Payments, Processors, & FinTech

If Software Is Eating the World… Payments Is Taking a Bite

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Payments, Processors, & FinTech
Table of Contents

The Credit Suisse Payments, Processors, & FinTech Top 44 Industry Themes

44 topics we expect to be top of mind for investors and industry participants

Global eCommerce & Software-led Payments

1. Global eCommerce as a key source of growth
2. Global eCommerce (and omnichannel) acquiring platforms
3. Checkout buttons/digital wallets
4. Increasing complexity in global eComm/Omnichannel
5. Fraud & chargebacks on card-based transactions
6. Software-led & integrated payments
7. Software platforms and broader embedded finance
8. Further rationale for software-enabled payments

NextGen FinTech Ecosystems

9. Continued consolidation and scaling of platforms
10. Open Banking expands to Open Finance
11. A2A payments gaining momentum with Open Banking
12. BigTech in FinTech, highlighting Apple's FinTech efforts
13. Unbanked and Underbanked opportunity for US FinTechs
14. P2P as a customer acquisition and engagement tool
15. Global remittance market innovation
16. FinTech driven credit
17. Buy-Now-Pay-Later (BNPL) offerings
18. FinTech-driven credit for merchants (micro & SMB lending)
19. Neobanks gaining scale as NextGen FinTech ecosystems

Drivers of Cash-to-Digital Conversion

20. "Push-to-card" payments unlocking new payment flows
21. Contactless payments
22. Loyalty & rewards becoming easier to spend
23. Long runway for card penetration in both EM & DM markets
24. Cross-border payments volumes
25. COVID-19 as a forcing factor

B2B/Corporate Payments

26. B2B payments coming of age
27. AP Automation transforming the traditional back office
28. Next leg of B2B payments puts SMB services in focus

Back-End Banking Innovation

29. "Faster payments" & "RTP" become more real
30. Concentration in traditional Issuer Processing market
31. Bank Tech outlook: shift to digital and consolidation
32. Modern Card Issuance platforms
33. The evolution of Banking-as-a-Service (BaaS) platforms

Regulation & Litigation

34. Two-Factor Authentication implications
35. Trends in global payments regulation
36. European payments regulation
37. US vs. international FinTech regulations and market dynamics
38. Bank Licenses for US FinTechs

Threats to Monitor for the Existing Ecosystem

39. Amazon's building blocks in Payments & FinTech
40. Alipay & WeChat expand acceptance beyond China
41. Cryptocurrency impact on the payments ecosystem
42. Decentralized Finance (DeFi)
43. Emergence of modern platforms in EM
44. National payment schemes, alternatives to V and MA

Return to Main Table of Contents

Payments, Processors, & FinTech coverage overview

Coverage organized by sub-group

Global payments networks	Merchant acquirers (including MSP, PSP, etc.)
mastercard, VISA	adyen, FIS, fiserv., globalpayments, PayPal, Square, Shift4 Payments, nuvei Payment Technology Network, Paysafe:, REPAY Realtime Electronic Payments, paya

SaaS & embedded finance	Bank technology	Money transfer	Risk & fraud solutions
shopify, lightspeed	jack henry & Associates Inc., meridianlink	WesternUnion WU, intermex International Money Express	riskified

Digital lending	B2B-related businesses & payments networks
ROCKET, affirm, loanDepot, SoFi	FLEETCOR, VERRA MOBILITY Safe. Smart. Connected., wex

Note: V, MA, AFRM, & SOFI are co-covered with Moshe Orenbuch;
RKT & LDI are co-covered with Moshe Orenbuch and Douglas Harter.

Payments, Processors, & FinTech company reports

Links to our initiations and other company-specific deep-dive reports

- Affirm (AFRM): A leading platform operating in a nascent and eCommerce-focused BNPL end market
- Adyen (ADYEN): Leading on all fronts
- Shopify (SHOP): Lightspeed & Shopify 2030 – Software platforms benefiting from embedding payments, additional financial services, and other commerce solutions
- Lightspeed (LSPD): Operating at the intersection of software and financial services
- SoFi (SOFI): A leading digital financial services platform & one-stop shop
- Nuvei (NVEI): Attractively positioned to benefit from global digital payments tailwinds
- Rocket Companies (RKT): Best-in-class technology platform driving a leadership position in the mortgage industry
- Visa (V) and Mastercard (MA): Expanding moats of the 4-party model
- PayPal (PYPL): The best way to win a fight…Is not to get into a fight
- Paysafe (PSFE): Positioned for success with vertical focus and attractive swimlanes
- Paya (PAYA): Middle-market focused integrated payments platform
- FleetCor Technologies (FLT): King of the cross-sell

- Jack Henry & Associates (JKHY): High-quality business with secular & idiosyncratic growth drivers
- Square (SQ): Square stands apart; ecosystem scaling
- Fidelity National Information Services (FIS): Accelerating at scale
- Fiserv (FISV): Scale begets scale
- Global Payments (GPN): In all the right swim lanes
- Western Union (WU): The traditional money remittance power
- WEX (WEX): Operating in attractive FinTech swim lanes
- Shift4 Payments (FOUR): Integrated payments player with idiosyncratic drivers over the medium term
- Riskified (RSKD): A leading chargeback protection provider operating in an attractive eCommerce end market
- loanDepot (LDI): “Home Means Everything”: Digital mortgage lending platform beginning to make inroads
- Verra Mobility (VRRM): Market leader in tolling payments processing and traffic safety solutions
- MeridianLink (MLNK): A leading SaaS-based lending & data platform
- Repay (RPAY): Integrated payments platform serving niche (but expanding) verticals
- International Money Express (IMXI): Focused competitor gaining share in important remittance corridors

Return to Main Table of Contents

Payments, Processors, & FinTech reports

Links to additional select company-specific reports

- V & MA: Evolving cross-border mix and path ahead; Faster growth & less cyclical end markets
- V: Thoughts on Amazon-related Visa Credit surcharges in Asia
- PYPL: Demystifying PayPal's business mix (take rates & transaction margins by TPV category); Updated TPV progression analysis
- PYPL: Venmo 2021 & Beyond: Anticipated monetization thesis begins to take hold
- PYPL: Thoughts on August 2021 US pricing updates
- SQ, ATP, & AFRM: SQ-APT additional analysis and read-through for Affirm; Accretion-Dilution model
- SQ: Decrypting Square's patent filings & job listings: Cash Network, wearable payment devices, and crypto; GPV progression update
- SQ: Management meeting takeaways (CFO & Co-Creator & Lead of Cash App); Pay with Cash App button beta progress
- SQ: Seller & Cash App ecosystem product-level detailed analysis
- SQ: Pay with Cash App; first signs of new offering via Cash by Cash App-enabled beta
- AFRM & AMZN: Partnership initial thoughts
- AFRM: Management meeting takeaways (with new details on Shopify partnership)
- GPN: Investor Day Recap
- FIS & GPN: Initial thoughts on reports suggesting merger talks; Accretion-dilution analysis
- GPN, FIS, & FISV: Detailed sub-segment monthly exit rate & progression analysis builds vs. intra-quarter data & commentary
- LSPD: Acquisitions of Ecwid & NuORDER

Credit Suisse Payments Innovation Event Series

Selection of event reports

Payment, Issuing, and Related

- Stripe
- Infinicept
- Rapyd
- Intersection of Software + Payments Panel Discussion
- Dwolla
- Sightline
- Ingo Money
- Finix
- TouchBistro
- Silverflow
- Global Processing Services (GPS)
- BlueSnap
- Railsbank
- PPRO
- NMI
- Stax
- Extend
- Sightline
- Payrix
- CardFlight
- Ingo Money
- Alloy
- Moov

Neobanks, Challenger Banks, and Related

- Chime
- Current
- Dave
- Novo
- Greenlight
- Neobank Panel (Dave, Varo, Revolut, & Atomic)
- Atomic FI

Open Banking

- Plaid
- Open Banking Discussion with Tink & Tribe
- Tink
- TrueLayer
- Open Banking Panel (11:FS & FDATA Global)
- GoCardless

Banking Technology

- BaaS Panel Synctera & Coastal Community Bank
- Nium
- Jifiti
- Finxact
- CO-OP Financial Services
- Bank CEO & COO Panel on Core Banking Technology (FIS, FISV, JKHY, Finastra, etc.)
- Finastra
- Synctera
- Apiture

B2B

- Demistifying B2B Payments Panel (Glenbrook Partners and Finexio)
- Cross-Border B2B Panel (Payoneer,Veem,& Currencycloud)
- Flywire
- Tipalti
- MineralTree
- Veem

Other Innovative Payments & FinTech

- "Demystifying Faster Payments" with Glenbrook Partners
- Finlync
- Stripe Sessions Keynote Address
- Jifiti
- MagicCube

Cross-Border

- Wise (formerly TransferWise) & Remitly
- Cross-Border Payments with FXC Intelligence

Payments, Processors, & FinTech coverage & ratings
Coverage by market cap

Ticker	Company Name	Market Cap ($b)	CS Rating	CS Target	Brief take on stock
V	**Visa**	$492b	OP	$285	US contactless rollout likely to benefit V to a greater extent vs. MA (due to mix); Emphasis on attracting new payments flows onto both card and non-card rails (Visa Direct + Earthport, efforts in both cross-border and B2B, acquisition of Tink); Evolving cross-border mix (mix shift to eComm, remittances, B2B, etc.)
MA	**Mastercard**	$346b	OP	$420	Higher exposure to faster growth international markets; Acquisitions (Vocalink, Transfast, Nets, Transactis, Finicity, Ekata, Aiia, CipherTrace) support multi-rail approach, B2B (Mastercard Track), and bill-pay (Mastercard Bill Pay Exchange); Evolving cross-border mix (mix shift to eComm, remittances, B2B, etc.)
PYPL	**PayPal**	$341b	OP	$315	Share gainer & eCommerce pure-play with a long list of nascent areas of upside (i.e., Braintree becoming more global, Venmo flipping to EPS boost [Pay With Venmo, Credit Card rollout], QR codes in-store, BNPL, cryptocurrency, partnerships [MELI, Uber], bill-pay, China, iZettle, Honey)
SHOP	**Shopify**	$189b	NEUTRAL	$1,700	Intersection of software + payments and the embedding of monetization- and ecosystem-enhancing financial services; Continued investments into Financial Solutions, Shop Pay and Shop App will help (1) alleviate some merchant pain points, (2) drive conversion, and (3) increase take rates
SQ	**Square**	$129b	OP	$300	Intersection of software + payments, "3x recycling"; Cash App adoption accelerated in 2020 via stimulus related Direct Deposit and a desire for mobile banking amid health risks; Seller ecosystem expansion upmarket alongside accelerating omnichannel offerings, setting up GPV recovery
ADYEN-NL	**Adyen**	$82b	OP	€ 2,950	Differentiated global single platform with large enterprise eCommerce exposure (89% 1H 2021 volumes) and clear share gainer within this swimlane offering superior runway for growth with the underpinnings of an embedded financial services offering in the works
FIS	**Fidelity National Information Services**	$77b	OP	$160	Expectation for accelerating topline in medium term; ~45% of merchant acquiring in global eComm & ISV; top 100 bank tech wins (existing and new) and cross-sell; Longer-term in-store expansion in new countries; Defensive banking and capital markets segments (recurring revenue)
FISV	**Fiserv**	$75b	OP	$135	Acceptance segment should benefit from an improving mix toward its four "crown jewel" businesses: Clover, ISV (CardConnect), eCommerce, and International; medium-term guidance (2022-2023) suggests a runway ahead for +7-9% internal revenue growth and +15-20% EPS growth
GPN	**Global Payments**	$49b	OP	$225	Amongst scaled incumbents, highest relative exposure to the fastest growing channels (owned & partnered software, global eCommerce/omnichannel with local support in 39 markets); improving technology-enabled mix (potential for ~75% medium-term); Leading credit issuer processor via TSYS
AFRM	**Affirm**	$39b	NEUTRAL	$105	BNPL platform catering to a wide range of order values in a large (~$1tr+ US eCommerce & Online Travel) and expanding (e.g., Split Pay, debit card, international, etc.) addressable market, with a long list of areas for potential upside (Shop Pay installments, Amazon, debit card, etc.)
RKT	**Rocket Companies**	$33b	NEUTRAL	$19	First mover to a fully online mortgage platform and share gainer (~5% in 2018 to ~10% CSe by 2022E) within a large TAM (~$2-3tr US mortgage market), with leadership supported by its tech platform (enabling its partner network) and industry-leading recapture rates
FLT	**FleetCor Technologies**	$22b	NEUTRAL	$275	Fuel, Corporate Payments, Lodging, & Tolls all recurring revenue, high margin, network effects, similar distribution; Best at cross-sell & accretive M&A ("Beyond Fuel" latest example); Historically a LDD organic ex-FX topline grower
LSPD	**Lightspeed Commerce**	$18b	OP	$115	Intersection of software + payments/financial services servicing complex merchants (large global TAM from ~8mm SMBs), with continued penetration of Lightspeed Payments the key growth driver for revenue and gross profit given its early stage relative to similar platforms (e.g., Square, Toast, and Shopify)
NVEI-TSE	**Nuvei**	$18b	OP	$145	Operating in attractive swim lanes (~85% eCommerce/CNP volume) with exposure to less competitive niche verticals (e.g. online gambling, gaming, regulated FX trading) and a willingness to customize offerings; 30% medium-term top-line growth with ~50% longer-term EBITDA margin

Source: Company reports, FactSet, Credit Suisse estimates

Payments, Processors, & FinTech coverage & ratings (cont.)
Coverage by market cap (cont.)

Ticker	Company Name	Market Cap ($b)	CS Rating	CS Target	Brief take on stock
SOFI	**SoFi**	$14b	NEUTRAL	$16.50	One-stop shop for digital banking services with ~2mm+ members (cumulatively) appealing first to the High Earners Not Well Served (HENWS) income bracket, with ARPU higher than most digital banks due to different loan offerings; Galileo bank technology/issuer processing a broader bet on Neobank industry
JKHY	**Jack Henry & Associates**	$13b	NEUTRAL	$170	Highly resilient financial model with ~85%+ recurring revenue from LT contracts enabled by sticky customer relationships, but we're mindful of the consolidation among customer base and Neobanks pressuring incremental account additions and transactions for core providers longer term
WU	**Western Union**	$9b	UP	$23	We continue to believe that while WU will benefit from certain sustainable competitive advantages (established brand, compliance infrastructure, global scale, and digitally initiated & retail payout capabilities), it has fewer competitive moats online (vs. traditional in-store)
WEX	**WEX**	$8b	NEUTRAL	$210	Bullish on the underlying businesses (including potential for accretive M&A ahead), but we remain neutral given a relatively balanced risk-reward profile and reasonable valuation; More defensive revenue streams in Healthcare and Corporate (ex-Travel) segments
FOUR	**Shift4 Payments**	$7b	OP	$100	An integrated payments pure play with a two-pronged growth algorithm driven by gateway volume conversion opportunity and ~900bps margin expansion (on net revenue) expected from 2019-2024E; Potential upside from 3dcart (Shift4Shop), VenuNext, and launch of Next Gen restaurant POS
PSFE	**Paysafe**	$6b	OP	$12	Global payments provider focused on eCommerce and integrated solutions; Growth in the US online gaming market (~$30b in 2025E) presents upside potential given relationships with top online gambling operators; Skrill US launch presents potential upside in digital wallet business
RSKD	**Riskified**	$5b	OP	$34	A modern eCommerce risk management platform focused on offering enterprise-level merchants with its core Chargeback Guarantee, with 4 nascent products providing call options; regarded as one of the best providers among competitors in a large, fast-growing end market with low penetration
VRRM	**Verra Mobility**	$3b	OP	$18.50	Positive on the moats and sustained mid-single digit+ growth (guidance Government +2-4%, Commercial +6-8%, + boost via M&A, Europe, and new initiatives); View Redflex acquisition positively with expansion to AUS and EU as well as expected cost and revenue synergies
LDI	**LoanDepot**	$2b	OP	$15	Digital mortgage lending platform; Stands out relative to competition with less exposure to the volatile refinance market (~30-50% purchase vs. ~15-30% for RKT) and its high-powered machine learning platform (mello®)
RPAY	**Repay**	$2b	OP	$30	Integrated payments in niche lending verticals; Increasing debit penetration in core verticals, adding verticals, new merchants & ISV partners as drivers (organic ~mid-teens + M&A, e.g., B2B and Healthcare); Ongoing mix shift toward B2B vertical (particularly following acquisition of BillingTree)
MLNK	**MeridianLink**	$2b	NEUTRAL	$27.50	Leading provider of lending, credit data, & account opening SaaS solutions with ~27% market share of ~4,900 mid-market financial institutions, set to continue to gain share and deliver LDD organic revenue growth over the medium-term supported by a large TAM
PAYA	**Paya**	$1b	OP	$14	Integrated payments platform with expansive TAM and nascent drivers; Estimated ~$1tr TAM of US card volumes across its five verticals ($400b via B2B) which can generally be characterized by high-dollar value transactions
IMXI	**International Money Express**	$1b	NEUTRAL	$18.50	Operates within a large TAM, share gainer, and numerous nascent initiatives (Africa, Canada, white labeling with Latin American banks, GPR cards); Mexico & Guatemala concentration (volatile data/end-market), two of strongest corridors globally (US-MEX largest corridor globally); Threat posed by digital competitors

Source: Company reports, FactSet, Credit Suisse estimates

Payments, Processors, & FinTech coverage overview

Top pick: Square (SQ) large-cap growth at intersection of software + payments

Top Pick	Rationale	Catalyst Path
Square	▪ Intersection of software, payments, and additional embedded financial services, with two ecosystems (Seller & Cash App) having the ability to launch and quickly scale new products (leading to estimates almost always being too low, almost by definition). ▪ Continued Cash App user base mix shift toward Cash Card users and direct deposit accounts, alongside increasing inflow limits & methods and a sustainably lower CAC level driven by P2P (and Boost, Bitcoin, stock investing, etc.). ▪ "Horizon three" related Cash & Seller ecosystems collaboration, with recent loyalty rollout as an early example; Expect Boost to become at least partially funded by merchants [Square Sellers in particular] over time, along with Pay with Cash App optionality. ▪ Seller ecosystem transitioning further upmarket (sales personnel investment), increasingly internationally (recently Ireland, France), and to eComm & omnichannel offerings (attracting larger-than-expected 2020 new cohort). ▪ SMB digital banking to be an increasingly important theme (Square Checking, Square Savings, Square Card and associated bill-pay/AP, treasury services, existing payroll, software, etc.); aligned with ecosystem and fast access to funds themes. ▪ Afterpay acquisition (announced August 2021) to bolster the size, growth rate, and diversification of gross profit streams, with potential for meaningful synergies (e.g., large seller mix for Square, smaller seller mix for Afterpay, additional Afterpay users via Cash App base, processing cost savings, international expansion, etc.).	▪ Afterpay integration (Seller & Cash App) ▪ Bolstering SMB digital banking offering ▪ Pay with Cash App beta progress ▪ Direct deposit traction within Cash App user base (i.e., via Credit Karma Q1 2021, marketing efforts, Boost, etc.) ▪ New fund inflow methods and higher inflow limits ▪ Further progress in expanding eCommerce & omnichannel platform ▪ Consumer Credit offerings (Cash App Borrow beta) ▪ "TBD" DeFi platform

Added Highlights	Rationale	Catalyst Path
PayPal	▪ Near pure-play on eCommerce, with a ~$6tr "True TAM" inclusive of global eCommerce, eTravel, eFood delivery, eTicketing, ride-sharing, streaming, etc. – supports persistence of growth and annual compounding, alongside being a rare large cap with a ~20% revenue CAGR forecasted (and guided) over a five year period, a ~15% user CAGR (growth to ~750mm), TPV CAGR of 25%, and potential for upside from both take rate stability and capital allocation. ▪ New service offerings, including prospects for high yield savings, investing capabilities, bill-pay, subscription management, budgeting, shopping via Honey, alongside already well developed core offering. ▪ Added areas of potential upside (long list of "call options"): QR Code in-store, BNPL, Cryptocurrency trading & transactions (lower cost of funds), Business Profiles, Pay With Venmo, Venmo Credit Card, Bill-pay (Paymentus), Braintree (local acquiring, APM/LPM, omni), Japan (via Paidy), Zettle (further offline omnichannel opportunity), new marketplace signings, emerging markets investments (Uber, MercardoLibre, GoPay), engagement (Pay with Rewards), and Honey.	▪ Venmo-related (Pay with Venmo, International, etc.) ▪ Revenue acceleration in Q4 & 2022 ▪ Pay in 4 (BNPL) data points ▪ Braintree becomes more global ▪ US In-store expansion opportunity (Zettle to US, QR code, etc.)
Lightspeed Commerce	▪ Lightspeed is operating within what we believe will be one of the most important themes within our coverage over the coming ~5-10 years – embedded finance. ▪ Lightspeed is not only capable of enabling complex merchants to run their businesses, but also in embedding and powering additional ecosystem- and monetization-enhancing financial services such as payments, instant payouts, lending, card issuing, banking & treasury services, and more (e.g., payroll, AP automation, insurance). ▪ Recent acquisitions (Ecwid & NuOrder) highlight opportunity underlying connecting suppliers, merchants and customers within specialized verticals where they have achieved leading market positioning.	▪ Supplier network strategy realization ▪ Payments business penetration updates ▪ ARPU expansion via payments, capital (lending), and additional financial services offerings yet to be launched ▪ Integration of Ecwid & NuOrder

Source: Company reports, FactSet, Credit Suisse estimates

Return to Main Table of Contents

Payments, Processors, & FinTech coverage overview

Additional highlighted Outperform rated stocks

Added Highlights	Rationale	Catalyst Path
Visa	▪ Slight preference for Visa given outsized (vs. MA) benefits from a US recovery and contactless (supportive of transactions & yields), increased mix of value added services (driven by eCommerce and other CNP transactions), high levels of renewals completed ~2 years heading into COVID (~55% of book vs. ~40% expected, suggesting stabilization in FY 2022), and prospects for stabilization in European share (ex-UK, where debit share is decreasing off of high levels). ▪ Evolving cross-border mix, shifting toward eCommerce, marketplace payouts, remittances, and cross-border B2B, all of which are faster growth and less cyclical vs. a mix of ~2/3rds travel pre-COVID. ▪ Valuation attractive vs. MA, but also vs. pre-COVID levels, despite interest rates and an improved cross-border mix (a cross-border business that is now deserving of a higher multiple given potential for improved durability of growth ahead).	▪ Cross-border (leisure focus) travel recovery and new category growth (remittances, marketplaces, B2B, etc.) ▪ Progress in US contactless Remittances & marketplace payouts ▪ Regulatory resolution (US debit)
Nuvei	▪ Medium-term growth targets of ~30%+ CAGRs on both revenue & EBITDA, alongside expectations for longer-term EBITDA margins to ramp into the ~50%+ range. ▪ Continues to invest behind expanding its sales teams alongside an attractive volume mix of ~80-85% eCommerce/CNP with exposure to niche (and less competitive) verticals (e.g., online gaming, financial services, social gaming, etc.). ▪ Local acquiring capabilities (now ~45 markets vs. ~35 end 2020), and acceptance of ~480 APMs (vs. 455 end 2020). ▪ Upside potential via accretive M&A (including more recent deals Mazooma & Simplex).	▪ US listing ▪ Continued bolt-on M&A ▪ Any added granularity on ~30% growth CAGRs (end-market, existing merchant share gains, new merchant wins, etc.)
Global Payments	▪ Among scaled incumbents, highest relative exposure to the fastest growing channels (2021E) of the large cap merchant acquirers: 1) ~27% owned software; 2) ~20% partnered software; and 3) ~20% International, with leading on-the-ground support in ~38 markets. ▪ Also ~27% eCommerce & omnichannel business (inclusive of a portion accounted for within owned & partnered software). ▪ Leading credit issuer processor with dominant share in the US, UK, Ireland, Canada, and China (~MSD+% growth vs. industry +3%); TAM expansion via AWS partnership (smaller issuers & FinTechs).	▪ M&A (high-growth dilutive, slower-growth accretive, and/or compelling rationale for a larger transaction to further scale) ▪ Market shift toward GARP vs. longer duration assets ▪ Additional B2B progress (via MineralTree)
FIS	▪ Prospects for +7-9% organic topline (total company) through 2024E with "staple-ish" and majority recurring revenue (largely SaaS billing structure); Banking and Capital Markets segments providing a stable base (combined for ~70% of revenues). ▪ Banking segment growing ~HSD revenue 2H 2021 (i.e., supported by top 100 bank and other large client wins). Continued wins (remaining ~2/3rd of top 100 US banks) and cross-selling (lending modules) provide a pathway for persistent growth. ▪ Worldpay business with high exposure to eCommerce & integrated payments (~half of acquiring business pre-COVID), alongside prospects for volumes and revenues to return to more normal patterns (i.e., recovery of SMB, travel, transaction size reduction, etc.); US iGaming opportunity - high market share in vastly expanding TAM.	▪ Continued Banking client wins in the top 100 US bank opportunity (a TAM less addressable to Fiserv and others) ▪ Potential M&A (either large scale and/or bolt-on acquisitions) ▪ Yield recovery in merchant acquiring

Source: Company reports, FactSet, Credit Suisse estimates

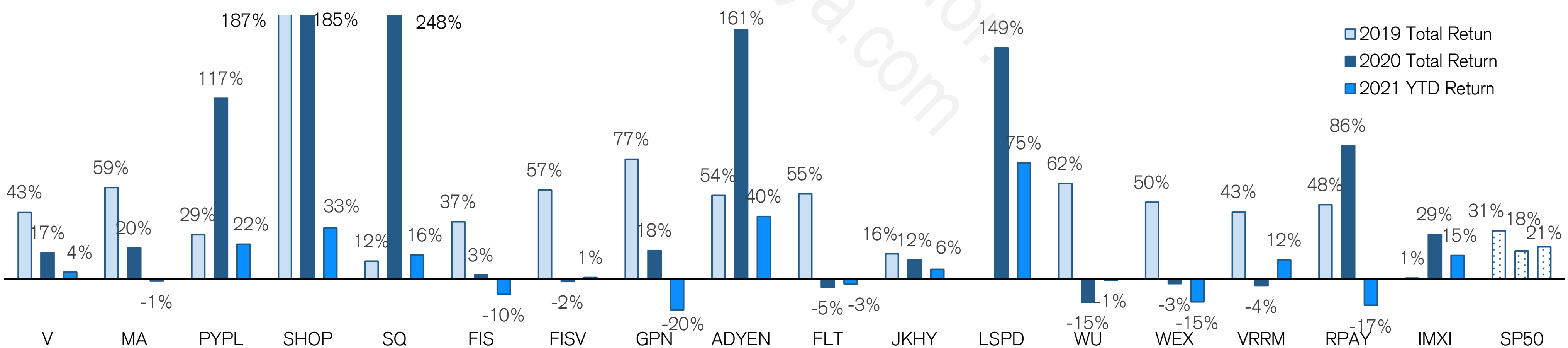
Return to Main Table of Contents

1H 2021 recap…

COVID-19, continued M&A, IPOs & SPACs, FinTech scaling

1H 2021 saw continued COVID-19 forcing factors and the beginnings of a recovery from the pandemic (albeit Delta variant limiting some re-openings and travel), continued M&A, numerous IPOs & SPACs bringing more companies public, alongside continued scaling of FinTech platforms

COVID as a forcing factor, and beginning to understand the new normal	▪ The initial move to increased digital commerce and activity continued as eCommerce & omnichannel payments and in-store contactless (via both contactless cards and digital wallet offerings, QR codes, etc.) took center stage. ▪ Neobanks brought on large cohorts of customers via digital onboarding due to continued restrictions. ▪ Now consumers and businesses around the world are faced with restrictions which vary by country, state, municipality, and are being forced into an unknown “new normal” where many governments move toward full domestic re-openings, continue to grapple with cross-border restrictions and large scale vaccination efforts.
Numerous IPOs (traditional & SPAC)	▪ Multiple payments IPOs including AFRM, LDI, COIN, PAY, MQ, RISK, MLNK, HOOD, DLO, FLYW, BLND, MLNK, RSKD and others, alongside notable companies that became (or are agreed to) public via SPAC including PSFE, SOFI, BTRS, PAYO, Acorns, Dave, Apex, eToro, Grab, MoneyLion, OppFi, etc.
Notable M&A	▪ SQ announced acquisition of APT and GPN-FIS explored a merger (according to press reports) but ultimately failed. ▪ Numerous additional acquisitions such as Ecwid, NuOrder, and Vend acquired by LSPD; Tidal acquired by Square; Ekata, Aiia, and CipherTrace acquired by Mastercard; Tink acquired by Visa (pending); VenueNext acquired by FOUR; Zego and MineralTree acquired by GPN; Pineapple Payments acquired by FISV; Simplex, Mazooma, Paymentez, and Base Commerce acquired by Nuvei; Nutmeg acquired by JP Morgan; BillingTree acquired by RPAY; Divvy acquired by BILL; Returnly acquired by Affirm; Roger by FLT; and Paidy by PYPL.
Premier private FinTechs scale their platforms	▪ Financing rounds and increasing valuations, including Stripe (~$95b), Klarna (~$46b), Revolut (~$33b), NuBank (~$30b), Chime ($25b), Checkout.com (~$15b), Plaid (~$13.4b), Brex (~$7.4b), Toss (~$7.4b), Mollie ($6.5b), Trade Republic (~$5.3b), Blockchain.com (~$5.2b), TripActions (~$5b), Chainalysis (~$4.2b), Ramp (~$3.9b), Pine Labs (~$3.5b), Cedar (~$3.2b), Razorpay (~$3b), BlockFi (~$3b), Forter (~$3b), BharatPe (~$2.9b), Airwallex (~$2.6b), Paxos (~$2.4b), Greenlight (~$2.3b), Bunq (~$.1.9b), Pleo (~$1.7b), Signifyd (~$1.3b), Feedzai (~$1b+), PPRO ($1b+), Sightline ($1b+), GoCardless (~$970mm), 10x Future Technologies (~$700mm), SumUp, (~$895mm in debt raised), Truelayer (raised an additional $70mm), and many more.



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Source: Company reports, FactSet, Credit Suisse research, WSJ, Reuters, TechCrunch

…and expectations into 2H 2021 and early 2022
digital distribution and scale still at forefront during COVID recovery

Some of our expectations for 2021 and early 2022 include a continued emphasis on M&A (consolidation due to increasing importance of eComm & omnichannel, software-distribution, and local acquiring on a global basis), embedded finance & BaaS platforms taking center stage, Neobanks continuing to scale, and increasing efforts/partnerships by BigTech in FinTech

Continued consolidation within merchant acquiring	▪ Scaled players continue to consolidate the ~150-200+ sub-scale merchant acquirers, PSPs, & ISOs that are more local/regional/bank-based, in part due to increasing complexity (merchant demands, global local acquiring, regulation, etc.).
eComm & Omni and Software-platform-led Payments	▪ Continue to believe eCommerce & omnichannel and software/platform-led payments are the two swimlanes that will drive the vast majority of the growth within our sector (with an even greater concentration post-COVID).
Embedded finance & BaaS platforms take center stage	▪ Continued expansion of software platforms beyond payments (e.g., Stripe enabling software platforms to embed financial services "beyond payments" such as issuing, loans, digital bank accounts, payouts, etc. – all via its broader commerce enablement platform). ▪ Integrated payments increasingly becomes a single prong within a broader financial services distribution effort for software platforms.
Neobanks gaining share (accounts, transactions, increased primary account status, additional cross-selling)	▪ Neobanks to continue scaling and increasing primary account status (emphasis on payroll direct deposit). ▪ Expect further rollout of cross-selling and monetization strategies (e.g., secured credit cards, credit cards, personal lending, insurance, tax prep, high yield savings accounts, and more) as Next Gen bank tech infrastructure companies lower barriers to entry while making Neobanks increasingly competitive with traditional FI's.
Increasing focus from and partnerships with BigTech	▪ We expect follow through in 2021 predicated on partnerships and efforts initiated during 2020 (e.g., Google Pay expanding, including the launch of Google Plex checking accounts alongside 11 traditional bank partners, etc.); to that point, we expect a meaningful increase in the number of partner banks enabled to support FinTechs (via platforms such as Synctera and others). ▪ Further examples we expect to scale include: Facebook Shops, Instagram Shopping, WhatsApp Payments, etc. (noting PayPal is a key partner to Facebook's platforms), while we continue to monitor any further moves by Amazon (including its partnership with Affirm).
Growing importance of Open Banking and bank-initiated (A2A) payments, beginning in Europe	▪ We saw Mastercard acquire Finicity in 2020 (and later Aiia in September 2021) and Visa agree to acquire Plaid (which ultimately did not happen) and then agree to acquire Tink in June of 2021 – we believe emphasis on acquiring these technology stacks shows that the networks believe bank-transfers can be a viable competitor to traditional debit card spending. ▪ We expect these types of solutions to have more impact in Europe due to PSD2, higher penetration of Local Payment Methods (LPMs), and higher relative debit card usage (when compared to the US, which is credit-heavy due to unregulated credit interchange).
BNPL to become increasingly commoditized	▪ We are already seeing evidence of numerous "copycat" BNPL providers springing up around the world following the rapid growth of non-bank providers Afterpay, Affirm, and Klarna, garnering sizable valuations (~US$29b, ~$45b, and ~$46b, respectively). ▪ Questions around extent to which installment sales are "incremental" (i.e., a consumer would have abandoned their purchase); We think there is a degree of defensibility to players with scale, a high touch consumer facing application, or robust underwriting and machine learning models.

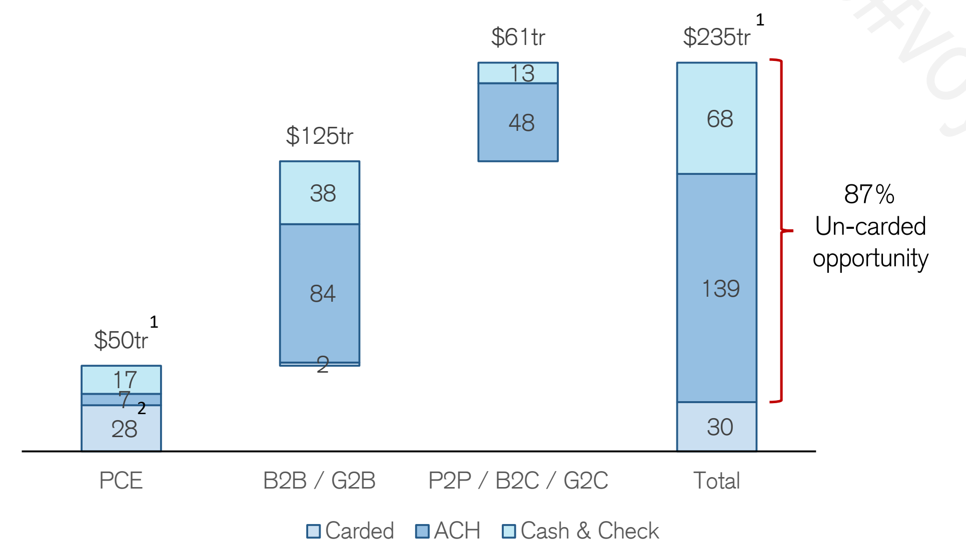
Source: Company reports, Credit Suisse estimates.

Global payments volume TAM is bigger than global GDP

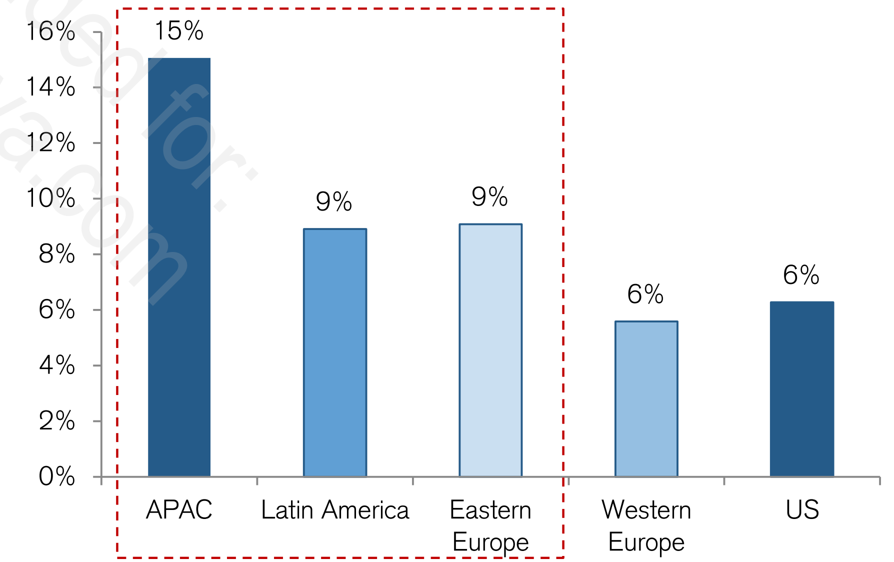
First ingredient to an investment thesis…

- Entire coverage universe is in some way exposed to secular trends toward digitization of payments.
- Global payments volume (~$240tr in 2018) is bigger than global GDP (~$85tr in each of 2018-20) because multiple payments are made for the same level of output or production.
- While a meaningful opportunity remains in the US and Europe, faster-growth markets are in Asia-Pacific, Latin America, and parts of Central/Eastern Europe.

Global payments TAM (total addressable market), across carded, ACH, and cash & check totals to ~$240tr+, with only ~15% carded



Total card volume (Visa, Mastercard, and numerous local schemes) are expected to deliver ~6-15% CAGRs (2020-2024E), with APAC, Latin America, and Eastern Europe as faster-growth geographies



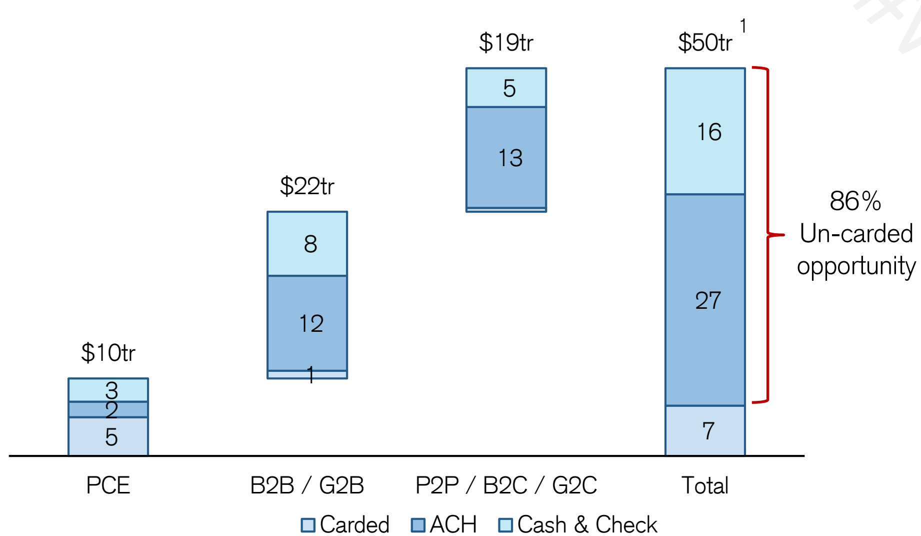
Source: Mastercard, Euromonitor, Credit Suisse estimates
(1) Includes $12T of non-purchase consumption; (2) Includes $13T of non-PCE card purchases in China

US Payments addressable market

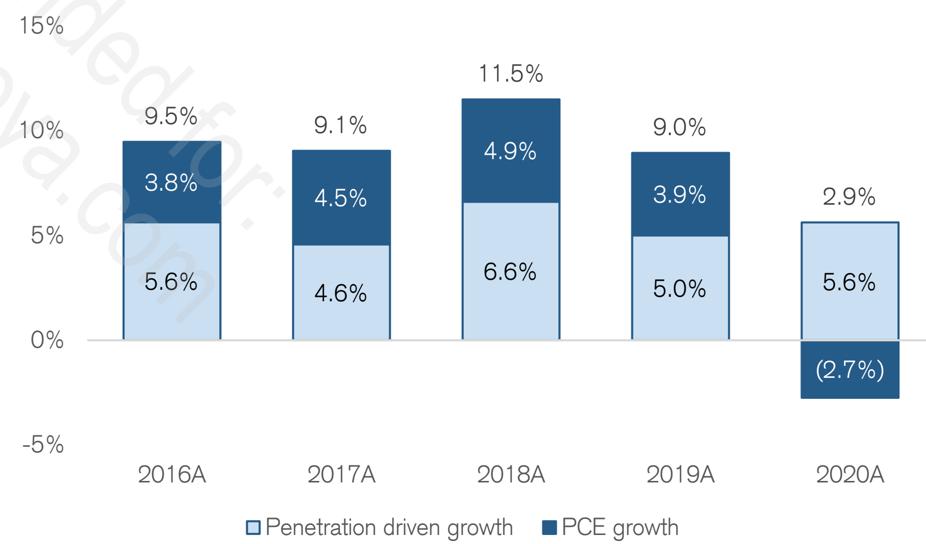
Large TAM driven by PCE growth + cash-to-card conversion

- Our industry model (card volumes/penetration vs. adjusted PCE + cash-to-card penetration) suggests continued HSD volume growth (~25% growth during 2021E given easier compares) should persist through at least 2023.
- We model Visa & Mastercard US volumes combining for ~63% of adjusted PCE by 2023E (vs. ~52% in 2020).
- Our confidence is driven by nascent TAM-expansive payment flows beyond traditional consumer-to-business retail payments (i.e., beyond PCE), particularly push-to-card (priced to attract interchange-sensitive payment flows) and B2B.

The US payments market has a large TAM, estimated at ~$50tr+ in volumes when viewed in its entirety (PCE, B2B, G2B, P2P, B2C, and G2C), with ~50%+ of consumer payments penetrated and ~5% of B2B



Our industry model is built based on a combination of US PCE growth + cash-to-card penetration increases; we note that V & MA combined represent ~70-80% of US volumes



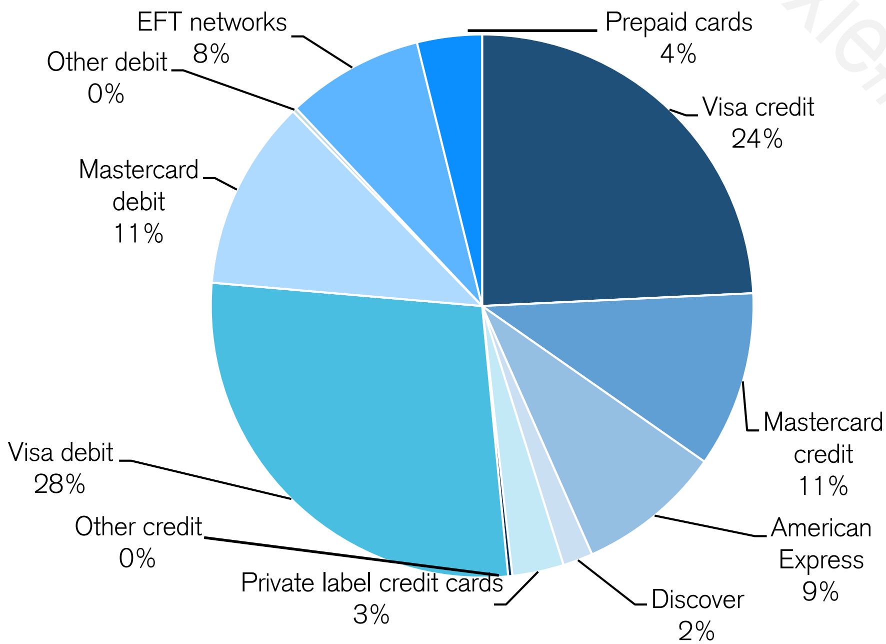
Source: Company reports, Mastercard September 2019 Investor Day, FactSet, the BLOOMBERG PROFESSIONAL™ service, Euromonitor, Credit Suisse estimates. There are rounding differences in both B2B and P2P bars in US TAM graph
(1) Chart represents 2018 US market size by payment flow

US Payments market revenue pools

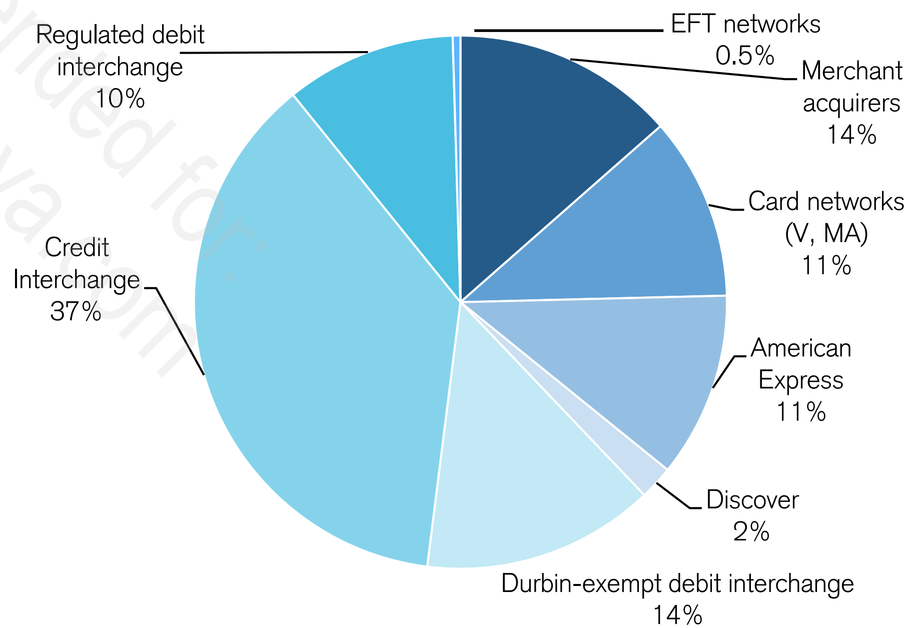
Merchant discount rate components (opportunity for acquirers, networks, & issuers)

- US payment card volumes are ~$8tr in total, with the vast majority touching Visa and/or Mastercard networks.
- Visa and Mastercard are not the largest revenue beneficiaries though – banks are (the card issuers themselves), with card issuers earning interchange on each transaction equivalent to ~130bps on average (vs. Visa and Mastercard earning network yields that come to roughly ~26bps inclusive of cross-border premiums).
- Additional revenue opportunities include software, working capital, payroll, issuer processing, security, loyalty, etc.

Visa and Mastercard-branded card make up more than 70% of all US payments volumes (credit, debit, prepaid)…



…but card issuing banks (which earn interchange) earn the majority of revenue made on a given transaction (excluding interest income)



Source: Company reports, The Nilson Report (2020 US purchase volume for four major card networks. Prepaid, EFT, Private and Other is CSe 2020E), The Federal Reserve, Credit Suisse estimates, EFT networks exclude Interlink and Maestro

Return to Main Table of Contents

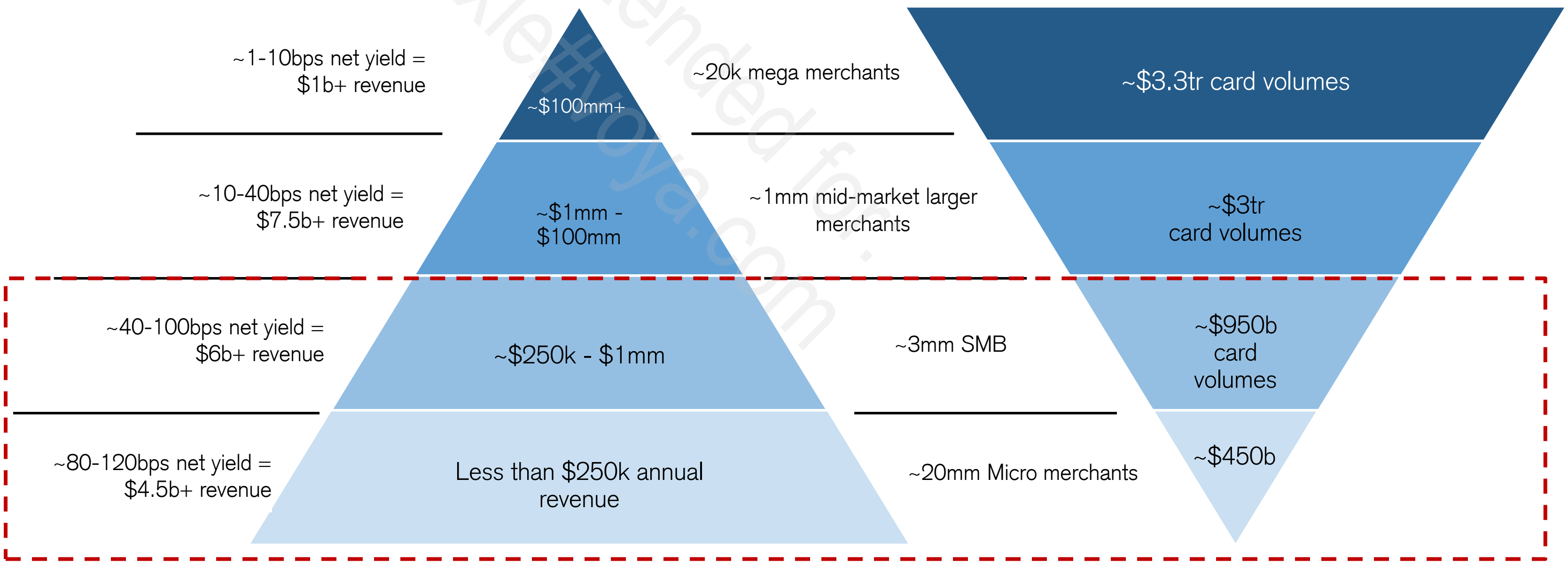
Merchant Acquiring: SMB is where the money is at

SMB segment ~18% of volumes, but ~55% of revenue in US market

- Often operate with bundled pricing models, with simple, rack-rate pricing (e.g., 2.6% + $0.10 for Square), which when combined with scale and interchange optimization, can result in net revenue yields ~40-140bps (vs. low-single-digit yields for large merchants).
- Less likely to be commoditized with bundling of vertical software embedded into operations.
- SMB merchant attrition is higher; ~20% of micro merchants fail per year[1] vs. LSD for larger merchants.
- Opportunity to expand beyond payments (e.g., capital/lending, payroll, tax preparation, card issuing, treasury & banking services, CRM/marketing tools, etc.).

~$7.7tr in US card volumes (2020A), of which ~$1.4tr is from SMB and micro merchants, which despite making up just ~18% of volumes, account for ~55% of the acquiring/processing revenue opportunity

"…First of all, we stick to our knitting and we focus really on SMBs in a given country. So as good a company as Amazon is, we're not interested in Amazon, right? So for us to be a commoditized provider…no contracts, 30-day outs, no minimums, no service, low fee. Why is that interesting?"
– Jeffrey Sloan, CEO, GPN (May 15, 2019)

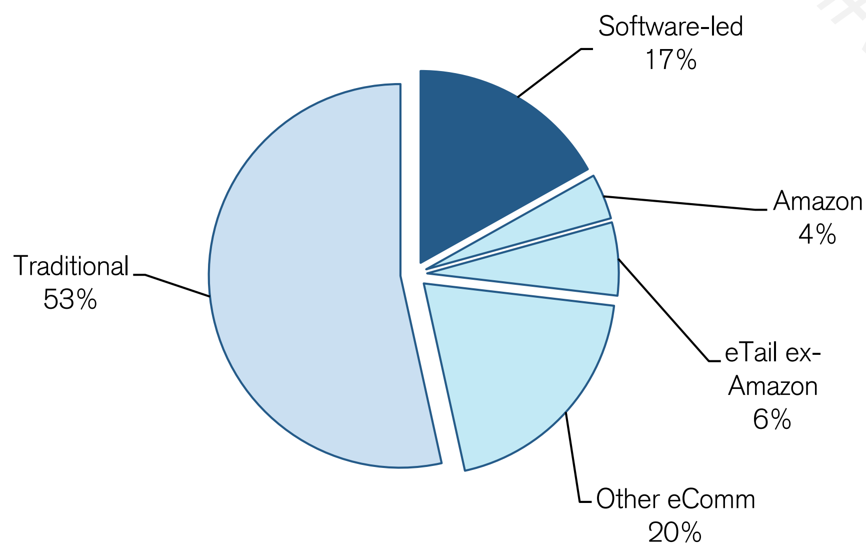


Merchant Acquiring: Software & eCommerce fast-growth channels

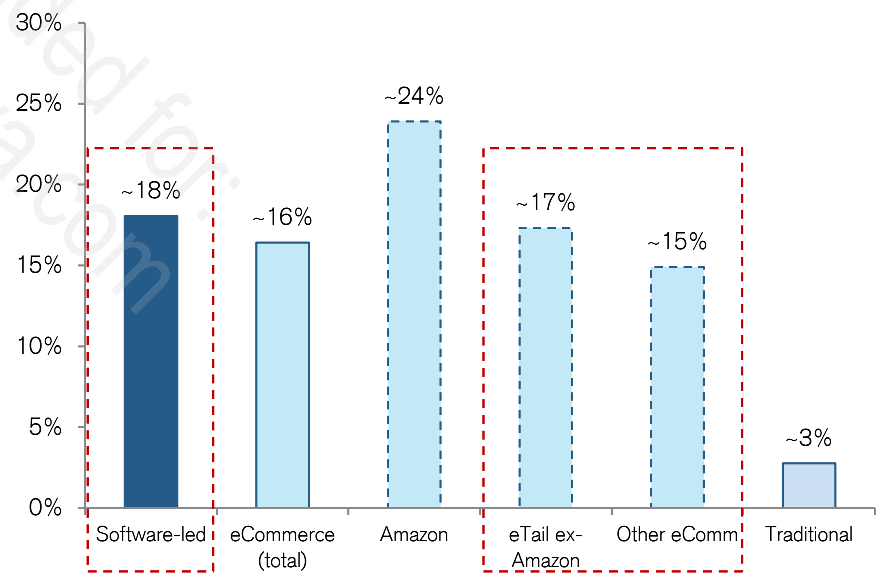
Want exposure to companies positioned to deliver tech-enabled payments

- Technology-enabled payments (software-led and eCommerce-related channels) is not a new trend, but it remains a powerful one, with software-led channels and eCommerce ex-Amazon growing ~6x+ the overall market (and meaningfully faster than traditional in-store payments).
- Share gainers will be payment providers with the best exposure to these channels (own the technology to serve, with business mix skewed toward these faster-growth swim lanes, along with the scale and resources required to keep up with increasing complexity and competition).
- Amazon makes up ~40% of US retail eCommerce (and ~50%+ of growth), a portion of payments that is less addressable for the majority of payments companies and with the lowest unit economics for acquirers – for this reason, we separate the remaining portion of eCommerce, which we define as eTail ex-Amazon (i.e., retail eCommerce for SMB and non-Amazon merchants) and other online commerce (e.g., eFood delivery, ride-sharing, online travel, etc.).
- Further, a large portion of the remaining eCommerce volume runs through marketplaces (60%+ of eCommerce globally) and multinational companies (e.g., Uber, Netflix), placing additional emphasis on global & cross-border eCommerce & omnichannel capabilities for merchant acquirers.

We estimate that US payments volumes are ~53% traditional, with ~17% software-led (SMB-focused) and ~30% eCommerce-related (across Amazon and other non-Amazon online channels)



Software-led payments (~6x+ traditional industry growth rates) and eCommerce are the most attractive verticals in the US market – 2019-2023E CAGRs below



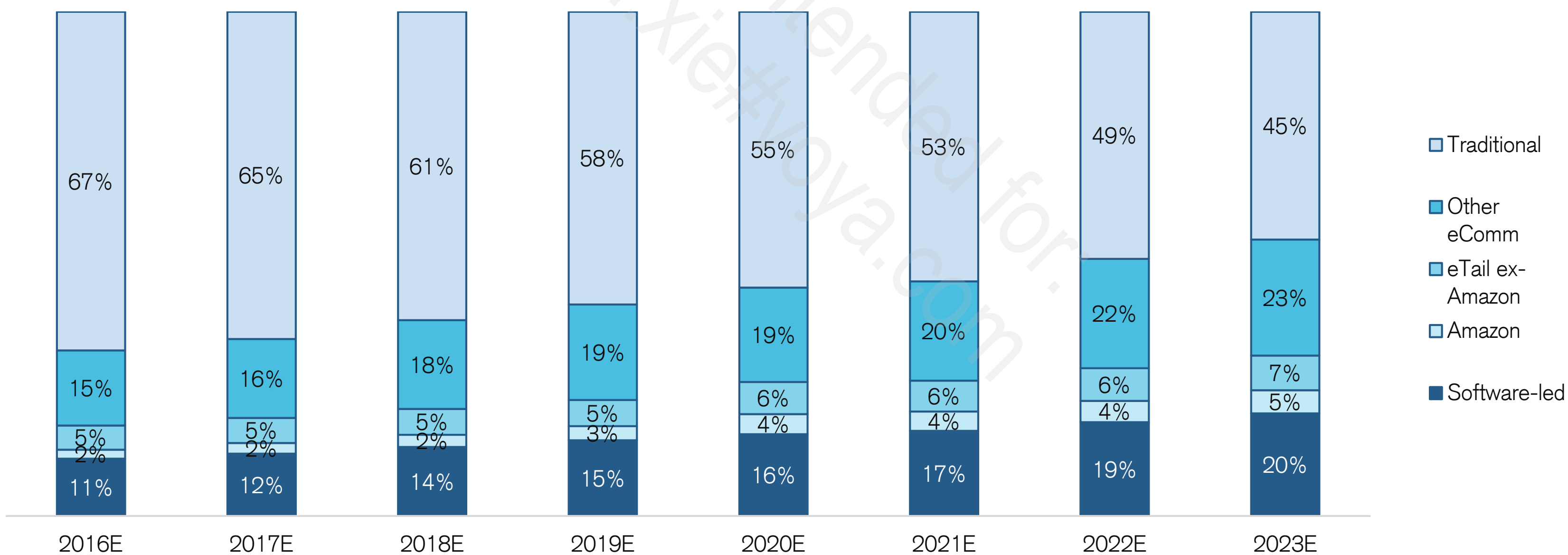
Source: Company reports, US General Purpose Card Volume from The Nilson Report for 2018 base, and 2019E represents Credit Suisse estimates, BCG, AZ Payments, eMarketer, 2019 Federal Reserve Payments Study, Shopify, Digital Commerce 360; Software-led defined as integrated payments sold through owned or partnered software platforms typically to small or medium-sized businesses.

Merchant Acquiring: Software & eCommerce fast-growth channels

Most attractive swim lanes in the US are Software-led & eComm ex-Amazon

- We expect the majority of all growth in the US payments market will accrue to Software-led and eCommerce channels (we note the increasing importance of omnichannel capabilities capturing this growth).
- We forecast traditional payments (i.e., in-store SMB direct and/or large merchant contracted separately) to cede ~13% share by 2023E (off a more normalized 2019 base), with roughly half benefiting software-led channels (i.e., owned software-led platforms like Square and ISV-partnered integrated payments; gaining ~5%, going from ~15% to ~20% share) and the remainder going to eCommerce payments channels (gaining ~8%, going from ~27% to ~35%).

Our US payments market estimates suggest that traditional payments, which still make up the vast majority of all volumes, will cede share to software-led channels (i.e., owned & ISV-partnered) and eCommerce (including digitized payments outside retail)



Source: Company reports, The Nilson Report, BCG, AZ Payments, eMarketer, Credit Suisse estimates

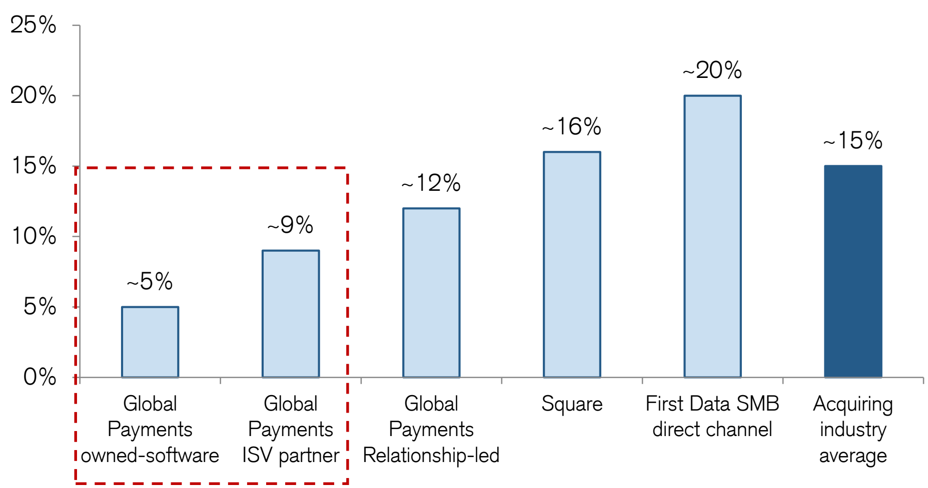
Merchant Acquiring: Software-led in two flavors – owned and partnered

Both support SMB access, cross-selling opportunities, and reduced attrition

- Results in a highly recurring revenue stream with reduced attrition, and the potential for higher margins (i.e., distribution leverage – "acquire the merchant once, sell the merchant many times", including additional ancillary products and services such as working capital loans, payroll processing, invoicing, etc.).
- Payments and vertical software companies often strive to work with the same underlying merchants (SMB and mid-market, higher net revenue yields vs. larger merchants).
- Makes sense for payments and software to work together given payments data is valuable for decision making and planning (customer preferences, inventory planning, cash flow management), making the offering less commoditized.

> *"…as we drive deeper into software & more integrated, the attrition fundamentals…are significantly better…once you're tied into the underlying software environment…it's hard to see people leaving…but I think to say those channels are in the single digits is probably a good estimate of where we see attrition rates in the sort of integrated and sort of the owned software markets."*
>
> *– Cameron Bready, CFO (currently COO), Global Payments (March 2018)*

Platforms that combine payments + software (both owned and ISV partnered approaches) benefit from meaningfully reduced attrition, particularly impressive given SMB skew of these channels



We estimate nearly 40% of Square's Seller revenue will come from additional seller services (e.g., Capital, payroll, Instant Deposit, Business debit, additional paid software, online store, etc.) by 2023E

CREDIT SUISSE Source: Company reports, Credit Suisse estimates

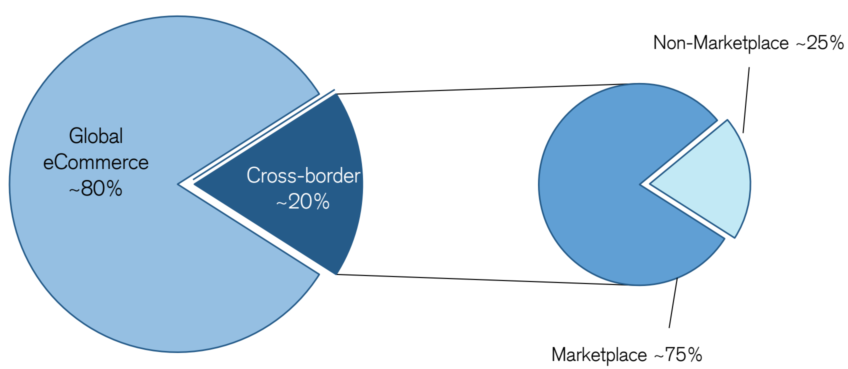
Merchant Acquiring: eCommerce & Omnichannel drive share gains

Increasing consolidation of relationships around fewer scaled platforms

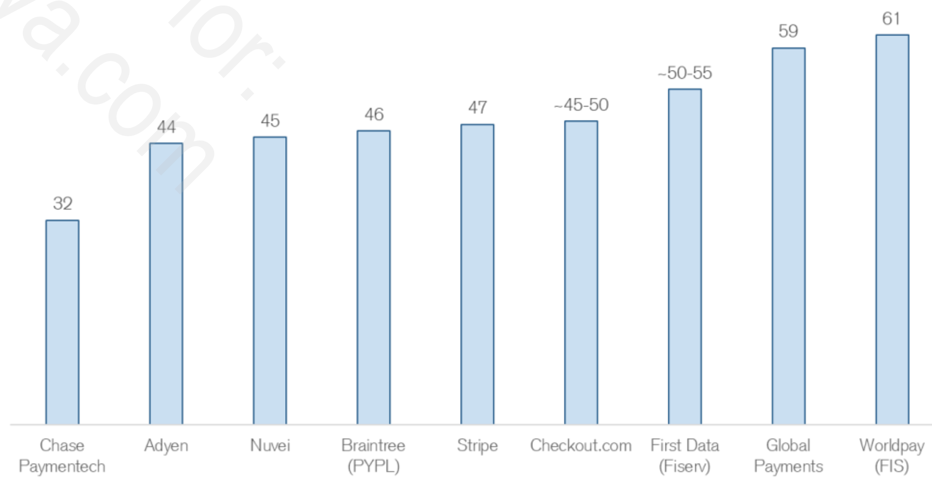
- We expect SMBs, mid-market merchants, and marketplaces to increasingly consolidate their payments relationships around fewer globally-scaled platforms to enable faster geographic expansion (new relationships will generally be won by modern acquirers), while large enterprises will be split between the laggards who stick with legacy relationships (particularly for in-store payment acceptance) and tech-forward enterprises who gradually consolidate among modern acquirers.
- Share gaining platforms will allow for omnichannel acceptance, a single (or few) integration(s) to access processing platform, integrations with important local payment methods, local acquiring support, and superior customer services.
- Global marketplace platform volumes (domestic and cross-border) expected to increase from ~40% of digital commerce volume in 2019 (includes bill payments) to 60% by 2023E, according to the 2020 McKinsey Global Payments report.

> "Marketplace Platforms like Amazon, eBay, Etsy, Flipkart, and Shopify have seen seller sign-ups increase by 70 to 150 percent since the start of the pandemic, based on their most recent filings and public statements, while proprietary platforms are losing share."
>
> *– McKinsey Global Payments Report 2020 (October 2020)*

Global eCommerce is about ~80% domestic and ~20% cross-border; within cross-border, ~75% are done via Marketplaces (and a meaningful portion of the remainder is via larger multi-national merchants)



There are only a select few companies with local/domestic acquiring capabilities in 30+ countries (number of local acquiring markets shown below; list is not exhaustive, but demonstrative)



Source: Company reports, Worldpay, eMarketer, Forrester Research, Zion Market Research, Credit Suisse estimates

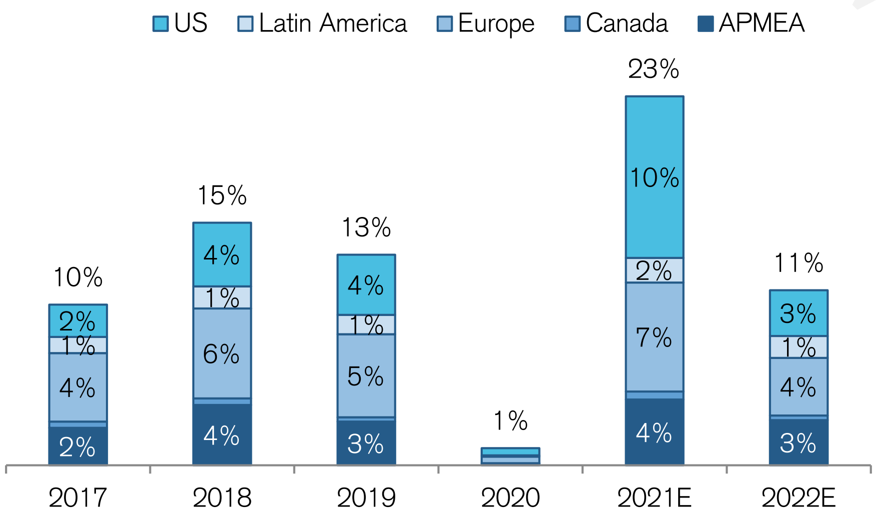
Merchant Acquiring: International exposure supports growth

Faster-growing underlying markets with lower penetration

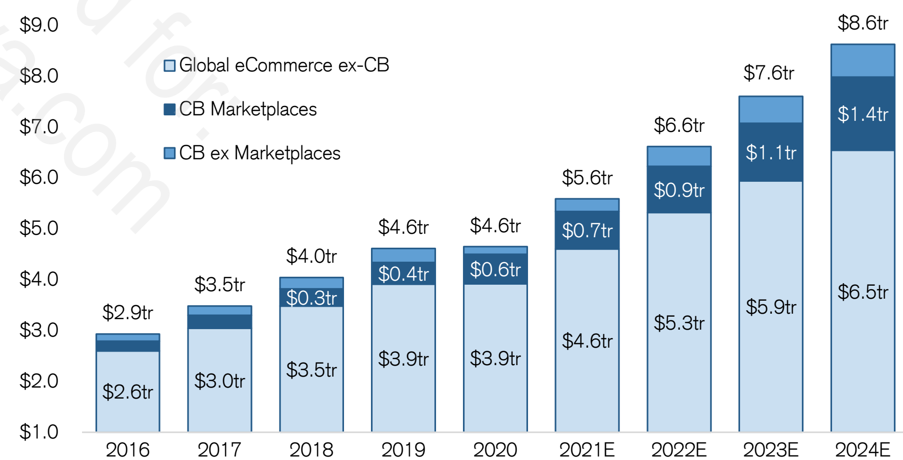
- Faster-growth international markets, often in earlier stages of the secular cash-to-card conversion (e.g. APAC, Latin America, and Central / Eastern Europe).
- Processing in-store payments for domestic merchants requires local acquiring capabilities (owned or sponsored licensing), local support staff, local knowledge, relationships with regulators, local payment methods, local language, etc.
- The ability to handle both in-store and eCommerce (omnichannel) is a differentiator, better positioning acquirers to win multinational merchant contracts (e.g., Global Payments won Citi for global eCommerce & omnichannel for Citi's multinational banking clients on this basis).

> *"…We expect continued growth and expansion into faster-growth markets. Most of our peers are in just a handful of geographies, just 1 geography, or are brand-new entrants into just a couple of markets. We should also think…about…the nature of how we compete globally…we provide a unified, seamless managerial operating in technology environment worldwide. Many of our competitors have multiple platforms - we do not. …"*
>
> – Jeffrey Sloan, CEO, Global Payments
> (March 2018)

Illustrative of the benefits of gaining exposure to faster-growth geographies; Mastercard is expected to have ~75% of its growth driven by international markets in 2022E and beyond



Global eCommerce is a fast-growth swim lane (~13% CAGR 2018-2024E), with the cross-border component growing ~24% (faster-growth sub-component, cross-border on Marketplaces, is growing ~27%)



CREDIT SUISSE Source: Company reports, Credit Suisse estimates

Return to Main Table of Contents

Merchant Acquiring: Channel and business mix matter

Estimated revenue exposure within merchant acquiring business segments

Provider	Software-led	eCommerce / CNP	SMB	International	Comment/Description
Adyen	< 10%	~85-90%	Low	~75-80%	EU-based enterprise eCommerce acquirer with a single unified omnichannel acquiring platform and a modern-built tech stack. In "higher-risk" verticals often prefers gateway capacity (e.g., Airlines); SMB via platforms and middle-market (i.e., <€25mm annual sales; ~3% of volume) via direct sales.
Global Payments	~45-50%	~25-30%	~80%+	~20%	Owned (e.g., Heartland, AdvancedMD) and partnered (Global Payments Integrated with ~6k ISV partners) approach to software, along with a global eComm & Omnichannel business processing in-store domestic; Degree of overlap with ~$400mm in eComm & Omnichannel (~800bps) within software-led.
FIS (Worldpay)	~20%	~25%	~60-65%	~25-30%	Includes a global eCommerce acquiring businesses, along with an integrated payments offering (Mercury); Revenue recognition based on home country of merchant, understating International.
Fiserv (First Data)	~15-20%	~20%	~60-65%	~25-30%	Software-led includes both Clover POS offering and ISV/integrated payments business (CardConnect & BluePay), which has a slight degree of overlap; SMB relationships are via Clover, Partner Solutions (ISV, agent, ISO), referral partners (bank and non-bank), and JV alliances; ~$714mm 2020A hardware revenue.
Nuvei	~10-25%	~65-75%	~35-45%	~50-55%	eCommerce/CNP-focused (transformed via 2019 acquisition of SafeCharge – an EU-based 100% CNP acquirer), with volume mix of ~48% North America, ~48% EMEA, ~2% APAC, and ~2% LatAm; Prominent in online gaming and regulated financial services verticals.
Paya	70%+	~85-90%	Low	0%	Pure-play integrated payments, operating across one of the higher growth, more nascent payment markets - B2B (~38% of revenue); Potential for future penetration of existing verticals (B2B goods, healthcare, non-profit, government & utilities, and education verticals) due to outdated legacy payment systems.
PayPal	~1-2%	~98-99%	~60-65%	~50%	Pure-play eCommerce, although QR code & iZettle represent offline potential; Large merchant mix was ~46% of volume at last disclosure (we assume an increase, and factor in marketplaces mix/change, pricing, and OVAS revenue). PayPal & Venmo (branded) and Braintree (unbranded, skews larger merchant).
Paysafe	~25%	~15%	~50%	<10%	eCommerce/integrated solutions-focused; 50% of revenue stems from integrated processing segment, which is split between SMB acquiring business and eCommerce/software led integrated solutions.
Repay	~90%	~90%	<50%	~1%	Pure-play integrated payments, with ~50% volumes integrated with ISV partners and -50% direct to merchant systems; Top 10 clients account for ~30% of revenue; Majority online or via phone, although we would place more of the categorization in software-led vs. pure eCommerce; TriSource "other" some in-store mix.
Shift4	~100%	~15-20%	~60-75%	0%	Pure-play integrated payments, with primary distribution via VAR and ISV partners, prominent in restaurant and hotel/hospitality verticals, attempting to execute strategy to acquire payments gateways/owned POS software providers to bring volume over to full-stack acquiring platform.
Square	~95%+	~35-40%	~85%	~10-15%	Horizontal software, with select vertical-specific solutions; -45% of Seller GPV in-store as of Q2 2021 (non-in-store includes Invoices product).

Source: Company reports, Credit Suisse estimates; Percentages are estimates (not precise, disclosed figures) of revenue mix within acquiring businesses and based on Credit Suisse definitions of the categories, acknowledging a degree of overlap and blurring among various channels

Merchant Acquiring: If these platforms gain share, who will lose it?

Hundreds of sub-scale, country/regional, and local bank-owned acquirers

Rank	Acquirer	Transactions (mil.)	Rank	Acquirer	Transactions (mil.)	Rank	Acquirer	Transactions (mil.)
1	Fiserv (First Data)	38,895.6	51	Sadad Informatics	1,290.7	101	Electronic Payments	245.4
2	FIS (Worldpay)	36,715.4	52	UniCredit Group	1,277.3	102	National Bank	240.7
3	JP Morgan Chase	29,409.0	53	StoneCo	1,264.2	103	Promsvyazbank	239.7
4	Sberbank	20,609.9	54	Aeon Financial Service	1,153.3	104	Piraeus Bank	234.7
5	Global Payments	16,188.0	55	Raiffeisen Bank Group	1,141.8	105	Nedbank	229.0
6	China UMS	13,800.4	56	Lloyds Bank Cardnet MS	1,111.8	106	QNB Finansbank	220.7
7	Bank of America	9,093.9	57	Yapi Kredi Bank	1,088.4	107	Alpha Bank	219.4
8	Barclays	8,400.4	58	T. Isbank	1,011.9	108	Clearent	218.5
9	Cielo	7,194.4	59	Gazprombank	933.1	109	Borgun	217.6
10	Elavon	6,853.5	60	Banco de Sabadell	910.7	110	Mashreq Bank	214.6
11	Behpardakht Mellat	5,680.0	61	PrivatBank	910.2	111	HDFC	213.3
12	BC Card	5,505.0	62	Desjardins (Monetico)	901.3	112	T.C Ziraat Bankasi	209.1
13	Wells Fargo	5,219.0	63	Paysafe	883.7	113	Card Complete	203.6
14	Rede	4,892.3	64	Pasargad Electronic Payment	856.8	114	Denizbank	203.3
15	Saman e-Pay	4,823.2	65					
16	Nets	4,415.5	66					
17	Moneris Solutions	4,007.7	67					
18	Worldline	4,004.6	68					
19	Credit Agricole	3,937.9	69					
20	Credit Mutuel	3,864.9	70					
21	Parsian E-Commerce	3,797.3	71					
22	Asan Pardakht Persian	3,688.8	72					
23	KB Kookmin	3,635.4	73					
24	EVO	3,609.5	74					
25	Santander	3,435.7	75					
26	Swedbank	3,246.2	76					
27	JCB	3,021.1	77					
28	Adyen	3,013.8	78					
29	BBVA	2,801.8	79					
30	Payone	2,494.5	80					
31	ANZ	2,452.4	81					
32	Iran Kish Credit Card	2,369.0	82					
33	BPCE	2,262.5	83					
34	VTB Bank	2,242.9	84					
35	BNP Paribas	2,136.0	85					
36	Westpac	2,103.3	86					
37	Commonwealth	1,933.8	87	Tinkoff Bank	371.3	137	Aurora Payments	118.4
38	Transbank	1,859.0	88	Russian Standard Bank	354.2	138	BankCard Services	117.9
39	Citi Merchant Services	1,796.1	89	CTBC	353.4	139	Millennium BCP	116.8
40	Societe Generale	1,747.2	90	Vero	326.8	140	CardNet	112.2
41	Nexi Payments	1,738.4	91	Network International	324.2	141	United Merchant Services	110.9
42	Samsung Card	1,726.8	92	PNC Merchant Services	310.8	142	VisaNet	108.0
43	Intesa Sanpaolo	1,677.1	93	T. Halk Bankasi	310.0	143	Axis Bank	100.1
44	Hyundai Card	1,657.4	94	First American payments Systems	302.4	144	Epicor Software	98.8
45	PagSeguro	1,575.0	95	SABB	297.8	145	Riyad Bank	98.1
46	Mitsubishi UFJ Nicos	1,566.1	96	Swiss Post	272.0	146	Diners Club	93.4
47	TD Merchant Solutions	1,486.9	97	SEB Group	260.2	147	Banco Inbursa	92.0
48	National Australia Bank	1,419.4	98	Vakifbank	258.1	148	Privredna Banka	90.8
49	Prisma Medios de Pago	1,321.0	99	Al Rajhi Bank	248.0	149	CMI	90.0
50	Garanti Bank	1,305.8	100	Valitor	247.7	150	Procesos de Medios de Pago	87.5

Merchant acquirers (and MSP, PSP, etc.) outside The Nilson Group's global top 25 handle ~25% of transactions in 2019 and a higher percentage of revenue (larger merchants are more likely to work with larger merchant acquirers)

And while there are numerous share gainers outside of the largest acquirers (e.g., those operating in a sub-segment or niche with vertical expertise have a unique technology or distribution relationship), we expect an increasing trend toward consolidation via both organic share gains and M&A

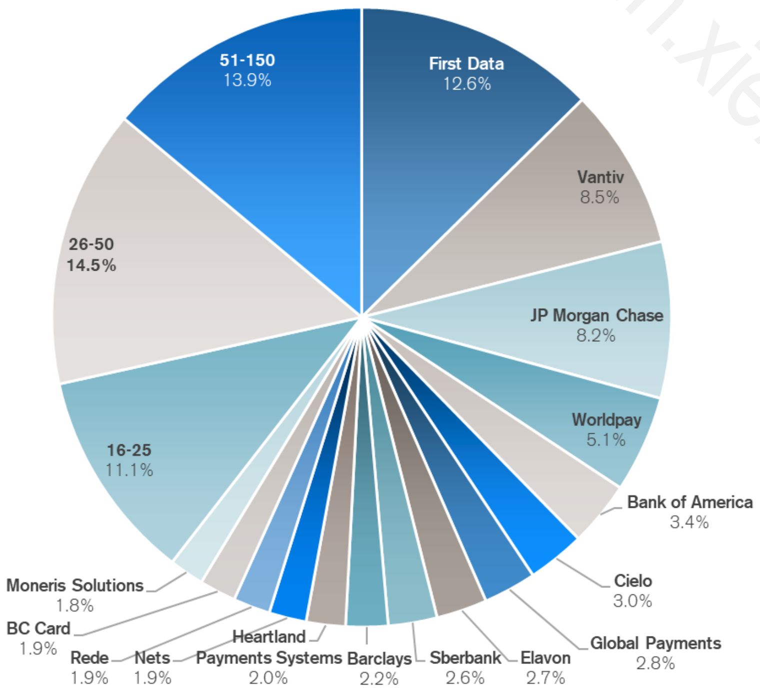
Source: The Nilson Report, First Data estimates include proportionate share of transactions for three largest JVs and largest revenue share agreement (BAMS, Wells Fargo, PNC, Citi), Credit Suisse estimates

Merchant Acquiring: Share remains fragmented

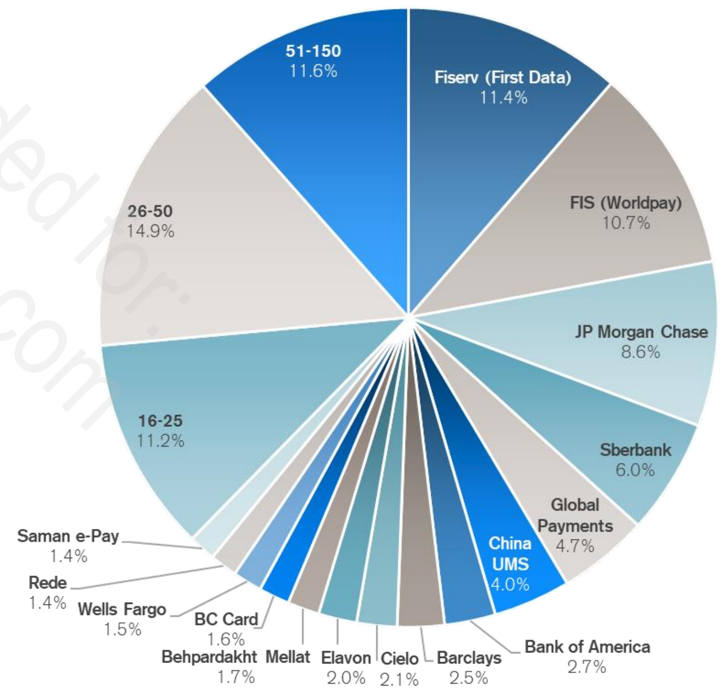
Combination of M&A and organic share gains will drive further consolidation

- Share remains fragmented beyond the top five, with no others exceeding ~4% - many of which are regional or bank-owned (which we expect to struggle to keep pace with innovation and merchant needs relative to well-capitalized, globally-scaled platforms).
- As a result, we expect a combination of M&A and organic share gains (due to scale, increased need to invest in technology, innovation, etc.) for globally-scaled acquirers; from 2015 to 2019, the top five acquirers gained ~300bps in acquiring share (by transactions).
- We expect the three mega mergers (Fiserv-First Data, FIS-Worldpay, Global Payments-TSYS), all with annual free cash flow in the $3-5b+ range, to resume scale-focused acquisitions with an emphasis on merchant acquiring, the fastest growing part of their businesses.

2015 Merchant acquiring share (by transactions), top five with ~38% share



2019 Merchant acquiring share (by transactions), top five with ~41% share



Source: The Nilson Report, First Data estimates include proportionate share of transactions for three largest JVs and largest revenue share agreement (BAMS, Wells Fargo, PNC, Citi), Credit Suisse estimates

Networks: New sources of volume supportive of 10%+ until at least 2023E

Street tends to underestimate growth persistence and power of compounding

- We quantify the potential impact (illustrative in sensitizing volume CAGR from small portions of penetration) of six nascent drivers of US card payments (push-to-card and B2B - beyond PCE - along with contactless, bill-pay, remittances, and underbanked additions to the card ecosystem) to determine their contribution to incremental growth.
- Industry incentives are designed to drive adoption providing economic benefits for issuers (interchange, incentives), networks (network fees), and consumers and business (rewards, speed, convenience, data) vs. cash, check, & ACH.
- Based on our illustrative (and likely conservative) estimates, these six drivers alone could add ~260bps to US industry growth (2019-2023E CAGR), lifting an expectation for high-single-digit trajectory into a more substantiated low-double-digit CAGR; implies less onus on PCE growth and traditional cash-to-card conversion baked into estimates.

New source of volume	TAM	Illustrative incremental card penetration (2023E)	Implied volume addition	Implied addition to 2019-2023E CAGR
Push-to-card	~$7.7tr	~5%	$386b	120bps
B2B	~$22tr	~1%	$220b	70bps
Contactless	~$3.0tr	~3%	$90b	30bps
Bill-pay	~$2.5tr	~2%	$50b	20bps
Remittances	~$1.0tr	~4%	$38b	10bps
Un-banked & under-banked	~$369b	~4%	$16b	10bps
Total				**~260bps**

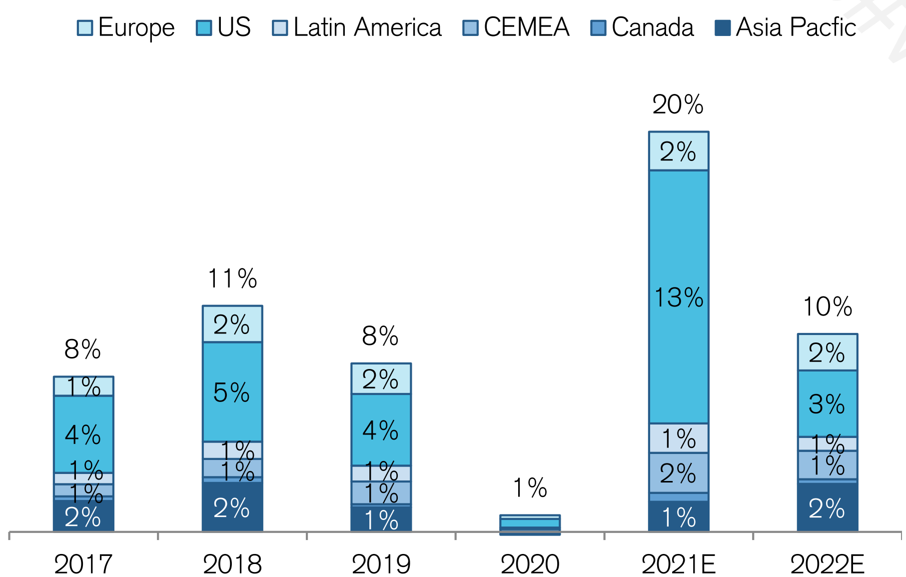
Source: Company reports, Visa, Aite, A.T. Kearney, FDIC, Mastercard, Credit Suisse estimates

Networks: Regional exposures a key driver of growth

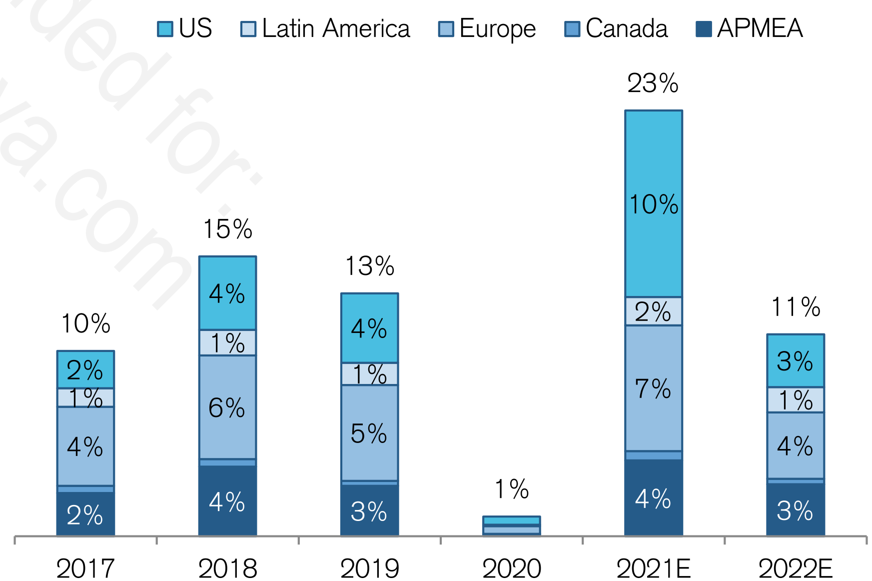
Mastercard's volume growth premium & secular exposure to growth markets

- Regional mix and greater exposure to geographies that have experienced a faster COVID-19 recovery have been contributors to Visa's recent outgrowth relative to MA (volume-wise).
- Visa has a larger US mix, and its European business is weighted toward the UK (more mature card market, Brexit, etc.).
- Longer-term, we expect Mastercard to benefit from its greater international mix, slight share gains, first-mover advantage with FinTechs (though Visa has since improved significantly), and continued Maestro card conversion (not included in reported volumes).
- We expect a continued recovery of cross-border travel to benefit both Visa and Mastercard, but more importantly we focus on the networks post-COVID increased mix of eCommerce and new cross-border flows such as remittances, marketplace payouts, and cross-border B2B to drive persistence of growth ahead.

Visa's volume growth has been driven by its leading US business, and we forecast ~1,300bps of its ~20% growth in 2021E to be US-sourced



Mastercard's growth has been somewhat more balanced (and higher overall), with meaningful contribution from the US, Europe, and APMEA



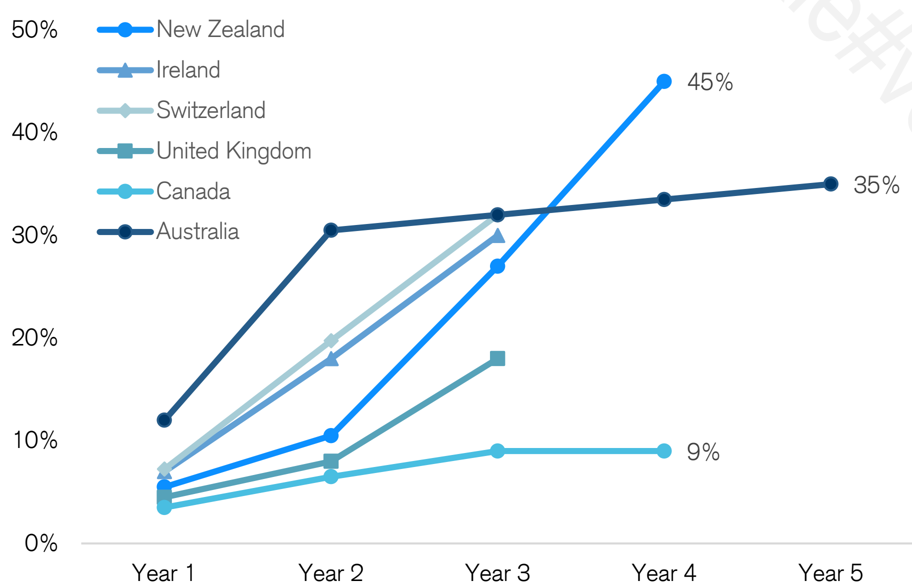
Source: Company reports, Credit Suisse estimates

Networks: Contactless rollout in the US

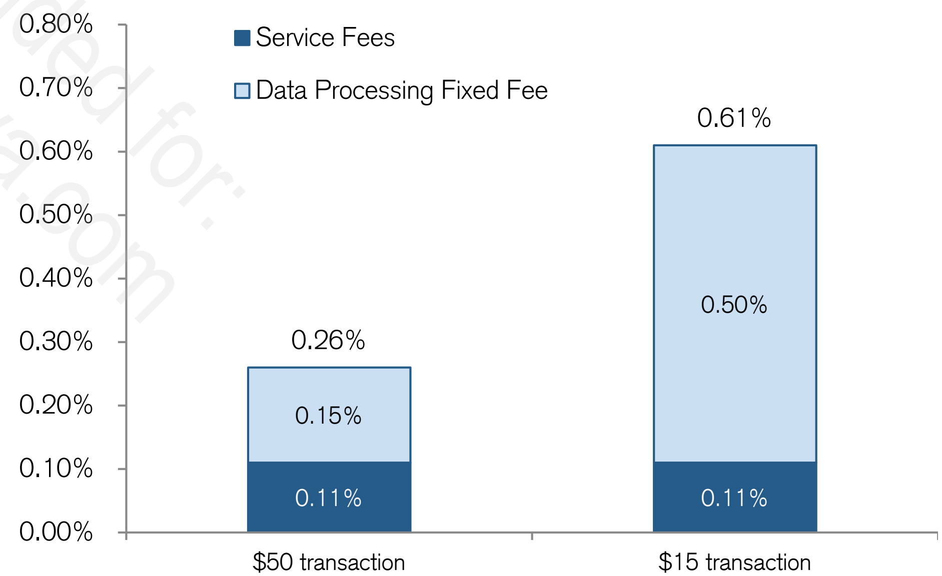
Near-term transaction growth driver and longer-term yield opportunity

- Driver of transaction growth in mature markets with high card penetration, helping to replace cash usage on small-ticket items – over 25% contactless penetration for Visa cards in NYC, SF, and San Jose in Q2 2021 (Visa contactless cards increased from ~100mm in 2019 to ~300mm in 2020 with ~450mm targeted by the end of 2021).
- Potential for ~$90b in incremental volumes by 2023E (~30bps additive to V/MA combined 2019-2023E CAGR), although more meaningful on a revenue basis given higher net yields (bps of volume) at steady state.
- We believe contactless (for the portion with a lower average ticket size) yields have potential to be ~2x+ that of an average sized transaction (i.e., a cents per transaction data processing fee spread over a lower ticket); although we expect V/MA will pay away the majority of this premium opportunity in the near term (~2-3 years) to incentivize the issuance and usage of contactless cards (i.e., rebates to both issuers and acquirers).

Markets similar to the US (e.g., Australia, UK) with high card penetration have seen meaningful adoption 3-4 years (percentage increase in face-to-face transactions per card, years 1-5 post rollout)



Illustratively, net yield opportunity in a steady state for contactless transactions has the potential to be ~2x+ that of a traditional, larger ticket size transaction (although still ~3-5 years away)

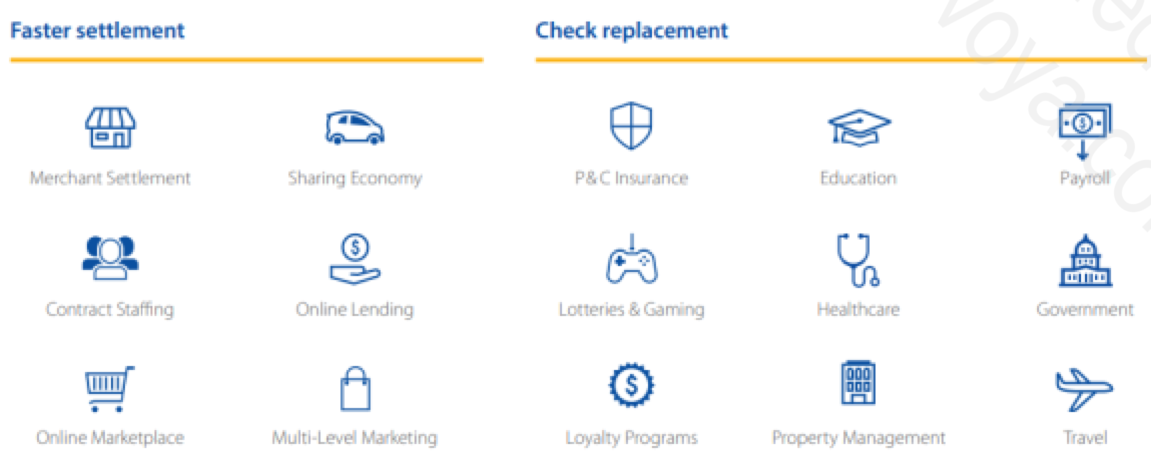


Source: Mastercard, Company reports, Credit Suisse estimates; Note that estimate yield is based on Visa-reported company-wide averages across credit and debit; A.T. Kearny.

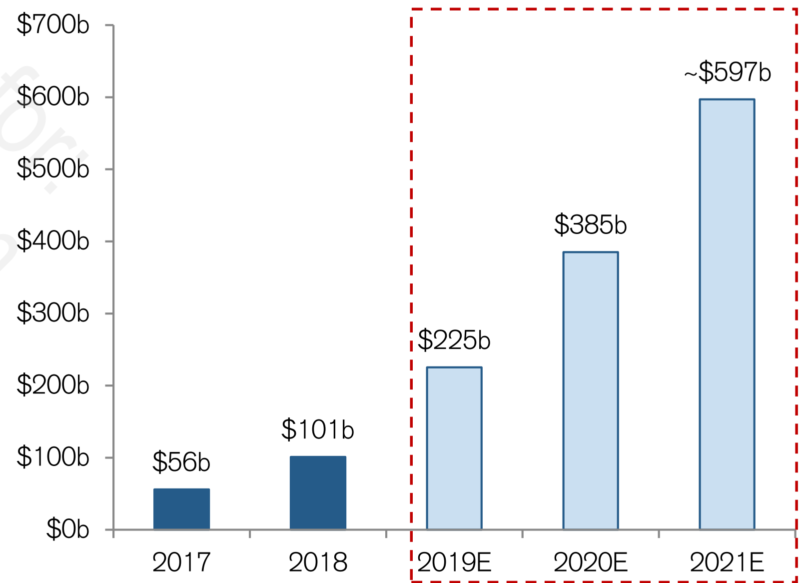
Networks: Push-to-card opening up new payment flows
Visa Direct and Mastercard Send

- Push-to-card is both offensive (priced to expand card-able TAM into larger, interchange-sensitive payments) & defensive (race to scale before modern/fast ACH rails gain ubiquity), resulting in increased carded velocity of those same PCE dollars and further into B2B.
- Expands card-able TAMs into new payment flows (i.e., beyond PCE, into marketplace merchant payouts, insurance claim payouts, etc.) – sends to card-based accounts, then re-spent on cards (increased consumer and business debit card usage as an indirect benefit).
- Earthport (Visa) & Transfast (Mastercard) expand the reach of V/MA to most accounts in the top 50 markets; Visa Direct remittance platform partnerships (and potentially bank partnerships) to drive premium priced cross-border transactions.
- These volumes have been and will continue to be additive to V/MA's volume growth algorithm, but come with a lesser revenue impact given lower net yields vs. debit (although as use cases become more commercial and cross-border increases in mix, pricing could improve).

"Push-to-card" payments (e.g., Visa Direct, Mastercard Send) expand card payments into new market opportunities, beyond C2B and into B2B, C2B, and P2P



Visa re-cast historical volumes pre- and post-inclusion of Visa Direct, suggesting the new product is already approaching ~MSD of total volumes



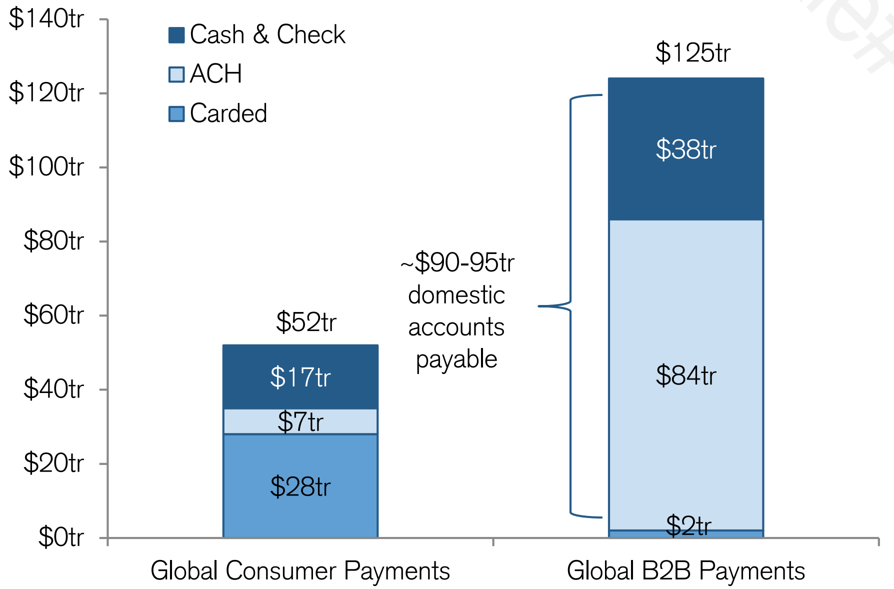
Source: Company reports, Visa, Credit Suisse estimates
[1)] 2017 and 2018 volumes disclosed from financials, 2019E-2021E volumes estimated from disclosed transaction growth

B2B Payments: Underpenetrated growth market nearing inflection

$125tr TAM that is so large, it almost does not merit discussion

- While the actual payments being made can be less of an issue for some merchants, antiquated processes, data/reconciliation challenges, and a lack of automation are common merchant pain points.
- Modern software/payments platforms are helping to solve these pain points and, in the process, are increasing awareness/usage of systems that will ultimately contribute to increased digitization of B2B payments.
- Additionally, card usage and/or rewards programs can lead to rebates – turning AP functions into revenue generators vs. cost centers, adding to the value proposition around efficiencies, reconciliation, etc.

Three buckets of B2B: 1) traditional corporate cards, virtual cards, etc. (~$20tr of volumes); 2) cross-border B2B (~$10tr); and 3) ~$90-95tr in accounts payable (domestic)



Common pain points are often related to processes and data, not the actual payments

Highly manual (people-intensive) processes are slow and expensive, given a lack of automation, and error prone

Checks have hidden costs (e.g., checks can be in the ~$4-20 range vs. ~$3 per ACH transaction) and are not guaranteed good funds

Limited transaction data from payments make reconciliation difficult

Cash flow management difficulty – i.e., paying on the due date with certainty vs. mailing a check a few days ahead of time, lacking certainty

Lack of visibility into supplier payment preferences

Source: Company reports, Mastercard, Visa, AvidXchange, Credit Suisse estimates

B2B Payments: FleetCor and WEX, B2B pure-plays

Corporate payments a fast-growing portion for both companies

- Beyond their core fuel card businesses (also a form of B2B payments), both FleetCor and WEX have corporate payments businesses aiming to shift businesses more toward full-AP automation. Both handle entire AP files (ACH, eCheck, virtual card) and are building supplier networks to expand virtual card acceptance, bolstered by recent acquisitions – FleetCor's Nvoicepay (~$220mm), WEX's Noventis (~$310mm).
- Corporate payments represents >20% of FLT revenue, growing ~20%, while the business makes up >10% of WEX revenue, growing at a similar ~20%. As these businesses become a larger part of mix, they should be supportive of FLT & WEX multiples, given prospects for longer-term growth persistence in a whitespace opportunity. GPN recently entered B2B via the acquisition of MineralTree in September 2021.
- Though not nearly at the scale of FLT and WEX, RPAY (made several acquisitions into B2B payments to diversify away from cyclical loan repayments business) and PAYA (nearly 40% of revenue from B2B) have a strong focus on B2B payments.

Corporate Payments segment	Virtual card	Cross-border	AP automation	Other	Comment/Description
FleetCor	Comdata	Cambridge, AFEX	Nvoicepay, Roger	Fintwist for Payroll	Emphasis on mid-market; partnerships with AvidXchange and Bill.com (more SMB focused platforms)
WEX	WEX Virtual Payments	n/a	Noventis, EFS	3Delta Systems, AOC Solutions, eNett/Optal	Inspyrus partnership in AP automation; utilizes bank channel partners (American Express, PNC Bank, etc.) to address larger multi-national merchants' cross-border needs
REPAY	Partners w/ issuing bank (e.g., WEX)	n/a	cPayPlus, CPS Payments, Kontrol	APS, Ventanex, BillingTree	B2B now ~20% of volume; aims to cross-sell A/P and A/R solutions with diversified sub-vertical exposure; Ventanex is in both healthcare B2B (outbound payments on behalf of insurers) and mortgages
Paya	n/a	n/a	n/a	First Billing Services	Mid-market focused merchant acquirer with 38% of revenue generated from B2B supplier payments

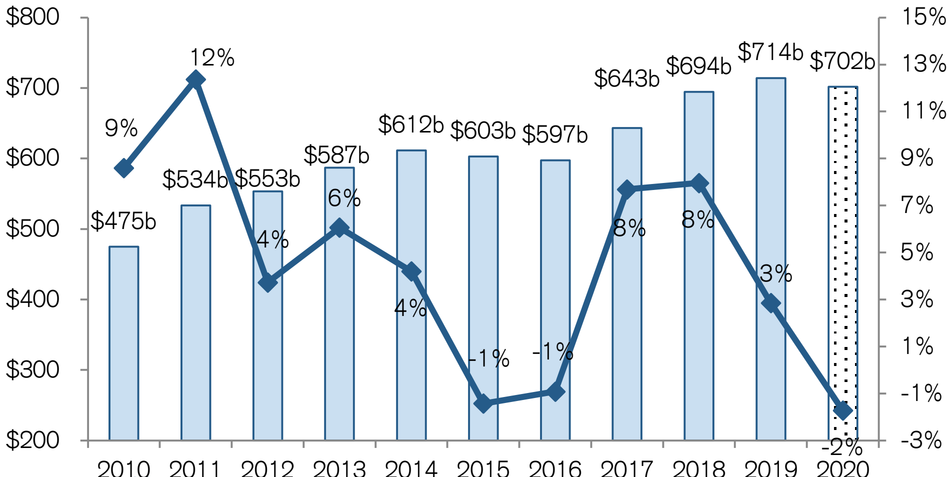
Source: Company reports, Credit Suisse research estimates

Money transfer & remittances: Large market, but increasingly competitive

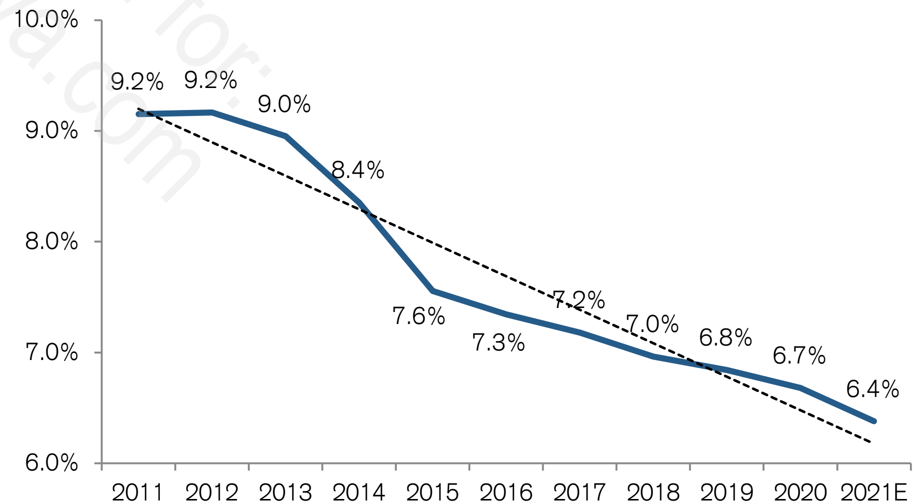
~$1tr+ TAM with economics compressing over time

- Traditional bank wires (i.e., SWIFT messaging and usage correspondent banking, ~65% of global volumes) are a trusted form of money remittance but historically have come with uncertain timing and fees (i.e., number of hops and fees taken at each hop), and represent an opportunity for tech-forward platforms that have built their own global treasury operations and/or networks of users and agent locations.
- New entrants (e.g., Wise [formerly TransferWise] already at ~£4.5b [~$6.25b] in volume / month) offer low-fee alternatives to sub-sets of banked customers; Visa Direct-Earthport further enabling globalization of FinTech competitors (via both card and bank account connectivity, though only applicable for account to account / card transactions) – markets with high underbanked (cash-based) remittances (e.g., US into Mexico – largest corridor) remain attractive for traditional players (WU, IMXI).
- The ~$700b World Bank TAM likely excludes volumes from informal channels (could be ~$300b), including Wise cross-border (~£55b [~$75b] in FY2021), other FinTechs (i.e., Remitly, Zepz (formerly known WorldRemit), certain consumer flows (i.e., some tuition pay), and small business transfers. The EDC estimates the TAM for personal cross-border payments was ~£2tr (~$2.7tr) in 2020; recent S-1 filing for Remitly suggests global remittance TAM of ~$1.5tr (2020E, estimated to generate ~$40b in transaction fees globally).
- Platforms like Western Union have both strategic/partnership value that is difficult to replicate – global breadth (operations in 200+ countries), local market knowledge, compliance infrastructure (~$200mm per year), numerous licenses, and a brand name.

~$700b TAM (according to the World Bank) with volume growth in the MSD, offset by pricing pressure, likely results in LSD revenue growth



World Bank data suggests a decline in industry-wide pricing (fees as a percentage of volume), although the data is heavily influenced by the bank channel (where fees remain higher than average)



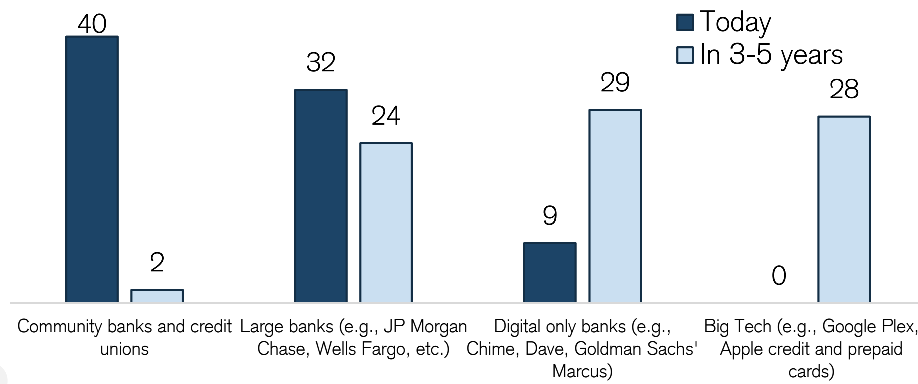
CREDIT SUISSE Source: Company reports, World Bank, EDC, Credit Suisse estimates

US bank tech: Stable outlook as banks need to lean on providers

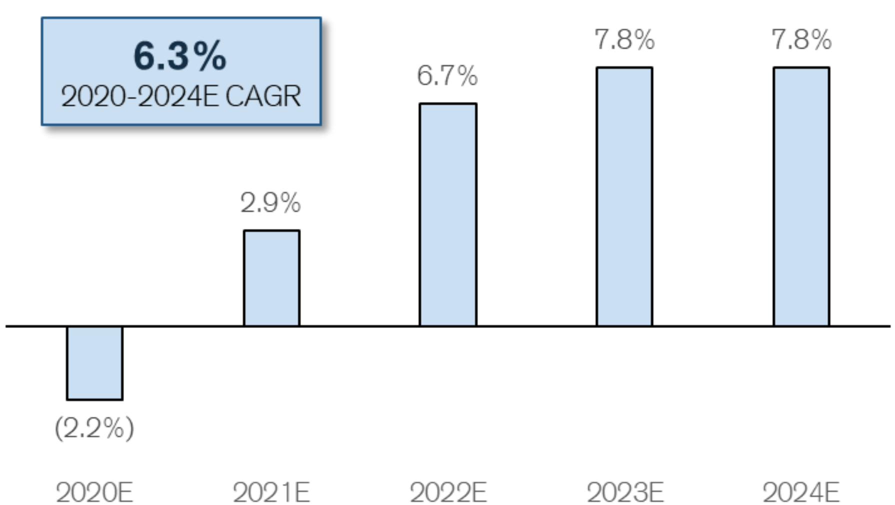
~$90b TAM growing ~6%, weighted toward growth vs. maintenance

- Healthy bank IT spend (~6% CAGR through 2024) driven by consumer expectations, leading to an increased need for banks to modernize infrastructure by leaning on technology providers.
- Banking is increasingly a technology business with digital now the primary distribution channel, lowering barriers to entry for FinTechs and large technology platforms (e.g., Apple, Amazon) while also favoring large incumbent banks with the capital to invest.

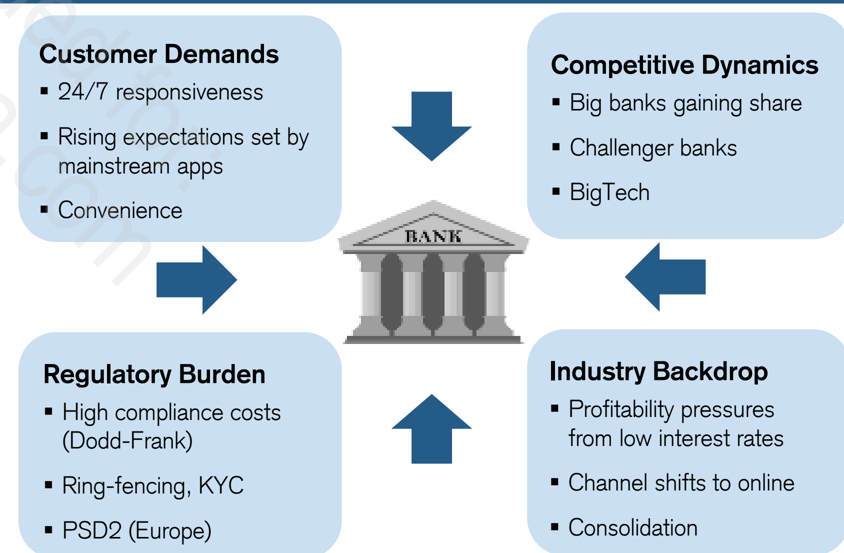
Surveyed banks' greatest source of competition today and in the next 3-5 years (top 1 & 2 expected to fall to 3 & 4 by 2024-2026)



IT spend by financial institutions fell in 2020 but is expected to grow at a ~6% CAGR from 2020 to 2024 on a slightly lower base of ~$90b



Banks seeing pressure from all sides (customer demands, regulatory, competition, industry consolidation, and profitability pressures)



Source: Fiserv, PWC, Company data, Credit Suisse estimates

Return to Main Table of Contents

US bank tech: Need to lean on core providers intensified by “barbell”
FinTechs are on one end of the “barbell”, big banks are on the other

- The top four banks in the US (~42% of deposits) have annual technology budgets totaling ~$40b, roughly equivalent to total aggregate private FinTech fundraising in 2020.
- As FinTechs (and BigTech) continue to gain new accounts, there are potential headwinds to monitor in the longer term (traditional banks’ potential to lose account & transaction share among digitally native generations).
- We believe the majority serve as secondary accounts with the potential for that to change as offerings expand.

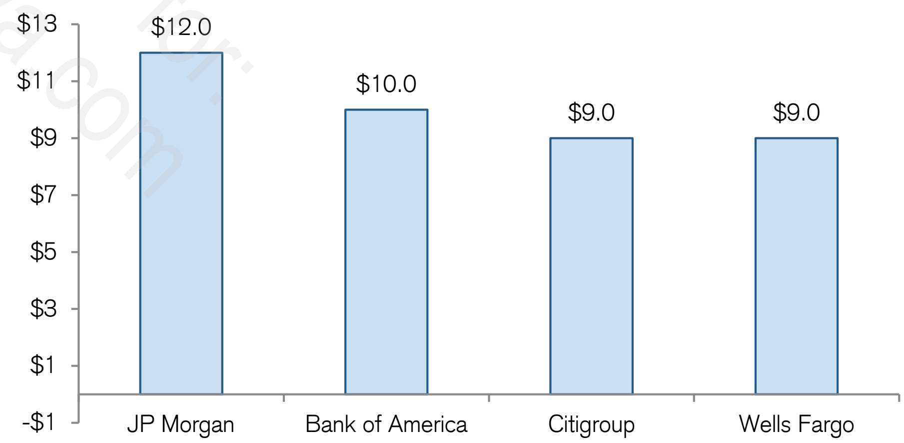
Both ends of the “barbell” are gaining share, in part due to better technology/user experience, along with tech & marketing spend

Neo/Challenger banks (FinTech) and large technology platforms (BigTech)	Regional banks, community banks, & credit unions (core FISV, FIS, JKHY customers)	Large US banks
Chime, SoFi, Cash App, Dave, Current, Varo, Revolut, Monzo, N26, Google, Apple, Marcus by Goldman Sachs, etc.	~10-11k US financial institutions	JP Morgan Chase, Bank of America, Wells Fargo, Citi, US Bank, PNC, TD Bank, Truist, Capital One

The top 15 banks in the US account for ~66% of total deposits, with their market share down ~115 bps YoY in Q1 2021

	Branches	Total Deposits ($b)		Market Share	
Company	Q1 2021	Q1 2021	YoY	Q1 2021	YoY (bps)
JPMorgan Chase & Co.	4,916	1,896.0	28.4%	13.9%	95
Bank of America Corp.	4,184	1,783.4	19.5%	13.0%	(1)
Wells Fargo & Co.	4,973	1,409.2	5.7%	10.3%	(136)
Citigroup Inc.	676	635.6	10.4%	4.6%	(39)
U.S. Bancorp	2,285	414.7	13.2%	3.0%	(17)
Truist Financial Corp.	2,560	395.6	13.0%	2.9%	(17)
TD Group US Holdings LLC	1,148	382.4	17.3%	2.8%	(6)
Charles Schwab Corp.	338	369.9	33.3%	2.7%	28
PNC Financial Services Group Inc.	2,773	366.6	23.4%	2.7%	8
Morgan Stanley	1,200	321.6	37.4%	2.4%	30
Capital One Financial Corp.	336	310.2	15.1%	2.3%	(9)
Bank of New York Mellon Corp.	51	218.4	3.4%	1.6%	(25)
Goldman Sachs Group Inc.	82	213.1	26.3%	1.6%	8
State Street Corp.	4	165.0	-7.8%	1.2%	(36)
Fifth Third Bancorp	1,112	162.6	20.3%	1.2%	1
Top 15 Bank Holding Companies	**26,638**	**9,044**	**17.6%**	**66.1%**	(115)
United States Total	**68,352**	**13,683**	**19.6%**		

2020E technology spend shows that the big banks are in a league of their own (annual spend of ~$40b)



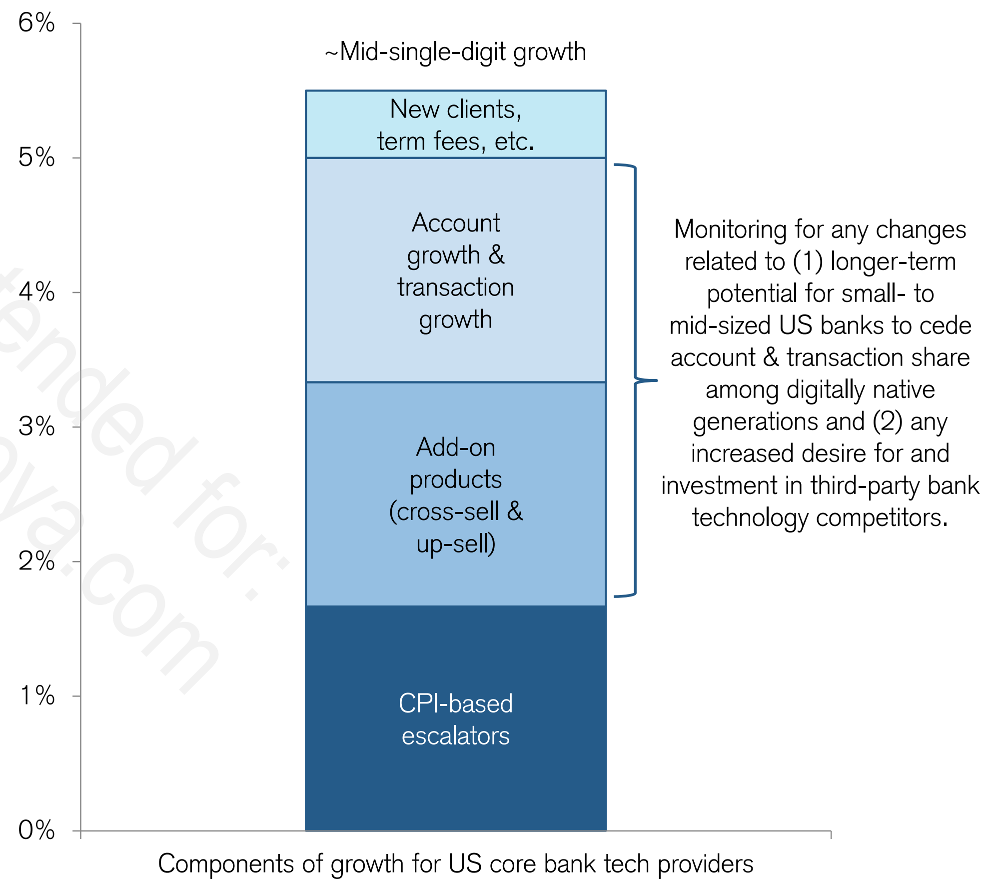
Source: Company data, Business Insider, MX, CB Insights, S&P Global Market Intelligence, FDIC, Credit Suisse estimates

US bank tech: Growth algorithm all about existing customer growth

Four key drivers with an emphasis on up/cross-sell, accounts & transactions

- US bank technology businesses (e.g., Fiserv, FIS, Jack Henry) are mid-single-digit growers with existing customers driving the majority of growth.
- Four components of growth:
  - CPI-based escalators included in contracts (and contractually cannot go negative if CPI does).
  - Add-on product sales (e.g., bill-pay, Zelle, RTP, online banking, etc. sold by core providers and integrated into the core system) including upgrades to more dated versions.
  - Account & transaction growth (checking accounts, debit cards, transactions processed).
  - New client additions (smallest driver), term fees, and other.
- While there are potential headwinds to monitor longer term (including Neobank primary account relationships), existing providers have meaningful moats such as:
  - Sticky relationships and long term contracts (~5-7 years).
  - Ability to price ancillary bank IT services attractively given low incremental costs alongside friction for customers to utilize third-party providers (e.g., fees, integrations, etc.).
  - Track record in maintaining technology leadership organically and via bolt-on M&A (further supported by elevated FCF levels from merger synergies).

Four key components to growth in US banking technology businesses (e.g., Fiserv, FIS, Jack Henry, etc.)



 Source: Company reports, Credit Suisse research estimates; Note: Growth contribution portions illustrative

Return to Main Table of Contents

US bank tech: Next-gen cores challenged by a ~1-2% window

Easier road for ancillaries vs. cores, but signs of interest hard to ignore

- Roughly 1-2% of banks switch core providers per year with core conversions viewed as the most challenging and expensive IT project a bank can undertake (challenge for new entrants).
- Increasing signs that a substantial number of banks would like to use third-party ancillary offerings in lieu of those offered by their core provider (consistent with ABA CEO's conversations with ~3.9k US bank CEOs that led to the formation of the ABA Core Platforms Committee, and the ABA's investment behind Finxact).
- Third-party providers of bank IT services (e.g., mobile banking) face competition from ancillary add-ons offered by the cores (FISV, FIS, JKHY), along with integration challenges (although the hurdle for ancillary services is much lower than switching cores).
- Ability to consider working with third-party providers (aside from bank's core provider) correlates with the size of the bank (i.e., smaller banks often lack a CTO, outsource IT to core provider, and are more likely to maintain a single vendor approach). We believe that banks with at least ~$500mm in assets (~2k banks and credit unions vs. ~11k total) are potential buyers of third-party offerings.
- Emerging vendors should have the most success in new product launches with mid- to larger-sized financial institutions looking for best-of-breed products rather than full core conversions (i.e. considering new savings accounts on a modern core).

"…met with roughly 3,900 bank CEOs…one narrative came up again, and again, and again…we're struggling with our core relationship – the core is not as nimble, it's not as agile, we're not able to offer the innovative customer experience that we'd like to with the same efficiency or the speed…"

– Rob Nichols, CEO, American Bankers Association, speaking to his first year on the job in 2016 (quote from February 2019)

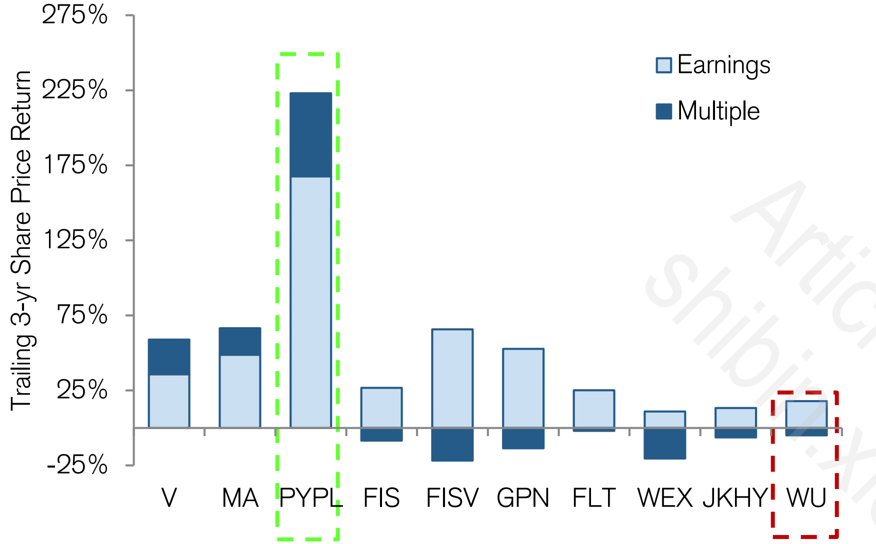
Roughly ~1-2% of US banks switch core providers each year (vs. ~20% up for contract renewal given ~5-year average contracts)

Source: Company reports, Aite Group, Credit Suisse estimates

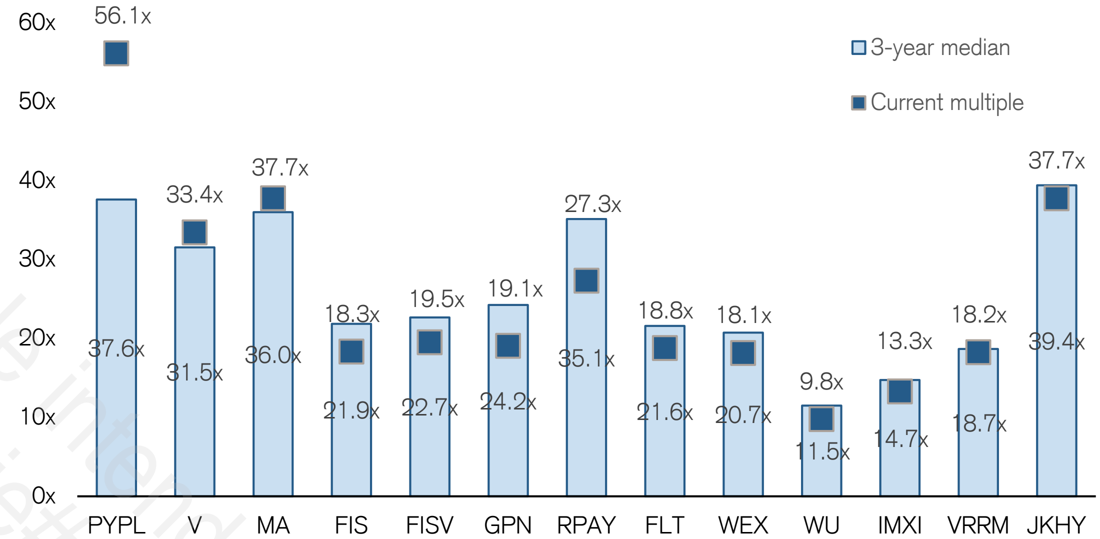
Valuations mostly at or above 3-year averages

But most of the stock price moves have been from earnings, not multiples

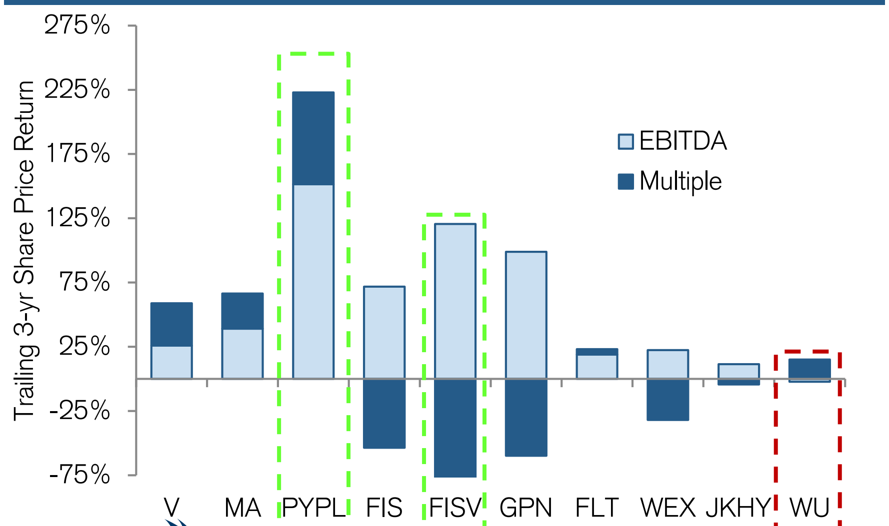
3-year price change – explained by earnings vs. multiple expansion



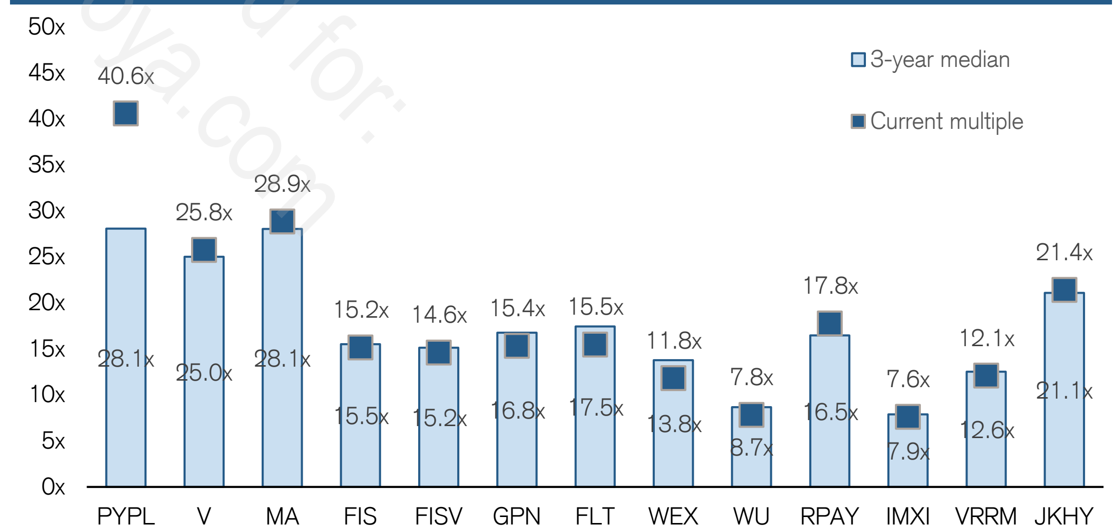
NTM P/E – current vs. 3-year median



3-year price change – explained by EBITDA vs. multiple expansion



NTM EV/EBITDA – current vs. 3-year median



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Source: Company reports, FactSet, Credit Suisse research estimates, excluded companies due to lack of data

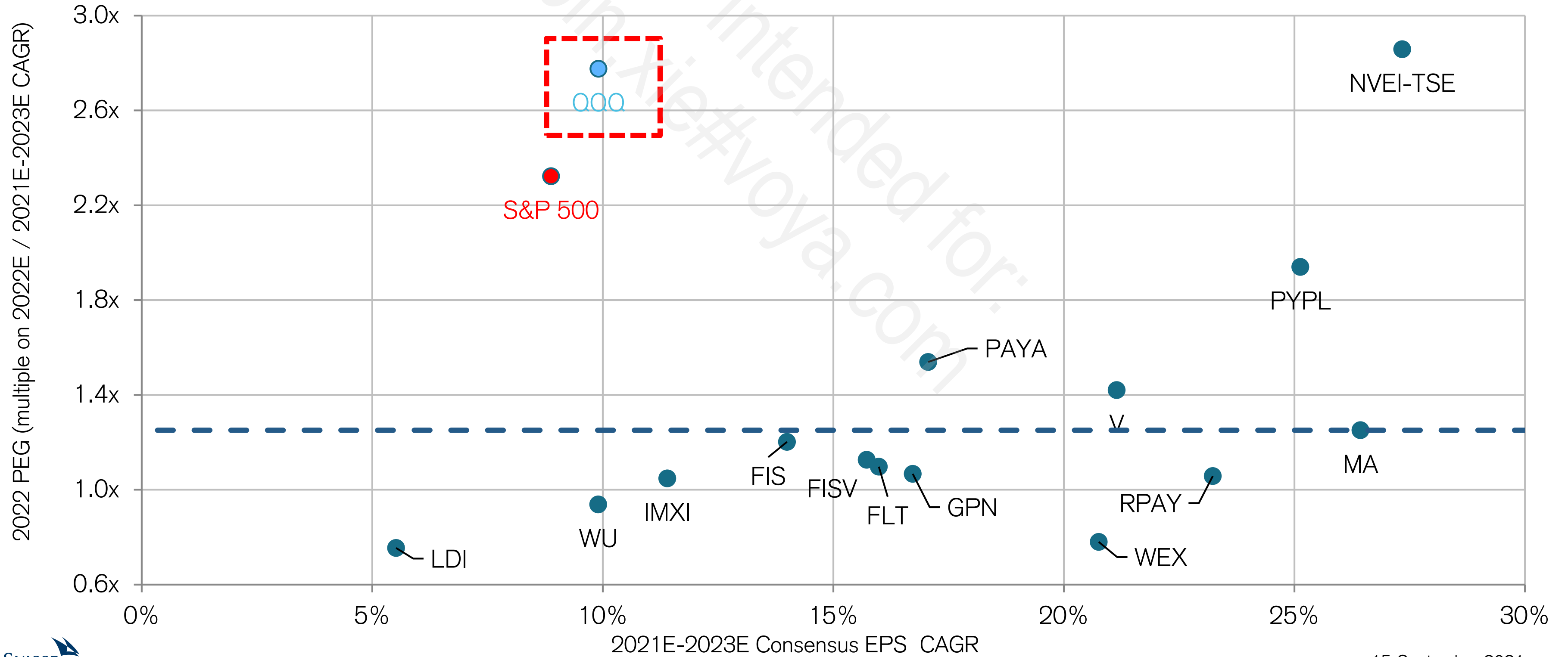
Return to Main Table of Contents

Median PEG ratio of ~1.2x

High valuation multiples, but more reasonable vs. growth, market

- Payments stocks appear expensive at first glance given low-20s median P/E multiple (mid-30s average), but on a growth adjusted basis valuations appear more reasonable (company dependent).
- For context, we show the S&P500 and QQQ tracking the Nasdaq 100 (tech-centric) are more expensive on a multiple-to-growth basis than our sector coverage median.

PEG ratio (P/E on 2022 estimates vs. 2021-2023E EPS CAGR)
When compared the technology sector ETF (QQQ) valuation appears less demanding (i.e. adjusted for growth)

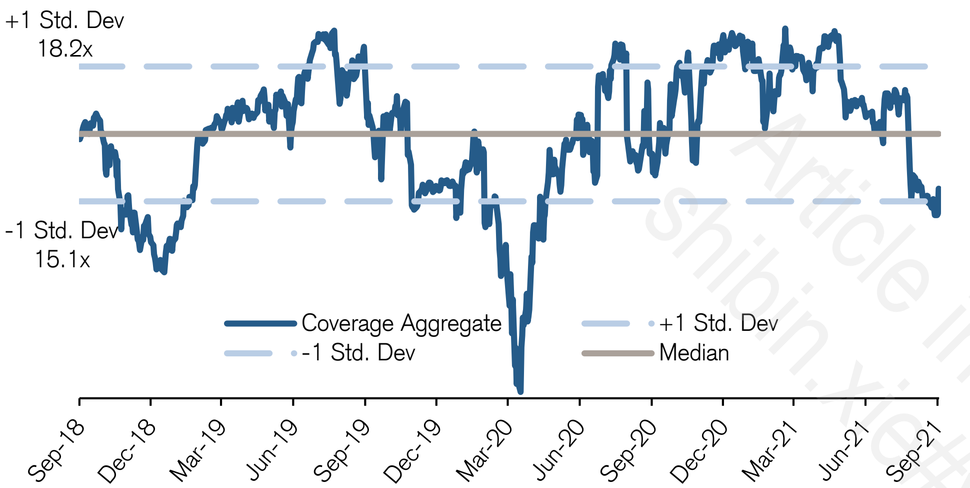


Source: Company reports, FactSet, Credit Suisse estimates; chart includes companies within bounds only.

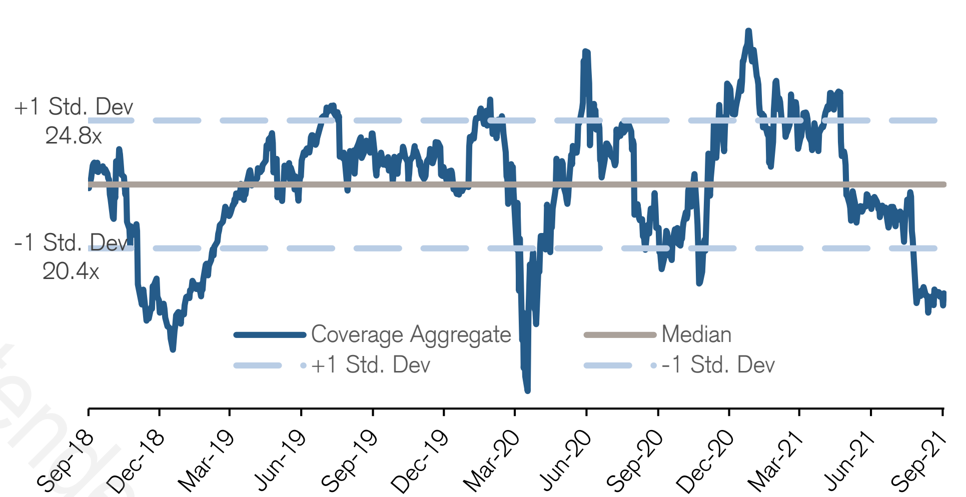
Payments, Processors, & FinTech sector valuation

Trades at a premium to S&P, but currently below average levels

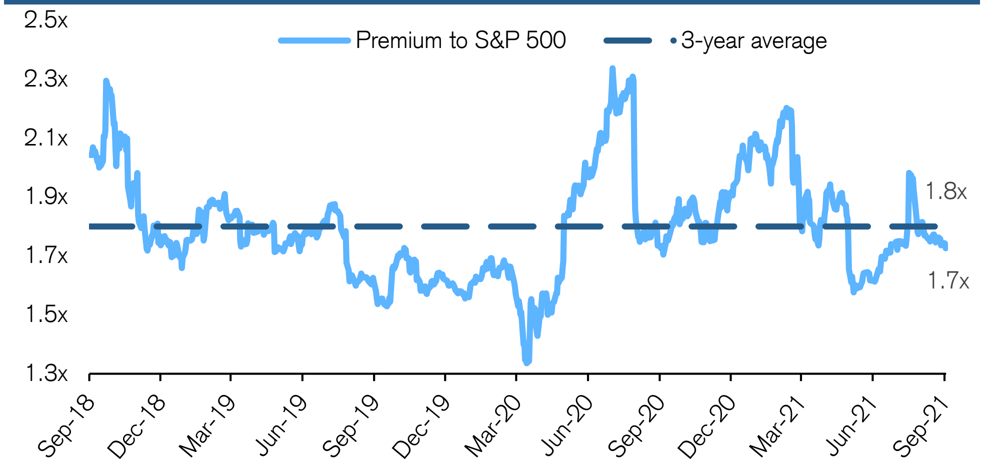
Sector 3-year historical median NTM EV/EBITDA



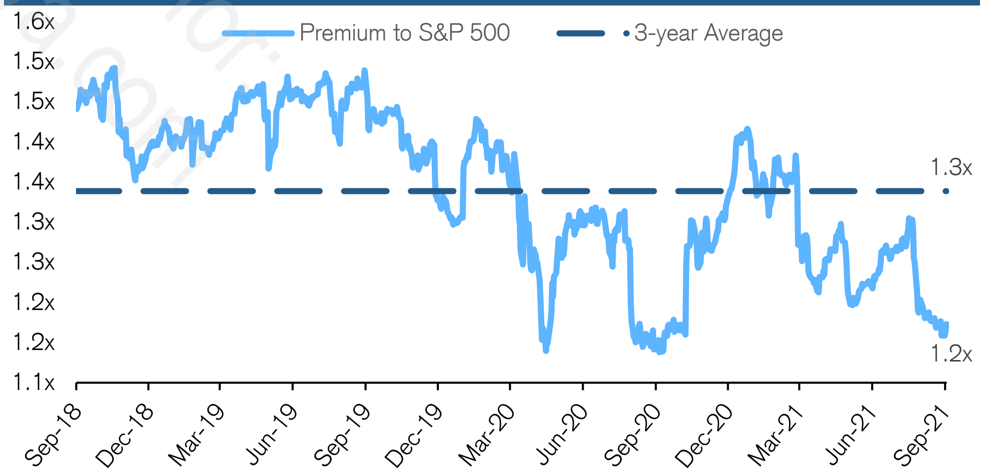
Sector 3-year historical median NTM P/E



Sector 3-year NTM EV/EBITDA premium to S&P 500 Index



Sector 3-year NTM P/E premium to S&P 500 Index



Source: Company reports, FactSet, Credit Suisse estimates; Sector includes CS payments coverage universe, excluding companies with limited data and/or history

Payments macro dashboard

An illustrative view of some of the macro and sector-related items we track

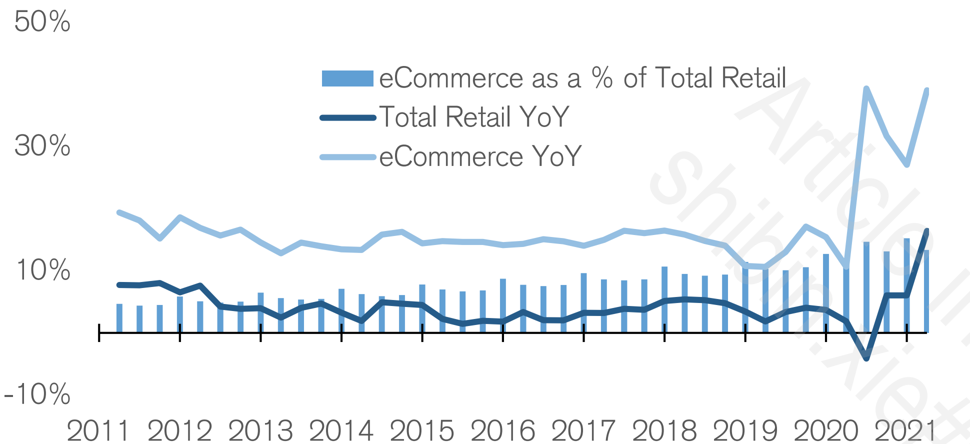
Metric	Comments	Direction
US retail sales	June US retail sales were up 0.6% and ex-auto & gas were up 1.1% compared to consensus expectations of (0.3%) and 0.5% and May revised levels of (1.7%) and (1.0%), respectively, with overall retail sales now sitting ~18.2% above their pre-COVID peak in February; Visa's CNP volumes (proxy for online sales) increased from ~140% of 2019 levels in the beginning of May to over 160% at the end of the month; Restaurant spending reported large gains (7% above February levels) due to easing pandemic restrictions and pent up demand	—
Global retail sales	April 2021 up ~25% vs. April 2020 (up 7% vs. April 2019) but down ~(1%) MoM (CS economics team global consumption index); Growth has accelerated from ~13% YoY growth in March and ~3% growth in February largely due to easing of COVID-related restrictions; Trend is materially above long-term average of ~2.4% YoY monthly growth (10-year average) as regions continue to reopen. However, spread of the Delta variant remains a potential risk to global retail sales	—
US eCommerce	Q1 2021 was a strong eComm quarter up ~55% YoY vs. Q1 2019 (up 39% vs. Q1 2020) as eCommerce adoption persisted with US consumers demonstrating lasting new habit formation and shopping behavior changes during the pandemic; we expect eCommerce YoY growth in Q2 2021 to decelerate as in-store mix is likely to recover with lifting of COVID-19 restrictions; Visa reported card not present spending excluding travel in May at 159% of 2019 levels and card present at 113%, signaling the improvement of economic conditions; Mastercard SpendingPulse noted that eCommerce sales for the month of May were up ~1% YoY	↑
USD strength (DXY)	USD was down ~(795) bps YoY in Q2 2021 vs. down ~(750) bps in Q1 2021 (DXY quarterly, daily average); DXY has leveled out around ~92 over the last month, ~flat vs. GPB and stronger vs. AUD, EUR, CAD, BRL in July	↓
FX Vol (CVIX)	Q2 2021 volatility down sequentially ~900 bps and 25% YoY; FX volaitlity is below the longer term average of ~9, at ~6 as of June 30, 2021, having decreased from levels seen in March 2020 reaching ~15; Note: CVIX is Deutsche Bank's measure of currency trading volatility. Increased FX volatility benefits cross-border yields	↑
US retail gasoline prices	Quarterly average retail gas price per gallon increased ~17% Q2 2021 vs. Q1 2021 and ~54% YoY; June average price was up ~17% YoY and ~260 bps MoM; V/MA ~MSD % of US volumes at gas stations; Summary is gas prices are up YoY and have continued to rise with the recovery of travel and the reopening of the US economy	↑
IATA	Industry wide RPK's down ~(65%) vs. 2019 levels in May (up ~310% YoY); Domestic travel recovering at a quicker pace vs international (down ~(30%) vs. 2019 levels whereas international is down ~(85%)); Note: IATA airline data provides tourism reads, with tourism representing ~50-60% or more of cross-border card volumes	↑
Barclaycard UK	Barclaycard consumer spending grew ~30% YoY in June on a nominal basis (~11% over June 2019) with essential spending increasing ~15% over 2019 while non-essential spending grew ~9% over June 2019; Online spending grew ~150% over June 2019 with online representing 20% of total spend and 48% of total transactions	↑
NFIB SMB confidence	The small business optimism index increased to 102.5 in June from 99.6 in May with business conditions expectations over the next six months rising 14% to a net negative (12%); Average selling prices increased 7% to a net 47% (seasonally adjusted), the highest reading since January 1981; Note: SMB payments volumes are the highest yielding for merchant acquirers (vs. larger merchants)	↑
First Data SpendTrend	Q2 2021 average of ~38% up significantly vs. Q2 2019 (~2%) and Q2 2020 (-~25%). All Industries data up ~43% QoQ with Q2 2021 Total E-Commerce Retail improving ~600bps vs. Q2 2019 and ~550 bps vs. Q1 2021; Total Brick and Mortar Retail is showing signs of recovery (up ~65% over Q2 2019 and 64% over Q1 2021); Note: SpendTrend is a macro-economic indicator based on aggregate SSS activity in the First Data POS network	↑
US card issuer volumes	Q2 2021 credit card volume improved sequentially from ~2% in Q1 2021 to ~47% YoY; Q2 2021 debit card volume growth accelerated ~11% vs. Q1 2021 from ~22% to ~33% YoY; total carded volume growth also accelerated ~35% in Q2 2021 vs. Q1 2021 from ~7% to ~42%; Note: US issuer volume includes AXP, BOA, COF, C, DFS, JPM, USB, WFC credit card volumes, and BOA, JPM, USB, WFC debit card volumes	↑

Source: the BLOOMBERG PROFESSIONAL™ service, FactSet, US Census Bureau, Company reports, NFIB, First Data, Barclays, IATA, Credit Suisse estimates; Data shown as illustrative of the items we track and is current as of Q1 & Q2 2021

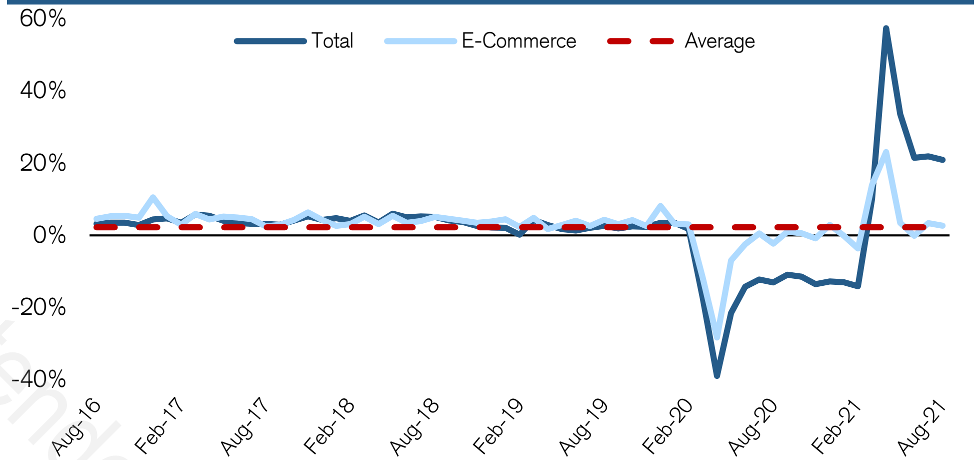
What's happening right now…macro and industry data backdrop

US Census Bureau & SpendTrend suggest eCommerce will continue to shine

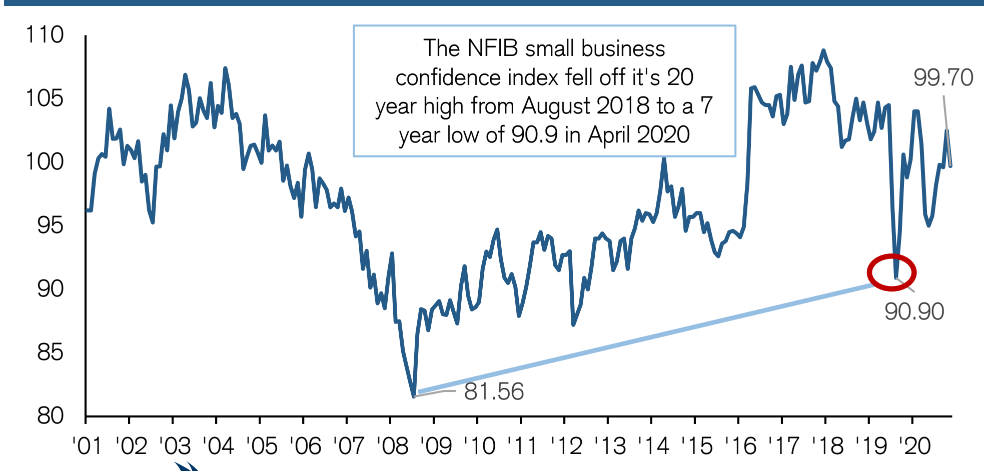
YoY Growth in e-Commerce retail sales was accelerated by the COVID-19 pandemic shifting consumer shopping habits. As a % of total retail sales, e-Commerce has grown to ~13% in 1Q 2021 from 1% in 2001



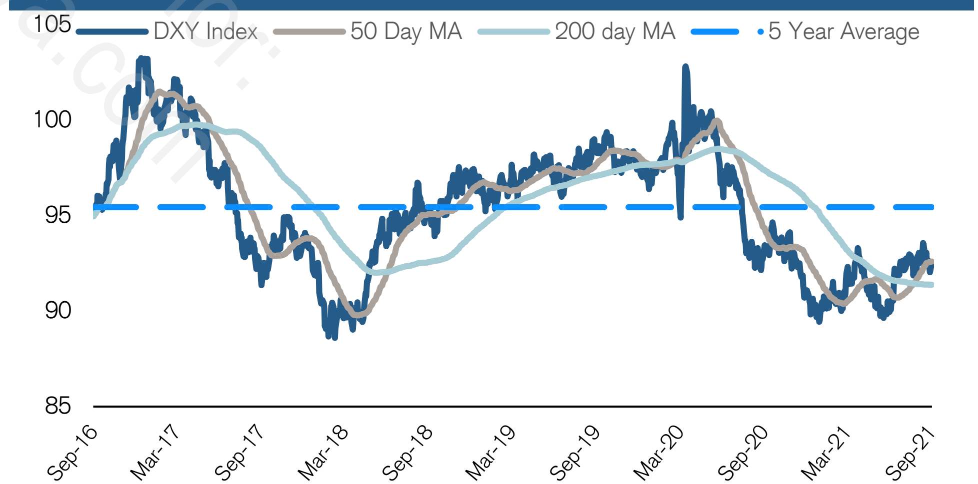
First Data Spend Trend (all industries SSS POS data) quarterly growth spiked in Q2 2021, but now reverting to long-term average



NFIB Small Business Confidence Index (1986=100); the index fell to a multi-year low in April 2020 as a result of the COVID-19 pandemic and has since rebounded, although remains below the 20-year high achieved in 2018



DXY index has fallen to levels last seen in 2018 (positive for cross-border card purchase volumes)



Credit Suisse

Source: FactSet, First Data SpendTrend, NFIB, US Census Bureau, Credit Suisse research

Payments, Processors, & FinTech detailed valuation table

Valuation across P/E, EV/Sales, EV/EBITDA, and relevant CAGRs

Ticker	Target Price	Rating	Price ($)	Market Cap ($mm)	EV ($mm)	Net Debt / EBITDA (2)	Sales 2020A	Sales 2021E	Sales 2022E	Sales 2023E	Sales 21-23E CAGR	EV/Sales (2022E)	Multiple-to-growth	Adj. EBITDA 2020A	Adj. EBITDA 2021E	Adj. EBITDA 2022E	Adj. EBITDA 2023E	Adj. EBITDA 21-23E CAGR	EV/EBITDA (2022E)	EBITDA margin %	Multiple-to-growth	Adj. EPS 2020A	Adj. EPS 2021E	Adj. EPS 2022E	Adj. EPS 2023E	Adj. EPS 21-23E CAGR	P/E (2022E)	Multiple-to-growth	3-Year Average PE
Payments																													
V	285	OP	224	489,030	489,767	0.0x	21,846	24,037	28,783	32,816	17%	17.0x	1.0x	14,868	16,749	20,401	23,540	19%	24.0x	70%	1.3x	5.04	5.80	7.23	8.61	22%	31.0x	1.4x	30.9x
MA	420	OP	347	344,807	351,487	0.7x	15,301	18,863	22,569	26,008	17%	15.6x	0.9x	8,755	10,857	13,888	16,477	23%	25.3x	58%	1.1x	6.43	8.15	10.63	13.03	26%	32.6x	1.2x	35.1x
PYPL	315	OP	280	335,460	332,755	(0.4x)	21,454	25,777	31,626	38,246	22%	10.5x	0.5x	6,324	7,657	9,450	11,701	24%	35.2x	30%	1.5x	3.88	4.72	5.88	7.38	25%	47.6x	1.9x	39.7x
SHOP	1700	NEUTRAL	1,466	186,632	179,954	N/A	2,929	4,631	6,235	8,639	37%	28.9x	0.8x	479	746	814	1,358	35%	221.0x	16%	6.3x	3.98	6.60	6.59	9.75	21%	222.5x	10.4x	573.7x
SQ	300	OP	247	128,019	127,763	(0.3x)	3,111	5,063	6,341	8,106	27%	20.1x	0.8x	474	1,070	1,363	1,937	35%	93.7x	21%	2.7x	0.84	1.89	2.30	3.16	29%	107.1x	3.7x	118.1x
FIS	160	OP	124	76,812	95,115	3.2x	12,552	13,921	15,033	16,126	8%	6.3x	0.8x	5,260	6,175	6,867	7,549	11%	13.9x	44%	1.3x	5.46	6.56	7.55	8.52	14%	16.4x	1.2x	20.1x
FISV	135	OP	110	73,937	94,939	3.3x	13,908	15,424	16,565	17,733	7%	5.7x	0.8x	5,445	6,470	7,119	7,797	10%	13.3x	42%	1.4x	4.42	5.57	6.50	7.46	16%	16.9x	1.1x	21.7x
(1) ADYEN-NL €	2,950	OP	€ 2,648	€ 81,525	81,106	(1.1x)	€ 684	€ 956	€ 1,324	€ 1,789	37%	61.3x	1.7x	€ 397	€ 616	€ 878	€ 1,215	40%	92.4x	64%	2.3x	€ 8.53	€ 14.85	€ 21.07	€ 29.20	40%	125.7x	3.1x	106.9x
GPN	225	OP	164	48,657	57,631	2.6x	6,748	7,738	8,520	9,342	10%	6.8x	0.7x	3,003	3,612	4,085	4,557	12%	14.1x	47%	1.1x	6.40	8.18	9.64	11.14	17%	17.1x	1.0x	22.8x
DLO	NC	NC	62	18,155	17,876	N/A	104	216	355	536	58%	50.3x	0.9x	42	92	157	248	64%	114.1x	43%	1.8x	-	0.25	0.44	0.70	66%	142.1x	2.2x	158.0x
JKHY	170	NEUTRAL	168	12,483	12,533	0.1x	1,697	1,758	1,906	2,049	8%	6.6x	0.8x	543	573	624	685	9%	20.1x	33%	NM	3.86	4.12	4.59	5.10	11%	36.6x	3.2x	38.2x
LSPD	115	OP	119	17,664	17,111	22.1x	150	292	388	487	29%	44.1x	1.5x	(21)	(35)	(11)	46	N/A	NM	NM	NM	(0.23)	(0.30)	(0.08)	0.50	N/A	NM	N/A	NM
NVEI-TSE	145	OP	129	18,655	18,637	(0.1x)	474	888	1,159	1,474	29%	16.1x	0.6x	206	380	505	664	32%	36.9x	43%	1.1x	1.06	2.05	2.60	3.33	27%	49.5x	1.8x	54.5x
PSFE	12	OP	8	6,108	8,306	N/A	1,427	1,552	1,749	1,956	12%	4.7x	0.4x	426	478	585	684	20%	14.2x	31%	0.7x	(0.07)	0.06	0.18	0.35	145%	46.6x	0.3x	NM
FOUR	100	OP	79	6,632	7,114	N/A	323	514	643	785	24%	11.1x	0.5x	91	178	244	300	30%	29.2x	35%	1.0x	(0.43)	0.58	1.18	1.85	79%	66.8x	0.8x	NM
QTWO	NC	NC	85	5,020	5,217	5.8x	407	499	595	711	19%	8.8x	0.5x	22	34	49	68	41%	107.1x	7%	2.6x	0.08	0.28	0.47	0.58	44%	179.3x	4.1x	406.4x
ACIW	NC	NC	32	3,865	4,901	3.0x	1,294	1,337	1,405	1,487	5%	3.5x	0.6x	359	379	405	441	8%	12.1x	28%	1.5x	0.62	1.12	1.29	1.58	19%	24.9x	1.3x	26.8x
(3) RPAY	30	OP	23	2,296	2,657	4.2x	155	219	282	333	23%	9.4x	0.4x	68	95	123	149	25%	21.6x	43%	0.8x	0.60	0.73	0.92	1.10	23%	24.7x	1.1x	34.7x
RSKD	34	OP	24	3,896	3,773	N/A	N/A	225	269	351	25%	14.0x	0.6x	-	(26)	(57)	(44)	30%	(66.2x)	NM	(2.2x)	-	(1.36)	(0.59)	(0.63)	(32%)	(40.3x)	NM	NM
MLNK	27.5	NEUTRAL	25	2,088	2,672	N/A	N/A	258	284	314	10%	9.4x	0.9x	-	113	117	133	8%	22.9x	44%	2.8x	-	0.11	0.28	0.38	83%	90.9x	1.1x	147.5x
PAYA	14	OP	11	1,337	1,446	N/A	206	248	285	325	14%	5.1x	0.4x	53	67	82	98	21%	17.6x	27%	0.8x	0.24	0.36	0.43	0.50	17%	25.8x	1.5x	NM
Median						**1.7x**					**19%**	**10.5x**	**0.8x**					**23%**	**23.5x**	**42%**	**1.3x**					**24%**	**41.6x**	**1.4x**	**38.9x**
B2B Payments / Other																													
FLT	275	NEUTRAL	261	22,154	25,173	2.1x	2,389	2,770	3,121	3,454	12%	8.1x	0.7x	1,253	1,528	1,763	2,004	15%	14.3x	55%	1.0x	11.09	12.94	15.08	17.40	16%	17.3x	1.1x	20.2x
WEX	210	NEUTRAL	174	8,042	10,242	3.1x	1,560	1,817	2,098	2,343	14%	4.9x	0.4x	572	734	859	996	17%	11.9x	40%	0.7x	6.06	8.61	10.73	12.56	21%	16.2x	0.8x	19.8x
VRRM	18.5	OP	15	2,541	3,403	4.1x	394	524	583	615	8%	5.8x	0.7x	182	251	286	308	11%	11.9x	48%	1.1x	0.51	0.59	0.89	1.05	33%	16.8x	0.5x	19.5x
BTRS	NC	NC	10	1,613	1,326	N/A	109	129	153	195	23%	8.7x	0.4x	(2)	(15)	(12)	(5)	(43%)	(112.8x)	NM	NM	(0.11)	(0.33)	(0.21)	(0.18)	(25%)	(47.7x)	NM	NM
EPAY	NC	NC	42	2,027	2,046	0.2x	442	471	520	582	11%	3.9x	0.4x	95	100	106	122	10%	19.3x	21%	1.9x	1.17	1.16	1.14	1.32	7%	37.2x	5.4x	33.4x
BILL	NC	NC	279	28,493	28,393	N/A	158	238	482	650	65%	58.9x	0.9x	(12)	(5)	(82)	(47)	212%	NM	NM	N/A	(0.17)	(0.12)	(0.92)	(0.66)	135%	NM	N/A	N/A
Median						**2.6x**					**13%**	**6.9x**	**0.5x**					**13%**	**11.9x**	**44%**	**1.0x**					**18%**	**16.8x**	**0.9x**	**20.0x**
Money Transfer																													
WPLCF	NC	NC	14	14,278	14,080	(1.8x)	421	541	682	854	26%	20.6x	0.8x	109	131	168	215	28%	83.7x	24%	3.0x	0.05	0.06	0.07	0.10	32%	193.5x	6.1x	154.6x
WU	23	UP	22	8,942	10,865	1.6x	4,835	5,157	5,298	5,488	3%	2.1x	0.6x	1,217	1,319	1,411	1,475	6%	7.7x	26%	1.3x	1.87	2.07	2.30	2.50	10%	9.4x	1.0x	11.2x
EEFT	NC	NC	128	6,972	6,767	(0.6x)	2,483	2,954	3,491	4,016	17%	1.9x	0.1x	302	403	701	876	47%	9.7x	14%	0.2x	2.82	3.63	7.84	10.13	67%	16.4x	0.2x	20.5x
IMXI	18.5	NEUTRAL	18	700	645	(0.7x)	357	446	495	567	13%	1.3x	0.1x	68	82	93	106	14%	6.9x	18%	0.5x	1.10	1.36	1.50	1.69	11%	11.7x	1.0x	14.0x
Median						**(0.7x)**					**15%**	**2.0x**	**0.4x**					**21%**	**8.7x**	**21%**	**0.9x**					**21%**	**14.0x**	**1.0x**	**17.3x**
Buy Now, Pay Later (BNPL)																													
AFRM	105	NEUTRAL	111	38,796	39,066	326.6x	N/A	870	1,198	1,697	40%	32.6x	0.8x	-	(24)	(58)	(3)	(65%)	NM	NM	NM	-	(2.29)	(0.85)	(0.68)	NM	NM	NM	NM
APT-ASX	147	OP	93	29,137	29,311	N/A	519	925	1,536	2,326	59%	19.1x	0.3x	44	39	130	356	203%	225.7x	9%	1.1x	(0.08)	(0.55)	0.12	0.46	N/A	NM	N/A	NM
Median						**326.6x**					**49%**	**25.8x**	**0.6x**					**69%**	**225.7x**	**9%**	**1.1x**					**N/A**	**N/A**	**N/A**	**N/A**
Digital Lending (Mortgage)																													
RKT	19	NEUTRAL	17	33,761	64,882	2.3x	15,735	12,447	9,596	9,677	(12%)	6.8x	NM	10,074	5,858	3,895	4,138	(16%)	16.7x	47%	NM	4.11	2.16	1.52	1.55	(15%)	11.1x	NM	10.7x
SOFI	16.5	NEUTRAL	15	13,287	15,086	N/A	566	962	1,439	2,074	47%	10.5x	0.2x	(45)	36	209	477	264%	72.0x	4%	0.3x	-	(0.54)	(0.01)	0.25	N/A	NM	N/A	NM
LDI	15.0	OP	7	2,275	3,754	0.2x	4,306	3,700	3,356	3,313	(5%)	1.1x	NM	2,085	899	992	939	2%	3.8x	24%	1.7x	4.50	1.86	1.84	2.07	6%	4.0x	0.7x	5.6x
Median						**1.3x**					**(5%)**	**6.8x**	**0.2x**					**2%**	**16.7x**	**24%**	**1.0x**					**(5%)**	**7.5x**	**0.7x**	**8.2x**
Mean						2.5x					20%	15.0x	0.7x					27%	29.7x	36%	1.4x					33%	47.9x	2.0x	85.8x
Median						1.6x					17%	8.7x	0.7x					20%	18.5x	38%	1.2x					22%	28.4x	1.2x	33.4x

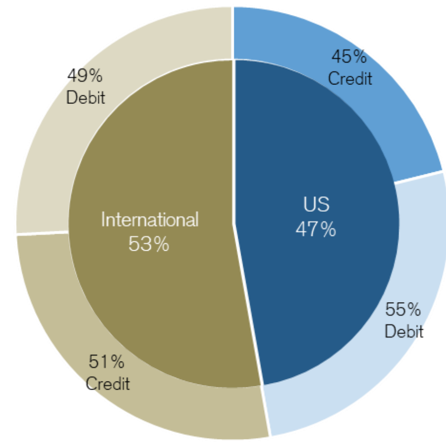
Source: Company reports, FactSet, Credit Suisse estimates

(1) Gross Profit is reported Net Revenue - which is revenue less interchange and other payaways, (2) International companies EBITDA on an annual basis, (3) Repay historicals and shares from CS model, FactSet does not have pro-forma financials in database or updated share count

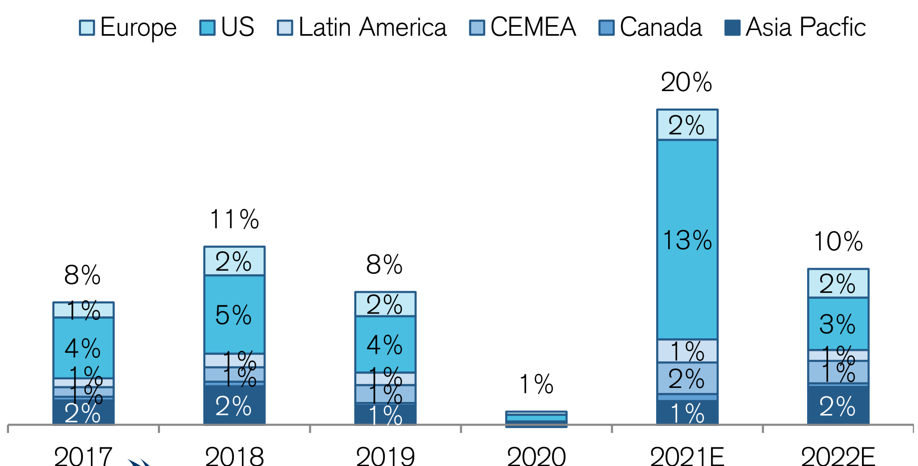
Visa (V)
Higher US & debit exposure vs. Mastercard

- Mid- to high-teens EPS compounder with higher relative exposure to the US, UK, and debit (benefitting from stimulus fund disbursements, vs. MA higher international and credit).
- Value-added services to continue to grow in the mid-teens+, particularly consulting & analytics services which continue to be in great demand.
- Largely fixed operating expense base to drive a return to operating leverage as volumes recover.
- Greater beneficiary of US contactless rollout given mix (~47% of volumes vs. ~37% for MA).
- Improved cross-border mix with eCommerce and new cross-border flows such as remittances, marketplace payouts, and B2B.

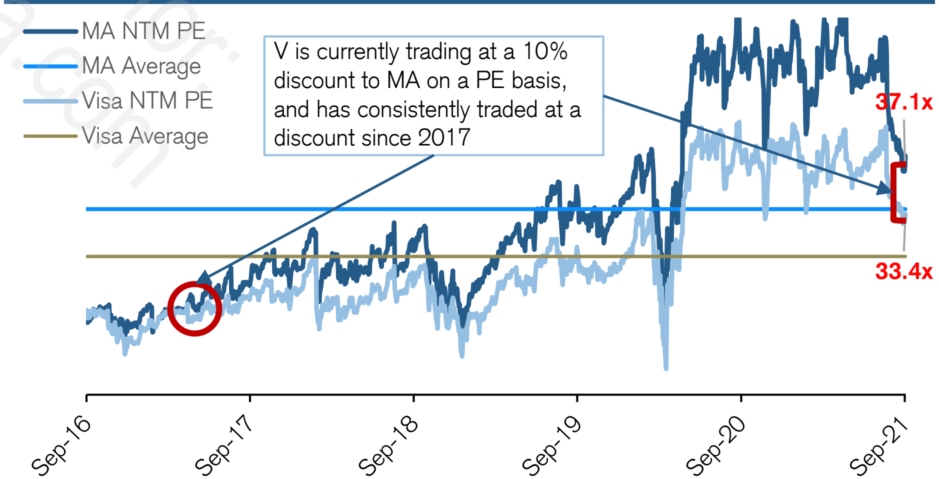
Visa's volumes are weighted more toward US & debit relative to Mastercard (which has higher exposure to International and credit)



Visa organic, ex-FX volume growth more driven by US vs. Mastercard, with ~63% of volumes international (vs. ~53% for Visa)



5-Year NTM P/E; MA has consistently traded at a premium vs. V, dating back to 2017



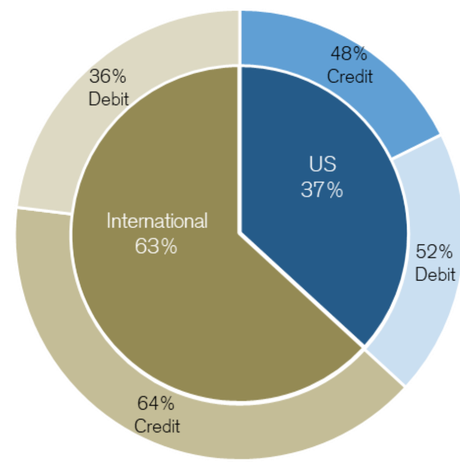
Source: Company reports, FactSet, Credit Suisse estimates

Mastercard (MA)

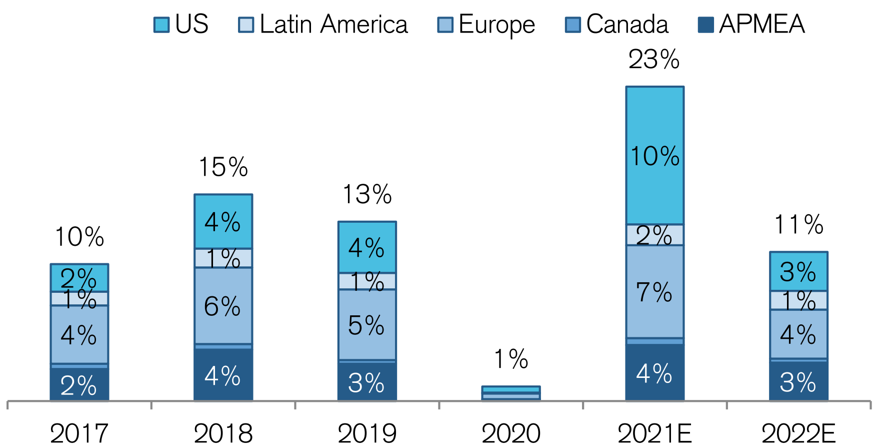
Attractive regional mix, double-digit compounder

- High-teens EPS compounder featuring higher relative exposure to faster-growth international markets (relative to V).
- Greater credit mix, and slightly greater travel mix (pre-COVID) within cross-border vs. Visa (expect strong cross-border recovery alongside improving mix now skewing more toward faster growth end-markets such as eCommerce, remittances and B2B).
- Acquisitions (Vocalink, Transfast, Nets, Finicity, Ekata) support a multi-rail approach and efforts to attract B2B flows (Mastercard Track), along with Transactis in bill-pay (Mastercard Bill Pay Exchange).
- Services business a key element to bringing in new clients, but also becoming an independent revenue stream. Additionally, MA is building significant loyalty and security assets which have also helped add issuers and merchants.

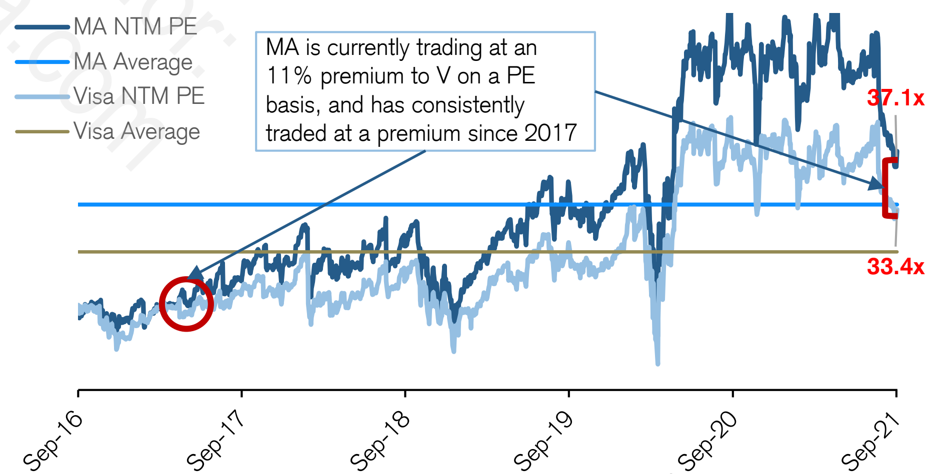
Mastercard's volumes are weighted more toward International & credit relative to Visa (which has higher exposure to US & debit)



Mastercard has an organic, ex-FX volume growth premium to Visa, driven by exposure to faster growing geographies



5-Year NTM P/E; MA has consistently traded at a premium vs. V, dating back to 2017



Source: Company reports, FactSet, Credit Suisse estimates

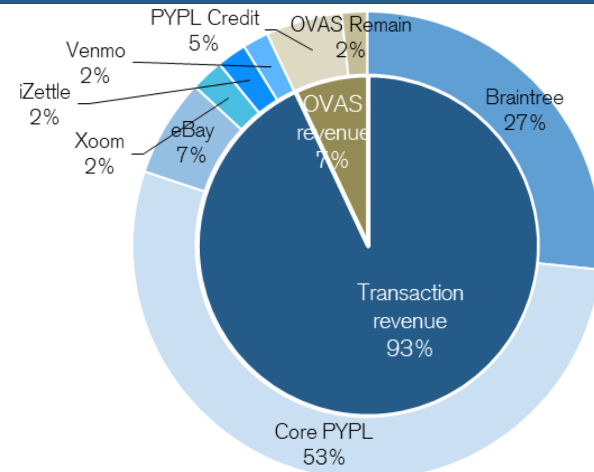
CS Rating	**OUTPERFORM**
CS Target Price	**$315**

PayPal (PYPL)

Rare large-cap with ~20% 5-year revenue CAGR guidance

- Near pure play eCommerce platform exposed to large TAM ("True TAM" inclusive of global eCommerce, online travel, eFood delivery, eTicketing, online charitable donations, ride-sharing, crowdfunding, gaming, streaming subscriptions, and more), supportive of management's outlook calling for a ~20% revenue CAGR (organic) through 2025E.
- Long list of emerging areas of upside (i.e., Braintree becoming more global, Venmo moving from an EPS drag to boost, in-store, BNPL, crypto & stock trading, bill-pay, China, iZettle, Honey, Paidy/Japan).
- Multi-year product roadmap including high yield savings account, investment capabilities (stocks and other), bill pay, subscription management, budgeting tools, shopping tabs (Honey), etc.

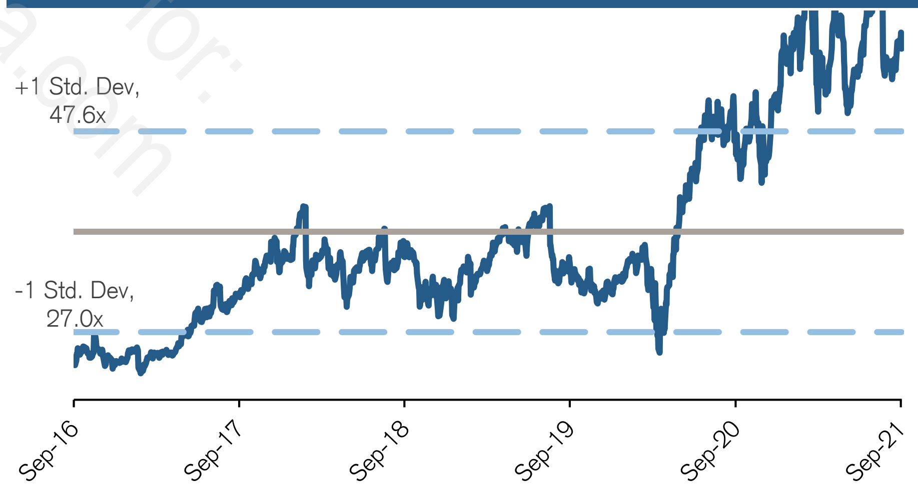
2021E revenue mix, with the vast majority of monetization via transaction-based revenue (Braintree ~25% of total)



We expect healthy Venmo ARPU (>30% CAGR) and user (~15% CAGR) growth from 2020 – 2023E

	2020A	1Q21A	2Q21A	3Q21E	4Q21E	2021E	2022E	2023E	2024E
Total Payment Volume	936,062	285,447	310,992	314,648	353,316	1,264,403	1,579,436	1,971,110	2,429,356
YoY	*31%*	*50%*	*40%*	*28%*	*28%*	*35%*	*25%*	*25%*	*23%*
2-year FXN Organic	*61%*	*73%*	*76%*	*71%*	*72%*	*74%*	*66%*	*56%*	*54%*
Venmo users (millions)	63	73	76	78	81	77	87	97	108
YoY	*35%*	*31%*	*25%*	*21%*	*17%*	*23%*	*13%*	*12%*	*11%*
ARPU by product									
Pay with Venmo	*$1.4*	*$2.2*	*$3.3*	*$3.6*	*$3.6*	*$3.1*	*$5.0*	*$7.1*	*$9.2*
Venmo Debit Card	*$4.7*	*$5.0*	*$5.0*	*$4.5*	*$4.5*	*$4.7*	*$5.6*	*$7.6*	*$9.9*
Venmo Credit Card	*$0.0*	*$0.1*	*$0.2*	*$0.2*	*$0.2*	*$0.2*	*$0.4*	*$0.9*	*$1.4*
Instant Transfer	*$4.1*	*$3.8*	*$3.9*	*$4.5*	*$5.0*	*$4.2*	*$5.6*	*$5.6*	*$5.1*
Business Profiles	*$0.0*	*$0.0*	*$0.1*	*$0.3*	*$0.5*	*$0.2*	*$0.9*	*$2.0*	*$3.8*
Bill Pay net	*$0.0*	*$0.0*	*$0.0*	*$0.1*	*$0.2*	*$0.1*	*$0.4*	*$0.8*	*$1.6*
Crypto Trading	*$0.0*	*$0.0*	*$0.0*	*$0.1*	*$0.1*	*$0.1*	*$0.2*	*$0.4*	*$0.8*
P2P funded by cc	*$0.7*	*$0.7*	*$0.8*	*$0.8*	*$0.8*	*$0.8*	*$1.6*	*$1.6*	*$1.6*
ARPU	*$10.9*	*$11.9*	*$13.3*	*$14.0*	*$14.9*	*$13.3*	*$19.6*	*$26.0*	*$33.4*
ARPU YoY	*37%*	*20%*	*19%*	*20%*	*24%*	*22%*	*47%*	*33%*	*28%*

PayPal's P/E has inflected since mid-2016's "Choice" decision, and further in 2021 due to meaningful "call options" ahead



Source: Company reports, FactSet, Credit Suisse estimates

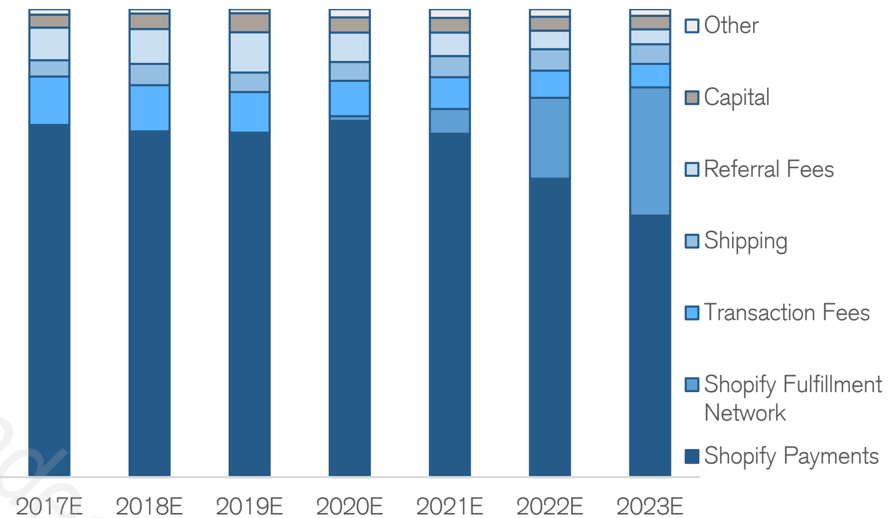
CS Rating	NEUTRAL
CS Target Price	$1,700

Shopify (SHOP)

Poised to capitalize from software solutions & commerce-enablement

- Well positioned within one of the most important themes within our coverage universe over the coming decade: the increasing intersection of software, payments, and a broader list of embedded commerce-enablement services (including both financial services and other merchant services such as fulfillment, shipping, and other back-office management tools).
- Continued investments into Financial Solutions, highlighted by Shop Pay (and Shop App) to drive checkout share, engagement, and Shopify Payments penetration (optionality on and off platform to further build network effects), along with growth in Shopify Capital, rollout of Shopify Balance (SMB digital banking), and more.
- Nascent in-store & omnichannel offerings provide potential for TAM expansion/realization.

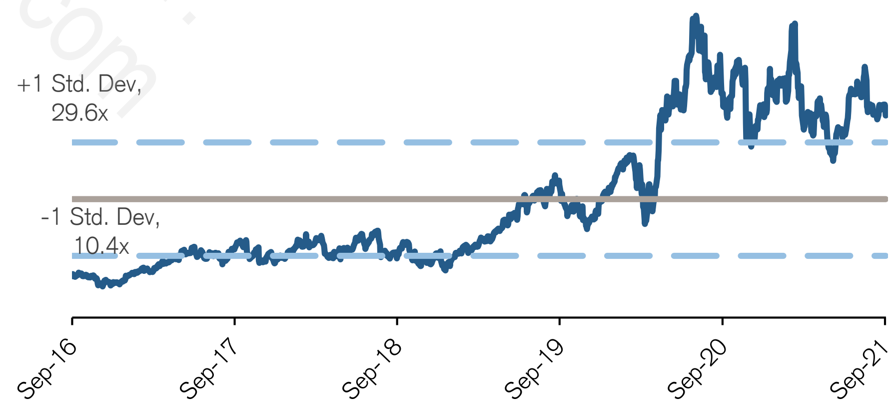
Shopify Fulfillment Network is expected to become an increasingly important contributor to Merchant Solutions Revenue



Revenue Build – We believe Payments and Fulfillment will be main drivers of growth over 2020-2023E

	2020A	1Q21A	2Q21A	3Q21E	4Q21E	2021E	2022E	2023E
Subscription Solutions Revenue	908,757	320,681	334,237	359,293	356,186	1,370,397	1,629,482	1,895,604
YoY	*41%*	*71%*	*70%*	*46%*	*27%*	*51%*	*19%*	*16%*
Shopify Fulfillment Network	19,730	12,324	34,810	48,080	63,637	158,851	794,435	1,899,276
YoY	*1457%*	*329%*	*601%*	*843%*	*838%*	*705%*	*400%*	*139%*
Shopify Payments	1,524,200	491,082	578,408	608,162	686,409	2,364,060	3,075,348	3,933,248
YoY	*121%*	*144%*	*52%*	*53%*	*26%*	*55%*	*30%*	*28%*
Transaction Fees	151,102	46,127	50,366	54,029	62,686	213,208	272,076	342,498
YoY	*86%*	*99%*	*31%*	*39%*	*24%*	*41%*	*28%*	*26%*
POS	10,029	3,370	3,370	3,520	3,520	13,779	16,535	19,842
Referral Fees	125,217	22,491	35,707	34,201	64,122	156,521	183,130	210,599
Capital	65,413	22,753	28,930	30,862	33,923	116,468	167,606	234,648
Shipping	80,896	29,394	33,835	36,615	42,764	142,608	215,203	291,962
6 River Systems	25,000	10,000	10,500	10,500	13,500	44,500	57,850	75,205
Total Merchant Solutions Revenue	2,020,734	667,966	785,208	815,470	957,060	3,225,704	4,724,333	6,932,073
YoY	*116%*	*137%*	*52%*	*56%*	*37%*	*60%*	*46%*	*47%*

EV/Sales multiple expanded meaningfully during pandemic due to merchant adds and GMV growth



Source: Company reports, FactSet, Credit Suisse estimates

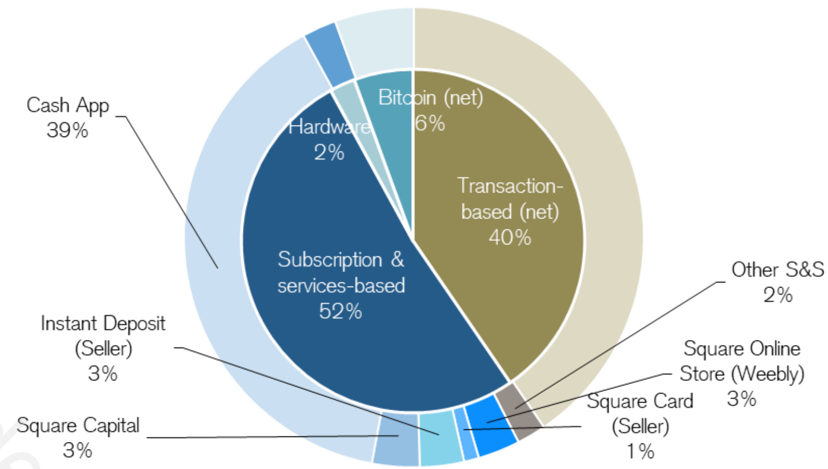
Square (SQ)

CS Rating	OUTPERFORM
CS Target Price	$300

“Recycling” monetization via software, payments, & financial services

- Intersection of software + payments, with a 3x "recycling" (Seller ecosystem, Cash App/Card, and Business Debit/ID).
- Cash App scaling rapidly, spurred by COVID-related stimulus efforts and a broader shift to digital banking (amid the pandemic), specifically direct deposit-related funds feeding higher Cash Card attachment rates and subsequent spending.
- Acquisition of Afterpay (announced August 2021) to bolster the size, growth rate, and diversification of gross profit streams, with potential for meaningful synergies (e.g., large seller mix for Square, smaller seller mix for Afterpay, additional Afterpay users via Cash App base, processing cost savings, international expansion, etc.).
- Optionality with Pay with Cash App online button, supported by Afterpay acquisition.

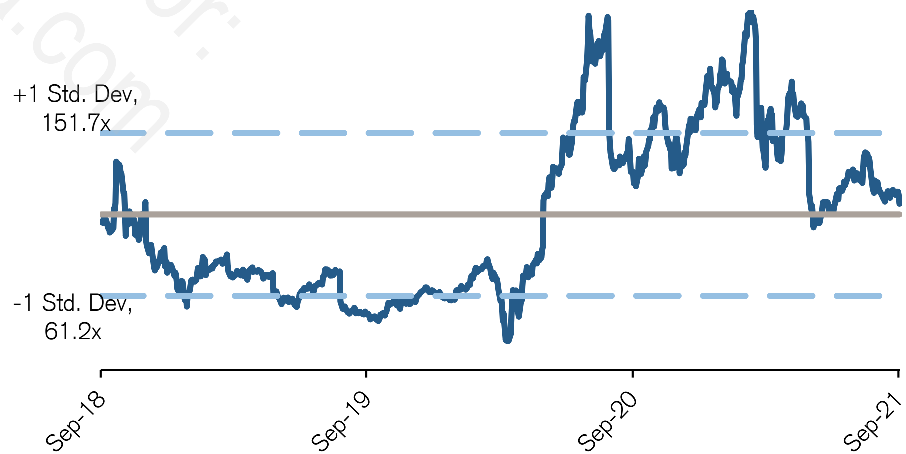
Square sources ~50% of its revenue from S&S (mostly Cash App) and another ~40% via the core seller transaction-based business in 2021E



Seller business share gains (large new cohort) in 2020, alongside expanded marketing, sales team additions, and recovery to drive 2021

	2020A	1Q21A	2Q21A	3Q21E	4Q21E	2021E	2022E	2023E	2024E
Gross Payment Volume (GPV)	112,295	33,138	42,828	46,200	46,224	168,390	212,496	261,541	319,088
YoY organic	*6%*	*29%*	*88%*	*46%*	*44%*	*50%*	*26%*	*23%*	*22%*
2-year organic	*33%*	*47%*	*60%*	*64%*	*61%*	*59%*	*89%*	*55%*	*50%*
Net transaction revenue	1,383	435	543	555	543	2,076	2,490	2,966	3,632
Net take rate	*1.23%*	*1.31%*	*1.27%*	*1.20%*	*1.17%*	*1.23%*	*1.17%*	*1.13%*	*1.14%*
YoY	*21%*	*49%*	*84%*	*38%*	*38%*	*50%*	*20%*	*19%*	*22%*
S&S revenue	1,539	558	685	692	728	2,663	3,581	4,826	6,160
Hardware revenue	92	29	44	35	32	140	146	167	184
Bitcoin Net revenue	97	75	55	27	27	184	124	147	183
Total adjusted revenue	**3,111**	**1,097**	**1,326**	**1,310**	**1,330**	**5,063**	**6,341**	**8,106**	**10,158**
YoY organic	*46%*	*78%*	*96%*	*44%*	*46%*	*63%*	*25%*	*28%*	*25%*
Seller ecosystem	*1,678*	*514*	*690*	*713*	*710*	*2,628*	*3,282*	*4,082*	*5,085*
Cash App ecosystem	*1,433*	*582*	*636*	*597*	*620*	*2,436*	*3,058*	*4,024*	*5,073*
YoY - Seller	*9%*	*30%*	*97%*	*54%*	*51%*	*57%*	*25%*	*24%*	*25%*
YoY - Cash App	*148%*	*164%*	*94%*	*34%*	*41%*	*70%*	*26%*	*32%*	*26%*

EV/EBITDA multiple on NTM estimates, expanded meaningfully in 2020 due to Seller share gains & Cash App acceleration



Source: Company reports, FactSet, Credit Suisse estimates

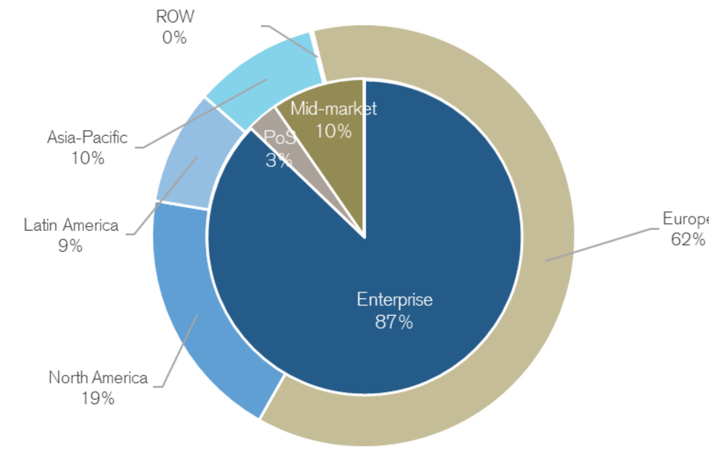
CS Rating	OUTPERFORM
CS Target Price	€ 2,950

Adyen (ADYEN.AS)

A leading global eCommerce & omnichannel payments platform

- See a long runway within its expanding TAM (increasingly addressing in-store POS, mid-market & long-tail via platforms) and potential for ramping of new products (issuing, and potentially additional embedded financial services) allowing for persistent high levels of growth ahead.
- Absolute dollar volumes being captured by Adyen's platform continue to represent increasingly formidable competition vs. our broader coverage universe, particularly in North America where the region's contributions now make up ~22% of net revenue (accelerating to +80% YoY), with management calling out consistent US domestic volume wins (vs. prior more skewed to supporting US merchants' expansion efforts abroad).
- Beginnings of embedded financial services offering, bolstered by bank charter in US (issuing and beyond).

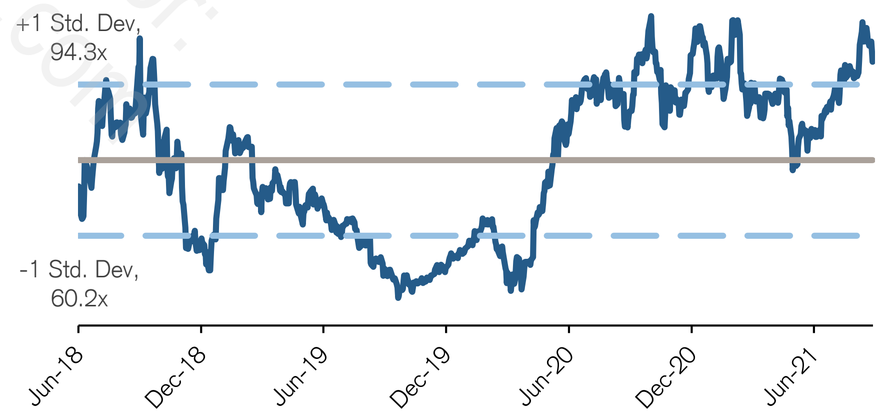
Enterprise accounted for ~85% of processed volumes (center) in 2020, with ~2/3 of total net revenue from the Europe



Volume and net revenue build: forecast annual volume growth well above 30% with stable total net take rates at ~0.20%

	FY18A	FY19A	FY20A	FY21E	FY22E	FY23E	FY24E
Total processed volume (x)	**159**	**240**	**304**	**495**	**694**	**957**	**1285**
YoY		*51%*	*27%*	*63%*	*40%*	*38%*	*34%*
Group average transaction value (y)	29	29	27	28	28	28	28
Total no. of transactions (bn) (a) = (x) / (y)	5.5	8.3	11.1	17.6	24.7	34.1	45.9
Processing fees (b)	0.024	0.021	0.020	0.016	0.014	0.014	0.014
Processing revenues (a) x (b)	133	176	217	275	348	470	633
as % of processed volume	*0.08%*	*0.07%*	*0.07%*	*0.06%*	*0.05%*	*0.05%*	*0.05%*
Total Acquired volume	**111**	**173**	**242**	**400**	**572**	**799**	**1079**
YoY		*55%*	*40%*	*66%*	*43%*	*40%*	*35%*
% of processed volume	*70%*	*72%*	*80%*	*81%*	*83%*	*83%*	*84%*
Net Acquiring fees	*0.13%*	*0.13%*	*0.15%*	*0.14%*	*0.14%*	*0.13%*	*0.13%*
Net settlement revenue	149	229	358	563	776	1067	1420
Other services revenue	65	93	111	143	196	265	358
Total net revenue	**349**	**497**	**684**	**980**	**1,320**	**1,803**	**2,411**
YoY		*42%*	*38%*	*43%*	*35%*	*37%*	*34%*
Net take rates	***0.22%***	***0.21%***	***0.23%***	***0.20%***	***0.19%***	***0.19%***	***0.19%***

Valuation history (EV/EBITDA on a NTM-basis) since IPO in Q2 2018



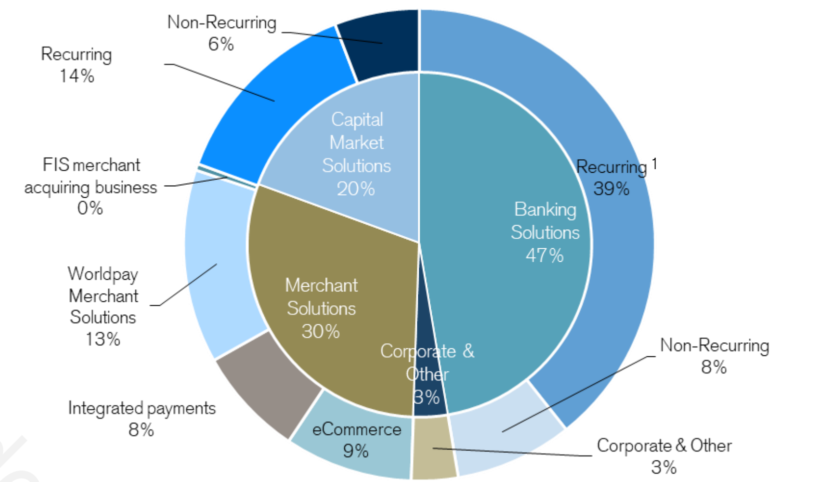
Source: Company reports, FactSet, Credit Suisse estimates

Fidelity National Information Services (FIS)

+6-9% top line for the foreseeable future (through 2024)

- Top line accelerating in 2021 and maintaining relatively faster rates of growth in the medium-term, with guidance recently updated calling for +7-9% growth extended into 2024.
- Banking segment improved topline trajectory fueled by top 100 bank wins (existing and new) and cross-sell (lending modules potential to double account & deposit-based revenue) opportunity.
- Meaningful exposure to high-growth channels, with high percentage of merchant acquiring in global eCommerce & integrated payments; longer-term in-store expansion in new countries (i.e., ~HSD today vs. GPN at 38).

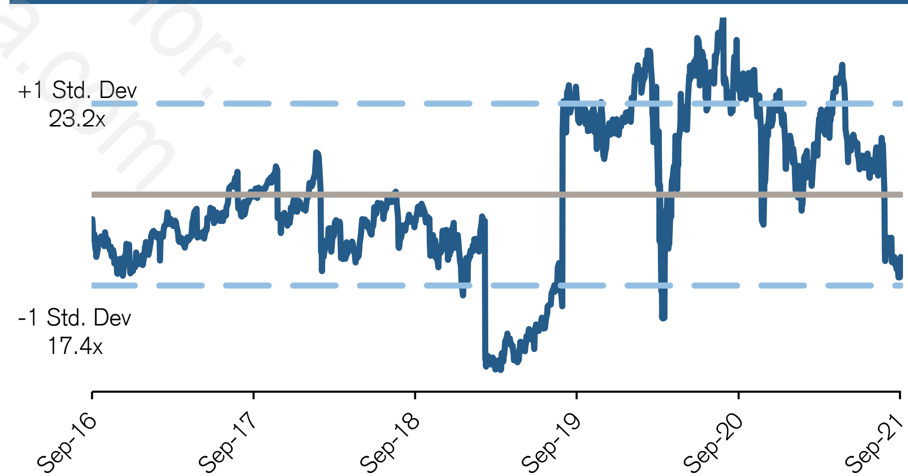
Banking solutions accounted for ~47% of revenues in 2020 (with ~85% stemming from North America)



FIS top-line growth benefiting from top 100 bank wins and a recovering Merchant segment in the near-medium term

	2020A	1Q21A	2Q21E	3Q21E	4Q21E	2021E	2022E	2023E	2024E
Total revenue	12,553	3,223	3,475	3,548	3,732	13,978	15,171	16,296	17,325
YoY reported	*(1%)*	*5%*	*17%*	*11%*	*13%*	*11%*	*9%*	*7%*	*6%*
YoY FXN	*(1%)*	*4%*	*15%*	*10%*	*12%*	*10%*	*10%*	*7%*	*6%*
Inorganic contribution to growth	*1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Revenue synergies run-rate ($)	*210*	*300*	*450*	*580*	*705*	*705*	*805*	*845*	*845*
Revenue synergies contribution to growth	*1%*	*2%*	*3%*	*3%*	*4%*	*3%*	*2%*	*0%*	*0%*
YoY organic FXN (w/ synergies)	*(1%)*	*4%*	*16%*	*11%*	*13%*	*11%*	*9%*	*8%*	*6%*
2-year	*(2%)*	*1%*	*3%*	*5%*	*8%*	*6%*	*16%*	*15%*	*14%*
YoY organic FXN ex-synergies	*(2%)*	*2%*	*13%*	*7%*	*9%*	*8%*	*7%*	*7%*	*6%*

FIS multiple on out year numbers came under pressure during 1H 2021 due to longer-term competitive concerns



Source: Company reports, FactSet, Gardner, Credit Suisse estimates
[1] Data in outer chart related to recurring, non-recurring, etc. is estimated as of 2019 (time of FIS/WP merger).

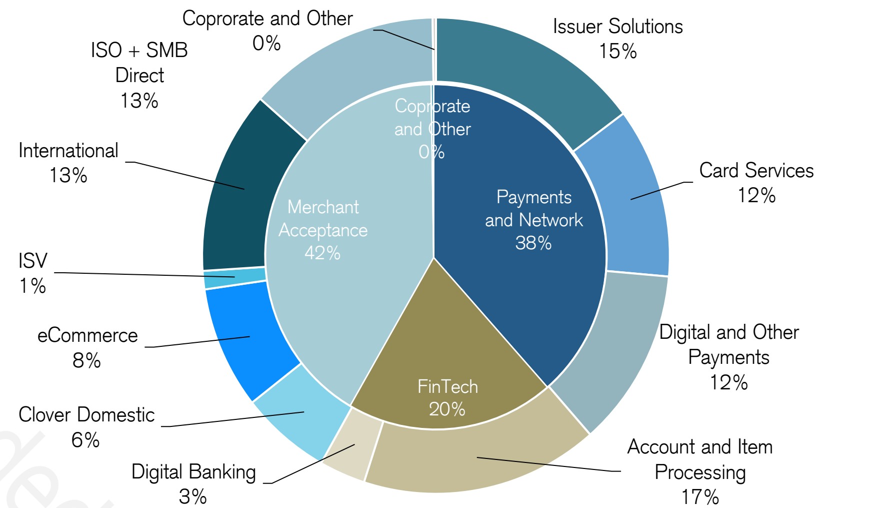
Fiserv (FISV)

Scale begets scale

CS Rating	**OUTPERFORM**
CS Target Price	**$135**

- Acceptance segment to benefit from an improving mix toward its four "crown jewel" businesses in Clover, ISV (CardConnect), eCommerce (Carat), and International.
- Medium-term guidance (2022-2023) suggests a runway ahead for +7-9% internal revenue growth and +15-20% EPS growth. Our Acceptance segment mix analysis suggest Merchant segment growth forecast is achievable.
- At Dec 2020 Analyst Day, the ~$1.2b in cost synergies pulled forward implies a more conservative pace of underlying margin expansion ex-cost synergy, leaving potential for upside ahead, either via margin flow-through or added re-investment for the persistence of growth.

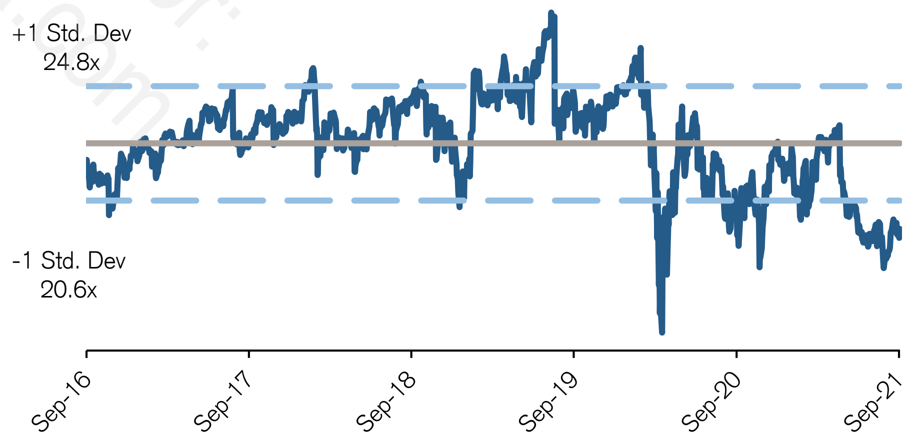
Estimated business mix (2021E) of FISV



FISV will benefit from revenue synergies and an improving Acceptance segment mix (toward "crown jewel" businesses)

	2020A	1Q21A	2Q21A	3Q21E	4Q21E	2021E	2022E	2023E	2024E
Total Adj. Revenue	**13,908**	**3,557**	**3,855**	**3,994**	**4,127**	**15,534**	**16,818**	**18,116**	**19,512**
YoY reported	(4%)	2%	20%	11%	14%	12%	8%	8%	8%
YoY Organic	(1%)	4%	14%	15%	17%	13%	10%	8%	8%
YoY FXN Organic (w/ Synergies)	0%	4%	14%	15%	17%	12%	10%	8%	8%
Run-rate Synergies ($)	184	239	314	331	348	348	416	549	674
Incremental Synergies (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%
YoY FXN Organic ex-Synergies	(1%)	3%	12%	14%	16%	11%	9%	7%	7%
2-year FXN Organic ex-Synergies	5%	7%	3%	16%	16%	10%	22%	17%	14%
Inorganic % to growth	(0%)	(0%)	5%	1%	1%	1%	0%	0%	0%

Similar to FIS, FISV's multiple (on out year numbers) came under pressure vs. pre-COVID levels during 2020 and 1H 2021



CREDIT SUISSE

Source: Company reports, FactSet, Credit Suisse estimates

[1]Illustrativve analysis of revenue mix

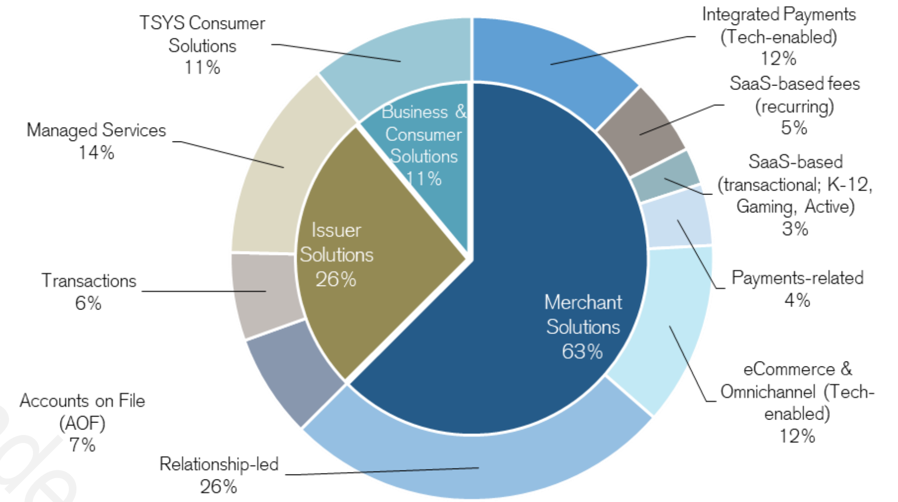
CS Rating	OUTPERFORM
CS Target Price	$225

Global Payments (GPN)

Owned & partnered software mix/approach within merchant acquiring

- Highest relative exposure to the fastest growing channels (2021E) of the large cap merchant acquirers: 1) ~45-50% owned & partnered software; 2) ~25-30% global eCommerce & omnichannel (inclusive of ~800bps within software); and 3) ~20% International, with leading on-the-ground support in ~38 markets.
- Near-term supported by greater bounce back in depressed verticals, (e.g., in-store gaming, outdoor events, K-12 education, etc.).
- Leading credit issuer processor with dominant share in the US, UK, Ireland, Canada, and China (~MSD%+ growth vs. industry +3%); TAM expansion via AWS partnership (smaller issuers & FinTechs).
- MineralTree acquisition expands TAM into B2B AP automation and increases GPN's B2B scale to >$600mm in revenue and prospects for further M&A ahead (a return to software-led accretive M&A).

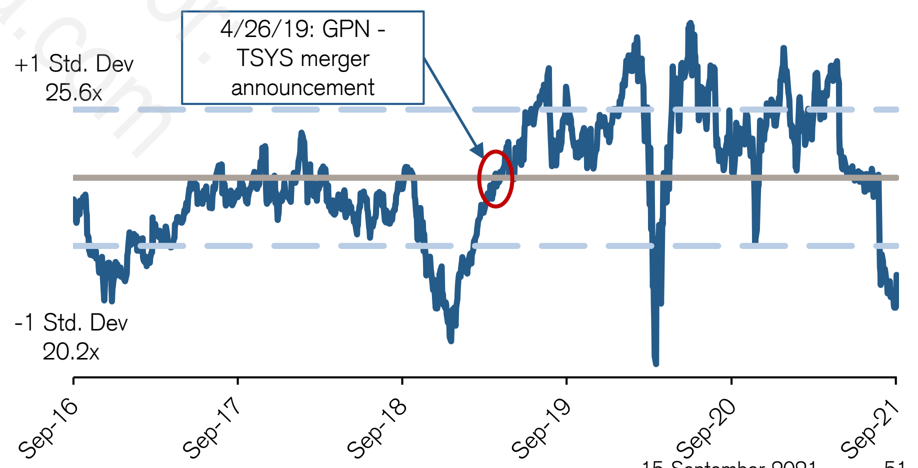
Estimated business mix (2020E) of the combined GPN-TSS entity



Global Payments guided to an organic growth range of ~HSD-LDD over the coming ~3-5 years alongside improving mix to software-led

	2020A	1Q21A	2Q21A	3Q21E	4Q21E	2021E	2022E	2023E	2024E
Total adjusted revenue	6,748	1,812	1,941	2,004	2,011	7,768	8,598	9,380	10,211
YoY reported	(5%)	5%	28%	15%	15%	15%	11%	9%	9%
YoY Organic	(6%)	4%	27%	13%	13%	14%	10%	9%	9%
YoY FXN Organic (ex-Synergies)	(6%)	3%	25%	12%	12%	13%	9%	9%	9%
Run-rate Synergies ($)	30	50	68	91	109	109	164	164	164
Incremental Synergies (%)	0%	1%	1%	1%	1%	1%	1%	0%	0%
YoY FXN Organic (w/Synergies)	(5%)	4%	26%	14%	13%	14%	10%	9%	9%
Inorganic contribution to growth (%)	1%	1%	0%	2%	2%	1%	1%	0%	0%

GPN has historically traded at a meaningful premium to the market, with estimates typically low due to continued M&A (software emphasis)



Credit Suisse

Source: Company reports, FactSet, Credit Suisse estimates

Return to Main Table of Contents

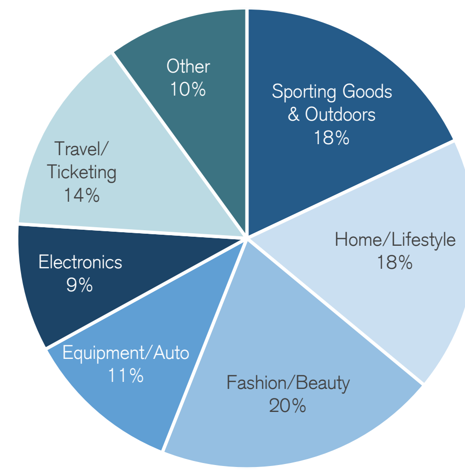
CS Rating	**NEUTRAL**
CS Target Price	**$105**

Affirm (AFRM)

Leading platform in nascent eComm-focused BNPL end market

- Operates in a large (~$1tr+ US eCommerce & Online Travel) and constantly expanding addressable market, with a long list of areas for potential upside (SHOP, AMZN, debit card, international expansion, etc.).
- Amazon partnership positions Affirm well with three leading eCommerce platforms in the US (Amazon, Shopify, and Walmart), supportive of network effects and future merchant & consumer additions ahead.
- In our base case, we assume Shopify contributes nearly ~$4b to FY 2024E GMV and Amazon contributes ~$6.5b, with potential for far greater contributions in the event of upstream presentment supportive of checkout share gains.

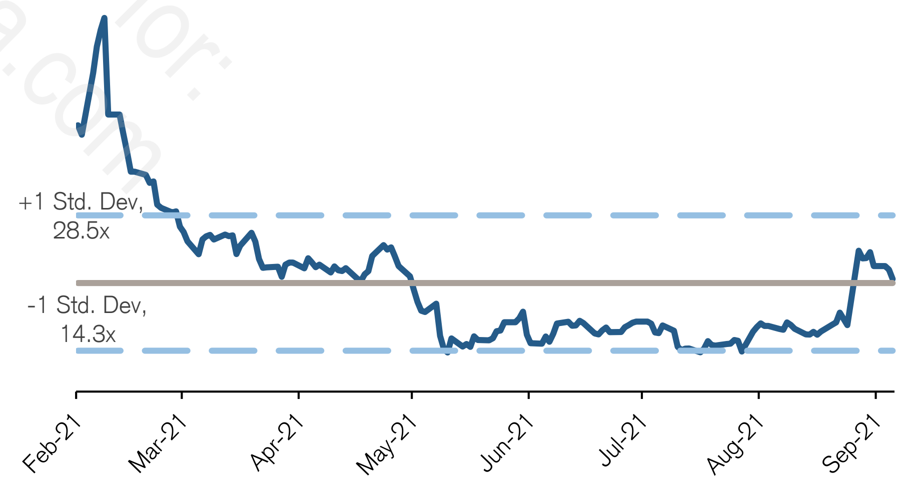
Vertical Mix (GPV), with fashion/beauty, sporting goods, & home/lifestyle as the leading categories



We expect SHOP Pay Installments to contribute ~10pps to GMV growth per annum in FY2022-2024E

	F2020A	F1Q21	F2Q21	F3Q21	F4Q21	F2021	F2022E	F2023E	F2024E
Total active consumers	3,618	3,882	4,493	5,364	7,121	7,121	11,048	17,335	25,837
YoY	*77%*	*63%*	*52%*	*60%*	*97%*	*97%*	*55%*	*57%*	*49%*
Active consumers US (thousands)	3,608	3,867	4,478	5,142	6,858	6,858	10,561	16,581	24,706
YoY	*76%*	*62%*	*51%*	*54%*	*90%*	*90%*	*54%*	*57%*	*49%*
Active consumers international (thousands)	10	15	15	222	263	263	487	754	1,131
YoY	-	-	*602%*	*4130%*	*2618%*	*2618%*	*85%*	*55%*	*50%*
Total GMV	4,637	1,476	2,075	2,257	2,484	8,292	12,729	19,879	29,728
YoY	*77%*	*71%*	*55%*	*83%*	*106%*	*79%*	*54%*	*56%*	*50%*
2-Year		*147%*	*213%*	*233%*	*228%*	*210%*	*229%*	*176%*	*143%*
Peloton AFRM GMV	1,075	427	440	405	215	1,486	997	1,067	1,175
YoY	*154%*	*319%*	*56%*	*33%*	*-45%*	*38%*	*-33%*	*7%*	*10%*
% Contribution to GMV growth	*25%*	*38%*	*12%*	*8%*	*-14%*	*9%*	*-6%*	*1%*	*1%*
SHOP Pay Installments Volume (AFRM)	-	-	1	11	28	40	813	2,377	3,941
YoY	*0%*	-	-	-	-	-	*1941%*	*192%*	*66%*
% Contribution to GMV growth	-	-	-	*1%*	*2%*	*1%*	*9%*	*12%*	*8%*

Valuation history (EV/Sales on a NTM-basis) since IPO in Q1 2021



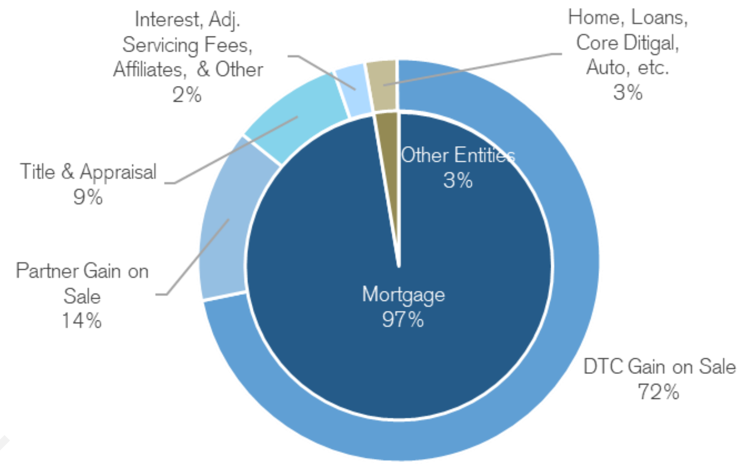
Source: Company reports, FactSet, Credit Suisse estimates

Rocket Companies (RKT)

Mortgage industry leader driven by best-in-class tech platform

- Share gainer (~7% in 2019 to ~9% CSe by 2021E) within a large TAM (~$2-3tr US mortgage market).
- First mover and industry leader supported by its technology platform (enabling its partner network) and industry-high recapture rates to a fully online mortgage platform (~80% vs. ~20% industry average).
- Other (non-mortgage) business lines (~LDD% of 2021E adj. revenue) reinforce the stickiness of the platform and have the potential to grow faster than the core business – including home search & agent referral, personal loans, auto loans, 3rd party appraisal, marketing, and sales.

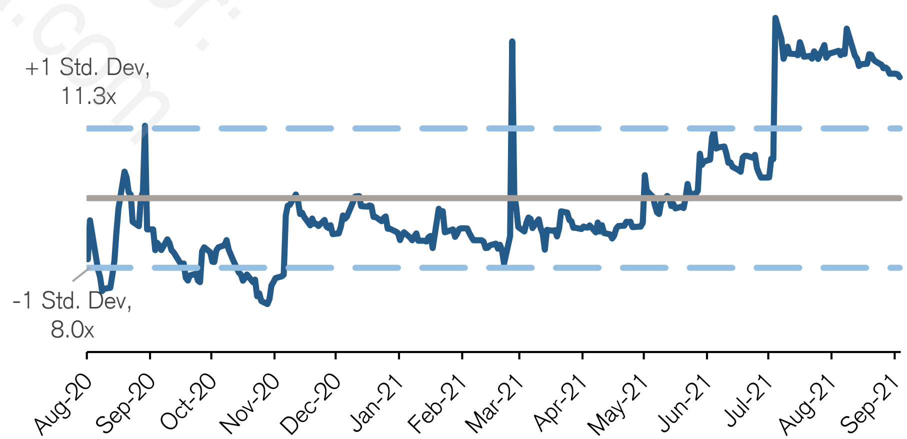
Mortgage (the main operating segment of RKT) makes up ~95% 2021E adj. revenue, composed of sub-buckets within that segment



RKT mortgage origination volume and revenue build: we model RKT gaining ~100bps in market share by 2022 vs. 2020

	2020	1Q21	2Q21	3Q21E	4Q21E	2021E	2022E	2023E
Industry Origination Volumes	3,972,667	1,191,000	1,105,000	880,000	755,000	3,931,000	2,895,000	2,598,100
RKT Total Originations (Closed)	**320,209**	**103,525**	**83,764**	**84,480**	**71,725**	**343,494**	**278,675**	**258,568**
YoY	*121%*	*100%*	*16%*	*-5%*	*-33%*	*7%*	*-19%*	*-7%*
Market Share (%)	*8.1%*	*8.7%*	*7.6%*	*9.6%*	*9.5%*	*8.7%*	*9.6%*	*10.0%*
DTC Originations (Closed)	200,454	61,424	48,902	48,898	41,156	200,380	156,383	139,921
% of Total	*65%*	*59%*	*58%*	*58%*	*57%*	*59%*	*56%*	*54%*
Rate Lock Volume	*221,718*	*57,125*	*51,836*	*50,120*	*41,156*	*200,237*	*157,947*	*141,320*
Partner Originations (Closed)	119,665	42,101	30,120	35,582	30,569	138,372	122,292	118,647
Rate Lock Volume	116,948	37,991	31,750	36,472	30,569	136,782	123,514	119,834
Gain on Sale Revenue								
DTC Gain on Sale	12,077	2,864	2,039	2,055	1,687	8,645	6,535	6,077
% of Volume (Rate Lock)	*5.5%*	*5.0%*	*3.9%*	*4.1%*	*4.1%*	*4.3%*	*4.1%*	*4.3%*
Partner Gain on Sale	2,986	684	302	401	352	1,739	1,639	1,738
% of Volume (Rate Lock)	*2.5%*	*1.6%*	*1.0%*	*1.1%*	*1.2%*	*1.2%*	*1.3%*	*1.5%*
Total Mortgage GOS, net	**15,146**	**3,575**	**2,363**	**2,481**	**2,061**	**10,480**	**8,259**	**7,885**

Valuation history (P/E on a NTM-basis) since IPO in Q3 2020

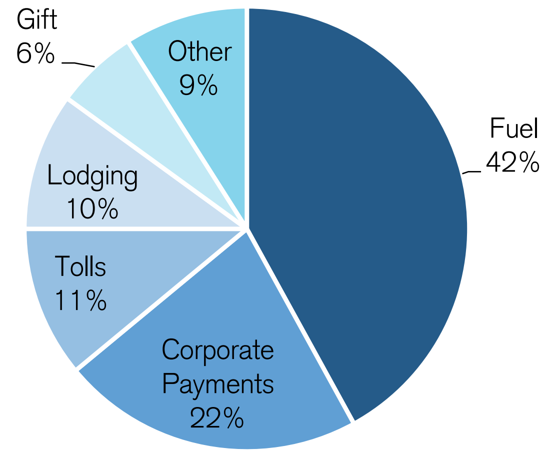


Source: Company reports, FactSet, Credit Suisse estimates

FleetCor Technologies (FLT)
King of the cross-sell

- More than half of revenues outside of Fuel segment and just ~11% of revenue exposed to fuel prices in 2020 vs. WEX's ~20%.
- Four main verticals (Fuel, Corporate Payments, Lodging, Tolls), share similar appealing characteristics (recurring revenue, high margins, network effects, similar distribution, scale) & overlapping customer bases.
- A potential return to success in "Beyond Fuel", faster-growth platforms in corporate payments (once lapping T&E pressures) & Brazil, and the prospect for more of what FleetCor does best (cross-sell & accretive M&A).

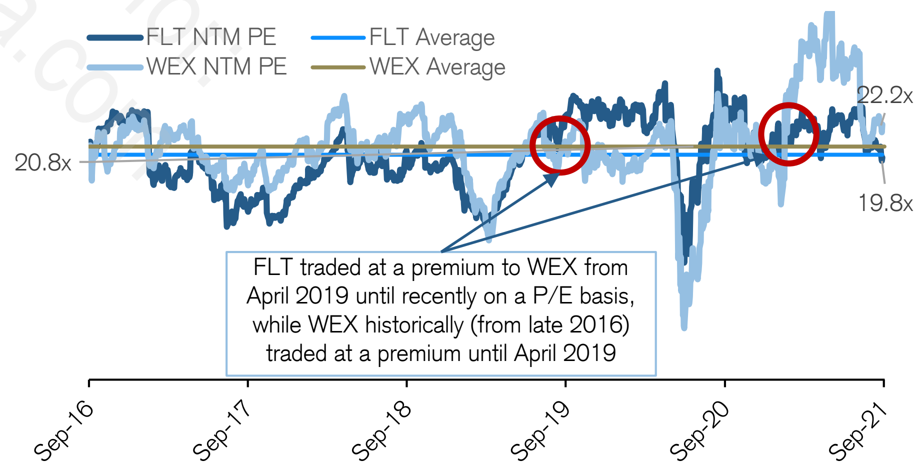
FleetCor has diversified away from the core fuel card business, with ~55% of revenue ex-fuel (Corporate Payments, Lodging, Tolls, 2021E)



Key to modeling FleetCor is uncovering the 2-year organic, macro-neutral (ex-fuel & FX) growth rate

	2020A	1Q21A	2Q21A	3Q21E	4Q21E	2021E	2022E	2023E
Total net revenue	**2,389**	**609**	**667**	**739**	**771**	**2,786**	**3,164**	**3,442**
YoY	(9%)	(8%)	27%	26%	25%	17%	14%	9%
YoY organic	(10%)	(9%)	24%	19%	19%	14%	14%	9%
YoY macro neutral	(6%)	(4%)	26%	23%	22%	16%	13%	9%
YoY macro neutral organic	***(7%)***	***(6%)***	***23%***	***18%***	***17%***	***14%***	***11%***	***9%***
2-year macro neutral organic	3%	(1%)	1%	3%	7%	5%	26%	21%
Inorganic %	1%	2%	3%	6%	6%	3%	2%	0%

FLT multiple typically driven by combination of consistent organic performance and accretive M&A

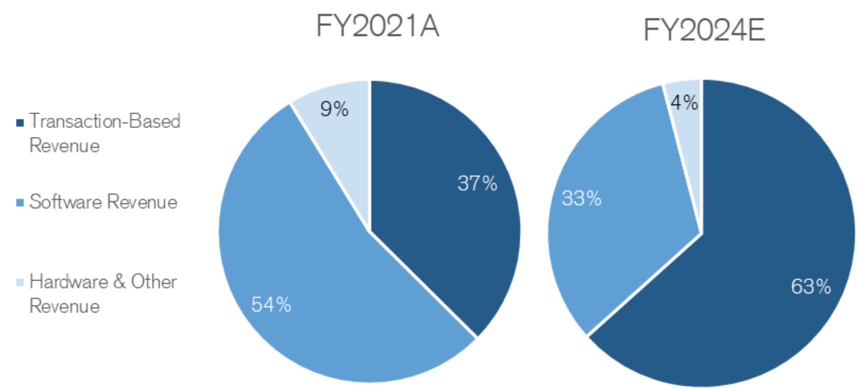


Lightspeed Commerce (LSPD)

Operating at the intersection of software and financial services

- Levered to one of the most important themes within our coverage, the intersection of software, payments, and a long list of additional financial and commerce-enablement services (e.g., supplier network, instant payouts, lending, card issuing, banking & treasury services, payroll, tax preparation, and much more).
- Capable of enabling complex merchants (large global TAM from ~8mm SMBs) vs. horizontal offerings for less complex merchants.
- Cloud-based POS gaining share on legacy solutions while offering ARPU upside via up-sell & cross-sell of modules, payments, etc.
- Continued penetration of Lightspeed Payments will be the key growth driver for revenue and gross profit given its higher net take rate vs. revenue share (in part supported by international expansion of the payments offering).

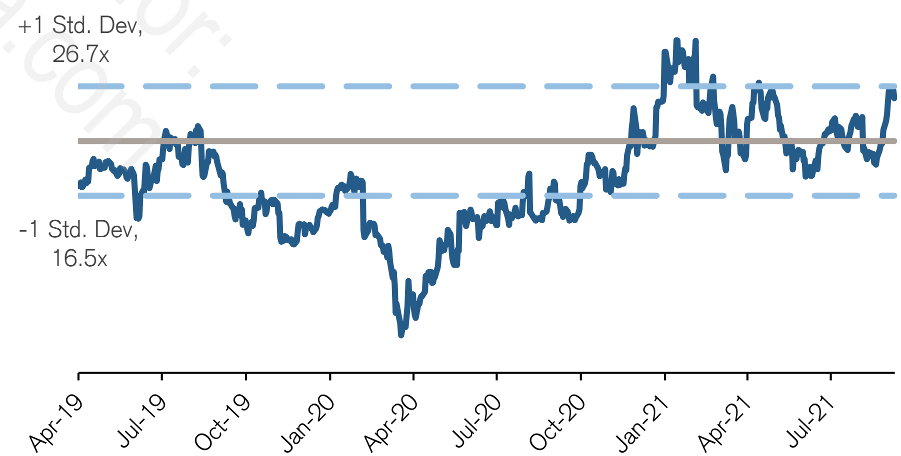
We expect transaction-based revenue to grow to roughly ~60% of total revenue by FY2024E as payments becomes increasingly important



We expect revenue growth to be driven by Lightspeed Payments' continued penetration of GTV (among other growth drivers)

	FY2020A	FY2021A	F1Q22A	F2Q22E	F3Q22E	F4Q22E	FY2022E	FY2023E	FY2024E
B2C Gross Transaction Volume (GTV)	22,300	33,800	16,340	17,050	18,269	17,343	69,002	86,810	104,172
GTV - Lightspeed Payments	545	2,045	1,029	1,381	1,745	2,127	6,282	13,373	24,022
% total GTV	*2%*	*6%*	*6%*	*8%*	*10%*	*12%*	*9%*	*15%*	*23%*
% card-based	*85%*	*90%*	*90%*	*85%*	*85%*	*85%*	*85%*	*85%*	*85%*
Gross take rate	2.60%	2.60%	2.59%	2.60%	2.60%	2.60%	2.62%	2.55%	2.50%
Revenue - Lightspeed Payments	**12**	**48**	**24**	**31**	**39**	**47**	**140**	**290**	**511**
GTV - Revenue share	8,162	14,137	7,353	7,673	8,038	7,457	30,521	32,202	30,155
% total GTV	*37%*	*42%*	*45%*	*45%*	*44%*	*43%*	*44%*	*37%*	*29%*
% card-based	*85%*	*87%*	*90%*	*85%*	*85%*	*85%*	*86%*	*86%*	*86%*
Total take rate	0.23%	0.29%	0.49%	0.48%	0.49%	0.49%	0.49%	0.51%	0.54%
Revenue - Revenue share	**16**	**35**	**32**	**31**	**33**	**31**	**128**	**142**	**140**
Customer locations (end of period)	76,500	119,000	150,000	153,600	287,850	293,800	293,800	336,401	383,497
Software monthly ARPU	107	106	124	125	97	77	99	82	86
Software revenue	**79**	**119**	**50**	**57**	**64**	**67**	**238**	**310**	**371**
Hardware and other revenue	13.8	19.5	9.5	8.4	8.1	7.8	33.9	36.9	40.6
Total revenue	**121**	**222**	**116**	**127**	**144**	**153**	**541**	**779**	**1,063**
Organic growth	*36%*	*41%*	*27%*	*45%*	*43%*	*41%*	*40%*	*61%*	*40%*

Valuation history (EV/Sales on a NTM-basis) since IPO in Q1 2019



Source: Company reports, FactSet, Credit Suisse estimates

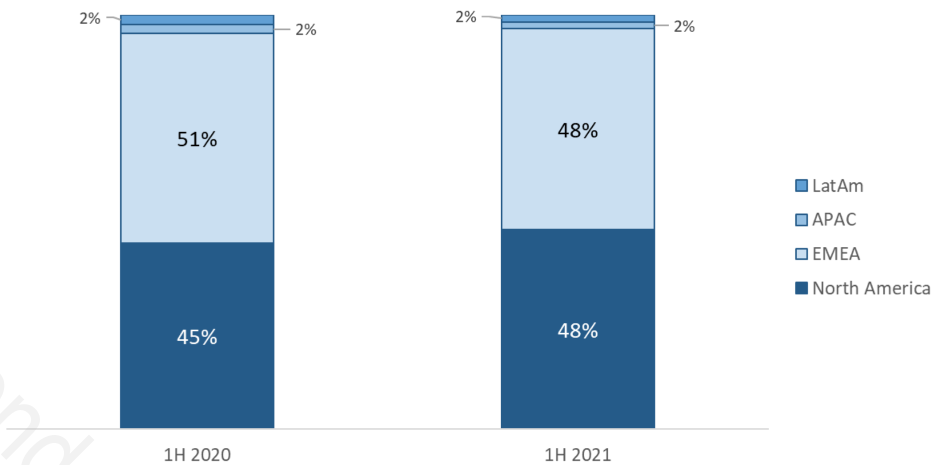
CS Rating	**OUTPERFORM**
CS Target Price	**$145**

Nuvei (NVEI)

Attractively positioned for global digital payments tailwinds

- Operates in relatively attractive swim lanes (~80-85% eCommerce/CNP volume mix), with exposure to niche verticals that have minimal competition (e.g. online gambling, gaming, regulated FX trading) and a willingness to customize offerings.
- Part of a smaller group of companies with nearly global omnichannel capabilities: ~45 local acquiring markets of its own (and cross-border acquiring outside these markets) and acceptance of 450+ Alternative Payment Methods.
- Transformative SafeCharge acquisition followed by additional accretive M&A (including the recent acquisitions of Base Commerce [ACH processing], Mazooma [A2A iGaming], Simplex [cryptocurrency], and Paymentez [LatAm acquiring]).

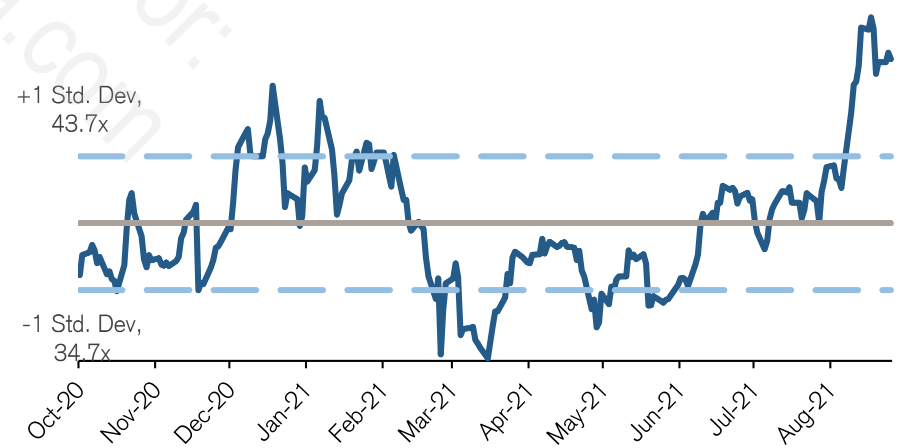
Volume growth (organic and via M&A) has shifted the geographic mix more toward North America, with the trend expected to continue



30%+ volume growth over the medium term (and faster near term) with upside potential via additional accretive M&A

	2020	1Q21	2Q21	3Q21E	4Q21E	2021E	2022E	2023E
Reported Payments Volume	**43,194**	**20,600**	**21,900**	**22,287**	**25,011**	**89,798**	**117,417**	**152,643**
YoY	*76%*	*131%*	*146%*	*94%*	*80%*	*108%*	*31%*	*30%*
YoY organic	*24%*	*70%*	*89%*	*43%*	*34%*	*55%*	*30%*	*30%*
Inorganic volume	12,706	5,512	5,059	5,842	6,385	22,797	254	-
Contribution to growth	*52%*	*62%*	*57%*	*51%*	*46%*	*53%*	*0%*	*0%*
Pro Forma Volume (incl. SafeCharge)	44,560	20,600	21,900	22,287	25,011	89,798	117,417	152,643
Total Revenue	**376**	**150**	**178**	**178**	**196**	**703**	**916**	**1,172**
YoY	*53%*	*81%*	*114%*	*91%*	*69%*	*87%*	*30%*	*28%*
YoY organic	*13%*	*51%*	*79%*	*55%*	*45%*	*57%*	*30%*	*28%*
Total take rate	*0.87%*	*0.73%*	*0.81%*	*0.80%*	*0.78%*	*0.78%*	*0.78%*	*0.77%*
YoY bps	*(13 bps)*	*(20 bps)*	*(12 bps)*	*(1 bps)*	*(5 bps)*	*(9 bps)*	*(0 bps)*	*(1 bps)*

Valuation history (EV/EBITDA on a NTM-basis) since IPO in Q3 2020



Source: Company reports, FactSet, Credit Suisse estimates

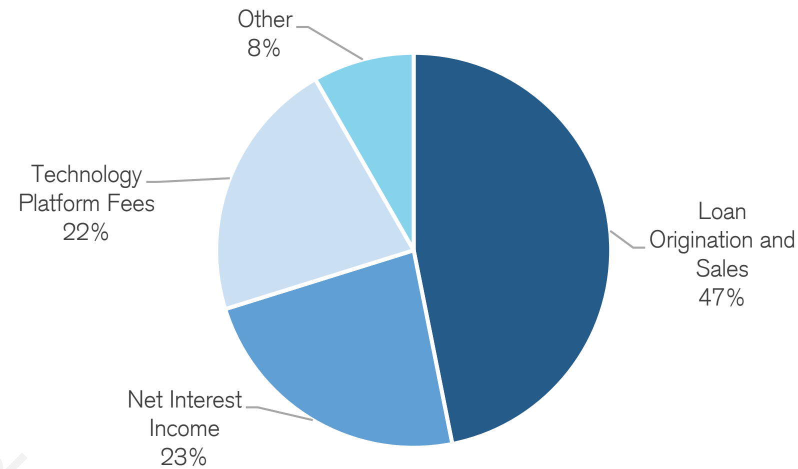
CS Rating	NEUTRAL
CS Target Price	$16.50

SoFi (SOFI)

Leading digital financial services platform & one-stop shop

- Servicing a large TAM as share leader in student loan and personal lending markets (~$150b each, outstanding balances), with High Earners Not Well Served (HENWS) the main addressable subsegment of the population.
- As a “one-stop-shop” US Neobank, SoFi enables deposits, card accounts, and investing after being concentrated on lending for much of the first decade of its existence, now offering a full suite of financial products to its customers, positioning the company well against Neobank competitors with less diversified products suites.
- Profitable lending operations expected to continue to subsidize the expansion of currently loss-making, but high-growth Neobank offering.
- Strategic acquisition of Galileo (core processing & issuer processing services for several prominent Neobanks) provides broader exposure to success of the Neobank industry and the proposed acquisition of a bank allows for increased capital efficiency and improved BaaS scaling.

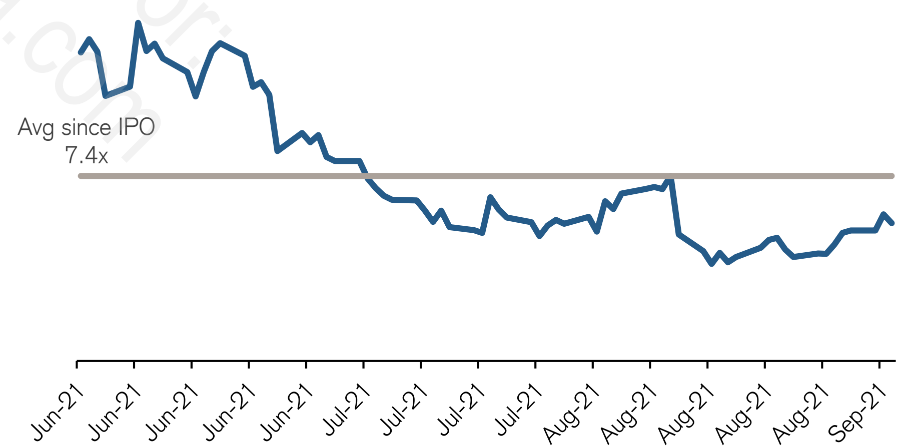
2021E Adjusted Net Revenue Split by revenue type (Loan Origination and Sales make up nearly half of net revenue)



~40% of SoFi’s revenue growth is expected to come from its Financial Services (Neobank) segment, which faces intense competition

	2020A	2021E	2022E	2023E	2024E	2025E
Total Origination Volumes ($mm)	9,692	12,259	18,434	23,647	29,683	35,995
YoY	*-13%*	*26%*	*50%*	*28%*	*26%*	*21%*
Lending Net Revenue	**481**	**676**	**874**	**1,059**	**1,228**	**1,421**
YoY	*11%*	*41%*	*29%*	*21%*	*16%*	*16%*
Money Accounts (thousands)	418	1,022	1,611	2,334	3,049	3,663
Invest Accounts (thousands)	334	1,141	1,990	3,192	4,531	5,784
Credit Card Accounts (thousands)	2	58	144	220	307	413
Total Financial Sevices Accounts (thousands)	754	2,222	3,744	5,745	7,887	9,860
ARPU	$15	$29	$49	$71	$88	$103
Financial Services Net Revenue	**12**	**66**	**191**	**427**	**717**	**1,048**
YoY	*202%*	*459%*	*188%*	*124%*	*68%*	*46%*
Total Accounts ex SoFi (millions)	44	85	139	202	255	281
YoY	*112%*	*96%*	*62%*	*46%*	*27%*	*10%*
Technology Platform Net Revenue	**96**	**212**	**337**	**488**	**659**	**820**
YoY	-	*122%*	*59%*	*45%*	*35%*	*24%*

Valuation history (CSe 2023 EV/revenue) since IPO in June 2021



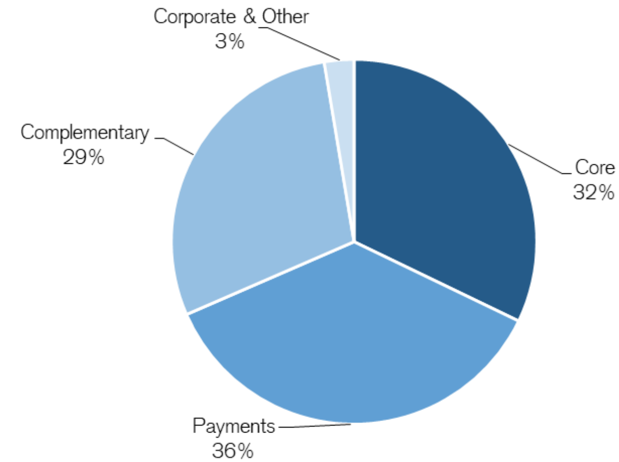
 Source: Company reports, FactSet, Credit Suisse estimates

Jack Henry & Associates (JKHY)

High-quality business with secular & idiosyncratic growth drivers

- Second largest market share and historically the fastest-growing core processor among the big three (FIS & FISV) in the US bank IT market, an industry guarded by significant barriers to entry.
- Highly resilient financial model with ~85%+ recurring revenue from LT contracts enabled by sticky relationship with customers (~1-2% of banks switch core providers per year).
- Longer term, we are mindful of the potential accelerating consolidation among JKHY's small community bank customer base and the competitiveness of Neobanks pressuring incremental account additions and transactions for core providers.

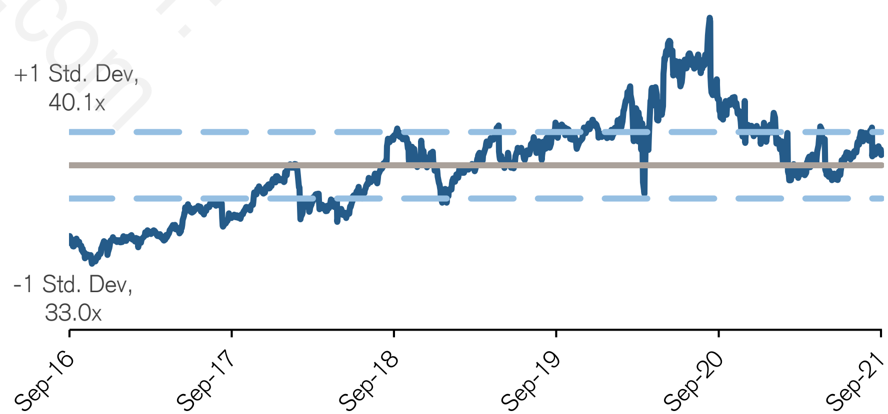
FY2021E revenue mix with three product level segments: Core, Payments, and Complementary Solutions



All three product level segments are projected to generate mid to high single digit revenue growth over the next few years

	FY2020A	F1Q21A	F2Q21A	F3Q21A	F4Q21E	FY2021E	FY2022E	FY2023E
Core (reported)	**567**	**155**	**135**	**135**	**139**	**564**	**602**	**642**
Core (Organic)	538	152	134	134	138	557	585	622
YoY organic	*3%*	*2%*	*4%*	*3%*	*6%*	*3%*	*5%*	*6%*
2-year	*10%*	*12%*	*10%*	*11%*	*10%*	*6%*	*8%*	*11%*
Payments	**598**	**157**	**155**	**161**	**164**	**637**	**682**	**734**
Payments (Organic)	582	155	155	159	162	631	671	722
YoY organic	*8%*	*7%*	*3%*	*10%*	*13%*	*8%*	*6%*	*7%*
2-year	*18%*	*17%*	*14%*	*19%*	*16%*	*17%*	*15%*	*14%*
Complementary	**480**	**129**	**121**	**125**	**131**	**507**	**538**	**578**
Complementary (Organic)	462	128	121	124	130	503	533	570
YoY organic	*13%*	*12%*	*4%*	*5%*	*10%*	*7%*	*6%*	*7%*
2-year	*20%*	*20%*	*12%*	*16%*	*17%*	*21%*	*13%*	*13%*
Corporate & Other	**54**	**12**	**11**	**12**	**11**	**46**	**52**	**57**
Total net revenue	**1,698**	**453**	**422**	**434**	**445**	**1,754**	**1,875**	**2,010**
YoY	*9%*	*3%*	*1%*	*1%*	*8%*	*3%*	*7%*	*7%*
2-year	*15%*	*15%*	*9%*	*14%*	*13%*	*13%*	*10%*	*15%*

Valuation history on P/E, benefiting during COVID-19 given stability of a largely B2B-driven business model



Source: Company reports, FactSet, Credit Suisse estimates

CS Rating	UNDERPERFORM
CS Target Price	$23

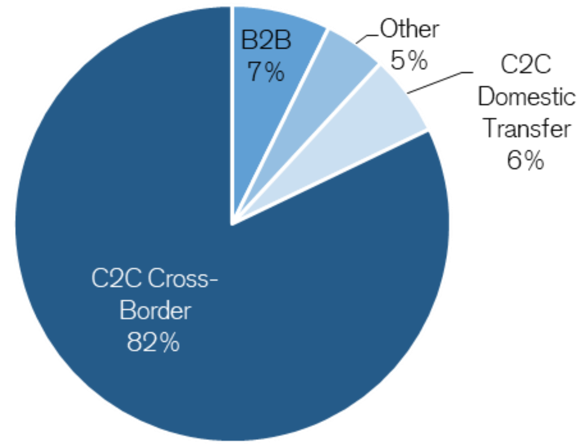
Western Union (WU)

Hard-to-replicate network, but slow growth and elevated competition

- We continue to believe that while WU will benefit from certain sustainable competitive advantages (established brand, compliance infrastructure, global scale, and digitally initiated & retail payout capabilities); however, it has few competitive moats online (vs. in-store retail).
- Continued competitive pressures from incumbents & FinTechs and declining US domestic C2C.
- Launching a WU branded multi-currency bank account (similar to Wise account) and debit card (integrated with money transfer), with the potential to leverage the WU brand and customer base, alongside expansion into a broader range of financial services (e.g., insurance, lending, etc.).

Western Union receives ~80% of revenue via the core C2C business, while the C2C segment makes up a single-digit component (2021E)

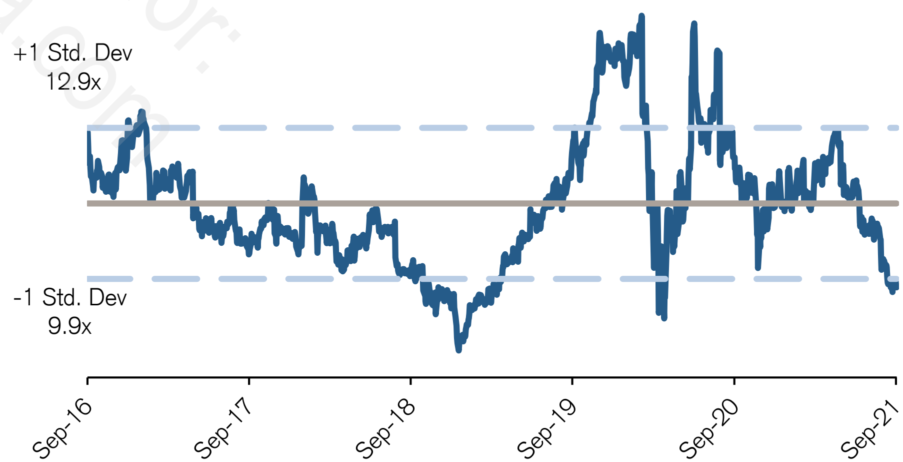
WU announced the divestiture of Western Union Business Solutions (~7% of TTM total company revenue and a smaller ~LSD portion of EBIT) as part of a ~$910mm deal (~$800mm+ net of tax); Expected close in two parts, mainly in early 2022



We parse out Western Union's 2-year organic, ex-FX, ex-Argentina inflation benefit

	2020	1Q21	2Q21	3Q21E	4Q21E	2021E	2022E	2023E
Total revenue	**4,835**	**1,210**	**1,290**	**1,335**	**1,346**	**5,181**	**5,322**	**5,489**
YoY	*(9%)*	*2%*	*16%*	*6%*	*6%*	*7%*	*3%*	*3%*
YoY FX Neutral	*(6%)*	*2%*	*13%*	*6%*	*6%*	*6%*	*3%*	*3%*
YoY organic	*(6%)*	*2%*	*16%*	*6%*	*6%*	*7%*	*3%*	*3%*
YoY organic ex-FX	***(3%)***	***2%***	***13%***	***6%***	***6%***	***6%***	***3%***	***3%***
2-year organic ex-FX	*(0%)*	*1%*	*1%*	*5%*	*5%*	*3%*	*9%*	*6%*
Argentina Inflation benefit	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*0%*	*0%*
YoY organic FXN ex-Argentina benefit	***(4%)***	***1%***	***12%***	***5%***	***5%***	***6%***	***3%***	***3%***
2-year FX neutral ex-Argentina benefit	*(3%)*	*(1%)*	*0%*	*3%*	*3%*	*1%*	*9%*	*6%*
Revenue per transaction ex-FX	*$14.67*	*$14.24*	*$14.04*	*$14.31*	*$14.29*	*$14.22*	*$14.08*	*$14.08*
Take Rate ex-FX	*4.40%*	*4.12%*	*4.05%*	*4.42%*	*4.23%*	*4.20%*	*4.18%*	*4.27%*

Western Union benefited from multiple expansion in 2019 following the announcement of its cost-savings initiative and 3-year targets



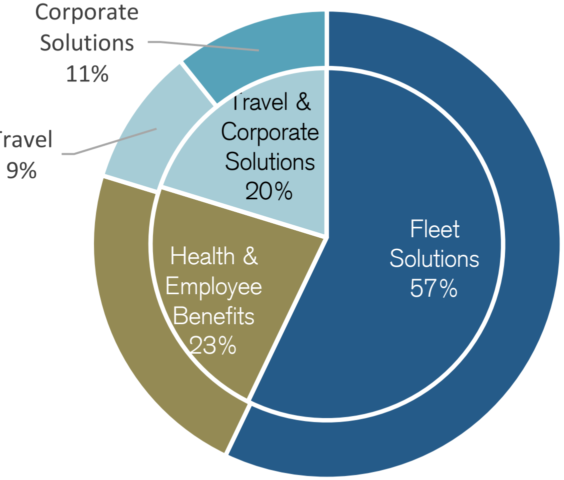
Source: Company reports, FactSet, Credit Suisse estimates

WEX (WEX)

Exposed to attractive FinTech end markets

- Positive on the underlying businesses and the longer term.
- While we are optimistic around an eventual recovery in COVID-impacted business units and the prospects for further accretive M&A ahead, we see a more balanced risk-reward given a combination of valuation, limited visibility in travel, and a slower recovery in high-margin SMB Fleet customers.
- Higher relative fuel exposure at ~20% of 2020 revenue vs. FLT's ~11%. Corporate Payments revenue surpassing ~10% of total (vs. ~20% for FleetCor).
- Completed eNett/Optal acquisitions in Dec. 2020, removed an overhang and should be growth accretive longer-term.

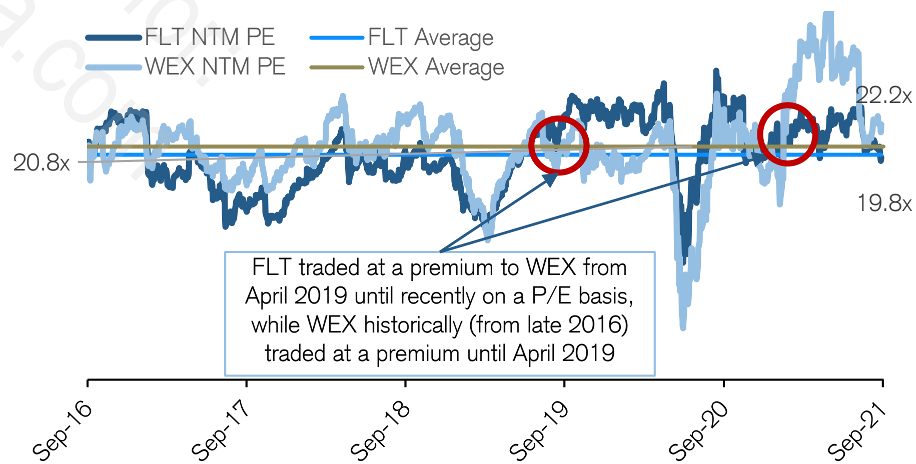
WEX business is heavier fuel (Fleet Solutions) and US vs. FleetCor, with Corporate Payments surpassing ~10% of revenue



For WEX, similar to FLT, we look at the 2-year organic, macro-neutral, growth (albeit greater emphasis on travel recovery in 2021)

	2020A	1Q21A	2Q21A	3Q21E	4Q21E	2021E	2022E	2023E
Total net revenue	**1,560**	**411**	**459**	**479**	**476**	**1,825**	**2,123**	**2,307**
YoY	*(10%)*	*(5%)*	*32%*	*25%*	*19%*	*17%*	*16%*	*9%*
"Macro Adjusted" ex-FX, ex-Fuel	*(10%)*	*(5%)*	*32%*	*25%*	*19%*	*17%*	*16%*	*9%*
Organic FXN (ex-FX, ex-Fuel, ex-M&A)	*(8%)*	*(6%)*	*20%*	*9%*	*4%*	*6%*	*16%*	*9%*
2-year Organic FXN	*1%*	*(0%)*	*2%*	*(7%)*	*(5%)*	*(3%)*	*23%*	*26%*
FX impact %	*(0%)*	*1%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Fuel impact %	*(3%)*	*(0%)*	*10%*	*10%*	*8%*	*7%*	*0%*	*0%*
Inorganic %	*2%*	*0%*	*3%*	*6%*	*8%*	*4%*	*0%*	*0%*
Fleet solutions segment revenue	918	244	274	287	288	1,093	1,223	1,297
YoY	*(12%)*	*(2%)*	*34%*	*25%*	*22%*	*19%*	*12%*	*6%*
"Macro Adjusted" ex-FX, ex-Fuel	*(6%)*	*(3%)*	*16%*	*8%*	*8%*	*7%*	*12%*	*6%*
Organic FXN (ex-FX, ex-Fuel, ex-M&A)	*(7%)*	*(3%)*	*16%*	*8%*	*8%*	*7%*	*12%*	*6%*
2-year Organic ex-FX	*0%*	*2%*	*1%*	*(7%)*	*5%*	*(1%)*	*20%*	*19%*

FLT and WEX have swapped premiums over the past few years



Source: Company reports, FactSet, Credit Suisse estimates

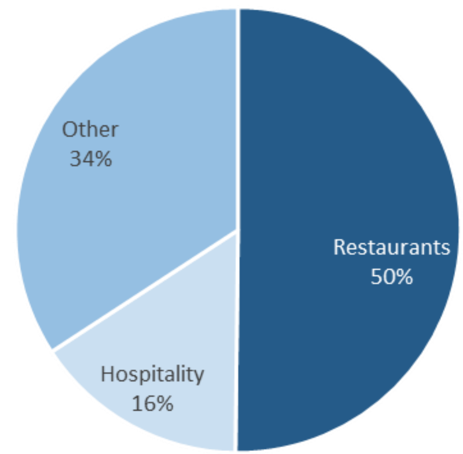
CS Rating **OUTPERFORM**
CS Target Price **$100**

Shift4 Payments (FOUR)

Integrated payments pure play with idiosyncratic drivers

- Has shown desire and ability to open up incremental payment flows in new verticals & channels organically and inorganically to fuel sustained long-term growth, including 3dcart (online marketplace platform providing omnichannel payments for SMB), VenueNext (sports venues and theme parks), launch of its own NextGen restaurant POS platform, strategic partnerships in the digital gaming space (Sightline [eWallet for gaming] and BetMGM), etc.
- Two-pronged growth algorithm driven by ~$150b (Q1 2021) gateway volume conversion opportunity and organic share gains (in part via expansion and partnerships listed above).
- Shift4 management has demonstrated a track record and ability to complete successful, strategic M&A transactions, unlocking value for shareholders (e.g., Merchant Link, Shift4 Corporation, Future POS, 3dcart, VenueNext, and more).

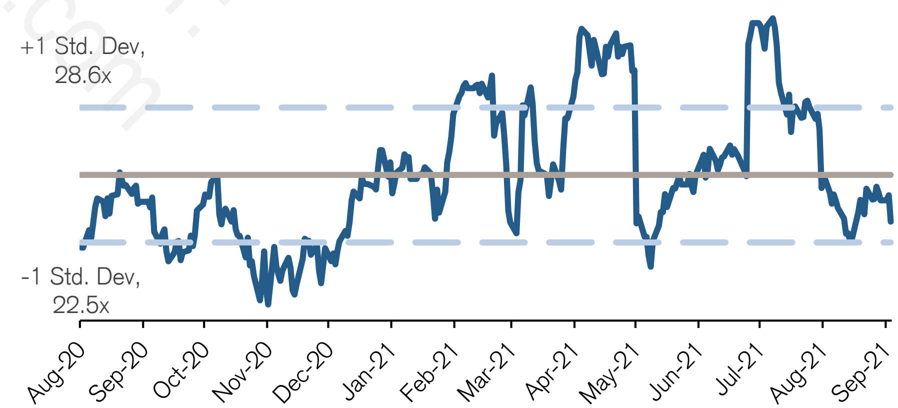
FOUR's E2E volume is predominantly from the restaurant and hospitality verticals (as of Q2 2021, CSe); Opportunity for further rebound in hospitality



Gateway conversion to drive a significant portion of E2E volume growth, corresponding mix shift to large merchants drags net take rate

	2020	1Q21	2Q21	3Q21E	4Q21E	2021E	2022E	2023E
End-to-end payment volumes	**24,284**	**7,988**	**11,834**	**14,188**	**14,137**	**48,147**	**68,934**	**85,605**
YoY	10%	*30%*	*179%*	*100%*	*108%*	*98%*	*43%*	*24%*
Organic Volume Growth	(11%)	*9%*	*121%*	*75%*	*74%*	*70%*	*25%*	*14%*
2-year organic volume	*23%*	*24%*	*43%*	*67%*	*52%*	*52%*	*113%*	*43%*
Gateway Conversion Volume - Incremental	*4,506*	*1,214*	*1,509*	*1,259*	*1,273*	*5,254*	*5,886*	*5,201*
Inorganic Gateway Conversion Volume growth	*20%*	*21%*	*56%*	*21%*	*26%*	*28%*	*18%*	*10%*
Gateway Conversion Volume - Cumulative	*4,367*	*1,518*	*2,248*	*2,617*	*2,960*	*9,343*	*20,119*	*27,131*
Penetration of Gateway Volume Opportunity	*3%*	*4%*	*5%*	*6%*	*7%*	*5%*	*10%*	*13%*
Penetration of Ex-Enterprise Gateway Opp	*6%*	*7%*	*8%*	*11%*	*12%*	*10%*	*18%*	*24%*
Net E2E Payments Revenue	**195**	**60**	**93**	**96**	**92**	**341**	**459**	**535**
YoY	13%	*35%*	*141%*	*70%*	*66%*	*75%*	*35%*	*17%*
Take Rate	0.80%	*0.75%*	*0.78%*	*0.68%*	*0.65%*	*0.71%*	*0.67%*	*0.63%*
YoY bps	*2 bps*	*3 bps*	*(12 bps)*	*(12 bps)*	*(17 bps)*	*(10 bps)*	*(4 bps)*	*(4 bps)*

Valuation history (EV/EBITDA on a NTM-basis) since Q3 2020 (IPO in June 2020)



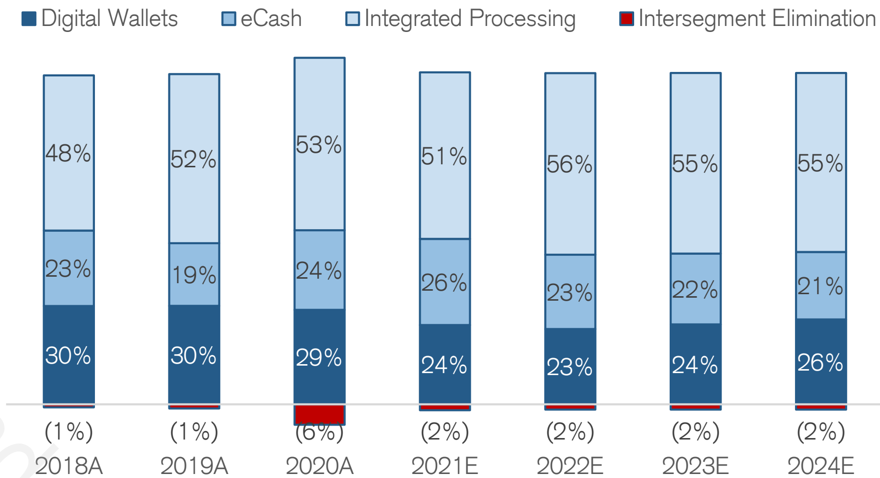
Source: Company reports, FactSet, Credit Suisse estimates

Paysafe (PSFE)

Global payments provider operating in relatively attractive swimlanes

- Global payments provider focused on eCommerce and integrated solutions (~75% of revenues across all three segments have an underlying online end market and/or come via integrated channels).
- The rapid growth in the US online gaming market (we estimate volumes to grow from $7b in 2020 to ~$30b in 2025E) presents upside potential given Paysafe's relationships with nearly every top online gambling operator (~36% of 2020 revenue tied to iGaming).
- Track record of M&A that has led to increased global scale, diversification of revenue streams, and complementary capabilities, with the potential for more ahead.

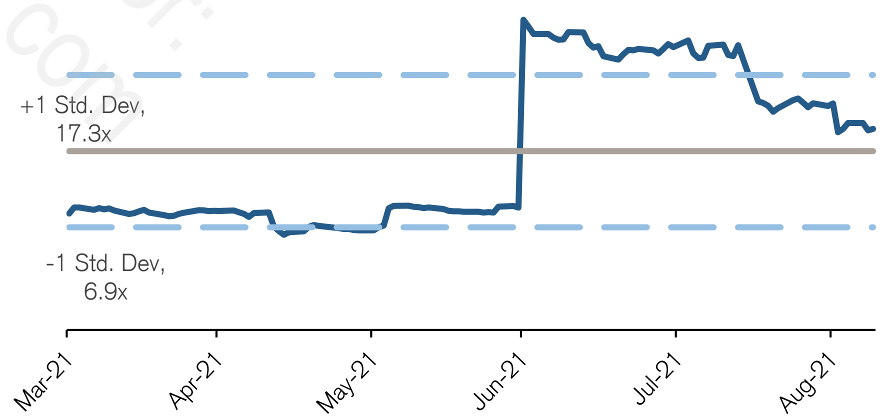
Most of Paysafe's revenue comes from the Integrated Processing segment, with Digital Wallets growing its share over time



Model summary with ~10% revenue growth, 60%+ gross margin and ~35% EBITDA margin medium-term

	2020A	1Q21A	2Q21A	3Q21E	4Q21E	2021E	2022E	2023E	2024E
Total volume	100,831	27,511	32,292	33,929	36,959	130,690	163,236	186,883	211,846
YoY Growth	*2%*	*8%*	*42%*	*30%*	*40%*	*30%*	*25%*	*14%*	*13%*
Digital Wallets revenue	395	95	97	88	92	372	389	449	525
YoY Growth	*(8%)*	*(13%)*	*7%*	*(11%)*	*(5%)*	*(6%)*	*5%*	*15%*	*17%*
eCash revenue	333	113	104	92	96	404	385	399	417
YoY Growth	*22%*	*63%*	*37%*	*12%*	*(10%)*	*21%*	*(5%)*	*4%*	*5%*
Processing revenue	720	177	191	199	215	782	940	1,015	1,108
YoY Growth	*(2%)*	*(5%)*	*7%*	*10%*	*23%*	*9%*	*20%*	*8%*	*9%*
Total revenue (ex-intrasegment)	1,362	377	384	373	395	1,530	1,686	1,833	2,017
YoY Growth	*(4%)*	*19%*	*21%*	*5%*	*7%*	*12%*	*10%*	*9%*	*10%*
Gross profit	892	226	229	218	256	928	1,027	1,137	1,263
YoY Growth	*(2%)*	*(2%)*	*6%*	*(1%)*	*13%*	*4%*	*11%*	*11%*	*11%*
Margin	*65%*	*60%*	*59%*	*58%*	*65%*	*61%*	*61%*	*62%*	*63%*
Adjusted EBITDA	426	113	119	107	141	480	559	645	732
YoY Growth	*(9%)*	*0%*	*8%*	*(0%)*	*48%*	*13%*	*16%*	*16%*	*13%*
Margin	*31%*	*30%*	*31%*	*29%*	*36%*	*31%*	*33%*	*35%*	*36%*

Valuation history (EV/EBITDA on a NTM-basis) since IPO in Q1 2021



Source: Company reports, FactSet, Credit Suisse estimates

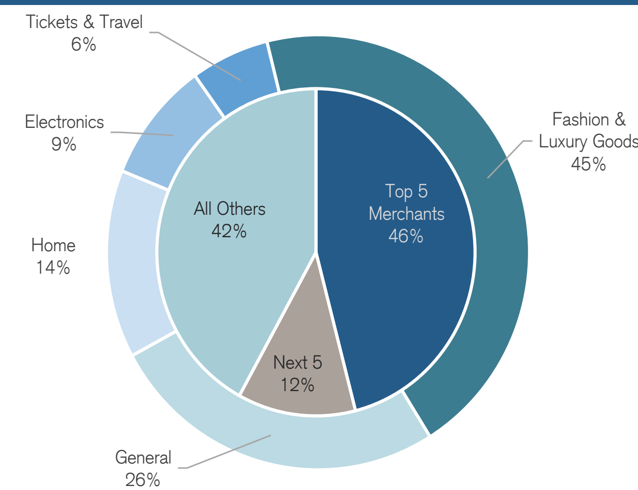
CS Rating	**OUTPERFORM**
CS Target Price	**$34**

Riskified (RSKD)

Leading chargeback protection provider in an attractive eCommerce market

- A modern eCommerce risk management platform focused on offering enterprise-level merchants with its core Chargeback Guarantee, with four nascent products providing call options.
- Low penetration (~5% enterprise customers use outsourced chargeback guarantee) and a large, fast-growing eCommerce end market (~$5.2tr TAM, growing 15%+) provide attractive tailwinds medium to longer term (25-30% revenue growth); Longer-term outlook calls for EBITDA margins to reach ~20% (vs. modestly negative medium term).
- Regarded as one of the top providers (along with Signifyd & Forter) with well-performing, reputable, & scaled fraud management solutions, while main competition remains in-house solutions supported by non-guaranteed services.

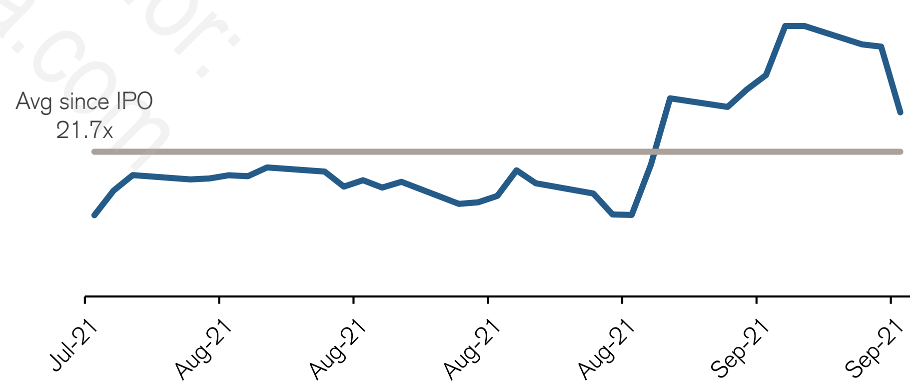
RSKD's 2020 billings mix by industry and customer, with top 5 merchants accounting for ~46% of total revenue



Fast-growth eCommerce end market and low penetration provide RSKD growth tailwind after bulk of PSD2 impact expected in 2022

	2019A	2020A	1Q21A	2Q21A	3Q21E	4Q21E	2021E	2022E	2023E
GMV	39,738	63,439	18,927	21,500	19,941	27,104	87,472	107,474	144,565
YoY		*60%*	*77%*	*56%*	*22%*	*20%*	*38%*	*23%*	*35%*
Revenue	131	170	51	56	51	67	225	268	353
YoY		*30%*	*54%*	*47%*	*23%*	*18%*	*33%*	*19%*	*31%*
Gross Profit	66	93	28	33	25	35	121	146	195
YoY		*41%*	*63%*	*66%*	*14%*	*4%*	*31%*	*20%*	*34%*
Margin	*50%*	*55%*	*56%*	*60%*	*49%*	*51%*	*54%*	*54%*	*55%*
Adjusted EBITDA	(2)	2	(0)	2	(18)	(10)	(26)	(57)	(45)
Margin	*(1%)*	*1%*	*(1%)*	*3%*	*(35%)*	*(14%)*	*(12%)*	*(21%)*	*(13%)*

Valuation history (CSe 2022 EV/revenue) since IPO in July 2021

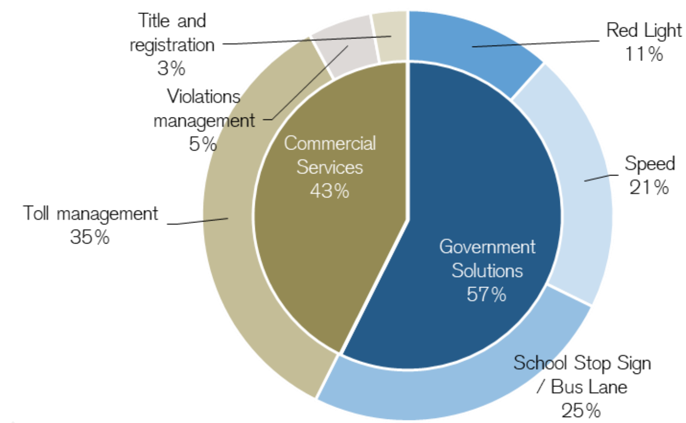


Source: Company reports, FactSet, Credit Suisse estimates

Verra Mobility (VRRM)
Leader in tolling payments & traffic safety solutions

- Share leader in both segments, and we expect sustained mid-single-digit+ growth (in-line with medium-term guidance of Government +2-4%, Commercial +6-8%, with a boost via M&A, Europe, and new initiatives).
- We view the acquisition of competitor RDF (photo enforcement provider) positively, which expands VRRM to AUS and EU, with both expected cost and revenue synergies.
- We are optimistic on the European expansion (~$350mm TAM), given initial agreements (tolling authorities, rental car companies) and relationships with US Rental Car Companies (existing customers) compose 40%+ of the market.

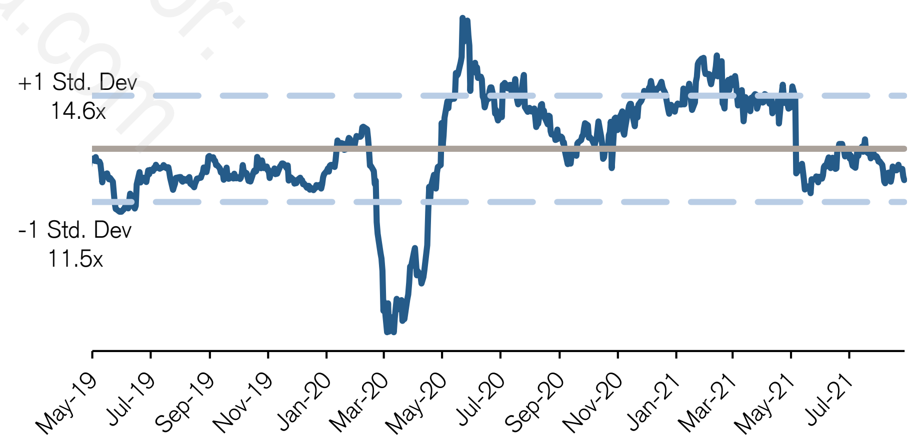
Mix roughly ~55/45 for Government vs. Commercial, and it is the undisputed share leader in both



Our forecast reflects expectation for robust leisure trends to continue for the balance of FY 2021 driven by rental car recovery

	2020A	1Q21A	2Q21A	3Q21E	4Q21E	2021E	2022E	2023E
Revenue	394	90	129	157	152	528	600	623
YoY Growth	*(12%)*	*(23%)*	*61%*	*61%*	*52%*	*34%*	*14%*	*4%*
Adjusted EBITDA	182	40	69	69	66	245	292	306
YoY Growth	*(25%)*	*(27%)*	*148%*	*30%*	*45%*	*34%*	*19%*	*5%*
Margin	*46%*	*45%*	*53%*	*44%*	*44%*	*46%*	*49%*	*49%*
Adjusted Net income	76	19	16	42	40	117	181	192
YoY Growth	*(31%)*	*(23%)*	*49%*	*81%*	*135%*	*55%*	*54%*	*6%*
Adjusted EPS	$ 0.46	$ 0.12	$ 0.10	$ 0.25	$ 0.24	$ 0.71	$ 1.07	$ 1.12
YoY Growth	*(33%)*	*(22%)*	*47%*	*79%*	*132%*	*54%*	*50%*	*5%*
FCF	23	5	24	64	66	159	165	201
YoY Growth	*(78%)*	*(21%)*	*1451%*	*260%*	*(2042%)*	*602%*	*4%*	*22%*

Valuation history (EV/EBITDA on a NTM-basis) since SPAC merger in March 2019 (post the acquisition of HTA, largest competitor, in 2018)



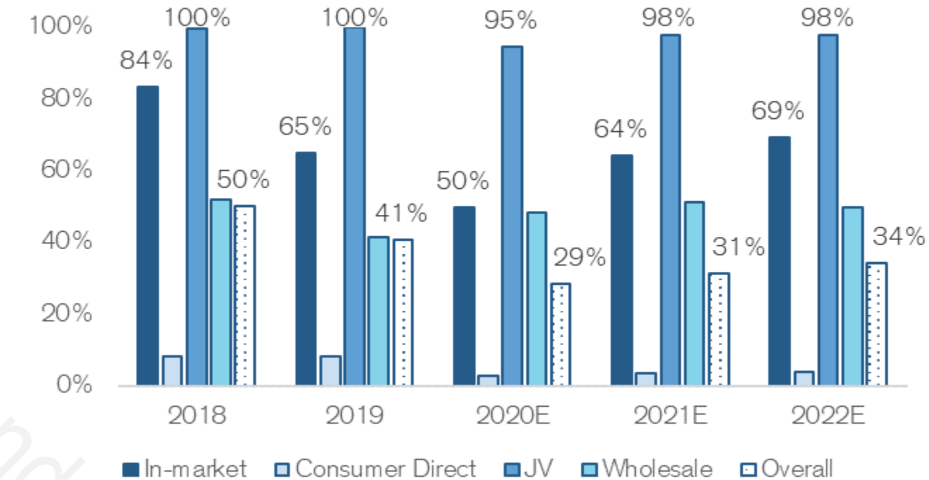
Source: Company reports, FactSet, Credit Suisse estimates

loanDepot (LDI)

Digital mortgage lending platform beginning to make inroads

- LDI's tech platform (allowing it to scale to meet demand) and in-market and JV channels (providing exposure to more stable purchase originations) offer potential for above-average loan growth in a challenging industry and competitive environment.
- Stands out relative to competition with less exposure to the volatile refinance market (~30-50% purchase vs. ~15-30% for RKT) and its high-powered machine learning platform (mello®).
- LDI's brand recognition, high recapture volume given the growth of servicing UPB from ~$36b in 2019 to ~$200b in 2022E (allowing origination of significantly more loans) and in-market strategy (with competitive advantages augmenting purchase volume market share gains) position the company to continue to gain share in the US mortgage origination market ($2-4tr per year).

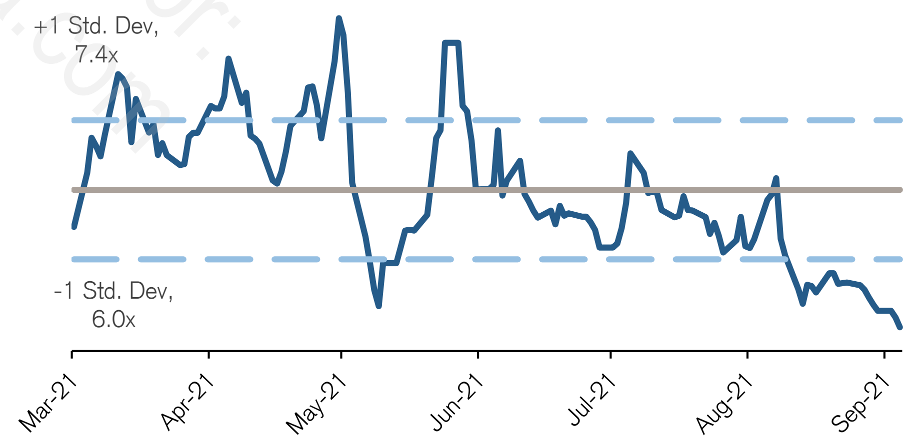
LDI purchase mix within each channel – in-market varies 50-85% depending on refi market strength



Higher origination levels and servicing retention lead to recapture volume growth (~$10b in 2020 to ~$18b in 2022E)

	2020A	1Q21A	2Q21A	3Q21E	4Q21E	2021E	2022E	2023E
Recapture Volume (Total)	9,856	4,761	3,950	4,024	4,288	17,023	18,392	18,296
YoY	*294%*	*249%*	*110%*	*49%*	*10%*	*73%*	*8%*	*-1%*
Recapture Rate	*48%*	*55%*	*53%*	*50%*	*50%*	*52%*	*54%*	*54%*
Total Servicing Runoff	20,626	8,657	7,523	8,049	8,575	32,804	33,829	33,614
Direct Runoff % of Total Runoff	*53%*	*55%*	*55%*	*55%*	*55%*	*55%*	*58%*	*58%*
Consumer Direct Runoff	10,843	4,761	4,138	4,427	4,716	18,042	19,452	19,328
Consumer Direct Recapture %	*65%*	*70%*	*75%*	*63%*	*63%*	*67%*	*65%*	*65%*
Recapture Volume (Consumer Direct)	7,004	3,333	3,103	2,767	2,948	12,151	12,644	12,563
Consumer Direct/Total Recapture	*71%*	*70%*	*79%*	*69%*	*69%*	*71%*	*69%*	*69%*
Recapture as a % of Total Refi Volumes	*13.6%*	*14.2%*	*16.4%*	*18.4%*	*24.1%*	*17.5%*	*28.4%*	*36.9%*
Total Retail Volume (Funded)	80,257	33,428	27,882	25,625	22,128	109,062	91,668	83,922
YoY	*145%*	*186%*	*62%*	*18%*	*-25%*	*36%*	*-16%*	*-8%*
Total Partner Volume (Funded)	20,503	8,051	6,612	6,874	6,488	28,025	26,686	27,381
YoY	*62%*	*130%*	*73%*	*26%*	*-16%*	*37%*	*-5%*	*3%*

Valuation history (PE on a NTM-basis) since IPO in Q1 2021 (limited history of valuation and estimates)



Source: Company reports, FactSet, Credit Suisse estimates

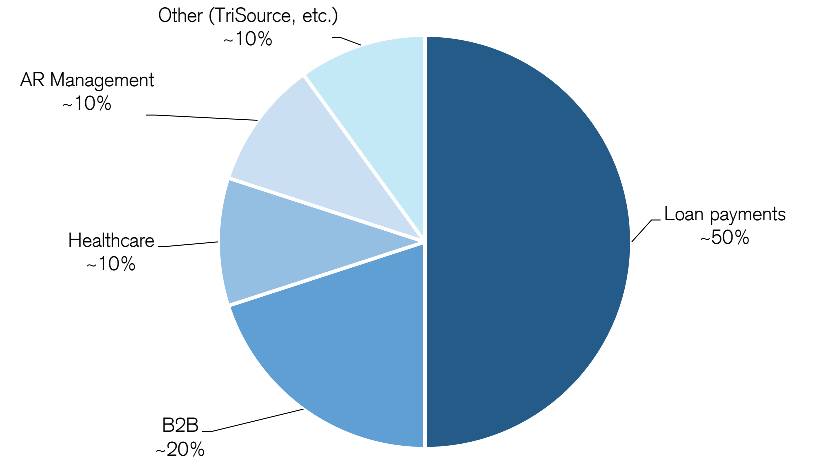
CS Rating	OUTPERFORM
CS Target Price	$30

Repay (RPAY)

Integrated payments in niche verticals, and expanding beyond

- We continue to believe that RPAY's evolving mix (toward B2B, now ~20% of mix, following numerous acquisitions since 2019 in APS, Ventanex, cPayPlus, CPS, Kontrol, & portions of BillingTree) & increasing ISV partnership list (now ~209, including ~80 B2B specific), along with the prospects for further M&A ahead (strong track record of M&A), including more recent BillingTree acquisition [~$500mm], which brings additional A/R, healthcare, energy, credit union, and broader B2B exposure.
- We expect further debit card penetration of existing verticals, entry into new verticals (B2B, Healthcare, Mortgage), new merchants & ISV partners to drive organic growth.
- Benefits from scale and processing cost leverage (in part due to TriSource acquisition, insourcing prior back-end partner).

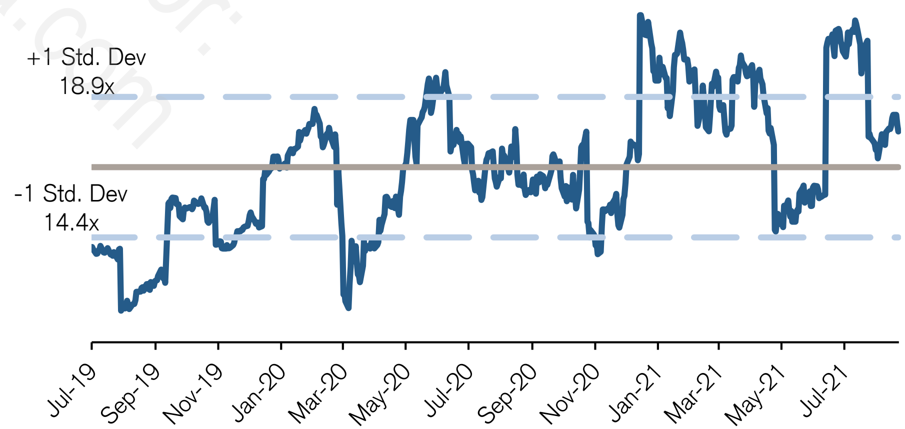
Repay's revenues are most heavily weighted toward loan payments, with B2B the 2nd largest component



Repay organic 2-year card payment volume build – we model organic growth in the mid-teens, plus material inorganic contributions

	2020A	1Q21A	2Q21A	3Q21E	4Q21E	2021E	2022E	2023E	2024E
Card payment volume ($mm)	15,183	4,614	4,624	5,653	5,872	20,764	26,063	29,972	34,018
QoQ	-	*17%*	*0%*	*22%*	*4%*	-	-	-	-
YoY	*42%*	*20%*	*28%*	*50%*	*48%*	*37%*	*26%*	*15%*	*14%*
Inorganic Volume growth	*31%*	*12%*	*18%*	*40%*	*31%*	*25%*	*10%*	-	-
Organic Volume growth	*11%*	*8%*	*10%*	*10%*	*17%*	*11%*	*15%*	*15%*	*14%*
2-year organic volume	*36%*	*25%*	*36%*	*18%*	*21%*	*24%*	*28%*	*32%*	*31%*
Inorganic Volume	3,290	454	644	1,511	1,245	3,854	2,161	-	-
Organic YoY "Proforma"	*11%*	*8%*	*14%*	*11%*	*19%*	*13%*	*14%*	*15%*	*14%*

Valuation history (EV/EBITDA on a NTM-basis) since SPAC merger in Q3 2019



Source: Company reports, FactSet, Credit Suisse estimates

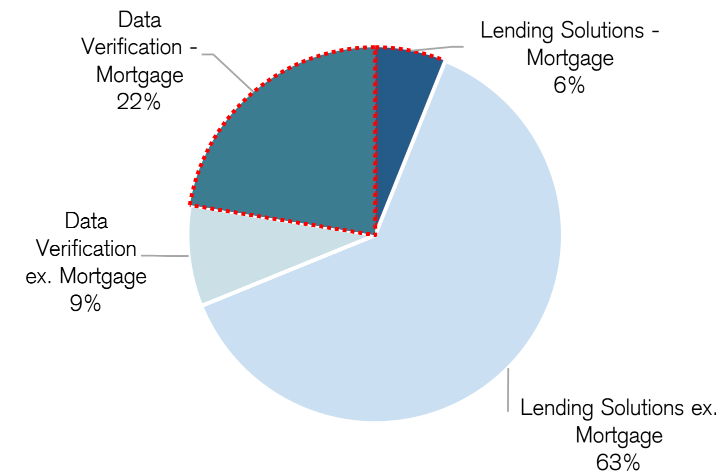
CS Rating	NEUTRAL
CS Target Price	$27.50

MeridianLink (MLNK)

Leading provider of lending, credit data, & account opening SaaS solutions

- Low-double-digit organic revenue growth over the medium-term supported by a large ~$10b TAM (~14% CAGR through 2024E) for its Lending and Data Verification software solutions.
- Industry leading lending platform with ~27% market share of ~4,900 mid-market financial institutions, set to continue to gain share from investments in go-to-market & product investments.
- Differentiated platform with a robust end-to-end, omnichannel solution and a comprehensive suite of consumer lending loan types, and +580 third-party integrations.
- We forecast mortgage-related revenue mix to decline to ~22% exiting 2021E from ~39% in 2020, driven by non-mortgage related acquisitions & normalization of the mortgage market.

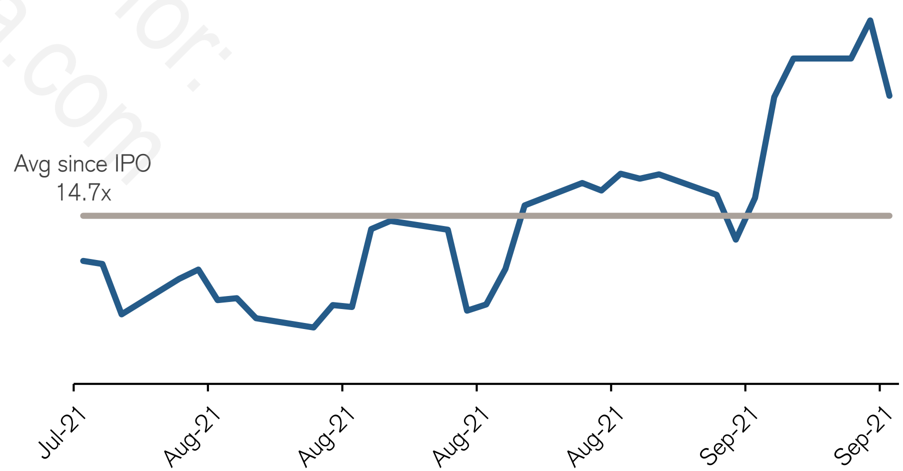
MLNK's 2021E revenue mix by reporting segment: mortgage exposure ~30% of business, mostly in Data Verification



Fast-growth integrated payments swimlane positions the company well to capture the large, growing TAM of US card and ACH payments

	2019	2020	1Q21A	2Q21A	3Q21E	4Q21E	2021E	2022E	2023E
Total Revenue	152,731	199,340	67,811	68,474	63,489	58,449	258,223	281,784	315,227
YoY		*31%*	*55%*	*38%*	*22%*	*8%*	*30%*	*9%*	*12%*
Gross Profit	105,409	140,986	48,335	47,368	39,610	38,921	174,234	196,030	223,986
YoY		*34%*	*59%*	*34%*	*6%*	*3%*	*24%*	*13%*	*14%*
Margin	*69%*	*71%*	*71%*	*69%*	*62%*	*67%*	*67%*	*70%*	*71%*
Adjusted EBITDA	64,451	104,611	34,310	33,434	25,169	20,801	113,713	116,279	133,265
YoY		*62%*	*60%*	*29%*	*(13%)*	*(26%)*	*9%*	*2%*	*15%*
Margin	*42%*	*52%*	*51%*	*49%*	*40%*	*36%*	*44%*	*41%*	*42%*
Adjusted Net Income	(12,604)	9,150	7,231	7,432	(22,714)	(874)	(8,925)	21,559	31,165
Margin	*(8%)*	*5%*	*11%*	*11%*	*(36%)*	*(1%)*	*(3%)*	*8%*	*10%*

Valuation history (CSe 2022E EV/EBITDA) since IPO in July 2021



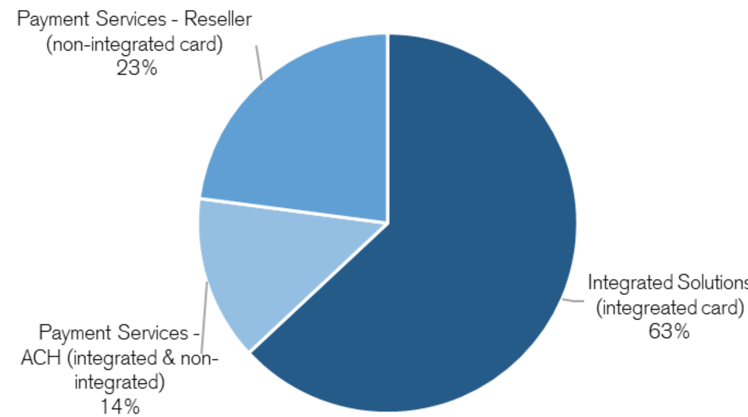
Paya (PAYA)

Integrated payments platform with expansive TAM and nascent drivers

CS Rating	**OUTPERFORM**
CS Target Price	**$14**

- Estimated ~$1tr TAM of US card volumes across its five verticals ($400b via B2B) which can generally be characterized by high-dollar value transactions. ACH volumes (~40-45% of 2021E TPV) also provide growth insurance should cash to card conversion slow.
- Longer-term outlook calls for EBITDA margins to reach ~35% (vs. ~27% for 2021E) driven by revenue mix shift toward integrated payments (an inherently high incremental margin business ex-pay-away to ISV partners), and operating leverage as the platform further scales.
- Taking share from other traditional providers given high touch customer service and solutions that are tailored to core verticals.

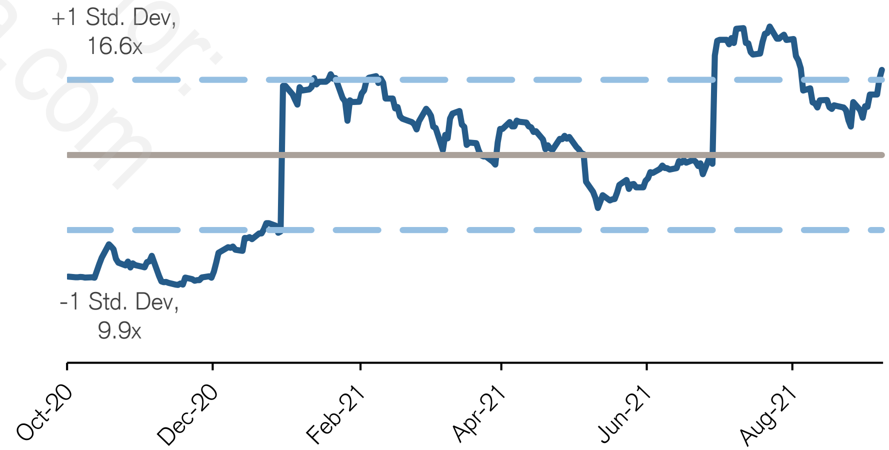
PAYA's 2021E revenue mix by business (based on the midpoint of its analyst day segment guidance)



Fast-growth integrated payments swimlane positions the company well to capture the large, growing TAM of US card and ACH payments

	2020A	1Q21A	2Q21A	3Q21E	4Q21E	2021E	2022E	2023E	2024E
Integrated Solutions Volume ($mm)	15,529	4,021	4,902	5,103	5,210	19,236	24,137	29,350	35,220
YoY	*4%*	*8%*	*33%*	*26%*	*28%*	*24%*	*25%*	*22%*	*20%*
Organic Volume growth	*4%*	*8%*	*16%*	*8%*	*18%*	*11%*	*23%*	*22%*	*20%*
Reseller Volumes	6,298	1,496	1,633	1,635	1,633	6,397	6,410	6,336	6,069
YoY	*-11%*	*2%*	*3%*	*-3%*	*4%*	*2%*	*0%*	*-1%*	*-4%*
ACH Volume	11,445	3,945	4,149	4,586	4,755	17,435	21,093	24,742	28,737
YoY	*21%*	*62%*	*63%*	*57%*	*34%*	*52%*	*21%*	*17%*	*16%*
Total Payment Volume	**33,272**	**9,462**	**10,685**	**11,324**	**11,598**	**43,068**	**51,640**	**60,427**	**70,026**
QoQ	-	*3%*	*13%*	*6%*	*2%*	-	-	-	-
YoY	*6%*	*24%*	*37%*	*31%*	*26%*	*29%*	*20%*	*17%*	*16%*
Organic Volume growth	*5%*	*21%*	*29%*	*23%*	*22%*	*24%*	*19%*	*17%*	*16%*

Valuation history (EV/EBITDA on a NTM-basis) since IPO in Q4 2020



Source: Company reports, FactSet, Credit Suisse estimates

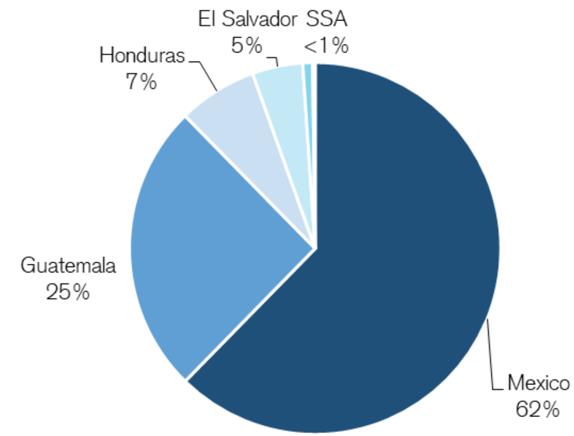
International Money Express (IMXI)

Focused money remittance provider

CS Rating	NEUTRAL
CS Target Price	$18.50

- We continue to expect Intermex to benefit from its track record of execution, well-respected brand, focus on premium agent locations, customer service approach, and omnichannel strategy.
- Operates within a large addressable market and has been a share gainer within that opportunity.
- Approach punctuated by purposefully targeted corridors (i.e. US-MEX the largest in the world), purposefully targeted send locations (i.e. certain states, cities, etc. within the US), with optionality in expansion to other high traffic corridors (i.e. US-Nigeria).
- Numerous nascent initiatives in motion (Africa inbound, Canada outbound, white-labeling with Latin American banks, general purpose reloadable [GPR] card) to support growth.

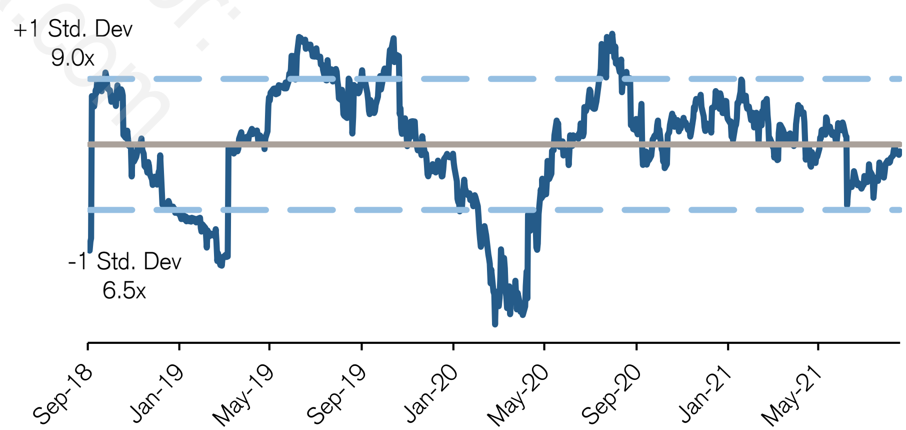
Intermex sources ~2/3rds of its volume (2021E) via the US-into-Mexico corridor (maintains #2 share in largest remittance corridor in the world)



Intermex remittance volume build – we model continued share gains in its two biggest remittance corridors (US-Mexico, US-Guatemala)

	2017	2018	2019	2020	2021E	2022E
US -> Mexico Inbound Volume ($b)	$ 29	$ 32	$ 35	$ 39	$ 41	$ 41
Growth		*11%*	*8%*	*13%*	*6%*	*-2%*
IMXI share	15%	17%	18%	19%	19%	20%
IMXI Mexico Volume	4,321	5,617	6,270	7,267	7,892	7,967
Growth	-	*30%*	*12%*	*16%*	*9%*	*1%*
Incremental share	***38%***	***41%***	***26%***	***23%***	***28%***	***NA***
% of IMXI volume	*63%*	*63%*	*60%*	*59%*	*57%*	*51%*
US -> Guatemala Inbound Volume	7.4	8.4	9.7	10.4	12.3	12.1
Growth		*13%*	*15%*	*8%*	*12%*	*-2%*
IMXI share	22%	24%	26%	27%	28%	28%
IMXI Guatemala Volume	1,601	2,016	2,472	2,827	3,358	3,301
Growth	-	*26%*	*23%*	*14%*	*19%*	*-2%*
Incremental share	***41%***	***42%***	***36%***	***46%***	***28%***	***28%***
% of IMXI volume	*23%*	*23%*	*24%*	*23%*	*24%*	*21%*

Valuation history (EV/EBITDA on a NTM-basis) since SPAC merger in Q3 2018 (trading at a low absolute level, and more so vs. growth)



CREDIT SUISSE Source: Company reports, FactSet, Credit Suisse estimates

Payments & Payments-related FinTech private company map

US-focused mapping, including select global/regional platforms

- ~$54b in global VC-backed FinTech investments during 1H 2021 (Q2 largest funding quarter on record); $43b in 2020 and $153b over 2015-19

Merchant Acquiring/Service Providers

PayFac Enablement
Amaryllis
Finix Payments
Infinicept
Payrix

iPOS
Appetize
CardFlight
CitiXsys
Payclip
Pine Labs (India)
Revel
SumUp
TouchBistro
Veloce POS (CAN)
Verifone

Other
AuthVia
Digital River
Emergent
Exela Technologies
Flow
Flutterwave
Forter
GoCardless
MagicCube
PPRO
Rapyd
ReCharge Payments
Spreedly
Text2Pay

ISO/Acquirers/PSPs/Gateways
BharatPe
Billing Tree
BillDesk
BlueSnap
Checkout.com
Clearent
Durianpay
Fast
FreedomPay
Gravity Payments
Mollie
NMI
North American Bancard
Paragon Payments
PayNearMe
Primer (UK)
Priority Payment
Razorpay (India)
RealPage
Sightline Payments
Silverflow
SpotOn
Stax
Stripe
Tidal Commerce
Titanium Payments
Tribe
Xplor Technologies
Yapstone
Zelis Payments

Bank IT

Core Processors
10x Future Technologies
Alkami
CoreCard
Correlation
Finastra
Finxact
Mambu
Neocova
NYMBUS
Thought Machine

BaaS
11:FS Foundry
Avaloq
Bankable
Cambr
ClearBank
Conductor (Brazil)
Deposit Solutions
Fidor Bank
Railsbank
solarisBank
Starling Bank
Synctera
Treezor

Connectivity/Payments APIs
Button
Finlync
Mobeewave
Plaid
Trovata.io
Tink
Token
TrueLayer
Yapily
Yodlee

Additional Services
100credit (China)
4Paradigm
Allied Payment Network
Alloy
Apiture
Ascent
Atomic FI
Backbase
Blend
Bond
BondLink
Capitolis
Carta
Chainalysis
ClearSale
Episode Six
FDATA Global
Fisoc
Hydrogen Platform
Kard Financial
Midaxo
Mistral Mobile
Moov
Nova Credit
Openfin
Sardine
Symphony
Synapse
Thought Machine
Treasury Prime
Trumid
Unqork
Vesta

B2B

AP / AR
Finexio
HighRadius
MineralTree
Modulr
Paystand
Tipalti
YayPay
Tradeshift
Ivalua

Other
Coalition
Dwolla
Pilot
UiPath

Corp. cards & Exp. Mgmt.
Brex
Expensify
Radius Payment
Ramp
Tide

Payroll
BambooHR
Gusto
Justworks
Kickfin
PayActiv
PayFit
Zenefits

Cross-Border
Airwallex
CurrencyCloud
EBANX
Ping-Pong
RTGS.global
Ripple
Veem

Instant Payments
Ingo Money
Earnin
PayFi

Digital Lending

SMB Lending / Banking
BlueVine
C2FO
CGTZ (China)
Forward Financing
FundBox
FundingOptions
Joust
Judo Bank
Loan Builder
Neptune Financial
OakNorth
On Deck Capital
Payability

Other
Built Technologies
Roofstock

Alternative Consumer Lending

Europe
Habito
Kreditech

ROW
Credit Culture (SG)
Creditas (Brazil)
Rupeek (India)
Simpl (India)

US
Avant
Better Mortgage
Clara
College Ave
CommonBond
Credible
Earnest
Elevate
Fair
Figure
Happy Money
LendingHome
LendingPoint
Marlette (Best Egg)
Payoff
Petal
Prosper
Tala
Unison
Upgrade

BNPL
Capital Float
ChargeAfter
Hoolah
Klarna
Laybuy

Issuer Processing
Extend
Glopal Processing Services
i2c
InComm
VPay

Networks
Faster Payments (UK)
RTP (The Clearning House)
RuPay (India)
Smartlink
UnionPay (China)

Real Estate
Flock Homes
Loft
PeerStreet
Ribbon

Super Apps & Diversified FinTech
Ant Group
Go-Jek
Grab
Paytm
Rappi

C2B & P2P
Early Warning (Zelle)
Funding Circle
Ovo
PayQwick
Plastiq
Toss (Korea)
Trustly
Verse (Europe)

Blockchain/ Cryptocurrency
Anchorage
Avanti
Binance
BitPay
BlockFi
Circle
Coinbase
Dash
Fireblocks
Grayscale
Kraken
Liquid
Securrency
Sila
Taxbit

Personal Finances
Acorns
Addepar
Ajaib
Alan
Albert
Alex.fyi
Anyfin
Bankbazzar
Betterment
Credit Sesame
Coverfox
Deserve
Digit
DriveWealth
Ellevest
Ethos
Gatsby
Ibotta
Jasper
M1 Finance
Moven
Personal Capital
Petal
PolicyBazaar
Propel
RentoMojo
Robinhood
SeedFi
Stakin'
Stash
Trade Republic
Unifimoney
Vestwell
Wealthfront
Wealthsimple (CAN)
Weatlhfront
YieldStreet

Neo / Challenger Banks

Consumer Digital Banking

Europe
Atom Bank (UK)
Curve (UK)
Monese (UK)
Monzo (UK)
N26 (GER)
Numbrs (CHE)
Raisin (GER)
Revolut (UK)
Starling Bank (UK)

US
Aspiration
booyah!
Chime
cred.ai
Current
Dave
GoBank
Greenlight
HMBradley
Lili
MoneyLion
Oxygen
Simple
Stash
TrustFund
Varo Money
Zenus

ROW
:86 400 (AUS)
Albo (MEX)
Banco Inter (Brazil)
Douugh (AUS)
Klar (MEX)
Mozper (MEX)
NuBank (Brazil)
OlaMoney (India)
Ualá (ARG)
Volt Bank (AUS)
WeLab (HK)
Xinja (AUS)

Remittances
NIUM (formerly InstaRem)
Paysend
Remitly
World Remit

CREDIT SUISSE

Source: Visa, CB Insights, Credit Suisse research.

The Credit Suisse Payments, Processors, & FinTech Top 44 Industry Themes

44 topics we expect to be top of mind for investors and industry participants

Global eCommerce & Software-led Payments

NextGen FinTech Ecosystems

Drivers of Cash-to-Digital Conversion

B2B/Corporate Payments

Back-End Banking Innovation

Regulation & Litigation

Threats to Monitor for the Existing Ecosystem

Return to Main Table of Contents

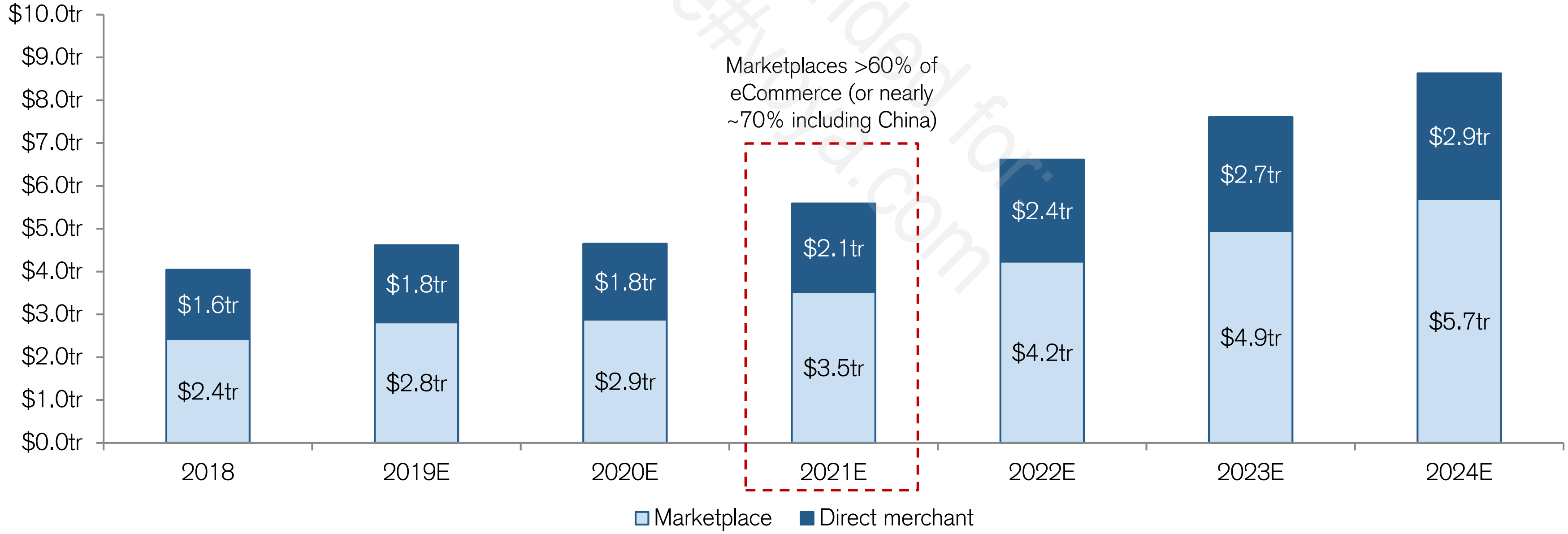
Global eCommerce & Software-led Payments

1. Global eCommerce as a key source of growth

eCommerce a mid-high teens grower, Marketplaces even faster

- It is a fast-growing TAM overall, which (depending on the source and definition of what is in scope) generally suggests a ~$5.5tr global market in 2021 (excluding China) growing ~mid-teens to high-teens (vs. ~4-5% PCE).
- One way to segment eCommerce is Marketplace vs. Non-marketplace (direct merchant). When viewed in this manner, Marketplace eCommerce is a faster-growth sub-segment (~20% CAGR through 2024 vs. ~low-to-mid-teens for the "rest" of eCommerce); a further, even faster-growing sub-segment is cross-border eCommerce (addressed separately in this presentation).
- We note that China meaningfully skews this data given it makes up more than half of global retail eCommerce and is dominated by Alibaba-owned marketplaces (Marketplaces make up early ~70% of eCommerce including China, and we estimate Marketplaces make up ~63% of global eCommerce excluding China in 2021).

Global eCommerce is a ~$5.5tr global market (excl. China) in 2021, with marketplaces-based eCommerce sales expected to be a key driver of total market growth (~20% CAGR 2020-2024 vs. direct merchant eCommerce growing more at a low-to-mid-teens pace)



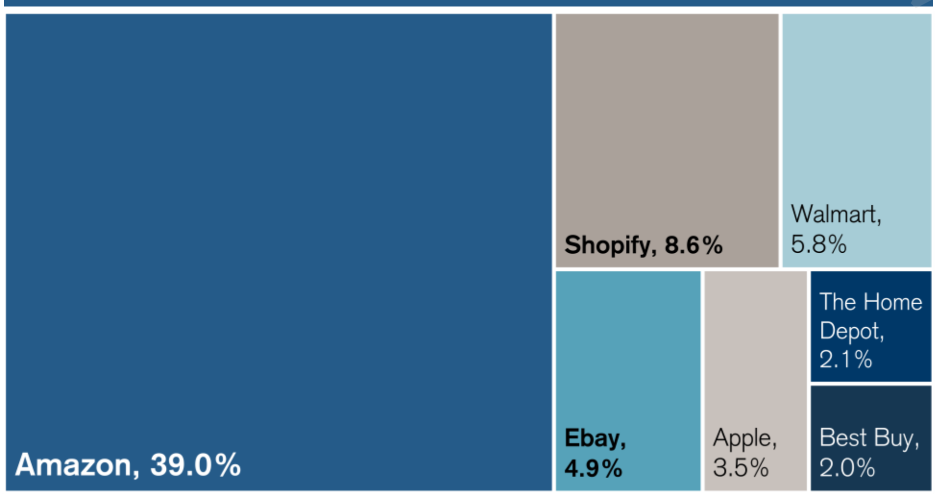
Source: McKinsey, eMarketer, Credit Suisse research

Return to Themes Table of Contents

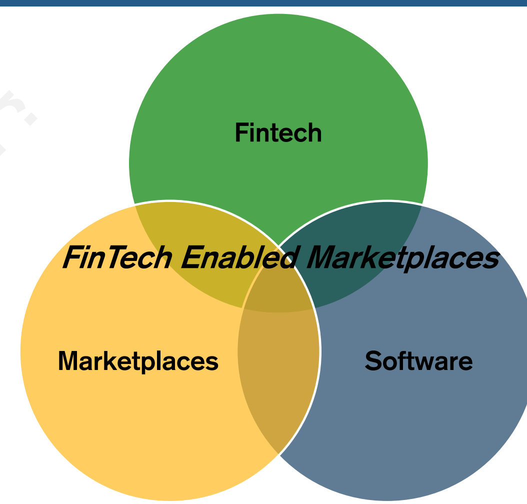
1. Global eCommerce as a key source of growth
Platforms and Marketplaces as eCommerce growth driver

- Platforms and marketplaces are increasingly becoming the distribution channel and relationship manager for SMB financial services.
- McKinsey estimates that by 2025 ~30% of all global economic activity (global GDP estimated to be ~$100tr) will be mediated by platforms, up from just a few percent in 2020, demonstrating the growth and scale potential for these software and marketplace relationships.
- Shopify is a share leader behind Amazon in this space serving over 1.7mm merchants with their Shopify platform solution and hosting over 24mm active users on their Shopify App store (incentivizing further creation in 2021 and beyond by removing any revenue share on the first $1mm earned for App creators and reducing the revenue share from 20% to 15% on earnings over $1mm).
- Shopify's partner ecosystem generated $12.5b in 2020 (up 84% YoY), a sign of both the growth in eComm as well as Shopify's partner options.
- Amazon is the clear market leader in US retail marketplaces; however, several startups within the FinTech space have begun to offer marketplace solutions in other verticals and geographies such as PolicyBazaar (insurance marketplace in India), Raisin (European deposit marketplace helping users find attractive interest rates), Synctera (marketplace connecting community banks with FinTech platforms), and many more.

Marketplaces had a 50%+ share of US retail eCommerce sales in 2020 with Shopify share growing ~270bps YoY (8.6% v. 5.9% in 2019)



FinTech enabled marketplaces are becoming the norm with certain value-added-services such as banking and financing expected



Source: Shopify, eMarketer, McKinsey, Credit Suisse research

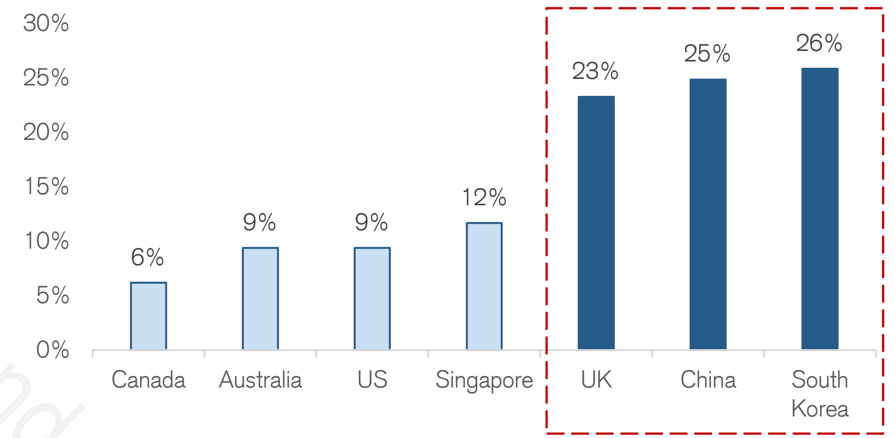
Return to Themes Table of Contents

1. Global eCommerce as a key source of growth

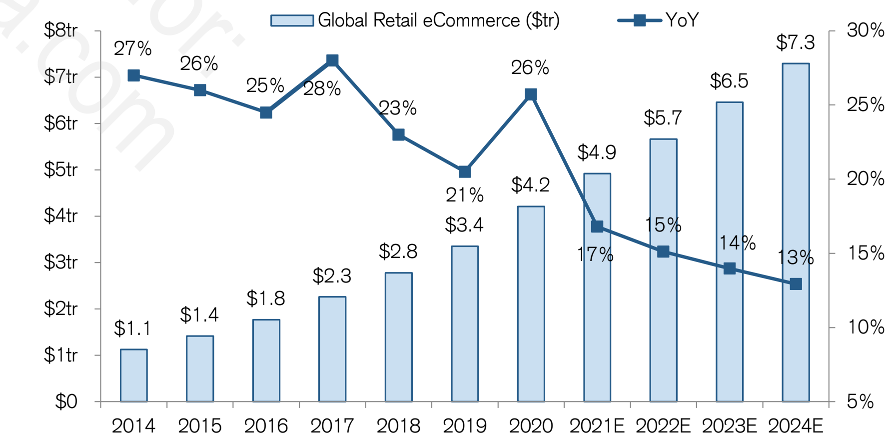
Many large, developed markets still at just ~5-15% penetration

- The global retail eCommerce market is expected to approach ~$5tr in 2021, although ~$2.6tr of that is in China, a meaningful portion of which is considered less addressable to many payments platforms.
- In China, the majority of volumes are done through Alipay and WeChat closed-loop systems, particularly with Alibaba [Tmall and Taobao], JD.com, and Pinduoduo as the dominant marketplaces.
- Still low levels of eCommerce penetration in large developed markets (including the US), particularly when viewed vs. penetration levels that are 2-3x higher in South Korea, UK, and China, suggesting stable growth ahead.
- A subset of drivers supportive of growth persistence include:
  1. Rising mobile penetration and conversion rates (supported by stored/tokenized credentials and eWallets), and
  2. Continued faster delivery times (supported by improvements in logistics infrastructure),
  3. Increasing availability of alternative payments methods (both for country-specific use cases and for the underbanked).

Numerous large, developed markets still at just ~5-15% penetration of retail sales, suggesting meaningful eCommerce runway remains



Global retail eComm is ~$5tr in annual volumes, growing at a mid-teens pace (albeit bolstered by China)



Source: eMarketer, Company reports, UNCTAD, Credit Suisse estimates

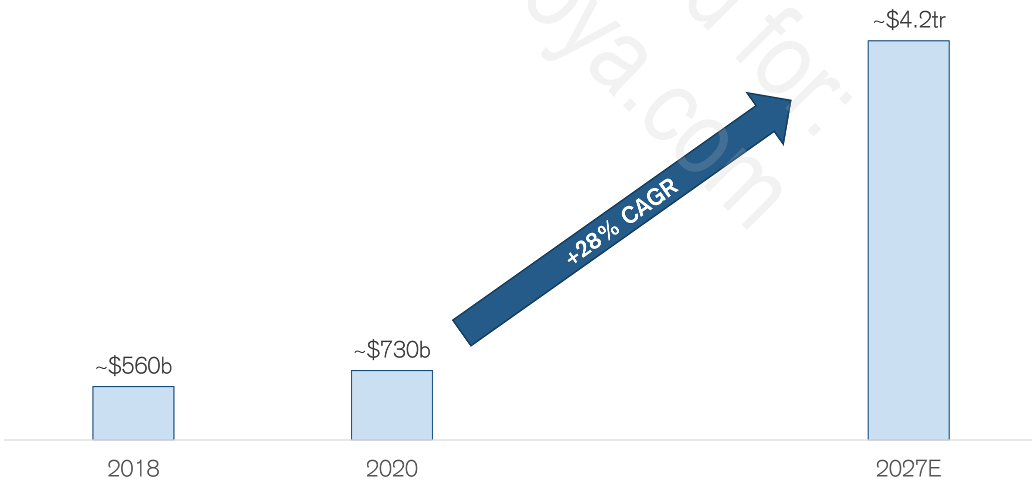
Return to Themes Table of Contents

1. Global eCommerce as a key source of growth

Cross-border the fastest growing sub-segment of eCommerce

- Cross-border eCommerce is becoming an increasingly important component of the overall online commerce market and as a driver of cross-border payments volumes.
  - We estimate cross-border eCommerce now makes up ~55% of cross-border card volumes for the networks decreasing to ~45% by 2024E as travel recovers and other faster growing channels gain share (B2B & remittances), whereas pre-COVID we estimated ~33% and five years ago ~30%.
- Cross-border eCommerce growth: (1) Zion Market Research expects cross-border eCommerce to grow at a +28% CAGR 2020-2027E; (2) Forrester expects a +17% CAGR (vs. +12% for overall B2C eCommerce) and estimates cross-border eCommerce is ~20% of the market, with ~2/3rds of cross-border done via marketplaces; and (3) Worldpay had estimated ~25% CAGR 2015-2020 vs. ~16% CAGR for eCommerce overall.
- Reasons for the growth: (1) improved localization (language, look, and feel); (2) more payments method choices; (3) means to gain access to goods not available in local markets; (4) means to benefit from lower priced goods; and (5) improved logistics.

Cross-border eCommerce is expected to grow 2x broader eCommerce (~high-20s% vs. ~mid-teens for eCommerce overall), per Zion Market Research



Source: Zion Market Research, Forrester, Worldpay, Credit Suisse research

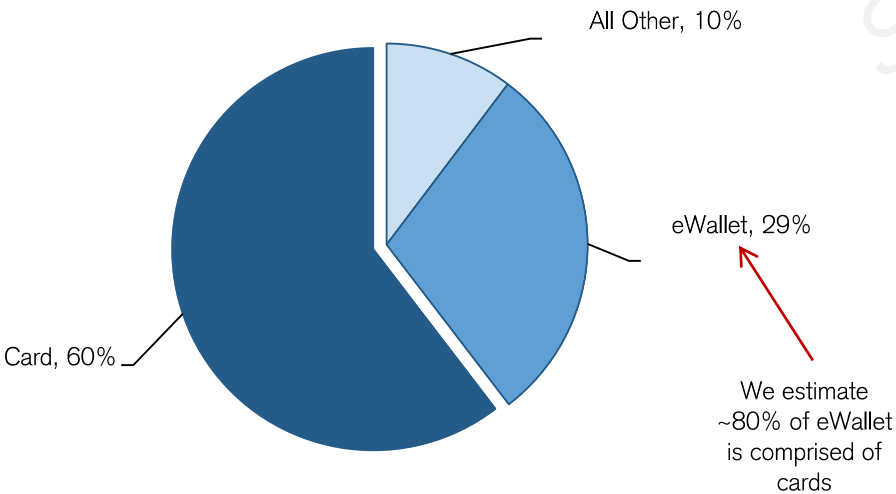
Return to Themes Table of Contents

1. Global eCommerce as a key source of growth

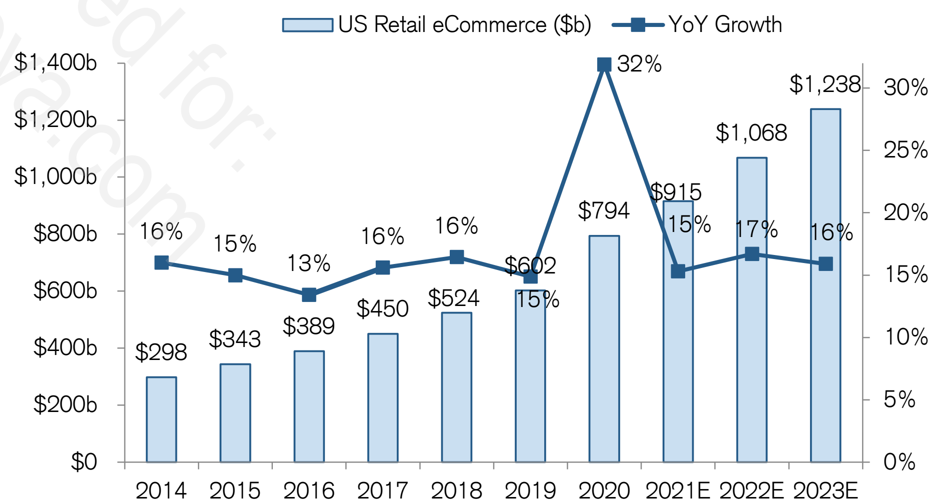
US market focus – eComm still growing 3-4x faster vs. in-store

- US Retail eCommerce market is approaching ~$800b and has been growing roughly mid-teens on average (expected to continue at a similar pace).
- It represents a meaningful growth driver for Visa and Mastercard given card mix for eCommerce transactions is significantly higher vs. in-store in the US (~roughly 85% vs. ~50%).
- Card not present was ~45% of transactions for Mastercard in 2020 vs. ~40% in 2019.
- Amazon US GMV in 2020 was ~$300b, which implies Amazon makes up ~40% of the US Retail eCommerce market (but will make up roughly half of total growth on average from 2020-2023).

North American eCommerce payments by card were ~60% of transactions (2020); When combined with eWallet transactions, it suggests card payments are a part of ~83% of eCommerce



US Retail eCommerce approaching~$800b as of 2020 and projected to exceed ~$1tr in 2022



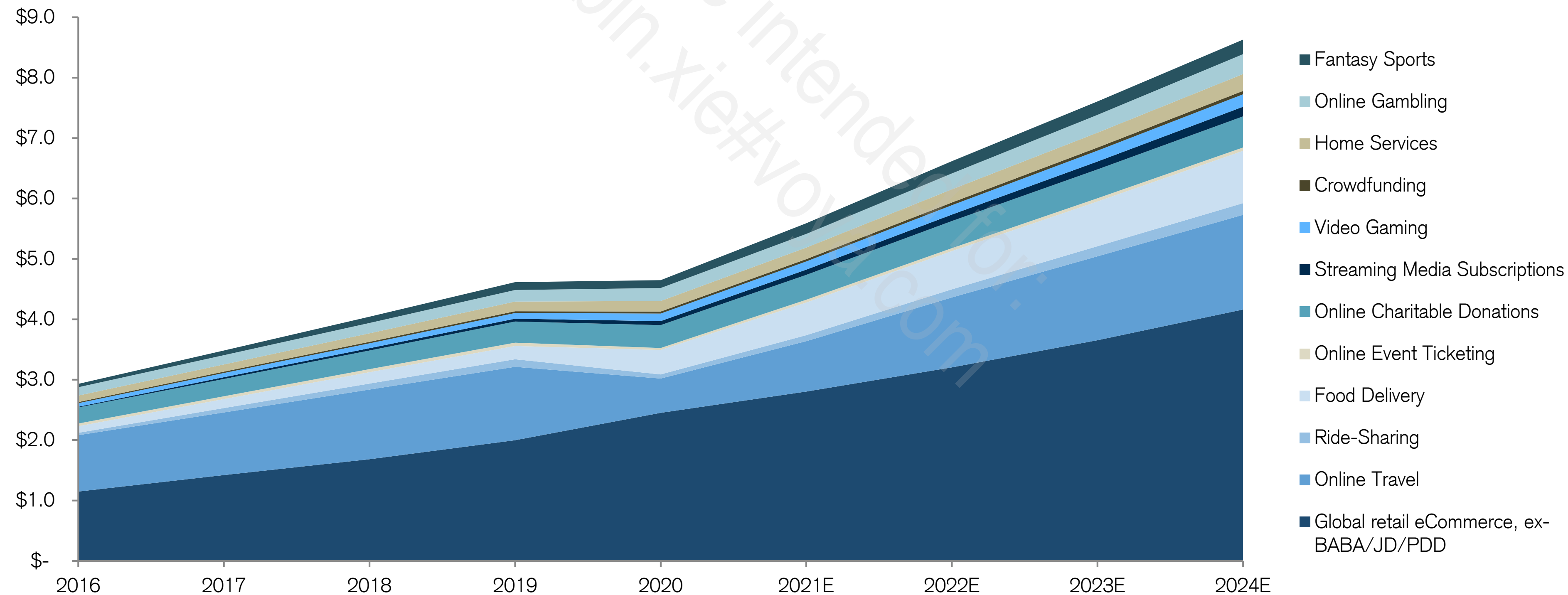
Return to Themes Table of Contents

1. Global eCommerce as a key source of growth

"True TAM" for global online acquirers

- Given various data sources include or exclude portions of "eCommerce", we constructed a "True TAM" that we estimate to be ~$5.5tr today, growing toward ~$8.5tr by 2024E.
- Our "True TAM" model is inclusive of global eCommerce, eTravel, eFood delivery, eTicketing, online charitable donations, ride-sharing, crowdfunding, video gaming, streaming subscriptions, online gambling, home services, and fantasy sports (but does not include BABA, JD, & PDD as a proxy for China eCommerce volumes which we view as largely un-addressable).
- This adds up to confidence in the persistence of growth (often underappreciated in payments) and annual compounding.

We constructed a "True TAM" that we estimate to be ~$5.5tr today, growing toward ~$8.5tr by 2024E



Source: Company data, eMarketer, Phocuswright, Euromonitor, ResearchAndMarkets.com, nonprofitsource.com, Statista, Credit Suisse estimates

Return to Themes Table of Contents

1. Global eCommerce as a key source of growth
True TAM assumptions and rationale

Global Category	TAM Assumptions & Rationale	2020-24E CAGR	2021E Size ($b)	% of TAM (2021E)
Global retail eCommerce, ex-BABA/JD/PDD	eMarketer Global Online Retail Estimates. Assumes China domestic eCommerce volumes are unaddressable. Use consensus GMV estimates for BABA, JD, & PDD as a proxy for China eComm volumes, conservative given Adyen announced in 2019 that it will facilitate payments outside of Chinese mainland for AliExpress, Taobao, Tmall, and Alibaba.com.	14%	$2,800	50%
Online Travel	Global online travel forecasts based on Euromonitor data which is directionally consistent with CS Global OTA Industry Model (Stephen Ju), indicating the online travel market does not recover to 2019 pre-COVID levels until 2022+.	29%	$850	15%
Ride-Sharing	Assumes Uber and Lyft represent 50% of the global ride-sharing market, with their global share declining slightly in each year in our forecast (assumes additional regional competitors gain share). We utilize Uber & Lyft ride-sharing consensus estimates.	30%	$100	2%
Food Delivery	Informed by Euromonitor estimates for Global Food Delivery market size (i.e.,GrubHub, UberEats, DoorDash, Postmates, Delivery Hero, Takeaway.com, Deliveroo, Just Eat, restaurant websites, etc.).	21%	$550	10%
Online Event Ticketing	Assumes ~$47b market size in 2017, with a ~7% CAGR through the forecast period (ex COVID impacted 2020E and assumed recovery in 2021E). Market sizing base sourced via ResearchAndMarkets.com.	14%	$50	1%
Online Charitable Donations	Forecasts assume US Charitable donation market has 40% global market share and grows ~5% annually overall (in line with historical trends) and card penetration increases 1% per year. US market historical figures reflect donations from individuals. Sources include givingusa.org and funraise.	8%	$400	7%
Streaming Media Subscriptions	We utilize consensus revenue estimates for Netflix and Spotify, and assume these two platforms represent 75% and 35% of the 2018 global video and music streaming markets, respectively. We then assume slight annual share loss (i.e., additional platforms grow faster off of a smaller base, gaining share) of the global video and music streaming markets, respectively.	24%	$90	2%
Video gaming	Includes in-game purchase of virtual goods (e.g., points, tools, additions) that video game players use to enhance their gaming experience. Our assumptions are informed by the CS video game industry model (Stephen Ju).	14%	$125	2%
Crowdfunding (ex-China)	Fundly estimates for global crowdfunding market size; addressable market growth CAGR below global forecasts from Technavio (17%) given expectations for non-addressable markets to grow faster (e.g., China).	14%	$40	1%
Online On-demand Home Services	IAC estimates for US Home Services TAM; assumes online penetration of 19% in 2019 with online penetration increasing over time; also assumes the US has 50% share of the global TAM; not all online transactions will have payments attached, but this portion of the market is becoming increasingly addressable.	12%	$200	3%
Online Gaming	Our TAM for online gambling represents our estimate of "Payments Volume" (said differently actual card or APM payments processed) on online gaming platforms - which we estimate is ~3x Gross Gambling Revenue (widely quoted as "market"), the processor will observe volume for pay-ins and pay-outs. Online gambling includes sportsbook wagering, casino, state lotteries, poker, and other. Source: Grand View Research	11%	$225	4%
Fantasy Sports	Our TAM for fantasy sports represents our estimate of "Payments Volume" flowing over fantasy platforms. Fantasy is a lower revenue business but tends to have higher payments flows vs. Online Gaming. We project payments volume as a multiple of market revenues (assuming ~7x or roughly double the multiple for Online Gaming). Includes Daily Fantasy and traditional fantasy. Source: Allied Market Research. IBISWorld	17%	$175	3%
Total		**17%**	**$5,600**	**100%**

Source: Company data, eMarketer, Phocuswright, Euromonitor, ResearchAndMarkets.com, givingusa.org, Funraise, Statista, IAC, Grand View Research, H2 Gambling, Credit Suisse estimates

Return to Themes Table of Contents

2. Global eCommerce (and omnichannel) acquiring platforms

Large eCommerce payments providers (summary)

- eCommerce payments providers compete on:
  - Authorization & fraud rates
  - Global acceptance methods
  - Conversion rates
  - Ease of integration
  - Ease of ongoing operations
  - Omnichannel capabilities
  - Vertical or segment expertise
  - Additional software & services
  - Pricing
  - Service & support

- Stripe has become a much more meaningful competitor, for both SMB and larger multinationals (now ~47 countries of local acquiring, 30+ unique forms of payment acceptance [aiming toward 50 in 2021], 195+ payout countries in 2021). Payments volume has reached "hundreds of billions", headcount is ~4k, and valuation most recently $95b – all indicative of a more scaled competitor. Our industry discussions suggest that Stripe has been appearing in and winning more RFPs, armed with its more fulsome global and commerce enablement capabilities. Further, the company's innovation cadence is resulting in numerous new offerings bolstering its position with software platforms (e.g., Stripe Treasury, Stripe Issuing, Stripe Corporate Cards, Stripe Capital, Stripe Terminal, etc.)

	Braintree (A PayPal Service)	stripe	adyen	worldpay	globalpayments	First Data is now fiserv
	~$340b	"Hundreds of billions"	~$320b	~$425b	~$170b	~$620b
2020E eCommerce volumes	~+20% YoY (inclusive of gateway and PayPal button transactions), impacted by heavy travel & events exposure (e.g., ticketing)	"Hundreds of billions" (disclosed by management in September 2019)	CS est. based on 2020 processed volume of €303.6b less €32.2b of POS processed volume, converted to USD	CS est. based on 2020 volume of ~$1.7tr times assumed eComm share of ~25%. Assumed eComm ex. Travel volume grew inline with ~30% reported transaction growth at ~75% of mix and Travel volume declined ~70% at 25% of mix in 2020.	CS est. based on ~$1b eComm & Omni revenue (disclosed in 2021 investor day) grossed up assuming ~60bps net acquiring spread	CS est. based on 2020 volume of ~$3.1tr times assumed eComm share of ~20%.

Source: Company reports, Credit Suisse estimates

Return to Themes Table of Contents

2. Global eCommerce (and omnichannel) acquiring platforms

Large eCommerce & omnichannel payments providers (detail)

Metric	Braintree (A PayPal Service)	stripe	adyen	worldpay	globalpayments	First Data is now fiserv.
Valuation	~20% of PayPal's revenue (Cse) , which is a ~$335b business	$95b (March 2021 financing)	~$95b	$43b acquisition price (now a part of FIS) FIS valued at ~$80b, with acquiring representing ~30% of revenue	~$50b	Global Business Solutions (GBS) was ~2/3rd of First Data revenue, acquired by Fiserv for ~$22b in 2019 FISV valued at ~$77b, with accceptance representing ~43% of revenue
2020E eCommerce volume	~$340b estimate, ~+20% YoY (including gateway only and PayPal button transactions)	"Hundreds of billions" (disclosed by management in September 2019, we estimate that volumes are slightly below Adyen & Braintree when including PayPal transactions)	~$320b (CS est. based on 2020 processed volume of €303.6b less €32.2b of POS processed volume, converted to USD)	~$425b (CS est. based on 2020 volume of ~$1.7tr times assumed eComm share of ~25%. Assumed eComm ex. Travel volume grew inline with ~30% reported transaction growth at ~75% of mix and Travel volume declined ~70% at 25% of mix in 2020)	~$170b (based on ~$1b eComm & Omni revenue disclosed at 2021 investor day, grossed up assuming ~60bps net acquiring spread)	~$480b (CS est. based on an assumed lower yield given mix of volume that is processing only, along with disclosure that eCommerce was ~$500mm in revenue in 2016 growing mid-high teens+)
Geographic	- 130+ currencies, 45+ countries, with nearly 20 settlement currencies - Heavy skew toward US volumes and US-based mid-market and enterprise merchants (Total PYPL TPV mix is 60% US and 40% international) - 8 offices globally including 4 in the US, 2 in EMEA, and 2 in APAC	- ~47 countries as of June 2021 (plus 3 additional markets from Paystack; with local/domestic acquiring) - APAC volume has more than doubled since 2019 and "Largest enterprise payment provider in Europe" per Stripe Sessions 2021 - Predominantly US (precise mix undisclosed)	- ~62% of net revenue from Europe in 2020 - ~19% North America - ~10% AsiaPac - ~9% in LatAm	- 72% of 2020 Acquiring revenue from North America, 28% from Rest of World (vast majority is Europe with a heavy skew toward UK from legacy Worldpay) - 146 countries, 126 currencies	- 84% of 2020 revenue from Americas, 12% Europe, 4% Asia Pacific - Local sales & customer support in 38 countries (including local support staff on the ground serving local merchants) - Payment acceptance across ~180 countries (including cross-border markets) and in 130+ transaction currencies (~16 settlement currencies)	- 130+ currencies, 200+ countries
Acceptance methods	~25 unique forms of payment globally, given business is largely US-focused; PPRO investment/partnership has the potential to expand LPMs	30+ APMs, but actively working toward expanding this number; first non-bank to integrate with Cartes Bancaires (France)	300+ APMs	300+ payments methods	140+ payment methods	260+ payment methods
Processing partners & licensing	- Regional banking relationships for processing (banks with acquiring licenses), e.g., Wells Fargo and Chase Paymentech in the US, AIB Merchant Services in Europe, NAB in Australia, etc. - PayPal does not serve as an acquirer in any market (acts as either a PayFac or ISO, depending on merchant size)	- Stripe serves as a merchant acquirer (direct licenses via the card networks) in virtually all markets (including all of Europe) - Wells Fargo and BBVA are acquiring bank partners in the US - Front- and back-end processing formerly done by Fiserv but being brought in-house	- Recently acquired a bank license in the US (formerly partnered with Wells Fargo and Deutsche Bank) - Offers local acquiring in 44 markets	- Offers direct domestic / local acquiring in 61 markets - Obtained an acquiring license in Argentina (October 2020) - Obtained an acquiring license in Malaysia (April 2021) - Nigeria and South Africa local acquiring in partnership with Flutterwave	- 59 local acquiring markets - Differentiation via local market, in-store presence at scale (i.e., local merchants doing in-store in ~38 markets, including local support for all merchants, including SMB)	- 50-55 markets "which we are licensed to acquire from merchants", partially with owned licenses and partially via sponsorships (with plans to expand self-sponsorship in a few new markets in 2020); Act as a direct acquirer and manage own sponsors in these countries
Customer segment	- Predominantly mid-market and enterprise (e.g., Uber, Airbnb, Facebook, Pinterest)	- Spans full gamut of merchants, with a focus on start-ups/SMB community, but also working with enterprise level merchants (Lyft, Target, UnderArmour, Amazon, etc.) - Shopify Payments partner (expands start-up/SMB reach) - Increasing large enterprise wins (RFP processes) - Well-positioned for software platforms and marketplaces which act as a customer acquisition channel for global SMBs	- Focused on enterprise (large, global, eCommerce and omni-channel) - Expanding into mid-market - Pursuing SMBs via a platform/ISV approach	- Larger merchants, many of which require live contact/support - Cross-border leader globally - Global digital retailers and leading online travel sites	- Focused almost exclusively on the SMB segment, along with multi-national corporations that require cross-border capabilities	- Serve a range of merchants from the largest retailers and platforms (PayPal, Yapstone, etc.) to smaller businesses via Clover (although not quite into the micro-merchant segment, given even Clover's average merchant is larger than Square's); gains SMB exposure via bank distribution channel (Bank of America, Wells Fargo, PNC, etc.)
Number of merchants	- "Thousands" of merchants per Braintree website	- "Millions of businesses on Stripe" and "thousands of platforms" - 50+ users with over $1b in annual payment volume as of June 2021	- ~3.4k as of December 2017 (last disclosure); we believe the company is now closer to ~5,000; no longer disclosed	- ~1mm+ merchants in total for WP (inclusive of offline only merchants)	- 3.5mm+ merchant locations via Global Payments; 820k via TSYS	- ~6mm merchant locations
Pricing Approach	- 2.59% + $0.49 in the US - Lower in Europe (e.g., 1.9% + €0.30) - Priced differently by region (volume discounts for large customers negotiated) - $0.10 per trans + $49 per month for gateway	- 2.9% + $0.30 in the US for standard, smaller merchant pricing (although larger merchants and/or platforms are able to negotiate based on volumes, which is similar to competitors) - Lower in Europe (e.g., 1.4% + €0.25 for European cards, 2.9% + €0.25 for non-European cards) - Priced differently in each region	- Interchange ++ - Acquiring spread starts at 0.60% - $0.12 processing fee per transaction	- Mix of bundled and interchange plus - ~22-25bps net yield (CS est.)	- Priced to value given high touch sales support - ~60bps net yield excluding software revs (CS est.)	Interchange ++ for larger merchants, and could employ a bundled approach for smaller merchants; processing only fees (either a small bps figure or cents per transaction for processing only relationships); competitive on pricing, in part due to scale (i.e., ~40% share in the US, largest acquirer globally)
Additional services	- Braintree Extend (contextual commerce/sell on another platform) - In-store payments available via PayPal Here and Zettle in select regions - Fraud Protection and Fraud Protection Advanced available for purchase	- Stripe Treasury (BaaS offering for platform customers to offer bank accounts), Stripe Billing (recurring business models), Atlas (incorporation, tax & legal services), Radar (machine learning applied to fraud), Chargeback Protection (40bps "insurance"), Stripe Terminal (programmable offline POS), Stripe Sigma (business data platform), Stripe Issuing (card issuance, including corporate cards), Stripe Capital (lending via bank partner), Premium Support (for complex cases), although support is offered to all merchants	- RevenueProtect risk management solution (being offered to merchants separately, including non-processing clients) - In-store payments and terminal (Unified Commerce), customer insights, revenue optimization, and other features - Launched card issuance business November 2019	- AuthMax to increase auth rates for CNP - Card issuance capabilities - In-store offerings (omnichannel solutions) - Data dashboard for customer insights, etc. - Increased data (FIS issuer processing & banking relationships) to aid in increasing authorization rates (management expects ~200bps potential increase, from mid-80%s to high 80%s)	- 60+ lenders connected via API (merchant cash advance, no B/S risk) - In-store API-based terminals - Card issuance capabilities - Issuer processing business (potential for improved authorization rates, SCA capabilities, economics) - Payroll services (e.g., Heartland Payroll) - High-touch local support in 33 markets	- Clover POS for in-store capabilities (omnichannel) - Owns both STAR and Accel debit networks (low cost debit routing), along with Acculynk (least-cost routing gateway supporting optimized online transaction routing) helps to prioritize based on approvals, costs, etc. - Card issuance capabilities
Go-to-market	-Self-service via Drop-in ("a few lines of code") for smaller merchants/developers or Customer UI and direct sales force approach - Combined salesforce with PayPal means a greater presence in countries outside core US/Europe	- Growing Business Development / Salesforce (largely self-serve to developers/startups, but high-touch for larger merchants)	- Salesforce on commission - Must ensure regional involvement - Work streams to ensure sales & engineering coordination	- Salesforce on commission, including a Global eCommerce sales team	- 3.5k+ direct sales people (including ~3k+ from Global Payments and ~500 from TSYS)	Combination of bank partners (both revenue share & JVs), direct sales, and other partners (agents, ISOs, ISV through CardConnect and BluePay); S-1 filing from 2015 suggests ~2.3k sales people
Marketplaces offering	Braintree Marketplace offering, bolstered by the acquisition of Hyperwallet for improving the payout capabilities	Stripe Connect (marketplaces & platforms), Stripe Treasury (BaaS offering for platform customers to offer bank accounts), Stripe Issuing, Stripe Capital, along with recently expanded payout capabilities (aiming for 100+ payout countries [over local bank rails], 90% users with instant payouts, and 1-2 day payouts everywhere, per Stripe Sessions 2019 in SF) amongst others	Adyen for Platforms, which aims to smooth onboarding of merchants, funds movement/payouts, etc. easy and compliant; Recent notable client win in eBay	In addition to working with Marketplaces merchants (pure-play eCommerce), also offers programs for Payment Facilitators (onboarding sub-merchants, collecting payments, reducing risk, etc.)	Works with marketplaces, in keeping aligned with overall company strategy of focusing on more niche verticals, SMB, and multi-nationals, where services and added capabilities are valued and compensated	Emphasis on Marketplaces, on-demand platforms, and aggregators, along with capabilities in digital disbursements, etc.; Programs tailed for Payment Facilitators for single and multi-MID programs (e.g., PayPal as a notable customer) and Marketplaces
Employees	500+	4,000+ as of September 2021 (vs. ~2k+ at Stripe Sessions September 2019)	1,954 as of H1 2021	~8.2k as of end 2018	Nearly 24k as of September 2021	~44k+ at Fiserv (where merchant acquiring was ~43% of the business in 2020)
Other	- Single contract and integration for PayPal and Venmo appealing to smaller merchants (single contract)	- GPTN foundation (Global Payments & Treasury Network) - Large investors include Tiger Global, Capital G, General Catalyst, etc. - Acquired Touchtech Payments in April 2019 (SCA technology) - Recent acquisitions include Paystack, Bouncer, and TaxJar - Single integration to access global capabilities of Stripe	- No single merchant customization (unless applicable to broader platform) - Top 10 merchants represented 38% of gross revenue and 20% of net revenue in 2020 (vs. 33% and 25% in 2019, respectively) - Single integration to access global capabilities of Adyen	- Will customize for clients, "consultancy services" on market expansion - Defines eCommerce as pure play eCommerce merchant volume only (i.e., the eCommerce associated with an omnichannel client is not included, and thus, the actual size of the total eCommerce business is by definition under-stated to an extent) - Single integration to access global capabilities via Access Worldpay launched in September 2020	- Vertical specific expertise and high-touch customer support, even for SMB level merchants - Defines eCommerce as CNP for both pure-play eCommerce merchants and the eCommerce/CNP portion of their omnichannel merchant clients	- Carat (enterprise platform) used by 7 of top 10 brands, 9 of top 15 QSRs, and 7 of top 10 grocers - Rapid Connect can serve as a middleware layer (although requires an added hop for transaction data) - Multiple gateways and platforms (e.g. Payeezy, CardPointe, Clover Gateway, etc.)

Source: Company reports, Credit Suisse estimates

Return to Themes Table of Contents

2. Global eCommerce (and omnichannel) acquiring platforms
Forrester's global payments provider assessment

- In the latest Forrester Wave report for merchant payment providers, Stripe was ranked the leader of the space, scoring highest in both the Current Offering & Strategy categories and being the only provider to receive a 5 out of 5 score in the "payments for platforms and marketplaces" category, a new category in Forrester's analysis.
- Adyen followed closely in the report, with strengths identified as global capabilities, single platform, and omnichannel solutions (homegrown terminal software and hardware).
- Fiserv (First Data), Worldpay (FIS), PayPal (including Braintree), Worldline, and JPMorgan were also listed as strong performers.
- We expect an increasing trend toward merchants consolidating acquirers around a few global omnichannel providers (displacing local acquirers).

Source: Forrester (The Forrester Wave™: Global Merchant Payment Providers, Q3 2020); Forrester excludes large bank acquirers that use third-party processing technology (e.g., Wells, Citi, Bank of America Merchant Services)

Return to Themes Table of Contents

2. Global eCommerce (and omnichannel) acquiring platforms

Stripe additional service offerings “beyond payments”

Stripe additional service	Description	Pricing
Billing	Offering for subscription and/or recurring billing businesses, including ability to customize pricing (e.g., usage-based, tiered, billing frequency, one-time charges, etc.).	0.5% for Starter package; 0.8% for Scale Package
Invoicing	Global invoicing platform built to create and send Stripe-hosted invoices in minutes. Can use the invoicing API and advanced features to automate collection and reconciliation of payments.	0.4% per invoice (first 25 free) for starter; 0.5% per invoice for plus
Connect	For marketplaces and platforms, enabling account setup (i.e., onboarding, 1099 reporting, KYC), including Stipe Instant Payout to a debit card (Visa Direct) and standard ACH transfers. Connect pricing is usage-based and flexible based on the capabilities needed, with pricing varying by account type (standard, express, or custom).	$2 per account and 0.25% + $0.25 per ACH payout; instant payout 1%; account debits 1.5%
RADAR	Machine-learning enabled fraud, with the ability to adapt to changing fraud patterns. Allows fraud teams to take action quickly once fraud patterns emerge. Chargeback Protection, insurance against chargeback disputes (i.e., pay a fixed 40bps in exchange for ability to redirect focus back on the business). No evidence submission is required, Stripe effectively takes on the risk.	$0.05 per transaction (included for those paying standard pricing); 0.40% for Chargeback protection
SIGMA	Reporting and data analytics (standard and custom SQL queries) for business operations/intelligence, accounting, finance, and product management teams.	$0.014 - $0.02 per charge (negotiated pricing for >50k charges/mo)
ATLAS	Outsourced offering for business start-up and formation, ranging from corporation filing (Delaware), IP documentation, stock issuance for founders, tax ID (EIN), bank account opening, Stripe accounts, etc.	$500 one-time fee, along with ongoing costs for Delaware filings, tax prep, etc.
ISSUING	Card issuance platform for both physical and virtual cards. Use cases include employee expense cards, virtual cards for couriers to pay via mobile, etc. Can also support the entire card stack for digital banks. Includes features such as dynamic spending limits, merchant category controls, per-user bookkeeping, and other controls. Both Visa and Mastercard cards are able to be built.	$0.10 per virtual card; $3 per physical card; 0.2% + $0.20 after first $500k in transactions; 1% + $0.30 for cross-border transactions; $15 per lost dispute
Tax	Automates tax calculation for sales tax, VAT and GST in all US states and more than 30 countries. Stripe acquired Taxjar (used by over 20,000 customers, automated tax filing and remittance on a tax-rules engine) in April 2021.	0.5% per transaction; 0.4% for $100k+ volume per month
Terminal	Unified experience for online and offline sales, and provides a seamless customer experience across channels. Ability to build custom POS software, all linked to EMV compliant card readers (hardware).	2.7% + $0.05 (+1.0% for international) for in-store payments; Hardware options $59 and $249
Identity	Packages identity verification, fraud prevention, global scalability, and security in a simple API. Can verify the authenticity of ID documents from over 33 countries. 8. Live in 8 countries (including US, UK, France, Australia).	$1.50 per verification; $0.5 per ID number lookup; negotiated if above 2k verifications / months
CORPORATE CARD	Instant sign-up corporate expense card, no personal guarantee required. 2% cash back on top two spend categories, and 1% cash back on everything else, includes $50k in free payment processing. Implements custom spend controls (i.e. by merchant category) with real-time expensing. Integrated with Expensify and Quickbooks Online.	No fees (annual, foreign, late), no interest (must pay balance in full monthly)
Capital	Similar to Square capital - quick and easy onboarding for SMB loans. Repayment is not a term structured interest payment, but is deducted from daily sales of the merchant as a fixed %. Stripe Capital for platforms now also available.	One flat fee, no interest, paid as a % of daily sales
Treasury	Banking-as-a-service API that enables Stripe's marketplace or platform users to embed financial services, allowing them to offer business customers bank accounts in minutes, near-instant access to revenue, transfer it, pay bills, and more.	N/A (currently invitation-only after initial roll-out in Dec 2020)
Climate	Enables Stripe users contibue a fraction of their revenue to funding carbon removal and let their customers know about the commitment with a new badge updated automatically on Stripe-hosted checkout, receipts, and invoices.	Free enrollment for Stripe users and no fee for contributions

Source: Stripe

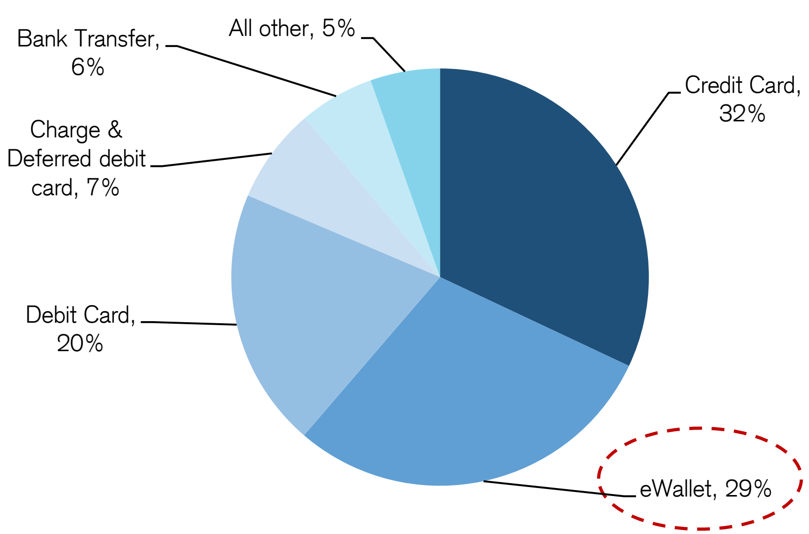
Return to Themes Table of Contents

3. Checkout buttons & digital wallets

eWallets ~29% of North American eCommerce; ~40% by 2024E

- Approximately ~29% of North American eCommerce occurs via checkout buttons as of 2020 (including buttons with actual digital wallets attached such as PayPal, as well as pass-through wallets such as Apple Pay and Google Pay that simply store card credentials); Worldpay expects this to reach ~40% by 2024.
- Much of the eWallet volume in North America ultimately flows over card rails (e.g., PayPal wallet funding method or card credentials stored in Apple Pay, Google Pay, Samsung Pay, etc.).
- ~3/4ths of US eCommerce sites have at least one checkout button; this has been relatively stable since 2017.
- The basic value proposition is increased conversion (via reduced manual entry), security, and trust (card numbers not passed to the merchant).

eWallets made up ~29% of North American eCommerce payments in 2020, per Worldpay



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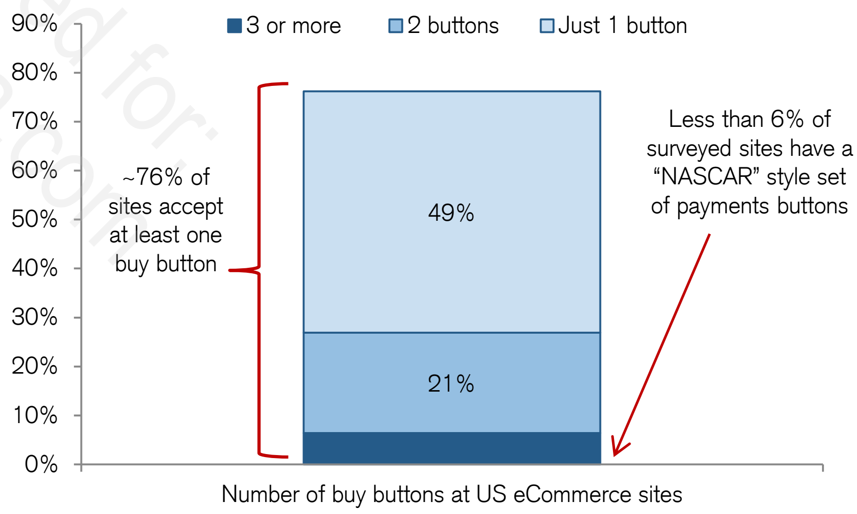


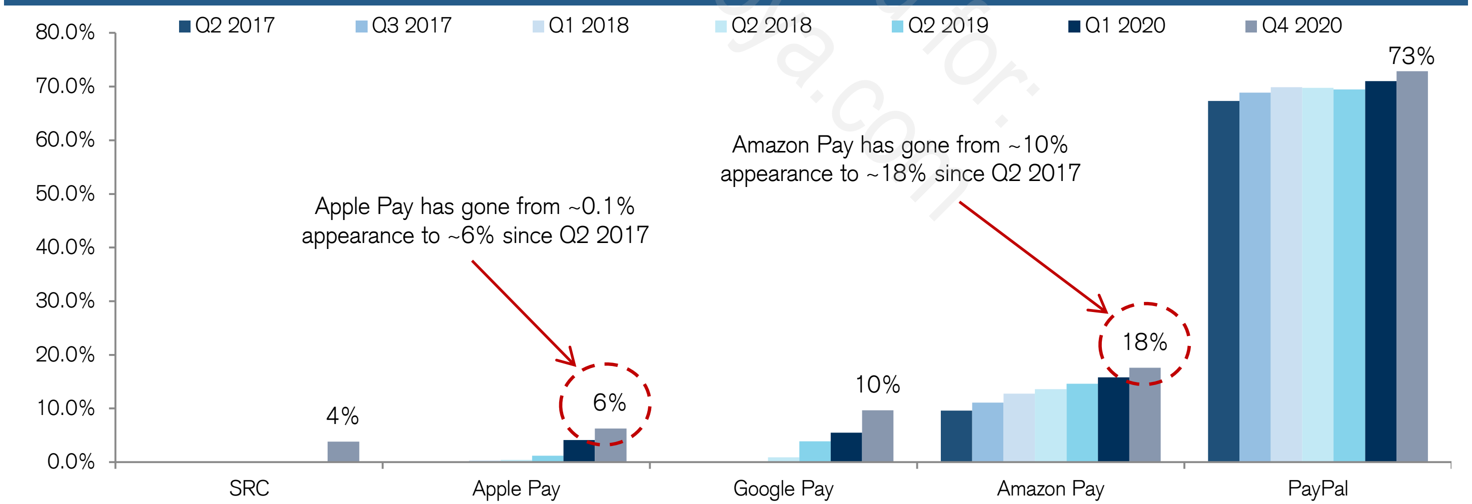
Source: Worldpay, PYMNTS.com, Credit Suisse estimates

3. Checkout buttons & digital wallets

PayPal the leader, Amazon gaining, and a new kid on the block

- PayPal remains the dominant option for merchants, appearing on ~73% of a surveyed group of US eCommerce sites (n = 800+). Amazon Pay is now appearing at ~18% of these sites, an increase of ~65% since Q2 2017.
  - Google Pay appears on ~10% of these sites, showing a meaningful uptick following its re-brand and consolidation.
  - Apple Pay now appears on ~6% of these sites, an increase of ~425% since Q2 2019.
  - A number of new checkout buttons have also been launched or are slated for launch in the near future, including Shop Pay and Facebook Pay.
- A new checkout button emerged (October 2019 launch) in the form of the network-supported EMV SRC button, which takes the place of Visa Checkout, Masterpass, and Amex Express Checkout. We expect an "easier sell" to merchants and acceptance rates that far surpass predecessor offerings.
  - SRC appears on ~4% of the surveyed group sites, the slow growth of adoption is likely due to long processes in developing industry wide standards and integrating with enterprise-grade platforms.

PayPal (~73% appearance rate) has a ~4x lead over its nearest competitor, which is Amazon Pay (~18% appearance rate)



Source: PYMNTS.com, Credit Suisse estimates

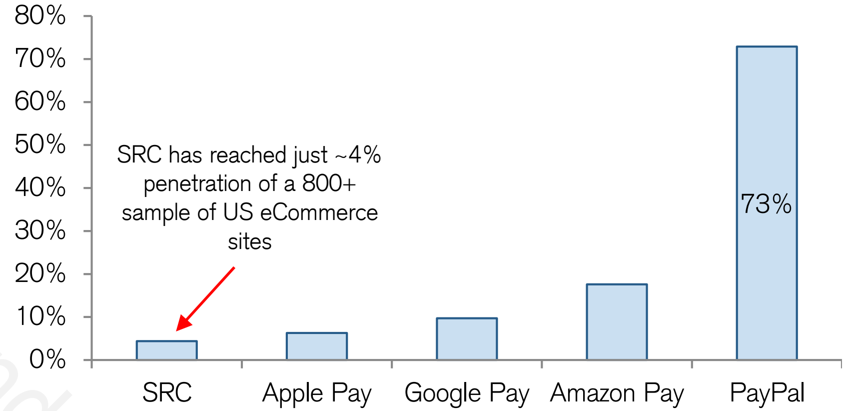
Return to Themes Table of Contents

3. Checkout buttons & digital wallets

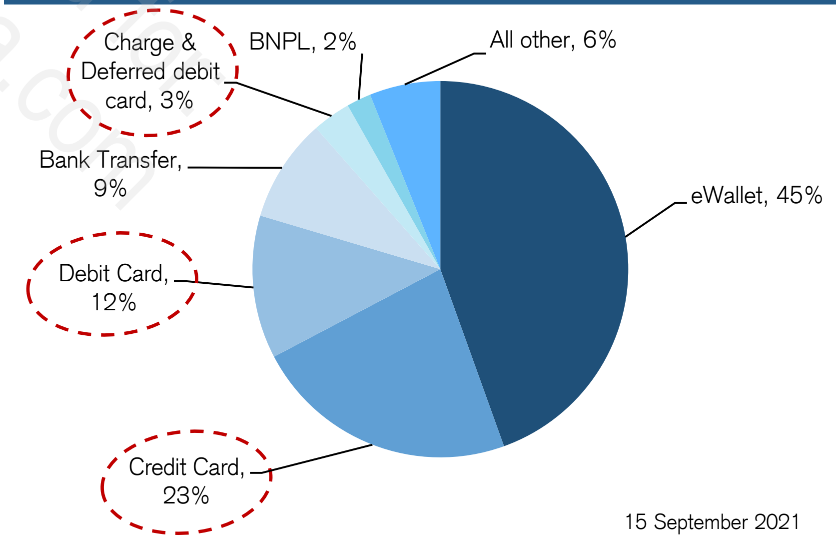
Secure Remote Commerce (SRC) "Click-to-pay"

- EMV SRC aims to create a "virtual payment terminal", mimicking the offline world where all payments methods come through the same terminal, along with a set of authentication and security standards.
- While Visa Checkout and Masterpass gained limited traction, we believe the SRC button will be an "easier sell" (relative to separate buttons from V, MA, and AXP) to all parts of the traditional "four-party model".
  - Consumer - less cluttered checkout
  - Bank card issuers - increased eCommerce volumes
  - Merchants - increased online conversion, a single integration vs. multiple, and potentially reduced acceptance costs
  - Merchant Acquirers - potentially increased volumes (and possibly fewer transactions siphoned off to PayPal, Amazon Pay, etc.) and likely higher conversion over time (closing gap vs. wallet oriented alternatives)
  - Networks – carve out a role alongside wallets (that have longer-term disintermediation risk associated with them)
- Risk to PayPal (and Amazon Pay), although we believe the most readily addressable audience for an SRC button are consumers currently entering cards manually (38% globally, 60% in the US) vs. PayPal's >370mm active accounts (and ~32mm merchants) and network effects.
- Began rollout with a few merchants in October 2019 and has since added 15,000 merchants in 16 markets as of November 2020.

SRC has yet to gain meaningful traction, although still early on its roll out (data for Q4'20)



~38% of Global eCommerce (~60% US) in 2020 was done via card (most readily addressable portion for the SRC button)



Source: Worldpay, PYMNTS.com, Credit Suisse estimates

Return to Themes Table of Contents

3. Checkout buttons & digital wallets

Overview of the major US wallets and business models

Product	PayPal	Amazon Pay	Google Pay	Apple Pay	EMV SRC "Click-to-pay"
Pricing	3.49% + $0.49 for online (US)	2.9% + $0.30 for online (US)	No fees charged by Google (online payment is considered a card-not-present transaction, and card-present when done in-store)	No fees to merchants (merchants pay their standard card acceptance fees through their acquirer or PSP); Apple shares in a portion of the bank issuer's interchange, ~15bps	No fees to merchants (merchants pay their standard card acceptance fees through their acquirer or PSP)
eCommerce acceptance (US) [2020]	73%	18%	10%	6%	4%
Contracting required?	Must be contracted with PayPal, offering "rack rate" pricing and negotiated deals for larger merchants	Must be contracted with Amazon, offering "rack rate" pricing and negotiated deals for larger merchants	Pass-through mechanism only, no contract (integration and development work only), i.e., paying with a Google-stored card credential	Pass-through mechanism only, no contract (integration and development work only)	Pass-through mechanism only, no contract (integration and development work only); Replaces (and consolidates) Visa Checkout, Masterpass, and Amex Express Checkout
User and/or transaction statistics	~400mm active accounts as of Q2 2021 (including ~32mm merchants)	~33mm last reported February 2017, but ~200mm Prime subscribers & ~500mm+ customers, this user number is understated	Hundreds of millions of card credentials compiled by Google (although that does not equate to usage of the Google Pay button)	Estimated >500mm users; ~12b transactions in 2019, growing ~100%+ YoY (although these statistics are largely offline in-store)	Live October 2019 at select merchants, and has since added 15,000 merchants in 16 markets as of November 2020
Additional comments	• Venmo ~75mm active users, monetizes same as PayPal • MercadoPago agreement expands utility (~230mm LatAm users enabled to transact at PayPal merchants)	• Amazon customers become Amazon Pay users simply by using their Amazon credentials on a third-party site (i.e., no separate registration process)	• All payments products consolidated and re-branded as "Google Pay" in early 2018 (prior offerings included Google Wallet, Google Checkout, Android Pay, etc.) • PayPal is a partner and funding option on Google Pay	• Online transactions limited to Safari browser, iPhone, iPad, or Mac device • ~5k card issuers supporting • Launched in September 2014	• We expect merchant acquirers to be supportive (increased conversion, and also the potential to gain a small portion of PayPal "button" volumes, supportive of growth) • SRC users will still need to go through their issuers for chargebacks & disputes (similar to most other wallets)

Source: Company websites, PYMNTS.com, Glenbrook Partners, EMVCo, Credit Suisse

4. Increasing complexity in global eComm/Omnichannel

Favors tech-forward acquirers with global omnichannel scale

- Increasing complexity in global eCommerce payments favors acquirers that can address all of a merchant's payments needs across geographies and channels, driving a trend toward consolidating providers from ~10-15+ down to 3-5 more globally capable, omnichannel providers.
- Some of the largest and fastest growing areas of eCommerce have the most complicated needs (global/local payments acceptance methods, payout capabilities, and seller identification for onboarding process, etc.).
- Competition in merchant acquiring is making additional services essential (software, capital, installments, etc.).

Global reach and expanding local payments methods (LPMs)

Trend toward consolidating acquirer relationships from 10-15+ to 3-5, favoring acquirers with global capabilities

Accept the primary payment types in each country, which can vary significantly, with many payment methods country-specific (domestic schemes, eWallets, bank transfers, etc.)

Aim toward processing as many payments in-country (local acquiring capabilities), reducing interchange fees (for those on interchange ++) and increasing authorization rates

Omnichannel needs

Merchants need to deliver a seamless commerce experience across channels: in-store, in-app, and online

Value-added services

Integrated payments, business management software, inventory, payroll, card issuance, instant transfer

Financing solutions such as working capital loans (and/or cash advance programs) and ability to offer consumer installments to consumers at the POS

Customer engagement (CRM tools), marketing program management

Increasing compliance burdens

Country-specific regulations put a heavy compliance burden on merchants and their acquiring partners

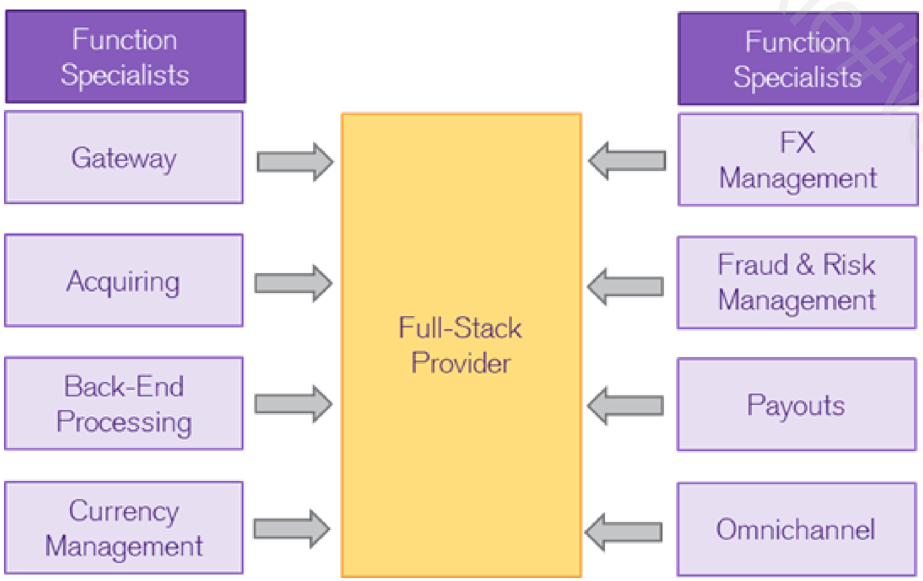
Know Your Customer (KYC), PCI compliance, PSD2 and SCA requirements, Anti-money laundering (AML), OFAC sanctions are a few examples that require continued investment and effort

Source: Credit Suisse research

4. Increasing complexity in global eComm/Omnichannel

Independent Gateway providers in complex environment

- Independent gateway solutions are another component of the complex eComm payments ecosystem with companies like Adyen (gateway-only services account for ~25% of Adyen volumes), Freedom Pay, Shift4, NMI, and Braintree providing the spot solution.
- Instead of offering a full-stack product, in some situations these companies look to avoid the acquiring risk altogether and provide only a front end gateway for a small fraction of the acquiring revenue or a simple SaaS fee.
- While the economics aren't as robust (M-HSD bps per transaction vs. ~10-100 bps for acquirers) as providing acquiring services, these third party gateway providers can avoid the cost and risk of underwriting certain merchants (i.e. airlines, gaming companies, etc.)



Types of Payment Gateways

Redirects – payment gateway takes customers to a third party to complete the payment and processing of the transaction (i.e. PayPal)

Checkout on site, payment off site – front-end gateway providers, such as Adyen or Freedom Pay in some circumstances, collect payment credentials but push to a third party to process

On site payments – control the whole transaction value chain on your own servers, more typical for larger scale businesses like Amazon as they capture more economics

Source: BigCommerce, Credit Suisse research

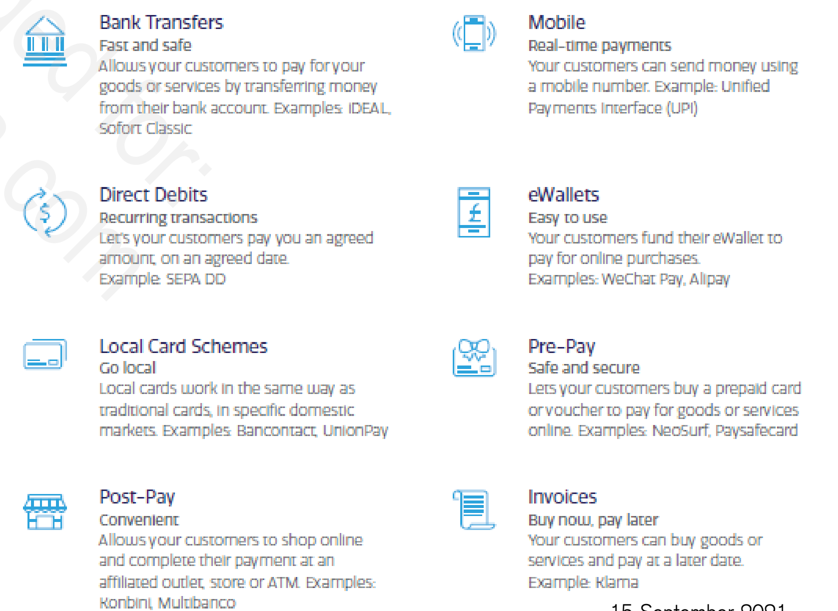
Return to Themes Table of Contents

4. Increasing complexity in global eComm/Omnichannel
Complexity associated with 1,000+ LPMs globally

- While cross-border eCommerce is gaining share within the broader eCommerce market (~2x growth rates, ~20% of B2C eCommerce), consumer payments habits remain locally and culturally specific.
- Country-specific acquiring license requirements make it burdensome and time consuming for merchant acquirers to add new countries.
    - In markets where an acquirer does not have a directly owned license, an alternative is to rent a license from an acquiring bank (i.e., "bin sponsor").
    - Generally speaking, this works just the same as owning a license, and often comes down to a decision around the level of volumes expected vs. the required investment to achieve a license.
- Consumer payment preferences by country make it difficult for local, sub-scale acquirers to compete in global eCommerce with 1,000+ local payment methods.
    - Checkout friction goes up when consumers are unable to pay with their preferred method, increasing their importance to merchants.
    - Adding local payment methods requires local integrations, which can take months, favoring scaled players.
    - For balance, beyond the first ~50-75 local payment methods, the volumes become less incremental on a global basis (although it can still be important in specific, local markets).
- Global merchants use multiple acquirers to meet these needs, but each acquirer adds complexity to operations, favoring acquirers with global omnichannel capabilities.

Platform	Methods	Countries	Currencies
Worldpay	300+	146	126
Adyen	300+	200+	150+
PayPal (Braintree)	20+ (we expect more via PPRO)	45+	130+
Stripe	30+, 50+ planned	95+ (47 local acquiring*)	135+
Global Payments	140+	38 in-store domestic (60 inc. eComm)	130+

PPRO estimates that LPMS were ~77% of 2019 global eCommerce, increasing to ~82% by 2024 (including local card networks)



Source: Company websites, Worldpay, Forrester, PPRO, Credit Suisse research
*Includes 3 from Paystack.

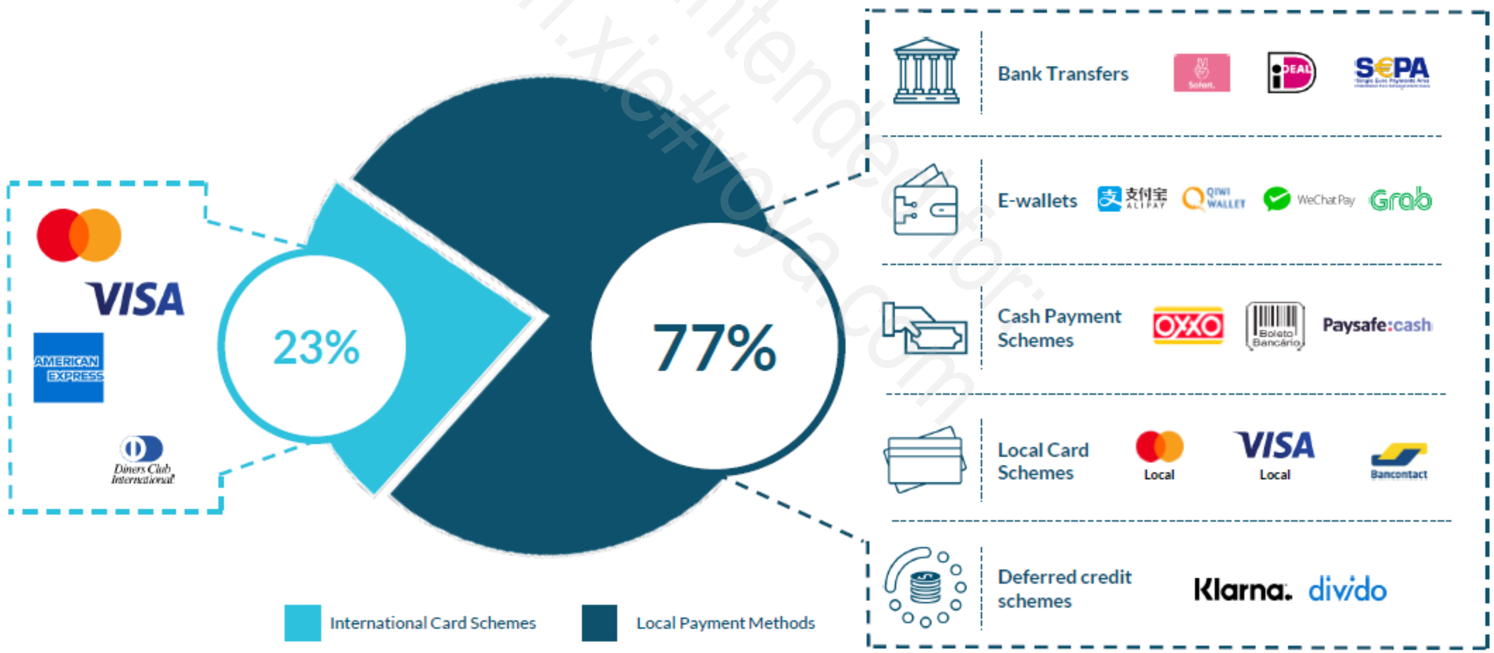
Return to Themes Table of Contents

4. Increasing complexity in global eComm/Omnichannel

PPRO offering solutions to help alleviate this complexity

- PPRO estimates that there are over 1k payment methods globally, while there are ~450 APMs and LPMs globally which PPRO has included in its index (e.g., eWallets, bank transfers, cash-based, deferred credit), up from just ~300 in 2017.
- PPRO works with 7 of the top 10 merchant acquirers to provide a single API integration, on one contract, to 150+ LPMs while also providing additional services (e.g., ongoing compliance, pricing negotiations, unified reporting, refund services, etc.).

PPRO estimates that only ~1/4th of global eCommerce is done on international card networks (although we note that localized versions of Visa and Mastercard are excluded from this figure)



Source: PPRO, Credit Suisse research

Note: PPRO data separates local V/MA cards when they are not enabled for usage outside of the countries (e.g., mainly LatAm) and the transactions are not going through the global Visa and Mastercard rails, and thus are not counted into the international credit card split

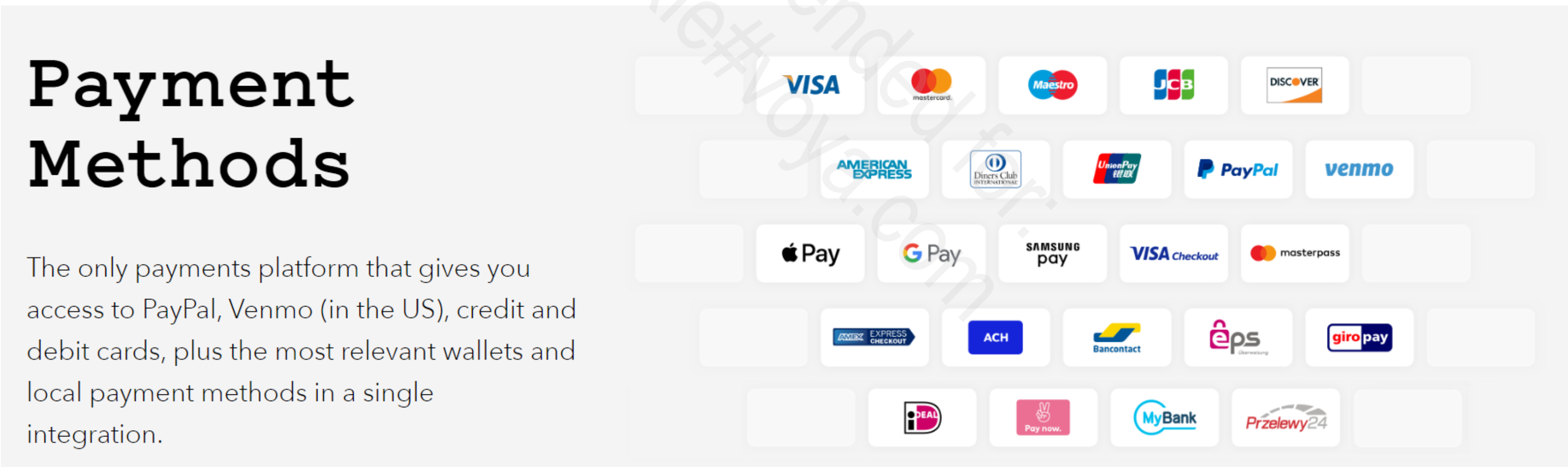
Return to Themes Table of Contents

4. Increasing complexity in global eComm/Omnichannel

PayPal's Braintree beginning to expand globally

- We expect Braintree to expand more globally in part due to its partnership with PPRO (we note that PayPal led a $50mm investment in PPRO in July 2018), alongside a recently expanded acceptance list (now at 20+ payment methods), and an appreciation for the importance of cross-border eCommerce inherent within PayPal.
- "Braintree is available for merchants in the United States, Canada, Australia, Europe, Singapore, Hong Kong SAR China, Malaysia, and New Zealand. In legal terms, you have to be domiciled in a supported country/region. We are working hard to bring Braintree to other countries/regions." – Braintree website

Braintree currently supports 20+ payment methods, including credit & debit cards, digital wallets, and select local payment methods, although we expect this number to continue to expand over the coming years



 Source: PayPal, Braintree, Credit Suisse research

Return to Themes Table of Contents

4. Increasing complexity in global eComm/Omnichannel

Expect continued share gains for globally leading platforms

- We expect larger merchants to increasingly consolidate their payments relationships around fewer scaled platforms.
- Share gainers will provide global acceptance across hundreds of local payments methods (card & non-card) both in-store and online.
- Provide local acquiring and consumer experiences, leading to higher authorization rates, increased conversion, and reduced costs (interchange, network fees, and fraud).
- Parallel to Visa & Mastercard vs. local schemes – hard for the domestic schemes to keep up with required technology investment/innovation (e.g., share loss by European domestic schemes).

Payments platforms with an ability to provide global eComm/omnichannel payments processing along with an ability to invest/innovate will continue to demonstrate growth above industry levels, particularly as cross-border eCommerce increases in importance

"…Point blank, it's share gains. If you look at our consistent growth…Just look in any metric…Visa, MasterCard numbers in the UK.- if you look at GDP in the UK, if you look at SSS growth in the UK, those numbers tend to be 0% or 1% or whatever the number is on a given day…it's another high-single-digit quarter growth for us (GPN). So there's no doubt in my mind, it's share gains. I would say that's augmented by our focus on the small to midsized business and leading with technology. UK, in particular, is a big place for us to have our eComm and omni business…"

- Jeff Sloan, CEO, Global Payments (October 2018)

"…It's not unusual for a large global retailer to be managing 30 to 60 and sometimes 100-plus contracts and partners…It is not unusual for a large international company to be eliminating potentially dozens of different partners and integrate one implementation across all of those regions with one set of contracts and one solution…"

- Brian Dammeir, Head of Product, Adyen (April 2019)

"…And our competitors span the gamut -- actually, globally, outside the U.S., primarily Adyen, but who we're taking share from when we win there [are] a lot of local acquirers [we are taking share from]…around share of wallet versus market share…in eCommerce, people use multiple acquirers. They just do. No one's going to go down to one single acquirer, which is how we are here in the US typically. They'll use multiple acquirers. They've grown up with multiple acquirers. Typically, they'll use anywhere from 4 to 8. A lot of them…are historical in terms of using local acquirers to enter certain countries…"

- Stephanie Ferris, CFO, Worldpay (now FIS) (November 2018)

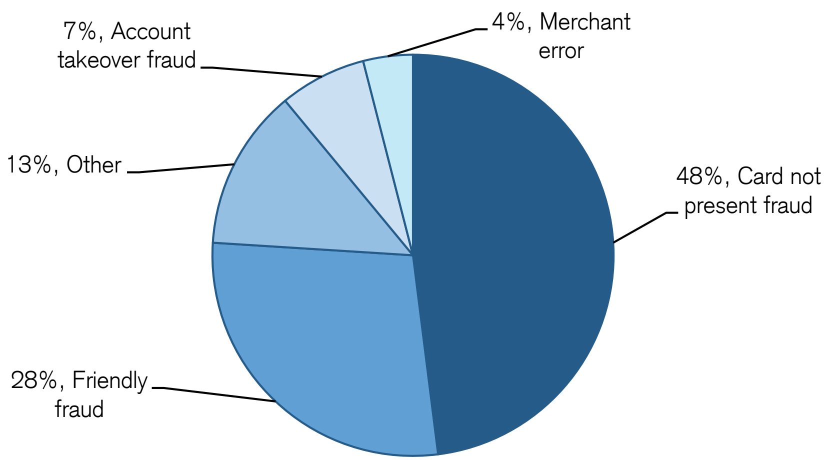
Return to Themes Table of Contents

5. Fraud & chargebacks on card-based transactions

Overview of the chargeback & dispute process

- This process is part of the consumer protection provided by the card network rules (i.e., part of zero-liability consumer protection policy for unauthorized transactions dictated by both Visa and Mastercard network rules for participating issuers, acquirers, and merchants).
- Chargebacks are a forced transaction reversal initiated by the cardholder's bank when a customer disputes a transaction (i.e., this construct is often viewed as a positive for consumers, although a big negative for merchants). Verifi estimates ~$1 in disputed transactions costs merchants $1.50.
- Chargebacks are an increasing burden on merchants driven by the rise of CNP fraud and the time-consuming dispute resolution process; both in terms of time and costs, dispute process can be highly manual, involving documentation, and take ~60-90 days.
- "Friendly fraud" is when a consumer makes an eCommerce purchase and then contacts the card issuer to dispute the transaction (e.g., reports item not delivered, item does not match description, claims to have cancelled the order, claims to not remember, etc.).
- Note: Merchant acquirers ("acquiring risk") are only financially exposed when their underlying merchant is either: a) fraudulent from the start; and/or b) not able or willing to stand up for its chargebacks (due to bankruptcy).

The largest source of chargebacks in the US is card-not-present (CNP) fraud, followed by "friendly fraud"



Typical chargeback & dispute process, which can take ~60-90 days to complete

1	Someone makes a purchase using a Visa or Mastercard
2	Cardholder initiates the chargeback by contacting their issuing bank (e.g., Bank of America, Wells Fargo, Citi, Chase, PNC)
3	Issuing bank reaches out to the merchant's bank asking for evidence to refute the claim (perhaps the merchant provides an invoice, receipt, proof of delivery of some sort, etc.)
4	Issuing bank makes a decision as to whether or not they believe the transaction was a valid one
5	Customer is informed of the decision – he/she can either accept the "proof" provided by the merchant or escalate to arbitration
6	As a last resort (issuing bank and merchant's bank are not able to agree), Visa and/or Mastercard govern an arbitration process

Source: Javelin Strategy & Research, Chargebacks911, Verifi, Square, Credit Suisse research

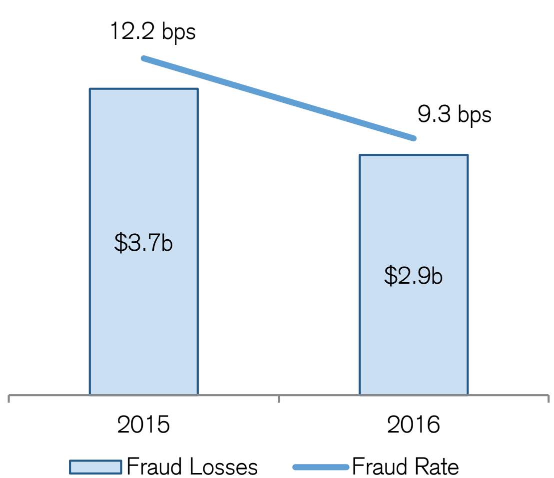
[Return to Themes Table of Contents](#)

5. Fraud & chargebacks on card-based transactions

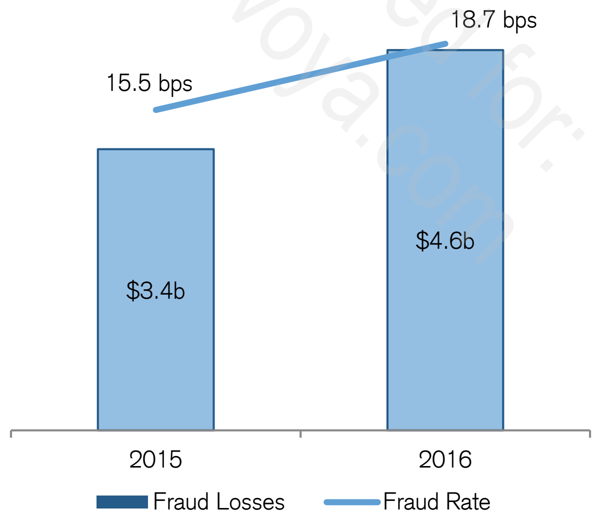
Card fraud migrating from in-store to online – Key drivers

- Migration to EMV – the migration away from magstripe "swipe" cards to chip-and-pin effectively reduced in-store counterfeit card fraud, causing criminals to shift their focus to online or card-not-present (CNP) fraud
  - 2015 EMV Liability shift in the US – Merchants that have not adopted EMV chip terminals became liable for fraud done via EMV cards
- Data breaches – Fraudsters have access to card data, login credentials, and personal information from numerous data breaches
- eCommerce growth – High secular growth of eCommerce relative to in-store payments amplifies CNP fraud losses
  - According to Juniper Research, merchant losses to eCommerce fraud will exceed ~$25b in 2024 globally, up from ~$20b in 2021

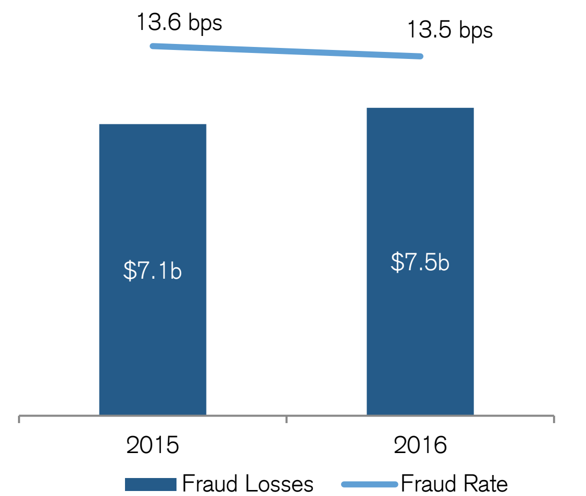
US in-store fraud losses and rates came down after EMV migration…



….while US card-not-present (CNP) fraud losses and rates increased…



…while total US market fraud losses and rates remained about the same



 Source: Federal Reserve Bank of Atlanta, Juniper Research, Credit Suisse research

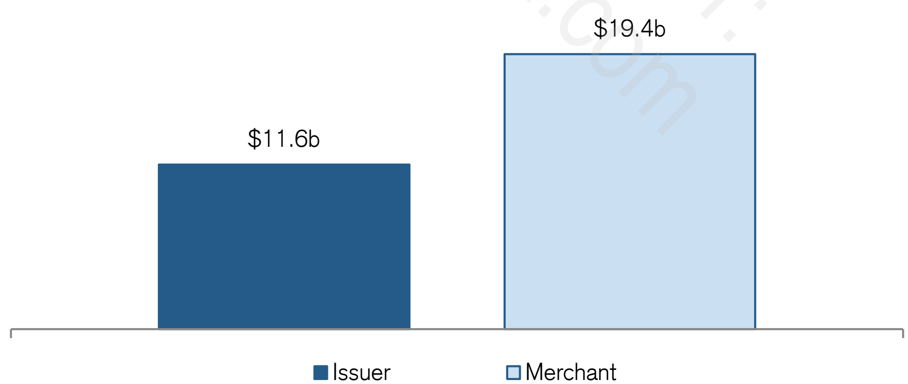
Return to Themes Table of Contents

5. Fraud & chargebacks on card-based transactions

Who pays for what?

- In-store transactions – <u>Card issuers are liable for card fraud</u> if the merchant is utilizing an EMV-enabled card reader and follows network rules in acceptance.
- Online or CNP transactions - <u>Merchant is liable for fraud</u> (unless the merchant is utilizing a 3D Secure authentication solution, which can shift the liability back to the issuer).
- Both Visa and Mastercard have made recent acquisitions to support chargeback-related capabilities (Visa acquisition of Verifi in June 2019, and Mastercard acquired Ekata in April 2021).
- In addition to costs (the actual chargebacks and fees from acquirers to support the process ranging from $10-25), merchants often have to dedicate time in responding to the dispute as well. Square does not charge merchants for chargeback disputes, while Stripe offers an insurance product (Stripe Chargeback Protection, at a cost of ~40bps) to cover all potential losses.

Of an estimated $31b of chargeback costs in 2017, roughly two-thirds of that cost burden was ultimately borne by merchants



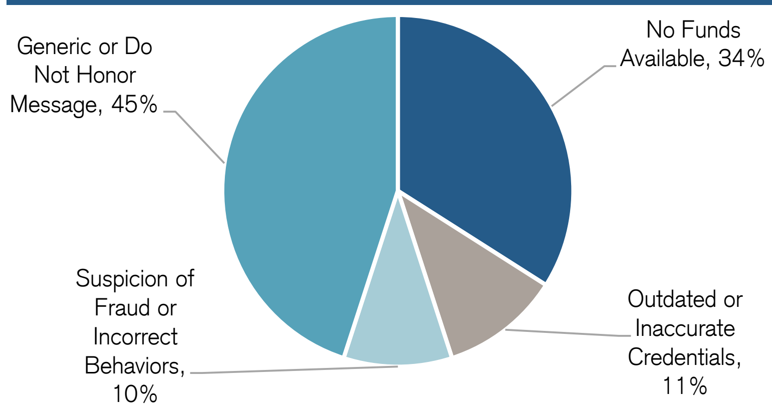
Source: Javelin Strategy & Research, Chargebacks911, Square, Credit Suisse estimates

Return to Themes Table of Contents

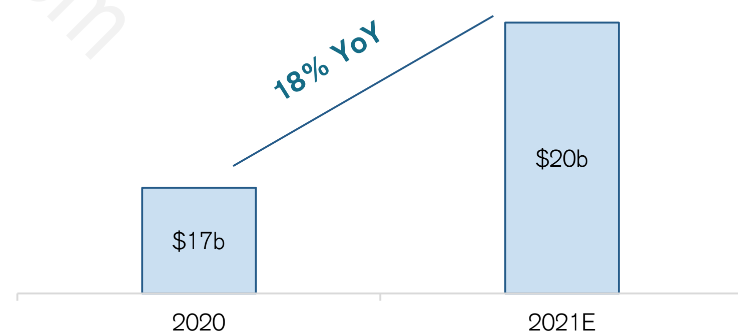
5. Fraud & chargebacks on card-based transactions
Tech enabled security and fraud prevention services

- Gartner originally forecasted an 8% decrease in fraud for 2020 but adjusted this forecast upward to a 10-15% increase after the pandemic set in (for every $1 lost to fraud, businesses pay ~$3 in total fraud costs).
- False declines however can be more expensive, expected to cost US merchants ~$443b in 2021 (up from ~$409b in 2020, according to Aite Group), >20x the losses from fraud.
- Clearly, there is a delicate balance between approving and denying transactions given the difference in losses between false declines (58% of declined transactions are legitimate orders and 33% of customers won't come back after a false decline) and fraud losses.
  - False negatives, transactions that should've been denied, have a greater impact on low margin businesses while false positives, transactions that should've been authorized, have a greater impact on high margin businesses.
- Full-stack integrated payments platforms such as Stripe and risk & fraud management platforms such as Riskified, Signifyd, and Forter are addressing these costly increases in fraud attempts by applying machine learning tools to curb fraud and increase authorization rates.
  - Providers such as Riskified and Signifyd offer chargeback guarantees as an additional protection for merchants. Instead of incurring the cost of maintaining an in-house team to address fraud risk and false declines, businesses will pay a fixed rate per transaction to offload any chargeback risk to the third party provider.

Reasons for card declines at Stripe – almost 50% come back with a generic decline message



Global losses due to eComm fraud expected to increase by 18% to ~$20b in 2021 and rise to >$25b in 2025



Source: Stripe, LexisNexis Risk Solutions, Aite Group, Nilson Report, Juniper Research, Gartner, Credit Suisse research

Return to Themes Table of Contents

6. Software-led & integrated payments

ISV or PayFac? It's not that simple…

ISV (with revenue share) — **In between exists a range of (often negotiable) options with varying degrees of control over experience, portability, revenue, costs, and risks** — **Full-fledged PayFac**

	ISV partners with integrated payments provider	Emerging "Hybrid Approach"	"Managed Payment Facilitator"	Full-fledged PayFac
Revenue	Can be ~20-80% of net revenue (ex-interchange, network fees, and other) but varies meaningfully by vertical and volumes	Revenue share can be lower in exchange for the instant onboarding, but negotiable (volumes matter)	Platform may determine mark up on partner pricing (under buy rate agreement) or some form of (negotiated) revenue share with a degree of ongoing costs	Retains net revenue (ex-interchange, network fees, processing, and banks sponsor fees); also has ongoing operating costs (staff, compliance, etc.)
Onboarding & Experience	Standard onboard with a separate MID for each merchant; acquirer handles KYC, AML, etc.; less control over experience	Depends on vertical, but potential for instant onboard for majority of merchants; acquiring partner handles KYC, AML, etc.; increased control over experience (but can still have limitations around onboarding process/design/capture)	Can include "white-labeled payments"; Instant and near-complete control over onboarding (incl. merchant underwriting) and near-complete control over experience; greater customization via Flexible APIs for custom UI / UX	Instant onboard with complete control over merchant experience; single touchpoint for merchant
Ongoing support	Payments co. handles; i.e., sub-merchant has two touchpoints	Generally stays with payments the partner (merchant acquirer); i.e., merchant has two touchpoints	Software company can take on a larger role in service	Payment Facilitator takes on
Risk	Stays with payments partner (acquirer)	Stays with payments partner (acquirer), generally, but varies	Software company takes on (as the "equity" tranche), but could revert to the payments partner ultimately	Payment Facilitator takes on
Portability (merchants, tokens)	No	Generally no (but can be negotiated)	May have contractual portability, but not practical portability	Yes
One-liner (ISV's perspective)	Can be profitable (i.e., no payments-related costs or responsibilities) if revenue share negotiated well	Close to full benefits of being a PayFac (although generally lacks portability), with minimal effort/costs	Must share revenue with the partner, but still takes on risk & support, and lacks practical customer/token portability	Highest revenue, best onboarding & experience, but comes with cost base justifiable only by larger ISVs
Selection of sample partners	Global Payments, Worldpay, First Data (CardConnect), Braintree (PayPal), Stripe Connect, BlueSnap, Paysafe, Nuvei, Repay, Shift4, Paya, Chase, and others	First Data (CardConnect), Stripe Connect, Adyen for Platforms, Chase, Braintree Marketplace (PayPal), Global Payments, Worldpay, and others	WePay (owned by Chase), ProPay, USIO, Stripe Connect (custom), Paysafe, Payrix, and others	Requires acquiring bank sponsor; Numerous aspects (e.g., tokenization, vaulting, fraud detection, onboarding, chargebacks, risk mgmt.) can be outsourced (e.g., Finix, Payrix, Infinicept, Amaryllis, Tilled, etc.)

Less control & merchant contract portability ⟷ **More control & merchant contract portability**

Source: Finix Payments, Infinicept, Payrix, Credit Suisse research; Note: Arrangements along this spectrum are often negotiated and customized, and various partners are able to operate and provide services across the spectrum (albeit with varying degrees of focus and mix) – i.e., the distinctions and boxes above are more illustrative and not hard rules; We note select circumstances where being a full-fledged PayFac is necessary: 1) if the platform has specific fund flows that require money transmission licenses in certain states, 2) if the platform has legacy systems that require registration as a PayFac, 3) if the platform must hold money for more than 30 days.

Return to Themes Table of Contents

6. Software-led & integrated payments
Difference between ISOs and PayFacs

Although often bucketed together in industry conversations, PayFacs are distinct from ISOs. Blurring this topic further, service providers often act as both (e.g., Square and PayPal can operate as PayFacs and can operate as ISOs for larger merchants).

- Independent Sales Organization (ISOs), like PayFacs, help to onboard SMBs into the payments ecosystem.
- Merchants that work with ISOs contract directly with the underlying acquiring bank and (historically) have gone through a more traditional onboarding process, which generally leads to PayFacs having meaningfully faster (i.e., minutes vs. weeks) onboarding processes.
- PayFacs generally have greater levels of control (i.e., funding and ownership of merchant relationships) but also assume greater risks.

Aspect of business	PayFacs	ISOs
Merchant of record?	• Merchants of record have their own master Merchant ID (MID) • Sub-merchants do not have their own MID (their payments are aggregated under the master MID)	• Varies by contract with underlying acquiring bank
Size of merchants/ sub-merchants	• Smaller, generally < $1mm in V and/or MA volumes (per network rules, although enforcement varies)	• Larger merchants that are not able to be onboarded via the PayFac model
Portability of merchants?	• Owns the sub-merchant relationship and can take sub-merchants to another acquiring bank sponsor	• Varies by contract with underlying acquiring bank (making the merchant relationship beholden to the sponsor bank)
Onboarding directly?	• Onboards sub-merchants directly • If sub-merchants exceed volume thresholds, they may be required to contract directly with the acquiring bank	• Onboarding done through the acquiring sponsor bank
Onboarding speed?	• Fast, can happen within minutes • Creates their own application process and underwriting criteria	• Time consuming, traditional merchant account application • Beholden to underlying acquiring bank process and criteria
Risk assumption?	• Takes on risk of chargebacks, fraud, failure to perform, etc. across its portfolio of sub-merchants • Ensures PCI, KYC, AML, OFAC, etc. compliance	• Wholesale ISOs take on risk • Retails ISOs do not take on risk (the risk is absorbed by the underlying wholesale ISO and/or acquiring bank)
Fund flows & payouts?	• Controls the flow of funds (and all associated reporting) • Handles payouts to sub-merchants	• Does not actually touch the money (acquiring bank controls, and handles payouts)

Source: PaymentFacilitator.com, Stripe, Credit Suisse research

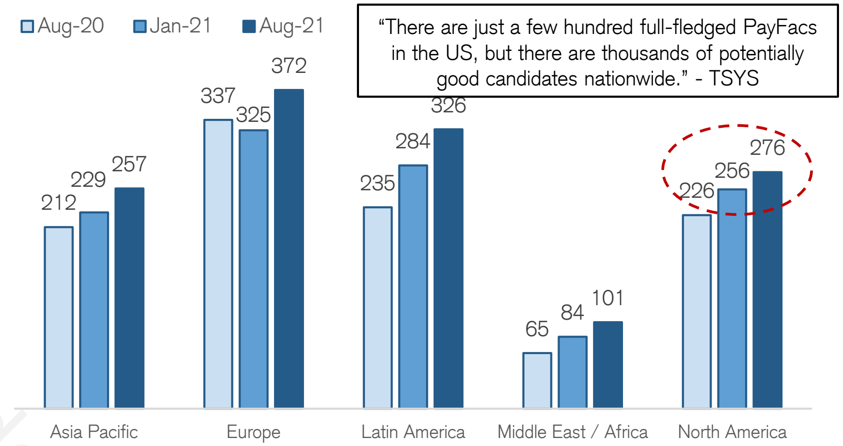
[Return to Themes Table of Contents](#)

6. Software-led & integrated payments

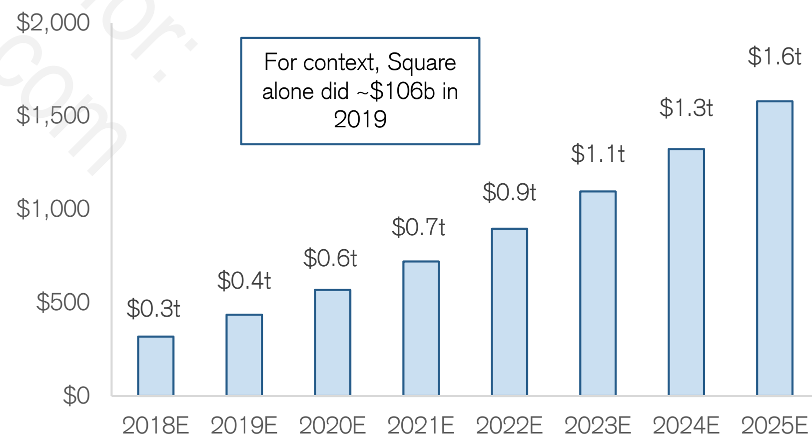
Expanding the addressable market of payments acceptance

- The original Payment Facilitator was PayPal; Square and Stripe also operate under the PayFac model; the term "PayFac" is a registered trademark owned by Worldpay.
- PayFacs (notably Square) have been vital in expanding card acceptance to micro and SMB merchants over the past decade.
  - Traditional acquiring bank onboarding processes have historically been more suited for larger merchants and are often lengthy and complex; approval processes could range from a week to months.
  - Customer acquisition costs were also a hindrance to attracting micro & SMB merchants; the PayFac model's streamlined onboarding processes enable "self-serve" and digital onboarding, as it's less profitable for direct sales forces to individually prospect SMBs.
- Companies becoming PayFacs (or PayFac-like alternatives) generally can be grouped into four buckets:
  1. Core commerce/payments platforms (e.g., PayPal, BlueSnap, etc.).
  2. Software platforms (e.g., Square, Mindbody, Lightspeed Commerce, Shopify, etc.), although even within this group, both PayFac and non-PayFac models can be employed (e.g., "PayFac lite" models enabled by partners such as Stripe).
  3. Marketplaces and related technology platforms that "take payments in-house" (e.g., Etsy, Wix, Yapstone).
  4. Gig economy platforms (e.g, Uber, Lyft, Airbnb, etc.).

276 PayFacs are registered with Mastercard in North America



Infinicept expects payment volumes attached to PayFacs to reach $1.6tr by 2025E (ex-PayPal, Square, Stripe)



Source: Mastercard, Double Diamond Group, Infinicept, Stripe, Credit Suisse research, AZ Payments

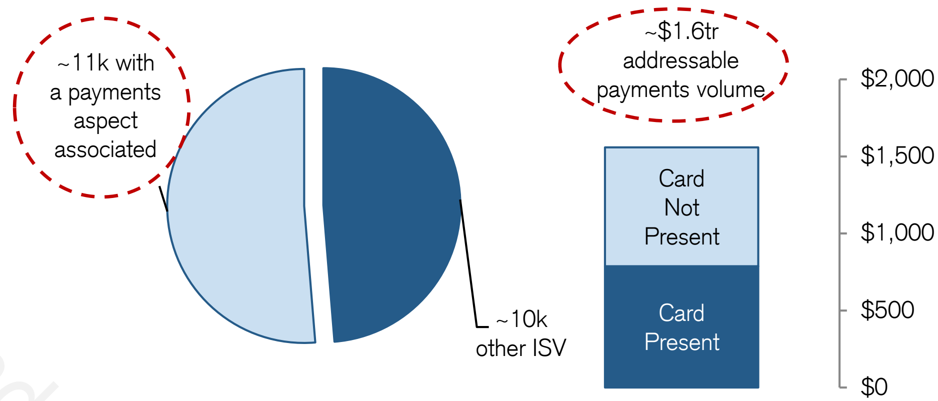
Return to Themes Table of Contents

6. Software-led & integrated payments
Advantages for ISVs & platforms that become PayFac-like…

The advantages of becoming a PayFac (or a PayFac-like alternative) largely revolve around: (1) maximizing revenue generation, (2) faster onboarding of sub-merchants, and (3) increased control & ownership of experience

1. Building a more meaningful revenue stream
   - Ownership of the payments experience, as a PayFac (or a PayFac-like alternative) maximizes the revenue the ISV or platform earns on each transaction (i.e., ability to maintain all payments net revenue)
   - Must be evaluated vs. revenue share opportunities via a traditional integrated payments relationship with a merchant acquirer (e.g., integration and revenue share with a traditional merchant acquirer, which takes on the payments risk and responsibilities, but pays a "lead gen" fee to the ISV in exchange for sourcing the volume)
2. Faster onboarding of sub-merchant
   - Sub-merchants avoid lengthy application processes required to receive merchant accounts via traditional acquiring bank onboarding
3. Increased control of experience
   - Control pricing of payments to underlying sub-merchants
   - Single point of contact for customer service (software & payments); consolidation in the merchant acquiring space has led to reduced service levels for ISVs partnering with acquirers
   - Ability to improve processes for your merchants (e.g., chargeback handling, funding) given ownership of those processes
   - Portability of merchant contracts (in case change of acquirer)

There are ~20k SaaS platforms in the US, ~11k are ISVs with approximately ~$1.6tr in potentially addressable payments volume; larger ISVs are addressable as potential PayFacs



Advantages of becoming a PayFac (or a PayFac-like alternative) for ISVs & tech platforms (vs. a traditional integrated payments relationship)

Revenue generation	• Create a recurring revenue stream (combination of software + payments is powerful) • Must be weighed vs. revenue share opportunities via a traditional integrated payments relationship
Fast onboarding of sub-merchants	• Sub-merchants avoid lengthy application processes required to receive merchant accounts
Control of customer experience	• Consolidation in the merchant acquiring space has led to reduced service levels for ISVs partnering with acquirers; so, take control of that, bring in-house

Source: Infinicept, Credit Suisse estimates; Note: $1.6tr from 2015 analysis represents a gross opportunity for conversion to the Payment Facilitator model (i.e., portions of volumes that flow through ISVs but are actually owned/managed by ISOs and bank acquirers, along with traditional integrated payments, that could potentially migrate to the Payment Facilitator model

Return to Themes Table of Contents

6. Software-led & integrated payments

…but must be weighed against the requirements and alternatives

Our view is that over the near- to medium-term, becoming a full-fledged Payment Facilitator will make sense for select scaled platforms & marketplaces that operate in specific vertical markets…

- Requires hiring payments expertise (both technical aspect and business processes such as chargebacks, fraud, data privacy, PCI compliance)
- Meaningful payments volumes would be required to justify the upfront and ongoing costs of becoming a PayFac
- ISVs and platforms in specific verticals and with a more domestic focus can more easily justify PayFac start-up costs (i.e., less complexity, reduced fraud, and increased homogeneity of sub-merchants) vs. a global marketplace that brings on vast sub-merchant types and cross-border complexities

…while remaining ISVs, marketplaces, and platforms are more likely to opt for alternative solutions (which generally means revenue shares with processing partners and more limited control, but also reduced responsibility and investment)

- Hybrid solutions, including the "Managed PayFac" alternative – options that allow for many of the advantages of being a PayFac, such as speedy onboarding, reduced support & compliance burdens, easier to expand internationally, etc., with enhanced revenue opportunities via "beyond payments" monetization and technology partners to assist with new product rollouts and innovation
- Traditional payments partnership – traditional integrated payments providers (e.g., Global Payments Integrated, Worldpay, CardConnect); come with lower revenue shares (wide range of ~20-80%) but zero risk and reduced support & compliance responsibilities

What are the traditional steps, processes, and costs associated with becoming a full-fledged Payment Facilitator? (but platforms are emerging to meaningfully reduce the time and costs associated with the process below)

Hiring team to manage capability
Requires team of full-time employees to manage business, legal, and engineering processes, along with building a customer service function, etc.

Payments systems set-up (6-12+ months, ~$650k – $1.1mm)
Acquiring processor (bank) sponsorship, potential gateway integrations, Level 1 PCI DSS certification, building initial merchant dashboard and payout systems; could require consultants/advisors

Merchant onboarding & compliance (6-18 months, ~$1.8mm)
Develop merchant underwriting and onboarding procedures (e.g., ID verification, risk scoring systems), along with compliance with various licenses and card network requirements, data retention & privacy, etc.

Ongoing management of capability (~$200k – $ millions per year)
Per account costs for onboarding & monitoring, risk monitoring, fraud prevention, chargeback process handling (i.e., responding with evidence submissions, reporting [1099s], annual compliance validation, etc.)

Additional costs to consider longer term
- International expansion (some of the above, but for a new market)
- Technical & procedural changes due to changing regulations (e.g., PSD2)

Platforms such as **Payrix, Finix, Infinicept, Amaryllis, Tilled, etc.** are beginning to emerge to help reduce the time & costs associated with transitioning from an ISV to a full-fledged PayFac.

Source: Stripe, Agile Payments, Credit Suisse research

Return to Themes Table of Contents

6. Software-led & integrated payments
Sample of a "Hybrid" alternative, Stripe Connect

Stripe Connect allows ISVs, marketplaces, and other platforms to "act like a PayFac, but not be a PayFac".

- Stripe Connect was built specifically for platforms and marketplaces.
- Stripe's offerings fall under the PayFac hybrid category. With Stripe Connect, platforms receive the benefits of fully customizable and speedy onboarding, control of pricing and fees, payout management, and integrated financial reporting but with lesser support and compliance burdens, greatly reduced up-front costs, and allows the platform to stay outside the flow of funds.
- Stripe Connect is API-first and allows the platform partner to:
  - Launch quickly with minimal upfront costs
  - Enable payments acceptance and payouts to sub-merchants
  - Still offer fast onboarding via fully customizable onboarding flows, with Stripe responsible for all KYC, AML, OFAC compliance, etc.
  - Scale globally without new market start-up costs (including not having to open bank accounts and legal entities in various regions)
  - Allows Stripe to handle all payment processing, acquiring bank sponsorship, support (24x7x365), compliance, further global expansion over time, tax reporting, etc.
- The platform (customer of Stripe) maintains the ability to determine pricing and fees charged to merchants (i.e., adding a margin on top of Stripe fees), allowing for a degree of monetization of the payments and financial services aspect of their business, in addition to the advantages outlined above.
  - Revenue = fees charged to sub-merchants
  - Cost of revenue = fees paid to Stripe
- Stripe Connect now allows for revenue share arrangements with any platform or marketplace with $1mm+ in volume.

Stripe enterprise and SaaS platform partners that have opted to use this alternative (examples by sub-segment)

eCommerce & Retail

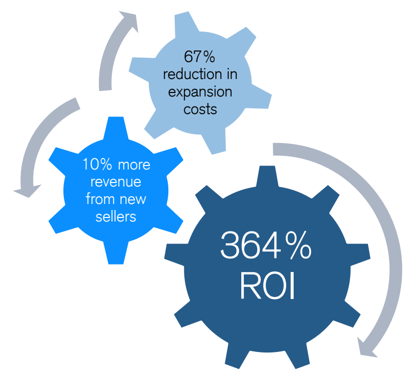
B2B Platforms

Software as a Service

B2C Marketplaces

Non-Profits & Fundraising

Forrester survey showed 364% ROI for platforms that switched to Stripe Connect



Return to Themes Table of Contents

6. Software-led & integrated payments

Methods of monetizing payments and financial services

There are a variety of pricing options for a platform to monetize payments and associated services ranging from subscription-based models that align with other SaaS fees to transaction-based fees driven by use of the services

Revenue share	Platforms can split the acquiring spread with the underlying payment processor/acquirer with economics dependent upon scale (volume), degree to which the platform takes on the acquiring risk (fraud, chargeback), onboarding and customer service responsibilities, etc.
Charge customers a fee to access payments	Platforms can create subscription models with fixed monthly charges for access to payments with tiered plan options. Plans can include access to capabilities such as accepting payments or donations, selling gift cards, POS, subscription management, or discounting tools.
Mark up transactions	Platforms can charge a mark up on each transaction and earn the spread above the processor's pricing. Mark ups can be adjusted based upon the payments plan tier referenced above, with higher cost plans charging lower mark ups.
Add fees for additional payment features	Platforms can charge for additional features such as chargeback protection or faster payouts. For example, platforms can charge a fixed fee for instant payouts and no fee for regular payouts.
Charge a fee for using other payment gateways	Platforms can charge fixed or percentage fees on any transactions that are made through payment providers other than the platform to allow for monetization of all transactions made by the merchants. For example, Shopify charges up to 2% in additional fees for use of other payment providers.
Charge for customer reporting and analytics	With the data that platforms accumulate from transactions, platforms can build custom reporting and detailed analysis which can then be sold to customers as part of the premium payments plan tiers or as a separate service.

Source: Stripe, Credit Suisse research

Return to Themes Table of Contents

6. Software-led & integrated payments

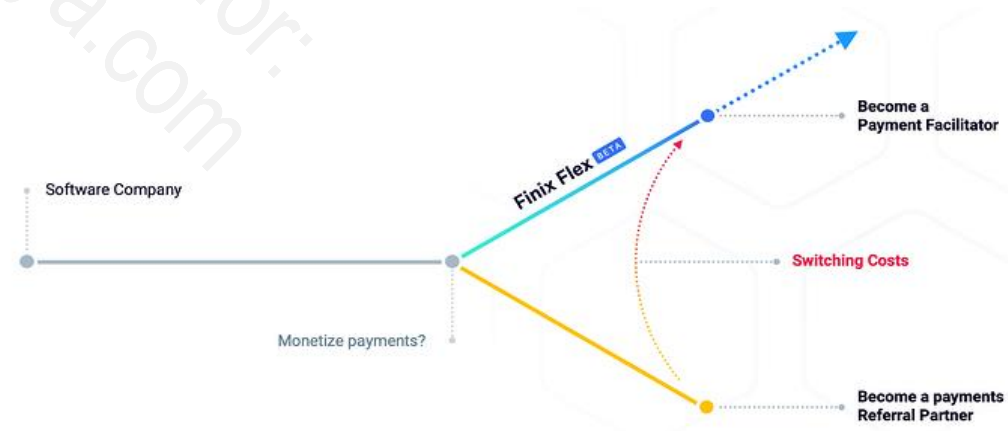
Finix reduces the burden of integrating payments

Finix is a payments Infrastructure-as-a-Service (IaaS) company that can assist software platforms to become full-fledged PayFacs or help companies with lower volumes to integrate payments without all of the cost burdens of becoming a PayFac (and reduced switching costs if a decision is made at a later time to become full-fledged PayFac)

- Finix aims to reduce the time required to bring payments in-house, often by months or even years, by providing the infrastructure required to onboard merchants, tokenize payments, manage settlements, funding, & chargebacks, and develop risk management processes.
- Finix estimates that software platforms require at least ~$50 million of card volume in order to recoup the costs of becoming a PayFac.
- With Finix Flex, earlier stage software platforms with less than $50 million in card volume can integrate payments into their platforms faster and start building the foundations to become a PayFac without immediately incurring all of the upfront costs.
    - With Finix Flex, interchange-plus pricing is offered by Finix which the ISV can then choose to mark up to monetize payments.
    - Finix Flex helps avoid future switching costs when the ISV platform eventually decides to become a full-fledged PayFac.

Finix provides APIs to help facilitate merchant onboarding, risk management, settlements, transfers, disputes, tokenization, and more

Finix Flex is built for software platforms that plan to eventually become PayFacs but don't have the volume necessary to justify the decision now



Source: Finix Payments, Credit Suisse research

Return to Themes Table of Contents

6. Software-led & integrated payments

Infinicept enabling and expediting the PayFac process

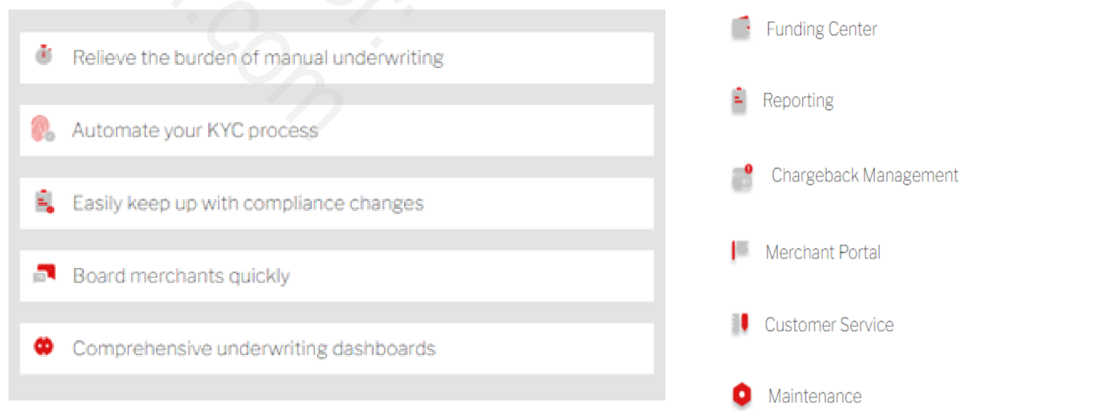
Infinicept makes the process of becoming a PayFac (or a PayFac hybrid) and managing a PayFac easier.

- Focused on the enterprise software market, Infinicept offers a provider-agnostic platform, serving as an access portal to numerous payments (e.g., gateways, token providers) and financial services offerings.
- Enables clients to participate in both the direct (monetization, revenue share, etc.) and indirect benefits (ecosystem, customer relationships, reduced churn, etc.) of embedding payments into their software.
- Infinicept allows software companies to take ownership of their payments (sometimes as a Payment Facilitator, sometimes via an alternative or lighter model) at roughly the same cost as a hiring a single software developer.
- Infinicept's business model is based on a monthly subscription-based fee (vs. basis points of dollar volume), thus allowing partners to benefit from operating leverage and scale.

Infinicept estimates there are ~20k US software platforms that touch the payments function, and ~209k worldwide (segmented as outlined below), resulting in what it considers to be a ~$15b recurring revenue opportunity on a global basis

Tier	ISV Population (thousands)	ISV Mix %	SaaS TAM ($mm)	Additional Products +50% of annual opportunity per ISV ($mm)	Recurring TAM ($mm)
Large & Enterprise (revenue $50mm - >$250mm)	21	*10%*	$3,597	$1,799	$5,396
Medium (revenue $10mm - $50mm)	42	*20%*	$3,754	$1,877	$5,631
Small & Micro (revenue <$1mm - $10mm)	146	*70%*	$2,399	$1,200	$3,599
Total	**209**	***100%***	**$9,750**	**$4,875**	**$14,625**

Infinicept enables software partners to seamlessly underwrite & onboard new merchants to their platform, providing a real-time dashboard & tools for the management of merchant data, reporting, etc.



Source: Infinicept, Credit Suisse research

Return to Themes Table of Contents

6. Software-led & integrated payments

Payrix helps small- to mid-sized software companies embed payments

Payrix provides SaaS businesses & marketplaces the ability to embed, brand, and scale their own payments capability via an open API approach through two offerings:

- Payrix Pro is a white label solution with no regulatory burden and shared risk that can be fully integrated with the software platform in a month, allowing for low upfront investments to embed and monetize payments.
- Payrix Premium provides the platform or marketplace with maximum control over the payments experiences and allows the company to earn more on each dollar of payments volume, but the platform takes full liability for risk and must become fully registered and compliant, requiring greater upfront investment and a longer time period (~3+ months) before going live.
- Payrix does have some larger enterprise customers, but tends to work with smaller companies relative to Infinicept, with customers often providing industry/vertical-focused software (e.g., spas & salons, fitness studios, pest control, lawncare, HVAC, landscaping, etc.).

Payrix significantly reduces the time required to go live with payments on a software platform

Source: Payrix, Credit Suisse research

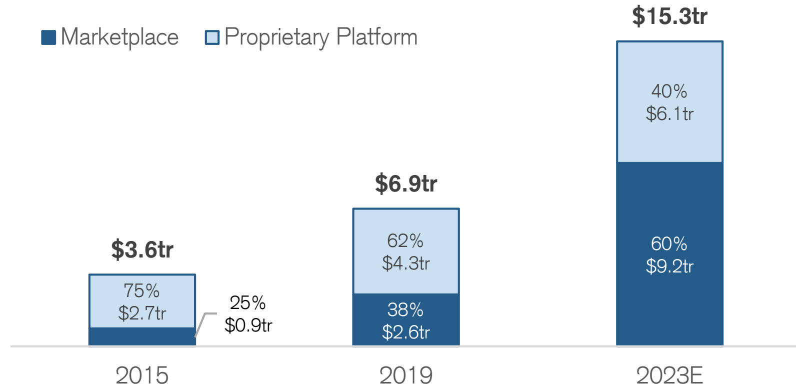
7. Software platforms and broader embedded finance

Reforming the SMB financial services distribution chain

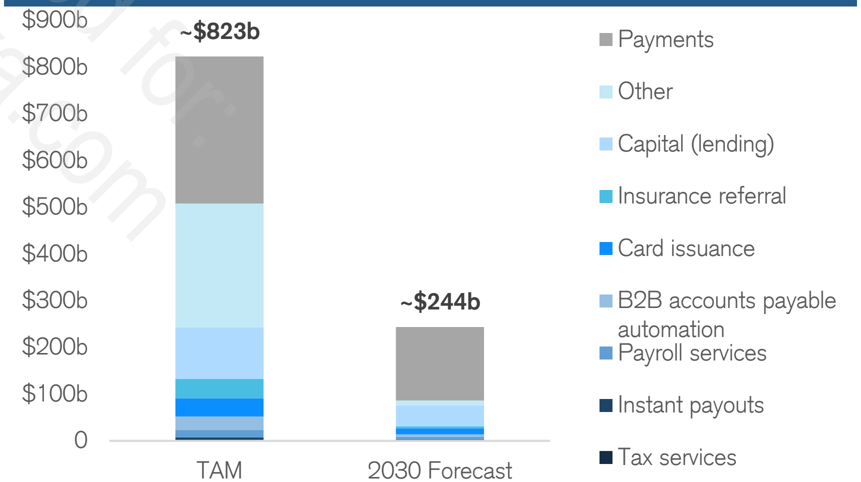
With SMBs becoming increasingly reliant upon software platforms to run their back-office operations and marketplaces to help sell their goods and services, we believe that these platforms provide the optimal distribution mechanism for financial services. Much as consumers have turned to digital channels and apps, and away from brick-and-mortar branches for financial services, we expect the same trend to occur for SMBs.

- **Incentive for SMBs:** Small business owners have two primary concerns when it comes to their financial services: complexity & cost. Platforms can address both of these through embedded finance. Application processes for account opening, loans, insurance, and more can be streamlined as the platform already has access to essentially all required information. Financial services can be managed through one centralized interface along with other aspects of the company's operations, and loan pay-downs and insurance premium payments can be automated. Further, as described in greater detail under "data advantage" below, platforms can offer SMBs superior pricing to that offered by financial institutions (FIs) through relationship-based pricing and enhanced underwriting capabilities.
- **Data advantage:** While digital lenders for years have touted better machine learning algorithms and analytics that enable superior underwriting to traditional FIs, for platforms this advantage is real and rooted in their visibility into the second-by-second cash flow and customer activity at these SMBs (to a degree that traditional FIs lack). This data could allow for superior insights, enabling better pricing of services (lending, insurance, etc.), better risk management, and faster adaptability to changing market conditions down to the company level.
- **Monetization potential:** The embedded finance opportunity is enormous covering nearly every financial product that SMBs currently receive via direct via traditional FIs (and often products the SMB already purchases). We estimate the embedded finance TAM to be $800b+, with platforms forecasted to achieve $240b+ in revenue from embedded financial services by 2030E.

By 2023E, 60% of digital commerce volume is expected to be intermediated by marketplace platforms



We estimate the embedded finance TAM to be $800b+ ($500b+ ex-Payments) with actual revenue projected to reach ~$244b by 2030E



Source: Stripe, McKinsey, Credit Suisse research

Return to Themes Table of Contents

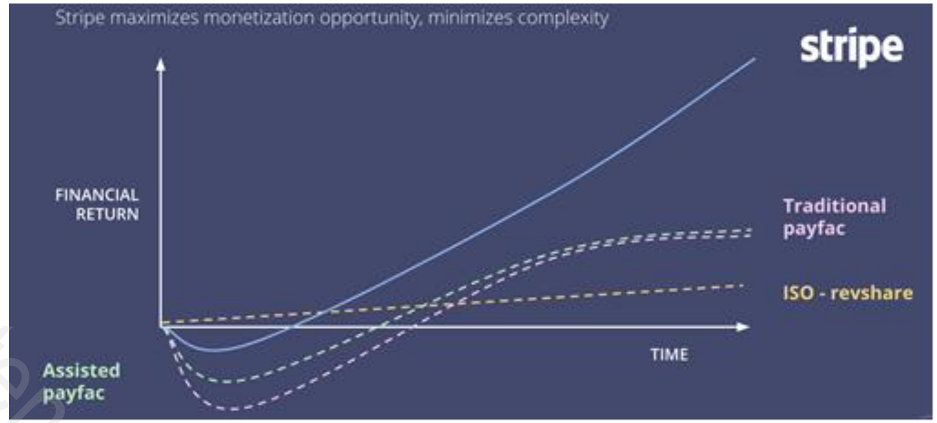
7. Software platforms and broader embedded finance

Stripe enabling the journey to embedded finance

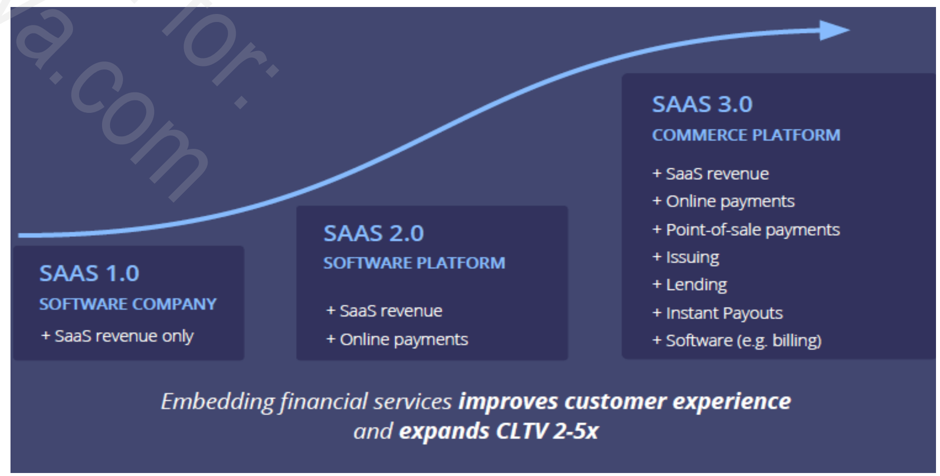
Ultimately we expect a continued move toward what Stripe terms "SaaS 3.0" for SaaS platforms, where an integration with Stripe and/or other providers can allow the software platform to serve as a one-stop-shop for financial services (i.e., distribution into its underlying merchants).

- **SaaS 1.0** - Refers to companies that derive revenue solely from SaaS subscription fees. Under this first iteration of the software company business model, companies were wholly reliant upon revenue relating to the sale of software and renewal of subscriptions.
- **SaaS 2.0** - Includes the introduction of integrated payments, with revenue generation from payments flowing through the platform. This transforms and extends the business model, and can lead to improved business valuations. An example of this was Shopify launching Shopify Payments in 2012.
- **SaaS 3.0** - Expands upon the payments opportunity, with the evolution from a software platform to a commerce platform. SaaS 3.0 includes the opportunity for POS payments, card issuing, merchant lending, instant payouts, billing management, etc. Our view is that all SaaS platforms and marketplaces have the potential to become commerce platforms over time, and penetration of integrated payments will drive growth both for software companies and payments companies that are facilitating this evolution.

Stripe enables SaaS platforms and marketplace to monetize payments, with little initial investment, but great upside potential



For software companies, the evolution from SaaS 1.0 (software only) to SaaS 3.0 (fully embedded finance) can expand CLTV by ~2-5x



Source: Stripe, Credit Suisse research

Return to Themes Table of Contents

7. Software platforms and broader embedded finance

Example of a platform embedding financial services: Lightspeed POS

In 2019, Lightspeed POS introduced its own integrated payments offering, Lightspeed Payments. The company has since expanded into other embedded financial services, including Lightspeed Capital, a working capital lending program, and Lightspeed Subscriptions, a recurring billing platform, with yet more opportunities on the horizon.

- Lightspeed has simplified the back offices of its restaurant and retail merchants by acting as a single point of contact for both POS software and payment processing, helping to build stickier customer relationships.
- Lightspeed recognized that its merchants' financial services needs extended beyond payments, and has discovered that it can offer a simplified solution for many of those needs through their software platform.
- While generating modest revenue (direct benefit) for Lightspeed, Lightspeed Capital also boosts merchant growth, which further serves to benefit Lightspeed Payments as merchant volumes grow (ecosystem, i.e., indirect benefits).
- We believe Lightspeed, like other SaaS platforms and marketplaces, could expand into additional embedded financial services such as instant payouts, card issuance, payroll management, and treasury services; Lightspeed has also rolled out their Supplier Network (a B2B network), which they intend to monetize via B2B payments and distribution fees (referring suppliers to new retailer buyers).

Lightspeed is finding ways to monetize financial services beyond simply payments – already offering lending through Lightspeed Capital and subscriptions (recurring payments), with plans for a monetized B2B network

Commerce-Enablement Opportunities		
Payments	✓ **(Lightspeed Payments)**	In-store and eCommerce payment acceptance, monetized via a fee as a % of transaction value plus a per transaction fee
Financing	✓ **(Lightspeed Capital)**	Extension of capital to merchants (up to $50,000 per customer location), monetized via a revenue share on interest income
Subscriptions	✓ **(Lightspeed Subscriptions - Beta)**	Establish recurring payments with automatic billing/processing, monetized similar to standard payments (% of transaction value plus a per transaction fee)
Payouts	**Opportunity**	Enable merchants to instantly access their revenue prior to funds settlement, typically monetized by charging a fee as a % of payout volume
Card Issuing	**Opportunity**	Provide expense cards to merchants to pay for business expenses and provide instant access to funds, typically monetized via interchange fees
Payroll	**Opportunity**	Offer merchants the ability to manage payroll through their Lightspeed platform and potentially allow employees early access to paychecks, monetized as a % of volume
Treasury Services	**Opportunity**	Provide financial products (interest-bearing and no interest bank accounts, bill payment, money movement, etc.) to merchants, likely monetized via debit card interchange

Source: Finix Payments, Infinicept, Credit Suisse research

7. Software platforms and broader embedded finance
Stripe Treasury – a re-envisioned business banking relationship

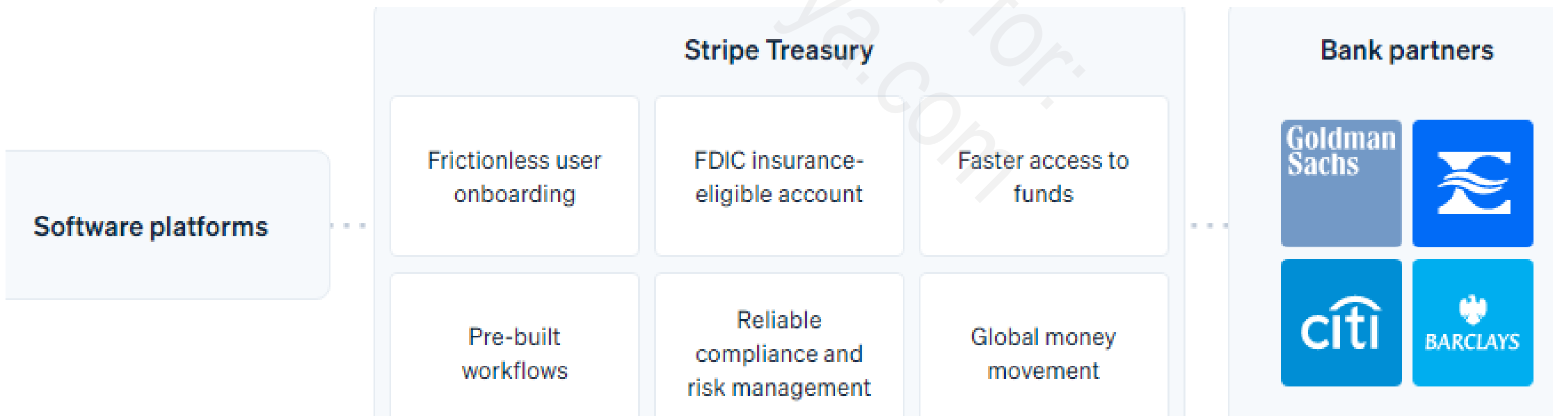
Stripe recently introduced Stripe Treasury – a BaaS API enabling several commonplace treasury features.

- Merchants are able to open bank accounts to hold funds and earn interest (partner with Goldman Sachs, Evolve Bank & Trust, Citi, Barclays).
- Make and manage bill payments for merchants; cash flow management tools and services.
- Merchants benefit from speed to open accounts and simplified management of funds through the same software used to operate the business.

Platforms owns the relationship and can participate in monetization of underlying banking offerings.

- While a bank partner holds the funds behind the scenes, the platform is the primary point of contact and the front-facing provider of the banking services, helping to grow and enhance the platform-merchant relationship, reducing churn and increasing customer LTV.
- Similar to other embedded financial services, platforms could potentially monetize via a range of fee streams and/or revenue shares (e.g., subscription fees, fees for additional services, marking up transactions, etc.).
- Platforms can integrate Stripe Issuing services for merchants, allowing them to pay employees and/or suppliers via stored-value account and other payment-based products such as a supplier payments account for order fulfillment.

Stripe Treasury works with global bank partners to enable software platforms to integrate traditional banking services into the software via a Banking-as-a-Service API making it easier for SMB merchants to access financial services



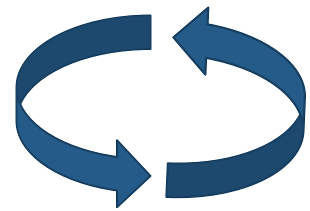
Source: Stripe, Credit Suisse research

8. Further rationale for software-enabled payments

Convergence of software + payments attractive from both starting points

- Results in a highly recurring revenue stream, with reduced attrition, and the potential for higher margins (i.e., distribution leverage – "acquire the merchant once, sell the merchant many times", including additional ancillary products and services such as working capital loans, payroll processing, invoicing, cards, etc.).
- Makes sense for payments and software to work together given payments data are valuable for decision making and planning (customer preferences, inventory planning, cash flow management).
- Both payments and software companies are attempting to work with the same underlying merchants, which are often SMB and mid-market merchants (also an attractive area of payments, which higher net revenue yields vs. working with larger merchants).
- Payments companies can get exposure via owned software (e.g., Global Payments, Square) or partnered (integrating payments into ISVs, referral relationships).

Software & services platforms adding payments	Payments platforms adding software & services
Shopify	Square
Lightspeed	Global Payments
Mindbody	Clover (Fiserv/First Data)
Coupa	Stripe
TouchBistro	Shift4
RealPage	iZettle (PayPal)



Example Platform	SaaS & other revenue ~%	Payments revenue ~%	Comment
Shopify	50%	50%	Based on CSe 2020 revenue mix; vast majority of Merchant Solutions revenue (>70% of total) is Payments
Intuit	85%	15%	2017A result (last payments disclosure), as a % of Small Business & Self-employed revenue
MindBody	61%	39%	2017A result, prior to being acquired by Vista Equity Partners
RealPage	77%	23%	Payments resides in the "Resident Services" category, which was ~46% of revenue LTM Sep. 2020 (we assume ~1/2 payments for illustrative purposes)

Source: Company reports, Infinicept, Credit Suisse estimates

Return to Themes Table of Contents

8. Further rationale for software-enabled payments

Software is one of the fastest growing swim lanes in payments

Channel/Type of Entity	Description	Increasing or decreasing in importance?	Growth	Sample payments providers employing model
Direct sales force	In-house sales force, generally focused on larger, high-value merchants within their employer/merchant acquirer's target market	↑	~20%+	Global Payments, FIS (Worldpay), Repay, FISV (First Data)
Direct self-serve	Mainly focus on micro and SMB merchants, where it can be less economical to deploy live sales resources; Square is the best example of self-serve digital onboard (for the majority of Square sellers), while Clover (and others) is also employing this approach	↑	~Mid-high singles	Square, Fiserv (First Data/Clover), Stripe
Bank branch	Bank-owned acquiring (e.g., Chase, US Bank) or referral partner relationships (e.g., First Data JV with Wells Fargo), leveraging the business customer base of the bank, effectively cross-selling payments acceptance in addition to loans, business checking accounts, etc.	–	~Mid-singles	First Data (via JVs with Bank of America, Wells Fargo, Citi, and PNC), FIS (Worldpay), Global Payments (mostly outside the US)
Independent Software Vendor (ISVs)	Vertical-specific SaaS offerings (e.g., software to help manage a restaurant, dental practice, fitness center, etc.) which have a payments aspect to their software and/or workflow; Range of options spanning ISV-payments partnerships with revenue share, owned-approach (payments company owns software), and PayFac approach (software company takes payments "in-house").	↑	~Mid-teens	Global Payments, FIS (Worldpay), Fiserv (First Data), Repay, Shift4, Paya, BlueSnap
Value Added Reseller (VAR)	A type of sales organization that packages together ISV technology (generally vertical specific, but could be ERP, accounting, etc. software as well) + Payments processing + other value added services to sell to merchants, typically earning a revenue share of payments-related volume. Could be selling a fully integrated, vertical-specific solution (i.e. Shift4) or packaging together a still integrated, but more commoditized solution (i.e. legacy acquirers / gateways).	↑	~Mid-teens	For payments: Shift4, FIS (Worldpay), Fiserv (First Data); For ISVs: Oracle, Microsoft, SAP (ERP/acctg), Shift4 (POS), Agilysis (real estate mgt) + many more
Modern Independent Sales Organization (ISO) - wholesale	In the US, technically, the large acquirers (Global Payments, Worldpay, First Data, etc. all operate as ISOs). This category employs the other categories as distribution methods. Third-party payment processing companies authorized by one or more underlying acquiring banks to sell/service payments acceptance and merchant accounts for businesses. There are also "Super ISOs" that operate as partners of the larger ISOs. Also, when PayFacs work with larger merchants, they must operate under the ISO (wholesale) model - e.g., PayPal, Stripe, Square must do this when working with merchants that exceed certain volume thresholds set by Visa & Mastercard); modern platforms add layers of technology and services to their product and distribution; Category includes many of the payments platforms that are "an authorized ISO of" an underlying acquiring bank.	–	~Slightly above market rates	Majority of large payments platforms in the US (Global Payments, First Data, Worldpay, etc.) are technically ISOs (of their sponsor bank) in the US market, but also have ISOs distributing their payments processing solutions
Traditional wholesale ISO	Traditional "feet on street" salesforce extensions; Wholesale ISOs take on the risk of merchant failure, and thus, are more well compensated than retail ISOs.	↓	~Low-mid-singles	Numerous smaller organizations
Independent Sales Organization (ISO) - retail	Retail ISOs do not take on the risk of merchant failure, and thus, are less well compensated than wholesale ISOs.	↓	~Low-mid-singles	Numerous smaller organizations
Total			~7%	

Source: Credit Suisse research; Note: There is overlap above (i.e., a modern ISO will use many or all of these distribution methods, but included for definitional purposes)

Return to Themes Table of Contents

8. Further rationale for software-enabled payments

Front-end differentiation extends to SMB too, not just consumers

Square

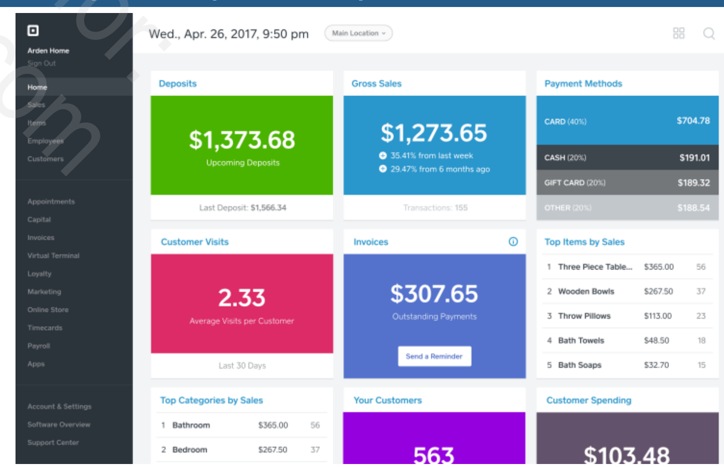
- Frictionless onboarding: merchants can sign up for Square in ~5 minutes vs. potentially weeks with banks/ISOs.
  - ~90%+ of Square's sellers self-onboard without any human intervention
- Cross-sell enabled by integrated software and self-serve nature of products.
  - Facilitates ease of use vs. integrating various
  - Square can proactively offer additional products (Square Capital Loans)
- Staged sign-up flow – removes friction by enabling users to sign up with minimal information and requests information as needed for additional services.
- Minimal employee training required reflects intuitive software – Square POS app runs on Apple and Andriod operating systems, which users already know how to use.

"…We know we have very compelling and differentiated hardware products. We build our hardware in-house, and that means we have greater reliability, speed of data and elegant design and interoperability with our software products.…"

– Amrita Ahuja, CFO, Square (November 2019)

Square's user interface has a more natural feel for digitally native consumers compared to legacy solutions

Square's entire ecosystem of "self-serve" products in one place simplifies the operations of their sellers



Source: Statista, comScore, Credit Suisse estimates

Return to Themes Table of Contents

8. Further rationale for software-enabled payments

Square as an example of additional software services for merchants

Service	Description	Pricing
Square POS	General purpose POS software, pre-installed on Square Register. Automatically tracks sales, inventories, customer data, digital receipts, and more	Free
Square for Retail	Designed for retail industry. Includes POS, online store, inventory management, and more advanced / premium features	Free; Plus and Premium plans from $60/month
Square for Restaurants	POS for full-service restaurants. Provides front of the house (tables, order, courses) and back of the house (revenue and cost reporting) business management solutions	Free; Plus and Premium plans from $60/month
Order Manager	Integrates >20 delivery platforms with Square for Restaurants, allowing sellers to manage all order from the POS. Top partners include DoorDash, Postmates, and Chowly.	~1% take rate
Payroll	Comprehensive payroll offering enabling sellers to pay wages and taxes, hire new employees and offer employee benefits. Available in all 50 states	$29 monthly subscription + $5/month per employee
Appointments	Provides sellers with an integrated appointment scheduling solution. Focused on the services industry	Free for individuals; from $50/mo. for 2+ employees
Team Management	Enables services including manage employee timecards, view employee sales analytics, secure employee permissions, and more	Free for basic version; $35/month for Team Plus
Text and Email Marketing	Enables sellers to run targerted marketing campaigns by linking customer data with transaction data, providing sellers easily assess the ROI of their marketing spend	From $10/month for text; from $15/month for email
Loyalty	Provides sellers with an integrated loyalty program for repeat customers	From $45/month
Gift Cards	Enables sellers to offer custom gift cards	From $0.80/card
Invoices	Enables sellers to create and send custom digital invoices to customers (recorded in transaction revenue)	No monthly fee; 2.9% + $0.30 fee per invoice
Developer Platform	Set of APIs and SDKs that enable third-party developers to integrate Square Payments into their Apps. Expands Square's addressable market to businesses with industry specific needs	N/A

Source: Company reports, Credit Suisse estimates

Return to Themes Table of Contents

8. Further rationale for software-enabled payments

Industry thoughts on software-led payments

"…So if you think about the thousands of ISVs that still have not monetized payments…. the ISV business, which is still early, early innings…"

– Frank Bisignano, Chairman and CEO, First Data (December 2018)

"…We've configured the pricing model for Lightspeed Payments such that we receive an average of ~2.6% of the gross noncash transaction volume and a normalized rate of ~65bps net of direct processing costs. When you consider that Lightspeed has only been earning around 25bps under our previous referral-stage program…you can start to see why we're so excited…"

– Brandon Blair Nussey, CFO, Lightspeed POS (May 2019)

"… I think the challenge is, the most rapidly - our most valued relationship, not the most valued relationship, but the ISV that has referred us the most merchant accounts in the US is one that was previously working with one of our competitors. And they called us, actually, we didn't call them. And they said, "Hey, listen, the processor that we were working with just bought one of our competitors. And I can't work with someone that owns software that competes in my space. So what is your view on owning software?" And we said, well, we're going to be in Switzerland. That's not the business that we're in. We're not going to own point-of-sale software. And he said, great, I'm going to integrate to your Snap platform, and I'm going to send you tens of thousands of accounts. It's a laundromat software. But I think if I were First Data and I was 50% of the U.S. market, would I feel differently? Potentially. And -- but I think for the rest of us, it's a really challenging proposition to preclude yourself from working with all the other ISVs that service any one market segment by choosing one to own. And the software development business is tricky. You have to constantly be investing and innovating. We happen to have a lot of exposure to the restaurant world, as I alluded to at the beginning. And 3 years ago, no one had heard of Toast. And today, Toast is the preeminent ISV in the sector. And I don't know that I would want to be super long Toast 3 years from now because someone else is going to come up with a new solution. So I think our skill set is moving money around super quickly, super securely. I think in the integrated payments world, what's incumbent on us is to have APIs that allow software companies to integrate to us in a very compressed time frame and get access to our global solutions in a very seamless way, to have very strong reporting tools, to have transparent contracts, referral agreements, pricing, rev splits, all that kind of good stuff. But I see point-of-sale software as being a very, very different business. And I think I'd rather have an addressable market of all the ISVs in the market rather than just picking a horse, buying it and praying that it remains the market leader.…"

– Brendan Tansill, President, North America, EVO Payments (November 13, 2019)

"…So in terms of thinking about where are we now in the US, I'd say we're probably in middle innings. So as you go out and you spend money at all your SMB retail restaurant, spa, health care, B2B, et cetera, a lot of those guys have converted off the old on-prem or they've moved away from terminals into this software, and payments is enabled. So we continue to take a ton of share there. It's growing mid-teens for us. But with respect to the U.S., over the next 5 years, we think it's middle innings. If I fast-forward, I think the U.K. and Europe, this trend is just starting. So you're just starting to see in the U.K. and Europe them begin to -- the integrated point-of-sale situation is happening there, and payments has not yet been enabled in a massive way there. So we think there's a big opportunity over the next 3 years to enable payments in those integrated point-of-sale solutions across U.K. and Europe.…"

– Stephanie Ferris, CFO, Worldpay (March 2019)

Source: Statista, comScore

NextGen FinTech Ecosystems

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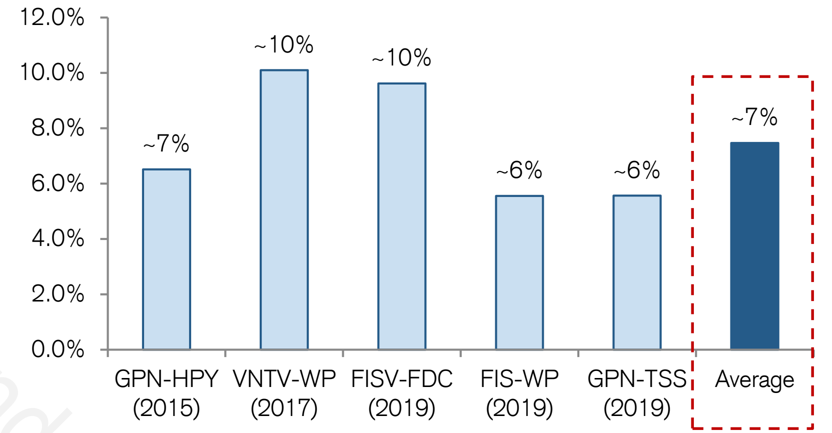
Return to Themes Table of Contents

9. Continued consolidation and scaling of platforms

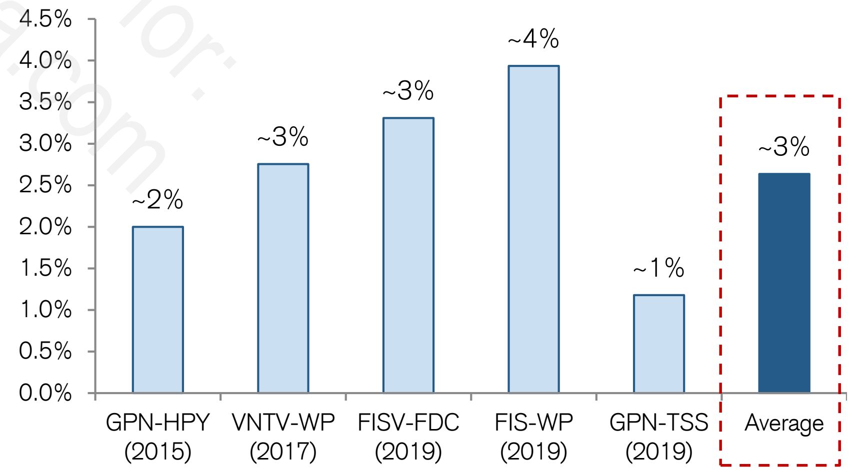
Driving distribution and expense synergies

- M&A is a core competency of incumbent payments players…
  - Historically, more "scale-driven" M&A in merchant acquiring vs. more bolt-on, product capability focused for bank technology providers (FIS/FISV/JKHY) to leverage existing distribution channel.
- …while "Next-Gen" players have digital distribution advantages
  - Square ~+90% of merchants self-onboard given seamless onboarding and strong brand in the US.
  - Stripe and Braintree are predominately eCommerce with distribution advantages over incumbents skewed toward in-store payments.
- Distribution scale drives top line and lowers hurdles for future M&A
  - Cross-selling (key driver of the three large 2019 deals).
  - Geographic expansion given heavy reliance on issuer relationships and regulatory barriers from country-specific license requirements (i.e., called out by FIS – WP for WP acquiring).
  - We expect the next phase of bolt-on M&A outside of traditional acquiring scale to feature purchases of next-gen FinTech ecosystem account connectivity assets and adjacent capabilities around authentication, risk, and personalization/data monetization (e.g., Honey).
- Operating expense scale, driving bottom-line growth and creating cash flow to re-invest
  - High fixed cost structures of payments companies create large cost synergy opportunities:
  - Duplicative corporate overhead
  - Technology and infrastructure costs (data center)

Announced cost synergy target as a percentage of combined cost base, average of ~7% across recent deals



Announced revenue synergy target as a percentage of combined revenue, average of ~3% across recent deals



Source: Company reports, Factset, the BLOOMBERG PROFESSIONAL™ service, Credit Suisse research

Return to Themes Table of Contents

9. Continued consolidation and scaling of platforms

Recent acquisitions (>$0.5b) by FIS, FISV, GPN, & their predecessors

Target Company	Closing Date	Description	Rationale	Price (EV)	LTM EV/EBITDA	Acquiring Company
MineralTree	Announced September 2021	Provider of AP automation and B2B payments solutions	Expands GPN's TAM (company disclosed ~$110b TAM), bolsters GPN's B2B offerings and capabilities	~$500mm	NA	Global Payments
Zego	Announced May 2021	Real estate software and payment solutions	Enhancing position at the convergence of software and payments in the large real estate vertical (~$6.5b TAM) with a payments nexus	~$925mm	NA	Global Payments
Total System Services	Sep-19	Merchant acquiring and issuer processing	Enhanced scale and product capabilities in merchant acquiring businesses, and diversification benefits by adding consumer and issuering processing business lines	~$26b	20x	Global Payments
Worldpay	Jul-19	Merchant acquiring and issuer processing	FIS' banking customer base provides a meaningful cross-sell opportunity for Worldpay's merchant acquiring business in high-growth international markets	~$35b	23x	FIS
First Data	Jul-19	World's largest merchant acquirer and issuer processor	Highly complementary combination with at least $500mm of revenue synergies from cross-selling and geographic expansion (Fiserv was 95% US) and $900mm of anticipated cost synergies	~$39b	13x	Fiserv
Elan Financial Services (Debit Processing Unit)	Oct-18	Electronic payments network (bills and invoices)	Sits within the Payments segment and expands reach/capabilities in debit card processing and ATM managed services.	~$690mm	NA	Fiserv
AdvancedMD	Sep-18	Software-led	Adds software and payments for SMB ambulatory physician practices	~$700mm	NA	Global Payments
Worldpay	Jul-18	UK-based global merchant acquirer	Expanded presence both internationally (Vantiv was a 100% North American-based business) and in eCommerce	~$12b	19x	Worldpay (legacy Vantiv)
Cayan Holdings	Jan-18	Merchant acquiring	Accelerate technology-led payments business, and added ~70k merchants and more than 100 integrated partners in the US. Strengths in omnichannel	~$1.05b	23x	Total System Services
BluePay	Dec-17	Integrated payments ISO	Strengthened the company's position in the card-not-present integrated software vendor (ISV) channel	~$760mm	NA	First Data
ACTIVE Network	Sep-17	Software-led	Adds event organization software and booking technology platform, focused on the health and fitness market	~$1.2b	12x	Global Payments
CardConnect	Jul-17	Integrated payments ISO	Strengthened the company's position in the card-present ISV channel	~$750mm	20x	First Data
Heartland Payments	Aug-16	Merchant acquiring	Added software and payments business, with an SMB emphasis	~$4.3b	20x	Global Payments
TransFirst	Apr-16	Merchant acquiring	Added ~1.3k integrated technology and referral partners in important areas such as ISVs, healthcare, not-for-profit, referral banks, and eCommerce	~$2.4b	16x	Total System Services
SunGard	Nov-15	Financial software & technology	Allowed FIS to expand its capabilities and client roster, gaining scale and technologies	~$5.1b	NA	FIS
Mercury Payments Systems	Jun-14	Merchant acquiring	Integrated payments leader, and part of the foundation of the integrated business today	~$1.65b	18x	Worldpay (legacy Vantiv)
NetSpend	Jul-13	Prepaid cards	Expands business capability to include prepaid debit card issuance	~$1.4b	14x	Total System Services

Source: Company filings, Credit Suisse research

Return to Themes Table of Contents

9. Continued consolidation and scaling of platforms

Additional recent FinTech acquisitions of greater than $1b

Target Company	Closing Date	Description	Rationale	Price (EV)	LTM EV/EBITDA	Acquiring Company
Afterpay	Pending	Buy now pay later platform	Bolsters size, growth rate, and diversification of gross profit streams, with potential for meaningful synergies (e.g., large seller mix for Square, smaller seller mix for Afterpay, additional Afterpay users via Cash App base, etc.)	~$29b	NA	Square
Tink	Pending	Open banking platform	Establish an open banking platform in the fast-growing European market and leverage Tink's relationships with 3,400+ banks that reach 2mm+ consumers	~$2.2b	NA	Visa
Divvy	Jun-21	Corporate spend management	Enhances B2B product for SMBs with a comprehensive solution offering both bill pay and spend management; serves a larger share of customer spend	~$2.5b	NA	Bill.com
Cardtronics	Jun-21	Largest non-bank ATM operator and service provider	Further shifts NCR's revenue mix to software, services and recurring revenue; synergies	~$2.5b	~10x	NCR
Nets	Jul-21	Merchant acquiring and issuer processing	Increases scale (resulting in the creation of the European PayTech leader); synergies	~$9b	~20x	Nexi
SIA	Pending	Merchant acquiring and issuer processing	Increases Nexi's scale in the Italian payments market to better position for international consolidation opportunities; synergies	~$7b	~20x	Nexi
Ellie Mae	Sep-20	Cloud-based platform provider for mortgage finance industry	Extends ICE's reach to the mortgage origination space, establishing ICE as the leading provider of end-to-end electronic workflow solutions serving the US residential mortgage industry	~$11b	~23x	Intercontinental Exchange
Ingenico Group	Oct-20	Merchant acquiring	Increases scale (creates one of the world leaders in merchant acquisition and payment processing); synergies	~$8.5b	~15x	Worldline
Credit Karma	Dec-20	Consumer technology and personal finance	Defensive on the tax side and offensive on the consumer side, expanding consumerTAM from $29b to $57bB and revitalizing the Consumer Platform strategy (based on Credit Suisse research)	~$7.1b	NA	Intuit

Source: Company filings, Credit Suisse research

9. Continued consolidation and scaling of platforms

Visa’s recent strategic investments and tuck-in acquisitions

Target Company	Deal Type	Date Announced or Reported	Target's Business	Target's Direct Customers	Target's Geography	Rationale	EV ($mm)	EV/Sales
Currencycloud	Acquisition	Jul-21	Cross-border payment	Banks, FinTechs	Worldwide	Strengthens Visa's existing FX capabilities by extending them to better serve financial institutions, FinTechs and partners while enabling new use cases and payment flows	~£700mm valuation	N/A
YellowPepper	Acquisition	Oct-20	Mobile payment	Consumers	Latin America and the Caribbean	Accelerates the adoption of Visa's “network of networks” strategy by significantly reducing the time-to-market and cost for issuers and processors	~$75 (to acquire rest of YellowPepper)	N/A
Tink	Acquisition	Jan-20	Financial data platform	FinTechs, FIs, Merchants	Europe	Accelerates the adoption of open banking in Europe by ensuring a secure, reliable platform for innovation	~€1,800	~60.0x
NovoPayment	Strategic investment	Dec-19	Banking-as-a-service platform	FIs, Merchants	Latin America and the Caribbean	Advances the digitization of payments and accelerates the deployment of V's digital solutions such as Visa Direct and Visa Token Services for various use cases	N/A	N/A
PayWorks	Acquisition	Jul-19	Payment gateway software	Merchant acquirers, Payment service providers, POS providers	Worldwide	Strengthens Visa CyberSource's existing digital payment management platform, in order to create an integrated acceptance solution for merchants and acquirers	~$50-70	~5.0-7.0x
Go-Jek	Strategic investment	Jul-19	Ride sharing and mobile wallet	Consumers	South East Asia	Accelerates and expands mobile payment services across the underbanked and unbanked in South East Asia, particularly in fast-growing urban areas	~$10b (last valued at)	N/A
Anchorage	Strategic investment	Jul-19	Crypto storage	Institutional investors	U.S.	Provides stake in all potential forms of digital payment	<$10 invested	~5.0x
Verifi	Acquisition	Jun-19	Dispute solution	Merchants, Merchant acquirers, Banks	Worldwide	Extends Visa's charge-back and dispute resolution capabilities to support a broad range of payment brands and partners across the ecosystem	~$60-90	~4.6-6.9x
Token services and ticketing business of Rambus	Acquisition	Jun-19	Tokenization and ticketing service	Merchants, Banks, FIs, Transport operators	Worldwide	Extends Visa's tokenization capabilities beyond card-based payments	~$75	N/A
Earthport	Acquisition	Dec-18	Cross-border payment	Banks, Companies that make cross-border payments	Worldwide	Quickly expands on the cross-border business (particularly cross-border B2B) given Earthport's existing presence in many countries	~£247	~7.7x
Conductor	Strategic investment	Oct-18	Digital payment processing	Merchants, Banks	Brazil	Accelerates innovation in payments and enable Conductor's product expansion	~$20 invested	N/A
Paidy	Strategic investment	Aug-18	E-commerce payment financing	Consumers	Japan	Develops new payment methods online and in-store. Japan is one of the fastest growing e-commerce markets, but is also heavily reliant on cash	~$5 invested	N/A
Behalf	Strategic investment	Aug-18	Lending	Merchants	U.S.	Extends Visa's capabilities to small businesses through collaboration with start-ups and FinTechs	~$10 invested	N/A
YellowPepper	Strategic investment	May-18	Mobile payment	Consumers	Latin America and the Caribbean	Accelerates innovation in digital payment technology and capture growing opportunities in tokenized payments and Visa Direct	~$20 invested	N/A
Fraedom	Acquisition	Feb-18	Payment tech	Banks	Worldwide	Bolsters B2B capabilities	~£142	~4.2x
Klarna	Strategic investment	Jun-17	Online payment solution	Merchants	Europe, U.S.	Accelerates online and mobile commerce	~$15-30 invested	N/A
CardinalCommerce	Acquisition	Dec-16	E-commerce payment authentication for browser, mobile app and devices	Merchants	Africa, Asia, Australia, Europe, North America and South America	Secures and accelerates digital commerce	~$300	~15.0x

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Source: Company filings, Credit Suisse research
Note: Valuation and sales include estimates by Credit Suisse research (as of date of deal, directional, not all consistent in terms of forward year, etc.)

9. Continued consolidation and scaling of platforms

Mastercard's recent strategic investments and tuck-in acquisitions

Target Company	Deal Type	Date Announced or Reported	Target's Business	Target's Direct Customers	Target's Geography	Rationale	EV ($mm)	EV/Sales
CipherTrace	Acquisition	Sep-21	Cryptocurrency security	Banks, Exchanges, Other FIs	North America, Europe, Asia	Combines CipherTrace's suite of digital assets and Mastercard's cybersecurity solutions to provide businesses with greater transparency to help identify/understand their risks and to help manage their digital assets. Provides global scale for CipherTrace	N/A	N/A
Aiia	Acquisition	Sep-21	Financial data platform	FinTechs, FIs, Merchants	Europe	Accelerates Mastercard's open banking efforts in Europe and complement Finicity	N/A	N/A
Ekata	Acquisition	Apr-21	Cybersecurity	FIs, Merchants, Marketplaces, Digital currency platforms	Worldwide	Advances Mastercard's digital identity capabilities and bolster the support Mastercard can provide as a one-stop partner for any consumer, bank, merchant, fintech or government's data, payment and open banking needs	~$850	~17.0x
Finicity	Acquisition	Jun-20	Financial data platform	FinTechs, FIs, Merchants	North America	Strengthens existing Mastercard open banking platform and expands it in NA and other geographies (e.g., Europe, where Mastercard open banking services feature connections to >1,800 FIs). Streamlines credit decisioning process for consumers/small businesses with Finicity's analytics platform. Delivers improved ACH and RTP experience	~$825	~30.6x
RiskRecon	Acquisition	Dec-19	Cybersecurity	FIs, Merchants, Governments, Industries outside financials	Worldwide	Enhances MA's suite of cyber solutions designed to help clients secure their digital assets	N/A	N/A
SessionM	Acquisition	Oct-19	Customer engagement and loyalty	Merchants in industries such as retail, airline, restaurant and consumer product	Worldwide	Enhances MA's ability to help brands deliver personalized, real-time offers and comprehensive campaign measurement based on data. Also, expands Mastercard's consulting and marketing services	N/A	N/A
Majority of Nets' Corporate Services business	Acquisition	Aug-19	Instant payment infrastructure and e-billing solution	Businesses, Banks	Europe	Captures account-to-account RTP and bill pay opportunities, as well as enhance existing capabilities	~$3,190	~7.6x
Polski Standard Platnosci	Strategic investment	May-19	Mobile payment	Consumers	Poland	Most likely to explore payment methods outside of cards	N/A	N/A
Transactis	Acquisition	May-19	Bill payment	Merchants	U.S.	Addresses bill payment needs in online bank applications as well as in biller websites with enhanced end user interfaces, expanded payment options and digital bill presentment capabilities. Complements Mastercard Bill Pay Exchange	~$500-600	~15.6-18.8x
Vyze	Acquisition	Apr-19	POS financing	Merchants, Lenders	U.S.	Complements Mastercard's existing card and ACH-based solutions, in order to give consumers payment flexibility at the moment of purchase	~$100-200	~20.0-40.0x
Jumia	Strategic investment	Mar-19	E-commerce	Consumers	Africa	Supports the adoption of electronic payment and boost Mastercard's presence in e-commerce in Africa	~$150	N/A
Network International	Strategic investment	Mar-19	Payment processing	Merchants, Banks	Middle East and Africa	Drives adoption of digital payments in the Middle East and Africa	~$300 invested (~$3b valuation)	N/A
Ethoca	Acquisition	Mar-19	Fraud solution for digital commerce	Merchants, Banks	Worldwide	Provides capabilities to reduce digital commerce fraud which enhances Mastercard's current suite of fraud solutions	~$40-60	~4.4-6.7x
Transfast	Acquisition	Mar-19	Cross-border payment	Companies that make cross-border payment, Consumers	Worldwide	Quickly expands Mastercard's cross-border business (particularly cross-border B2B) given Transfast's existing presence in many countries	~$180-270	~5.1-7.7x
Oltio	Acquisition	Mar-18	Mobile payment	Merchants, Banks	South Africa	Accelerates digital payment adoption in Middle East and Africa	~$10	~3.3x
Brighterion	Acquisition	Jul-17	Payment security using artificial intelligence	Banks	U.S., Europe, Asia, Latin America	Enhances customer experience and security through artificial intelligence	~$220	~6.7x
NuData Security	Acquisition	Mar-17	Online and mobile payment security	Merchants, Banks	Worldwide	Enhances security of IoT transactions by adding to Mastercard's existing suite of security products	~$125	~4.8x
Vocalink	Acquisition	Jul-16	Payment platform, fast ACH	Payment schemes	Worldwide	Allows Mastercard to participate in payment flows beyond card rail (particularly in fast ACH) and play a more strategic role in the U.K. payment ecosystem	~$920	~3.5x

Source: Company filings, Credit Suisse research
Note: Valuation and sales include estimates by Credit Suisse research (as of date of deal, directional, not all consistent in terms of forward year, etc.)

10. Open Banking expands to Open Finance

Open Finance = Open (consented) access to customer financial data

- Started in Europe with PSD2 & Open Banking in the UK – Policy objectives to facilitate innovation and competition in retail financial services; now governments across the world are pursuing open-banking agendas for similar reasons (see map below).
- Characterized as regulations mandating banks to make consumer financial data available (i.e., granting consumer rights to *openly* share their financial data) for licensed third-parties to build services on (FinTechs/Techs) via APIs.
- Has more recently expanded to "Open Finance" to give consumers and businesses more control over a wider range of their financial data (e.g., savings, insurance, mortgages, investments, pensions and credit), given initial European regulations were limited to payments accounts (akin to a doctor providing medical advice with only access to parts of your medical history).
  - The UK's FCA solicited a call for input on Open Finance in 2020 to extend Open Banking principles beyond payments accounts
  - In September 2020 the European Commission announced an intention to adopt a new open finance framework by mid-2022

Open Banking initiatives around the world, noting that there is no formal program in the US (rather, open banking is being introduced by market forces)

Source: Whitesight, Credit Suisse research

Return to Themes Table of Contents

10. Open Banking expands to Open Finance

State of Open Finance in the US

	State of Open Finance in the US
Open Finance Penetration	▪ Despite no formal regulations specifically mandating Open Finance like in Europe & the UK, Open Finance penetration is higher in the US given: ▪ Regulations are not limited to payments accounts like in Europe and the UK (both of which are looking to correct this) ▪ Standards are set by industry groups rather than regulators (e.g., FDX with 197 members) ▪ Section 1033 of Dodd-Frank provided consumers legal rights in 2010 to financial account and transaction data, years before the EU and UK (albeit it had shortcomings included below)
Shortcomings of Dodd-Frank Section 1033	▪ Non-specific statutory language with a general lack of robustness that deals with disclosure/informed consent, scope of data, security, accountability, privacy, etc. ▪ Some banks argued that consumer data rights only apply to direct consumer access, but not through consumer authorized third-parties. The US Treasury recommended the CFPB to affirm agents of consumers (authorized third-parties) fall within the definition of a consumer so that banks are mandated to share data with aggregators (e.g., Plaid, Finicity) ▪ A lack of guidance on a liability accountability framework (e.g., who is responsible for account takeover, the bank, Fintech, the data aggregator?) ▪ The scope of financial data that is required to be shared with consumers is not specific and some banks are unwilling to share certain types of consumer financial data (e.g., account fees, pricing, etc.)
CFPB actions to address shortcomings of Dodd-Frank Section 1033	▪ Released Consumer Protection Principles in 2017 on Consumer Authorized Financial Data Sharing and Aggregation – but no mandates ▪ Held an industry symposium in February 2020 to assist with the policy development process – findings included here ▪ Issued an Advance Notice of Proposed Rulemaking in October 2020 "in developing regulations to implement section 1033" ▪ The CFPB solicited input from all stakeholders on how to "efficiently and effectively implement section 1033" until February 4th, 2021. They have yet to take action since the public comment period ended. ▪ President Joe Biden encouraged the CFPB to make these rule changes to section 1033 in his June 2021 executive order
CS Take	▪ We expect the outcome of CFPB's actions to "effectively and efficiently implement section 1033" will ultimately result in increased consumer financial data rights and will be instrumental to unlocking innovations in financial services and leveling the playing field with incumbents ▪ Giving FinTechs unrestricted, consumer permissioned, and standardized access to consumer financial data will make it easier for FinTechs to build new innovative products (e.g., all of the same data fields provided by each bank, using an industry developed & standardized API format)

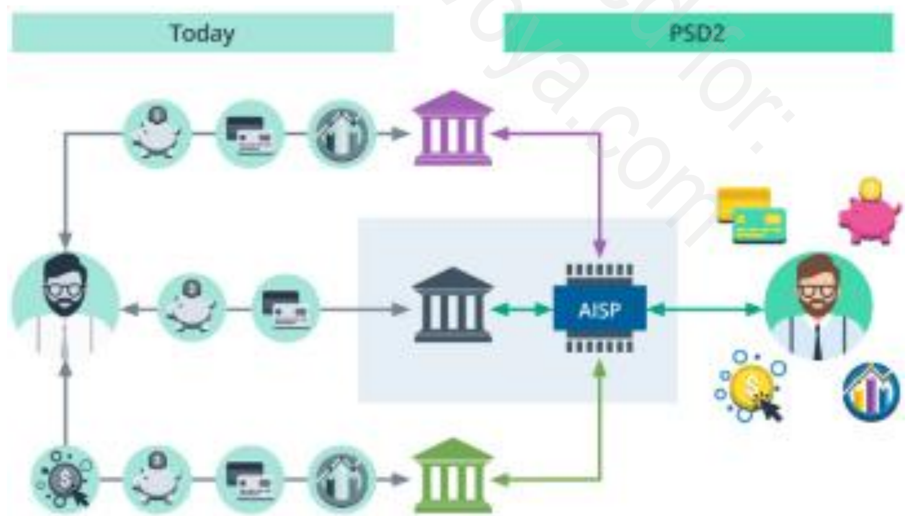
Source: CFPB, US Treasury, Arent Fox Credit Suisse research

Return to Themes Table of Contents

10. Open Banking expands to Open Finance
Driving force of innovation by enabling FinTech

- Bringing about the "platform-ification" of banking as distribution of financial services becomes increasingly digital and decouples financial products from banks, allowing consumers and Neobanks to cherry pick the best services.
- Data aggregators are building the infrastructure that power Fintech apps by connecting them to banks via APIs.
- APIs facilitate the sharing of data between (financial service) providers in a controlled, yet seamless fashion.
- Essentially developer platforms, allowing for faster product creation (hours from months), enable developers to:
  - Initiate payments from a bank account or transfer funds (Venmo)
  - Aggregate all of a customer's account data (Mint)
  - Innovate with the data (credit assessment, automating loan applications, budgeting, etc.)

APIs enable the platform model into financial services



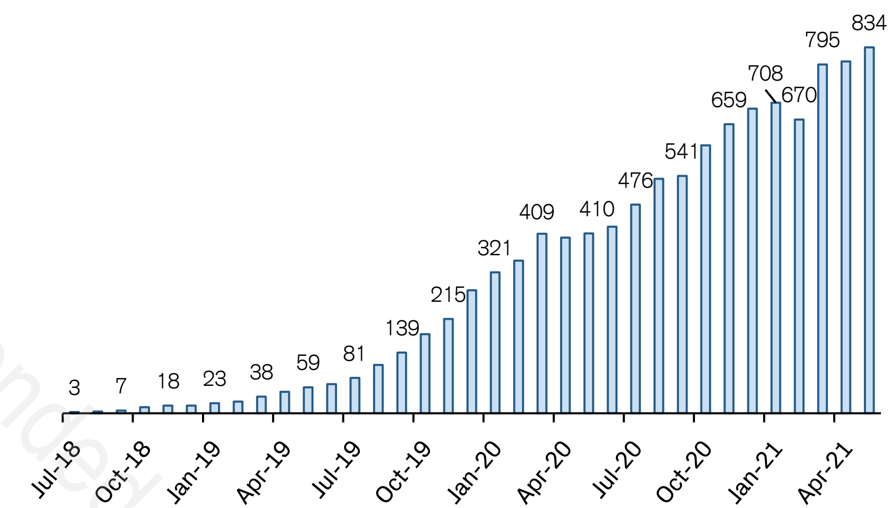
Return to Themes Table of Contents

10. Open Banking expands to Open Finance

European enablers: Tink, TrueLayer, Token, and Yapily

- Tink (founded in 2013), TrueLayer (founded in 2016), Token (founded in 2015), and Yapiliy (founded in 2017) are European provider examples/leaders
  - TrueLayer powers both Revolut and Monzo
  - Tink powers both N26 and PayPal (in Europe, while PayPal/Venmo work with Plaid in the US)
  - Pending $2.15b Visa acquisition of Tink announced in June 2021
- Tink and Plaid founders (and CS Research) believe that no single company will build all products in-house and that there will be an ecosystem of specialized applications
- Regulations require banks to make customer account data available electronically:
  - PSD2 in Europe requires banks to have open APIs
- US market challenging because:
  - US banks are required to make data available electronically from Dodd-Frank section 1033, but has many shortcomings as discussed earlier
  - More challenging in the US given >10k banks and credit unions

Monthly open banking API calls (millions) in the UK – Illustrates continued increasing levels of adoption



European example N26 – Brings the platform model into financial services via APIs connecting to point-solutions

1	Barzahlen: cash withdrawal & deposit at retailer partners
2	Transferwise: international foreign currency transfer
3	Vaamo: Robo-investing
4	Raisin: marketplace for highest rate savings accounts
5	Clark: InsureTech
6	Auxmoney: loans

 Source: Open Banking UK, N26, Credit Suisse research

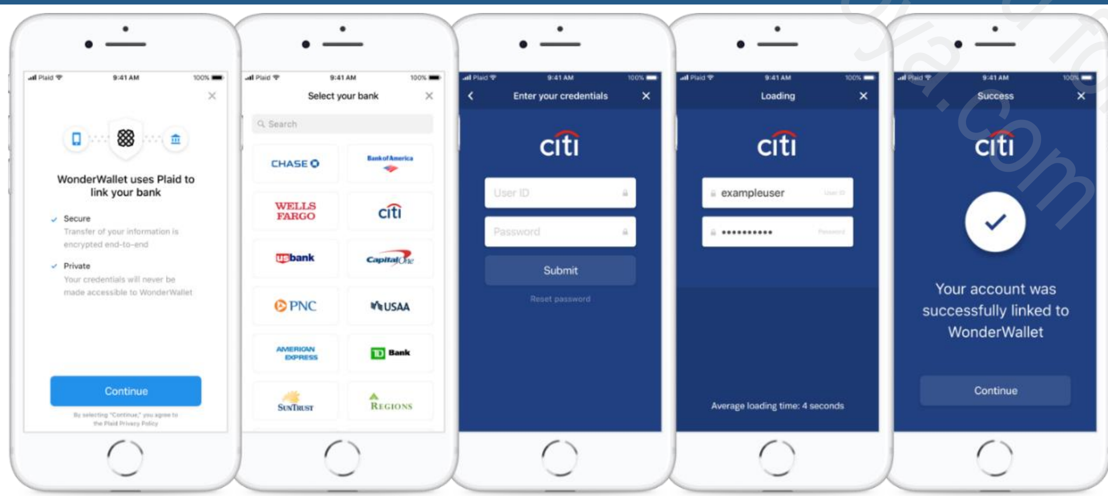
Return to Themes Table of Contents

10. Open Banking expands to Open Finance

US enablers: Plaid, Finicity, and Yodlee

- Plaid is the infrastructure (data plumbing) layer, allowing FinTechs to access customer account data via APIs to "*build any financial application from payments to lending to wealth management*".
  - In the US, Plaid powers over 5k apps, connecting >200mm consumer accounts to over 11k financial institutions (as of July 2021).
  - Sample FinTechs working with Plaid: Venmo, Robinhood, Cash App, Acorns, Expensify, SoFi, Marcus, Betterment, and more.
  - Visa signed an agreement to acquire Plaid for $5.3b in January 2020, which was terminated a year later following the DOJ filing an anti-trust lawsuit against Visa for attempting to acquire Plaid; Plaid is now valued at $13.4b (Series D) .
- Finicity, another leading provider of financial data and insights was acquired by Mastercard in November 2020 for $1b.
- Yodlee (founded in 1999) is the pioneer of account data aggregation, but it has been utilized less by FinTechs.

Plaid example, with an illustrative wallet ("WonderWallet") using Plaid to link to a selection of banks, with the user giving access via their familiar online banking login credentials



Plaid's mission statement summarizes the spirit of open finance well:

"Transform financial services by lowering the barriers to entry for developers, spurring technical interest in the sector and democratizing access to critical services."

Source: Plaid, Credit Suisse research

Return to Themes Table of Contents

10. Open Banking expands to Open Finance
Plaid, the leading enabler of North American FinTechs

- Now focused on Phase 1, solving the financial data engineering challenge: (1) providing connectivity to all banks via one API, with high up-time access; (2) categorizing and cleansing data to enable FinTechs to offer services (e.g., budgeting); and (3) building out a merchant database across the US (to enable transaction categorization and budgeting tools for consumers).
- Phase 2 will be focused on value-added services through analytics, with examples including loan and mortgage application automation (both of which require ~60 pieces of information to process).
  - "*Products that need to interact with your financial data*" – Plaid CEO, Zach Perret
- Acquired Quovo in January 2019 for $200 million: (1) bolsters ability to incorporate investment and brokerage data; and (2) supports expansion into Europe with Quovo's PISP license with the UK regulator (FCA).
- We believe Plaid will help US FinTechs compete in Europe and be the go-to for European Challenger banks in the US.
- In the latest Forrester Wave open banking report, Plaid was ranked the leader in the space with differentiated aggregated and value-added services. Tink ($2.15b pending acquisition by Visa) was ranked second.

>11k financial institutions

JP Morgan Chase, Wells Fargo, Citi, Bank of America, American Express, Fidelity, BBVA, PNC, Capital One, Ally, USAA, Charles Schwab, Regions, Simple, US Bank, SunTrust (now Truist)

PLAID

- 25% of US adults have an account linked through Plaid
- The average US bank account has >15 connected services
- >200 million accounts are connected to Plaid (January 2020)

Powers >5k applications

Venmo & PayPal, Square (Cash App), Marcus by Goldman Sachs, Robinhood, Coinbase, Betterment, Gusto, Transferwise, Acorns, Intuit, Microsoft, Zillow, LendingClub, Quicken Loans, Blend

Source: Company reports, Credit Suisse research

Return to Themes Table of Contents

11. A2A payments gaining momentum with Open Banking

Enhanced UX enabling Fintechs to pursue massive consumer payments TAMs

With Open Banking platforms focused on improving the user experience for A2A payments, we see increased potential for A2A payments to gain share over time:

- **Improved UX for mobile and desktop:** Merchants are focused on making the checkout experience as smooth as possible to optimize checkout conversion. By leveraging biometric authentication like FaceID, Open Banking platforms can enable consumers to complete a payment in seconds on their phones. For desktop based eCommerce, users can scan a QR with their phone to authenticate themselves with their phones.
- **In EU, PSD2's 2-factor authentication mandate leveling the playing field:** Strong customer authentication (SCA) mandates going live throughout Europe during 2021 through 1H 2022 will require both card and A2A payments to go through a similar two-factor authentication process (excluding a portion of card volume that can use an SCA exemption).
- **Reach & Distribution:** Open Banking platforms have strong reach and distribution that continues to grow given they are powering nearly all consumer-facing FinTechs.
    - Reach: Plaid has connections into >11k US Financial institutions and 250mm+ consumer accounts; Tink is integrated into >3.5k FI's and 250mm+ consumer accounts.
    - In aggregate, the Open Banking platforms are starting to approach the reach of V&MA in developed markets in terms of account connectivity.
    - Distribution: By being the go-to-platforms for building FinTech products these platforms have relationships with the vast majority of FinTechs (e.g., Plaid 4.5k+).
- **Revenue opportunity for FinTechs:** Large TAM with high secular growth and high-margins on legacy card-based payments makes consumer payments a logical place for FinTechs to pursue and provide value (e.g., TrueLayer & Tink note their A2A payments are +80% cheaper than cards).
    - All of the most valuable FinTechs participate in payments economics representing ~$2tr in market cap – Visa, MA, PayPal, Square, Stripe, Adyen, FIS, Fiserv, Chime, etc.

Leaders from the top Open Banking platforms becoming increasingly focused on the massive consumer payments TAM

"The other thing you're going to see is price competition that benefits consumers and merchants. Open banking payments are fundamentally going to be a challenge to interchange for card networks, and I think competition between open banking players will mean that the benefits of these payment rails are ultimately felt by both consumers and merchants…I think we're moving to a world where it shouldn't cost a merchant 3% of the sale just to process a payment. You're going to start to see that getting negotiated down quite quickly over time."

– Keith Grose, Head of International, Plaid (Summer 2021)

"We really believe that payments will be the killer use case for open banking and will quickly become the default way to pay online in the next five to 10 years, displacing cards."

"The convergence of technology, user experience, regulation and economics conditions are giving banking the momentum it needs to offer a mass-market alternative to card payments."

"The introduction of Strong Customer Authentication [SCA, in Europe] adds another layer of friction to cards with workarounds that deliver a poorer customer experience."

– Francesco Simoneschi, CEO, Truelayer (Spring 2021)

Source: The Payments Revolution, Credit Suisse research

Return to Themes Table of Contents

11. A2A payments gaining momentum with Open Banking

Top and emerging use cases

- Biggest impact for FinTech to-date:
  - Account funding for digital wallets, instant bank payments, crypto-exchanges, trading, savings and investment apps
  - Bill Pay: Provides higher conversion for utility providers and represents the majority of Tink's Open Banking Payments volume as of August 2021
- eCommerce becoming an emerging growth area:
  - Higher-value transaction given most savings potential on payments (hence seeing it in account funding), and higher fraud & chargeback risk
  - Any transaction value: given the enhanced UX, A2A payments can compete with any payment method
  - Variable recurring payments: Competes with card on file payments, enabling consumers to authenticate once and enable seamless eCommerce comparable to Amazon's one-click checkout
- Future areas of growth:
  - Physical point of sale using QR codes

To-date, A2A payments have had the biggest impact on the Account Funding (for wallets, Neobanks, investing apps), shown as "ACH" below

	Cost	Coverage	Speed	Direction of payment with consumer
ACH	Low	High	Medium	Push & Pull (Credit/Debit)
RTP	Low	Low	Real time	Push (Credit) only
DEBIT	Medium	High	Fast	Push (Credit) primary*
CREDIT CARD	High	Medium	Fast	Push (Credit) only

*Debit can be used bi-directionally, yet there is an increase cost with the additional service

Plaid calling for consumer retail eCommerce A2A payments

"What you've not seen yet, but you will, is the ecommerce side — checkouts with your bank. That will come as we build additional features, and open banking payments become trained in consumers' minds as a safe and more beneficial payment method than cards or card-on-file. It's already started in account."

– Keith Grose, Head of International, Plaid

(Summer 2021)

Source: Plaid website, Payments Revolution Report, Credit Suisse research

Return to Themes Table of Contents

11. A2A Payments gaining momentum from Open Banking

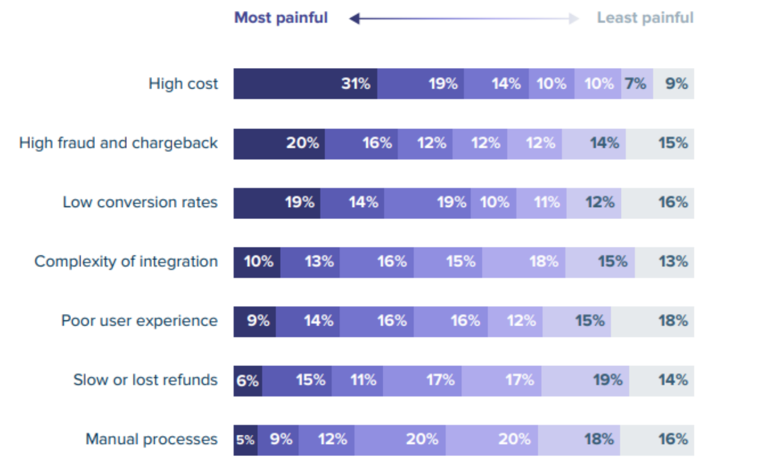
Merchant Incentives

Top merchant incentives for adding A2A payments to their checkout page

1) Reduce fees vs. traditional card-based transactions (~80% lower according to Tink & TrueLayer)
2) Potentiality lower chargebacks and fraud given bank-based biometric authentication
3) Higher conversion at checkout vs. cards (In Europe given SCA)
   i. TrueLayer has seen a ~97% payment success rate for its A2A product, a ~10-20% premium to what its seen for card payments
   ii. Embedded user experience that doesn't force consumer to leave the app
4) Merchant funds are available immediately in countries with faster payments (e.g., UK) vs. ~3-5 days for card-based transactions
5) Merchant ability to process refunds in seconds vs. days (better user experience)

- Smooth UX & high consumer use of A2A payments is key - while lower costs for merchants is nothing new, the recent UX enhancements of A2A that make it more convenient to use is the key factor here (i.e., without a good consumer experience merchants would generally not sacrifice conversion rates to save on payments fees)

TrueLayer Case study on 340 UK Merchants: Top two merchant pain-points related to cards



Common pain-points by payment method relative to Instant Bank Transfers (i.e., A2A payments) – TrueLayer Case study

	DIGITAL WALLETS	CARDS	INSTANT BANK TRANSFER
Fee per chargeback	£14	£15	No chargebacks
Fee per transaction	1–4%	1–4%	<1-1.5%
Fraud rates	Medium	High 0.062% value of fraud as share of transaction value	Virtually none
Payment failures	10–20%	10–15%	<5%

Source: TrueLayer Case Study "Change at the checkout", Credit Suisse research

Return to Themes Table of Contents

11. A2A payments gaining momentum with Open Banking

A2A Payments most likely to gain share in Europe first

1. SCA mandates leveling the playing field for checkout convenience

- Strong customer authentication (SCA) mandates in Europe (Theme 34) going live during 2021-1H 2022 expected to decrease card checkout conversion
- A2A open banking payments have SCA built-in with biometric authentication (e.g., Face & Touch ID) that allows users to checkout in seconds
  - TrueLayer has seen a ~97% payment success rate for its A2A product, a ~10-20% premium to what its seen for card payments
- A large portion of European Issuers are not ready for SCA despite:
  - Complexity around managing SCA exemptions for issuers (e.g., tracking if a consumer's last series of eCommerce transactions has surpassed $100, requiring a user to re-authenticate)
  - Portion of European Issuers are not on 3DS 2.0 (network authentication protocol that's more smooth and required for some SCA exemptions)

2. Consumer Preferences for Debit & LPMs

- A2A is more of a debit card alternative and Europe has a strong consumer preference for debit vs. credit cards
- Interchange regulation in Europe reduces bank incentives to steer consumers

3. Faster Payments Infrastructure

- Europe has many countries that are global leaders in payments infrastructure, with SEPA Instant Payments and Faster Payments in the UK, Sweden etc.

4. Regulatory focus to increase competition with the card schemes

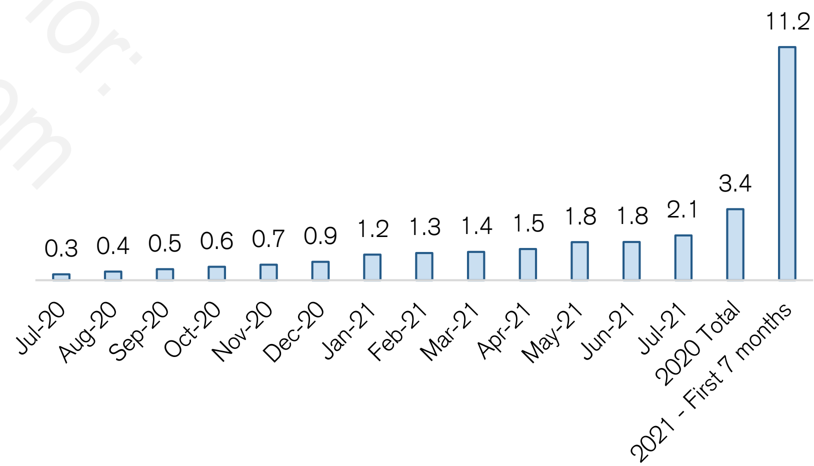
- The CMA continues to add regulatory requirements on Payments APIs to increase utility and functionality of A2A payments (e.g., variable recurring payments added in July 2021)

SCA in Europe could be a catalyst for adoption of A2A payments given potential for high friction on Card Payments achieving SCA

"Card issuers in the UK are required to implement strong customer authentication in March 2022 to reduce card fraud. ***Issuing banks' implementations of SCA across Europe so far have been variable – with some causing drop off of 20-30%.*** *Instant bank transfers powered by open banking were designed with strong authentication in mind – they get the payer on their mobile and use biometric authentication like face or touch ID to make the journey more seamless and keep conversion rates high.."*

– Ossama Soliman, Chief Product Officer, TrueLayer (Summer 2021)

Number of successful Open Banking Payment Initiation API calls in the UK (millions); July 2021 already +75% above January 2021

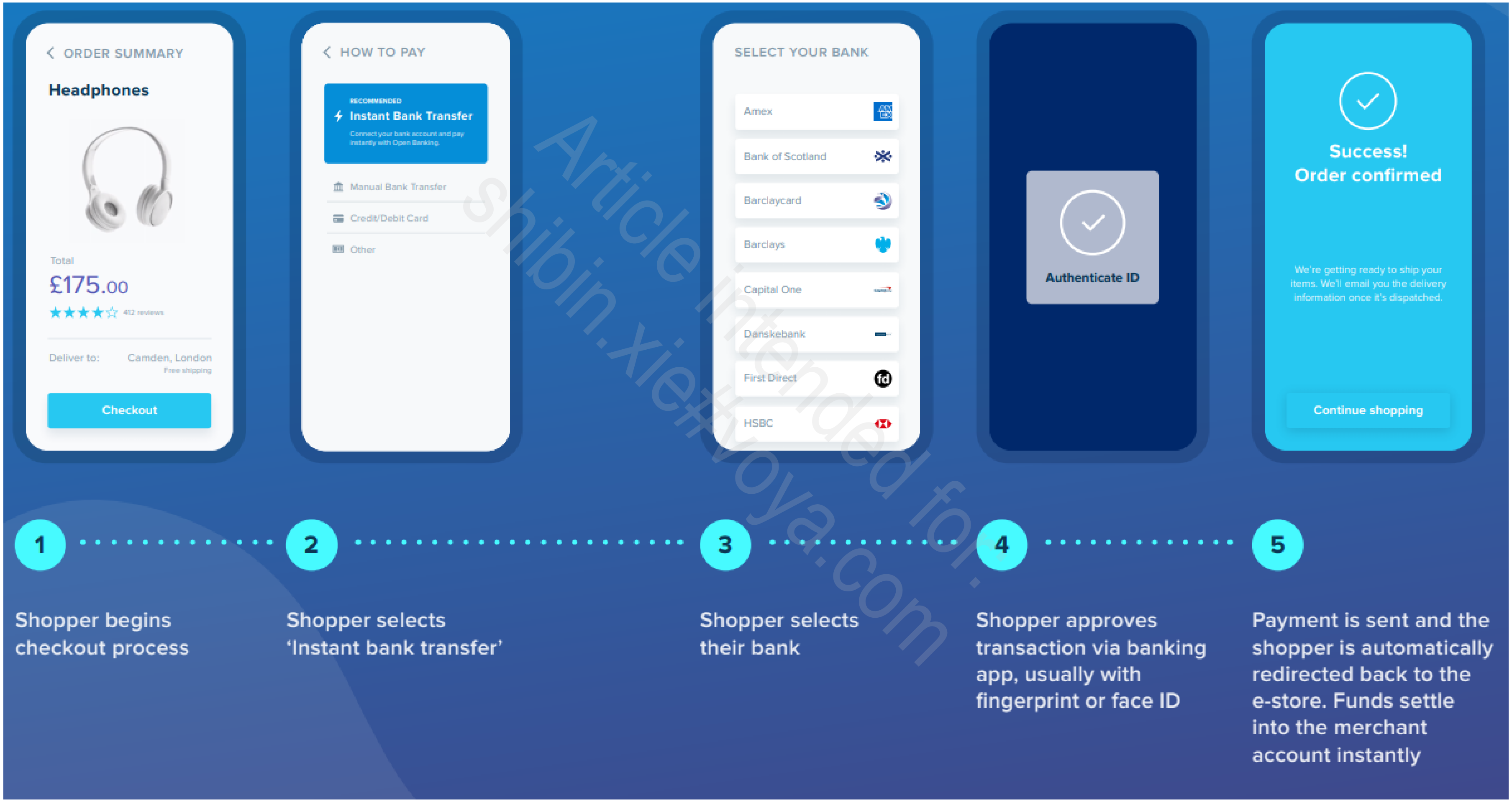


Source: TrueLayer Case Study "Change at the checkout", Open Banking UK, Credit Suisse research

[Return to Themes Table of Contents]

11. A2A payments gaining momentum with Open Banking

TrueLayer example A2A checkout flow can now be <10 seconds



Source: TrueLayer Case Study "Change at the checkout", Credit Suisse research

Return to Themes Table of Contents

12. BigTech in FinTech, highlighting Apple's FinTech efforts

BigTech focusing on payments to better monetize interactions within their ecosystems and reduce friction

BigTech	Actions taken in FinTech
Amazon (detailed in Theme 39)	▪ Suite of both consumer & merchant credit offerings, in partnership with both JP Morgan and Synchrony ▪ Amazon Pay for third-party merchants off-Amazon (i.e., PayPal competitor)
Apple (detailed further)	▪ Partnering with Goldman Sachs to launch a new service that will allow Apple Pay customers to pay for purchases in installments (July 2021) ▪ Launched Apple Card with Goldman Sachs (Aug 2019), which GS believes to be "the most successful credit card launch ever" ▪ Apple Pay (launched Sept 2014), at 15b annual transaction run-rate as of Q4 2019 at a 155% CAGR since Q1 2017, in nearly 70 markets ▪ Apple Cash and Apple Cash Card (launched Dec 2017)
Google	▪ Received a pan-European e-money license in Dec 2018, enabling Google to issue e-money (e.g., cards) and provide payment services (e.g., execute payment transactions, money transfers) ▪ Announced plans to offer checking accounts in partnership with Citi ▪ Hired Bill Ready to lead Google Commerce in Dec 2019 (ex-PYPL COO), an area of increased focus with visions for a universal shopping cart across Google's properties (search, shopping, YouTube, Gmail), ultimately to support/strengthen its core ad business ▪ Focused on scaling Google Pay in EM initially and then mature markets with strong progress in India, rising to #1 market share of UPI transactions within 2 years of launching with ~67mm MAUs in 2019 ▪ In Nov 2020, launched the redesigned US version of Google Pay app, through which Google Plex Accounts will be offered in 2021 from 11 bank and credit union partners for checking and savings accounts with no monthly fees, overdraft charges or minimum balance requirements ▪ Increased focused on connecting merchants, advertisers and users, in addition to helping SMBs
Facebook	▪ Launched Facebook Pay in Q4 2019 in the US, a mobile wallet powered by PayPal and Stripe for users to make purchases across Facebook's ecosystem (Messenger, Instagram, WhatsApp, and Facebook Marketplaces), P2P, and donations ▪ Potential to build a substantial eCommerce business with substantial reach and a highly engaged user base: >1.8b DAUs and140mm registered businesses on Facebook, >1b DAUs on Instagram and WhatsApp ▪ Launched Instagram shopping in March 2019, which we believe has big potential longer-term, noting 90% of users follow a business and the average user spends ~30 minutes per day on the app ▪ Diem (formerly Libra) cryptocurrency wallet expected to launch in 2021 but not essential for FB's other FinTech efforts to be successful, in our view; we see this as a longer-term call option, noting that FB could achieve similar transaction cost/speed benefits via on-platform transactions ▪ Beginning August 2021, US-based customers will be able to make purchases from Shopify-powered businesses using the Facebook Shop and Instagram

Source: Company reports, bizcommunity.com, qz.com, Credit Suisse research

Return to Themes Table of Contents

12. BigTech in FinTech, highlighting Apple's FinTech efforts

BigTech focusing on payments to better monetize interactions within their ecosystems and reduce friction

- Alibaba (Alipay) and Tencent (WeChat) are the pioneers of BigTech in FinTech that US BigTech is attempting to emulate, albeit in a drastically different regulatory environment with world-class established incumbents.
- Alipay and WeChat are expanding into Southeast Asia, where Grab and Go-Jek have dominant positions.

BigTech	Actions taken in FinTech
Alibaba	▪ The scaled Ant Group ecosystem includes MYBANK, asset management, insurance ▪ Flagship Alipay wallet with a nearly 55% share of China's mobile payments market ▪ Expanding acceptance into key international tourism locations (including US and Europe) ▪ Owns ~40% share in Paytm, $16b valuation and #3 market share of UPI payments in India (filed for IPO in 2021)
Samsung	▪ Samsung Pay ▪ Started worldwide deployment of Samsung POS in Q4 2019; the solution (in partnership with Mobeewave, which was later acquired by Apple) enables merchants to accept debit and credit payments by tapping contactless cards, Samsung Pay, Apple Pay, and Google Pay wallets onto Samsung NFC-enabled devices ▪ Piloted SoftPOS in Q4 2019, which powers contactless payments on Samsung phones with via an app download
Tencent	▪ WeChat FinTech ecosystem (Tenpay, WeBank, asset management, insurance) ▪ Leading lifestyle super app with ~1.2b MAUs ▪ WeChat's mobile payment wallet has a nearly 40% share of China's mobile payments market

Source: Company reports, iResearch, statista, Credit Suisse research

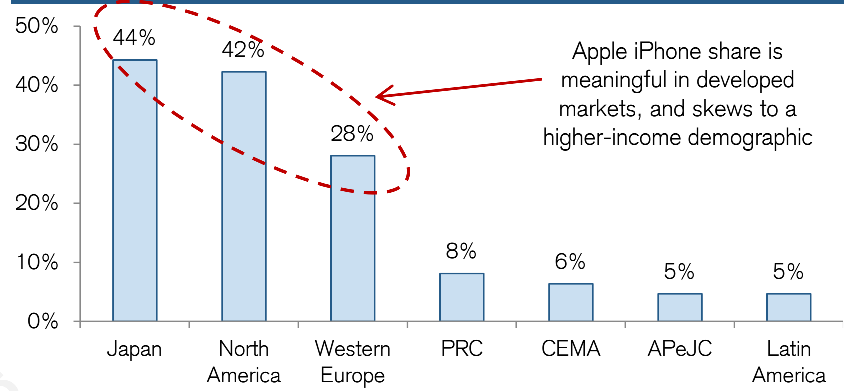
Return to Themes Table of Contents

12. BigTech in FinTech, highlighting Apple's FinTech efforts

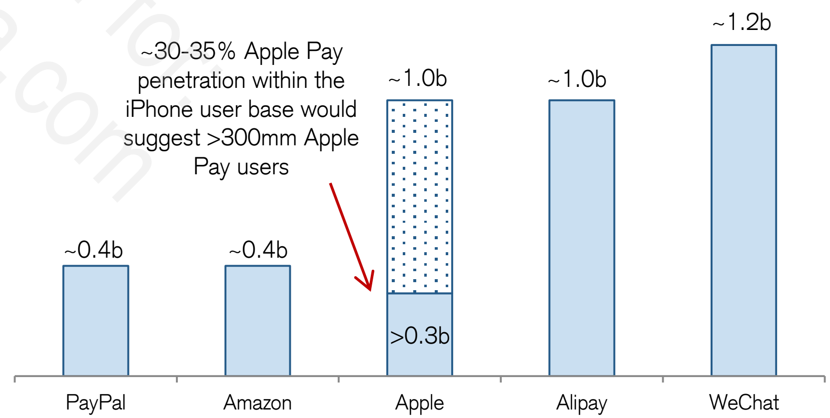
Began with Apple Pay, now expanding its financial services ecosystem

- From its first financial services product, Apple Pay (launched in September 2014), to the more recent Apple Card, the company has built the beginnings of a digital financial services ecosystem, leveraging partnerships with Green Dot and Goldman Sachs.
- The audience for these products is generally confined to iOS device users – although iPhone share is meaningful in developed markets and skews to the higher-income demographic – i.e., Apple's importance in payments outweighs its unit share.
- Payments & FinTech offerings are additive to the ecosystem (i.e., direct monetization is not the sole focus) and reduce friction and customer stickiness – acting as "the glue".
- Apple products in payments and financial services
  - Apple Pay (launched September 2014)
  - Apple Cash and Apple Cash Card (launched December 2017)
  - Apple Card (launched in the U.S. in August 2019)
    - Goldman Sachs had issued ~$10bn in credit to Apple Card users as of 9/30/19
  - Apple Pay Installments in partnership with GS (reported July 2021)

Apple's financial services are limited to the iOS audience, although iPhone share is meaningful in developed markets



Apple's iPhone install base is ~1b globally, which compares favorably to PayPal active users and Amazon customers



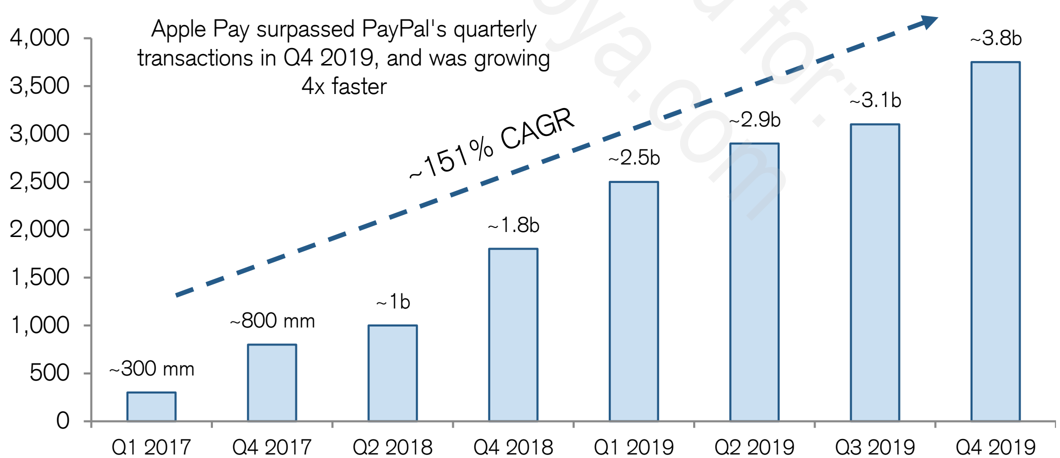
Source: Company reports, IDC, Credit Suisse research

Return to Themes Table of Contents

12. BigTech in FinTech, highlighting Apple's FinTech efforts
Apple Pay, Apple Cash, and Apple Cash Card overview

- Apple Pay acts as a "glove" that goes around card credentials.
- We believe Apple can earn ~15bps of the purchase price on credit and $0.005 per transaction on debit, paid by the issuers (depending on issuer arrangement). The value proposition to issuers is reduced fraud (tokenization, biometrics) and increased eCommerce volumes.
- No separate merchant fees and no contracts with Apple (standard card processing fees from the acquirer or PSP are paid by the merchant).
- Any offline merchant that has a modern payments terminal (NFC contactless enabled) can accept Apple Pay.
- For online merchants, Apple provides developer tools to add the Apple Pay button to websites and apps (Apple Pay will be shown to the customer only when an enabled Apple device is detected).
- Available in nearly 70 markets globally (as of early 2021); ~90% of stores in the US accept Apple Pay as of early 2021 (up from >70% in early 2019).

Apple Pay transactions more than doubled YoY in Q4 2019 with annual run rate >15b and was "doing exceptionally well" in 2020



Source: Company reports, Company website, Credit Suisse estimates, AAPL calendar year (not FY)

Return to Themes Table of Contents

12. BigTech in FinTech, highlighting Apple's FinTech efforts
Apple Pay, Apple Cash, and Apple Cash Card overview

- **Apple Cash** is an iMessage-enabled P2P payments service that works in conjunction with the **Apple Pay Cash Card**.
- Funds are received into a virtual Apple Pay Cash Card (powered by Green Dot), which is stored in the Apple Wallet.
- Funds can be spent via Apple Pay (using the Cash Card at any merchant that accepts both Apple Pay and Discover) or transferred to a bank.

Apple Cash and the Apple Pay Cash Card, a virtual prepaid debit card that allows P2P received funds to be spent in-store & online

Green Dot powered virtual prepaid debit card that sits within the Apple Wallet

Discover is the card network partner (i.e., Apple Pay Cash card is accepted anywhere Discover is accepted)

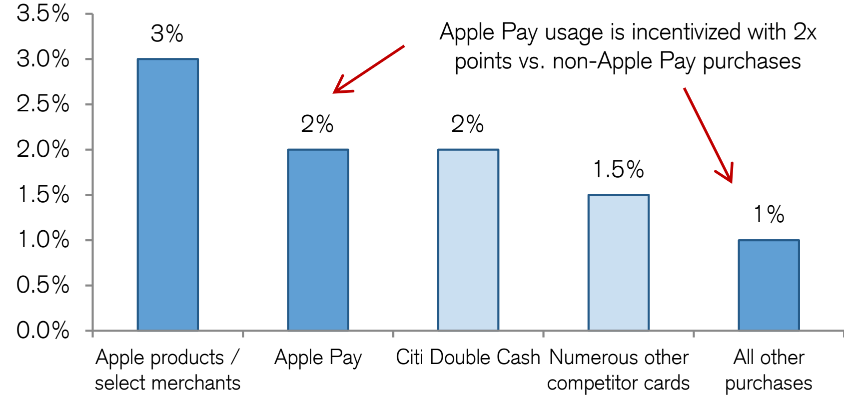
Source: Company reports, Company website, Credit Suisse estimates, AAPL calendar year (not FY)

12. BigTech in FinTech, highlighting Apple's FinTech efforts

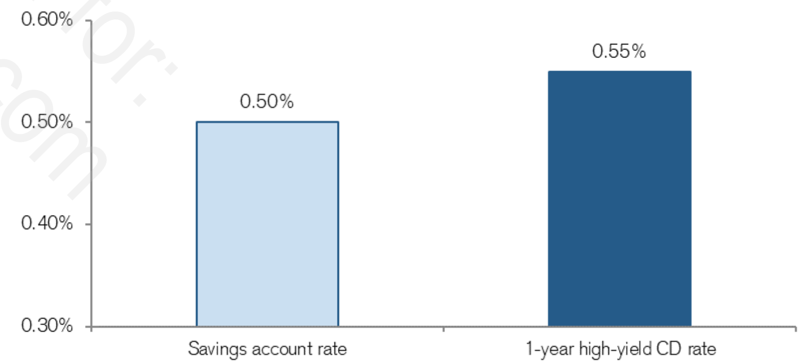
Apple Card, in conjunction with Goldman Sachs, and what's next?

- **Apple Card** is a physical and virtual credit card that we expect to appeal to Apple enthusiasts and help to increase engagement with Apple's other financial services (Apple Pay, Apple Cash).
  - Goldman Sachs is the card issuer, Mastercard is the network. Apple sharing in card economics (interchange and interest income).
  - Cardholders earn more when using Apple Pay, and rewards are delivered through Apple Cash same day ("Daily Cash"); 3% on Apple products, 2% when using Apple Pay, and 1% on all other purchases.
  - Spending tools within the Apple Wallet will be color-coded by category and contain various analytics (weekly and month summary data, interest expense estimates based on various payment amounts, etc. – though we note Apple maintains the highest data privacy standards, enabled by owning the hardware that runs the software / applications).
  - Apple launched an installments product (BNPL) for Apple Card holders, initially available for iPhone purchases in Sept 2019 (0% APR, 24-month), and will be extending BNPL to all Apple Pay via partnership with Goldman Sachs (reported in July 2021).
- What could be next for Apple in payments & FinTech? Expanding the product suite into a more full-service digital bank offering (competing with traditional & Neobanks).
  - Additional Goldman Sachs partnering (i.e. savings accounts, CDs, loans)
  - Physical Apple Cash debit card (monetize via debit interchange)
  - Wealth Management and/or Investing/Trading functionality
  - Enable iPhone to accept contactless card payments with no additional hardware (Samsung is already doing this), to be potentially enabled by the technology of Mobeewave which Apple acquired in August 2020

Apple Card rewards attractive when used within the Apple ecosystem, but less attractive on non-Apple Pay purchases



Goldman Sachs Marcus offers highly competitive interest rates for savings accounts and CDs (as of Jan 2021)



Source: Company reports, NerdWallet, Credit Suisse research *Apple is covered by CS analyst Matthew Cabral

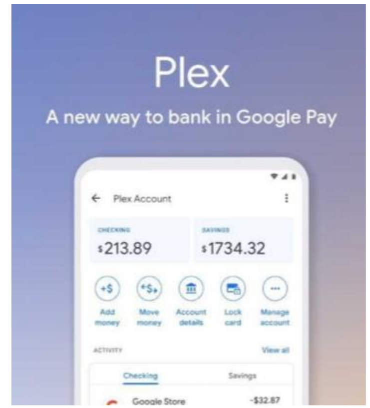
Return to Themes Table of Contents

12. BigTech in FinTech, highlighting Apple's FinTech efforts

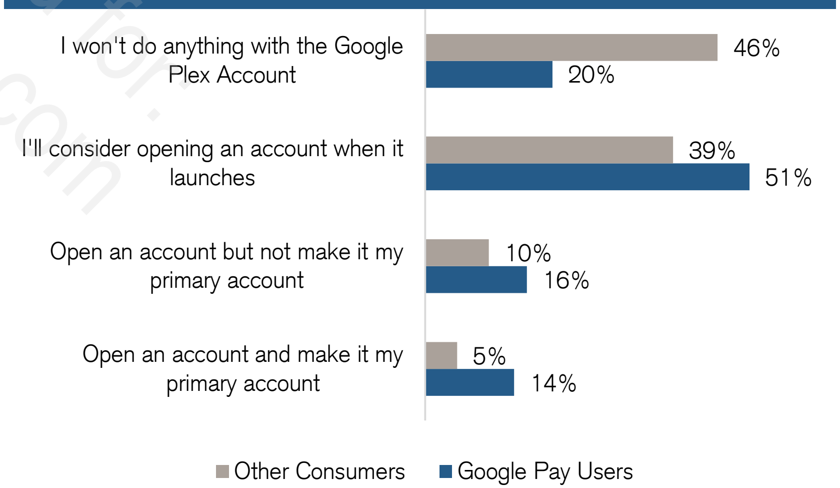
Google Plex Accounts

- Google has partnered with 11 financial institutions to offer checking accounts to Google Pay and these FI's customers through there yet-to-be released "Google Plex" product
- The 11 financial institutions include
  - 3 big banks (BBVA, BMO, Citi)
  - 4 community banks (Coastal Community, First Independence, Harbor, and Seattle)
  - 2 credit unions (SEFCU and Stanford FCU)
  - 2 digital banks (BankMobile and GreenDot)
- Google Plex checking accounts will be integrated within Google Pay and offer these financial institutions a tech forward digital banking platform to better compete with the rising amount of FinTechs grappling for market share
- Google has an advantage over the incumbent technology vendors like FIS and Fiserv due to their rich data sets and ability to attract new consumers through their brand name ultimately lowering these FI's customer acquisition costs
- Citi announced in November 2020 they would be rolling Citi Plex mobile banking accounts on the Google Pay platform sometime in 2021. Similar to digital bank offerings today, the savings and checking accounts will include:
  - No monthly account fees, no minimum balance requirements, and no overdraft
  - Instant digital Mastercard debit card and upon request, a physical, contactless debit card
  - Seamless P2P capabilities for one-time, recurring, and group payments

Google is partnering with FIs to rollout a more comprehensive digital banking platform within Google Pay



Adoption rates of Google Plex accounts remains to be seen with the release of the product expected in 2H 2021



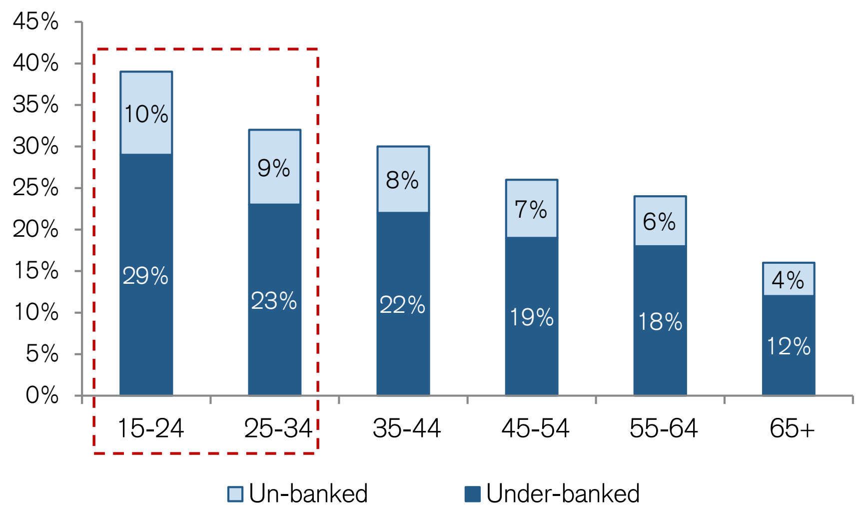
Source: Cornerstone Advisors, Google

13. Un-banked and Under-banked opportunity for US FinTechs

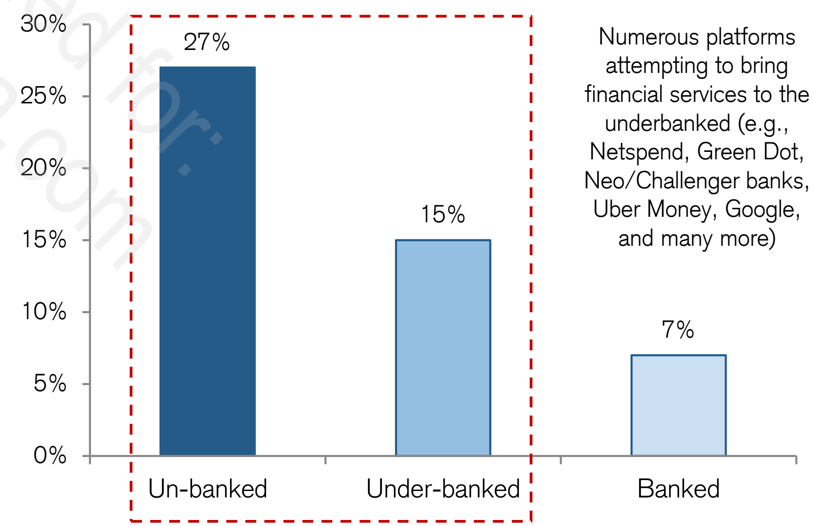
Providing access to modern/affordable financial services

- FinTech companies are targeting the ~60-80mm underserved US consumers.
  - 14mm un-banked adults in the US (no accounts) + 49mm under-banked adults in the US (have a checking or savings account, but also utilize services from alternative providers, e.g., money orders, check cashing, international remittances, payday loans, etc.), per FDIC
  - Square estimates 70-80mm underserved US consumers
- Value proposition to the consumer:
  - Low fees and low/no account minimums.
  - Digital-only bank hallmarks of smooth UI/UX & fast onboarding
  - Checking account functionality (e.g., prepaid debit card, ATM access, direct deposit)
  - "Hook" features (e.g., P2P via Venmo, Bitcoin trading & Boost rewards via Cash App, free FX conversion via Revolut, Investing via Robinhood, etc.)

There are ~63mm under-banked and un-banked in the US, demonstrating a high overlap with Millennials and Gen Z consumers



Prepaid card usage data by market segment suggest a heavy skew toward underserved consumers



Source: 2017 FDIC Survey of Unbanked and Underbanked Households, Credit Suisse research

Return to Themes Table of Contents

14. P2P as a customer acquisition and engagement tool

Why does P2P matter if it does not make any money?

- Strong network effects lower customer acquisition costs, a key advantage for FinTechs vs. traditional banks (i.e., users sign up new users, "*Download Venmo, so I can pay you back*.").
- Costs of P2P are offset by cross-selling other services to large P2P user base.
  - Transaction costs for getting funds on and off of the platform – debit and ACH fees (loss making at first)
  - Technology costs to build and maintain the platform
  - Cards attached to wallets to monetize via interchange (e.g., Venmo Card & Cash Card)
  - Instant transfer fees (consumer fees of ~1-1.5% for faster funds access)

P2P was the foundation for many of the largest FinTech companies

PayPal	WeChat Pay	venmo	Cash App
Market leader globally ex China	Market leader in China	Largest FinTech app in the US	2nd largest FinTech app in the US behind Venmo (owned by Square)
- Started in 1998 as a P2P company	- Started in 2014 via P2P (tradition of giving money in red envelopes)	- Started in 2009 as a P2P app	- Started in 2013 as a P2P app
~403mm active accounts (as of Q2 2021)	~1.25b Weixin & WeChat MAUs (as of Q2 2021)	~76mm users (as of Q2 2021)	~40mm MAUs (as of Q2 2021)

Source: Company reports, Credit Suisse research; Credit Suisse estimates

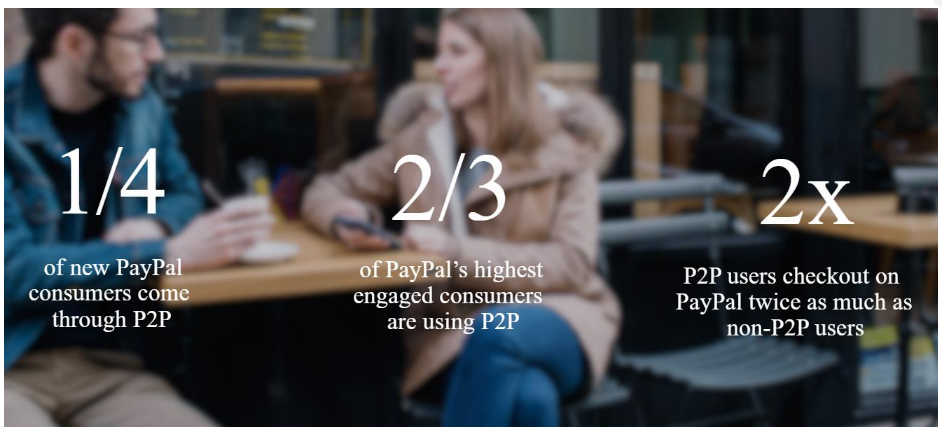
Return to Themes Table of Contents

14. P2P as a customer acquisition and engagement tool

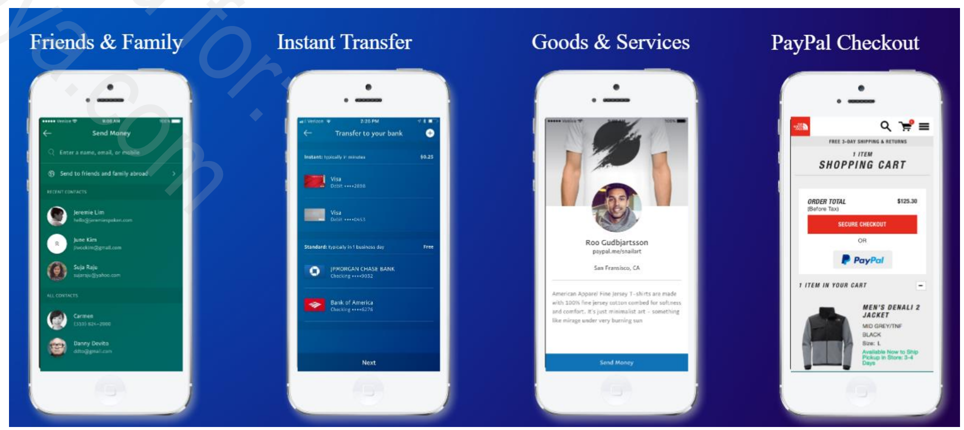
Direct and indirect benefits for the platforms providing P2P

- Strategic value for the FinTech platform is two-fold:
  - Direct monetization opportunity from banking services (e.g., prepaid card interchange, instant transfer fees, increased use of checkout button in PayPal's case).
  - Network effect benefits (e.g., driving activations, user growth, and engagement).
- PayPal receives ~25% of new users via P2P, with these users making up ~2/3rds of the highest engaged accounts on the platform.
- Square notes that Cash App's P2P business provides efficient customer acquisition through network effects and that the business is evaluated by management on the basis of its network, engagement, and monetization.

PayPal disclosed that P2P users checkout on PayPal (monetized transactions) twice as much as non-P2P users



PayPal P2P contributes to activations, user growth, and engagement with the platform (benefiting network effect)



Source: PayPal, Credit Suisse research

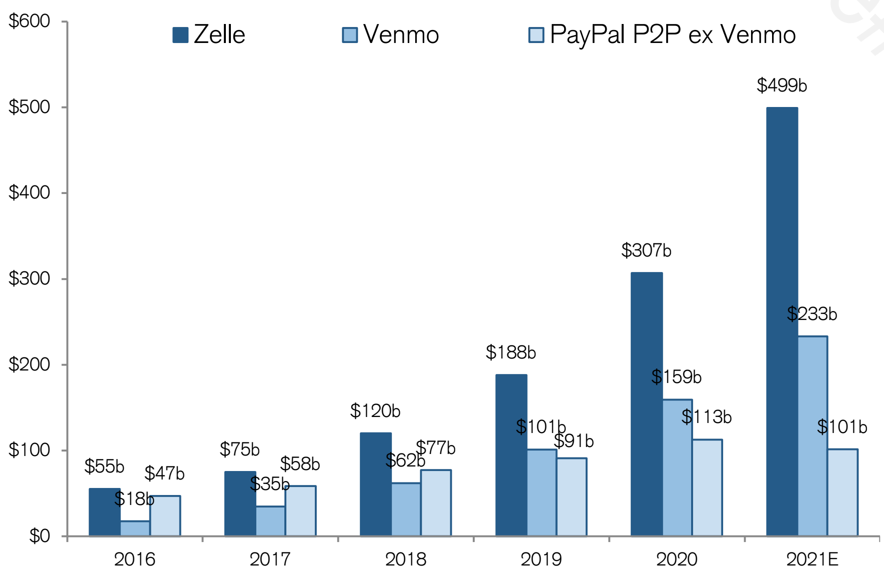
Return to Themes Table of Contents

14. P2P as a customer acquisition and engagement tool

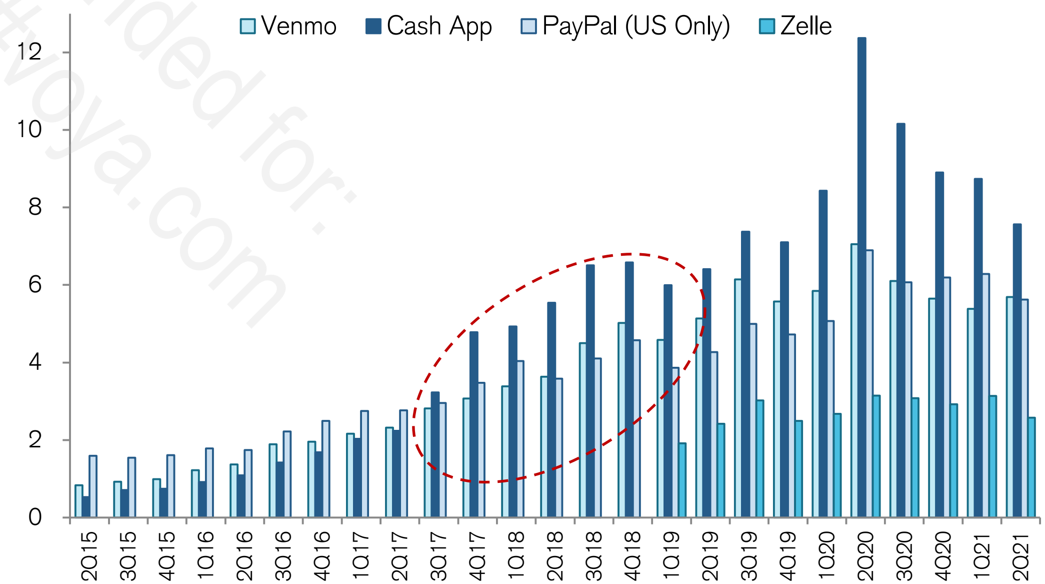
How we think about Zelle vs. FinTechs

- US banks are addressing P2P FinTech competition by introducing Zelle.
  - Checking accounts are a key part of a bank's relationship with customers (daily engagement).
  - Consumers are using P2P apps like a checking account (e.g., paying rent with Venmo or direct depositing paychecks into Cash App).
- In our view, assessing P2P volume trends is a good proxy for engagement & user base growth but has limited importance beyond that – it's a customer acquisition tool (the important thing is what the platform does with that engagement in terms of cross-selling and/or a consumer network for payments).

Zelle volumes are ~2x Venmo's, largely driven by different use cases (e.g., Venmo used more for everyday expense sharing)



US quarterly app download data show the rise of the use of Square's Cash App (surpassing core PayPal in Q3 2017)



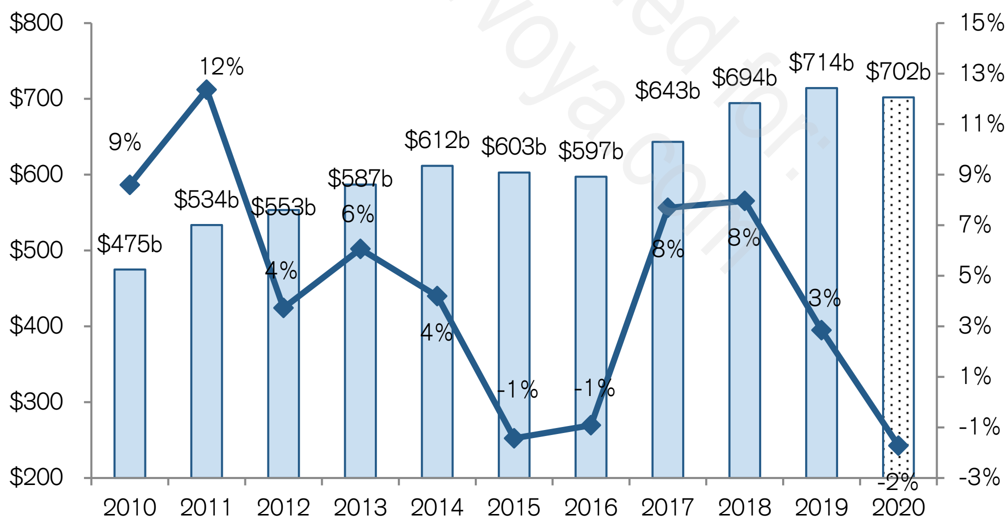
Source: Sensor Tower, Company Data

15. Global remittance market innovation

~$700b+ industry TAM, typically growing ~low- to mid-singles

- Historically a MSD+ growth market, mostly driven by migrant flows (many in industry estimate a true TAM >$700b [EDC estimates a $2tr TAM], which likely excludes informal channels, some tuition pay, SMB, etc.).
- Cross-border remittances are still dominated by traditional bank wires, despite higher and uncertain sending costs vs. money remittance providers and FinTech entrants.
- An opportunity exists for incumbents (already in progress at Western Union) to convert bank wires (65% of global volumes) into payments over their own remittance network via white-label partnerships with traditional banks.
  - Bank wires are a trusted form of money remittance but often come with uncertain timing and uncertain fees.
  - The correspondent banking system causes this uncertainty, involving a variety of local and international branches in each country before the money arrives.

Global remittance market TAM of ~$700b in volumes, expected to grow ~low- to mid-single digits (although differs meaningfully by corridor)



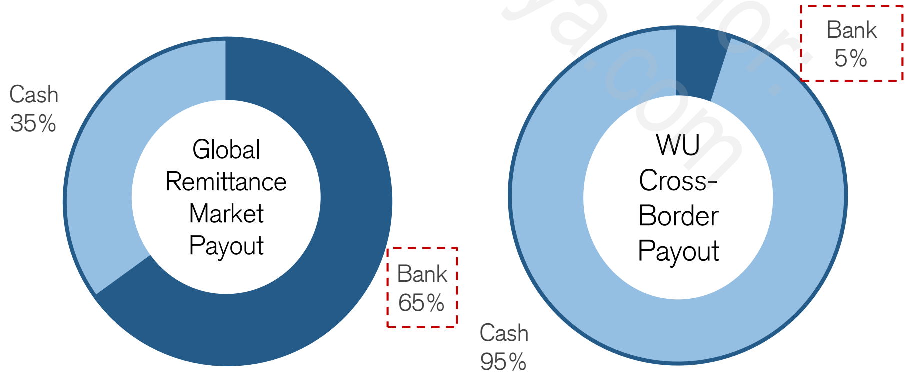
 Source: World Bank, Western Union, Credit Suisse research

15. Global remittance market innovation

FinTech entrants could play a role in expanding TAM

- FinTech entrants could play a role in expanding the TAM of the market, adding volumes from individuals who would not have otherwise transferred money cross-border (i.e. easy-to-use mobile phone apps, travelers, international business more willing to move money).
- A linked bank account is normally required to open an account with a FinTech remittance company; therefore, it is not feasible for a portion of wire senders (unbanked or underbanked).
- Visa Direct + Earthport has teamed with "every large remittance provider", enabling direct connection to the majority of bank accounts around the world, easing expansion for less-scaled players (though likely used in conjunction with, not in lieu of, local operations, due to non-account based payout requirements in certain geographies – i.e. cash pickup).

Global remittance market cash vs. bank split, compared to Western Union (inverse, with only ~5% bank-based for Western Union)



Source: World Bank, Western Union, Credit Suisse research

Return to Themes Table of Contents

15. Global remittance market innovation

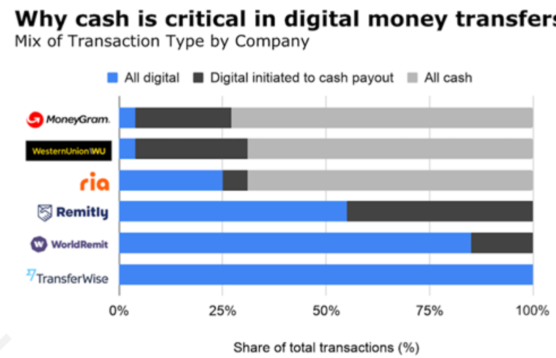
Cash = still king in remittances

- In a prior slide we cite that 65% of all remittance transactions are cash-based.
- As long as one side of the transaction is cash-based, we would consider that a cash transaction (i.e., Wise would not be able to handle that transaction, at the moment, and Remitly & WorldRemit would have limited ability to handle that transaction).
- Cash transactions (if any part is cash-based) cannot be facilitated by Visa Direct + Earthport or Mastercard Send + Transfast (as this provides access to accounts – so an account is required on both sides of the transaction).
  - While we believe the networks will help establish scale amongst digital remittance providers, ultimately they will still have to enable local treasury networks or partnerships to facilitate transfers for many of their users and markets (i.e., will miss the long tail, which is actually not really the tail, but comprises a good portion of remittance volumes).
- Over time, as more individuals become banked globally (especially in developing countries), we expect digital remittances to become more and more important.
- Digitally initiated transactions have been growing as a percent of transactions, which has been accelerated by COVID.

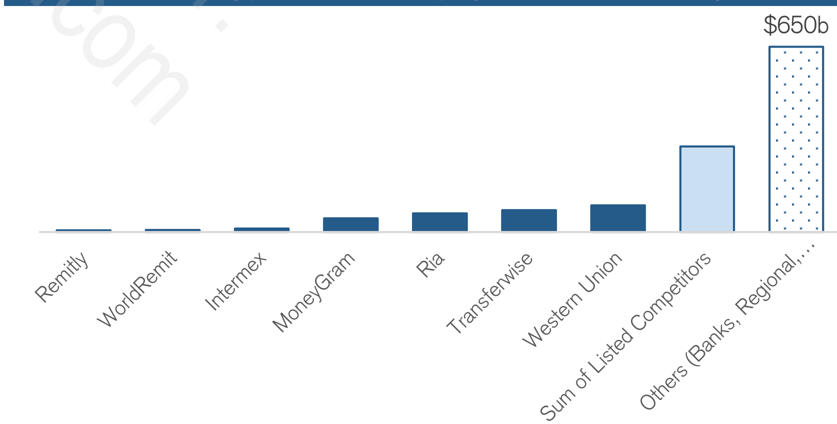
Cash still makes up one side of a good portion of transactions in remittances

Cash has been the enabler of digital growth

Digital growth has stolen all the recent headlines but even before the pandemic, counter-intuitively, cash has been the critical component enabling digital growth. We've published some new data on transactions mixes across the six leading players to show why.



Of the ~$900-$1,000b market (the informal global TAM) the majority of volumes are handled by the large players (MGI, Ria, WU) and banks and other regional remittance players – who are mostly cash



Source: World Bank, Western Union, Credit Suisse research, FXC Intelligence

Return to Themes Table of Contents

15. Global remittance market innovation

Wise reimagining remittances

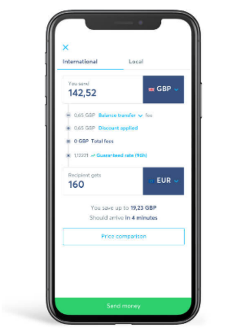
The borderless account is a cross-border Neobank offering for more affluent expats worldwide solving a massive pain point amongst consumers around difficulties getting banked when living abroad.

- As part of its hook, Wise offers remittances to 80+ countries at competitive rates (fees < 1% for some currency pairs).
- The borderless account by Wise adds on to its remittance services, eliminating the complexities of banking while living abroad.
- Wise partners with banks worldwide to be able to hold deposits and is regulated by the FCA (UK financial authority).

Features of the Borderless Account include

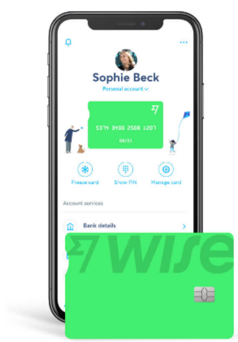
- Receive bank account details in UK, EU, USA, Canada, New Zealand, Australia, Singapore, Turkey, Romania, and Hungary which can be used to receive payments from any other account in and transfer out (enabling bill payment, salary receipt, etc.)
- Debit card which can be used anywhere in the world, transacting at the current FX rate, without fees
- Can move your money in between your bank accounts with various currencies for a small fee
- No international ATM withdraw fees

Cross-border payments and banking has often been regarded as one of the more complex and difficult pain-points to solve within remittances, and Wise has made significant headway into this market



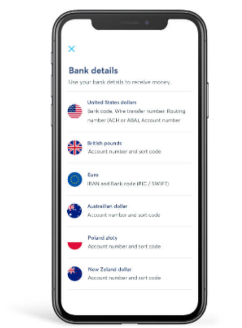
Send money cheaper and easier than old-school banks.

Send money at the real exchange rate with no hidden fees.



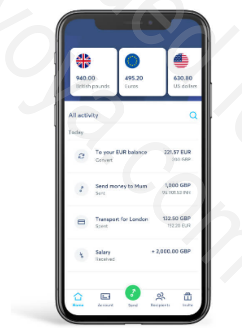
Spend abroad without the hidden fees.

Use a card in 200 countries, spend with Apple and Google Pay, and withdraw anywhere. Get yours for 9 USD.



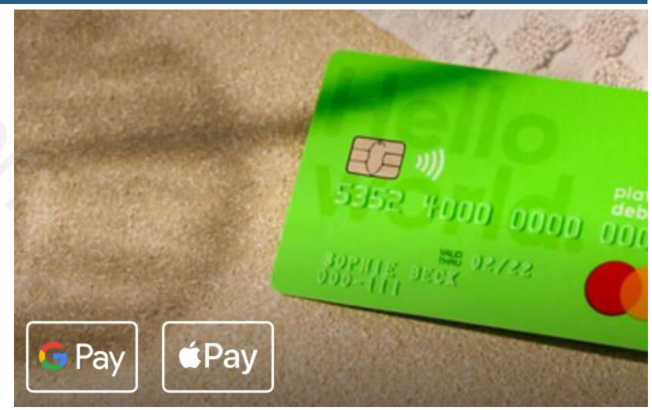
Receive payments like a local in 10 currencies.

Get your own UK account number, Euro IBAN, US routing number, and more.



Convert and hold 54 currencies.

Holding multiple currencies is completely free, and we use the real exchange rate to convert.



Source: Wise, Credit Suisse research

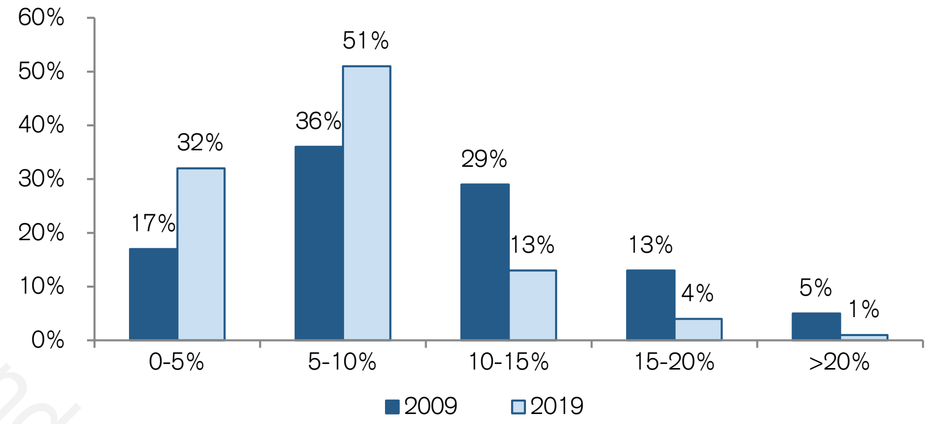
Return to Themes Table of Contents

15. Global remittance market innovation

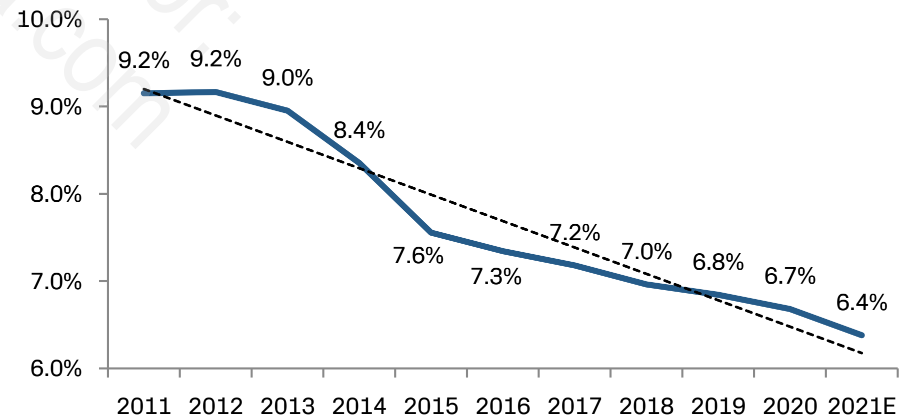
Large market with pockets of pricing pressure

- Global money transfer prices still high at ~7% on average (which includes bank wires) despite innovation given high barriers to entry and high-cost structures of incumbent players:
  - Barriers to entry – money transmitter licenses in each country
  - High costs to manage agent networks, receiving fees when money is sent and received
  - Increased regulatory requirements such as know-your-customer (KYC) and anti-money laundering (AML)
  - A local presence, including bank accounts and capital held in that country's foreign currency (FX markets are a last resort to complete a transfer)
- Costs vary widely between specific corridors, generally inversely correlated with volumes.
- Costs are gradually coming down from increased competition taking a digital approach such as Wise, Remitly, WorldRemit, and others.

Pricing varies widely by corridor – now 83% of corridors cost <10%, up 30% from 2009



Sustained broader industry level pricing pressure (global average cost for sending $200 shown below), although impacted by bank channel and other mix-related dynamics



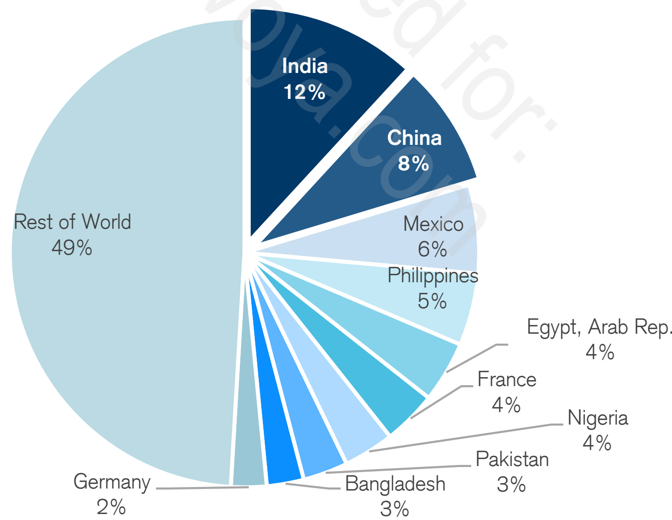
Source: World Bank, Credit Suisse research

Return to Themes Table of Contents

15. Global remittance market innovation
US dominates the world remittance landscape

- Generally speaking, flows are most frequently moved from developed countries to developing countries (typically job-seeking activity).
- Inbound remittance market:
  - India and China are leading receive markets but are driven by a more fragmented distribution of immigrants around the world.
  - No one corridor is overly material to migrant flows, with all <25% of the country's inflows.
  - Flows to Mexico, the 3rd biggest country in the world by inflows, are highly concentrated, with 90%+ volumes of coming from the US.

2020 Global inbound remittances (% of total volume), with India and China the two largest inbound markets, followed by Mexico



Source: World Bank, Credit Suisse research, US Census Bureau

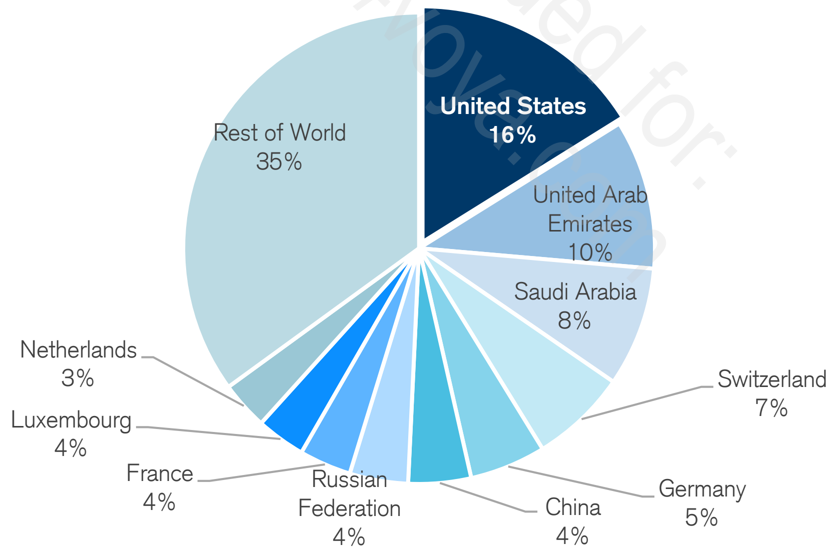
Return to Themes Table of Contents

15. Global remittance market innovation

US dominates the world remittance landscape

- Outbound remittance market:
  - The largest outbound remittance market is the United States, by a margin of ~1.5x the number two market (UAE).
  - The US Census Bureau estimated in 2017 that ~14% of the American population was foreign born (~44mm people, 3x more immigrants than the next closest country).
  - 6 of the top 10 money remittance corridors originate in the United States, with US into Mexico representing the single largest remittance market in the world (~5% of the entire industry).

2020 Global outbound remittances (% of total volume), with the US and the UAE the two largest outbound markets, followed by Saudi Arabia



Source: World Bank, Credit Suisse research, US Census Bureau

Return to Themes Table of Contents

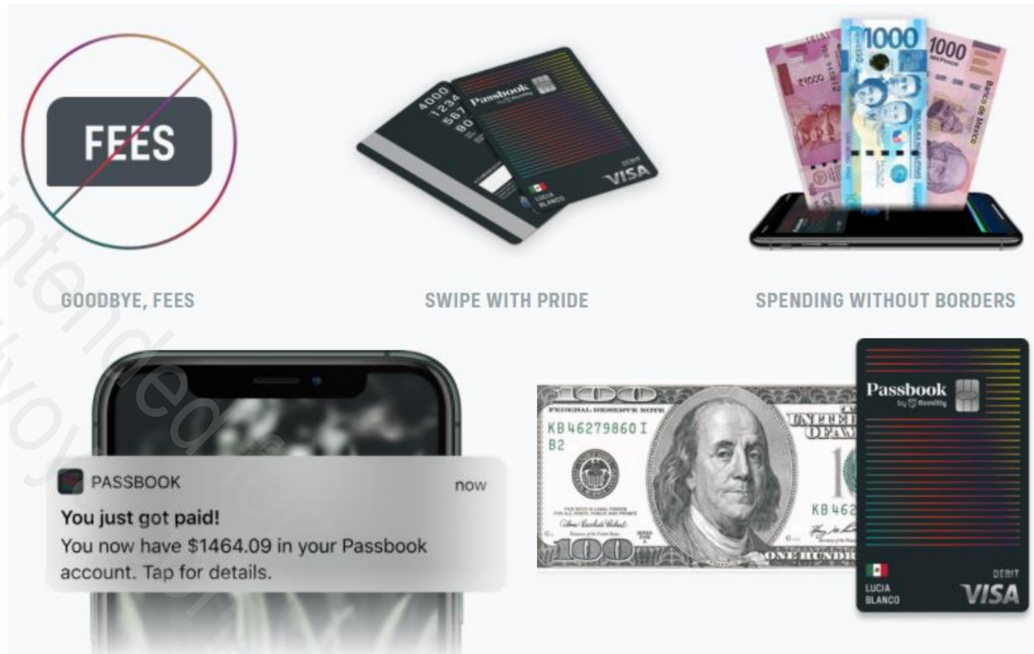
15. Global remittance market innovation

Remitly provides Neobank for those “impossible” to bank

Remitly launched Passbook in 2020 to enable immigrants living in the United States to access banking services:

- Passbook was designed for multi-nationals with the understanding that not all immigrants have a Social Security Number (generally required to open a bank account in the US), instead allowing for accounts to be opened with a passport, ITIN, immigration ID, US visa, Mexican Matricula Consular ID, or other form of government-issued ID and physical US address.
- Passbook is designed to suit the needs of migrants and traditional unbanked individuals, with a variety of features:
  - Early access to direct deposits (up to 2 days early)
  - Cash deposits at 90k+ retail stores
  - Earn cash back on Remitly transfers made with the Passbook Visa debit card
  - International spending without foreign transaction fees
  - No overdraft, minimum balance, transfer, or ATM withdrawal fees, and no service charges
  - Provides a bank account number and routing number for receiving funds
- Passbook is an attempt by Remitly to address a previously mostly un-bankable population (undocumented immigrants) estimated at ~10.5mm of ~18-20mm unbanked individuals.
- Remitly has most recently cited ~4mm total users, but given the recency of the rollout we believe Passbook comprises a small percentage of these users.

Passbook by Remitly provides a banking solution for immigrants that have been unaddressed by the traditional banking system



 Source: Passbook by Remitly, Credit Suisse research, Pew Research Center, FDIC

Return to Themes Table of Contents

15. Global remittance market innovation
Start-ups see elevated remittance prices as an opportunity

Metric	Wise	Remitly	Zepz (formerly WorldRemit)
Recent valuation	~£10b (publicly traded in the UK, LSE)	~$1.5b (July 2020)	~$5b (August 2021)
Geographic reach	Hold in 54 currencies Send to 80 countries	17 send and 100+ receive countries	50 send and 130 receive countries
Approach	• Started off as P2P focused on GBP to EUR, now can transact in 54 currencies across 2.5k routes • Now white-labeling banking "network" for others to build on • Expanding into B2B with business accounts (borderless accounts) • Revenue ~40% at £421mm, 5th year in a row of posting a profit	• Launched in 2011 • Initially had send capabilities from the US and Canada to 10 high-traffic countries (e.g., Mexico, India, the Philippines and Guatemala) • Expansion to ~600 send-to-receive corridors (as of December 2018)	• Launched in London in 2010, focused on consumer cross-border payments • Expanded into B2B payments with business accounts for SMBs • 70+ currencies, 150 countries • Acquired Sendwave, and rebranded platform to Zepz in 2021
User base	~10mm	5mm+	11mm+
Other notes	• $7b monthly transfers (or $84b annualized vs. Western Union at ~$95b in C2C volumes in 2020) • In the summer of 2018, was ~3m users transferring £2b monthly (both more than tripled) • Multi-currency debit card w/ $250/month free ATM withdrawal • Business accounts: international invoices, payouts, APIs (Xero)	• Visa Direct partnership to send funds internationally from US Visa cards • Perfect Delivery Promise: guarantee of exact date and time of delivery • Funding via bank account or card, and recipient can receive directly in a bank account or do cash pickup • Added delivery options (e.g., M-Pesa, home delivery)	• $10b in transfers in 2020 • Bank transfers, cash pickups, mobile money accounts, WorldRemit Wallet, and airtime top ups • Business accounts • 90%+ transactions are authorized within minutes, and 70% of mobile-to-mobile transfers take less than 3 minutes

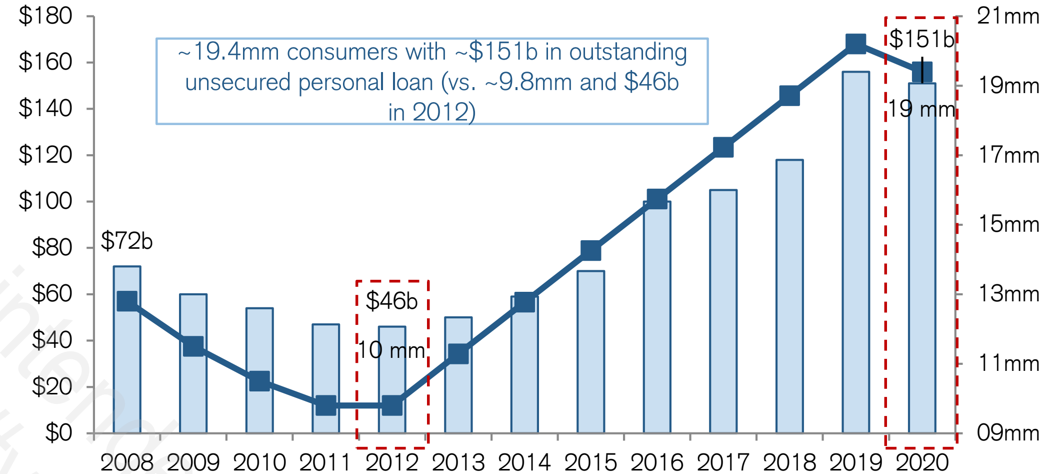
Source: Company reports, World Bank, Crunchbase, PYMNTS.com Credit Suisse research

16. FinTech Driven Credit

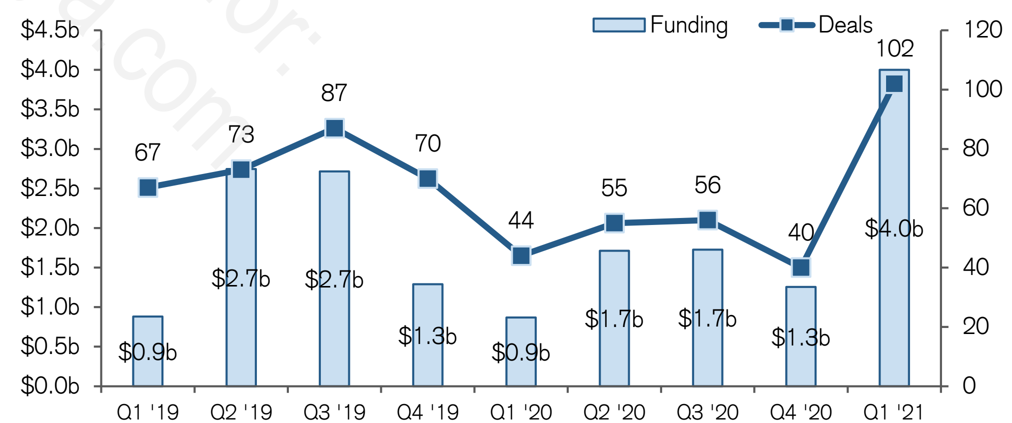
Expanding the addressable market of consumer credit

- The current market size for the personal loan industry is ~$150b, and it is considered to be the fastest growing sub-segment of consumer credit, with FinTech lenders driving personal loan growth since 2012.
- TAM expansion via FinTech platforms that often leverage traditional data points (e.g., FICO scores) in conjunction with potentially thousands of other alternative data sources (e.g., employment, education, income potential, spending habits, etc.).
  - Reduced costs vs. traditional banks (lack of brick-and-mortar branches, modern tech platforms reducing back-office expense).
- Personal lending platforms generally prefer customers who would like to consolidate debt, although offerings span a wide range of loan products (e.g., student loan refinancing, private student loans, personal loans, purchase-specific financing).
  - We believe a subset of FinTechs are considering moves further upscale, given varied degrees of success with riskier borrowers (which comes with larger loan sizes).
- FinTech led sub-segments of the personal loan market are:
  - **Marketplace lending** – Generally unsecured installment loans done through an online P2P lending platform (e.g., Lending Club, Prosper, Avant, and Marlette).
  - **Dedicated POS financing** – Financing options that are offered when consumers are checking out, either online or in-store (e.g., AfterPay, GreenSky, PayPal Credit, Klarna, Square Installments, Vyze, etc.). Varying degrees of maintaining risk and/or selling off to investors (there are FinTech personal lending platforms that keep lending on balance sheet, e.g., Marcus).

The US market for unsecured personal loans stands at ~19.4mm consumers, with ~$151b in outstanding loan balance (vs. ~9.8mm and $46b in 2012)



Global VC-backed lending received more than $5.7b in funding in the last 12 months (through Q1 2021)



Source: Company reports, CB Insights, LendingClub, TransUnion consumer credit database, Credit Suisse research

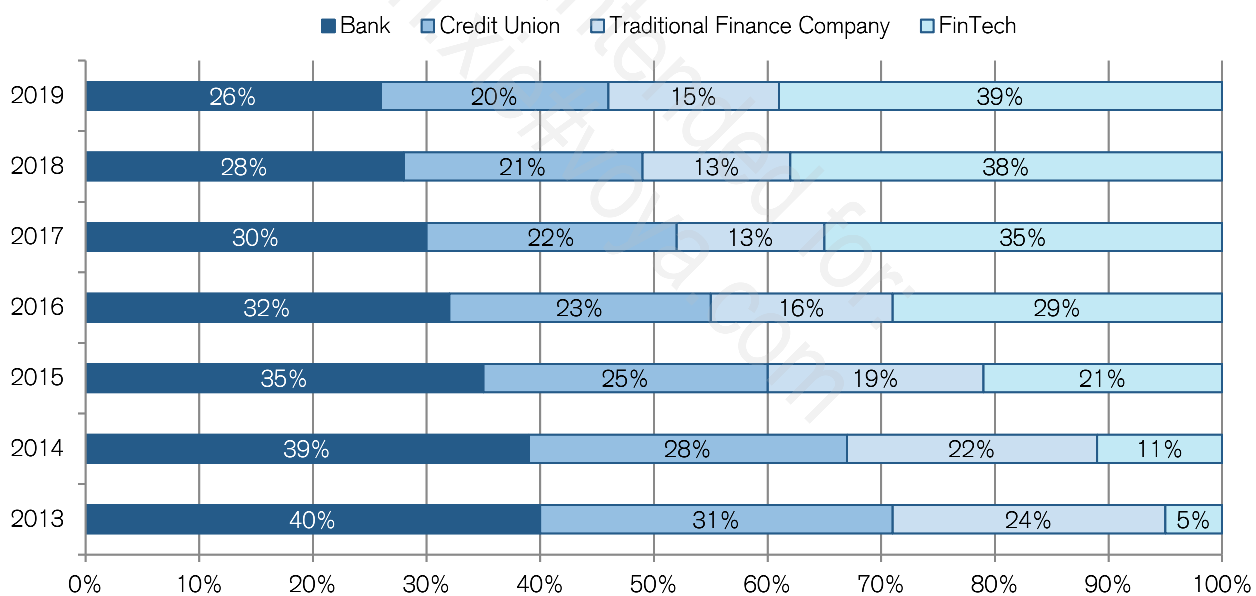
Return to Themes Table of Contents

16. FinTech Driven Credit

FinTech loans gains share within the personal loan market

- FinTech platform loans made up 39% of personal loans in 2019, having first gained a market share leadership position in 2018 (relative to banks, credit unions, and traditional finance companies – when combined, banks and credit unions make up ~46% of all personal loans).
- In 2013, FinTechs accounted for just 5% of such balances (and combined bank and credit union share has decreased from 71% to 46% during the same time period).

FinTech share of the personal loan market has grown from ~5% in 2013 to ~39% in 2019



Source: Company reports, TransUnion consumer credit database (TransUnion does not break out POS personal loans separately, per The Financial Brand), Credit Suisse research

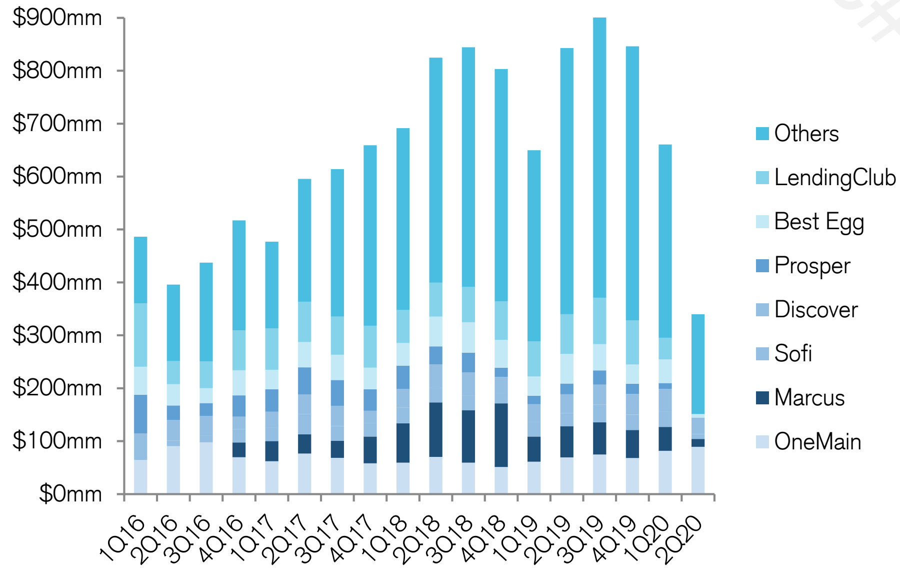
Return to Themes Table of Contents

16. FinTech Driven Credit

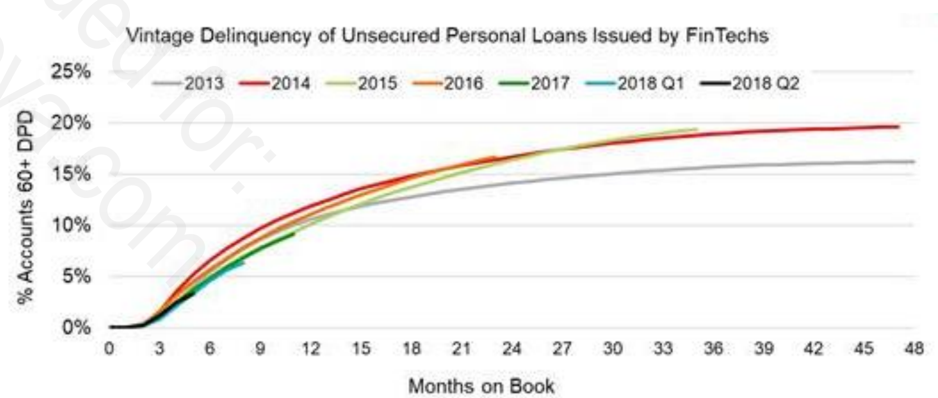
Marketplace (peer-to-peer) lenders

- Examples of large marketplace (P2P) lenders are Lending Club (LC), Prosper, Avant, and Marlette (Best Egg).
- Marketplace lenders generally offer unsecured installment loans done through an online investment platform (i.e., P2P lending platform).
- Serve as an intermediary in matching borrowers (attracted by speed and convenience) and investors (prospects for higher returns), although a "true" marketplace model is no longer viable (hybrid model has emerged, some funding is necessary).
- Key question is whether risk separation of credit grades will be maintained; the test will be in a weaker economy.
- Additional notes: (1) Risks tend to increase significantly as growth scales up; and (2) These borrowers are not just consolidating other debts (although debt consolidation and/or credit card debt repayment are key uses cases).

Top personal lending brands by mail volume (i.e., the number of mail offers personal lenders mail out to solicit personal loan applications)



FinTech vintages are showing steady improvement when viewed by the percentage of accounts that are 60 days+ past due



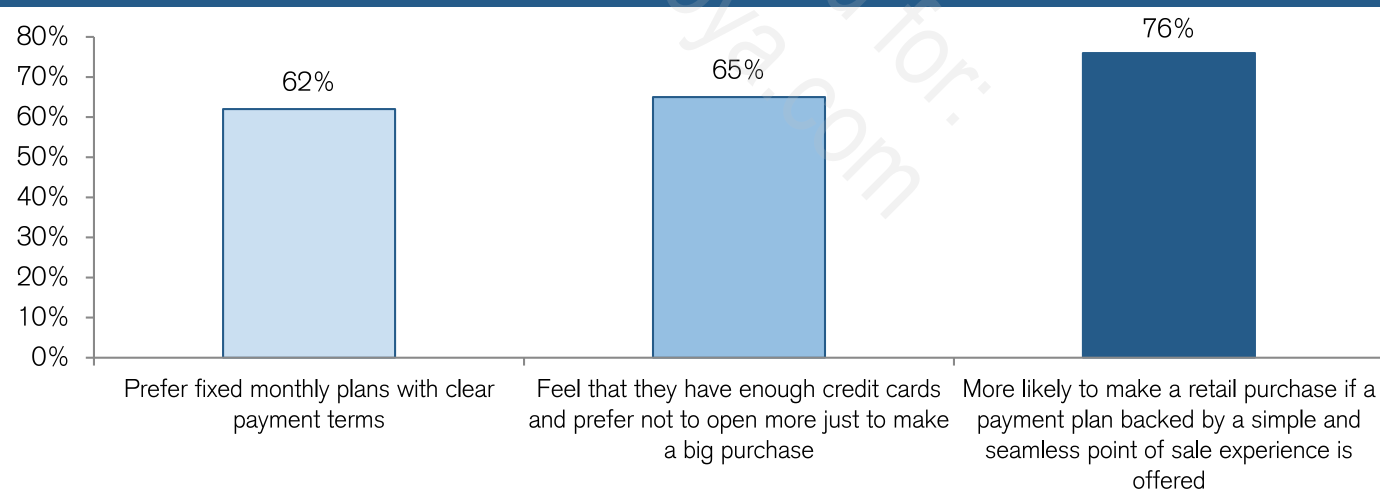
Source: Company reports, Mintel Comperemedia, TransUnion, Credit Suisse research

16. FinTech Driven Credit

Dedicated POS financing (purchase-specific credit offerings)

- Examples of large, FinTech-dedicated POS financing platforms are AfterPay, PayPal Credit, GreenSky, and Klarna, along with Synchrony Financial, ECN Service Finance, and private-label issuers (Wells Fargo, Citi, etc.) and, increasingly, traditional banks (e.g., Chase offering "My Chase Plan", Synchrony offering "SetPay").
- FinTechs offer financing at the POS (online & in-store), with merchants benefiting from conversion rates and higher average basket size.
  - Accounts for only ~20% of approved loans (suggesting a different purpose than personal lending and, thus, less competitive), partially due to many of the providers being newer products/concepts.
  - POS lending accounted for ~8% of total unsecured lending balances in 2018, up from ~5% in 2015.
- Considerations: (1) What will happen to the industry if more credit card issuers allow borrowers to turn credit card balance into monthly installment loans with comparable terms (already beginning with Chase, Citi)?; (2) What happens if banks more prominently offer dedicated POS financing by themselves without relying on third-party platforms? (announcements in 2019 from both Visa [installment APIs] and Mastercard [Vyze] to enable banks at the POS).

Survey suggests that having clear and easy access to financing at the POS meaningfully increases conversion (n=520, June 2018)



 Source: Company reports, PYMNTS.com, McKinsey, Transunion, Experian Citizens Financial Group, Inc., Credit Suisse research

Return to Themes Table of Contents

16. FinTech Driven Credit

Selection of dedicated financing platforms innovating at the POS

POS financing platform	Valuation	Comment
AfterPay (AfterPay Touch Group)	~$30b (publicly traded in Australia, APT)	• SQ recently announced (8/1/2021) its intention to acquire AfterPay; expected to close in Q1 2022 • Checkout button credit (installments), Afterpay and Touchcorp merged June 2017 • Merchant funded at ~4-6% plus $0.30 (free to consumers) • ~$20bn (A$) volume run rate (as of December 2020) • ~75k+ merchants (as of F1H 2021)
GreenSky	~$1.0b (publicly traded in the US, GSKY)	• Emphasis on home improvement & elective healthcare • Partners with banks (Regions, Fifth Third, Synovous) • ~$6b+ volume run rate (as of Q2 2021) • ~16k merchants (Feldco, Danley's, Morgan Exteriors)
Klarna (Visa strategic investor)	~$46b ($640mm financing, June 2021)	• Range of repayment options (e.g., after delivery, over time, 30 days, 36 months, etc.), with shorter payment terms (e.g., 14-30 days) interest free • 250k+ merchants in 17 countries and 90m+ consumers • ~2m transactions per day
PayPal Credit / PayPal BNPL	Part of PayPal (PYPL)	• PYPL recently announced (9/7/2021) its intention to acquire Paidy; expected to close in Q4 2021 • Consumer offering in the US done via Synchrony Financial (SYF), but kept on balance sheet ex-US • ~$3.9b in consumer receivables (largely international) as of Q2 2021 • ~1% of PayPal total payments volumes is funded via PayPal Credit • BNPL available in US, Germany, UK, France and Australia
Square Installments (Square Capital)	Part of Square (SQ)	• Launched October 2018 • Range of $250–10,000, fixed monthly payments (3, 6, or 12 months) at a 9.99% APR (8.99% for auto repay) • Consumer funded, although merchant pays an installment-specific MDR on sale (e.g., 3.5% for in-store)
Vyze (Mastercard acquired)	Part of Mastercard (MA)	• A platform for lenders at the POS (allows merchants to offer credit from multiple lenders) • No credit risk to Mastercard (platform only) • Partnered with Ally as installment loan lender on the Vyze platform

Source: Company reports, Digiday, Credit Suisse research

Return to Themes Table of Contents

16. FinTech Driven Credit
Selection of Personal lending FinTech platforms

Marketplace lenders	Comment
SoFi	• ~$12b+ market cap • ~$10b loan volume in 2020 across 2mm+ members • Offerings in student loan refi, private student loans, personal loans, home loans, SoFi Invest, and SoFi Money • Expanding into Neobank offerings and cryptocurrency trading (partnering with Coinbase) • Anthony Noto became CEO in early 2018 (former COO of Twitter, CFO of NFL, Goldman Sachs analyst & banker) • Received preliminary approval for US bank charter in October 2020 (announced acquisition of Golden Pacific Bancorp to accelerate bank license in March 2021) • Acquired digital payments platform Galileo for $1.2b in April 2020
Lending Club	• 3mm+ consumer borrowers and 200k+ self-directed individual investors, along with banks, institutions, and managed accounts serving as investors (banks are largest source of funds) • ~8% - 36% APR on loans up to $40k (average loan ~$15k). Charges 3-6% origination fee. • Publicly traded in the US (LC)
Avant	• $6.5b+ borrowed across 1.5m+ consumers; • Loan amounts of $2k to $35k, with APR range of ~10-36%, terms of 24-60 months • Also charges an administrative fee of up to 4.75%; Primarily a lower FICO score lender (and lending-as-a-service)
Prosper	• $19b+ borrowed across 1.1mm+ consumers; fixed-rate, fixed-term loans of $2k to $40k, with terms of ~3-5 years
Marlette (Best Egg)	• $11b+ borrowed across 630k+ consumers; loan amounts of $2k to $50k, with APR range of ~6% to 30%
Upstart	• $10.8b+ originated; loans from $1k to $50k; 3- and 5-year terms, with APR range of ~7-36%
Upgrade	• $5b+ credit extended across 500k consumers; loans from $5k to $50k; 36- to 60-month payback periods
Other personal lending FinTechs	**Comment**
Earnest	• Range of student loan refi, private student loans, and personal loans (up to $100k) • Acquired in July 2018 by Navient Corp., for $155mm
Marcus (Goldman Sachs)	• Loans up to $40k, with APR starting at 6.99% (range ~7-20%), terms of 36-72 months • Combines with online savings accounts (Marcus-branded) and Apple Card (credit card) to form basis of a nascent consumer business
Elevate	• Online credit products for non-prime consumers; $8b+ in volume, 2.5mm customers

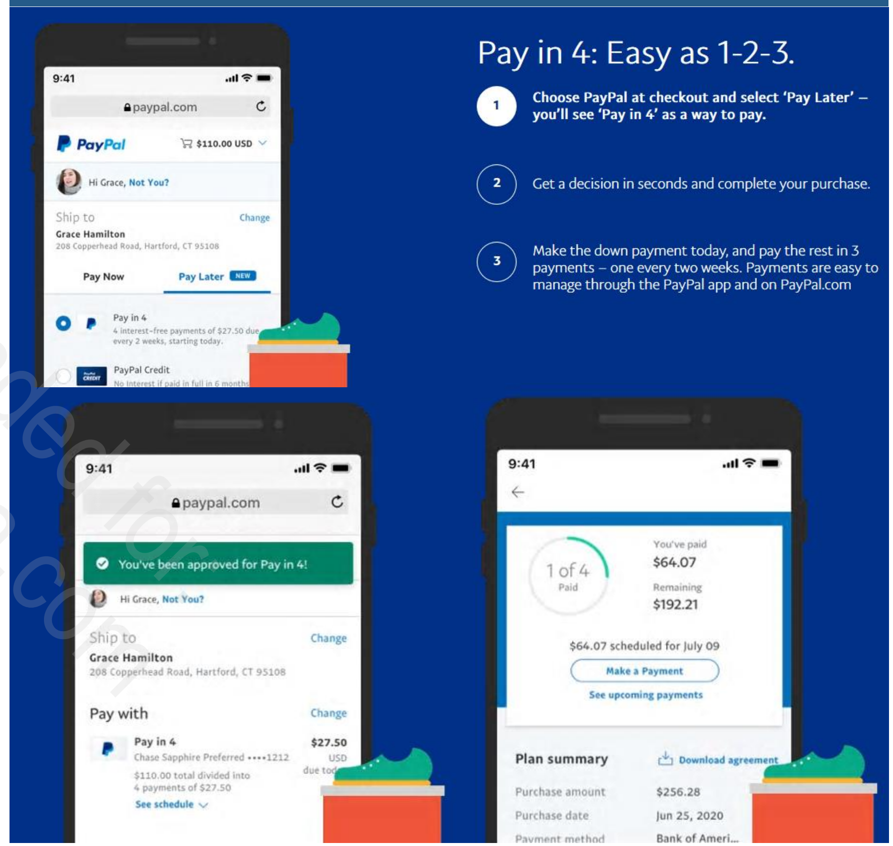
Source: Company reports, Credit Suisse research

17. Buy-Now-Pay-Later offerings

How does BNPL work?

- Four primary methods of BNPL solutions:
  1. Consumer facing (B2B2C) technology – where provider coordinates with the merchant to provide the BNPL service, which consumers are able to access when shopping as a payment method (e.g., Affirm, Klarna, Afterpay, Quadpay, Sezzle, others).
  2. POS Integrated installment via Networks – V/MA enabling installments at POS, with loans provided to the prospective customer real time by preselected partner lenders in a predetermined hierarchy (i.e., MA – Vzye, Visa has partnered with ChargeAfter).
  3. Traditional bank & non-bank Issuers – Traditional issuers (e.g., Bank of America, Chase, COF, Amex etc.) provide an installment pay option that can be elected during or after the purchase. Private label issuers also can provide financing.
  4. Merchant white-label – Allows the merchant to customize and offer their own BNPL solution, while the white label provider lends capital and holds risk on its balance sheet or is solely a facilitator of the transaction while partnering with bank funding option (e.g., Limepay, Bread Payments [ADS]).
- Can take the form of a balance sheet light approach (selling whole loans to forward flow partners or securitizations), typically funded with a partner bank or a marketplace approach.
- Product can vary in length and structure depending on the underlying provider.

PayPal has introduced Pay in 4 for all merchants with the PayPal button (and for some with an explicit "Pay in 4" button)



Source: The Nilson Report, PayPal, Company reports, Credit Suisse research

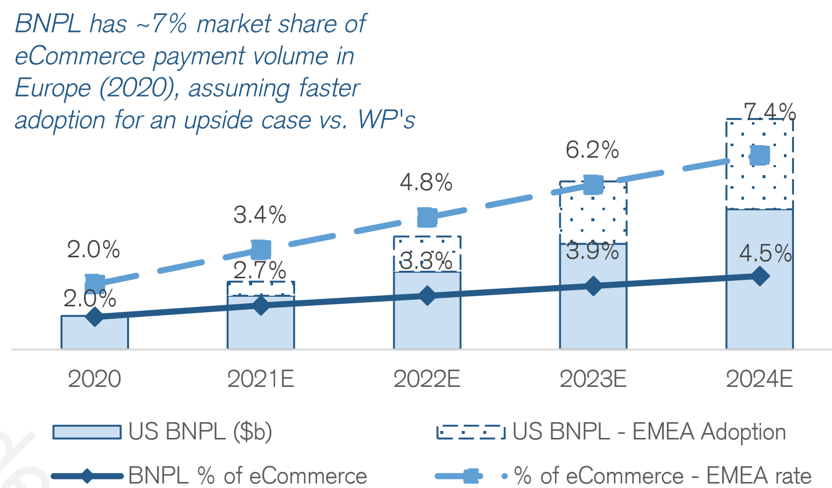
Return to Themes Table of Contents

17. Buy-Now-Pay-Later offerings

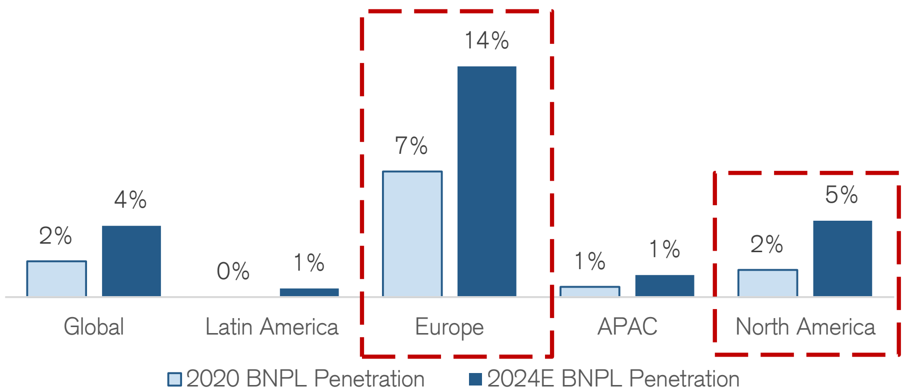
How big can BNPL get in the US?

- Worldpay estimates guide us to ~$85b 2024E for US BNPL, assuming ~4.5% penetration of US eCommerce volumes (2.25x vs. 2020).
- Other geographic regions have seen faster BNPL adoption, with Europe reaching ~7% BNPL penetration of eComm volumes in 2020.
- Certain countries, such as Sweden at 23% penetration (where Klarna was founded in 2005, earlier than most other BNPL providers) have progressed to more widespread usage of BNPL.
- Reasonable upside case for the US would assume it approaches the current ~7% Europe BNPL penetration by 2023, growth which could be achievable given the high levels of private and public investment behind BNPL platforms in 2020 and aggressive marketing to millennial/Gen Z consumers.

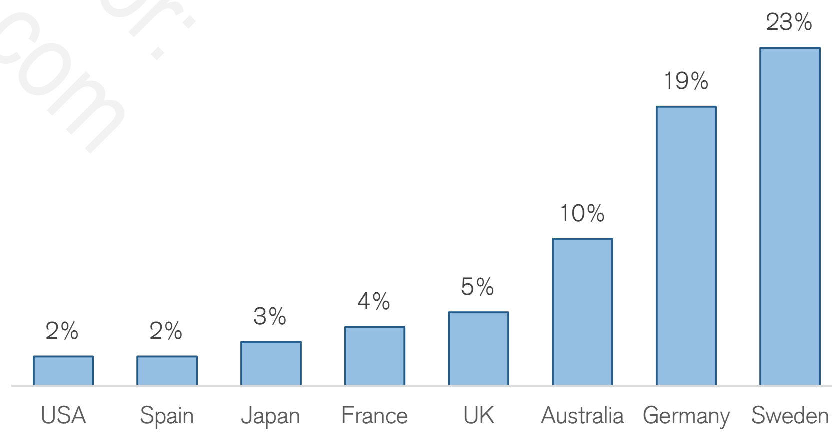
BNPL is still in the early stages of growth, but has seen rapid adoption in foreign markets, signaling potential upside to US forecasts



Europe is by far the leading market for BNPL, expected to reach 14% of eComm payments by 2024 (WP); It is not unreasonable to frame 6% BNPL eCommerce adoption as an upside case given several developed markets (i.e., Australia, Germany, Sweden) have well exceeded this number



Note: Worldpay does not breakout BNPL as a payment method for Middle East and Africa



Source: Worldpay Global Payments Report, Company reports, Credit Suisse research

Return to Themes Table of Contents

17. Buy-Now-Pay-Later offerings

BNPL competitive landscape

	Affirm	Afterpay	Klarna	Splitit	PayPal (Pay in 4)
Company	affirm	afterpay	Klarna.	splitit	Pay in 4 from PayPal
Valuation	~$33b (AFRM US)	Acquired by Square in 2021 for $29b	Private - $45b+ (June 2021, ~$640mm raise)	ASX - ~$250mm AUD (ticker SPT AU)	New product within PayPal (PYPL US)
Countries of Operation	US, Canada	Australia, US, UK, Canada, New Zealand	US, UK, Germany, Sweden, Norway, Finland, Denmark, Austria, The Netherlands, Australia	US, Australia, Canada	US launched Q4 2020, Australia, Germany, France, UK (under various names and structures)
Product Offering	Installment Pay, Virtual Card, Splitpay (quad pay), Consumer Marketplace, Savings account, Affirm Plus Debit Card	Quad pay (interest + late fees charged)	Invoices (try before you buy), Core installments (longer term), quad pay (56 day installment), Klarna card (revolving credit), savings accounts	Core installments via issuer - taking excess credit capacity and holding it	Available to all PayPal merchants (no additional integration and/or sign-up required), as product is part of the PayPal wallet
Range of Duration	6 weeks - 48 months	~6 weeks (down payment and three additional payments every two weeks)	0 - 36 months	3-24 months	4 - 6 weeks (varies by country)
Average AOV	~$495 (FQ4 2021)	~$150 (FY 2020)	~$70 (FY2020, assuming ~2mm transactions / day)	~$1,000+ (1Q 2021)	Range of $30-$1,500 is allowed
Credit Risk	Yes - portion on B/S via bank partner, and a portion sold to securitizations, forward flow	Yes - during FY 2020, gross losses reflected ~85bps of underlying sales or ~13.7% of the average receivables balance throughout the year	Yes - Bank in Europe, partner in US and elsewhere	No - sits with issuer via hold on credit line	Yes - currently kept on balance sheet (although could be sold off as part of asset light approach as program scales); Relatively lower AOV and short duration loans (less capital intensive vs. other PayPal Credit offerings)
GMV & Revenue	$~8.2b in GMV (FY 2021); ~$870mm in revenue (FY 2021)	~$15.5b in GMV (FY 2021), with ~$680mm in revenue (FY 2021)	$53b GMV (FY 2020, +46%), 2mm transactions per day; ~$1b revenue (FY2020)	$245mm GMV FY2020, $8.4mm rev	Q2 2021 GMV of $1.5b+; Low cost offering (no additional fee to merchants, included in existing ~3% on average PayPal merchant fees)
Merchants	~29k (FQ4 2021)	98.2k globally, with ~28.4k US	250k retail partners	~2.8k	~34mm (Q3 2020, globally), 40k upstream presentment
Active Users	~7.1mm (mostly US) as of FQ4 2021	9.9mm active globally, with ~5.6mm US as of end FY 2020, and now at ~7.5mm US	90mm active users as of 1H 2021	~566k	~400mm (Q2 2021, globally, ~175-200mm US accounts)
Misc.	Founded by PayPal co-Founder Max Levchin; Does not charge late fees (vs. key competitors that do); ~20-30% of revenue generated via Peloton relationship (high take rate business); Acquired Amazon as a partner in August 2021	Core markets are for clothing, pets, jewelry, and entertainment; Does not run a credit check on its clients (uses other metadata to triangulate, but not credit score); First payment for first time users ("down payment"); Late fee component; CSe ~54% revenue growth in FY 2022	Visa is an investor; Acquired Italian BNPL provider Moneymour in 2020; In-store option live in 10 markets; Vibe loyalty program rewards consumers who pay on time (1mm members as of Dec.); Late fees component (though has decreased 5-fold since 2013 as % of vol); Klarna Card ~660k outstanding (as of 1H 2021)	Does not use application or credit check; uses a debit or credit card to obtain authorization; does not charge interest, as is a pending charge on credit statement; Average AOV of ~$1000 March; Integration with Stripe Connect	Available to all PayPal merchants (no additional integration and/or sign-up required), as product is part of the PayPal wallet; No impact on credit score (soft check at time of purchase); First payment at time of shipping (down payment); Late fee component

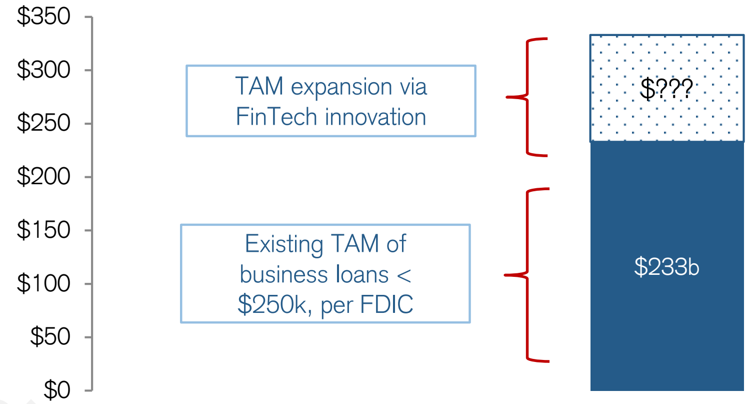
Return to Themes Table of Contents

18. FinTech-driven credit for merchants (micro & SMB lending)

Expanding the addressable market for merchant credit

- FinTech platforms are in the process of expanding the addressable market for small business lending – similar to what Square has done for micro merchant payments; these platforms are able to offer loans that traditional banks previously avoided.
  - Cost prohibitive for many traditional banks to go after small loan sizes (e.g., Square ~$6-7k average loan size) in terms of customer acquisition, costs to review application, etc.
  - FinTech often already have acquired a heavily engaged customer, and the loan offering can be done via cross-sell through a dashboard with which the merchant interacts on a daily basis.
  - FinTechs often utilize additional and/or more real-time data that banks do not have, including sales trends through their payments or eCommerce platform (e.g., Square Capital, Shopify Capital, Amazon Lending) to reduce risk.
  - Alternative data sources used by FinTechs include accounting software linkages (inventory levels, receivables and payables data, hiring trends), social media accounts, linkage to all bank accounts (cash balance trends, outflows and inflows), website traffic, user reviews & ratings, and more.
  - FinTech platforms are often "paid first" via a percentage of payments volumes, further reducing risk.
- Numerous types of credit offerings (working capital loans, merchant cash advance, equipment financing, invoice factoring, other business loans, etc.); merchant cash advance offerings through payments platforms are not new, but expansion into smaller merchant is (e.g., Square Capital, PayPal Credit, Shopify Capital).

Business loan balances < 250k in the US stood at ~$233b as of year-end 2019, but FinTech's are expanding the reach (new TAM)



FinTech SMB loan experience vs. traditional bank – easier application, faster approvals, and based on more than traditional credit metrics

Lower customer acquisition & processing costs, existing merchants	vs.	Often not economical (CAC, risk, etc.) to pursue smaller loans
Online application (including pushed pre-approvals in dashboard) and fast	vs.	Can be offline (brank branch) and time consuming (more requirements)
Automated review & approval (often times instantly or within minutes)	vs.	Reviewed by a person (weeks or more of application processing)
Funding available same-day or next day (perhaps directly via debit card)	vs.	Funding can take multiple days in some cases
Decisions enhanced with payments, accounting, social, & other data	vs.	Decision based on traditional credit analysis

Source: Company reports, OnDeck, Credit Suisse research

Return to Themes Table of Contents

18. FinTech-driven credit for merchants (micro & SMB lending)

Examples of Payments & eCommerce platforms offering merchant credit

Merchant credit offerings	Comment
Square Capital	• Cumulative ~$9b+ (Including 460k small businesses) volumes across 850k+ loans since launch May 2014 • Repayment as a percentage card volume done through Square's platform • Loss rates consistently at less than 4%, despite smaller merchant size
PayPal Credit	• Merchant credit business remains on balance sheet for PayPal (US consumer sold to Synchrony Financial) • PayPal Business Loans ($5k to $500k range) & PayPal Working Capital ($1k to $125k range) • Total receivable ~$3.9b as of Q2 2021
Shopify Capital	• Cumulative ~$2b+ total merchant cash advances as of Q1 2021 • July 2019 expanded to non-Shopify Payment merchants in the US (expands TAM ~10%) • Supported by data within Shopify Payments and Shopify Fulfillment Network
Amazon Lending	• Invitation-only program that offers $1k-75k loans for sellers to purchase inventory for use on Amazon • Utilizes real-time sales data (and growth), customer reviews, profitability metrics, etc. • Terms on the loans tend to be 12 months or less (i.e., short term) • "Amazon Lending surpassed $3 billion lent to small businesses on Amazon since the program started in 2011" (January 2018)
Amazon.com Revolving Corporate Credit Line & Amazon.com Corporate Pay-In-Full Credit Line	• Credit line can only be used at Amazon.com • More flexible payment terms (i.e., pay-in-full or make minimum monthly payments only) • The Pay-in-Full Corporate credit line offers 55-day payment terms (no interest, no fees) and is marketed more toward larger businesses (e.g., libraries, schools, government organizations)
Global Payments (Evolocity Financial partnership)	• Up to $300k per loan • Repayment as a percentage of card volume • Cash advance and SMB loans • Additional TSYS offerings (cash advance up to $150k)
Clover Capital (Fiserv)	• Repayment as a percentage of card volume (but tends to be in the 10-20% range) • Available to any First Data merchant directly or through any ISO, partner, etc.
Worldpay Business Finance (Liberis partnership)	• Partnership with Liberis Ltd (Worldpay will receive a commission) • UK-based offering for businesses taking at least a minimum of 10 credit and debit card transactions totaling +£5k a month

Source: Company reports, Credit Suisse research

Return to Themes Table of Contents

18. FinTech-driven credit for merchants (micro & SMB lending)

Additional FinTech platforms innovating in merchant credit

FinTech Platform	Comment
Behalf (Visa strategic investor)	• Allows vendors to extend no-fee terms and 30-90 financing (30-90 days) to SMBs (line of credit) • Behalf customers can make business purchases (access credit line) via Visa virtual cards
BlueVine	• Invoice factoring, term loans, and lines of credit • Invoice factoring up to $5mm • $14b+ cumulative funds delivered to 450k+ customers
FundBox	• Revolving lines of credit for SMBs • Connects to accounting software, business accounts, etc. • $2b+ capital lent to over 275k small business customers
Kabbage	• $9b+ in volume to 225k+ SMB since founding (2009) • Working capital lines of credit up to $150k, repaid in 6-, 12-, or 18-month terms • Pulls from multiple sources (bank accounts, sales channels, social media, accounting software, etc.) • Launched SMB payments capabilities in Oct 2019 for instant A/R payments • Nations third largest PPP loan lender by application volume ~300k approved for $7b+
LoanBuilder (Swift Financial, acquired by PayPal)	• Business loans between $5k and $500k • $42k annual sales and a 550 FICO score required • The lender for LoanBuilder is WebBank (Utah based ILC)
Funding Circle	• Peer-to-peer lending platform (investors lend to SMBs) • Business loans between £10k and £500k • UK, US, Germany, and the Netherlands
On Deck Capital	• $13b+ total originations across 100k+ SMBs • Term loans (~80% of business), line of credit, and equipment finance offerings • Previously publicly traded in the US (ONDK); acquired in October 2020 by Enova International (ENVA)
Payability	• Empowers eCommerce sellers (Amazon, Shopify, Newegg, Walmart) with access to 80% sales on a next day basis (vs. up to 14) • Requires 90 days of sales history and monthly sales of $2k

Source: Company reports, TechCrunch, PitchBook, Credit Suisse research

Return to Themes Table of Contents

19. Neobanks gaining scale as nextgen FinTech ecosystems
Definition and business model characteristics

- **Definition of a Neobank:** We define a Neobank to be a technology platform that offers financial services, built upon a foundation of a checking account and affiliated debit card enabling the business to expand into other free, reduced-cost, or enhanced services and functionality. We are cognizant that Neobanking platforms can and likely will continue to be built as adjacent services on top of another core financial services offering (e.g. trading platform or lending platform expanding into checking accounts), aligned with the theme of “rebundling” over the medium-longer term. Neobanks generally operate outside of the traditional banking regulatory system through partner bank arrangements in which they leverage the national or state banking charter of a fully-licensed and regulated financial institution, allowing the business to accept customer deposits and facilitate money transmission and payments. We note there are of course exceptions where Neobanks have opted to obtain a charter (e.g., Varo in the US).

- **Highly recurring, transaction-based, and largely non-discretionary revenue stream (SaaS-like):** Today, the vast majority of Neobank monetization (for the companies within scope for this 1st edition report) is derived from interchange earned on customer card spend (largely debit card, although select Neobanks have introduced credit card offerings). Direct deposit users are the most desirable as they tend to use the debit card as their primary spending vehicle, driving elevated, sticky, and predictable levels of engagement, resulting in a highly recurring, transaction-based, and largely non-discretionary revenue stream.

- **Cross-selling opportunities abound:** An important feature of primary customer account status, often associated with direct deposit accounts, is the opportunity to deepen the customer relationship, with this claim supported by a recent survey conducted by Chime that indicated ~75% of its users would like Chime to offer additional products in areas like lending, investing, insurance, etc.

- **Potential for attractive unit economics longer-term:** Neobank platforms are designed to operate (at scale) with low cost structures (vs. traditional banks), resulting in attractive longer-term unit economic profiles (with the potential for continued improvement as the platform further scales over time).

Return to Themes Table of Contents

19. Neobanks gaining scale as nextgen FinTech ecosystems

Neobank Company Map

United States

Acorns	Current	Lucky Card	Revolut
Arrival	Dave	M1 Finance	Robinhood
Aspiration	Daylight	Majority	Sable
Azlo	Empower	Marygold & Co.	Save
Bambu	Envel	Meed Banking Club	Simple
Bank Mobile	Extra	Mercury	SoFi
Bella	Finch Money	MoneyLion	Stash
Betterbank	First Boulevard	Monzo	Step
Betterment	GoBank	N26	Stilt
booyah!	Good Money	North Loop	TrustFund
Braid	Greenlight	NOVO	Unifimoney
Branch	Greenwood	One Finance	Varo
Bridge Money	Happy Money	onJuno	Wealthfront
Capway	HMBradley	Oxygen	Wise
Cheese	Ivella	Passbook by Remitly	Yotta Savings
Chime	Juno	Pinch	Zenus
Cogni	Letter	Point	Zero
Copper	Level	Purple	Zeta
cred.ai	Long Game	Qapital	Zoro Card
Credit Sesame	Lili	Qube Money	

Europe

220 Bank	Go Henry	Muniy	Raisin
Alpian	Hello bank!	N26	Revolut
Anytime	Holvi	neon-free	Rocket Bank
Aoin	Hype	Nest Bank	Rooster Money
Atom Bank	ImaginBank	Nickel	Shine
Bitwala	Indo	Nimbl	Soldo
Bnext	Kard	OakNorth	Starling Bank
BuddyBank	Knab	Orange Bank	Tandem
Bunq	Kontist	Osper	Tide Bank
Countingup	Lintel	P.F.C.	Tinkoff Bank
CSX by Credit Suisse	Lunar	Penta	Tomorrow
Curve	manager.one	Pixpay	Vivid
Dozens	mBank	Pockit	Wise
EasyEuro	Monese	Prismea	Xaalys
Fidor Bank	MonoBank	Qapital	Yapeal
Fire	Monzo	Qonto	Zak Banque Cler
Gimi			

Latin America

Agibank	Flink	Next
Albo	Fondeadora	NuBank
B89	Hey Banco	Original
Banco Inter	Klar	Oyster
Banco Pan	Ligo	RappiPay
Broxel	Mach	Rebanking
Brubank	meu pag!	superdigital
C6 Bank	Mozper	Swap
Cuenca	Nelo	Uala
Enso	Neon	Wilobank
Evva	Nequi	

Canada

Koho
Neo Financial
Stack
Tangerine Bank

APAC

811 by Kotak	Kakao Bank	TMRW by UOB
86 400	Kyash	Tonik
Airstar Bank	Livi Bank	Tyro Payments
Aspire	MYBank	UP
BigPay	Neat	Volt Bank
Digibank by DBS	NiYO	Walrus
Douugh	Open	WeBank
Hay	PAObank	WeLab Bank
InstantPay	Sony Bank	Xinja
Jenius	STAN	Yono by SBI
Jibun Bank	Statrys	YouTrip
K Bank	Timo	ZA Bank

Africa & Middle East

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Xpence

Source: Credit Suisse research, Neobanks App

Return to Themes Table of Contents

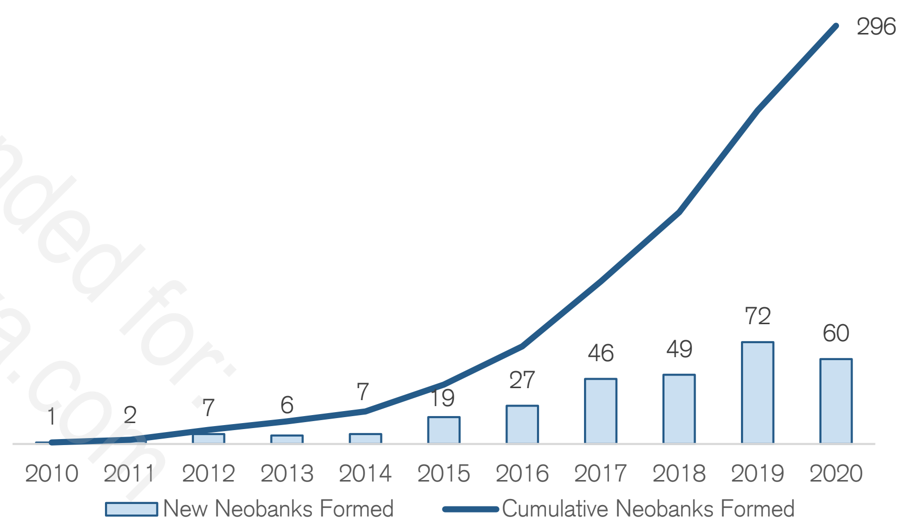
19. Neobanks gaining scale as nextgen FinTech ecosystems

Neobank adoption accelerated in 2020 and new Neobank formations persisted

- Neobank user growth was accelerated in 2020 and 2021 by COVID as physical bank branches were closed to the public and individuals desired more immediate access to funds and simplified management of personal finances.
- New Neobanks continue to be formed at a rapid pace, with most outsourcing the vast majority of their technology and banking infrastructure to Banking-as-a-Service (BaaS) providers, bank partners, and other modern bank tech providers.
- It is important to note that in many cases certain users are not monetizable, most notably in the cases of Venmo and Cash App in which many users are only taking advantage of free P2P services and are not utilizing debit cards, instant transfer, or other revenue-generating service.

We estimate Neobanks in the US now have over 200mm+ cumulative users (although we believe there is likely substantial cross-over)

Globally, there are now ~300 Neobanks with an average of 5 new Neobanks opened each month in 2020



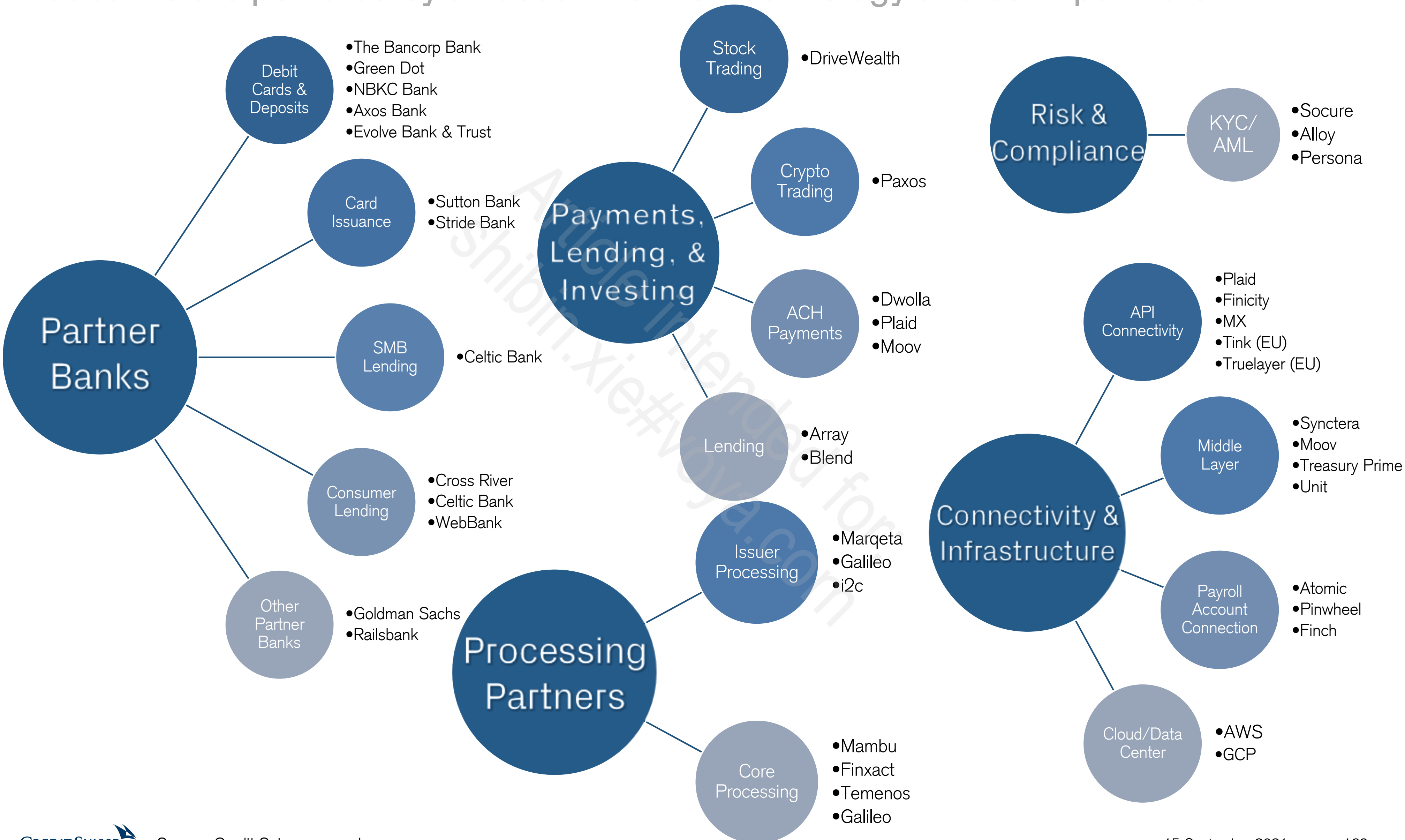
[1] As of Q2 2021A per earnings call
[2] Greater than 70mm annual active users disclosed during Q2 2021A earnings (comparable to how Venmo discloses users)
[3] 18 million as of March 2021
[4] 13 million as of May 2021 (eMarketer)
[5] 10mm users as of December 2020 (Investor presentation)
[6] 4mm as of May 2021 (eMarketer)
[7] Nearly 3 million "parents and kids" per discussions with company management
[8] 2.7mm as of May 2021 (eMarketer)
[9] "Nearly 500,000 customers" as of August 2020 (N26 press release)
[10] 150,000 users as of October 2020 (CNBC.com)

Source: Company data, Credit Suisse estimates, SoFi

Return to Themes Table of Contents

19. Neobanks gaining scale as nextgen FinTech ecosystems

Neobanks are powered by an assortment of technology and bank partners



Source: Credit Suisse research

Return to Themes Table of Contents

19. Neobanks gaining scale as nextgen FinTech ecosystems

Tech and bank partners provide a range of services enabling Neobanks to quickly go to market

Partner Banks	• Shift banking regulatory burden from Neobank to partner bank • Enable deposits, card issuing, and loan origination capabilities
Issuer Processors	• Manage issuance of cards, and often physical card creation, packaging, & shipping • Transaction authorization and settlement via connection with card networks
Core Processors	• API integration, fraud detection, risk management, transaction processing, internal ledger, and loan management functionality
ACH Payments Providers	• Facilitation of ACH payments, and in some cases push-to-debit payments
Risk & Compliance Providers	• Digital identity verification and fraud/risk management • Ongoing KYC/AML compliance
Connectivity/Data Aggregators	• Establishes data connection between banks to enable balance checks, identity verification, and rapid account onboarding
Brokerage Infrastructure	• Cloud-based, API infrastructure to enable trading of stocks, ETFs, cryptocurrencies
Cloud Providers	• Scalability through cloud-based infrastructure vs. legacy on-prem tech stacks • Enable data analytics and business insights

Source: Credit Suisse research; Please note, categorization is often imperfect as providers frequently offer services that go beyond the broad labels above or provide services that fit in multiple categories; therefore, any categorization is by nature more limiting than reality

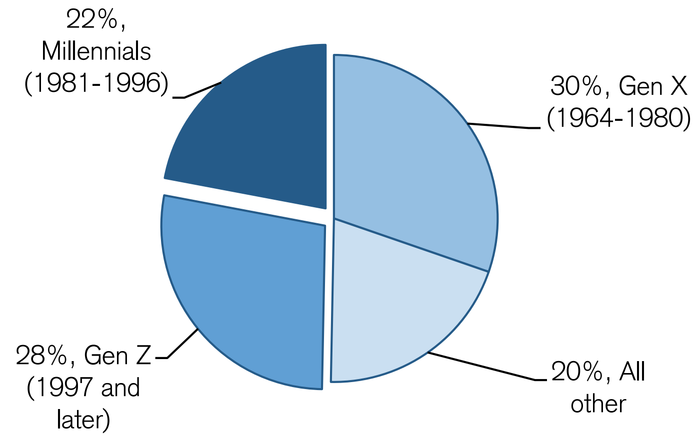
Return to Themes Table of Contents

19. Neobanks gaining scale as nextgen FinTech ecosystems

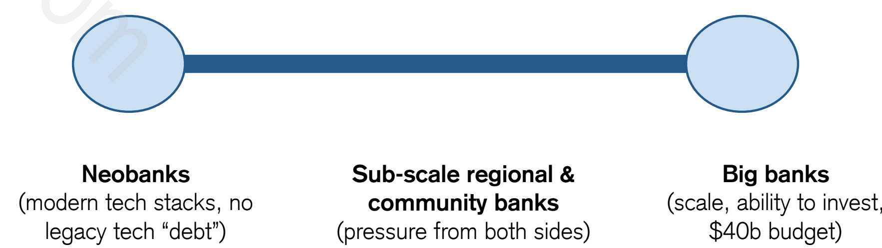
FinTechs are on one end of the "barbell", big banks are on the other

- Digitally native consumer expectations for mobile apps are set by the mainstream apps (Instagram, Amazon, YouTube, Uber, etc.) where Millennial & Gen Z consumers spend most of their time.
- High expectations for mobile apps favor banks that can keep up (investment, innovation) and/or lean on the more modern offerings from bank technology providers.
- Millennials & Gen Z are already ~50% of the US population (2017). We expect their preferences to influence winners and losers in consumer financial services.
  - Big banks – The top four banks in the US have the scale to compete with nearly 50% of industry assets, supporting annual technology budgets of over $40b in aggregate.
  - Sub-scale regional & community banks – These banks will continue to face pressure from both sides of the "barbell" with legacy systems that are expensive to maintain and built on programming languages that communicate less fluidly with modern tech.
  - Neobanks & Fintech platforms – Modern technology stacks (i.e., no legacy assets) allow for faster product development centered around feedback from their increasingly large users bases (lack of branch costs, e.g., personnel, real estate).

Millennials & Gen Z are already ~50% of the US population (2017) – we expect their preferences to dictate winners & losers



The "barbell" of financial services favors large banks (able to invest, scale offerings) and Neobanks (nimble, modern, lower cost base)



Drivers of Cash-to-Digital Conversion

[Return to Themes Table of Contents]

20. “Push-to-card” payments unlocking new payment flows

Visa Direct & Mastercard Send strategy and ecosystem benefits

- Both offense (priced to expand card-able TAM into larger, interchange-sensitive payments) & defense (race to scale before modern/fast ACH rails gain ubiquity), resulting in increased carded velocity of those same PCE dollars and further into B2B.
  - Expands card-able TAMs into new payment flows (i.e., beyond PCE, into online & on-demand marketplace merchant payouts, insurance claim payouts, etc.).
  - Sends to card-based accounts, then re-spent on cards (increased consumer and business debit card usage as an indirect benefit).
- Revenue generation for both card networks (network fees) and issuing banks (interchange-like revenue stream for receiving banks).
  - Slows modern/faster ACH rails from gaining ubiquitous adoption – Visa and Mastercard gaining scale – i.e., partners embedding these offerings ahead of various emerging faster payments offerings (e.g., NPP in Australia, FPS in the UK, RTR in Canada, RTP provided by The Clearing House in the US, Zelle by Early Warning in the US).
- Beyond Visa and Mastercard, push transactions available via STAR (Expedited Transfer), NYCE (Money Transfer), & PULSE (A2A Transfer).

“Push-to-card” payments (e.g., Visa Direct, Mastercard Send) expand card payments into new market opportunities, beyond C2B and into B2B, C2B, and P2P

Faster settlement

Merchant Settlement
Sharing Economy
Contract Staffing
Online Lending
Online Marketplace
Multi-Level Marketing

Check replacement

P&C Insurance
Education
Payroll
Lotteries & Gaming
Healthcare
Government
Loyalty Programs
Property Management
Travel

“Push-to-card” disbursements provide advantages to business and governments (senders)

82% More likely to work with a business that offers fast disbursements

72% Consider a debit card number to be more convenient than a bank account + routing number

88% Organizations that have cited efficiency as the primary reason to switch to electronic payments

Source: Company reports, Visa, Credit Suisse research; Note: Digital Disbursements Consumer Preferences Survey was commissioned by Visa and conducted by SevenDesign via Ask Your Target Market, among 2,000 active U.S. debit card users (2017); [3] "2015 Payments Cost Benchmarking Survey," The Association for Financial Professionals (2015)

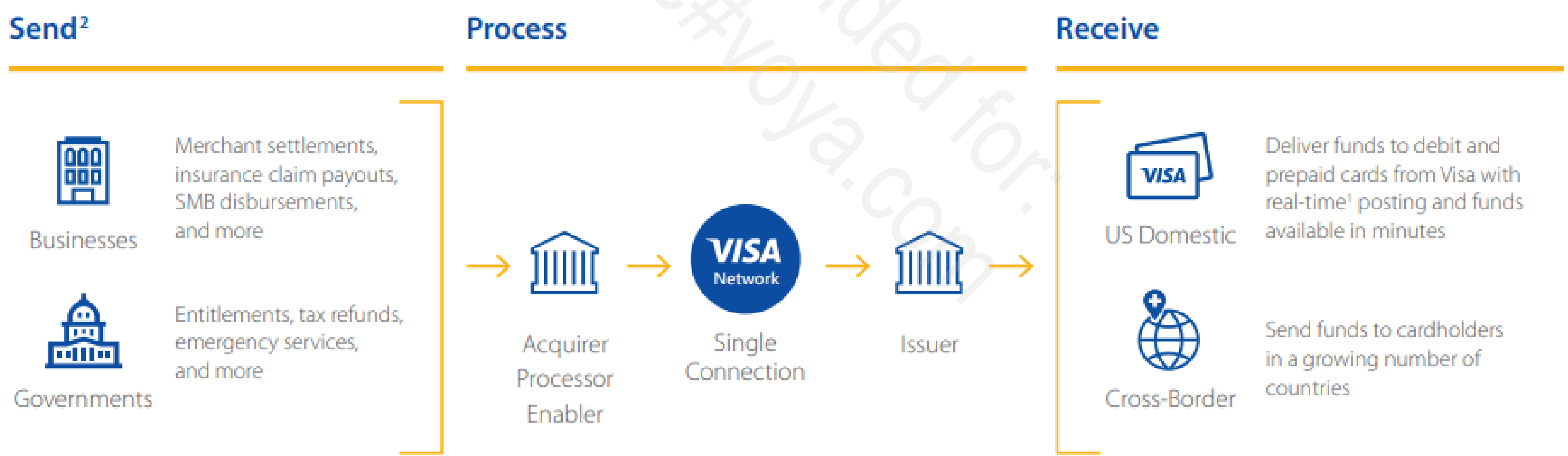
Return to Themes Table of Contents

20. "Push-to-card" payments unlocking new payment flows

Visa Direct & Mastercard Send – Push payments using card rails

- Leverage existing card rails (debit card linkage to bank accounts) for all general purpose and prepaid cards, essentially reversing the payment flow within the payments network (i.e., born out of the returns/refunds process).
- Domestic and cross-border capable.
- Visa Direct can send funds to Mastercard cards (and vice-versa).
- Can be "instant" or standard T+2 (instant requires "fast funds" posting requirement on the receiving bank – funds available within 30 minutes).

"Push-to-card" payments still require a facilitator function (e.g., merchant acquirer, payments service provider, processor, or other facilitator) to connect to the network



Source: Visa, Glenbrook Partners, Credit Suisse research; Note 2: Use cases are for illustrative purposes only; Program providers are responsible for their programs and compliance with any applicable laws and regulations

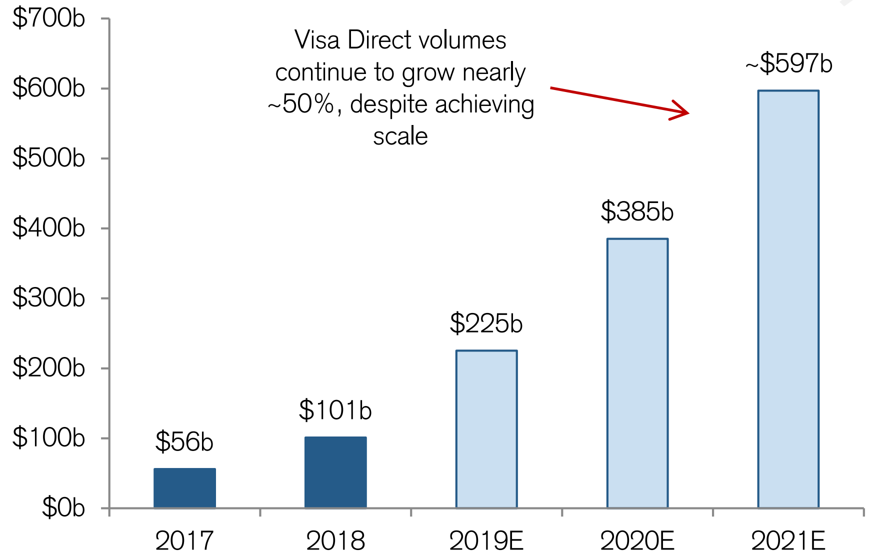
Return to Themes Table of Contents

20. “Push-to-card” payments unlocking new payment flows

Visa Direct & Mastercard Send growth and pricing

- Network pricing (yields) vary by use case but are (on average) below traditional pull debit at the POS.
  - Use case based network fees, priced to value, but on average tend to be lower than traditional debit (in part due to larger average dollar amounts per transaction, i.e., cents per transactions spread across a $1,200 insurance claim payout vs. $50 shirt).
  - Generally more fraud prevention and risk associated with a traditional C2B card transaction vs. a B2C/G2C disbursement.
  - Visa generally refers to transaction growth vs. volumes (although recent disclosures allowed for backing into a volume measure).
- Interchange-like fees (not officially considered interchange and thus not a part of Visa’s publicly available pricing schedule paid by sender to the receiver’s bank); potential for this portion of the economics to be reduced or removed over the longer term (ACH push payments do not provide revenue for receiving banks).

Visa Direct continues to grow ~50%, and these volumes now make up ~MSDs of Visa’s total payments volume; of the ~$100b in 2018, ~$42b was US (vs. ~$14b in 2017)



Visa Direct and Mastercard Send provide an “interchange” to the receiving bank, likely put in place to incentivize uptake

“Interchange” paid to receiving bank	~$0.10 per domestic transaction for Visa Direct
Network fees	Largely priced on a “cents per transaction” basis, and thus, appear mainly in “Data Processing Fees”; Use case based and still early days in the price discovery process (e.g., different prices for B2C vs. P2P, perhaps negotiable for large payers such as insurance companies with larger average send amounts); Generally amounts to a net yield for Visa that is below traditional debit
Other	Visa OCT is the transaction, while Visa Direct is the service; Mastercard Money Send is the transaction, while Mastercard Send is the service

Source: Company reports, Glenbrook Partners, Credit Suisse research

[1] 2017 and 2018 volumes disclosed from financials, 2019E-2021E volumes estimated from disclosed transaction growth

Return to Themes Table of Contents

20. "Push-to-card" payments unlocking new payment flows

Visa Direct & Mastercard Send vs. ACH-based alternatives

Aspect	Visa Direct & Mastercard Send	ACH-based (including faster payments, ACH-like alternatives)
Domestic vs. Global	Cross-border: Global by definition, with cross-border capabilities and access to ~3.5b cards and ~25k banks connected to Visa and Mastercard	Local (but evolving): ACH-based systems are (today) by definition local, and often country-specific; Examples include NPP in Australia, FPS in the UK, RTR in Canada, RTP provided by The Clearing House in the US, Zelle by Early Warning in the US, and the pending FedNow system (potential launch in 2023/2024) in the US; That said, it is possible that over time modern ACH systems could become linked/interoperable for use in cross-border payments (i.e., many are using ISO 20022 standards, making connecting various systems more feasible over time)
Account-access	Traditional bank accounts & prepaid cards: Broader access to the underbanked via prepaid cards; Can also access credit cards	Traditional bank accounts only: Generally does not have access to prepaid cards and credit cards, although there are country-specific examples that can access 16 digit debit and prepaid cards via ACH rails (e.g., FedGlobal via FedACH to SPEI).
Costs to sender	Higher, but priced to value: Use case specific pricing and still in the early stages of an evolving pricing strategy (emphasis on transactions at the moment)	Lower: Appropriate for many uses cases, but without the full scope of services provided by card network-enabled push payments
Costs to receiver (bank)	Banks earn money: Banks are compensated for receiving funds, earning "reverse interchange-like" revenue; Receiving banks earn $0.10 each time they accept Visa Direct	Banks have costs: Banks (sending and receiving) have costs associated with accepting ACH-based payments, typically paying the operator (e.g., NACHA, EPN) and a third-party service provider (e.g., Popmoney by Fiserv)
Risks	Chargebacks & dispute process: Card network rails come with processes around chargebacks & disputes; Originating bank bears the risk when accounts are taken over; These processes generally add costs to the ecosystem	No chargebacks & disputes: ACH-based payments cannot be reversed due to issues with a product or service delivery (merchant failure); The originating bank does assume risk when accounts are taken over (per Reg E)
Speed & availability	24/7 real-time (card rails are always on); Visa requires fast-funds enabled issuers to make funds within 30 minutes	Modern systems are 24/7, traditional are not: Modern faster payments systems (e.g., RTP in the US) are 24/7; Legacy ACH systems are not, and often operate under bank branch-like hours (batch processing)
Other	Long-standing real-time capabilities, consolidated into two known brands (Visa, Mastercard)	Numerous, more recent developed options

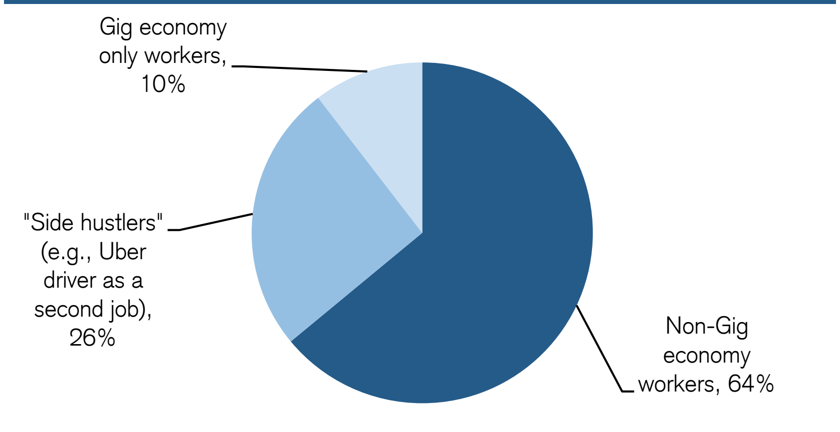
Source: Visa, Glenbrook Partners, Credit Suisse research

Return to Themes Table of Contents

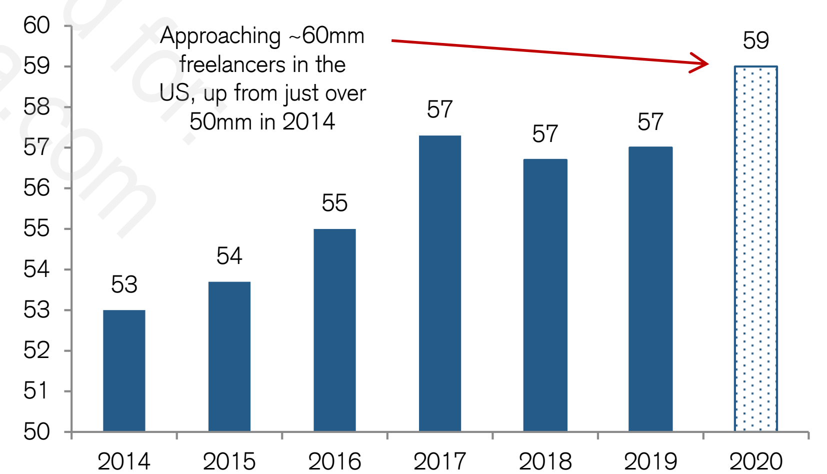
20. “Push-to-card” payments unlocking new payment flows
Freelancer (“Gig”) economy & marketplaces growth…

- “Payouts” are funds disbursed by eCommerce marketplaces and on-demand platforms to sellers and freelancers, often leveraging local payments rails (ACH or an ACH/faster payments alternative), along with network capabilities (Visa Direct, Mastercard Send) and card issuance (attaching a card to seller account).
- The growth of the “Gig” economy (~$1.6tr in US earnings) along with the proliferation of eCommerce Marketplaces (roughly half of online sales) is increasing the importance of payout capabilities.
- Platforms provide value to consumers via increased selection of suppliers (sellers & freelancers) – two-sided network.
- Part of attracting suppliers is meeting their liquidity needs via instant payouts (e.g., Etsy seller use in purchasing supplies, TaskRabbit “Tasker”, and/or Uber driver purchasing groceries later that day).

~36% of US workers are participating in the “Gig” economy



Approaching 60mm freelancers (vs. US workforce of ~160mm)



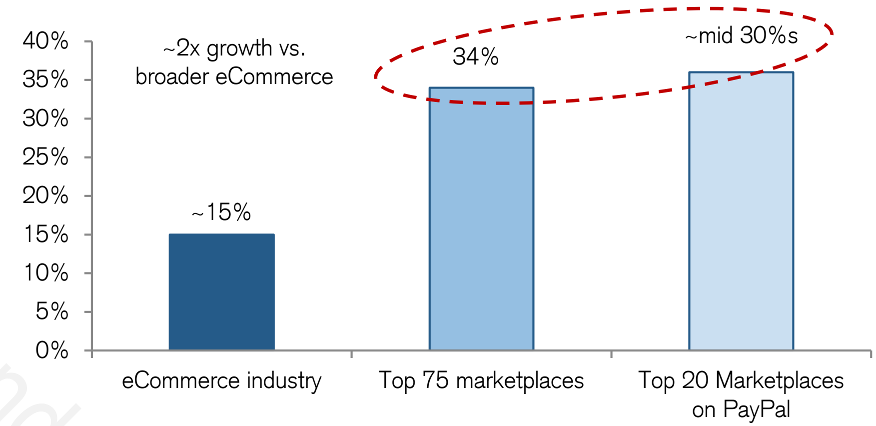
Return to Themes Table of Contents

20. "Push-to-card" payments unlocking new payment flows

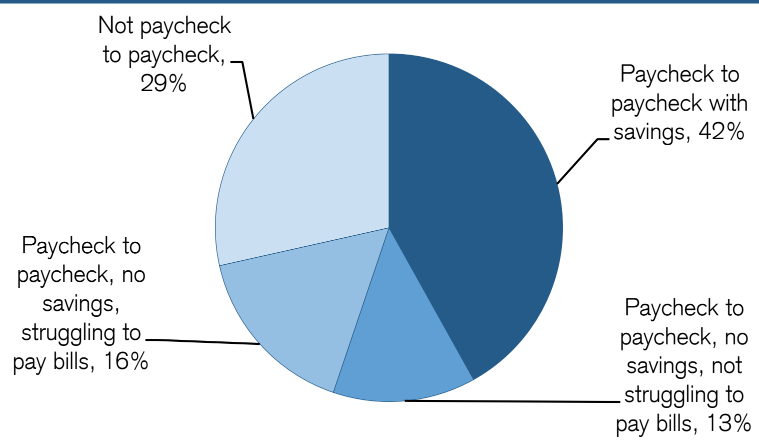
…driving an increasing need for platforms to pay out fast

- Approximately 70% of Gig economy workers live paycheck-to-paycheck and place a high value on timeliness of payment, which creates both challenges and opportunities for platforms and payments providers.
- On-demand platforms & marketplaces that can deliver early (pay advance) or timely (instant, same-day) payments are likely to gain share vs. those with a more offline or off-platform payout experience.
- Liquidity needs create an opportunity for payments providers to meet this demand and earn fees either via instant transfer or the issuance of prepaid debit cards.
- Gig economy workers are more likely to be "underbanked", representing a financial services cross-sell opportunity.

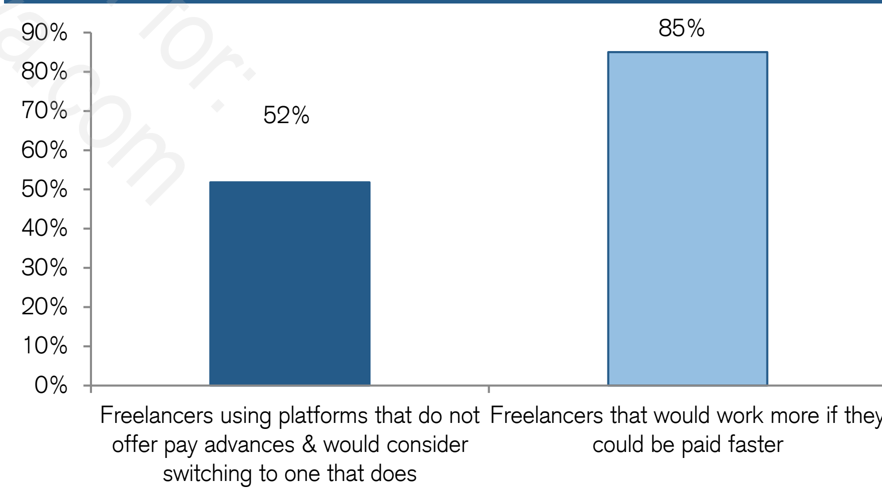
Marketplaces growth outpacing broader eCommerce growth



~70% of Gig economy workers (freelancers) live paycheck-to-paycheck and place high value on timelines of payment



Freelancers value timeliness of payments and would consider swapping platform or working more/less because of it



Source: Hyperwallet/PYMNTS.com Gig Economy Index, Edelman Intelligence, PayPal, Credit Suisse estimates

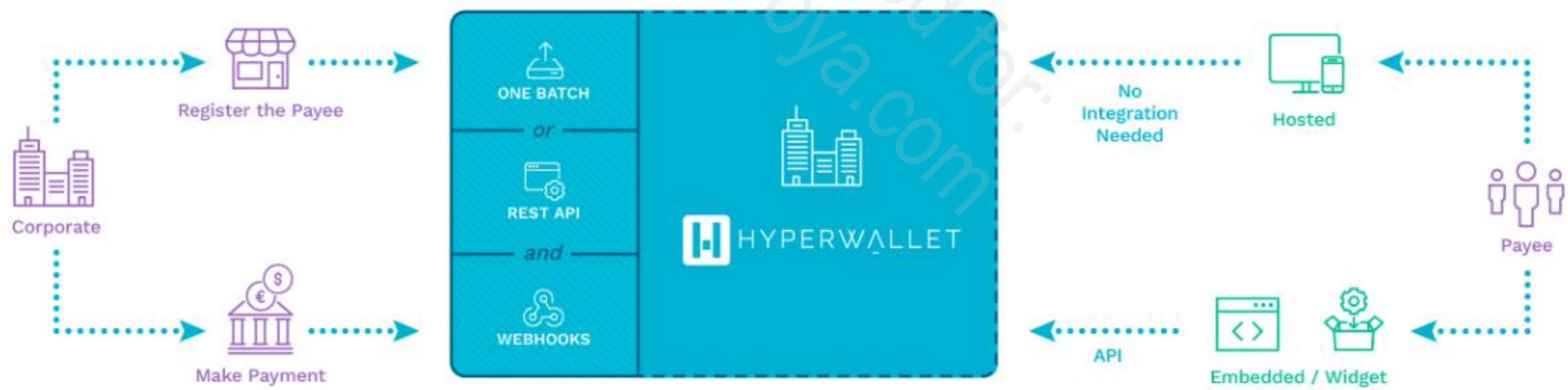
Return to Themes Table of Contents

20. "Push-to-card" payments unlocking new payment flows

Examples of efforts by various payments providers

- Payments providers focused on serving on-demand platforms and marketplaces have developed payout capabilities (e.g., Stripe Connect, Adyen MarketPay, BlueSnap by First Data, WePay by Chase, etc.).
- PayPal acquired Hyperwallet for $400mm in November 2018 to bolster its payout capabilities, citing the fact that merchants and service providers using on-demand platforms and marketplaces desire fast and flexible access to their earnings.
- In addition to instant transfer to debit cards (Visa Direct enabled and with ~1% fees), PayPal launched two additional ways for small businesses, marketplace sellers, and freelancers to be paid faster. Rather than being fee-based, these offerings are available to only a subset of merchants in good standing.
- PayPal Funds Now gives merchants access to funds they earned via sales or services within their PayPal account. PayPal Instant Transfer to Bank uses real-time payments rails via The Clearing House (followed the launch of Instant Transfer to Debit Card).

PayPal acquired Hyperwallet in November 2018 for ~$400mm to enhance its global payout capabilities to better serve merchants/platforms; Hyperwallet easily integrates its global payout technology into merchant/platform's existing infrastructure via APIs



Source: Company reports, Credit Suisse estimates

Return to Themes Table of Contents

20. "Push-to-card" payments unlocking new payment flows

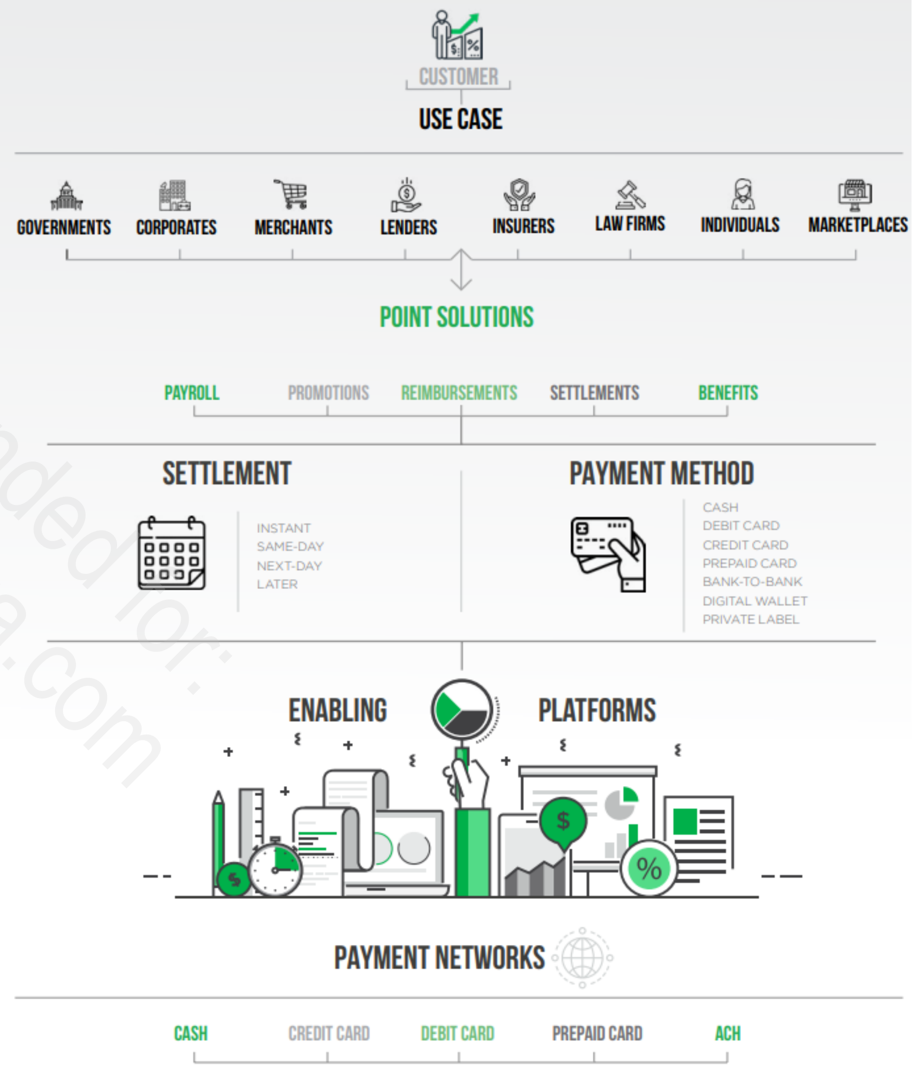
INGO Money modernizing push payments, B2B and B2C uses

- INGO Money Instant Payments focuses on enabling push payments for enterprises, sole proprietors and consumers via a rail agnostic approach (least cost, most time efficient/effective method).
- For card payments, the company pushes payments via reversing transactions over existing card rails (akin to chargebacks and returns).
  - Has 26 direct integrations in all including Visa Direct, Mastercard Send, PIN Debit networks – Pulse, STAR, etc – Netspend, PayPal.
  - The integrations enable payout to accounts, digital wallets (i.e. PayPal), or cash (MGI partnership).
- Overall the INGO vision is for customers to get paid in the way that they are able to pay – with plenty of choices and on-demand.
- Initial use case for INGO specifically was pushing money to Gig economy workers (i.e. tips to bartenders, wait staff).
- Also enables on-demand Pull payments, allowing businesses to request payment via card or account (i.e. loan payment collections).

Offerings on the INGO Money platform, focused on enterprise clients

Enterprise and B2B Solutions			Consumer
Ingo Push	Ingo Check	Ingo Cash	INGO
• *API Service* – enables payout on demand • *SAAS* – Push payments in a box • *iFrame* – processing + settlement	Enables mobile and branch / ATM check cashing for businesses	Turns cash received at register into push payments via APIs or web POS platform	An app store mobile application which allows consumers to cash checks remotely into various payout options, or across various methods

There are numerous use cases for push payments (i.e. Government, Insurers, etc.), enabling payout to various payment methods



Source: Company reports, Credit Suisse estimates, Company Website, INGO Money + PYMNTS.com Disbursement Tracker

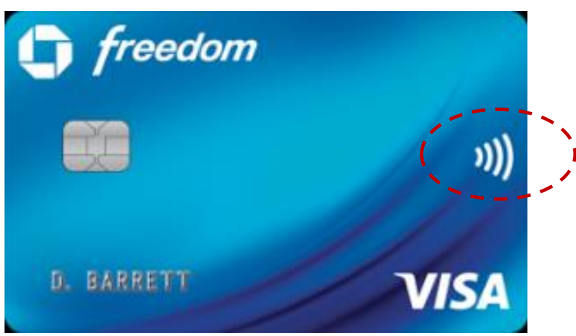
Return to Themes Table of Contents

21. Contactless payments

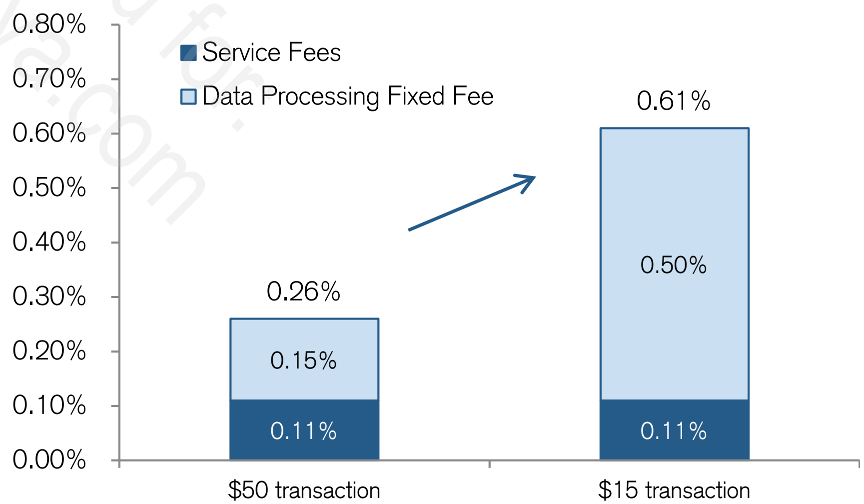
Driving penetration of small-ticket habitual purchases

- Contactless payments is a driver of transaction growth in mature markets with high card penetration, with key benefits such as:
  - Replacing cash, particularly in small-ticket items that are disproportionately still done in cash today (we note that this turns out to be yield accretive for the card networks given fixed data processing fees are spread over lower ticket sizes)
  - Increasing spend per active card by ~14-16%
  - Decreasing checkout time and improving customer experience
- Enablers of Contactless – Critical mass of acceptance and cards before taking off (chicken and egg).
  - Merchants need to have EMV-enabled terminals
  - Banks need to issue contactless-enabled cards (cost issuers at ~$5 per card vs. ~$2-3 per card without contactless capabilities)
  - Drive consumer adoption by habituating the use of contactless payments through daily use cases (e.g., transit)

Contactless logo on the front of the card signifies a contactless-enabled card, which began appearing more often in the hands of US cardholders in 2020



Illustrative example: Visa's net revenue yield potentially could be more than ~2x higher on a small-ticket transactions (ex enhanced rebates & incentives)



 Source: Visa, Credit Suisse estimates

Return to Themes Table of Contents

21. Contactless payments

US rolling out as we speak, experience elsewhere

- Consumer adoption in international markets bodes well for adoption in new geographies (particularly the US).
  - Contactless penetration grew to ~40% of face-to-face transactions around the world in 2020, ~65% excluding the United States.
  - Acceptance in the US is improving. Currently 60% of Visa and Mastercard US payments volume is occurring at contactless-enabled merchants.
- Visa noted that as of end of Q1 2020, nine of the top ten issuers are participating in contactless and as of Q2 2021, more than 370mm Visa contactless cards had been issued (vs. expectation of 450mm by end of 2021).
  - We expect an outsized benefit for V vs. MA in the US given mix (~45% of volume vs. ~35% for MA, skew to large issuers).
  - Visa noted that in Q3 2020 more than 50 countries improved tap-to-pay penetration by more than 5%, with more than 10 countries increasing by 10%+.
  - In the first six months of 2021, Visa added more than 70mm contactless cards.
- Mastercard noted at Q2 2021 that contactless penetration rose 37% YoY to 45% of in-person transactions

Contactless % share of face-to-face transactions; rapid consumer adoption indicates strong customer experience

	Australia	Singapore	Canada	UK
2014	52%	22%	14%	4%
2017	84%	52%	42%	44%

"… So where we've seen contactless come in, it has taken off like a rocket ship, and we've given you some of the statistics. It takes 2 or 3 years to build. And then within a couple of years, 90% of transactions are contactless. And what it does is 2 things. One, it allows you to go deeper and deeper into smaller and smaller transactions and so digitizes more cash. And secondly, it becomes so easy that people displace other modes they were using to pay like tapping phones…"

– Vasant Prabhu, CFO, Visa (December 2019)

Source: Company reports, Visa Investor Day, Credit Suisse research

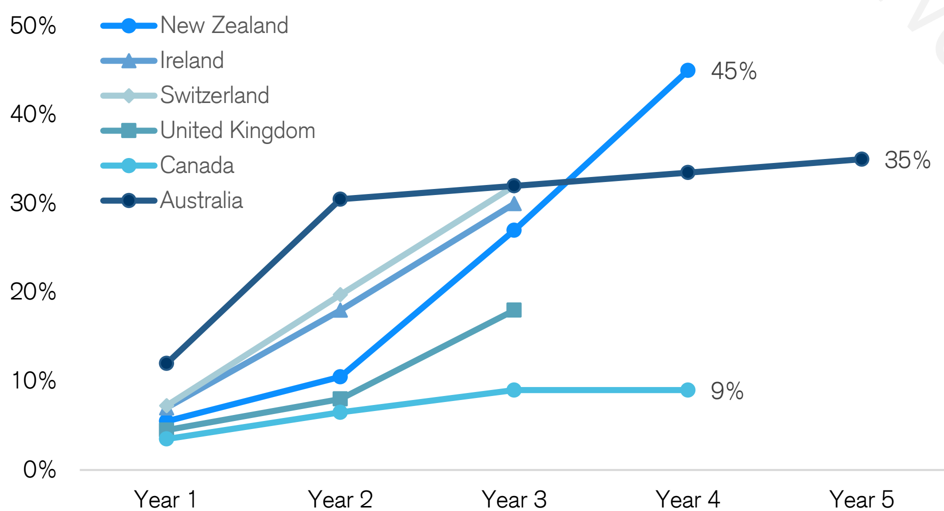
Return to Themes Table of Contents

21. Contactless payments

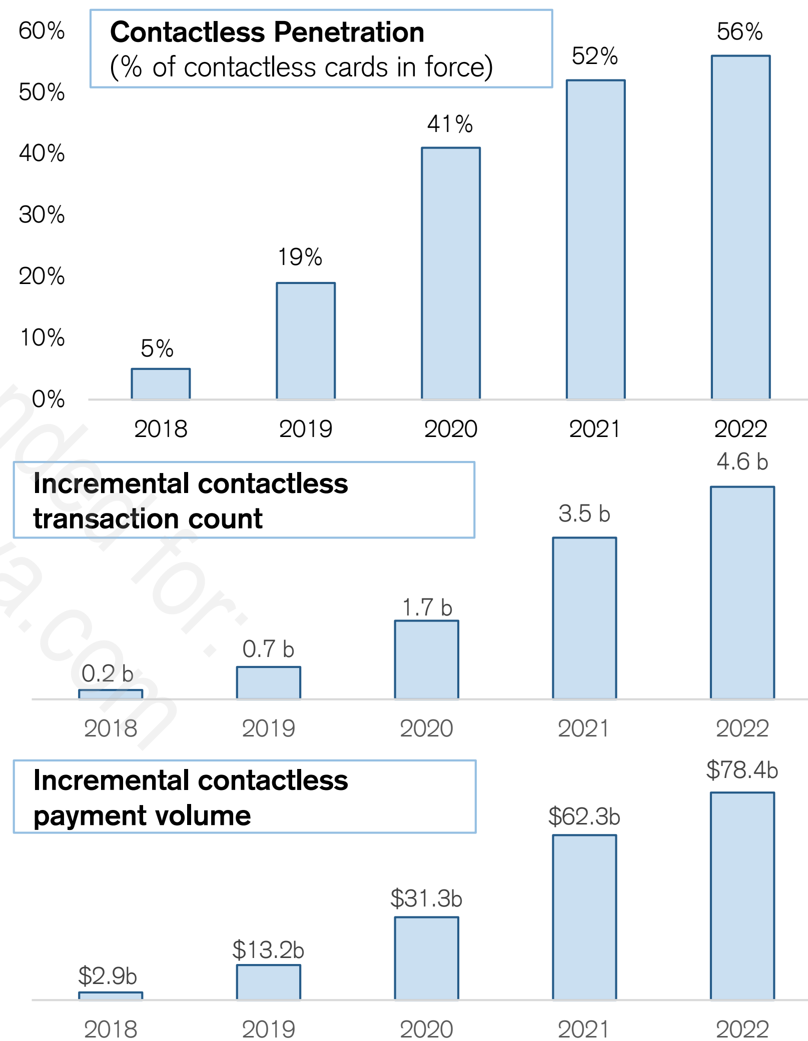
US contactless rollout phasing and impacts

- Contactless payment methods are largely a new development (~5% penetration as of 2018) and should increase rapidly as issuers continue converting to contactless capabilities.
- Previously un-carded transactions should contribute incremental volume as contactless issuance ramps, further incentivizing issuers and merchant acquirers to put more resources into selling contactless terminals into merchants.

Contactless-enabled cards have shown transaction per card increases of 35-45% in card markets similar to the US (years 1-5 post rollout)



The US market for contactless cards is expected to ramp quickly, with incremental transactions reaching ~4.6b by 2022E



Source: Credit Suisse estimates, A.T. Kearney via Consulting.us (2018)

21. Contactless payments

Top 15 economies' experience with contactless rollouts

Contactless cards began rollout in the early 2000s in select markets, with more recent rollouts in countries with payments markets (high card penetration) more similar to the US, experiencing meaningful adoption within 3-4 years

Country	Year of contactless cards deployment Year first card was issued, year of contactless acceleration	Drivers of contactless adoption (2016)		Contactless penetration (2016)	
		% point-of-sale transactions conducted using cards	% cards in force that are contactless	% *total* point-of-sale transactions that are contactless	% *card* point-of-sale transactions that are contactless
Australia	2009, 2012	45.00%	67.45%	12.44%	27.64%
United Kingdom	2007, 2015	54.00%	63.87%	12.56%	23.27%
Canada	2007, 2013	61.00%	66.40%	13.93%	22.84%
South Korea	2004, 2012	58.00%	95.91%	12.07%	20.82%
Spain	2012, N/A	13.00%	53.09%	2.48%	19.11%
China	2006, N/A	6.00%	59.25%	0.96%	15.94%
France	2007, N/A	37.00%	42.85%	2.47%	6.67%
Italy	2010, N/A	14.00%	38.24%	0.89%	6.39%
Russia	2013, N/A	18.64%	21.88%	1.13%	6.06%
Germany	2012, N/A	16.60%	58.73%	0.88%	5.33%
India	2015, N/A	7.00%	3.14%	0.04%	0.52%
United States	2003, N/A	56.00%	3.47%	0.18%	0.32%
Mexico	2012, N/A	15.64%	0.37%	0.01%	0.07%
Brazil	2013, N/A	40.00%	0.69%	0.03%	0.06%
Japan	2001, N/A	16.20%	0.03%	0.00%	0.02%

Low card penetration | High card penetration | High contactless penetration | Low contactless penetration

CREDIT SUISSE

Source: A.T. Kearney, Credit Suisse research

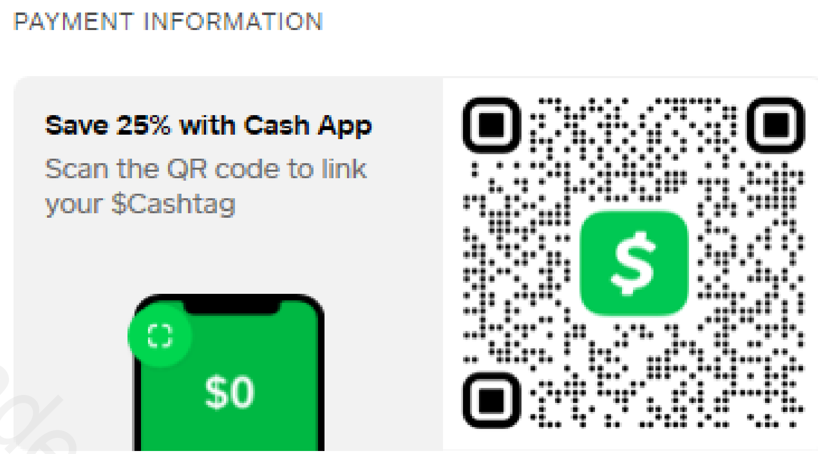
Return to Themes Table of Contents

21. Contactless payments

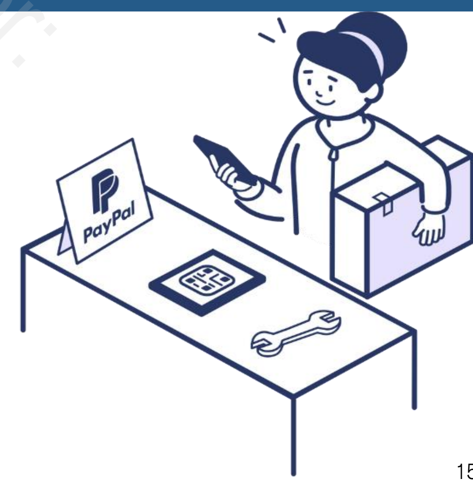
QR Codes as next wave of in-store payment acceptance

- In an effort to accelerate truly contactless payments in-store due to COVID, PayPal signed 29 large enterprises to support the acceptance of Venmo and PayPal QR code based payments representing over 600k locations in 2020, including CVS, Foot Locker, Nike, Macy's, etc. with ~1.3mm merchants supporting Venmo and PayPal QR codes as of Q2 2021.
- Management noted a 19% increase in TPV from customers that use QR codes.
- Further, in-store efforts across PayPal and Venmo for QR codes, contactless cards, and traditional cards yielded over $20b in TPV from almost ~10mm consumers.
- We see strong potential for these efforts to assist with the launch of PayPal's US in-store focused Zettle offering .
- Currently, Cash App users can only employ QR codes to checkout online.
- Cash App Pay (launched in September 2021) allows Cash App users to pay participating Square sellers in-store (via QR codes) and online (desktop uses QR codes, mobile does not).
    - Cash App Pay Beta launched in December 2020 without the in-store functionality

QR codes to facilitate Cash App checkout online (and potentially expanded in-store, omnichannel)



With the launch of Zettle in the US, we expect greater adoption of payments via Venmo and PayPal in-store QR codes



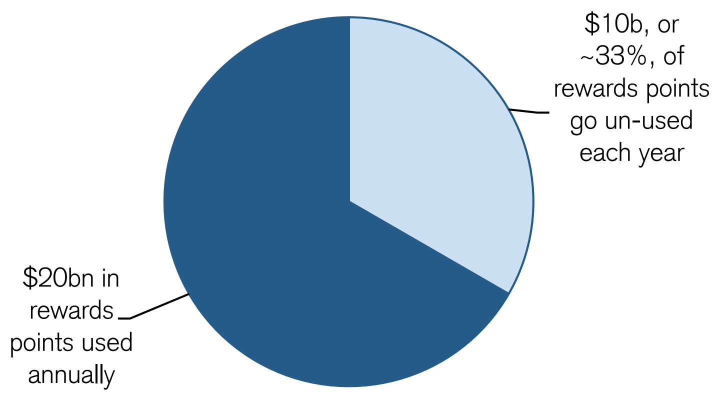
Source: Credit Suisse estimates,

Return to Themes Table of Contents

22. Loyalty and rewards becoming easier to spend
FinTechs entering the rewards and improving liquidity

- Opportunity for payments ecosystem to take friction out of using rewards points (provide an easy-to-spend, at the POS, instant access to rewards points vs. formally spending via a rewards program website), with various ways to provide this value (e.g., FIS, Square, PayPal programs).
- PayPal estimates 1/3rd, or roughly $10b worth, of reward points in the US go unused each year at the top 6 banks alone, while FIS suggests that there are more than 200b unused rewards points that are up for grabs.
- Merchants that work with FinTechs to accept loyalty rewards benefit from providing an option that consumers find attractive (per survey results below, potentially leading to increased foot traffic), an additional payment method choice online (greater choice generally leads to increased conversion), and potentially reduced costs (in the case of FIS Premium Payback, merchants are not charged interchange on the rewards-funded portion of the transaction).

PayPal estimates that ~33% of rewards points go unused in the US each year



FIS Premium Payback-related consumer survey results point to the value proposition for merchants

56% Consider Premium Payback a better value than other redemption options

88% Would redeem their points again for purchase rebates

88% Rated their experience (with FIS Premium Payback) as a four or a five

Source: PayPal, FIS, Credit Suisse estimates

Return to Themes Table of Contents

22. Loyalty and rewards becoming easier to spend

FIS Loyalty-as-a-Currency set to expand with WP merchants

- Thousands of financial institutions representing over 7,000 card loyalty programs are enrolled in the Premium Payback program.
- Gas stations were the initial vertical (~24k US gas stations); the success of the program had led to new vertical expansion.
  - No action required by consumer (will be prompted at the POS with the option to use rewards points)
  - Merchant benefits from reduced interchange for the rewards points-funded portion of the transaction
  - Issuer is able to remove liability from balance sheet and convert the points at a slight discount
- FIS-WP benefits from creating a value-added service for both issuer and merchant partners, allowing for a degree of increased stickiness, price compression protection, and potential share gains via new client additions.
- FIS went live with the first joint (FIS-WP) loyalty-as-a-currency customer in 1H 2020, with the integration work done for this first client paving the way for a more streamlined onboarding process for future new clients.
- FIS-WP will extend this offering into eCommerce sites of Worldpay merchants (large and multinational retailers).

FIS Premium Payback is seamlessly enabled into the existing POS payment process

1. Shop
Premium Payback works for existing customers and drives new in-store traffic.

2. Pay
Customers are surprised and delighted at the checkout POS when given choice to redeem points for dollars off of the purchase price.

3. Accept
A frictionless experience allows customers to complete a transaction just as they would normally do.

Early consumer adoption stats suggest the offer resonates at the POS

37%	Portion of consumers that accept the offer when prompted at POS (offer to redeem points as part of their current purchase)
10%	Increase (YoY) in take rate experienced during the early innings of this new service

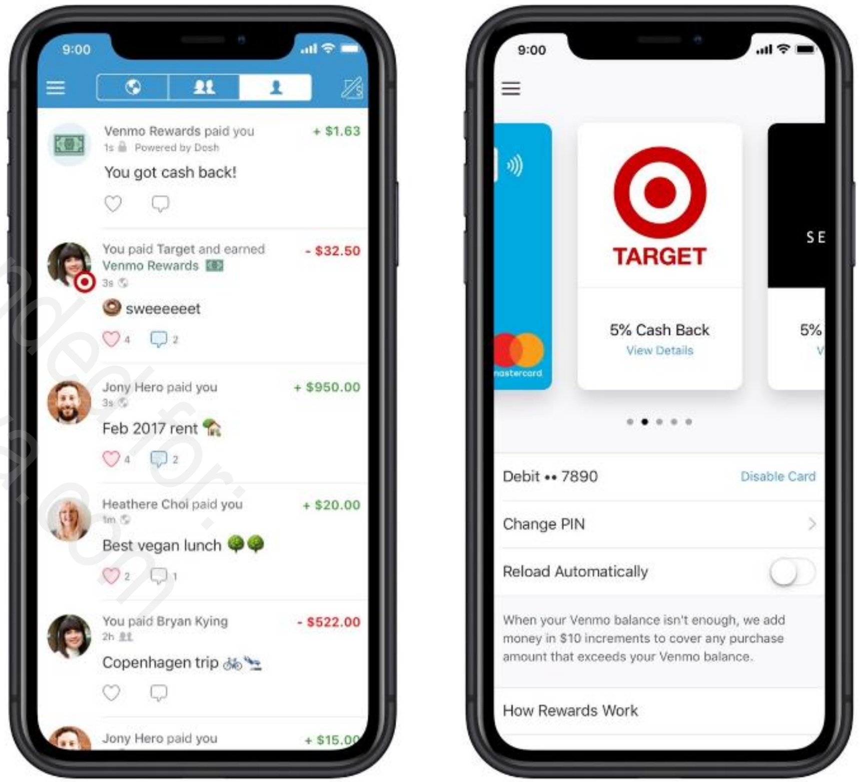
Source: FIS, Credit Suisse research

22. Loyalty and rewards becoming easier to spend

PayPal and Venmo leveraging their 2-sided networks

- PayPal provides instant rewards programs in two forms: PayPal Pay with Rewards and Venmo Rewards (cash back).
- PayPal Pay with Rewards:
  - Enables consumers to consolidate points across accounts to use at PayPal's >32mm merchants globally
  - PayPal benefits from reduced funding costs (rewards a low-cost funding method, supportive of transaction margins)
  - Deepens bank relationships, with large US issuers (partnering Chase, Amex, Citi, Discover, etc.) with PayPal
  - Banks improve their consumer value proposition and reduce reward points liability on balance sheet
  - Merchants benefit via increased conversion
- Venmo Rewards (cash back program):
  - The Venmo credit card is using rewards to drive engagement, offering double rewards through the end of 2021 (top spend category 6% rewards, next 4%)
  - Venmo is offering immediate Cash back on purchases at select merchants (when Venmo Card is used); funds entire Venmo account balance
  - We expect rewards to be used as an engagement lever for Pay with Venmo (PWV)
  - Unique (but similar to Boost from Square's Cash Card) in that attractive awards can be earned on a debit card (vs. credit card), given debit rewards have been meaningfully reduced since debit interchange became regulated for large banks after 2010

PayPal leverages its 2-sided network to drive value for the entire ecosystem (consumers, merchant, banks, and PayPal) via PayPal Pay with Rewards and the Venmo Rewards cash back program



Source: PayPal, Credit Suisse research

Return to Themes Table of Contents

22. Loyalty and rewards becoming easier to spend
Square's Cash App Boost

- Square's Cash Card (card attached to Cash App account for consumers) provides consumers with instant cash back rewards without an annual fee.
- Unique (but similar to Venmo Rewards) in that attractive rewards can be earned on a debit card (vs. credit card, given debit rewards have been meaningfully reduced following the Durbin amendment).
- Delivers rewards immediately (i.e., instant gratification to users, funds delivered to Cash App balance); examples are 15% of Shake Shack, $1 off any coffee, 10% off Nike, 10% off DoorDash, etc.
- Drives incremental revenue for merchants (Square and non-Square sellers) via foot traffic, frequency of visits, higher ticket size, etc.
- Cash App introduced Bitcoin Boost and Direct Deposit Boost in Q4 2020. The company noted that 50% of users that received the Bitcoin Boost were new to Bitcoin and 1/3rd started to trade Bitcoin in the following month.
- We approximate ~5% of Cash Card transactions are Boosted, which translates into a CSe contra-revenue of ~50bps of the blended ~150bps gross interchange revenue Square earns on Cash Card volumes.
- Cash Boost (rewards) potential to turn from a cost center (currently a contra-revenue item, serving as a marketing cost as Square funds the rewards) to a revenue generator (potential for merchant funding of rewards, paying for positioning within Cash App, etc.).
- The first step toward improving monetization of Boost has begun, with Square beginning to reduce some of the contra-revenue costs by asking partners to contribute to funding of the offers – next step could be to ask for full merchant funding, followed by competition (bidding) for positioning within Cash App.

Square's Cash App Boost has the potential to turn from a cost center (contra revenue item, with Square funding the rewards) to a revenue generating, hyper-targeted advertising platform

Source: Square, Credit Suisse research

Return to Themes Table of Contents

22. Loyalty and rewards becoming easier to spend

PayPal's Honey acquisition – Doing things other payments methods don't do

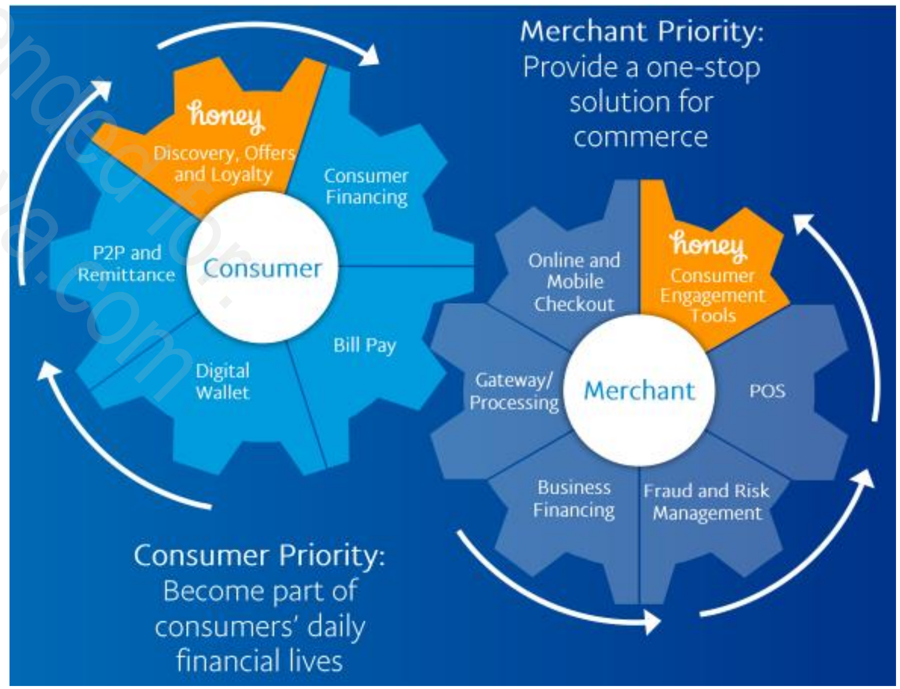
- In Nov. 2019, PayPal announced the $4b acquisition of Honey, an online shopping and rewards platform that works across more than 30k online merchants and ~17mm monthly active users, which PayPal can scale across its ~400mm users.
- ~40% of all eCommerce begins through a "trigger event", such as a personalized offer.
- It supports PayPal's pricing (i.e., transaction take rates) and will help to differentiate PayPal vs. alternative checkout methods; simply stated, doing things other payments methods don't do.
- We expect the integration of Honey shopping directly into the Venmo app as part of the Venmo app refresh in 2021 has potential to add additional utility as well shopping tools (e.g., wish lists, price monitoring, deals, coupons and rewards)
- Honey enhances Venmo's push into online shopping through rewards, in a similar vein to earlier brand initiatives.
- We note the vast majority of rewards are merchant funded, an emerging tool for marketers to directly engage with consumers.

"…This year we expect to work with our financial industry partners to introduce even more functionality, including budget and savings tools, investment alternatives including, but not limited to, crypto and enhanced bill pay options. We also intend to fully integrate the entire suite of Honey's shopping tools, including wish lists, price monitoring, deals, coupons, and rewards for use in the physical and digital worlds."

– Dan Schulman, CEO, Q4 2020 earnings call, February 3, 2021

Honey is a highly-strategic acquisition enabling PayPal to become involved with consumers at the beginning of the shopping experience (i.e., drives traffic to merchants, moving PayPal to top of funnel, a notable differentiator)

For consumers	For merchants
Helps save money by streamlining discounts and rewards, in addition to price-tracking tools and alerts	Expands PayPal's value proposition by enabling it to target specific consumer demographics with customized (personalized) offers, increasing conversion and sales



 Source: PayPal, Credit Suisse research

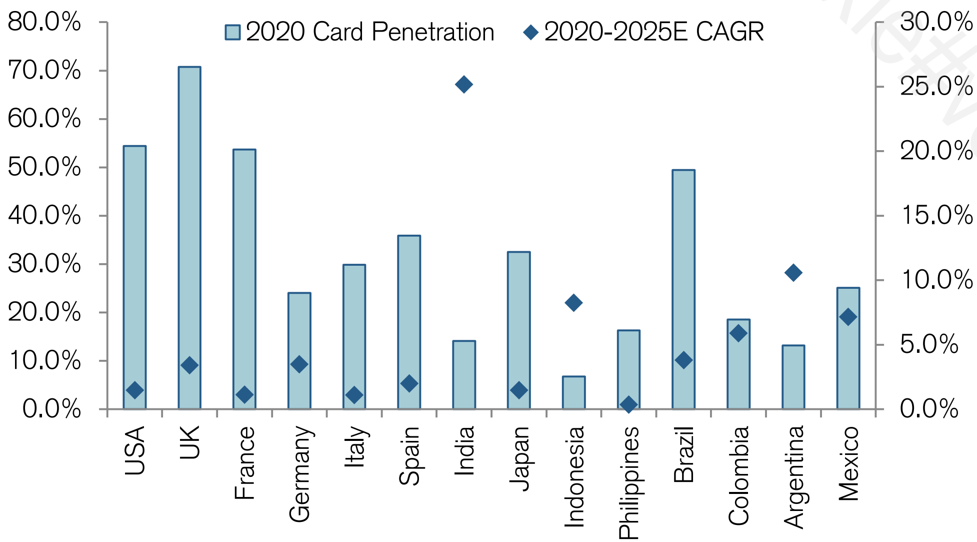
Return to Themes Table of Contents

23. Long runway for card penetration in both EM & DM markets

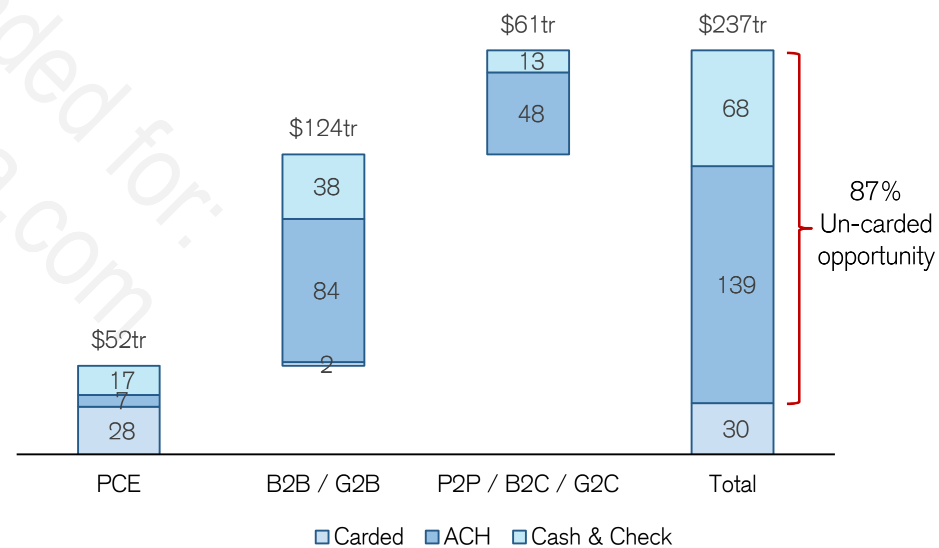
Emerging markets will be a key source of growth payments companies

- Emerging markets will be a key source of growth for global payments companies, with card payments growth in developed markets now below 10% (e.g., ~4-7% in the US) given now higher levels of PCE penetration.
- The Asia-Pacific region is the least penetrated, with a TAM of $6tr and meaningful opportunities for continued cash & check conversion in India, Japan, Indonesia, and the Philippines.
- Europe represents the next largest opportunity, with a TAM of $3.5tr in cash & check transactions yet to be converted, with still sizable opportunities in Germany, Italy, Spain, and France (for the card networks specifically).

Global card penetration of consumer spend remains low in numerous countries, with the US and the UK representing two of the more mature payments markets (both north of 50% penetrated)



Globally, Mastercard estimates there is still ~$17tr of cash & check within the Personal Consumption Expenditures (PCE), and ~$68tr in total globally



Source: Visa, Euromonitor, Mastercard, Credit Suisse research

Return to Themes Table of Contents

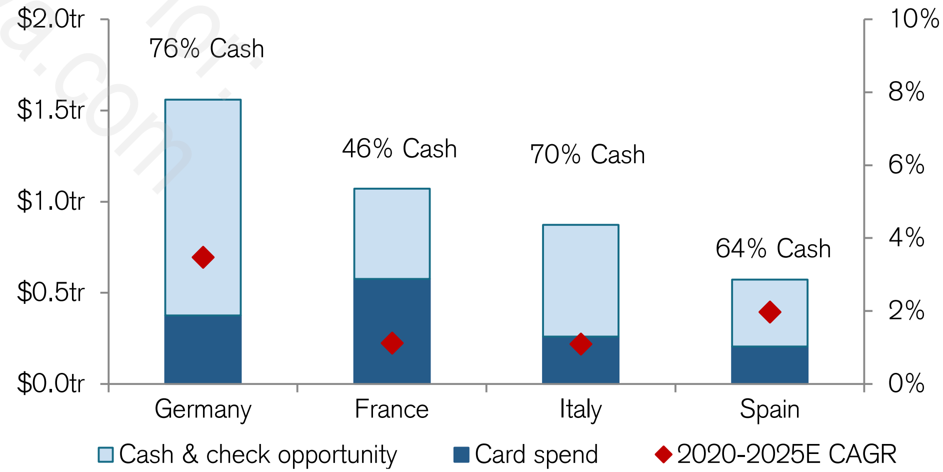
23. Long runway for card penetration in both EM & DM markets

Europe a ~$3-4tr cash opportunity, drivers, country highlights

- Government influence has been a driver of the European payments landscape, highlighted by interchange caps and PSD/PSD2.
  - Interchange Caps in December 2015 reduced acceptance cost and stimulates electronic payments penetration with SMBs
  - PSD/PSD2 aimed at fostering innovation and competition
- Debit-centric market – cultural preferences to not use credit.
  - Low-interchange also limits card reward programs, with interchange generally viewed as funding those costs
- Network mandate for all POS terminals to be contactless-enabled.
- Germany, #4 GDP country in the world:
  - Cash >55% of in-person payments, debit card ~25%
  - Girocard, national card scheme, >70% card share
- France, #7 GDP country in the world:
  - Cash ~45% of in-person payments, debit card ~30%
  - Cartes Bancaires, national card scheme, >90% card share
- Italy, #8 GDP country in the world:
  - Cash >60% of in-person payments, debit cards >20%
  - Bancomat, national card scheme, >40% card share

~$3-4tr cash & check opportunity remains in Europe

The key growth countries in Europe are still relatively cash heavy



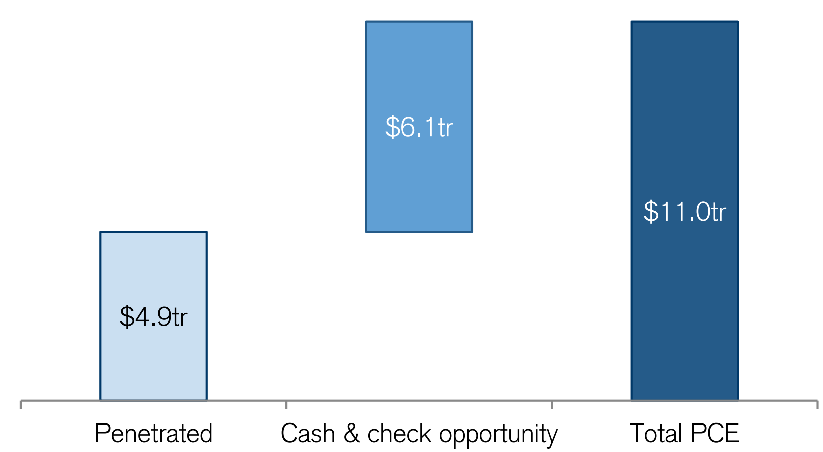
Source: Visa, Euromonitor, Credit Suisse estimates

23. Long runway for card penetration in both EM & DM markets

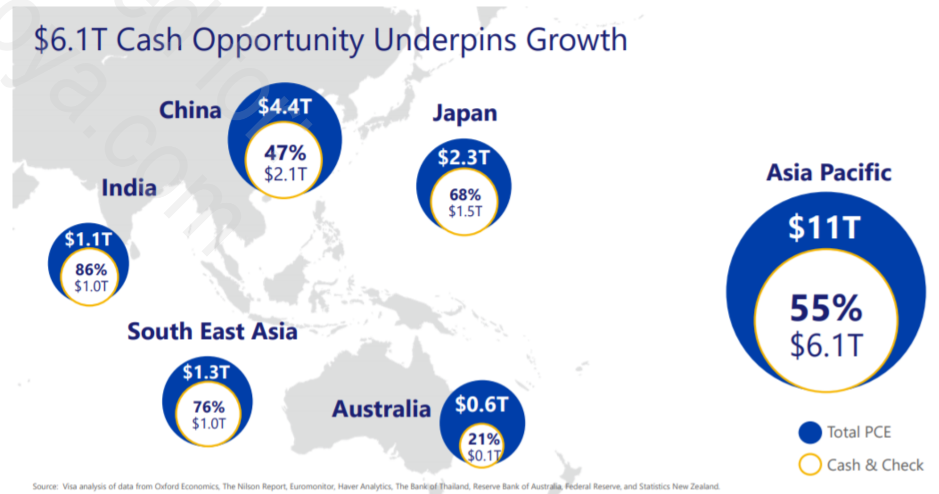
Asia-Pacific still ~50% cash & check, a favorable backdrop

- Government initiatives to reduce cash (India demonetization, Japan Cashless initiative).
- High smart phone penetration (e.g., China at 73% in 2020, South Korea at 91%, and Malaysia at 90%).
- Prevalence of super apps with large user bases (meets ubiquity requirements for consumer adoption of new payment behaviors).
- Near greenfield opportunity to fill in financial services gaps from large underbanked populations.
- QR codes lower barriers for electronics payments – cheaper, lower infrastructure requirements.

>$6tr cash & check opportunity to be brought onto electronic means of payments within emerging markets…



…with the opportunity in Asia-Pacific extending beyond emerging markets (e.g., Japan ~65% cash & check)



Source: GSMA, Statista, Visa, Euromonitor, Credit Suisse research

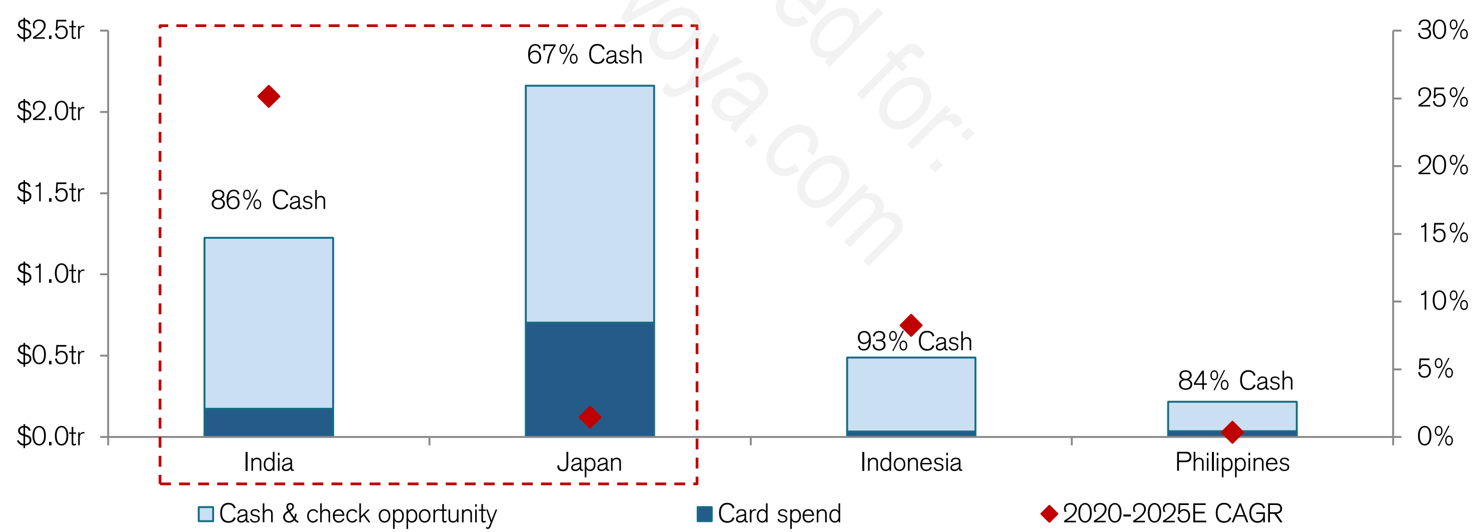
Return to Themes Table of Contents

23. Long runway for card penetration in both EM & DM markets

Asia-Pacific opportunities in India, Super Apps in the region

- India (#6 GDP globally, 2nd by population) along with Japan (#3 by GDP) represent the two largest addressable opportunities in Asia ex-China.
- India – Government highly supportive of electronic payments and, in 2016, introduced demonetization efforts to reduce cash.
  - Launched Unified Payment Interface (UPI) in 2016, utilized by Paytm, Google Pay, etc.; V/MA have ~70% share, along with Rupay (domestic network).
  - Paytm: largest payments wallet with >330mm users, ~40% owned by Alibaba (Ant Group), payments bank license in 2018 to offer debit cards and investment products (Ant Group started with similar products).
- Indonesia & Philippines – super app-dominated countries (unlocks large underbanked populations for payments ecosystem).
  - GoTo Group: super app >100mm MAUs, leader in Indonesia, Visa invested in 2019 in GoJek (merged with Tokopedia to form GoTo Group in May 2021) to promote 4-party payments model (Visa-credentials).
  - Grab: 25mm monthly transacting users, leader across Southeast Asia, first partnered with Mastercard in 2018 to issue pre-paid debit cards.

Both India and Japan represent the largest addressable opportunities, sitting at ~65-85% cash dominant



Source: Visa, Paytm, Euromonitor (September 2019 annual update), Credit Suisse research

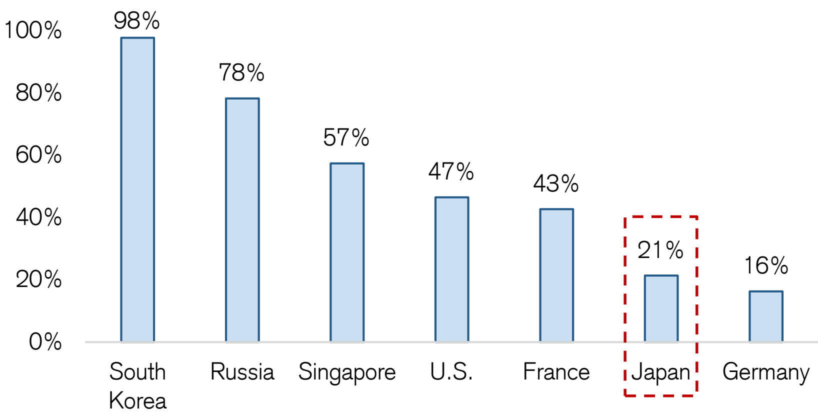
Return to Themes Table of Contents

23. Long runway for card penetration in both EM & DM markets

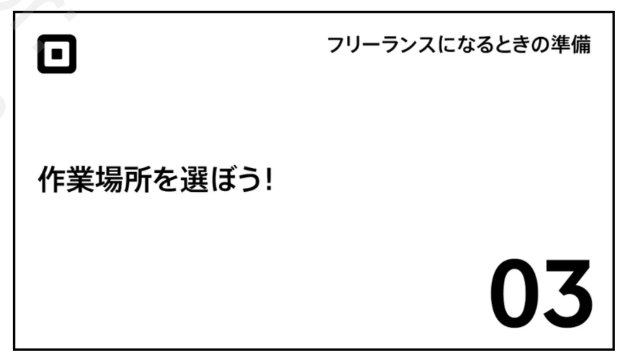
Japan cashless initiatives aim to 2x penetration by 2024

- Japanese government's Cashless Initiative is expected to take electronic payments from ~21-22% today to ~40% by 2024.
- Cash usage in Japan remains high, in part due to cultural reasons (including low crime rates/safety in carrying cash).
  - Incentives are provided to merchants for both acceptance and hardware costs, along with ~5% rewards (rebates) for consumers using cashless payments means at registered businesses (which are mostly SMB, given larger retailer are more likely to accept already).
  - As of November 2019, ~770k SMB had installed cashless payment terminals with the support of government subsidies (~39% of the 2mm eligible businesses).
  - In 2012, only ~33% of Japanese households were using cashless payments – that number has risen to ~50% recently.

Japan's cashless payment ratio is among the lowest of developed nations, sitting at ~20% (with government initiatives in place with an aim toward ~40% by 2024)



Square launched in Japan in 2013 and, more recently, began accepting JCB (local scheme); Management has highlighted the tailwinds related to government cashless initiatives



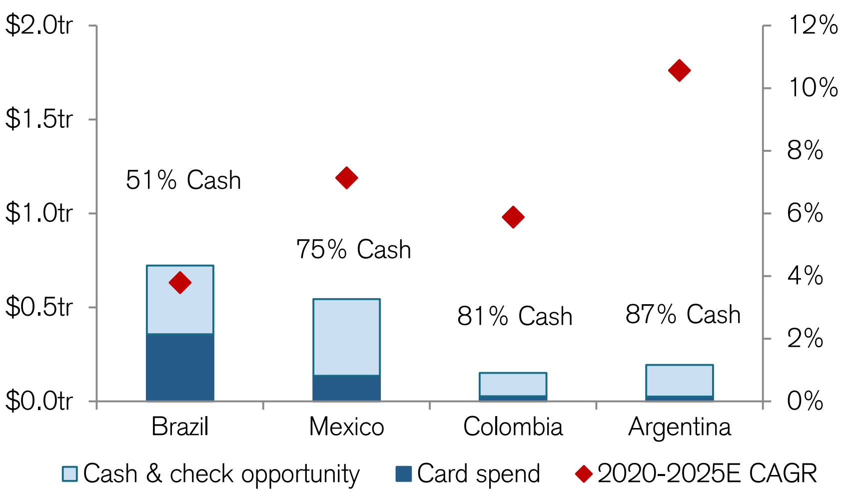
Source: Company reports, the BLOOMBERG PROFESSIONAL™ service, Japan Consumer Credit Association, Credit Suisse research

23. Long runway for card penetration in both EM & DM markets

Latin American opportunities greatest in Brazil, Argentina, Mexico

- Brazil (#12 GDP country in the world), Mexico (#15 GDP country), and Argentina (#31 GDP), along with acquiring markets opening, have made Latin America an attractive area of investment and growth (we focus below on First Data's entry and success).
- Brazil – until 2010, banks in Brazil were restricted to using only two incumbent acquirers:
  - (1) Cielo (previously VisaNet until 2010) had exclusivity on Visa acquiring; and (2) Rede, which had exclusivity on acquiring Mastercard transactions.
  - Following the opening up of the Brazilian acquiring market, First Data seized the opportunity by building a greenfield merchant acquiring business in Brazil from scratch in 2014 that has grown rapidly, gaining share from legacy acquirers with antiquated technology platforms.
- Argentina – similarly, regulators are ending card scheme exclusivity, but in a phased approach.
  - Visa and 14 Argentinian banks owned the Prisma network, which will retain exclusivity to processing their existing Visa portfolios through 2022.
  - First Data had 44% POS market share but only 15% acquiring share (2017) due to its inability to acquire Visa cards (~80% of the market).
  - Next catalyst will occur in 2022 when the Prisma exclusivity agreement ends.

Both Brazil and Mexico are healthy growing electronic payments markets, currently at ~50-75% cash dominant



First Data highlights the various acquiring markets that have opened up Latin America (Brazil in 2010, Argentina 2H 2018, Uruguay 2019, Chile)

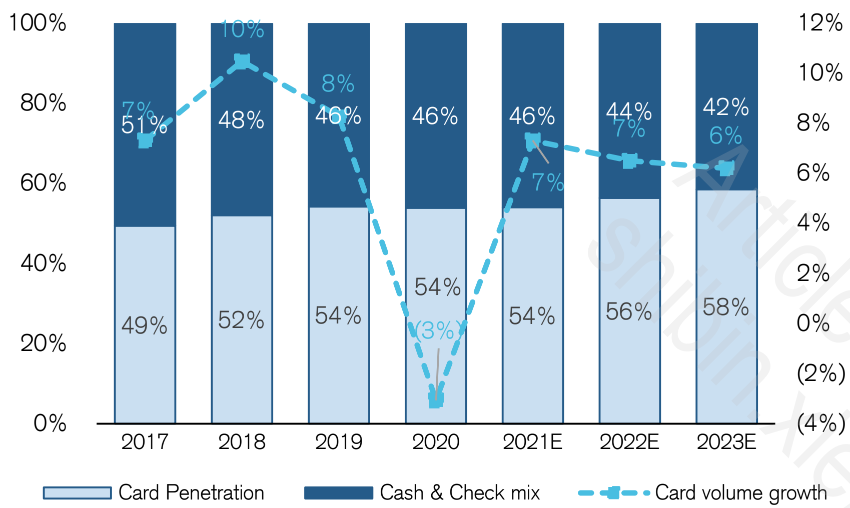
Source: First Data, Euromonitor, Credit Suisse estimates

Return to Themes Table of Contents

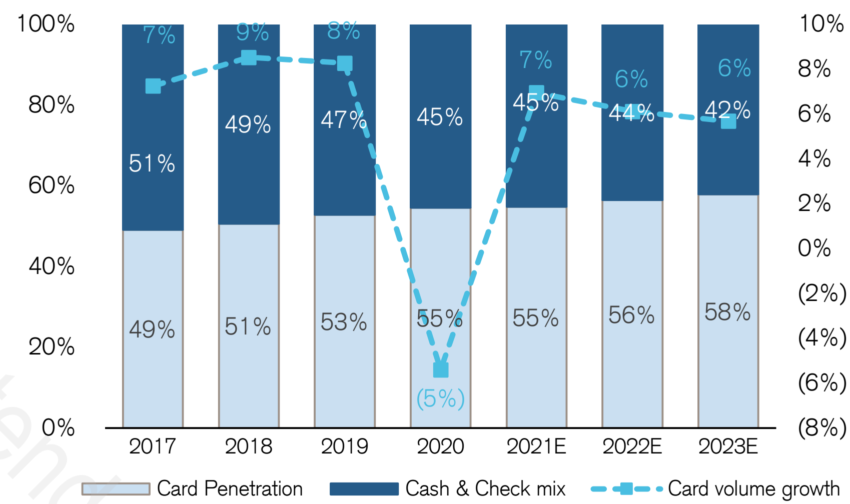
23. Long runway for card penetration in both EM & DM markets

Summary data for the US, Europe, AsiaPac, and LatAm

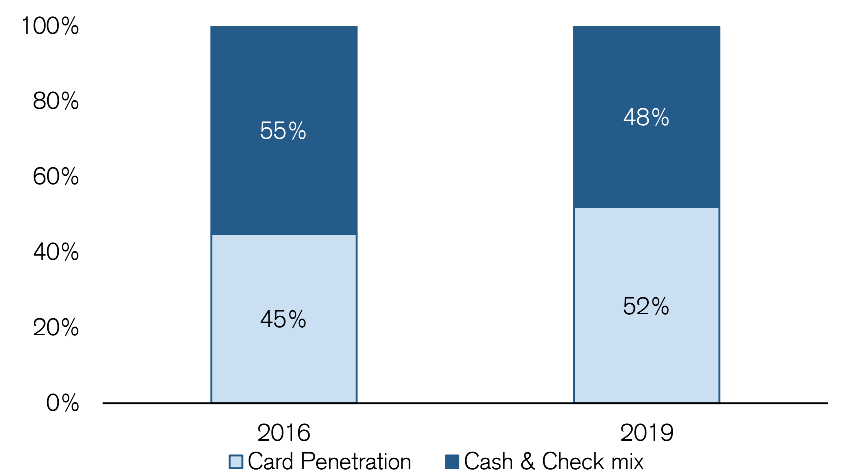
US



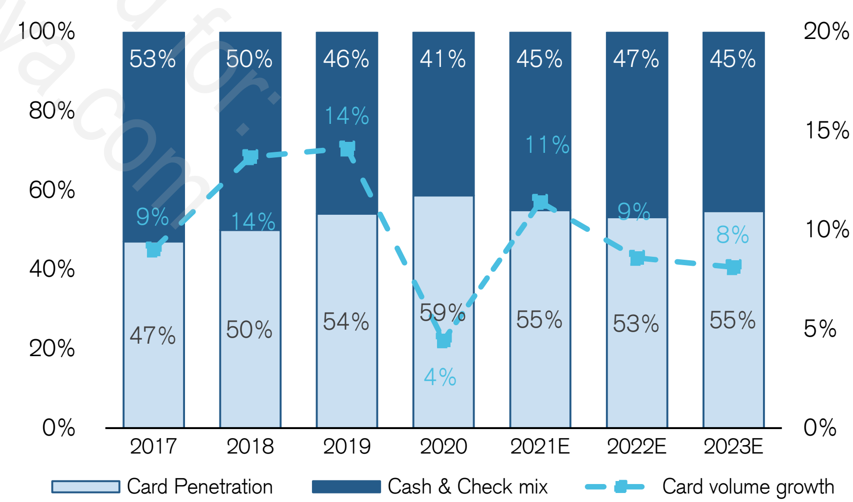
Europe



AsiaPac



LatAm



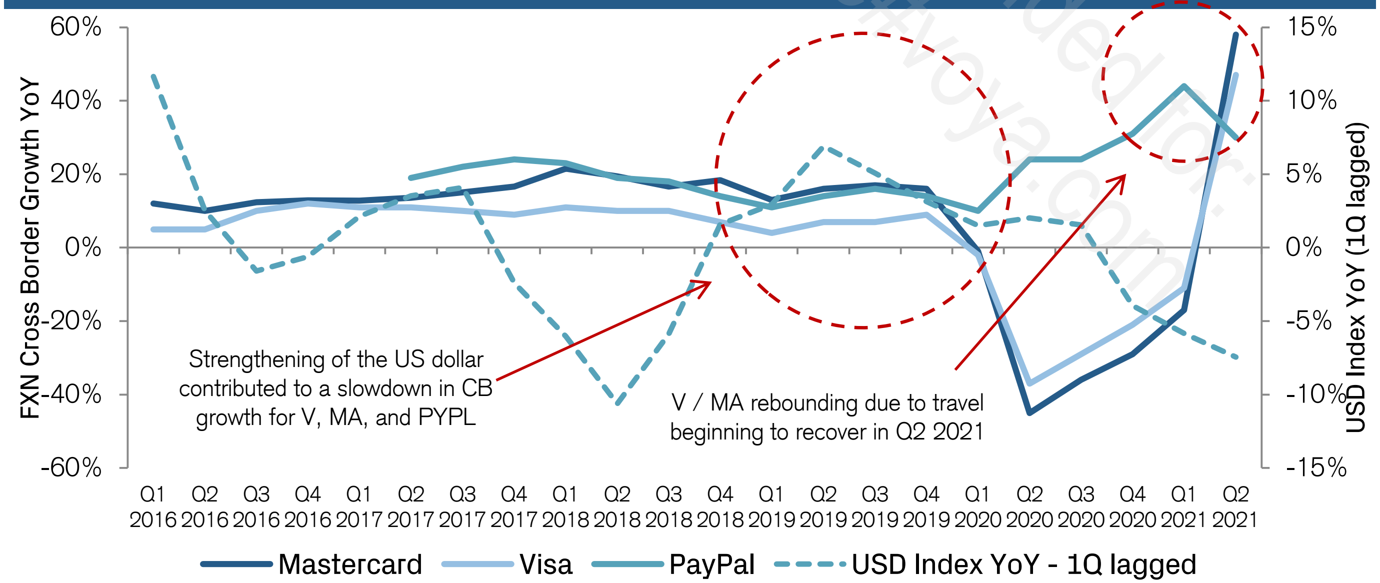
Source: Euromonitor, FactSet, Visa (for AsiaPac) Credit Suisse estimates

Return to Themes Table of Contents

24. Cross-border payments volumes
Travel and eCommerce key drivers

- Cross-border payments volumes for the card networks pre-COVID was comprised of ~50-60% tourism spend (both consumer and corporate travel), growing roughly mid-single digits, and ~40-50% eCommerce (this would have been closer to ~70% travel just ~5 years ago, and ~90%+ travel 20 years ago), growing in the ~20-30% range.
  - Tourism spend is inherently discretionary and cyclical as well as more sensitive to geopolitical factors and exchange rates, particularly a strengthening USD given (1) the US is the largest inbound tourism market in the world, much larger than US outbound, providing only a partial offset from increased US outbound cross-border; and (2) Over 65 countries use US currency or are pegged to the US dollar.
  - eCommerce spend is more stable, which helps to reduce cross-border volume volatility for the card networks as it increases as a portion of the mix (this has been happening for years, a trend we expect to continue).

Cross-Border Volume growth on a currency-neutral basis vs. the USD Index (1Q lagged); Strengthening of the USD generally leads to slower growth in cross-border volumes



"…Start with the thinking of cross-border as both determined by the level of travel and tourism on the one hand at a consumer level, combined with corporate travel and commercial travel at a commercial level, combined with cross-border e-commerce. When you look at all 3 together, you get what the market is growing at in a secular way…"

– Ajay Banga, CEO, Mastercard (February 2019, Q4 2018 earnings call)

Source: Company filings, FactSet, IMF, researchandmarkets.com, Credit Suisse research

Return to Themes Table of Contents

24. Cross-border payments volumes

Strong US dollar weighs on cross-border revenue in 3 ways

A strong US dollar has three impacts on the financial results of the card networks and a selection of merchant acquirers (e.g., PayPal)

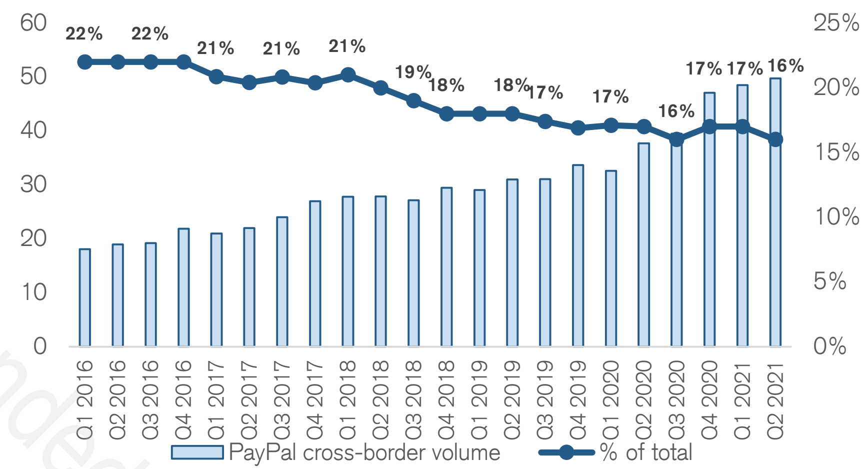
Demand destruction
Example 1: Brazilian consumers spend less on US-sourced eCommerce websites
Example 2: European consumer reduces vacation to the US in terms of total trip time, or in some cases, opts not to take the trip at all

Translational impacts
Example 1: US-based company (V, MA, PYPL) that reports in USD sees reduced reported revenue and earnings as a result of non-USD business being translated back to fewer USD as part of reported results

Amplified revenue & EBIT impacts
Example 1: Generally higher take rates and, thus, higher incremental margins associated with price-based flow through to EBIT and earnings

1. Demand destruction for tourism spend in the US given it becomes relatively more expensive – only partly offset by US outbound increasing given US has significantly more inbound spend (since US consumers travel less).
2. Translational impacts that reduce reported cross-border volume and revenue from when the USD is stronger.
3. Amplified revenue impacts due to higher take rate nature of cross-border, meaning there is a disproportionately larger impact on overall revenue and thus margins (given the incremental margins on this higher take rate business are higher).

PayPal's cross-border volumes make up ~16% of total, which has trended down from ~22% in early 2016, in part due to increasing Braintree/Venmo mix (historically more US-focused platforms)



- We believe Visa and Mastercard's cross-border businesses are more balanced vs. PayPal's (but also more cyclical given high travel mix).
- Visa and Mastercard have a greater mix of tourism vs. PayPal, which has a larger mix of retail eCommerce (meaning card networks may see increased cross-border outbound from travel spend when the dollar strengths as an offset to reduced inbound cross-border).
- PayPal has a greater mix of foreign consumers purchasing US goods vs. US consumers purchasing foreign goods (while Visa and Mastercard are more balanced in this sense, creating more of an offset as the USD strengthens and weakens).

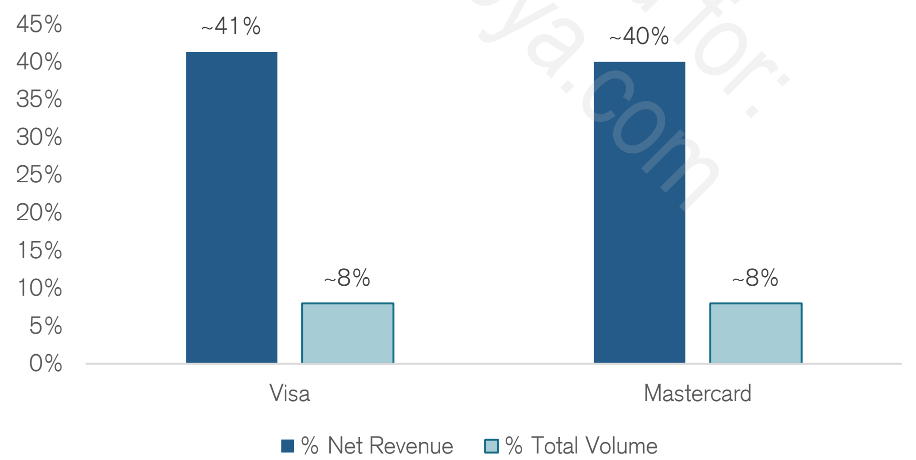
Return to Themes Table of Contents

24. Cross-border payments volumes

Attractive economics for the networks and acquirers

- We believe card network cross-border transactions can earn ~6 to ~8x the yield of traditional domestic transactions. Further, Visa and Mastercard process ~75-80% of their transactions, respectively, although they process ~100% of cross-border transactions (further adding to the revenue gap when comparing cross-border and domestic transactions).
- While there are no clear disclosures that allow for the derivation of these estimates, we use a combination of card network financial results, tourism spend, eCommerce market sizing, and numerous industry discussions to arrive at rough estimates of cross-border volume and revenue contributions (i.e., not precise estimates, but directionally indicative of cross-border's importance to the business – we aim to refine these over time).
- Select merchant acquirers revenue yield can be ~1.3-1.5x higher on cross-border transactions (based on rack rate pricing, although large merchants that have lower negotiated domestic rates could see differing gaps).
    - Differentiate by helping merchants avoid high cross-border fees from the card networks, enabled by local acquiring licenses in a country.
    - Local licenses allow acquirers to classify transactions as domestic (when the merchant maintains a business entity in the country), allowing the transaction to be processed in the local currency (avoids increased network fees, increased interchange, and improves authorization rates).

Revenue stemming from cross-border (yields higher than a traditional domestic transaction) vs. volumes for Visa and Mastercard; we est. ~M-HSD% of volumes & ~40% of revenue (2020E)



Source: Wells Fargo Merchant Services for US merchants, Credit Suisse estimates

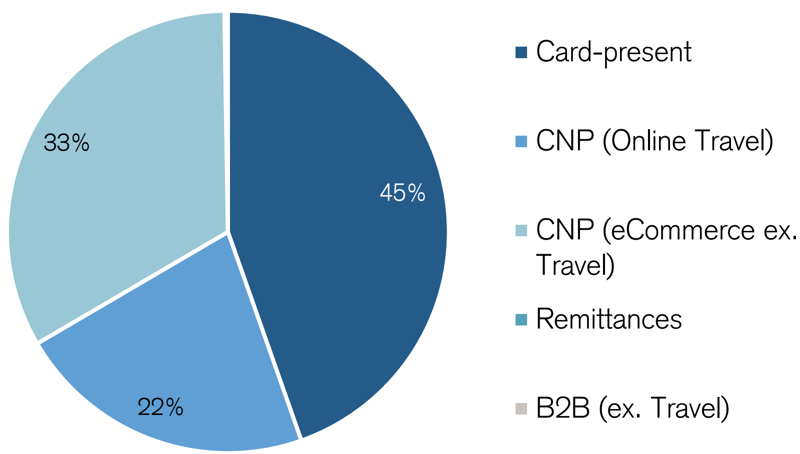
Return to Themes Table of Contents

24. Cross-border payments volumes

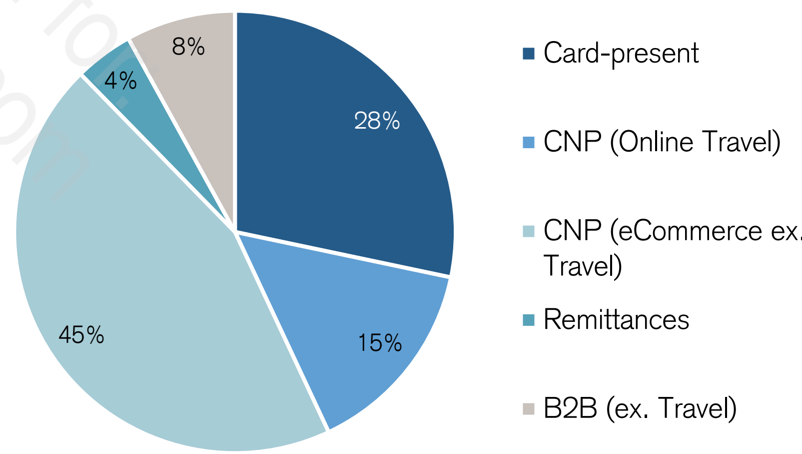
Cross-border mix evolving through COVID-driven changes and expansions into new end markets

- We estimate that pre-COVID, cross-border revenue made up ~40% of total for Visa & Mastercard, and the volume was ~2/3rd travel-related (slower growth end-market, more cyclical) and ~1/3rd retail & other eCommerce (faster growth, less cyclical). We estimate that during 2020 this volume mix evolved to ~57% retail & other eCommerce, with only ~41% from travel – a more attractive mix.
- We believe this reduced travel mix will be sustained post-COVID driven by greater revenue mix sourced via faster growth and less cyclical end-markets not only in retail eCommerce, but also in more nascent verticals such as remittances and B2B.
- This improved mix bodes well for Visa & Mastercard multiples, given cross-border is the most important & defensible (least impacted by nationalism, domestic payment schemes, and regulation) revenue stream (which can also be less associated with rebates & incentives).

Illustrative combined 2019 cross-border mix (pie chart), across both Visa & Mastercard, with travel components making up ~2/3rd of total



Illustrative combined 2024 cross-border mix (pie chart), across both Visa & Mastercard, with the addition of remittances & B2B and faster growth in eCommerce moving travel components to ~43%



Source: Company data, Credit Suisse estimates as of 3/16/2021

Return to Themes Table of Contents

24. Cross-border payments volumes

Attractive economics for the networks and acquirers

- Some of the variances between Visa and Mastercard cross-border net revenues could also relate to issuer mix (larger issuers for Visa, on average), regional processing share on domestic transactions (i.e., Visa has higher share of domestic transaction processing vs. Mastercard, in part due to US and UK mix, where Visa processes the majority of its transactions), and intra-European mix (transactions priced more similarly to domestic transactions, though are cross-border technically).
- Generally speaking, we would expect Mastercard to have a slightly higher portion of cross-border volume (and higher travel mix within this portion, due to travel virtual card & regional mix), although a greater portion of that being intra-Europe vs. Visa.

Network	Reporting of revenue associated with cross-border transactions
Visa	Cross-border related revenue contained in "Service Fees" and "Data Processing" (including a processing premium), along with the bulk of the premium residing in the "International transaction fees" line item.
Mastercard	Cross-border related revenue contained in "Transaction Processing Fees" (at a premium), and also within "Cross Border Volume Fees"; Mastercard's "Domestic Assessments" revenue line item does not contain brand fees associated with cross-border transactions.

Source: Wells Fargo Merchant Services for US merchants, Credit Suisse estimates

24. Cross-border payments volumes

Enabling global marketplace sellers and freelancers

- Marketplace sellers and freelancers are increasingly engaged on a cross-border basis, creating a need for cross-border currency management platforms such as Payoneer, EBANX, Airwallex, PingPong, and others, along with similar offerings via Wise and Revolut.
- Platforms can be thought of as global treasury networks offered as-a-service to SMBs.
  - Core offering involves multi-currency/"borderless" small business bank accounts, combined with the ability to convert back to the seller/freelancer's home currency within the provider's ecosystem (at a reduced rate vs. what might be charged by an eCommerce platform or what might be available via a traditional banking relationship).
  - Ability to pay out to local suppliers in local currency (further reducing FX fees given the currency remains local, often leveraging local payments schemes and/or faster payments rails for last-mile delivery); supplemented by cards attached to the borderless account, providing instant access.
  - Additional services might include working capital products (lending), eWallets, VAT services, fraud combatting solutions, etc.

Company	Overview of cross-border platform and how it supports SMB merchants
Airwallex	• Hong Kong-based platform with strength in APAC • Customers include: JD.com, Tencent, and Shopify; investors include: Tencent, Sequoia, DST, and Mastercard • 130+ countries and 50+ currencies
EBANX	• Brazilian-based platform that offers payments for the entire eCommerce transaction • Allows global merchants to more easily reach Brazilian consumers
Payoneer	• International money transfer for marketplace sellers and freelancers, along with working capital offerings, payout capabilities, and fraud combatting solutions for marketplace partners • 5mm+ customers and ~$45b of volumes in 2020, across 190+ countries and 150+ currencies • KYC, AML investment (automating as much as possible – i.e., in the US, 86% of accounts automatically onboard and get approved) • Provides solutions for marketplaces to combat fraud (~4% of revenues, with ~60-70% of fraud via by repeat users/opening new stores)
PingPong	• Hangzhou, Zhejiang, China-based platform with $10b+ in payments volume (1mm+ customers) • Amazon-focused for sellers in China (also works with sellers on NewEgg, Wish, and others) aiming to reduce cross-border fees for 3P sellers
Wise & Revolut	• Offer borderless accounts that compete with other companies on this page (although core business is in P2P money transfer)

Source: Company filings, Credit Suisse research

Return to Themes Table of Contents

25. COVID-19 as a forcing factor

Industry leaders' recent commentary on COVID-19

A common theme amongst thought leaders in the payments industry is how the COVID pandemic has accelerated the movement to digital and omnichannel interactions, it has accelerated plans for businesses, it has accelerated consumer adoption of remote commerce channels, and most importantly, many believe these changes will persist, recasting a new normal for the way for its users to interact with the payments ecosystem.

"By many estimates, the pace of e-commerce penetration has accelerated by several years in a single quarter, and there is greater demand for contactless payments than ever before"

"We have more confidence in the sustainability of the elevated e-commerce trends we are seeing. What had first felt like a potentially short-lived phenomenon resulting from initial panic and pantry packing and even stimulus checks has become a much more durable and profound behavior shift. We've seen the strongest and most encouraging new customer volume and engagement trends in our history…. As we sit here today, the concept of normalcy is being redefined and at times feels elusive. What we do know is that this is a pivotal moment in PayPal's history. We believe that we've never been better positioned to realize our ambition for greater relevance, ubiquity and impact as a global payments leader"

– John Rainey, CFO, PayPal (July 2020)

"Institutions globally are not going to move backwards to legacy mainframe-based systems. The digitization of financial services will accelerate catalyzed by the pandemic. Issuers will increasingly move toward newer cloud data technologies over time that leverage the talent based prevalent in today's market, increasing resilience and compliance in light of the regulatory requirements in the marketplace now and in the future."

– Jeffrey Sloan, CEO, Global Payments (July 2020)

"According to our latest COVID-19 consumer impact study, over 70% of consumers plan to continue or increase their online purchasing. And approximately 60% believe they will use less cash even after the pandemic subsides."

– Michael Miebach, CEO-elect, Mastercard (July 2020)

"In the first half of 2020, the penetration of e-commerce as a percentage of retail sales outpaced prior external forecasts by an astonishing three to five years… Both consumers and merchants are rapidly moving towards digital payments across their online and offline experiences. This is an existential issue for merchants who realized that reopening their retail stores depends on touchless forms of payments to keep both their employees and customers safe and healthy."

– Daniel Schulman, CEO, PayPal (July 2020)

"I think the pandemic has accelerated everything people thought about digital. Maybe what people thought would take five years will take two years or less than that. You watched us build capability in digital much faster than maybe we would have thought it would have taken before, and our clients are fully engaged in it. So I think speed matters, and clients are completely committed to being digital-first, and we're committed to delivering digital-first for them."

– Frank Bisignano, CEO, Fiserv (Aug 2020)

"The crisis accelerated many favorable secular trends, the digitization of cash, the shift to e-commerce, and the penetration of tap-to-pay."

– Vasant Prabhu, CFO, Visa (July 2020)

Return to Themes Table of Contents

25. COVID-19 as a forcing factor

Utilization of online financial services increasing

- Closures and social distancing measures have driven many consumers to utilize online banking and mobile phone applications to conduct their banking activities as opposed to in-person.
- FIS noted that April saw a 200% jump in new mobile banking registrations, with mobile banking traffic increasing 85%.
- J.D. Power noted a 14% increase in digital banking usage among largest banks as of April 5, 2020.
- We believe that COVID-19 has accelerated the adoption of online banking, with many consumers overcoming traditional hurdles (i.e. the comfort/trust of a personal relationship with your banker), we believe the customers will be relatively sticky due to the convenience factor; a recent study conducted by Novantas found that only 40% of respondents said they expect to return to physical bank branches post-COVID.

"The COVID-19 pandemic <u>has accelerated and solidified a transition in how customers behave and interact with brands that was already well underway</u>, posing significant questions around how companies can best serve customers going forward"

– Beth Johnson, Chief Experience Officer, Citizens Bank (July 2020)

½ of respondents and ¾ of businesses stated COVID-19 had changed the way they interact with their financial institution…

50% Believe COVID-19 changed they interact with their bank

67% Feel these changes will be permanent

69% Prefer banking online some or all of the time

Source: Citizens Bank, Company Reports, J.D. Power, Novantas, Company Websites

Return to Themes Table of Contents

25. COVID-19 as a forcing factor

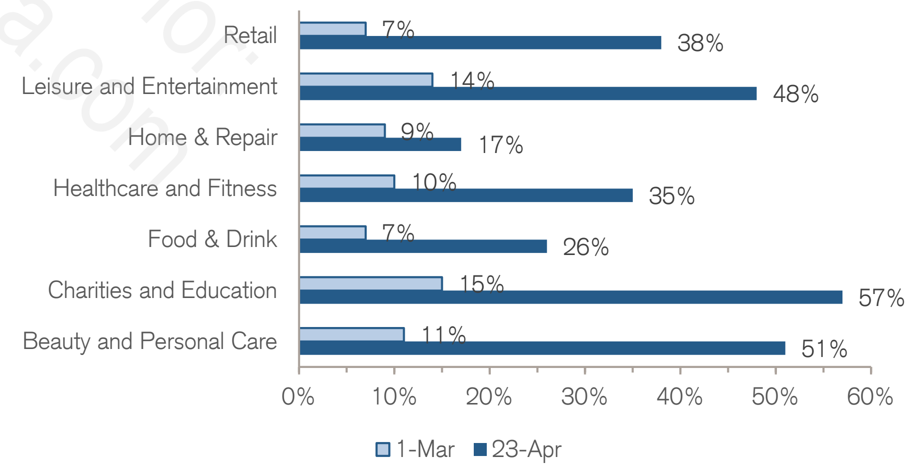
CDC guidelines and consumer preferences driving cashless

- Visa stated that Q1 2020 global tap-to-pay payments were up 40% YoY, with 60% of face-to-face transactions ex-U.S. being tap-to-pay.
  - In the US, 80mm Visa contactless cards were shipped in the first six months of 2020, and the total outstanding contactless cards were noted as ~190mm (in June 2020) out of ~1000mm cards in the US (or ~20% penetration).
  - ~50 countries improved tap-to-pay penetration by more than 5%, and over 10 countries increased tap-to-pay penetration by more than 10%.
- Mastercard noted a similar trend, with >50% of switched volumes in April being card not present and a 40% increase YoY in contactless transactions worldwide.
- WHO and CDC recommended the use of contactless payment options as opposed to cash to reduce risk of transmission.

"Tap-to-pay is likely to accelerate post-COVID, especially as consumers start going back to the office, where they tend to conduct smaller transactions for their commute, paying for public transit fares, and buying food and drinks."

– Alfred Kelly, CEO, Visa (July 2020)

From March 1st to April 23rd Square sellers skyrocketed from 8% cashless to 31% cashless; Led by Retail and Beauty



Source: Square company website, Company Reports, WHO, CDC

Return to Themes Table of Contents

25. COVID-19 as a forcing factor

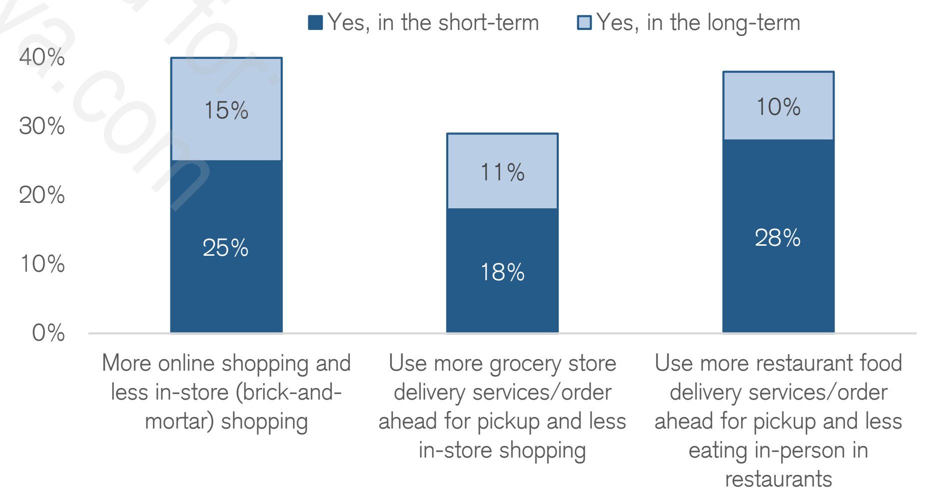
eCommerce absorbing offline retail sales

- Adobe Digital Insights estimates that COVID-19 accelerated the growth of e-commerce between 4-6 years.
- Widespread social distancing and statewide store closures has begun accelerating ecommerce shopping.
- U.S. online retail sales were up ~15% YoY in Q1 2020 U.S. Department of Commerce.
- Adobe Analytics noted that U.S. daily ecommerce sales grew 49% from April 1-23 vs. March 1-11, and total online spending increasing 77% YoY in May 2020.
- While we acknowledge that some retail sales will shift-back to in-person channels, we believe that many shoppers (who have developed preference habitually) will continue to utilize ecommerce options once restrictions have been fully lifted.

"According to our data, it would've taken between 4 and 6 years to get to the [eCommerce] levels we saw in May if the growth continued at the same levels it was at for the past few years… We typically don't expect to see surges at this level, at any time outside of the holiday season."

– Vivek Pandya, Digital Insights Manager, Adobe (July 2020)

FIS Survey results indicate both short-term and long-term shifts in consumer behavior, notably with 15% of respondents expecting to conduct more online shopping in the long-term



Source: Adobe Analytics, Forbes, Adobe, Company Reports, FIS Performance Against Consumer Expectations Survey

Return to Themes Table of Contents

25. COVID-19 as a forcing factor

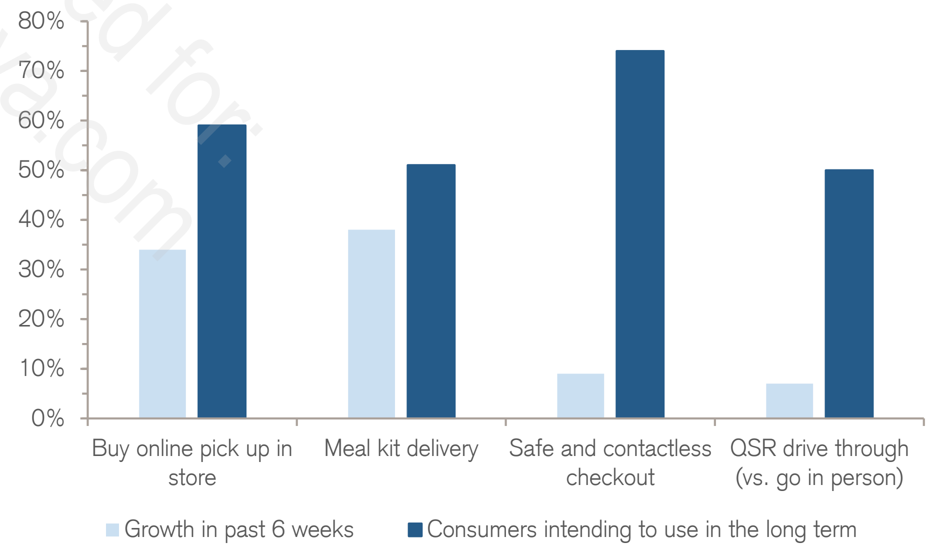
Omnichannel offerings are increasingly important for consumers

- Statewide social distancing and closures have increasingly driven consumers to leverage omnichannel to continue to shop safely (i.e., curbside pickup, delivery, eCommerce).
- Businesses which have predominantly conducted business in-store are finding success (and surviving) by shifting to omnichannel experiences to accommodate consumer demands.
- Adobe Analytics reported that buy online, pickup in store (BOPIS) grew 259% YoY in August 2020 (up 59% MoM).
- As consumers begin to habitualize these services (i.e. curbside pickup, meal kit delivery, QSR drive through, etc.) and recognize their utility, we believe that many will continue to leverage these services even post-COVID.

"We are seeing signs that online purchasing trends formed during the pandemic <u>may see permanent adoption</u>… While BOPIS (Buy Online Pick up In Store) was a niche delivery option pre-pandemic, it is fast becoming the delivery method of choice as consumers become more familiar with the ease, convenience and experience"

– Vivek Pandya, Digital Insights Manager, Adobe (July 2020)

McKinsey COVID-19 US Consumer Pulse Survey Indicates that buy online pick up in store has grown 34% in the past 6 weeks, with 59% of consumers intending to continue in the long term



Source: McKinsey & Company Consumer Pulse Survey, Forbes, Adobe, Company Reports,

Return to Themes Table of Contents

25. COVID-19 as a forcing factor

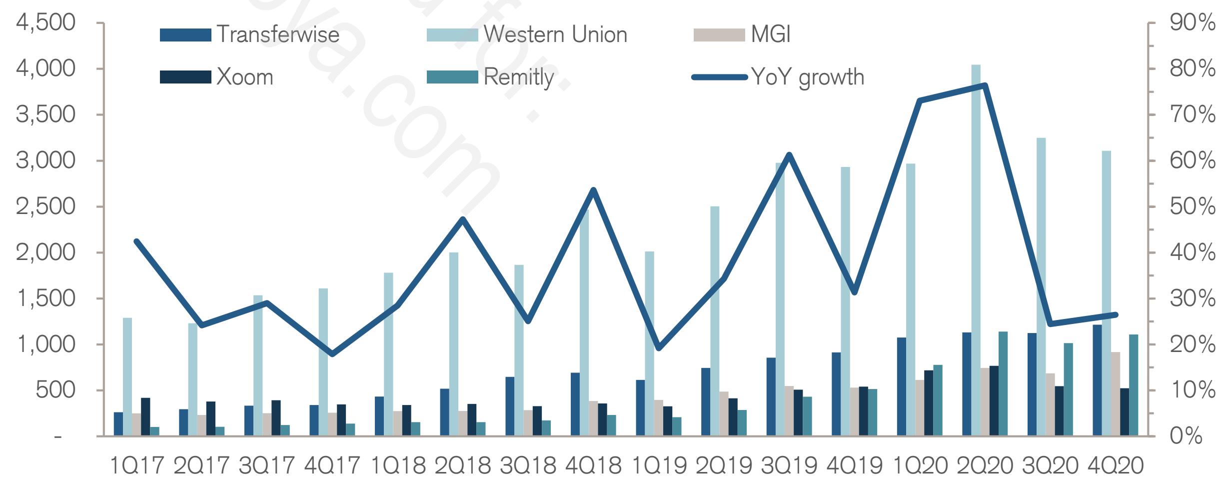
Increasing consumer adoption of online remittance offerings

- Due to statewide closures and increased social distancing guidelines, many consumers leveraged online or mobile applications to send critical cross-border remittances in lieu of traditional brick and mortar agent locations.
- IMXI online transactions increased 142% YoY in Q3 2020 and number of customers using the app increased 48% YoY.
- Western Union online transactions increasing 96% in both Q2 and Q3 2020.
    - Digital transactions have grown from 15% of the C2C transactions in Q2 2019 to 31% in Q3 2020.
- It is clear that COVID has forcibly removed a level of inertia from the remittance process, that level of trust and comfortability with in-person interactions (important when handling critical funds for the receivers [literal monthly income]).
- We acknowledge that a certain subset of consumers which are unbanked or underbanked (~20% in the US) will be unable to move to digital, as in order to begin sending money, linkage to a bank account is required. This subset will continue to fuel B&M remittances.

"The current environment has benefited the border digital money transfer market and not just from retail customer switching. It is also bringing in new consumers to the market, some from informal channels or banking system and others with recently developed needs. They keep the westernunion.com momentum going, we will continue to invest in acquiring new customers and enhancing services like real-time payments"

– Hikmet Ersek, CEO, Western Union (Aug 2020)

Monthly app downloads (thousands) for popular remittance apps were up ~47% YoY in 2020, led by Remitly, MGI, and Transferwise



Source: Sensor Tower, Company reports, Credit Suisse estimates

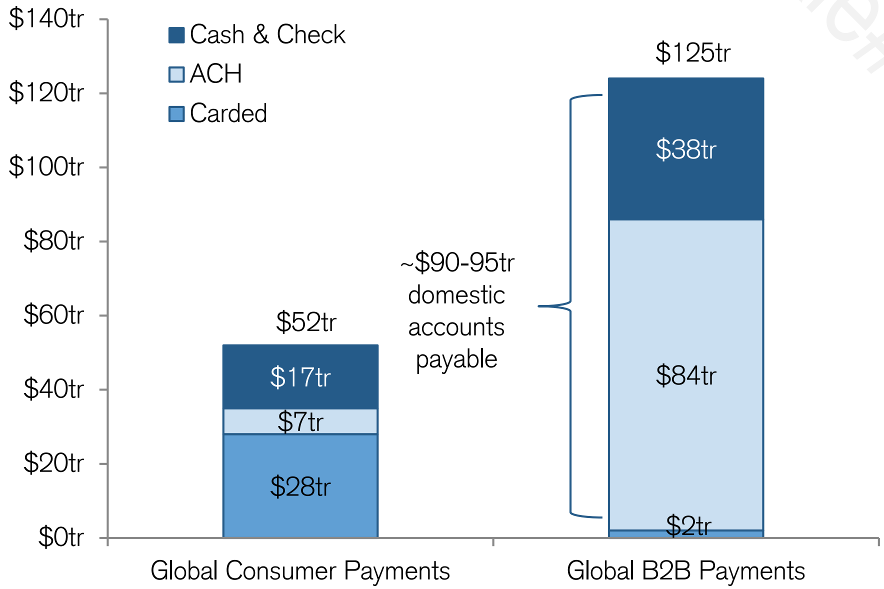
B2B/Corporate Payments

Return to Themes Table of Contents

26. B2B payments coming of age
Underpenetrated growth market nearing inflection

- $125tr TAM that is so large it almost does not merit discussion; accounts payable (AP) payments between businesses represent ~$110tr (~90%) of the B2B opportunity, of which ~20% is "card-able" and ~$10tr is cross-border.
- Card networks are enablers for the rest of the ecosystem by embracing alternative payment types in B2B (e.g., efforts in bill-pay, virtual cards, push payments, account-to-account).
- Public and private technology companies building software and workflows to unlock this opportunity (i.e., issue is less around the payments themselves and more on the processes, reconciliation, data, workflows, etc.).
- B2B pure-players, FleetCor and WEX, differentiated with comprehensive B2B capabilities targeted at SMBs – both can now handle the entire AP file and are building supplier networks to help address the pain points below.

Global B2B TAM ~$125tr volume opportunity, although with various means of monetizing volume (*ad valorem* via virtual cards, cents per transaction on ACH, SaaS fees, etc.)



While the actual payments can be less of an issue, antiquated processes, reconciliation, data, and a lack of automation are common pain points

Highly manual (people-intensive) processes are slow and expensive, given a lack of automation, and error prone

Checks have hidden costs (e.g., checks can be in the ~$4-20 range vs. ~$3 per ACH transaction, per AvidXchange) and are not guaranteed good funds

Limited transaction data from payments make reconciliation difficult

Cash flow management difficulty – i.e., paying on the due date with certainty vs. mailing a check a few days ahead of time, lacking certainty

Lack of visibility into supplier payment preferences

Source: Mastercard, Visa, Credit Suisse, Rounding differences for B2B payments figure

Return to Themes Table of Contents

26. B2B payments coming of age

Companies under coverage with B2B exposure (V, MA, FLT, WEX, etc.)

Company	Overview of B2B assets
Mastercard	• Commercial business: corporate cards, travel and expense cards, fleet cards, and small business cards, representing ~11% of volume • Mastercard Track Business Payments to optimize B2B flows, acting as the switch and directory (~210mm registered entitles as of September 2019) • Leading provider of Fast ACH solutions (Vocalink & Nets), representing 67% of the addressable B2B TAM • Transfast, account-to-account payments platform, allows MA to reach ~90% of the world's bank accounts • Largest Virtual Cards business and push payment capabilities from Mastercard Send • Bill Pay Exchange (launched 4Q 2019), targeting a $4tr TAM in the US, and global capabilities gained from the Nets acquisition
Visa	• Corporate cards, also representing 12% of volume • Visa Direct, the company's rapidly scaling push payments product, growing +~75% YoY to reach ~$350b of volume in 2020 (CS estimate), which combines with Earthport's account-to-account payments capabilities providing Visa with access to 99% of bank accounts in the top 50 markets; currently working with all large remittance providers • B2B Connect, distributed ledger-based cross-border platform for higher-value transactions/larger merchants (FIS and Bottomline distribution partners) • Business Payments Network, payments directory that contains payments preferences (which suppliers take what type of payments)
FleetCor (Pure-play B2B)	• >80% of revenue derived from B2B payments: Fuel (44%), Corporate Payments (18%), Tolls (12%), and Lodging (9%) • Full suite of Accounts Payable products with ability to handle the full spectrum of payment methods (Nvoicepay acquisition in 2019), including cross-border (Cambridge acquisition in 2017) • Largest issuer of virtual cards (Comdata acquisition in 2014), and is building a vertical specific supplier network to accept virtual cards (separate integration required), consisting of ~1mm distinct businesses
WEX (Pure-play B2B)	• >75% of revenue derived from B2B payments: Fuel (59%), Travel and Corporate Payments (18%) • Pioneer of virtual cards first used in the travel industry, with the broadest virtual card issuance (Mastercard, Visa and JCB) • Complete accounts payable file servicing, with the ability to make payment by virtual card, ACH, check, or wire transfer • White-label virtual card management platform for banks, leveraging assets from the AOC acquisition – customers include AXP & PNC • WEX also white-labels its Accounts Payable product to banks (AXP, PNC), leveraging assets from the AOC acquisition in 2017 • Offers invoicing and bill-pay to corporates and consumers via capabilities gained from the Noventis acquisition in 2019
Paya	• Mid-market focused merchant acquirer with ~38% of revenue generated from B2B supplier payments • The company estimates nearly $1tr of total US card payment volumes ($400b+ via B2B, with ~8% card penetration) across its five core verticals • Paya provides integrated payments into B2B and other similar verticals which are a relatively less competitive (vs. restaurant, retail, etc.), providing an attractive backdrop
Repay	• B2B now ~20% of volume; aims to cross-sell A/P and A/R solutions with diversified sub-vertical exposure; Ventanex is in both healthcare B2B (outbound payments on behalf of insurers) and mortgages • Recent acquisition of APS Payments for entry into B2B vertical. followed by CPS and cPayPlus • Integrations into Sage, SAP, Adagio, etc. representing an immediate addressable opportunity of ~$80b in volumes vs. RPAY 2019 ~$10b • Will compete with Paymetric (among others) in this vertical

Source: Company reports, Credit Suisse research

26. B2B payments coming of age
Additional B2B assets at various public companies

Company	Overview of B2B assets
FIS	• Legacy Worldpay expanded into B2B with the 2017 acquisition of Paymetric, which manages and automates payment workflows within enterprise systems (Oracle, Hybris, Sales, etc.) • FIS provides traditional B2B solutions to its bank customers, such as cash and treasury management • FIS is planning to create a broader B2B solution by combining its treasury management solutions with Paymetric
FISV	• Management sees the potential for increased B2B money movement by combining FISV cash management, CheckFree RXP (e-Billing solution) with some of First Data's payments capabilities • Leader in bank-based Zelle implementation and considers B2B a potential opportunity for the Zelle platform • Popmoney capabilities in B2B money disbursements
Global Payments	• MineralTree acquisition expands TAM into B2B AP automation and increases GPN's B2B scale to >$600mm in annual revenue • Previously called out B2B as an opportunity from the TSYS acquisition with Netspend's payroll card; views Netspend as a launch pad into B2B areas including invoicing and accounts payable automation (both in the US and on a global basis)
PayPal	• Bill Pay TAM expansion via the January 2019 partnership with Paymentus and more partnerships expected to be announced • PayPal's network with >32mm merchants positions the company well for further expansion into B2B payments
Square	• Initial step into B2B payments with its Invoices product, enabling sellers to send professional invoices • Launched Square Card in January 2019, a business debit card for Square merchants • Also offers Cash App for business, allowing merchants to accept payments via Cash App • Cash App is the largest source of Visa Direct transactions – more than 3x nearest competitor • We expect Square to launch additional B2B products, such as a business credit card through Square Capital
Bill.com	• Provides accounts payable and receivable solutions and accounting software integrations • Partnerships with FleetCor for virtual cards • SMB-focused platform, with likely some overlap with FleetCor in the lower-mid-market
Bottomline Technologies	• Offers Paymode-X B2B payments platform with 600k+ members in network and $200b+ annual volume • Included distribution through key banking partners (e.g., Bank of America)
Western Union	• Payment solutions for SMBs, mostly consisting of cross-border payments, and white-labels the solution to banks • Industry-specific solutions, customizing their offering by vertical

Source: Company reports, Digiday, Credit Suisse research

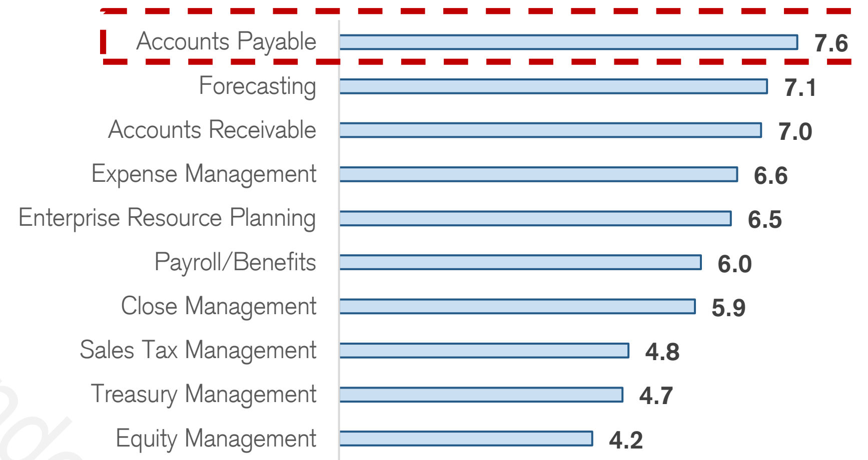
Return to Themes Table of Contents

27. AP Automation transforming the traditional back office

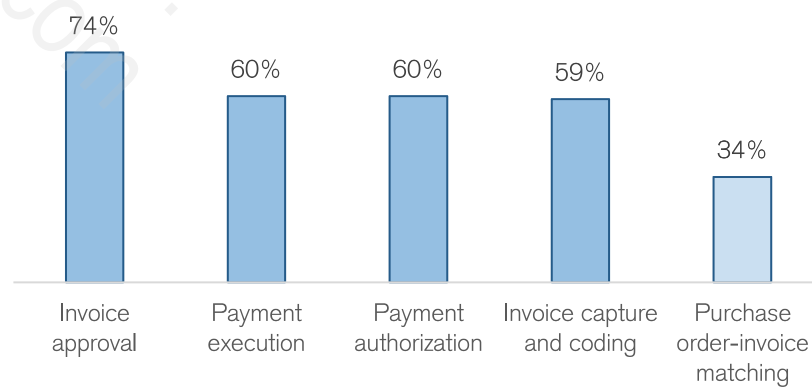
Significant benefit, but still in the relatively early stages of adoption

- Accounts payable (AP) automation has been transforming traditional AP processes which had been manual (often still paper-based), slow, and costly.
  - MineralTree states time savings up to ~80% in the general AP process, with payback periods ranging from several weeks to months.
  - Tipalti has noted that its offering similarly reduces up to ~80% of the payments workload, and can accelerate time to close by ~25%.
  - Finexio has indicated that AP automation presents the opportunity to offset associated costs with automation, effectively allowing for a $0 expense to run a payments back-office.
- While COVID-19 has led to a step-up in the adoption of digital payments and AP automation, they largely remain in the early stages, according to MineralTree.
  - Digitization and automation of the AP (closed followed by AR) function ranks as the top priority of the finance departments.
  - While each individual AP task (invoice approval, payment execution, payment authorization, and invoice capture & coding) has been automated by at least ~60% of companies, only ~9% of companies have end-to-end AP automation (i.e., all four steps automated).
  - In its latest survey (April-June 2021), MineralTree (recently acquired by GPN) surveyed 669 finance professionals involved in the AP function at companies of various sizes, providing a timely view of the current state of AP automation.

AP tops the list of digitization/automation priorities at companies' finance department (with AR ranking 3rd but not far behind)



AP tasks that have been automated:
While each individual AP task has been automated by the majority of companies (other than PO-invoice matching), only ~9% of companies have end-to-end AP automation (all 4 tasks automated)



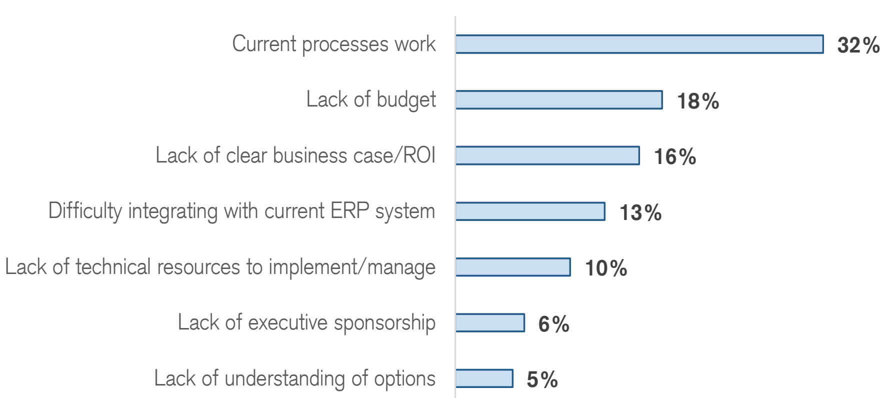
Source: MineralTree State of AP Report 2021, Tipalti, Finix, Credit Suisse research

27. AP Automation transforming the traditional back office

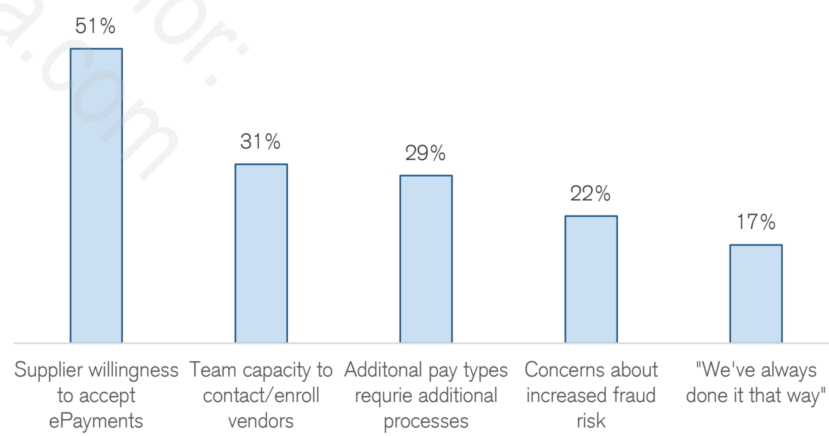
Adoption of digital bill payment and automation: drivers and barriers

- Drivers of adoption:
  - COVID as a forcing factor for back-office digitization and automation
  - Tech-savvy younger generation progressing to leadership roles at organizations
  - Companies increasingly experiencing the benefits (e.g., efficiency and cost reduction) of SaaS-based automation solutions in other business areas
  - Concerns about fraud risk and data privacy associated with paper-based AP processes (invoices and checks)
- Barriers to adoption:
  - Inertia (current process work, i.e. “We’ve always done it that way”) remains the No. 1 barrier to the adoption of AP automation, although it plays a relatively small role in the adoption of digital payments (which is being accelerated by AP automation)
  - Difficulty in the integration with ERP systems is further complicated with a multitude of vertical-specific ERP/accounting systems, particularly in the middle market, while the SMB and large enterprise segments tend to be more dominated by major horizontal ERP systems for each segment

Barriers to AP automation adoption (MineralTree survey, 2021)



Barriers to digital payments (MineralTree survey, 2021)



Source: MineralTree, Credit Suisse research

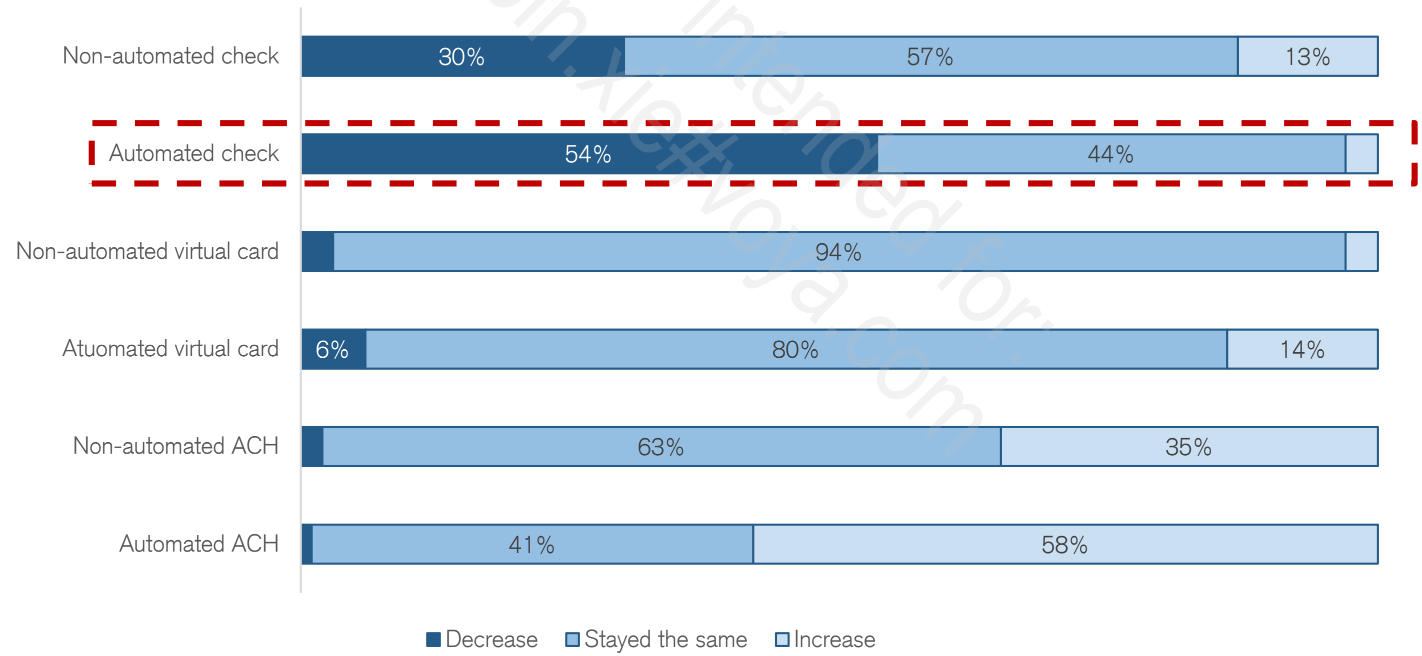
Return to Themes Table of Contents

27. AP Automation transforming the traditional back office

AP automation accelerates digital payment growth

- Companies that have implemented AP automation report above-average increases in ACH and virtual card payments, along with a greater decrease in checks.

Impact of AP automation on companies' use of ACH, virtual card, and check payments (automated vs. non-automated)



Source: MineralTree State of AP Report 2021, Credit Suisse research

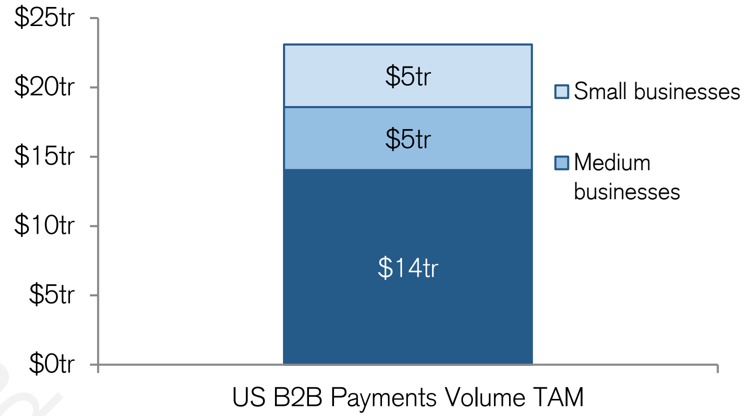
Return to Themes Table of Contents

28. Next leg of B2B payments puts SMB services in focus

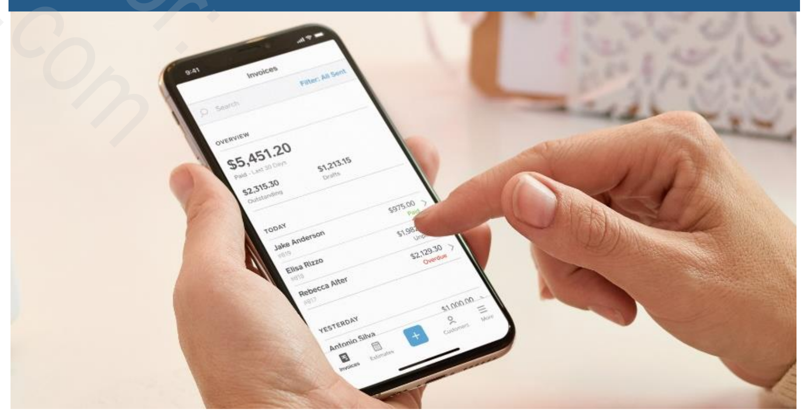
Whitespace opportunity created by historical distribution and tech issues

- **Whitespace opportunity created by small banks lacking distribution to profitably reach SMBs, along with underdeveloped product offering (e.g., primarily corporate cards), as the vast majority of these banks outsource their IT.**
- We estimate 75% of the US $10tr SMB B2B payments TAM is addressable, with key areas including accounts payable/accounts receivable, corporate cards, and expense management.
- Incumbents working with FinTechs to overcome hurdles:
  - Distribution - Multi-pronged approach leveraging current clients, a direct salesforce, and partners such as banks (WEX) and FinTechs (FleetCor, WEX, PayPal).
  - Technology and capabilities - Comprehensive product sets, the ability to make their products accessible to Fintech partners (e.g., APIs), and integrations into accounting software (e.g., QuickBooks, Xero).
- Square offers invoicing (Square Invoices), debit products today (Square Card), and Cash App for Business; we expect more B2B products to come, particularly around expense management and/or credit card offerings.

SMB represents $10tr of the $24tr US B2B Payments TAM



Square offers Square Invoices, Square Card, and Cash App for Business; we expect more B2B products to come (i.e., expense management and/or credit card offerings)



Source: Company Data, Deloitte, Credit Suisse research

Return to Themes Table of Contents

28. Next leg of B2B payments puts SMB services in focus

Numerous fast-growing private and public companies developing solutions

Overview of a selection (not exhaustive) of private B2B payments companies serving the SMB and middle-market segment	
BREX	• Provides start-ups of all sizes with a corporate credit card • Helps businesses reach higher credit limits, expense management, automation and accounting integration • Launched BREX Cash, a business checking account in October 2019 that enables no-fee B2B ACH and wire payments
Divvy	• Divvy was acquired by Bill.com (BILL) in June 2021 • Business expense management and budgeting tools are free to customers, currently monetized via virtual card economics • Partners with WEX for corporate and virtual cards
AvidXchange	• Provides accounts payable and receivable solutions and accounting software integrations • Partnerships with FleetCor for virtual cards • SMB-focused platform, with likely some overlap with FleetCor in the lower-mid-market
Billtrust (BTRS)	• Provides an end-to-end payment cycle management solution, which automates every step of the invoice-to-cash process • Business Payments Network (BPN), a payments directory that contains payments preferences (i.e., details around which suppliers take what type of payments, various terms around timing, discounts, etc.) • Billtrust completed its listing on the Nasdaq via SPAC in early 2021
MineralTree	• Focused on accounts payable automation • Emphasis on middle-market merchants • Global Payments (GPN) announced its intention to acquire MineralTree for $500mm cash in September 2021 (transaction expected to close in Q4 2021)
Veem	• Focused on accounts payable automation for cross-border payments ("consumerization" of cross-border experience) • Proprietary multi-rail technology, businesses can send or receive money in a click, track their payments end-to-end
Expensify	• Receipt management and expense tools for SMBs, along with Visa card offering attached • Competes with Divvy, Concur, etc.
Tipalti	• Provides accounts payable and receivable solutions and accounting software integrations • Works with both SMB and mid-market business

Source: Company Data, Credit Suisse research

Back-End Banking Innovation

Return to Themes Table of Contents

29. “Faster payments” & “RTP” become more real

Real-Time Payments (“Fast ACH”) overview

- “Traditional ACH” systems were designed in the 1970s to replace checks, with no significant updates since.
  - ACH systems are how banks send money to other banks domestically and make up the largest part of a country’s payments system (ex-wires).
  - Process transactions 1-2 times a day in batches and can take up to 3 days for funds to be made available (closed on weekends).
- Fast ACH is the first overhaul of domestic payments (connecting banks); main advantages over legacy systems:
  - Speed & availability – Payments are authorized and (often) settled simultaneously, making funds available instantly, operating 24/7.
  - Data – Utilizing ISO 20022 messaging standard (adopted in 70+ countries).

Key drivers & enablers of “faster payments” and RTP globally
Central bank mandates to update national payments systems to reduce cash (increase taxes), financial inclusion, and innovation
Mastercard, the leading provider of Fast ACH globally with Vocalink and Nets (working with 14 of the top 50 GDP countries already)
Bank technology providers (FIS, FISV, JKHY, Finastra, ACI, etc.) will need to connect their bank customers to any new payments systems
Increasing consumer and business (B2B applications) demand for faster payments

Source: Mastercard, Credit Suisse research

Return to Themes Table of Contents

29. “Faster payments” & “RTP” become more real

Real-Time Payments (“Fast ACH”) overview

- Adoption of RTP in consumer payments will vary by country (e.g., dominant in Denmark now), although we do not expect any meaningful market share gains at the expense of cards in core markets like the US over the medium term.
- We expect initial use cases will be targeted at traditional ACH/Check flows in B2B/P2P/G2C payments.
- We note that banks earn little or no interchange on faster payments/ACH/RTP and, therefore, lack a direct monetary incentive to encourage adoption of RTP for retail payments (although incentives are driven by consumer experience and demands).
- Historically, payment infrastructure innovation has happened only on the card network side, but now, FinTechs can start building services off of these lower-cost rails.
- UK Faster Payments has been live since 2008 and has included P2P, P2B, B2B, B2P, G2B, and G2P transactions through mobile or online means.
- Vocalink (Mastercard) is the underlying system and operator.

UK Faster Payments has been live since 2008

Name
Faster Payments

Year live
2008

Average daily volume
7 M (2019-20)

Average daily value
GBP 5.4 B (2019-20)

Payment applications supported
P2P, P2B, B2B, B2P, G2B and G2P through mobile or online.

Open Access API interface (y/n)
No

Overlay Services
Request-to-pay service (pilot May 2020), account alias (mobile number), Confirmation of Payee, third-party beneficiary payments, standing order payments, forward dated payments, return payments, direct corporate access (bulk payments, just-in-time payments, emergency payouts, insurance, payday loans, etc.)

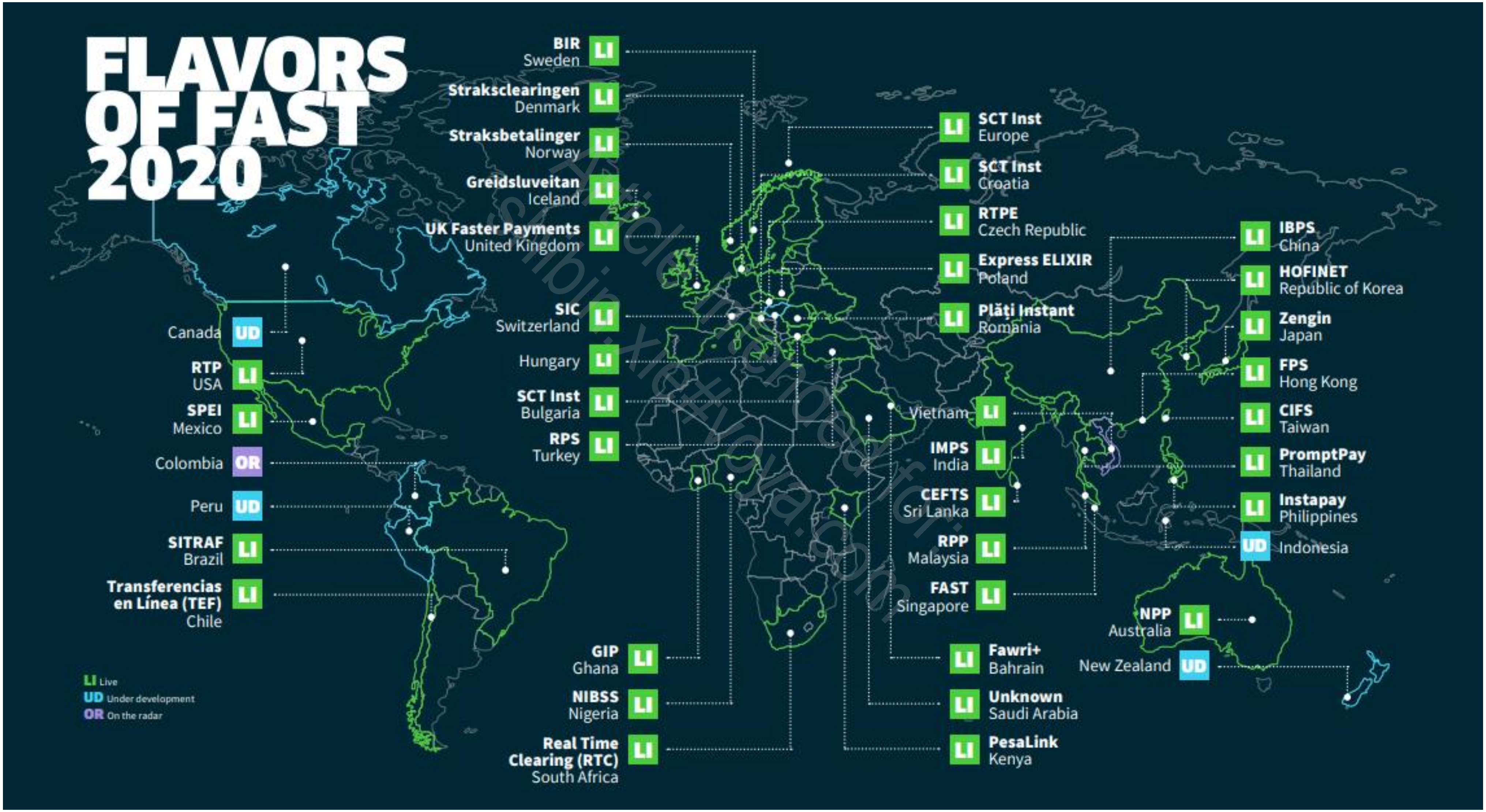
Commentary
U.K. growth is steady at 20 percent and the New Access Model ensures service provider and new entrant participation, without significant investment. New Payments Architecture under development will be ISO 20022-based.

Source: Mastercard, FIS, Credit Suisse research

Return to Themes Table of Contents

29. “Faster payments” & “RTP” become more real

56 schemes live vs. 14 in 2014 and 40 in 2018

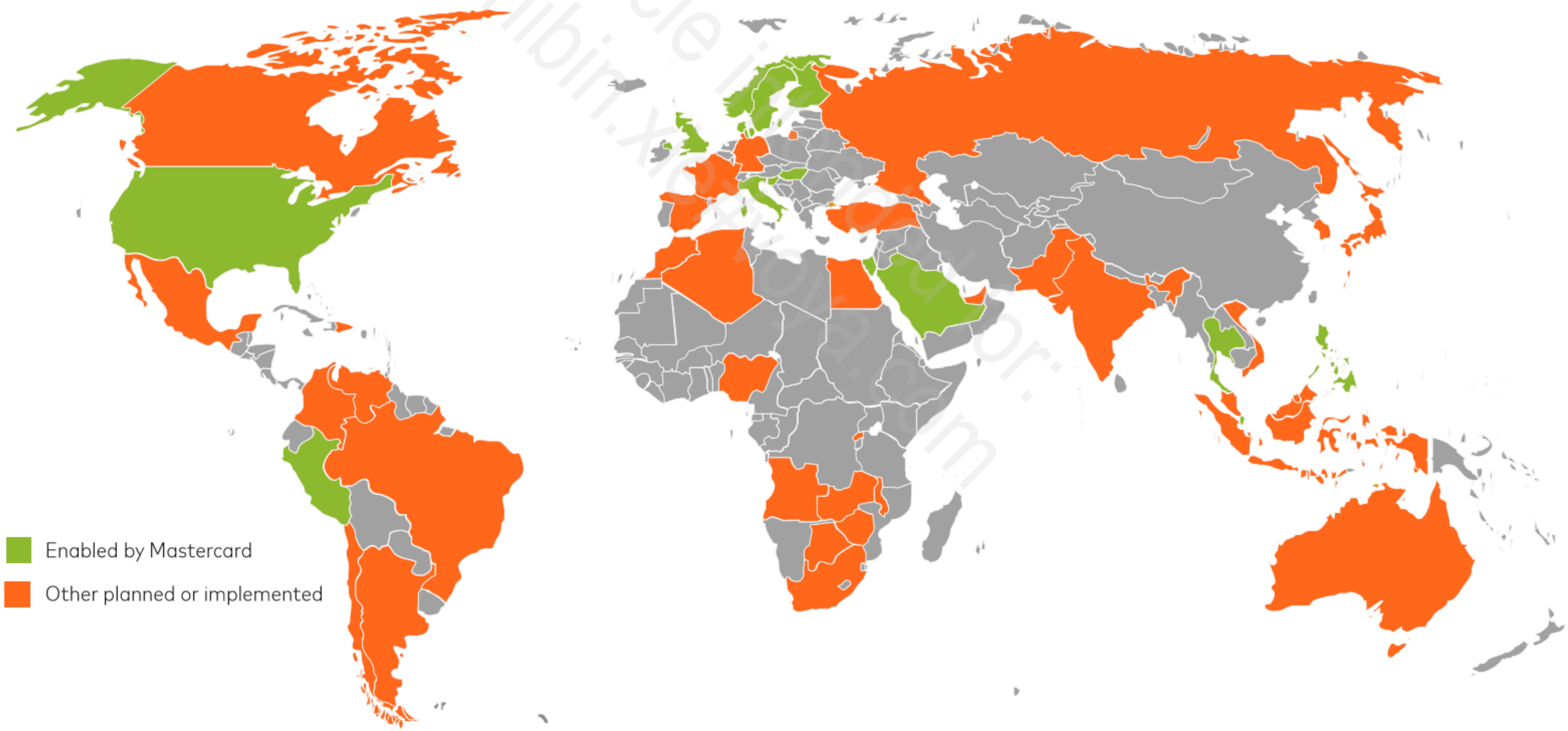


Source: FIS (41 scored above)

29. "Faster payments" & "RTP" become more real
Mastercard's role in RTP as an important global enabler

- Made possible in part by the acquisitions of both Vocalink (2016) and Nets interbank processing and billing assets (2019).
- Mastercard also has a leading (first-mover) position with FinTech companies that will use faster payment rails.

Mastercard, the leading provider of Fast ACH globally with Vocalink and Nets (working with 14 of the top 50 GDP countries already); 56 countries in total now have real-time payments systems



29. "Faster payments" & "RTP" become more real

Mastercard's three-pronged approach (rails, apps, & services)

- Holistic approach on all three layers of RTP: (1) infrastructure (rails), (2) applications, and (3) services.
    - Important because all three layers are necessary for the ecosystem to start utilizing RTP (i.e., infrastructure layer to enable FinTechs, while apps & services support incumbents).
    - For the first time, scaled industry incumbents are innovating on a new set of rails beyond just cards.
- Global approach with regional hubs in each market will facilitate directly connecting domestic payment systems; numerous FinTechs were founded to solve inefficiencies caused by lack of global connectivity (Revolut, Transferwise, Airwallex).
    - Domestic payment systems not being connected globally is an advantage of card rails today (vs. traditional correspondent banking system).
    - Enriched transaction data from ISO 20022 messaging standard (in 70+ countries), an important ingredient that will help empower FinTechs to create services that compete with the card rails (albeit today a non-perfect solution given numerous iterations of the standard, but potential to be fully interoperable in time).

Company	Vocalink	Nets	Mastercard
Infrastructure	• Larger markets • Sophisticated & customized	• Smaller markets • Fast deployment • Region-specific capabilities	• Extended global coverage • Industry-leading solutions
Applications	• US Bill Pay (C2B) • Transactis • Pay by Account (P2M)	• Europe Bill Pay • E-invoicing & new billing platform	• Proven applications (e.g., Pay by Account) • New flow penetration (e.g., bill-pay) • Extensive roadmap
Services	• Suite of services & analytics • Can be provided across technologies	• Additional market access	• Broad opportunity to sell suite of services & analytics

Source: Mastercard, Credit Suisse research

Return to Themes Table of Contents

29. "Faster payments" & "RTP" become more real

A focus on progress being made in the US, RTP by TCH

- Where it stands today – roughly 60% of all US bank accounts are connected to TCH's RTP system.
- Utilizes a unique approach – "equity in a pooled account" at the Federal Reserve to allow for instant settlement.
- Credit push only (no debit pull), with a request for payment feature (effectively a merchant or biller can ask for a push).
- Where will these faster payments rails be used?
  - Banks making B2B, P2P, B2C, and C2B transfers (24/7/365).
  - B2B payments using this system can be thought of as "precision payments" given the known send/receive time (~15 seconds vs. up to three days for traditional ACH); RTP will include data important for B2B payments (e.g., invoice details via use of the ISO 20022 messaging standard).
  - Instant deposit products for merchants and consumers (PayPal using RTP already as an alternative to card-based instant transfer).
- What rails will it replace?
  - Alternative to checks and the traditional "slow ACH" rails (which operate via batched or delayed payments) initially, expanding over time.
  - These rails could also be used domestically as a substitute for Visa Direct and Mastercard Send when possible (likely due to reduced costs).
- Vocalink is the underlying system, but not the operator (licensing only).

RTP in the US has been live since 2017

Name
RTP (Real-Time Payments)

Year live
2017

Average daily volume
NA

Average daily value
NA

Payment applications supported
P2P, P2B, B2B, B2P, A2A & G2P through mobile and internet.

Open Access API interface (y/n)
No

Overlay Services
Payment confirmation, request for payment (e-invoice or e-billing), payment queries, remittance advice, scheduled payments.

Commentary
The Clearing House is working to ensure U.S. institutions of all sizes can access the RTP network but other schemes competing for real-time payments include Zelle® (live with P2P only) and the Federal Reserve's FedNow (reports intentions to go live in 2023 or 2024), while the Faster Payments Council (FPC) is working with Industry stakeholders to support the widespread use of faster payments.

[Return to Themes Table of Contents](#)

29. "Faster payments" & "RTP" become more real

A focus on progress being made in the US

System	Owners	Overview & Status
The Clearing House (TCH) Real-Time Payments (RTP)	25 large US commercial bank owners	• Launched in December 2017, now reaches 60%+ of US bank accounts • First new core US payments infrastructure to be built in over four decades, licensing Mastercard's technology (Vocalink) • Pricing structure consists of flat fees and no volume discounts, and only the originating bank pays for a transaction • Credit transfer sent costs $0.045 per transaction (e.g., P2P), request for payment sent $0.01 per transaction, and a $0.10 request for payment incentive fee paid by the bank that initiated the payment
Zelle (Early Warning Services)	7 large US commercial banks	• Initially launched by JPM, Wells Fargo, and Bank of America in 2011 as clearXchange, rebranded to Zelle in 2017 • US banks view Zelle as their antidote to compete with Venmo and Cash App • Participating banks represent 80% of bank accounts in the US • Zelle can reach any Visa or Mastercard debit card in the US, providing reach to consumers that don't have Zelle available through their bank, leveraging network push payment rails (Visa Direct, Mastercard Send) • Current use cases are for P2P and disbursements (government, corporate-like insurance payouts) • Potential to be used for consumer purchases, per comments from Fiserv • Real Time? For end users, transactions occur in real time via banks "fronting" the funds, but the actual funds settle overnight via ACH rails
FedNow (live in 2023)	US Federal Reserve	• Similar to TCH's RTP network, but operated and owned by the Federal Reserve • Expected to launch in 2023 and will increase competition in RTP, a net positive for the ecosystem • "*The U.S. real-time retail payment infrastructure stands to gain from competition, including through higher service quality and lower prices over the long run*," – Fed Governor Brainard

Return to Themes Table of Contents

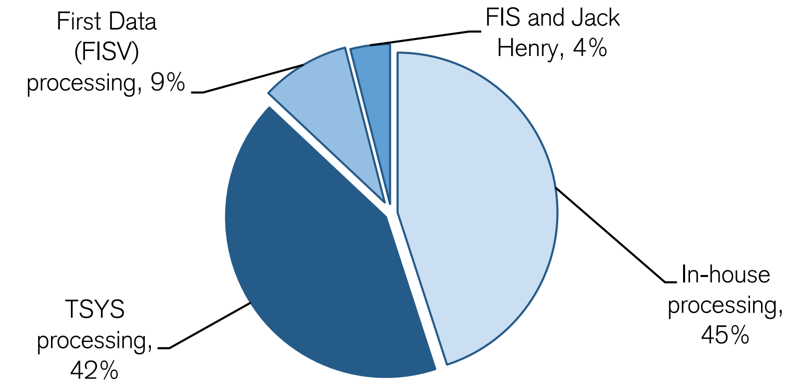
30. Concentration in traditional Issuer Processing market

Concentrated market in credit issuer processing, less so for debit

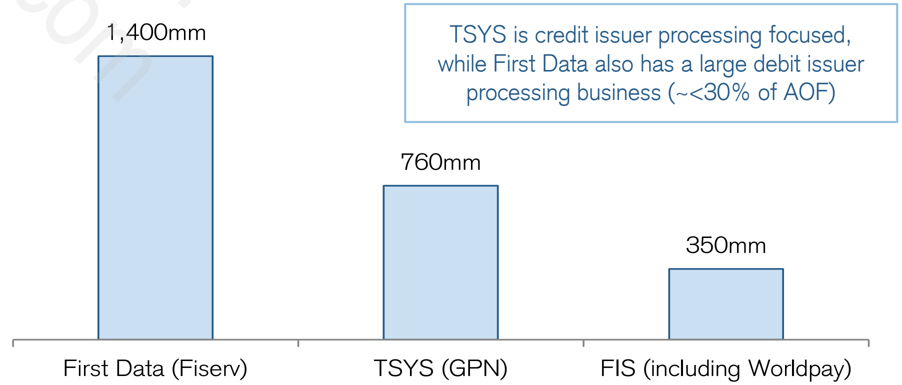
- Credit issuer processing is dominated by TSYS (Global Payments), which maintains ~40% share, processing ~40% of all US Visa and Mastercard accounts, including ~90% of their US commercial credit cards.
- For larger financial institutions, TSYS, First Data (Fiserv), and FIS (including the legacy Worldpay issuer processing) are the key players.
    - TSYS is focused almost exclusively on credit issuance and larger issuers (although we could see TAM expansion for TSYS further into debit and/or by engaging with smaller issuers on a select basis).
    - TSYS has dominant share in the US (8 of the top 10 issuers), Canada (7 of the top 10 issuers), UK (6 of the top 10), Ireland (4 of the top 5 issuers), and China (JV with China Union Pay), along with the second largest issuer processing business in Western Europe.
- For smaller community banks & credit unions, Fiserv (legacy Fiserv), Worldpay (legacy issuer processing), and Jack Henry are the more common providers.
- Additional players more in the "modern card issuance" category include Marqeta, i2c, Stripe Issuing, InComm, Galileo, CoreCard, and others.

Smaller bank/issuer skew | Larger bank/issuer skew

US credit card issuer processing market share data based on number of accounts (estimated), with TSYS the clear leader (largest competition being in-house processing)



By accounts on file (credit and debit) on a global basis, First Data is the largest base, while TSYS is the leader in US credit issuer processing (and in Canada, UK, Ireland, and China [JV with CUP] and is the number two business in Western Europe)



Source: TSYS, Company reports, Credit Suisse estimates

Return to Themes Table of Contents

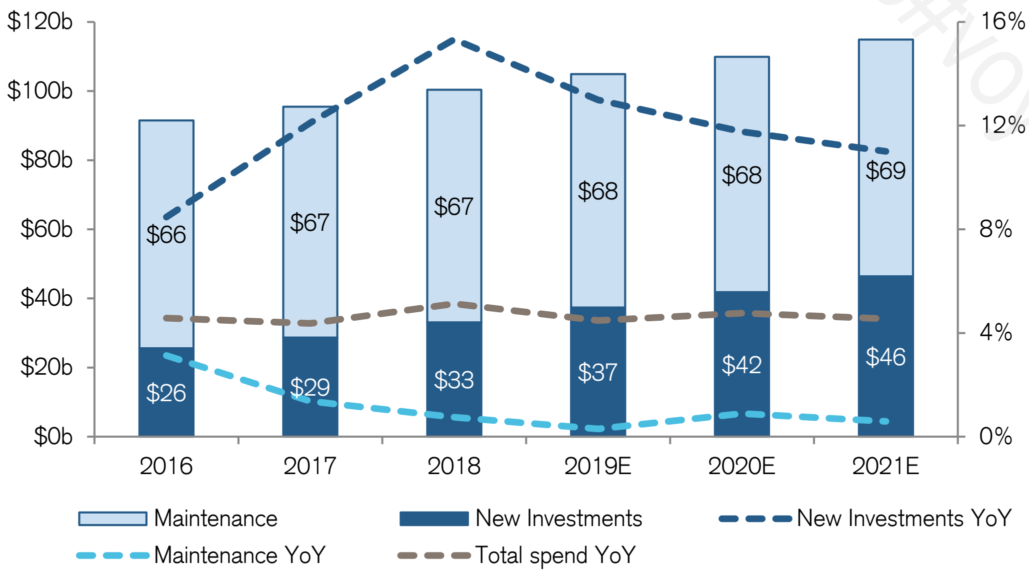
31. Bank Tech outlook: shift to digital and consolidation

Healthy bank IT spend outlook driven by a need for banks to modernize

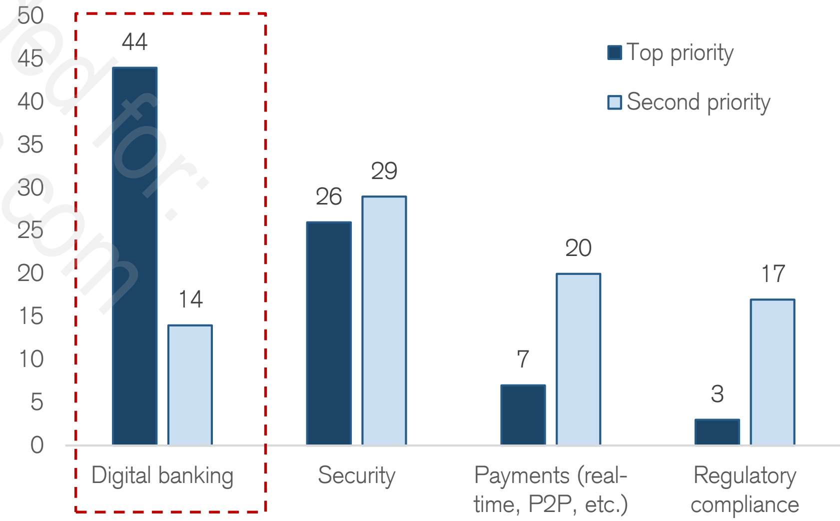
- Bank IT spend environment is driven by an increasing need for banks to modernize their infrastructure by leaning on technology providers.
- Banking is increasingly becoming a technology business, with ~75% of US consumer banking interactions now occurring digitally, lowering barriers to entry for FinTechs and large technology platforms (e.g., Apple, Amazon) on one side of the barbell and favoring large incumbents with the capital to invest on the other.

> *"It is a constant, never-ending set of investments that have to be made because as everyone in the audience knows our expectations change every day as we visit Amazon or Google or WeChat or whatever technology provider – Facebook – that you want to talk about, it changes the expectations that we have for our financial institutions. That puts pressure on the institutions to invest and that's good for us because it allows us to go into the market, aggregate services, deliver them both on a one-off and is scalable.."*
>
> – Jeff Yabuki, Fiserv CEO (March 12, 2019)

~2/3 of bank tech spending in North America is maintenance related, but 80% of the growth in IT spending is earmarked for new investments



The top four IT spending priorities of surveyed banks were digital, security, payments, and regulatory compliance



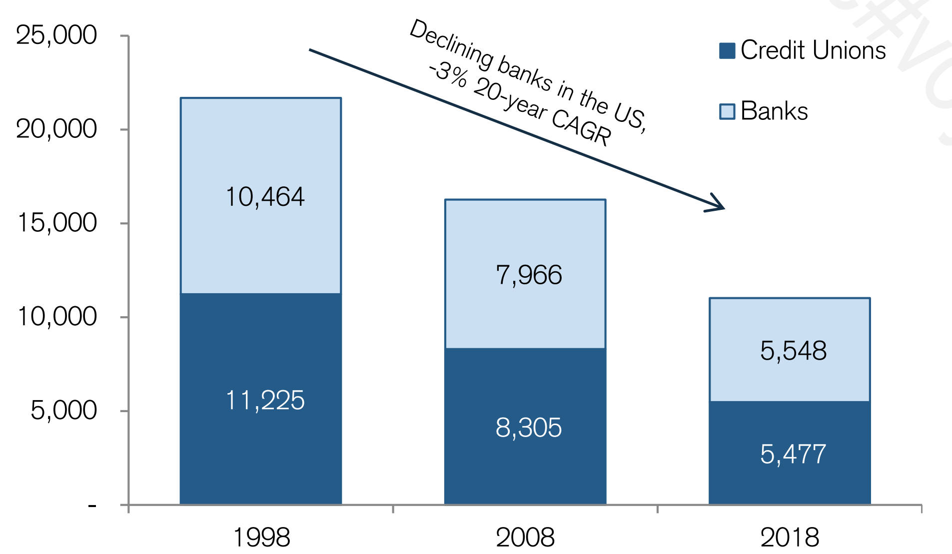
Source: Celent, PWC, Company data, Credit Suisse estimates

Return to Themes Table of Contents

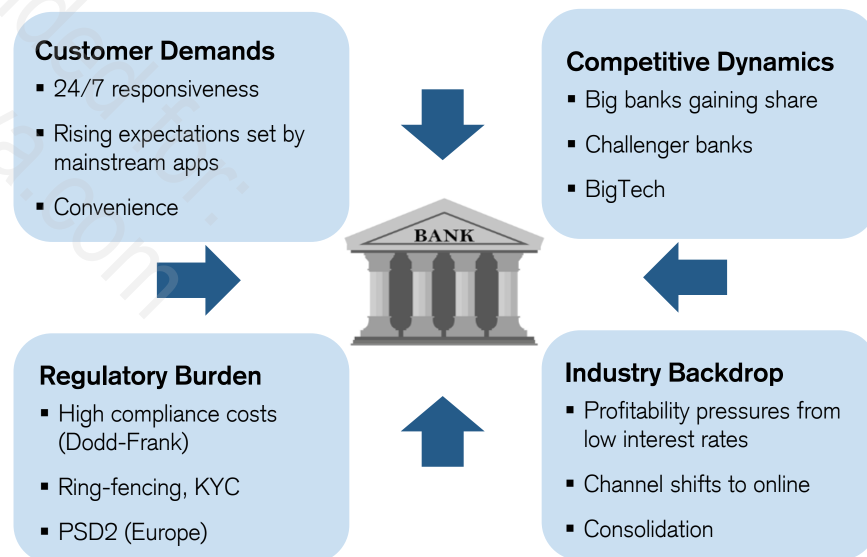
31. Bank Tech outlook: shift to digital and consolidation
Consolidation headwinds offset by shift toward digital

- Despite long-term consolidation trends, US retail banking remains highly fragmented with >10k institutions (~2x Europe)
- Consolidation among US banks set to continue, driven by:
  - Desire for M&A cost synergies to reduce spend given high costs of regulation and technology upgrades
  - Intensifying competitive pressures from both sides of the barbell (i.e., the larger money center banks and FinTechs/BigTech)
  - Exacerbated by profitability pressures from historically low interest rates (net interest margin pressure)
- Predominantly at the low end of the market (impacts Fiserv and Jack Henry most), leaves fewer bigger banks to serve

Consolidation trends in the US banking industry, with the number of banks decreasing ~3% per year (although both accounts & transactions continue to grow, more important near-term drivers of growth)



Banks seeing pressure from all sides (customer demands, regulatory, competition, industry consolidation, and profitability pressures)



Source: CUNA, Credit Suisse research

Return to Themes Table of Contents

31. Bank Tech outlook: shift to digital and consolidation

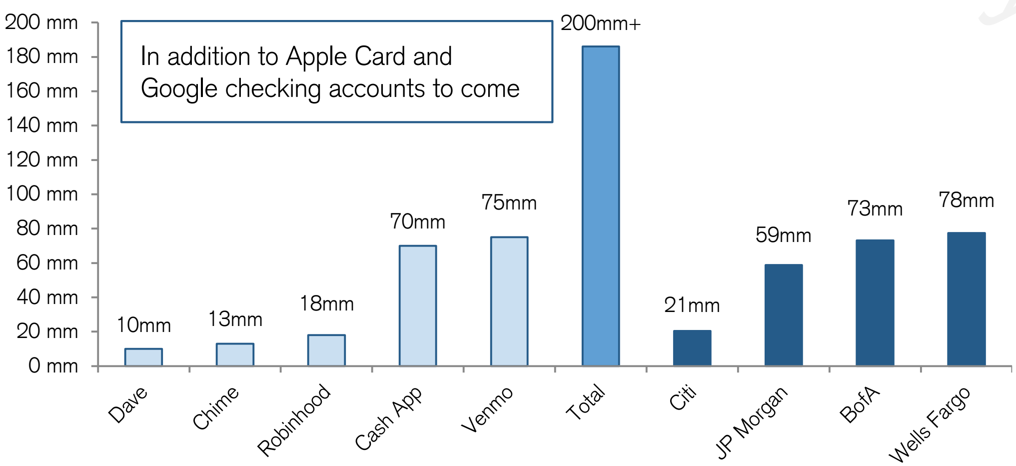
FinTechs are on one end of the "barbell," big banks are on the other

- Scale of the top four big banks in the US (which maintain ~40% of assets) allows for annual technology budgets of ~$40b, equivalent to ~95% of global FinTech funding in 2020 (per CB Insights).
- We estimate Fiserv and FIS spent a combined ~$10b in 2018 technology spend supporting their banking clients.
- As FinTechs (and BigTech) continue to gain new accounts, there is a longer-term potential for these platforms to pressure accounts and transaction growth at small- to mid-sized US banks (although we currently believe the majority serve as secondary accounts, and are thus, at least currently, incremental from an account basis and a rounding error in terms of transactions).

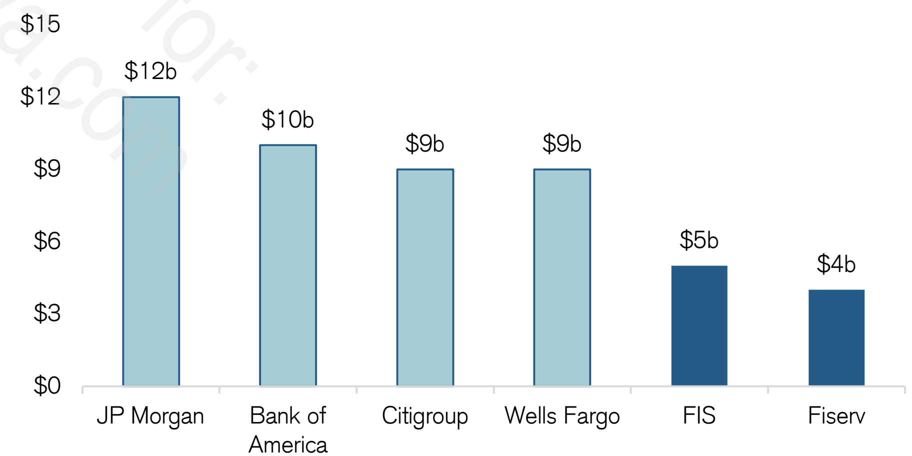
Both ends of the "barbell" are gaining share, in part due to better technology/user experience, along with tech & marketing spend

Neo/Challenger banks (FinTech) and large technology platforms (BigTech)	Regional banks, community banks, & credit unions (core FISV, FIS, JKHY customers)	Large US banks
Chime, Revolut, Monzo, N26, Uber Money, Google, Square Cash App, Varo Money, Apple, Marcus by Goldman Sachs, etc.	~10-11k US financial institutions	JP Morgan Chase, Bank of America, Wells Fargo, Citi, US Bank, PNC, TD Bank, Truist, Capital One

FinTechs in the US now have over 200mm+ users in aggregate; longer-term potential to pressure account growth and transactions



2020 estimated technology spend budgets show the big banks in a league of their own (annual technology spend of ~$40b) vs. FISV & FIS estimated ~$10b combined spend in 2018



Source: Company data, Credit Suisse estimates; Note: FISV and FIS bank tech spend estimates are based on a combination of related 2018 operating expenses (ex-SG&A), capex, and acquisitions (fluctuates by year) and are meant solely to be directional indicators vs. precise figures

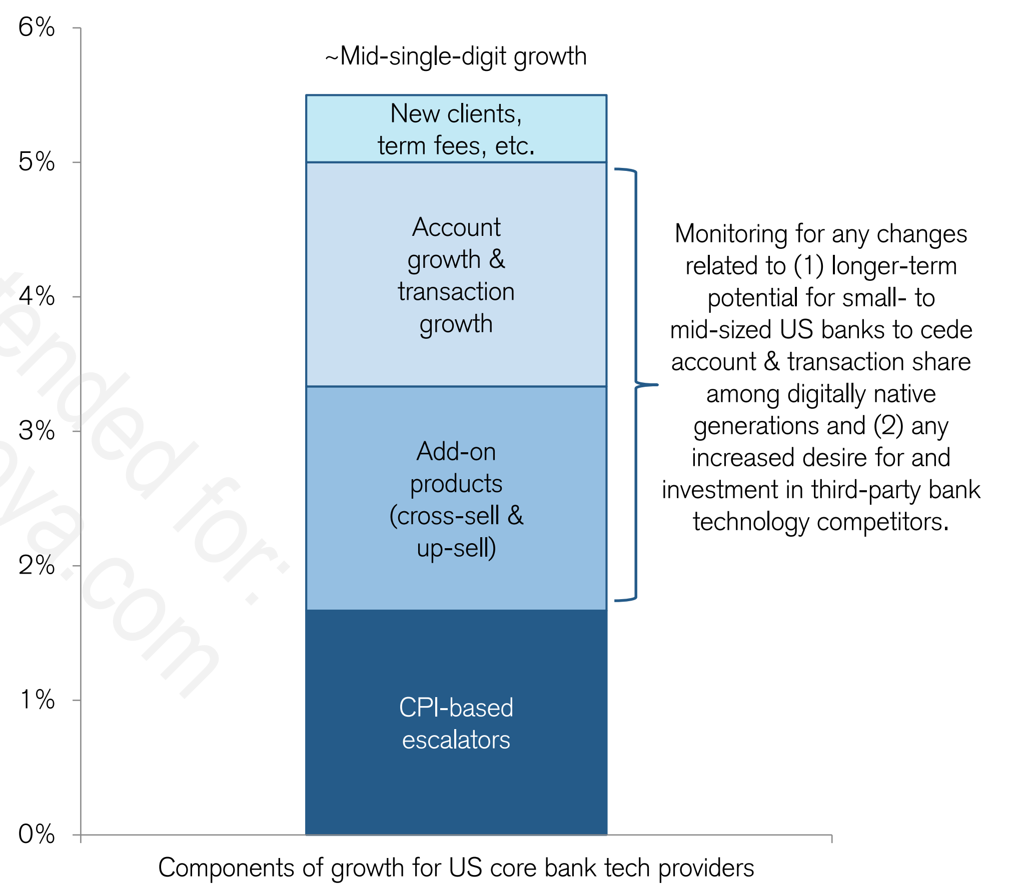
Return to Themes Table of Contents

31. Bank Tech outlook: shift to digital and consolidation

Key drivers of growth for US banking technology providers

- US bank technology businesses (e.g., Fiserv, FIS, Jack Henry) are mid-single-digit growers with existing customers driving the majority of growth.
- Four components of growth:
  - CPI-based escalators included in contracts (and contractually cannot go negative if CPI does).
  - Add-on product sales (e.g., bill-pay, Zelle, RTP, online banking, etc. sold by core providers and integrated into the core system) including upgrades to more dated versions.
  - Account & transaction growth (checking accounts, debit cards, transactions processed).
  - New client additions (smallest driver), term fees, and other.
- While there are potential headwinds to monitor longer term (including Neobank primary account relationships), existing providers have meaningful moats such as:
  - Sticky relationships and long term contracts (~5-7 years).
  - Ability to price ancillary bank IT services attractively given low incremental costs alongside friction for customers to utilize third-party providers (e.g., fees, integrations, etc.).
  - Track record in maintaining technology leadership organically and via bolt-on M&A (further supported by elevated FCF levels from merger synergies).

Four key components to growth in US banking technology businesses (e.g., Fiserv, FIS, Jack Henry, etc.)



Source: Company reports, Credit Suisse research; Note: Growth contribution portions illustrative

Return to Themes Table of Contents

31. Bank Tech outlook: shift to digital and consolidation

Core conversions viewed as challenging and expensive IT projects

"…And then finally, modern core banking system. Many of you know, this is something that we started working on about a year ago that's progressing very nicely. It's a multiyear project. But we've moved steadily through the due diligence phase. We know who we want to partner with, although we haven't announced that publicly yet. We expect that next year will be much about planning and testing for the conversion, which will then probably take place in 2021. So right now, that is on time, on budget. We're quite excited about how that's going. I can tell you this about the system that we'll be moving towards, it is a much more modular and much more open system than the one that we have now. It's tested, it's true, it's already in implementation. But we're delighted by the fact that it's got a lot more open APIs, it facilitates many more integrations, not only with their own modules, but with other partners, which will allow us to partner with FinTechs where we want to, with other providers, allows us to choose best-in-breed services and facilitate a true omnichannel experience. Because all of the transaction data comes into one place and can then be used to populate things like CRM systems or other means of tracking transactions and taking care of our clients."

– Jason Bender, COO, First Republic Bank (November 2019, at First Republic Bank's Investor Day)

Factors for Core System Replacement	Factors Against Core System Replacement
Legacy cores are expensive to maintain	Viewed as the hardest project a bank can undertake; it can be risky and take ~6 months to 2 years to complete
Faster time to market for new products	Expensive, with potential de-conversion and integration fees that often equal ~>90% of the remaining contract value
Need for more open platforms that remove friction from partnering with FinTechs	Long contracts (3-7 years), comfort with existing provider, and desire for a single vendor limit other options
Need for a centralized view of customer data across product silos, full access to customer data, and real-time transaction posting	Limited IT budgets and digital investment priorities
Legacy programming languages (Cobol) are not relevant for top tech talent and are inefficient	Different talent requirements: modern core platforms written in modern language

Source: Company reports, Aite Group, Credit Suisse research

Return to Themes Table of Contents

31. Bank Tech outlook: shift to digital and consolidation

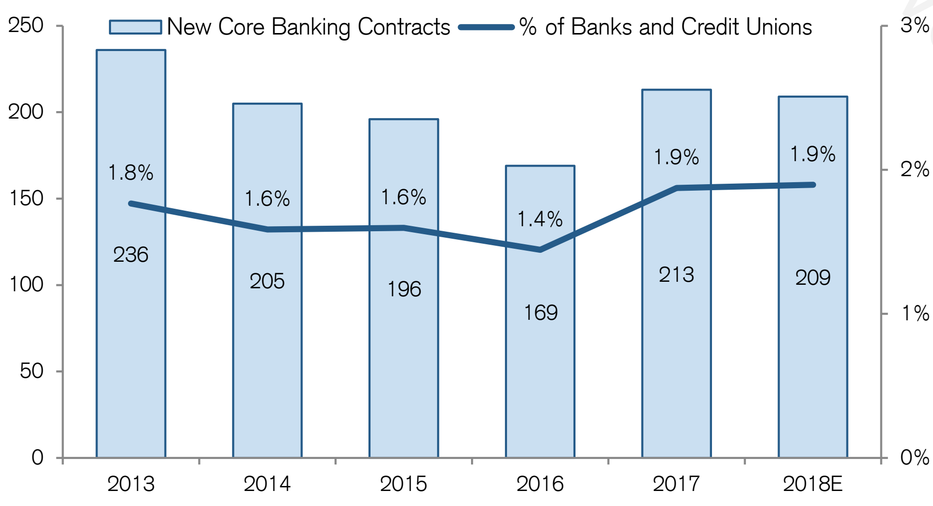
We estimate that only ~1-2% of banks switch core providers per year

- We estimate that only ~1-2% of banks switch core providers per year, with core conversions viewed as the most challenging and expensive IT project a bank can undertake.
- This dynamic alone makes it difficult for new entrants to gain meaningful market share.
- The ABA Core Platforms Committee (and ABA investment behind Finxact) suggests some degree of desire from a subset of banks and credit unions to at least consider alternatives.

"…I've heard time and again the desire to have a nimble and agile core so they can provide a customer experience served with efficiency and effectiveness.. I've discussed it with hundreds of bank CEOs.. A great portion of them are very excited about a future core dialogue that moves in this direction.."

– American Bankers Association CEO, Rob Nichols, in an interview discussing their Finxact investment

Only ~1-2% of US banks switch their core providers each year (vs. ~20% that come up for contract renewal given ~5-year average contracts)



US bank tech market share shows Fiserv as the leader by the number of banks, with FIS more skewed to larger-sized banks

Banks by asset size	FIS	Fiserv	Jack Henry
Market share (# of banks)	*12%*	*38%*	*16%*
Large banks (>$30b)	41	7	1
Mid-size banks ($10-$30b)	37	19	6
Small banks ($5-10b)	37	24	14
Community banks (<$5b)	909	2,164	1,020
Credit Unions	239	1,886	695
Total	1,263	4,100	1,736

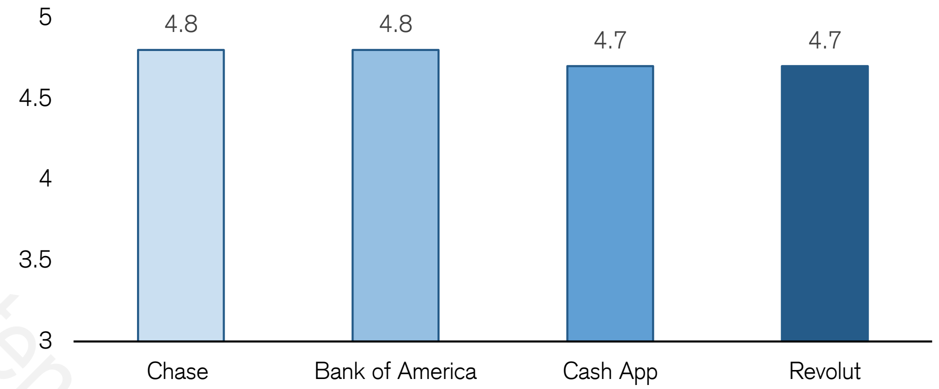
Source: Company reports, Aite Group, Credit Suisse estimates

31. Bank Tech outlook: shift to digital and consolidation

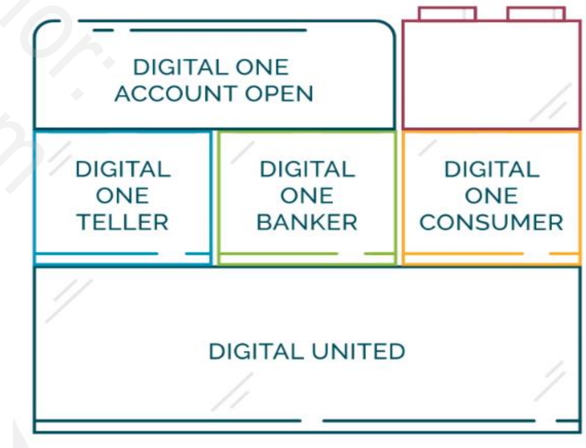
Bank technology providers' mobile banking solutions

- Fiserv has experienced mobile-related growth of ~20% over the past ~4-5 years and plans to allocate a portion of its $500mm innovation investment (as part of the First Data merger) on digital enablement.
  - Mobiliti, Architect, Corillian, and other services to a range of community banks and credit unions.
  - Recently signed New York Community Bank (> $50b assets), which opted to use Fiserv's DNA along with ~40 additional solutions, including Mobiliti and OpenNow/FundNow (online account acquisition).
- FIS launched its 3rd generation digital banking in 2018.
  - Digital One is an integrated digital banking platform that allows community banks to offer a consistent omnichannel experience.
  - Includes Digital One Account Open, which allows for an online account opening experience that takes less than five minutes, specifically targeting customers that prefer not to visit a branch.
- Jack Henry's mobile offerings are part of the Banno Digital Banking Suite, including digital account opening capabilities (JHA OpenAnywhere).

Mobile banking app ratings offered by larger banks within the Apple App Store are generally receiving high scores, creating a challenge for community banks and credit unions



FIS Digital One platform of integrated solutions delivers an omnichannel banking experience for both the customers and employees of the bank



Source: Credit Suisse estimates; Number of ratings per app in US Apple App store as of September 2021: Chase (3.7mm), Bank of America (3.7mm), Cash App (2mm), Revolut (24K)

Return to Themes Table of Contents

31. Bank Tech outlook: shift to digital and consolidation

SaaS (hosted) vs. Licensed (on-premise)

- Generally speaking, break-even between SaaS and licensed can be reached at ~3-4 years (i.e., if a bank keeps its system longer than 3-4 years prior to upgrading to the next license, the math works on a direct basis).
- We estimate FISV's banking solutions consist of ~85% recurring revenue.
- FIS's banking segment ~83% recurring revenue (Q1 2020 earnings).

> *"…But generally, if you move from an in-house or on-premise to an outsourced, there is a multiple of long-term revenue. I'd call it probably 3x overall of what the revenue profile could look like versus just an ongoing maintenance stream. But it all depends on where they're at, how much is developed in-house, is it your technology versus -- just in-source versus outsource, or are they really going a different direction and taking an old in-house developed capability and moving to an outsource, which is all incremental there…"*
>
> – James Woodall, CFO, FIS (November 2019)

Aspect	SaaS	Licensed
Upfront fees	• Little to none	• Upfront perpetual license (with revenue recognition also upfront, which can create a degree of lumpiness)
Recurring fees	• Monthly or quarterly fees (and revenue recognized similarly) • No maintenance fees (monthly fees are all inclusive)	• Annual maintenance fees (~20% of total cost)
Data storage and processing	• Runs on a private cloud (not AWS, Azure) managed by the core provider (e.g., Fiserv, FIS)	• Typically runs on-premise, but banks can pay their core provider for a private cloud
Customization	• More likely to be out-of-the-box and less customizable, and tends to attract smaller banks • Fiserv and Jack Henry have a greater degree of this vs. FIS, due to smaller bank and credit union skew (i.e., Fiserv has more SaaS mix than FIS)	• Customizable and tends to attract larger banks that make these modifications • FIS has a greater degree of this vs. Fiserv and Jack Henry, due to larger bank skew

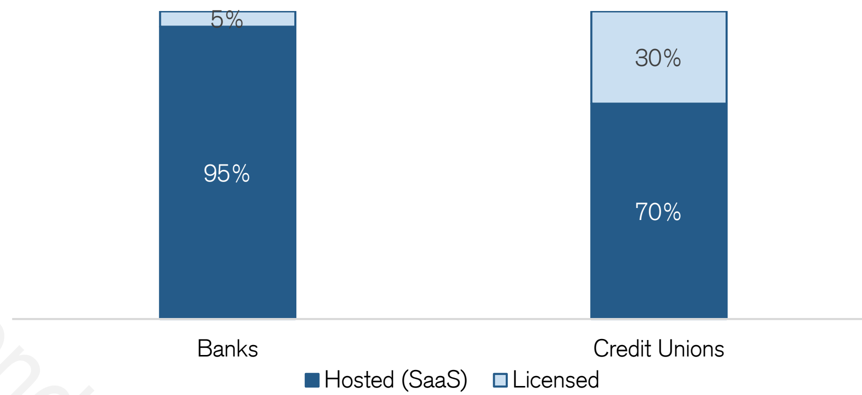
Source: Company data, Credit Suisse research

31. Bank Tech outlook: shift to digital and consolidation

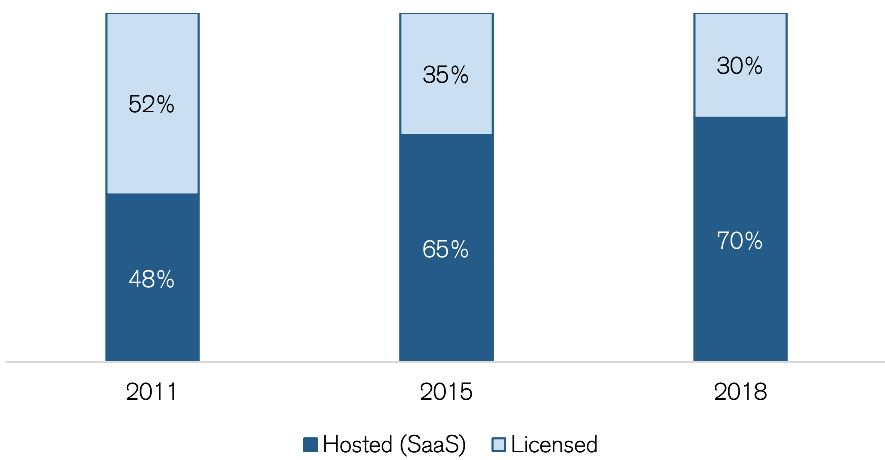
SaaS (hosted) vs. Licensed (on-premise)

- Market shifts toward SaaS core deployments have been ongoing for the past decade with ample room for continued growth.
- Hosted deployments generally lead to faster time to market, reduced capital expenditures, and more frequent software updates.
- We expect this trend to benefit the Bank Technology providers by increasing their ability to cross-sell new products and reducing revenue volatility from reduced license sales.

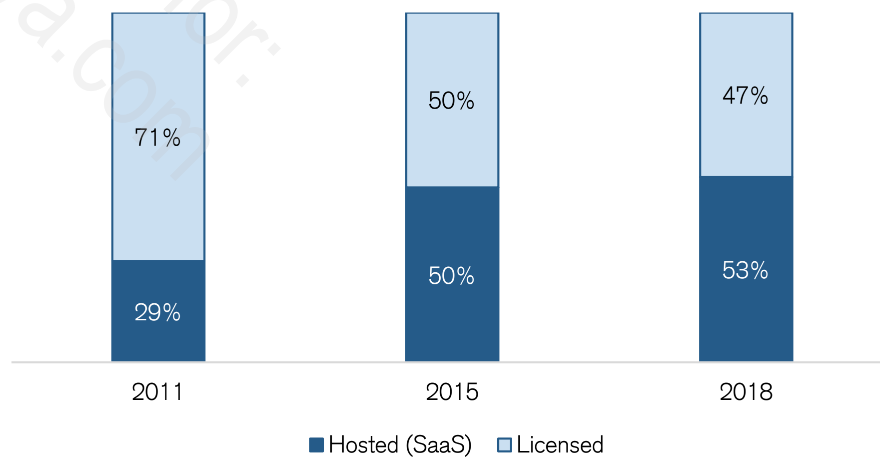
In 2018, ~95% of new core system contracts signed by banks were hosted vs. ~70% for Credit Unions



US Bank Core Systems deployment types over time



US Credit Union Core Systems deployment types over time



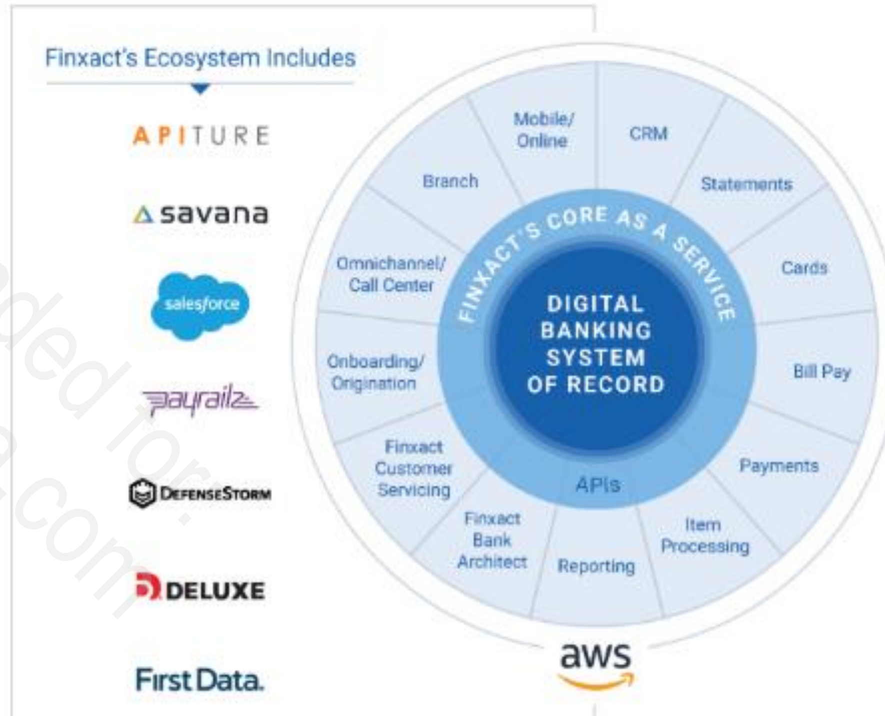
Return to Themes Table of Contents

31. Bank Tech outlook: shift to digital and consolidation

Emerging vendors – Can they break through in the US?

- After a period of consolidation over the past 20 years, with the big three vendors now serving ~66% of market (counted by number of banks), we are starting to see new vendors re-emerge.
- While the next-gen core banking platform providers are worth monitoring for investors, we believe that a meaningful portion of bank CEO/CTOs are reluctant to embrace due to (1) lack of client references (chicken and egg), (2) long-term strategic decisions that favor providers with balance sheets indicative of continued investment and longevity, and (3) preference for minimizing the number of vendors.
- We believe that next-gen core providers (e.g., Finxact, MAMBU, Nymbus, etc.) have the potential to be successful in their own right, accumulating more bank customers over time; however, even with a great deal of success, it is unlikely that any meaningful financial impact would be felt by FIS, Fiserv, and/or Jack Henry over the foreseeable future.
- We would also expect the legacy providers to consider acquiring next-gen providers (i.e., deliver their technology via vast distribution networks, reduce risk of market share loss), consistent with their historical approach.
- On the core banking side, we expect them to be competitive for digital-only De Novo banks (including Neo/Challenger banks) and with select mid-sized banks.

Finxact, as an example of a Core-as-a-Service model, was formed by a former FIS executive and received investment ($30mm) from the ABA, Accenture, First Data, and SunTrust



Ecosystem Partners are at various stages of integration.

Source: Finxact, Credit Suisse research

Return to Themes Table of Contents

31. Bank Tech outlook: shift to digital and consolidation

Not a near- to medium-term risk, but developments to monitor

2017

May 2017
Finxact raises initial seed round of $12mm via Live Oak Ventures, First Data, Woodforest National Bank, and TNI

November 2017
Iowa Falls State Bank v. Jack Henry & Associates, Inc. related to access to the bank's data in context of a new vendor discussion

2018

October 2018
ABA sends letter to "three major core providers" with an aim toward coming to a solution to what is a "significant problem"

Formation of the ABA Core Platforms Committee (of ~20 reps. from banks ranging in size from $150mm to $25b in assets) invested in improving relationships with core providers

2019

2019
ABA Core Platforms Committee meets with Fiserv, FIS, Jack Henry, and Finastra in May (to discuss three items): (1) contracts; (2) access to innovation (i.e., FinTech advances & API access to core); and (3) access to data (getting to a bank's owned data to better personalize). Publishes "Principles for Strong Bank-Core Provider Relationships" in October.

September 2019
Chime surpasses 5mm FDIC-insured accounts in < 5 years

July 2019
Monzo and N26, leading European challenger banks, launch in the US

September 2019
Revolut announces expanding global partnership with Visa, including the US, with plans to expand headcount from 1.5k to 5k during 2020

2020

2020
Traditional core providers are 0 for 10 with the top/fastest growing Neo/Challenger banks, i.e., so far not showing signs of involvement with the potential next generation of banks (although we note FIS won Atom bank in the UK, a meaningful challenger)

September 2020
Chime is valued at $14.5b (raised $485mm in series F) with over 9mm user accounts

2021

June, July and August 2021
Nubank valued at $30b in June (up from $4b in 2018), Revolut valued at $33b in July (up from $1.7b in 2018), Chime valued at $25b (up from $1.5b in 2019)

2021
Moneylion, SoFi, Robinhood, and Dave all go public.

June 2021
Cash App exceeds 10mm Cash Card users and ~40mm MAUs

2021
CFPB public solicitation for Dodd Frank 1033 period ends in Feb 2021; Starts re-writing consumer financial data rights

Source: American Bankers Association (ABA), WSJ, the BLOOMBERG PROFESSIONAL™ service, Credit Suisse research

Return to Themes Table of Contents

31. Bank Tech outlook: shift to digital and consolidation

A selection of emerging bank IT vendors

Company	Year Founded	Description	Expertise	Customers	Investors
Alkami	2009	Provider of online and mobile banking for retail and business customers	Ancillary services	Nicolet National Bank ($3b), Oregon Community CU ($1.7b)	General Atlantic, S3 Investors, Argonaut
Apiture	2017	Vision to "redefine the digital experience across the financial industry..." 500+ customers, API-first mindset (i.e., build everything as an API vs. wrapping old technology in an API layer)	Ancillary services	SunTrust, Live Oak Bank	Canapi Ventures, First Data
nCino	2012	Modern cloud-based core banking system provider built on Salesforce with a particular strength in lending solutions	Ancillary services	TD Bank, KeyBank, Navy Federal Credit Union	T. Rowe Price, Salesforce Ventures, Bessemer Venture Partners, etc.
Synapse	2014	Modern provider of ancillary banking services including card issuance, brokerage accounts, and loan origination and servicing products	Ancillary services	Not disclosed	Andreessen Horowitz, Core Innovation Capital
Backbase	2003	Core overlay service, also offering omnichannel banking and digital solutions	Core overlay	ABN AMRO, Barclays, ING, KeyBank, Lloyds Banking Group	Not disclosed
Treasury Prime	2017	Core overlay service, also offering instant digital onboarding for account opening	Core overlay	Not disclosed	Not disclosed
Corelation	2009	Core provider focused on serving credit unions	Core platform	150+ Credit Unions	N/A
Finxact	2016	Core-as-a-Service banking system provider built on AWS with a curated ecosystem of third-party partners	Core platform	Live Oak Bank	First Data (now Fiserv), SunTrust Banks, American Bankers Association, etc.
Mambu	2011	Modern cloud-based core banking system focused on Europe with headquarters in Berlin, Germany	Core platform	ABN AMRO, Santander, N26, OakNorth, TBC Bank, new10	Bessemer Venture Partners, Acton Capital, CommerzVentures
Neocova	2019	Modern cloud-based core banking system provider focused on community banks and credit unions	Core platform	Not disclosed	Not disclosed
Q2	2004	Provider of digital and mobile banking, lending and leasing services, and cloud-based core banking systems	Core platform and ancillary services	Core customers: Sallie Mae, Qapital, H&R Block	Public company (QTWO)
Temenos (limited US presence)	1993	Switzerland-based provider with expertise in core banking, digital, payments, wealth management, and fund administration; international platform, with limited core banking traction in the US currently	Core platform and ancillary services	HSBC, PayPal Credit, EQ Bank, UBS	Public company (TEMN)
Nymbus	2015	Modern cloud-based core banking system with a particular strength in payments; acquired R.C. Olmstead in 2016 and gained 46 core Credit Union clients; also features NYMBUS SmartPayments real-time payments suite	Payments: NYMBUS SmartPayments real-time payments suite	~50 Credit Unions	Insight Partners, FSC, OFG Bancorp, Curql
Additional providers:		Thought Machine (core), Allied Payment (community banking payments), Fisoc (loyalty programs sold to banks and credit unions), Treasury Prime (core overlay), Mistral Mobile (mobile banking), Hydrogen Platform (platform helping financial institutions speed development and innovation)			

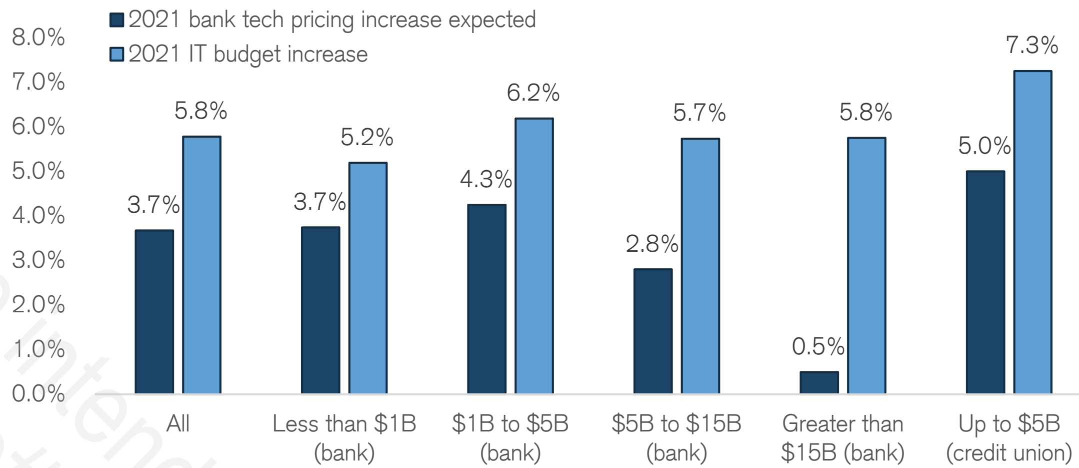
Source: Company data, Crunchbase, Credit Suisse research

Return to Themes Table of Contents

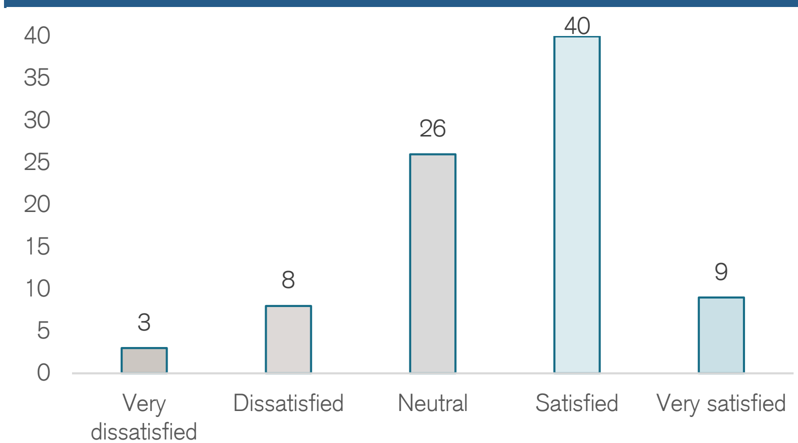
31. Bank Tech outlook: shift to digital and consolidation
2021 Credit Suisse Banking Technology Survey

- On average, banks & credit unions expect their 2021 IT budgets to increase by ~5.8% (with ~90% of respondents expecting an increase and only ~1% planning for a decline), up from a ~3.7% increase (~3/4th of respondents expecting an increase and ~6% a decrease) in our previous survey in May 2020.
- Compared to ~57% of respondents that are “satisfied” or “very satisfied” with the products of their core providers, only ~12% are “dissatisfied” or “very dissatisfied.”
- The respondents using core providers outside of the top three and those using FIS are more satisfied, on average, with the quality of both their core providers’ product and customer service than JKHY and FISV respondents.

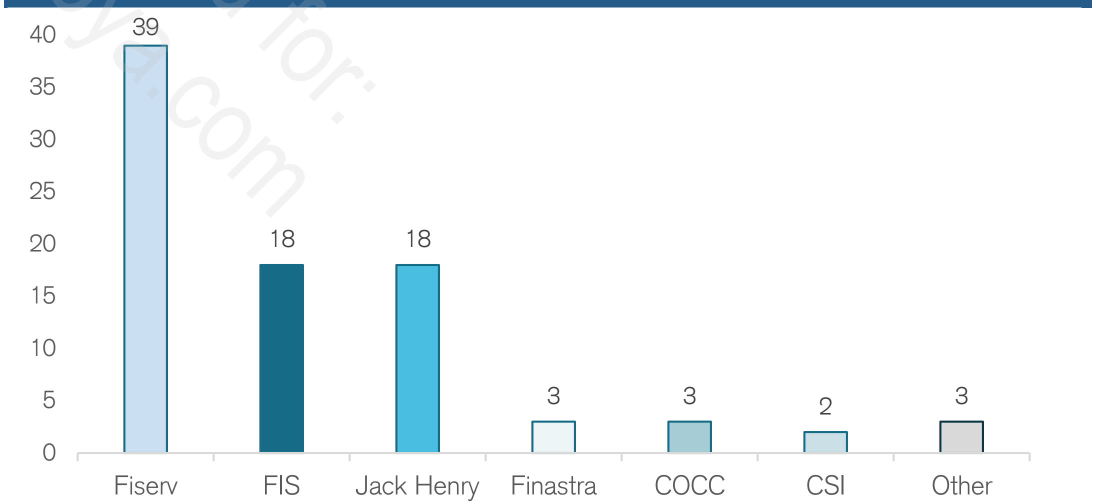
Current expectations for pricing on equivalent bank tech products and IT budget increase in 2021 – from all respondents, banks (by asset), and credit unions



Only ~12% are “dissatisfied” or “very dissatisfied” with the products of their core providers



Our latest survey produced 86 total responses (including a bank using two providers), of which 86% use the top three core providers (roughly in line with last survey result)



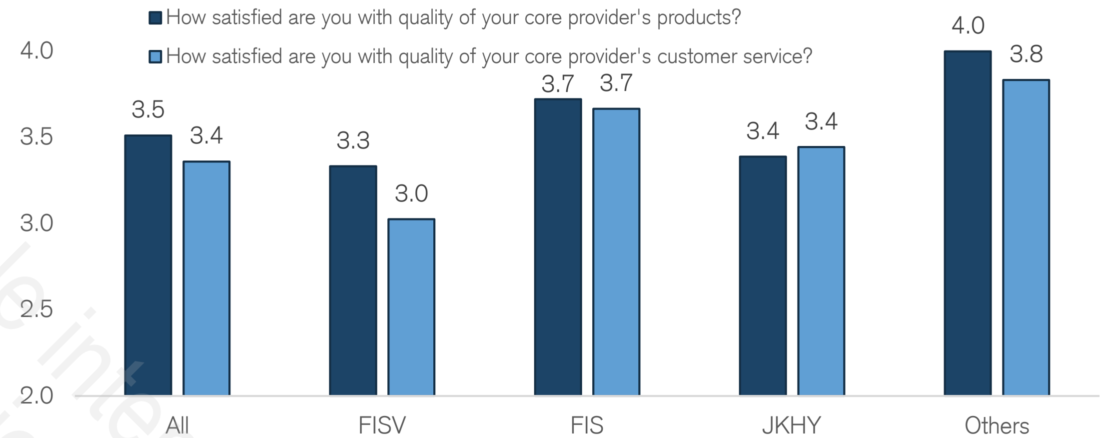
Source: Credit Suisse 2021 Bank Technology Survey – (n = 86 bank and credit union executives, conducted Jan-Feb 2021)

Return to Themes Table of Contents

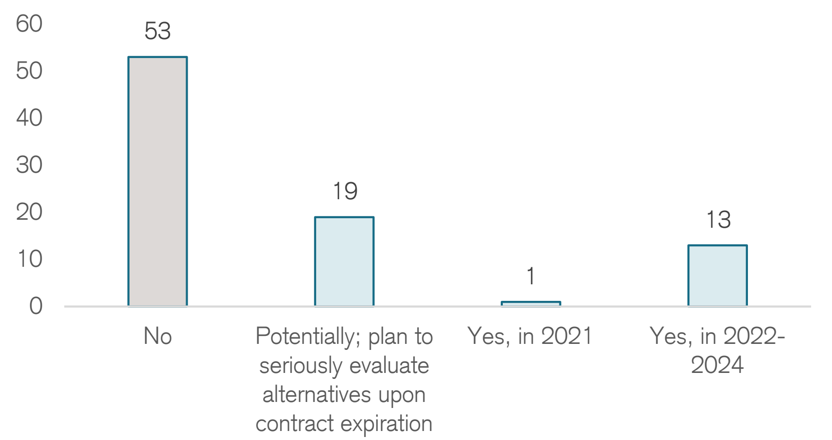
31. Bank Tech outlook: shift to digital and consolidation
2021 Credit Suisse Banking Technology Survey

- The respondents using “Other” core providers (outside of FISV/FIS/JKHY) and those using FIS as their core provider are more satisfied than average with the quality of both their core providers’ product and customer service.
- While survey respondents view community banks (~47% of respondents) and big banks (~37%) as their greatest source of competition for new consumer accounts today, digital only Neobanks (~35% of respondents) such as Cash App, Chime, Dave, etc. and BigTech (~34%) platforms such as Google (Plex bank accounts), Apple (credit card and budgeting), and Amazon are expected to become the greatest source of competition in 3-5 years.

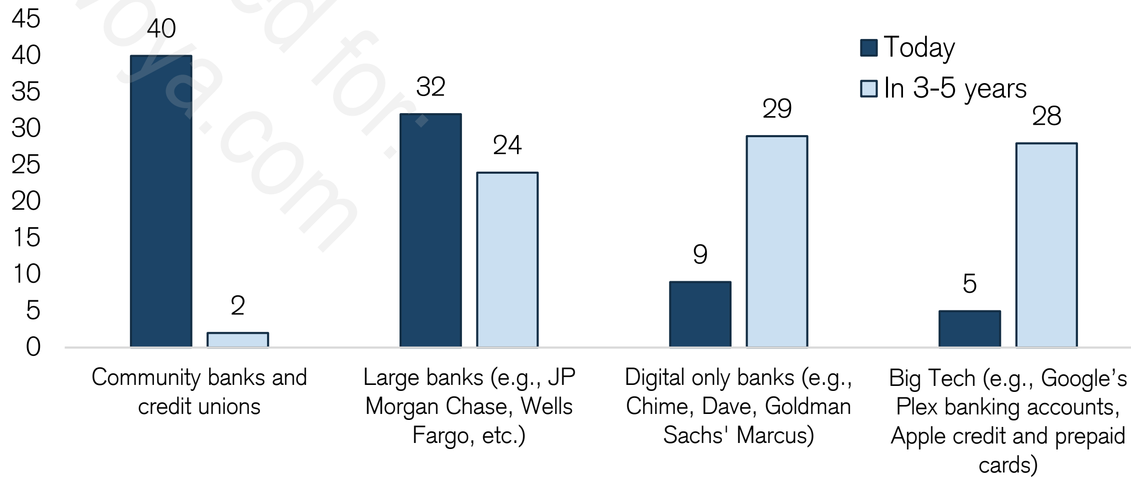
Average levels of satisfaction with FISV, FIS, JKHY, and other core providers on a scale of 1-5 (5 = very satisfied; 3 = neutral; 1 = very dissatisfied)



The majority (~62%) of the respondents do not plan to switch core providers, while ~16% plan to switch between 2021-2024



Greatest source of competition for new consumer accounts customers today and in the next three-to-five years? The top 1 & 2 today are expected to fall to 3 & 4 by 2024-2026



Source: Credit Suisse 2021 Bank Technology Survey – (n = 86 bank and credit union executives, conducted Jan-Feb 2021)

Return to Themes Table of Contents

32. Modern Card Issuance platforms

Enabling any platform, brand, or FinTech to issue cards

- Card issuance is no longer just for traditional banks (e.g., Chase, Bank of America, Capital One) and large merchant co-brands (e.g., Delta Airlines, Marriott , Costco).
- Platforms and service providers ("modern card issuance" technology companies such as Marqeta, Stripe Issuing, i2c, Green Dot, Galileo Financial Technologies, etc.) are now enabling any company or brand to issue cards across a wide range of use cases, including:
  - Employers (to employees for smart expense control)
  - On-demand platforms (for couriers)
  - Challenger banks ("Neobanks")
  - Core payments & P2P platforms (e.g., Square, PayPal, Venmo)
  - Additional FinTech issuers (e.g., Wise, Betterment, etc.)
  - Brands (for customers, i.e., loyalty, engagement)
- To date, modern issuer processors have been more focused on new channels of card issuance (FinTechs, brands, etc.) vs. traditional banks, although we believe that both could begin to win portions of larger traditional issuer portfolios.

Technology platforms and FinTechs are partnering with licensed card-issuing banks (typically smaller, Durbin-exempt) to issue cards (typically pre-paid debit cards) for employees, contracts, and customers

COMPANY	Betterment	wealthfront	STASH	acorns	N26	TransferWise	NOVO
PARTNER BANK	GBC	green dot	green dot	Lincoln Savings Bank	axos Bank	CFSB	Middlesex Federal
COMPANY	Square	Cash App	Uber	PayPal / venmo	chime	Current	zero
PARTNER BANK	Sutton Bank	Lincoln Savings Bank	green dot	The Bancorp	The Bancorp	Metropolitan Commercial Bank	Evolve bank & trust

 Source: Company reports, CB Insights, Credit Suisse research

Return to Themes Table of Contents

32. Modern Card Issuance platforms

The four roles (and key players) in modern card issuance

- Green Dot is the only player that has offerings across all four capabilities and expands beyond cards (BaaS).
- Often times, the issuer processor and program manager are the same.
- Additional players are the networks (Visa, Mastercard) and, at times, a distribution partner (e.g., Blackhawk).

Non-bank issuer

- Owns the cardholder relationship (e.g., employee, contractor, consumer)
- Marketing and/or distribution of the cards (sometimes through a distribution partner)

Examples:
- DoorDash
- PayPal & Venmo
- Uber
- Square
- Green Dot
- Walmart
- Hyundai
- Apple

Issuing Bank

- Holds an actual bank license
- Final approval on account creation (i.e., risk tolerance on NSF, fraud)
- Typically a more minimal role, but cobrand issuers (e.g., SYF, ADS) can be more active in marketing

Examples:
- Green Dot Bank
- Axos Bank
- Sutton Bank
- Cross River Bank
- Lincoln Savings Bank
- MetaBank
- Evolve Bank & Trust
- The Bancorp Bank

Issuer Processor

- Routing of card transactions for approval (including advanced rules for case-specific approvals)
- Account number & card generation
- Offer APIs to developers

Examples:
- Marqeta
- Stripe Issuing
- i2c
- Green Dot
- Galileo
- InComm
- CoreCard
- Large-caps FISV, FIS, GPN/TSS

Program Manager

- Oversees P&L of program, along with fraud and compliance
- Maintains relationship with issuing bank and card networks (V/MA)
- Earns the largest portion of interchange on smaller programs

Examples:
- Marqeta
- Stripe Issuing
- Green Dot
- Galileo
- Fiserv, FIS, & TSYS
- NetSpend (GPN/TSYS-owned)
- i2c
- BREX

Source: Company reports, Credit Suisse research

Return to Themes Table of Contents

32. Modern Card Issuance platforms

“Smart” controls on card transaction approvals

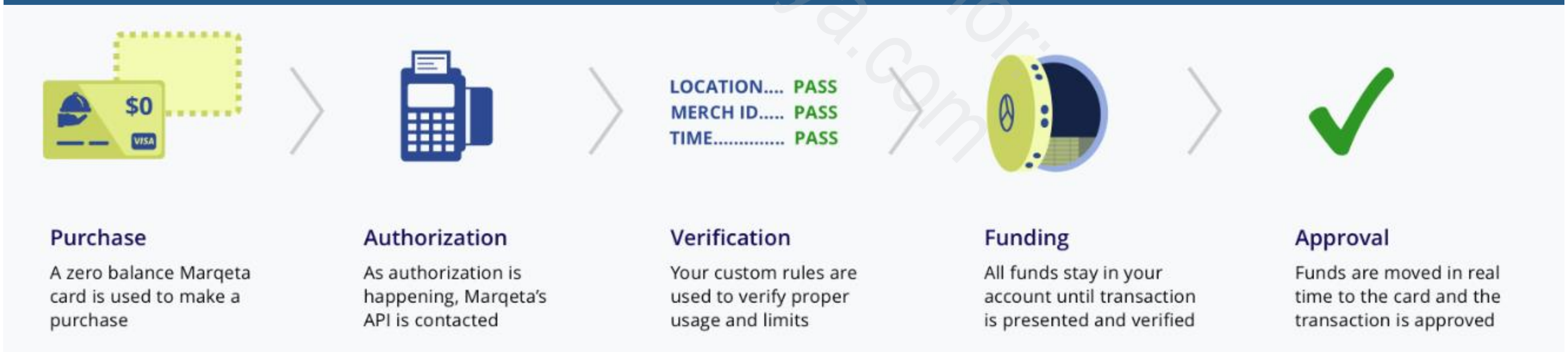
- An increasing use case provided by modern card platforms is the placement of smart controls on transaction approvals. Generally speaking, controls on cards can be placed at three difference levels:

1. **At the network level** – Visa and/or Mastercard are able to stop a transaction before it reaches the issuer for an approval decision (e.g., “no international transactions”).

2. **At the issuer (issuer processor) level** – Certain Merchant Category Codes (MCC) can be turned on and off or purchase caps can be placed over a time period (e.g., a dollar amount that can be spent at a certain location over the course of a week). Fuel cards are another example (e.g., may enable only fuel, supplies, and vehicle maintenance-related MCCs). All issuer processors can restrict MCCs, although APIs allow co-brand partners to control these by making real-time and/or grouped changes to restrictions.

3. **An additional layer of control – Just-in-Time (JIT) funding** – Auto-funding of card-linked accounts in real time, only after the transaction is approved through the custom evaluation process (e.g., approval rules based on the specific order, time, and merchant).

Marqeta JIT example: DoorDash uses JIT funding by Marqeta to help reduce fraud related to delivery courier order pick-up, allowing DoorDash to ensure couriers are paying for the exact orders (and only exact orders) at the right time and at the right merchant (e.g., transaction approvals are specific to the order that came through the DoorDash platform)



Return to Themes Table of Contents

32. Modern Card Issuance platforms

Economics of pre-paid debit (majority of modern card issuance)

- **The vast majority of modern card issuance platforms are issuing prepaid debit cards**, with the economics on prepaid debit interchange generally ~20-40bps higher than on traditional debit.
- Bank partners used by FinTechs are typically exempt from Durbin debit interchange caps (unregulated) – e.g., The Bancorp, MetaBank, Comdata, Axos Bank, etc.
- Economics are spread across all four parties in the stack (non-bank issuer and/or co-brand partner, bank issuer, issuer processor, and program manager), with the program manager generally receiving the largest portion, although depending on volumes (tier-based contracts), the non-bank issuer may garner the majority of the economics.
- Example: Square Cash Card receives ~65% (CS est.) of the prepaid debit interchange, while its bank partner (Sutton Bank) and issuer processor & program manager (Marqeta) share the remainder.

Visa US Interchange (US Retail category)	Regulated debit	Exempt debit (unregulated)	Exempt prepaid (unregulated)
Illustrative transaction size	$38	$38	$38
+ Cents per transaction	$0.21	$0.15	$0.15
x Bps of volume	0.05%	0.80%	1.15%
= Total interchange ($)	$0.23	$0.45	$0.59
Total interchange (%)	***0.60%***	***1.19%***	***1.54%***

Rank	Pre-paid debit issuer	2020 purchase volume
1	The Bancorp Bank	$50.3b
2	Bank of America	$42.1b
3	MetaBank	$39.1b
4	Green Dot Bank	$31.2b
5	Comerica Bank	$30.3b
6	US Bank	$16.4b
7	KeyBank	$11.4b
8	Fifth Third Bank	$6.9b
9	Axos Bank	$6.8b
10	UMB Bank	$4.7b
11	JPMorgan Chase	$4.1b
12	Sunrise Banks	$4.1b
13	Webster Bank (incl. HAS)	$2.6b
14	Comdata	$1.6b
15	PNC Bank	$1.0b
16	Wells Fargo	$0.9b
17	Regions Banks	$0.5b
18	Truist	$0.5b
19	Commerce Bank	$0.2b
20	TD Bank	$0.2b

Source: Company reports, Visa USA Interchange Reimbursement Fees, Board of Governors FRB, The Nilson Report, Credit Suisse research

Return to Themes Table of Contents

32. Modern Card Issuance platforms

Marqeta 2021 update and highlights

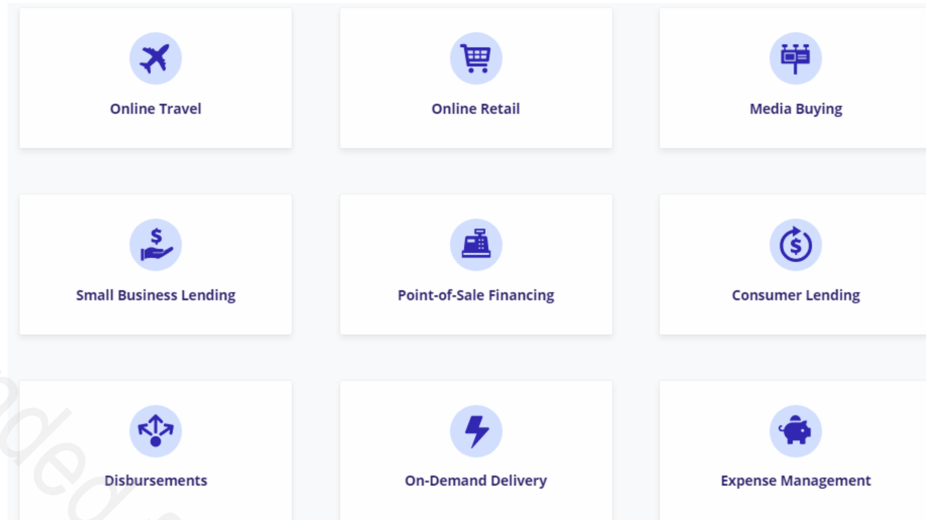
- Platform would now rank as a top 25 issuer of debit cards in the US (if consolidated as a single card issuer).
- Over 320 million cards now issued & saw revenue double for the 5th consecutive year.
- New offerings launched in 2020:
  - Industry-First Tokenization-as-a-Service Product - allowing any card issuer to instantly provision cards into a mobile wallet.
  - Marqeta 3D Secure – help card issuers meet regulatory requirements of SCA under PSD2 in certain markets and reduce fraud.
- Additional highlights disclosed:
  - IPO'd in June 2021 with initial valuation of ~$15b.
  - Added to premier customer list (Google, Uber, JP Morgan, Afterpay, Dozens, P.F.C., Novus).
  - Became a European-certified processor with Mastercard in 2020 to provide processing services enabling European fintechs to get to market faster.
  - $60b of volume processed in 2020 throughout 36 countries.

"…We are in the midst of a transformation in card issuing around the globe," said Jason Gardner, founder and CEO of Marqeta. "When today's innovators are in need of modern payment solutions, they aren't turning to banks as their primary issuers anymore and want a platform built for their needs. We've been proud to power this transformation as the most advanced card-issuing platform built in over two decades. It has been exciting to see our customers embrace these new possibilities and build extraordinary products and services that have helped define markets in their own right.."

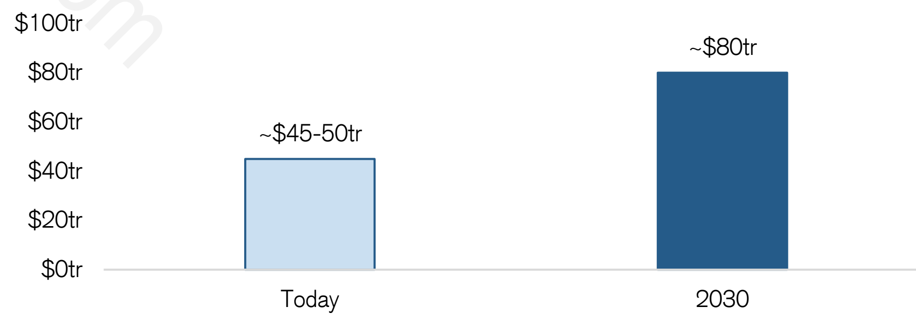
– Jason Gardner, Founder and CEO, Marqeta (May 2019)

MARQETA

Marqeta serves a range of issuers, with modern card issuance extending beyond the traditional bank issuers of the past (i.e., non-bank issuers)



Marqeta sees the global card issuance market reaching ~$80tr in volumes by 2030, increasing ~$30tr+ over the decade (per Edgar, Dunn & Company)



Source: Company reports, Edgar, Dunn & Company, Credit Suisse research

Return to Themes Table of Contents

32. Modern Card Issuance platforms

Cards allow for a "recycling" of volumes (get paid 2x on the same business)

- Traditional fund access was done via ACH bank transfers, which are not only slow but come with a small cost (vs. card issuance, which is immediate and is a revenue generator).
- Example: Square Card for sellers
  - Square gets paid when a consumer makes a purchase at a seller's POS or website (~3% gross), and then Square gets paid again (~2% unregulated debit interchange) when the seller accesses the funds (spends) via card.
  - Fees earned by Square, PayPal, and Venmo (interchange share with partner bank and program manager) are roughly similar to the "Instant Transfer" and "Instant Deposit" fees earned today (which we consider to be at risk longer term due to increased usage of The Clearing House's RTP network and eventually FedNow, although not a near-term concern).
- Square is an example of a platform that has successfully monetized cards both from a consumer (Cash Card associated with Cash App balances) and merchant perspective (Square Card associated with seller account balances).

Square Card issuance to sellers allows instant access to seller balances (sales made that day) at no charge, yet Square still earns commercial debit interchange when card is used…

…similarly, Cash Card issuance to consumers provides instant access to Cash App balances at no charge, and Square earns prepaid debit interchange when the card is used

Return to Themes Table of ontents
Return to Themes Table of Contents

32. Modern Card Issuance platforms

“Recycling” examples in PayPal, Square, Stripe, Adyen, etc.

- While PayPal (both for core PayPal and Venmo), Square, and Stripe all offer forms of “instant transfer” to bank accounts or debit cards (i.e., Visa Direct or Mastercard Send), we believe card issuance could prove to be the better way to address supplier liquidity needs.
- It also increases seller stickiness via expansion into expense management (a payments platform’s involvement was traditionally more limited to the revenue side of the business).
- Stripe Issuing was launched in July 2018, followed by Stripe Corporate Card in September 2019.
- Adyen announced a card-issuing program in November 2019, highlighting the access to faster funds for its merchant base (e.g., for marketplaces to provide to their sellers).

PayPal & Square business debit cards earn unregulated debit interchange and provide instant access to funds for sellers, while Stripe Issuing offers cards for employees (dynamic expense controls), contractors (on-demand platforms), and customers, along with a formal Corporate Card program

 Source: Company reports, Credit Suisse research

Return to Themes Table of Contents

33. The evolution of Banking-as-a-Service (BaaS) platforms

The rise of global BaaS platforms

- Banking-as-a-Service (or BaaS) has historically applied to enabling non-banks or Neobanks to provide banking services to their customers, for instance outsourced core deposits and card issuing programs – but in some cases is evolving to a broader end-to-end set of solutions, powering embedded financial services.
- There a few main flavors of BaaS platforms:

1) More focused providers enabling one or two services (i.e., issuing) who require a BIN sponsor.
2) A provider of comprehensive set BaaS capabilities, and with appropriate banking licenses, but are more local in nature.
3) A more turnkey end-to-end solution BaaS solution via an e-Money license, allowing them to hold deposits, clear and, settle transactions and V/MA issuing capabilities.

Global BaaS landscape

Issuer business	BaaS w/ Sponsor	BaaS owned
GPS global processing services	solarisBank	Railsbank
MARQETA	GALILEO	TUTUKA
	Synapse	cross river
	BOND	green dot

Global Processing Services (GPS) helped to launch the Neobank revolution (powering Monzo, Revolut, Starling, Curve, and more) with its award winning GPS Apex issuer platform

Features of the Apex issuer platform

Single global processing platform	Over 90 open APIs	Certified by Mastercard and Visa as a 3rd party processor
Partner for Visa Fast Track & Mastercard FinTech Express	Supports all currencies	PSD2 open banking and TPP Access Compliance
Enable an FX program (Multi-FX card / wallet)	Mobile solutions including wallets	Virtual card solutions

Railsbank offers a multitude of services through its open APIs, which have global capabilities, and eMoney licenses

A super simple API for developers to embed global financial services directly into your app or customer journey.

A global operations and license platform that processes billions of dollars annually to run your embedded financial services for you.

Or if you have your own licenses and financial operations capabilities, these can be plugged in and you can use ours to scale to new geographies.

Banking as a Service

Cards as a Service

Credit as a Service

Operations as a Service

Insights as a Service

Source: Company websites, 11:FS Foundry, Credit Suisse research

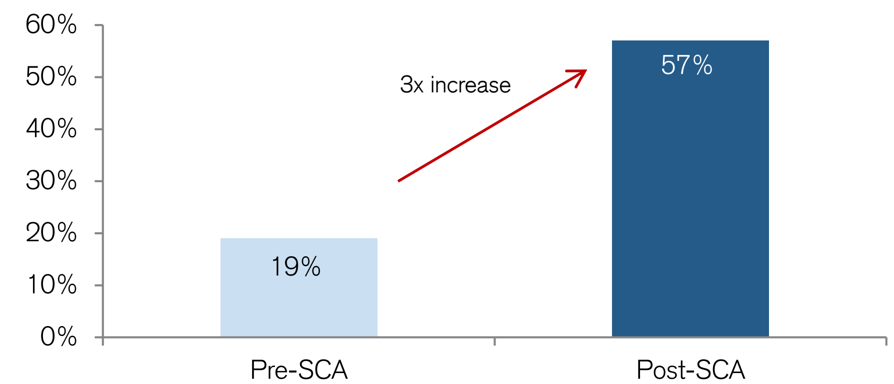
Regulation & Litigation

[Return to Themes Table of Contents]

34. Two-Factor Authentication implications
Customer experience and fraud prevention

- What is Strong Customer Authentication (SCA)?
  - Two-factor identity authentication is a requirement for online purchases in Europe (part of PSD2 regulation).
  - Card-issuing banks will be required to decline non-SCA compliant transactions.
  - SCA deadline was delayed to March 2022 from Dec. 31, 2020 (original deadline was Sep. 2019).
- Why is SCA important? SCA poses a significant challenge to eCommerce merchants by adding friction to online shopping.
  - Retailers in India experienced a 25% drop in online checkout conversion over night from two-factor requirements in 2014.
  - 451 Research estimates a €57 billion loss of eCommerce sales in the first year after SCA is enforced.
  - Expected to be a catalyst for consumer adoption of A2A eCommerce payments in Europe by making the consumer (authentication) experience difficult for cards given a lack of issuer tech readiness for 3DS 2.0 exemptions (see theme 11).

Mastercard estimates SCA will triple the number of online transactions requiring two-factor authentication from 19% to 57%



SCA requirements: 2 of 3 factors below

SCA exemptions

- Low-value transactions (< €30); SCA required after 5 transactions regardless of size or after €100 in cumulative spend
- Trust websites – first use required SCA
- Recurring payments
- Contactless payments
- Corporate payments
- Merchants are liable for fraud on exempt transactions that do not go through SCA

Source: Mastercard, Stripe, 451 Research, Credit Suisse research

Return to Themes Table of Contents

34. Two Factor Authentication implications
3-D Secure 2.0 – Industry SCA Solution

- What is 3-D Secure (3DS)?
  - 3DS is an authentication protocol that enables issuing banks to verify the identity of cardholders during a CNP transaction.
  - 3DS is the primary framework for addressing PSD2's SCA.
  - Utilizing 3DS transfers fraud liability from merchant to issuer.
  - 3DS specifications are governed by EMVCo.
- Key benefits of 3DS 2.0?
  - Lower checkout friction (Visa claims a 70% improvement in cart abandonment rates).
  - Increased transaction approval rates (+5% lift in approval rates)
  - Reduced fraud rates.
- 3DS 2.0 is big improvement but not a panacea for SCA.
  - Optimizing for SCA exemptions is complex.
  - Likely that not all issuers will be able to support 3DS 2.0 by the SCA deadline.
  - Issuers need to have technical capability to make use of SCA exemptions for cards, which we suspect could limit the full use of SCA exemptions in the medium term (~2021-2023).

"…SCA will make or break Internet businesses. The urgency to get ready for it cannot be overstated…"

- Guillaume Princen, Head of Continental Europe, Stripe (June 2019)

Key differences between 3DS 1.0 and 3DS 2.0

3-D Secure 1.0	3-D Secure 2.0
Static passwords	Sophisticated authenticators (e.g., biometrics, one-time passwords)
Browser dependent	Mobile enabled
Limited dataset (supports 15 data elements)	Enriched dataset (supports 150 data elements, 10x the number of 3DS 1.0)
Enrollment required	No enrollment required
Merchant bound by issuer decision	Merchant opt-out option

SCA complexity favors tech-oriented merchant acquirers

Adyen
First to market its SCA-compliant 3DS 2.0 Solution to help merchants boost conversion rates and security

FIS (Worldpay)
Launched Exemption Engine for SCA in June 2019 to work with its 3DS 2.0 solution "3DS Flex"

Stripe
Launched 4 types of SCA-compliant merchant products in 2019 and acquired Touchtech to help banks prepare for SCA

Source: Mastercard, Visa, Stripe, 451 Research, Credit Suisse research

35. Trends in global payments regulation

Commonalities across payments regulations worldwide

1. Centered around stimulating competition in financial services via Open Banking regulatory initiatives (practically every major developed economy has such regulations aside from the US).
2. Reducing card payment fees borne by merchants and consumers (indirectly) via Interchange caps.
   - Australia – Caps on debit and credit interchange
   - Europe & UK – Caps on debit and credit interchange (IFR)
   - US – Caps on debit interchange for banks with over $10b in assets

North America	
USA	▪ US Department of Justice investigating Visa's online US debit practices (March 2021) ▪ CFPB public solicitation for Dodd Frank 1033 period ends in Feb 2021; Starts re-writing consumer financial data rights ▪ Ongoing US Merchant Interchange Fee Antitrust Litigation ▪ Anti-steering case with American Express deemed legal by US supreme Court (2018) ▪ Interchange caps on debit transactions (Durbin, 2011)
Canada	▪ Launched publication consultation on Open Banking merits in 2019 and issued a final report of findings in April 2021
Mexico	▪ FinTech law effective (2018)

Europe
▪ Interchange reduction on cross-border transactions from consumers outside the EU spending inside the EU
▪ PSD2 regulation (2018-2020); Open Banking APIs & SCA mandated
▪ GDPR (2018); EU consumer data protections
▪ Interchange Fee Regulation (2015 and 2016), Interchange caps on credit and debit, Separation of Scheme and Processing, Co-badging, Anti-steering & Honor all cards relaxation, Un-blending of MDR

Asia-Pacific	
Australia	▪ 2017 Interchange caps on credit and debit ▪ Open Banking mandated in July 2019
Singapore	▪ Open Banking support but not mandated ▪ Published API playbook for financial industry in 2016
India	▪ RBI expected to release Open Banking guidelines in 2020
Hong Kong	▪ Open Banking mandated in four phases from 2019 to 2020

Source: Company reports, Credit Suisse research

[Return to Themes Table of Contents](#)

36. European payments regulation

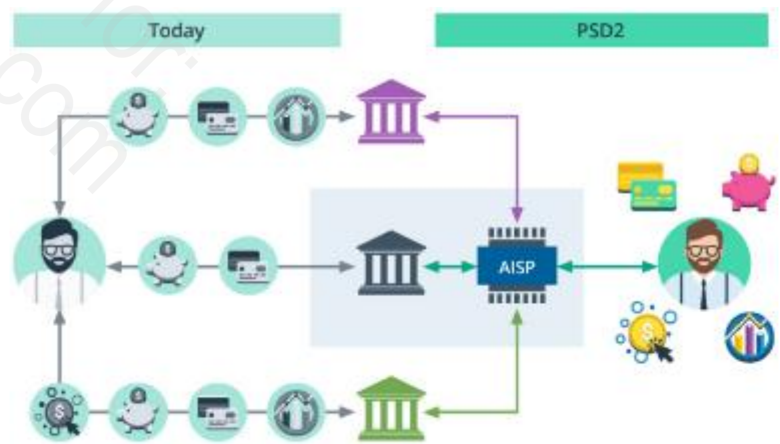
PSD2 in Europe: Evolution, not revolution

The Second Payment Services Directive's (PSD2) regulatory objective is to stimulate competition in financial services, reduce fraud, and increase consumer protection in the European Economic Area, with an emphasis on two key aspects:

- Open API mandates on European banks
  - Requires European banks to grant qualified third parties automated access to customer accounts (retail and corporate) via open APIs.
  - Empowers new platform-oriented business models and pulls them into regulatory scope: (1) Account information service providers (AISPs) can provide a consolidated view across a consumer's financial accounts; and (2) Payment initiation service providers (PISPS) can initiate transactions payments directly from a bank account (e.g., PayPal) without relying on screen scraping.
- Enhance customer security
  - Requires strong customer authentication (SCA), two-factor authentication when a consumer initiates an online payment or accesses bank account information online; detailed in [Theme 34](#).
  - Reduces consumers' liability for unauthorized payments.
  - Prohibits surcharging.

PSD2 Timeline – Key Dates	
November 2015	Final approval of PSD2 by European Council
January 2018	PSD2 becomes national law
February 2018	Regulatory technical standards (RTS) on open banking APIs and SCA published, giving European banks and merchants 18 months to implement
September 2019	RTS mandated to start (for open banking API requirements, not SCA). In June 2019, the EBA allowed for time extensions on an exceptional basis
March 2022	RTS to be enforced for SCA

Open Banking brings the platform model into financial services



Source: Credit Suisse research, EY

Return to Themes Table of Contents

36. European payments regulation
Open Banking perceptions from European banking executives

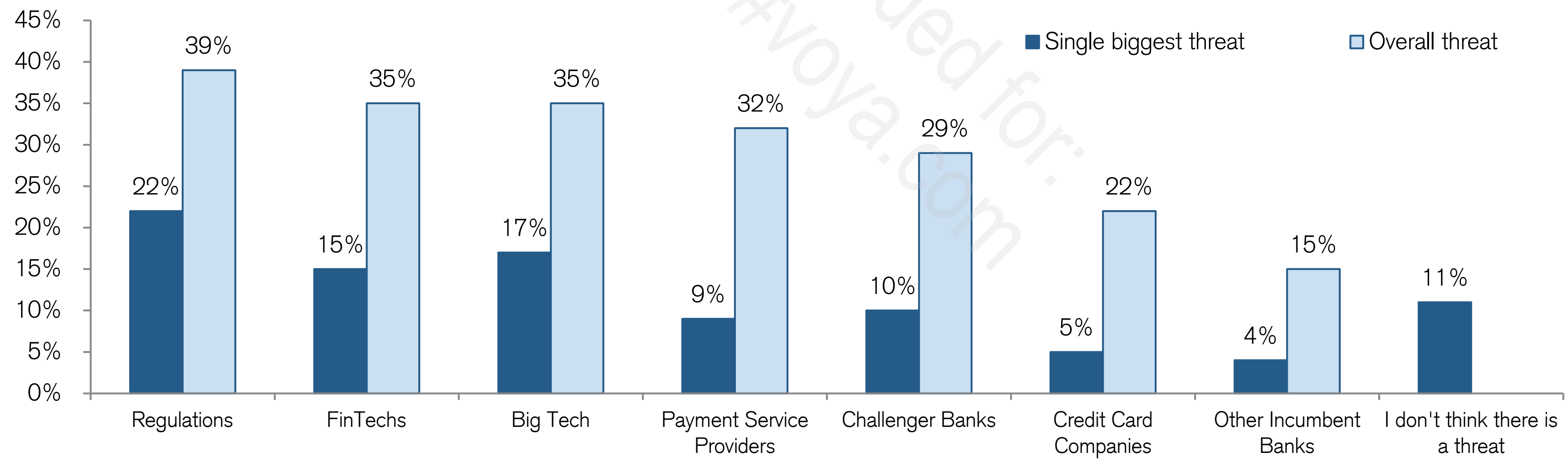
- 22% of European Banking Executives view regulations as the biggest threat to their business
- 17% view BigTech as the single biggest threat (Google, Amazon, Apple), given established customer relationships, large user bases, brand recognition, and technical talent
- 64% believe the financial services industry will significantly evolve as a result of open banking

Top Open Banking challenges & priorities from Tink's survey of European banking executives

Top 3 Challenges
Modernize IT systems, comply with EU regulations, and finding the right talent

Top 3 Opportunities
Develop better digital services, increase customer personalization, and reduce costs of customer acquisition

Biggest threats to incumbents from Open Banking (European banking executives)



Source: Credit Suisse research, Tink Report "Inside the minds of European Bankers"

36. European payments regulation

Europe Interchange Fee Regulation (IFR)

- Regulatory objective: Reduce the cost of card payments and increase competition
- Applies to all card-based payment transactions in the European Union as of June 2016 (aside from Interchange caps, which became effective in December 2015)

European Commission presentation on IFR regulation

IFR Articles	Description	Objective & Potential Impact
Interchange Caps (articles 3 & 4)	▪ Cap domestic interchange rates to 0.30% and 0.20% for credit and debit card transactions, respectively; also applies to intra-Europe cross-border	▪ Lower acceptance cost of card payments and stimulate merchant acceptance of card payments
Separation of Processing & Scheme (article 7)	▪ Card networks must separate their processing and scheme operations (accounting, organization and decision-making) ▪ Bans price bundling for processing and scheme fees	▪ Increase competition in the processing market to reduce prices ▪ Prevents card schemes from favoring their own processing by enabling choice for banks and retailers ▪ Facilitated Mastercard and Visa's processing share gains in Europe
Co-badging (article 8)	▪ Restricts card networks from charging scheme fees for transactions made on co-badged cards that were not processed on the scheme's network	▪ Improves competition in cross-border payments among card schemes
Honor all cards relaxation & Anti-steering (articles 10 & 11)	▪ No longer required to accept all card types issued by a particular scheme (consumer prepaid, debit, and credit) ▪ If a merchant wishes to accept one type of consumer card across the 3 categories, it must still accept all (e.g., if you accept 1 type of Visa credit, you must accept all Visa credit cards) ▪ Prohibits card schemes banning merchants from steering consumers	▪ Allows merchants to decide if they want to accept various card types (consumer prepaid, debit, and credit)
Unblending (article 9)	▪ Acquirers required to separately list interchange fees, scheme fees, and the acquirer mark-up	▪ Improves transparency on card transaction fees paid by merchants

Source: ECB, Credit Suisse research

36. European payments regulation
Cross-Border Europe Interchange Fee Regulation

- Regulatory objective: Reduce the cost of cross-border card payments in the European Economic Area (EEA)
- Each of the three regulations listed below brought more transactions occurring within the EEA into scope

Date	Description	Example of Cards/Transactions in Scope
December 2015	▪ Interchange Fee Regulation (IFR): Caps domestic interchange rates to 0.30% and 0.20% for credit and debit cards issued and used in Europe, respectively; also applies to intra-EEA cross-border	▪ Applies to all domestic and cross-border transactions for cards issued and used in Europe ▪ For example, a French consumer making card purchases in France ▪ And a French consumer making card purchases in Germany
~October 2019	▪ Regulates/reduces interchange on cards used in Europe but issued elsewhere (tourists visiting Europe), by 40% on average ▪ For in-store transactions (card present), caps interchange rates to 0.30% and 0.20% for credit and debit cards, respectively ▪ For online transactions (card not present), caps interchange rates to 1.50% and 1.15% for credit and debit cards, respectively	▪ For example, a US tourist making an in-store card purchase in Belgium ▪ And a US consumer making a card purchase at an eCommerce merchant in Belgium while in the US
December 2019	▪ Regulates/reduces interchange on cross-border card payments in euro, in non-Eurozone Member states (Bulgaria, Croatia, Czechia, Denmark, Hungary, Iceland, Liechtenstein, Norway, Poland, Romania, Sweden) to be the same as domestic payments (December 2015 IFR caps listed above) ▪ These transactions account for ~80% of all cross-border payments from non-Euro area member states	▪ For example, a Polish consumer making card purchases in France

Source: European Commission, Credit Suisse research

37. US vs. international FinTech regulations and market dynamics

A big opportunity in the US with big hurdles

Regulations

"Market-driven" approach in the US vs. Innovation-oriented regulations abroad

- Un-mandated consumer financial data rights vs. mandated consumer financial data rights abroad (mandated Open APIs)
  - Dodd-Frank mandates direct consumer access to data but not specifically data aggregators, meaning technically banks aren't required to allow companies like Plaid to connect (e.g., PNC turning off Venmo and telling customers to use Zelle in December 2019); CFPB finished its public consultation and started re-writing section 1033 of Dodd-Frank in 2021
- Interchange unregulated (ex. Debit for big banks)
  - Interchange rate decisions left up to the courts in the US vs. addressed by regulators abroad
  - Unregulated Debit interchange enables US FinTechs to monetize at materially higher rates than FinTechs in regions where interchange is regulated (e.g., Europe debit interchange is 20bps vs. 150-190bps + $0.10 in the US), reducing their need to monetize via new products

> *"…the PNC-Venmo spat shows how much we need to adopt open banking that lets customers own their own data."*
>
> - Karen Mills, Senior Fellow at Harvard Business School

Licensing

US FinTech licensing is fragmented across 50 states and 10+ federal agencies

- In the US, FinTechs must get money transmitter licenses in 50 states with varying requirements and interpretations of the same law, vs. significantly more fluid processes abroad
  - E.g., 50 licenses required for 1 country vs. 1 license for 31 countries in Europe…
- CSBS' Vision 2020 initiative is working to harmonize/streamline the multistate licensing process:
  - Developed a model money services business (MSB) law given each State defines and interprets legal terms differently (28 states on board to-date)
  - This reduced application times by two-thirds in 2019
  - Latest accountability report detailing state regulators adherence to CSBS recommendations can be found here
- US FinTechs subject to overlapping authority and jurisdiction from 10+ federal agencies, 50 state regulators vs. 2 in other countries (e.g., UK, Australia)
  - Insightful testimony to the Senate discussing this here

Banking Market Dynamics

US banking market is more consolidated at the top and fragmented at the bottom

- Top 4 big banks spend ~$40bn/year on IT, equal to total Global VC Fintech funding (in 2018, ~>2x in other years)
- Top 4 US Banks have 40% of assets, the next 11k have the remaining 60%
- Europe has ~50% less banks (~6k) yet ~50% more people (i.e., ~8 banks per million citizens vs. the US with ~34 banks per million citizens)
- Bank technology provider market for the majority of banks is led by Fiserv, FIS, Jack Henry, Finastra, and others

> *"Although it boasts one of the world's largest FinTech ecosystems, the US lags behind other major countries in providing a cohesive and consistent regulatory framework for FinTechs."*
>
> - White & Case

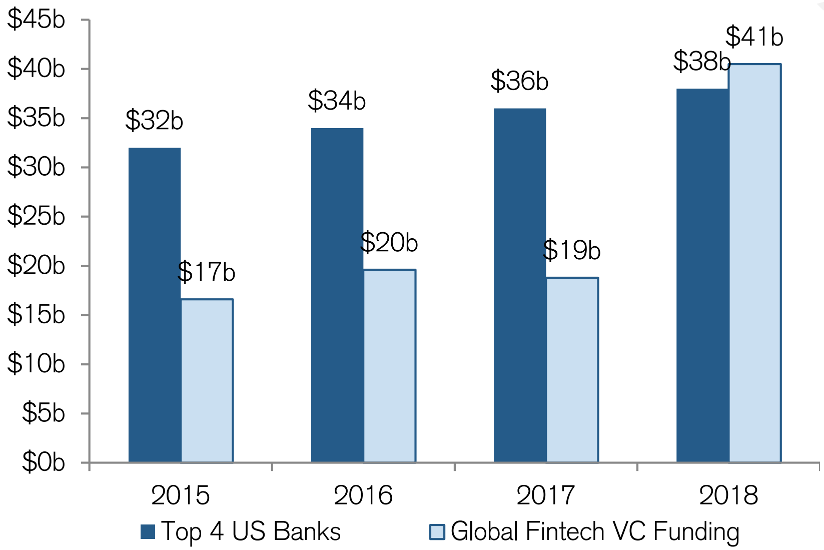
Source: 2018 US Treasury Report: "A Financial System That Creates Economic Opportunities", CSBS, Credit Suisse research

Return to Themes Table of Contents

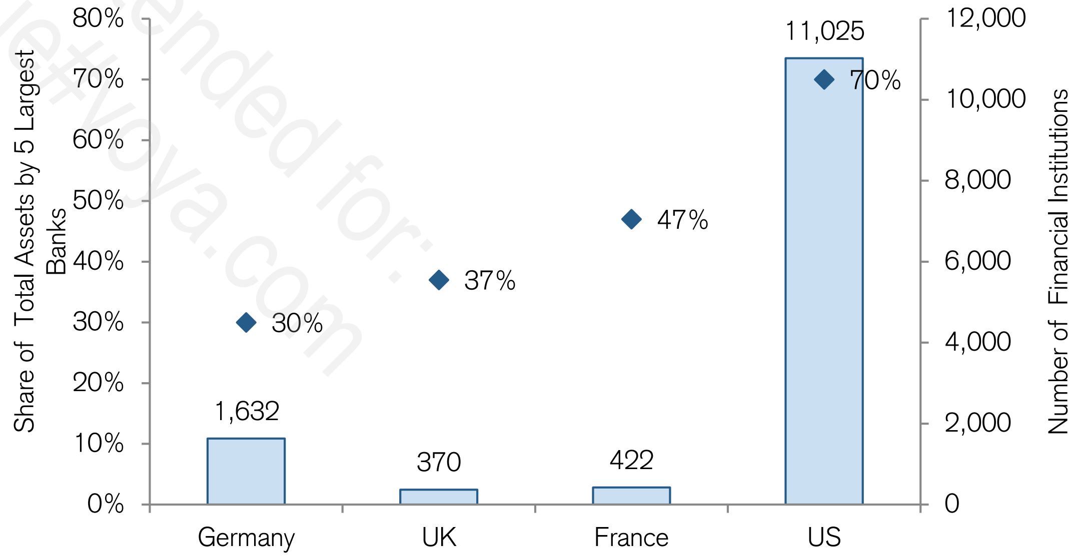
37. US vs. international FinTech regulations & market dynamics
Fragmented US Banking Market

- ~6,000 financial institutions in Europe compared to ~11,000 in the US
- The US market is significantly more concentrated at the top and fragmented at the bottom
- This is evidenced by the scale and resources of top 4 big banks with annual IT spend of ~$40bn, equal to ~95% of Global VC Fintech funding in 2018 and ~>2x 2015-2017

IT spend of top 4 US banks vs. global FinTech funding



Share of total assets by 5 largest banks



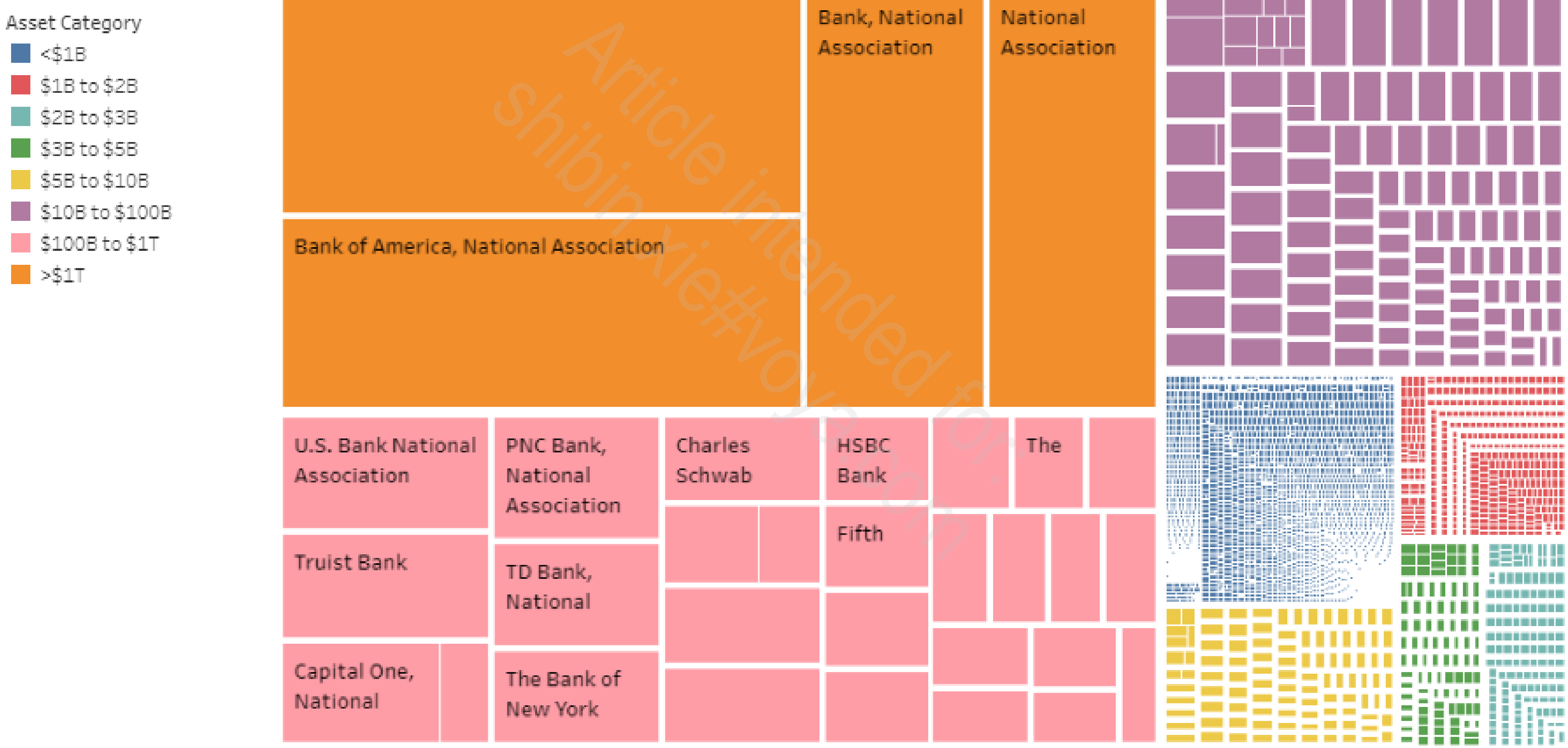
Return to Themes Table of Contents

37. US vs. international FinTech regulations & market dynamics

Fragmented US Banking Market

CSBS Analytics and Research

Banks by Asset Category as of December 2020



Source: CSBS (only shows US banks, excludes credit unions), Credit Suisse research

Return to Themes Table of Contents

37. US vs. international FinTech regulations & market dynamics

Overview of US Payments Regulations

Regulation	Date	Description
US Interchange Regulation (MDL 1720)	Ongoing since 2005	▪ Case of all US merchants against Visa, Mastercard, and US banks, with the plaintiffs contending the defendants violated antitrust laws and caused merchants to pay excessive fees for accepting credit and debit ▪ Detailed overview on the following page
Anti-Steering	June 2018	▪ Supreme court ruled AMEX's anti-steering practices that ban merchants from "steering" consumers to use alternative cards that have lower fees are legal and do not violate antitrust laws
Prepaid Accounts	April 2019	▪ Improved consumer protections for prepaid cards from fraud and unauthorized charges ▪ Increased transparency on prepaid account fees and provide free ways to access account information
Dodd-Frank (Durbin Act)	October 2011	▪ Capped debit interchange at $0.21 + 0.05% for banks with >$10bn in assets ▪ Issuers must enable at least 2 unaffiliated card networks on each debit card and allow the merchant to select to lowest-cost option

Source: Credit Suisse research

[Return to Themes Table of Contents](#)

37. US vs. international FinTech regulations & market dynamics
US Merchant Interchange Case

Timeline	MDL 1720: Payment Card Merchant Discount and Interchange Fee Antitrust Litigation
2005	Merchants brought suit against Visa, Mastercard, and their card-issuing banks for: ▪ Default interchange fees on every transaction ▪ Honor all cards, requiring merchants to accept all cards regardless of the differences in interchange fees ▪ Rules banning surcharging
2012	$7.25b settlement approved ▪ Visa, Mastercard, and the banks agreed to pay a $7.25b settlement and allowed merchants to surcharge ▪ In return, merchants (current and <u>all future merchants</u>) forfeit right to sue banks and card networks on these topics
2016-Present	Case re-opened, settlement overturned ▪ 2012 settlement overturned in summer 2016 because the future merchant class was "inadequately represented" in the settlement negotiations (given they were represented by the same counsel posing a conflict of interest) ▪ 2 classes of plaintiffs: comprising all the merchants in the US that accept Visa and/or Mastercard 1. Current merchants (monetary relief class) who accepted Visa/Mastercard from January 1, 2014, through January 25, 2019; AKA monetary relief class, receiving a portion of the $6.24b settlement amount; have option to "opt-out" of settlement and individually sue the card networks and bank 2. Rules relief (injunctive relief class) negotiations are ongoing
Recent Developments & Next Steps	▪ January 2019: Preliminary approval of $6.24b settlement for the current merchant class ▪ December 17, 2019: Court granted final approval of a $5.5b settlement ▪ January 2020: Merchants appealed the court's settlement order to the US Court of Appeals for the Second Circuit ▪ The most important aspect of the case relates to any potential rule changes to the card networks business practices with Rules Relief class, with no major rule changes likely to occur in our view

Source: Credit Suisse research, PACER.

Return to Themes Table of Contents

38. Bank Licenses for US FinTechs

What are they and why are FinTechs applying?

Item	Industrial Banks	OCC FinTech Charter	Commercial Banks
Make loans?	▪ Yes	▪ Yes	▪ Yes
FDIC-insured deposits?	▪ Yes, but not demand deposits if assets are > $100mm	▪ Does not permit access to FDIC-insured deposits	▪ Yes, including demand deposits
Interest on deposits?	▪ Yes	▪ Charter explicitly for non-depository FinTechs	▪ Yes
Regulation of parent company?	▪ No, not a bank (as defined by the BHCA) ▪ The bank itself is subject to federal (FDIC) & state banking regulators (e.g., Utah Department of Financial Institutions), but the parent company is not ▪ License in one state allows for credit extension nationwide	▪ Yes, would operate as Special Purpose National Banks (SPNB) under the National Bank Act, which is overseen by the OCC ▪ No state-by-state regulation and licensing ▪ No formal requirement to adhere to the Community Reinvestment Act (CRA)	▪ Yes, defined as a bank by BHCA ▪ Parent company limited to banking and/or financial services ▪ Cannot mix commerce and banking ▪ National banks regulated by the OCC, while US State banks (non-member banks) are regulated by the FDIC
Additional	▪ Square and Nelnet's applications were approved in March 2020, no applications had been approved since 2006 prior ▪ Square's motivation: (1) speed (removing 3rd party), (2) economics (no revenue share), (3) low-cost funds, and (4) accept deposits ▪ Low-cost source of funds (discount window & deposits) ▪ Can become a member of Visa & Mastercard ▪ Two separate applications (Utah and FDIC), but state will generally accept the FDIC application ▪ Utah DFI and FDIC generally review in close coordination ▪ 27 current ILCs in the US	▪ OCC FinTech charters originally proposed in 2016 as an alternative option; US District Court for the Southern District of NY ruled in October 2019 that the OCC does not have legal power to grant such a charter to non-banks ineligible for federal deposit insurance, however the decision was overturned by the Second Circuit Court in June 2021 ▪ Although the Second Circuit Court dismissed the NYDF's complaint, further litigation is expected should the OCC grant a SPNB charter to a FinTech company ▪ Charter would include preemption of usury laws	▪ ~4.7k commercial banks in the US (vs. 12k in 1990)

Source: Utah Center for Financial Services (University of Utah), James Bart (Lowder Eminent Scholar in Finance, Auburn University), Pepper Hamilton LLP, FDIC, Credit Suisse estimates

Threats to Monitor for the Existing Ecosystem

39. Amazon's building blocks in Payments & FinTech

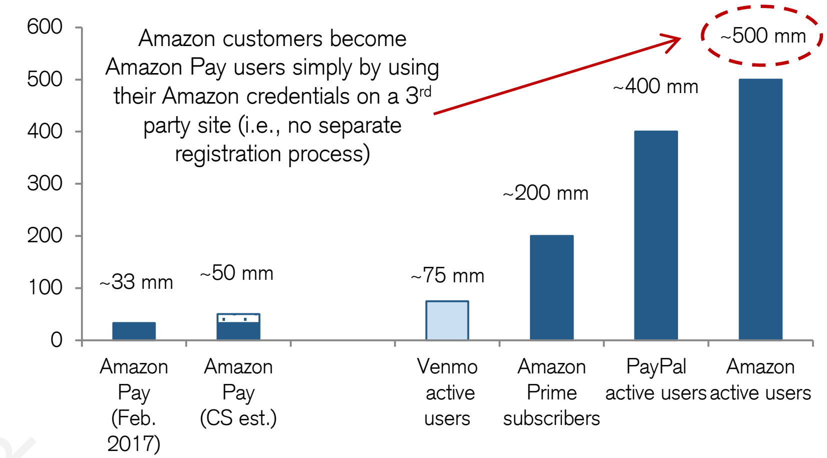
All of the pieces are there, and the rationale is sound

- Rationale for Amazon in Payments & FinTech:
  - Amazon "flywheel" benefits to both sides of Amazon's network (consumers, merchants), allowing Amazon to enter adjacent businesses without having to be directly profitable (e.g., Fulfillment by Amazon [FBA] not profitable on a direct basis, but adds product selection, an indirect, but meaningful benefit).
  - Large addressable markets (digital payments), including portions ripe for disruption and/or new TAM creation (SMB lending).
  - Monetizing existing assets in terms of users (~500mm est.), data (merchant sales history), trust (19% of cart abandonments due to lack of trust), and capabilities – i.e., payments honed internally ahead of extending to 3rd parties (the Marketplace, AWS, Logistics playbook).
  - Potential for reduced payments acceptance costs.

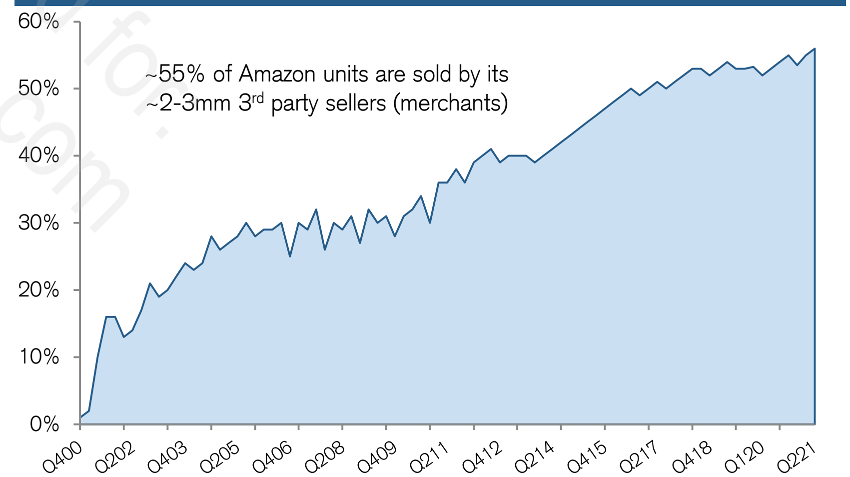
- Consumer-side (~500mm est. buyers with cards in Amazon wallets):
  - Increased spending (credit extension, rewards & incentives).
  - Extends customer base into lesser-penetrated demographics (e.g., Amazon Credit Builder secured credit card).

- Merchant-side (~2-3mm 3rd party sellers on Amazon Marketplace):
  - Lending specifically for inventories to be placed on Amazon.com.
  - Amazon Pay "button" on brand.com sites expands merchant relationships (increase stickiness).
  - According to a Business Insider article in early September 2021, Amazon is creating a POS system for on- and offline sales to combat Shopify's SMB dominance. We note that Amazon also attempted a POS offering in 2014, Amazon Local Register, but eventually shut down the effort.

Amazon Pay disclosures understate the true customer base



Amazon 3rd party sellers contribute more than half of units sold



Source: Company reports, Credit Suisse research *Amazon is covered by CS analyst Stephen Ju.

Return to Themes Table of Contents

39. Amazon's building blocks in Payments & FinTech

Building a consumer ecosystem in-house and via partnerships…

Amazon Consumer Payments & FinTech offerings	Description	Partner	Pricing and/or Incentives
amazon pay	**Amazon Pay** allows Amazon customer to checkout at 3rd party websites using their Amazon credentials, accessing the payments methods already stored with Amazon, address & shipping preferences, etc. The trust of the Amazon brand is a key aspect of the offering, along with the customer-base that Amazon brings to bear. Worldpay as an acquiring partner reduces the integration work required by merchants to accept Amazon Pay.	None (although Worldpay is an acquiring partner for merchant distribution)	2.9% + $0.30 web & mobile; 4% on transactions done over Alexa; Cross-border an additional 1% fee
prime VISA	**Amazon Prime Rewards Signature Visa Card** is an open-loop card for Amazon Prime members only, with 5% back at Amazon and Whole Foods, 2% back at restaurants, gas stations, and drugstores, and 1% back on all other purchases. There is also a non-Prime version of this card (Amazon Rewards Visa Signature Card, which features 3% cash back at Amazon.com.	Chase Bank (J.P. Morgan Chase)	No annual fees, no foreign transaction fees; $50 Amazon Gift card sign-up bonus; ~16-24% APR
amazon.com STORE CARD	**Amazon.com Store Card** is a closed-loop card for Amazon customers, although Prime members earn 5% back. Provides no interest financing offers for 6, 12, and 24 months for purchases of above thresholds ($149, $599) and/or select items. Also, EqualPay allows for equal split of payments over time at 0% APR. There is also an Amazon Prime version of this card which earns 5% back.	Synchrony Bank	No annual fees; $60 Amazon Gift card sign-up bonus; APR is 28% if not paid off within agreed monthly plan
amazon.com STORE CARD	**Amazon.com Store Card Credit Builder** and Amazon Prime Store Card Credit Builder are secured card versions of the traditional store cards above (closed-loop cards). Customers make a deposit that becomes their credit limit, and allows for building or rebuilding credit. Provides access to the under-banked. A more recent offering, launched June 2019.	Synchrony Bank	No annual fee; Minimum deposit of $100 (max of $1,000); $10 Amazon Gift card sign-up bonus; Non-prime version has no rewards
reload	**Amazon Reload** and Amazon Prime Reload allow customers to earn a 2% bonus if they agree to provide both a debit card and checking account & routing number. Amazon sometimes routes the reloads through checking accounts instead of debit cards. Reloads occur when the balance drops below a set amount.	None (although the balance technically sits in a gift card, provided by ACI Gift Cards)	2% bonus for using these lower cost funding methods (debit, checking account) and reloading in bulk
amazon cash	**Amazon Cash** allows customers to add cash to an Amazon account at a physical retailer (e.g., convenience store, pharmacy) location. Allows Amazon to expand into an under-banked demographic.	Numerous retail partnerships (7-Eleven, CVS, Rite Aid, etc.)	No fees
amazon protect	**Amazon Protect and other insurance offerings** are insurance products for Amazon purchases (i.e., added coverage above and beyond those offered by the manufacturer). Can cover accident and theft as well.	London General Insurance Company Limited for UK; Asurion for US	By product and purchase price

Source: Company website

Return to Themes Table of Contents

39. Amazon's building blocks in Payments & FinTech

…and beginning to bolster the business side as well

Amazon Business Payments & FinTech offerings	Description	Partner	Pricing
	**Amazon Business American Express Card** and Amazon Prime Business American Express Card are open-loop cards for non-Prime and Prime member business accounts. Standard Business card (non-Prime) features 3% back or 60 day terms, while the Business Prime card has 5% back (on first $120k, 1% thereafter) or 90 day terms (on US purchases at Amazon Business, AWS, Amazon.com and Whole Foods). Also, both cards get 2% back at restaurants, gas stations, and wireless phone service, along with 1% back on other purchases. Launched by Amazon and American Express in October 2018.	American Express	No annual fee; $100-$125 Amazon Gift card sign-up bonus for; ~16-24% APR
amazon lending	**Amazon Lending** is an invitation only program that offers both credit lines up to $1mm (through Marcus Business Line of Creit) and loans of $1k-$75k for sellers to purchase inventory, expand product lines and reach more shoppers through marketing. Amazon has data that others (banks) don't, including real-time sales data (and growth), customer reviews, profitability metrics, etc. Amazon has the ability to be "paid back first" via topline earned by sellers on Amazon (similar to Square Capital). Amazon also can provide fast decisions (minutes), in part due to the invite only nature of the program pre-screening applicants. Further, these smaller business loans are often not profitable for traditional banks, which prefer to focus on larger dollar amounts. Terms on the loans tend to be 12 months or less (i.e., short term). In January 2018, Amazon disclosed that "Amazon Lending surpassed $3 billion lent to small businesses on Amazon since the program started in 2011."	Partnered with Goldman Sachs (Marcus) in 2020, Bank of America added as a partner in early 2018	Range from ~7-21%, but depends on the seller-specific offer made by Amazon. Maintenance fee is sellers don't use at least 30% of their credit line.
amazon CORPORATE PAY-IN-FULL CREDIT LINE; amazon CORPORATE REVOLVING CREDIT LINE	**Amazon.com Revolving Corporate Credit Line and Amazon.com Corporate Pay-In-Full Credit Line** offerings are made available to business accounts that want more flexible payment terms (i.e., pay-in-full or make minimum monthly payments only). Credit line can only be used at Amazon.com. Allows businesses to authorize multiple buyers/employees through Amazon Business US. The Pay-in-Full Corporate credit line offers 55 day payment terms (no interest, no fees) and is marketed more toward larger businesses (e.g., libraries, schools, government organizations).	Synchrony Bank	No annual fee; APR 12.99%

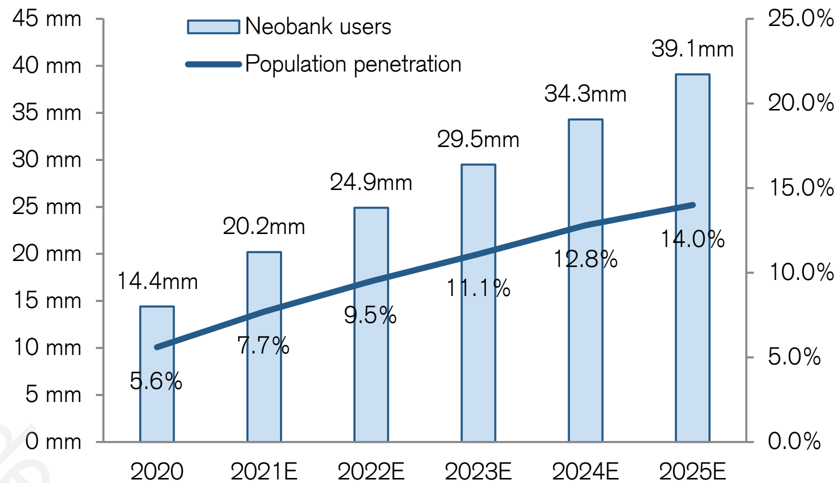
Source: Company website, Fundera, PYMNTS.com, Credit Suisse

39. Amazon's building blocks in Payments & FinTech

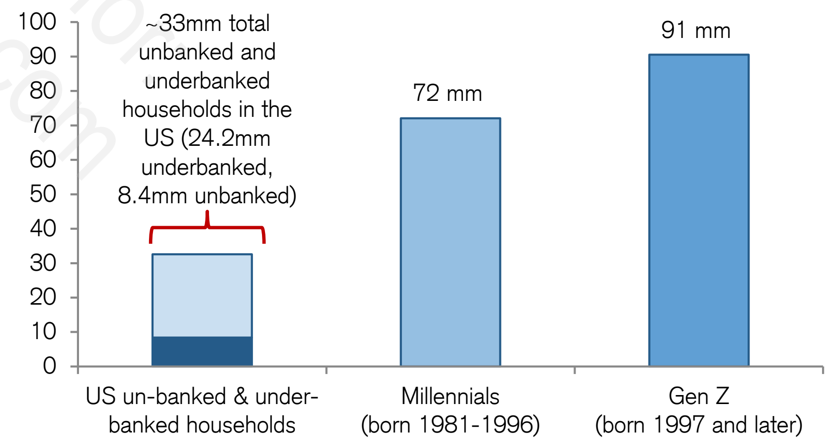
Could a digital bank be a logical/potential next step?

- Neobanks are gaining users at an impressive rate by innovating faster, reducing fees, offering higher interest rates on savings, providing a hook (e.g., International P2P, robo-investing, savings analytics), and in many cases, targeting niche demographics (Millennials, GenZ, underbanked).
- Why not Amazon? Lower customer acquisition costs (brand, user base) and the fact that Amazon would not need to turn a direct profit.
- A digital bank from Amazon would have the potential to:
  - Increase user engagement (account balance views, conducting other transactions, bill-pay, etc.), another reason to open Amazon app.
  - Increase wallet share with account holders (funds kept within Amazon ecosystem, potential for lower cost transaction expense) enhanced by even more purchase behavior information.
  - Offer low or no fees, with monetization coming indirectly (flywheel effect).
  - Come with user-friendly and high utility saving and spending analytics.
  - Target a combination of: (1) Amazon Prime subscribers and (2) underbanked consumers, which expands Amazon's customer reach (similar to the Amazon.com Credit Builder card offering).
  - Utilize a bank partner (we do not expect Amazon to pursue a bank license).
  - Free Amazon Prime after "$XXX" is spent on Amazon debit card.
- Would also stimulate adoption of Amazon Pay on 3rd party merchant sites:
  - Offer rewards on debit cards that can be spent on Amazon.com and Amazon Pay merchants (differentiated given debit interchange is now regulated for large banks, meaningfully limiting rewards offers on debit).
  - Offer discounts on Amazon.com and at Amazon Pay merchants when purchases are funded via checking or savings accounts vs. cards.
- Concerns? Competing against existing partners (bank partners) and any consumer data privacy fears (even un-founded).

Neobank users are expected to grow rapidly in the US



Underbanked, Millennial, and Gen Z populations in the US



Source: Company reports, 2017 FDIC Survey of Unbanked and Underbanked Households, eMarketer, Credit Suisse research;

Return to Themes Table of Contents

39. Amazon's building blocks in Payments & FinTech

What are some of the other logical/potential next steps?

- Additional incentives for consumers & merchants to use Amazon Pay:
  - Amazon-funded discounts to expand the Amazon Pay network effect, both in the US and Europe (Amazon Pay is available in 18 countries).
  - We note that Amazon offered limited-time pricing that was ~36% below competitors for over a year (while ongoing pricing was ~9% below).
  - Opening up Alexa to 3rd party merchants using Amazon Pay; we suspect Voice-related payments apps will be an area where Amazon takes a leadership role.
  - Competitor retailers may resist.
  - Financial app relationship with consumers enables expansion of Amazon Pay in-store and potential to offer geo-targeted offers to drive foot traffic to merchants (e.g., similar to Square Boost driving Cash App users in-store, at greater scale).
- Digital bank offerings for Amazon Business customers:
  - Potential to feature added SMB software (e.g., expense management, inventory, etc.), leveraging internal data and products, along with white-labeled offerings.
  - Business debit card produces interchange revenue and expense management data.
- Offering additional financial services within Amazon (or a digital bank app):
  - P2P, Wealth Management & Investing/Trading, high-yield savings, P&C Insurance etc.; some could be done asset light (i.e., lead-generation, similar to Ant Group and WeChat).
- Additional thoughts & broader expansion (and what we'll be watching for):
  - Furthering the JP Morgan partnership (as Apple and Goldman Sachs do the same).
  - Risk of Amazon becoming more closed (i.e., less reliant on the traditional four-party model, similar to Ant Group & WeChat-like), although given numerous bank partnerships and a desire to reduce friction (increased choice of payment method, keep conversions high), we think Amazon will generally play ball.

Amazon Local Register (2014-2015) offered introductory transaction fees of 1.75%, meaningfully undercutting Square (2.75%), PayPal Here (2.7%), and others

Could Amazon and JP Morgan begin to partner on additional financial services, alongside the more recent partnership between Apple and Goldman Sachs?

amazon

JPMorgan Chase & Co.

Goldman Sachs

Source: PYMNTS, Company reports

Return to Themes Table of Contents

40. Alipay & WeChat expand acceptance beyond China

Strategy that caters to Chinese outbound tourists

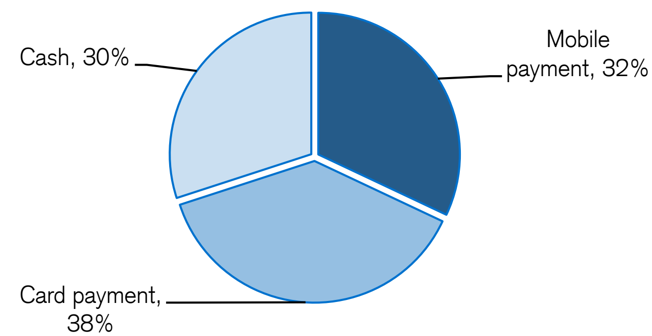
China outbound tourism is important to the payments ecosystem

- 140mm China outbound tourists in 2018 spent ~$280b, growing at a ~6.5% CAGR (2015-2020E), majority in the "4-hour fly zone" (e.g., Korea, Japan), but increasingly Europe; ~3.5mm Chinese visitors to the US
- ~1/3rd of transactions already done via mobile payments (despite nascent merchant acceptance), with Alipay and WeChat the dominant platforms (>1.2b users each, access to the majority of China consumers by dollar volume)
- 93% of Chinese outbound tourists state that they would increase their spending while travelling if mobile payments were more widely accepted
- Retail, restaurants, accommodations, tourist attractions, and in-market transportation (e.g., ride-share) are the largest areas of spend

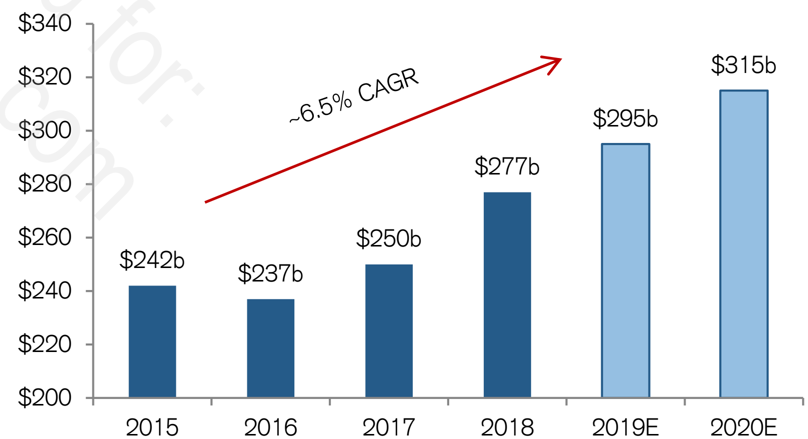
Alipay's strategy for expansion beyond China is currently focused on Chinese travelers' outbound spend (expanding global acceptance) and expanding the user base across Southeast Asia (not competing for users in US & Europe)

- Gain merchant acceptance in key international destinations (e.g., New York, Los Angeles, London, Paris, Rome) for Alipay users
- Leverage existing ecosystem to support direct distribution, working with various payments service providers and merchant acquiring (e.g., First Data, Adyen, Ingenico, Barclaycard, Citcon, Verifone, etc.)
- Multiple local eWallet partnerships allow Alipay users to leverage acceptance network (including Paytm in India, GCash in Philippines, Kakao Cash in the Korea, TrueMoney in Thailand, Line Pay and Paypay in Japan)
- Pitch to merchants? (1) Drive traffic and volume, including use of marketing platform ("drive to store"); (2) Lower acceptance costs for merchants vs. cross-border credit cards (price determined by payments partners, not Alipay)
- Enabled a version of its app for foreigners visiting China (Tencent also announced plans to allow foreigners to use international cards in China as well)

Mobile payments usage by Chinese tourists already surpassed cash in 2018, despite a still nascent acceptance footprint



China outbound tourism spend is approaching $300b, a figure that is ~10% the size of Mastercard's ex-US purchase volume



Source: McKinsey, Nielsen, Alipay, The World Tourism Organization (UNWTO), Glenbrook Partners, 11:FS, Credit Suisse estimates

Return to Themes Table of Contents

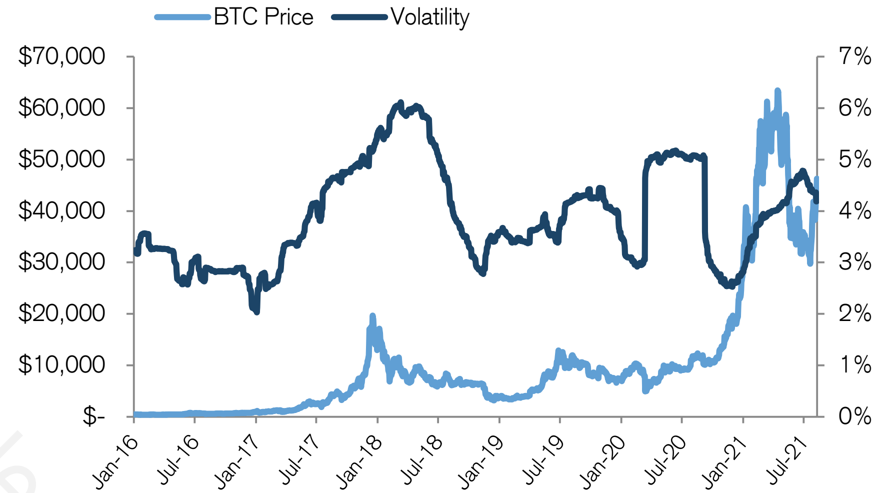
41. Cryptocurrency impact on the Payments ecosystem

Unlikely to gain C2B payments adoption at least in the short term…

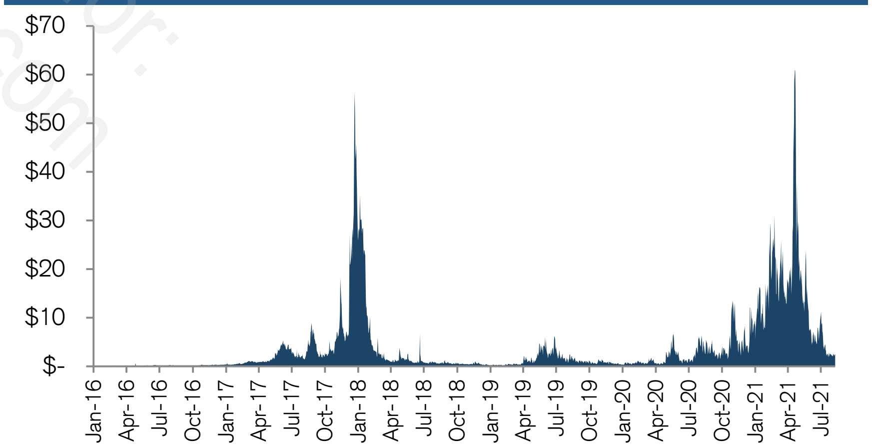
Reasons we believe cryptocurrencies (particularly settlement in cryptocurrency) will be challenged to make a meaningful impact on the existing consumer payments (C2B) ecosystem, **absent working with the existing ecosystem itself (e.g., attaching a Visa or Mastercard to a crypto-wallet, or via PayPal or Square, etc.)** over the near to medium term (i.e., minimal downside risk to our companies under coverage):

1. **Lack of chargeback & dispute process** – lack of consumer disputes mechanism, and adding such functionality would add costs (Note: merchants would welcome a system with no chargeback risks, but consumers would not, nor would regulators)
2. **Taxation** – each cryptocurrency transaction is a taxable (capital gain or loss) transaction; means for calculating vs. cost basis, tax reporting, etc. yet to be solved (although there are a number of FinTechs, such as TaxBit [backed by PayPal Ventures] which are working to solve this issue); CBDCs would likely resolve this issue (and Stablecoins have less potential for meaningful gains/losses)
3. **Regulatory uncertainty** – lack of regulatory certainty creates a “holding pattern”
4. **Price volatility** – elevated levels of volatility bring additional risk into the merchant acceptance equation (absent a third-party aggregating such risk); Stablecoins or CBDCs would solve this problem in theory
5. **Requires merchant adoption** – Visa & Mastercard cards are accepted at 70mm+ merchant locations with an established distribution channel (e.g., banks and acquirers)
6. **Requires consumer adoption** – Visa & Mastercard have gathered ~3.6b (Visa) consumer cards worth of consumption power, along with incentive systems (rewards on credit)
7. **Transaction costs** – absolute levels under normal circumstances are not challenging, but the transaction cost volatility is – costs can be prohibitive at times of congestion, particularly for smaller transaction sizes (fees are decoupled from transaction size)
8. **Debit-only substitute** – lack of credit extension mechanism exists in cryptocurrency
9. **Vast number of coins** – approximately ~10k competing coins as of Q2 2021
10. **Speed** – Bitcoin can process ~7 transactions per second vs. ~65k capacity for VisaNet, with time spanning up to 10 minutes (or more, with backlogs), albeit with an understanding that other (non-Bitcoin) cryptocurrencies are meaningfully faster (e.g., Dash, EOS, Litecoin, Bitcoin Cash, Bitcoin SV, Ripple, etc.)

Bitcoin volatility creates challenges in payments for both merchants (acceptance risk) and consumers (taxable events)



Average fees per Bitcoin transaction can be volatile, particularly under times of congestion (a challenge for payments acceptance)



Source: CoinMetrics, Visa, Credit Suisse research

Return to Themes Table of Contents

41. Cryptocurrency impact on the Payments ecosystem

…but there are nascent and niche use cases we plan to monitor…

Select innovations could alleviate some of the drawbacks of using crypto in C2B payments

- Numerous examples of innovations that effectively solve for one or many of the status quo challenges (i.e., speed, volatility/certainty to merchants accepting payments, costs), but not all (i.e., taxation remains an issue, along with regulatory uncertainty and lack of chargeback and dispute processes)
- A key rationale for crypto is decentralization – which appears unlikely for C2B payments given a need for taxation, instant conversion, consumer protection, etc.

We see select C2C remittances use cases for more volatile and lower-volume EM markets

- Existing platforms (e.g., Wise, Remitly, Western Union, Ria) already have developed global treasury operations and innovations (matching) that effectively enable real-time C2C cross-border payments at reasonably low fees
- While matching (netting) can "match volumes" across high-volume developed market currencies (G10), and use traditional banking rails for the remaining amounts, challenges remain in lower-volume EM currencies

Cross-border B2B is the most meaningful, near-term use case for crypto payments

- Up against an existing bank wire transfer (SWIFT messaging) system that is viewed as less than ideal and utilizes multiple correspondent banks per transaction, resulting in uncertain timing (3-5 days), high (and also uncertain) fees, and high failure rates
- Platforms like Ripple have the potential to reduce settlement times (from days to seconds) and provide savings (low bps, but large absolute dollars)

C2B innovation will have a higher bar for adoption, given the status quo works well…	
The Lightning Network	Additional layer on top of the blockchain, using payments channels between parties; when the channel is closed, the transactions are added to the blockchain
BitPay	Bitcoin payments processing for merchants at a fee of 1%; removes volatility issue for merchants (by promising a $ amount at the time of the transaction) and aggregating the volatility risk on their end
Stablecoins	Less volatile due to linkage to either one (e.g., USD Coin by Coinbase and Cirlce) or many (e.g., Diem) fiat currencies
Diem	Potential example of a stablecoin, backed by a basket of fiat currencies

…while cross-border C2C (remittances) solves a problem for volatile EM currencies…	
Western Union	Has evaluated Ripple and crypto to improve on speed and costs but has not yet implemented
Wise	Currently does not accept any cryptocurrency; Has evaluated various blockchain technologies (e.g., Ripple), but have yet to find a solution that enables them to improve on their current speed, costs, etc.

…cross-border B2B payments are an actual pain point (i.e., a problem to be solved)	
Ripple	Hundreds of financial institutions using platform (RippleNet), which provides an option to use XRP cryptocurrency
JPM Coin	JP Morgan's stable coin (USD backed) for use in cross-border B2B payments, securities transactions, and treasury applications
IBM World Wire	Cross-broder solution that uses the Steller protocol and a multi-digital asset approach (e.g., stablecoins, CBDCs)
R3	Offers Corda Settler, which supports XRP (but intended to support multiple options); Partnering with SWIFT on standards, Global Payments Innovation (Swift GPI); Bank of America recently joined MPN

Source: Ripple, BitPay, Credit Suisse research

Return to Themes Table of Contents

41. Cryptocurrency impact on the Payments ecosystem

…along with crypto-related activities for our covered companies

Company	Cryptocurrency-related activity
Square	▪ Launched Bitcoin buy/sell capabilities within Cash App in Q4 2017, and generated $97mm in net Bitcoin trading revenue in 2020A ($4.6b in gross Bitcoin revenue) ▪ "*It's not an if, it's more of a when and how do we make sure that we're getting the speed that we need and the efficiency*." – Jack Dorsey, CEO in speaking about integrating the Lightning Network into Cash App (February 2019)
FIS	▪ Worldpay is the acquirer for Coinbase, a leading cryptocurrency wallet (i.e., Worldpay benefits when users load fiat currency into their Coinbase account)
PayPal	▪ Launched cryptocurrency trading Q4 2019, and also rolled out cryptocurrency as a funding source for consumer purchases in 2021 (converted to fiat currency immediately prior to transaction and settled in fiat currency) ▪ Initially Braintree-enabled Bitcoin acceptance in 2014, but pulled it back due to lack of demand/usage ▪ Originally announced as part of the original Libra Association (although later removed itself)
Visa	▪ Partnered with Coinbase on the issuance of a Visa card ▪ Helping to facilitate transactions initiated in cryptocurrency (settled in fiat) ▪ Originally announced as part of the original Libra Association (although later removed itself) ▪ Involved in purchase (consumers use their Visa card to purchase cryptocurrency via an exchange/trading platform), cash-out (adding Visa cards to various wallets and trading platforms to enable the Visa acceptance footprint, ~35 large crypto wallets & exchanges already working with Visa and could result in ~50mm+ additional Visa card credentials), APIs (to enable financial institutions), settlements (early stage but some partnerships [Anchorage] to allow for settlement in digital currencies), and CBDC (in discussions with various CBDCs lending expertise).
Mastercard	▪ Recent hiring in areas of cryptocurrency (payments, wallets) ▪ Helping to facilitate transactions initiated in cryptocurrency (settled in fiat) ▪ Originally announced as part of the original Libra Association (although later removed itself) ▪ Mastercard involved in varying degrees in CBDC (potential role at the infrastructure level and acceptance, including ongoing consulting engagements with central banks), private Stablecoins (will enable certain Stablecoins for a settlement over the Mastercard network which will allow acceptance similar to any other currency), and cryptocurrencies (cards used to purchase crypto, several partnerships with businesses that look to enable consumers to use crypto at POS, but MA does not handle the crypto in this case - MA takes delivery of the fiat, but the platform can leverage the MA acceptance footprint); Acquisition of CipherTrace (AML in cryptocurrency space).
Nuvei	▪ Acquisition of Simplex platform (paid $250mm cash) provides the fiat infrastructure to the cryptocurrency industry

Note: We do not plan to express views on cryptocurrencies themselves. The scope of our research interest is limited to the potential to impact (benefit or harm) the financial results and stock prices of the companies we cover.

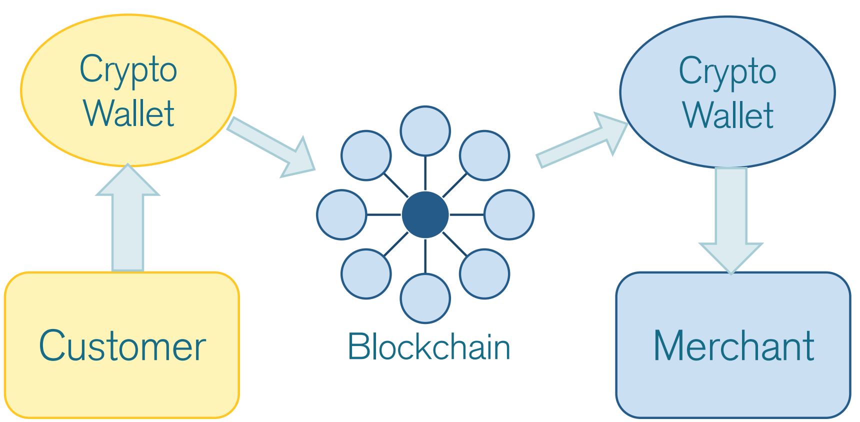
Source: Company reports, public commentary

41. Cryptocurrency impact on the Payments

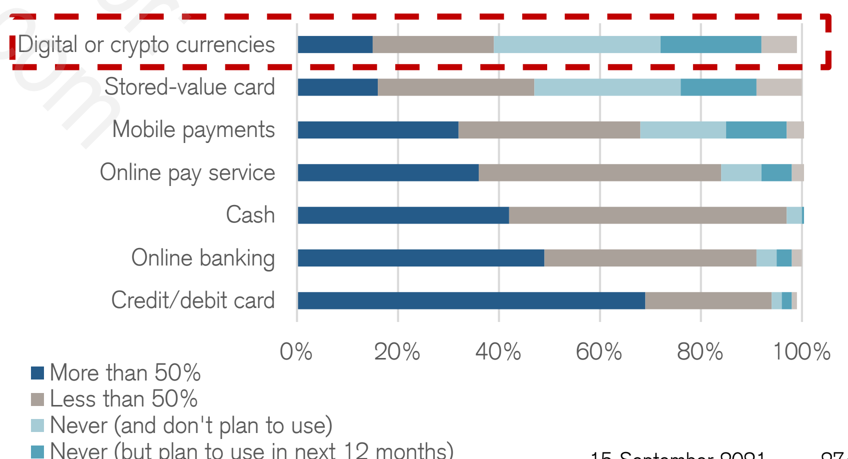
Cryptocurrency, Stablecoins, and CBDCs and their role in payments

- Central bank/government backing is expected to help legitimize CBDCs, while price stability could help facilitate consumer adoption of Stablecoins, as well as bring merchants greater confidence in their use in payments (without the constant necessity for immediate crypto-fiat conversion to preserve/lock-in value). Recently, the IMF and other governing bodies have explored CBDC use cases for cross-border payments to correct the issues created by national/regional payment systems.
- Concerns that a dominant CBDC could become the future global reserve currency are forcing governments (particularly the US & China) to more seriously consider the potential for CBDCs and actively work on their development and rollout.
- While some FinTech startups are attempting to establish pure cryptocurrency-based payments involving direct wallet-to-wallet transactions (often via the use of Stablecoins or major cryptocurrencies such as bitcoin), more established, public companies (e.g., V, MA, PYPL) are tending to enable cryptocurrency-fiat conversion to facilitate crypto payments over their own rails.
- Proposed benefits of CBDCs include lower transaction costs (particularly in cross-border use cases), faster settlement, and alternative payment instruments for use in countries with hyperinflation or unstable governmental regimes. Additional benefits include increased monetary policy flexibility (with China experimenting with a CBDC Yuan in Shenzhen with an expiration date, leading to ~90% of the vouchers being spent in shops), illicit activity prevention, and financial inclusion.
- Associated risks and problems of CBDCs include cybersecurity concerns, lack of consumer protections (disputes and chargebacks), disintermediation of the banking system and fractional reserve banking (as CBDCs are fully reserved), and centralization of currency.

Cryptocurrency payments occur over blockchain networks from wallet to wallet with instantaneous settlement



2021 consumer crypto survey from The Economist, % of purchases and/or transactions by payment method



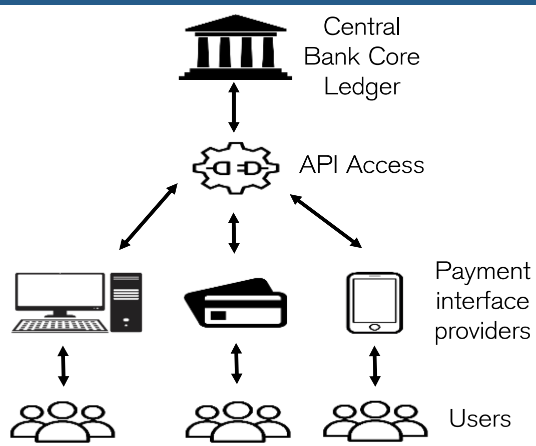
Return to Themes Table of Contents

41. Cryptocurrency impact on the Payments ecosystem

Will central banks begin issuing their own digital currencies?

- Crypto assets are receiving increased attention from central banks and regulatory bodies, with the Bank for International Settlements recently publishing a report to the G20 on CBDCs for cross-border payments. Further, a 2021 BIS survey of central banks found that 86% are actively researching the potential for CBDCs, with 60% experimenting, and 14% piloting.
- Notably, El Salvador recently adopted Bitcoin (as opposed to a CBDC) as a national currency with Bitcoin ATM networks, kiosks, and a government-run eWallet, with the government establishing a trust of ~$150mm to facilitate dollar conversions.
- Governments and central bankers have been conflicted on the development of CBDCs and their risks to the financial system.
    - "It looks probable in the UK if we want to retain public money capable of general use and available to citizens, the state will need to issue public digital money that can meet the needs of modern day life" – Jon Cunliffe, Deputy Governor for Financial Stability of the Bank of England
    - "I remain skeptical that a Federal Reserve CBDC would solve any major problem confronting the U.S. payment system. There are also potential costs and risks associated with a CBDC ...... It is my belief that government interventions into the economy should come only to address significant market failures" – Christopher Waller, Member of the Federal Reserve Board of Governors

Illustrative CBDC model from the BOE



Major countries contemplating CBDCs and the stage of their progress (research, development, and pilot)

United States - Research
United Kingdom - Research
European Union - Research
Canada - Development
Brazil - Development
Australia - Research
China - Pilot
India - Research

Source: Credit Suisse research, BIS, Businesstimes, Board of Governors of the Federal Reserve System

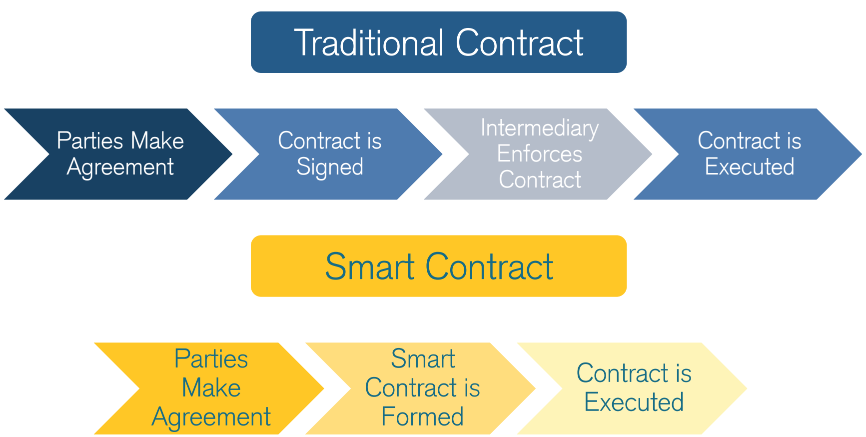
[Return to Themes Table of Contents]

42. Decentralized Finance (DeFi)

Advantages of DeFi and associated use cases

- The beginnings of DeFi are centered around blockchain architecture utilizing decentralized platforms (e.g., Ethereum, Solana, Uniswap, etc.) to establish smart contracts and DApps that are fully decentralized (absent a centralized institution/controller), permissionless (can be used by anyone in the world; no central authority can revoke access), and transparent (platforms are fully auditable given their open source nature).
- The grand vision for DeFi is for smart contracts to replace the needs for centralized exchanges for financial securities and derivative contracts, financial institutions, and credit unions as sources of loans, accounts payable and procurement processes within corporate finance, and more.
- Use cases include decentralized lending, leveraged trading, structured products, decentralized exchange trading, market making, insurance products, synthetic assets, asset tokenization, use of Stablecoins, etc.
- A non-exhaustive list of proposed benefits include: open source nature of platforms reduces the barriers to entry for entrepreneurs/developers; funds can be easily moved between ecosystems on a given blockchain (e.g., the Ethereum blockhain) meaning that projects on the same blockchain must compete aggressively on fees, user experience, and reliability (vs. higher switching costs for consumers at traditional FIs where moving funds from one FI to another can be difficult, tedious, and time consuming); ecosystems are designed to make contract beneficiaries liable for losses, thereby aligning the incentives of all parties and encouraging effective risk management; near instantaneous settlement leading to greater market efficiency; and universal access democratizes financial services.

Smart contracts eliminate the need for financial intermediaries by automatically enforcing contracts



Example use cases of DeFi where an intermediary would be unnecessary (i.e., decentralized)

- Securities Trading
- Lending
- Real Estate
- Supply Chain Management
- Insurance
- Employment & Payroll

Source: Credit Suisse research, Ethereum

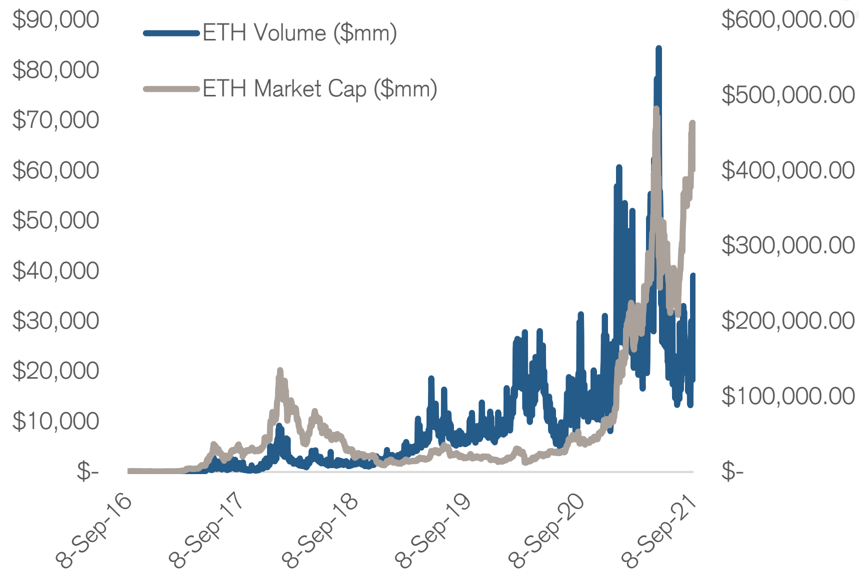
Return to Themes Table of Contents

42. Decentralized Finance (DeFi)

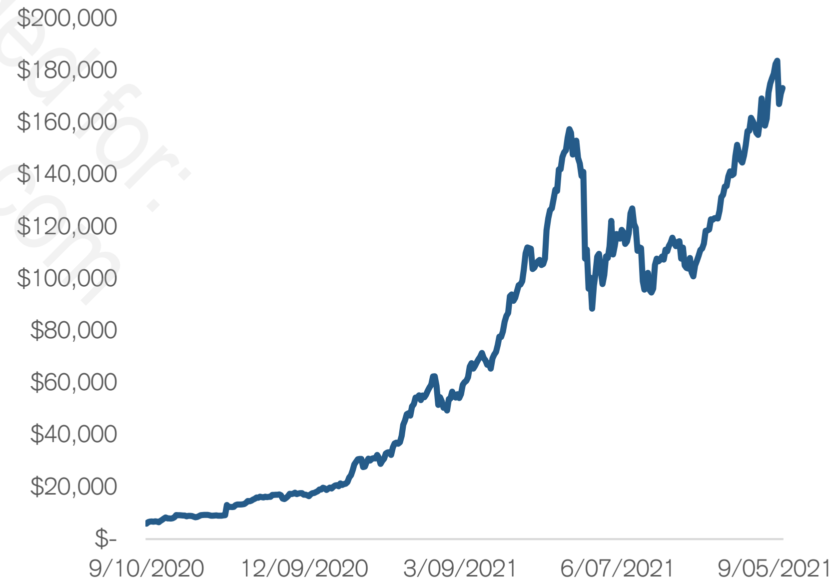
Remains in the proof of concept stage with numerous adoption barriers

- DeFi technology has the opportunity to disrupt certain distribution channels of financial services, effectively reducing or even eliminating the need for certain financial intermediaries in a more extreme (and lower probability) scenario; however, numerous barriers remain before widespread mainstream use. Certain countries including Nigeria, Vietnam, and the Philippines have relatively high cryptocurrency adoption, with an estimated 32%, 21%, and 20% using or owning cryptocurrencies, respectively.
- Adoption barriers include limited scale (e.g., Ethereum's limited daily processing capacity can cause gas fees to spike); absence of centralized body can create issues if disputes arise; reliance upon consensus for changes to be made in many ecosystems/projects; limited understanding/familiarity; cybersecurity risks; lack of regulation; tax complications; etc.
- We expect DeFi adoption to be gradual until there is greater certainty from a regulatory/taxation perspective, with the greatest hurdle likely being consumer trust and understanding given the complex nature of DeFi and the relative level of difficulty to participate in DeFi at this time.

Popularity of DeFi has been a major driver of Ethereum's use, as well as the more nascent popularity in NFTs



Rapid increase in DeFi usage as measured by Total Value Locked ($mm)



Source: Credit Suisse research, Ethereum, Statista global consumer survey, CoinMarketCap, DeFiLlama

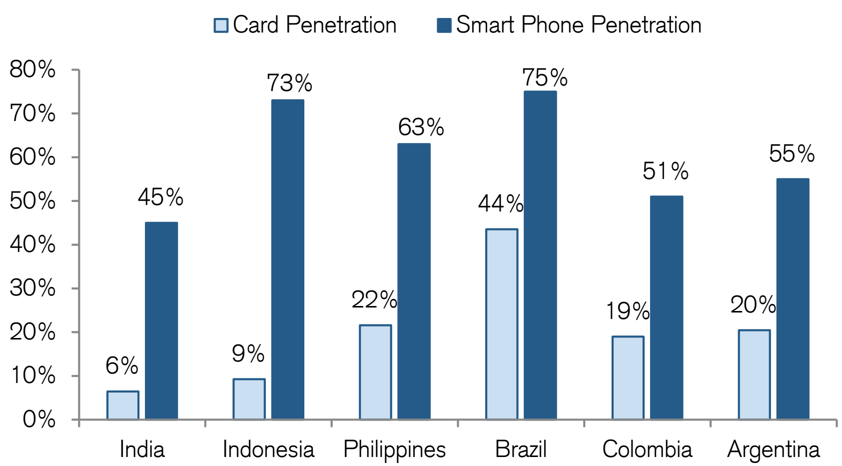
Return to Themes Table of Contents

43. Emergence of modern platforms in EM

Tech platforms & super-apps represent important partners for 4-party incumbents

- Ingredients are present to create “super apps” in emerging markets (large population, high smart phone penetration, low credit card penetration, underbanked populations, fast-growing eCommerce markets).
- Smartphone penetration is north of 50% and approaching 75% in many markets, while credit card penetration remains low (~5-40%) – i.e., cash payment still dominant.
- Mastercard estimates 75% of Southeast Asians are underbanked, providing opportunity to increase card adoption while consumer electronic payment preferences are still being formed (i.e., Visa and Mastercard partnering with emerging platforms to avoid cards being leap-frogged in a similar manner to China with Alipay and WeChat).
    - For example, Argentina-based MercadoPago has a large user base in Central/South America and issues Mastercard prepaid debit, while Columbia-based Rappi has ~10mm MAUs and launched Visa prepaid cards in 2019.

Emerging Markets characterized by high smart phone penetration (2017) but lower card penetration (2018)



Southeast Asia ingredients for the creation of “super apps”

~75% underbanked

Fast-growing eCommerce markets

Low card penetration (~5-40%); i.e., cash payment still dominant

High mobile penetration (~50-75%)

Source: Company Reports, Contoxo, CNBC, Apptopia, Credit Suisse research

43. Emergence of modern platforms in EM

Grab and Go-Jek as examples in Southeast Asia

- Fundamentally different business models vs. western platforms, monetizing across numerous revenue lines (e.g., ride-sharing, delivery, advertisements, banking products, etc.) leads to a different approach to payments.
- Payments as the "glue" to their ecosystems, justifying rationale to undercharge merchants to grow their platform.
- Southeast Asia's rapidly growing super-apps: GoTo Group (Gojek and Tokopedia merged entity) and Grab.
  - Combined used base of 125mm+ monthly users for Grab, and GoTo covers ~20% of the regions ~670mm population, representing ideal distribution partners for payments companies.
  - The opportunity for the card networks is predominately cross-border spend on prepaid cards given these platforms utilize closed-loop payments in-country.
  - Mastercard and Visa partnered with Grab and Go-Jek, respectively, to provide prepaid debit cards and global acceptance.
- Grab's GrabPay and GoTo Group's Go-Pay are leaders of digital payments in the region online and offline.
  - QR codes enable merchants to accept electronic payments with as little as a piece of paper (no terminal costs/integrations).
  - QR payment through super apps could offer attractive incentives to build consumer habits (e.g., QR wallets linked directly to banks, offering 10% off promotions), although not a longer-term sustainable approach.

Grab's GrabPay and GoTo Group's Go-Pay are leaders of digital payments in Southeast Asia online and offline

Indonesia's GoTo Group (Gojek and Tokopedia) has a network of over 2mm drivers and 100mm MAUs

Source: GoTo Group, CNBC, Credit Suisse research

[Return to Themes Table of Contents](#)

43. Emergence of modern platforms in EM

Grab: Southeast Asia's leading offline-to-online platform

- Founded in 2012 as a ride-hailing app – similar to Uber, expanded into delivery (2015), and launched GrabPay (2016), leveraging the power of its two-sided network.
  - Operations in a market of >670mm consumers in 8 countries (Malaysia, Singapore, Indonesia, Thailand, Vietnam, Cambodia, the Philippines, Myanmar).
  - Now one of the largest employers across Southeast Asia with ~5mm drivers and ~25mm MTUs (Monthly Transacting Users).
- Grab is planning to IPO in late 2021 for a ~$40b valuation via SPAC.
- Key investors include: SoftBank, Toyota, Experian, Microsoft; acquired Uber's operations in March 2018 in exchange for a 27.5% stake. Expected to IPO in 2H 2021 through a SPAC merger with Altimeter Growth Corp. (expected to be world's largest SPAC merger to date).

On-demand Transportation

Largest player in the region

- ~5mm drivers
- Offers monthly subscription ride packages

Offerings include:

- GrabTaxi
- GrabBike
- GrabCycle
- GrabShuttle
- Offers car rentals

Financial Services

Grab Financial	○ Loans, investment, and insurance services
GrabPay	○ In-app mobile payments analogous to Alipay with online and offline capabilities through QR codes ○ Adoption supported by 2-sided network of drivers & users of ride-hailing feature ○ For merchants, powers online and offline storefronts, taps on Grab's large user base, access to partner-exclusive online promotions & campaigns ○ Mastercard prepaid card for cross-border spend
GrabRewards	○ Earn points for spend on platform to be used at any Grab merchant

Market Place

GrabExpress	○ On-demand delivery for users to send items such as documents, parcels, and gifts to business partners, family, and friends ○ Addresses local challenges of last-mile delivery in congested cities
GrabFood	○ Food delivery platform similar to UberEats

Source: Company reports, Fortune, Credit Suisse research

Return to Themes Table of Contents

43. Emergence of modern platforms in EM

PayPal becoming a developed market equivalent partner ecosystem

Incumbent ecosystem partners

- Drives customer acquisition and payments volume growth (e.g., 40 bank-led marketing campaigns in 2018)
- Provides PayPal with in-store card network tokens and necessary acquiring bank relationships

J.P.Morgan, citi, BANK OF AMERICA, VISA, WELLS FARGO, mastercard

Traditional eCommerce (Large & Small)

macy's, Walmart

80% of Internet Retailer 500

~32mm Merchants

PayPal, venmo, Braintree

~400mm Consumers

Platforms & Market Places

Uber, mercado libre, Etsy

Other market places post eBay agreement

Social Networking

facebook, WhatsApp, Instagram

- PayPal powers Facebook Pay and also allows Venmo users to sync their Facebook friends list
- PayPal also powers Instagram Shopping

Travel Commerce

airbnb, skyscanner

Ride-Sharing & Food Delivery

Uber, seamless, Uber Eats, GRUBHUB

- Daily use case spend categories, aids consumer engagement
- Plans to power Uber's mobile wallet - direct distribution channel to underbanked driver's globally

Return to Themes Table of Contents

44. National payment schemes, alternatives to V and MA

Payments is the most local, global business

- Nationalism related to payments schemes can make for an uneven playing field for Visa & Mastercard in some countries.
  - Varying degrees of regulations supporting government-sponsored domestic payment schemes and/or mandating that processing (authorization, clearing, and settlement) be performed by local entities.
  - China, India, Indonesia, Russia, Thailand, and Vietnam are examples where some form of government support or mandate exists.
  - Some countries are mandating data localization, which aside from increasing operating expenses (a lesser concern), limits the use of the data informing risk models.
  - Additionally, there are certain countries where either the government itself or consortiums of local banks own domestic processing assets.

Sample list of competing domestic networks, the majority of which are by definition sub-scale relative to Visa & Mastercard, and thus have a lesser ability to invest, innovate, etc.

AsiaPac	Eftpos (Australia), Eftpos (New Zealand), BC Card (South Korea), Smartlink (Vietnam), VNBC (Vietnam), Bancnet (Philippines), MegaLink (Philippines), NEPS (Nepal)
North America	US PIN debit networks (STAR, Accel, NYCE, Jeanie, Presto, Shazam, etc.), Interac (Canada)
Europe	Girocard (Germany), Carte Bancaire (France), PostFinance (Switzerland), Multibanco (Portugal), Eufiserv (Pan Europe ATM), BCC (Belgium), Nets (Nordic/Baltic), UPC (Ukraine), DIAS (Greece)
Latin America	Elo (Brazil), Prosa (Mexico), Redcompra (Chile)
Middle East & Africa	GCC Net (pan-Middle East), BENEFIT (Bahrain), UAE SWITCH, OMAN NET, KNET (Kuwait), NAPS (Qatar), InterSwitch/Verve (Nigeria), Monetique (Tunisia), EthSwitch (Ethiopia)

Source: Company reports, Reuters, Infosys, Credit Suisse estimates

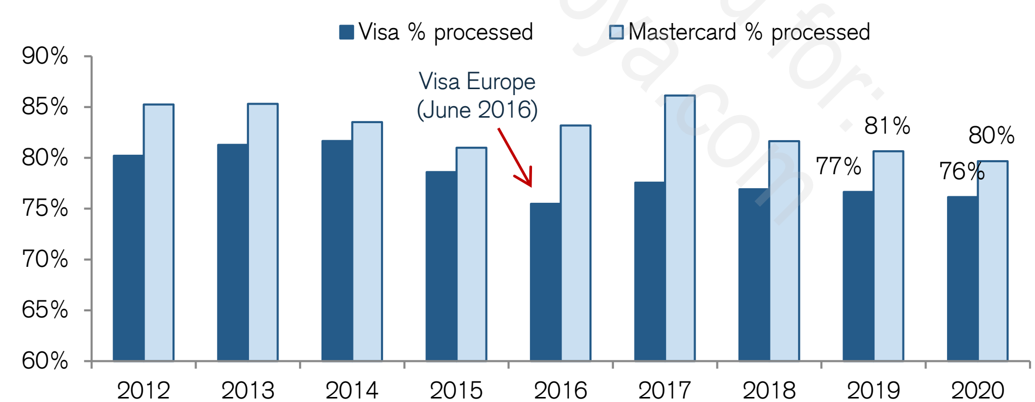
Return to Themes Table of Contents

44. National payment schemes, alternatives to V and MA

Payments is the most local, global business

- What are some of the offsetting forces for Visa & Mastercard?
  - Global scale and the ability to invest & innovate in an increasingly complex payments ecosystem (e.g., security & fraud management, global acceptance, eCommerce, tokenization); local schemes are challenged to keep pace given they are sub-scale, at times non-profit entities, and they often lack cross-border capabilities.
  - For balance, almost every country has some form of local or domestic payments scheme that V/MA must compete with (this is not new), and despite this, V/MA have maintained processing share of their own transactions.
  - We believe the widening gap between global card networks and domestic schemes will aid share gains for V/MA.

V & MA process ~75-80% of their transactions
(i.e., transactions where V/MA earn processing revenue)



Source: Company reports, Reuters, Infosys, Credit Suisse estimates

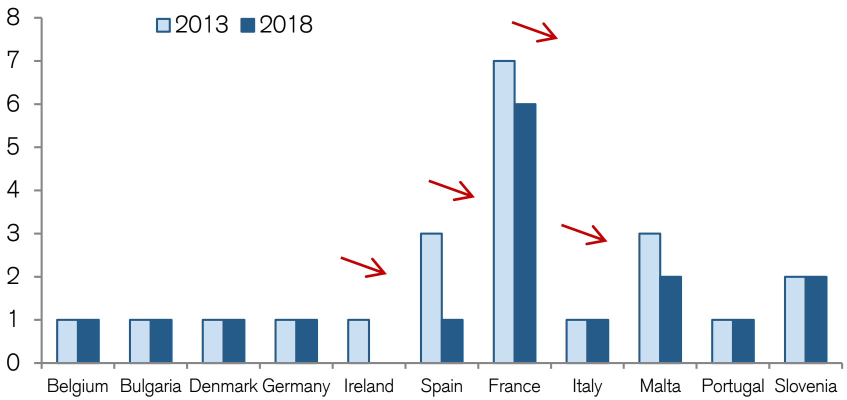
44. National payment schemes, alternatives to V and MA

European example, and the moat around Visa & Mastercard

European domestic schemes continue to lose share to V & MA, partially driven by a lack pan-European acceptance without co-badging. European regulators are committed to unifying the domestic schemes:

- We believe this is likely the next focus of completing the SEPA vision (that led to the euro, PSD2, IFR, etc.) and is a risk we plan to monitor, although past initiatives have failed.
- Large upfront investment required to capture a smaller portion of transactions (~8% of European card transactions are cross-border).
- V/MA are partially hedged given; 1) their networks would be required for acceptance outside Europe; 2) incumbent banks increasingly need help from increasing competition with PSD2; and 3) SEPA for cards is "market-driven".
- The ECB believes a connected instant payment systems may be a viable solution, positioning MA best to help realize this objective (global networks have non-card capabilities that could be helpful to select domestic schemes, although case-by-case to avoid improving a competitor network).

According to the ECB, in 2013, there were 23 active national card schemes in Europe – that number dropped to 17 by 2018



European Payments Initiative (EPI) aims to create a pan-European payment scheme for both euro & non-euro markets as a response to V & MA share.

- Introduced in July 2020, EPI consists of 31 European banks / credit institutions and 2 third-party acquirers aiming to create a new pan-European payment solution leveraging Instant Payments and cards.
- Given ~80% of card transactions are routed through Visa and Mastercard in Europe (up from ~68% in 2016), EU members and ECB policymakers are focused on developing a "home grown" payments scheme which they could regulate directly and build autonomy in core financial services.
- It's certainly a monumental task to migrate existing schemes to the EPI network and develop new infrastructure on applications, platforms, and cards so it remains to be seen whether the initiative will a) get off the ground and b) develop a network with the sophistication and ease of migration to threaten V & MA's existing share.

Reasons we believe V & MA will maintain/increase share in Europe (in addition to a greater ability to invest/innovate – e.g., online, tokenization, contactless, etc.) relative to comparatively sub-scale domestic schemes (still too early to tell on EPI):

- FinTech issuers ("Challenger banks") will continue to pick V/MA due to: 1) pan-European & global acceptance vs. single country; 2) card monetization is a main source of monetization, and thus best-in-class capabilities from V/MA are crucial: and (3) V/MA have invested in programs specifically to onboard FinTechs (i.e., why would a FinTech waste time with onboarding with each domestic scheme when they could get fast, global acceptance with V or MA?).
- Interchange has already been capped in Europe (both domestic and cross-border), removing the prior total MDR advantage for national schemes.
- Co-badging is a solution that has worked for pan-European acceptance (i.e., domestic scheme for in-country, V or MA for cross-border).

Source: Eurocommerce, European Payments Initiative, European Central Bank, Credit Suisse research; SCT Inst is SEPA Instant Credit Transfer, launched November 2017

Return to Themes Table of Contents

44. National payment schemes, alternatives to V and MA

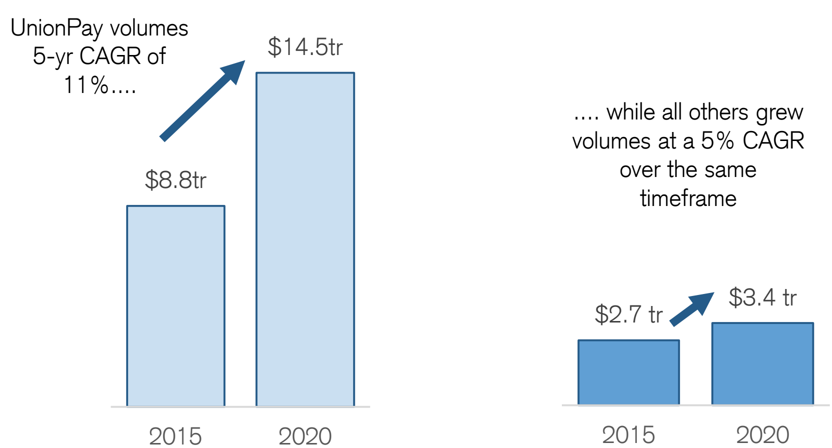
Payments in China, Union Pay the single domestic network

- Currently, the only network allowed to handle renminbi-denominated settlement and clearing is China UnionPay (majority owned by the People's Bank of China - PBOC).
- Visa and Mastercard offer single-badged and co-badged cards (through Chinese issuing banks) for use when travelling outside China.
- China Union Pay has ceded mobile payments share to both Alipay and WeChat (which combine for 90%+ share).

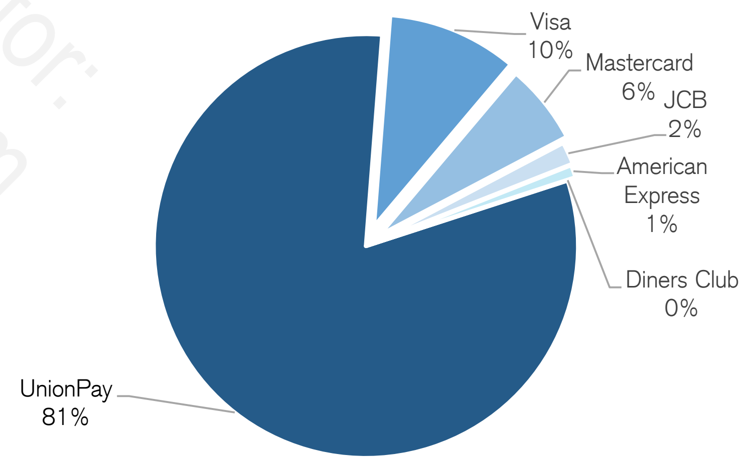
"… Alipay and Tencent -- Tencent's WeChat in the last 18 months has been able to really drive a Mac truck through payments in China. And the reality is that…they certainly have had the advantage of not being regulated as a bank, and I don't think that's going to be the case as they ultimately migrate out of China. But also I think CUP took their eye off the ball as they probably put more emphasis on looking at growing acceptance outside of China. And as a result, we've seen what happens…"

– Al Kelly, CEO, Visa (May 2017)

APAC general purpose card (GCP) payments volume



APAC card network volumes are dominated by China Union Pay, making up ~80% of the entire region



Source: The Nilson Report, Credit Suisse research

Return to Themes Table of Contents

44. National payment schemes, alternatives to V and MA

Payments in China – 20 years of history since China joined WTO

- PayPal announced that the PBOC approved its acquisition (70% equity ownership) of Guofubao Information Technology Co (GoPay) in September 2019. Became 100% owner in January 2021.
- China is the largest retail eCommerce market in the world, estimated at ~$2.6tr in 2021 vs. ~$4.9tr globally, according to eMarketer (>500mm Chinese consumers).
- PayPal believes this opportunity has the potential to be material in the medium to longer term (2022 and beyond) but acknowledges a relatively high degree of uncertainty (see timeline below).
- GoPay has a license enabling it to process online and mobile payments in China and issues UnionPay-branded debit cards.
- PayPal will not have the ability to clear and settle transactions.
- American Express was the first US-based network to enter China through its JV with China-based LianLian Group (November 2018). In June 2020 the PBOC announced its approval of American Express' application to start a bank clearing card business in China.

PayPal announced intent to acquire 70% of GoPay in September 2019

PayPal

GoPay

2000

2001
China admitted to the World Trade Organization (WTO)

2006
China mandated to allow payments access to US providers (but no agreement was reached)

2010
WTO asked by US Trade Representative to create a panel to discuss "discriminatory and restrictive" treatment of US payments networks prohibited from operating in China

2017
PBOC issued Bank Card Clearing Institute (BCCI) license regulations – in order to clear and settle payments on renminbi-denominated cards

2017
MA and AMEX entered agreements with joint venture partners to pursue a BCCI license;

2018
After the US gov't placed tariffs on Chinese goods, the approval process for Visa and Mastercard was suspended and has not resumed since

2019
PayPal acquired majority stake in GoPay – a small Chinese payments company

2020
The PBOC approved AMEX's application to start a bank card clearing business in China making it the first US network to enter China

2021
PayPal acquires remaining 30% share of GoPay (first foreign firm with 100% ownership of a payments platform in China)

2021

Return to Themes Table of Contents

44. National payment schemes, alternatives to V and MA

Examples of government and/or local preferential treatment

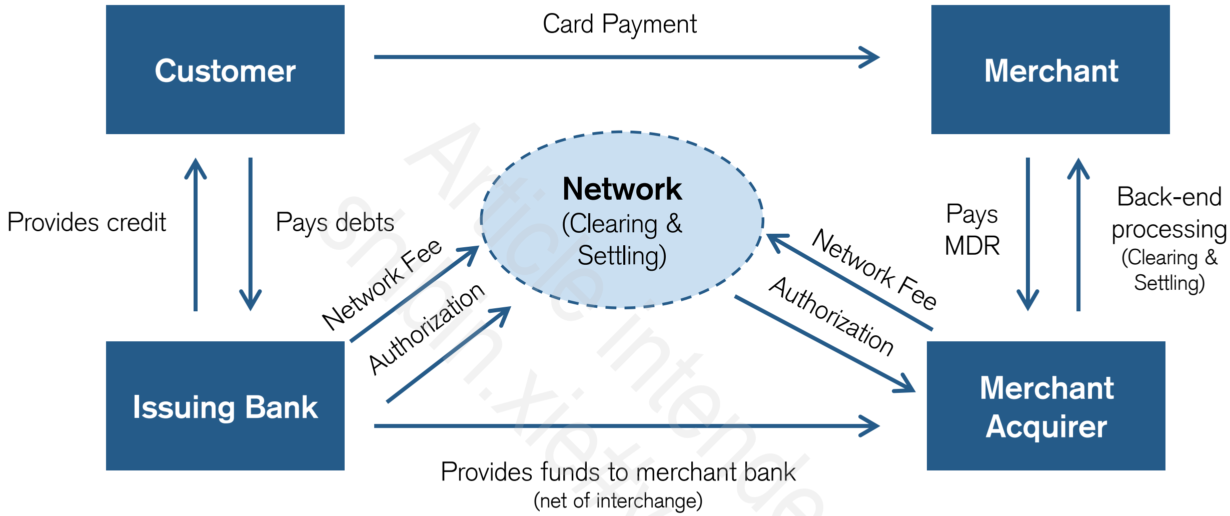
Country/Region	Benefiting domestic network	Government and/or local operating preferential actions
China	China Union Pay	▪ Only China Union Pay (CUP) is able to process domestic transactions ▪ Both V & MA have filed applications via the People's Bank of China (PBOC) requesting a Bank Card Clearing Institution (BCCI) license, the applications have yet to be "recognized" ▪ CUP (and Mir, below) have expanded acceptance outside their home countries, which puts a distant risk on the table around the networks' international routing rule (requires international transactions be processed by V & MA)
Russia	Mir	▪ Mir was created in 2014 and favored by Russia's National Card Payment System (NSPK) ▪ Government disburses payments (e.g., pension, unemployment benefits) on Mir cards ▪ Effectively prevents V & MA from processing domestic transactions (all domestic transactions run through NSPK)
India	RuPay	▪ RuPay is owned by the National Payments Corporation of India (NPCI), which is in turn owned by a group of state banks (along with private and foreign banks) ▪ Publicly supported by Indian Prime Minister Narendra Modi ▪ Demonitization (removing high-value paper notes) efforts in 2016 have led to increased digital payments and thus the importance of any potential favoritism ▪ RuPay (similar to CUP) has a partnership with Discover to allow for more global acceptance
Indonesia	Gerbang Pembayaran Nasional	▪ Local regulations require processing to be done domestically, per National Payment Gateway (NPG), via Gerbang Pembayaran Nasional ▪ Switching companies must be at least 80% owned by a domestic entity
Thailand	Thai Payment Network	▪ Domestic processing mandate by the Electronic Transactions Commission (for debit)
Vietnam	Smartlink, VNBC	▪ Smartlink, VNBC are the domestic networks
Europe	All domestic schemes	▪ As of 2016, new regulations mandated that Visa and Mastercard could no longer earn fees on domestic European transactions if the processing was done by a domestic network ▪ Card networks previously earned a small brand assessment in select countries (those fees were eliminated)

Source: Company reports, Reuters, Infosys, Credit Suisse research

Payments Primer Materials

Return to Themes Table of Contents

1. The 4-party model
Diagram and economics



Issuing Bank:
+ 205bps – interchange
- 10bps – network fees
- 3bps – issuer processing
+ 3bps – rebates
= + 195bps net

Customer:
- $100 – payment
- $100 net

Network:
+15bps – merchant fee
+10bps – issuer fee
- 6bps – rebates
+19bps net

Merchant Acquirer:
+ 250bps – MDR
- 205bps – interchange
- 15bps – network fees
+ 3bps – rebates
= + 33bps net

Merchant
+ $100 – sale
- 250bps – MDR
= + $97.50 net

Transaction notes:
- Customer inserts card into POS terminal (data capture), then the merchant acquirer routes the data to the network, which then queries the issuing bank for authorization (sufficient funds, fraud checks, etc.)
- Then the authorization flows back through the system to the merchant acquirer, allowing the transaction to close
- Then the issuing bank settles the outstanding balance with the merchant's bank, and the funds are deposited net of fees

Source: Company reports, Glenbrook Partners, Credit Suisse research

Return to Themes Table of Contents

1. The 4-party model

Description of parties with examples (illustrative economics)

Merchant	Network	Merchant Acquirer: Front-end processor	Merchant Acquirer: Back-end (acquirer processor)	Card Issuer	Issuer Processor
Accepts payments from consumers and pays the merchant discount rate (MDR) to the merchant acquirer	Acts as the hub for card payment transactions, relaying authorization and settlement messages between issuing and acquiring banks (earning fees from both in the process)	Signs up individual merchants, underwrites a merchant account for them at the underlying acquiring bank, and enables merchants to accept card payments; captures card/transaction data, routes the message to appropriate network for authorization (in real-time); earns the majority of the acquiring spread[1]	Handles settlement and clearing messages received from the card network, and deposits funds net of fees into the merchant's account; receives fixed fee per transaction, a minority portion of the acquiring spread[1]; chargebacks come to the merchant via the back-end processor	Provides consumers and businesses with bank accounts, credit extension, and cards; earns interchange on card transactions, the largest portion of the MDR. Interchange rates are set by V/MA	Sits in front of the issuing bank to receive authorization request messages from the card network, and relays decision back to the card network (in real time); then, clears and settles transaction for the issuing bank; earns account and transaction fees, outside of the MDR (indirectly funded by the issuers' portion)
Target, Home Depot, McDonald's, Lululemon, Reebok, Safeway, WaWa	Visa & Mastercard (open-loop); American Express & Discover (closed-loop); STAR, Accel, NYCE, Pulse, Interlink, Jeannie (PIN debit)	FIS (Worldpay), Global Payments & TSYS, Adyen, Chase Paymentech, Fiserv (First Data), Repay – all technically operate as ISOs in the US, sponsored by an acquiring bank		Chase, Barclaycard, Bank of America, Wells Fargo, US Bank, Capital One, Citi, Synchrony Financial	TSYS, FIS, Fiserv (First Data), Marqeta, Galileo, i2c, or in-house for larger banks (TSYS is the share leader among banks that outsource)
		Square, PayPal, Stripe	Acquiring banks (BIN sponsor): Wells Fargo, BMO Harris, BBVA USA, MetaBank, etc.		
Sample economics on $100 eCommerce credit card transaction					
+ $100 Customer payment - $2.50 (250bps) MDR = + $97.00	+ $0.15 Merchant network fee + $0.10 Issuer network fee - $0.03 3bps rebates (acquirer) - $0.03 3bps rebates (issuer) = +$0.19 net	+ $2.50 MDR - $0.15 Merchant network fee - $0.05 Back-end processing fee - $2.05 Interchange = + $0.25 acquiring spread - $0.05 back-end acquiring fee + $0.03 Network rebates = + $0.23 net	+ $0.05 Back-end acquiring fee (~25% of acquiring spread ex-rebates, which was $0.20 in this example)	+$ 2.05 ($0.10 + 195bps) Interchange - $0.10 Issuer network fees - $0.03 (flat charge) Issuer processor fee + $0.03 network rebates = + $1.95 net	+$0.03 (flat charge) issuer processor fee Note: Issuer processors also charge fees based on the number of accounts, along with other services like statement printing, card production, customer service, etc.

Source: Glenbrook Partners, Credit Suisse research, [1] Acquiring spread refers to the portion of the MDR the acquirer retains after all other parties receive their fees (networks, back-end acquiring processor, and the issuing bank); depending on the contract, these fees are fixed (cost +) or variable (in which case the spread is dictated by the level of interchange associated with the specific type of card), generally for smaller merchants without pricing power; merchant acquirers also pay small fees to their sponsoring acquiring bank for BIN rental (~1-3bps)

Return to Themes Table of Contents

1. The 4-party model

Step 1. Authorization (illustrative example, credit cards)

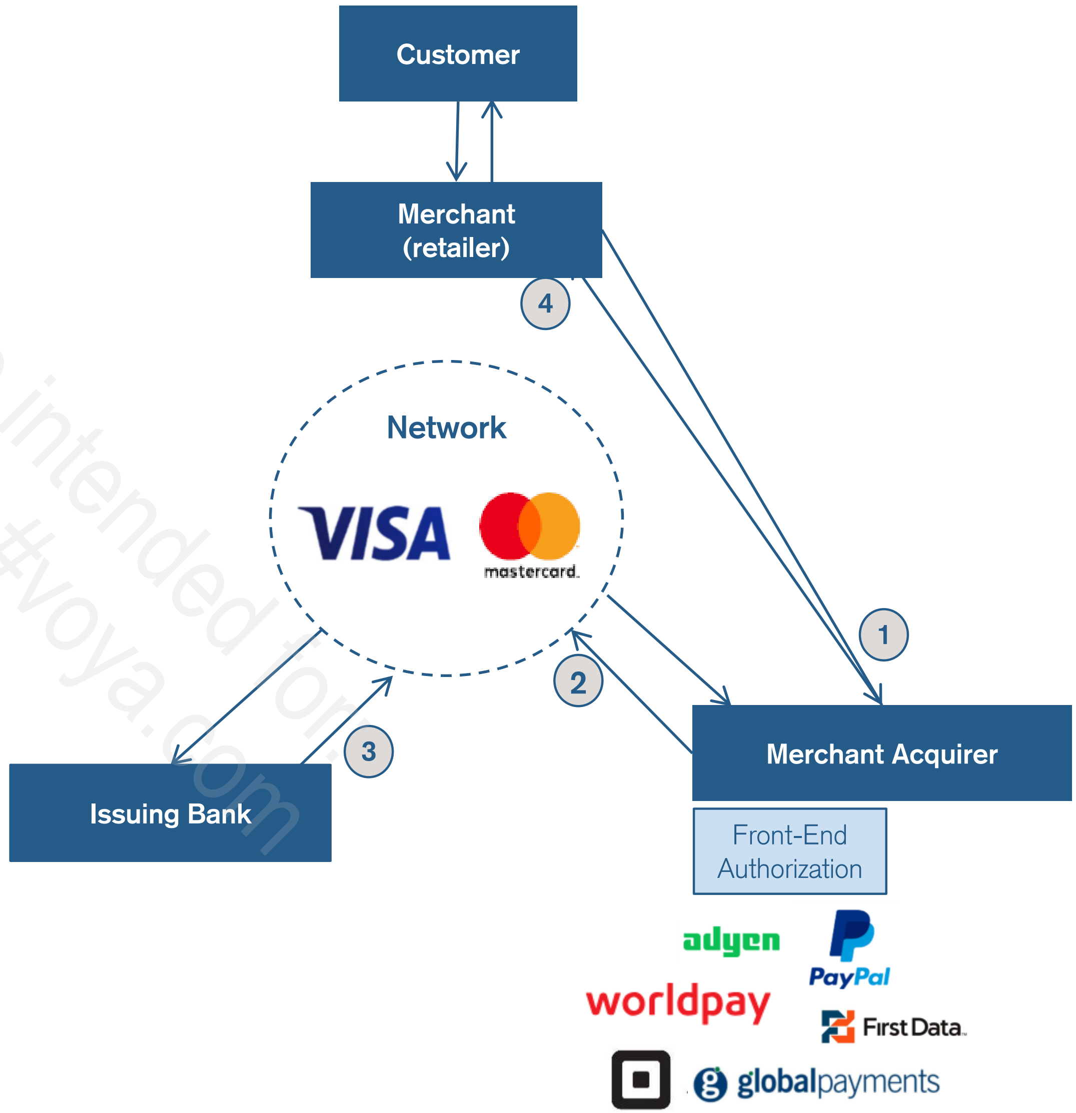
1. Data Capture – The customer inserts the credit card into the merchant's POS (online or in-store). Card credentials and transaction data are captured (and if prompted, the customer provides 2-factor authentication).

2. Authorization Routing - The merchant acquirer sends the authorization request through the network (e.g., V, MA) for the card being used, which is ultimately received by the issuing bank (that issued the card).

3. Once the issuing bank has authorized the transaction (sufficient credit available, fraud, risk analysis, etc.), it will communicate a confirmation back through the network to the merchant acquire in real time.

   Note: Europe – if a non-exempt issuer transaction, then issuer must verify using 2-factor authentication (PSD2 SCA)

4. The merchant receives confirmation (from its merchant acquirer) that the transaction is authorized and completes the sale.



Source: Company websites, Credit Suisse research

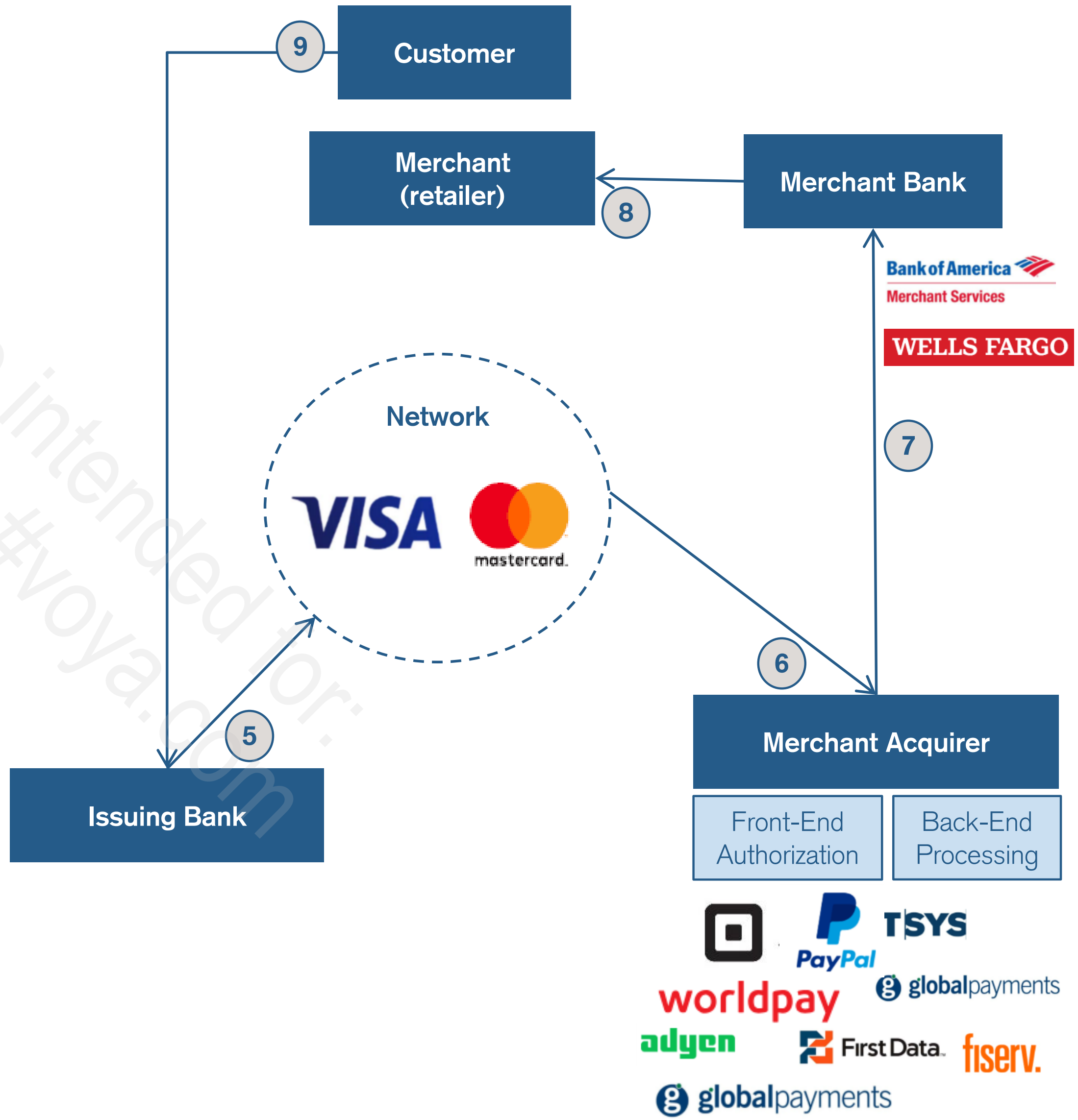
1. The 4-party model

Step 2. Payment and settlement (illustrative example)

5. To initiate the payment process, the credit card issuing bank will front credit on behalf of the customer to settle the transaction, which is then routed through the payments network.
6. The network passes the transaction to the merchant acquirer's back-end processor (which may be handled by a third-party) for settlement.
7. Ultimately, the back-end merchant processor will settle the net outstanding balance between the card-issuing bank and the merchant acquiring bank (where the merchant has its merchant account).

   The settlement bank sits between both the merchant bank and the issuing bank and settles daily via a netting process by account (facilitated by V, MA).

8. The merchant bank will then credit the merchant's account for the amount of the purchase, less fees charged for facilitating the transaction across multiple parties, such as:
   - Interchange ~150-300bps paid to the issuing bank,
   - Acquiring spread ~10-100bps (wide range) paid to the merchant acquirer (majority to front-end processor if separate),
   - Network fees ~15-20bps paid to the networks (net of rebates and incentives).
9. Credit card statement comes due, and the cardholder must pay the bill (interest on unpaid balances earned by issuing bank, which can represent the majority of total credit card economics).

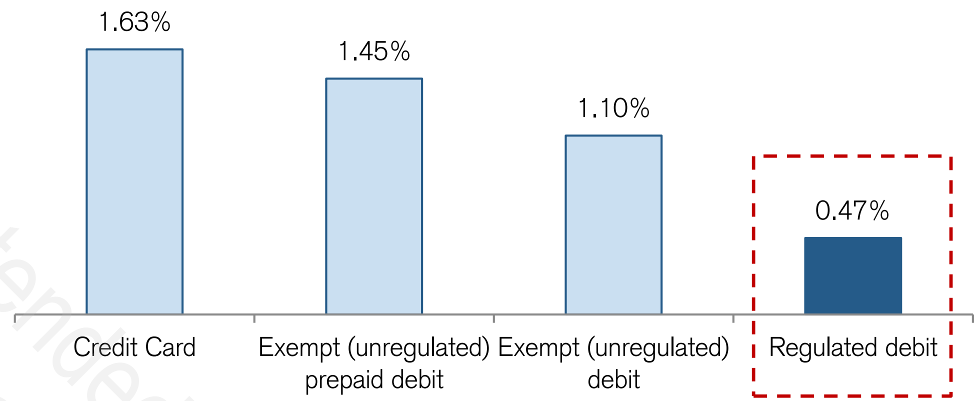


Return to Themes Table of Contents

1. The 4-party model
Interchange fee economics

- Interchange fee dynamics
  - Interchange fees differ by type of card used (credit, debit, prepaid debt, Durbin-exempt debit) and by transaction type, merchant type, domestic vs. cross-border, etc.
  - Interchange fees are set by the card networks (Visa, Mastercard) but earned by issuing banks
- Interchange rate caps
  - Generally increased over time due to increased mix of premium cards (e.g., Platinum rewards programs)
- Durbin Amendment (Dodd-Frank Act of 2010)
  - Reduced interchange fees earned by debit issuers with greater than $10b in assets
  - Non-Durbin exempt debit capped = 5bps + $0.21
- Interchange fee caps in Europe (IFR regulations)
  - ~20bps for debit
  - ~30bps for credit

Various US Interchange fees paid to issuers for a sample $50 Visa retail transaction; regulated debit cards carry significantly lower interchange rates



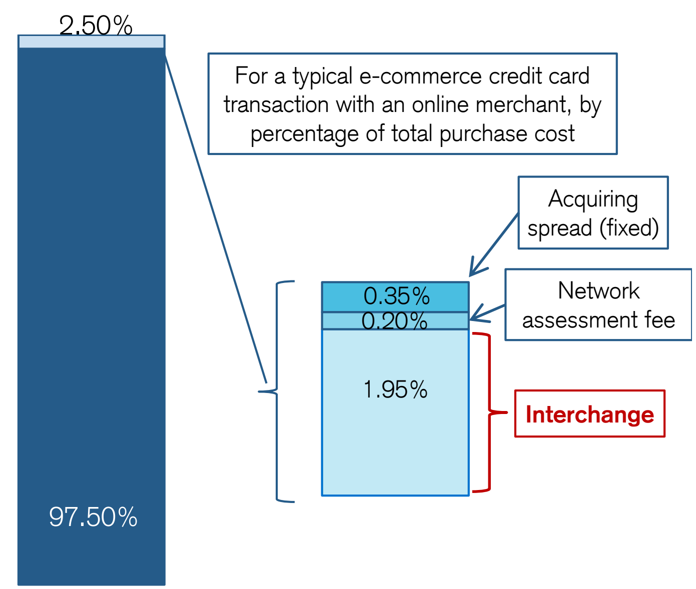
Visa US interchange (US Retail category)	e-Commerce	Retail			
	Credit Card	Credit card	Exempt (unregulated) prepaid debit	Exempt (unregulated) debit	Regulated debit
Illustrative Transaction Size	$50	$50	$50	$50	$50
+ Cents per Transaction	0.10	0.10	0.15	0.15	0.21
x % of volume	1.95%	1.43%	1.15%	0.80%	0.05%
= Total Interchange ($)	$1.08	$0.82	$0.73	$0.55	$0.24
Total interchange (%)	**2.15%**	**1.63%**	**1.45%**	**1.10%**	**0.47%**

Source: Credit Suisse research

2. Merchant Acquiring Pricing
"Interchange plus (+ +)" pricing

- The merchant acquirer charges a fixed spread on top of interchange (paid to issuing bank) and card network fees (Visa, Mastercard)
  - Merchant Discount Rate (MDR) ~250bps (variable by definition) – Fee paid by the merchant accepting a transaction to the merchant acquirer
  - Interchange ~195bps – Fee paid to issuing bank based on a combination of card type (rewards level, gold card, platinum, etc.), merchant type, domestic vs. cross-border, etc.; largest component of MDR
  - Network fees ~10-30bps – Fee paid to the card networks (Visa, Mastercard)
    - Brand / service fee (assessment), *ad valorem* charges
    - Data processing fees (processing), cents per transaction charges
  - Acquiring spread (fixed under interchange ++, although likely associated with tiered volume discounts) but can range ~10-40bps – Set by and paid to merchant acquirer (and perhaps is shared with a third-party back-end processor) in exchange for acquiring, processing, and settling the transaction; Acquiring spread is inversely related to merchant size (higher volumes gives larger merchants pricing power)
- Price transparency considerations for merchants:
  - Larger merchants demand and receive greater price transparency versus smaller merchants (larger are more likely to use interchange ++ model)
  - European Union laws require greater pricing disclosures vs. US

e-Commerce Typical Interchange + Pricing for a Mid-Size Merchant

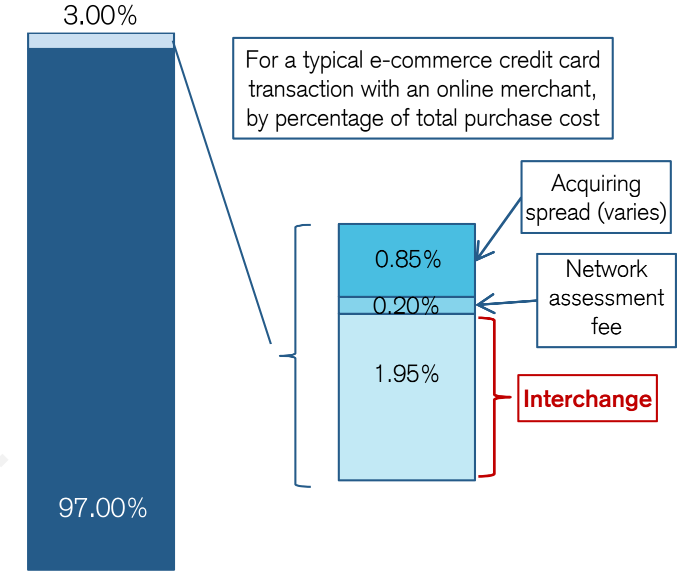


Return to Themes Table of Contents

2. Merchant Acquiring Pricing
Bundled fee model

- The merchant acquirer earns a variable spread but charges a standardized fee per transaction (acquirer then absorbs all other transaction-related fees)
- Example: Square's rack rate pricing is bundled fee
  - Flat 2.60% + $0.10 for each merchant transaction (card present, in-store), allowing Square to earn this amount less interchange, network fees, and any back-end processing fees (including sponsor acquiring bank fees)
  - Larger merchants are able to negotiate lower pricing based on volume levels and/or card mix (e.g., higher debit would allow the merchant to negotiate the bundled fee slightly lower)
  - Interchange ~195bps – Fee paid to issuing bank based on a combination of card type (rewards level, gold card, platinum, etc.), merchant type, domestic vs. cross-border, etc.; largest component of MDR
  - Network fees ~10-30bps – Fee paid to the credit card networks (Visa, Mastercard
    - Brand / service fee (assessment), *ad valorem* charges
    - Data processing fees (processing), cents per transaction charges
  - Acquiring spread ~30-100bps (variable) – Set by and paid to merchant acquirer (and perhaps is shared with a third-party back-end processor) in exchange for acquiring, processing, and settling the transaction; smaller merchants typically sign up for bundled fee pricing
- Simplified pricing model for merchants (pay one rate on all purchases vs. interchange++ varying by card type, transaction type, etc.), but less transparent as to underlying cost components (merchants cannot tell how much money goes to acquirer on each transaction)

Typical Bundled Pricing for a Small Merchant



Return to Themes Table of Contents

3. Roles in merchant acquiring
Front-end processing and back-end processing

- POS Vendor
  - A device at a physical store location allowing a merchant to accept card payments
  - Can be supplied by a merchant acquirer/ISO
- Independent Sales Organization (ISO)
  - Signs up merchants for card acquiring capabilities
  - Receives a portion of the acquiring spread (commission)
  - Merchant of record only in "wholesale" relationships
- Gateway
  - Receives transaction data from POS and transmits it to the network via front-end processor for authorization
  - Earns a fixed fee per transaction (lowest share out of 4 front-end roles)
  - eCommerce a frequent use case (bridging merchants to the front-end processor)
- Payments Services Provider (PSP)
  - Sometimes referred to as a front-end processor
  - Handles authorization message communication for merchants, earning a fixed fee
  - Gateways may allow a merchant to connect to multiple payment services providers

- Back-end Processor
  - Receives and processes batched settlement and clearing messages, earning a fixed fee
  - Nets interchange from transaction proceeds, routing the settlement amount to the merchant
  - Creates bill and reporting for underlying merchant
- Acquiring Bank
  - Acquiring license (from the card networks) is needed to be a merchant acquirer
  - In the US, non-acquiring banks achieve this capability via partnership ("renting a BIN" from a sponsor acquiring bank)
  - In Europe and other parts of the world, payments service providers can more easily directly obtain an acquiring license
  - Responsible for merchant's and processor's adherence to rules of the network

Source: Glenbrook Partners, Credit Suisse research; Note: often larger acquirers and ISO fulfill many or all of the roles above, while others specialize in certain aspects and outsource others to third parties

Return to Themes Table of Contents

3. Roles in Merchant Acquiring
Local acquiring

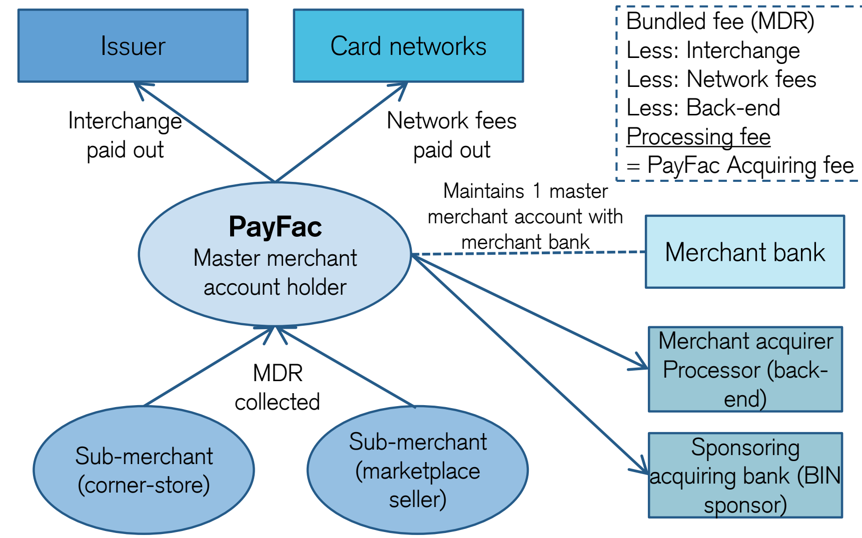
- Acquiring licenses allow merchant acquirers to underwrite merchants, accept payments, and settle funds back to the merchant through the processing platform. The acquirer takes on the merchant default risk for situations in which the merchant has chargebacks and for any number of reasons it is not able or willing to pay (e.g., no funds in account, goes out of business, was fraudulent).
  - **Increased Authorization Rates** - When a payment processor is operating with a local acquiring license in the same market as the issuing bank, the risk associated with approving that transaction is perceived to be lower and, thus, results in a higher approval rate. This is of particular importance in eCommerce (card-not-present) environments, where authorization rates average in the mid-80%s and can be materially lower in certain markets.
  - **Reduced Interchange and Network Fees** - Local acquiring allows the acquirer to classify transactions as domestic (vs. cross-border), which results in reduced interchange (charged by issuing bank) and network fees (charged by the card networks). In "interchange + +" models (interchange + network fees + acquirer spread), this means the ability to provide reduced costs to the merchant.
  - **Faster Settlement of Funds** - Allows for the clearing and settlement process to be done over the local clearing solution.
  - **Local Merchant Accounts** - With a domestic license, the merchant acquirer can offer a domestic merchant account to its clients. This means the merchant can receive payments in the local currency and simply hold (or use) them in that market.
  - **Local Payment Methods and Experience** – Adding more locally relevant payment methods by country and/or region, provides for an increased choice at checkout and makes for a more familiar and local feel for the in market customer.
  - **Control of Data and Offering** - End-to-end ownership of data (not having to be exported to a partner) allows for control of how transaction details and card numbers are presented to issuing banks for authorization. This also means not having to wait for a local partner to begin accepting new forms of payment (e.g., Apple Pay, Google Pay) but can control the timing and availability itself.
- In markets where a payments provider does not have a directly owned acquiring license, an alternative is to rent a license from another acquiring bank (i.e., "bin sponsor"). Generally speaking, this works just the same as owning a license, and often comes down to a decision around the level of volumes expected vs. the required investment to achieve a license.
  - Many countries require BIN sponsorship to be done with a regulated bank, while others allow for acquirers to self-sponsor
  - Achieving a local acquiring license typically involves establishing a local business entity, establishing connections to the local banking system, meeting local regulatory requirements, and ultimately, applying for a license
  - Addition of an extra party (generally a local bank) can at times potentially impact control of the data, restrict merchant categories (e.g., airlines, gaming), merchant onboarding practices, and overall authorization rates (depending on bin sponsor arrangement)

Source: Adyen, First Data, Credit Suisse research

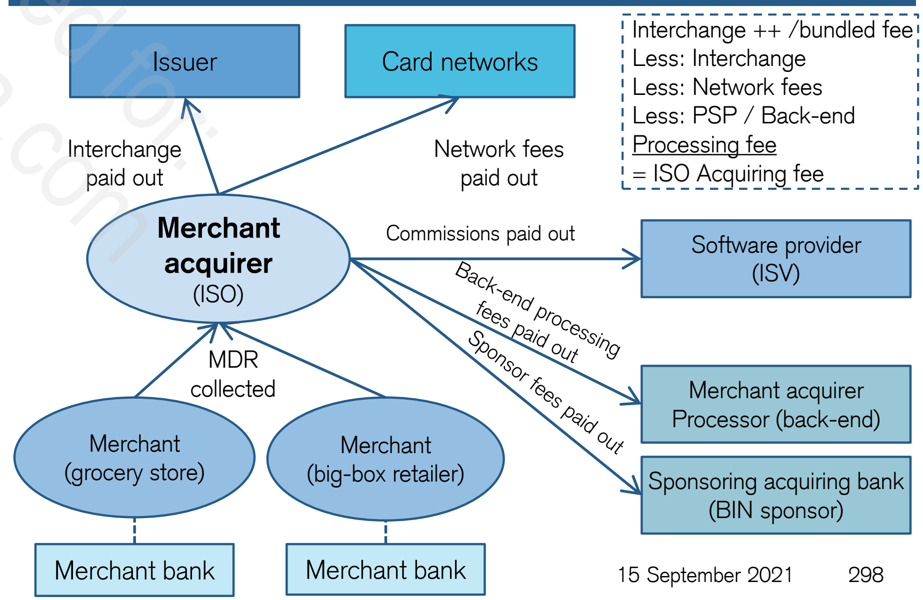
3. Roles in merchant acquiring
What is a Payment Facilitator?

- PayFacs, often referred to as merchant aggregators, sign up and process payments for small merchants as "sponsored merchants" or "sub-merchants" that reside under the PayFac's merchant account.
  - Visa has referred to PayFac's like Square as a single merchant when describing merchant acceptance location numbers.
- The PayFac handles all aspects of a payments transaction on behalf of the sub-merchant, including PSP/back-end merchant processing, and maintains sub-merchant accounts under their master account.
  - Facilitation allows for easy onboarding of sub-merchants, often done via an in-house proprietary underwriting program.
  - If a sub-merchant achieves > $1mm in annual volume, network rules (Visa, Mastercard) dictate that they cannot be a sub-merchant anymore and must have their own merchant account opened.
  - Merchants with volume beyond these thresholds must be onboarded under the Independent Sales Organization (ISO) model, a more lengthy, rigorous application process (numerous forms, days/weeks vs. instant).
- Companies that become PayFacs can be grouped into three buckets:
  1. Core commerce platforms/payments companies (e.g., Square, Stripe, PayPal, BlueSnap, PagSeguro, SumUp), although even within this group, both PayFac and non-PayFac models can be employed (e.g., Stripe can serve as both PayFac and ISO);
  2. Integrated Software Vendors (ISVs) with verticalized SaaS offerings (e.g., to operate a restaurant or fitness center), which have a payments aspect to their software/workflow (e.g., Toast, Mindbody, Lightspeed); and
  3. Marketplaces and related technology platforms that "take payments in-house" (e.g., Etsy, Shopify, Wix, Yapstone).

Typical PayFac structure, where the PayFac aggregates many sub-merchants (typically micro & SMB) under its master merchant account



Typical ISO structure (each merchant has its own account) integrated payments example shows merchant referral commission paid to ISV



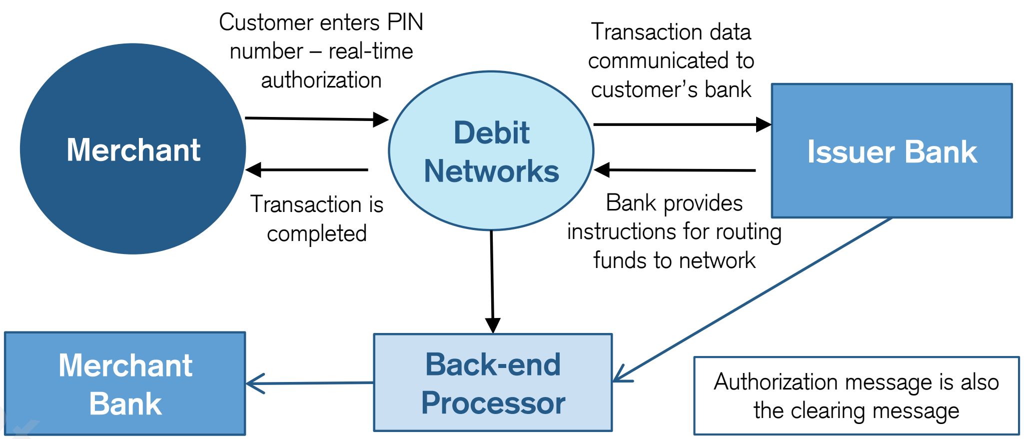
Source: Company reports, Glenbrook Partners, Credit Suisse research

Return to Themes Table of Contents

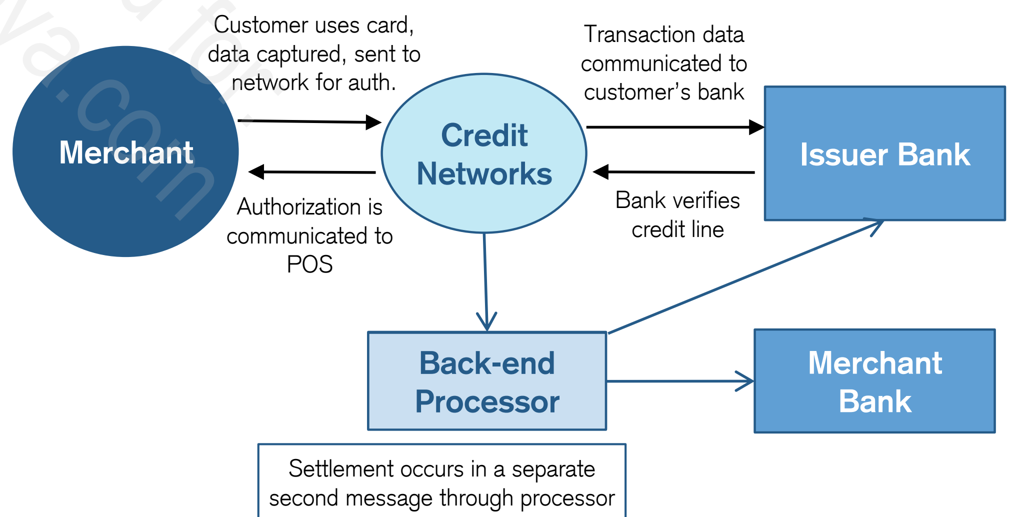
4. Debit card network mechanics
Single and dual-message

- Single message – Initially created for ATMs, where authorization & settlement are handled at the same time
  - Generally, a Personal Identification Number (PIN) is required to complete the transaction
  - PINLess debit allows for usage of single message but does not require a PIN entry (allowed for transactions under $50)
  - Allows customer to take cash back at point of sale
- Dual message (e.g., credit card rails) – 2 messages, 1 for authorization and 1 for settlement
  - Signature debit transactions flow similarly to credit transactions
  - Captured data gets routed over credit card rails
  - Signature debit use cases:
    - Recurring payments (utilities, car loan, phone bill, rent)
    - Pre-authorization requirements (e.g., in order to tip at a restaurant, the settlement amount has to be different than the initially authorized amount)
- Transaction funding differences
  - PIN - Money is pulled directly from the bank account linked to the debit card to fund the transaction
  - Signature - Transactions are posted in 1 day to the account after settlement occurs through back-end processor

Single Message Illustration (PIN Debit)



Dual-Message Illustration (Signature Debit)



Source: Glenbrook Partners, Credit Suisse research

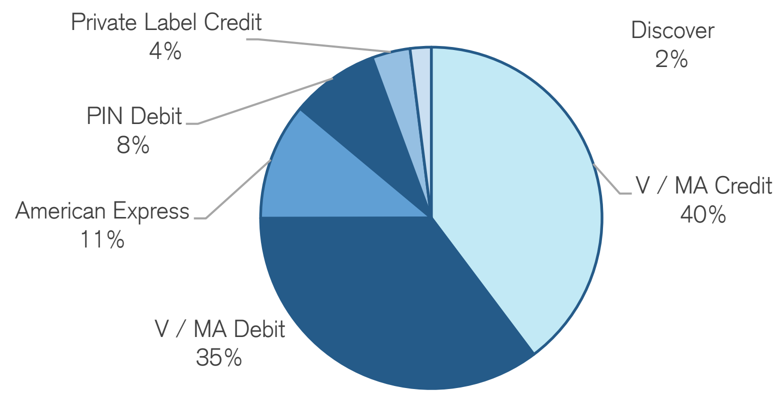
Return to Themes Table of Contents

4. Debit card network mechanics

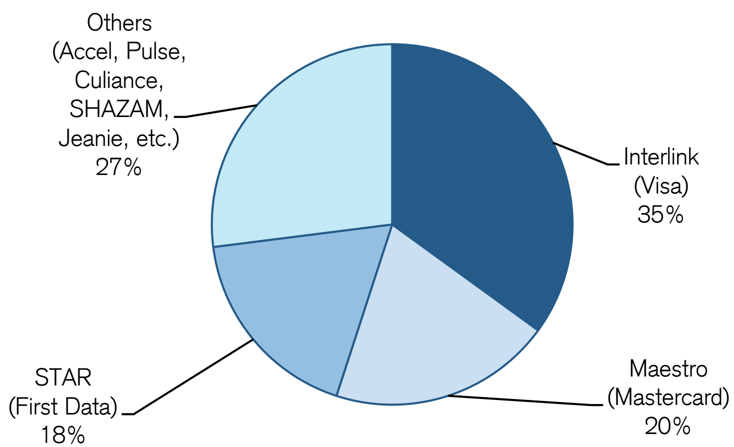
Competitive overview

- PIN debit usage has decreased in the past 5 years, while signature debit and credit card usage has grown HSD.
- After a period of consolidation beginning in the 1980s, the majority of debit networks are owned by scaled incumbents in the payments industry.
  - Visa – Interlink
  - Mastercard – Maestro
  - First Data – STAR
  - FIS – NYCE
  - Fiserv – Accel
  - Discover – Pulse
  - Worldpay - Jeanie
- Network fees are lower for PIN debit transactions vs. signature debit transactions.

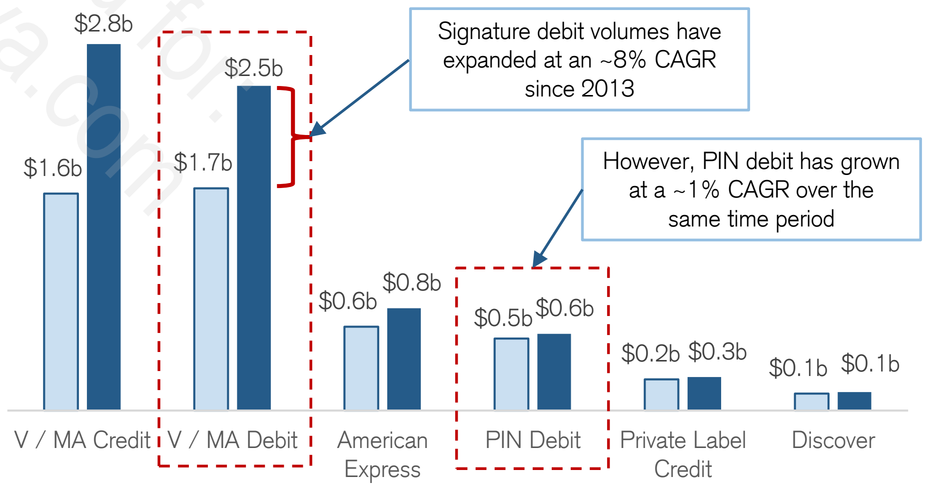
US general purpose purchase volume market share, showing Visa and Mastercard credit and debit as the lion's share of total volume



US PIN debit share leaders are Visa (Interlink) and Mastercard (Maestro), with STAR (Fiserv/First Data) a clear number three



US general purpose purchase volume ($b) suggests signature debit has grown at a much faster rate (2013-2018) vs. PIN debit



Source: Company reports, The Nilson Report (2018 Merchant volume), Mergermarket, Credit Suisse research

Return to Themes Table of Contents

4. Debit card network mechanics
ACH vs. debit, key differences and use cases

Aspect	Traditional debit (Visa, Mastercard, PIN debit networks)	ACH-based (including faster payments, ACH-like alternatives)
Costs to merchant	Interchange fees, network fees, and merchant acquiring fees; regulated interchange when card issued by bank with > $10b assets (21bps + $0.05), or Durbin-exempt, unregulated interchange when issued by smaller banks	Fees paid to NACHA (bank-owned association that makes the operating rules), fees paid to the operator: (1) EPN by The Clearing House (TCH) and (2) FedACH by the Federal Reserve, and fees paid to a third-party service provider to access ACH systems (e.g., Dovetail by Fiserv, UPP by FIS); priced on a cents per transaction basis (i.e., meaningfully lower cost than traditional debit)
Good funds	Immediate authorization and guarantee of good funds (debit cards will not authorize if funds are not in the account), although there is a risk of chargebacks; cannot bounce, as authorization is a binding commitment by the issuing bank per network rules	Good funds not guaranteed – risk of insufficient funds (2-day window where banks can pull back funds for insufficient funds, account closed, wrong account number, etc.); even on a same-day basis, ACH payments can bounce due to lag in authorization and settlement (can send more money than in account, which catches up upon settlement time)
Chargebacks and disputes	Chargebacks & dispute process: Card network rails come with processes around chargebacks & disputes; originating bank bears the risk when accounts are taken over; these processes generally add costs to the ecosystem	No chargebacks & disputes: ACH-based payments cannot be reversed due to issues with a product or service delivery (merchant failure); in practice, banks at times reimburse their customers, but only legal recourse is small claims court
Account take-over	Network rules protect for signature debit, Reg E protects for PIN debit and signature debit	Reg E protections only (out of scope of card network rules); the originating bank does assume risk when accounts are taken over (per Reg E)
Domestic vs. Global	Cross-border: Global by definition, with cross-border capabilities and access to ~3.6b cards and ~25k banks connected to Visa and Mastercard	Local (but evolving): ACH-based systems are (today) by definition local and often country-specific. Examples include: NPP in Australia, FPS in the UK, RTR in Canada, RTP provided by TCH in the US, and the pending FedNow system (potential launch in 2023/2024) in the US; that said, it is possible that over time modern ACH systems could become linked/interoperable for use in cross-border payments (i.e., many are using ISO 20022 standards, making connecting various systems more feasible over time)
Speed & availability	24/7 real-time: Card rails are always on	Modern systems are 24/7 (e.g., RTP in the US), legacy are not; legacy ACH systems use batch processing (i.e., all transactions end of day) and often operate under bank branch-like hours
Other	Long-standing, real-time capabilities consolidated into two known brands (Visa, Mastercard)	Numerous, more recently developed options; use cases typical for services that can be turned off by the merchant (e.g., phone bill, electric bill, college tuition)

Source: Visa, Glenbrook Partners, Credit Suisse research

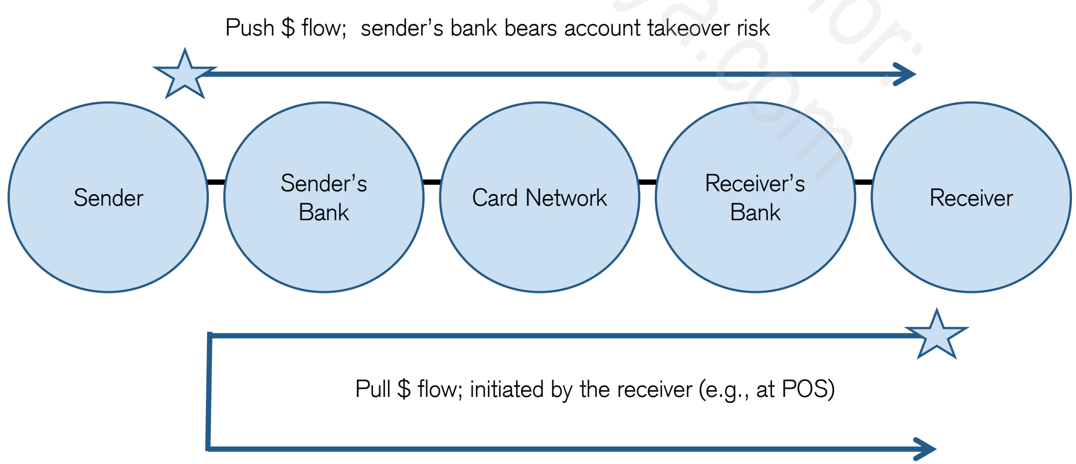
[Return to Themes Table of Contents](#)

4. Debit card network mechanics

Push vs. pull payments overview

- Pull Payments – Traditional card payments where the recipient (merchant) instructs their bank to pull funds out of the consumer's account
    - Traditional card payments are by definition debit pull payments, ACH debit pull (e.g., recurring utility bill debited from bank account)
- Push Payments – Sender instructs its bank to send (push) money to the recipient's bank
    - Traditional ACH credit push (e.g., direct deposit of payroll pushed from employer's account to employee)
    - Real-Time Payments from The Clearing House are exclusively credit push, although they have a request for payment feature
    - Other examples include: Visa Direct, Mastercard Send, and Zelle
    - Authorization message from sender's bank to receiver's bank (asking permission to send vs. granting permission to pull in a typical transaction)
    - Generally not reversible due to fraud or service issues (whereas pull payments can be disputed if not happy with the product or service)

Payment flows for push vs. pull payments



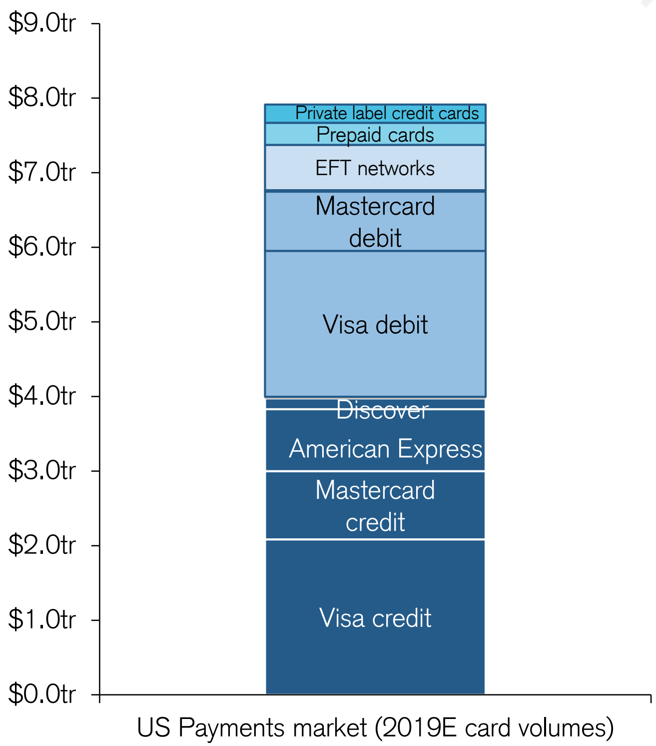
Source: Visa, Glenbrook Partners, Credit Suisse research

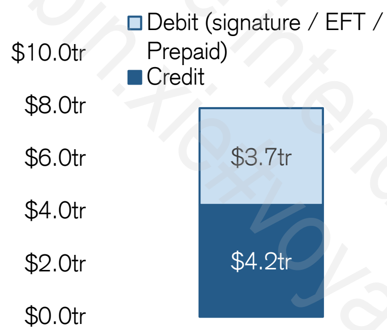
Return to Themes Table of Contents

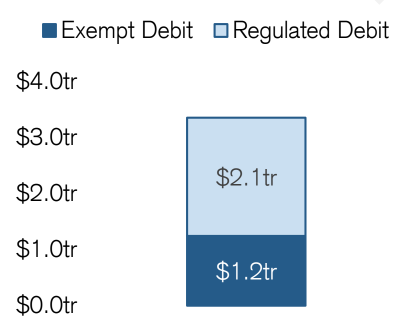
5. US Payments market revenue pools

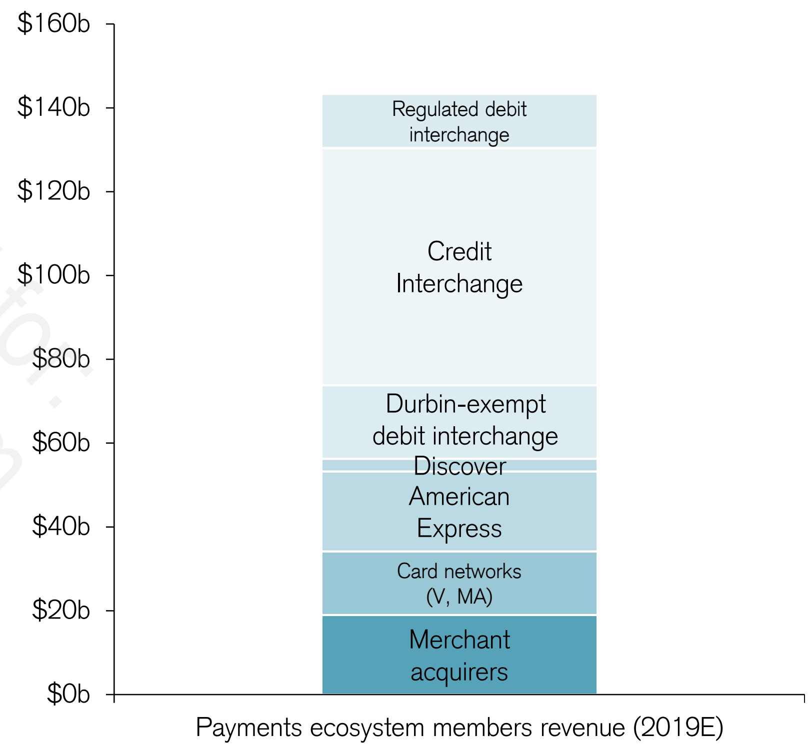
Merchant discount rate components (opportunity for acquirers, networks, & issuers)

- US payment card volumes are approaching $8tr in total, with the vast majority touching Visa and/or Mastercard networks.
- Visa and Mastercard are not the largest revenue beneficiaries though – banks are (the card issuers themselves), with card issuers earning interchange on each transaction equivalent to ~130bps on average (vs. Visa and Mastercard earning network yields that total come to roughly ~26bps)









Source: Company reports, The Nilson Report (US Purchase Volume from The Nilson Report for 2018 base, and 2019E represents Credit Suisse estimates), The Federal Reserve, Credit Suisse estimates

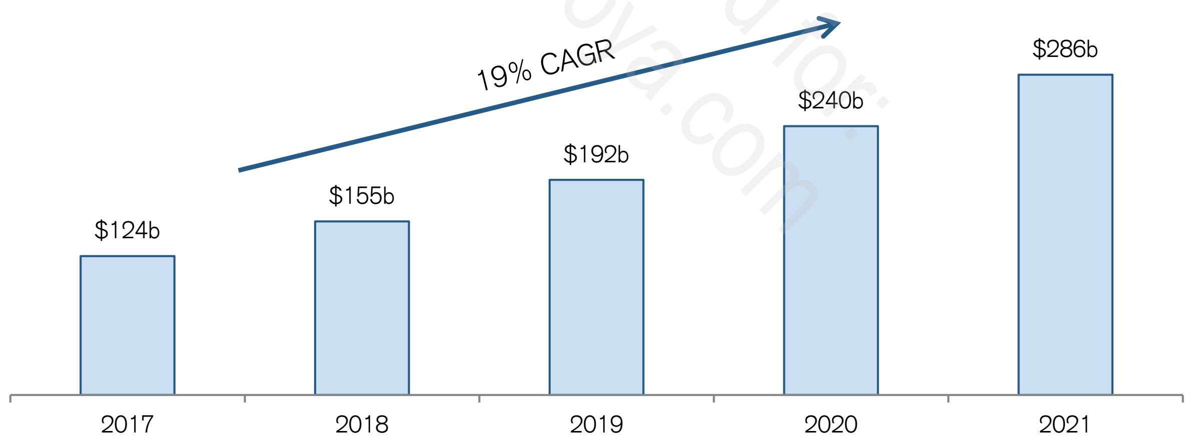
Return to Themes Table of Contents

6. Virtual cards in B2B Payments

A key driver of card penetration in B2B payments

- First introduced in the early 2000s, primarily used in B2B travel and fleet management
- Now a key component in automating Accounts Payable/Accounts Receivable-related payments, replacing inefficient paper-based payments that require manual efforts for both sides
- Roughly ~20%-40%+ of an AP file can be addressed via virtual cards, although it may require individual supplier discussions to educate on the benefits, costs, etc. (companies like FleetCor and WEX do this when given a complete AP file)
- Virtual card numbers function like a token, serving as a substitute for the underlying account number
  - Single-use cards - good for only one transaction, enhanced safety/security
  - Lodge cards - reusable virtual card, typically stored with a trusted vendor

Virtual cards are one of the fastest growing areas in payments, expected to deliver a near ~20% CAGR 2017-2021E (roughly ~2-3x underlying industry growth rates)



Source: WEX, eNett, Mastercard, Credit Suisse research

Return to Themes Table of Contents

6. Virtual cards in B2B Payments
Virtual cards leaders FleetCor and WEX

- WEX is the pioneer of virtual card usage, focused on online travel.
- WEX and FLT have large acceptance (supplier) networks (WEX quotes ~2.5mm, while FleetCor quotes ~1mm), with WEX's scale enhanced by white-labeling its corporate payments product through financial institutions (e.g., PNC, American Express).
  - FleetCor offers Comdata Mastercard virtual cards for customers to pay invoices.
  - Both WEX and FleetCor have specific teams designated to signing up suppliers (i.e., gain an AP file, attempt to increase virtual card acceptance penetration within the suppliers that are to be paid).

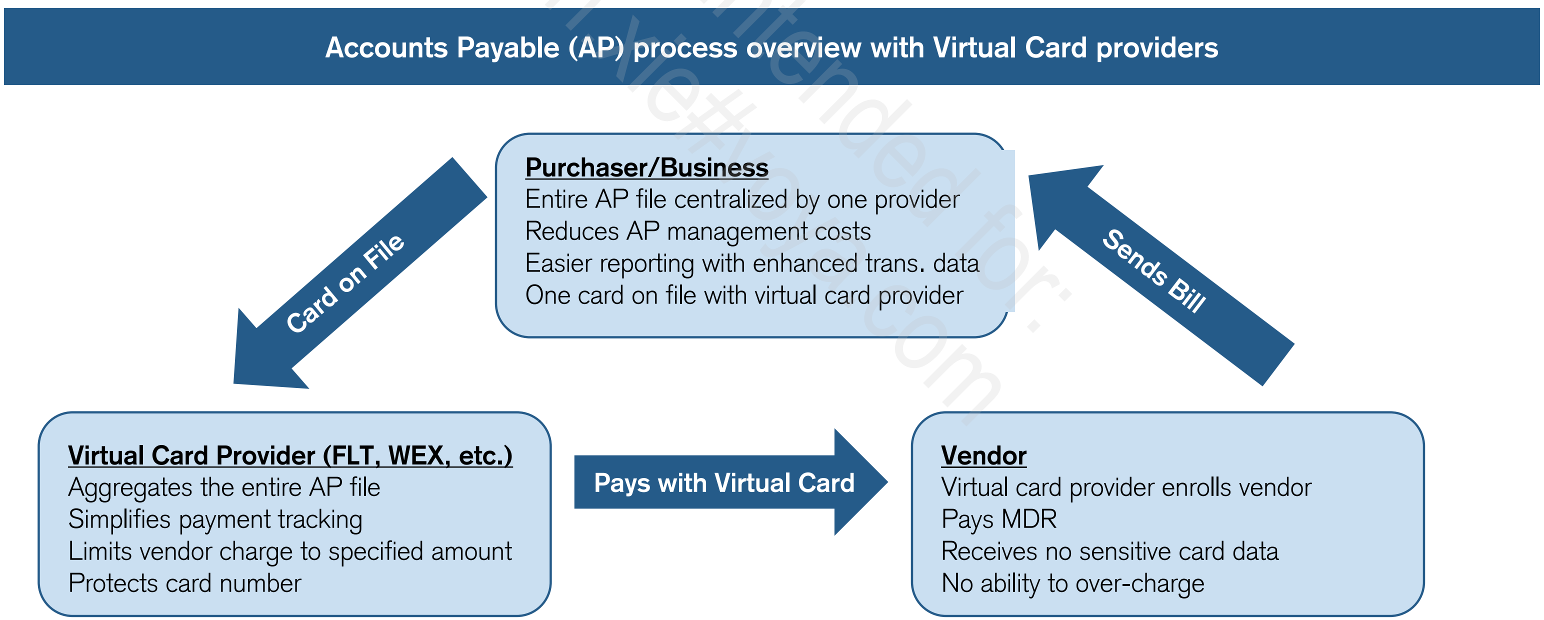
Key benefits of virtual card usage
Improve speed and simplification of AR & AP reconciliation processes
Reduce operating costs – scale from process efficiency, reduces errors, helps to avoid FX markups (up to 3%)
Increase control of corporate spend – limit a purchase to the amount, date, merchant, and MCC code
Revenue opportunity from financial incentives (rebates) on transactions
Reduce fraud – single-use virtual card numbers can only be used once with the controls above
Better reporting with enhanced data from card transactions

Source: WEX, eNett, Mastercard, Credit Suisse

Return to Themes Table of Contents

6. Virtual cards in B2B Payments
Virtual Card mechanics within traditional AP/AR

- Virtual cards can help to decrease check processing costs, reduce manual processing errors, and enable direct linking of payments to expenses.
- Beyond cost savings, virtual card usage can lead to rebates – to the point of turning AP functions into revenue generators vs. cost centers, adding to the value proposition around efficiencies, reconciliation, etc.
- Specifically, interchange earned on virtual cards can be (depending on the arrangement) shared back with the underlying payee, helping to reduce the total costs of AP operations.



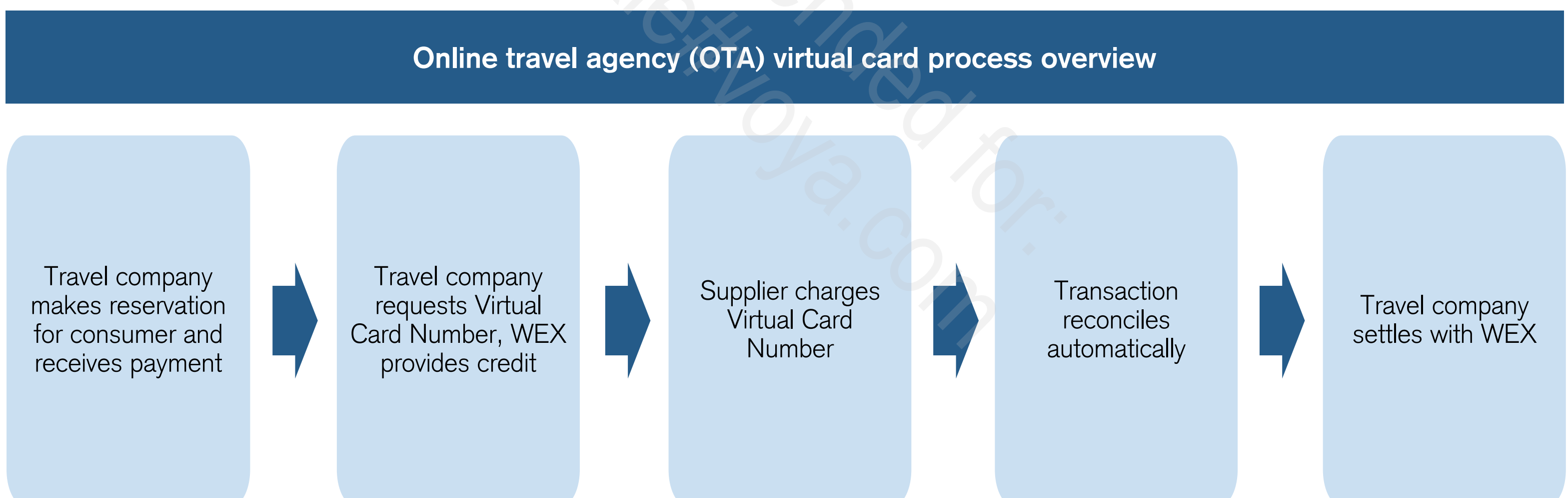
Source: WEX, Credit Suisse research

Return to Themes Table of Contents

6. Virtual cards in B2B Payments

Virtual Card mechanics within the travel segment

- Virtual cards within travel are mainly utilized with hotels booked online via OTAs (key clients include Expedia and Booking.com), specifically when the OTA employs the merchant model (i.e., takes payments for the hotel from the customer, and later sends a virtual card payment to the hotelier upon stay).
- Booking.com was traditionally an agency model OTA but has more recently began utilizing the merchant model for both hotels and alterative accommodations (e.g., vacation rentals).
- WEX plans to focus on non-hotel travel markets (airlines, vacation rentals, tours & activities, and car rental), which make up two-thirds of online travel.



Source: WEX, Credit Suisse research

Appendix

CREDIT SUISSE

Framework for "at-a-glance" view of companies

Credit Suisse framework and snapshot

	Growth & Share Gains			Differentiation				Financial		Additional Factors	
	eCommerce & Software exposure	Geographic Mix & Scale	Partnerships & Distribution	Product & Innovation	Proximity to Customer	Additional Services	Pricing Power	Benefitting from M&A/Cash	Operating Leverage	Emerging Areas of Upside	Threats (Competitive, Regulatory)
V	◕	◕	●	◑	◕	◑	◕	◕	●	◕	◕
MA	◕	●	●	◕	◕	◑	◕	◕	●	◕	◕
PYPL	●	◕	◕	◕	●	◕	◑	◕	◑	●	◑
SQ	◕	◔	◕	●	●	●	◕	◑	◑	◕	◕
ADYEN	●	◕	◑	●	◔	◑	◑	◑	●	◕	◕
FIS	◕	◕	◕	◑	◕	◕	◑	◕	◑	◕	◑
FISV	◕	◕	◕	◑	◕	◕	◑	◕	◑	◑	◑
GPN	◕	◕	◕	◑	◕	◑	◕	●	◕	◕	◕
AFRM	●	◔	◑	◕	◕	◕	◑	◕	◕	◕	◕
RKT	◕	◑	●	◕	◕	◕	◑	◕	◕	◑	◑
FLT	◔	◕	◕	◕	◕	◑	◕	●	◕	◕	◕
LSPD	◕	◕	◑	◑	◕	◕	◕	●	◕	◕	◔
NVEI	◕	◕	◕	◑	◕	◑	◕	◑	◑	◑	◕
SOFI	◑	◑	◑	●	◕	◕	◑	◑	◑	◑	◑
WU	◑	◕	◕	◔	◑	◑	◑	◔	◑	◑	◑
WEX	◑	◑	◕	◕	◕	◑	◕	◕	◕	◕	◕
FOUR	◕	◑	◕	◕	◕	◕	◑	◑	◕	◑	◕
PSFE	◕	◕	◑	◔	◑	◔	◑	◕	◑	◕	◔
RSKD	●	◕	◑	◕	◕	◑	◕	◔	◑	◕	◔
VRRM	◔	◑	◕	◕	◕	◑	◕	◕	◑	◑	◑
LDI	◕	◑	●	◕	●	◕	◑	◑	◕	◑	◑
RPAY	●	◔	◕	◕	◑	◑	◑	●	◕	◕	◑
MLNK	◕	◑	◑	◑	◕	◑	◑	◑	◑	◑	◑
PAYA	◑	◑	◕	◑	◑	◑	◑	◕	◑	◑	◔
IMXI	◔	◑	◕	◑	◕	◑	◑	◑	◑	◕	◑

Source: Company reports, Credit Suisse research

	Growth & Share Gains			Differentiation				Financial		Additional Factors	
	eCommerce & Software exposure	Geographic Mix & Scale	Partnerships & Distribution	Product & Innovation	Proximity to Customer	Additional Services	Pricing Power	Benefitting from M&A/Cash	Operating Leverage	Emerging Areas of Upside	Threats (Competitive, Regulatory)
V											
	- eCommerce transactions come with meaningfully higher carded rates and represent a channel growing ~5x that of traditional off-line commerce (in-store); further, cross-border eCommerce is growing ~1.5x that of domestic, an added tailwind from a yield perspective	- Compared to Mastercard, Visa has greater debit volume mix and greater US volume mix, with Mastercard having greater international exposure benefiting its top-line growth	- Visa's strong distribution is bolstered by its leading position with the largest card issuers in developed markets (e.g., JPM, Bank of America). Visa extended its partnership with JPM through 2029, solidifying its position as the leading US network	- Sourced from both in house (e.g. Visa Direct, B2B Connect) and acquisitions (e.g. Earthport), recent example (June 2019) around installments (enabling card issuers to offer installments [i.e., BNPL] for Visa cardholders directly through merchants)	- By definition card issuance capabilities and the global acceptance network enabled by Visa/Mastercard enable their core customers (issuing banks) to earn money (via interchange directly, and via interest earning on outstanding credit balances indirectly)	- With the technical migration in Europe complete, Visa has begun to offer add-on services (e.g. risk services, loyalty solution) to European clients; we expect subtle (but positive) continued "pricing" (net yield) increases in Europe	- Contactless transactions skew lower ticket, implying higher yields (due to "cents per transaction" data processing fees), although we expect a meaningful portion of this increased yield to be paid-away via incentives	- Substantial FCF allows for consistent bolt-on acquisitions to enhance technology and service offerings to banks & merchants/acquirers (e.g., Earthport, Verifi, Payworks, CardinalCommerce, Tink, Currencycloud, amongst others)	- Incremental margins in theory in the ~90-100% range, although investment behind innovation, acquisition of technology & services, etc. have kept margin expansion in check	- Visa Direct "push payment" expands the existing rails into new market opportunities, beyond C2B and into B2B, G2C, and P2P; Both offense (new payment flows opened up) & defense (race to scale before modern/fast ACH rails gain ubiquity)	- Interchange regulation risk (e.g., Australia, Europe, and the US [debit only] have capped interchange), although little credible evidence to suggest that interchange regulation has resulted in reduced network fees
	- Visa owns CyberSource, an eCommerce gateway connected to 100+ processors in 190+ countries (acquired PayWorks in 2019 for in-store payments and to combine with CyberSource to form a fully integrated solution)	- Relative to Mastercard, Visa is more skewed towards developed markets with Visa having a larger mix in the US and the majority of Visa Europe volume from the UK, a primary driver of Visa's slower payments volume growth in recent history	- Visa Direct is the engine fueling many existing instant payout options such as P2P (Venmo, Zelle, PayPal), instant disbursements (Square, Worldpay), and bill payment (Paytm, banks in Singapore), but works with all on a white-labeled or partnership basis	- Visa has various in-house incubator environments (e.g., "Fintech Fast-track" program), where it partners with various players in the ecosystem to streamline partnerships for FinTechs (e.g., issuing bank partners, issuer processing, program managers)	- Visa Direct (and Mastercard Send) as both offense (priced to expand card-able TAM into larger, interchange-sensitive payments) & defense (race to scale before modern/fast ACH rails gain ubiquity)	- CyberSource (and authorize.net) global eCommerce gateway and Payworks (former strategic partner, acquired), a provider of next-gen gateway software for in-store POS, allows Visa to offer unified acceptance platform	- Visa Europe yields were initially below those of Mastercard, although a combination of commercial agreements, additional product/service sales, and processing share gains have led to increasing European yields	- Both V & MA have ramped competition in faster payments via non-card assets that can handle B2B cross-border (Earthport acquired by Visa); Earthport will be a fit with Visa's B2B Connect (and is indicative of a willingness to capture non-card flows)	- Visa has the ability to evaluate and potentially reduce expenses in the event of a downturn, providing a degree of protection to EPS (we note that reduced volumes in a downturn also turn into reduced incentives, another balancing factor)	- Visa's cross-border mix has become incrementally more attractive, in part driven by COVID-19, with reduced reliance upon travel and greater mix of eCommerce as well as newer, fast growing areas such as B2B and remittances	- Numerous potential/longer term risks to monitor, but none materializing near-medium term (e.g., regulatory [PSD2], national schemes, Alipay & WeChat [and CUP] expansion, added super app platforms, Amazon and other BigTech efforts, etc.)
	- SRC initiative aims to make the online checkout process more seamless; We expect the merchant acquiring community to support SRC (e.g., higher conversion, potential to capture economics on transactions otherwise lost to APMs)	- Tencent's announcement to allow international card schemes to be added to its mobile wallet for China inbound commerce is a positive for the card networks, along with other super apps leveraging the global networks	- While Mastercard began earlier (and is advantaged as a result) vs. Visa in partnering with FinTechs (e.g., European Neo banks), Visa has more recently gained ground (e.g., Revolut global expansion partner, Chime, and others)	- Visa and its issuer partners have started to roll out contactless cards in the U.S., which we expect to drive transaction growth and possibly be yield accretive longer term (and could compete with mobile tap-and-pay as the next form factor for payment)	- The Earthport acquisition doubles the number of accounts that can be reached via the Visa network by connecting Visa to various real-time payments and ACH networks	- Visa also operates an issuer processing business (Visa DPS, which provides services across debit, prepaid, and credit), which Mastercard does not offer	- Gross yields 8-10bps greater than net yields; Yields had been higher (~29bps FY 2016) prior to the Visa Europe acquisition, which reset total company averages	- Visa offers a small dividend, with majority of capital allocation expected to go toward M&A and stock buybacks to the extent that it is not reinvested in the business organically	- Over the long term, we expect Visa to continue to benefit from operating leverage as more transactions run on largely fixed-cost infrastructure (and greater scale overall relative to Mastercard)	- We expect Visa to be an outsized beneficiary (vs. Mastercard) of the contactless rollout in the US given mix differences, along with a skew to large issuers that are likely to be faster to re-issue contactless cards	- Blockchain is a threat to the existing 4-party system (although a number of limitations lead us to believe use cases will be niche and outside core C2B med-term); CBDCs and Stablecoins pose a greater threat

	Growth & Share Gains			Differentiation				Financial		Additional Factors	
	eCommerce & Software exposure	Geographic Mix & Scale	Partnerships & Distribution	Product & Innovation	Proximity to Customer	Additional Services	Pricing Power	Benefitting from M&A/Cash	Operating Leverage	Emerging Areas of Upside	Threats (Competitive, Regulatory)
MA	◕	●	●	◕	◕	◑	◕	◕	●	◕	◕
	- eCommerce transactions come with meaningfully higher carded rates and represent a channel growing ~5x that of traditional off-line commerce (in-store); further, cross-border eCommerce is growing ~1.5x that of domestic, an added tailwind from a yield perspective	- Mastercard has greater credit volume mix and greater International volume mix relative to Visa	- Early start (and lead) vs. Visa in partnering with FinTechs (e.g., Neo banks, particularly in Europe/UK, issuing cards as part of their digital banking or other FinTech offerings); although Visa has gained ground (e.g., Revolut global expansion partner, Chime)	- New products & innovation via in-house developments (e.g. Mastercard Send, Bill Pay Exchange, Mastercard Track) and acquisitions (e.g. Ethoca, Vyze, Transfast, Vocalink, Transactis, Nets, Finicity, etc.)	- By definition card issuance capabilities and the global acceptance network enabled by Visa/Mastercard enable their core customers (issuing banks) to earn money (via interchange directly, and via interest earning on outstanding credit balances indirectly)	- Numerous investments to support security (Ethoca, Brighterion, NuData Security), innovation at the POS (Vyze POS financing platform), and additional value-added services (Mastercard Payment Gateway Services, Applied Predictive Technologies)	- Contactless transactions skew lower ticket, implying higher yields (due to "cents per transaction" data processing fees), although we expect a meaningful portion of this increased yield to be paid-away via incentives to help ramp contactless adoption in the US	- Generating substantial annual FCF, allowing for consistent bolt-on acquisition (e.g., Transfast, Transactis, Vyze, Brighterion, amongst others) and more meaningful acquisitions (e.g., Vocalink and Nets)	- Incremental margins in theory in the ~90-100% range, but investment behind innovation, acquisitions (e.g., Vocalink, Transfast, Nets, etc.), investment behind services, etc. have kept margin expansion in check	- Cross-border volume mix shift to faster growing eCommerce, B2B, remittances, etc. and away from travel, in part due to COVID-19	- Interchange regulation risk (e.g., Australia, Europe, and the US [debit only] have capped interchange), although little credible evidence to suggest that interchange regulation has resulted in reduced network fees
	- SRC initiative aims to make the online checkout process more seamless; We expect the merchant acquiring community to support SRC (e.g., higher conversion, potential to capture economics on transactions otherwise lost to alternative methods/wallets)	- Tencent's announcement to allow international card schemes to be added to its mobile wallet for China inbound commerce is a positive for the card networks, along with other super-apps leveraging the global networks for broader/open-loop acceptance	- Mastercard Send in the gig economy (workers preferring to be paid in real time); The service should also continue to see growth in corporate disbursement use cases (payroll, insurance claim) - partners Mastercard Send include Zelle, Google, Facebook, and others	- Mastercard has various in-house incubator environments, such as its Start Path and Accelerate program, which allowed for an early "first mover" advantage with FinTechs relative to Visa	- Mastercard Send (and Visa Direct) as both offense (priced to expand card-able TAM into larger, interchange-sensitive payments) & defense (race to scale before modern/fast ACH rails gain ubiquity)	- Mastercard Track Business Payments Service goes beyond payments rails, enabling rich data exchange, a directory of payments preferences for ~210mm entities, credit rating monitoring, supplier management, and various compliance applications	- New addressable payments volume likely comes at a reduced yield vs. current company average (i.e., B2B, P2P, G2C), with Visa Direct a recent example (lower yield than debit on average, although varies by use case, with the majority of fees priced as cents per transaction)	- During 2019, spent more than $350mm for minority stakes in two (at the time) pre-IPO companies, i.e. Network International & Jumia, and announced acquisition Nets assets for ~$3.2b (largest acquisition on record), with many bolt-on acquisitions since	- Revenue growth algorithm of PCE (+4-5%) + penetration + services + mix + pricing + share, building on a largely fixed cost operating expense base	- While PSD2 is a potential threat, it is also an opportunity in consumer authentication (i.e., could provide a connectivity hub); Mastercard can also provide fraud monitoring services that help FinTechs and banks with compliance, amongst other Services offerings	- Numerous potential/longer term risks to monitor, but none materializing near-medium term (e.g., regulatory [PSD2], national schemes, Alipay & WeChat [and CUP] expansion, added "super-app" platforms in EM, Amazon and other BigTech efforts, etc.)
	- Identity Check (for merchants), which passes ~200- data elements to the issuing bank (vs. 8 data elements for SecureCode), allowing improved issuers risk assessment (resulting in more authorizations, citing +13% increase in approval rates in the early days)	- Mastercard is growing faster than Visa in developing markets like Latin America and Asia; these markets also tend to have a greater portion of cross-border volumes and more attractive underlying cash-to-card opportunities	- Mastercard extended their global agreement with Citi (largest issuer of Mastercard) for additional 5 years through 2029, and will remain Citi's exclusive global partner in consumer credit, debit and small business cards	- Mastercard and its issuer partners have started to roll out contactless cards in the U.S., which we expect to drive transaction growth and possibly be yield accretive longer term (and could compete with mobile tap-and-pay as the next form factor for payment)	- Transfast acquisition will help Mastercard increase worldwide reach in the account-to-account space (covers more than 125 countries with a proprietary network consisting of direct integration with 300+ banks)	- Mastercard's Bill Pay Exchange allows banks to offer a multi-rail bill-pay service to its underlying customers (with bills paid via ACH, card, real-time payments, etc.); currently ~135k+ billers with plans to expand meaningfully (supported by the Transactis)	- Gross yields 15-20bps greater than net yields (with ~35% of gross revenue paid away as incentives), with potential for improved gross yields from value-added services, while incentives will continue to grow given large issuer mix	- Mastercard offers a small dividend (~50bps range recently and has grown ~20%+ per annum over the past 5 years)	- Mastercard has the ability to evaluate and potentially reduced expenses in the event of a downturn, providing a degree of protection to EPS (we note that reduced volumes in a downturn also turn into reduced incentives, another balancing factor)	- To the extent Mastercard is able to migrate clients and credential users to beyond just card payment and card services (e.g. new payment flows, new payment services, beyond payment services), MA will further the moat around its ecosystem	- Blockchain is a theoretical threat to the existing 4-party system (although a number of limitations lead us to believe use cases will be niche and outside core C2B med-term); Current cryptocurrency use cases often travel over existing 4-party infrastructure, often converted to fiat

	Growth & Share Gains			Differentiation				Financial		Additional Factors	
	eCommerce & Software exposure	Geographic Mix & Scale	Partnerships & Distribution	Product & Innovation	Proximity to Customer	Additional Services	Pricing Power	Benefitting from M&A/Cash	Operating Leverage	Emerging Areas of Upside	Threats (Competitive, Regulatory)
PYPL	●	◕	◕	◕	●	◕	◑	◕	◑	●	◑
	- Clean pure-play on eCommerce, particularly on mobile (Braintree, core PayPal, Venmo), which makes up >40% of TPV and growing >30%	- <50% of revenues ex-US, although about 1/5 of that exposure is UK-based; all other countries are <10%	- >40 partnership agreements since 2016, with the key early agreements coming with Visa and Mastercard; a more recent, notable partnership in Paymentus (opening the bill pay vertical)	- Venmo's attractive highly-engaged >40mm Millennial user base and social aspect (newsfeed) provides a direct engagement platform for merchants	Two-sided global payments platform with unrivaled scale, consisting of ~300mm consumers and ~24mm merchants	- POS software via Zettle (inventory management, invoicing, staffing tools, etc.), expanding PayPal's in-store TAM; Payout tools enhanced by Hyperwallet acquisition (important for marketplace customers)	- When viewed as a customer acquisition partner, suggests pricing upside remains (industry-leading conversion rates and ~300mm users); SMB eCommerce players enabled with tools of larger tech players	- Cash and leverage levels leave ample room for continued M&A, share repurchase and minority investments (e.g., $750mm invested in MercadoLibre, $500mm invested in Uber); Pre-2021 outlook includes ~150bps growth contribution from acquisitions	- Non-transaction expense base is largely fixed (~75%), and is guided to grow ~5-8% vs. revenue growth in the high-teens (3-5 year guidance)	- Zettle in offline payments and software for SMB (in >10 markets ex-US) moved into the US market in 2021	- Any capping (regulation) of interchange serves to lower funding costs (a positive for PayPal margins)
	- Approaching 20% of TPV from non-eBay, fast growing eCommerce marketplaces (e.g., Facebook, Instagram, AliExpress, Grubhub, Airbnb, etc.)	- MercadoLibre commercial agreement provides for added exposure to fast growth/low penetration Latin American payments and eCommerce (also Itau partnership in Brazil)	- In addition to V/MA, partnerships with large tech platforms (e.g., Google, Facebook), retailers (e.g., Walmart), banks (e.g.,. Citi, BofA, Itau), and others (e.g., FIS, América Móvil)	Smart checkout buttons (now re-tooled to not rely on browser cookies) and enables users to pay with issuer rewards points at PayPal's ~23mm merchants	Consumer reach extended to new geographies and contexts via partnerships. In-store (V/MA, Walmart), Facebook (contextual commerce on Instagram), MELI (230mm users in Latin America)	- PayPal Credit offerings for both consumers (via SYF in the US, on balance sheet ex-US) and merchants (PayPal Business Loans, PayPal Working Capital), benefiting from the Swift Financial acquisition	- Cross-border capabilities (global two-sided network) suggests ability to increase price in certain corridors over time (took a meaningful cross-border price in crease in 2017)	- Honey (close Q1 2020E, $4b in cash), has potential to move up PayPal to the beginning of the shopping experience from purely a checkout button at the end. iZettle (acquired 2018, $2.2b) benefits still to come	- Transaction expenses are variable and gross margin trajectory has been/will be down	- Venmo monetization and deepening relationships with millennials via Pay with Venmo, Venmo Card (Debit and Credit), Instant Transfer, cryptocurrency trading, and more	- Alternative checkout options such as the Secure Remote Commerce (SRC) "single button" from networks, which we expect to be supported by acquirers
	- Industry leading checkout conversion rate of 89%, on average ~60% higher than other digital wallets and 80%+ higher than all other payments types (comScore study, April 2018)	- GoPay controlling stake acquisition has made PayPal the first non-Chinese payments company licensed to provide online payment services in China. Potential to be material to longer-term growth (2021 and beyond)	- Minority investments (e.g., MercadoLibre, Uber, Acorns, Monese, Raisin, etc.) suggest potential for additional integration and/or partnering	Differentiated set of capabilities for marketplaces (PayPal Commerce Platform): expertise from powering eBay, OneTouch seller sign-up, relationships with existing sellers and consumers, trusted brand	- Partnership approach provides PayPal's merchants with access to north of 380mm additional consumers (150mm Baidu users and 230mm MELI users)	- Recent addition of BNPL functionality embedded (Pay in 4 in the US) at zero incremental cost to merchants; rapidly growing in volumes from ~40k upstream presentments	- >400mm users with increasing engagement makes it difficult for a merchant to opt out of PayPal acceptance	- In Sept. 2021, agreed to acquired Paidy ($1.5b TPV, ~6mm users, ~700k merchants), BNPL provider in Japan, for ~$2.7b, bolstering Japanese domestic business	- Top line growth drives margin expansion (due to fixed non-transaction costs, despite large and variable transaction expenses)	- Opportunity to provide consumer financial services to Under-banked (1.7b people globally and 70mm in the US); Xoom money remittances provides an inroad to consumers in emerging markets	- Additional efforts by large cap tech companies, namely Amazon, but also Google, Facebook, Samsung, Apple, etc. (although many are partners, reducing risk)

Source: Company reports, Credit Suisse research

	Growth & Share Gains			Differentiation				Financial		Additional Factors	
	eCommerce & Software exposure	Geographic Mix & Scale	Partnerships & Distribution	Product & Innovation	Proximity to Customer	Additional Services	Pricing Power	Benefitting from M&A/Cash	Operating Leverage	Emerging Areas of Upside	Threats (Competitive, Regulatory)
SQ	◕	◔	◕	●	●	●	◕	◑	◑	◕	◕
	- Two broad buckets 1) First-party commerce enablement (Square Online Store (powered by Weebly) and Weebly; 2) Developer Platform-related efforts with Marketplaces, eCommerce enablement platforms, and a set of APIs and SDKs	- ~5% of revenues International although likely to move higher (more complete feature set rolling out globally, accompanied by brand campaigns)	- 90%+ of merchants self-onboard to Square's easy to use, intuitive platform. Leading cross-sell capabilities, which also reduces incremental CAC	- Continued new product innovation (>50% of adjusted revenue from products launched in past 5 years)	- Crucial to the operations of its sellers and regular engagement drives cross-sell (i.e., daily usage and dependence via dashboard/ analytics, CRM, inventory management, payroll, business debit card, etc.)	- >50% of adjusted revenue from products launched in past 5 years outside of Square's core payments business, the highest amongst its merchant acquiring peers	- "Rack rate" pricing increased in September 2019, increase for a subset of its sellers (with those merchants that were still being charged a 2.75% flat rate moving to 2.60% + $0.10 per transaction)	- Not part of Square's strategy to acquire customers and seek cost synergies; focused on technology and talent acquisitions (e.g., Weebly, Zesty)	- Incremental margins (ex-investment) are capable of being in the ~50%+ range, but Square generally opts to reinvest in its growth, thereby artificially depressing margins	- Additional financial services being added to the Cash app (consumer lending, asset management, insurance, etc.), along with additional Cash card adoption (unregulated debit interchange monetization)	- Intensifying competitive landscape from incumbents launching similar products and moving up market into larger merchants (FISV's Clover, GPN's Vital, PayPal's iZettle, etc.)
	- Developer Platform APIs and SDKs allow developers to use Square services (and access the full ecosystem) in a customized way, for websites, mobile apps, and in-store	- Square is working to product parity in international markets, which has helped to accelerate international expansion and made Square more competitive in international geographies	- Square hardware available at 24k+ physical retail stores (including Apple, Amazon, Best Buy, Staples, Target, and Walmart)	- Unique ability to rollout and scale new products quickly (Instant Deposit, Cash App features, Square Capital, etc.), partially due to daily use of dashboard for merchants	- Direct relationship with >70mm Cash App users (annual actives) makes Square a two-sided network. Enhances value for both sides: drive Cash App users to Square Sellers and reward Cash App users for this (Boost)	- Installments product allows sellers to increase their sales by offering credit extension at the POS to their customers (via Square Capital); integrated into Square Invoices as well (larger ticket items)	- Gross take rate expected to decline over time due to mix shift to larger merchants and away from micro-merchants	- Weebly acquisition meaningful in expanding on 2/3 strategic priorities (omnichannel and international, Weebly 40% of customers outside the US, learning ahead of any potential geographic expansion)	- Efficient Seller payback periods of 3-4 quarters, which Square has opportunistically chosen to extend to accelerate its merchant acquisition and move upmarket	- Any further move into B2B payments, with Invoices and Square Card the first two products in this area (we expect more, including AR/AP software, card issuance potentially, etc.)	- Any capping (regulation) of interchange serves to lower funding costs (a positive for Square margins)
	- Weebly acquisition & Square Online Store (powered by Weebly) aligned with omnichannel strategy but still a di minimis portion of mix today (sellers never have to think about where customers are from, single platform across channels, etc.)	- While brand recognition may not be the same as in the US, Square has Net Promoter Scores ranging from 60-80 in the UK, Canada, and Australia	- Third-party developers through the developer platform (APIs, SDKs, Developer Platform)	- Order API provides integration with Postmates, DoorDash, and Chowly (reducing the "tablet farm" at restaurants)	- 90%+ of merchants self-onboard to Square's easy to use, intuitive platform	- Automated chargeback dispute process (no chargeback rebuttal letters to author, no fees to handle disputes); previously offered $250 per month in chargeback protections, but recently ended program (accretive to margins)	- Demonstrated by Square's planned Feb. 2020 price increase of Instant Transfer to 1.5% from 1% after testing the increase before the broader rollout; likely afforded by the value of Square's product ecosystem	- Substantial cash balance and ability to use stock as an attractive currency is supportive of further M&A, which Square typically does for acquisition of new capabilities as opposed to for scale	- We expect Square's non-GAAP EBITDA margin to approach ~30% by 2025E	- Cash Boost (rewards) potential to turn from a cost center (marketing costs as Square funds the rewards) to a revenue generator (merchant funding of rewards and paying for positioning within Cash App)	- Local competition and lower awareness (relative to the US home market) in International markets

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FIS	◕	◕	◕	◑	◕	◕	◑	◕	◑	◕	◑
	- Leading eCommerce acquiring platform, accepting 300+ payment methods across, ~150+ countries and serving 1mm+ merchants	- Majority of revenue is derived from the US, with a meaningful presence in UK from legacy Worldpay as well as local presence in Brazil, India, and certain parts of Asia to accelerate Worldpay EM-expansion	- Direct salesforce of 3k+ (local market presence), supported by relationships with 14k+ financial institutions and the ISV business partnerships (1k+ partners, 3k+ integrations)	- Early pioneer in integrated payments (bolstered by Vantiv's Mercury acquisition in 2014), with 3k+ integrations, taking a predominantly partnered approach (vs. hybrid partner + owned software approach used by Global Payments)	- Long-term, privileged relationships ~1k+ core banking customers in the US empowers FIS' to capture a majority of client wallet share and supports differentiation potential with increased access to underlying consumer account data	- Core bank technology business drives annual wallet share gains via additional product sales (e.g., laying on additional risk products, digital, payments, billing, etc.)	- Legacy FIS offerings (e.g., core account processing) generally associated with long term contracts (~4-5 years) that include annual pricing escalators	- Transformative deal acquiring Worldpay increases organic growth profile, with medium-term potential upside via cross-sell, revenue synergies, and mix shifts to faster growth areas, which should enable HSD growth rates	- Expectation for EBITDA margin expansion as an output of the revenue and cost synergy program as well as natural leverage delivered by scale in the businesses in which FIS operates	- Expansion of Worldpay's acquiring (and in particular, eCommerce) business into Brazil, India, and other EM where FIS has a local presence, relationships, knowledge, etc.	- Modern banking core and ancillary technology competitors emerging, with potential to take small portions of incremental share/growth, although di minimis concern near-medium term
	- Top 3 for local acquiring markets globally, allowing for reduced costs (for those on interchange++ and for merchants with an entity in the foreign country) and improved authorization rates	- Global eCommerce acquiring allows for serving multinationals (e.g., Apple, Google, Expedia) and to benefit from merchants consolidating relationships to fewer, global providers (vs. ~10+ including regional players)	- Long-term, privileged relationships with 1k+ core banking customers in the US combined with FIS' "mass enablement" cloud-based distribution for outsourced customers facilitates cross-sell efforts of ancillary services	- FIS Core on Demand allows financial institutions to quickly and cost-effectively launch a direct-to-consumer digital bank in as little as 90 days	- Legacy Worldpay's strong integrated payments business reduces churn and facilitates cross-sell of additional services (with similar ambitions to increased software revenue like Square)	- FIS sells core processing to financial institutions, then upsells ancillary services/products such as digital solutions (back office automation), fraud/risk mgmt, EFT & network services, issuer processing, bill-pay, corporate liquidity, etc.	- Legacy Worldpay Merchant Solutions business has meaningful exposure to US big box retail (low yield, low growth, albeit a unit that provides meaningful scale benefits to the overall platform) and slower growth UK retail	- High level of FCF generation and growth of EBITDA has enabled significant debt repayment and leverage reduction post-Worldpay acquisition, putting the company in a position to resume large scale M&A	- FIS is continually focused on operating efficiency and cost enhancements, including a number of incremental cost-cutting measure taken during COVID-19 (some of which are temporary, and others which were permanent)	- Increased data (FIS issuer processing & banking relationships) to aid in increasing authorization rates (management expects ~200bps potential increase, from mid-80%s to high 80%s)	Consolidation trend of small banks (negative 4% CAGR, albeit with overall assets and accounts growing), potentially compounded by "barbell" pressures (large bank IT budgets at one end, FinTech challenge banks at the other)
	- Building repositories of data (via FIS financial institution data, along with Worldpay existing data) should enable differentiated eCommerce authorization rates (aiming toward ~2-5% better than the eComm global average of ~85%)	- FIS has the opportunity to see revenue synergies, by cross-selling merchant acquiring and core processing businesses into geographies where clients are not overlapping	- Worldpay became the first acquirer to partner with Amazon, adding the Amazon Pay button into its payments options (prior, merchants would have had to directly integrate with Amazon Pay, but now can simply enable via Worldpay)	- 80%+ of digital applications delivered via private cloud, allowing FIS to guarantee availability/ downtime of less than 15 minutes (vs. industry standard ~24+ hours)	- Legacy Worldpay's eCommerce acquiring offering lacks direct consumer relationships via unbranded online checkout capabilities, leading to lower yield's relative to acquirers with consumer networks (e.g., PayPal, Square)	- Unique loyalty redemption program ("loyalty-as-a-currency"), with roots at gas stations, and recently expanded to retail and restaurants (with further expansion ahead via the Worldpay merchant relationships)	- Due to the overhaul required to upgrade/switch core processing systems (time, dollars, training of staff, etc.), banks rarely make full core transitions (we estimate ~1-2% turnover annually)	- Legacy FIS strategy also includes divestitures of non-core business, demonstrating this discipline with the sales of various solutions/geos (e.g., SunGard Public Sector, SunGard K-12 Education, CAPCO, Kingstar)	- Both legacy FIS and WP business characterized as high fixed-cost, high recurring revenue (e.g., ~80% combined across IFS, GFS in legacy FIS), high incremental margin businesses (ex-investment for future growth)	- Potential for a more meaningful contribution from B2B payments over time (combining Paymetric, which was acquired by Vantiv [Worldpay] in 2017, with FIS cash management and treasury services)	- Modern competitors in acquiring (Adyen, Stripe, Square) and issuer processing (Marqeta) gaining greater scale; unlikely to disrupt core business near-term, but on the margins takes away a portion of would-be growth opportunities

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FISV	◕	◕	◕	◑	◕	◕	◑	◕	◑	◑	◑
	- Underappreciated eCommerce business, with 250+ payments methods accepted (including numerous local licenses that allow for reduced interchange and improved authorization rates all else equal)	- Combined company has predominantly US-based revenue (FISV was ~95% North America, while FDC was ~78%), with First Data having exposure to high-growth Latam and APAC regions	- First Data acquiring JVs and rev share relationship with large banks (e.g., Citi, Wells Fargo, PNC, with BAMS terminated June 2020) along with ~1500 referral/distribution partners (e.g., TD Bank, SunTrust, KeyBank, BBVA Compass, etc.)	- Dedicated multi-million dollar innovation investment pool, aimed at digital enablement, advanced risk management, eCommerce, next-gen merchant solutions, and data-focused solutions	- Long-term, privileged relationships ~4k+ bank customers in the US empowers Fiserv to capture a majority of client wallet share and supports differentiation potential with increased access to underlying consumer bank account data	- Bank technology business drives annual wallet share gains via additional product sales (e.g., laying on additional risk products, digital, payments, billing, etc.)	- Fiserv traditional offerings (e.g., core account processing) generally associated with long term contracts (~4-5 years) that include annual pricing escalators (CPI-based and/or linked to CPI, although at times negotiable alongside rest of contract)	- Transformative deal acquiring First Data produces a platform with unrivaled scale within the broader Payments, Processors, & FinTech segment	- Cost synergies from First Data acquisition have been consistently raised, showing the meaningful cost benefits that can be achieved through scale, on top of the cross-sell revenue synergy benefits	- More nascent, but fast growing ISV channel (via CardConnect & BluePay acquisitions) rapidly adding new integrations, bringing higher take rate revenue (due to primarily SMB end markets)	- Modern competitors in acquiring (Adyen, Stripe, Square) and issuer processing (Marqeta) gaining greater scale; unlikely to disrupt core business near-term, but on the margin takes away a portion of would-be growth opportunities
	- Domestic 50+ countries (last disclosed at First Data's 2016 investor day), allowing for reduced costs (for those on interchange ++ and for merchants with an entity in the foreign country) and improved authorization rates	- Dovetail (payments platform for allowing banks to handle various ACH, real-time, and wire-based money movement) has the potential to increase distribution more globally via First Data financial institution relationships	- Long-term, privileged relationships with ~4k+ core banking customers in the US facilitates cross-sell efforts of ancillary services (banking and now merchant acquiring)	- Clover POS platform combining hardware, software (including app-store populated by 3P developers), Clover Capital, etc.; Clover is viewed as the crown jewel of the Fiserv portfolio	- Clover's expansive integrated payments and business software ecosystem reduces churn and facilitates cross-sell of additional services	- Fiserv has many incremental "add-on" services it can offer banking clients, such as risk management, bill pay, wealth management, loan servicing, and others, allowing for opportunities to cross-sell and upsell its existing core banking clients	- Due to the overhaul required to upgrade/switch core processing systems (time, dollars, training of staff, etc.), banks rarely make full core transitions (we estimate ~1-2% turnover annually)	- Leverage has been significantly reduced post-First Data acquisition through EBITDA growth and debt reduction, putting Fiserv in a position to resume M&A in attractive markets	- Both Fiserv and First Data characterized as high fixed-cost, recurring revenue, and incremental margin businesses (ex-investment for future growth); although topline growth profile has been in the L-MSD, reducing ability to realize full benefits	- First Data acquiring business in Latin America had been achieving strong growth pre-COVID, with markets such as Brazil, Argentina, and others recently opening up their acquiring markets, supported by lower card penetration levels	- Dissolution of BAMS JV demonstrates the potential impacts of further JV losses or loss of distribution partners
	- Potential for data residing within Fiserv's DDA base to better inform risk engines (i.e., improved authorization rates and reduced fraud, which is of particular importance in eCommerce acquiring)	- Significant LatAm acquiring opportunity as countries increasingly allow foreign companies to participate in domestic acquiring	- Clover POS distribution enhanced by digital onboarding initiatives in addition to referral partners and a direct website - is expected to contribute meaningfully to revenue synergies	- Leader in P2P enablement for bank customers, via both Popmoney (Fiserv-owned account-to-account P2P capability) and Zelle implementations; acquired CashEdge in 2012 to accelerate P2P capabilities	- Portion of volumes are related to back-end processing only (e.g., PayPal, Stripe, JVs) where yields are lower and pricing considered to be more commoditized	- First Data brought the 3rd largest debit network in the US (STAR), which could be combined with Accel (Fiserv-owned) to form a more formidable competitor for debit volumes (PIN, PINless, and signature)	- Banking technology contracts (core account processing, issuer processing, etc.) tend to come with termination fees (often triggered by consolidation, i.e., ~4% CAGR for depository institutions in the US, although still ~10k+ remain)	- Substantial FCF generation, allowing for both debt pay down and continued M&A (technology assets would be preferred, e.g., Clover-like deals)	- Both legacy Fiserv and First Data business characterized as high fixed-cost, high recurring revenue, high incremental margin businesses (ex-investment for future growth)	- Clover remains one of Fiserv's greatest contributors to growth, and has the opportunity to expand into new verticals or expand its geograhpic presence	- Modern banking core and ancillary technology competitors emerging, with potential to take small portions of incremental share/growth, although de minimis concern near-medium term

Source: Company reports, Credit Suisse research

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GPN	◕	◕	◕	◑	◕	◑	◕	●	◕	◕	◕
	- Large eCommerce & omnichannel business with an emphasis on SMB and multinational merchants	- Substantial majority of its revenue sourced via North America, with meaningful exposure to Canada	- Sizeable (~3.5k person) direct salesforce, including ~3k from Global Payments and another ~500 from TSYS (vs. ~2-2.5k for large competitors FISV and FIS); combined team will enable cross-selling of Global Payments & TSYS merchant offerings	- In the top 3 for number of local/domestic acquiring licenses, which aids in Global Payments' ability to provide reduced interchange (for those on interchange plus pricing) and higher authorization rates for its merchant clients	- Via owned software and integrated payments (integrations into ISV software platforms), Global Payments is more central to the entire business operation, particularly in owned verticals	- Addition of Consumer Solutions (Netspend) provides for new/expanded opportunities in payroll (synergies of PayCard business with existing Global Payments Payroll offerings), as well as other B2B,B2C, & P2P payments	- Owned software approach provides for enhanced price protection, given payments are often delivered as part of a broader business/software solution (i.e., payments pricing can be rolled into software pricing)	- TSYS acquisition done purposefully as an all stock deal to allow for continued flexibility for investment and room for continued M&A; leverage ~2.5x pro-forma (vs. FIS at ~3.5x and FISV at ~3.9x following recent acquisitions)	- Merchant acquiring & issuer processing business both tend to have high incremental margins (ex-investments for growth)	- Acquisition of MineralTree significantly increases the scale of Global Payment's B2B exposure, albeit still a relatively small proportion of total revenue	- Integrated payments could see competitive pressure on ISV commission (revenue share) levels (although GPN has a degree of protection given high levels of service and global reach); software-led is insulated, via software ownership
	- Combination of merchant acquiring & issuer processing business will allow for increased authorization rates, particularly within eCommerce/CNP transactions (i.e., proprietary SCA, known issuer customers transacting)	- Addition of TSYS reduces revenue exposure to the UK, which had been LSD previously, leaving FIS as the most exposed to UK of the scale, incumbent acquirers	- Following the acquisition of TSYS, Global Payments now has customer relationships with over 3.5mm merchants globally	- The combination of issuer (at scale) & acquiring businesses allows for the replication of the benefits of owning a debit network (via technology) without owning a branded network. This allows for "on-us" routing (globally & cross-border)	- Integral to the operations of customers, particularly in owned software verticals (via AdvancedMD, Xenial, SICOM, Heartland Restaurant, ACTIVE, Gaming, education, universities, etc.)	- Xenial/SICOM provide enterprise SaaS for QSR & food service, with front of house POS, mobile ordering, back-office analytics, loyalty, payroll, scheduling, etc.; has 21 of top 40 QSR as clients (e.g., Burger King, Taco Bell, Wendy's)	- Integrated payments pricing (acquiring spreads) tend to be higher (can be ~2x a typical payments business on a like-for-like merchant size basis) given integration into software (ISVs) and primary SMB end customer, albeit with potential pressures on ISV revenue shares	- Future M&A possibilities are open to: 1) horizontal (along the lines of Heartland and TSYS); 2) vertical software (likely share leaders in fragmented markets, with a payments aspect); and 3) geographical expansion	- Global Payments has historically been extremely focused on achieving ongoing cost efficiencies, even beyond those expected as synergies through its numerous acquisitions	- Potential for enhancing the Vital POS & cross-selling it into the Global Payments/Heartland merchants, with ambitions to make the product more attractive than both Square and Clover; and potential to further reduce attrition	- eCommerce competitors are also focused on expanding local presence (Adyen pursuing mid-market, Stripe expanded domestic acceptance with plans to expand further, Worldpay-FIS working on geo-expansion)
	- Have capabilities in hard-to-serve markets (e.g., Taiwan, Singapore, Malaysia, Brazil, China, etc.) where competitors in RFP processes are either more limited to just 1-2 players (likely Worldpay and Adyen) and/or local acquirers	- Leadership position in issuer processing (particuarly credit issuer processing) in key markets outside the US (e.g., # 1 share in Canada, UK, Ireland, China, # 2 share in Western Europe)	- Global Payments previously had 500+ global financial institution relationships (largely in the form of merchant referrals), while TSYS more than doubles this with an additional 800+ (largely in the form of issuer processing)	- Netspend is a pioneer of prepaid and the 2nd largest US prepaid program manager. We expect Netspend to launch outside the US in late 2020, with added growth from new products (e.g., DDA, loyalty, co-brands, virtual accounts)	- Global Payments has benefited from attrition rates that have generally been at the low end of industry range (~10% overall, and at the industry low in the US vs. industry averages more in the ~10-20%+ range)	- Partner with 60+ lenders (connected via APIs) to provide merchant cash advance offerings to merchants (functioning similar to offerings from Square Capital, PayPal Credit, etc.); lending is not on balance sheet (i.e., no credit risk)	- Contactless card rollout in the US (beginning in 2H 2019, into 2020-2021) represents a meaningful revenue opportunity (i.e., ~640mm+ accounts on file, ~50% of issuer business in the US, ~$3-5 per contactless card)	- Successfully integrated 3 vertical software acquisitions in 2017-2018 (ACTIVE Network September 2017, AdvancedMD & SICOM September 2018), increasing the mix toward technology-enabled vs. relationship-based	-Increasing exposure to SaaS/software-based revenue (faster growth, higher margin, M&A focus) produces mix-shift based margin expansion, albeit with a preference to re-invest upside into future growth vs. all flowing into margin expansion	-Increased issuer processing clients via Global Payments' FI relationships; management noted early interest from bank partners, likely ex-US (given Global Payments uses bank partners in parts of Europe, Canada, & Asia)	- Local operating presence in ~38 countries necessitates additional oversight, compliance, and regulatory knowledge/costs vs. more focused providers

Source: Company reports, Credit Suisse estimates

	Growth & Share Gains			Differentiation				Financial		Additional Factors	
	eCommerce & Software exposure	Geographic Mix & Scale	Partnerships & Distribution	Product & Innovation	Proximity to Customer	Additional Services	Pricing Power	Benefitting from M&A/Cash	Operating Leverage	Emerging Areas of Upside	Threats (Competitive, Regulatory)
AFRM	●	◔	◑	◕	◕	◕	◑	◕	◕	◕	◕
	- The overwhelming majority of Affirm's volume is processed online through either the integrated checkout or Split Pay products or with an Affirm-issued virtual card	- Affirm's volume is predominantly from the US; however, with the acquisition of PayBright Affirm has grown it's exposure to Canada	- Merchants that have integrated Affirm serve as an organic customer acquisition and distribution system with flywheel effects (merchants offer Affirm as a payment method, customers begin to request other merchants offer Affirm as a payment method)	- Affirm's integrated checkout platform enables merchants to offer both 0% APR and interest-bearing loans to consumers across nearly any transaction size, in-store or online, and simplicity allows users to sign up in minutes and get a credit decision	- Affirm is featured on the payments pages of merchants with which it has integrated as well as in some cases on product pages to entice consumers with offerings of 0% APR or low interest rate installment loans for purchases	- Affirm introduced a savings account with 0.65% APY to Affirm consumers as a method of increasing user engagement with the Affirm app, in-line with the road map for most neobanks - getting money onto their platform to drive down processing costs	- Affirm is able to charge a signficantly higher take rate than standard card interchange due to the credit risk assumed as well as the more differentiated ability to offer longer duration loans	- Recent acquisition of PayBright adds ~$200mm+ incremental annualized GMV in the Canadian market with additional new merchant relationships in Canada	- We forecast operating leverage from FY21 to FY23 in each of the three operating expense lines not directly tied to transactions: tech & data analytics , sales & marketing, and G&A	- Affirm's exclusive integration and partnership with Shopify for Shop Pay Installments presents a large and lucrative opportunity, with medium-term expectations to reach 10% checkout share	- In the US, Affirm is facing significant competition from existing BNPL providers (Klarna, Afterpay) and new entrants (PayPal), particularly in low AOV transactions that require a simpler credit decisioning process
	- At first glance, the most common use case for eCommerce payments is retail (where Affirm is concentrated), but has numerous other use cases such as online travel, online event ticketing, home services, telehealth and more	- We expect that Affirm will expand internationally over time, largely driven by existing customer demand, with Peloton being the primary force in dictating which international markets will be addressed first	- The Affirm marketplace generates 30%+ of the company's transactions, and the company's app receives millions of downloads each quarter	- Affirm's Virtual Card product enables Affirm to offer single-use virtual cards for consumers to use at merchants to run the payments over Visa rails but still provide the consumer with an installment loan payment structure	- Affirm's merchant partnership approach provides Affirm with exposure to the merchant's customers but also provides merchants with access to Affirm's sizeable active consumer base, including through Affirm's marketplace	- in 2019 AFRM launched its marketplaces mobile application, a consumer-facing app which consolidates and advertises merchants, and customizes a landing page and offers based on a consumer's preferences and transaction history	- We believe pricing on low AOV, short-duration transactions will become commoditized over time; however, we believe pricing on high AOV, long-duration transactions will be dictated by success in credit decisioning and risk management	- Affirm's sizeable cash balance post-IPO enables the company to do large-scale M&A in the BNPL space, likely with an emphasis on international expansion	- The company guides to a long-term sustainable contribution profit take rate of ~3% due to pricing competition over the medium- to long-term	- We expect Affirm to expand globally in the coming years, growing the company's TAM, in addition to organic TAM growth (nascent BNPL market with LSD penetration globally)	- As Affirm expands internationally, the company will face intense pressure from BNPL providers that have already established merchant relationships in the country, as we believe that there is a significant degree of first mover advantage in the BNPL market
	- While Affirm has high exposure to eCommerce channels, it is relatively early stages for BNPL generally at the POS, the primary use case is tapping a mobile phone enabled virtual card for a pre-approved ~$250 or less purchase	- Industry experts believe that it can take ~2 years to successfully enter new markets organically, which we believe makes it likely that Affirm will complement its global expansion efforts with international M&A to quickly gain scale and licenses in new markets	- Partnership with Shopify on Shop Pay Installments gives Affirm exposure to Shopify's merchant base that utilizes Shop Pay, initially benefitting Affirm's low AOV transaction growth and eventually expanding to high AOV transactions	AFRM has a very robust credit underwriting machine learning model and a proprietary credit scoring metric (ITACs) contributing to industry low charge offs, with a decent amount of longer tenor loans (i.e., PTON 39m), despite $0 late payment fees	- Management has stated that the company's product pipeline is focused on products that will enhance user engagement to increase the number of average transactions per user, likely indicating additional app features	- AFRM, which has a different hook (BNPL) than most neobanks (i.e., P2P, card, etc.), with very low CAC, it will likely add to its app offering; Also, given deep merchant relationships, AFRM has potential to build out further merchant centric services	- Affirm can negotiate pricing with merchants on two fronts: interest rates offered to customers and MDRs (i.e., Affirm can offer lower interest rates to consumers for a higher MDR and vice versa)	- Over time AFRM expects to mix shift towards lower AOV transactions, which benefits cash; as average tenor decreases, AFRM is able to turn its funding sources over much faster, and also takes lesser credit risk (for the loans remaignig on B/S)	- Additional operating leverage could come from better negotiated funding arrangement with lower costs of funding as well as the potential for better credit loss provisions as risk management improves with greater customer data	- Low AOV transactions are expected to grow as Split Pay is made available for more merchants, Shop Pay Installments grows, Affirm increases user engagement, and additional merchants are added to the platform	- Affirm depends on its relationships with bank partners (Cross River Bank and Celtic Bank) to originate customer loans, with the partner banks generally requiring risk management changes and new products to gain various levels of bank approval

Source: Company reports, Credit Suisse research

	Growth & Share Gains			Differentiation				Financial		Additional Factors	
	eCommerce & Software exposure	Geographic Mix & Scale	Partnerships & Distribution	Product & Innovation	Proximity to Customer	Additional Services	Pricing Power	Benefitting from M&A/Cash	Operating Leverage	Emerging Areas of Upside	Threats (Competitive, Regulatory)
RKT											
	- Other mortgage companies outsource the technology platforms that are needed to effectively underwrite and write mortgages, RKT developed tech in-house, creating more efficient and seamless processing and closing times	- RKT's business is largely US-focused. It is the largest mortgage originator in the US, yet with only 9% market share, its scale and platform positions the company to continue to take share from smaller less tech-enabled competitors	- The rapidly scaling Rocket Professional network (a B2B origination app on the Rocket platform) allows RKT to leverage "influencers" or individuals involved in or referring clients to home purchase, but are not lenders (i.e. real estate agents)	- RKT technology platform is best in class, and has led to the highest recapture rates in the industry - customers are retained in the RKT system through multiple mortgage refinancings, as well as other ancillary services (auto, consumer lending).	- RKT owns retail customer relationships, as the majority of origination occurs through RKT's DTC channel, which also has higher GOS margin. RKT has more DTC exposure than other peer mortgage platforms which we view as a positive	- Outside of the core mortgage platform, RKT also runs a capital-light business in auto and personal loan area. The company helps facilitate the use of used cars and originates personal loans which are then sold to investors	- The current spread between primary and secondary mortgage rates is 50 bps wider than LT averages, leading to full origination pipelines and robust margins as refinancing demand remains high	- Leverage on both a gross and net basis sits below 1.0x, using warehouse facilities with an average maturity of < 1 month to fund the majority of originations	- With a large fixed cost base (primarily marketing, SG&A), generating operating leverage, benefitting from centralized operations ("assembly line" for mortgages)	- Rocket Auto is a fast growth business that is expected to outgrow the rest of RKT's business in the years to come. This business still has a lot of upsides given RKT currently only has single digit bps share in the market	- Fluctuations in mortgage market - mortgage volumes are very sensitive to interest rate movements, which affect refinance activity and volumes. A large increase in lending rates could lower refinance volumes significantly.
	- Rocket Mortgage has a long history of online innovation, pivoting from its 24 in-person branches in 1999, to create Rockloans.com for online mortgage applications, and again pioneering innovation by creating Rocket Mortgage in 2016 (and associated mobile app)	- RKT is also expanding in Canada ($400 Bn market) through its 2 mortgage start-ups Lendesk & Edison. These aim to provide loan origination platform for lenders. RKT could use its technology to serve the Canada market which is less tech-enabled	- RKT marketing partners (i.e. Intuit, Charles Schwab, American Express) where their website, brands, and advisors push potential borrowers through to the Rocket platform; This portion of the partner platform has been around since the early 2010s	- RKT has been a pioneer in the mortgage industry, embracing technology and a specialized origination process (vs legacy one-person-does-everything). This has helped the company achieve scale, win market share and establish itself as a top brand for consumers	- Owning the customer relationship allows RKT to cross-sell other financial products to its core mortgage customers. Combined with best in class technology, this also allows RKT to have higher recapture rate	- Rocket Auto is expected to outgrow the core business in the years to come, driven by currently low penetration in the auto market. Rocket Loans would also benefit from the fast growing yet underpenetrating personal loan industry	- As refinance pipeline works through the system, margins should compress somewhat as originators lower mortgage rates in order to spark additional volume. RKT's scale and cost to originate positions them to generate attractive returns even with lower margins	- Completed various acquisitions in the last 5 years extended or complementing existing business lines, such as Core Digital Media (marketing), LowerMyBills.com, ForSaleByOwner, Lendesk and Edison (Canada mortgages)	- When volumes scale (i.e. rapid uptick in ReFi), SG&A does not necessarily ramp with the same velocity given the siloed origination functions allow a limited corresponding increase in salaries & benefits	- Additional new products could be launched on the Rocket Platform in order to bolster the platform's image as a one-stop shop for customers' financial needs	- The unhedged MSR portfolio is subject to mark-to-market adjustments that could negatively impact GAAP earnings and book value during periods of interest rate volatility.
	- Rocket has been working for years to take a historically paper-based business and digitize it, the company was the first major independent online mortgage originator	- The company has been able to centralize mortgage operations allowing it to scale across the US, utilizing a mortgage "assembly line" instead of the traditional mortgage officer structure which limits the number of loans processed	- RKT primarily distributes loans through the retail channel (100% direct), while its competition most frequently originates through the correspondent channel (committing to purchases off of 3rd parties)	- RKT has enabled a speedy closing process (with a rate lock in as little as ~15 mins) driven by ingenuity such as integrations with banks to pull financial information, integrations with credit scoring applications, etc.	- RKT originates through the Partner network. with lower GOS than DTC, but is ramping fast, and the opportunity is still nascent with RKT penetrating its influencer networks	- The goal of having additional products to the RKT platform is to reinforce the value of the platform to consumers as a one-stop shop for financial products, which would allow for cross-selling given RKT's technical capabilities	- While the level of interest rates determines ultimate pricing power for RKT, its funding source (secondary MBS market) is the second largest fixed income market in the world, and gives RKT certainty of execution and funding.	- The company has plenty of capacity for incremental M&A, and also would consider product extensions or the potential to accelerate geographic expansion	- Marketing makes up ~$1b in expense (~20% of 2020 total), and could be scaled back to further expand margins (either on the variable or fixed portion)	- Leveraging its success in the U.S., RKT is expanding in the mortgage market in Canada ($400 Bn TAM). As the Canada market is less tech-driven, RKT has the advantage to leverage its technology and experience in the US to drive efficiency in Canada	- Any disruption in the US economy could adversely affect the mortgage market as unemployment and other macro factors are tied to originations. Additionally, government programs created as a response to any widespread disruption could affect business.

	Growth & Share Gains			Differentiation				Financial		Additional Factors	
	eCommerce & Software exposure	Geographic Mix & Scale	Partnerships & Distribution	Product & Innovation	Proximity to Customer	Additional Services	Pricing Power	Benefitting from M&A/Cash	Operating Leverage	Emerging Areas of Upside	Threats (Competitive, Regulatory)
FLT	◔	◕	◕	◕	◕	◑	◕	●	◕	◕	◕
	- Roughly 40-50% of sales come via or are originated from a digital channel (vs. 10 years ago 100% was via a direct salesforce); digital provides leads to salesforce	- The US makes up ~60% of revenue, with Brazil (~15%) and UK (~10%) the next largest exposures; Brazilian business is the Tolls segment (and "Beyond Toll")	- FleetCor's best-in-class distribution (SMB segment) is a key differentiator, helping the company build and scale new businesses, driving its 19% revenue CAGR from 2010-2020 despite covid (22% 2010-2019)	- Beyond Fuel expands the use case of a traditional fuel card (e.g., supplies, maintenance, materials, etc.), while still providing analytics, cost controls, etc.	- Owning the network (closed loop) makes for direct contracting and relationships with accepting merchants (e.g., fuel stations, supply shops, etc.)	- Across all business units, a common theme, regardless of payment method or type, is to add software/services that help the client control spend, reporting, compliance, analytics, etc.	- Relatively high-degree of pricing power by serving SMBs with limited pricing leverage in niche payments markets (e.g., core Fuel segment >50% smaller fleets)	- FleetCor has acquired ~80+ companies since 2002, having shaped FleetCor into the diversified B2B payments company it is today	-Fixed costs make up about 60% of the cost structure (when including corporate costs)	- Beyond fuel initiative in the US, combining FLT's new SMB bill pay platform (Roger) with its fuel card UI used by ~100k clients in the US to bolster cross-selling	- Long-tailed risk related to Electronic Vehicles (EV), although one where FLT could adapt and/or provide management services across mixed fleets (consolidating spend, reporting, analytics, etc.)
	- eCommerce enabled booking of hotels within the Lodging segment (recently refreshed the brand and mobile experience), with total segment contributing ~7-8% of revenue	- High relative exposure to fast growing, underpenetrated international fuel card markets compared to WEX	- Partnerships core to strategy, with emphasis on expanding the corporate payments business (e.g., AvidXchange, Bill.com), cross-selling opportunities, and geographic expansion (e.g., oil outsourcing portfolios)	- Built a differentiated corporate payments over ~7 years with an unmatched, comprehensive suite of products (domestic and international AP/AR) on all major payment rails	- Sem Parar tags are attached to automobile and essentially "on" whenever the car is in transit (for use at gas stations, parking lots, McDonald's and soon-to-be other fast-food outlets)	Beyond Fuel increases client wallet share from existing fleet customers by capturing spend in new areas related to business expenses (e.g., supplies, maintenance, materials, etc.)	- Owning the network (closed loop) means FleetCor is not subject to V/MA rules, and allows for their own contracts and terms with merchants (vs. taking interchange levels set by V/MA)	- Strategy focus M&A around tuck-in acquisitions, new categories of spend, and additional geographies (aim is to deploy $1b per year in M&A, further penetrating existing markets or entering new ones)	- Inherently higher fixed cost structure allows for continued margin expansion, although somewhat tempered by consistent M&A integration and re-investment for organic growth	- Beyond toll initiatives in Brazil (car rental, fast food, parking, gas stations), leveraging installed base of 5mm tag holders, and building the network effect/utility for existing tag holders and merchants	- Credit risk exists, but is minimal (i.e., bad debt runs in the 6-7bps of billed revenue); As purchasing capabilities expand in the core fuel card business ("beyond fuel"), focus is on existing customers where they are comfortable with creditworthiness
	- In FleetCor's full AP automation efforts, the digital channel is used to drive traffic and set up appointments rather than closing deals	- One of the largest virtual card processors in the US on Mastercard's platform provides scale for the corporate payments business	- Operates as the partner (card processor) with many customers in Corporate Payments, although goes direct to merchants via Nvoicepay (full AP automation software); creates a degree of optical channel conflict	- Beyond Tolls, scaling a new vehicle tag-based payments network in Brazil with new use cases (fast-food, parking, fuel, car rentals, and car wash) with quick consumer adoption and partner interest to participate (e.g., McDonald's approached FLT)	- FleetCor's direct (and indirect) relationships with customers across all business units affords its best-in-class distribution capabilities	- Beyond toll initiatives in Brazil (car rental, fast food, parking, gas stations), leveraging installed base of 5mm tag holders, and building the network effect/utility for existing tag holders and merchants	- Purchasing power within lodging segment allows for hotel discounts for members of the network, further bolstered by Traveliance and ALE Solutions	- Low leverage of 2.6x (Q2 2021), combined with high FCF generation of ~$1b+ per year and ~$2.5b in liquidity provides the company with ample capital to continue its accretive M&A strategy	- The natural ~200-300bps of margin expansion with ~10% organic revenue growth can be higher or lower depending on M&A (i.e., integration costs and/or lower margins initially vs. synergies & increasing margins LT)	- Addition of Nvoicepay opens the door for a full-service, full AP file corporate payments business, encompassing all payments types (virtual card, ACH, check, cross-border, etc.) via a cloud-based platform	- Two revenue sources are sensitive to fuel prices summing to ~11% of revenue, discount revenue related to fuel and revenue tied to fuel spreads

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LSPD	◕	◕	◑	◑	◕	◕	◕	●	◕	◕	◔
	- Lightspeed's core product offering is its cloud-based POS software integrated with an assortment of payment providers and its own PayFac service (Lightspeed Payments) which was rolled out in early 2019 and has since been gaining share of the company's GTV	- >50% of locations are in North America with the remaining locations in Europe and the rest of the world	- Lightspeed offers numerous third-party integrations for retail merchants and restaurants to help businesses manage employee scheduling, accounting, marketing, customer service, appointments, etc.	- Lightspeed's core product offering consists of its verticalized POS software platform built for retailers, restaurants, and golf establishments, built as a fully cloud-based product with greater access to real-time data and functionality not offered by legacy POS solutions	- POS platform used by >150k customer locations (as of mid 2021), with an added touchpoint for merchants that also use Lightspeed Payments	- In addition to Payments, Lightspeed has introduced Lightspeed Capital for US retailers to help SMBs gain access to financing (up to $50,000 per location)	- Cloud-based modern POS providers that offer integrated payments tend to offer a flat rack rate for Payments with relatively limited ability for merchants to negotiate on payments pricing	- Acquisitions of Ecwid and NuORDER accelerates the next stage of Lightspeed's development to become the provider of choice in any channel within its key verticals, and to further its move into for supplier solutions	- Significant operating leverage in the business model, with LT adjusted EBITDA margin outlook fo ~25% from negative ~(10%) in FY 2021.	- Lightspeed Payments penetration of total GTV currently just over ~10%, leaving ample opportunity for further penetration of the PayFac offering (LT target of ~50%)	- Alternative modern, cloud-based restaurant POS options in the full-service restaurant space (TouchBistro, Brink, etc.) are highly competitive
	- Normalized retail GTV ex-COVID expected to be 85-90% in-store GTV and 10-15% eCommerce GTV, with restaurant eComm currently at a minimal level given recent launch of restaurant eComm platform in August 2020	- Lightspeed Payments is currently available in US, Canada, and Europe, with plans to roll it out to APAC region in the near future	- The majority of Lightspeed's business is acquired through the direct sales channel, although the company utilizes partner relationships with companies such as Specialized (bikes) and Anheuser-Busch to gain referrals as well as indirect sales through resellers	- Lightspeed Payments is the company's PayFac offering with better economics than other ISV relationships, and the company has begun to expand beyond Payments with Lightspeed Capital, Subscriptions, and talks of payout and issuing services in the future	- Lightspeed Payments and additional modules (eComm, accounting, loyalty, analytics) offer numerous cross-sell opportunities	- eCommerce solution can be used to help construct an eCommerce store for retailers, and in August an eComm offering was added for restaurants to help build out online ordering optionality	- Offer incentives to adopt Lightspeed Payments (which often charges a higher MDR than other payment processing options) such as reduced hardware costs and lower SaaS fees for POS software	- Lightspeed has remained in a net cash position, leaving ample room for further M&A activity, along with possibility of stock and/or cash & stock transactions	- Due to lower gross margin yet higher growth of Lightspeed Payments revenue (reported on a gross basis), we see companywide gross margin decline	- Looking beyond payments to other monetizable financial services including financing (Lightspeed Capital), subscriptions (Lightspeed Subscriptions), and possible future opportunities such as card issuing, payouts, and treasury/bank services.	- Legacy retail POS systems (NCR, JWI, RDS, IBM) remain dominant given the greater number of ERP system integrations that are available for the legacy systems, which aren't available for the cloud-based systems
	- LSPD has been expanding its omnichannel capabilities and begun to see online-only merchants signing up for its solutions, even before the Ecwid acquisition which significantly strengthened its eCommerce offerings	- Recent acquisition of iKentoo, Kounta, Gastrofix, and Vend have expanded the company's presence in Europe and Australia, while also providing further opportunity for Payments penetration	- Direct sales force focuses on North America, Europe, and Australia, and is supplemented by indirect sales channels (resellers) that support sales in other countries across the globe	- With capabilities including loyalty, analytics, and eComm, Lightspeed solutions are optimally suited for mid-sized merchants with relatively more complex inventory management needs, a large number of SKUs, or the need to manage restaurant orders	- With direct sales being the primary channel for new business, nearly all relationships are directly through Lightspeed, with the company managing customer relationships and handling customer service for all of their products	- Lightspeed's platform allows users to choose up to six modules available (POS, Payments, eCommerce, Accounting, Loyalty, and Analytics), addressing the complexities in the merchants' specific business needs while also providing flexibility	- Larger merchants with higher volumes tend to use other payment providers that offer more competitive, variable MDRs depending on the level of payment volumes, and may thus be able to negotiate lower than standard rates if they choose Lightspeed Payments	- Since IPO in early 2019, Lightspeed has made numerous acquisitions, a key driver of growth in its GTV, customer locations, and revenue as well as capacity expansion	- Lightspeed targets a ~3-4x LTV:CAC ratio	- Lightspeed seeks to enter new industry verticals through potential acquisitions, which could further expand its TAM; e.g. its 2019 acquisition of Chronogolf added a niche vertical in golf course management with a ~$100b TAM	- Lightspeed expects more consolidation in the fragmented market and seeks to be an active consolidator itself, with recent acquisitions having bolstered its footprint in the US, Europe, and Australia

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	eCommerce & Software exposure	Geographic Mix & Scale	Partnerships & Distribution	Product & Innovation	Proximity to Customer	Additional Services	Pricing Power	Benefitting from M&A/Cash	Operating Leverage	Emerging Areas of Upside	Threats (Competitive, Regulatory)
NVEI	◕	◕	◕	◑	◕	◑	◕	◑	◑	◑	◕
	- 85%+ of NVEI's volume is exposed to higher growth eCommerce / Card Not Present end markets, with a significant portion acquired via SafeCharge in 2018 (regulated online gaming, regulated financial services, tech & business services, travel, retail, etc.)	- Originally a primarily North America business, the acquisition of SafeCharge expanded NVEI into Europe and other geos; Nuvei's volume mix is roughly 50/50 North America/ Europe, with limited contribution from LatAm and APAC	- ~1/3 of the company's volumes come via its partner channel, which include relationships with ISOs, ISVs, VARs, and marketplaces, where NVEI earns on average a revenue share of ~50-60% (towards the higher end of the industry range of 25-75%)	- Using its Smart Routing technology, NVEI will (using algorithms) if authorization is declined, will then re-route to the next highest-probability acquirer; NVEI also has partial authorization, in which it will suggest a smaller approved amount	- NVEI's direct sales channel generates ~2/3 of volumes, and is expected to grow ~40% in the next few years as it plans to ramp this channel; Direct sales also means local support, in local languages, and in certain jurisdictions local acquiring	- NVEI supports global pay-outs (often a service requiring multiple partners to complete a transaction), which can be done globally in 150+ currencies nearly instantaneously - this service is used in its online gaming business	- NVEI reports a high take rate relative to the industry average given its exposure to high risk verticals that face less price competition, as well as support from Nuvei's sale of value-added services	- NVEI completed (and integrated) a transformative acquisition of SafeCharge in 2019 - an EU based eCommerce payments processor which materially expanded its eComm/CNP mix	- Over time we expect the potential to take back-end settlement and clearing in-house (and limit usage of partner TSYS) could provide leverage in the COGS contributing a ~30-40% decline in back-end processing costs (typically ~1/4 of COGS in industry)	- Growth opportunity in US online gaming as Nuvei is one of the few payments providers that is actively competing in the space	- For payments, the EU is often viewed as very fragmented market - with many APMs, local schemes, and complexities; thanks to the SafeCharge acquisition, NVEI already has many integrations and licenses that would have needed to be built or acquired
	- NVEI's payments engine can be fully integrated into merchant software applications through a single integration, and NVEI partners with a variety of ISVs, VARs, and PayFacs that integrate NVEI's solutions directly into their software or mobile applications	- LATAM presents a large, nascent market opportunity, and NVEI is increasing its presence in the region through the addition of popular local APMs (50%+ of transactions done through APMs) and hiring of a general manager to oversee the market	- With an already strong foothold in European large enterprises, NVEI is leveraging its partnerships and indirect sales channels to gain greater access to SMBs in Europe and replicate the partner model in North America that has successfully addressed SMBs	- With Cashier, merchants can embed a two-way payments page that is fully customizable and localized to provide payment acceptance and withdrawal functionality, particularly useful for the online gaming and FX verticals	- NVEI offers tailored and modular solutions that are sold to customers as customized packages that address merchant-specific needs with sales engineers focused on providing the "right" solution rather than a one-size-fits-all end-to-end product	- To maximize sales conversion, NVEI offers partial approval, enabling approval of partial transaction amounts, and decline recovery, encouraging users to try a different payment method, amount, or speak with customer support rather than cancel the transaction	- As NVEI ramps up its direct sales channel and increases focus on large enterprises, this will create downward pressure on the total take rate	- NVEI is focused on deals that are accretive to earnings with "meaningful" synergies that would expand the company's service offerings and global footprint	- Shifting sales channel emphasis to direct sales should result in reduced commissions expense as a percentage of total volumes	- Nuvei has been rapidly expanding its local acquiring capabilities, both organically and through acquisitions, which is increasingly making Nuvei a competitive international player outside of its core markets	- eCommerce is widely considered one of the more complicated verticals to do payments processing for, given the multitude of fraud, security, etc. controls required by merchants, and the complexity associated with the front-end (i.e., gateway)
	- A portion of NVEI's "eCommerce" exposure is more appropriately classified as Card-Not-Present, given it is not traditional retail or spending-based relationships; examples include regulated financial services and online gambling, which make up ~30-35% of volumes	- Less focus is currently placed on APAC, though the company views it as a nascent opportunity; NVEI has offices in China and Singapore with direct acquiring capabilities in Hong Kong and Singapore and local acquiring partners in select markets	- NVEI has established strategic platform partnerships (software partners, marketplaces, etc.) to help facilitate partners' growth and address complex payments needs by offering highly customized solutions, with partners acting as lead generators / referral sources	- Cognizant of stricter security and risk management needs, NVEI developed Smart 3DS, an acquirer-agnostic solution to help merchant compliance with PSD2 and 3D Secure 2, while reducing fraud but maintaining high authorization rates	- NVEI's single integration, full stack product suite with global reach allows the company to provide comprehensive solutions to customers that would normally require 5-7 contracts and integrations	- With NVEI's PayLink solution, merchants can accept payments by generating a QR code for the payments page, enabling payments to be made on smart devices without an online store of a physical POS terminal	- NVEI has an extensive suite of Value-Added Services (i.e., dynamic FX conversion, Cashier & Checkout, Tokenization, KYC & AML, etc.) which it monetizes on an a la carte basis; upside to take rates exists via upselling existing customers to these services	- Targeting leverage of 2-3x as the "sweet spot" indicates ample balance sheet capacity for M&A which has historically been the main capital allocation priority for the business	- Employee compensation has operating leverage relating to administrative, finance, and other non-sales personnel, with a large portion being more fixed cost in nature	- NVEI has stated that a portion of its growth algorithm would be attributable to product innovation, including additional Value-Added Services, which in the past included Global Pay-out, decline recovery, localized payments, and Smart 3DS	- Payments is a highly competitive industry benefitting scale, facilitating ability to offer better and reinvestment to fund more innovation, while NVEI has moderate scale, its ability to provide customized solutions and complex vertical expertise, gives it an advantage

Source: Company reports, Credit Suisse research

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SOFI	◐	◐	◐	●	◕	◕	◐	◐	◐	◐	◐
	- Galileo offers a turnkey debit card issuer offering, lending offerings and wealth management products as well. They provide APIs to enable software developers to build credit, prepaid cards, virtual cards, investing and cryptocurrencies to banks (mostly Neobanks)	- Predominantly U.S.-based and target customers in the top 2/3rds of the country. Contrast this with many U.S. neo-banks who target customers in lower income strata (often adversely impacted by bank overdraft fees).	- SoFi relies on financial infrastructure providers such as Plaid as well as loans servicers (Mohela for student) to collect loan payments. Outside service providers helped them launch several new products in 2019 and 2020 without building out full infrastructure	- Wide portfolio of products with mortgage, student loans, personal loans, credit cards, a debit account, investing accounts and more products and services coming. Contrast this with most challenger banks which currently offer a debit account and a secured credit card	- SoFi has placed focus on daily usage products (money, mobile app, invest), app logins and usage (incentivized with SoFi points), 50,000 member Facebook group, social media following, and content operation	- SoFi offers a unique set of benefits for members. They provide premier social events for members, career coaching from Korn Ferry, financial planning with a CFPB, online estate planning, and Edmit plus (admissions and pricing data for colleges)	- SoFi's pending bank license application could enable it to more competitively price its financial services (cost savings from funding loans with deposits), including offering high yield savings accounts, no fee ETFs (already an offering), or marketing promotions to acquire users	- SoFi has expressed an interest in clearing their own stock trades as they grow. We believe this would likely reduce ongoing operating expenses enabling them to increase product offerings within SoFi Invest. SoFi previously held a ~16% stake in Apex clearing, who they still partner with	- We believe that compensation for SoFi's employee base will also create operating leverage as their employee count reflects recently built infrastructure (Money, Invest, ETFs, credit card). Many of these products utilize a shared infrastructure	- SoFi has and will continue to look at additional loan products, including auto, insurance, practice loans for healthcare professionals. We also think they might consider new credit cards after their inaugural issue, incorporating the idea of frequent use products	- Digital banking is a a very competitive market, given relatively low barriers to entry (i.e., costs mostly headcount but limited physical overhead), and the ability of FinTechs to partner with existing participants to ramp quickly, which attracts many entrants to the space
	- SoFi is a mobile banking application (and has been web-based since its founding in 2011, focused on Student Loan Refis), and has had ~2.6mm downloads since its current mobile application launch in 2017	- SoFi recently purchased an online stock brokerage in Hong Kong and has noted that they have looked at geographic expansion. They were previously U.S. focused but are considering international expansion as they review opportunities	- SoFi's main distribution methods come from their mobile app, digital advertising (search, social, Youtube), social media, and direct mail. We think their branding and marketing better resonates with gen Z and millennials than messaging from traditional banks	- SoFi's second major selling point is their fully integrated app where one can seamlessly apply for and be approved for almost all of their financial products. Contrast this with the mobile apps of money-center banks where one cannot access all of their products	- SoFi plans to grow its customers with multiple products offerings (Money, Invest, Relay, Credit Card, Student Loans, Personal Loans, etc.), implementing their cross-buy strategy (selling to existing customers) which is supportive of lower unit level CAC (for those customers)	- Another element of SoFi is their content offering in the mobile app. They host a daily podcast and publish numerous articles which help them place high in search results, allowing for organic loan acquisitions. Their content increases app logins which makes cross buy easier	- Committed to offering attractive interest rates and competitive pricing on Invest products. The goal is to drive user acquisition. We think it will be a long time until they exercise pricing power in lending, Investing and Money, but could come eventually down the line	- Global M&A. SoFi recently purchased an online stock broker in Hong Kong, indicating that they are considering global expansion. Galileo has also begun its expansion ex-US (into Latin America) and could acquire a company to bolster its expansion plans	- We believe that SoFi will generate operating leverage as they grow into their large marketing apparatus. This consists of SoFi stadium, a material social media presence, diversified and experimental online ad copy, and significant experience marketing	- SoFi Invest is likely to add additional products including margin and options. We are also interested in how successful they will be in attracting new asset management customers with large signing bonuses, which they have begun to do.	- The CFPB will remain a factor for SoFi, given exposure to student lending and personal loans but also expansion in credit cards (not high risk at the CFPB) and mortgages; however, their higher end customer base puts them less at risk.
	- We think that SoFi Invest is benefiting from the trend of millennials and gen Z trading stocks in large numbers, brought by Robinhood's popular free trading. Robinhood grew members from 3mm to 13mm in 2020 compared to 67mm individuals in Gen Z.	- Galileo has begun to make in-roads within Latin America, including an initial expansion to Mexico, where it counts Klar (a consumer Neobank) as a client; we expect Galileo to invest further in growing its business in Latam	- Channels of distribution for SoFi include a direct channel (such as direct marketing via social media, online advertising, etc.), but also markets via affiliate marketing; while Galileo is distributed via more traditional sales channels (sales force) given its business oriented customer base	- SoFi desires to be a "one stop shop" for financial services, something they believed was lacking amongst their digital competition; and they offer a full suite of products/services seamlessly integrated into a single app.	- Cross buy of certain products is quite high, with Home Loans a clear bright spot, ~70%+ of the products being cross-bought in multiple quarters. SoFi is working to increase cross-buy of other profitable lending products, via leveraging their growing Financial Services base	- Lantern is an alternative credit marketplace for individuals who do not qualify for SoFi's suite of lending products (i.e., FICO score too low), for which SoFi earns lead generation fees for each loan originated; revenues are categorized into the Financial Services segment	- Galileo should command strong pricing power over time as it provides essential infrastructure for entire companies. We would expect them to gradually raise prices as they become more relevant to clients and clients become more profitable	Acquiring Golden Pacific Bancorp for only $22mm to expedite their plan to obtain a national bank license - which during the roadshow process they estimated was the approximate cost to obtain one organically	- More operating leverage is likely to come from Galileo as existing customers utilize more of Galileo's products and services. There is some operating leverage in Money and Invest as a greater number of accounts are spread over a mature technology platform.	- SoFi Money - we think SoFi could target a premium monthly subscription service that supplies members perks such as lower interest rates, cash back on debit purchases, premium member events, special partner discounts, etc.	- As the FinTech API ecosystem grows it will become easier to build greenfield digital banks. These will inevitably compete with SoFi. Many neo-banks create a debit product with only 25-40 employees.

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WU	◐	◕	◕	◔	◐	◐	◐	◔	◐	◐	◐
	- Online platform (westernunion.com) economics (currently) similar to retail at the gross profit level, but lower overall due to marketing, technology infrastructure (although there should be tech cost leverage over time)	- 200 plus countries/territories, ~1/3 of which have outbound capabilities, serving 20k distinct corridors overall, a near ubiquitous operation	- Amazon partnership in certain EM countries will allow customers that normally would not have access to Amazon due to the currency they transact in, or the country they live in, to pay local currency via WU retail locations	- Ability to expand further into offering platform capabilities (leveraging scale, compliance, licenses, local knowledge, etc.), serving as a cross-border arm for many 3rd party platforms	- ~70%+ exclusive agent locations (e.g., US, Eastern Europe, but not regions like Middle East and Russia), with agent locations in 200+ countries	- White-labeling of the platform (leverage of fixed cost, compliance, licenses, knowledge, etc.). Western Union does not intend to pursue becoming a bank itself, but partnering with banks (albeit with reduced/shared economics) can provides access to an expanded TAM	- Pricing pressures vary by corridor - and given WU's breadth, there will always be corridors with pricing power (i.e., where WU is one of just a few providers) and others that are more competitive (where consumers are migrating to online - e.g., AsiaPac)	- Leverage and cash position sufficient for tuck-in acquisitions or potential to take on additional debt for a larger deal	- Scaled platform with EBITDA margins ~25% vs mid-high teens for Ria & Intermex, although with a relatively high fixed cost structure (~40% fixed in nature), WU would see margin expansion on ~MSD revenue growth (vs. flat to LSD in recent past)	- We believe Western Union has ample opportunity for additional integrations/ partnerships with FinTechs, further leveraging its platform (fixed costs) and its ubiquity on a global basis (e.g. Sberbank, STC)	- Competitive industry, particularly with smaller players tending to be more willing to discount, select incumbents gaining share on a regional basis (i.e., Intermex in Mexico now second to WU), and FinTechs offering disruptive tech & pricing
	- High quality mobile applications extend the TAM to banked customers, allowing for transfers using bank accounts (account-based), debit card, credit card, and other local-payment methods (although more competitive online vs. FinTechs)	- Majority of volume is sent via North America and the EU & CIS regions. US is the largest outbound remittance market by more than 2x, with Saudi Arabia as the second largest	- White labeling with universities, banks, NGO's, non-profits, & others to facilitate cross-border transactions - can take numerous forms, e.g.., C2B payment (tuition), C2C payment (banking transactions), B2B payment (NGO's), etc.	- WU Connect initiative - integrate WU cross-border technology into digital platforms allowing for P2P transfer via card or bank account, and allows connection into social media and consumer messaging platforms	- Agent locations are often large retailers (e.g., 7-11, Walgreens, Albertsons, Dollar General) providing frequent touchpoints in high traffic retailers	- Still has some ability to increase send-market penetration; Management has communicated it intends to push for growth into additional send markets (although limited volume opportunity)	- Recently (Q2 2019) took meaningful (~10-15%) price increases on US domestic P2P (and following revenue going from ~10% of C2C in 2014 to 7% in 2018), helping to offset (short term) reduced volumes due to low cost (or free) offerings (e.g., Venmo, Cash App, PayPal)	- Attractive set of local asset (licenses, knowledge, infrastructure) for a potential large cap technology platform interested in expanding further into financial services (e.g., Ant Financial attempted to purchase MGI at ~11x EBITDA in 2017)	- WU Way initiative (completed in 2018) resulted in ~$70mm in cost savings (although largely re-invested in compliance, online, etc.); more recent savings initiative is targeting $150mm run-rate savings (including ~10% reduced headcount)	- WU partners and integrates with numerous businesses operating in different verticals (NGO, Bank, universities, etc.), and has the ability to increase penetration in these verticals, and the possibility to expand into additional verticals	- Threat of past and ongoing litigation impacting operations, have a past joint case settled in 2017 for $586mm (that has also spurred multiple class action lawsuits due to admission of guilt) and ongoing cases, pose significant legal threats to business operations
	- Mobile application has a significant installed base (downloads grew at a ~90% CAGR over 2015-2018).	- State and country-based licenses, knowledge of local rules & regulations, and even banking licenses in certain European countries (e.g., Ireland). Money transmitter licenses can be time consuming and in certain countries challenging to obtain	- Greater number of agent locations than the competition (550k vs. 370k for MGI, <6k for IMXI); 10% of WU's send agents (~55k) are located in the US; Top 40 agents have been with WU for an average of 20 years	- Implementation of dynamic pricing methods (from previous static, wholesale), able to utilize customer transaction data to adjust prices based on city, location density, day of the week, time of day, and customer service preference	- Multiple avenues for end-consumer interactions including agent locations, white-labelled products, mobile application, C2B payments, and bill-pay services	- Bill-pay services for consumers, allowing for handling of bill payments (e.g., utility, car, mortgage, electricity, etc.) either online, in person, or by phone	- Pricing pressure exists in certain corridors due to increased availability (and more scaled) offerings from FinTech platforms (e.g., Transferwise, Remitly), but has maintained industry leading take rates, albeit in part due to mix	- WU has not been active in M&A recently (last two acquisitions were $25mm or less, in 2017 and 2014), other than the divestiture of two businesses in 2019 (Speedpay and Paymap)	- Compliance spend has increased at a >10% CAGR since 2012; these costs are largely fixed in nature, and thus could contribute to margin upside in combination with MSD revenue growth	- Through WU Way and other cost cutting initiatives (announced at Investor Day) the company has committed to cutting overhead to bolster industry leading EBITDA margins	- Regulations around money-transfer: 1) Bank Secrecy Act regulated by FINCEN (KYC/AML); 2) Dodd-Frank regulated CFPB (disclosures); 3) additional requirements related ID (transactions over $3k), fraud prevention/ detection, etc.

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WEX	◐	◐	◕	◕	◕	◐	◐	◕	◕	◕	◕
	- Online travel virtual cards business, an underlying market generally growing at GDP+ along with gains in online penetration; leader in OTA virtual card business bolstered by eNett acquisition	- Mainly US-based business (i.e., less FX exposure), but also has business in Australia, Canada, New Zealand, Brazil, and within Europe	- Digital distribution investments in marketing tools supporting growth in Fleet business (particularly in harder to reach smaller fleets)	- Essentially created the virtual card market in the online travel industry, and has been deploying the tech/approach for ~20 years with its OTA clients (leader in the market)	- Fuel card controls and analytics crucial to daily operations and cost avoidance of Fleet segment customers (including EFS SecureFuel, Driver-Dash, and ClearView analytics)	- New digital fleet products contributing to contract wins (Chevron) and gaining wide adoption from customers (Clearview Snap analytics at 6k customers, Driver Dash pilot with large merchant)	- Relatively high-degree of pricing power by serving SMBs customers in niche payments markets (e.g., core Fuel segment ~50% smaller fleets), typically underserved by traditional banks (i.e., some banks lacking focus or expertise)	- Longer term revenue growth target is +10-15%, with an expectation of +8-12% organic growth (with the remaining 200-700bps via acquisitions)	- Longer term adjusted EPS target of +15-20% (vs. revenue of +10-15%) implies a degree of margin expansion (given buy backs are not a key component of cash deployments)	- Further expansion in the large B2B corporate payments market (+10% of revenues today) via continued M&A, partnerships, and a potential move further up-market; potential to add cross-border capabilities longer term	- Long-tailed risk related to Electronic Vehicles (EV), although one where WEX could adapt and/or provide management services across mixed fleets (consolidating spend, reporting, analytics, etc.)
	- Online dashboard and analytics available to Fleet solutions customers (ClearView Analytics & Reporting) supports differentiation	- Lower relative exposure to fast growing, underpenetrated international fuel card markets compared to FleetCor	- Go-to-market in all businesses typically involves both a direct approach (salesforce) and a partnership approach, which necessitates a degree of proactive channel management to avoid conflicts	- New digital fleet products contributing to contract wins (Chevron) and gaining wide adoption from customers (Clearview Snap analytics at 6k customers, Driver Dash pilot with large merchant)	- Direct relationship with over +30mm consumers on the WEX Health Cloud platform (mobile app and desktop)	- WEX Telematics for real-time vehicle conditions, fleet performance and GPS tracking	- Large OTAs in the Travel payments business hold a high degree of pricing power over WEX in this business given their high market share	- M&A has helped to reduce fuel price sensitivity down to ~20% impacted by fuel prices vs. ~70% revenue exposed to fuel prices at time of IPO/2005	- Inherently higher fixed cost structure allows for continued margin expansion, although somewhat tempered by consistent M&A integration and re-investment for organic growth	- Recovery in global travel volumes to bolster growth in Travel & Corporate solutions segment	- ~20% of WEX revenue is sensitive to the price of fuel (every $0.10 move in fuel prices impacts revenue by about $14-$15mm, or ~$0.20 in EPS)
	- Suite of HSA-related online and mobile-based spend management tools (e.g., product eligibility check) for underlying consumers	- Does not hedge currency risk, but acknowledges that if the ex-US business were to increase in size they could consider changing course (i.e., investing in hedges)	- Contracts with 9 of the 10 major oil companies in the US	- WEX Health Cloud (mobile app and desktop) provides a comprehensive consumer solution for managing healthcare related accounts and expenses	-WEX has benefited from attrition rates that have generally been at the low end of industry range (~3% overall, vs. FleetCor at ~8%)	- WEX Bank allows for lower cost of capital, issuing capabilities, etc.; WEX Bank is an Industrial Loan Company (ILC)	- Product innovation across all three segments supports pricing power	- Leverage target of 2.5x - 3.5x, but willing to take above these levels for right acquisition (i.e., through a lens of diversifying away from fuel price sensitivity, growth, de-risk, or technology that can reduce costs/in-source functions)	- Fuel sensitivity either creates (higher fuel prices) or eliminates (lower fuel prices) high incremental margin revenue (i.e., close to zero added cost for incremental transaction, but interchange impacted by fuel price)	- Potential to win fuel card portfolio outsourcing deals with European oil companies (still managed in-house)	- WEX Bank adds a degree of regulatory oversight (primary regulators are Utah DFI and the FDIC)

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FOUR	◕	◑	◕	◕	◕	◕	◑	◑	◕	◑	◕
	- ~100% of Shft4's payments business is exposed to the attractive software-led payments channel, with its gateway and E2E processing capabilities integrated into both via owned and partnered software platforms	- Vast majority of revenues are US-sourced, although the potential to expand internationally (with the UK and Europe as potential next steps) exists medium-term (in part by leveraging the existing merchant base footprint)	- Partner-centric distribution approach consisting of both independent software vendors (350+ ISVs) and value added resellers (~7k VARs)	- SkyTab order- and pay-at-the-table offering, which includes both marketing (email collection) and reputation management (customer satisfaction surveys that provide instant alerts to manager, allowing to address in-person)	- Both an owned (Harbortouch, Future POS, Restaurant Manager, POSitouch) and partnered (350+ integrations to leading software platforms) allows Shift4 to be a part of day-to-day operations (leading to reduced churn)	- Lighthouse Business Management System for business intelligence, including a customizable dashboard, reporting, employee scheduling, social media management, online reputation tools, etc.)	- Mix-shift based take rate declines as base shifts to larger merchants (i.e., conversion of MerchantLink & Shift4 gateway customers to E2E); larger merchants ($2mm+ annual volumes) yield ~40bps net vs. ~90bps for SMB (~$300k annual volumes)	- We forecast FCF as a percentage of net revenue improving toward 30%s in 2024E, as EBITDA margins expand, with potential upside from any refinancing of high interest rate debt as leverage is reduced	- A partner-centric business model (where sales, and front line support is driven by VARs) supports a high incremental margin business, with lower costs (vs. competition) for sales and support staff	- Potentially conservative targets related to conversion of MerchantLink & Shift4 gateway volumes (~$200b base of gateway volume, serving as a "rolodex" for the E2E payments business); guided to ~6%, ~11%, and ~13% penetration 2019-2021E	- Competitive industry with numerous scaled platforms willing to compete on price, although Shift4 typically faces a more limited set of competitors with comparable offerings (Elavon and FreedomPay most often cited)
	- Harbortouch was an internally developed restaurant POS software, and other owned software (Future POS, POSitouch, Restaurant Manager) together boast over 100k merchants in the restauarant vertical	- Shift4 Model merchants include multinational hospitality brands (that use tokenization and POS outside the US), but there is also an opportunity to expand further with customers into new geographies	- Many resellers can attribute their recent success to Shift4, and the ability to offer the Shift4 platform has become a winning proposition for VARs and ISVs, with many of them now selling / integrating 80-90% Shift4 processing (vs. Paymentech, Elavon, FreedomPay, First Data, etc.)	- When Shift4 was acquired by Lighthouse Network it was the largest independent gateway in North America, but was also the inventor and leader of payment tokenization, an important feature given PCI and other requirements for secuirty	- Though Shift4 products / services are distributed through resellers, often times a Shift4 employee is on a first name basis with the merchants, with frequent touchpoints (every few weeks - at least a couple of times per year) to discuss new ideas or updates	- Marketplaces allows POS software to download to various 3rd party applications (i.e. MailChimp, DoorDash, UberEats, Quickbooks), providing easy integration into payments and front-of-the house operations	- Shift4 has a number of legacy software integrations which are difficult / not worthwhile to integrate to; often times Shift4 is the only gateway provider or payments processor with the ability to do this across a property / business, giving it pricing security	- Shift4 has done numerous acquisitions in recently years, including VenueNext, 3DCart, MerchantLink, Shift4 Corp., and 3 software POS platforms in 2017 catering to the restaurant vertical	- Margin expansion drivers: 1) M&A synergies ; 2) Oerating leverage/scale; 3) Taking processing in-house; and 4) Distribution costs	- International expansion of End-to-End is a large opportunity, and is mostly untapped, but the company has existing business with multinational brands, some of which are gateway only customers (includes Int'l) or payments processing customers in the US only	- Shift4 pays partner residuals near industry highs, which along with a well-like and easy to connect to product, and ability to offer subsidized or free hardware / software to merchants, typically moves Shift4 to the top for partners when going to market
	- Limited exposure to eCommerce, except for hospitality clients requiring omnichannel capabilities online bookings, but significantly boosted its eCommerce capabilities with the 3DCart acquisition	- Though initially focused on restaurant sector and SMBs, Shift4's next evolution will be moving into higher volume payments processing for larger enterprise hospitality clients	- Onboarding time is dependent on reseller installation (for a new relationship / location), but Shift4 can board an existing client from gateway to full processing in as little as 24 hours (easy APIs), for more complex integrations still speedy but weeks-months	- Simple API connectivity, making integration incredibly smooth; connecting to the API is as simple as entering a port number; ISVs rave of the ease to write customized programs to Shift4's APIs, improving relative positioning of their products	- Within the hospitality vertical, Shift4 can be the sole payments processor for all profit centers and their software integrations at the property (Spa, Front Desk POS, Retail, Golf Course, Restaurant) - a rarity, as often times many are needed	- Despite being the 2nd line of the defense (behind partners), Shift4 has a dedicated 24/7/365 support team, capable in multiple difference languages; Shift4 also provides support in onboarding merchants - doing live trainings and sending "How To" videos	- Shift4 has a number of complimentary products / services it provides free of charge (i.e. POS hardware and software), but typically locks merchants into multi-year contracts, at times including monthly hardware / software charges	- Part of the growth plan for Shift4 includes inorganic growth, with an M&A team constantly evaluating deals, and a vast majority of sourcing being inbound (ISVs looking to be acquired), with plans to allocate capital to attractive acquisitions	- In-house processing scheduled for 2022, and will be a one-time step up in margins (estimated to boost EBITDA margins by >300bps)	- Industry talks suggest a large opportunity exists in the modernization of current POS solutions and migration to the cloud, which can save merchants money on customer data storage; Shift4 has been heavily investing in these efforts	- Lighthouse Network - was the subject of a 2018 antitrust lawsuit regarding the acquisition of Shift4, alleging the company had monopolized payments in restaurants, as it could route transactions in self-serving manner; Lawsuit was dropped in 2018

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PSFE	◕	◕	◑	◔	◑	◔	◑	◕	◑	◕	◔
	- 100% of revenue from the Digital Wallets and eCash segments are linked to eCommerce, and 50%+ of the Integrated Processing segment is tied to online transactions; in aggregate 75%+ of total revenue is generated through online payments	- ~47% of revenue comes from North America (mostly US), ~39% from Europe, and ~14% from the rest of the world in 2020	- Integrated Processing sources its revenue through direct sales (~1/3 of new merchant additions from direct sales channel), distribution partners, and ISV & eCommerce partner channels	- Paysafe is working to create Paysafe Unity Platform, a single API that would enable merchants to integrate with all of Paysafe's payment methods as well as their merchant acquiring and gateway platform	- With <20% of Integrated Processing revenue coming from the direct channel, Paysafe often is party to multi-entity contracts acting as an intermediary for its payment processing operations	- Paysafe offers customer service for consumers and merchants globally in 15+ languages with solutions that enable multi-currency transactions along with local payment methods (LPMs)	- Paysafecard charges an MDR of 5-7%, significantly above that of cards and other payment methods (however a significant portion is split with the retail distribution partner), and therefore is likely to face pricing pressure over time	-Paysafe sees potential acquisition opportunities across all of its business segments (including 170+ potential targets in Digital Wallet and 20+ in eCash), particularly in iGaming and eCommerce market verticals	- Paysafe's long-term outlook has modest gross margin and EBITDA margin expansion through 2023, with further upside expected in 2024+	- Outside of iGaming, Paysafe also distinguishes itself with its expertise in managing the risks and complexity in emerging market verticals which tend to offer higher growth and take rates; emerging verticals accounted for ~39% of its 2020 revenue	- Paysafe's high exposure to specialized and high-risk verticals can increase its risks relative to other companies in the payments industry from regulation, operational complexity, challenge in maintaining supplier/customer relationship, etc.
	- Within the Integrated Processing segment, ~39% of revenue is generated from integrated and eCommerce solutions sold through ISV and eCommerce partners	- eCash is almost entirely Europe while Digital Wallets is split roughly evenly between Europe and RoW with both segments having very little exposure to North America	- Paysafecard can be purchased / loaded at ~650k distribution points (retailers) globally and is also a payment method option for merchants using Adyen's platform in North America, Europe, LatAm, and APAC	- Paysafe is working to fully migrate to the cloud with eCash migration complete, Digital Wallet expected to be completed by the end of 2021, and Integrated Processing by 2022	- Skrill and NETELLER are generally directly integrated with merchants as payment methods, and through the Knect rewards program, Paysafe is working to build loyalty with users of the digital wallets	- Skrill and NETELLER can be used for P2P and remittance capabilities to transfer money globally	- iGaming tends to have higher average take rates than other merchant verticals given the regulatory and reputational risks, KYC & AML requirements, and higher prevalence of chargebacks	- Paysafe has made multiple acquisitions since public listing to expand both its scale and capacity in eCash and Digital Wallets segments	- SG&A accounts for ~30% of revenue in Digital Wallets and Processing (vs. ~20% in eCash, with both segments having higher revenue share and expected growth than eCash), leaving room to gain operating leverage and drive EBITDA margin expansion	- While US iGaming represents just ~2% of Paysafe's 2020 Processing revenue, Paysafe is focused on the strong exponential growth in this vertical given its large TAM where it sees a ~39% CAGR over 2019-25 for deposit volume alone	- We see some yield risk longer-term in Digital Wallets, as cross-border and A2A services become more ubiquitous (esp. given open banking regulation in the EU)
	- Paysafe has over 150+ ISV integrations and is a leading reseller of the Clover Smart POS system [FISV]	- Integrated Processing is a North America-focused business (>90% of revenue), with a heavy tilt towards US merchant acquiring, with the remainder of segment revenue coming largely from Europe	- Skrill and NETELLER Digital Wallets are distributed by merchants that integrate the wallets as a payment method, heavily focused on the iGaming vertical and achieve network effects via the two-sided network	- Strong risk, compliance, and analytics expertise, with over 300+ risk & compliance employees that have global expertise, which is particularly useful in the complex iGaming vertical with a high degree of variance in regulations between countries	- Paysafe is working to migrate ~80% of eCash volume to account, app-based distribution vs. the traditional method of loading at distribution points and receiving PINs on printed receipts, increasing the opportunity for retention and increased use by users	- Paysafe supplements its processing business with a suite of value-added solutions including around working capital management and reporting, merchant cash advance, merchant funding, and equipment leasing	- While Paysafe acts as a gateway in US iGaming, it shares in the acquiring revenue with Worldpay through their partnership, enabling Paysafe to receive a take rate of ~30-50 bps, higher than typical gateway-only take rates	- Paysafe has a 20+ year history of M&A and integration of 15 deals, which is further boosted by the network, execution experience, and M&A track record of Bill Foley as its Chairman	- Paysafe has guided to free cash flow conversion margin (FCF/EBITDA) of ~70-80% in 2021 and ~80% longer term, a somewhat conservative projection in our view	- Paysafe sees opportunities to enter new markets and verticals in eCommerce though potential acquisitions	- While eCash is part of a payment method category that is losing prominence, the paysafecard and Paysafecash products are geared towards two solidly growing end markets that should enable the eCash segment to grow at low-double-digit rates

Source: Company reports, Credit Suisse research

	Growth & Share Gains			Differentiation				Financial		Additional Factors	
	eCommerce & Software exposure	Geographic Mix & Scale	Partnerships & Distribution	Product & Innovation	Proximity to Customer	Additional Services	Pricing Power	Benefitting from M&A/Cash	Operating Leverage	Emerging Areas of Upside	Threats (Competitive, Regulatory)
RSKD	●	◕	◑	◕	◕	◑	◕	◔	◑	◕	◔
	- 100% of RSKD's GMV and revenue are from RSKD's eCommerce risk mgmt. platform that assesses merchant eCommerce volumes. RSKD GMV is gaining share and growing at 2x global eCommerce (i.e., in 2020, RSKD's GMV grew by 60% organically while global eCommerce grew by 28%).	- 80% of revenues are in North America, 18% in EMEA (~90% of which are in the Netherlands), and 2% in APAC in 2020.	- Riskified employs a "land and expand" strategy, usually starting the relationship with a merchant by receiving a small percentage of the merchant's eCommerce volume. We estimate billings from the each year's new cohort accounts ~30% of YoY growth in total billings during 2020-23.	- Core Chargeback Guarantee product (i) provides higher approval rates for merchants in real-time (vs >3 days for merchants manually reviewing) with 99.8% accuracy which increases sales, (ii) reduces fraud and other operating costs for merchants, and (iii) delivers a superior consumer experience.	- eCommerce platform available to merchants globally. Existing merchant network contains hundreds of merchants, allowing RSKD to see over 400mm unique consumers in more than 190 countries through its existing merchant network.	- Recently launched four new products: (i) Policy Protect, (ii) Account Secure, (iii) Deco, and (iv) PSD2 Optimize. These four additional products (combined) are expected to account for ~LSD% of total revenue by 2023.	- Pricing is data driven and set based on each merchant's risk profile and appetite. RSKD tries to keep all merchants on the same margin profile, i.e. pricing (take rates) largely depends on the targeted chargeback rates under a guaranteed level of approval rate.	- RSKD has grown organically since its founding. M&A hasn't been part of their strategy to grow their GMV or customer base. They intend to continue enhancing their existing products and may develop and introduce new products through internal R&D.	- Improvements in CTB ratio (which is ~80% of COGS) within the context of rapid growth and higher fraud sophistication is a key focus that should lead to consistent increases in Gross Margin over the forecast period. The remaining 20% of COGS are primarily variable costs.	- TAM: RSKD has ~1% share of its global "true TAM" ~$5.2tr (CSe.) Meaningful opportunity to grow share of wallet with existing merchants while also acquiring new clients. Relative to RSKD's ~$63b GMV, the opportunity remains large even on a reduced TAM/SAM view.	- PSD2 in Europe has made ~2/3rd of RSKD's business in the region less addressable; it shifts chargeback liability to the issuer on qualifying transactions (albeit with potential for RSKD to offer other solutions to merchants and potentially issuers). ~10% billings headwind expected in FY22 (~MSD% in FY21 & FY 23).
	- In addition to its core Chargeback Guarantee product, RSKD's four new products also solve merchants' pain points in eCommerce orders (focused on increasing sales, reducing costs and improving consumer experience).	- RSKD's merchant network consists of hundreds of primarily enterprise merchants located across 36 countries worldwide—53% of which are in the US, 28% in EMEA, and 19% in RoW.	- 45% of 2020 revenue came from Fashion & Luxury Goods, 26% from General, 14% from Home, 9% from Electronics, and 6% from Tickets & Travel. ~46% of revenue comes from RSKD's top 5 merchants, with merchants 6-10 representing 12% of revenue in 2020.	- Core Chargeback Guarantee allows merchants to generate higher revenues by increasing their approval rates – in some cases, by >20% (on average, their ten largest merchants saw an 8% increase in revenue after integrating RSKD).	- Customer reach consistently extended to new geographies and contexts via expansion with legacy clients (i.e., seeing a larger % of a merchant's GMV) or through new customer wins.	- (i) Policy Protect identifies cases of refund abuse, reseller abuse, promotions abuse, and referral abuse. (ii) Account Secure prevents bad actors from gaining unauthorized access to a consumer's account at a merchant's online store.	- Third-party chargeback guarantee offerings are relatively new to eCommerce (RSKD, Signifyd, and Forter were founded in 2012, 2011, and 2013 respectively), with industry penetration relatively low (~95% enterprise customers use in-house solutions).	- RSKD will have net cash of over $500mm post-IPO (by our estimates). The company has stated that the proceeds are for general corporate purposes (as they do not have any debt on their balance sheet).	- Top 10 merchants represented 58% of sales in (vs. 65% in 2019). As they onboard additional large accounts with scale, opportunity to improve take rates as new accounts typically onboard with a higher take rate as part of the company's Land and Expand strategy.	- Investing behind more nascent geographies (e.g., LatAm, APAC) by expanding GTM motions to targeted markets; e.g., APAC is a new growth area and TAM proof point growing at a 160%+ CAGR from 2018-2020.	- RSKD's main competition is in-house solutions, which is how ~95% of the market operates today.
	- RSKD's industry leading approval rate is materially higher than average authorization rates for eCommerce CnP (as low as 85%) & CP (96%) transactions per Edgar, Dunn & Company. Also, ~10-15% of online orders are declined by issuing banks, offering a large opportunity for Riskified's Deco.	- 36% of submitted volume is cross-border, which is why ~75% of billings are derived from US-based accounts (despite 53% of merchants located in the US), ~15% from European-based accounts, and ~10% RoW.	- RSKD's grants it merchants continuous access to their software platform under a hosting arrangement over agreed upon contractual periods. RSKD does not provide merchants with the right to take possession of their platform.	- Net of RSKD's fees, the platform can reduce chargeback costs for their merchants, in some cases, by more than 60% (on average, their ten largest merchants saw a 39% decrease in fraud related operating costs and chargeback expenses after integrating RSKD).	- In 2020, RSKD processed over 485mm orders, with >93% of revenue from merchants with >$75mm in online sales. RSKD captures >100 attributes across the network on every order (e.g., shopping cart contents, IP address, email address, shipping/billing address, device ID).	- (iii) Deco helps merchants combat bank authorization failures during the checkout process (if the bank declines the customer, but Deco views it as legit, sale goes through via RSKD). (iv) PSD2 Optimize enables merchants to minimize the effect of the EU's PSD2 regulations on their business.	- RSKD's ability to see >1b historical transactions, including over 1mm chargebacks, provides a data set with meaningful scale that's not easily replicated at most enterprise level merchants. Once plugged in, RSKD's annual dollar retention rate has been 98-99%.	- Guidance does not include any contributions from acquisitions, but RSKD has noted that they may selectively pursue acquisitions.	- PSD2 related loss expected to be a 400-600bps margin headwind in 2021-2023. Investments in geographic expansion, IPO related expenses, and investment in new products are expected to contribute a ~500-1,000bps margin headwind in 2021-2023.	- Increasing the performance of their core Chargeback guarantee product, increasing enterprise sales personnel, introducing new products (including four launched in the recent past), and other call options (e.g., potential to expand to issuer clients) are further supportive.	- Riskified, Signifyd, and Forter all offer well-performing, reputable, and scaled fraud mgmt. solutions in terms of capability (albeit with varying offerings & areas of focus). Merchant acquirers generally offer less effective fraud mgmt. solutions, although Stripe has a strong offering relative to other acquirers.

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VRRM	◔	◑	◕	◕	◕	◑	◕	◕	◑	◑	◑
	- While rental cars are commonly booked online, the add-on purchase of the tolling product is largely done in-person at the rental car location (not a discrete add-on option on most rental car websites)	- Business is predominantly US, outside the of the recently acquired EPC and Pagatelia businesses in Europe (we expect European business to grow over time as tolling business begins to monetize)	- Unlikely that other competitors (none are yet to exist on a nationwide basis - with a fully outsourced management program for RAC) would be able to do the one-by-one legwork required	- Core tolling product in and of itself is an innovation past the traditional processes, and required (requires) detailed, one-by-one, working with and integrating to various tolling authorities (meaningful barrier to entry)	- Deeply integrated into the operations of tolling authorities and core RAC customers (in terms of infrastructure, program management, employee training, customer service, billing & reconciliation, etc.)	- Title and registration services provided to existing RAC and FMC customers (through acquisition of Sunshine) which allows bulk processing of registration on a fully outsourced basis	- Only nationwide provider for the core tolling product (i.e., meaningful barriers to entry given decade long efforts to integrate with various state-based tolling authorities), but customer acquisition is provided by RACs (car rentals), so pricing upside is capped to an extent	- M&A has been (Sunshine for title & registration) and will be used to provide added services to existing customers, in part due to an "ask" from these customers, along with other deals that add optionality (smart tech related to connected cars, autonomous driving, etc.)	- Lower margin Government business has a higher fixed cost structure (e.g., people costs related to analyzing camera data, incidence reports, etc.); currently working against VRRM given Texas business loss	- Tolling in Europe, with the EPC and Pagatelia acquisitions overall (tolling & violations in Europe) representing a $350mm revenue TAM opportunity	- Downward pressure/sentiment around red light cameras (e.g., Texas, Miami recent revenue headwinds); 21 states have photo enforcement vs. upside around school zone speed (e.g., Georgia, NYC) and work zone speeding (e.g., Pennsylvania)
	- To the extent the Peasy system gains traction, this is a mobile-first platform that can be used both in mobile phones or in other mobile OS (e.g., OEM in-dash OS)	- Within Europe, France, Spain, and Portugal make up the bulk of the opportunity, and are all operated by a single tolling authority located in France (France is the single largest tolling country in Europe)	- Long term contacts with the three large RAC companies in the US (Avis Budget Group, Enterprise, Hertz), although this brings meaningful customer concentration	- Peasy example by innovating off the core tolling platform (leveraging the assets built for the RAC and FMC customer base, and repurposing the technology and connectivity to tolling authorities in the form of a consumer product)	- Acts as a partner in helping government and law enforcement clients promote public safety (e.g., in school zones, at bus stops, in work zones), with potential for additional surveillance camera usage (e.g., for detectives)	- Government Solutions segment includes the installation of cameras for any camera-programs (either traditional where VRRM owns the camera, or in New York where VRRM actually sells - product revenue - the camera, but still handles the installation)	- Revenue generator for partners in both businesses, i.e., RAC earn a revenue share from deploying VRMM tolling products and government/law enforcement citations	- EBITDA growth and debt reduction should reduce leverage to enable M&A	- Higher mix of variable costs (lower fixed costs) in the high margin Commercial business, although could be somewhat pressured (or at least margin expansion limited) due to investment required to build a business in Europe	- Peasy consumer tolling, mobile app-based coverage across most toll roads in the US (opportunity to add white labeled additional services to the app, and also to white label the core Peasy service into 3rd party apps - e.g. OEMs infotainment systems)	- Redflex competitor in red light business (Government segment) plans to transition efforts/assets from red light cameras to traffic congestion (provides a near-term share gain opportunity in red light business, although a negative market signal)
	- After acquiring their title & registration business in 2016 (streamlining vehicle registration and tracking for customers - including RACs), software integrations into the DMVs themselves were required for matching cars to registrations	- Additional European upside would come from a second leg of tolling & violations penetration (i.e., into the Nordic countries)	- Agreed to a partnership with Arrive (branded and white-label tool for parking, i.e., identifying, booking, paying for parking spots)	- Adapting focus, with more of an emphasis on "purpose-built speed enforcement" with specific use cases such as school zone speeding, bus stop arm cameras, and work zone speed enforcement	- Aligned with government clients' safety goal, with a combination of fixed (dollars per month per camera, regardless of activity) and variable (revenue share per citation or dollar amount per citation) contracts; uses data to model the variable contracts to maturity	- Additional business such as ATS Live (real-time visual intelligence and post incidence analysis for law enforcement) and ATS Street Safe (handheld speeding cameras equipped with mobile citation issuance)	- Recent strength has been a combination of volume (i.e., number of billable days, number of tolling activities) vs. price / mix shift (e.g. shift to leisure, over corporate travel driving increases) with wholesale pricing done on a longer term contractual basis	- Verra Mobility has plans to build out a larger and more formal acquisition funnel and screening process to make inorganic revenue a more meaningful contributor to total company growth in the future	- Leveraging a decade of "heavy lifting" for the core US business, now beginning to add focus on bolt-on M&A (hiring of VP of Corporate Development and Strategy), new markets (Europe), and other new areas/call options (Peasy, ATS Live, ATS Street Safe, etc.)	- Congestion pricing (more common in Europe), and likely becoming a service that VRRM will be able to support (more of a ~5-10 year opportunity); US opportunities in Philadelphia, NYC, Washington DC, and others	- Highway tolling is regulated on a state level, and certain states will never approve expansion of tolling (negative sentiment, not enough volume to generate $). Expansion of toll roads or building new toll roads can take years and is subject to govt bureaucracy

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LDI	◕	◑	●	◕	●	◕	◑	◑	◕	◑	◑
	- While traditional mortgage companies outsource the technology platforms needed to originate and service mortgages, LDI developed its proprietary, end-to-end mello technology to enable a best-in-class customer experience	- LDI's business is largely US-focused and licensed in all 50 states; it is the second largest nonbank retail mortgage originator in the US and the fifth largest overall retail originator in the US, according to Inside Mortgage Finance	- LDI's retail strategy is bifurcated into two segments: consumer direct and in-market. The consumer direct channel has been constructed though significant investment into their digital channels, facilitating relationships with individual customers	- LDI's proprietary technology mello is the core to its operations, as it maximizes loan officer closings, reduces cycle times, and improves customer satisfaction. It also helps the company integrate new products or services	- LDI employs an in-market strategy that it built via acquisition, where it maintains local relationships through real estate agents, builders, and other channels. Currently, 75% of the US population is covered by LDI's in-market strategy	- LDI offers three lines of ancillary businesses: Settlement Services (title insurance), Real Estate Service (real estate broker referral), and Insurance Services (homeowners and other consumer insurance brokerage)	- The primary secondary spread has compressed from its 2020 highs back down to historical levels, which signals a lower gain on sale margin for the industry and likely a less sizeable origination market in 2021 as compared to a record 2020	- LDI entered the in-market loan officer channel via its 2013 acquisition of imortgage and 2015 acquisition of Mortgage Master; these relationships have proven to help LDI win business over pure play digital consumer direct competitors	- Gross and net debt/LTM adjusted EBITDA remains well below 1.0x; LDI is primarily funded through short-term warehouse facilities	- In February of 2021, LDI entered into a multi-year partnership with Major League Baseball, where it has been named the MLB's "Official Mortgage Provider" in order to expand their brand reach and reach millions of baseball fans nationwide	- Fluctuations in mortgage market - mortgage volumes are very sensitive to interest rate movements, which affect refinance activity and volumes. A large increase in lending rates could lower refinance volumes significantly
	- LDI's Consumer Direct platform leverages its centralized operations centers and proprietary technology to provide customers with a rate quote within seconds and enables customers to complete the mortgage application processes completely online	- Yet with only a ~2.5% market share in 2020 (having grown from ~1.0% in 2014), LDI's scale and platform positions the company to continue to take share from smaller less tech-enabled competitors	- LDI's in-market strategy employees its proprietary machine learning technology mello, along with its nationwide relationships with builders and realtors, to produce fast and accurate lead matching	- LDI has positioned itself as a leader in its field with its utilization of data science; its mello platform uses a data base of 40mm unique individuals and 10b data points, paired with machine learning capabilities, to efficiently and effectively route leads to the channel most likely to close the client	- LDI sees its in-market presence as a core competency, given that its digitally native competitors do not have this set up and thus cannot build local relationships as well. This allows LDI to source deals more efficiently. It currently has 1,300 in-market mortgage professionals	- LDI chooses to retain the MSRs of its originations, which not only act as balance on its portfolio in a rising-rate environment, but are also used as a prepaid pool of leads with whom LDI can maintain relationships and get low-cost recaptures given little marketing spend required	- As refinance pipeline works through the system, margins should compress somewhat as originators raise mortgage rates less than TSYs in order to spark additional volume. LDI's scale and cost to originate positions them to generate attractive returns even with lower margins	- LDI acquired settlement service provider Closing USA and its affiliate American Coast Title in 2016-2017, which expanded LDI's national licensing footprint for title, escrow, and settlement services to more than 30 states and Washington, DC	- LDI expects to reduce its cost per loan approximately 5% annually over 2021-2022. This will largely be reached by LDI executing on their plan to cost-effectively recapture MSR clients as they refinance	- LDI's extensive marketing spend has established it as the second most recognizable mortgage brand; the brand has grown through its national TV ad campaign which had 7b household impressions in 2H 2020 and 330mm online media exposures during 4Q 2020	- While LDI hedges its MSR which helps mitigate earnings and BV fluctuations, large interest rate moves and imperfect hedging could negatively impact GAAP earnings and book value during periods of interest rate volatility
	- LDI's technology platform also powers its In-Market loan officers, Wholesale network, JV and Integrated Referral Partners during various stages of the origination process including lead generation, processing, and fulfillment	- Through its localized In-Market strategy, LDI covers 75% of the US population with a nationwide network of ~1,400 in-market mortgage professionals responsible for sourcing, engaging, and maintaining local customer relationships	- LDI also uses a partner strategy, where it has built a network using joint ventures, integrated referral partners and wholesale. The relationships in this segment are with home builders, real estate brokers, and banks	- As US residential mortgage market is still largely served by legacy mortgage originators, which require consumers to navigate time-consuming and paper-based processes to apply for mortgages, LDI is well positioned to capitalize on the shift to digitally-enabled platforms	- LDI's 2020 purchase volume was comprised of 55% through its retail strategy (51% In-market and 4.0% consumer direct) and 45% through its partner strategy (21% joint venture and 24% wholesale)	- LDI originates mostly conforming loans (meeting FNMA and FMCC rules and regulations for secondary market purchases), while also offering conventional prime jumbo loans, FHA & VA loans, and home equity loans	- While the level of interest rates determines ultimate pricing power for LDI, its funding source (secondary MBS market) is the second largest fixed income market in the world, and gives LDI certainty of execution and funding	- LDI's unrestricted cash and cash equivalents totaled ~$284mm at December 31, 2020, up 288% year over year	- LDI has a relatively small fixed cost ratio relative to its peers (approx 1/4 of total expenses vs. 1/2 for Rocket's mortgage segment). This provides for less volatility in both rising and declining markets	- As the economy looks to be improving given the positive outlook on the vaccine front for Covid, rates are projected to increase throughout 2021 (and have already started). While this will hurt originators' GOS, LDI will be protected by its sizeable MSR portfolio	- Any disruption in the US economy could adversely affect the mortgage market as unemployment and other macro factors are tied to originations, and government programs created as a response to any widespread disruption could affect LDI's business

Source: Company reports, Credit Suisse research

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RPAY	●	◔	◕	◕	◑	◑	◑	●	◕	◕	◑
	- Focus on digital and/or ease of interaction (e.g., mobile, online, text message, voice) to simplify and shorten the process of making loan payments for consumers, using proprietary technology	- REPAY is a US-focused business, with direct sales and ISV relationships with SMB's in certain niche verticals	- Repay is heavily exposed to its ISV channel, where the ISV (software providers) integrates REPAY payments solutions into their software offerings	- Repay is ringing debit card acceptance to markets that are dominated by checks & ACH (personal loans, auto loans, receivables management, etc.)	- Consumer-friendly payment channels provided by REPAY allow for an accelerated payment cycle (and thus, the merchant has increased ability to lend more/faster)	- Back-end processing capabilities acquired through TriSource (formerly a partner, now insourced), which will serve to decrease processing costs (i.e., removal of margin paid to TriSource, largely fixed cost base of platform); also maintains non REPAY client base	- REPAY typically pays away ~11% of net revenue to ISV partners (ISV commission), which is meaningfully lower than other integrated payments verticals, where ISV commissions can be in the ~20-70%+ of net revenue range	- Plans to grow both organically and via acquisition, either on additional capabilities (e.g., back-end processing acquired via TriSource), penetration into existing markets, or expansion into new verticals; TriSource improves margin profile by bringing costs in-house	- Automotive loan take rates are lower vs. other REPAY verticals, mostly due to higher principal (i.e., car payments tend to be higher vs. personal loans or receivables payments)	- New vertical expansion focus around B2B and healthcare (where REPAY has already gained some traction, but not reported separately), specifically Revenue Cycle Management (RCM) which manages billing for healthcare providers and practitioners	- Risk that ISV partners push for a larger revenue share (i.e., paid as a percentage of net revenue, typically defined as MDR less interchange, network fees, & possibly other costs) as competitors approach ISV partners over time
	- REPAY's gateway is its own proprietary technology built on the cloud, and provides added functionality for merchants (e.g., tokenization/ security boost, recurring billing, account billing, reporting, web hooks, PCI DSS compliance, card vault, etc.)	- Entered Canada market in 2019, given existing overlap between certain receivables merchants that were already clients in the US; partnered with Visa to accelerate debit acceptance in Canada, along with use of Visa Direct (for instant funding)	- The rest of the business is primarily sourced through REPAY's direct sales channel. Merchants approached by the direct sales team tend to be larger ($1-$5mm+ monthly volume) and could operate their own in-house software (vs. working with an ISV)	- Provides tokenization of payments, transferring data protection risk (a liability) away from the merchant by providing Payment Card Industry Security Standards Council (PCI DSS) compliance for the merchants	- REPAY fully underwrites each of its merchants, operating as an Independent Sales Organization (ISO); prefer to risk manage in-house, given their indirect liability to the merchant bank through facilitating CNP transactions	- Sales support team staffed to aid in the merchant onboarding process, helping to simplify and guide through the merchant application and initial set-up processes	- REPAY, over time, could see increasing pressure on ISV commission levels (although not experienced to date), as merchants in their verticals are approached with more attractive revenue share agreements from competitors	- Company has made numerous acquisitions since going public, the most notable being its acquisition of BillingTree which materially increased the company's exposure to the B2B segment	- Gross margin expansion ahead as front-end processing & bank sponsor fees are likely renegotiated lower, along with TriSource related leverage on back-end processing	- Credit Union (CU) vertical (recently announced integration with Jack Henry's Symitar platform), with a focus on credit union auto lending, solving a need, particularly in non-member lending where payment collection is more difficult	- Longer term risk that some ISVs (mostly larger ISVs) consider the PayFac model (PayFacs own more responsibilities, and keep a greater share of economics); lower risk in REPAY verticals given merchant onboarding complexity in lending
	- Proprietary underwriting software for onboarding merchants (although final onboarding decision made by acquiring bank partner, given REPAY operates as an ISO, not a PayFac), along with monitoring for early indications of financial difficulties	- REPAY operates in niche verticals in two countries (US, Canada) and is integrated into five main verticals (receivables, personal loans, and auto loans, and more recently Healthcare and B2B) vs. Global Payments operating in 70+ verticals and 100+ countries	- Recently signed partnership with Jack Henry's Symitar offering (allows the JKHY customers using Symitar to access/use RPAY in a more seamless, integrated way), targeting expansion to the Credit Union vertical	- Differentiated payments technology, with a gateway that can be leveraged cross-vertical, and software additions specifically tailored by vertical to meet industry specific needs for merchants and ISV partners	- The payments solution integrates into merchants' ERP system (either home grown via an ISV), reducing complexity for merchants (integrated into loan/deal management systems, reduced manual check-cashing, etc.)	- REPAY has the ability to move further into parallel verticals, offering the same type of enhanced payment services (with potential additions targeted in healthcare, credit union auto loans, and B2B payments)	- Any mix shift toward ACH (vs. debit) could optically pressure pricing (as a percentage of volumes) given only di minimis "cents per transaction" fees earned when customers pay via ACH (currently ~1-2% of revenue)	- Tri-Source has bolstered M&A synergy possibilities given its back-end processing capabilities (that REPAY did not have previously); ~$50mm in cash and ~$200mm in debt capacity to pursue smaller acquisition targets in the near term	- Operating leverage inherent in core platform (as is typical in the merchant acquiring industry, i.e., high incremental margins), which forms a base that can be modified to fit clients specific needs	- B2B payments is a new vertical of focus for REPAY, in which REPAY is focused on accounting software partnerships (e.g., platforms like Sage Intacct) and on A/R (payments acceptance); with first steps to expansion kick-started by the recent acquisition of APS for $60mm)	- Any increased competition from larger payments platforms (e.g., ACI (including Speedpay, acquired via WU), Billing Tree, Global Payments, and others) - which has been historically lower given larger players typically do not process payments for lending merchants

Source: Company reports, Credit Suisse research

	Growth & Share Gains			Differentiation				Financial		Additional Factors	
	eCommerce & Software exposure	Geographic Mix & Scale	Partnerships & Distribution	Product & Innovation	Proximity to Customer	Additional Services	Pricing Power	Benefitting from M&A/Cash	Operating Leverage	Emerging Areas of Upside	Threats (Competitive, Regulatory)
MLNK	◕	◑	◑	◑	◕	◑	◑	◑	◑	◑	◑
	- ~90% of revenue derived from software subscription fees for Lending and Data Verification Solutions (usage-based with minimums)	- 100% of revenues are US-based	- Invested in direct sales team, focused by region and vertical, going from ~4 quota-carrying sales representatives in 2018 to ~40	- MeridianLink's lending platform has ~27% market share amongst mid-market community banks and credit unions, a testament to the quality of their products	- Long-term, privileged relationships ~1.9k financial institution customers in the US empowers MeridianLink to capture a majority of customer lending wallet share	- Within the Lending Solutions segment, MeridianLink also provides account opening solutions, collections software, and data intelligence products to FI customers	- Due to the overhaul required to upgrade/switch lending platforms (time, dollars, training of staff, etc.), customers are sticky (e.g., lending platform churn is ~50% of company average)	- MeridianLink has completed four acquisitions since 2018, proving its ability to acquire and integrate deals	- Potential for high operating leverage with gross-margins of ~75% that generally represent MeridianLink's normalized incremental margins	- Expanding Bank IT TAM up and down market beyond MeridianLink's immediate mid-market financial institution focus (~$100mm to ~$10b assets)	- Big banks with large IT budgets (e.g., top 4 >$40b annually) and neobanks continuing to scale are competitive threats to the health of MeridianLink's customers
	- Operating within a large Financial Services SaaS TAM of $10b, expected to reach $19b by 2024E, compounding at ~14% CAGR	- Of MLNK's ~1,900 customers, ~52% are Credit Unions, ~24% Consumer Reporting Agencies, ~17% Banks, and ~8% Independent Mortgage Brokers	- +580 third-party partner integrations that enable customers to augment their MeridianLink solutions while generating revenue shares for MeridianLink	- MLNK is investing in R&D focused on new products and enhancing existing products (grew software development team 1.6x from ~105 employees in 2018 to ~165 in 2020)	- MeridianLink's end-to-end lending platform is directly used the end consumer (omni-channel) and the financial institution's employees	- With the acquisition of Tazworks in late 2020, MeridianLink expanded its Data Verification business to include employment, tenant, and volunteer screening services	- MLNK's product innovation (e.g., new features added to the platform) for a substantial source of the customer's revenues (e.g., lending is ~78% of revenue from community banks, FDIC) supports pricing power for contract renewals	- MeridianLink's robust +580 marketplace partners offers a unique perspective to identify complementary service providers that are resonating with customers	- No EBITDA margin expansion forecasted through 2023E from 2019 levels given growth investments in go-to-market and products to fuel robust topline growth	- Better than expected returns from salesforce investments	- Potential for digital first mortgage platforms (e.g., RKT, LDI, etc.) to take share from the bank channel
	- Lending Solutions products are omni-channel in nature, while Data Verification solutions largely support a similar omni-channel lending market	- Lending platform has a leading market position amongst mid-market financial institutions (~27% market share of immediate ~5k FIs), but relatively sub-scale in the broader Bank IT market vs. select public competitors (e.g., FIS, FISV, JKHY, BKI)	- White-label solution for core providers (e.g., Jack Henry)	- Robust partner market place with +580 third-party partner integrations enables MeridianLink's customers easily leverage best-in-class ancillary solutions	- In the Channel partner business (e.g., JKHY white-label) Meridianlink still contracts directly with the end customer	- Provides consulting services that helps financial institutions optimize their business, in addition to implementations and outsourced administration.	- Solutions provide a measurable return on investments for customers	- Leverage under 3x post IPO and robust FCF generation provides the means to sustain inorganic M&A investments	- Long-term adjusted EBITDA margins of ~43% to ~48% compared to ~42% in 2019A	- Additional M&A that is currently not reflected in estimates	- Potential for additional regulations to be placed on MeridianLink's customers, which reduce their ability to invest in new technology

Source: Company reports, Credit Suisse research

	Growth & Share Gains			Differentiation				Financial		Additional Factors	
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PAYA	◐	◐	◕	◐	◐	◐	◐	◕	◐	◐	◔
	- Integrated Solutions segment generates its entire revenue from is entirely integrated payments with ISV partners and accounts for ~2/3 of Paya's total revenue in 2021+	- Paya generates its entire revenue from the US and is one of top 10 card-not-present acquirers in the US	- Paya was spun out of Sage (ERP software system), and has integrations with Sage (its largest ISV partner) along with numerous other ISVs (including Intuit Quickbooks, Acumatica etc.), more than 1/3 of their volumes are B2B (many via integrations with ERP)	- Paya Connect is the company's fully integrated, proprietary payment platform that allows software developers to quickly create flexible, secure, and cost-efficient payment and commerce solutions	- Paya is typically integrated with a front-end CRM system (i.e., Salesforce), and a back-end accounting system (ERP, such as Sage), making it an integral part to A/R operations for B2B payments (Paya's largest vertical exposure)	- Paya Connect offers quick and scheduled e-Invoicing with click-to-pay functionality, helping businesses get paid faster and post back to partner's software and simplifying account reconciliation	- Paya offers multiple pricing options for ISV partners, including simplified swipe/non-swipe, interchange, and tiered structures, with consumer facing service and convenience fees for card and ACH, and check transactions provide flexibility for Paya's partners	- With a dedicated M&A team, Paya will continue to opportunistically make strategic acquisitions to enhance scale, expand into new verticals, add product capabilities and embed payments in vertical software	- Operating leverage is limited to an extent by the referral share paid to distribution partners, but will also allow Paya to scale its business quickly, and could allow for future downward negotiations of share agreements, as well as a potential transition to more direct sales	- We believe a higher portions of US card volumes will be driven by card penetration in payment flows outside traditional PCE payments, currently with a mere ~5% penetration in all other categories including B2B, G2B, B2C, and G2C where Paya is more heavily exposed	- Paya competes with a large number of merchant acquirers that provide integrated payments solutions to customers within its existing verticals, including niche players and horizontal acquirers, as well as the acquiring arms of FIS, FISV, & GPN
	- Within Payment Services, the ACH business (<20% of Paya's total revenue) is a combination of integrated and non-integrated payments; the integrated portion expands Paya's integrated TAM and enables cross-selling ACH into existing base of integrated card customers	- While Paya ranks atop the CNP processor ranks, it is undoubtedly a higher relative rank amongst B2B processing, and has a vertical specific advantage when compared against incumbents, given its roots borne out of Sage	- Paya's distribution approach leverages VAR and ISO partners to sell its payments solutions, with >50% of volumes distributed via partners	- Tailored to its core end market verticals entities with complex payment needs. Paya Connect also ensures that software partners can easily consume new features and services while keeping them fully compliant with industry regulations	- Paya has several value added services which are business and consumer facing, directly attributable features such as e-Invoicing, back-end reporting integrations, split funding, tokenization, etc.	- Paya Connect enables flexible reporting for organizations large and small with complex data needs to support their organizational hierarchies	- Paya has a degree of benefit from scarcity (a level of lack of competition in its verticals), allowing it to charge convenience fees; as a result Paya receives ~80 bps and ~90 bps from Integrated Solutions and Payment Reseller businesses, respectively, net of interchange	- Paya has set 3 criteria for M&A targets: strategic, accretive, and integrated, as it seeks to bring value to the acquired businesses that allow for accelerated growth, willing to re-invest cost synergies into marketing to increase top line growth	- Paya has guided to longer term 35% EBITDA margins, which we view as achievable, but outside of our forecast period, likely in 2026 or 2027	- With revenue from Integrated Solutions expected to grow at mid- to high teens and non-integrated payments (Payment Reseller) staying flattish, integrated card payments will account for a higher portion of Paya's revenue going forward, strengthening Paya's growth profile	- Inertia is a large competitor for Paya (and other B2B payments processors), as the industry is dominated by legacy paper and check based files, with significant manual processes, there is risk that the status quo continues for many in the middle market
	- Paya is one of top 10 US card-not-present acquirers, with the vast majority of its card volume being card-not-present	- Paya is a Top 20 provider of payment processing in the US; as of December 31, 2020, Paya served >100k businesses, representing >$33b in card and ACH payment volume in 2020 which it expects to increase to well over $40b	- Paya leverages a direct salesforce for a portion of its sales (not an immaterial amount, > ~40%)	- Paya Connect features omni-channel payment capabilities, capable of accepting credit and debit cards, ACH or electronic funds transfer transactions, electronic benefit transfer, and FSA transactions in both card/check present and non-present use cases	- For its ISV partners, Paya has a dedicated team providing personalized service to top 40 partners and 400+ premier customers	- Paya Connect offers secure storage of all cardholder information to enable recurring payments, and the Account Updater provides a direct connection with card networks to keep the stored payment method updated if a card is lost, stolen, or expired	- Paya's ACH business receives ~$0.65 per transaction, and generates separate services fee revenue on top of that	- Paya has made four acquisitions since late 2018, enabling it to enter the non-profit vertical and expanding its offerings as well as scale in the government and utilities, non-profit, and healthcare verticals	- Paya has a proprietary in-house ACH processing system via its Paya Connect platform, which is more cost efficient compared against the typical processor arrangement where back-end processors are used (although Paya does not process cards in-house)	- The integrated portion of Paya's ACH business is expected to offer attractive growth at low teens, and this is TAM-expansive rather than a competitor to card, with cross-selling ACH into Paya's existing base of integrated card customers presenting a large opportunity for revenue growth	- Government contracting typically has a level of risk with contract renewals and sensitivity to funding provisions at a federal and state level, and often times are subject to strict RFP processes

	Growth & Share Gains			Differentiation				Financial		Additional Factors	
	eCommerce & Software exposure	Geographic Mix & Scale	Partnerships & Distribution	Product & Innovation	Proximity to Customer	Additional Services	Pricing Power	Benefitting from M&A/Cash	Operating Leverage	Emerging Areas of Upside	Threats (Competitive, Regulatory)
IMXI	◔	◑	◕	◑	◕	◑	◑	◑	◑	◕	◑
	- Predominantly an offline, in-store business, particularly given the focus on Mexico and Guatemalan markets (higher portion of under-banked consumers)	- Focused on the largest (~$33b in 2018 volumes vs. industry of ~$690b) and most profitable (~$5 gross profit per order) corridor in the industry, which is US into Mexico. Taking market share from incumbents in this corridor	- 6k+ sending agent locations in the US, selected based on location (high concentration of foreign born consumers) and ability to provide customer service	- On-site the remittance network accessed through an installed, Windows-based application (vs. a web-based interface); means less data loads per transaction (given the interface is local), resulting in faster speeds (~10-20 seconds vs. competitors 1+ minutes)	- Source of revenue generation for sending agents both on a direct (commission paid to agents) and indirect basis (driver of traffic into retail location)	- Launched a GPR/ payroll card in 2019, with distribution through the company's 32 owned store locations (ability to offer lower fees vs. Green Dot, Netspend, etc. due to indirect monetization via additional Intermex wires)	- Intermex mix shift optically reduces overall profitability (any mix shift away from US -> Mexico is likely to be margin dilutive), though like-for-like pricing trends have been relatively stable (comments from both IMXI and WU management)	- Roughly neutral net debt position, providing flexibility to increase leverage to acquire and/or invest when/if attractive opportunities present themselves	- EBITDA margins guided to ~flattish over the near-medium term as mix shift to lower gross margin business (Africa, Canada, El Salvador, Honduras, CA/TX as send states) to be offset by non-transaction expense leverage (despite investment in new markets, GPR card, etc.)	- Growth states, where Intermex has lower share (vs. ~25-30% in more established, stronghold states), with growth rates that have been ~1.5x that of the core stronghold states (which also continue to growth above market rates)	- Generally a competitive industry, particularly around smaller competitors tending to be more willing to discount to attempt share gains (making maintaining a premium service integral to maintaining share)
	- Offers online & mobile transfers, although this makes up a de minimis portion of the business (if and when the demographic group served begins to desire an online product, Intermex will have available, albeit comes with added CAC)	- Receive capabilities in over 20 countries across LatAm and Africa. Volume drivers are Mexico and Guatemala, but generally focused on highest volume corridors in any region (Nigeria is 90% of Sub-Saharan Africa volume)	- Does not attempt to gain ubiquity in terms of agent locations; focused approach provides for quality customer experience (interview agents, credit worthiness, provide with faster technology, etc.), with agents 4x as productive as industry average	- Emphasis on "time to live" in customer service, i.e., getting a live customer service representative fast, helping to decrease cancellation rates (currently stand at less than 1%, well below industry averages of ~mid-single digits %)	- Agent locations based in convenient, densely populated (foreign born) areas within targeted neighborhoods, with new agent locations driving ~half of growth (vs. ~half SSS)	- Began partnering with employers in Q3 2019 (working to bring workers to the US from Mexico and sponsor their visas); beneficial to the employer (reduce paper check cost) and the employee (saves check-cashing fees)	- Industry wide pricing compression more concentrated in online transactions, which typically appeal to banked customer sets and corridors (e.g., US -> India, where online would be a higher portion of the mix for highly skilled workers in the US)	- Prior to 2012, acquired Servimex, Americana, and Maniflo to extend their footprint to additional states (but has not made any acquisitions since)	- Focused approach allows for reduced overhead (vs. being in ~200 countries with a larger fixed cost base to maintain licenses, compliance, etc. in those markets); allows for additional focus and expertise on the customer, compliance, regulations of core markets	- Africa inbound (~$9-10b volume TAM, similar to Guatemala) and Canada outbound (~roughly the size of Texas) - both launched during 2019, with Canada enabling additional inbound markets due to its diversity (many equally split send geographies internationally)	- Any real or perceived threat related to taxation of remittances (i.e., into Mexico and Guatemala) at a national level, along with any efforts by states to introduce taxation (e.g., Oklahoma currently has a tax, Tennessee and Georgia have laws being proposed)
	- Mobile application only launched in July 2019 with ~4k downloads 1st four months (vs. WU had 1mm+ over the same period), partially explained by underbanked mix, but a trend to watch as underbanked get increasing access to financial services	- Targeted approach to send locations in the US through highly dense Latin-born population states/ neighborhoods. In a similar light, key "growth" states have been identified (CA, TX, UT, AZ, etc.) for targeted expansion into highly dense foreign populated areas in those states	- Bank partner white labeling expands reach into banked customers (more typically users of online, where CAC is high - but not a concern in a white-label deal); typically ~$2-$3 net per wire (not too dissimilar from ex-Mexico/Guatemala wires)	- Sizable amount of capex investment ("millions of dollars on capex for our technology") in and also maintenance of highly operational call centers (1 in Mexico, 1 in Guatemala); supports ~8-second answer time (live service) operating extended hours (until midnight)	- GPR / payroll card increases stickiness of customer relationship (i.e., increased engagement, more daily usage when used as primary card/account), in addition to the Interpuntos loyalty program (drives ~1/3rd of volumes)	- Interpuntos loyalty program (began 2014) allows customers to earn points for transacting with Intermex. Points can be redeemed for discounted fees. Program members transact 3x non-members, with 85% of cards actively transacting	- Continued share gains supportive of the brand and potential leverage with customers and/or agents (i.e., traffic driver for retail locations)	- Public company with equity as a currency for M&A increases choice in deal funding relative its previous private status	- Agent startup cost synergies from expansion / increased focus into geographies that have agent overlap (both send & receive side). On the send side, agent start-up costs are ~$2.5k per location, and take 2-3 years to ramp (which can be avoided using existing agents)	- White labelling of the platform, leveraging additional capacity and expanding reach (i.e., into a more banked consumer base, via bank partnerships); large bank partner established with ~3.5mm Guatemalan customers in the US	- Regulations around money-transfer: 1) Bank Secrecy Act regulated by FINCEN (KYC/AML); 2) Dodd-Frank regulated CFPB (disclosures); 3) additional requirements related ID (transactions over $3k), fraud prevention/ detection, etc.

Source: Company reports, Credit Suisse research

What do we like in a payments stock?

Large TAM + share gains/mix + unit economics + "call options"

We prefer companies that show

- Aforementioned sector-specific factors such as meaningful exposure and/or best-in-class capabilities in Software-led payments, eCommerce payments, and/or SMB exposure
- Large total addressable markets (of which almost all payments companies have, by definition)
- Unit or volume share gains, either currently or expected over the near to medium term (either due to lack of competition or a more attractive/sticky offering relative to competitors)
- Unit economics, either via stable pricing (and high incremental margins) or mildly reduced pricing (i.e., tiered volume discounts) successfully driving growth
- "Call options" or areas of upside not properly valued or understood by the market (e.g., new business, new product launch, partnership potential)
- Management teams with strong track records of meeting and/or exceeding guidance and expectations
- Valuation that is reasonable on a growth-persistence-adjusted basis (typically expressed by a ~2- to 3-year forward CAGRs)

We do not prefer companies with

- Lesser exposure or upside related to software and/or eCommerce-based growth
- Decreasing unit or volume share metrics, either currently or expected over the medium term (either due to increasing competition, elevated customer attrition, or a less relevant offering vs. alternatives)
- Deteriorating unit economics, either due to pricing pressure or an elevated need to invest in customer acquisition, particularly when competitors with willfully lower margins are willing to drive up CAC in key channels
- Lack of new business and/or product launch cadence (i.e., lower levels of innovation)
- Less consistency in meeting targets and expectations
- Valuation that appears stretched relative to expectations for growth persistence

Source: Credit Suisse research

Companies Mentioned *(Price as of 13-Sep-2021)*

ACI Worldwide Inc (ACIW.OQ, $32.28)
Adyen (ADYEN.AS, €2647.5)
Affirm Holdings (AFRM.OQ, $109.3)
Afterpay (APT.AX, A$123.89)
Airbnb, Inc. (ABNB.OQ, $160.32)
Alibaba Group Holding Limited (BABA.N, $165.41)
Alibaba Group Holding Limited (9988.HK, HK$160.8)
Alphabet (GOOGL.OQ, $2846.65)
Amazon com Inc. (AMZN.OQ, $3457.17)
American Express Co. (AXP.N, $161.45)
Apple Inc (AAPL.OQ, $149.55)
BTRS Holdings (BTRS.OQ, $10.08)
Bank of America Corp. (BAC.N, $40.94)
Barclays (BCS.N, $10.34)
Best Buy (BBY.N, $112.07)
Bill.Com Hldg (BILL.N, $280.71)
Blend Labs (BLND.N, $16.28)
Bottomline Tech (EPAY.OQ, $42.43)
Capital One Financial Corp. (COF.N, $158.93)
Citigroup Inc. (C.N, $70.52)
Coinbase Global (COIN.OQ, $242.84)
Discover Financial Services (DFS.N, $122.56)
Dlocal (DLO.OQ, $60.97)
EVO Payments (EVOP.OQ, $24.84)
Euronet Worldwid (EEFT.OQ, $129.06)
Facebook Inc. (FB.OQ, $376.51)
Fidelity National Information Services Inc (FIS.N, $124.63)
Fiserv (FISV.OQ, $110.07)
FleetCor Technologies, Inc. (FLT.N, $260.01)
Flywire (FLYW.OQ, $45.63)
Global Payments (GPN.N, $164.77)
Goldman Sachs Group, Inc. (GS.N, $409.26)
Green Dot Corporation (GDOT.N, $50.08)
Home Depot (HD.N, $335.45)
International Money Express (IMXI.OQ, $17.63)
Intuit Inc. (INTU.OQ, $557.42)
JD.com (JD.OQ, $80.17)
JD.com (9618.HK, HK$313.2)
JPMorgan Chase & Co. (JPM.N, $159.86)
Jack Henry & Associates (JKHY.OQ, $168.44)
LendingClub Corporation (LC.N, $29.36)
Lightspeed Commerce (LSPD.N, $118.61)
Lyft (LYFT.OQ, $51.84)
Marqeta (MQ.OQ, $27.4)
MasterCard Inc. (MA.N, $347.82)
MeridianLink (MLNK.N, $25.12)
MoneyGram International Inc (MGI.OQ, $8.9)
NCR (NCR.N, $39.86)
Ncino (NCNO.OQ, $73.6)
Nexi (NEXII.MI, €17.985)
Nuvei Corp (NVEIu.TO, $122.63)
PNC Financial Services Group (PNC.N, $194.46)
PayPal (PYPL.OQ, $280.49)
Paya Holdings (PAYA.OQ, $10.97)
Payoneer Global (PAYO.OQ, $9.57)
Paysafe Ltd (PSFE.N, $8.46)
Pinduoduo Inc (PDD.OQ, $104.16)
Q2 Holdings (QTWO.N, $84.83)
Repay Holdings (RPAY.OQ, $22.73)
Riskified Ltd. (RSKD.N, $24.9)
Robinhood (HOOD.OQ, $40.6)
Rocket Companies (RKT.N, $16.93)
Samsung Electronics (005930.KS, W76,300)
Shift4 Payments (FOUR.N, $79.11)
Shopify Inc. (SHOP.N, $1476.87)
SoFi Technologies (SOFI.OQ, $15.01)
Splitit (SPT.AX, A$0.385)
Square (SQ.N, $246.68)
Temenos (TEMN.S, SFr137.95)
Tencent Holdings (0700.HK, HK$478.0)
U.S. Bancorp (USB.N, $56.54)
Uber (UBER.N, $40.07)
Usio (USIO.OQ, $6.18)
Verra Mobility (VRRM.OQ, $15.24)
WEX (WEX.N, $175.22)
Walmart Inc. (WMT.N, $145.06)
Wells Fargo & Company (WFC.N, $45.76)
Western Union (WU.N, $21.7)
Wise (WISEa.L, 1025.5p)
Wix.com (WIX.OQ, $214.61)
Worldline (WLN.PA, €70.63)
eBay Inc. (EBAY.OQ, $72.67)
loanDepot, Inc. (LDI.N, $7.25)

Disclosure Appendix

Analyst Certification

Timothy Chiodo, CFA, Moshe Orenbuch and Nik Cremo each certify, with respect to the companies or securities that the individual analyzes, that (1) the views expressed in this report accurately reflect his or her personal views about all of the subject companies and securities and (2) no part of his or her compensation was, is or will be directly or indirectly related to the specific recommendations or views expressed in this report.

As of December 10, 2012 Analysts' stock rating are defined as follows:

Outperform (O) : The stock's total return is expected to outperform the relevant benchmark* over the next 12 months.

Neutral (N) : The stock's total return is expected to be in line with the relevant benchmark* over the next 12 months.

Underperform (U) : The stock's total return is expected to underperform the relevant benchmark* over the next 12 months.

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