

What does a bankrun on Circle look like?

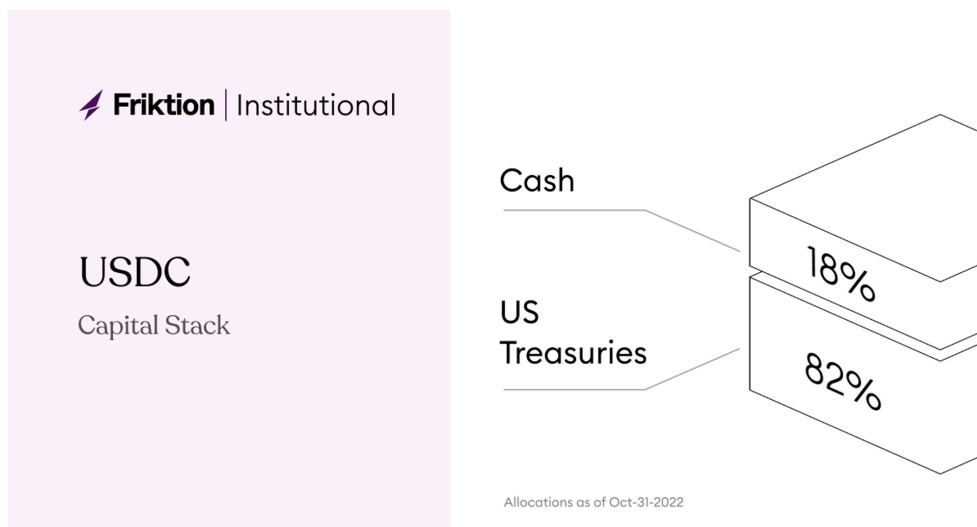
December 2022



Everyone knows how lucrative Circle's stablecoin business is. With all facets of the crypto economy being stress tested this year, it's important to understand how USDC's risk management works.

Question: if today, half of all USDC gets redeemed for USD, how long would it take to get that cash out?

USDC: a stablecoin's capital stack



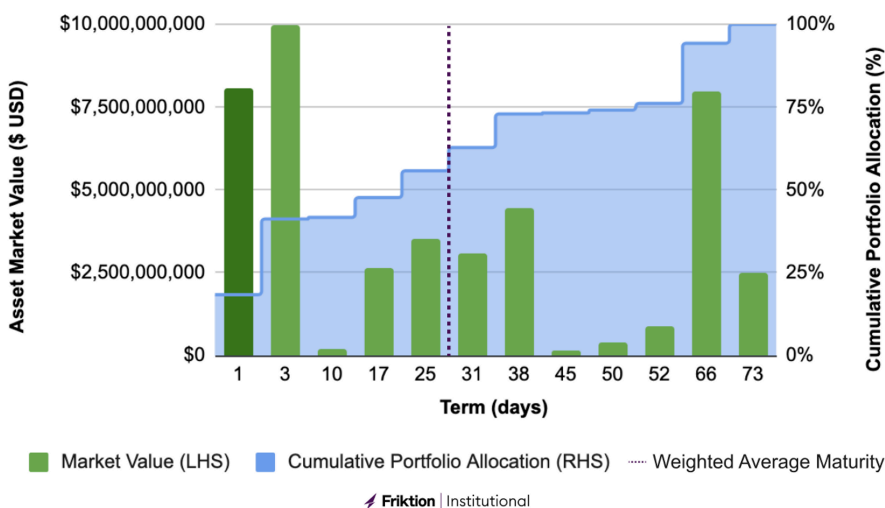
USDC = Cash (18%) + US Treasuries (82%)

USDC is backed by a transparent reserve of USD (Cash held in bank accounts^{\$^1\$}) and US Treasuries (T-bills), with monthly assets and liabilities published^{\$^2\$}, providing insight into what we view as the **USDC Portfolio**. When USDC is issued, it represents a claim on USD, which is a liability on Circle's balance sheet. In other words, USD is borrowed by Circle from USDC holders to purchase assets on their balance sheet, i.e. US Treasuries.

The portfolio can be conceptualized as a **capital stack**: with USD (low risk, no return) on top of T-bills (low risk, returns a function of the current interest rate environment). As a general rule of thumb, the higher on the capital stack, the lower the return and risk are. As Interest rates have risen in 2022, moving from Cash to holding US Treasuries (held till maturity) has increased revenues for Circle.

Duration management

USDC: Managing a \$43bn stablecoin portfolio



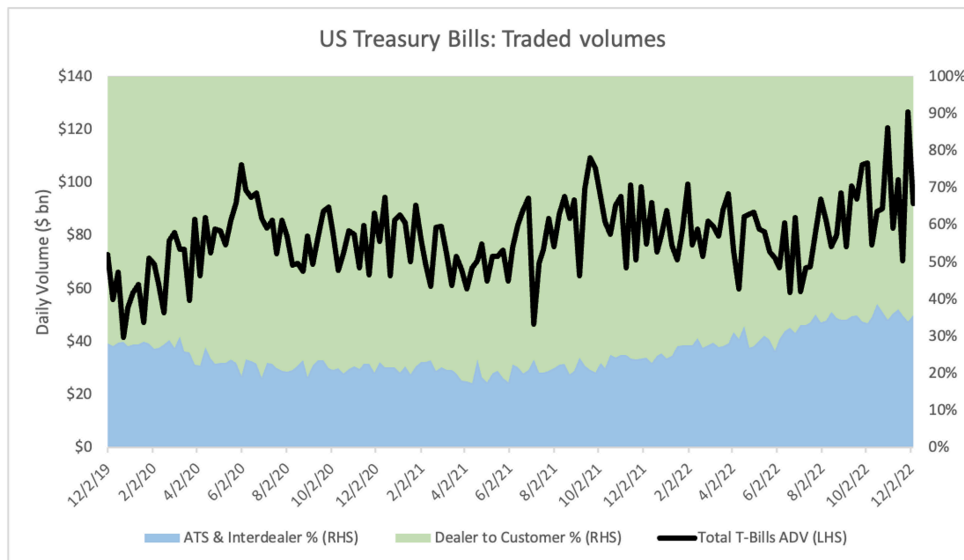
The USDC reserve resembles a short duration fixed income portfolio, prioritizing liquidity and capital preservation. In the case of a reserve as large as USDC (\$43bn USD), a key component of risk management is duration. The distribution of maturities from T+1 to T+73 creates a new form of risk, **time**, that influences the price of the asset.

USD (Cash) can be settled T+1, meaning within 1 day of withdrawal, cash should be redeemable from a Bank. With \$8 billion in cash reserves, this is where the first \$8bn withdrawals are processed from.

A misconception today amongst stablecoin redeemers is that a centralized exchange withdrawal (off-ramp) process is T0 settled. However a bank transfer is required which can result in CEXs having to pause or halt withdrawals if there is duration mismatch between stablecoins on their venues.

US Treasuries (T-bills) are short-term debt issued by the US government and trade in a highly liquid market. The portfolio of T-bills backing USDC range from 3 to 73 day maturities, yielding 1 to 4% APR at maturity. In the event of half the USDC supply being redeemed for USD, Circle would need to sell these T-bills in the open market in order for customer's to have liquidity. Since the value of these debt securities fluctuate based on interest rates, a sale before maturity (when yields are realized) can result in loss or gain on invested principal (higher rates → bond prices fall) - also know as the marked-to-market PnL.

As a proxy for liquidity, average daily traded volume of T-bills was ~\$100 bn in Q4'22. In the case of half of USDC being redeemed, \$14 bn of T-bills, representing 15% of ADV, need to be sold



Waterfall: theory vs practice

Under an extreme event of \$22 billion in redemptions in a single day, the likely second step would not be to liquidate the T-bills in reserve but to pause withdrawals/redemptions until the situation is halted. Since Circle controls the authority to pause/freeze transfers, a pause may be prudent if there is a liquidity mismatch, which seems like a 3-sigma+ move given the liquidity of the current portfolio.

In the event in which a pause occurs and the stablecoin floats on the markets (ie trades openly across exchanges), it will be up to market participants to price the mismatch in real-time on exchanges through USDC/BUSD, USDC/USDT, Curve 3pool. Other stablecoins assets may trade at premiums vs USDC on DEX/CEX venues but given the robustness of the current USDC portfolio, it's likely any open market discounts will be quickly lifted as the market prices this as an open-term zero-coupon bond.

Quantifying duration: time to get liquid

Weighted Average Maturity (WAM) is a valuable duration metric to measure the dollar-weighted duration of a portfolio of loans. The most recently reported WAM for the assets backing USDC is 28 days (dashed line in the image below). A longer WAM correlates with greater interest rate and credit risk vs shorter WAMs. Circle has been reducing the WAM of their portfolio over the last few months, reducing the time to hold positions and taking advantage of the inverted US Treasury yield curve - double win.

WAM = SUM[(Percentage Portfolio Allocation) * (Time to maturity)]

Asset	Market value & Allocation	Maturity	2022			2023		
			Oct	Nov	Dec	Jan	Feb	Mar
Cash	\$8,060,519,623 18% ALLOCATED	11 / 01 / 22	1d					
US Treasury	\$9,990,800,960 23% ALLOCATED	11 / 03 / 22	3d					
US Treasury	\$204,863,931 0% ALLOCATED	11 / 10 / 22	10d					
US Treasury	\$2,626,645,277 6% ALLOCATED	11 / 17 / 22	17d					
US Treasury	\$3,537,071,005 8% ALLOCATED	11 / 25 / 22	25d					
US Treasury	\$3,080,421,979 7% ALLOCATED	12 / 01 / 22	31d					
US Treasury	\$4,429,238,786 10% ALLOCATED	12 / 08 / 22	38d					
US Treasury	\$139,396,834 0% ALLOCATED	12 / 15 / 22	45d					
US Treasury	\$388,041,225 1% ALLOCATED	12 / 20 / 22	50d					
US Treasury	\$870,463,125 2% ALLOCATED	12 / 22 / 22	52d					
US Treasury	\$7,957,949,568 18% ALLOCATED	01 / 05 / 23	66d					
US Treasury	\$2,495,156,650 6% ALLOCATED	01 / 12 / 23	73d					

Stablecoin redemptions: a stress testing framework

A secondary market depeg due to synchronized withdrawals on the Cash reserves is possible with a large enough catalyst. In this case, the first support level on USDC/USD markets may be found at \$0.82 (equivalent to \$1.00 minus the % of Cash holdings at the time).

Now understanding the risk management built into the USDC portfolio, a stronger standard for reporting and transparency must be adopted by the industry in order for stablecoins to become the defacto payments vehicle. Further data from stablecoin issuers and portfolio managers should include the following, represented by a credit based Value-at-Risk (VaR) model:

- Liquidity:** Nominal withdrawal amount (or range) which would require Circle to pause USDC → USD redemptions. This disclosure is critical to the security and safety of users funds, and informs the market how to value USDC in the event of a run on the bank (as a portfolio of liquid debt securities).
- Waterfall:** The prioritization by which non-Cash assets would be sold in the event of a significant redemption. Since this can occur at any time, the portfolio’s maturities and bond prices will be key considerations. Closest to maturity T-bills are likely first to be sold, even if at a slight discount.
- Market impact:** Expected price impact of an open market sale of non-Cash assets (10%, 20%, 50%, 75% redemption scenarios). Requires primary/secondary Treasury market depth analysis. Since the cash Treasuries market is largely dealer-to-dealer and

Circle does not touch the futures/options markets, this requires strong trading relationships with OTC Treasury desks and the US Federal Reserve itself.

Stablecoins killer use case: a risk-free rate?

USDC growth and dominance has been driven in large part by DeFi, with the likes of Maker (issuer of stablecoin DAI), Aave, dYdX, Compound, and Curve holding nearly 10% of all USDC in circulation.

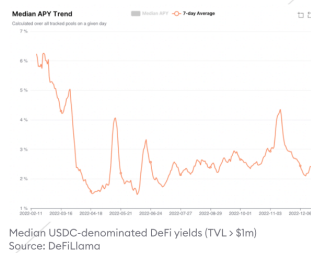
However, DeFi yield strategies (USDC deposit/denominated) have seen falling rates through 2022 with current USDC lending rates around 1.5% (overcollateralized). Rising US Treasury rates mean USDC redemptions by fast money yield-seekers are to be expected with the off-chain risk-free rate ([1Y T-bill](#)) yielding north of 4.5%.

 Frikktion | Institutional

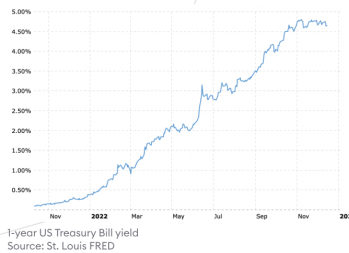
DeFi needs a risk-free rate

A hunt for risk-adjusted yields is driving stablecoin redemptions off-chain

1 DeFi yields ↓



2 US Treasury Bill yields ↑



Stablecoins, and cryptoassets broadly, have not existed in a high interest rate environment where global quantitative tightening is being used to tame asset price inflation. Therefore, stablecoins must create a way for holders or minters to access off-chain risk-free rates otherwise risking a slow bleed back into fiat. This furthers the stablecoin agenda of retaining funds on-chain and driving adoption of “real-world” financing which in turn brings institutional participation. However, the precariousness of this solution lies in the regulatory structure of USDC - if all USDC holders are passed through the risk-free rate that Circle is earning from lending reserves to the US Treasury, the stablecoin risks classification as a security. There are attempts at this underway across many projects, but with USDC’s market dominance, a risk-free rate offering to permissioned Circle users will be highly anticipated in Q1’23.

Projects like [Volt Protocol](#) are pioneering inflation-adjusted stablecoins and deploying their reserve into lower risk DeFi yield strategies.

Outstanding questions and areas of research

- What does Circle/Centre's governance look like? From a regulatory perspective, how systemic is USDC to the crypto markets?
 - Operationally how does a mint/redeem work? Is there a treasury wallet? Are there any retained earnings that sit on the USDC balance sheet that are reserved for high redemption scenarios?
 - OK now do it for USDT! Reserves aren't published or transparent, making a similar analysis challenging.
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References and Footnotes

1. Circle uses Bank of New York Mellon, Citizens Trust Bank, Customers Bank, New York Community Bank, Signature Bank, Silicon Valley Bank, and Silvergate Bank.
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