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Money Market Funds

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Aim of the lesson

- What is special about Money Market Funds?
- We start with an introduction to the economic function and business model of money market funds;
- The main focus, though, will be on the market structure as well as **the interconnectedness** of money market funds with other parts of the economy;
- The euro area and US markets will be analyzed separately in order to capture their different profiles;
- We will also give a brief overview of current regulatory initiatives;
- Finally, we will sum up the findings and discuss drivers of potential future developments.

What is so special about Money Market Funds (1)

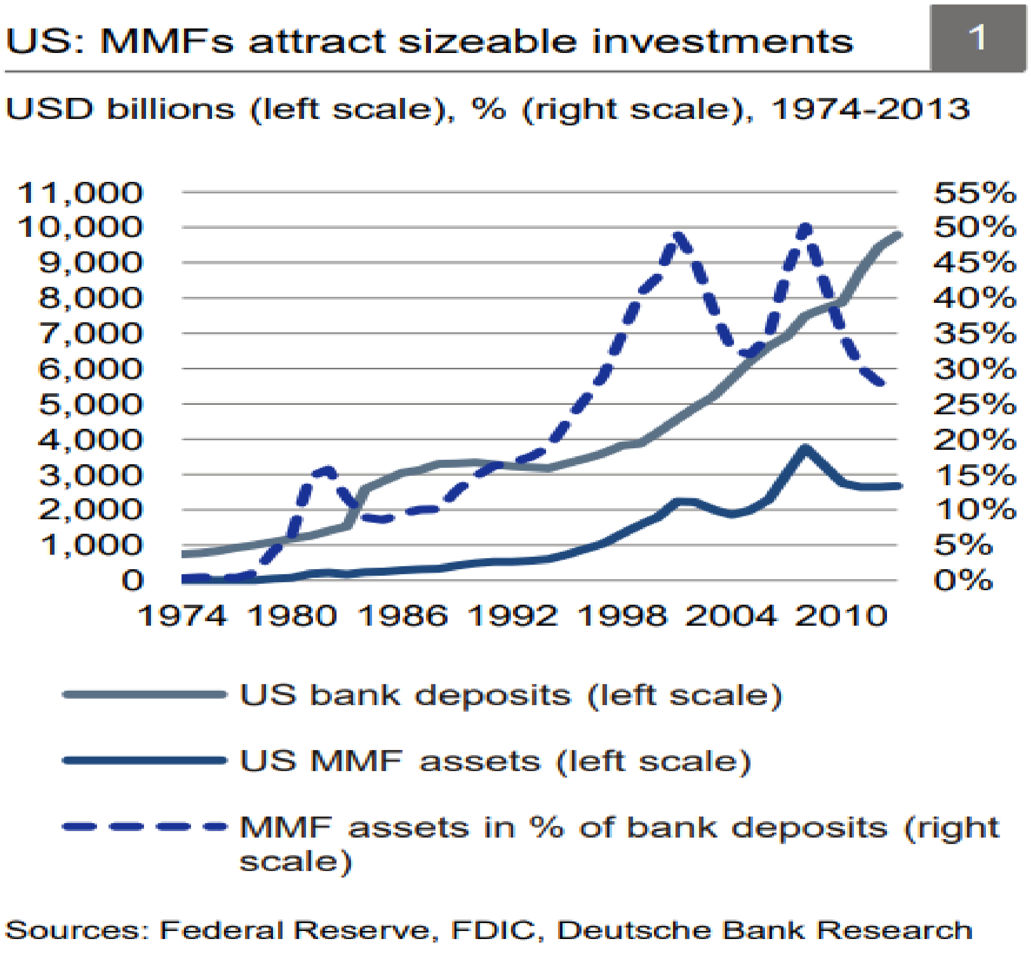
- **Money market funds** are well-established players in the US and European financial markets, and increasingly in some emerging economies;
- They offer cash-like investments to lenders on the one hand and short-term funding to wholesale borrowers on the other hand;
- Their important role in short-term credit intermediation became evident at the height of the financial crisis in 2008 when US money market funds experienced an investor run and, subsequently, reduced their lending;
- This caused serious financial stress for some borrowers reliant on short term funding and triggered central bank intervention. Since then, money market funds have been in the focus of regulators in the US and the European Union, as part of broader initiatives aimed at enhancing financial stability.

What is so special about Money Market Funds (2)

- In the US, money market funds emerged in the 1970s when regulation capped the interest that banks were allowed to pay on deposits at a level below money market yields;
- Money market funds were set up to mimic bank deposits by maintaining a stable value of USD 1 per share while offering money market yields to investors;
- Thus, money market funds gained a reputation as a profitable alternative to bank deposits and quickly attracted investments – especially from retail clients and banks.

What is so special about Money Market Funds (3)

- Besides, money market funds could gain nationwide scale as they did not fall under the legal restrictions on interstate banking;
- In Europe, France was in the vanguard of the development of the money market fund sector. There, as in the US, regulatory restrictions regarding interest on bank deposits led to the emergence of money market funds.



What is so special about Money Market Funds (4)

- As a **financial intermediary**, a money market fund performs **maturity** and **size transformation** and offers **risk reduction** via diversification;
- Although money market funds are only active in short-term instruments, they still transform maturities;
- **On the one hand**, they offer liquidity to their investors by allowing daily share redemptions at stable or only slightly fluctuating share prices;
- **On the other hand**, they invest in money market assets which are short term by nature but comprise financial instruments with remaining maturities of up to two years;

What is so special about Money Market Funds (5)

- In order to preserve the principal value of the cash received, money market funds operate within tight investment rules requiring high-quality assets and setting tight limits on the portfolio’ average maturity;
- Capital preservation and daily liquidity make money market funds an attractive cash management instrument for institutional investors who seek to place a short term cash surplus and to earn interest above the rate for bank sight deposits;

Money Market Funds
Credit Risk reduction

- As a **pooled investment vehicle**, credit risk reduction has especially gained importance since the 2008 financial crisis;
- Investors benefit from the fund' portfolio diversification into different instruments. Counterparty risk is thus less than with a bank deposit, especially for amounts above the threshold of deposit insurance;
- The risk reduction from diversification comes at a low cost for investors as the pooling of funds combined with the specialization of an asset manager provide scope for increased efficiency and economies of scale in the investment process;
- Investors can save resources by relying on the asset manager's expertise in credit risk management in short-term markets.

Money Market Funds
Maturity and Size transformation

- Moreover, money market funds transform the size of investments. Retail investors in particular may appreciate the possibility to gain access to diversified money market investments at low minimum purchase requirements;
- The existing literature suggests that most of the growth of money market funds since the 1990s has nevertheless been associated with cash-rich institutional investors' demand for safe investment opportunities (International Monetary Fund, 2014);
- For wholesale borrowers, the sizeable investments made by money market funds have become an additional and important source of short-term funding;

Money Market Funds

Maturity and Size transformation

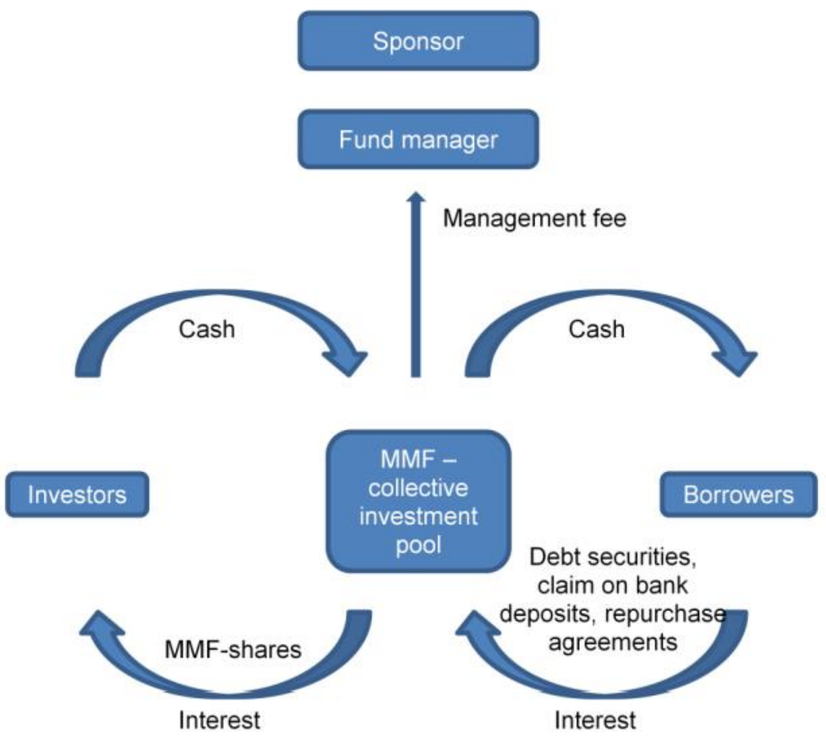
- Quite often, **<u>the borrowers are financial institutions</u>** which in turn perform further steps of credit intermediation, ultimately channeling savings to businesses or households for investment or consumption purposes;
- As an example, a money market fund investing in bank debt essentially supports the bank's lending to other parties;
- Also, a money market fund might invest in asset-backed commercial papers issued by a special purpose vehicle which in turn holds securitized bank loans made to households or firms;
- Money market funds, thus, are part of a chain of entities involved in credit intermediation, a process which is traditionally all conducted directly within one depository institution: **<u>a bank</u>** (Pozsar et al., 2010; 2013).

Money Market Funds Business Model

- Investors in money market funds include participants from all areas of the private sector, i.e. banks, insurers, pension funds, other non-bank financial institutions, corporations and households;
- They invest surplus cash in return for shares in the fund and receive interest on their investment. Generally, investors are entitled to redeem their shares daily;
- The fund manager, in turn, invests the funds in money markets, e.g. by engaging in repurchase agreements (repos), depositing funds with a bank or investing in high-quality short-term debt securities;
- Also, money market funds may invest in high-quality longer-term bonds – if the remaining maturity is short. Repos are secured cash lending, with the lender (in this case the money market fund) buying a security from the borrower who commits to buy it back at a certain date and price;

Money Market Funds Business Model (1)

Money Market Fund (MMF) Structure



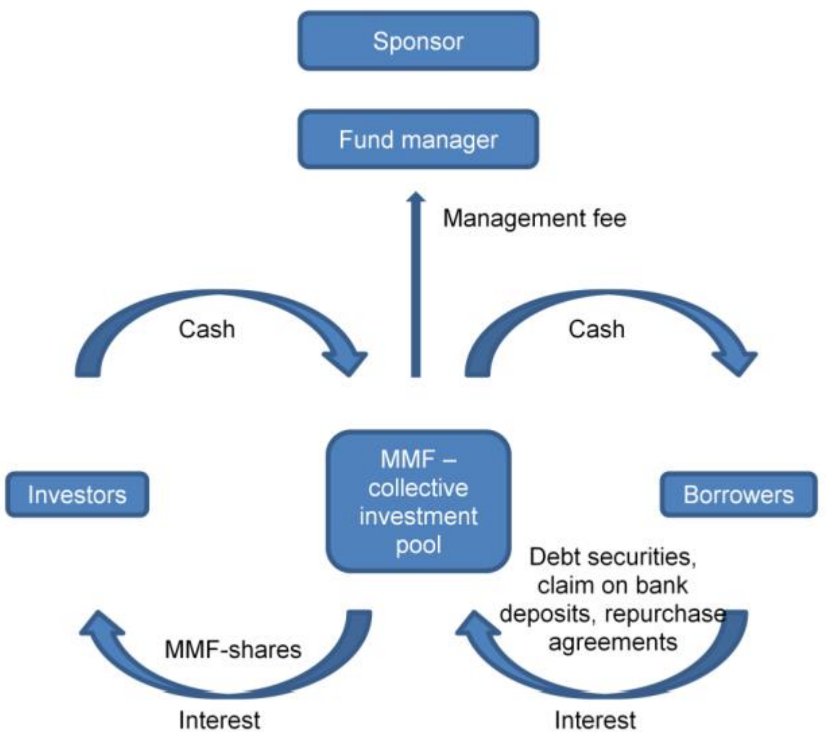
Source: Deutsche Bank Research

<u>The short-term securities bought by money market funds comprise the following instruments:</u>

- Certificates of deposit (CD): issued by banks;
- Commercial papers (CP): unsecured promissory notes issued by banks or large corporations;
- Asset-backed commercial papers (ABCP): securities issued by special purpose vehicles (SPV) and secured by assets purchased by the SPV;
- Short-term debt issued by government entities or backed by government guarantees;
- Short-term bonds issued by private issuers;
- Shares of (other) money market funds.

Money Market Funds Business Model (2)

Money Market Fund (MMF) Structure



Source: Deutsche Bank Research

- The fund manager or its service providers will take care for operational and custody services. The fund manager earns a fee which can be based on various pricing models, e.g. a deduction from the interest earned by the fund or a charge related to buying or redeeming shares;
- In part overlapping with the range of investors, the borrowers from money market funds are mostly financial institutions (banks, insurers, pension funds and investment funds, and others), but also governments and to a small extent corporations. The sectoral composition of borrowers as well as of investors in money market funds differs in the various national markets;
- The term “sponsor” is used for an affiliated or parent company of the money market fund’ manager. This will usually be an asset management firm running various funds, or a bank.

Classification of Money Market Funds (1)

- Money market funds follow different investment policies and are tailored to the differing needs of potential investors;
- They can be classified by the targeted investor group (institutional versus retail) or by investment focus (debt of private or public issuers);
- However, all money market funds attempt to maintain the value of the invested funds while offering liquidity and some interest payments;
- Depending on the accounting technique applied, money market funds either offer their shares at a **constant net asset value** (CNAV) or a **variable net asset value** (VNAV, also called floating NAV);
- The net asset value (NAV) is a fund' price per share and is calculated as the difference between the fund's assets and its liabilities, divided by the number of shares outstanding.

Classification of Money Market Funds (2)

- **CNAV funds** use amortized cost accounting. This enables the fund to maintain a constant share price of EUR 1 (if the fund is denominated in EUR). Nevertheless, as a check, CNAV funds must periodically calculate their NAV at market prices. If this NAV falls below the CNAV by a certain amount, the shares have to be re-priced. In the US, a money market fund must reduce its constant share price if the mark-to-market value of the fund's NAV is down to 99.5 cents or less. The fund is then said to "break the buck (dollar)";
- **VNAV funds** use mark-to-market accounting, i.e. the share price depends on the market value of the fund' assets. Income is accrued daily and usually treated as a capital gain reflected in an increased NAV.

Money Market Funds in US

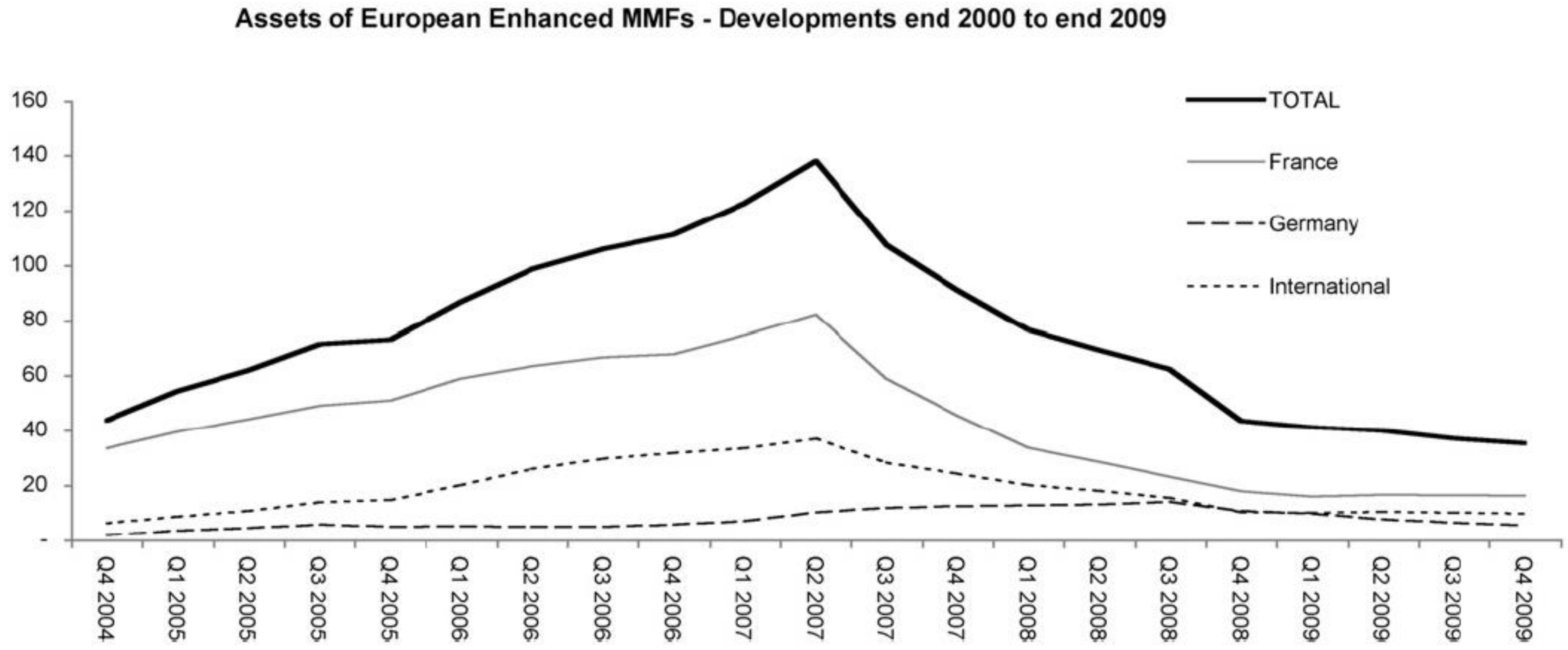
- The US has the largest money market fund industry worldwide. When money market funds emerged in the 1970s, they were subject to existing US laws governing mutual funds;
- In 1983, the SEC issued Rule 2a-7to set out portfolio requirements regarding credit quality, liquidity, maturity and diversification which are meant to help ensure a stable net asset value;
- This is important given that US money market funds traditionally market their shares at a stable price of one dollar (i.e., they are CNAV funds);

Money Market Funds in US

- Over the years, the SEC tightened portfolio requirements for money market funds several times, most recently in 2010 and 2014, as a response to the run on US money market funds in 2008;
- The collapse of Lehman Brothers on September 2008 triggered large withdrawals by institutional investors from prime money market funds;
- The outflows accelerated when the Reserve Primary Fund, a large MMF, announced it had "broken the buck" on September, 2008. This meant that the fund' mark-to-market net asset value deviated from its constant net asset value by more than 0.5 cents and the fund' shares had to be re-priced to less than one dollar ("buck");
- The massive redemptions from MMFs aggravated a severe funding shortage in US short-term credit markets;
- In order to restore investor confidence in MMFs, the US Treasury announced a program on September 19th which guaranteed the share price of 1 USD for participating MMFs.

Money Market Funds in Europe (1)

- Over the years, European MMFs have grown into a EUR 1.3 t industry dominated by France, Luxembourg and Ireland (Bengtsson, 2013):



Money Market Funds in Europe (1)

- Money market funds in Europe have traditionally been governed by national market practices and legislation;
- However, the gradual integration of national financial markets under the umbrella of the European Union certainly helped to develop a cross-border market for asset management, e.g. by introducing the UCITS directive.

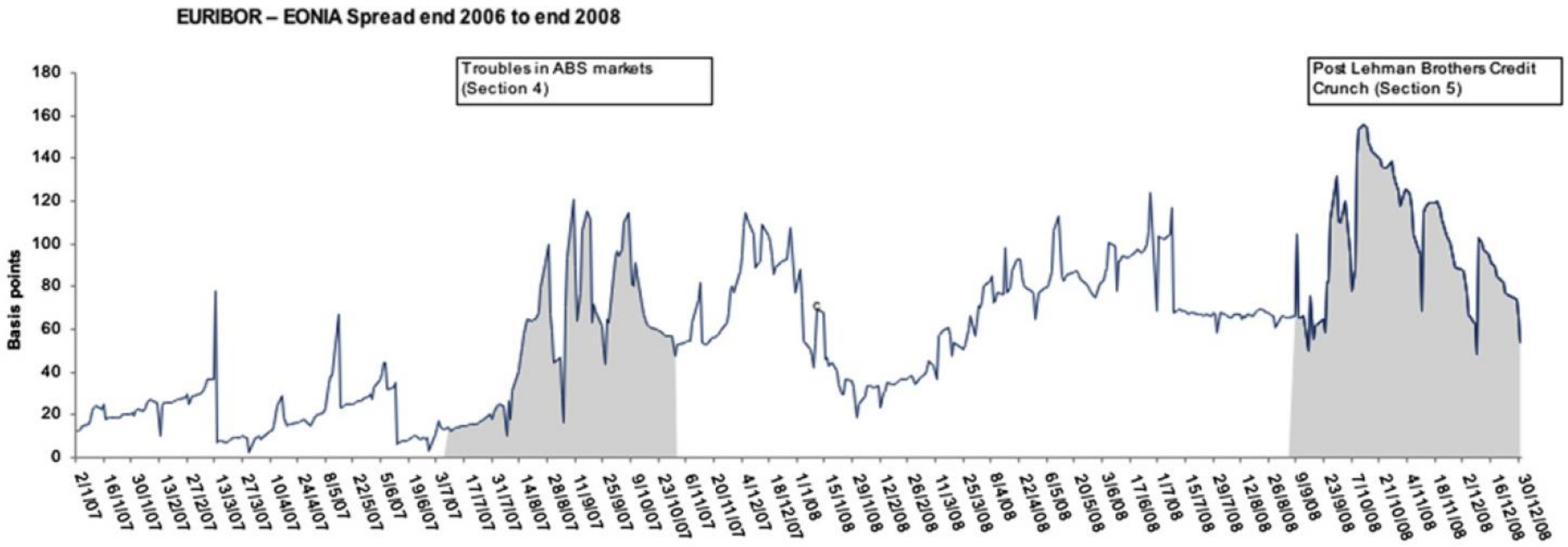
<u>Let's shed some light on the European MMFs in the credit crunch</u>

European MMFs in the credit crunch (1)

- In spring 2008, apprehension returned to money markets. In March, interbank funding and wholesale funding market dried up, not least following the bail out of Bear Sterns by the Federal Reserve (Hördahl & King, 2008; Allen et al. 2009);
- While market stress decreased during summer due to wide range of central bank activity, it returned with full force and culminated in the fallout of Lehman Brothers on September 15th. The aftershocks rippled through credit and money markets;
- Following the events of September 15th–16th, the money market entered a deep freeze. Investors flocked to treasury bills seeking liquidity and safety, and thereby sharply driving up credit spreads;
- Interbank lending was reduced to overnight only. Securities with longer-dated maturities simply did not trade (Heider et al. 2008);

European MMFs in the credit crunch (2)

- Over the following weeks, conditions deteriorated further and credit spreads widened to near-record levels. For example, the spread between the 3-month Euro Interbank Offered Rate (EURIBOR) and the Euro Overnight Index Average (EONIA) rate jumped nearly 100 basis points in the one month period.



Significant events
European MMFs summer 2007 to summer 2008

Date	Event
June–July 2007	Subprime MBS problems start to become evident. Certain hedge funds report huge losses. Bear Stems close down two funds.
09/07 2007	In one week, S&P, Moody's, Fitch and Dominion initiate reviews and/or downgraded distressed subprime transactions amounting to a total value of more than $138 bn.
23/07 2007	AXA Investment Management reports that two of its money market funds = World U.S. Libor Plus Fund and Investment Managers Fixed Income Investment Strategies U.S. Libor Plus Fund fell by around 13% between July 18 and July 19. Following the continued drop in value amounting to 21%. AXA bails out clients in its AXA US Libor Plus Strategy and Investment Managers Fixed Income Investment Strategies U.S. Libor Plus Fund by guaranteeing NAV by purchasing underlying assets.
27/07 2007	French asset manager ODDO dissolves its Cash Titrisation, Cash Arbitrages and Court Terme Dynamique funds.
03/08 2007	Germany's Union Investment closes its ABS-funds following a 10% run-off rate during the past month.
	HSBC Investments Germany suspends redemptions in its Trinkaus ABS-fund.
06/08 2007	Trading activity in certain US securitized instruments evaporates completely.
	Frankfurt Trust closes Frankfurt fond ABS Plus.
	Sal Oppenheim freezes redemptions in its two ABS funds.
	WestLB Mellon Asset Management suspends redemptions in its Compass Fund: ABS Fund.
09/08 2007	To avoid a sharp increase in short-term lending rates and maintain liquidity, the ECB injects EUR 95bn into European money markets followed by an additional EUR 61bn the next day. On Monday 13 August, a further EUR 48bn is provided.
13/08 2007	NAV calculations and redemptions are suspended for three funds managed by BNP Paribas: Parvest Dynamic ABS, BNP Paribas ABS EURIBOR and BNP Paribas ABS EONIA.
13/08 2007	DWS restricts redemption to below par value for investors in its ABS fund.
23/08 2007	ECB announces a supplementary liquidity-providing longer-term refinancing operation to support the functioning of the euro money market.
	BNP Paribas announces plans to reestablish NAV for its BNP Paribas ABS EURIBOR and BNP Paribas ABS EONIA funds using a combination of mark-to model techniques.
29/08 2007	BNP Paribas reopens its BNP Paribas ABS EURIBOR and BNP Paribas ABS EONIA funds for redemptions. Two days later, the NAV calculations are resumed for Parvest Dynamic ABS, which also is opened for redemptions.
01/11 2007	Credit Suisse transfers UB$6 bn of remaining money market fund assets onto its balance sheet to meet redemption claims.

Significant events
European MMFs summer 2008 to summer 2009

Date	Event
9/09 2008	Lehman Brothers looses half its market capitalization. Six days later the bank is declared bankrupt. The Euribor – Eonia Spread rises by 39 basis points.
September 2008	ECB announces several facilities to support European money markets.
19/09 2008	Lehman Brothers Liquidity Funds PLC suspends all dealings the three sub-funds the Euro Liquidity Fund, the Sterling Liquidity Fund and the US Dollar Liquidity Fund. US Treasury launches Temporary Guarantee Program for Money Market Funds.
13/10 2008	German Bundesbank announces special liquidity assistance to MMFs and near MMFs against collateral.
14/10 2008	The Luxembourg government and central bank grant liquidity assistance to MMFs against collateral.
14/10 2008	The Luxembourg government and central bank grant liquidity assistance to MMFs against collateral.
15/10 2008	ECB expands its collateral framework to secure longer-term financing for Euro-zone financial markets. The expanded list of eligible assets includes all CDs and certain subordinated debt instruments (with hair-cuts). The threshold for marketable and non-marketable assets is lowered from A- to BBB-.
16/10 2008	The Irish central bank relaxes requirement for CNAV MMFs to conduct weekly reviews of discrepancies between market value and the amortised cost value for their AuM.
19/10 2008	US Federal Reserve Board announces the Asset Backed Commercial Paper Money Market Mutual Fund Liquidity Facility (AMLF), providing loans to banks to purchase ABCPs from US MMFs.
21/10 2008	US Federal Reserve Board launches Money Market Investor Funding Facility (MMIFF) purchasing CDs and CPs with minimum requirements for ratings and remaining maturities of 90 days or less from US MMFs.
November 2008	Several Luxembourg domiciled MMFs receive support from parent banks to meet redemptions.
12/11 2008	AVIVA alters its Sterling and Euro liquidity funds from CNAV to VNAV.
18/02 2009	SGAM reports losses resulting from the liquidity support measures to dynamic money market funds in Q1 08 and valuation adjustments on some assets in Q4 08.

Systemic vulnerabilities of MMFs (1)

- The financial market turmoil at the onset of the coronavirus (COVID-19) pandemic revealed systemic vulnerabilities in MMFs;
- Some MMFs investing in private sector debt securities experienced acute liquidity strains when faced with a high level of redemptions by investors combined with a lack of liquidity in private debt money markets;
- This led to concerns that liquidity strains in those MMFs might amplify the effects of the COVID-19 shock in other parts of the financial system;
- The situation was particularly serious in the United States and the EU and improved only after exceptional measures were taken by the Federal Reserve System and the ECB under their respective monetary policy mandates.

Systemic vulnerabilities of MMFs (2)

- These events took place just over ten years after the global financial crisis, which itself had revealed systemic concerns relating to MMFs;
- There is an **underlying tension** between which depends on the economic functions provided by MMFs;
- The tension arises from the fact that MMFs offer on demand liquidity for investors and are often assumed to be cash-like instruments, whereas the instruments in which they invest are not reliably liquid;
- **The tension does not manifest itself under normal market conditions**. MMFs are largely able to meet investor redemption requests from the liquidity within their portfolio and without having to resort to extraordinary measures, except during certain crises;

Systemic vulnerabilities of MMFs (3)

- The underlying tension can become a cause of systemic concern. This is based on the following potential sequence of events:
- An exogenous shock emerges, such as COVID-19 or a credit shock on banks;
- In response, investors redeem MMF shares/units: (i) on a forced basis in order to meet liquidity needs elsewhere (e.g. margin calls, emergency cash needs for corporates); or (ii) on a voluntary basis (e.g. for flight-to-quality reasons);

Systemic vulnerabilities of MMFs (4)

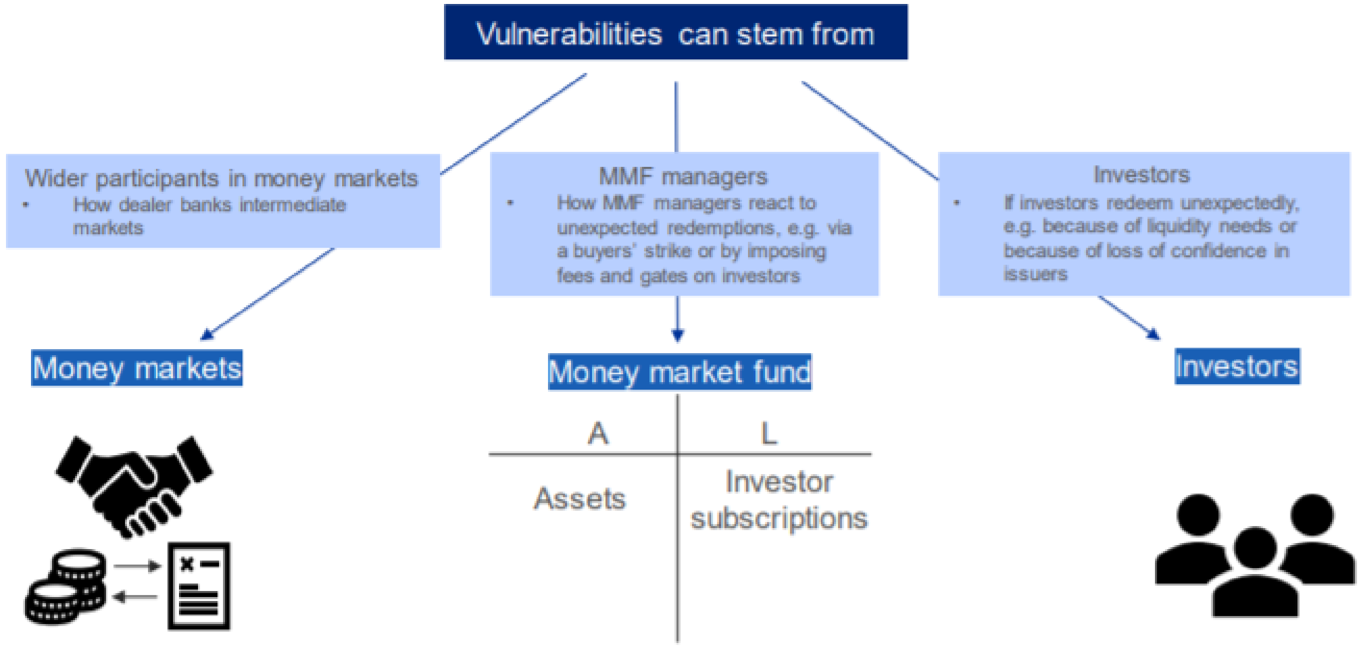
- MMFs attempt to meet this unexpected increase in redemption demand, although in doing so they may generate two potential externalities:
- Disruptions in short-term funding markets: To honor redemptions MMFs may (i) use maturing assets; (ii) sell assets, potentially disrupting the functioning of wider short-term funding markets; and/or (iii) reduce their purchases of new money market instruments in order to reduce the weighted average maturity of their assets. This can affect the flow of funding to financial institutions and the real economy;
- Propagation of liquidity strains elsewhere in the system: MMFs can also manage their liquidity risk by restricting the access of unitholders to their money, for example by introducing fees on redemptions or even redemption gates. This could in turn transfer the liquidity risk to other parts of the system;
- Both externalities are relevant for systemic risk.

Manifestation of systemic risk in MMFs (1)

- The actual manifestation of systemic risk from MMFs arises from a complex interplay of market structures, the economic functions of MMFs, as well as the decisions and actions taken by a number of market participants;
- MMF managers and their reactions to increased redemptions (or the expectation of increased redemptions to come) can determine whether MMFs amplify the shock; i.e. they may try to use parts of their buffers to meet redemption demand or they may use maturing assets, which can lead to reductions in or the disappearance of liquidity from short-term markets as described above;
- Wider market participants that have an impact on money markets, such as dealer banks, which intermediate markets, and issuing banks, which may or may not be willing to buy back their own paper.

Manifestation of systemic risk in MMFs (2)

Systemic vulnerabilities around MMFs



Source: ESRB.
Note: A "buyers' strike" is a situation in which MMFs stop buying the instruments in which they normally invest.

Manifestation of systemic risk in MMFs (3)

- This interplay has important policy implications and deserves further investigation;
- It affects how the underlying risks and their emergence could be targeted by policy reforms in order to make MMFs more resilient and reduce their systemic vulnerabilities;
- Further investigation of the behavior of investors: what do they do with the funds they redeem from MMFs? what do other agents receiving that money do and why do they not invest in money markets? what are the alternatives for investors looking for cash management vehicles? and of money markets (how important they are for banks? what are the alternatives? would inform policy reforms.

Shadow banking and financial stability (1)

- The term shadow banking is commonly understood to encompass the range of non-bank institutions that to various extents provide liquidity services, maturity mismatch or leverage;
- It was coined by (McCulley, 2007) who views the development of MMFs as the birth of the shadow banking system (McCulley, 2010);
- The events and the developments in the European MMF industry clearly demonstrate a number of links between the shadow banking system and overall financial stability;
- The first important observation is to confirm that financial intermediaries in the shadow banking system are subject to runs (cf. McCabe, 2009; Brunnermeier, 2009);

Shadow banking and financial stability (2)

- There is a lack of transparency in the asset composition of MMFs. This makes it difficult for investors in European MMFs to discriminate between MMFs in terms of the quality of their assets;
- As a result, investors started to redeem their MMF units en masse (although certain funds with particularly significant ABS exposures were more severely hit than others) in 2007.
- It is likely that these redemption waves were reinforced by first mover incentives faced by MMF investors, as observed in the US MMF industry by McCabe (2009);
- These shadow bank runs, in turn, caused contagion within the European MMF industry as they evoked decreasing price spirals (c.f McCabe, 2009).

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