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The Definitive Guide to Stablecoins

June 2024

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Stablecoins – crypto's killer use case?

The current financial system is a patchwork of old solutions under the hood with a patchwork of modern solutions on top. Inertia and profit motives keep this financial system from moving properly into the 21st century.

For end users, the inefficiencies of the current financial system have many consequences. Slow and expensive cross-border payments are one of these. Sending money internationally can take several days and incur hefty fees. According to the World Bank, the global average fee on a remittance payment is 6.4%[i]. Also, in many countries with high inflation, unstable local currencies, and poor financial access, any cash savings you manage to accumulate will quickly lose their value.

Cryptocurrencies, like bitcoin, have been touted as the solution to the problems listed above. Anyone with internet access can receive and use cryptocurrencies, and the borderless nature of blockchain networks makes cross-border transactions fast. Still, despite these properties, cryptocurrencies have experienced slow adoption when it comes to remittance payments and everyday use.

Stablecoins are changing that. With stablecoins, end users have a stable value bearer while also keeping the accessibility and borderless nature of cryptocurrencies. This allows for fast and cheap cross-border transactions in a stable asset and access to savings in the most trusted currencies in the world.

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[i]

https://remittanceprices.worldbank.org/sites/default/files/rpw_main_report_and_annex_q423_final.pdf

Report Summary

Stablecoins have had a meteoric rise in use over the last five years. They provide a solution to a common problem in the crypto space—a stable value bearer and a more familiar currency to trade with—while retaining the portability of crypto.

Stablecoins have been around since 2014, but they really took off with the crypto wave of 2020. From the start of 2020 to the peak in May 2022, stablecoin issuance rose from $5 billion to over $180 billion, a staggering 3,500% increase. Since then, stablecoin issuance has followed market trends, contracting throughout the bear market and rising as the markets have heated up again.

Figure 1 – Stablecoin issuance and crypto market cap.

Source: Coingecko, DefiLlama
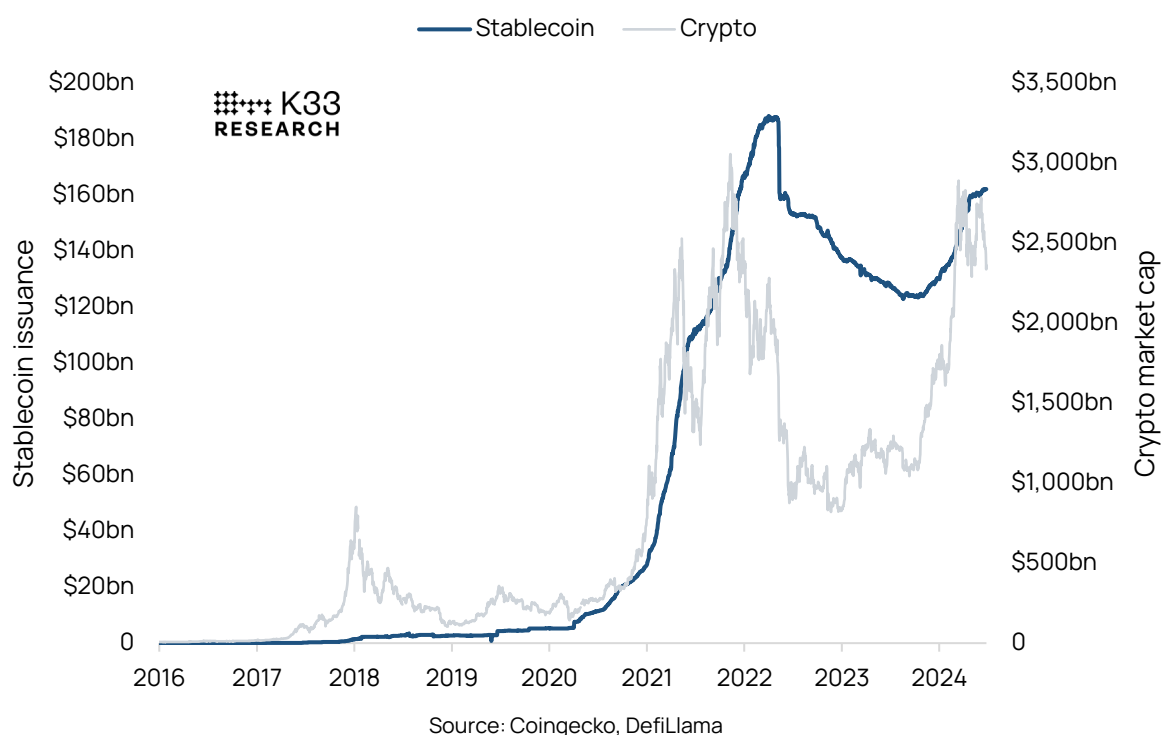
Stablecoin on-chain transaction volumes are on par with those of the world's largest payment networks. In 2020, stablecoin on-chain transaction volume surpassed PayPal's payment volume, before also surpassing the ten times larger volume of the Visa network the following year. Stablecoin volume has since been on par with Visa in 2022 and 2023 but is set to surpass the Visa payment network in 2024 convincingly. Still, stablecoins are some way from passing the payment volume of the Fedwire, the system for instant money transfers between U.S. banks.

Figure 2 – Stablecoin payment volumes compared to other payment networks. *Annualized numbers and estimates for 2024. Chart in log scale.
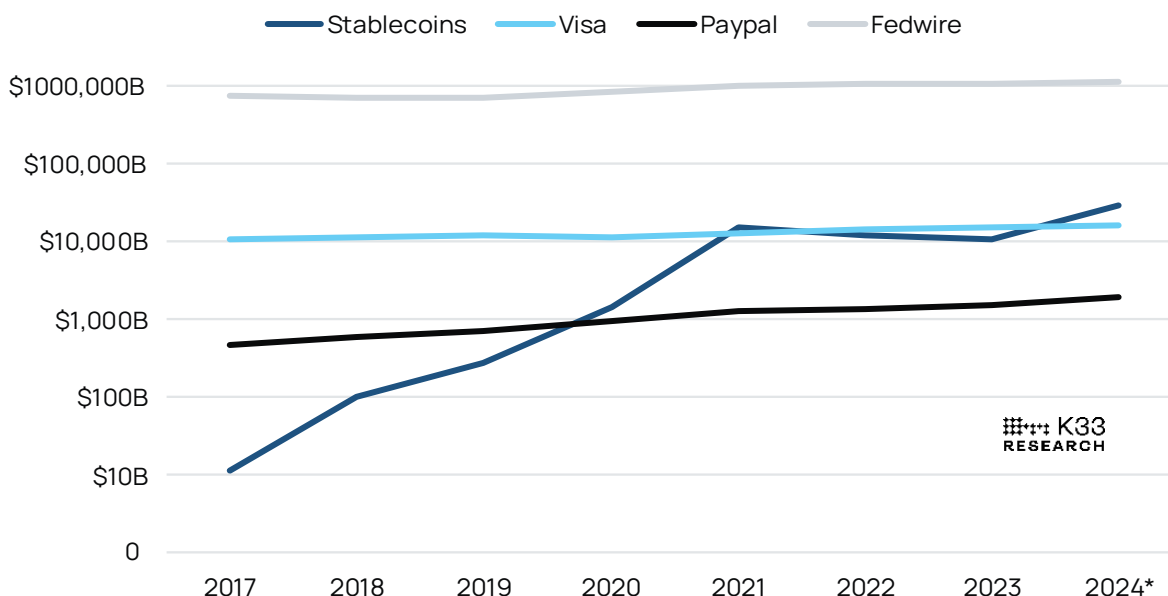
Source: Flipsidecrypto, Coinmetrics, Allium, K33 Research, Visa and Paypal annual reports, The Federal Reserve

The chart above is popular in crypto circles, as it in some way indicates that stablecoins are more used than the Visa payment network. However, interpreting the numbers in this way is severely misleading. On-chain stablecoin transactions generally represent entirely different types of transactions than the Visa payment network. The average transaction size on the Visa network is $54 on 276 billion transactions, while the average on-chain transaction size of stablecoins is $4,200 on 2.6 billion transactions.

Table 1 – Transactions and average transaction size in 2023 for different payment networks.

| Payment type	Transactions (million)	Average tx size
Stablecoins	2,587	$4,167
Visa	276,000	$54
Paypal	25,000	$61
Fedwire	193	$5,623,909

Source: Flipsidecrypto, Coinmetrics, Allium, K33 Research, Visa and Paypal annual reports, The Federal Reserve

The nature of the use of blockchain networks makes it virtually impossible to expose the intent behind all blockchain transactions, even though all transactions are publicly visible on the blockchain. In contrast, Visa's transaction history is not publicly available, but given the numbers, we have a clearer idea of what these payments are, typically retail payments for goods and services.

Blockchain transactions are used for a wide array of transactions. Simplifying, we can divide them into three types of transactions: Trading-related transactions, consolidation transactions (sender and receiver the same), and payments or transfers for non-trading purposes.

Trading and consolidation transactions likely dominate stablecoin on-chain volume. 95% of stablecoin volume comes from transactions over $10,000, payment sizes that are likely to fall within the trading or consolidation category. Still, even though blockchain networks process a lot fewer stablecoin transactions than the Visa network, most on-chain stablecoin transactions are smaller. Smaller transactions are more plausible to be everyday types of transactions.

Figure 3 – Stablecoin transaction volume and transaction count by transaction size. Ethereum and Tron.
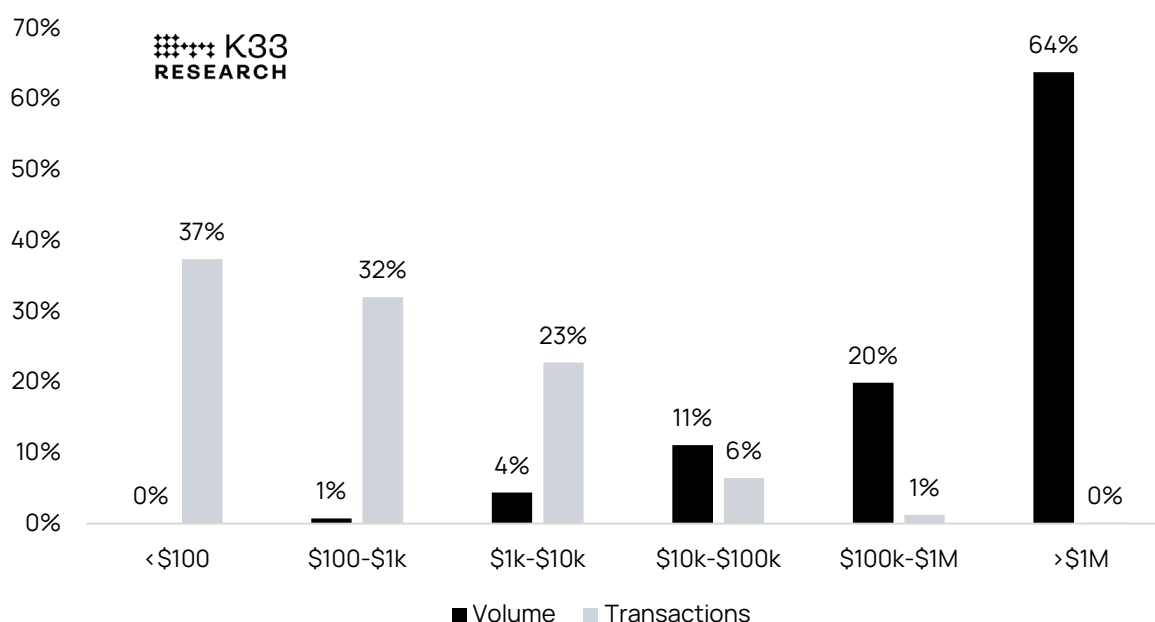
Source: Flipsidecrypto, @steakhouse / USDT on Tron (dune.com)

Stablecoins are used for purposes outside of crypto trading and most on-chain stablecoin transactions are under $1,000. Still, the extent of stablecoin use outside crypto trading is a large unknown. By using blockchain data, we are not able to decipher the motivation behind the transactions, and this is especially true for everyday types of transactions. They are blockchain forensically equal to so many other types of transactions that we are not able to identify them.

Another problem is that all everyday types of use of stablecoins will not leave a blockchain footprint either. Many users will use a custodial service, like Binance Pay. When two users of the same custodial service transact, it will typically not leave a blockchain footprint.

Hence, we possibly do not observe many stablecoin transactions when looking at blockchain data.

Even though we have not found any comprehensive and convincing numbers to reveal the extent of stablecoin usage outside of crypto trading, many report stablecoin adoption to be widespread.

In terms of non-trading use of stablecoins, Africa and Southeast Asia are mentioned a lot. For many people in that part of the world, using stablecoins makes sense. Many countries have weak national currencies and strong dollar influence while also having poorer access to financial services than many other parts of the world. Stablecoins can, therefore, be used as a protection against weak local currency while at the same time providing a savings account on your mobile phone.

Feet on the ground reports that stablecoins are used for savings and payments in the global south. While it is hard to grasp the overall magnitude of adoption based on these reports, the reports are too many for adoption not to be present. The Nigerian government prosecuting Binance officials for helping to circumvent capital controls and posing a risk for the Nigerian Naira is also a solid anecdotal supporting argument to the reports from the ground.

According to reports, Southeast Asia is also a hotbed for stablecoin use for non-trading purposes. Sources, including journalist-written books, mention currency shops dealing with USDT and regular shops accepting USDT. The presence of these shops indicates that there must be some usage of stablecoins in the area. Remittance payments made in USDT would fit the bill nicely, as many Southeast Asian countries receive substantial remittance payments from relatives abroad.

In conclusion, the reports of stablecoin use outside of trading are many, and there's a mountain of anecdotal evidence out there. Still, to the best of our professional opinion, there are no sources to give a convincing estimate for the number of users and extent of stablecoin use outside trading.

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1 What is a stablecoin?

Cryptocurrencies, even bitcoin, are volatile and can experience massive price fluctuations in a short period of time. For users of blockchain networks, this can represent a problem as the currency one holds can vary greatly in purchasing power. As demand for cryptocurrencies and the use of blockchain networks increased, the demand for a more stable value bearer also arose. Many crypto users wanted something more stable than bitcoin while still being able to use blockchain technology.

The solution to more stable crypto assets came in the form of what we call stablecoins. A stablecoin is a blockchain token meant to keep the exact same value as some fiat currency. In other words, if the stablecoin works as intended, you will have a blockchain representation of a regular currency, say the dollar, that you can freely use to transact in the crypto ecosystem.

In terms of transaction capabilities, stablecoins do precisely the same as other cryptocurrencies: They are stored and transacted on blockchains. So, the difference between a stablecoin and another cryptocurrency lies in what gives it value. Where the bitcoin price is determined by the willingness to buy or hold bitcoin at given prices based on bitcoin's properties alone, stablecoins are stable because of some incentive mechanism to keep the value pegged to a fiat currency's value. The incentive mechanisms, or pegging mechanisms, can vary between stablecoins, a topic we will look closer at in the next chapter.

In this report, we focus solely on stablecoins pegged to the U.S. dollar to keep the arguments cleaner. Stablecoins pegged to other currencies, like the Euro, exist, but the U.S. dollar-based stablecoins fully dominate the market. Hence, we find it sensible to focus on the dollar-based stablecoins but note that the different types of stablecoins can, in principle, be made in any currency.

2 The different types of stablecoins

For a blockchain token to be a stablecoin, it must have a pegging mechanism that keeps its value aligned with a fiat currency's value. We divide the pegging mechanism into three components: Trust, mint/redeem mechanism, and backing. Trust relates to whether the stablecoin is issued by a centralized counterparty or is governed by smart contracts in a decentralized fashion. The mint/redeem mechanism tells how you can mint new issuance of the stablecoin. Backing tells which types of assets underpin the value of the stablecoin. The table below shows which values the different components can take, and these categorizations are further explained in the following text.

The components making a stablecoin
Trust: Centralized, decentralized
Mint/redeem mechanism: Straight-up, assets, over-collateralization
Backing: Non-crypto assets, Crypto assets, flexible supply crypto assets, carry trade

Component 1 - Trust
Trust, in relation to types of stablecoins, only has two dimensions. A stablecoin can either be issued by a **centralized** counterparty relying on trust or governed by smart contracts in a trustless and **decentralized** fashion.

Component 2 - Mint/redeem mechanism
We divide stablecoin design into three different mint/redeem mechanisms:
1. Straight up: Exchange for $1
2. Assets: Exchange for $1 worth of assets
3. Over-collateralization: Lock up more than $1 in assets to mint the stablecoin

1. Straight up: Exchange for $1
'Straight up' is the simplest and most straightforward mint and redeem mechanism, where one stablecoin unit can always be bought and sold for $1. In technical terms, this means that one stablecoin unit can always be minted by providing $1, and one stablecoin unit can always be redeemed for $1. If the stablecoin trades at more than $1, people will arbitrage by minting and selling the stablecoin, increasing the stablecoin supply until the price equals $1. Conversely, if the stablecoin trades at less than $1, people will arbitrage by buying and redeeming the stablecoin, reducing the stablecoin supply until the price equals $1.

2. Assets: Exchange for $1 worth of assets
This mint and redeem mechanism works the same way as "Straight up", except that you exchange $1 with $1 worth of assets. So, instead of being able to mint one stablecoin unit by providing $1, you provide $1 worth of an eligible asset to mint one unit. Conversely, one unit of the stablecoin can be redeemed for $1 worth of the eligible asset. The arbitrage mechanism becomes the same as previously. If the stablecoin trades at over $1, people will

arbitrage by minting and selling, or buying and redeeming when the stablecoin trades below $1.

The difference between exchanging for $1 or $1 worth of assets might seem trivial, but it certainly is not. If the eligible asset is not strong enough to cope with large selling pressure, the risk of entering a 'death spiral' is high over time.

3. Over-collateralization: Lock up more than $1 in assets to mint the stablecoin
The over-collateralized mint and redeem mechanism is more complicated than the previous two mechanisms. To create one stablecoin unit, more than $1 of an eligible collateral asset must be locked into a protocol for the handling of this collateral.

The collateralization rate is the value of the collateral assets divided by the number of stablecoin units issued for this collateral. When the collateralization rate falls under a certain threshold (must be bigger than 1), an auction is initiated. Participants in the auction bid stablecoin units for the collateral and the winning bid gets the collateral. The stablecoin units from the winning bid are automatically burned. This mechanism ensures that the stablecoin remains overcollateralized (unless a vicious death spiral occurs).

The collateral can always be redeemed for the initial issuance of the stablecoin unit (excluding potential interest rate payments). If the stablecoin remains properly over-collateralized but the stablecoin trades at less than $1, users will likely buy the stablecoin and redeem their collateral. As long as the stablecoin remains properly over-collateralized, there's no reason to expect the low price to be permanent. Hence, when the value falls below $1, it's an opportune time to repay debt. When people repay debt, the stablecoin supply contracts until the parity of $1 is reached again.

The two mechanisms above alone aren't enough to keep a strict peg like the other pegging mechanisms. As you will see in the case of the decentralized stablecoin DAI, the only prominent stablecoin with this type of mechanism, additional measures are taken to keep DAI stable at $1.

Component 3 - Backing
Backing tells which types of assets underpin the value of the stablecoin. We divide the type of backing a stablecoin can have into four different groups:
1. **Non-crypto assets -** Non-crypto assets refer to real-world assets that are considered to have a stable value, such as bank deposits, cash, treasury bills, etc.
2. **Crypto assets -** Crypto assets refer to all types of cryptocurrencies.
3. **Flexible supply crypto assets –** A cryptocurrency whose supply contracts when new stablecoin units are minted and conversely expands when stablecoins are redeemed.
4. **Carry trade –** A strategy where you sell futures of an asset while you buy the underlying asset. If futures trade at a premium, you will create a "guaranteed" profit.

In the following section, we will categorize the existing stablecoins based on the three components mentioned above. Although almost all combinations would be theoretically possible, only certain combinations are used or have been used in the past.

2.1 There are historically four types of stablecoins

Using the categorization from the previous chapter, we see that there are four combinations of the different components that historically have been used to create stablecoins. We call the four combinations centralized asset-backed, decentralized crypto-over-collateralized, decentralized algorithmic, and centralized carry trade-backed. The table below shows the trust, mint/redeem, and backing mechanism of the four types of stablecoins.

Name	Trust	Mint/Redeem	Backing
Centralized asset-backed	Centralized	Straight up: Exchange for $1	Non-crypto assets
Decentralized crypto-over-collateralized	Decentralized	Over-collateralization	Crypto assets
Decentralized algorithmic	Decentralized	Assets: Exchange for $1 worth of assets	Flexible supply crypto assets
Centralized carry trade-backed	Centralized	Assets: Exchange for $1 worth of assets	Carry trade

Centralized asset-backed stablecoins dominate the stablecoin landscape making up 93% of the stablecoin market cap. Decentralized crypto-over-collateralized stablecoins make up 4%, while the emerging centralized carry trade-backed stablecoins make up almost all of the remaining 3%.

Figure 4 – Market cap by type of stablecoin. Date: June 25, 2024
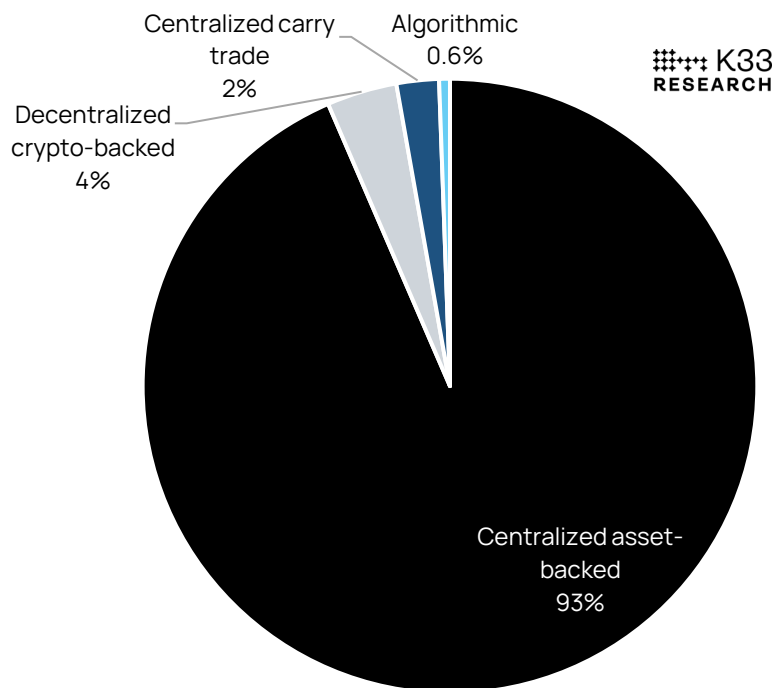
Source: Defillama and K33 Research

Decentralized algorithmic stablecoins with the Terra UST token had a short-lived period of high popularity. At the height, 20 billion UST were issued, but the roof came crashing in when the UST depegged in May 2022 and quickly became basically worthless. Since this spectacular crash, algorithmic stablecoins have generally been considered impossible to make work.

The following chapters will look at each of the four stablecoin types, explain how they work, and show the prominent stablecoins in the category.

2.2 Centralized asset-backed

Centralized asset-backed stablecoins are by far the most popular stablecoins for crypto users. Centralized refers to the fact that there is a trusted counterparty issuing the stablecoin, whereas asset-backed refers to the fact that assets back up the stablecoin's value.

Name	Trust	Mint/Redeem	Backing
Centralized asset-backed	Centralized	Straight up: Exchange for $1	Non-crypto assets

The underlying principle for the centralized asset-backed stablecoins is that each blockchain currency unit is backed by at least an equal-valued holding by the issuing party. One more unit of the stablecoin can be issued by providing the issuer with one dollar. Conversely, one unit of the stablecoin can be exchanged for one dollar. This mint-redeem mechanism ensures that the stablecoin's worth stays stable at $1 by introducing arbitrage opportunities when it differs from $1.

The 1-to-1 mint and redeem mechanism means that the $1 peg will only be upheld if the backing never dips below $1 per issued stablecoin unit. Consequently, the backing must be held in assets that are guaranteed or near-guaranteed to maintain their dollar value. The simplest form of doing this would be to keep the backing in cash deposits after the stablecoins are minted. Barring counterparty risk with the bank, all stablecoin holders would then be guaranteed to be able to redeem their stablecoin for $1 each.

As we will detail later, stablecoin issuers pocket the accrued interest on the backing. Hence, the issuers will want to keep the backing in assets that return as much interest as possible while at the same time not running the risk of becoming undercollateralized. Due to this fact, we see that short-term treasury bills and alike mainly back up the centralized asset-backed stablecoins.

2.2.1 A few issuers dominate centralized asset-backed stablecoins

As of writing, there are almost $150 billion worth of centralized asset-backed stablecoins issued. Two issuers account for 97% of this issuance. These two issuers are Tether and Circle, with the USDT and USDC stablecoin, respectively. Tether's USDT is the largest, making up 76% of the centralized asset-backed stablecoin supply, while USDC's corresponding number is 22%. First Digital USD (FDUSD) is in a clear third with 1% of the supply, while the remaining 2% is spread across multiple different stablecoins.

*Figure 5 – Distribution of stablecoin supply by coin for centralized asset-backed stablecoins.
Date: June 25, 2024*
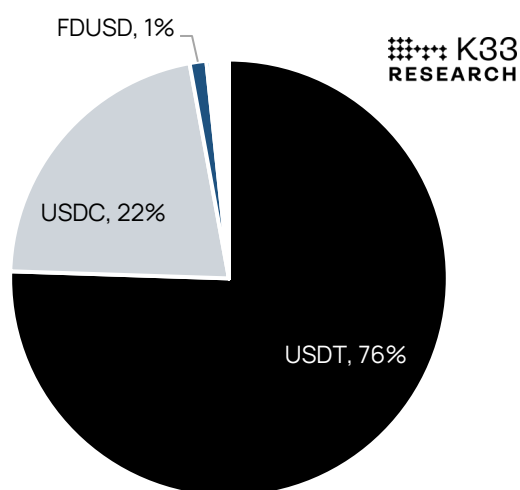
Source: Defillama and K33 Research

2.2.2 The business model of centralized asset-backed stablecoins

The business model of the centralized asset-backed stablecoins is generally a straightforward one. Someone comes with a dollar to issue one unit of the stablecoin. The dollar is used to buy assets backing up the one dollar; let's assume all treasuries for simplicity. Until someone comes to redeem the stablecoin, the backing assets, in this case, a treasury bill, will earn interest. At the time of redemption, the stablecoin issuer only owes the redeemer exactly one dollar still. This means that the stablecoin issuer pockets the entire yield on the backing assets. Therefore, a stablecoin issuer's revenue will generally be the stablecoin issuance times the interest rate.

With stablecoins becoming hugely popular, the prominent stablecoin issuers have become profit machines, especially after interest rates increased. In 2023, Tether reported net profits of $6.2 billion, of which about $4 billion represented the net operating profits on U.S. treasuries and alike. The remaining $2 billion in profits came from return on investments in bitcoin and gold, which Tether has partially bought from earlier profits.

2.2.3 Emerging: Centralized yield-bearing stablecoins

Yield-bearing stablecoins are an emerging token class and the natural next step given the current stablecoin issuers' outsized profits. Following standard economic theory, issuers should start passing on some of the yield to token holders to steal users. A stablecoin that also pays an interest rate would be a strict improvement on the current non-yield-paying stablecoins. Hence, crypto users should switch to yield-bearing stablecoins if they are rational.

Principally, yield-bearing stablecoins are already here, but they pose several calculation difficulties of use that prevent them from being a simple unit of account like the non-yield-bearing stablecoins. To see why this is a problem, remember our definition of a stablecoin: *A stablecoin is a blockchain token meant to keep the exact same value as some fiat currency.*

A yield-bearing stablecoin must, therefore, be a stablecoin that keeps its value at $1 while at the same time paying some interest to the owning account of the stablecoin. To make this possible, the account must be issued more of the stablecoin as interest accrues. This is harder to do than one might anticipate due to the cost of doing blockchain transactions. If the owning account would be sent the interest every block, the transaction fees would far outweigh the accrued interest. Hence, it becomes unattainable to do it that way.

To solve this problem, developers have devised a solution called rebasing. Rebasing allows for interest to accrue while the token maintains a stable value. However, rebased coins don't interact with the popular DeFi protocols, meaning that the rebasing portion falls away, and the token will drift in price. This prevents rebasing stablecoins from having the same simplicity as non-yield-bearing stablecoins in DeFi.

2.2.3.1 USDM - A rebasing dollar token

The USDM token is a yield-bearing stablecoin designed to maintain a peg of $1. The token utilizes the same rebasement mechanism as Lido's staked Ether to pay yield while keeping the peg. The rebasement mechanism consists of two factors: shares and the reward multiplier. The reward multiplier is the cumulative interest paid since the very first issued USDM. When you want to mint $100 worth of USDM, you will then be issued 100/reward multiplier shares. The rebased amount of USDM will always be shares times the reward multiplier. As long as the interest rate is positive, this reward multiplier will rise, increasing the rebased amount of USDM in line with the interest rate paid. This way, USDM maintains its $1 peg while also paying interest.

2.2.3.2 Without rebasing, it's not a stablecoin

Ondo's USDY is similar to the USDM token except that it doesn't utilize rebasing. That means the USDY produces yield for holders but fails to keep a stable value of $1. Ondo's USDY works like this: The issued USDY is a claim on the USDY treasury based on Ondo's set

interest rates. The very first issuance of 100 USDY would initially be done at $100. But after this, USDY's price never returns to $1. After one year with an interest rate of 5%, the claim on the treasury will have grown to $105, pushing the price of USDY to 1.05. If you now want to issue 100 more USDY, you would have to pay $105 to do so. This will continue, with the consequence being that USDY's unit price will rise with the offered interest rate – there's nothing stable about that.

2.3 Decentralized crypto-over-collateralized

Decentralized crypto-over-collateralized stablecoins are backed by over-collateralized crypto deposits combined with smart contracts. Users provide some over-collateralized amount of cryptocurrency to issue one unit of the stablecoin. If the collateral falls under a certain multiplier compared to the issued stablecoin value, the collateral will be used to buy back and burn the stablecoin. Theoretically, this ensures that the stablecoin will always be over-collateralized, and users should trust its value.

Name	Trust	Mint/Redeem	Backing
Decentralized crypto-over-collateralized	Decentralized	Over-collateralization	Crypto assets

2.3.1 Decentralized stablecoins are all about DAI

Decentralized stablecoins are defined by Maker DAO's DAI, which was introduced on the Ethereum blockchain already in late 2017. DAI has been the only decentralized crypto-over-collateralized stablecoin of note for much of the time since 2017. In the last year, Curve has introduced a similar stablecoin to DAI, but the issuance far lags behind DAI. At the time of writing, more than 5.2 billion DAI are issued, compared to under 130 million for Curve's similar stablecoin.

Ticker	Governor	Valid collateral	Issuance (June 5, 2024)
DAI	MakerDAO		5.2 billion
crvUSD	CurveDAO		123 million

DAI is the stablecoin of the Maker protocol. Users can mint DAI by locking up crypto collateral in the Maker protocol's smart contracts. DAI maintains its $1 value through over-collateralization and stability mechanisms.

Over-collateralization ensures there's always more than $1 worth of crypto backing each DAI. When the collateral falls under a certain threshold, a liquidation auction can be initiated. The collateral will then be bought in the auction for a DAI amount that is burned.

Since the auction is initiated while the individual DAI position is still over-collateralized, this will keep DAI over-collateralized.

The Maker DAO controls the interest rate on collateralized debt positions and the DAI savings rate. These rates are set to manipulate the DAI supply to keep DAI's value at $1.

The DAI's pegging mechanism isn't an easy arbitrage mechanism like the mint-redeem mechanism of the centralized asset-backed stablecoins. Instead, the pegging mechanism relies on trusting that the over-collateralized debt positions and Maker DAO's rate decisions will keep the value at $1 over time. If the price deviates from $1 but you fully expect it to return to $1, arbitrage mechanisms will help stabilize the price at $1. When the price falls below $1, buying DAI and repaying debt positions becomes more attractive. This will reduce the DAI supply and pull DAI back towards the $1 value. Conversely, if DAI trades above $1, it becomes more attractive to mint new DAI and sell them in the market.
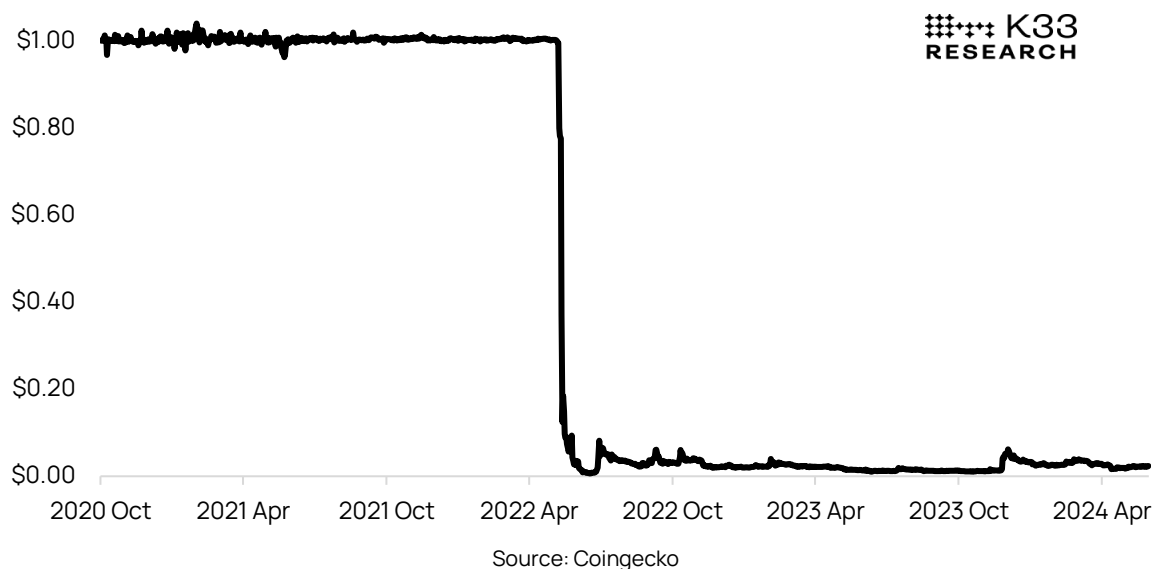
2.4 Decentralized algorithmic

Algorithmic stablecoins were once booming but are now practically non-existent. Unlike the other types, algorithmic stablecoins do not use collateral. Instead, they use algorithms and smart contracts to control the supply of the stablecoin, expanding or contracting it to maintain its peg to a stable asset.

Name	Trust	Mint/Redeem	Backing
Decentralized algorithmic	Decentralized	Assets: Exchange for $1 worth of assets	Flexible supply crypto assets

The famous Terra USD token (UST) was a decentralized algorithmic stablecoin. You could always burn one dollar's worth of LUNA to mint one UST, and vice versa, you could always burn one UST to get one dollar's worth of LUNA. If UST traded above one, you would arbitrate by burning LUNA and selling UST. If UST traded below one, you would arbitrate by burning UST and selling LUNA. Unlike the other stablecoins where the issuance of the collateral is unaffected by the stablecoin demand, the supply of LUNA is flexible.

The arbitrage mechanism requires selling LUNA when you burn UST. When hoards came to redeem their UST in May 2022, this mechanism broke down, as the LUNA token and UST entered a death spiral where the prices plummeted continuously.

Figure 6 – Terra's UST price chart

Source: Coingecko

Today, decentralized algorithmic stablecoins are virtually extinct. The UST, now dubbed USTC, trades at cents on the dollar with a non-realizable market capitalization of about $150 million. In the statistics, Tron's version of UST, the USDD token, has a market capitalization of over $700 million. However, it's important to note that this $700 million is likely parked in Tron founder and crypto billionaire Justin Sun's wallets, and there is no evidence of people using USDD at all.

Figure 7 – Market capitalization of decentralized algorithmic stablecoins. Date: June 25, 2024

Source: Defillama
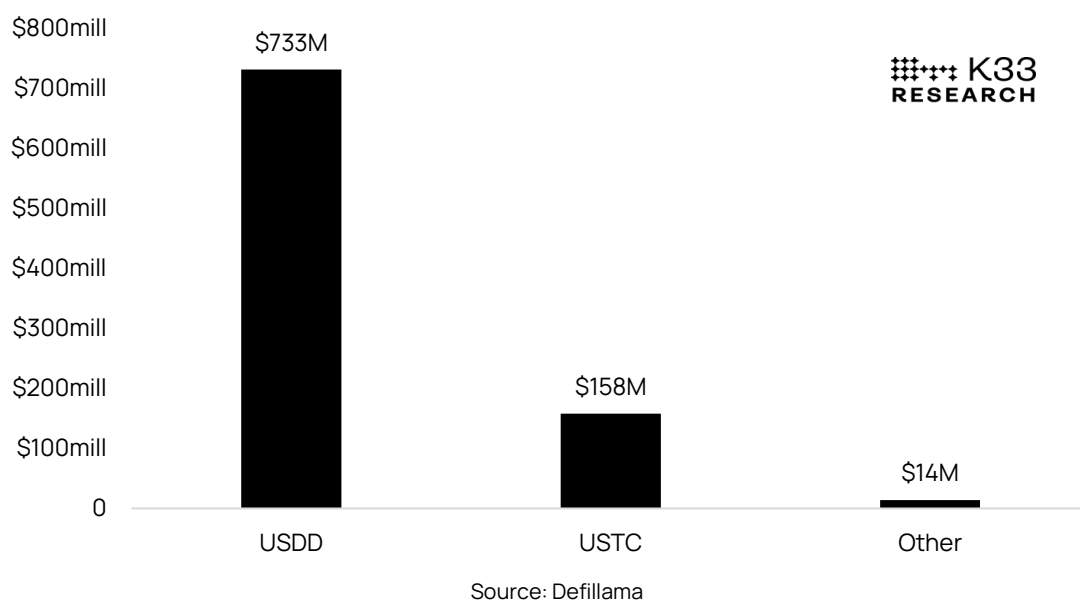
2.5 Centralized carry trade-backed

Centralized carry trade-backed stablecoins are a newly launched class with only one serious actor so far. The carry trade-backed stablecoin follows a design that has been talked about for years. The design takes advantage of futures premiums on crypto to create a locked-in return that backs up the stablecoin's value.

Name	Trust	Mint/Redeem	Backing
Centralized carry trade-backed	Centralized	Assets: Exchange for $1 worth of assets	Carry trade

Crypto futures, at least for the largest coins, trade at a premium to spot most of the time. When futures trade higher than the spot price, you can lock in a dollar profit of the difference between the future and the spot price. The strategy requires that you buy in the spot market while at the same time selling a future that is priced higher. Doing this, you lock in the profit on an invested capital equaling the spot price.

Ethena's USDe stablecoin utilizes the carry trade in Ether and bitcoin to back up its value. USDe launched in early 2024 and is so far the only carry trade-backed stablecoin of any meaningful size. The issuance of USDe has risen quickly, and has passed 3 billion at the time of writing[ii].

Ethena's USDe is being labelled by some as a yield-bearing stablecoin, but the coin itself is not actually yield-bearing. USDe is a stablecoin with a pegging mechanism holding it to $1, given that the Ethena carry-trades don't incur large losses. But to earn interest on USDe, you must stake it with Ethena. The APY is currently very tasty, but this isn't substantially different to what you can do with other stablecoins – they can also be staked or locked into protocols to earn yield.

[ii] June 25, 2024

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3 Peg stability

The value proposition of stablecoins lies in them having a stable value compared to the intended fiat currency. Therefore, looking at how well the most popular stablecoins have maintained their peg over the years is of interest.

In general, the centralized asset-backed stablecoins have done an excellent job of maintaining the $1 peg. Only at a few points in time have they traded below the peg. In recent times, the most notable event was following the collapse of the Silicon Valley Bank in March 2023. Silicon Valley Bank was a popular bank in the crypto industry, and USDC issuer Circle had large deposits in the bank. In a dramatic weekend, the market became worried about whether Circle would be able to redeem their deposits in the bank and, hence, leave USDC undercollateralized. As a consequence, USDC depegged and traded well below $1. The depegging proved temporary, as when markets opened the following week, it became clear that USDC was still fully collateralized.

The centralized asset-backed stablecoins simple mint and redeem procedure means that the stablecoin will only fall under $1 for any length of time if the market believes that the stablecoin is undercollateralized. Conversely, the mint and redeem arbitrage is not that straightforward for the decentralized stablecoin DAI. This became evident in the markets in 2020, as DAI traded above $1 for much of the year.

Figure 8 – Market price of the top 3 stablecoins since 2020.
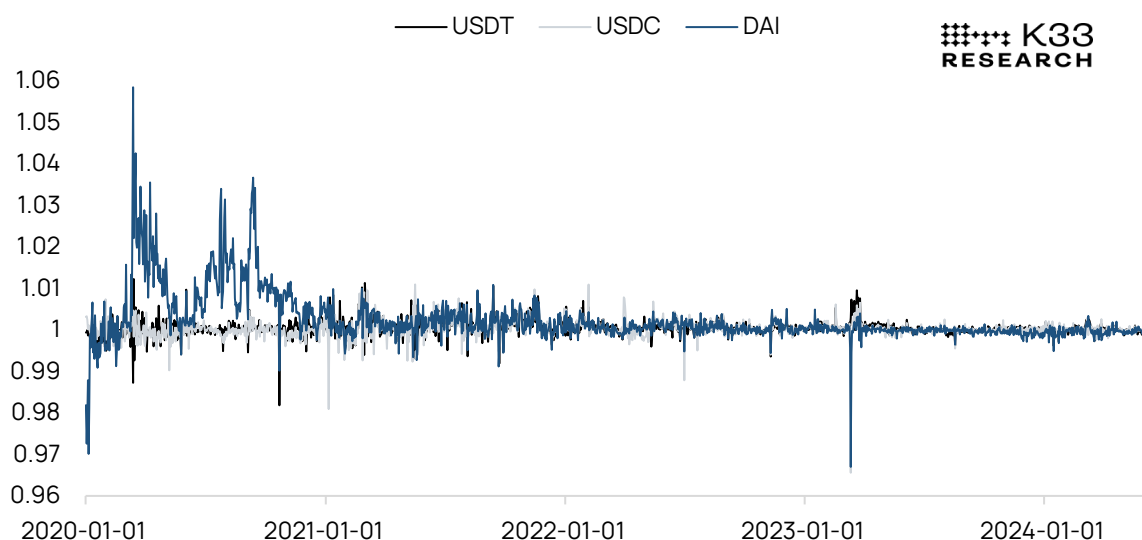
Source: Coingecko

In 2020, DAI traded, on average, one cent away from its peg, ten times more than USDT and USDC. The reason for this discrepancy came from outsized demand for DAI during the Covid crash and later to gain yield, combined with the missing straightforward arbitrage mechanism when DAI trades away from the peg. Still, DAI has gradually become more stable

since 2020. In 2023, DAI's deviation from peg averaged 0.08 cents, the same as USDT's and USDC's average deviation.

The MakerDAO, the governor of DAI, has taken multiple measures to increase the stability of DAI. Among them, we find increased use of stablecoins and U.S. treasuries as collateral and more active governance via the stability fee rate and the DAI savings rate.

4 The use of stablecoins

Making comparably usable statistics from blockchain data is a challenging task, and it can't evade the subjective definition of what 'real' and 'fake' activity is. In the following, we will look closer at different metrics for stablecoin adoption and discuss the weaknesses and strengths of the given metrics.

4.1 Stablecoin issuance

Stablecoin issuance is, in many ways, the cleanest measure of stablecoin demand. With the current non-yield paying stablecoins dominating, the stablecoin issuance shows the amount of dollars that are willing to forfeit interest to stay in the crypto ecosystem.

By now, stablecoins feel like, and are, an integral part of the crypto ecosystem. However, it hasn't always been like this. Stablecoins have existed since 2014, but it took several years for them to take on any use. At the start of 2017, stablecoin issuance was barely 10 million dollars, a drop in the ocean. The first significant uptick in stablecoin issuance came during the bull run of late 2017 and early 2018, where stablecoin issuance grew to 2 billion.

Later, the stablecoin issuance lingered between 2 and 3 billion halfway through 2019 before it rose to 5 billion by the start of 2020. In the summer of 2020, stablecoin issuance really took off, taking on a parabolic growth trajectory. By January 2021, stablecoin issuance reached 30 billion, and only four months later, in May 2021, it had more than tripled to 100 billion. The growth continued, with issuance reaching nearly 190 billion in May 2022. The rise of stablecoin issuance stopped with the Terra/Luna crash, where about $20 billion of decentralized algorithmic stablecoins evaporated in days. The Terra crash marked the bear market's proper start, starting a contraction of the stablecoin issuance that would last more than one year. By the fall of 2023, stablecoin issuance had fallen to just over $120 billion, down 35% from the peak issuance. With rising crypto prices throughout 2023, more money finally sought to participate in the ecosystem in late 2023, when the 17-month decline in stablecoin issuance finally reversed. Currently, total stablecoin issuance is 160 billion, a 30% rise from the bottom in 2023.

Figure 9 – Stablecoin issuance and crypto market cap.

Source: Coingecko, DefiLlama
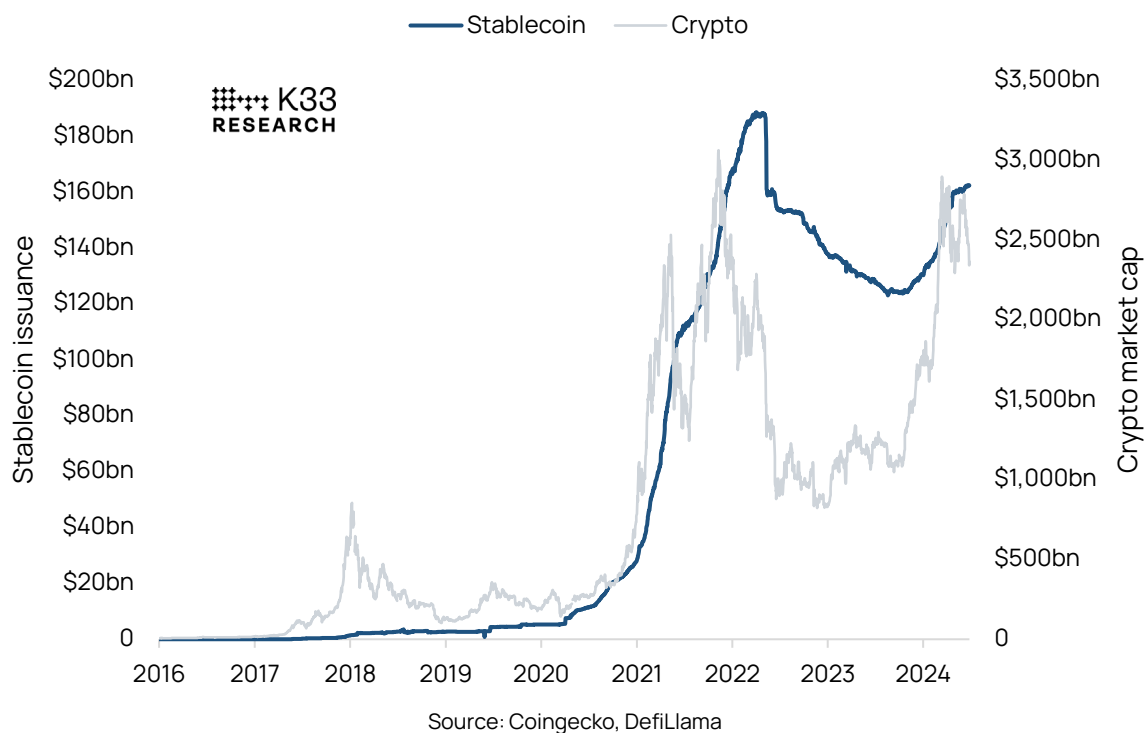
Half of the stablecoin market cap is issued on Ethereum, with Tron following in a clear second, with more than one-third of the total stablecoin supply issued on Tron. The remaining 14% is scattered on multiple different blockchain networks, with Binance Smart Chain being the biggest with 3%.

*Figure 10 – Stablecoin market cap by blockchain network. Date: June 1, 2024*
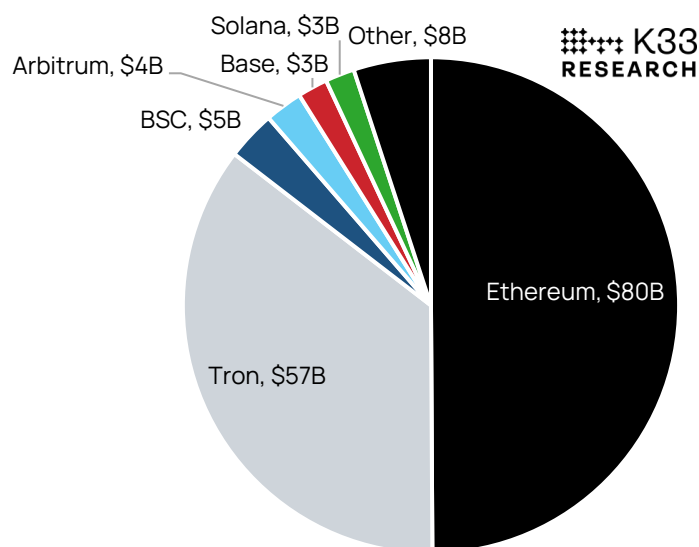
Source: DeFiLlama

4.2 Stablecoin transactions

Another metric for stablecoin demand is on-chain transaction volume and transaction count. The metric shows what the name alludes to; it shows the total value of every stablecoin transaction on blockchain networks and the total number of those transactions. Comparing blockchain statistics to other payment statistics can lead to severe misinterpretations of actual usage. To make things clear and understandable, we will start by presenting the numbers, showing some of the most common comparisons, and then explaining why the comparisons are not good at all.

On-chain stablecoin volume is massive. In 2023, on-chain stablecoin volume totaled more than $10 trillion on 2.5 billion transactions. Stablecoin volumes have spiked further in 2024, with volume being on pace to surpass $30 trillion on 4 billion transactions.

Figure 11 - Yearly stablecoin transaction volume and count.

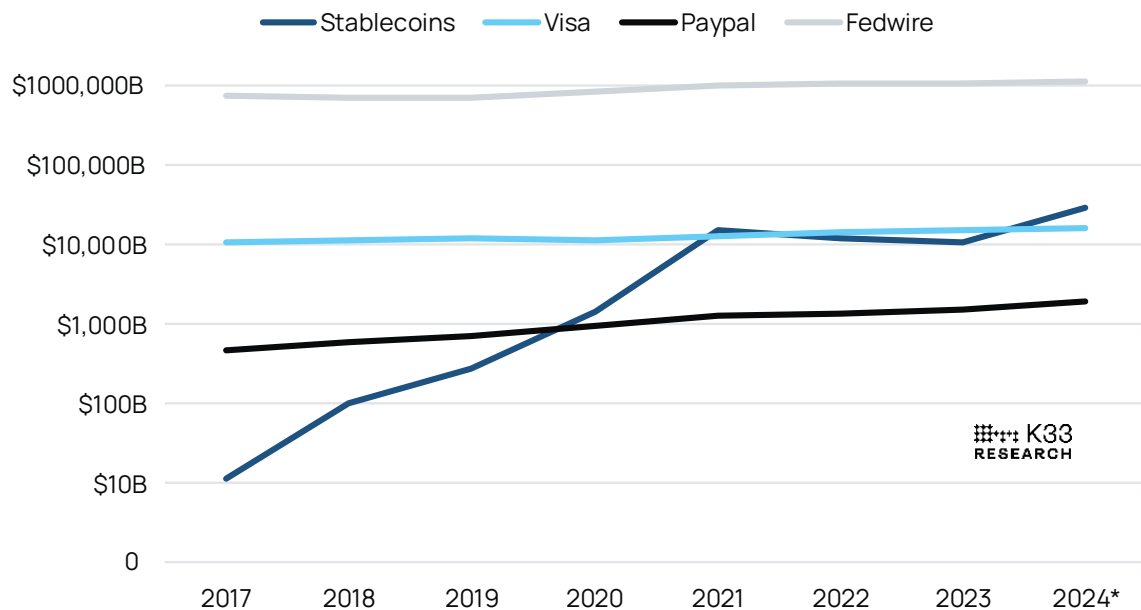
Source: Flipsidecrypto, Coinmetrics, Allium, K33 Research
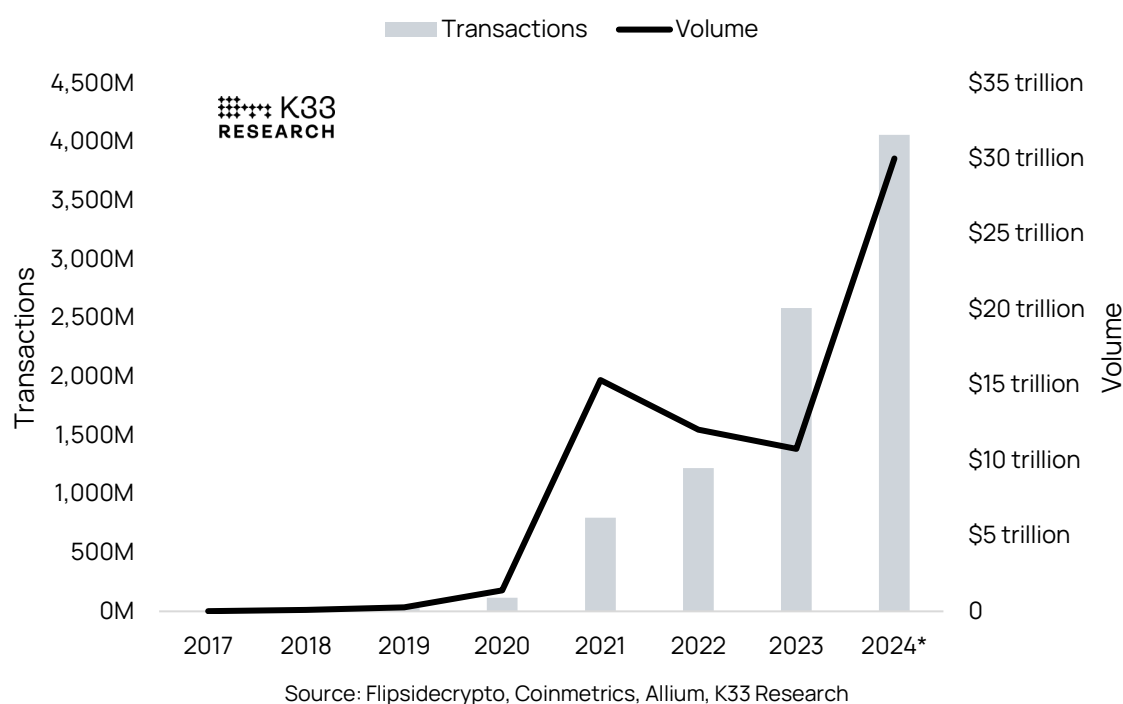
$30 trillion is a hard number to grasp, so comparing it to something makes sense. In **Figure 12**, we show on-chain stablecoin volume compared to payment volumes in other payment networks, namely Visa, PayPal, and Fedwire.

We see that stablecoin payments volume has had a meteoric rise in the last seven years compared to the other payment networks. Stablecoin payment volume passed PayPal already in 2020 and Visa in 2021. After 2021, stablecoin payments volume has lingered around Visa's payment volume in both 2022 and 2023 before stablecoin volume is on pace to do another burst upward this year.

While on-chain stablecoin volume is on par with the world's most popular retail payments network, there's still a long way to go before the volumes seen on the interbank settlement network, the Fedwire. In 2023, the Fedwire settled almost $1,100 trillion compared to stablecoins' $11 trillion.

*Figure 12 – Stablecoin payment volumes compared to other payment networks. *Annualized numbers and estimates for 2024. Chart in log scale.*

Source: Flipsidecrypto, Coinmetrics, Allium, K33 Research, Visa and Paypal annual reports, The Federal Reserve

The payment networks in the above chart are used for vastly different purposes. Take the Visa network, which is mostly retail card payments; the network settled 276 billion payments in 2023 with an average transaction size of $54. Paypal had a similar usage pattern, with users making 25 billion transactions at an average of $61. On the other hand, Fedwire only had 193 million transactions with each transaction settling a whopping $5.6 million.

Table 2 – Transactions and average transaction size in 2023 for different payment networks.

Payment type	Transactions (million)	Average tx size
Stablecoins	2,587	$4,167
Visa	276,000	$54
Paypal	25,000	$61
Fedwire	193	$5,623,909

Source: Flipsidecrypto, Coinmetrics, Allium, K33 Research, Visa and Paypal annual reports, The Federal Reserve

Now, where do stablecoins rank in terms of the number of transactions and average transaction size? In 2023, there were 2.6 billion stablecoin transactions, with an average transaction size of $4,200. Compared to the other payment networks, stablecoins don't have the same use patterns as any of them. Still, the numbers give us some obvious insights. On-chain stablecoin transactions are not nearly as widely used for retail payments and retail money transfers as Visa and Paypal. For that, the number of transactions is too low.

Blockchain transactions are used for a wide array of transactions. Simplifying, we can divide them into three types of transactions: Trading-related transactions, consolidation transactions (sender and receiver the same), and payments or transfers for non-trading purposes.

Trading-related transactions are all transactions related to crypto trading activity, either at centralized services or in DeFi. These transactions are many and diverse, from small fish transfers to mega whales. Market makers moving between exchanges probably account for significant portions of volume in this category. Consolidation transactions are transactions where the sender and receiver are the same entity. These transactions are very common due to the technicalities of blockchain transactions and security reasons. For instance, almost all trading-related transactions will trigger at least one consolidation transaction. Payments and transaction for non-trading purposes are the remaining transactions that are more similar to common everyday use of money, including transfers between individuals and payments for goods and services.

Trading and consolidation likely dominate stablecoin on-chain volume. 95% of stablecoin volume comes from transactions over $10,000, payment sizes that are likely to fall within the trading or consolidation category. Still, the large number of stablecoin transactions are of smaller size. 70% of transactions are less than $1,000, showing that there is a significant number of blockchain transactions that could be more everyday type of use payments.

*Figure 13 – Stablecoin transaction volume and transaction count by transaction size. Ethereum and Tron*
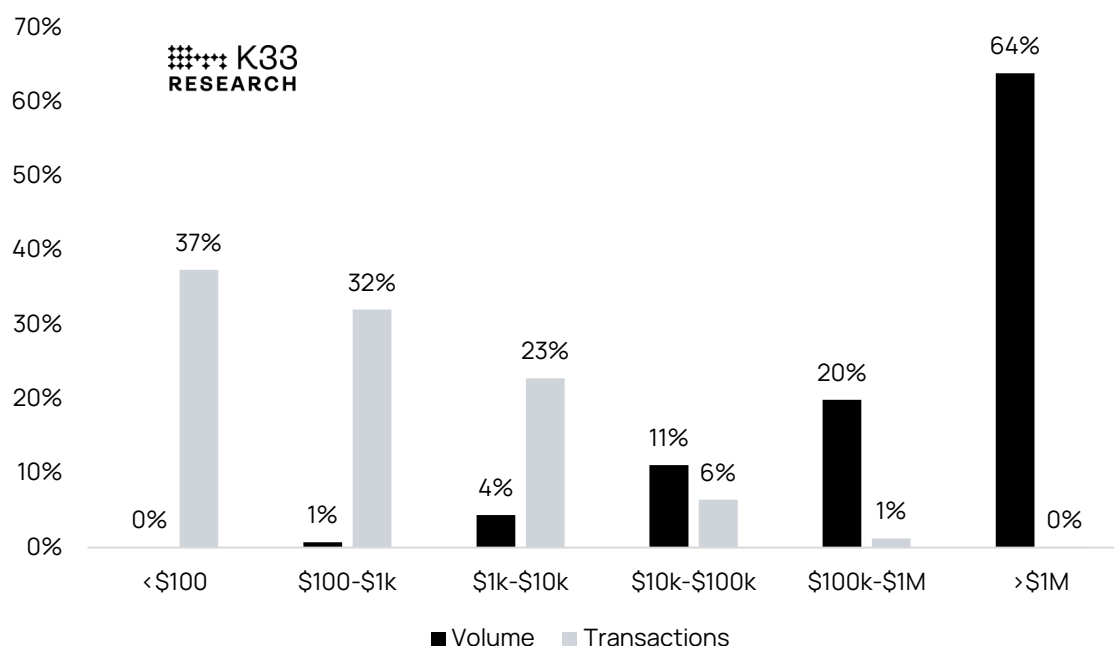
Source: Flipsidecrypto, @steakhouse / USDT on Tron (dune.com)

The number of stablecoin transactions a year has been on a continuous rise, going from 450 thousand in 2017 to 115 million in 2020 to 2.6 billion in 2023. So far, in 2024, the number of transactions is on pace to reach 4 billion transactions for the full year.

Stablecoin volume has also risen sharply but not at the same continuous rate as the number of transactions. Until recently, stablecoin volume has moved in tandem with the stablecoin supply, but that close matching is breaking now. In the last six months, stablecoin volume has risen significantly more than the issuance.

Meteoric stablecoin growth on Solana explains the skyrocketing stablecoin volume in 2024. As can be seen from **Figure 14**, the Solana network is on pace to do $14 trillion in stablecoin volume alone, compared to $0.6 trillion in 2023.

Figure 14 - Yearly stablecoin volume by blockchain network

Source: Flipsidecrypto, Coinmetrics, Allium Labs, K33 Research
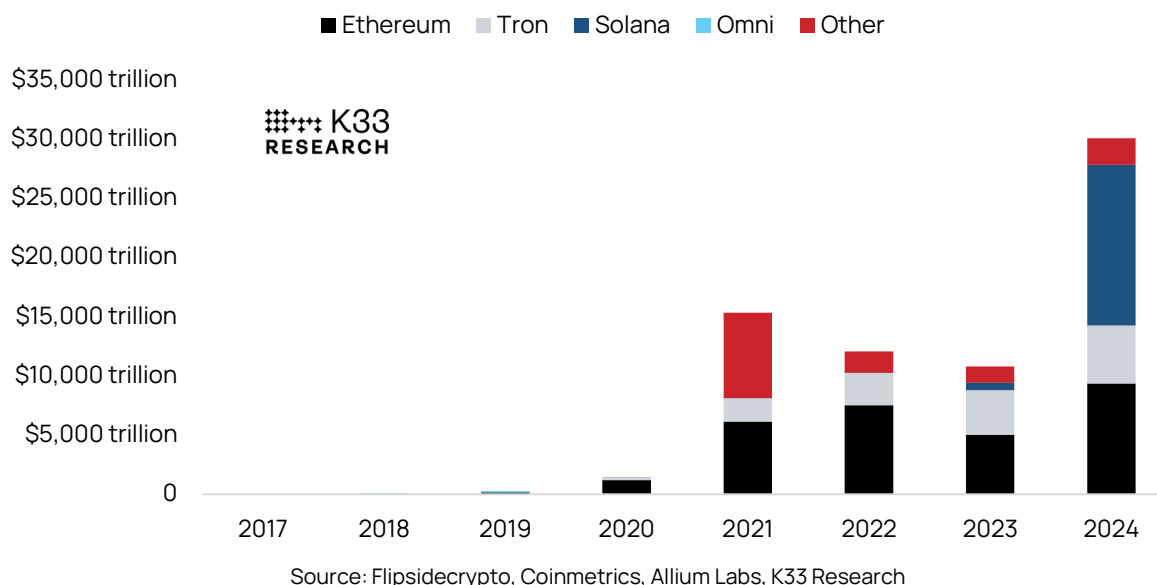
The Solana numbers are peculiar and highlight the problem with on-chain stablecoin statistics. Solana is set to do half of the stablecoin volume in 2024, but only 2% of the stablecoin supply currently resides on Solana. The discrepancy arises from MEV bots going crazy on Solana due to the increased DeFi activity and low transaction fees. In this case, it's pretty obvious that the stablecoin volume on Solana isn't 'real' as the practical use of the chain has not changed that materially from the fall of 2023 to now.

Even though we can see that something is 'wrong', it's not obvious how to correct it. For stablecoin transactions, there are no established sources or heuristics that determine 'real' stablecoin volume.

# 4.3 Attempts at determining 'real' volume

A report from Visa looks into the use of stablecoins and tries to separate organic and inorganic activity from 'bots and other artificially inflationary practices'.

To find organic activity, Visa and their partner Allium Labs start with standard blockchain data on stablecoin transactions. Instead of aggregating all the stablecoin transactions, Visa first applies a filter to remove 'inorganic' transactions.

The filter comprises two subfilters: the single-directional volume filter and the inorganic use filter. The single-directional volume filter removes internal transactions in smart contracts. The inorganic use filter keeps only transactions from accounts that have initiated less than 1,000 stablecoin transactions and $10m in transfer volume over the last 30 days.

After applying the two filters to the blockchain data, about 90% of the transactional volume and 80% of the transactional count disappears. According to Visa's adjusted statistics, the organic volume of stablecoins is close to $10 billion daily on more than 2 million transactions. If true, it represents significant adoption, although severely lagging the Visa network's $40 billion on 750 million daily transactions.

Figure 15 – Monthly stablecoin volume and transactions. Unadjusted and adjusted numbers. Date: June 25, 2024

Source: Allium Labs
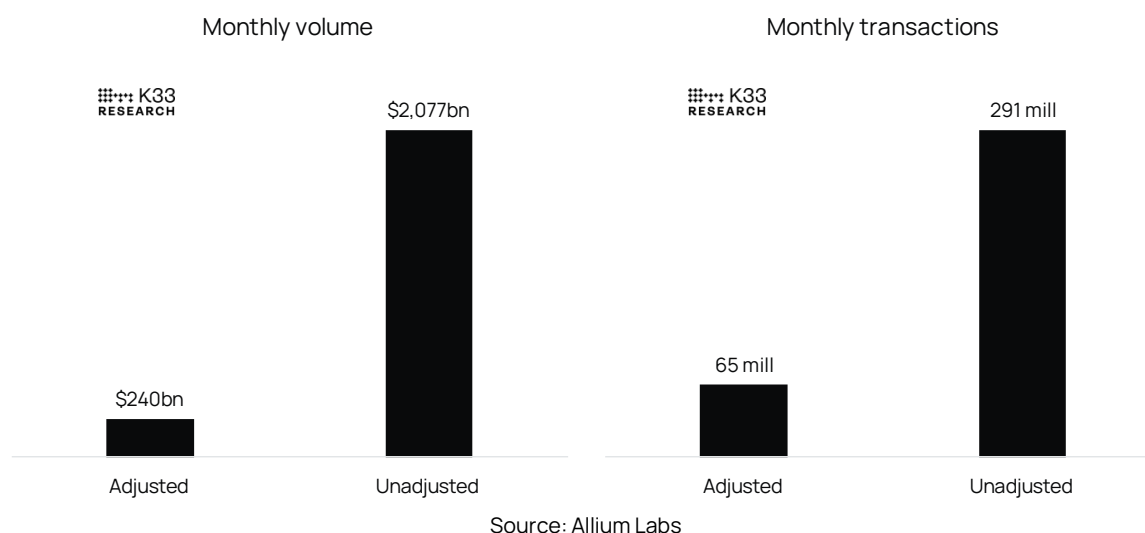
Undoubtedly, a lot of on-chain activity does not represent any meaningful settlement between entities. Still, Visa's filters are quite unsophisticated and arbitrary. The filters definitely wash away a lot of 'fake' volume, but they also run the risk of filtering out meaningful transactions and still keeping 'fake' volume. What Visa basically does is just remove the big transactions and frequent transactors. Bots that do volumes under $10 million and 1,000 transactions per address will pass the Visa filter, while a custodial wallet service used for payments will be filtered out if it does 40 transactions a day.

4.4 Stablecoin use outside crypto trading

The difficulties of interpreting blockchain data mean other sources are needed to grasp stablecoin usage properly. Unfortunately, there are few well-documented sources, and the supporting evidence of statements is often anecdotal. Still, despite not being backed up by scientific-grade evidence, many reports indicate that stablecoins are used for purposes other than crypto trading in many countries.

Generally, stablecoins are said to be used the most for non-trading purposes in countries with weak national currencies and low financial inclusion. For instance, Tether CEO Paolo Ardoino recently underlined that USDT is used by more than 300 million people worldwide.

We are not sure where that 300 million people number comes from, but taking it for a fact, one still must be precise about what that 300 million number alludes to make a sensible interpretation of the number.

According to a recent report, estimated global crypto ownership is 6.8%, equating to 560 million people. We know that many of the most popular trading pairs are stablecoin to crypto trading pairs. Therefore, in itself, it's within reason that half of that 560 million have touched upon stablecoins while they have traded crypto. But that means using stablecoins as a bridge between regular fiat and crypto. That is not using stablecoins for anything not related to crypto trading.

In terms of non-trading use of stablecoins, Africa and Southeast Asia are mentioned a lot. For many people in that part of the world, using stablecoins makes sense. Many countries have weak national currencies and strong dollar influence while also having poorer access to financial services than many other parts of the world. Stablecoins can, therefore, be used as a protection against weak local currency while at the same time providing a savings account on your mobile phone.

Feet on the ground reports that stablecoins are used for savings and payments in the global south. While it is hard to grasp the overall magnitude of adoption based on these reports, the reports are too many for adoption not to be present. The Nigerian government prosecuting Binance officials for helping to circumvent capital controls and posing a risk for the Nigerian Naira is also a solid anecdotal supporting argument to the reports from the ground.

According to reports, Southeast Asia is also a hotbed for stablecoin use for non-trading purposes. Sources, including journalist-written books, mention currency shops dealing with USDT and regular shops accepting USDT. The presence of these shops indicates that there must be some usage of stablecoins in the area. Remittance payments made in USDT would fit the bill nicely, as many Southeast Asian countries receive substantial remittance payments from relatives abroad.

Turkey is another country that is often mentioned regarding the use of stablecoins. Turkey has battled high inflation and a weakening currency for years. With a well-established presence from the crypto exchanges and a well-developed banking system, stablecoins provide a convenient way to save for the Turkish. As we will show in the following, exchange statistics back up the fact that stablecoins are especially popular in Turkey.

Fiat to stablecoin trading pairs give an indication of where in the world stablecoins are bought the most. According to data from a Chainalysis report, the U.S. dollar accounts for more than half of the trading volume in fiat to stablecoin trading pairs. The Euro is the second largest fiat to stablecoin currency, followed by the Turkish Lira in third.

In March 2024, more than $40 billion were traded in fiat to stablecoin trading pairs. In line with rising crypto markets, this volume has increased over the last year, growing almost threefold from the $15 billion in April 2023.

Figure 16 – Fiat purchases of stablecoins.
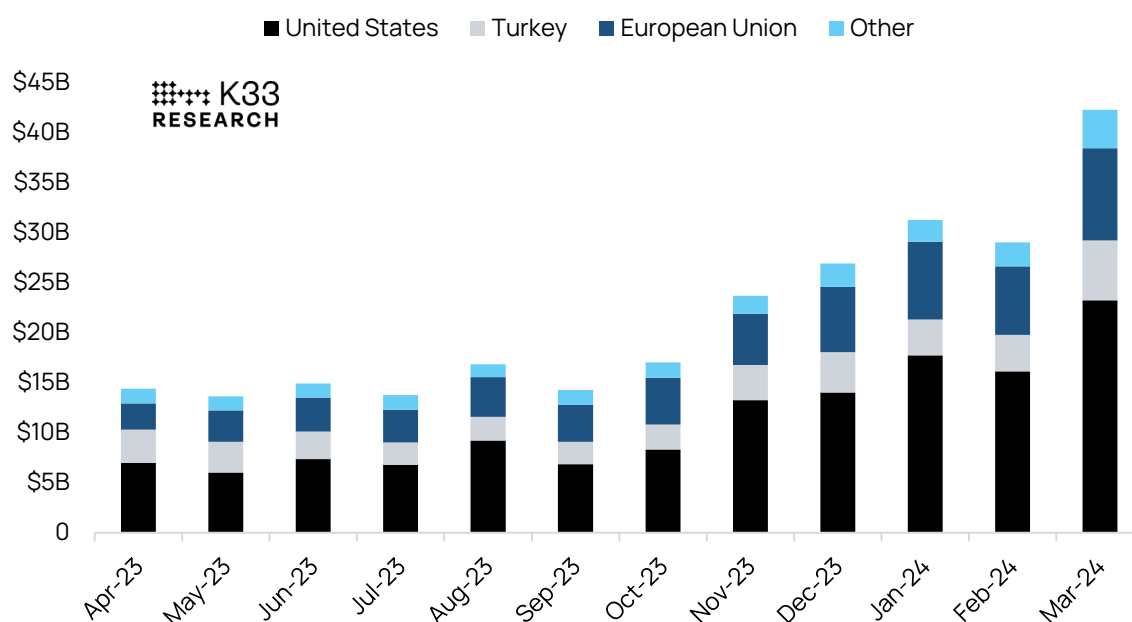
Source: CCData via Chainalysis

Relative to the size of the economy, the extent of stablecoin usage looks to be by far the highest in Turkey, with Lira stablecoin purchases equating to over 4% of Turkey's GDP. Turkey has huge inflation problems with its national currency, and reports from the ground indicate that the demand for stablecoins is at least partly driven by the demand to save in a stable currency.

Figure 17 – Stablecoin purchasing as a share of GDP by country. April 2023 to March 2024.
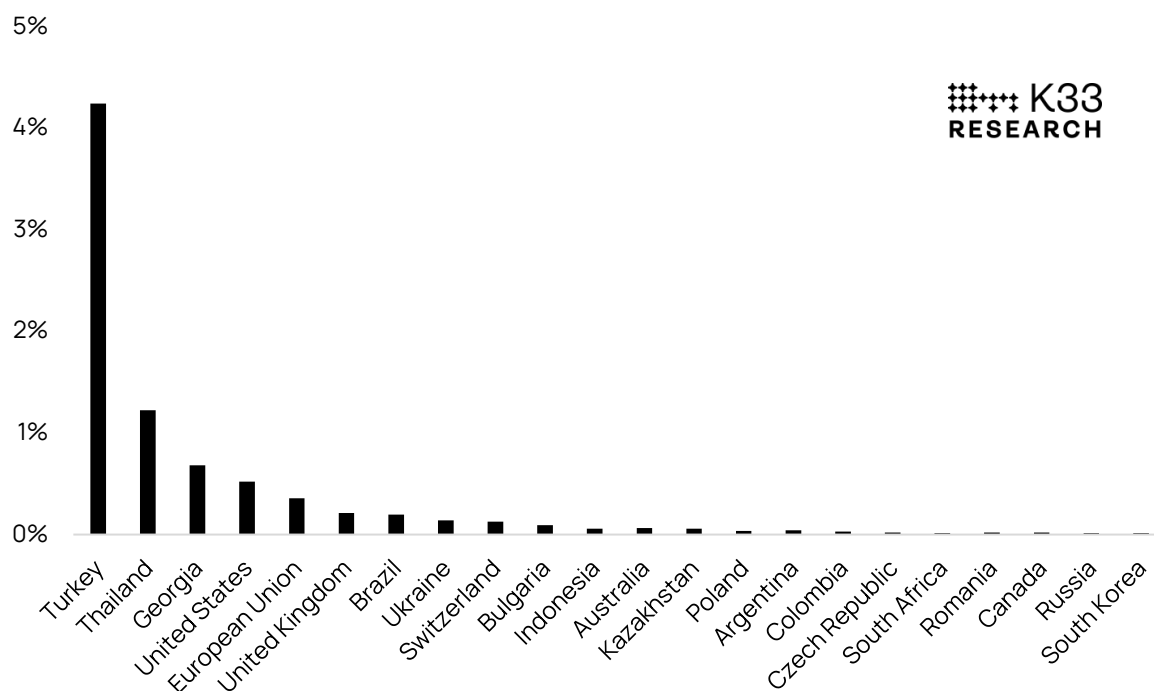
Source: CCData via Chainalysis

In conclusion, the reports of stablecoin use outside of trading are many, and there's a mountain of anecdotal evidence out there. Still, we haven't been able to find any comprehensive and conclusive statistics that reveal the extent of this stablecoin usage. However, the distinct impression is that stablecoin use for non-trading purposes is increasing and represents an attractive alternative to local currencies in many places.

5 The future of stablecoins

Stablecoins are a well-established part of the crypto trading ecosystem, serving as a crucial bridge between fiat currencies and cryptocurrencies. This role has historically been the primary driver of demand for stablecoins and will continue to play a significant role in their use going forward.

More intriguing, however, is the potential development of stablecoin use for purposes beyond crypto trading. They present an enticing option for many people worldwide and are already in use, although the extent of this usage remains uncertain. If unopposed, the use of stablecoins for everyday purposes is likely to continue growing, potentially becoming the next major wave of crypto adoption.

However, this growth faces significant uncertainty. Governments and law enforcement can take measures to strangle stablecoin adoption. Authorities could hinder stablecoin adoption by shutting down on and off ramps to crypto exchanges and brokers, making it difficult to acquire or liquidate stablecoins. With the most popular stablecoins being largely backed by U.S. treasuries, another attack vector is freezing assets or denying stablecoin issuers to buy more treasuries or have bank deposits.

These attack vectors have existed since the inception of stablecoins, and although many attempts have been made to disrupt access to crypto, they have largely been unsuccessful. While it is a possibility that cannot be fully ruled out, successfully shutting down access to crypto appears to be both politically and technically challenging. Additionally, as the daily use of stablecoins increases, the likelihood of halting their adoption diminishes. Eventually, there will be enough stablecoins in circulation to lessen the importance of traditional on and off ramps.

Despite this, if stablecoins remain backed by U.S. Treasuries, the risk of asset freezing remains a significant concern. However, this scenario seems unlikely. Stablecoin issuers are already important buyers of Treasuries, and given the U.S. debt situation, Treasury buyers are sorely needed. Thus, increased stablecoin usage might be viewed positively by U.S. authorities, greatly reducing the likelihood of freezing the collateral of stablecoin issuers.

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