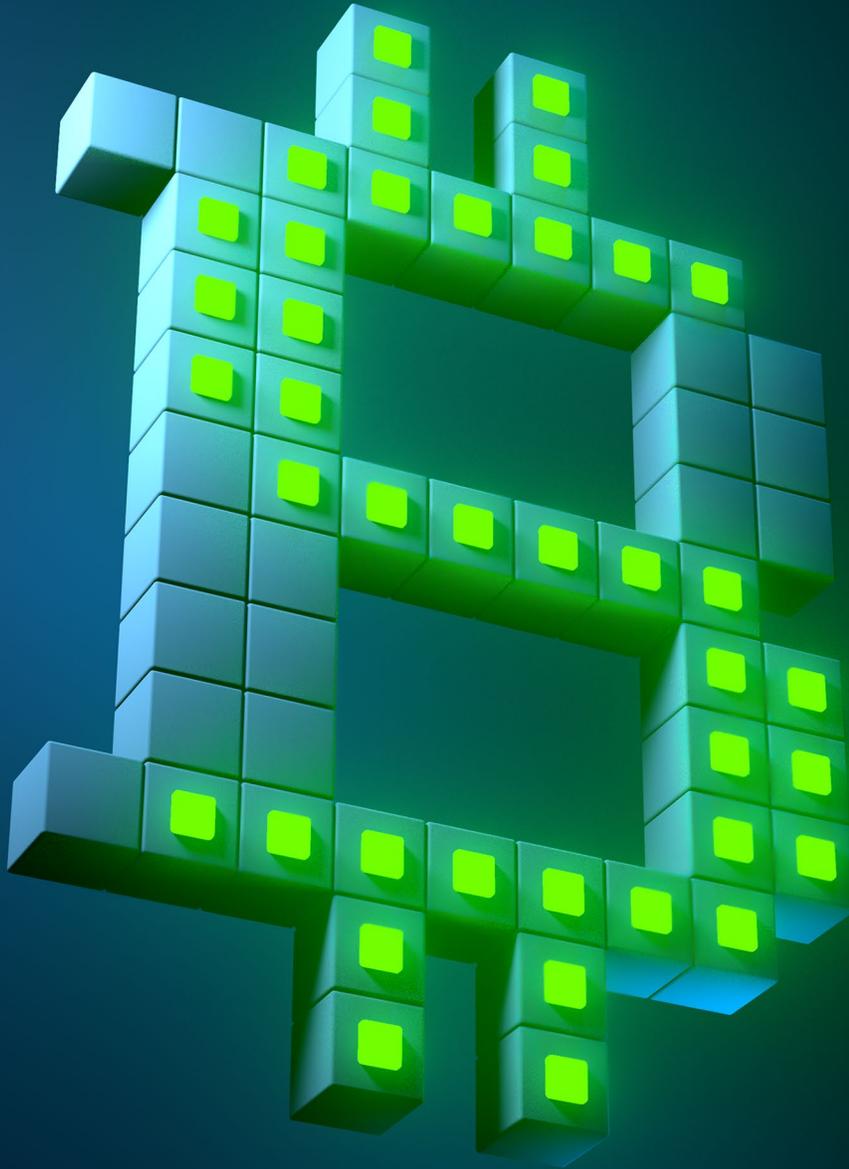


# CRYPTODOLLARS

THE STORY SO FAR



CASTLE ISLAND  
VENTURES

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## ABOUT

# CASTLE ISLAND VENTURES



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Castle Island Ventures is a Boston-based, early stage venture firm which invests in startups building in the public blockchain sector. Started in 2018, we have backed blockchain-adjacent businesses operating in custody, key management, data and analytics, banking, digital media integrity, brokerage, exchange, prime services, API connectivity, gaming, tax preparation, data privacy, internet service provision, and supply chain integrity. Castle Island Ventures was founded by Matt Walsh and Nic Carter, who previously worked at Fidelity Investments.

Cover art by Jason Benjamin ([@perfecthue](#))

## INTRODUCTION

While the public blockchain phenomenon purports to transform many industries, “killer apps” remain elusive. Eleven years after the genesis of Bitcoin, few applications have gained traction, outside of the continued monetization of Bitcoin and the trading and exchange of cryptocurrencies generally. However, in the last year, an unambiguous early success has emerged: simply the notion of fiat tokens circulating on chain. Though initially dubbed ‘stablecoins,’ due to their emergence as a response to volatile ‘native’ cryptocurrencies, they are increasingly being referred to as *cryptodollars* (in the etymological tradition of their conceptual cousin, eurodollars).

Put simply, cryptodollars are cryptographic tokens which circulate on public blockchains and aim to track the return of sovereign currencies. The vast majority of extant cryptodollars are redeemable for actual dollars in bank accounts – this makes them cryptographic bearer assets. The bulk of cryptodollars in existence are backed on a 1:1 basis by digital fiat in a bank account, but in some cases they are backed by asset portfolios like corporate debt, treasuries, cryptocurrencies like Bitcoin and Ethereum, or simply the promise of issuers to defend a peg.

Cryptodollars exist to merge the low volatility characteristics of sovereign currencies like the dollar with the settlement assurances of public blockchains. In short, they allow you to move and settle arbitrary amounts of fiat currency anywhere over the internet with strong finality and few of the encumbrances of the traditional banking system. When integrated into local fiat exchanges (enabling the transfer of bank dollars to cryptodollars), these assets offer some distinct advantages over the current banking system:

- It's trivial to accept a cryptodollar circulating on a public blockchain – all you need is to create a mobile wallet and share an address
- Public blockchains, the infrastructure powering these systems, operate 24/7/365 with virtually no downtime
- Currently, cryptodollars offer users stronger autonomy, privacy, and interoperability qualities than digital dollar services like Paypal, Venmo, or Zelle, which require KYC for users and delist accounts frequently. At present, cryptodollars rely on a “permissioned pseudonymity” model, in which end user behavior is relatively unconstrained
- Unlike the traditional banking system, cryptodollars issuers rely on shared infrastructure (like public blockchains and open standards like ERC20), permitting a fast pace of development and making these systems natively interoperable
- Certain, although not all, cryptodollars have extricated themselves entirely from the financial system and manage to achieve a dollar-denominated return without relying on the financial system
- Individuals in countries with weak or captive banking systems can use cryptodollars to rely on the assurances of foreign banking systems where issuers are domiciled. This effectively allows for the export of property rights abroad
- Due to the ubiquity of crypto exchanges globally, cryptodollars typically have a value as a tradeable IOU, rather than simply because they are a claim on dollars in a bank account. This means that users can rely on cryptodollars without ever having a relationship with an issuer

While cryptodollars were initially created as a value-added service for traders seeking to remain “in crypto” but wanting to de-risk their exposure, they have grown far beyond that niche. In the near and medium term, we believe that dollar-backed tokens are the most directly transformative phenomenon currently occurring in this industry. In the longer term, a global patchwork of crypto-dollar issuers hearkens a return to the “free banking” standard of yore – this time backed by digital commodities rather than gold.

This primer is intended to demystify the cryptodollar phenomenon from both a conceptual and practical perspective. We offer a definition and a taxonomy of cryptodollars, recapitulate their growth to date, and discuss how practitioners are employing these assets. Unlike ‘native’ cryptocurrencies, cryptodollars are

(for the most part) not investable in of themselves. Thus, in this primer we highlight some of the emergent business models that they have brought to bear and discuss how entrepreneurs are beginning to take advantage of the phenomenon.

## DEFINITIONS

Cryptodollars were initially created by industry participants for the simple purpose of maintaining collateral on blockchain rails in a less volatile format. Subsequently, this grew into a much larger phenomenon. As such, cryptodollars have historically been explored mostly with respect to their impact on markets, with their characteristics as functional settlement media largely ignored. Only recently has there been a recognition that these assets are not merely tokens for inter-exchange settlement but have begun to see usage as non-bank dollar substitutes. Definitions have been general. For instance, the ECB in 2019 defined stablecoins as:

“Digital units of value that are not a form of any specific currency (or basket thereof) but rely on a set of stabilisation tools which are supposed to minimise fluctuations of their price in such currency(ies)<sup>1</sup>”

This definition is unsatisfying, as it omits the cryptographic nature of these assets, focusing instead on their stabilization mechanisms. But as we will see, there is something fundamental about the localization of cryptodollars on crypto-financial infrastructure which is worth including in a definition. That said, their emphasis on intentionality and minimizing volatility is useful, as in practice, cryptodollars do not perfectly track their underlying.

As such, our definition of cryptodollars as **cryptographic tokens which circulate on public blockchains and aim to track the return of sovereign currencies** takes note of this. To express the definition in a detailed manner, we consider the conditions are jointly necessary but individually insufficient to denote something a cryptodollar:

1. Ownership is described by a public key infrastructure. An entity is the owner of a cryptodollar if they possess the private key which can permission a spend from an address that exists on a distributed ledger where a token resides. Ownership in some but not all cases exists on a ‘bearer’ basis – that is, possession of the keys entitles the holder to redeem the token for the underlying asset, if applicable.
2. It circulates as a token on an auditable public blockchain, allowing any third party to build software which interacts with the asset. Key metrics like supply are trivially observable by operating a node.
3. It is intended to track the return of some sovereign currency. In the spirit of the comparison to Eurodollars, which does not uniquely specify dollar-denominated assets, we would suggest that ‘cryptodollar’ can be used to refer to tokens which track other sovereign currencies as well.

Thus the ‘crypto’ in cryptodollars can comfortably refer to cryptography. These are, for the most part but not exclusively, cryptographically-encumbered, dollar-denominated bearer assets.

We are choosing to exclude ‘redeemability’ from this definition, as there exist established tokens tracking the return of dollars without giving holders a convertible claim on some underlying reserve asset. And importantly, we do not require that cryptodollars faithfully track the actual return of the USD, for instance, because in practice cryptodollars *target* the return profile of a sovereign currency, while in some cases deviating from the peg periodically. In this sense, they better resemble currency boards.<sup>2</sup>

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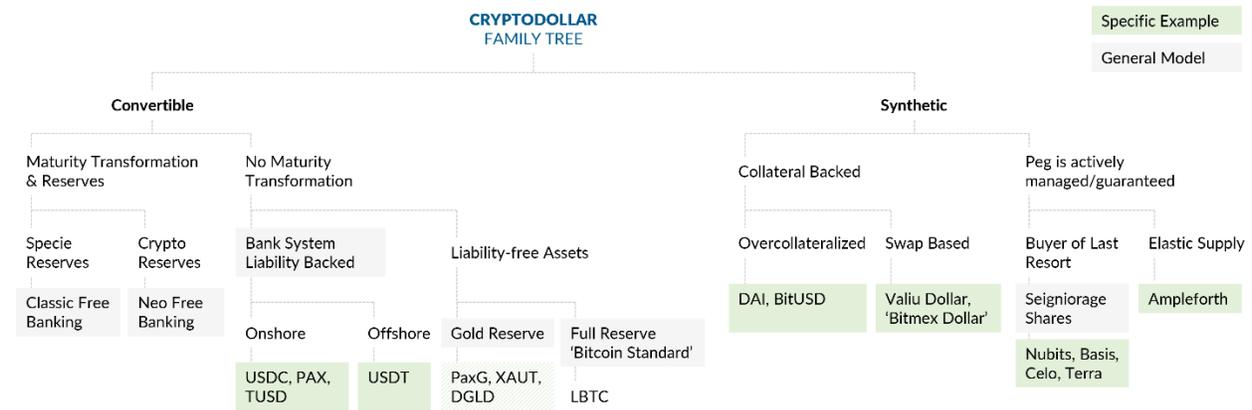
<sup>1</sup> Bullmann, Dirk, Jonas Klemm, and Andrea Pinna. "In search for stability in crypto-assets: Are stablecoins the solution?." *ECB Occasional Paper* 230 (2019).

<sup>2</sup> See Lyons, Richard K., and Ganesh Viswanath-Natraj. *What Keeps Stablecoins Stable?*. No. w27136. National Bureau of Economic Research, 2020.

# TAXONOMY

Several cryptodollar or stablecoin taxonomies have been devised. We would refer you to Clark, Demirag, and Moosavi<sup>3</sup> or Bullmann, Klemm, and Pinna<sup>4</sup> for high quality attempts. In our taxonomy, we wanted to make note of the extreme diversity in cryptodollar schemes that have been deployed, while clearly distinguishing them from the perspective of the user. While other taxonomies have divided projects by backing (or lack thereof), we primarily distinguish classes of projects along the axis of convertibility. While the majority of cryptodollars by monetary base are indeed convertible, alternative synthetic approaches exist, whereby users can expect a target return but cannot redeem their tokens for an asset held in reserve. For the purposes of this taxonomy we will be considering only private monetary arrangements, of which cryptodollars are a subset.

**Figure 1: Cryptodollar Taxonomy**



Broadly, cryptodollars can be divided into tokens which are convertible for some assets held in reserve, and those which attempt to target the return of some reference currency without offering convertibility. Within the convertible camp, you have full reserve approaches with no maturity transformation, in which the issuer holds liquid reserves equivalent to 100 percent of the value of the tokens outstanding. These effectively constitute narrow banks.<sup>5</sup> The vast majority of cryptodollars by monetary base are situated in this category. They can be further subdivided along the axis of where the custodian banks themselves are located and the credibility of the backing. Some cryptodollars like USDC, PAX, and TUSD are issued by US-domiciled entities, with reserves held in US-domiciled banks.

Tether's reserves are held in a patchwork of offshore banks, and the issuer is less forthcoming about the nature of these relationships. The quality of the guarantees afforded to tokenholders is partially a function of issuer and bank jurisdiction. These are heterogeneous on a legal and regulatory basis. The fully reserved and convertible category can be further divided by the reserve type employed. Some issuers offer users fully reserved gold-backed tokens instead of dollars, as gold has a different return profile. These are generally redeemable for physical gold bullion – albeit typically subject to a minimum threshold constraint. A full reserve Bitcoin standard advocated by some<sup>6</sup> would behave similarly, with banks accepting Bitcoin deposits and issuing IOUs redeemable for Bitcoin held in their vaults. Consortia like Liquid are experimenting with this model by issuing assets redeemable for physical Bitcoin like LBTC.

<sup>3</sup> Clark, Jeremy, Didem Demirag, and Seyedehmahsa Moosavi. "SoK: Demystifying Stablecoins." Available at SSRN 3466371 (2019).

<sup>4</sup> See Bullmann Klemm and Pinna (cited above)

<sup>5</sup> For more on narrow banking, see Pennacchi, George. "Narrow banking." *Annu. Rev. Financ. Econ.* 4.1 (2012): 141-159.

<sup>6</sup> For a description of a Bitcoin standard see Weber, Warren E. *A Bitcoin standard: Lessons from the gold standard*. No. 2016-14. Bank of Canada Staff Working Paper, 2016., and Ammous, Saifedean. *The bitcoin standard: the decentralized alternative to central banking*. John Wiley & Sons, 2018.

It's worth noting the existence of issuers operating in a convertible but not fully reserved model. More traditional banking involves transforming liquid deposits into illiquid but productive loans, the proceeds of which are used to pay interest on deposits and finance bank activity. This is the process of maturity transformation. Because the rate of deposits and the return from lending is not perfectly predictable, banks hold reserves with which to honor withdrawals. In the free banking paradigm, which we will cover later, these reserves mostly took the form of specie (standardized gold coins), and notes issued by these banks were redeemable for specie on demand. Arguably, for the duration of the period in which Tether was purportedly not fully reserved, it operated more like a free bank with an asset portfolio consisting of dollars and corporate debt.<sup>7</sup>

Conventional banking does not appear on the taxonomy because it is not self-contained – the 'stability' of the notes issued by commercial banks derives from a state guarantee in the form of depositor insurance, as well as a buyer of last resort and liquidity provider in the form of a state central bank.

Moving to the synthetic side of the family tree, we have more exotic models of stability targeting that do not entail holding a full reserve of liquid assets. These are referred to as synthetic because they involve targeting the return profile of a sovereign currency (typically the USD) without convertibility. Instead, administrators actively manage a peg, in some cases with the assistance of an algorithm or smart contract. Some of these synthetic cryptodollars are backed by collateral, although tokenholders cannot directly redeem their cryptodollars for their share.

In some cases, crypto-native collateral is employed, with the most successful example being the Maker system, which is primarily backed by Ether. Algorithmic risk management and a minimum reserve ratio of 150 percent guides the asset to the peg, with the assistance of interest rates which moderate supply. Another novel approach to obtain dollar-denominated risk in a self-contained manner employs an asset portfolio of long physical Bitcoin and short a Bitcoin swap on a derivatives exchange. This hedging strategy, relying on crypto-financial infrastructure, been productized by issuers such as Valiu to create dollar-denominated tokens for remittance purposes outside of the US financial system.



"Valiu offers Bitcoin-backed financial services in Latin America. We allow people to save and pay each-other in crypto dollars. We also allow people to send fiat to fiat remittances at excellent rates. In both cases we abstract the use of Bitcoin to simplify the user experience.

Valiu makes that happen using a treasury and trading engine that manages both fiat and crypto assets by connecting to custodians and counter parties to hedge BTC, on ramp and off ramp. Valiu offers the closest experience to Cash App or Revolut in Latin America. The only difference is that Valiu is built mostly on top Bitcoin infrastructure.

The impact of cryptodollars could change the course of the whole region for good. Today the dollar's strength could cripple capital markets and cause foreign currencies to collapse, leading to debt defaults, money printing and inflation. We have already experienced it, not just in Venezuela, but in virtually every Latin American country. In the meantime, dollar demand will continue to grow, despite obstacles set up by the US and foreign governments to allow foreigners to acquire the currency.

In the end, everyone in the region, regardless of their socioeconomic status, will be affected by inflationary economies. We believe that Bitcoin-backed synthetic dollars are the most liquid, anti-inflationary and self-sovereign monetary solution for billions of people outside of America and West Europe."

**Simon Chamorro**

Co-founder and CEO of Valiu

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<sup>7</sup> The New York Attorney General claimed in a lawsuit that Tether suffered an \$850m loss and filled that shortfall with a loan from Bitfinex, effectively backing the asset with a loan portfolio of dubious quality. For more see Larson, Erik, Matthew Leising, and Olga Kharif. "Crypto Market Roiled by New Allegations Against Tether, Bitfinex." *Bloomberg*, April 25, 2019. Available online at <https://www.bloomberg.com/news/articles/2019-04-25/bitfinex-operator-accused-by-new-york-of-850-million-coverup>

Lastly, there exist cryptodollars which are not fully backed by a collateral reserve, but instead target a return based on the ability of an issuer or administrator to backstop the value of the token. For so-called seigniorage shares projects, certain entities are rewarded with the spoils of new issuance during times of growth, and are expected to act as a buyer of last resort during confidence crises (when the token loses its peg to the downside). Some high-profile seigniorage shares projects including Basis have been funded, but few have demonstrated the ability to create synthetic stability at scale.

## DISTINGUISHING CRYPTO DOLLARS FROM DIGITAL DOLLARS

In the discourse around digital dollars, there has been a certain degree of conflation between cryptographic bearer assets that are dollar denominated, and digital representations of dollars. Referring to cryptodollars as merely 'digital dollars' is semantically unhelpful, because cryptodollars are only a tiny subset of all of the dollars that exist in digital format. At the time of writing, the US money supply (as measured by the M2 Money Stock) is \$18.2 trillion,<sup>8</sup> of which only \$1.9 trillion exists in hard, physical currency form. The remainder exists in digital format, depicted in the savings deposits in commercial banks, money market mutual funds, the reserve deposits that commercial banks hold at the Fed, and so on. These are dollars in digital format, but they are not cryptodollars. The delivery and usage of these dollar products in banks may entail cryptography, but that alone is not sufficient to describe them as cryptographic bearer assets.

Key differences exist. Primarily, cryptodollars compare with digital dollars in the commercial bank or fintech system along the dimensions of transactional freedom, interoperability, and transparency.

### 1. CRYPTODOLLARS ARE LESS ENCUMBERED

A key design consideration for cryptodollars is the creation of dollar-denominated liquidity outside of the confines of the traditional, US-led financial system. The lack of encumbrances is not just an accidental feature of these systems, it is a core objective. It is no secret that the US banking system is a non-neutral financial network; it is frequently leveraged for political objectives by the US government, whether for the imposition of sanctions, or to disempower specific industries in a discretionary manner.<sup>9</sup> Given that the crypto-financial industry has been historically excluded from the mainstream financial sector, it's no surprise that entrepreneurs chose to pursue the creation of cryptodollars which are partially or fully free from existing transactional constraints.

Additionally, the bearer asset nature of these tokens means that they can be transacted peer to peer, without the necessary oversight of an issuer. While redemption and creation for fiat-backed cryptodollars requires the consent of an issuer (and generally entails KYC and standard compliance requirements), the bulk of transactions on cryptodollar networks do not include the issuer as a counterparty. Rather, transactions occur on a peer to peer basis. While issuers may be generally aware of the nature of transactional activity occurring within the transactional graph (not at the edges, where they authenticate users) through chain analysis, their ability to fully surveil these systems is incomplete. This partial surveillance regime, in which issuer-facing transactions require identity data, but regular internal transactions between users on the ledger do not, has been dubbed 'permissioned pseudonymity' by analysts.<sup>10</sup> The ease of acquiring cryptodollars on third party exchanges, and the growing acceptance of

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<sup>8</sup> Board of Governors of the Federal Reserve System (US), M2 Money Stock [M2], retrieved from FRED, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org/series/M2>, June 11, 2020.

<sup>9</sup> For an example, see Operation Choke point, discussed in Shaul, Dennis. "There's no downplaying the impact of Operation Choke Point." *American Banker*, Nov. 28, 2018. Available online at <https://www.americanbanker.com/opinion/theres-no-downplaying-the-impact-of-operation-choke-point>

<sup>10</sup> See Antony Lewis. "KYC in Stablecoins" *Bits on Blocks Blog*, Oct. 30, 2019. Available online at <https://bitsonblocks.net/2019/10/30/kyc-in-stablecoins/>; and JP Koning. "From unknown wallet to unknown wallet" *Moneyness Blog*, Nov. 6, 2019. Available online at <https://jpkoning.blogspot.com/2019/11/from-unknown-wallet-to-unknown-wallet.html>

cryptodollars in commerce, means that most users of these systems never undertake a relationship with the issuer.

Fundamentally, issuers do not audit each transaction, nor may they be able to. Those cryptodollars which possess issuers generally operate on a blacklist rather than whitelist basis. This means that transactions are permitted by default, and sanctioned activity, when it does occur, can result in blacklisted accounts. This contrasts with the whitelist model, which programmatically prohibits all activity which is not explicitly permitted by the issuer or administrator. Since blacklistings are relatively infrequent, cryptodollar users still enjoy relatively strong seizure-resistance. That said, the blacklist model is not guaranteed to be sustained in perpetuity, and the relatively sparing approach to account freezes by issuers may not last.

Lastly, while redemption for cryptodollars might be jurisdiction-specific, they circulate on public blockchains and are hence available worldwide, anywhere markets for cryptoassets exist. Their primary points of secondary distribution are crypto exchanges, which are ubiquitous, existing in virtually every country. If fiat trading pairs are not available, end users can acquire cryptodollars with cryptocurrencies like Bitcoin, for which liquid peer-to-peer and over the counter markets exist.<sup>11</sup> The existence of crypto-financial infrastructure like exchanges and mobile wallets means that end users can acquire and transact in cryptodollars on a global basis with little restriction.

## 2. CRYPTODOLLARS RUN ON FUNDAMENTALLY OPEN NETWORKS

While digital representations of bank liabilities, sometimes understood as digital dollars, exist on internal bank databases, the ownership for cryptodollars is represented on public blockchains. To transact with cryptodollars, users must prove ownership of a private key through wallet software and broadcast a transaction which is registered to a public blockchain like Bitcoin or Ethereum. To make an online banking transaction, for instance, a user must authenticate themselves to their bank through a password or conventional authentication method, and ask that the bank update their internal database (and if necessary interact with another bank's database through an established messaging system).

The existence of cryptodollars on open, publicly available databases renders them amenable to third party applications by design. Application developers seeking to build wallets, exchange integrations, or smart contracts using cryptodollars do not need to ask permission. Instead they must simply appeal to the holders of cryptodollars directly and persuade them to use their product. Ingesting the property registry for cryptodollars is as simple as running a blockchain node for whichever chain the tokens circulate on. This enables a fast pace of iteration for developers building products for these end users. While certain jurisdictions like the EU have encouraged the rise of "open banking,"<sup>12</sup> endeavoring to treat bank deposits in a similar open manner, this is an aberration rather than the default globally. By being natively permissionless by design, cryptodollars have a significant advantage over the legacy financial system.



"At BlockFi, we have a team of folks from traditional banking and fintech. We're building financial services for the digital asset ecosystem and currently offer the ability to earn interest on stablecoins, receive a loan in stablecoins, or trade stablecoins for cryptocurrency on our platform. Stablecoins are exciting to us for a couple of reasons:

<sup>11</sup> For a description of how peer to peer fiat onramps for Bitcoin work in Latin America, see Matt Ahlborg, "Latin American Bitcoin Trading Follows the Heartbeat of Venezuela," Open Money Initiative, Mar. 24, 2020. Available online at: <https://medium.com/open-money-initiative/latin-american-bitcoin-trading-follows-the-heartbeat-of-venezuela-71a28cb86ba0>

<sup>12</sup> See Kosoff, Jacob, Aaron Bridgers, and Henry Lee. "Europe's new API rules lay groundwork for regulating open banking," *American Banker*, Jan. 21, 2020. Available online at <https://www.americanbanker.com/opinion/europes-new-api-rules-lay-groundwork-for-regulating-open-banking>

- By running over blockchain payment rails, stablecoins create a level of accessibility to dollars that was unavailable under the traditional banking system. Many countries with inflationary fiat currencies restrict or have limited access to dollars, whereas stablecoins improve access and create more options and freedom to access financial services globally.
- They also offer wider distribution of financial services. Fintech companies traditionally struggle to expand internationally due to complex regulations that vary by region. Using stablecoins and blockchain payment rails provides fintech companies with the option to distribute their services at a global scale that simply wasn't possible before.

We think the adoption trend for stablecoins is poised to rapidly accelerate and promote positive structural change over time.”

**Zac Prince**

Founder and CEO, BlockFi (CIV portfolio company)

### 3. CRYPTODOLLARS ARE AUDITABLE

Lastly, as cryptographically verifiable assets issued on public blockchains, cryptodollars can be accounted for in full. This allows third parties to track their flow between exchanges, banks, custodians, it entitles individuals to verify that no covert inflation is occurring, and it allows for precise assessments of market share and economic throughput. And these cryptographically verifiable assets enable third party custodians can prove to the public that they have tokens held on their balance sheet in real time.

Of course, for issuers, the fiat reserves side of the equation can be more challenging to ascertain, and this has historically caused confidence crises with certain issuers,<sup>13</sup> but the liabilities side – the tokens circulating on chain – is transparent. For certain models of cryptodollars like the crypto-collateralized approach, the entire system’s risk can be made transparent, as debt positions are visible on chain. For fiat-backed systems, the issuer must be trusted to a degree, and indeed most issuers do publish periodic attestations verifying that the bank balances backing cryptodollars are present. This has been a space of under-appreciated innovation, as cryptodollar issuer Trust Token has released a system of real-time attestation system, allowing holders of various fiat-backed tokens to verify that bank reserves match IOUs on a real time basis.<sup>14</sup>

The flexibility of smart contracts allows gold-backed tokens to give users a claim on a precise gram or bar of gold, and redeem if directly if desired. This is a more direct model of ownership, without the intermediation that characterizes the majority of gold ETFs. The auditability trait of cryptodollars is a considerable differentiator relative to digital fiat and standard securities.

<sup>13</sup> See Larson, Leising, and Kharif, cited above [7]

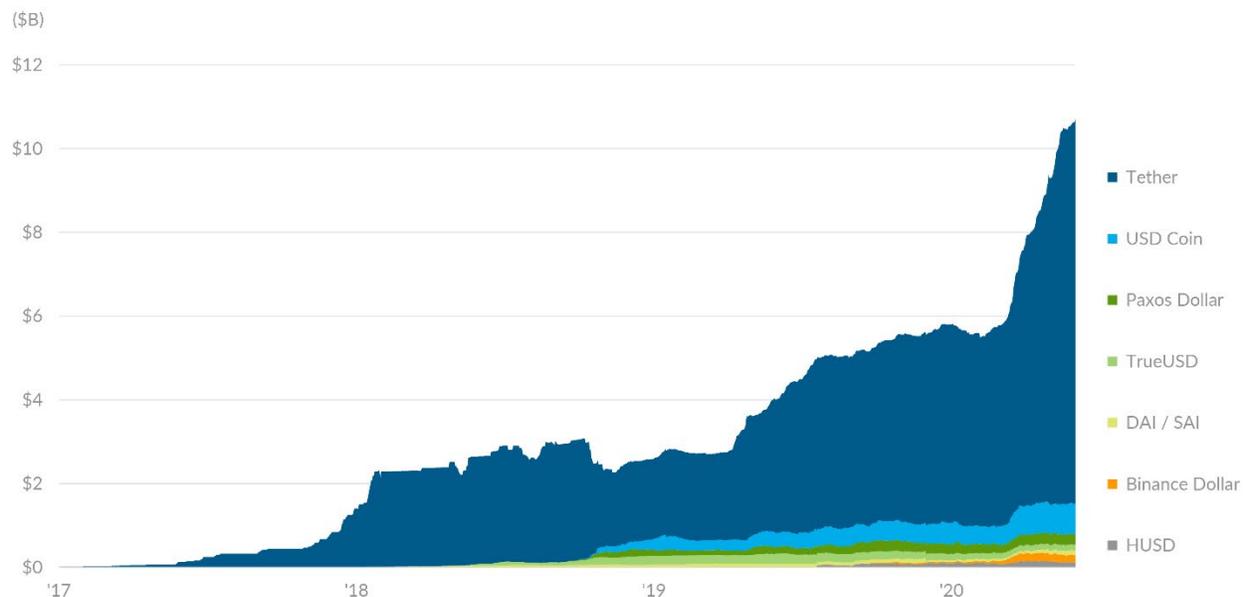
<sup>14</sup> See Armanino LLP’s real time audit platform, TrustExplorer, which allows users to compare balances in both the fiat currency in bank accounts with the cryptodollars existing on chain to ensure they match – on a real time basis. Available here: [real-time-attest.trustexplorer.io/](https://real-time-attest.trustexplorer.io/)

## PROGRESS TO DATE

Thanks to the profound auditability of cryptodollars, their transactional characteristics can be trivially assessed by inspecting the blockchains that they circulate on.

The growth of the free floating (i.e., not held in treasuries) monetary base of the seven largest cryptodollar projects is profiled below. These projects account for 96 percent of all cryptodollar capitalization. At the time of publication, they have surpassed \$11B; growing from effectively 0 in early 2017.

**Figure 2: Free float supply, cryptodollars with over \$100m in monetary base (as of 6/20)**

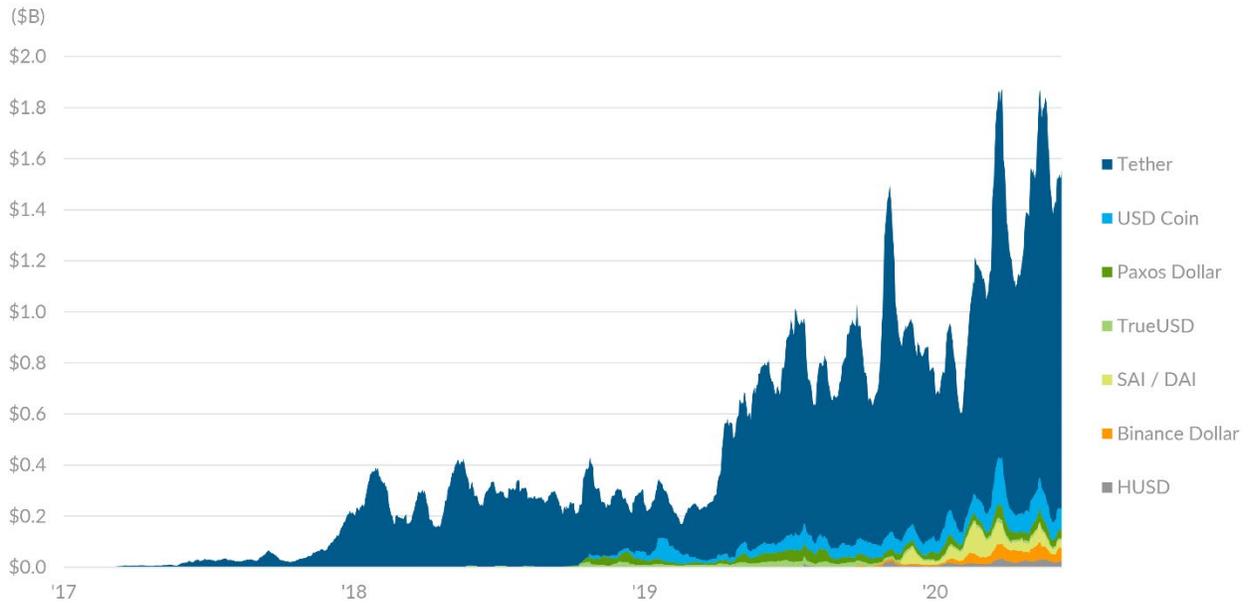


Source: Coin Metrics

In terms of serving as a medium of exchange, cryptodollars exhibit strong vibrancy relative to generic cryptocurrencies (like BTC or ETH). The 'velocity' for the projects profiled above range from 30-60 with Dai's velocity exceeding 100. Velocity in this context counts the number of times an average cryptodollar turns over or changes hands *on-chain*; that is, undergoes final settlement, in a given year. This figure includes adjustments to omit abnormal or spammy transactional usage. Comparable velocities for Bitcoin and Ether typically fall in the 4-10 range.

As a whole, cryptodollars settle \$1-2B worth of transactions on-chain in a given day. Keep in mind this does not include transactions that might occur within an exchange: on-chain settlements incur fees and can be understood as 'final settlement.' Thus the on-chain figures are considered to be a more reliable gauge of commercial activity, rather than exchange volume figures which are simply entries in an exchange's internal database and can be trivially faked.

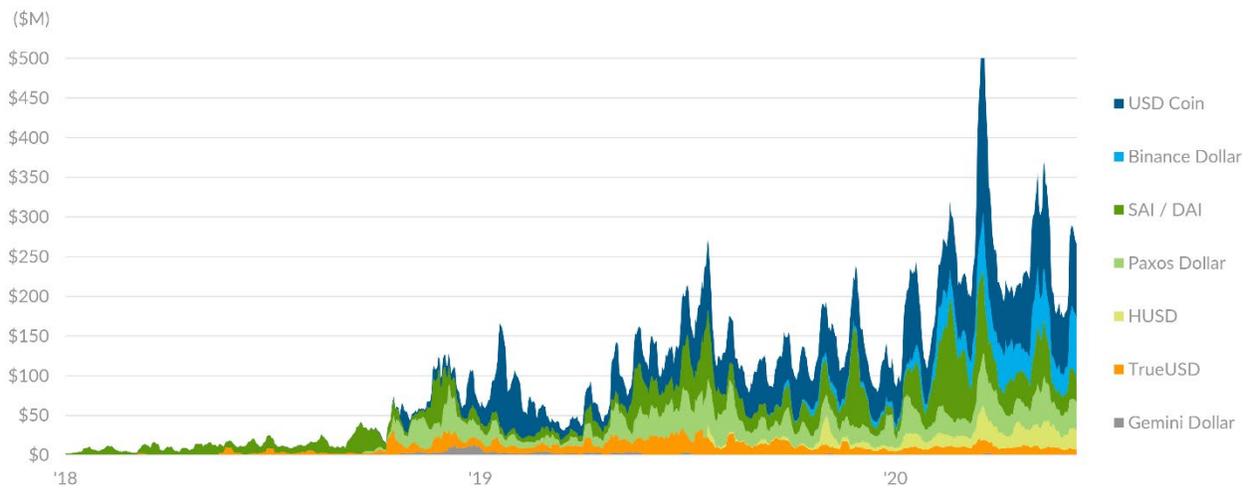
**Figure 3: Daily adjusted value settled on-chain, major cryptodollars**



Source: Coin Metrics

While Tether dominates both in terms of the monetary base and in terms of final settlement on chain, competing cryptodollars have also seen significant growth in the last 18 months.

**Figure 4, Daily adjusted value settled on-chain, major non-Tether cryptodollars**



Source: Coin Metrics

Of the non-Tether cryptodollars, USD Coin, issued by the CENTRE consortium (currently consisting of Coinbase and Circle) is the most active in terms of settling value. These non-Tether cryptodollars are currently settling \$91B on an annualized basis, growing from effectively 0 in 2018.



“When we launched USDC and Centre Consortium in 2018, we did so with an ambition that we were creating a new money format and protocol for digital dollars on the internet. The ultimate uses would be as wide and diverse as the uses of dollars today, but turbo-charged with the powers of crypto and the open internet.

Early, or “bootstrap”, use cases were obviously in “crypto capital markets” – trading, liquidity, exchange – but quickly throughout 2019 we began to see use cases expand into other innovative areas in the crypto economy including payments, savings, lending, and cross-border settlement between firms, especially in Asia.

By early 2020, the shift towards more general forms of payments, commerce and financial apps was kicking more into gear, and we now see companies adopting USDC across an incredibly wide area of industries and use-cases. People and businesses are rapidly figuring out that cryptodollars such as USDC give them a powerful and safe store of value that can also transact with the convenience of the internet, and so the networks of use cases are growing.

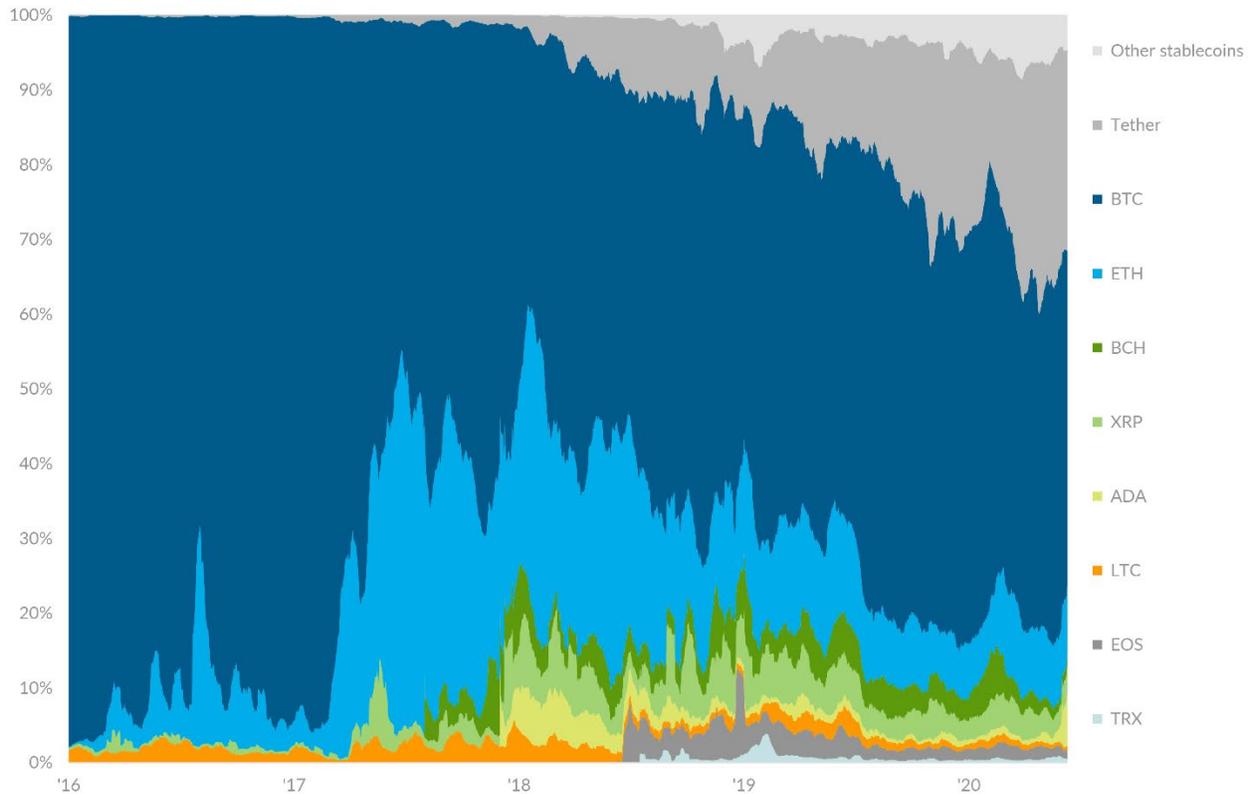
As we go into late 2020 and 2021, our view is that the use cases will explode – USDC as a protocol or settlement rail for digital dollar transactions will take hold with major financial and payments firms adopting it as a standard of interoperable internet payments, creating end-user distribution into the hundreds of millions. This will all happen as 3rd generation public chains and much improved software wallet UX make this breakthrough work at scale and with approachable customer experiences.”

**Jeremy Allaire**

Co-founder and CEO, Circle

There are clear signs that cryptodollars are eating into the usage of more volatile native unit cryptocurrencies when it comes to transactional purposes. While cryptodollars are not without counterparty risk, users appear to prefer them for inter-exchange settlement purposes and for holding crypto-native working capital. Since early 2018, Tether and other cryptodollars have been steadily eating into the market share of non-pegged cryptocurrencies when it comes to on-chain settlement, with the bulk of this growth attributable to Tether.

**Figure 5: Relative share of adjusted value settled on chain, major native tokens and cryptodollars**



Source: Coin Metrics

This chart depicts a sample of large-cap cryptoassets that have historically been used as media of exchange. Bitcoin's share of has remained roughly constant since the rise of alternatives in 2017; but coins like Ether have seen their usage compressed by the growth of cryptodollars. Today, cryptodollars account for 30 percent of transactional value settled on-chain within this sample. Interestingly, they accomplish this feat on a relatively smaller monetary base. Cryptodollars as a whole fundamentally exhibit more transaction usage per unit of market cap than regular cryptocurrencies.

**Figure 6: Trailing 12 month transaction value and market capitalization for major cryptoassets (as of June 2020)**



Source: Coin Metrics

This scatterplot, which includes a comprehensive sample of 54 cryptoassets, demonstrates that cryptodollars as a cohort structurally account for more transaction value than regular cryptoassets, regardless of size.



“At Flipside Crypto, we leverage the transparency afforded by public blockchains to better understand ecosystem health and user behavior. We are actively monitoring stablecoins as they find increasing adoption across blockchain protocols and applications.

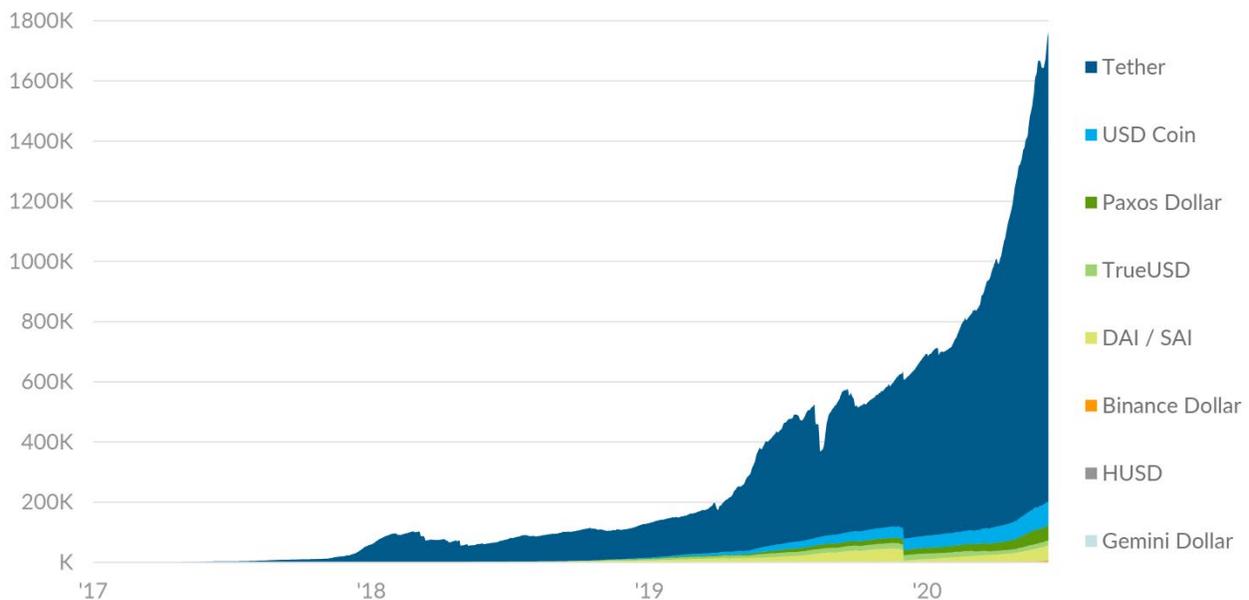
The main use case for stablecoins is arbitrage between centralized exchanges. This is particularly true for Tether. Time of day analysis indicates that Tether is mostly utilized during Asian and European trading hours. We speculate that users in these timezones have less access to the US banking system and more incentive to seek alternatives.

Centralized stablecoins do come with counterparty risk, but that does not preclude their use in the emerging DeFi ecosystem. There, USDC adoption is widespread, while Tether, considered a riskier form of collateral, is only supported by a few protocols.”

**Dave Balter**  
Co-founder and CEO, Flipside Crypto (CIV Portfolio Company)

And while the bulk of cryptodollar value is held in exchange omnibus accounts or with OTC desks and traders, their on-chain footprint evidences strong user growth.

**Figure 7: Count of addresses holding an active balance greater than \$1, major cryptodollars**

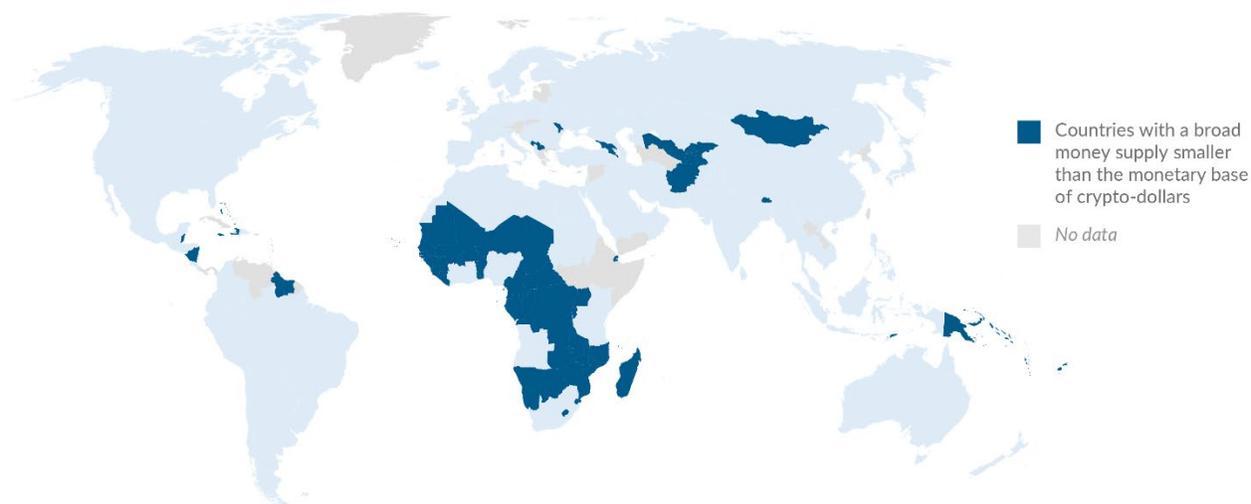


Source: Coin Metrics

The above chart depicts the number of addresses on the various constituent blockchains (Ethereum, Tron, Bitcoin, etc) holding an active balance of greater than \$1 worth of cryptodollars. This figure stands at over 1.7m today, having grown 330 percent in the last 12 months. So there is a large and growing userbase interested in directly owning cryptodollars, rather than a claim at an exchange.

Indeed, the supply of cryptodollars has already outstripped numerous countries when it comes to an active monetary base. When thought of as an individual nation, cryptodollars currently boast a broad monetary base greater than that of 72 countries.

**Figure 8: Countries with a broad money supply smaller than the current monetary base of cryptodollars**



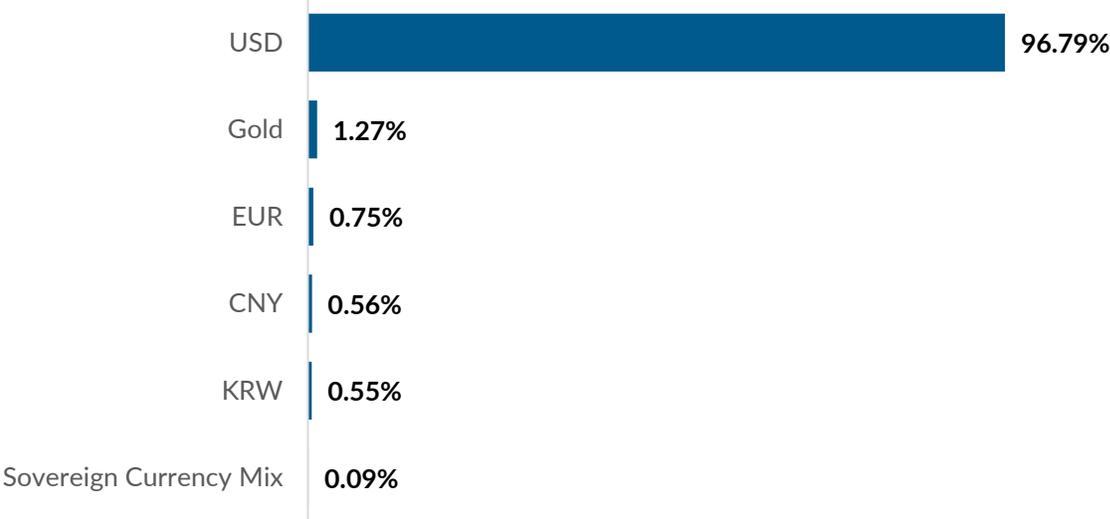
Source: Coin Metrics, International Monetary Fund, International Financial Statistics and data files, and World Bank and OECD GDP estimates

Cryptodollars so far do not match the distribution of sovereign currencies in terms of their relative prevalence in sovereign reserves. Instead, users exhibit an overwhelming preference for the US dollar. While other alternatives exist which offer holders exposure to the return profile of other sovereign currencies, dollars continue to dominate. This is especially interesting given the revealed presence of cryptodollars overseas, in particular in Asia.<sup>15</sup>

For this report, we conducted a survey of all the active cryptodollar projects with a supply of greater than \$1m (see the full table in the Appendix). From this sample, we found that 96.7 percent of circulating cryptodollars by monetary base were intended to track the return of the US dollar. The second most popular referenced currency was gold, followed by the Euro and the Chinese Yuan. The implications of this crypto-dollarization are potentially troubling for sovereign states whose citizens might seek to flee an inflationary currency for the USD – and may find an outlet in cryptodollars.

<sup>15</sup> For analysis linking cryptodollar movement patterns to Asian business hours, see Flipside Crypto, “Daily Mover, Clockchain Analytics,” *The Daily Mover*. Apr. 16, 2020. Available online at <https://flipside.substack.com/p/daily-mover-clockchain-analytics>

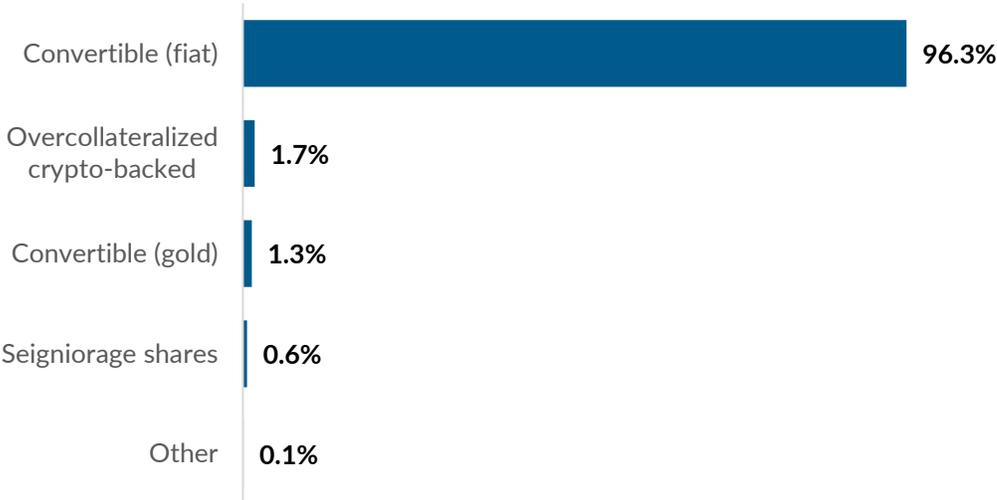
**Figure 9: Cryptodollar supply (USD terms) by reference unit (as of June 2020)**



Source: CIV estimates, full data in Appendix

While a wide diversity of stability targeting models exist, as described in our taxonomy found above, the fiat-convertible model is by far the most popular. Within the crypto industry, the notion of creating stable tokens based on a reserve of risky cryptoassets remains a popular and widely-discussed idea; that said, the model only supports 1.7 percent of cryptodollars in existence today.

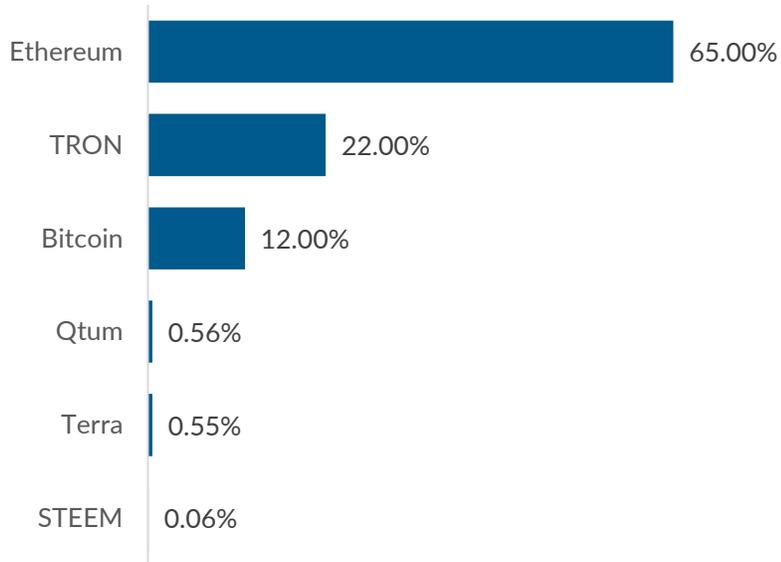
**Figure 10: Cryptodollar market share by stability model (as of June 2020)**



Source: CIV estimates, full data in Appendix

Several high-profile seigniorage shares projects have been funded and launched, but this model only backs 0.6 percent of outstanding cryptodollars. The 1:1 backed fiat-redeemable model is capital efficient and convenient to set up, and users do not seem overly concerned about the reliance on the bank system at present. However, for the vision of cryptocurrency as high-powered, programmable reserve collateral to develop, enthusiasts will want to see cryptodollars backed by crypto grow at the expense of fiat backing.

Figure 11: Cryptodollar market share by resident blockchain (as of June 2020)



Source: CIV estimates; full data in Appendix

The distribution of cryptodollars by constituent blockchain is still in flux. A significant transition occurred in the last 12 months, as users largely departed Tethers held on the Omni protocol (which runs on Bitcoin) and opted for the Ethereum version of the asset. Cited reasons include faster confirmation times and a more developed infrastructure, as the ERC20 standard is widely used and popular. Simultaneously, TRON (which is a fork of Ethereum) seized significant market share. A handful of other blockchains host cryptodollars; some were not included because they didn't meet the \$1m eligibility threshold for inclusion in the survey.

The considerable churn among blockchains of choice for cryptodollars is telling; it speaks to the blockchain agnosticism of these tokens. Tether for instance straddles seven different blockchains and has meaningful usage on three. Public blockchains are increasingly being treated as infrastructure, while applications traverse multiple chains, demonstrating an indifference as to which public blockchain specifically they circulate on. This suggests that there is still an opportunity for challenger blockchains to seize market share, and indeed several new smart contract platforms are launching with the specific objective of wooing cryptodollar issuers.

## WHY NOW?

The considerable growth of cryptodollars after the March 12<sup>th</sup> risk-on event in crypto markets has puzzled analysts. While the precise reasons for the recent rotation into cryptodollars aren't known, there are some long-term factors which explain why cryptodollars have been able to grow past \$10B from a standing start three years ago.

### 1. EXCHANGE UBIQUITY

The crypto-financial infrastructure which powers the industry has been under development in a meaningful sense since 2012, and has been the recipient of significant venture backing since 2014-15.<sup>16</sup> Today, individuals in most countries on earth have access to crypto brokers giving them the ability to exchange their local sovereign currency for cryptocurrencies like Bitcoin. Even if their local exchanges do not offer cryptodollar pairs, it's trivial to register at an offshore exchange and use Bitcoin or Ether to acquire cryptodollars. These offshore exchanges have been so resilient because they do not depend on connections to the financial system to operate; their settlement networks are the public blockchains themselves. Thus they are somewhat insulated from the demands of regulators who are used to using the financial system as leverage.

Additionally, even where orderbook-style exchanges do not exist, vibrant peer to peer markets exist to facilitate the exchange of sovereign currency for cryptocurrency. The largest of these are Paxful and LocalBitcoins, and they are particularly popular in Latin America and Africa,<sup>17</sup> where centralized exchanges aren't as well developed. This exchange model is hard to regulate, and as such peer to peer markets offer users worldwide an onramp into cryptocurrency, which can then be substituted for cryptodollars. Ultimately the only requirements for the creation of a market for cryptodollars are an internet connection and entrepreneurs that are willing to engage in grey or black market currency exchange. Once users are onboarded into crypto financial infrastructure, it is difficult for the state to impose capital controls on them without taking extremely onerous measures.

### 2. HUMAN-USABLE KEY MANAGEMENT

Another factor making adoption of cryptodollars much more seamless is the rise of mobile wallet technologies which make ownership of a cryptographic bearer asset less risky.

The last twelve months have brought us much more sophisticated wallets aimed at a mass market audience, rather than exposing users to the complexities of using crypto. Some wallets use on-chain multisignature transactions to split keys among multiple devices, creating a new tradeoff of resilience and convenience. Novel approaches utilize multi-party cryptography to share keys between users and a custodian, giving them recourse in case of loss, albeit under a different trust model.

Such wallets do not require that users write down a paper seed, relying instead on biometrics or the secure enclaves on iPhones and android devices. This gives users the security assurances they are used to, and increases the resilience of key setups. Practically, what this means is that an individual with a low-end smartphone and a data plan can get onboarded to this ecosystem and do so in a frictionless way, without worrying about an easily-lost 12 or 24-word paper key. For the large population worldwide which operates solely on mobile, functional mobile wallets are a necessity. These are vital enabling technologies allowing for less user-hostile experiences with cryptographic assets.

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<sup>16</sup> Since 2013, Pitchbook lists 3,159 venture capital investments injecting a total of \$17.35B into the cryptocurrency or blockchain vertical

<sup>17</sup> For a geographical breakdown of peer to peer Bitcoin markets, see Ahlborg, Matt, "Nuanced Analysis of LocalBitcoins Data Suggests Bitcoin is Working as Satoshi Intended" Medium, Feb. 2019. Available online at <https://medium.com/@mattahlborg/nuanced-analysis-of-localbitcoins-data-suggests-bitcoin-is-working-as-satoshi-intended-d8b04d3ac7b2>



“The future of payments will be primarily built for mobile which is the only computing platform that can reach billions of users today.

It appears unimaginable either that most users will be willing to handle self-custody and advanced security for digital assets, or that full custody – reliant on an existing banking system – will be the solution for hundreds of millions of un- or under-banked users.

Multi-party computation is now performant enough to open the door to a new form of hybrid on-chain security right from your mobile phone: funds can still be on-chain without the burden of total self-custody or total delegation without losing control and ownership.

The future of payments cannot rely entirely on passwords because of inevitable human errors and other risks like SIM-swapping. Security can now be tied to who you are, rather than which password you know. Recent advancements in biometrics like liveness finally offer a reliable solution that guarantees that only the owner, or people he trusts, can access his funds and make payments.”

**Ouriel Ohayon**

Co-founder and CEO, ZenGo

## CRYPTODOLLARS AS A RESTORATIVE TECHNOLOGY

It's not clear today which cryptodollar stability model will ultimately prove successful, whether cryptocurrency or fiat currency will collateralize these systems, and whether cryptodollars will be able to retain their unconstrained nature. Lessons can however be taken from the history of prior banking epochs when private entities took responsibility for issuing money, effectively outside of state control. These periods were generally referred to as periods of free or laissez-faire banking.

While the term ‘free banking’ has been used to describe both the semi-regulated period of banking in the 1830s to 1860s in the United States, as well as historical epochs of truly unregulated banking, here we'll rely on the more restrictive Selgin and White definition:<sup>18</sup>

“There is no government control of the quantity of exchange media. There is no state-sponsored central bank. There are no legal barriers to the entry, branching, or exit of commercial banks (or non-bank financial institutions, assuming any distinction can be drawn). There are no restrictions on the quantities, types, or mix of debt and equity claims a bank may issue, or on the quantities, types or mix of assets it may hold. Interest rates are not controlled. There are no government deposit guarantees. In general, no restrictions are placed on the terms of contracts made between banks and their customers, beyond the requirement that they adhere to the standard legal principles governing all business contracts.”

White clearly distinguishes the American financial system in the mid 19<sup>th</sup> century, colloquially referred to as a period of free banking, from genuine instances of the phenomenon:

“By free banking I refer generally to the **unrestricted competitive issue of currency and deposit money by private banks on a convertible basis**, not to the so-called free-banking

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<sup>18</sup> Selgin, George A., and Lawrence H. White. "How would the invisible hand handle money?." *Journal of Economic Literature* 32.4 (1994): 1718-1749.

systems adopted by a number of American state governments between the late 1830s and the Civil War.<sup>19</sup>

Episodes of 'true' free banking, such as the one found in Scotland from 1716 to 1844, are associated with low inflation or even deflation, few bank failures, an absence of systemic bank crises, and stable macroeconomic growth. In that era, Scotland enjoyed "complete immunity from panics and runs."<sup>20</sup> The money supply was determined entirely through private commercial banks. The Scottish example is telling, because it contrasts with its neighbor England, which suffered significant macroeconomic instability throughout the period under the yoke of the Bank of England.



"Zabo is a connection platform that allows financial services applications to aggregate their customers' cryptocurrency accounts and data.

To date, much adoption of cryptocurrency has involved the investing or trading use cases. Exchange and brokerage have been the "killer app" of cryptocurrency the last decade. Yet today we are witnessing the emergence of a new killer app for cryptocurrency: fiat-denominated value on blockchain networks parallel to the traditional financial system. The combination of stability and open, alternative financial networks present us with completely new financial options and products.

At Zabo we are building technology enabling financial services applications to leverage stablecoins in building these new products for consumers. Specifically, we expect stablecoins to impact the following markets:

- Remittances and cross border payments
- Savings and wealth preservation – people and companies will increasingly hold stablecoins indexed to more stable currencies (e.g. USD) relative to their local currencies as a means of avoiding volatility, inflation or wealth confiscation
- Trading and financialization of everything – stablecoins will likely be the base asset used to trade a huge number of other tokenized assets we expect to emerge the next decade

Today Zabo supports many of the leading stablecoins. Going forward, we plan to invest aggressively in additional capabilities and be on the vanguard of making stablecoins an important part of financial services."

**Alex Treece**

Co-founder, Zabo (CIV Portfolio Company)

## A NEW DAWN FOR FREE BANKING?

In a certain sense, it's not surprising that the rise of digital bearer instruments has led to a host of private entities issuing banknotes. In 1996, Dwyer predicted that electronic money would resemble the notes of free banks, claiming that "electronic money is likely to consist of uninsured liabilities of private individuals or companies."<sup>21</sup> He adds that private electronic money is most likely to develop offshore, outside the purview of the US.

And such schemes aren't new: DigiCash and E-gold both achieved moderate success in the '90s and '00s, respectively. They aimed to allow internet users to transact in a cash-like manner (i.e., with final settlement) in dollar denominations on the internet. What's different now is the underlying architecture of

<sup>19</sup> White, Lawrence H. "Competition and Currency: Essays on free banking and money." New York University, 1989. Chap. 1, *Free Banking as an Alternative Monetary System*, pp. 13

<sup>20</sup> Ibid., pp. 23

<sup>21</sup> Dwyer Jr, Gerald P. "Banking Panics, and Free Banking in the United States." *Economic Review* (1996)

these internet cash systems, and the enabling infrastructure supporting the space. Public blockchains are much less fragile than single issuers running servers, and easier to marshal a community of users and developers around. The cryptocurrency industry thus introduces two concepts which reintroduce free banking into the realm of possibility: non-state monetary assets which can serve as a synthetic specie, and settlement networks that exist independent of the financial system.

The parallels between these contemporary private money systems to historical free banking episodes are worth investigating. Without overstressing the analogy, White's reference to the "unrestricted competitive issue of currency and deposit money by private banks on a convertible basis" certainly seems to characterize a subset of the cryptodollar market. While free banks issued physical banknotes against reserves (and of course credit portfolios), cryptodollar issuers create virtual IOUs which circulate on chain. Free banks were not encumbered by the state; a significant fraction of extant cryptodollars exist outside the purview of state control. Free banks relied on specie as their liability-free collateral at the base of the system; cryptodollars are mostly backed by fiat reserves but some are issued against liability-free synthetic commodities; namely, cryptocurrencies.

In their 1994 article "How Would the Invisible Hand Handle Money?", Selgin and White enumerate the qualities of a laissez-faire banking system:<sup>22</sup>

- No state control of the monetary base
- No (discretionary) central bank
- No legal barriers to either entry or expansion
- No regulation of bank financing
- Free choice of bank reserves
- Interest rates float freely
- Contractually bound to redeem liabilities for commodity money
- No depository insurance (like FDIC)

Selgin and White note that free banking does not definitionally require gold as the reserve medium; other commodities or a frozen stock of fiat currency could act as the base too. With the above conditions in mind, cryptodollar issuers appear to suit the analogy. In many cases, they choose to operate independently of the state, both through the existence of offshore jurisdictions, and public blockchains which are not regulated. When issued against risky cryptoassets like Ether or Bitcoin, they rely on the soundness of liability-free collateral.

The chief disanalogies are the following: cryptodollars are primarily backed by dollars held within the financial system (and which are hence exposed both to US monetary policy and the socialized nature of the system), and cryptodollar issuers generally aim to operate with a full reserve and as such better resemble narrow banks, rather than conventional commercial banks carrying a loan book. They do not, as the free banks in Scotland did, engage in maturity transformation. This isn't inconceivable though – the Bank of Canada has speculated in a research note<sup>23</sup> that banks under a Bitcoin standard would indeed engage in maturity transformation. And a handful of cryptodollar issuers explicitly do not maintain full reserves.<sup>24</sup>

The below table lays out a comparison between the two major cryptodollar models and the archetypical approach to free banking.

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<sup>22</sup> Selgin, George A., and Lawrence H. White. "How would the invisible hand handle money?." *Journal of Economic Literature* 32.4 (1994): 1718-1749.

<sup>23</sup> Weber, Warren E. *A Bitcoin standard: Lessons from the gold standard*. No. 2016-14. Bank of Canada Staff Working Paper, 2016.

<sup>24</sup> See the stability model in Appendix A and the cryptodollar taxonomy

Table 1, Free banking compared with two models of cryptodollar issuance

	'True' Free Banking (Scottish archetype)	Crypto-backed free banking	Fiat-backed cryptodollar issuance
<b>Reserve collateral</b>	Specie (gold)	Synthetic commodities (BTC, ETH)	Dollars in bank accounts
<b>Geographic limits</b>	Limited; trust signals are local	Global	Trading is global but creation/redemption can be jurisdiction-specific
<b>Redemption</b>	Must physically take ownership of gold at a branch	No direct redemption in the MKR model	Can occur anywhere, trivial to take ownership
<b>Auditability</b>	Limited; issuers must be trusted not to overissue	Strong assurances with real-time on- chain risk assessment	Reasonable assurances can be found with Proofs of Reserve
<b>Incentive not to overissue</b>	Speculative attack from competitors	Issuance is programmable	Contractually bound to depositors
<b>Interest bearing notes</b>	Uncommon; cumbersome	Implemented and in production	Nonexistent but trivial to implement
<b>Government oversight</b>	Virtually absent	Minimal	Limited, especially at offshore exchanges
<b>Notes are mutually accepted by banks</b>	Yes	In some cases	In some cases
<b>Reserve ratios</b>	Generally low (2-3 percent of assets held in specie) <sup>25</sup>	Typically well over 100%	Typically full reserve, in practice sometimes less <sup>26</sup>
<b>Note exit costs</b>	Must physically travel to a branch and redeem or exit at a discount (if far from a branch)	Sell on the secondary market; in extreme cases global settlement	Either redeem at issuer or sell at a discount on the secondary market

In a sense, the fully crypto-backed model is more faithful to the genuine free banking archetype, as it relies on liability-free collateral and allows for the issuer to be more unconstrained. Generally, crypto-backed cryptodollars are not as highly regulated than their fiat-backed counterparts, because they are issued primarily by users interacting with smart contracts on a public blockchain, rather than a single centralized organization.

It's also worth noting that cryptodollars outperform banknotes issued by free banks in some key respects. The 'notes' are not physical, but virtual, and hence have significant portability and divisibility advantages. Liquidity is unconstrained, allowing for more scale, and a highly competitive set of issuers targeting a global audience. The credibility signals generated by the issuing institution are no longer regionally bounded, but global in scope. Cryptodollars are programmable, so issuers could seamlessly offer interest on notes (this was extremely cumbersome with physical banknotes) should a market for interest develop. And instead of competing on the basis of opulent headquarters, issuers could compete on the basis of transparency, which is easily afforded by the cryptographic nature of these assets. Lastly, a robust market for private currency could offer consumers a range of choices not available in sovereign settings, such as stronger transactional privacy.

<sup>25</sup> See Kroszner's claim of 2-3 percent reserve ratios, found in Kroszner, Randall. *Free Banking: The Scottish experience as a model for emerging economies*, pp. 51. The World Bank, 1995

<sup>26</sup> See prior caveats about Tether's reserve ratio

## EXCHANGES AS PROTO NEO FREE BANKS

The likeliest candidates for recapturing the qualities of genuine free banks are the crypto financial institutions called exchanges – in particular the ones outside the purview of the US. And indeed, many of them have recently begun to issue cryptodollars. In many cases, these exchanges mutually accept each other's cryptodollars, another characteristic of free banking.

**Table 2, Characteristics of major crypto financial institutions**

Exchange	Coinbase	Binance	Huobi	Bitfinex	OKEx	Gemini
Age (years)	8	3	7	8	6	6
BTC held on deposit (7/1)	~970k	268k	364k	62k	118k	140k
Issues cryptodollar	USDC*	BUSD†	HUSD	Tether ‡	USDK†	GUSD
Cryptodollars outstanding (7/1)	\$978m	\$168m	\$114m	\$9.659B	\$28m	\$8.9m
Cryptodollars accepted in the core business besides their own	Just DAI	Yes, many	Yes, many	Yes, many	Yes, many	Just DAI
Based / Registered	USA	Unclear	China/ Singapore	HK / BVI	HK / Malta	USA
Offers interest on deposits	Yes (USDC)	Yes (many assets)	Yes (though a 3 <sup>rd</sup> party)	Yes (many assets)	Only staking	No

\* = Coinbase is a founding member of the CENTRE consortium that administers USDC

† = issued in partnership with a third party (see Appendix A)

‡ = The ownership of Bitfinex and Tether is cloudy, but the two entities share technical & administrative staff

The growing role of crypto exchanges as deposit-taking institutions (as opposed to mere brokerages or exchanges) makes the resemblance to banks more apt. Some of these exchanges have begun to offer interest on deposits, although this is still a haphazard practice. Few crypto exchanges have truly instrumentalized user deposits in a manner akin to a commercial bank – although they certainly possess the reserves to do so. But the most striking feature of the system is the mutual acceptance of IOUs. The convergence on shared cryptodollars vastly increases the convenience of these systems for depositors, and increases the resilience of the system. Thanks to a globally available set of crypto exchanges, many of whom list the same assets, the cryptodollar system is reaching a new level of ubiquity and convenience.

## OPEN QUESTIONS

While 2020 has undeniably been a banner year for cryptodollars, lingering questions about the phenomenon abound. The specter haunting the market sector is the NYAG litigation still pending against Tether/Bitfinex. At the time of writing, Tether accounts for 84 percent of the cryptodollar capitalization, and while competitors might be waiting in the wings to replace it, its failure could undermine confidence in the fiat-backed cryptodollar model. Together with Bitcoin, Tether is the reserve currency for the crypto industry, the quote currency on dozens of exchanges, and a widely used transactional medium of exchange. If Tether isn't successful at fending off US regulators, the offshore cryptodollar model might be written off, to the benefit of the onshore model. Because of the significant scrutiny cast on Tether and its supporting banks, its long-term viability is still in question. The fact that the cryptodollar industry is so indexed to Tether is a significant residual source of risk. While the more regulated alternatives would likely benefit from the dissolution of Tether, the collapse of the longest running cryptodollar would be a significant shock to the entire concept of fiat-backed cryptodollars.

Even onshore cryptodollar issuers face unanswered questions. Currently, the permissioned pseudonymity model abounds. This means that issuers generally have a lesser ability to monitor and curtail transactional usage within their networks as compared with fintech providers like Paypal or Venmo. Cryptodollars are cash-like, in that while some measure of surveillance exists at the entry and exit points to the network (as with withdrawing cash from a bank branch), transactions between individuals are not easily monitored. Historically, few addresses have been blacklisted. Whether this re-institution of a cash-like standard on the internet is ultimately something regulators will tolerate remains to be seen. With cash, there are constraints on the amount of value that can be easily transacted – excessively large transactions are simply difficult to instrumentalize, because bills have maximum denominations. And transporting lots of cash covertly is a genuine logistical challenge. With cryptodollars, arbitrarily large global transactions are possible, which is one reason regulators might insist that they deserve a different treatment from mere cash. You could envision systems which impose automated throughput or account limits to force cryptodollars to mirror the constraints of physical cash. Indeed, the Libra whitepaper<sup>27</sup> endorses this approach in its language about wallets not managed by entities under the purview of the association:

“These addresses will be subject to controls, among them transaction and address balance limits that, along with other controls, will be enforced by the protocol.”

We expect that the question of permissioned pseudonymity will rise to the fore if cryptodollars maintain their ascendancy and blacklisting remains sparing. Automated on-chain limits – which are trivially programmable, but also circumventable – might placate some regulators; but the industry fears a more onerous enforced switch to a whitelist model, where issuers must be aware of all activity that involves their token.

More generally, if cryptodollars continue their upwards trajectory, they will soon eclipse all ‘native unit’ cryptocurrencies combined when it comes to transactional volume, and this will bring additional scrutiny. Unlike cryptocurrencies with a more decentralized architecture like Bitcoin, cryptodollars for the most part have issuers, administrators, and backers. These are all strategic chokepoints which can be held to account by the state. The Financial Action Task Force has kept a keen eye on cryptodollars, having expressed worries about cryptodollars being used for terrorist financing and money laundering.<sup>28</sup> Perhaps in an attempt to curtail illicit usage, the FATF issued guidance covering virtual asset service providers (effectively, custodial exchanges) in June 2019. This guidance insists on more invasive practices with regards to user information collection and sharing. As of June 2020, the level of service provider compliance with these recommendations is actively being assessed.<sup>29</sup>

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<sup>27</sup> Libra Association. “Official Libra White Paper v2.0.” (Apr. 2020). See specifically Section 05. Available online at: <https://libra.org/en-US/white-paper/>

<sup>28</sup> “Outcomes FATF Plenary, 16-18 October 2019.” The Financial Action Task Force. Available online at <http://www.fatf-gafi.org/publications/fatfgeneral/documents/outcomes-plenary-october-2019.html>

<sup>29</sup> PricewaterhouseCoopers, “The New FATF Rules for Crypto Exchanges and Custodians.” Aug. 2019. Available online at <https://www.pwc.com/gx/en/industries/financial-services/assets/pwc-crypto-client-update-fatf-vasp-guidance-august-2019.pdf>

Not to be outdone, the Bank for International Settlements has suggested that highly-available and liquid cryptodollars might undermine financial stability and sovereign monetary policy.<sup>30</sup> If dollar-denominated bearer assets are freely available worldwide with minimal friction, this could undermine more inflationary sovereign currencies and inhibit a government's ability to defend them with capital controls. Of course, the welfare benefits of giving regular savers access to less inflationary currency cannot be overlooked.

Another significant open question has to do with the tax treatment of cryptodollars. While fiat-backed cryptodollars represent a claim on a dollar in a bank account, the IOUs themselves float freely and might trade at a discount or premium to the peg. Given that cryptocurrency has been treated as property under the US tax regime, trades expose users to the significant challenge of evaluating their taxable gain or loss each time they transact, even if it is with a dollar-denominated instrument. One can imagine a carveout in the tax code for cryptodollar transactions, but this is not the case today. Other jurisdictions like Singapore, Malta, and Portugal take a less severe approach to taxing cryptocurrency usage. If cryptodollars come to account for a meaningful share of standard online commerce, expect tax authorities to be pressured to treat them like currency, rather than property.

Additionally, the question of the best approach to creating cryptodollars has not been fully settled. While the fiat-backed model of cryptodollars is the overwhelming favorite at present, it's possible that alternatives could grab market share. The alternative with the most mindshare is the overcollateralized cryptocurrency-backed approach, which purports to be more resistant to regulation or state action, given that it primarily relies on a constellation of users creating dollar-denominated tokens by locking some risky collateral on chain. However, it's fundamentally less capital efficient (requiring an excess reserve of collateral for risk management), and the quantity of cryptodollars produced is more of an externality of these systems than their direct purpose.<sup>31</sup> A model that is both capital efficient and offers meaningful censorship resistance has long been a holy grail of the cryptodollar industry. This was the objective of high-profile projects like Basis, which was scuppered after a \$133m capital raise. Several newer projects are taking on this challenge and will seek to displace the more centrally-controlled fiat-backed systems.

Lastly, questions remain about the role that cryptocurrency will play in cryptodollar creation. Will it be ignored, in favor of fiat or gold backing? Will it be employed as risky collateral in an intricate set of interlocking smart contracts, à la Maker? Will it be used in tandem with derivatives exchanges to create non-bank, Bitcoin-backed dollars, as Valiu does? Or will exchanges themselves come to use crypto deposits as collateral against which they can issue crypto dollars, something they already do with fiat currency in bank accounts? While cryptocurrencies like Bitcoin are meaningfully differentiated in terms of settlement quality and liability free-ness, serving as collateral backstopping the issuance of cryptodollars would be significantly accretive in terms of driving demand for the assets and the narratives surrounding them.

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<sup>30</sup> The Bank for International Settlements, "Investigating the impact of global stablecoins," CMPI Papers. Available online at <https://www.bis.org/cpmi/publ/d187.htm>

<sup>31</sup> See Zhu, Su, and Hasu, *Maker Dai: Stable, but not Scalable*. Medium, Jan. 2019. Available online at <https://medium.com/@hasufly/maker-dai-stable-but-not-scalable-3107ba730484>

## CONCLUSION

We have considered the contemporary usage characteristics of cryptodollars, distinguished them by type, and examined why they are surging in popularity today. We have not however dwelled meaningfully on individual use-cases for cryptodollars, since they can be used for the same purposes as any online payments system; b2b transfers, remittances, e-commerce, p2p transfers among friends, and so on. However, because of their bearer asset nature, cryptodollars are also more brittle, so they better suit the transactional needs of entities that specifically benefit from their distinguishing qualities.

The major revealed cryptodollar use-cases so far have been for inter-exchange settlement, as a form of liquid, risk-off collateral for traders, and for stable collateral within programmable contracts (“DeFi”). In each case, the architectural design of cryptodollars rendered them particularly suited to the transactional need. More recently, reports have emerged of cryptodollars being used for cross-border settlement for export businesses operating on the fringe of legality,<sup>32</sup> for access to ponzi schemes,<sup>33</sup> or for regular online retail payments.<sup>34</sup> Looking ahead, if cryptodollars can resist shutdown and reliably adhere to their pegs, they will continue to take market share from cryptocurrencies with unmanaged exchange rates.

Combining the settlement quality of public blockchains with the low-volatility nature of sovereign currencies is a powerful value proposition. As we have shown empirically, cryptodollars are more actively employed in a transactional manner than their cryptocurrency counterparts. With the caveat that these cryptodollars must demonstrate that they can offer meaningful settlement assurances in the long term, we expect that they will come to occupy transactional uses which previously would have been the domain of cryptocurrency or “utility tokens.” Consumers have shown a marked resistance to the theory of the application token barter economy, and have been unwilling to utilize “utility tokens” in their intended context. No one wants to amass a risky portfolio of application-specific assets to be used for digital services, nor do they want to execute a trade every time they want to engage in decentralized file storage, for instance. It is fundamentally much more convenient to use a single monetary good for a variety of purposes – better yet if it’s relatively stable.

So far the industry has historically focused on developing new base layer blockchains as well as services powered by application-specific tokens. An industry-wide recognition that cryptodollars are a superior medium of exchange might encourage developers to revisit some of these ideas, except with stable collateral, which users might be less averse to holding. We can imagine that cryptodollars will continue to penetrate DeFi applications, and might reinvigorate older ideas like prediction markets and decentralized file storage. Ideas which never meaningfully attained traction because they were paired with the development of volatile cryptocurrencies might get a second look – whether this involves machine to machine payments, online content provision, or incentivized routing for networked services.

If cryptodollars remain robust and functional, their continued growth in the online payments segment is likely. We expect that in the coming years, cryptodollars and payment systems built atop them will challenge centralized p2p transactional systems like Venmo, Paypal, Cash App, and Zelle – if they don’t jump in with competing offerings of their own first. The relative lack of encumbrances offered by cryptodollars provides a superior experience, especially on a cross-border basis. Remittance use cases, especially in corridors which are poorly served by current infrastructure, are an obvious target for cryptodollar issuers and founders building atop them. They appear uniquely suited for large, b2b transfers, in particular on a cross border basis where the correspondent banking system might be lacking.

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<sup>32</sup> Coindesk has reported on Chinese importers in Russia using Tether for cross border transactions. See Baydakova, Anna. “Millions in Crypto Is Crossing the Russia-China Border Daily. There, Tether Is King,” Coindesk. Jul. 30, 2019. Available online at <https://www.coindesk.com/tether-usdt-russia-china-importers>

<sup>33</sup> See Harper, Colin. “Almost half of all PAX stablecoin transfers linked to ponzi,” *Decrypt*. Jun. 9, 2020. Available online at <https://decrypt.co/31761/paxos-stablecoin-transactions-linked-ponzi-report-claims>

<sup>34</sup> The first cryptodollar to achieve apparent traction with a meaningful userbase for standard retail transactions appears to be Terra’s Chai, which claims several hundred thousand active users. For more on Terra’s strategy, see Nelson, Danny. “Clicks and Bricks’ Strategy to Drive Korean Users to Terra’s Blockchain,” *Coindesk*. Available online at <https://www.coindesk.com/clicks-and-bricks-strategy-to-drive-korean-users-to-terras-blockchain>

Of course, as with everything in this novel industry, some of the most exciting applications are those we cannot foresee. The history of the industry suggests that the most enduring use-cases are those in which crypto protocols offer users assurances or freedom that users cannot obtain from established systems. We expect that the future will be no different. The question is: can cryptodollars retain their independent, unencumbered, and relatively stable nature as the spotlight turns to them? This is the challenge that issuers will have to meet.

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## APPENDIX: SUMMARY INFORMATION ON MAJOR ACTIVE CRYPTODOLLAR PROJECTS

Rank	Ticker	Name	Market cap (USD)	Blockchain	Reference unit	Issuer	Stability model
*1	USDT-eth	Tether	5,742,000,000	Ethereum	USD	Tether	Convertible, fiat reserve
*1	USDT-tron	Tether	2,585,000,000	Tron	USD	Tether	Convertible, fiat reserve
*1	USDT-btc	Tether	1,336,000,000	Bitcoin (Omni)	USD	Tether Center Consortium	Convertible, fiat reserve
2	USDC	USD Coin	745,000,000	Ethereum	USD	Paxos	Convertible, fiat reserve
3	PAX	Paxos Standard	246,000,000	Ethereum	USD	Paxos	Convertible, fiat reserve
4	BUSD	Binance Dollar	168,000,000	Ethereum	USD	Paxos / Binance	Convertible, fiat reserve
5	TUSD	TrueUSD	138,000,000	Ethereum	USD	Trust Token	Convertible, fiat reserve
6	DAI	Multi-collateral DAI	120,000,000	Ethereum	USD	Maker Stable Universal / Paxos / Huobi	Overcollateralized crypto backed, nonredeemable
7	HUSD	HUSD	118,000,000	Ethereum	USD	Paxos / Huobi	Convertible, fiat reserve
8	XAUT	Tether Gold	71,000,000	Ethereum	Gold (troy oz)	Tether QuickCash network	Convertible, gold reserve
9	QC	QuickCash	65,000,000	Qtum	CNY	QuickCash network	Overcollateralized crypto backed, nonredeemable
10	KRT	TerraKRW	64,107,000	Terra	KRW	Terra Foundation	Seigniorage shares
11	PAXG	PAX Gold	47,000,000	Ethereum	Gold (troy oz)	Paxos	Convertible, gold reserve
12	EURT	Euro Tether	40,000,000	Ethereum	EUR	Tether	Convertible, fiat reserve
13	EURS	STASIS Euro	36,000,000	Ethereum	EUR	Stasis Prime Trust / OkCoin	Convertible, fiat reserve
14	USDK	USDK	28,000,000	Ethereum	USD	Blockchain / MKS	Convertible, fiat reserve
15	DGLD	DGLD	24,000,000	Bitcoin (Mainstay)	Gold (1/10 troy oz)	Blockchain / MKS	Convertible, gold reserve
*1	USDT-liquid	Tether Neutrino Dollar	16,561,000	Bitcoin (Liquid)	USD	Tether	Convertible, fiat reserve
16	USDN	Gemini Dollar	14,100,000	WAVES	USD	Neutrino Gemini Trust Company	Seigniorage shares
17	GUSD	Dolllar	11,000,000	Ethereum	USD	Company	Convertible, fiat reserve
18	ANCT	Anchor Synthetix USD	10,100,000	Ethereum	MMU†	Anchor AG	Seigniorage shares
19	SUSD	Synthetix USD	9,000,000	Ethereum	USD	Synthetix	Overcollateralized crypto backed, nonredeemable
20	DGX	Digix Gold Token	6,700,000	Ethereum	Gold (one gram)	Digix	Convertible, gold reserve
21	SBD	Steem Dollars	6,600,000	STEEM	USD	STEEM	Collateralized crypto backed, convertible
22	USDQ	USDQ	5,500,000	Ethereum	USD	Q DAO	Overcollateralized crypto backed, nonredeemable
23	AMPL	Ampleforth	5,400,000	Ethereum	USD	Ampleforth Swiss Crypto Tokens AG	Elastic supply peg management
24	XCHF	CryptoFranc	4,900,000	Ethereum	CHF	JUST (Tron)	Convertible, fiat reserve
25	USDJ	Stablecoin	4,233,000	Tron	USD	JUST (Tron)	Overcollateralized crypto backed, nonredeemable
26	BITCNY	BitCNY	4,060,000	Bitshares	CNY	Bitshares	Overcollateralized crypto backed, nonredeemable
27	SGA	Saga	1,800,000	Ethereum	SDR ‡	Saga Monetary Technologies	Convertible, fiat reserve (variable)
28	TAUD	TrueAUD	1,070,000	Ethereum	AUD	Trust Token	Convertible, fiat reserve

\* Tether is broken up here by constituent blockchain but no distinction exists in practice; this is purely a technical detail

† The Monetary Measurement Unit is a purportedly non-inflationary index aiming to track global growth

‡ Saga's SDR consists of USD, GBP, EUR, JPY, and RMB

Source: CIV estimates, Coin Metrics, CoinMarketCap

Note: data is current as of June 11, 2020. Only projects with a circulating supply greater than \$1m are listed.