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The persisting effect of the pandemic on Money Market Funds and money markets

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This letter examines the impact of a sudden surge in demand for cash in March, on money markets in general and Irish-resident Money Market Funds (MMFs) in particular. The immediate impact was felt across MMFs invested in money market debt issued by banks and companies. Liquidity declined in money markets while some investors in these funds redeemed their shares/units. In response, MMFs invested very cautiously in these securities in the following months. These effects are quite typical of what occurred in other key financial centres for MMFs and contributed to a sharp contraction in volumes in money markets.

Introduction

This letter explores the experience of money markets during the period of the pandemic from March to August from the perspective of Irish-resident MMFs.[1] With Ireland accounting for 45 per cent of MMFs in the euro area, this analysis provides insights on a global funding channel of banks and companies. Irish-resident MMFs provide a good cross-currency picture, being mostly denominated in sterling and US dollars, with the remainder in euro. By issuing short-term debt, banks and companies benefit from cheaper funding than by issuing longer-term debt or borrowing from (other) banks (see Box 1).[2] MMFs are a key source of demand for this short-term debt.[3] This matters less these days when banks and companies benefit from increased retail deposits and central bank funding facilities designed to tackle a crisis but will be more important when central bank facilities unwind.

Money markets succumbed to a surge in demand for cash in wider financial markets in March 2020, with MMFs experiencing large investor withdrawals. Hauser (2020) describes one source for this "dash for cash" in terms of margin calls as leverage in the system unwound amid rising market volatility reflecting uncertainty over asset valuations. Similarly, market contacts suggest that widening spreads, amid little to no bid activity in debt markets, triggered margin calls, particularly within repo markets that led to clients withdrawing money from MMFs.[4] Another source of heightened cash demand was corporate clients fearful of their earnings outlook, who

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[1] Money markets refer to debt securities, certificates of deposit, and other instruments maturing within one year.

[2] Short term debt is usually cheaper than long-term debt as repayment of the principal is sooner. The yield curve can invert so that long-term debt is cheaper, if interest rates are expected to decline after short-term debt has matured.

[3] Most securities held by MMFs are issued by banks. As pointed out in ECB (2020), although commercial paper is a minor source of bank funding, covering less than 3 per cent of total funding needs, it provides a meaningful source of wholesale unsecured short-term funding, especially in US dollars, for internationally active banks.

[4] In order to deepen our understanding of the conditions and developments in financial markets, the Central Bank routinely speaks to market participants operating in major financial centres. These bilateral market intelligence calls are conducted on the basis of anonymity, similar to the process conducted by other central banks.

drew on multiple sources to raise cash, including their holdings of MMF shares/units. The scale of withdrawals from MMFs was reminiscent of 2008, when a run on MMFs was one of a number of landmark events that exacerbated the 2007-09 global financial crisis.[5] Both the EU and US introduced significant reforms to MMF regulations in subsequent years to prevent a repeat (see Box 1, EU Regulation (2017) and, for a comprehensive overview of EU and US regulations, see Alshaleel (2020)).

Box 1: What are MMFs?

MMFs invest mostly in highly-rated debt securities with maturities of less than six months, certificates of deposits and reverse repurchase agreements.[6] These funds act as close substitutes for bank deposits, allowing investors to channel funding into very safe assets to earn a slightly higher return while maintaining the protection of the principal investment as the key objective.

Investors in MMFs, who generally require "cash-equivalent" assets, are mostly non-financial corporations, and also include retail investors, local authorities, investment funds[7], investors in other markets placing their cash holdings in MMFs, etc. As MMFs invest largely in bank debt, these potential bank deposits are instead converted into more attractive term funding for banks through maturity transformation. The MMF promises instant access to these funds through redeeming shares/units in the fund from clients upon request. As such, MMFs play an important role in liquidity transformation when investing in maturities greater than overnight. However, instant access can become problematic when liquidity drains from money markets.

MMFs are split into two broad categories based on their commitment to protect the principal investment. Constant Net Asset Value funds (CNAVs) promise to repay the principal in full whereas Variable Net Asset Value funds (VNAVs), as the name suggests, do not make this explicit promise. Reforms following the 2007-08 financial crisis, saw the phasing out of CNAVs in the EU and US, unless investing predominantly in government debt (Public Debt CNAVs or PCNAVs). In the EU, these were replaced by Low-Volatility Net Asset Value funds (LVNAVs) that had the characteristics of a CNAV but with the ability to switch to a VNAV if need be. CNAVs and LVNAVs in the EU have daily and weekly liquidity ratios, i.e. ratios of total assets maturing in a day or a week, of 10 and 30 per cent respectively, whereas VNAVs require ratios of 7.5 and 10 per cent respectively. Restrictions on the ability of investors to withdraw money are imposed if these thresholds are breached.[8] If these restrictions last for more than 15 days in a 90 day period, the LVNAV must switch to a VNAV (see EU Regulation (2017) and, for a summary, J. P. Morgan Global Liquidity (2017)).

In Ireland, most MMFs are LVNAVs. To provide a picture days before the crisis hit, total assets under management of Irish-resident MMFs amounted to €574 billion at the end of February 2020. LVNAVs account for €475 billion of this figure or 83 per cent, PCNAVs for €71 billion or 12 per cent, and VNAVs just €29 billion or 5 per cent.

The pandemic of 2020 represents the first significant test of these reforms. With MMFs largely unable to sell securities at reasonable prices, they paid these investors out of cash reserves and

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[5] Amid a fear one would "break the buck", i.e. no longer be in a position to return to investors at least the principal amount they invested (see, for example, McCabe (2010)).

[6] A repurchase agreement (repo) is an agreement to sell debt securities to another entity and repurchase them later. MMFs undertake reverse repurchase agreements (reverse repos) by purchasing debt securities from another entity for cash, effectively providing a loan, to later sell these securities back to the counterparty at a slightly higher price.

[7] Including the securities financing flows to/from Liability Driven Funds (these buys bonds and repo these for cash to buy more bonds). They hold significant portions of sovereign debt markets, particularly UK gilts.

[8] The rule that may actually cause the imposition of restrictions is that, for an LVNAV, shares/units are purchased or redeemed at a constant price, as long as the value of the assets in the MMF do not deviate by more than 0.2% from par. Once liquidity thresholds are reached, the MMF is forced to sell longer term assets to meet further investor redemptions, and, if sold below par values, can breach this rule.

maturing debt. Declining reserves or liquidity ratios, in turn, raised the prospect of more redemptions. Though central bank actions had a calming effect on markets in general, there has been a persisting effect on MMFs and the wider money markets as MMFs invest much more cautiously than before. As a result, regulatory reforms are once again in focus.[9]

The mid-March market shock

Irish-resident MMFs saw sudden pressures on two fronts in mid-March. First, on the liability side, investors withdrew money from MMFs for their own cash requirements or to switch from those MMFs investing in corporate debt into those investing in government debt, which is seen as less risky and more liquid. Second, within MMF holdings of securities, many sellers and almost no buyers of money market instruments saw money markets become illiquid.

As cash-equivalent assets in MMFs declined to meet investor outflows, there was significant concern that an MMF somewhere in Europe or the US could fall below key liquidity ratios. Within Irish-resident MMFs, these pressures were most intense around 12-23 March when almost 10 per cent of the value of total assets, as of end-February, was withdrawn from Irish-resident MMFs (Table 1).

Table 1: Scale of outflows across Irish-resident MMF types from 12-23 March

Type of MMF	Outflows as % of February NAV
All MMFs	10
USD LVNAV	23
USD LVNAV + PCNAV	10
VNAV only	9
EUR and STG LVNAV only	9

Source: Central Bank of Ireland

The outflow from US dollar LVNAVs was even larger during this period, at 23 per cent, and nearly 30 per cent for the period 6-31 March. This reflected significant amounts flowing from US dollar LVNAVs to US dollar PCNAVs investing in government debt. Net outflows from 12-23 March declined to the industry average, of 10 per cent, when these flows are combined, while inflows to PCNAVs outweighed outflows from LVNAVs in late March. These flows mirrored US-resident MMFs, which, just as in 2008, saw large flows from other MMFs into those invested in government debt, which comprise most of the MMF industry there (see Cipriani et al (2020)).[10]

[9] See Central Bank of Ireland (2020), in particular, "*IOSCO's Financial Stability Engagement Group (FSEG), working with the Financial Stability Board (FSB), has launched a group looking at MMF resilience and the Central Bank is a member of this group.*" This is part of a broader work programme focused on the funds industry, see Rowland (2020).

[10] Namely outflows from MMFs invested in municipal debt, "muni funds", and private debt, "prime funds", of 15 per cent of total assets between 2-20 March, mostly to CNAV MMFs invested in government debt. Both muni and prime funds are VNAVs, though with a 30 per cent weekly liquidity threshold.

The scale of outflows from euro and sterling LVNAVs was 9 per cent from 12-23 March. The European MMF industry has a much smaller share of MMFs invested in government debt and a lower supply of very-highly rated government debt, which might help to explain the divergence with US dollar MMFs invested in private sector debt but not when combined with PCNAVs

The problem was also apparent in VNAVs, where outflows were close to the industry average, though the sample size in Ireland is small.

These patterns were not exceptional in an international context (Table 2). Sterling MMFs throughout Europe, including a large number of mostly LVNAVs resident in Luxembourg, also saw 10 per cent outflows over almost the same period (see Hauser (2020)). VNAVs experienced significant stress in March in France and the US, albeit for different time periods.

Despite this volatility, no LVNAV in Ireland breached key regulatory thresholds that would trigger actions required by MMF regulation, though some funds were not far from doing so. While MMF regulation provides for LVNAVs to transition to VNAVs, most likely temporarily imposing fees and gates on investor redemptions while doing so, market contacts expressed concerns over how investors would react to such a conversion in these market conditions, whether based on their investment preferences or their systems not being set up to cater for it.[11] For US-resident MMFs, Li et al (2020) argue that liquidity restrictions introduced in 2016 might have exacerbated redemption pressures within "prime" (non-public debt) MMFs in 2020.

Table 2: Scale of outflows across MMF types internationally

Type of MMF	Outflows as % of February NAV	Period
Sterling MMFs (mostly LVNAV)	10	12-20 March
France – all MMFs (mostly VNAV)	14	1-31 March*
US – prime and muni** VNAV	15	2-20 March

*Only month end data available
**Muni funds invest mostly in municipal debt
Sources: Bank of England, Banque de France, US Federal Reserve.

In March, as asset valuations declined, bids for securities in money markets and other debt markets became scarce. Some MMFs struggled to sell holdings and some incurred losses when they successfully sold.[12] Meanwhile, some investors in MMFs faced significant cash needs and redeemed MMF shares/units to raise cash. These cash needs seem to have come from two main sources, (i) investors in other markets facing margin calls, particularly within repo markets and (ii) firms seeking to build up cash buffers in anticipation of sharp declines in earnings going forward in an environment where their ability to issue new debt had disappeared due to illiquid debt markets. MMFs were forced to pay these investors from cash-equivalent assets, lowering

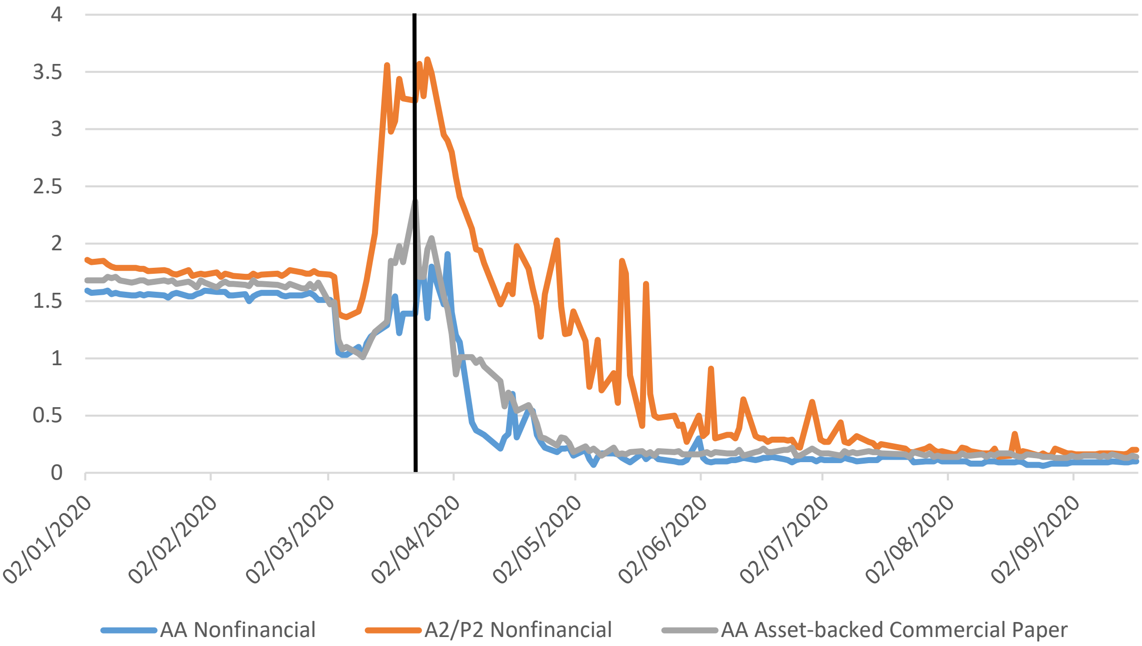
[11] Liquidity fees are a financial penalty imposed on redeeming shares/units while redemption gates temporarily suspend the ability to redeem shares/units.
[12] In some isolated cases, banks agreed to buy back their own securities at close to redemption values or bought securities off-market given the importance of relationships, according to market contacts.

liquidity ratios, and increasing market concerns that one MMF breaching a regulatory threshold would encourage a new wave of redemptions across the industry.

Whatever sales took place during this period did not have a pro-rata pattern, according to our data and confirmed by market contacts. Pro-rata selling helps to protect investors by preventing investor outflows from impacting the portfolio for those investors that remain. Yet it was likely impossible for an MMF to sell each security proportionately in these market conditions.

Announcements of large-scale asset purchase programmes and other market interventions, such as easing collateral requirements to allow banks to hold more securities, by the ECB, US Federal Reserve, and Bank of England, alongside fiscal stimulus, helped to calm this turmoil in three key respects. First, by announcing widespread asset purchases in other markets, these markets stabilised and margin calls declined sharply, including for investors in MMFs.[13] Second, debt issuance resumed in record volumes, providing firms with an alternative route to build up cash buffers. Coupled with the impact of fiscal support measures, corporate outflows turned into large-scale inflows as firms employed MMFs to hold some of these cash balances. Third, the US Federal Reserve announced a Money Market Mutual Fund Liquidity Facility (MMLF). This provided a backstop to money markets in the US through loans to banks, taking in eligible securities purchased by banks from prime and municipal MMFs resident in the US, as collateral for these loans. The effect on key money market securities was quickly apparent in the US (Figure 1).

Figure 1: Selected US 30-day commercial paper rates (MMLF inception on 25 March = black line) – February to mid-September 2020



Source: Board of Governors, US Federal Reserve (replicating a Figure in Cipriani et al (2020)).

MMFs in Europe and the US took this opportunity to build up weekly liquidity ratios to very high levels, generally over 50 per cent of total assets, which helped to restore investor confidence

[13] Bua and Dunne (2019) illustrate, however, how monetary policy can negatively impact MMFs over time through lower interest rates.

further. There followed a period of considerable caution in MMF investment behaviour, despite a remarkably strong recovery in investor flows, as discussed in the next section.

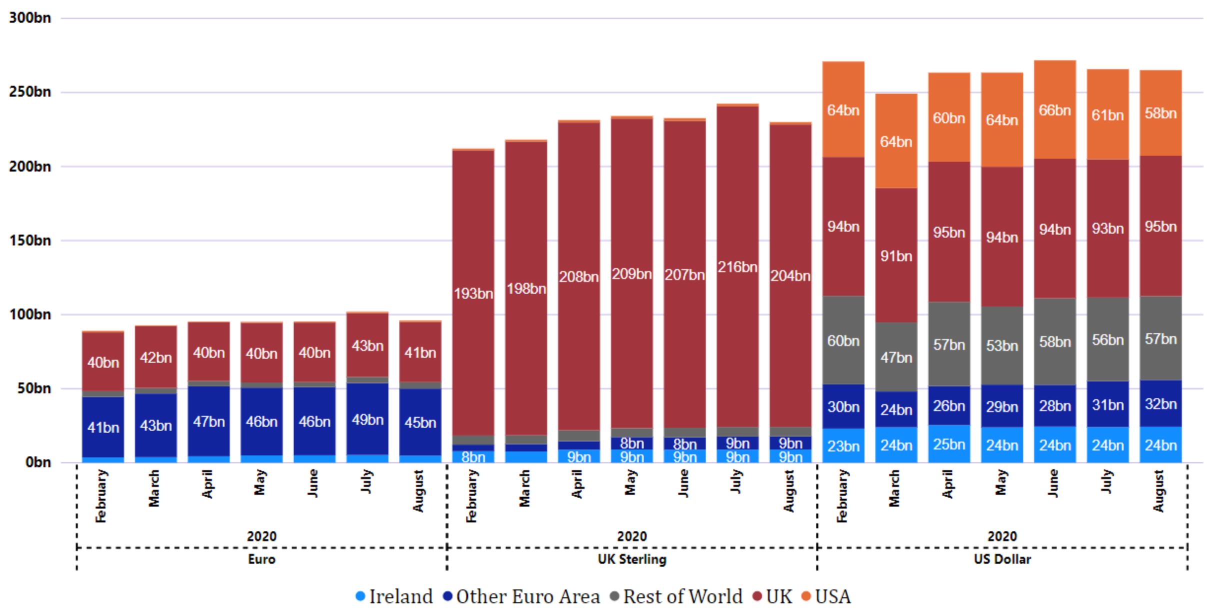
A strong recovery in investor flows

By end-March, signs of stabilisation were already apparent (Figure 2). Euro and sterling MMFs received net investor inflows, of €4 billion and €6 billion respectively, by month end.[14] US dollar MMFs saw net outflows of €23 billion, however, for the month as a whole. This persisted until second round effects of the MMLF on US dollar money market spreads fed through as offshore, including Irish-resident, US dollar MMFs had no access to the MMLF.

In April, investor flows recovered strongly, mainly driven by corporate clients, while US dollar MMF outflows dissipated. By the start of April, the positive impact of the MMLF was feeding through more fully to the prices of US dollar money market instruments, benefiting offshore, including Irish-resident, US dollar MMFs. There were also sharp inflows from corporate clients, saving funds to support future cash flow needs arising from the pandemic. These funds were raised from drawing down banking facilities, government loans and, most importantly, the proceeds from record levels of debt issuance on longer-term markets that were supported by central bank facilities.

May to August was a period of relative calm and consolidation, with investor inflows and outflows returning to more normal day-to-day patterns. There have been few signs of large corporate inflows unwinding to meet cash flow needs, apart from SMEs that do not issue on debt markets. Market contacts suggest this may still occur if the negative cash flows being experienced by some of their clients continues.

Figure 2: Holders of shares/units in MMFs / Net asset values by currency and investor location - February to August 2020



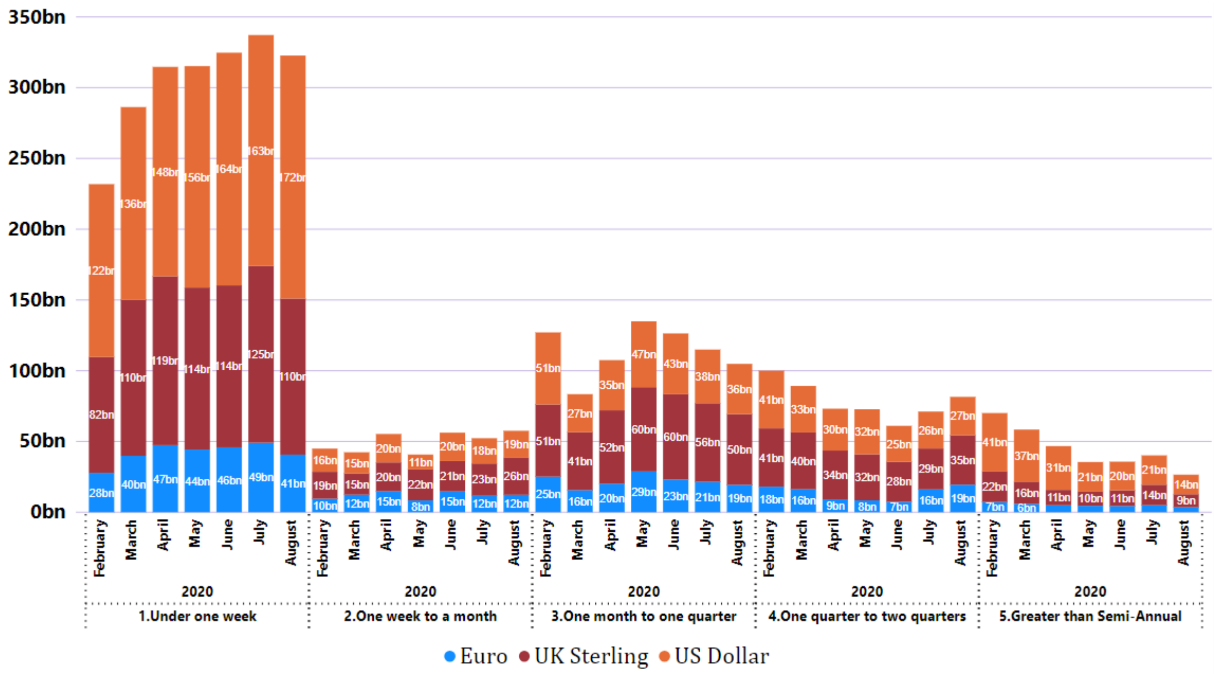
Source: Central Bank of Ireland

[14] These amounts do not stand out historically but represent a sharp reversal of net outflows earlier in the month.

Fund managers holding higher liquidity ratios

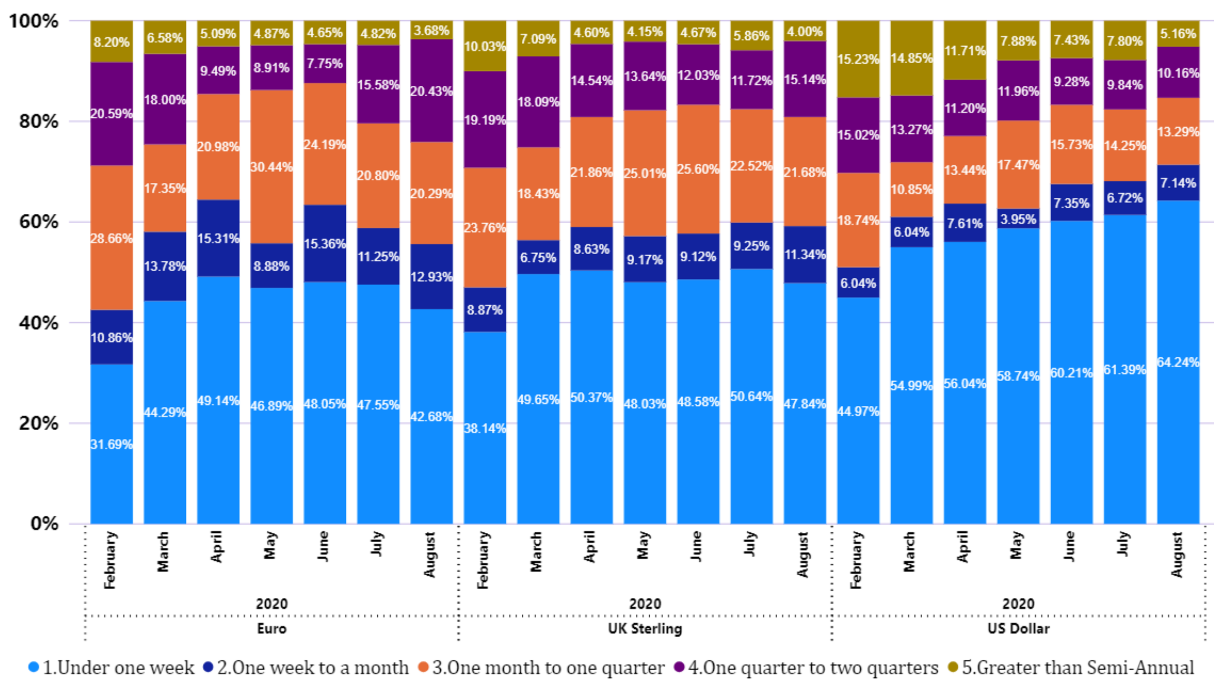
Despite large investor inflows, fund managers showed a marked reluctance to return to the investment patterns of pre-March, particularly in Europe. Even by August, asset holdings maturing within one week were significantly larger than in February, driven by an ongoing desire to hold precautionary high liquidity ratios (Figures 3a and 3b). This section describes two phases, namely the accumulation of cash-equivalent assets in March and how this pattern largely persisted in the following months.

Figure 3a: Total assets held by MMFs by residual maturity – February to August 2020



Note: Under one week includes government debt up to 170 days as per regulation for one week liquidity

Figure 3b: Shares of MMF asset holdings by residual maturity – February to August 2020



Note: Under one week includes government debt up to 170 days as per regulation for one week liquidity.
Source: Central Bank of Ireland

In March, fund managers across currencies invested in significant amounts of cash-equivalent assets maturing within one week ("cash"), mostly by allowing debt securities to mature and reinvesting in these cash-equivalents. In US dollar MMFs, the funds from maturing bonds were used to pay back investors who were redeeming shares/units. This can be seen in declining holdings of securities maturing in more than one month, but stable holdings of cash. These one-week holdings consist largely of bank deposits, certificates of deposit, reverse repurchase agreements, and asset-backed commercial paper. The MMF regulation includes government debt with residual maturities of up to 170 days in this measure, as do Figures 3a and 3b.

These cash balances reflected intertwined concerns on both sides of the balance sheet, according to market contacts. On the asset side, MMFs were reluctant to buy securities that they may not be able to sell in the future to banks or broker dealers, if needs be, to meet investor redemptions. On the liability side, high cash balances reassure investors in MMF shares/units that future investor requests for their money can be met without the need to sell assets. Fund managers articulated a widespread lack of faith in the extent and stability of liquidity in money markets, were any signs of stress to re-emerge. They pointed to an unwillingness of banks to buy back their own issued securities. Bank contacts acknowledged limits to their capacity to trade in March but stated that they need buyers and sellers in order to make markets and, moreover, the scale of selling was well beyond what their balance sheets could ever be expected to cope with. In this respect, BIS (2016), which warned about the impact of various trends on liquidity in debt markets, may provide some food for thought for policy discussions.[15] The outcome was that MMFs invested very cautiously over the following months, despite strong investor inflows, and secondary market liquidity in money markets remained weak.

From April onwards, there was a slow return towards normality in US dollar MMFs, and a much slower pace of recovery in euro and sterling MMFs. Fund managers described how they would very slowly extend out to a new maturity spectrum by purchasing only the highest rated government and public agency securities. As more MMFs were active in this area, debt purchases would gradually extend to other types of debt security. Once this consolidation took place, tentative steps were made into the next maturity bracket. For example, in Figures 3a and 3b, this pattern can be seen out to 3 months in April and May, with debt holdings out to 6 months largely unaffected.

In US dollar markets, the MMLF provided a shortcut to this process. For eligible debt, prices and traded volumes benefitted from the knowledge that a US-resident entity could pass the security to the US Federal Reserve via a willing investment bank if need be. In euro and sterling markets, however, market contacts suggest that money market liquidity only improved incrementally throughout this period. Eventually, by the middle of June, these fund managers deemed liquidity to have returned to money markets to a significant degree, though more so in primary rather than secondary markets. Despite this, very high ratios of one week liquidity have only marginally unwound, and asset holdings with maturities of longer than three months remains well below February levels.

[15] The key findings of this report, as summarised in the preface, include: "*Dealers have continued to cut back their market-making capacity in many jurisdictions. Demand for market-making services, in turn, continues to grow. The effects of these diverging trends have, thus far, not manifested themselves in the price of immediacy services, but rather they are reflected in possibly increasingly fragile liquidity conditions. Key drivers of current trends in liquidity include the expansion of electronic trading, dealer deleveraging, arguably reinforced by regulatory reform, and unconventional monetary policies.*"

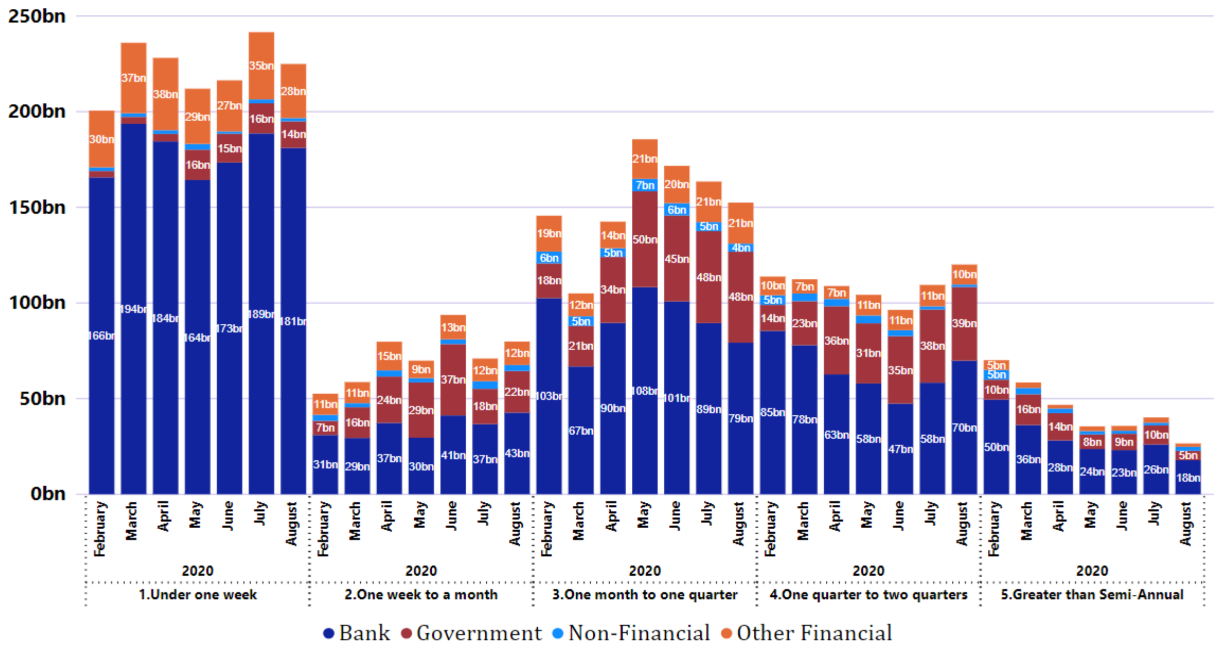
Going forward, the key question is whether the March turmoil represents an isolated incident. The ongoing cautious behaviour of fund managers suggests a wait-and-see approach. This may be warranted; the speed at which banks and other market participants withdrew from money markets suggests that this market can move from unstressed to stressed very rapidly. Furthermore, secondary markets have not been tested by significant selling activity since March that might assuage this view. These developments, replicated in other jurisdictions, frame international regulatory discussions, which are currently focused on investor behaviour, liquidity management, market structures and regulatory structure (see Central Bank of Ireland (2020)). This is in addition to the need to develop and operationalise the macro-prudential framework for market-based finance (see Makhlouf (2020)).

MMF funding of other sectors

Irish-resident MMFs have no asset holdings linked to domestically-focused Irish banks. Nevertheless, an indirect effect is possible, namely by providing significant funding to other banks, Irish banks may benefit if this reduces the cost of inter-bank lending. By purchasing debt securities, placing deposits, and engaging in reverse repurchase agreements (securities financing), Irish resident MMFs, through one or a combination of these, act as funders of banks, non-financial corporates, and investment funds. This section focuses on how the nature of this funding changed and, indeed, contracted.

In response to outflows, MMFs sharply reduced their holdings of debt securities in March, while bank deposits rose and securities financing remained stable (Figure 4).

Figure 4: MMF funding of other sectors by residual maturity – February to August 2020



Note: In this chart, one week does not include government debt with residual maturity of up to 170 days
Source: Central Bank of Ireland

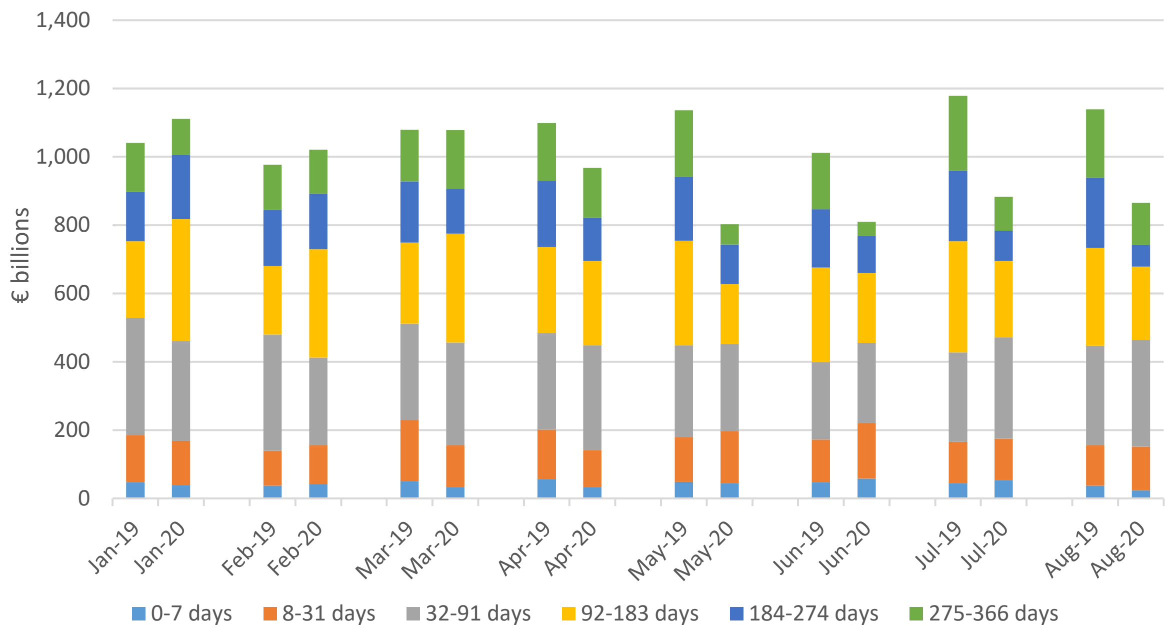
Even allowing for increases in bank deposits, however, bank funding fell by 13 and 15 per cent in euro and sterling MMFs respectively, and fell twice as fast, at 29 per cent, in US dollar MMFs. MMF holdings of non-financial corporate debt also declined sharply. As non-financial corporations often issue through financial intermediaries, adding the other financial sector to non-financial holdings provides a better indicator of these holdings, except for the securities borrowing component which reflects lending to investment funds.

These effects persisted through the following months. It took until May for funding of banks and other corporates, out to three months, to recover to February levels. Beyond three months, however, funding of other entities has remained much lower than in February, except for government debt.

The impact on banks and other corporations is quite limited during this period however, as the ECB and other central bank facilities play an important role in funding banks and supporting issuance by non-financial corporations.[16] One notable example was the particularly large (€1.31 trillion) take-up by banks of the Eurosystem's TLTRO III facility for loans up to three years. Banks have significantly reduced their issuance of money market instruments since then and contributed to a flattening of the short-term yield curve. While this curve flattening could reduce incentives further for MMFs to extend maturities, a desire to lock in rates, before they go lower still or even negative, could have the opposite effect. Nevertheless, at some stage, money markets will regain their importance in the financial system.

These patterns within portfolio investment of Irish-resident MMFs were also evident in other European MMFs, mostly denominated in euro. As key participants in short-term markets, their changed investment patterns had a significant overall impact on these markets through reduced demand (ECB (2020)), which has persisted. There was also a supply side impact from banks and other corporates availing of central bank facilities, and therefore under less pressure to seek funding in money markets. The net result has been a significant contraction in short-term money markets driven by debt maturing beyond three months, as shown in Figure 5 for the European market.

Figure 5: European Short-Term Paper, amounts outstanding – January to August 2019 and 2020



Source: European Central Bank

[16] Banks are also more resilient due to reforms since the Great Financial Crisis, see ECB Banking Supervision (2020).

Conclusion

Amid a sudden loss of liquidity in short-term debt markets in March, investor outflows were evident across the various MMF types in Ireland and elsewhere. Portfolio shifts show how portfolio managers of Irish-resident MMFs reacted to market tensions as investor outflows reversed. However, these investment patterns persisted in the following months, which had a marked impact on the pattern and scale of MMF funding of banks and other sectors and on activity in overall money markets.

The return to pre-crisis conditions in money markets has been very slow and liquidity ratios within Irish-resident MMFs remain elevated even as liquidity returns to money markets, reflecting concerns that this liquidity could suddenly disappear again if stress in other markets were to emerge. Looking more widely, money markets improved at a faster pace in the US than in Europe, as the MMLF provided an effective backstop facility.[17]

The longer these concerns persist, the more likely that money markets will reflect this in a risk premium in the future, which could increase the price of short-term funding for banks and other corporations.

A decade on from the financial crisis, money markets are once again in focus. There are particular issues around MMFs that invest in private sector debt (rather than government securities). For policymakers, questions surround the optimal approach to regulation to reduce risks, manage the impact of broader market disruption, and, more widely, understand the impact of structural market changes on liquidity, particularly at times of market stress. This is all on top of the immediate challenge for MMFs from the very low interest rate environment and planning for the possibility, even if considered faint, that negative rates, already prevalent in euro securities, might become a feature of some sterling or US dollar securities.

[17] The US Federal Reserve was also responding to an asymmetric issue in the US, namely very large safe haven flows into its very large government MMF sector from other MMFs.

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