

Liquidity risks of pension funds' derivatives portfolios under various stress scenarios

DeNederlandscheBank

EUROSYSTEEM



AFM

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Summary

This report presents the findings of a study conducted by the Dutch Authority for the Financial Markets (AFM) and De Nederlandsche Bank (DNB) into liquidity risks arising from pension funds' derivatives portfolios, following a recommendation by the Financial Stability Committee (FSC).

A number of pension funds and relevant pension administration organisations were asked to calculate four stress scenarios involving significant interest rate and currency shocks and drying up of the repo market. The results of this study provide insight into the sensitivity of pension funds' liquidity positions when responding to margin calls following specific shocks, and the assumptions that underpin their subsequent choice of liquidity instruments.

The study shows that pension funds are able to meet margin calls in the stress scenarios without resorting to an extensive sell-off of assets. Pension funds face large margin calls in the event of interest rate and currency shocks due to their sizeable derivatives portfolios. The study shows that they use different liquidity sources to meet these margin calls. Some use a “waterfall method” that specifies which sources are to be used and when. Often, pension funds initially use readily available liquidity such as cash, deposits and maturing reverse repos.

They also rely on other sources of liquidity, such as repo transactions and redemptions from money market funds. Additionally, they make use of the flexibility of bilateral derivative contracts by depositing high-quality debt securities as collateral instead of cash. None of the scenarios requires extensive sales of short-term debt securities (or other assets).

However, the results show that pension funds are dependent on assumptions about the functioning of repo markets and money market funds, which may compel them to sell more assets in extreme scenarios. It is noteworthy that large pension funds are particularly likely to depend on the repo market for a significant part of their liquidity needs in worst-case scenarios. Indeed, the maximum (daily) amount that pension funds expect to receive from the repo market is higher than was traded on a daily basis in March 2020.¹ In addition, pension funds rely on the availability of liquidity from money market funds. In extreme scenarios, e.g. when the repo market dries up nearly completely or when money market funds partially close down, it cannot be ruled out that pension funds will need to sell several billions worth of assets. This can give rise to market effects and procyclicality. A stronger macroprudential framework for the non-bank sector, in particular money market funds, can boost the sector's resilience in times of stress, thus improving access to liquidity for investors, including Dutch pension funds.

¹ At the start of the COVID-19 crisis in March 2020, demand for cash was high (“dash for cash”), which put pressure on the repo market.

In addition, liquidity pressure will increase in the coming years as the ability to meet margin calls with high-quality debt securities declines, although the new pension contract may ease this situation somewhat. The exemption that pension funds had from obligatory central clearing of derivatives has recently expired, which means liquidity pressure resulting from margin calls will increase. However, this will happen only gradually, as the clearing obligation applies solely

to new transactions. Conversely, the new pension contract may put downward pressure on liquidity needs if interest rate hedging shifts to shorter maturities. Hence future liquidity needs are uncertain. It would therefore be prudent to repeat the analysis in this report in a few years once the central clearing obligation has a greater impact on liquidity pressure and the impact of the new pension contract has become more evident.

1 Introduction

In previous studies, the AFM and DNB concluded that liquidity risks arising from pension funds' derivatives portfolios are significant. The Financial Stability Committee (FSC) discussed this topic in its February 2023 meeting, and explored a number of possible policy options. The FSC endorsed the findings in the studies and recommended that the AFM and DNB “assess in a risk-based manner, with a particular focus on large pension funds and relevant asset managers, which liquidity effects could occur in the event of a sharp rise in interest rates in the money market and a temporary drying up of the repo market”. At the FSC’s request, the AFM and DNB therefore conducted a new study into the liquidity risks of a number of pension funds and relevant pension administration organisations.

This report presents the findings of liquidity risks based on different stress scenarios.

The pension funds and pension administration organisations have calculated four different stress scenarios in a liquidity stress test, in which substantial interest rate and exchange rate movements occur, and access to the repo market is limited. The results of the stress test provide insight into the liquidity position and liquidity instruments used to meet margin calls in the stress scenarios. The analysis in this report takes a macro(prudential) perspective: liquidity risks and potential contagion effects are assessed at the macro level; the study is thus not primarily focused on individual institutions or their supervision. It goes without saying that sound liquidity management at the micro level also helps to mitigate liquidity risks at the macro level.

2 The stress scenarios

Pension funds and pension administration organisations were asked to calculate four stress scenarios as part of a liquidity stress test.

The results of the liquidity stress test reflect the possible liquidity effects in the event of significant interest rate and currency shocks, combined with the partial drying-up of the repo market. We distinguish between an adverse scenario and a worst-case scenario for both interest rate and currency shocks, and for the available repo market liquidity, resulting in four stress scenarios (see Table 1).

The interest rate and currency shocks have been calibrated to the maximum historical movements over a two-day horizon over the last 15 years. In the study we use the same (cumulative) size of the interest rate and currency

shocks for the adverse and worst-case scenarios. In the latter scenario we assume that this shock materialises entirely in one day, while in the former scenario the same shock is spread over two days (see Table 2). The focus in all scenarios is on a short horizon, as earlier research shows that margin pressure from derivative portfolios can cause problems in the event of severe shocks on a one-day horizon in particular. We also assume that the interest rate shocks are parallel and identical for both swap and sovereign rates, distinguishing between different geographical areas. The currency (exchange rate) shocks have been calibrated for the most important foreign exchange rates, namely euro-dollar (USD), euro-sterling (GBP) and euro-yen (JPY). Table 2 shows an overview of the interest rate and currency shocks in the four scenarios.²

Table 1 Stress scenarios involving interest rate and currency shock and partial drying up of the repo market

| | Adverse scenario repomarkt | Worst-case scenario repomarkt |
|--|---|---|
| Adverse scenario, interest rate and currency shock (two-day horizon) | Scenario 1 Interest rate and currency shock on both days Maximum repo volume per existing trading partner: € 325 million One trading partner unavailable | Scenario 2 Interest rate and currency shock on both days Maximum repo volume per existing trading partner: € 100 million One trading partner unavailable |
| Worst-case scenario interest rate and currency shock (one-day horizon) | Scenario 3 Interest rate and currency shock in one day Maximum repo volume per existing trading partner: € 325 million One trading partner unavailable | Scenario 4 Interest rate and currency shock in one day Maximum repo volume per existing trading partner: € 100 million One trading partner unavailable |

² The interest rate shock in the worst-case scenario is greater than the interest rate shock in the Bank of England's system-wide exploratory scenario (Launch of the scenario phase of the system-wide exploratory scenario | Bank of England).

Table 2 Interest rate and currency shock in the four stress scenarios

| Interest rate and currency shock, adverse scenario (scenarios 1 and 2) | | | | |
|--|--------------|-----------------------------------|-----------------|-------------|
| Daily parallel interest rate shocks - absolute changes (basis points) | | Currency shocks - relative change | | |
| Geographic Area | Basis points | Currency | Description | Percentages |
| EU | 18 | USD | EUR 1 per x USD | -2,2 |
| UK | 38 | GBP | EUR 1 per x GBP | -2,3 |
| US | 22 | JPY | EUR 1 per x JPY | -3,8 |
| Japan | 17 | | | |
| Other | 21 | | | |

| Interest rate and currency shock, adverse scenario (scenarios 3 and 4) | | | | |
|--|--------------|-----------------------------------|-----------------|-------------|
| Daily parallel interest rate shocks - absolute changes (basis points) | | Currency shocks - relative change | | |
| Geographic Area | Basis points | Currency | Description | Percentages |
| EU | 36 | USD | 1 EUR per x USD | -4,4 |
| UK | 77 | GBP | 1 EUR per x GBP | -4,5 |
| US | 44 | JPY | 1 EUR per x JPY | -7,5 |
| Japan | 33 | | | |
| Other | 42 | | | |

The scenarios for the European repo market are based on historical pension fund repo transactions. The European repo market is crucial for pension funds and pension administration organisations to generate liquidity when faced with increased margin calls. However, the available volume in the repo market is uncertain and is moreover dependent on market sentiment. Given the high dependence on the repo market and uncertainty about the volume available in

this market, the scenarios include limitations on the availability of liquidity in the repo market. For example, the transaction volume with trading partners is capped at €325 million in the adverse scenarios and €100 million in the worst-case scenarios. It is also assumed that pension funds can trade only with existing trading partners and that one existing trading partner (the one with the largest transaction volume) is not available to trade.

3 Pension funds' derivatives portfolios and liquidity positions

3.1 Interest rate and currency sensitivity of the derivatives portfolio

Pension funds' derivatives portfolios are sensitive to changes in both interest and exchange rates. The total interest rate sensitivity of the derivatives portfolio (DV01) – aggregated for the relevant pension administration organisations – is more than €500 million per basis point change in the swap rate (see Table 3). In addition, pension administration organisations generally use FX forwards to hedge the currency risk (mainly EUR/USD). The currency sensitivity (PV01) arising from EUR/USD forwards per basis point change in the exchange rate amounts to around €22.3 million for the pension administration organisations. The sensitivity to EUR/GBP and EUR/JPY is substantially lower, at €2.4 million and €1.1 million respectively.

Table 3 Interest and exchange rate sensitivity of total derivatives portfolio
(EUR million per basis point)

| Sensitivity | |
|----------------|-------|
| DV01 | 501,1 |
| PV01 (EUR/USD) | 22,3 |
| PV01 (EUR/GBP) | 2,4 |
| PV01 (EUR/JPY) | 1,1 |

Pension funds can settle interest rate swaps centrally with a central clearing counterparty (CCP) or bilaterally with a relevant trading partner. This is important for the liquidity risk arising from margin calls, as the margin calls must always be settled in cash in the case of centrally cleared contracts (and intra-day margin calls may occasionally also be required). Settling margin calls in cash creates additional liquidity pressure and imposes higher liquidity management requirements than in the case of bilateral

contracts, in which pension funds can also meet margin calls in the form of high-quality debt securities (and sometimes also a day later in part, depending on the contractual arrangements with the counterparty). The ability to meet margin calls with high-quality debt securities will gradually decrease in the coming years due to the obligatory central clearing of derivatives (EMIR regulation) (see Section 5.3).

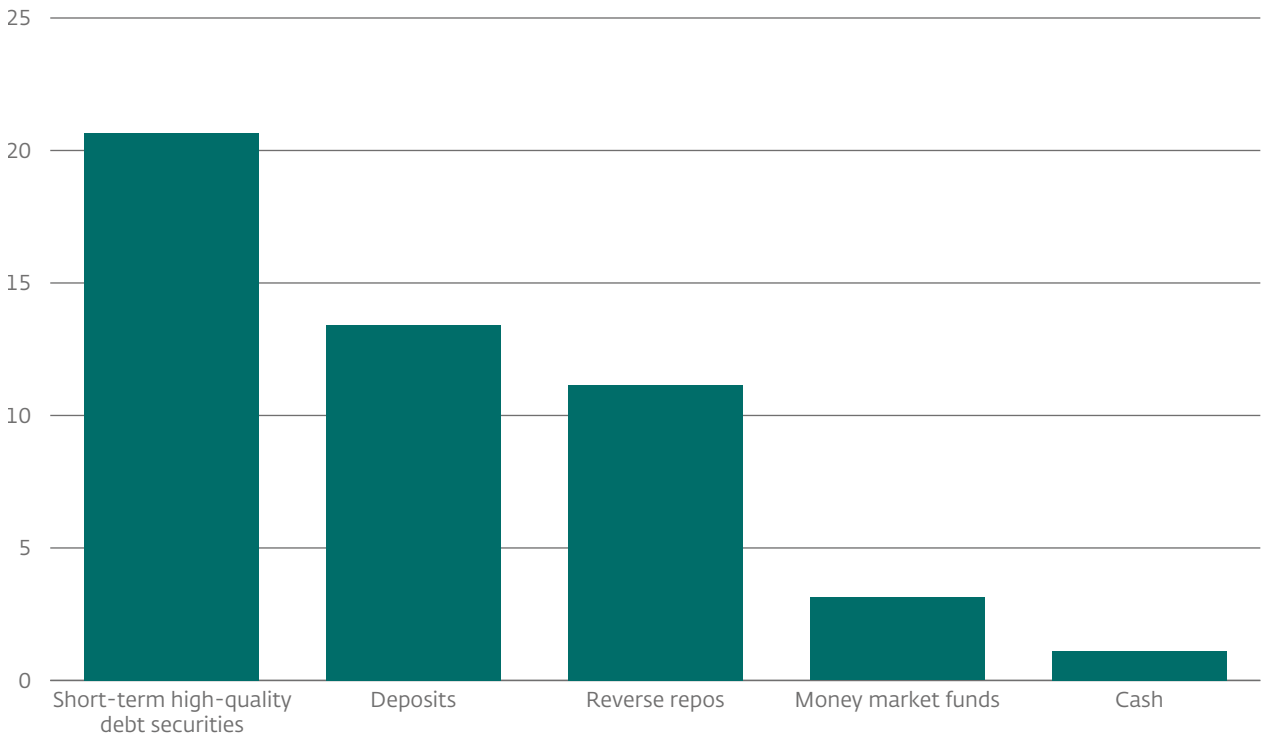
3.2 Liquidity position

Pension administration organisations use various sources of liquidity to meet margin calls.

A distinction can be made between readily available liquidity sources and sources of liquidity that are available with less certainty. Readily available liquidity consists of instruments that have a maturity of up to one day and that are available for use within that period. This includes cash, deposits and maturing reverse repo transactions (i.e. cash deposited short-term in exchange for high-quality collateral, much of which matures within one day). Additional sources of liquidity available with less certainty in the short term include repo transactions, redemptions from money market funds and sales of short-term high-quality debt securities (i.e. bonds with maturities of less than one year and a minimum rating of AA). Pension administration organisations can thus spread counterparty risk and are not dependent on a particular type of liquidity source. Figure 1 shows the total liquidity position of the relevant pension administration organisations, with their liquidity position consisting mainly of short-term debt securities, deposits, reverse repos and money market funds. It is notable that these organisations hold relatively little cash due to low returns.

Not all sources of liquidity can be turned into cash immediately in all circumstances. For example, deposits and reverse repos normally have a maturity of one or a few days, during which these sources cannot be made liquid or are difficult to make liquid. Positions in money market funds can (often) be bought or sold on a daily basis under normal circumstances, although this option may be restricted or suspended in the event of very large redemptions in times of market stress. Notably, it is precisely in such scenarios that margin calls tend to increase. Finally, short-term debt securities can be sold, but this is likely to be accompanied by a larger market impact in stress scenarios (as seen in March 2020, for instance).

Figure 1 Total available liquidity sources of relevant pension administration organisations (EUR billion)



4 Results of stress scenarios

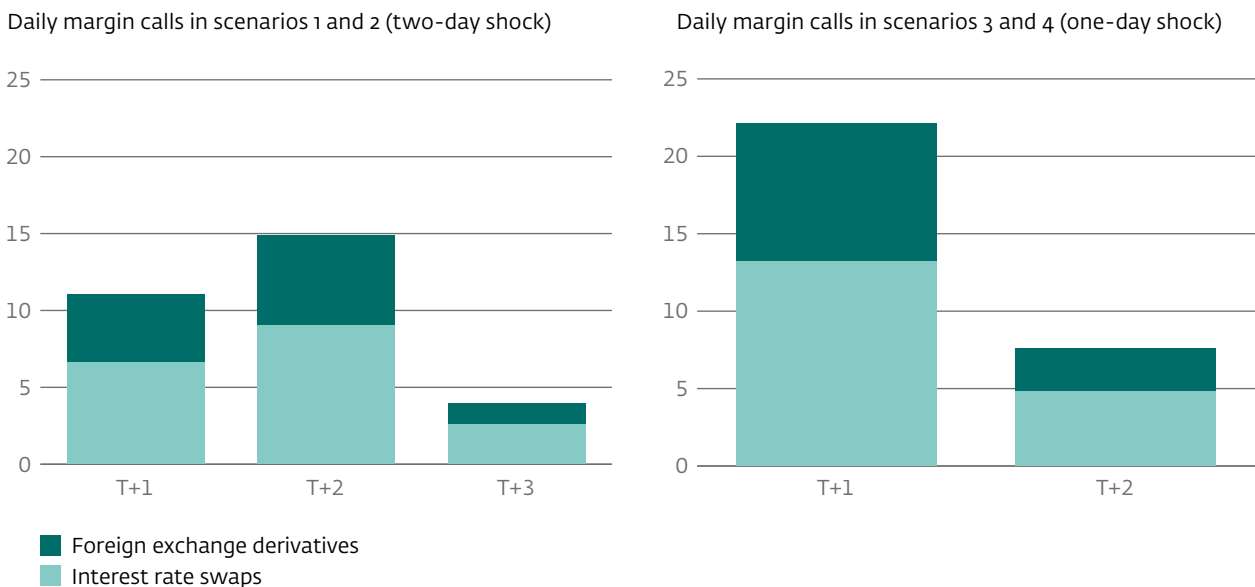
4.1 Margin calls

As a result of the interest rate and currency shocks, margin calls – aggregated for the relevant pension administration organisations – amount to around €30 billion in all scenarios, although the horizon within which they have to meet these calls varies. In all four stress scenarios, the aggregate interest rate and currency shocks are the same, and so are the total margin calls. However, the horizon within which pension administration organisations must meet these calls varies. For example, the adverse scenarios (scenarios 1 and 2) for interest rate and currency shocks occur over a two-day horizon, while the shocks fully materialise in one day in the worst-case scenarios (scenarios 3 and 4). Moreover, depending on the applicable CSA (credit support annex) rules for derivatives, margin calls must be met within one or two days following an interest rate or currency shock. This

is also reflected in the results that show that the total margin call of €30 billion in scenarios 1 and 2 (adverse scenarios) is met over the course of three days. For example, pension administration organisations have to pay around €11.1 billion on T+1, €14.9 billion on T+2 and €4 billion on T+3 (see Figure 2). In scenarios 3 and 4 (worst-case scenarios), the margin call is around €22.2 billion on T+1 and €7.6 billion on T+2. In these scenarios, liquidity pressure on the first day is therefore considerably greater.

It should be noted that the bulk of margin calls is attributable to interest rate derivatives. The total margin calls of €30 billion consist of €18.2 billion (61%) arising from interest rate derivatives and €11.8 billion (39%) from foreign exchange derivatives (see Figure 2).

Figure 2 Margin calls arising from interest rate swaps and FX derivatives
(EUR billion)



4.2 Impact on liquidity position

In the least severe scenario – scenario 1 – pension administration organisations mainly use readily available liquidity and repo transactions to meet margin calls. In scenario 1, interest rate and currency shocks take place over a two-day horizon, and the repo market functions relatively smoothly. In this scenario, more than 25% of margin calls are met using readily available liquidity (i.e. deposits, maturing reverse repos), especially on the first day following a shock (see Figure 3). It is also notable that pension administration organisations make extensive use of repo transactions. In three days, they raise around 30% of the required liquidity through repos. Pension funds also make use of the remaining flexibility in bilateral contracts by meeting the remainder of margin calls, around 24%, with high-quality debt securities. Finally, about 11% of the liquidity needed is redeemed from positions in money market funds, and 7% of margin calls are met by selling debt securities.

In scenario 2, restrictions in the repo market increase, leading pension administration organisations to make greater use of the opportunity to meet (bilateral) margin calls with high-quality debt securities. Scenario 2 involves the same interest rate and currency shocks, but the repo market dries up even more. Due to greater restrictions, pension funds can execute fewer repo transactions to meet liquidity needs. As a result, total use of repos in this scenario falls to 17% of the required liquidity (see Figure 3). Pension funds and pension administration organisations compensate this by posting more high-quality debt securities as collateral (9% in excess of margin calls), complemented by greater use of their readily available liquidity (around 3% additional) and by

selling more of their positions in money market funds (around 2 % additional).

In scenario 3, where the interest rate and currency shocks occur on a single day, it is notable that pension funds meet a higher proportion of margin calls with repo transactions and high-quality collateral.

Scenario 3 assumes the interest rate and currency shocks materialise in one day and the repo market functions relatively smoothly. Two developments stand out in this scenario. First, repo transactions are already used more on T+1 (28% of margin calls on T+1 against 11% in scenario 1), while in addition more use is made of the option to use securities as collateral. In this scenario, pension funds also expect to execute redemptions from money market funds more quickly.

In the most severe stress scenario – scenario 4 – pension administration organisations make particular use of the option to meet margin calls with high-quality collateral and they redeem significant amounts from money market funds. Interest rate and currency shocks occur over a one-day horizon in scenario 4, and the repo market dries up further. As a result, pension administration organisations can execute fewer repo transactions and they become more dependent on other sources of liquidity, which needs to be turned into cash more quickly. In this scenario, pension administration organisations use more direct liquidity (especially reverse repos) to meet margin calls, and almost 44% of margin calls are met with high-quality collateral on T+1. In addition, they expect to meet 23% of margin calls through money market fund redemptions. In this scenario, daily money market fund redemptions are high. Indeed, the pension administration organisations expect to get almost 40% of the

liquidity they need from money market funds on the second day after the shock.³

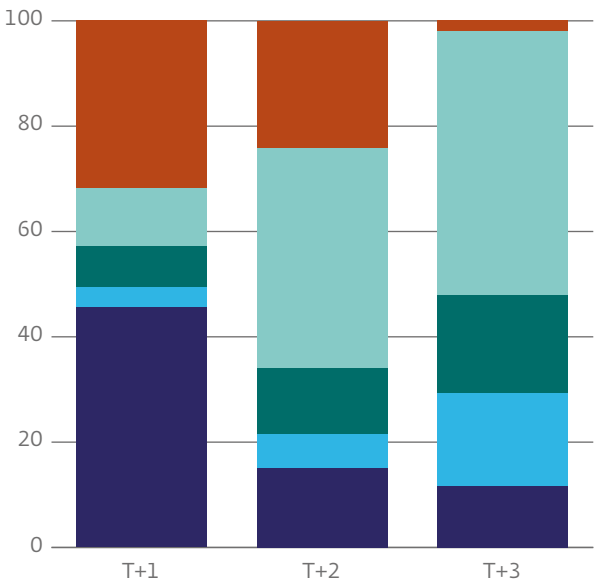
In summary, the results show that the relevant pension administration organisations are able to meet margin calls in all stress scenarios without an extensive sell-off of assets. Pension administration organisations use different liquidity sources to meet margin calls, and none of the scenarios requires a substantial sell-off of short-term debt securities (or other assets). Some organisations use a waterfall method that specifies which liquidity sources are to be used and when. In general, readily available liquidity, repo transactions and money market fund redemptions are more likely to be used than the sale of short-term debt securities (or other assets). Pension administration organisations indicate that they have sufficient decision-making power to deal with unexpectedly high margin calls in times of stress. If, in the event of major liquidity stress and insufficient liquidity buffers, a pension administration organisation must resort to the sale of debt securities, this could cause problems in practice if such a sale requires coordination with pension funds and this takes too long.

However, the results show that pension administration organisations are dependent on assumptions about the functioning of repo markets and money market funds, as well as the possibility to meet margin calls with high-quality debt securities. Compared to historical periods of heightened stress, it is notable that pension administration organisations raise a significant amount of liquidity through repo markets in certain stress scenarios (see Section 5.1). They also expect to be able to redeem up to 35% of their total positions in money market funds on a daily basis (see Section 5.2). Finally, they still make significant use of the ability to meet margin calls using high-quality debt securities as collateral instead of cash. This option will gradually decline in the years ahead (see Section 5.3).

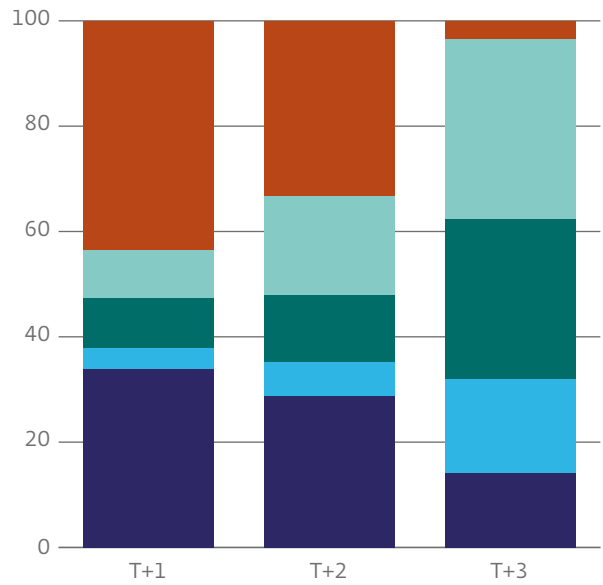
³ The use of money market funds differs between pension administration organisations.

Figure 3 Use of liquidity sources in the four scenarios
(as a percentage of margin calls)

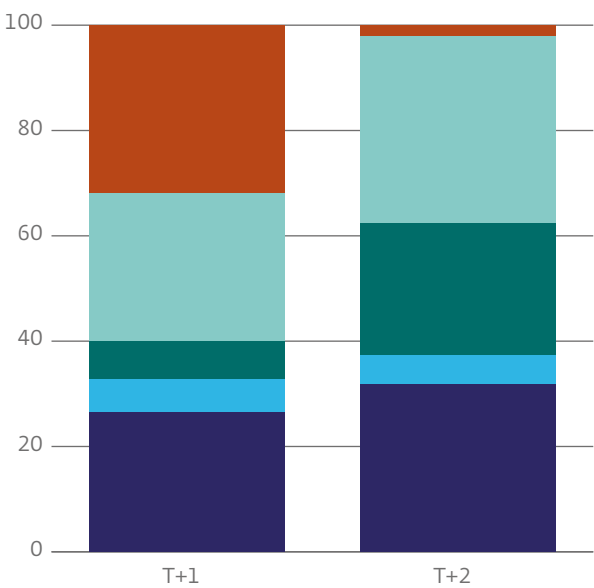
Scenario 1 (adverse interest rate and currency shock scenario and adverse situation on the repo market)



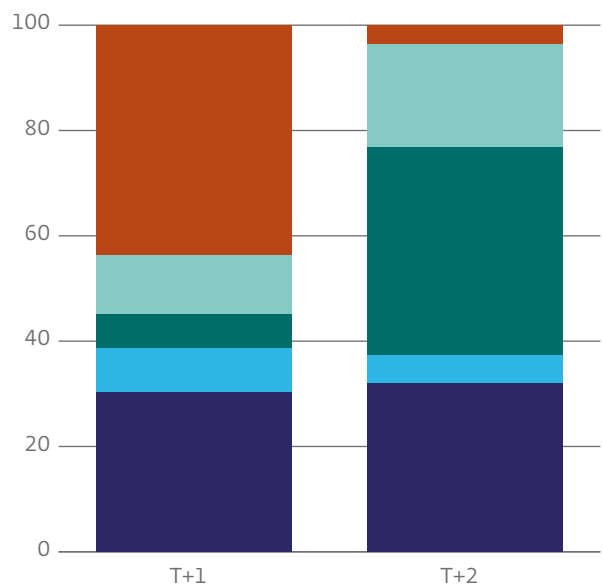
Scenario 2 (adverse interest rate and currency shock scenario and worst-case scenario on the repo market)



Scenario 3 (worst-case interest rate and currency shock scenario and adverse scenario on the repo market)



Scenario 4 (worst case interest rate and currency shock scenario and worst-case scenario on the repo market)



■ Met with securities ■ Sale of debt securities
■ Repo transactions ■ Direct liquidity
■ Money market funds

5 Role of European money markets

The functioning of money markets is an important factor on which pension funds' and pension administration organisations' liquidity management depends. The study results show that pension funds rely on repo transactions and money market funds for part of their liquidity needs (although the extent varies). In this section, we take a closer look at the functioning of the European repo market and the use of money market funds. Finally, we briefly discuss long-term developments in pension funds' liquidity needs.

5.1 Importance of the repo market

Under normal market conditions, the repo market is very deep, but the available volume can become uncertain in times of stress. In the repo market, parties can raise short-term liquidity in exchange for (generally high-quality) collateral. Under normal circumstances, the repo market is very deep and sufficient liquidity is available for raising cash. For example, the average daily volume in the European repo market is more than €600 billion.⁴ Given the vastness of the European repo market, pension funds can rapidly scale up their trading volumes if necessary. On days with increased activity, trade volumes may increase to €30 billion without a significant increase in tariffs. However, the volume available in the repo market depends on market sentiment, which means there is inherent uncertainty for pension funds whether the market can meet liquidity demand at all times. The repo market's available volume depends primarily on banks' willingness to lend cash. If banks wish to hold more reserves, for example due to volatile market conditions, the liquidity in the repo market can rapidly dry up.⁵

Dutch pension funds are active in the repo market both as borrowers and lenders. In the low interest rate environment of recent

years pension funds have mainly been active as lenders in the repo market, while they become active as borrowers when interest rates rise. The average transaction size of Dutch pension funds is significantly larger than the average of all repo transactions. Moreover, the individual transaction size of the largest pension funds falls in the highest percentile in extreme cases. Pension funds generally deal with more borrowers than lenders. This can be expected given the higher number of transactions for loans provided by pension funds. When pension funds need cash, access to (multiple) parties willing to lend cash is crucial. The diversity among pension funds with regard to the number of counterparties is great.

In the stress scenarios, pension funds still make full use of the repo market despite the constraints. In doing so, they exploit the maximum capacity of the repo market within the relevant scenario. Some pension funds indicate that they use the cash from repo transactions to replenish their liquidity buffers, but that they do not yet need the cash to meet margin calls.

Compared to historical episodes of heightened stress in repo markets, pension funds expect to be able to obtain a significant amount of liquidity in repo markets in certain stress scenarios. For instance, the maximum daily amount of expected repo transactions in scenarios 1 and 3 (in which repo markets are still expected to function reasonably smoothly) is much higher than traded on a daily basis in March 2020 and September 2022. It is uncertain whether such volumes can be raised in the repo market in times of stress. Nevertheless, the European repo market continued to function relatively smoothly in these periods of heightened stress.

⁴ ECB Euro money market study 2022.

⁵ An example of low liquidity in repo markets is the US repo market in September 2019.

5.2 Use of money market funds

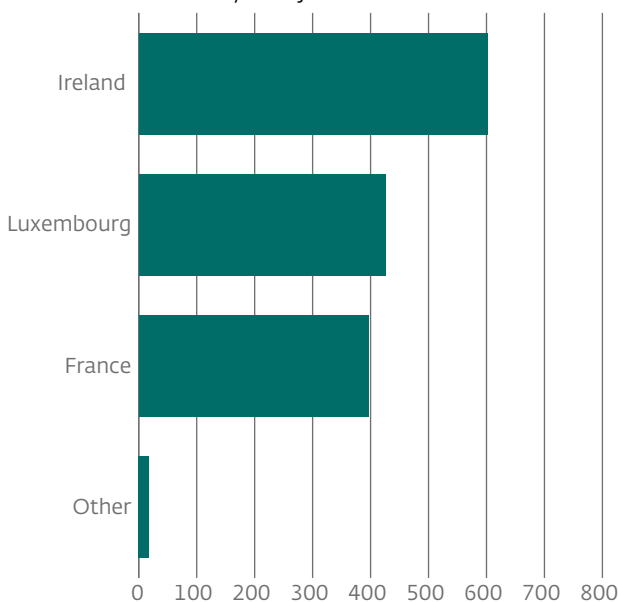
Pension funds hold units in money market funds to raise or reduce short-term cash holdings.

More than 450 money market funds and around 125 fund managers are active in the EU. These funds are mainly domiciled in France, Ireland and Luxembourg. European money market funds jointly manage around €1,400 billion (see Figure 4), invested in short-term liquid instruments with maturity constraints. The bulk of the portfolio is invested in money market instruments (MMI), issued mainly by banks (such as commercial paper and certificates of deposit). Pension funds and insurers together account for around 15% of these positions, with Dutch pension funds investing around €35 billion in money market funds. The share of Dutch pension funds in European money market funds is therefore relatively limited, and investing in multiple money market funds seems to be a straightforward proposition.

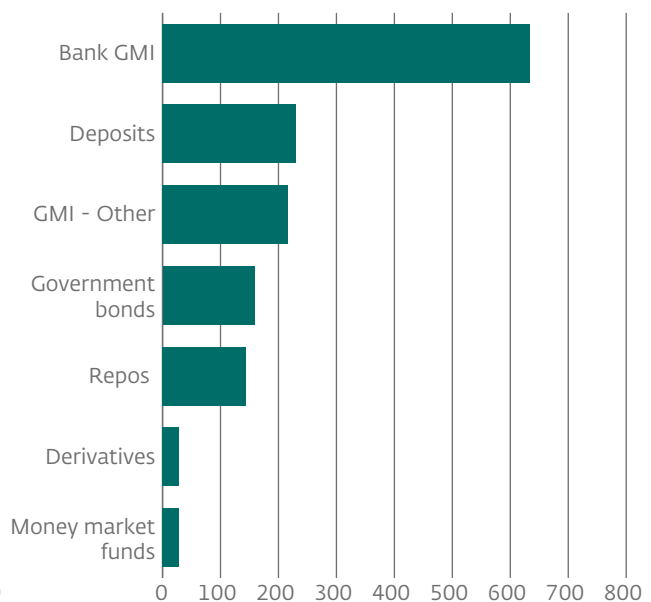
European money market funds are subject to specific rules, e.g. for the assets that can be invested in and their minimum required liquidity. There are various types of money market funds, with different requirements in some respects. For example, CNAV (Constant Net Asset Value) money market funds invest almost entirely in assets related to sovereign bonds, while LVNAV (low volatility net asset value) and VNAV (variable net asset value) money market funds invest to a large extent in short-term debt securities issued by financial institutions. Figure 5 shows the daily and weekly average liquidity requirements and the actual liquidity available for the different types of money market funds. In practice, it is clear that liquidity is well above the minimum daily and weekly liquidity requirement for all types of money market funds.

Figure 4 Assets and portfolio distribution of European money market funds
(EUR billion)

Assets broken down by fund jurisdiction

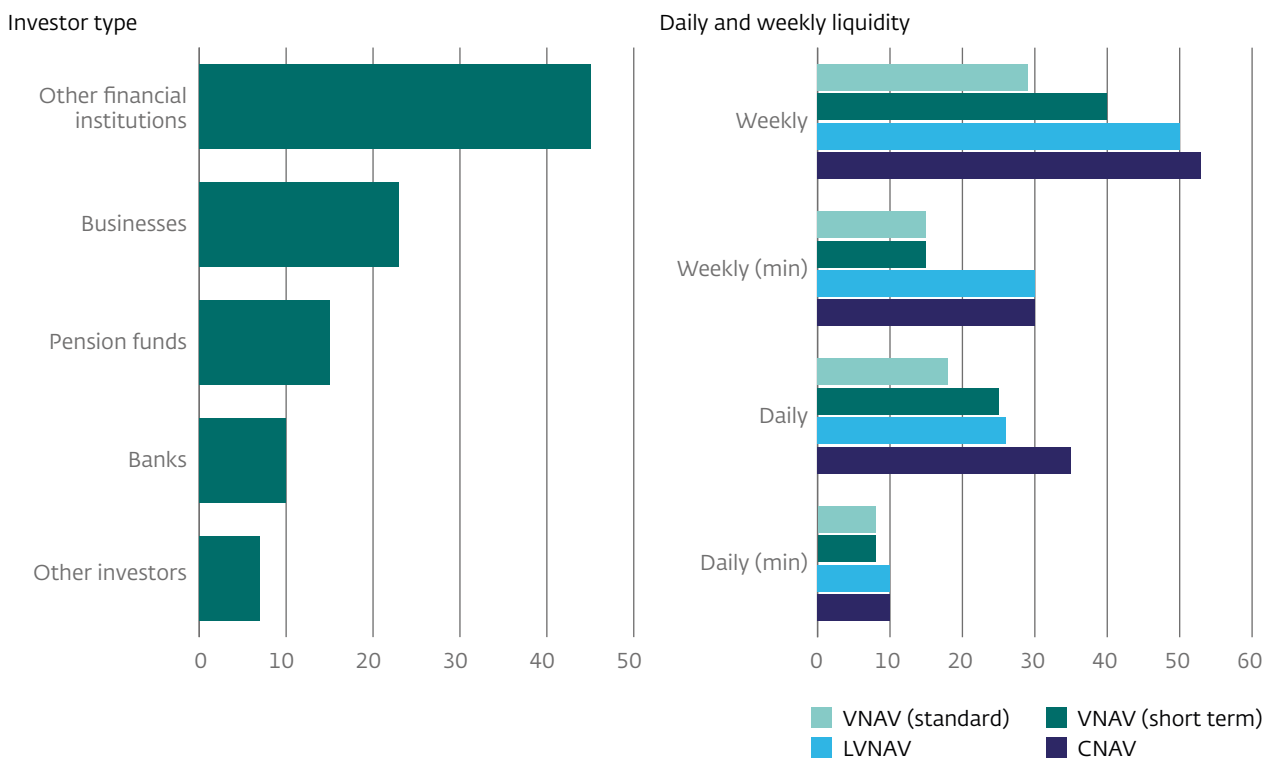


Portfolio distribution



Source: EU MMF Market Report 2023 (ESMA)

Figure 5 Investors in and liquidity of European money market funds
(percent)



Source: EU MMF Market Report 2023

Dutch pension funds make varying use of money market funds in their liquidity management and they make different assumptions about liquidity. Most pension funds invest part of their assets in money market funds. This also applies to the pension funds in this study. A large proportion of money market fund investments by Dutch pension funds are managed by smaller pension funds. One possible explanation for this is the fact that smaller pension funds often do not have access to the repo market, making them more dependent on alternative options such as money market funds. At the same time, some pension funds included in the study do not make use of money market fund

redemptions, mainly because market liquidity is limited around year-end or because they currently cannot do so for operational reasons. Regarding

the availability of assets in money market funds, some pension administration organisations assume that money market funds are 100% liquid, while others take into account limited liquidity (e.g. 40%). Some pension administration organisations set limits on their unit holdings per fund and thus may invest in multiple funds.

Pension funds that use money market funds to manage their liquidity – owing to their relatively optimistic assumptions about

liquidity – redeem significant amounts from money market funds in the stress scenarios.

Pension funds indicate that they have not experienced any problems with money market fund redemptions thus far. However, in times of stress – when many market participants need cash – these assumptions could very well prove optimistic. In March 2020, for example, money market funds found it difficult to meet investors' redemptions. Although money market funds managed to create sufficient liquidity through sales of securities and no funds closed down as a result, the sale of securities by money market funds did contribute to the fire sale spiral in March 2020. This shows that, in times of stress, pension funds can indirectly exacerbate market effects through money market fund redemptions (see also Section 6).

In stress scenarios 3 and 4, the expected money market fund redemptions exceed the maximum redemptions during the start of the COVID-19 crisis in March 2020. This applies in both absolute and relative terms (Table 4). The expectations for such redemptions entail the risk that either money market funds will be unable to meet all redemptions (resulting in liquidity risks for pension funds), or that money market funds – as in 2020 – may be a contributing factor in a fire sale spiral.

Table 4 Maximum daily money market fund redemptions by relevant pension administration organisations

| | March 2020 | Scenario 3 | Scenario 4 |
|------------------------|------------|------------|------------|
| Absolute (EUR billion) | 0,9 | 1,9 | 3,0 |
| Share (in %) | 16 | 23 | 36 |

5.3 Long-term developments in liquidity needs

The ability to meet margin calls with high-quality debt securities will gradually decrease in the coming years due to the obligatory central clearing of derivatives (EMIR regulation). The exemption for the obligatory central clearing of bilateral derivatives lapsed in June 2023. This means liquidity pressure from margin calls will increase, as margin calls can no longer be met in high-quality debt securities, but in cash. This will happen only gradually, as the clearing obligation applies solely to new transactions. Currently, 39% of the DVo1 of the derivatives portfolio is cleared centrally by pension administration organisations. The share of the total derivatives portfolio that will be cleared centrally rather than bilaterally will increase by 16 percentage points by 2028. Although pension funds indicate that they already often meet margin calls in cash, the results of this study show that many still make use of the option of meeting margin calls with debt securities in stress scenarios.

Conversely, the transition to the new pension contract may ease margin calls by potentially shifting interest rate hedging to shorter maturities. Although it is still unclear what the precise impact of the new pension contract will be, interest rate hedging may shift from long to short maturities. Indeed, interest rate risk will not be shared between generations under the new contract. For younger people in particular, lower interest rate hedging than is currently the case would make sense, while the situation is reversed for older people. Shorter maturities lead to downward pressure on margin calls. However, this will not be the case until pension funds switch to the new pension contract, while the impact of EMIR will gradually increase in the years ahead.

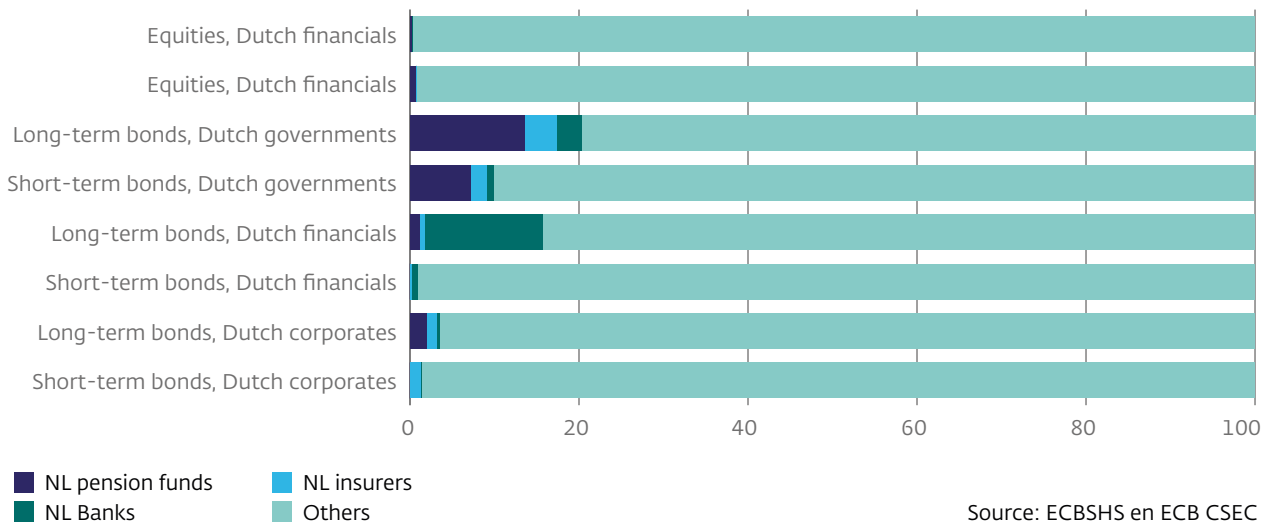
6 Financial stability considerations

Pension funds can have a negative impact on financial stability (indirect contagion), mainly through forced sales of assets (fire sales). Due to the size of the investment portfolio, the actions of the pension fund sector as a whole can potentially impact financial markets. If several (large) pension funds are compelled to sell securities simultaneously to meet margin calls, this can result in price pressures in financial markets, especially as such a situation is likely to take place in a market that is already under pressure.

The likelihood of (procyclical) market impact from asset sales by pension funds is only present in a severe tail scenario, specifically for long-term sovereign bonds. Data on holdings of financial instruments can be used to estimate the potential for market impact of fire sales by pension funds. Whether a large-scale sale of assets leads to self-reinforcing effects

depends on which proportion of the securities are held by pension funds.⁶ Figure 6 illustrates the holdings of pension funds for various asset classes, for securities issued by Dutch institutions (governments, companies, financials).⁷ Long-term sovereign bonds are the only securities that pension funds hold a significant proportion of. For the other asset classes, holdings are limited in relative terms, and a hasty sale by pension funds is not expected to have a price impact, as these securities are largely held by other market participants. Since pension funds hedge interest rate risk with long-term sovereign bonds, among other things, they are less inclined to sell these assets and are more likely to sell short-term bonds. Pension funds' liquidity needs will only lead to contagion effects through fire sales in a tail scenario. Pension funds have sufficient liquidity resources in the stress scenarios and hardly need to sell any assets. Moreover, the stress scenarios

Figure 6 Holdings of Dutch pension funds in different asset classes
(percentage of total market value issued)



⁶ This can be illustrated using DNB's Securities Holding Statistics.

⁷ The figure only shows the holdings of Dutch-issued securities, as these holdings are proportionally the largest. This reduces the likelihood of market impact of non-Dutch assets.

do not involve a sale of long-term bonds. The likelihood of contagion effects due to fire sales, such as during the UK gilt market crisis, therefore seems scant. Fire sales will only cause price effects in the case of a severe tail scenario with rapidly rising interest rates. This is all the more true as it is likely that many other market participants would also opt to sell in such a scenario.

Finally, pension funds can indirectly cause market effects through money market fund redemptions. In order to meet pension funds' redemptions, money market funds must sell underlying investments, which (in addition to any direct sales of pension funds' investments) may also result in procyclical effects. This is also evident from the ECB's study on the dash for cash in the spring of 2020, when there was a high correlation between payments of variation margin by insurers and pension funds on the one hand, and outflows from money market funds on the other.⁸

Pension funds' reliance on money markets shows the importance, from a macro-prudential perspective, of strengthening the regulation of money market funds. Reforms to better regulate non-bank financial intermediaries (NBFIs) will make this sector more resilient in times of stress and can also improve access to liquidity for investors in these funds, including Dutch pension funds. For example, improvements in the regulation of money market funds may mean that these funds can meet the needs of exiting investors for longer in times of heightened stress, and be less involved in perpetuating a self-reinforcing spiral, as was the case in March 2020, when Dutch pension funds were also involved.⁹

Moreover, better regulation of money market funds may also reduce the need for pension funds to use other sources of liquidity. Although the European Commission has postponed the review of the Money Market Fund Regulation (MMFR), there is growing awareness that vulnerabilities in money market funds require renewed scrutiny.

The remaining risks in a severe tail scenario also raise the question of how to deal with risks that non-bank financial institutions, such as pension funds, can pose to the financial system. The role and systemic importance of NBFIs has been increasing for a long time, and the vulnerabilities of these parties have been exposed during recent periods of stress. This underscores the importance of improving regulation and supervision of NBFIs. Nonetheless, a level of heightened stress is conceivable where regulation and supervision are insufficient to prevent procyclicality. Due to the potential risk of contagion through fire sales, the Bank of England (BoE) recently announced the creation of a lending facility to provide pension funds, insurers and LDI funds with liquidity in times of extreme liquidity stress (see Box for more information on this new facility and how the UK situation compares to the Dutch context).

⁸ ECB (2023), Derivative margin calls: a new driver of MMF flows, *Working Paper Series*, No 2800.

⁹ ECB (2020), Financial Stability Review. May 2020.

BoE announces permanent lending facility for non-bank financial intermediaries

The Bank of England has recently announced the creation of a lending facility to provide liquidity (in the first instance) for pension funds, insurers and LDI funds in times of extreme liquidity stress. This facility has been created as a direct response to various episodes of liquidity stress in market-based finance (US repo market in 2019, the dash for cash in March 2020 and the LDI crisis in the UK in September 2022), along with the assumption that the liquidity risks of NBFIs and their implications for financial stability will continue to increase. The BoE refers to this as a “Grand Bargain”, in which NBFIs must build up increased resilience to major, idiosyncratic liquidity shocks (first line of defence), while central banks develop new instruments to safeguard stability in the event of extreme tail risks. An important argument put forward by the BoE for a direct backstop facility is that asset purchases, as the BoE conducted during the LDI gilt crisis, may distort the perception of the central bank’s monetary policy stance and be counterproductive. When designing the details of the new facility, the BoE will have to strike the right balance so that the facility can forcefully and quickly rectify dysfunctioning markets, but at the same time operate solely as a backstop. In this context, the BoE stresses the importance of further reforms aimed at ex ante resilience of NBFIs.

The Dutch-European context differs from the UK situation in various respects. First, the BoE has a more explicit financial stability mandate than the ECB.¹ Second, the results in this report show that pension funds mainly run into trouble when repo markets fail to function effectively. In that case, system-wide liquidity stress is likely, which could also put pressure on monetary transmission. The ECB has instruments (such as purchase programmes) available for scenarios such as in March 2020 to support the European money market, thereby also indirectly addressing the pension fund problem. Third, it should be emphasised that the situation in the UK during the gilt crisis is unlikely to arise in the Dutch context. Such a rapid rise in risk-free interest rates is difficult to imagine in the eurozone, and it is less likely that Dutch pension funds would get involved in a vicious circle as arose in the UK. Indeed, the role of Dutch pension funds in the European bond market is much smaller than that of UK pension funds in the UK bond market. In addition, Dutch funds hedge less interest rate risk than UK funds, and the supervisory requirements for liquidity are stricter, meaning Dutch funds have larger liquidity buffers. All this reduces the liquidity risk and the likelihood of self-reinforcing effects in the Netherlands.

¹ The BoE has a dual mandate to maintain both price stability and financial stability. The ECB's primary mandate is price stability.

7 Conclusion and recommendations

This study shows that pension funds are able to meet margin calls without a massive sell-off of assets in stress scenarios involving interest rate and currency shocks and a reduced repo market activity. Pension funds face large margin calls in the event of interest rate and currency shocks due to their sizeable derivatives portfolios. The study reveals that pension funds use various sources of liquidity to meet these margin calls, initially using readily available liquidity such as cash, deposits and maturing reverse repos. In addition, they use other liquidity sources such as repo transactions, redemptions from money market funds, and high-quality debt securities as collateral instead of cash. None of the scenarios requires extensive sales of short-term debt securities (or other assets).

However, the results show that pension funds are dependent on assumptions about the functioning of repo markets and money market funds, which may compel them to sell significant amounts assets in extreme scenarios. It is noteworthy that large pension funds depend on the repo market for a significant part of their liquidity needs particularly in worst-case scenarios. In addition, pension funds rely on the availability of liquidity from money market funds. In an extremely bad-weather scenario, pension funds expect to be able to redeem up to 35% of their total position from money market funds on a daily basis, which is more than the daily redemptions from these funds during the worst of the COVID-19 crisis. Although the stress scenarios in this study only involve (partial) restrictions on the repo market, it is likely that other parts of the money market will also be less liquid in times of stress and that pension funds will therefore be unable to meet their liquidity needs through these channels. Moreover, pension funds could indirectly amplify market effects through large money market fund redemptions, as these MMFs

would then have to sell assets in order to meet these redemptions. In extreme scenarios, e.g. when the repo market dries up completely or when money market funds close down, it cannot be ruled out that pension funds will need to sell vast quantities of assets. This can give rise to market effects and procyclicality. Mitigating such systemic risks requires, among other things, a stronger macroprudential framework for NBFIs, including money market funds. This will make the NBFIs sector more resilient in times of stress, while at the same time improving access to liquidity for investors – including Dutch pension funds. For example, improved regulation of money market funds may mean that these funds can meet the needs of exiting investors for longer in times of heightened stress, and be less involved in perpetuating a self-reinforcing spiral.

In addition, liquidity pressure will increase in the coming years due to the decline in the ability to meet margin calls with high-quality debt securities, as often used in stress scenarios, although the new pension contract may ease the pressure on liquidity. The exemption that pension funds had from obligatory central clearing of derivatives has now expired, which means liquidity pressure resulting from margin calls will increase. This will happen only gradually, however, as the clearing obligation applies solely to new transactions. Conversely, the new pension contract may put downward pressure on liquidity needs due to a potential shift from longer to shorter maturities. Hence future liquidity needs are uncertain. It would therefore be relevant to repeat the analysis in this report in a few years once the central clearing obligation has a greater impact on liquidity pressure and the impact of the new pension contract becomes more evident.

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