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US dollar funding markets during the Covid-19 crisis – the money market fund turmoil

Egemen Eren, Andreas Schrimpf and Vladyslav Sushko

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## US dollar funding markets during the Covid-19 crisis – the money market fund turmoil

### *Key takeaways*

- *Short-term dollar funding markets experienced severe dislocations in mid-March 2020, with funding diverted from unsecured funding markets as investors withdrew and switched to secured funding markets and government MMFs.*
- *Outflows from US prime MMFs led to a loss of funding for banks and a significant shortening of funding maturities; this precipitated spikes in indicators of bank funding costs, such as the LIBOR-OIS spread, despite banks not being at the epicentre of the liquidity squeeze.*
- *The turmoil highlights broader lessons for MMF regulation, the role of non-banks for monetary policy implementation, and the role of the central bank during stress.*

The Covid-19 crisis severely disrupted the functioning of short-term US dollar funding markets, in particular the commercial paper and certificate of deposit segments. Commercial paper (CP) is a form of short-term unsecured debt commonly issued by banks and non-financial corporations and primarily held by prime money market funds (MMFs). Certificates of deposit (CDs) are unsecured debt instruments issued by banks and largely held by non-bank investors, including prime MMFs. Both instruments are important sources of US dollar funding for banks, especially for non-US headquartered banks.

The tensions lingered until end-April and spilled over to other international money market segments. Notably, they were the main factor behind the widening of LIBOR-OIS spreads to levels second only to those last seen during the Great Financial Crisis (GFC), and contributed to wide swings in offshore dollar funding costs. As such, they hampered the transmission of the Federal Reserve's rate cuts and other facilities aimed at providing stimulus to the economy in the face of the shock. This Bulletin analyses strains in MMFs exacerbating the stress in US dollar short-term funding during the Covid-19 crisis. The companion bulletin (Eren, Schrimpf and Sushko (2020)) focuses on the US dollar funding stress for non-US banks in particular and how the disruptions to CP/CD markets reverberated globally via FX swap markets.

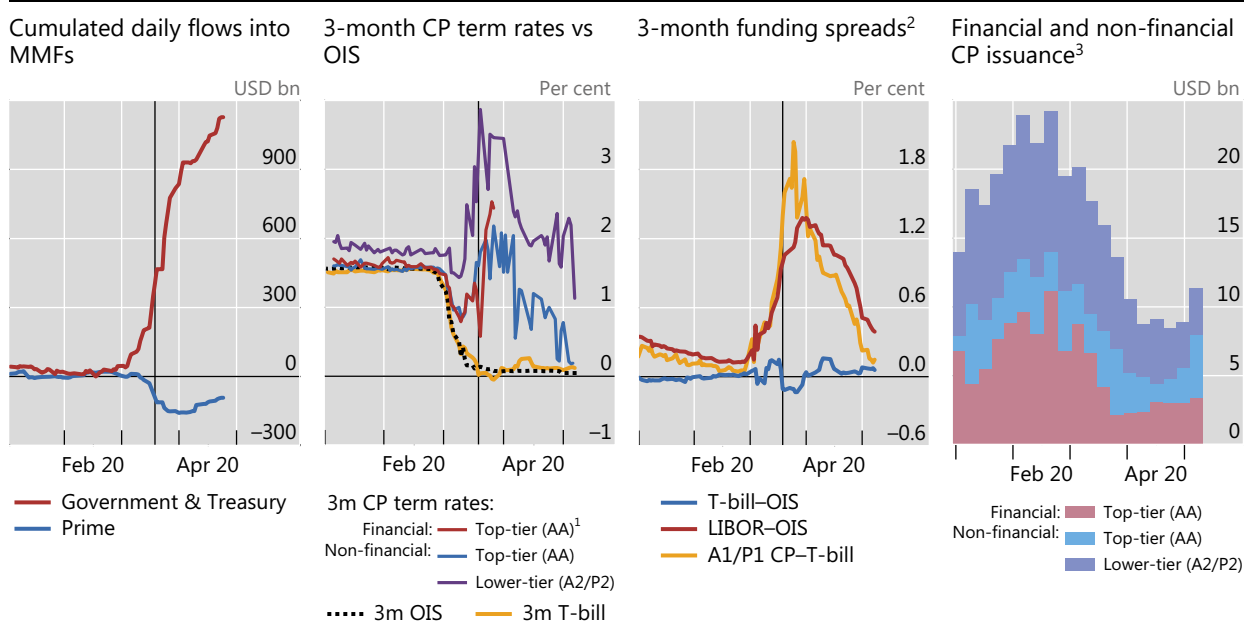
Amid escalating market turmoil, market participants wanted to hold cash or something that resembles cash as closely as possible. At the same time, financial intermediaries experienced difficulty accommodating the surge in demand for safe and liquid assets. MMFs, in particular, were strained by this "dash for cash." Prime MMFs had to liquidate large parts of their portfolios, while government MMFs had to buy more assets to accommodate surging inflows, all in a very short order. Even though, unlike the GFC, banks were not at the epicentre of the crisis, dealers were unable or unwilling to expand their balance sheets sufficiently to intermediate all the rebalancing taking place in money markets. The Federal Reserve's intervention managed to restore market functioning.

## Unsecured funding dries up and key money market rates diverge

Investor de-risking and scramble for cash at the onset of the Covid-19 crisis impacted US MMFs through two main channels: (i) redemptions from prime MMFs that can invest in short-term bank and corporate paper; and (ii) a flight to safety towards government and Treasury MMFs that invest in safe government instruments (Graph 1, first panel). As a result, key money market rates diverged (second and third panels) and issuance of CP in primary markets fell off sharply (fourth panel). Unsecured rates (eg CP/CD rates and LIBOR) initially edged down in tandem with the Fed's rate cuts, but then surged and remained elevated for some time, especially for term borrowing. By contrast, rates on secured borrowing and on T-bills fell sharply – at times even falling below zero.

Divergence in money market fund flows and money market interest rates

Graph 1



The vertical line indicates 18 March 2020 (the establishment of the Fed Money Market Mutual Fund Liquidity Facility, MMLF).

<sup>1</sup> Discontinued due to a lack of underlying market activity. <sup>2</sup> During the GFC, LIBOR-OIS reached 366 bp on 10 October 2008, while the T-bill-OIS spread reached a minimum on 20 August 2007. <sup>3</sup> Weekly averages.

Sources: Board of Governors of the Federal Reserve System; Bloomberg; Crane Data; JPMorgan Chase; authors' calculations.

## Redemptions from prime funds strain unsecured funding markets

As part of the first channel, prime MMFs were hit by large-scale redemptions to the tune of \$200 billion by end-March, or around 20% of their assets under management (Graph 1, first panel). This was the largest volume of outflows since the adjustments to the 2016 MMF reform, when their assets dropped by more than \$850 billion from April to October 2016. But unlike then, the redemptions during the Covid-19 rout were unanticipated and rapid, thus putting significant strains on the industry and funding markets.<sup>1</sup>

The Covid-19 turmoil illustrates that prime MMFs were susceptible to rapid redemptions, even as the 2016 MMF reform alleviated many of the issues that were laid bare during the GFC.<sup>2</sup> Prime MMFs offer

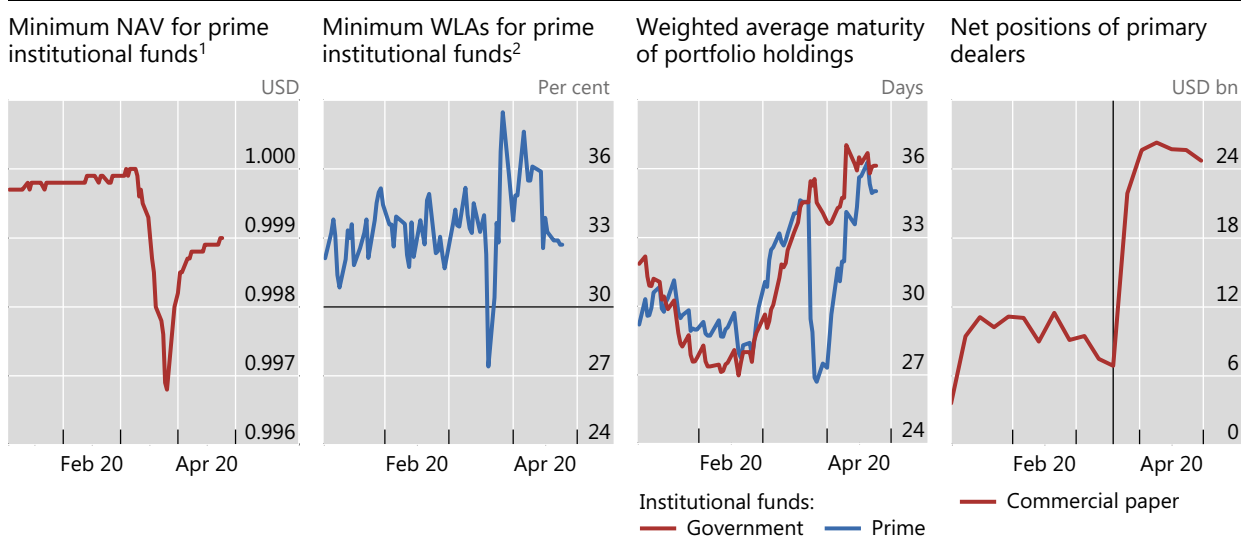
<sup>1</sup> This period saw heavy portfolio rebalancing as key players sought to be as liquid as possible. See Huang and Takáts (2020) on the role of CCPs and Bank of England (2020) on how margin calls may have intensified redemptions from prime MMFs.

<sup>2</sup> The MMF reform required prime funds to switch from a stable to a floating NAV calculation and introduced redemption gates and fees at the fund's discretion should its weekly liquid assets (a combination of government securities and other assets maturing within a week) fall below 30%.

daily liquidity to their shareholders, allowing redemptions at their daily-close net asset value (NAV). But the value of their assets can be quite sensitive to sizeable liquidations. Liquidating some of these assets to meet redemptions, by offloading them to dealers, can be difficult at short notice and may need to occur at a discount. This is especially so for CPs or CDs that are typically held to maturity. Hence, when many investors redeem their shares simultaneously, this can adversely affect the value of the fund shares for the remaining investors. This “first-mover advantage” creates incentives akin to depositors in bank runs: investors have an incentive to move their money out before others do; and the higher the risk of redemptions, the more investors will try to exit ahead of others.

## Stress for prime funds and commercial paper on dealers’ balance sheets

Graph 2



The vertical line in the fourth panel indicates 18 March 2020 (the establishment of the Fed Money Market Mutual Fund Liquidity Facility, MMLF).

<sup>1</sup> Minimum daily mark-to-market net asset value (NAV) of all prime institutional funds. Prime institutional funds trade on these values. <sup>2</sup> Minimum weekly liquid assets (WLAs) of all prime institutional funds.

Sources: Federal Reserve Bank of New York; Crane Data; authors’ calculations.

In mid-March, the risk of a run on prime funds intensified, exposing some of the fragilities. As funds faced significant stress due to heavy redemptions, the NAVs of some prime funds deteriorated rapidly (Graph 2, first panel).<sup>3</sup> Some funds saw their weekly liquid assets (WLAs) falling below the 30% regulatory lower bound (second panel). As their weekly liquidity positions deteriorated, the funds approached a point where the imposition of redemption gates became a possibility. Faced with redemptions and a risk of further outflows, managers sought to offload their holdings of CP and other illiquid short-term assets, rather setting a precedent of locking in investors. And, to preserve the liquidity of their portfolios, they shed longer-maturity assets and rolled them over into shorter maturities. This improved the liquidity and decreased the average maturity of their holdings (second and third panels).

Funds’ demand for liquidity is typically met by dealers. However, dealers faced difficulty absorbing the assets shed by prime funds, as they were reaching limits to further balance sheet expansion, not least due to large amounts of other securities they had been taking into their inventories (Schrimpf, Shin and Sushko (2020)). This led to severely impaired market functioning in mid-March, as dealers were less willing to warehouse risk outside of matched trades. This, in turn, exacerbated the stresses in funding markets that depend on prime MMFs as marginal lenders. Activity in CP and CD markets came close to a halt,

<sup>3</sup> By 24 March, the minimum NAV dropped to 99.7 cents on the dollar – a notable deterioration, but less dramatic than the 97 cents on the dollar on 16 September 2008, when the Reserve Primary Fund broke the buck.

primary issuance dwindled, and corporate and financial issuers struggled to roll over funding. Unsecured funding costs for banks and corporates rose substantially, even for the most creditworthy borrowers.

Dealers began to expand their CP inventories only after the announcement of the Fed's Money Market Mutual Fund Liquidity Facility (MMLF) on 18 March (Graph 2, fourth panel). This facility is intended as a way for the Fed to extend loans to dealers to purchase eligible assets from MMFs.<sup>4</sup> By mid-April, following successive measures by the Fed to improve funding conditions in core money markets, prime funds again began to see modest inflows. In this context, they also started to increase the maturity of their holdings, in an effort to balance demand for liquidity with maintaining yields on their portfolio.

### Risk-free interest rates tumble as government MMFs face massive inflows

The other side of the coin of the scramble for liquidity were heavy inflows into government MMFs. These inflows reflected not only a reallocation away from prime funds, but a widespread "dash for cash", driven by divestments from other less liquid asset classes. The desire to be more liquid arose from the heightened uncertainty key economic agents faced regarding their cash flows, cash management needs, as well as margin calls. By end-March, government and Treasury MMFs saw inflows in excess of \$800 billion, or about 30% of their assets under management. The ensuing investment needs of fund managers pushed T-bill rates towards zero. Similarly, repo rates for the safest collateral tumbled towards zero, with a fair amount of overnight transactions even occurring at negative rates. Some government MMFs stopped accepting inflows during this period (eg several Treasury MMFs closed to new investors on 31 March). The situation normalised somewhat around end-March, on the back of aforementioned measures by the Federal Reserve and the increased supply of assets sought by government MMFs due to heavy T-bill issuance.

### Shifts in money market funds' portfolio holdings

According to granular MMF portfolio data, government MMFs sought to purchase the safest assets. They expanded their holdings of T-bills and agency debt (Graph 3, left-hand panel). And, in repo investments, they mostly expanded their Treasury reverse repos (lending cash against Treasuries as collateral) in the cleared repo segment (via the Fixed Income Clearing Corporation (FICC)), by more than \$50 billion. At the same time, they curtailed their reverse repo positions with dealers by more than is usual at quarter-ends (times when dealers typically cut back their exposures for regulatory reporting reasons). This was another indication of dealers' balance sheet constraints during this period: the cleared segment is more attractive for dealers because it is less capital-intensive due to netting, which in turn may explain the substitution towards the FICC and away from bilateral reverse repos in this episode.

The Fed's overnight reverse repo (RRP) facility also proved to be an important release valve for rapidly rising MMF cash balances amid the surge in demand for safe investment opportunities.<sup>5</sup> In normal conditions, MMFs prefer to place funds in the market, not least to preserve their relationships with dealers. The Fed's facility, on the other hand, typically only serves as an outside option, in particular at quarter- and year-ends when dealers tend to pull back. But, given the stressed conditions and lack of attractive investments in the market, the take-up of the Fed's facility moved up to \$285 billion by end-March, up from \$64 billion in the previous quarter-end and the highest since year-end 2017. By turning to the Fed's RRP facility, which at the time was paying zero interest, government MMFs were essentially accepting 0% returns, while also waiving management fees, all in an effort to avoid negative rates of return. Absent the facility, increased demand for safety may well have pushed risk-free rates deeper into negative territory.

<sup>4</sup> On 14 April, another programme, the Commercial Paper Funding Facility (CPFF), under which the Fed directly purchases three-month CP from issuers, went operational. The pricing is OIS +110 bp for A1-rated CP and OIS + 200 bp for A2-rated CP.

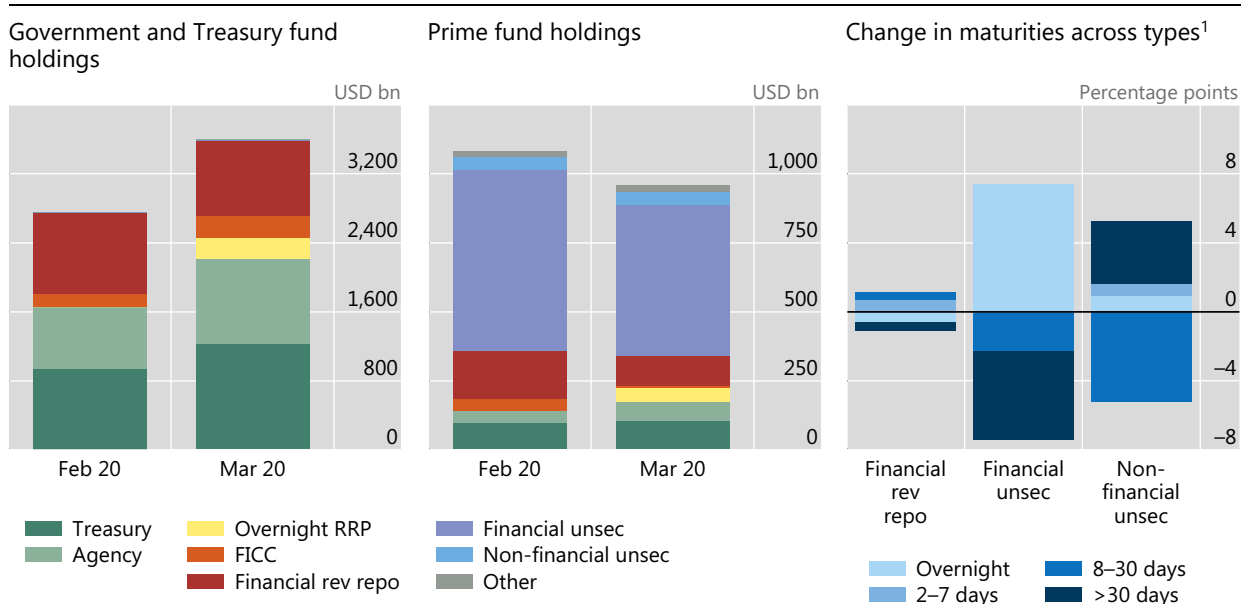
<sup>5</sup> The Fed's overnight RRP facility was introduced in 2013 as a tool to provide a firm floor for key money market rates in an environment of excess liquidity, thereby helping policy rates lift off from the lower bound. The set of eligible counterparties is significantly broader than that in conventional central bank repo operations and also includes MMFs.

Prime MMFs, in turn, made three key portfolio adjustments in this period. First, to accommodate outflows, they curtailed their repo lending, both with dealers and in the cleared repo segment (Graph 3, centre panel). Second, to prepare for the risk of future redemptions, they shed less liquid and riskier longer-dated instruments, such as term CP and CDs, in favour of T-bills, agency debt and reverse repos (both via cleared repo and the Fed’s RRP facility). Third, they significantly shortened the maturity of their holdings of unsecured debt, such that the share of overnight unsecured investments rose by around 7 percentage points (Graph 3, right-hand panel). The drop in portfolio duration mostly came at the expense of term instruments issued by banks, which represent the largest part of their holdings. Holdings of non-financial CP by prime MMFs exhibited different dynamics, with a rise of both overnight and longer-dated instruments (possibly as funds sought to balance liquidity and yield considerations).

## Money market fund portfolio holdings and maturity distribution

March vs February 2020

Graph 3



FICC = Fixed Income Clearing Corporation; financial rev repo = reverse repos with financial institutions other than the New York Fed (overnight RRP) and the FICC; financial unsec = unsecured instruments issued by financial institutions (CP, CD, time deposits etc); non-financial unsec = unsecured instruments issued by non-financial institutions (mostly commercial paper).

<sup>1</sup> Difference in the share of holdings by government, Treasury and prime MMFs within each maturity bucket: March versus in February 2020.

Sources: Crane Data; authors' calculations.

## Implications for bank funding costs

The withdrawals of MMFs from providing term funding to banks and corporates and the freeze of CP/CD markets translated into a persistent widening of US dollar LIBOR-OIS spreads. By mid-March, the latter widened to levels second only to those during the GFC (Graph 1, third panel), despite the fact that, unlike the GFC, the banking system was not the main source of distress (also see Aldasoro et al (2020)).<sup>6</sup>

A key reason is that CP/CD rates have come to play an important role in the determination of LIBOR. Post-GFC, interbank deposits, the traditional underpinning of interbank offered rates (IBORs), such as

<sup>6</sup> Corporates rushing to draw on their contingent credit lines with banks (\$230 billion between 5 March and 13 April, according to market estimates) also created pressure on banks. On the other hand, while metrics of bank credit risk, such as CDS spreads, temporarily widened in mid-March, they narrowed quickly thereafter and so do not appear to have constituted the primary drivers of persistently wide LIBOR-OIS spreads.

LIBOR, no longer serve as the major marginal source of term funding for banks. Instead, unsecured instruments like CP/CD, held by non-bank institutional investors such as MMFs, constitute the most important unsecured wholesale funding source for banks. The health of CP/CD markets is therefore an important barometer of bank funding conditions. Moreover, reflecting the lack of interbank transactions, banks' submissions to IBOR-style benchmark interest rates nowadays mostly rely on funding costs from CP/CD and other related markets as inputs (via the so-called waterfall methodology).

The widening of the LIBOR-OIS spread signalled tightening of financial conditions exactly when the Fed aimed to provide stimulus via cuts in interest rates and lending programmes. With dealers' intermediation capacity to step in as buyers of illiquid paper impaired, the Fed took over this function via its MMLF facility. Priced at 100 bp over the Fed's discount window rate (25 bp) for lending against CP collateral, the MMLF provided an implicit rate ceiling on CP. Aided by the Fed's actions, markets started to heal gradually, with flows into prime MMFs recovering slightly in late April, a week after the Fed began to directly purchase three-month CP from issuers via its Commercial Paper Funding Facility (CPFF). By the first week of May, LIBOR-OIS spreads compressed below 50 bp.

### Some policy considerations

A surge in demand for liquidity by the non-bank sector precipitated strains in short-term dollar funding markets during the Covid-19 crisis. The MMF sector became strained, which diverted funding away from core unsecured funding markets. The Fed's swift response to backstop the MMF industry for a second time in the past 12 years stabilised funding markets, thereby helping to avert a full-blown run on the fund sector. The episode was also a reminder that disruptions to short-term unsecured funding markets can quickly spill over to other financial market segments and to the real economy through their effects on widely used interest rate benchmarks.

Nevertheless, broader policy questions remain. First, the events in March showed that the 2016 reforms did not extinguish completely the MMF redemption channel in exacerbating money market stresses. Hence, it will be important to review the lessons from the episode and assess the resilience of the MMF sector going forward. Second, in the light of the growing importance of non-bank financial investors for conditions in money markets in general, the extent to which they may participate in central bank facilities, as well as the modalities of that access, remain open questions. Third, the central bank balance sheet (once again) acted as an important buffer, accommodating demand for safety coming from the non-bank sector in the Covid-19 crisis. This raises broader questions about the systemic benefits and costs of facilitating access to safe central bank liabilities for a wider set of players.

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