UNIVERSITY OF NICOSIA
ΠΑΝΕΠΙΣΤΗΜΙΟ ΛΕΥΚΩΣΙΑΣ

DFIN-511

Introduction to Digital Currencies

Session 9

Digital Currency and Financial Institutions

Objectives of Session 9

- Briefly summarize existing financial services as an introduction
- Explore cryptocurrency financial services as they are at the moment, i.e. exchange centers, merchants and wallets for cryptocurrencies
- Understand the opportunities behind payment as a process with the use of cryptocurrencies

Agenda

- Existing Financial Services: Some Brief Notes
- Early areas of cryptocurrency financial services
  - Exchanges
  - Wallets
  - Merchant Processing
  - Asset Management
- Payments Opportunities?
- The lower levels of Financial Systems and the future
- Conclusions
- Further Reading

Existing Financial Services: Some Brief Notes

What is Financial Services?

Financial Services

Retail /Commercial Banking	Investment Banking	Markets Infrastructure	Asset Management	Insurance
Depository	Corporate Finance/ M&A	Exchanges	Mutual Funds	Life
Lending	Sales & Trading	Custody/Clearing etc.	Mandates	Property & Casualty
Non-Depository Credit Institutions	Underwriting	Stocks	Alternatives	Accident & Health
Domestic Payments	Structured Finance	Commodities	Wealth Management	Specialty
International Payments	Prime Brokerage	Foreign Exchange		Reinsurance
Remittances		Futures & Options		Brokerage

Financial Services are well developed…

Financial Services: Strengths

- Hundreds of years of financial systems development has lead to a very developed and sophisticated field, serving many different needs
- Most consumers in developed countries have a friendly consumer environment:
  - Generally, taxpayer protection for deposits <$100K or so
  - Generally, consumer protection for misuse or fraudulent use of payment systems
  - Makes use of financial system low-risk for an individual user
- Regulation and taxation is quite clear
- Significant trust in financial institutions
- Costs well hidden from consumer and mutualized. Fraud and customer reward costs (aka airline points) are embedded in merchant processing fees and not directly seen by consumer (instead they enter the cost of products)

..but have significant gaps

Financial Services: Areas for Improvement

- Large number of people still unbanked. 60M in high income OECD countries, 2.5B worldwide
- Mixed performance of payment systems. Certain countries have near real-time payment systems (aka Faster Payments in UK) but the United States lags substantially (ACH payments take 1-3 days)
- Major security and fraud costs: Credit card security model not well suited for the electronic age (equivalent of “private key” on card in basic model). Tens of billions of losses annually mutualized and ultimately paid by the consumer
- Mixed performance on remittances. Some country pairs are very competitive and low cost. Others cost 10-12% of transaction. No viable method for small international remittances
- Cyprus “bail-in” in 2013 was the first bail-in of national systemic banks. A one-time occurrence or an ongoing risk?
- The financial sector in the US, Europe since 2008 has required massive taxpayer support to avoid collapse

Early areas of cryptocurrency financial services

Financial Services: Representative Figures

Financial Services is the most profitable industry in the United States (US Department of Commerce):

- It represents 7.9% of US gross domestic product ($1.24T)
- It generates between 30-40% of all US industry profits. This likely reflects some level of barriers to entry in the system
- Total Global Assets Under Management: $63T rising to $102T by 2020

  (PwC 2020 Asset Management Report)
- Currency Trading: $5.3T per day. (Bank for International Settlements)

This is why some investors are excited about cryptocurrencies – even a small penetration of financial services is a huge opportunity

Cryptocurrency financial services

Cryptocurrency Industry: Representative Figures

- Total Industry Revenue: Less than $1B per year, the large majority in mining, exchanges
- Total value of all cryptocurrencies: ~ $13B
- Total Daily Trading Volume in cryptocurrencies is less than $1B per day

Tiny in traditional terms, but still rather remarkable given that Bitcoin was just a white paper about 8 years ago

This is due to the open nature of cryptocurrency – in traditional financial services access to "payment rails" is strictly controlled

Cryptocurrency financial services

First wave of cryptocurrency financial services startups focused on four areas:

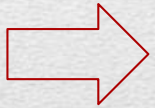
Cryptocurrency Institutions		Existing Equivalent
Cryptocurrency Exchanges	→	Global FX Market
Wallets	→	Depository Accounts (storage and payments function only) Money Transmitters
Merchant Processing Services	→	Merchant Processing Services
Cryptocurrency Funds	→	Investment Funds

Foundational services in Bitcoin

Wallets

Exchanges

Merchant Tools
(for processing payments)



- These three technologies are the fundamental building blocks of cryptocurrency financial services.
- Once they exist in a mature format, they will be the backbone of the payments system and will allow higher order applications. All more advanced financial products will benefit from greater underlying liquidity, superior security and better user experiences.
- As such and in aggregate, they will serve as the payments infrastructure for cryptocurrency, taking on the role of the following areas in the traditional sector:

  Cash | Checks | Debit Cards |
  Payment/Clearing House Networks |
  Wire Transfers | International remittances
  Merchant Processors | Foreign Exchange

Foundational services in Bitcoin

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Exchanges

Merchant Tools
(for processing payments)

Key Bitcoin And Blockchain Adoption Metrics: Price Up 82%, Trading Volume Increased 424%

	Quarterly Total or End-of-Quarter (EoQ)				Year Ago	
	Q4 2015	Q3 2015	Q4/Q3Δ	Q3/Q2Δ	Q4 2014	Δ
Commerce						
Wallets (EoQ)	12,768,681	11,051,719	16%	18%	7,396,772	2x
Transaction Volume (BTC)	384,835,478	350,286,741	10%	7%	291,817,718	1x
Merchants' annual revenue ($bn) (EoQ)	$197	$190	4%	0%	$180	1x
ATMs (EoQ)	536	475	13%	12%	342	2x
Price						
Price (EoQ)	$430.05	$236.25	82%	-10%	$319.7	1x
Exchange trading volume (BTC)	150,025,305	28,615,261	424%	17%	40,041,026	4x
Bitcoin market capitalization ($bn) (EoQ)	$6.5	$3.5	86%	-8%	$4.4	1x
Industry						
All-time VC investment ($m) (EoQ)	$949	$923	3%	10%	$459	2x
Number of VC-backed startups (EoQ)	127	120	6%	6%	90	1x
Media						
Mainstream media mentions	521	411	27%	11%	508	1x
Blockchain						
Number of blockchain companies (EoQ)	54	42	29%	40%	14	4x
Technology						
Network hashrate (billion/second) (EoQ)	743,604,444	457,184,328	63%	30%	313,142,289	2x

State of Bitcoin and Blockchain 2016 CoinDesk 8

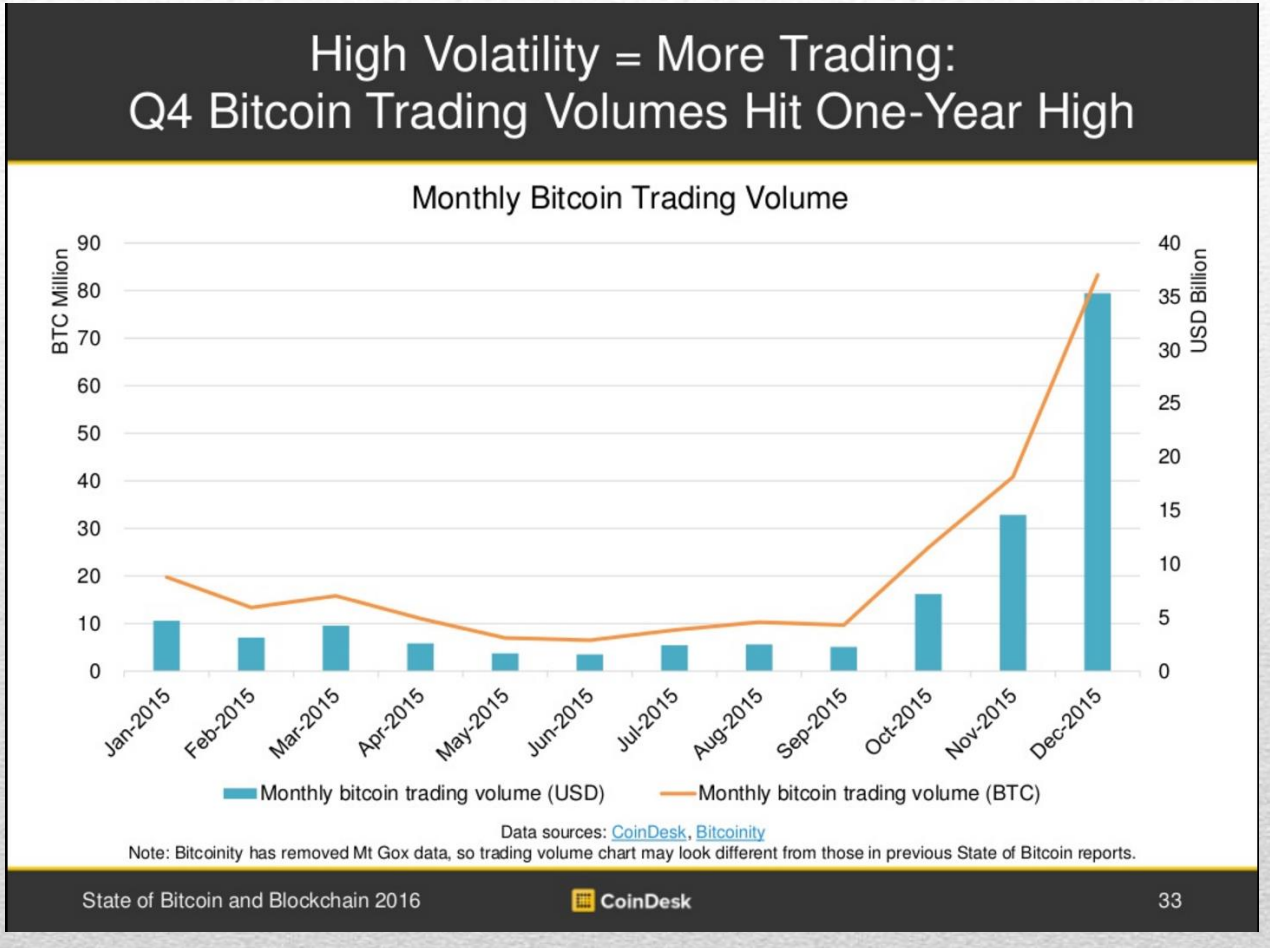
Source: http://www.coindesk.com/state-of-bitcoin-blockchain-2016/

Foundational services in Bitcoin

Wallets

Exchanges

Merchant Tools
(for processing payments)



Source: http://www.coindesk.com/state-of-bitcoin-blockchain-2016/

Foundational services in Bitcoin

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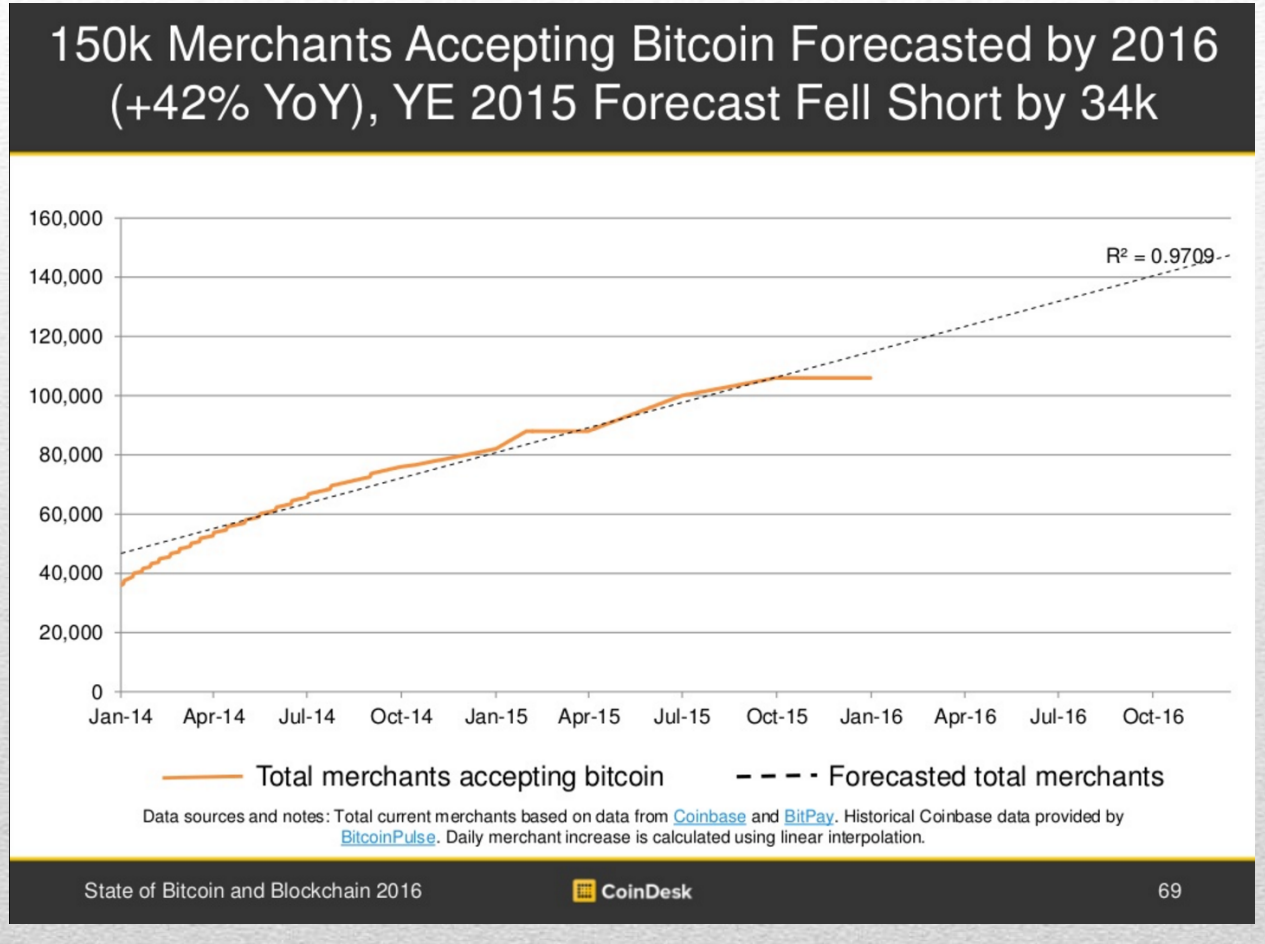


Source: http://www.coindesk.com/state-of-bitcoin-blockchain-2016/

Cryptocurrency Exchanges

Representative Firms

BITSTAMP itBit kraken GEMINI BTCChina 比特币中国

Overview

- Cryptocurrency exchanges allow users to buy or sell cryptocurrencies in exchange for one or more sovereign currencies. They are essentially the gateways in/out of the cryptocurrency world from the existing financial system.
- To date, they have had a chequered history, as many of the early exchanges, including Mt. Gox, the long-standing largest crypto-exchange have lost customer funds, either due to technical errors or misuse.
- Exchanges only exist for a handful of currency pairs, primarily USD, EUR and Yuan (though the Chinese exchanges are under pressure from the Chinese government). Many of the large remittances markets are just beginning to develop exchange services (India, Philippines, Indonesia, etc. More on this on session 12). In most other cases, users often use **localbitcoins**, another ad hoc exchange service that connects local demand to local supply.

Cryptocurrency Exchanges:
Issues/Areas for Development

- **Liquidity**: There is low liquidity in cryptocurrency markets relative to the traditional foreign exchange markets (about 3-4 orders of magnitude compared to traditional Forex Trading). This means it is hard to transact institutionally significant amounts of bitcoins. It also makes the markets more subject to manipulation.

- **Security:** Exchanges have been plagued with security breaches / loss of customer funds, the latest of which is Bitfinex. Future developments will either model themselves on existing custodial models in traditional exchanges (see reading by Richard Brown), multi signature private key management and/or cryptographic proof of funds (like Bitsqaure is doing).

- **Futures**: There is no well-developed futures market in cryptocurrency, though some firms have made a start. Futures provide the ability to lock in currency rates for future transactions and play an important role in reducing volatility in any asset class.

Cryptocurrency Exchanges:
Issues/Areas for Development

- **More currency pairs**: For cryptocurrencies, there are very few currency pairs that are even marginally liquid – each currency area will need at least 1 liquid exchange for cryptocurrency to reach its potential.

- **Regulatory Environment**: There is still lack of clarity on exactly what requirements cryptocurrency exchanges need to comply with. New York State has produced a "Bit License" which we will discuss in the next session.

Cryptocurrency Exchanges: Decentralized or distributed

- Although a number of well-known exchanges have suffered or gone bankrupt recently, a new decentralized and distributed platform named Coinffeine emerged in November 2014 and is still in development since then.
- Coinffeine's innovation is that it is designed to work in a fully decentralized P2P manner, thus ensuring anonymity and increased efficiency, and without requiring a trusted third party.
- Coinffeine theoretically offers the same experience as a traditional exchange but in a fully P2P manner.
- A Spanish bank called Bankinter has been supporting this new exchange.

A fully decentralized exchange has been considered by many in the community as the holy grail of exchanges. Even if a transaction of exchanging bitcoins can be secured against counterparty risk effectively, the main hurdle might still remain: the exchange of fiat currencies for those bitcoins.

Bitsquare

- Bitsquare claims to be a next generation decentralized trading platform, including both cryptocurrency and fiat currencies. In the same avenue as LocalBitcoins they aim to connect the buyers and sellers in as much a P2P as possible, without exclusive control over coins, funds or privacy credentials.

- In a manner not unlike Open Bazaar we already discussed, arbitrators are being used (to some extent, as the system is still in development) to ensure receipt of funds and the release of coins through multi-signature transactions. Arbitrators are incentivized to remain truthful as they have security deposits which far exceed the amounts traded (trades are capped at 1BTC). This still opens up chargeback concerns on the fiat side, therefore the most final ways of transferring fiat are preferable (and PayPal not used at all). Further decentralizing the arbitration system is in the works and should provide a complementary method of security together with a robust decentralized reputation system.

- Bear in mind, that using Bitsquare mandates already having some small amount of bitcoins to be able to lock as a security deposit (so that there's a so called "skin in the game") before you can engage in transactions. This makes it a useless way to buy your first bitcoins, but it provides with a more secure alternative to conventional exchanges once you have even small amounts of it.

More information on Bitsquare can found here and here

Wallets

Representative Firms

Overview

Wallets provide users with a system to hold their cryptocurrency and to make / receive payments with their wallet. These wallets provide features or ease of access that the standard Bitcoin client wallet does not. Wallets are divided into three types, broadly speaking:

- **User Hosted**: These are solutions (like Multibit, Electrum and Mycellium) where the users exclusively hold the private keys (with or without a full copy of the blockchain). That means that the wallet developer cannot access or lose the users' coins or provide information to authorities about account activity. On the other hand, if the user loses his/her password or their wallet is otherwise compromised, there is no recourse and the coins are lost.
- **Web Hosted**: Services like Blockchain.info and GreenAddress provide encrypted wallet hosting on the web. The user takes advantage of their infrastructure to host locally encrypted private keys which the service cannot access. The user still runs a risk of a compromised computer or forgotten password.
- **Fully Hosted:** These are solutions where the wallet provider holds the private key to a wallet. That means they can recover from password losses, but also means the user must trust the wallet provider not to lose the coins or share data with authorities. Multi-signature wallets are an attempt to mitigate the former problem by creating multiple points of failure. In any case, it is not clear in this situation if a user owns coins or just a claim against the company.

Wallets: Issues/Areas for Development

- **Exchange w/Sovereign Currencies**: Some online wallets offer a linkage back and forth to sovereign currencies without being full-blown exchanges themselves. The user experience of the current implementations of this concept is still quite slow – it may take several days to get started – and could use improvement.

- **Security/Insurance:** Consumers in traditional banking system have earned, over time, significant consumer protections, from FDIC insurance to the ability to not pay for fraudulent charges on credit cards. Certain wallet providers have started offering private insurance to start to replicate this protection, at least partially.

- **AML/KYC**: Many exchange/wallet services are implementing homegrown AML/KYC approaches. In time, one should expect practices in this regard to standardize.

Wallets: Issues/Areas for Development

- **Merchant Acceptance**: To date, while merchant acceptance is skyrocketing in percentage terms, it is still small in absolute numbers. The two largest payment processors (Coinbase and Bitpay) serve about 100,000 merchants that accept Bitcoin compared to 29M merchants that accept Visa.

- **Tax Reporting**: No wallets yet support the latest tax reporting requirements though that is expected to change rapidly. Payment processors like Bitpay offer a level of accounting system integration to businesses accepting Bitcoin.

Merchant Processors

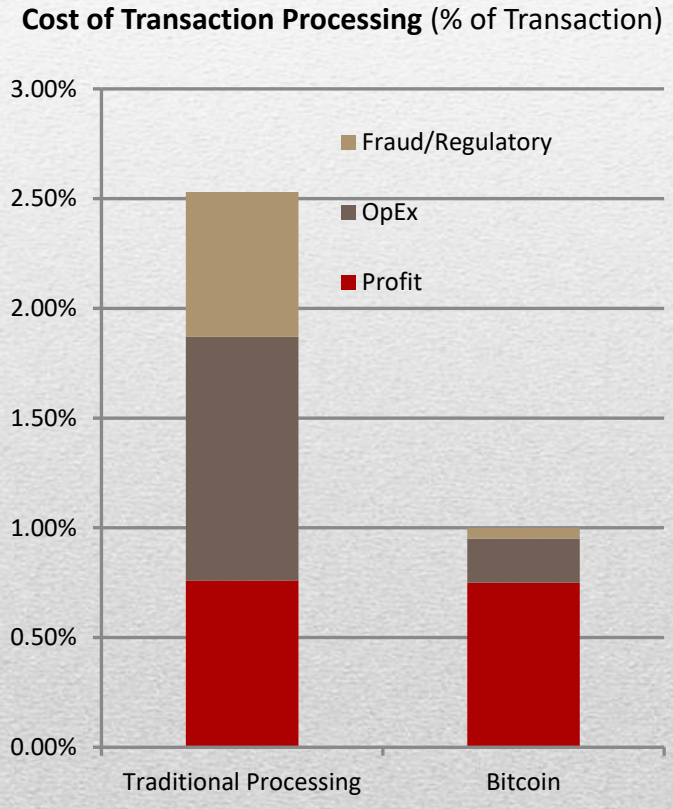
Representative Firms

coinbase bitpay CIRCLE GOCOIN International Payments Platform

Overview

- Merchant processors provide tools to merchants to accept payments in cryptocurrencies.
- They are almost directly analogous to the current merchant processors (First Pay, WorldPay, Elavon, Authorize.net, Square, etc) for current payment networks (Visa, Mastercard, American Express, Discover).
- These tools typically include integration with the merchant's website and shopping cart and then the option to convert the digital currency back to sovereign currency (with no exchange rate risk to the merchant).
- Current market prices are about 1% in processing fees (as opposed to 2-3% for credit card processing) or a monthly subscription model. These lower costs plus the publicity boost that accepting digital currency may entail have been driving merchant adoption.
- It is not clear exactly how much transparency there is about FX spreads to the consumer in these firms (a situation with some parallels to spending in foreign currency with a traditional credit card)

Today, Bitcoin merchant processing appears to have a cost advantage



Source: Goldman Sachs, "All About Bitcoin" report

- As of now, Bitcoin payment processing has a tremendous cost advantage 0.25% vs 1.77% on cost side.
- Fraud costs should be permanently lower in cryptocurrency as it has better security and is irreversible (no charge backs).
- It remains to be seen if compliance/regulatory costs rise over time.
- Some of the profit margins might be coming from opacity in bitcoin/sovereign currency exchange rates, allowing the merchant processors to arbitrage the consumer. It will be seen if that survives in a more liquid world.

Merchant Processors: Likely Initial Areas For Adoption

- **Online Products**: The major value proposition of digital currency merchant processing to date is lower costs. Online firms, particularly in categories like electronics, have notoriously low margins (< 5%). In that context, saving even 1% in merchant processing fees would have a significant impact on profitability.
  - The best-known example to date has been Overstock.com. It estimates that in 2014 (the first year it accepted Bitcoin), that $20-$30M of its $1B in annual sales will be in Bitcoin. Projections were missed by a wide margin, and Overstock reported about $3M in Bitcoin sales in 2014.
  - The fact that online products need to be shipped also means that transaction confirmation times are not relevant.
- **Sensitive Products:** Sensitive areas like medical spending (HIV tests, pregnancy tests), pornography, or political speech might be areas where consumers feel more comfortable transacting in cryptocurrency. Consumers might not want these transactions recorded along with the rest of their payment records and banking history.

Merchant Processors: Likely Initial Areas For Adoption

- **High-Risk Vendors**: Consumers concerned about giving access to their credit card/credit line to "risky" vendors can use cryptocurrency that uses a "push" model rather than a "pull" model. In other words, the customers exposure is limited to the amount the customer proactively sends.

- **International Customers**: Many websites turn away customers from higher risk locations due to fear of chargebacks due to fraudulent card use. Given that cryptocurrency is irreversible, merchants can accept customers from any location without fear of fraud chargebacks.

- **Open Bazaar :** Should OB gain traction and adoption, we can expect several merchants will open stores in it, and since Bitcoin is the only currency accepted on it, it should drive merchant adoption and the interface with payment processors for conversions.

Merchant Processors: Likely Initial Areas For Adoption

- Sberbank, the largest Russian bank has indicated that it sees potential in Bitcoin's blockchain technology, with regards to replacing the existing funds transfer technology e.g. between banks.
- They noted that, *"The current system where 10,000 banks are used to transfer funds can be replaced by the blockchain"*
- In a similar light, the Estonian Bank LHV has also made further links in the digital currency space, by partnering with Coinfloor, a UK-based Bitcoin Exchange, to handle customers' deposits. LHV have said that, *"For fiat deposits, Coinfloor undertakes a number of measures, including proper due diligence (KYC) on each customer. The company goes to great lengths to make sure all client funds are kept with European banks that understand Bitcoin and Coinfloor's business model".*
- *After this fact, several more banks have jumped in either their own ventures or as part of R3, or Hyperledger, or a multitude of other initiatives which have sprung up since early this year.*

Asset Managers

Representative Firms

BITCOIN INVESTMENT TRUST™

Winklevoss ETF, Winkdex, (Gemini)

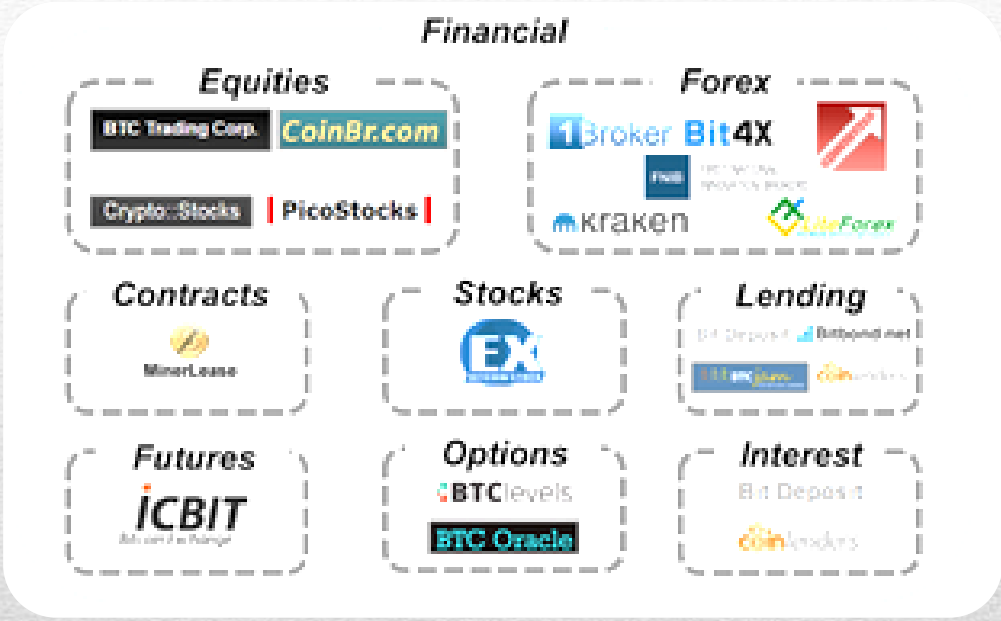
Overview

The cryptocurrency investment trusts or ETFs are vehicles to buy cryptocurrency. Given that anyone can invest in cryptocurrency by buying it directly, these vehicles are more geared towards:

- the convenience of customers who might not want to have to learn how to manage cryptocurrency directly and
- the ease of distribution into traditional investment channels (brokerages, IRA managers and so on)
- Other cryptocurrency "hedge funds" claim that they can earn returns by trading cryptocurrencies (buying and selling them). This would be a direct equivalent to funds that trade in foreign currency and would be something only open to institutional investors.
- This area is only now starting to develop because institutional investors will require larger, more regulated, more secure exchanges in order to be able to trade on them.
- These asset managers are the most straightforward cryptocurrency financial services firms. They are not trying to displace or disrupt any part of the existing system and will fit in naturally among the wide range of other existing investment options

More Financial services in Bitcoin

- Forex
- Equities
- Lending
- Stocks
- Contracts
- Futures / Options



Most of these services try to emulate highly regulated conventional instruments but take advantage of the legal uncertainty that exists in this (at best) uncertain regulatory environment. New regulatory rulings by relevant authorities may impact the operation of these services significantly.

Source : http://thefinanser.co.uk/fsclub/2014/07/the-most-irritating-and-most-wonderful-thing-called-bitcoin.html

More Financial services in Bitcoin

- Forex
- Equities
- Lending
- Stocks
- Contracts
- Futures / Options

Overstock.com has launched T0 (TeeZero) a regulated yet decentralized stock market which may soon be presented to US-based investors.

Nasdaq's OMX Group Inc. has been testing a new use of Bitcoin's blockchain technology, to transform the trading of shares in private companies. According to Nasdaq Chief Executive Robert Greifeld, *"Utilizing the blockchain is a natural digital evolution for managing physical securities".*

Nasdaq's Private Market platform has more than 75 private companies signed up, and it aims to revolutionize the systems that have facilitated the trading of financial assets for decades.

More information on their latest test can be found here : http://www.wsj.com/article_email/a-bitcoin-technology-gets-nasdaq-test-1431296886-lMyQjAxMTE1MzEyMDQxNzAwWj

Payments Opportunities

Payments: The Opportunity?

- Estimates of the cost of processing global payments are in the range of $500 billion per year.
- The market capitalization of firms or operating divisions in payments is probably close to $1T.
- Wedbush Securities and CoinDesk estimate the market capitalization of standalone firms in payments to be $458B but that ignores the large payments divisions located inside money center banks and privately held firms (aka First Data, owned by KKR) so the value of this sector is significantly understated.
- Naively, this presents a gigantic opportunity for cryptocurrency based payment systems. However, for them to succeed at scale, they need to solve several distinct items(that would work together in a virtuous cycle if solved):
  - Reduce Bitcoin volatility.
  - Build institutional grade exchanges, wallets and payments processors.
  - Provide clear value to consumers, a task made more difficult given that the key costs of the current system are cleverly mutualized and hidden from consumers.
  - Build trust with consumers and merchants.

Payments: The Opportunity?

It is important to also keep in mind that consumer behavior changes very slowly even in the developed world and basic non-cash transactions (credit cards, cheques, credit transfers, direct debit) have barely penetrated large parts of the world. That might change though with increasing access to the Internet and more options to connect the global market faster.

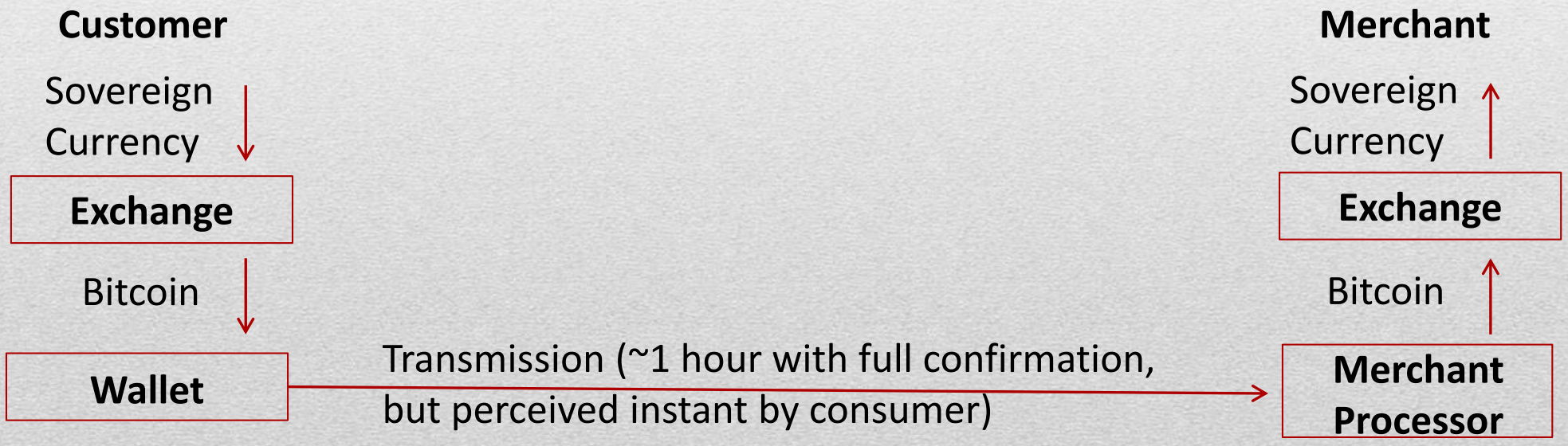
- In 2012, nearly twenty years after launch of consumer internet, only 5.7% of retail transactions in the US were transacted online (US Department of Commerce).

  In 2010, the number of cashless transactions of all types per year, per inhabitant was only 5% in China and 6% in India (BIS).

- Even a superb success story for cryptocurrencies would only see them gaining a very small percentage of payments transactions over the next few years. Taking a meaningful share of global transactions will be a shift with a 10 to 20 year timeframe.

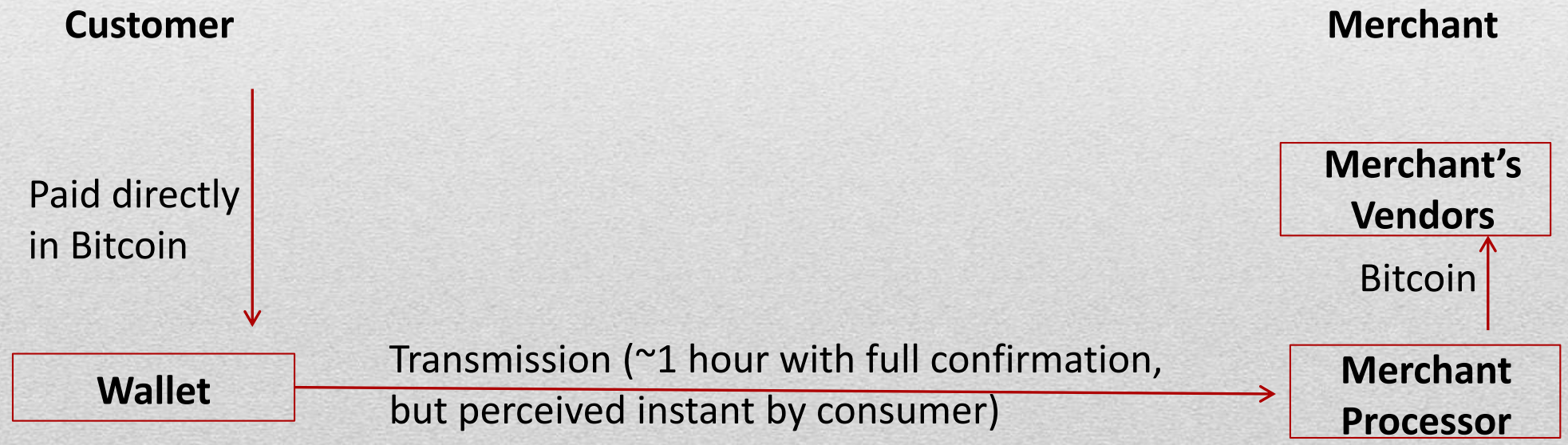
Payments – Consumer Transactions : The Medium Term Outcome?

Today, some, if not all, of the cost savings of cryptocurrency merchant processing are being taken up by the spreads/fees to translate back and forth from sovereign currency. Merchants are receiving most of the savings and might consider rewarding the consumer directly (via lower prices, rewards, etc.) to encourage use.



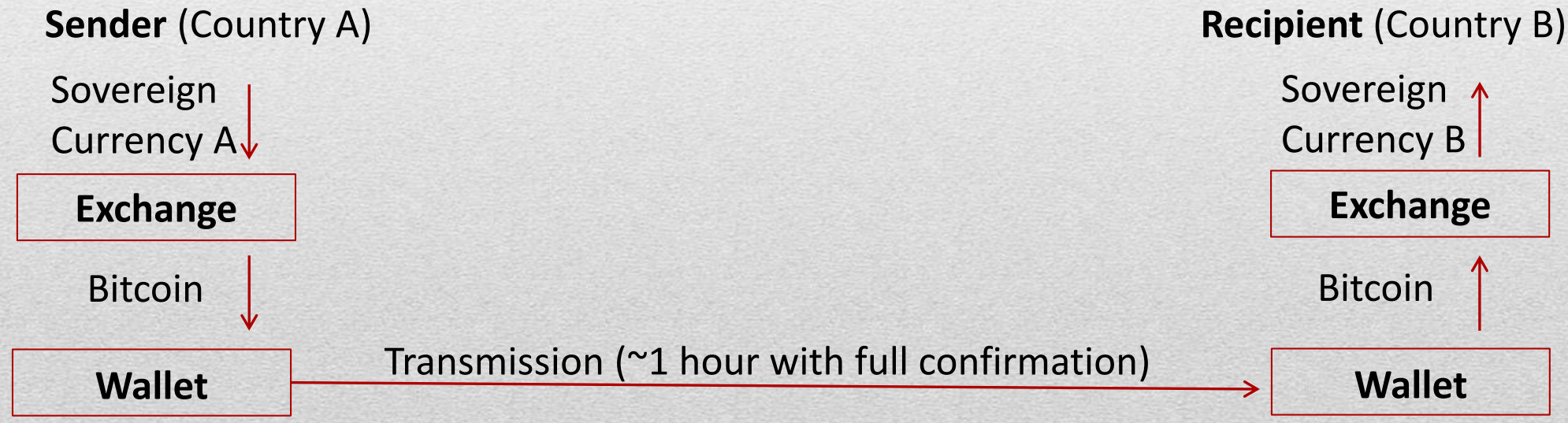
Payments – Consumer Transactions: The Long-Term Outcome?

In a future world where there would be broad merchant acceptance of, say Bitcoin, and sufficient price stability for people to be comfortable holding Bitcoins, payments could then operate in a closed-loop within Bitcoin. This would represent the desired outcome for Bitcoin enthusiasts.



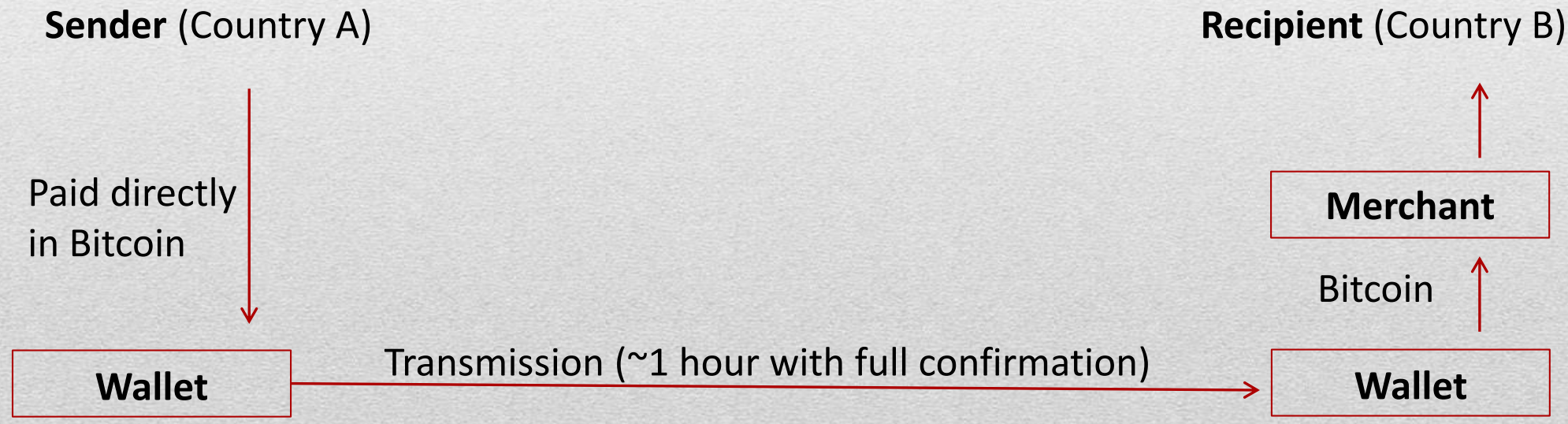
Payments - Remittances: The Medium Term Outcome?

With a fully developed global network of exchanges and easy-to-use wallets, remittances could be done without dedicated remittance providers. Hurdles to overcome will include: (1) Exchange spreads on both sides (the "fees"), (2) other KYC/AML costs, and (3) technological savvy of sender/recipient.



Payments - Remittances: The Long Term Outcome?

In a future world where there would be a broad merchant acceptance of, say Bitcoin, and sufficient price stability for people to be comfortable holding bitcoins, the remittances could happen without exchanges at all. This would represent the desired outcome for Bitcoin enthusiasts.



The lower levels of Financial Systems and the future

But wait… there's (far) more …

We've only scratched the surface of financial systems and the functions they perform in the global economy. Bitcoin and blockchain technology, has perhaps, the profound potential to transform several of the functions that take place in the lower levels of our financial systems' operation. These are the, so called, "plumbing" of how financial systems interconnect, and how they operate.

- These involve how **Settlement** and **Clearing** takes place (How banks and other organizations convey financial information and transfer funds between each other and account holders)
- **Cards** and **Payment systems,** that operate in quite a different manner than we see in Bitcoin.
- **Asset Issuance, Trading, Clearing and Settlement** through which all shares, bonds and stocks are traded
- **Insurance**, **Financial Derivatives** and **Prediction markets** which act to stabilize risk in financial activities
- **Auditing**, **Accounting** and **Financial Controls**, which act as the planning and security mechanisms of financial activity worldwide

Settlement and Clearing

Three basic Systems :

- Gross Settlement Systems(GSS) and Real-time Gross Settlement Systems (RTGS)
  - Each transaction is processed as it happens (not bundled or netted or batched with others) but increases liquidity needs (you need to fund each transaction at a time) and, subsequently, cost of liquidity (more reserves or interest charges)

- Net Settlement Systems
  - Transactions are netted out at the end of the day, so only the 'net' amount is settled but with an increase in intra-day credit risk

- Hybrid Systems
  - Systems that are effectively near real-time systems but look for opportunities to reduce liquidity needs, such as netting of queued orders, or the prioritization of orders, or delaying orders above certain liquidity limits

There's far more similarities to how Bitcoin already operates in this regard, but also stark differences. We examine these in depth in the DFIN 513 course of the Msc, Open Financial Systems.

Payment Systems

Payment systems like VISA, Mastercard, Paypal (and cash) have been the backbone of consumer and merchant payments for decades. As we saw in slide 26, they use "**pull**" systems to draw funds from an account and channel these instructions through a wide and complex network, in which costs are largely hidden from end consumers, and costs and risks are mutualized through to them.

- While an accepted and normal part of everyday life, it is rather staggering if one thinks about it too carefully. A large array of parties may potentially have access to this information including the merchant, the acquirer, the payment processor, the gateway, the network and all of its employees, contractors and vendors.

- **Push** payments like Bitcoin and MPesa, theoretically are more secure in that:
  - only two parties have access to the payment information, the payment provider and the consumer device
  - only the transaction at hand is at risk (not the whole account)

Push payments open up a new set of challenges in that they make consumer end-points (browsers, phones, etc) the most important point to protect, and they make the user ultimately responsible. This in itself presents complexity but significant opportunity as well, as we examine in depth, in the DFIN 513 course of the Msc, Open Financial Systems.

Assets

The basic function of how Real Assets and Financial Assets are traded is split into three functions and this is inevitable, given the much faster cycles required by trading (now down to the milliseconds) vs. settlement (still measured in multiple days).

- Trading: Matching bid/ask orders among traders
- Clearing: Everything that has to be done between trade and settlement
  - Order reconciliation
  - Risk/credit management
  - Handling failure states
  - Etc
- Settlement: Actual transfer of the securities, cash to execute the trading promise

While development of platforms to provide for the decentralized issuance, trading and settlement of assets on the blockchain, has progressed significantly in the last 2 years since it was introduced, the linkage to the physical world, actual delivery or underlying assets is still far from perfected and NASDAQ's experiment is ongoing. What role could new constructs like sidechains or the lightning network, on top of the blockhain, play in transforming this important market function?

Financial Derivatives, Insurance and others

Insurance is chiefly, a practice of “pooling” or aggregating risks, while financial derivatives aim to anticipate or foresee the outcome of one event. The nuances between Insurance, Derivatives and Gambling are subtle and often not too hard to confuse.

Whether to hedge the risk of a potential future event or generate a gain from it, these industries are important pieces of the global financial system, highly regulated and hugely impactful in the global business environment.

Several challenges still exist, for the insurance industry to harvest the potential advantages that blockchain solutions might provide :

- Underwriting
- Claims management
- Solvency reporting
- Regulatory oversight

In DFI513, we examine how close and how far an application for these markets is, and what elements it would need to exist.

Auditing, Accounting and Fin. Controls

Accounting has been an integral part of how businesses and countries operate globally, how tax systems operate and function, and how financial planning and budgets takes place. Moreover, it additionally provides a system of authority and accountability in financial decision making and corporate governance globally.

How could an immutable ledger with global, or local, transparency and specific transaction rights help us improve existing systems, accounting standards, taxation and financial planning and controls ? Probably, more ways than one.

For a company, it could algorithmically provide transparency and internal corporate governance controls and accountability by using multi-signature transactions to ensure everyone involved is participating, specifically structured HD wallets for intra-department spending, etc.

Could such systems scale to work on a government level ? Could tax authorities use such systems to easily account for customer purchases and directly correlate them with business earnings ? Would such a structure allow citizens to audit their governments and how would that impact political processes?

We examine these (and more) further in DFIN 513, Open Financial Systems, in the Msc in Digital Currency.

Conclusions

Conclusions

- Financial services is an extremely complex, extremely large and extremely profitable industry, protected by significant barriers to entry. It serves the needs of developed world consumers reasonably well, but leaves a large percentage of the population unbanked and imposes significant mutualized losses on customers and taxpayers

- Early investment to date in cryptocurrency-based financial services has focused on “building block” technologies like exchanges, wallets and merchant processors.

- This is a logical starting point as this infrastructure is needed for higher-order financial services to emerge. Asset management (aka Bitcoin funds) are also under development but they fit in more comfortably into the existing financial system

Conclusions

- Cryptocurrencies have to trigger a virtuous cycle of market liquidity, consumer acceptance and merchant acceptance in order to reach their full potential as a payments system. Theoretically and at scale, they should represent a more cost-effective and more integrated system. They only reach their full promise however if they can start serving in a closed-loop capacity without constant exchanges with the existing financial system and sovereign currencies.

- Many businesses will need to be rebuilt and duplicated across national borders or currency zones. This means that the overall globalization of financial infrastructure will require significant time and investment.

- More firms are starting to see potential in Bitcoin's blockchain technology e.g. in terms of interbank funds transfer or settlements, including r3cev.

Further Reading

All About Bitcoin (Goldman Sachs)
http://www.paymentlawadvisor.com/files/2014/01/GoldmanSachs-Bit-Coin.pdf

Bitcoin Exchanges Are Much More Centralized Than Traditional Exchanges. We Can Do So Much Better
http://gendal.wordpress.com/2014/03/02/bitcoin-exchanges-are-more-centralised-than-traditional-exchanges-we-can-do-so-much-better-than-this/

Why the Payment Card System Works The Way it Does
http://gendal.wordpress.com/2014/07/05/why-the-payment-card-system-works-the-way-it-does-and-why-bitcoin-isnt-going-to-replace-it-any-time-soon/

The Fierce Battle For the Soul of Bitcoin
http://www.wired.com/2014/03/what-is-bitcoin/

Optional: Innovations in Retail Payments (Bank of International Settlements, Committee on Payments & Settlement Systems) http://www.bis.org/publ/cpss102.pdf

7 Wall Street Firms Test Blockchain for Credit Default Swaps
http://www.coindesk.com/blockchain-credit-default-swaps-wall-street/

Further Reading

PwC - Consumer Intelligence Series Report
"Digital Disruptor - How Bitcoin is Driving Digital Innovation in Entertainment, Media and Communications"
http://www.pwc.com/us/en/industry/entertainment-media/publications/consumer-intelligence-series/assets/pwc-consumer-intelligence-series-bitcoins-entertainment-media-communications.pdf

Deloitte Center for financial services Report: "Bitcoin - The new gold rush?"
http://www.deloitte.com/assets/Dcom-UnitedStates/Local%20Assets/Documents/FSI/us_fsi_BitcointheNewGoldRush_031814.pdf

Deloitte University Press – "Bitcoin Fact. Fiction. Future." http://dupress.com/articles/bitcoin-fact-fiction-future/

KPMG Press release – "Bitcoin and beyond: what role for Gibraltar's gaming industry?"
http://www.kpmg.com/gi/en/issuesandinsights/articlespublications/pressreleases/pages/bitcoin-possibilities.aspx

Ernst and Young Article – "Bitcoin should not be seen as a currency"
http://www.theguardian.com/technology/2013/dec/11/ernst-young-warn-bitcoin-payment-problems

More Banks join R3CEV
http://www.reuters.com/article/2015/10/28/global-banks-blockchain-idUSL8N12S2OG20151028

Further Reading

Spanish Bank Backs Decentralised Bitcoin Exchange Coinffeine
http://www.coindesk.com/spanish-bank-backs-decentralized-bitcoin-exchange-coinffeine/

Overstock Invests in Broker-Dealer Ahead of Decentralised Stock Market Launch
http://www.coindesk.com/overstock-medici-pro-securities/

LHV Bank Partners with Bitcoin Exchange CoinFloor
http://www.coindesk.com/lhv-bank-partners-with-bitcoin-exchange-coinfloor/

Sberbank-Backed FinTech Investment Fund Sees Blockchain Potential
http://www.coindesk.com/sberbank-blockchain-investments

A Bitcoin Technology Gets Nasdaq Test
http://www.wsj.com/article_email/a-bitcoin-technology-gets-nasdaq-test-1431296886-lMyQjAxMTE1MzEyMDQxNzAwWj

Private and Public Blockchains
http://www.americanbanker.com/bankthink/private-distributed-ledgers-miss-the-point-of-a-blockchain-1077435-1.html

Questions?

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