

## The market implications of Libra and other stablecoins

### A primer and stability analysis

- Unlike free-floating cryptocurrencies, stablecoins are designed to minimize price fluctuations, in some cases by tying their value to collateral (including fiat currencies and assets).
- Libra is the most high profile such token, owing primarily to the significant network externalities created by its association with Facebook...
- ...and more recently central bankers appear to have started seriously considering a supranational multi-currency-backed token as a replacement global reserve asset.
- Rather than opine on the likelihood of success for this project, we consider the stability risks introduced in any scenario in which stablecoins have a global and systemic footprint.
- Though e-commerce is primarily associated with C2B and C2C transactions, the vast majority of these payments are B2B...
- ...which subjects any Libra or other stablecoin-based payments system that takes on a significant share of these transactions to the intraday liquidity requirements of a high turnover network like Fedwire.
- Without overdraft or other short-term credit markets to redistribute cash and maintain payment chains, such a system would be prone to gridlock, particularly under stress.
- Though underbanked populations could be less at risk of payment gridlock, they make up a very small fraction of global economic and payments activity, even after including shadow economies.
- As designed, Libra relies on the income from collateral in the Reserve Account to fund network maintenance and other costs, as well as to compensate Libra Association members...
- ...but with most major currencies subject to negative yields, it is unclear how such a system could continue to function if the collateral is a cost rather than a revenue source.
- The need to impose transaction costs as rates decline—especially when they turn negative—could worsen and prolong recessions by acting as an escalating tax on consumers and businesses as conditions worsen.

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## Libra and other stablecoins: A primer and stability analysis

What follows is both a primer on stablecoins in general and a detailed discussion of two key stability risks introduced by some designs. **But first we cut to the chase:**

**First**, high-turnover payments systems require short-term liquidity facilities, particularly daylight overdraft provided by a non-economic central authority, to avoid gridlock—especially under stress. For an asset-backed stablecoin like Libra, this is difficult if not impossible to implement by construction.

**Second**, the underbanked populations likely make up a small fraction of global payments volume, even after folding in the shadow economy. This means a world in which Libra or another stablecoin is successful is one in which its activity is dominated by developed markets—and by extension B2B transactions with its associated reliance on intraday liquidity.

**Third**, any system that relies on reserve asset income to fund operational and other ongoing costs becomes unstable in a negative yield world. With more than half of high-quality short-term sovereign debt already negative, the vast majority of the remainder made up of U.S. government securities, and trends pointing towards global monetary easing, a fully negative yielding Libra Reserve has become a plausible (some would argue likely) risk. The need to impose transaction costs as rates decline—especially when they turn negative—could worsen and prolong recessions by acting as an escalating tax on consumers and businesses as economic conditions deteriorate.

### Introduction

Though media and market focus has waned as Bitcoin and other cryptocurrencies have fallen significantly off their 2016 peaks, the technology has not gone away (see [Facebook](#), D. Anmuth et al., 6/18/19, [Blockchain and Cryptocurrencies](#), J.P. Morgan Perspectives, 1/24/19, [Decrypting Cryptocurrencies](#), J. Loeys et al., 2/9/18). Rather, it has evolved, and in some ways we have arguably learned the most valuable lessons of that bubble: volatility is a severe impediment to broader adoption. Extreme price fluctuations severely undercut the utility of cryptocurrencies as a store of value and, as a result, severely limit their use in true economic activity and commerce. Even today, there is evidence that Bitcoin remains primarily a vehicle for speculation<sup>1</sup>.

This highlights what we believe to be the more durable benefits offered by this innovation. As has been highlighted in prior work (see above), at base cryptocurrency is arguably more about crypto than currency. In other words, more efficient and resilient information transfer and storage via distributed ledger technology has many more applications and use cases than simply monetary.

**Along these lines, the community has prioritized the ledger over the currency to some extent in shifting towards tokens designed to minimize price fluctuations relative to other financial assets and fiat currencies.** Though not yet live, the

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<sup>1</sup> A [recent report by Chainalysis](#) found only 1.3% of Bitcoin transactions involved merchants in the first quarter of 2019.

most prominent cryptocurrency that has identified itself as a stablecoin is Libra, a project driven by Facebook. Such high profile sponsorship and associated network externalities create significantly greater potential for adoption and integration into global financial markets and payments than other currencies, in our view. Facebook is not the only large institution discussing such things; more recently, Governor Carney of the Bank of England [voiced support](#) for a similar project intended to provide a truly global reserve currency. But these are only two examples of a family of cryptocurrencies with strong ties to more traditional market instruments.

**Before we begin, a caveat: we are not explicitly arguing for or against the likelihood of success of the stablecoin project—or cryptocurrencies more generally for that matter.** Doing so would require careful consideration of the (potentially significant) remaining technological—e.g., scalability of a particular blockchain—and regulatory—e.g., the willingness of governments and central banks to allow integration—hurdles to these kinds of projects. These are perhaps more fundamental considerations, but beyond the scope of what we seek to accomplish here. Instead, we consider the market and stability implications of widespread use of Libra and/or other stablecoins as a medium of exchange and store of value. **In this sense, for this analysis their success is assumed in constructing our scenarios, and we proceed from there.**

To date, there has been quite a bit of discussion of the macro risks posed by this technology. First and foremost, a wholesale shift towards alternative currencies without government backing could significantly reduce the efficacy of monetary policy. Further, P2P digital money—even coins issued and backed by familiar central authorities (e.g., [The long, uncertain road from bitcoin to Fedcoin](#), M. Feroli, 10/20/17)—runs the risk of disintermediating the commercial banking system, disrupting credit creation with negative consequences for growth. **Less focus, however, has been paid to the impact on financial infrastructure, and in particular the potential instabilities introduced by design decisions.** In the case of Libra or an alternative global reserve currency, there is an advantage to undertaking this kind of analysis when the project is in its infancy, and seemingly small changes can have an outsized impact down the road. **Particularly with stablecoin-style tokens now being discussed—even in passing—by some central authorities as a global reserve asset, these considerations become that much more critical to the stability of global payments.**

## A brief primer on stablecoins

**With that in mind, we first consider the various families of stablecoins that have been proposed and/or launched.** Broadly speaking, they fall into three categories: **asset-backed, sponsored, and algorithmic.** We summarize this family tree with some examples in **Exhibit 1.**

**Asset-backed tokens derive and maintain their value by being exchangeable for other assets<sup>2</sup>.** Most analogously to more traditional currencies, these assets can take the form of commodities like gold—Digix Gold is one such example. They can also

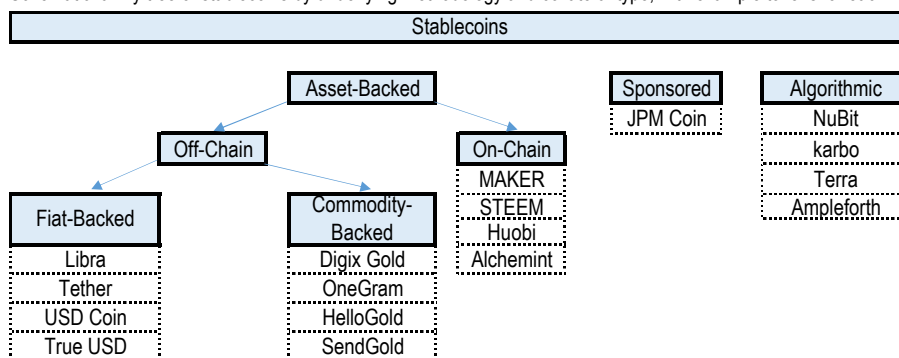
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<sup>2</sup> Though in theory exchangeable for the underlying collateral, it is important to note that the mechanism by and circumstances under which the holders of asset-backed stablecoins could actually receive this collateral is highly uncertain and generally unregulated. The management of those assets is also unregulated with very limited transparency. In the case of a basket, the holder could also receive a cheapest-to-deliver subset of the collateral, and in that sense is short a delivery option to the reserve manager.

take the form of fiat currencies, either in the form of bank deposits or securities. By far the largest of these is Tether, which as of this writing has a market capitalization in excess of \$4bn, making it the seventh largest token and nearly 10x larger than USD Coin. Both of these stablecoins are generally referred to as off-chain, meaning they are backed by non-crypto assets. Alternatively, there are on-chain stablecoins, which can reference a basket of free-floating cryptocurrencies.

**Exhibit 1: Stablecoins can be broadly split into asset-backed, sponsored, and seigniorage-style (algorithmic), and the asset-backed can be backed by a mix of on- and off-chain collateral**

Schematic family tree of stablecoins by underlying methodology and collateral type, with example tokens for each



Source: J.P. Morgan, Blockdata.tech

**Sponsored stablecoins are backed by an agreement with a sponsor institution.**

In the case of the prototype JPM Coin as currently contemplated, for example, they are freely exchangeable for a USD-denominated credit<sup>3</sup> to a J.P. Morgan deposit account. In this way, they can be easily converted into fiat currency and in theory should have a strong anchor to their value. Another distinguishing feature of coins sponsored by banks is that they can be designed to be exchangeable for FDIC insured fiat deposits and therefore could be considered higher credit quality than some asset-backed coins.

Finally, there are **seigniorage-style, a.k.a. algorithmic, stablecoins**. These essentially amount to rules-based monetary policy taken to the extreme: new coins are automatically created (or “minted”) and destroyed (“burned”) to target a stable exchange rate versus a reference fiat currency or basket.

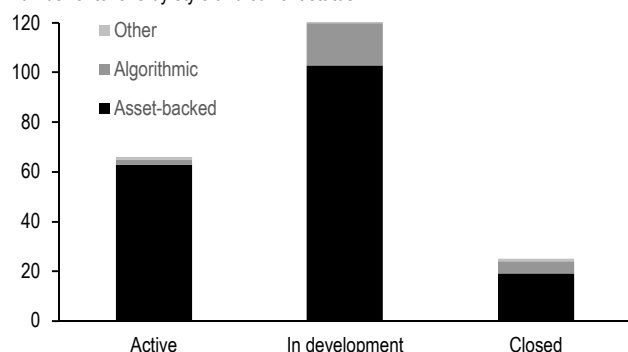
**Recent trends suggest the market has broadly coalesced around asset-backed stablecoins (Exhibit 2).** A recent report from Blockdata.tech, for example, finds that 95% of the roughly 66 currently active stablecoins use this approach. Though there was a bit more diversity among the 134 new tokens in development at the time the report was published, 77% of those were also asset-backed. It is also worth noting that of the 25 stablecoins that have been closed, 20% were algorithmic, and roughly half of the remainder were linked to gold rather than fiat currency.

<sup>3</sup> One key difference between the prototype JPM Coin as currently contemplated and most stablecoins is the private and closed nature of its network. By some definitions, this does not qualify as a cryptocurrency. Rather, JPM Coin and other similarly designed tokens are better described as a more efficient protocol for book transfer payments on a closed network, the unit of which has been termed a “coin” but which bears only a passing resemblance to most cryptocurrencies. However, the concept of sponsored transferability as an anchor, as opposed to explicit asset-backing, is one that in principle could be applied to future stablecoins on public networks.

**Libra has unsurprisingly received disproportionate attention since its announcement earlier this year.** This has less to do with its design than its sponsor, in our view: with over 2.4 billion monthly active users, Facebook is a powerful and valuable platform for the promotion of a new digital currency. In this sense, we think it's useful to focus specifically on its proposed collateral pool, the potential for growth, and what impact its success might have on financial markets. That is with the important caveat that the Libra project remains in very early stages, with details subject to change.

**Exhibit 2: The vast majority of stablecoins, both active and in development, are asset-backed**

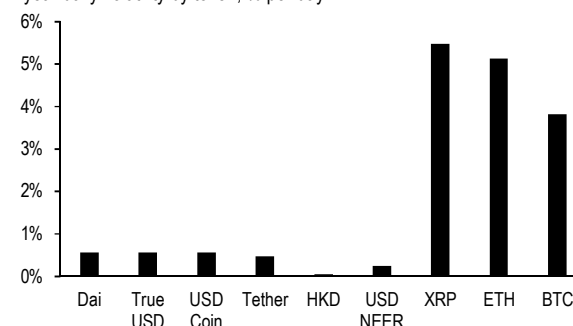
Number of tokens by style and current status



Source: Blockdata.tech

**Exhibit 3: USD-backed stablecoins exhibit much lower volatility than their freely floating cousins, but are still much more unstable than pegged fiat currencies**

1-year daily volatility by token; % per day



Source: J.P. Morgan, coinmetrics.io

The first question we can ask is: does fiat currency backing work in practice? For this we can compare the daily volatility in several stablecoins pegged to USD to larger free-floating cryptocurrencies. **The results suggest that even in arguably very nascent form these pegs are effective at suppressing daily volatility: roughly 0.5% per day versus 4-6% for XRP, ETH, and BTC (Exhibit 3).** To be clear, 0.5% of daily volatility in FX markets is far from stable. In fact, not only have pegged currencies like HKD posted much lower levels of vol over the same period, but even the trade-weighted U.S. dollar is less volatile. That said, it is plausible that observed inefficiencies in stablecoins reflect a relatively thin and under-developed market. Presumably better liquidity would alleviate much of this volatility, helping further improve stablecoins' function as a store of value and facilitating adoption.

### **A large-scale payments system without short-term credit for settlement liquidity is inherently unstable**

Given some empirical evidence that fiat currency-backed tokens are much more stable, we turn our attention to implications of their success. Naturally, this is a big "if." The regulatory hurdles facing Libra and its cousins are substantial, to say the least. In addition to reports of significant regulatory scrutiny in the U.S., multinational organizations have voiced concerns and highlighted the need for extensive study and risk management as well<sup>4</sup>. However, **rather than opining on the likelihood of widespread adoption, we consider the direct impact such an event might have on financial markets.** In particular, we consider the financial stability implications of a large, Libra-based global payments system to rival those tied to fiat currencies.

<sup>4</sup> See for example [Big tech in finance: opportunities and risks](#), BIS 2019 Annual Economic Report, 6/23/19 and [Update from the Chair of the G7 working group on stablecoins](#), 7/18/19

To do so, we start with the amount of Libra that would likely be required to safely and reliably operate such a system. Two features are key to this estimate. **The first is the nature of settlements in most cryptocurrency-based payments: real-time gross settlement (RTGS),** meaning all transactions are cleared instantly and there is no netting. Similar mechanisms are currently common among the large value payment (LVP) systems—e.g., Fedwire in the U.S., TARGET2 in Europe, etc.<sup>5</sup>—that form the backbone of global transfers and dominate global payments volume (90-95% across most major jurisdictions). In this sense, we have some empirical evidence to rely on when considering their behavior in normal times and under stress.

The second is the volume and nature of that activity. For this aspect, we focus on e-commerce activity that would likely be a first mover to a stablecoin-based payments system. Data collected by the UNCTAD suggests that the vast majority of that volume occurs in B2B format, rather than among or to consumers (**Exhibit 4**). That is not to say Libra is likely to be dominated by these types of transactions. However, it does suggest that a world in which stablecoins are used for a significant fraction of e-commerce is also one in which the players are predominantly B2B. **Were Libra or something like it to constitute a systemically important currency and payments system, it would likely behave similarly to operational corporate wholesale bank deposits: high turnover with relatively small average balances compared to gross activity.** Though there are important differences worth keeping in mind, this suggests that LVP systems like Fedwire are a reasonable if imperfect analogy.

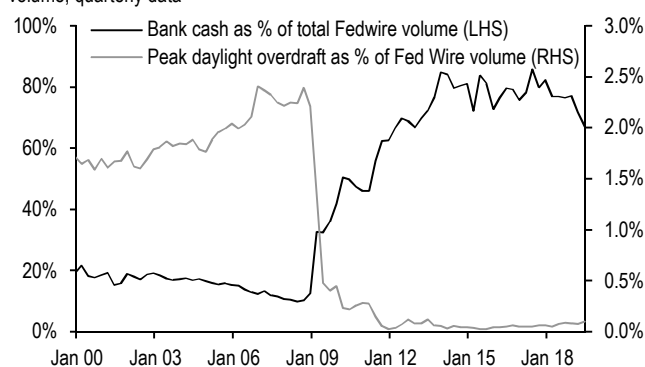
**Exhibit 4: The vast majority of global payments occur in large value payment systems, and e-commerce makes up a modest share even of those remaining retail payments**

Payments data by country as of 2017

Country	Retail & Fast Payments		E-Commerce Volume		
	Amount, \$bn	% of total pmts	Amount, \$bn	% of retail	B2B Share
United States	\$65,654	5%	\$8,883	14%	90%
Japan	\$26,712	5%	\$2,975	11%	95%
China	\$47,282	12%	\$1,931	4%	49%
Germany	\$3,704	5%	\$1,503	41%	92%
Korea	\$18,362	15%	\$1,290	7%	95%
United Kingdom	\$8,781	9%	\$755	9%	74%
France	\$6,572	16%	\$734	11%	87%
Canada	\$4,380	6%	\$512	12%	90%
India	\$1,741	9%	\$31	2%	91%
Italy	\$1,816	1%	\$23	1%	93%
Top 10	\$185,005	7%	\$18,637	10%	87%
Global Total	\$204,854	6%	\$29,367	14%	87%

Source: J.P. Morgan, BIS, UNCTAD

**Exhibit 5: The payment system effects of a larger Fed balance sheet provide an invaluable experiment in intraday liquidity requirements of institutions' RTGS systems at different levels of underlying cash**



Source: J.P. Morgan, FRB

**A critical difference between fiat currency RTGS systems and cryptocurrencies in general—including stablecoins—is the availability of short-term extensions of credit for settlement liquidity.** For the Federal Reserve System, there are both private and public venues to do so. The Federal funds market allows for the temporary redistribution of reserves among banks, from those with excess liquidity to those with a shortfall. Alternatively, the central bank extends credit in the form of daylight overdraft, in which temporary new reserves are created to relieve shortfalls. This effectively bridges timing mismatches between receipts and payables that would

<sup>5</sup> For details on global payments systems in major and larger economies, see the most recent [Red Book](#) from the BIS Committee on Payments and Market Infrastructure.



otherwise lead to significant frictions and gridlock in the payments system (for a theoretical discussion, see also [Beyeler et al., 2006](#)). For example, if a bank has an opening balance of \$20 and owes \$100 before noon, but expects to receive \$90 before the close at 6:30pm, it can resort to either borrowing the reserves from another bank with an excess (e.g., buying Fed funds) or overdrafting its Fed account if that payable is late in arriving and not miss the deadline.

**This allows Fedwire and other RTGS systems with very high account turnover to operate stably on relatively small stocks of cash.** It is also particularly important to allow the payments system to continue operating during unexpected events—e.g., the September 11, 2001 attacks, which rendered several large Fedwire nodes unable to process instructions ([McAndrews & Potter, 2003](#)). **It is also worth noting that a public source of temporary settlement liquidity (e.g., Fed daylight overdraft), in being immune from market distortions and the laws of supply and demand, is particularly valuable during these periods of unforeseen stress.**

As proposed, Libra and other stablecoins—all cryptocurrencies, for that matter—have no such short-term credit markets. In being fully asset-backed, their design is somewhat inconsistent with daylight overdraft or similar facilities, since there is no central counterparty with authority to mint temporary coins for this purpose, and it would be impractical to source collateral for such short periods. **This suggests the ratio of volume to cash in such a payments system must be sufficiently low as to make overdraft unnecessary.** Thankfully for our purposes, the Fed conducted precisely this experiment when it expanded its balance sheet as part of QE: as excess reserves increased and member banks were able to more easily run higher opening balances, overdraft activity essentially vanished (**Exhibit 5**). This also led to much earlier payments overall, which further reduced the risk of timing mismatches to trigger short-term disruptions that risk cascading into much larger events (see [McAndrews & Kroege, 2016](#)). This not only applies to the system as a whole, but to its smaller participants in particular (see [Copeland et al., Liberty Street Economics, 2/25/19](#)). Based on this experience, **we estimate that roughly \$600bn of stablecoin would be required to facilitate \$1tn of daily transactional activity without frequent disruptions** (defined as less than 0.1% peak daylight overdraft). That said, given a lack of daylight settlement liquidity, we would argue more conservative levels are likely necessary, since even isolated disruptions in payment activity can have cascading consequences if they occur in key nodes. **Conservative design calls for targeting a cash-to-volume ratio that is calibrated to times of stress, rather than normal operations.**

This highlights a key risk posed by the sequencing of growth in a global stablecoin. As usage expands, merchants and service providers will increasingly accept these tokens as payment at the same time as new coins are minted. **One could imagine a scenario in which payment activity expands faster than the available stock of the currency's ability to safely facilitate those transactions under stress.** Under those circumstances, the risks posed by this setup would be masked by smooth operation in normal times. By the time tail events do materialize, stablecoin-based payments could have grown systemically important, making the macroeconomic and financial consequences of significant disruption similarly destructive. This would be compounded by any run from Libra and other stablecoins due to currency and credit events or, as we discuss below, problematic shifts in global monetary and bank regulatory policy.

This could be addressed in two ways. The first would be to implement liquidity-saving mechanisms. These systems delay and aggregate transactions to allow for

netting and are much more efficient. In the U.S., CHIPs (LVP) and ACH (retail) are highly efficient while allowing for same-day settlement. We estimate these venues allow U.S. institutions to facilitate \$100 of gross payment activity with less than \$10 of cash on hand (see [The financial stability benefits of very abundant reserves](#), J. Younger et al., 2/21/19). **In this sense, incorporating some capacity to allow for netting by delaying payments that are not truly needed urgently into stablecoin payment systems would enhance their stability.**

The second would be to conduct an extensive study of existing payment systems, with the results used to inform restrictions or incentives in the minting and burning of stablecoin, as well as regular monitoring of risks to the payments system. Libra, in particular, is set up well for this kind of supranational regulatory infrastructure, given a governing Libra Association, a gatekeeping role played by authorized resellers of the currency, and a closed network for the first five years. In principle, **part of the responsibility of these resellers could also be to provide short-term liquidity to major participants in the payments system, to further mitigate the risk of abrupt and significant timing shifts to trigger cascading disruptions.**

**Tokens issued by central authorities do not suffer this limitation.** A dollar-backed token issued by the Fed, for example, could in principle benefit from the same or comparable liquidity facilities currently enjoyed by participants in Fedwire. However, this benefit primarily arises from the fact that such a token would be issued by fiat and not backed by collateral; Fedcoin would only be a 'coin' to the extent it exists on a distributed ledger. This brings up a host of questions about who should be given access to such a network, but they are beyond the scope of the currency itself. In other words, a Fedcoin or equivalent token from another central authority would likely in practice simply be a technology upgrade to the payments system, rather than a truly decentralized and/or alternative venue.

## What about the underbanked?

**A reasonable retort to the above would be: what about the underbanked?** The Libra White Paper is quite clear that financial inclusion is a key motivation for their project. Were this segment of global consumers to drive the growth of this or another similar currency, it would presumably be more about P2P than B2B payments. And, as such, one could imagine it would lessen the risk of gridlock by distributing activity across a much larger number of accounts, avoiding issues of congestion at individual nodes.

**The first observation worth making is the relatively small footprint of the underbanked in the global economy.** Based on data collected by the World Bank in 144 countries, global economic activity is unsurprisingly far more concentrated among countries with high levels of financial inclusion (**Exhibit 6**). For example, the 1.5 billion people (~20% of the total) in its sample for which less than 40% have a bank account<sup>6</sup> represent less than 5% of nominal GDP across the whole sample. On its face, this suggests the payments activity associated with these populations is likely to be rather limited.

To what extent do official statistics undercount activity in developing countries? There are well established statistical techniques for estimating the size of the shadow

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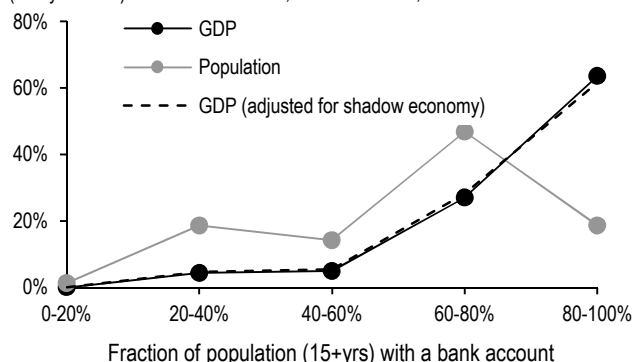
<sup>6</sup> Bank account in this context refers to the definition from the World Bank Findex glossary, which includes deposits at banks and other financial institutions as well as self-reported personal use of mobile money services



economy, the results of which show very clearly that a significant fraction of “true” GDP in developing and underbanked economies does occur in underground markets (e.g., [Median & Schneider, 2018](#)). That said, **we are not talking about an order of magnitude—more like 20-30%, on average, among lower income countries, with some as high as 50-60%.** Further, underground activity makes up a non-trivial fraction of economic output in larger economies as well. As a result, the proportion of world GDP attributable to underbanked economies is very similar after applying these adjustments (again, Exhibit 6).

**Exhibit 6: Though the underbanked represent a significant fraction of the global population, economic activity is much more concentrated among countries with higher levels of financial inclusion ...**

Fraction of global GDP and population in buckets by fraction of adult population (15+ years old) with a bank account, data as of 2017; %



Note: Based on data from the [2017 World Bank Global Findex Database](#). Economic and population data also from the World Bank with the exception of Taiwan (from Bloomberg and the IMF). South Sudan data as of 2016. The sample includes 144 countries. Shadow activity based on estimates as a % of GDP as of 2015 by L. Medina & F. Schneider, [Shadow Economies Around the World](#), IMF Working Paper 18/17, 2018, which covers 92% of the World Bank sample by count and more than 99% by GDP.

Source: J.P. Morgan, World Bank, IMF, Bloomberg, Medina & Schneider

**Exhibit 7: ... and BIS payments data suggest that, if anything, lower income countries, which are also generally underbanked, have lower levels of payments activity per unit economic output**

Statistics for various countries split by World Bank Income Category

Attribute	World Bank Income Category			
	Low	Lower middle	Upper middle	High
2017 GDP (\$bn USD)	\$418	\$6,439	\$22,231	\$50,346
% of World GDP	0.5%	8%	28%	63%
Shadow economy (% of GDP)	35%	29%	21%	13%
% of adjusted World GDP	0.6%	9%	29%	61%
Avg % with bank accounts	33%	44%	62%	92%
GDP-wtd % w/ bank accounts	37%	58%	73%	95%
Non-bank pmt to GDP Ratio*	N/A	8.1	29.3	12.2

\* As of 2016 for countries covered by the BIS Red Book.

Note: GDP and financial inclusion statistics cover the full World Bank sample of 144 countries; shadow economy data covers 92% of that by count and more than 99% by economic output; and payments data is for the subset of 22 countries covered by the 2017 BIS Red Book.

Bank account in this context refers to the definition from the World Bank Findex glossary, which includes deposits at banks and other financial institutions as well as self-reported personal use of mobile money services

Source: J.P. Morgan, World Bank, IMF, Bloomberg, BIS, Medina & Schneider

We can combine this with data for the 22 countries covered by the [2017 BIS Red Book](#) to get a sense of how this maps to payments specifically ([Exhibit 7](#)). Though more limited, this does include some examples of lower middle income countries (per the World Bank definition), for which the average level of financial inclusion is much lower than that of upper middle or high income countries. The results suggest, if anything, the ratio of payments activity to economic output is lower in these less developed economies. Combined with the observation that the shadow economy in these countries only marginally increases their global footprint, we believe it's fair to say that **a world in which Libra is systematically important is a world in which payments in this currency are dominated by larger economies, and by extension B2B payments and with the associated reliance on intraday liquidity.**

**Finally, P2P payments in underbanked populations will not necessarily behave like those in developed economies.** In the U.S., for example, a [CFPB study](#) found that frequent overdrafters typically were younger with shorter tenures as depositors, had lower FICO scores and much less access to traditional sources of consumer credit (e.g., credit cards). At the same time, they had the highest level of gross monthly deposits but lowest average end-of-day balances. In many ways, this population resembles the underbanked globally, and their high-turnover payment activity looks more like B2B than anything else.

## Negative yields pose a significant challenge to fiat-backed stablecoins like Libra

**Libra, as currently proposed, is an asset-based stablecoin tied to multiple fiat currencies.** The Libra Reserve will be set up to manage the collateral pool, consisting of bank deposits and short-term government securities in currencies from “stable and reputable central banks.” We think it’s safe to say this likely refers to large, developed economies like the G10, and particularly avoids significant capital controls. Authorized resellers can mint new Libra by delivering eligible fiat currency cash and securities; equivalently, they can redeem their Libra for the same. In this way, the value of a Libra will vary with this underlying basket and will not be pegged to any one currency. The Reserve will also inherit the monetary policies of the relevant central banks, similarly to currency boards like the Hong Kong Monetary Authority.

The investment policies of this Reserve are set by the Libra Association, a third-party governing body based in Switzerland, and can only be changed with a supermajority vote. Their stated goal, however, is value preservation rather than maximizing returns. Consistent with this, **the holders of Libra do not benefit from any income or trading gains generated by the Reserve; they are instead used to fund day-to-day expenses and development.** Libra Association Members will also receive Libra Investment Tokens (LITs), which represent a pro-rata share of any income or trading gains on the reserve assets, net of these expenses.

This raises the question of whether there is sufficient free float of collateral for stablecoin payments systems to take on a significant volume of retail transactions. **Conceptually, fiat currency-backed stablecoins will function very similarly to central banks with a highly managed exchange rate—a combination of gold standard and currency board.** Net inflows into a given stablecoin can therefore be thought of as a capital account surplus; to avoid appreciation versus the reference basket, those inflows are invested in fiat currency assets against which new tokens (liabilities) are minted—and *vice versa* in the event of net outflows. Thus, the collateral pool functions analogously to an FX reserve manager in emerging economies with a large current account imbalance and explicit valuation targets relative to a reference basket.

Given this conceptual framework, there is optically more than adequate high-quality collateral to provide reserves for such a payment system in aggregate, including more than \$2tn of AAA-rated short-term government securities<sup>7</sup>. Potential issues arise, however, when we consider the global monetary policy environment. As Europe and Japan have abandoned the zero bound as a floor on policy rates, more than a third of global bonds now trade with a negative yield (**Exhibit 8**), including more than half of the front end (the vast majority of which are concentrated in USD and GBP; **Exhibit 9**). This presents a significant challenge to reserve models like what has been proposed for Libra, which rely on income from their holdings to fund operational costs and development work to maintain and improve the network. **In this way, it is unclear how Libra and other similarly designed stablecoins would cope with persistently negative yields on a large proportion of reserve assets.**

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<sup>7</sup> We have omitted short-term CGBs and other CNY-denominated securities from this analysis. This was done under the assumption that capital controls and lack of free float make them very unattractive reserve assets. Consistent with this [COFER data](#) published by the IMF suggests that global FX reserves include a small (~1%) exposure to CNY.

**What if the Libra Reserve were to simply avoid negative yields?** If we restrict this sample to just securities likely to be eligible for Libra collateral, this includes roughly half of the short-term, highly liquid government securities issued by the top 10 countries most active in e-commerce and retail payments (**Exhibit 10**). Of the roughly \$2tn left with a positive yield, more than 70% consists of T-Bills and short coupons issued by the U.S. government. Of that, roughly \$750bn is already held by U.S. money market funds (see [Short-Term Fixed Income](#), *US Fixed Income Markets Weekly*, 7/12/19) and a bit less than \$300bn in foreign official hands (see e.g., the [May 2019 release](#) from the Treasury International Capital [TIC] System). This leaves quite a bit less free float in positive yielding, short-term government assets not subject to capital controls than broader market aggregates would suggest.

**Exhibit 8: Over the past few years negative yields have enveloped more than a third of global sovereign debt ...**

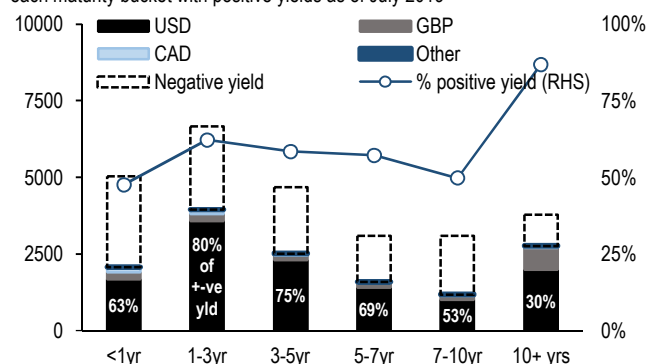
Fraction of GBI constituents with negative yields; %



Source: J.P. Morgan

**Exhibit 9: ... particularly at the front end, where negative yields are the rule rather than the exception**

Outstanding balance of GBI-eligible assets broken out into positive yielding currencies (LHS; \$bn), with % of that amount labeled, as well as % of all bonds in each maturity bucket with positive yields as of July 2019



Source: J.P. Morgan, Bloomberg

**Could the Libra Reserve simply turn to bank deposits as an alternative?** This presents two challenges. **The first is a lack of federal insurance on most large corporate deposits.** This exposes the reserve to counterparty risk, which in principle should sharply narrow the list of banks to those which are a *de facto* substitute for government securities—i.e., large international and well-capitalized institutions that would likely be considered too big to fail in a crisis, and thus enjoy an implicit government backstop. **Second, those same large institutions are subject to liquidity requirements that sharply penalize wholesale deposits<sup>8</sup>.** The high runoff rates assumed in outflows used to calculate the relevant ratios require larger stocks of low-yielding high-quality liquid assets (HQLA; mostly government securities and bank reserves) that negatively impact business performance (**Exhibit 11**). In the U.S., for example, this led to an industry-wide push to reduce exposure to non-operating corporate deposits (see [Deposit non-grata](#), A. Roever et al., 2/27/15)—which would presumably describe Libra Reserve assets.

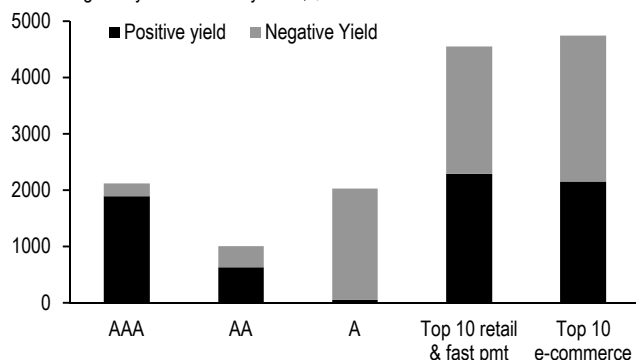
**This is an inherently unstable setup.** Imagine, for example, that Libra achieves its potential as an alternative currency with a significant share of global payments but with reserve assets heavily concentrated in USD and other positive yielding government securities. In such a scenario, **any move into negative rates by the Fed would be a profound shock to Libra.** On the one hand, it would deprive the system of income to meet baseline expenses, which might require passing these

<sup>8</sup> See e.g., [The Liquidity Coverage Ratio and liquidity monitoring tools](#), Basel Committee on Bank Supervision, BIS, January 2013

costs along to some combination of authorized resellers or Libra Association Members. On the other, **it would render LITs not just essentially worthless**, but more akin to a liability than an asset from the perspective of these members. It would be natural to question the value of remaining a member of the Association under those circumstances.

**Exhibit 10: Global financial markets are awash in high quality short-term government debt suitable as stablecoin collateral, but only half offer positive returns**

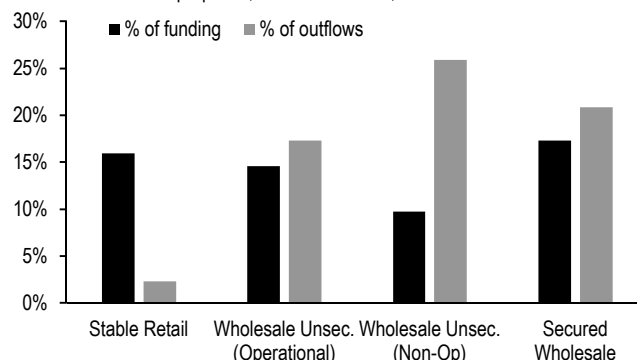
Outstanding balance of government debt with a single-A credit rating and positive versus negative yields as of July 2019; \$bn



Source: J.P. Morgan

**Exhibit 11: Libra Reserve deposits would likely be considered non-operational wholesale unsecured funding, which receives relatively punitive treatment in bank liquidity regulations**

Funding by source among the four largest U.S. banks, fraction of overall funding and outflows for LCR purposes, all as of 4Q 2018; %



Source: J.P. Morgan, company disclosures

**The risk of an exodus and run on LITs could be very destabilizing for the currency, and global markets more generally.** First, it would become much harder to maintain the network in the absence of funding, and in the extreme, of willing participants—a run on LIT, if not the currency. Second, to the extent this results in a substantial reduction in the stock of Libra available for transactions, the risk of payment system gridlock due to liquidity shortfalls would increase as well. At a minimum, persistent negative yields on Libra Reserve assets would likely force a significant redesign of the currency—for example, charging a negative yield on Libra wallets, either through transaction or storage fees. In the extreme, this could make it far more difficult for global central banks to respond to economic or financial shocks without introducing new systemic risk via this channel.

One potential way to continue operating a Libra-based payments system in a low and especially negative yield world is to impose transaction costs when funds run short. This would, however, arguably drive vicious cycles during periods of stress. **Since negative yields reflect challenging economic circumstances, imposing transaction costs would be in some sense equivalent to raising taxes on consumers and businesses in the face of slowing growth.** The implicit rate of this tax would also increase as worsening growth and financial conditions drove rates lower. To the extent Libra-based payments become an important part of the global economy, this would work against monetary policy and potentially worsen and prolong recessions.

## Conclusions

What are we to conclude from this exercise? Stablecoins, and Libra in particular, have the potential to grow substantially and ultimately shoulder a significant fraction of global transactional activity. However, as currently designed and proposed, they do not take into account the microstructure of operating such a payment system. **A lack of short-term liquidity facilities, particularly those relatively insulated from**

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**market forces, introduces the risk that activity grows faster than the underlying base of currency can safely support.** The risk of payment system gridlock, particularly during periods of stress, could have serious macroeconomic consequences. Though underbanked populations could be less exposed to this risk, they make up a very small fraction of global economic activity, even after including shadow economies. **This is exacerbated by the difficulty of operating the Libra Reserve in a world increasingly dominated by negative interest rates.** The interaction between the two poses significant and potentially systemic risks to global payments, and by extension economic growth. Finally, the need to impose transaction costs as rates decline—especially when they turn negative—could worsen and prolong recessions by acting as an escalating tax on consumers and businesses as conditions worsen. They can, however, be addressed by learning the lessons of fiat currencies: liquidity-saving mechanisms and short-term credit are essential, and reserve assets should be thought of as collateral rather than a source of returns.

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