



Banc Ceannais na hÉireann
Central Bank of Ireland

Eurosystem



Market Based Finance Monitor 2021

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Executive Summary

Market-based finance (MBF) has grown rapidly in recent years and has become a central part of the international financial system.

MBF refers to the raising of debt or equity through financial markets, rather than through the banking system.¹ In Ireland, the main participants in the MBF sector are investment funds, including money market funds (MMFs), and special purpose entities (SPEs).

The MBF sector in Ireland is one of the largest internationally, both in absolute terms and relative to the size of the economy. Irish entities are generally internationally focused, with a diverse set of exposures, both in terms of geography and asset class. Consistent with international patterns, the MBF sector in Ireland has continued to grow rapidly, although not uniformly across entity types and business models. Total assets held by these entities currently stands at around €5.2 trillion.

MBF provides a valuable alternative to bank finance for many businesses and households, supporting economic activity.

Nevertheless, like all sources of financial intermediation, MBF can also contribute to a build-up of financial vulnerabilities, which need to be monitored. Potential sources of financial vulnerabilities include leverage, liquidity mismatches and/or interconnectedness with other parts of the financial system. In times of stress, such financial vulnerabilities could mean that MBF entities act to amplify shocks, with adverse implications for other parts of the financial system or the broader economy.

The aim of this new publication is to monitor – in a systematic way – activities and balance sheet trends in the Irish MBF sector that could point to potential financial vulnerabilities. Given the changing nature of financial intermediation – and Ireland’s role as a financial centre – systematic monitoring of the sector is a core element of the Central Bank of Ireland’s (the Central Bank) approach to safeguarding financial stability. This new publication complements other monitoring reports – to which the Central Bank already

The market based finance sector in Ireland is one of the largest internationally.

Total assets held by these entities currently stands at around €5.2 trillion.

Systematic monitoring of the market based finance sector is a core element of the Central Bank of Ireland’s approach to safeguarding financial stability.

¹ See [Lane and Moloney \(2018\)](#). "Market-based finance: Ireland as a host for international financial intermediation," Central Bank of Ireland, Financial Stability Review No. 22: 63-72.

contributes – by the Financial Stability Board, at a global level, and the European Systemic Risk Board, at a European level.

In that context, over the past year, the most notable trends in the Irish MBF sector include:

- Continued rapid growth in the size of the sector:** Following the market disruption at the onset of the COVID-19 shock in Q1 2020 ([FSR H1 2020](#)), the investment fund sector has continued to experience very strong growth in assets under management (AUM). This is largely due to a strong rise in valuations of financial assets globally, but it also reflects growth in inflows into the sector over the period.
- Some reduction in leverage within investment fund segments that are most highly leveraged:** Within the investment fund sector, three types of funds that appear to have the highest levels of leverage are real estate funds, ‘other’ funds, and hedge funds. Over the past year, there has been some reduction in leverage for these segments. Nevertheless, when compared with the equivalent segments across Europe, these fund types appear to be more leveraged than their European peers.
- Broadly stable levels of liquidity amongst non-MMF investment funds:** Within the investment fund sector, funds holding the largest proportion of less liquid assets are real estate funds, bond funds, hedge funds and ‘other’ funds. Liquidity risk can be managed by the use of liquidity management tools (LMTs) such as temporary suspension of redemptions, redemption gates, swing pricing and anti-dilution measures among others. In addition, real estate funds’ liquidity risks are mitigated somewhat by low redemption frequency. Bond funds are largely daily dealing, whereas hedge and ‘other’ funds have somewhat lower redemption frequencies. Over the past year, there have been no notable trends in the share of less liquid assets in the portfolios of these types of funds.
- An improvement in the liquidity position of MMFs following the COVID-19 shock, which has persisted:** One segment of the fund sector where there has been a sustained

The investment fund sector has continued to experience strong growth in assets under management since the COVID-19 shock.

improvement in liquidity is in MMFs, which have become more liquid following the COVID-19 shock. A greater proportion of MMFs now hold lower-maturity assets and/or more liquid government debt securities than they did just before the onset of the COVID-19 shock.

- **No evidence of an aggregate increase in the riskiness of funds' fixed income exposures, despite the continued low interest rate environment.** That is both in terms of the credit quality of their debt and the average maturity of their fixed income exposures.
- **Within the Irish SPE sector, rapid growth in collateralised loan obligations (CLOs) - mainly due to tax changes in the Netherlands leading to a relocation of these entities to Ireland.** Ireland has historically been the largest domicile for European CLOs. In addition, a Dutch VAT ruling around management fees resulted in €31.4 billion of Dutch CLO assets re-domiciling to Ireland in Q4 2020. This accounted for the majority of the approximately €50 billion growth in the Irish CLO industry in 2020. As at Q2 2021 the CLO sector is valued at €182 billion. In this sector, there is an apparent disconnect between the rating structure of the underlying borrowers following the COVID-19 shock and the pricing/liquidity of the CLOs, which has returned to levels seen before the COVID-19 shock (see Box A for more details).

The Irish collateralised loan obligation (CLO) sector experienced rapid growth over the period.

Over time, the annual MBF Monitor (hereinafter referred to as the Monitor) is likely to evolve, as the Central Bank's approach to analysing developments in the sector deepens. For example, the Central Bank's approach to quantifying leverage and liquidity mismatch may deepen, based on new data, analysis or research. Similarly, given the changing nature of financial intermediation, the Monitor may expand to other activities by non-bank financial intermediaries. Overall, this new publication underscores the Central Bank's commitment to advancing our analysis and research to inform policy discussions and supervision, given the changing financial sector landscape in Ireland and globally.

1. Introduction

MBF has grown rapidly in recent years and has become a central part of the international financial system. MBF usually refers to investment funds (including MMFs), SPEs and other entity types such as holding and treasury companies. In Ireland, these entities are generally outward looking, meaning they have international exposures, investors, or counterparts.

Investment funds (including MMFs) have been a key driver of the growth in MBF over the past decade, both globally and in Ireland. This growing form of financial intermediation provides a valuable alternative to bank finance, supporting economic activity. But, like all forms of financial intermediation, MBF can also contribute to a build-up of financial vulnerabilities. As such, the Central Bank is actively monitoring the MBF sector, including through this new publication.

The aim of the *Monitor* is to track developments in the MBF sector in a systematic manner, with a particular focus on trends that might point to the potential build-up of financial vulnerabilities. The *Monitor* does not intend to cover all the activities that are occurring in the sector in detail or highlight sub-sectors at a very granular level. It is envisaged that the *Monitor* will complement existing, in-depth analytical Central Bank publications, such as *FS Notes or Research Technical Papers*, which give a more detailed analyses of the sector.² The *Monitor* also complements the existing [Financial Stability Review \(FSR\)](#), which as part of its overall domestic focus, looks specifically at the segments of the MBF sector that are linked to the domestic economy.

The *Monitor* focuses primarily on tracking potential sources of financial vulnerability in MBF. There are many risks potentially facing the financial system, and the extent to which a crystallisation of these risks could have an impact on the MBF sector depends on (i) the nature and magnitude of the risks themselves; and (ii) the ability of the sector to absorb – rather than amplify – a crystallisation of those risks. The nature and magnitude of risks is not discussed in this publication. Instead, the *Monitor* focuses on potential financial vulnerabilities in the sector, which would be key determinants of the

Investment funds (including money market funds) have been a key driver of the growth in market based finance.

The Market Based Finance *Monitor* will track developments and potential sources of financial vulnerability in the market based finance sector.

² See [Cima, S., Killeen N. and V. Madouros \(2019\), "Mapping Market-Based Finance in Ireland", Central Bank of Ireland, Financial Stability Note, Vol. 2019, No. 17.](#)

resilience of this form of financial intermediation in times of stress. Specifically, consistent with the approach taken by financial stability authorities globally, the *Monitor* focuses on the following sources of financial vulnerability:

- **Liquidity transformation:** This can occur when open-ended funds or other entities invest in less liquid assets, but allow their investors the opportunity to redeem their shares at a higher frequency or have short-dated debt liabilities;
- **Leverage:** Leverage in investment funds or other entities can amplify shocks in times of stress, leading to asset sales over a short period of time, with adverse implications for financial market functioning;
- **Interconnectedness:** Financial system interconnectedness arises through the many complex transactions and relationships between institutions, and can act as propagation mechanism of adverse shocks.³

The remainder of this publication is structured as follows: Section 2 provides a short overview of the MBF sector in Ireland. Section 3 focuses on the investment fund sector and in particular on trends in leverage, liquidity mismatch and asset holdings of debt instruments (by maturity, ratings and geographical location) by fund sector subtype over the past year. Section 4 looks at SPEs, which are set up to raise funding through public or private debt markets, and then usually to lend or invest that funding on to a number of activities or assets. The *Monitor* also includes two boxes that explore two areas in more depth: Box A looks at Irish-resident CLOs trends in 2020 and Box B outlines the liquidity risk metric for investment funds employed in this publication.

Like all forms of financial intermediation, market based finance can contribute to a build-up of financial vulnerabilities such as liquidity transformation, leverage and /or interconnectedness with other parts of the financial system.

³ See [Hallissey N. \(2016\) 'Interconnectedness of the Irish banking sector with the global financial system' Quarterly Bulletin 01 January.](#)

2. Overview of the MBF sector in Ireland

The MBF sector is many times the size of the Irish economy and ranks among the largest of such sectors internationally, with growth having continued over the past year. At the end of 2020, Irish MBF assets stood at around 23 times the modified Gross National Income (GNI*) (Chart 1), further signalling Ireland’s role as a small, open economy with a large, internationally-focused financial system. The Irish MBF sector has undergone particularly strong growth in recent years, both in terms of the number of active entities and the total value of their assets.⁴ The number of MBF entities increased from 5,940 in June 2016 to 8,597 in June 2021 (Chart 2), while the value of assets increased from roughly €3 trillion to €5.2 trillion in the same timeframe (Chart 3). Growth continued in the year to mid-2021, and was particularly pronounced in terms of total assets. This can be largely traced to the strong performance of securities markets across the globe during the same timeframe, although it also reflects a growth in underlying activity.⁵

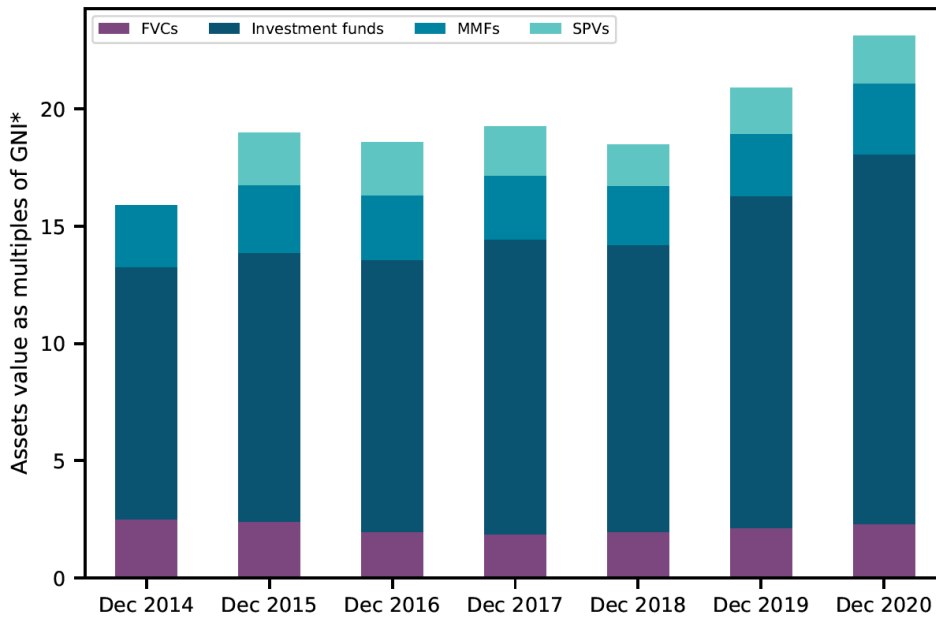
In Ireland, the number of market based finance entities increased from 5,940 in June 2016 to 8,597 in June 2021 while asset values increased from approximately €3 trillion to €5.2 trillion in the same timeframe.

⁴ FSB (2019) which shows that Ireland is the sixth largest jurisdiction based on the narrow measure of non-bank financial intermediation.

⁵ It is difficult to disentangle inflows from assets valuation in the rise of MBF assets. But market evidence indicates significant rises in valuations. In the year up to June 2021 Irish equity investment funds increased their assets on average by 48%, while the US equity market (S&P 500) appreciated 42%, the EU’s EuroStoxx 50 gained 28% and the UK’s FTSE 100 increased by 16%. It should be noted, that the US is the largest region of exposure for Irish MBF entities, particularly equity funds.

Chart 1: The MBF sector represents increasing multiples of the Irish economy (~23 times GNI*)

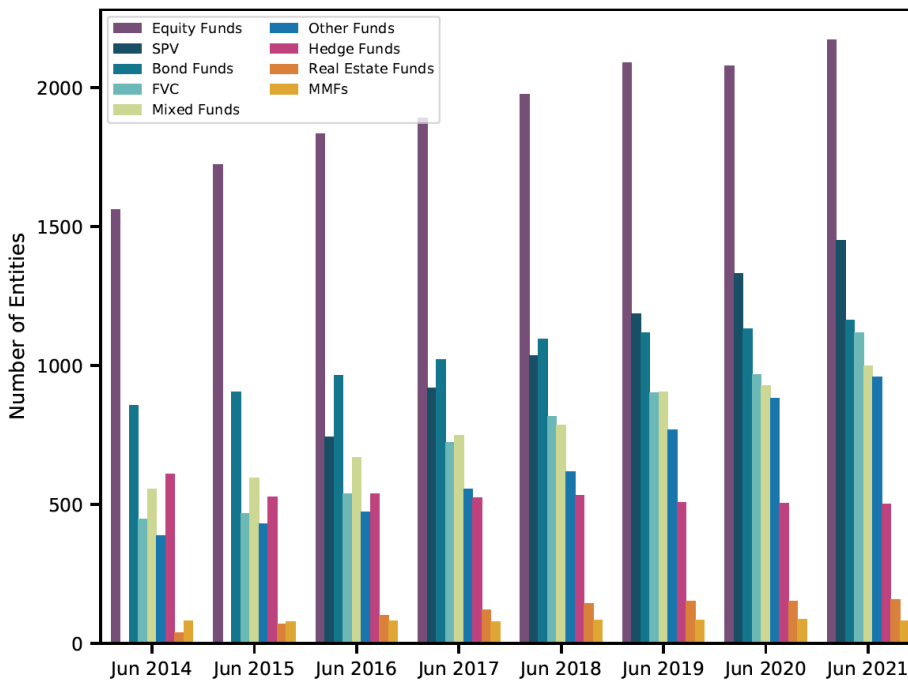
Total MBF entities' assets as a multiple of GNI* by type of entity



Source: Central Bank of Ireland, Central Statistics Office.

Chart 2: The number of MBF entities in Ireland is increasing, especially SPEs

Number of Irish MBF entities by type of entity

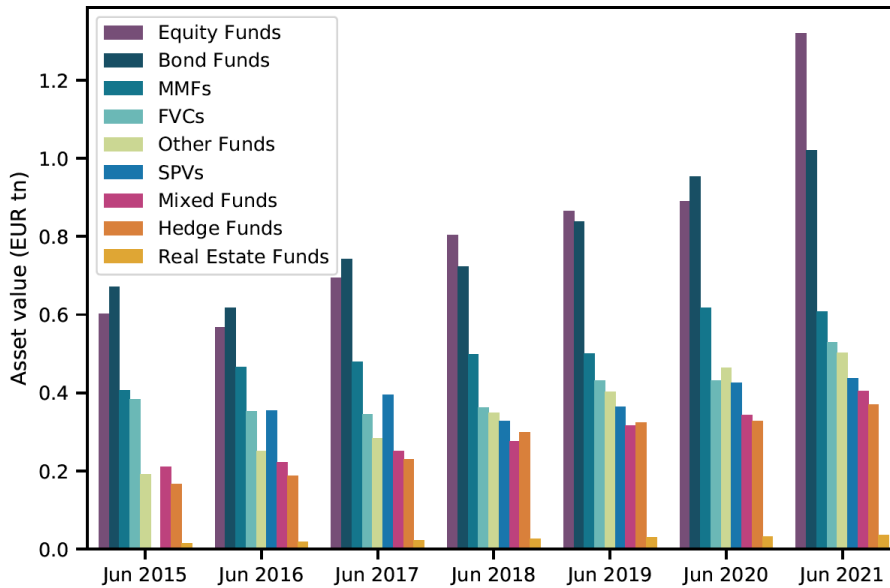


Source: Central Bank of Ireland.

Notes: SPE comprise Financial Vehicle Corporations and from Q3 2015 other SPEs.

Chart 3: Assets held by MBF entities are also rapidly increasing, particularly in equity investment funds

Total MBF entities' assets by type of entity



Source: Central Bank of Ireland.

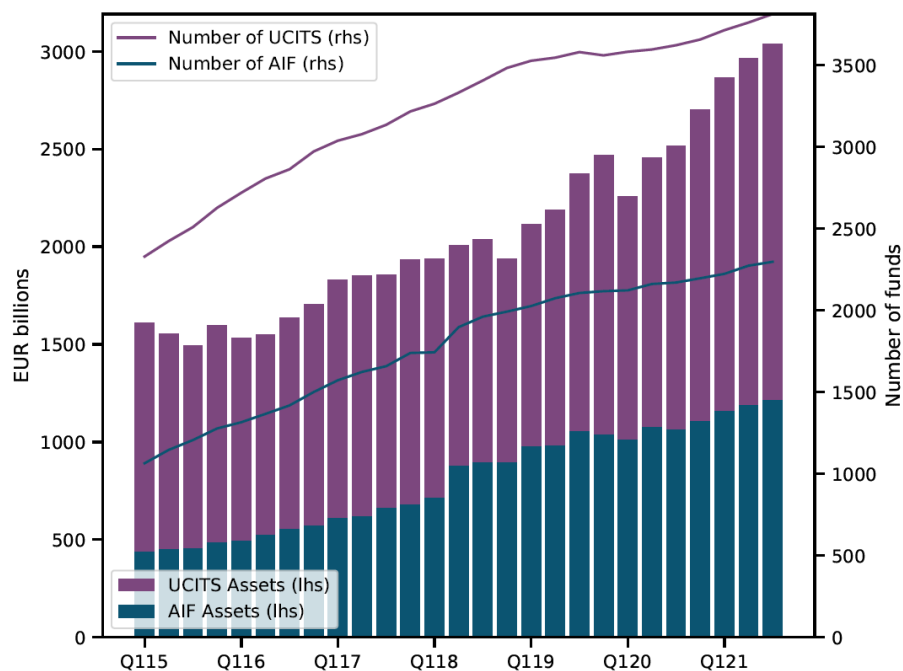
Notes: MMFs – Money Market Funds, FVCs – Financial Vehicle Corporations, SPVs – Special Purpose Vehicles.

There are two main entity types within the Irish MBF sector – investment funds (including MMFs) and SPEs. Funds and SPEs have very different business models and there is significant variance in business models even within each type. For example, funds are mainly financed through daily-dealing equity, while SPEs are financed through debt that is rarely, or not at all, traded and is usually held to maturity by investors. Funds are subject to a range of regulations, directives and guidelines depending on their business models (e.g. UCITS, MMFR and AIFMD etc.), including supervisory controls and processes. About 70 per cent of the investment funds sectors' assets are held in UCITS funds (Undertakings for Collective Investment in Transferable Securities), which are aimed at retail investors. The remaining 30 per cent are in AIFs (Alternative Investment Funds), more commonly designed for qualified or professional investors.

Investment funds and special purpose entities are the main entity types within the Irish market based finance sector.

Chart 4: Growth of total assets and number of UCITS and AIF Investment Funds

Total assets and number of UCITS and AIF Investment Funds



Source: Central Bank of Ireland.

SPEs have some touch points with the Central Bank depending on their activities (e.g. EMIR, the Prospectus Directive etc.). However, they are not authorised by the Central Bank and do not fall within the supervisory parameter of the Central Bank at an entity level.⁶ The vehicles themselves are quite diverse in terms of categorisation ([Special Purpose Entities Statistics Q2 2021](#)). Thus, the two groups play a very different role in the financial system and require separate monitoring and analysis from a financial stability perspective.

Within the broad category of MBF, the entities are largely outward-looking, with diverse exposures across sectors (Chart 5 and 6). This degree of diversification acts to some extent as a mitigant to the impact of potential shocks on the sector. Exposure to the US market rose by around 15 per cent to €1.5 trillion year on year (YoY) to June 2021, while during the same period exposure to the UK grew by 10 per cent to €964 billion. Exposure to other European countries and to the ‘Rest of the World’ increased by 15 per cent to €1 trillion and 26 per cent to €1.1 trillion respectively.⁷ Exposures to non-financial corporations’ (NFCs) assets and insurance companies and pension

Irish market based finance entities are largely outward looking.

⁶ SPEs are subject to the [Companies Act 2014](#).

⁷ In our geographical categorisation of funds’ exposures, ‘Rest of the World’ refers to countries that are not Ireland, the UK, the US and that are not in the EU.

funds' (ICPFs) assets increased significantly by 35 per cent to €1.8 trillion and by 20 per cent to €63 billion respectively YoY to June 2021. This increase came mostly via investment-grade corporate bonds. Exposures of funds to bank-related assets increased by 8 per cent YoY to €980 billion in June 2021, strengthening the interconnectedness between the two sectors. Holdings of highly-rated government bonds increased significantly, in line with the surge in primary market activity.

The sector's exposure to Ireland is dominated by activity between financial institutions with the main links to the domestic economy relating to the property sector.⁸ The sector's exposure to entities based in Ireland increased by 14 per cent YoY to €570 billion in June 2021. Nevertheless, the size of these exposures is *not* a good indicator of the links between MBF and the domestic economy. The vast majority of the reported links to Ireland are in fact to other Irish domiciled MBF entities, where the underlying assets and investors are often international. Specifically, €404 billion of such total domestic exposure is attributable to investments in other investment funds and MMFs. This domestic exposure is up 16 per cent YoY. Despite being Irish-resident, these entities almost exclusively have international investment holdings and investor bases. €77 billion is attributable to NFCs, which are dominated by exposures to large international NFCs domiciled in Ireland. These NFC exposures are up 13 per cent YoY. €28 billion is attributable to domestic and international banks resident in Ireland, which are up 8 per cent YoY and €13 billion is attributable to government agencies which is up 74 per cent YoY.⁹ The most significant direct link to the domestic economy is via Irish property funds as they hold a total of €23 billion in Irish property and land or over 40 per cent of the estimated 'investable' Irish commercial real estate (CRE) market (Chart 5). Recent monitoring of non-bank lending has also noted its increasing importance as a source of financing for Irish small and medium sized enterprises ([Heffernan et al., 2021](#)), particularly in the real estate and construction sectors. It should be noted that non-bank lenders are

The sector's most significant direct link to the domestic economy is via Irish property funds as they hold a total of €23bn in Irish property and land.

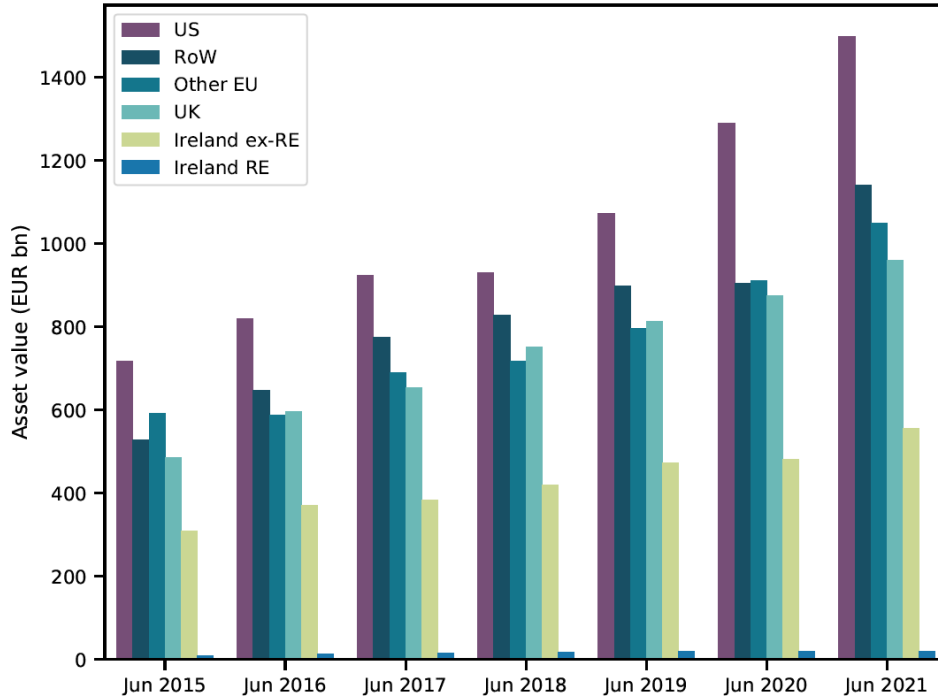
⁸ The Central Bank recently published a [Consultation Paper](#) on a proposal to introduce macroprudential limits on leverage and provide Guidance to limit liquidity mismatch for Irish-authorized property funds.

⁹ €10 billion of these exposures are held by Irish SPEs, while €18 billion are held by Irish investment funds. Irish SPEs also hold around €40 billion in securitised loans originated by Irish banks.

specialist lending and finance companies rather than investment funds. Further assessment of links to the Irish economy are discussed in the [FSR](#).

Chart 5: The Irish MBF sector is increasingly internationally exposed

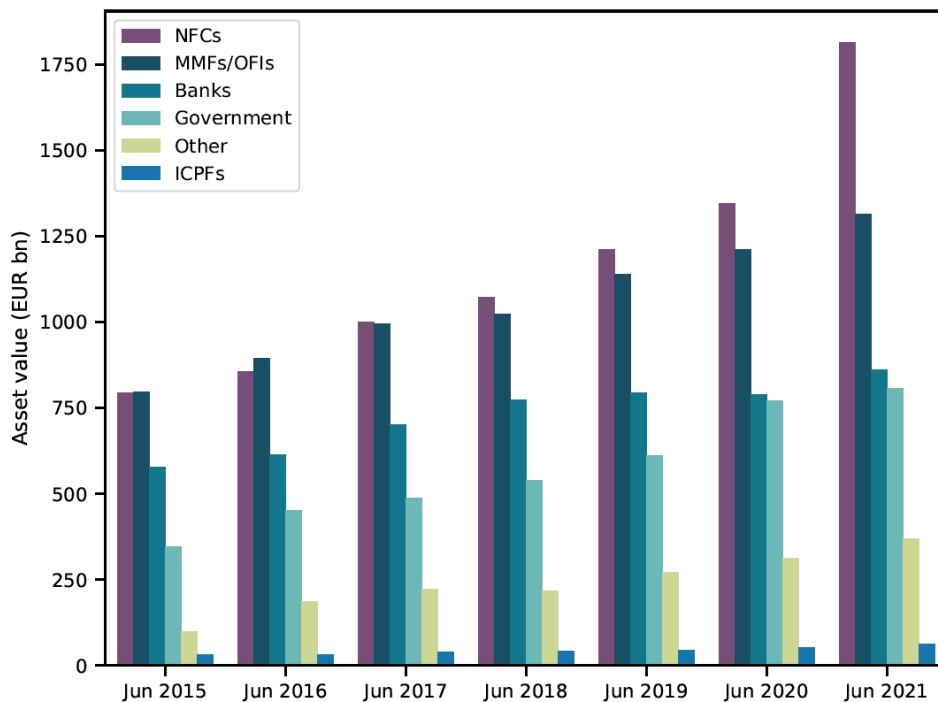
Total MBF entities' assets by region of exposure



Source: Central Bank of Ireland. Ireland RE denotes Irish real estate assets. Ireland ex-RE means all other Irish assets.

Chart 6: MBF exposures are fairly balanced across sectors, with a recent increase in corporate and government assets

Total MBF entities' assets by sector of exposure

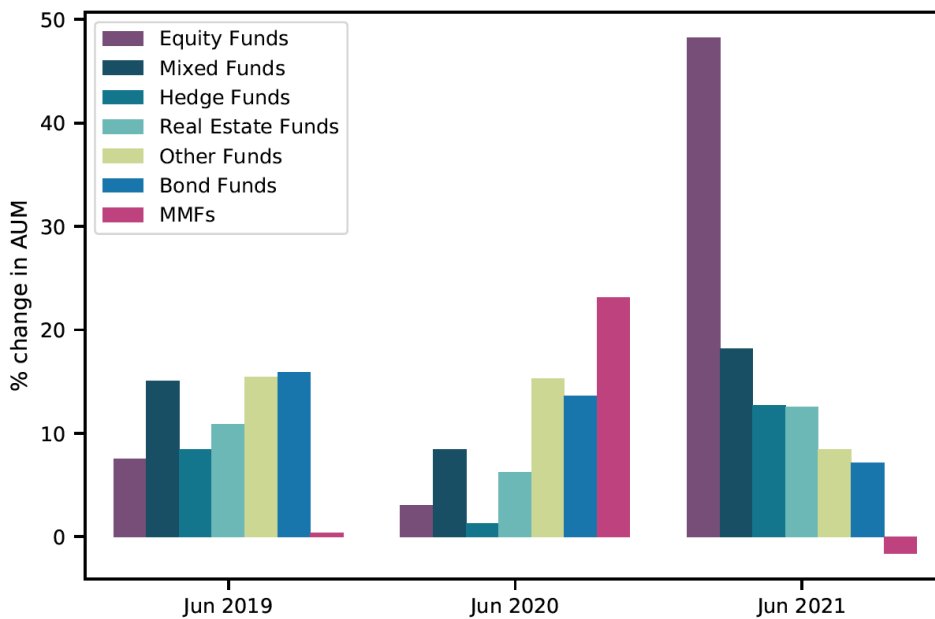


Source: Central Bank of Ireland.

3. Recent trends in the investment funds sector in Ireland

Rising global asset valuations increased the value of AUM of investment funds. The valuation of total AUM of Irish investment funds increased by 21 per cent YoY as of Q2 2021. The increase in values is mainly linked to a stark appreciation of global assets during the year. While the growth in AUM was widespread across fund types, there was significant variation between them. The growth in AUM ranges from 48 per cent for equity funds to broadly unchanged for MMFs (Chart 7). Also of note is the continued growth in exchange traded funds (ETFs), which tend to be mainly – but not exclusively – equity funds. These grew in significance to around 16 per cent of all funds’ assets, from less than 9 per cent five years ago.

Chart 7: Annual percentage changes in AUM by fund category
 Percentage changes in AUM



Source: Central Bank of Ireland.

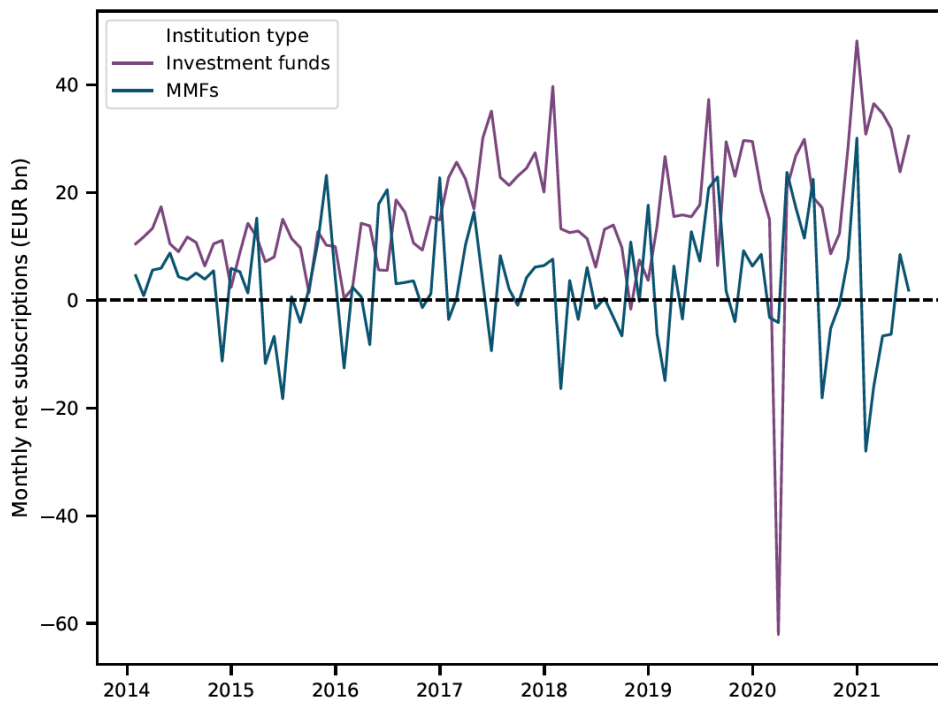
In aggregate, net inflows into investment funds recovered strongly after the early COVID-19 market disruption in Q1 2020. The severe market disruption in March 2020 was associated with some very large redemptions from the investment fund sector (Chart 8). Since then however, flows into investment funds have strengthened significantly. In the year to June 2021, a cumulative €275 billion of inflows was observed in the investment fund sector.

Net inflows into the investment fund sector recovered strongly after the COVID-19 shock.

The pattern of flows across the investment fund sector over the past year is consistent with increased risk appetite amongst investors. In absolute terms, cumulative net inflows into equity funds between June 2020 and June 2021 totalled €137 billion, accounting for around 50 per cent of total inflows into the sector over the period. Relative to starting AUM, cumulative net inflows have been highest for ‘other’ funds, real estate funds and equity funds, pointing to increased risk appetite amongst investors over the past year (Chart 9). Specifically in relation to ‘other’ funds, this increase in net flows may be due to some investors’ preferences for alternative investment strategies, given that a significant number of these new funds are linked to private equity or Liability-Driven Investments (LDI).

Chart 8: Irish investment funds and MMFs have proven to be broadly resilient to the COVID-19 shock in terms of redemptions

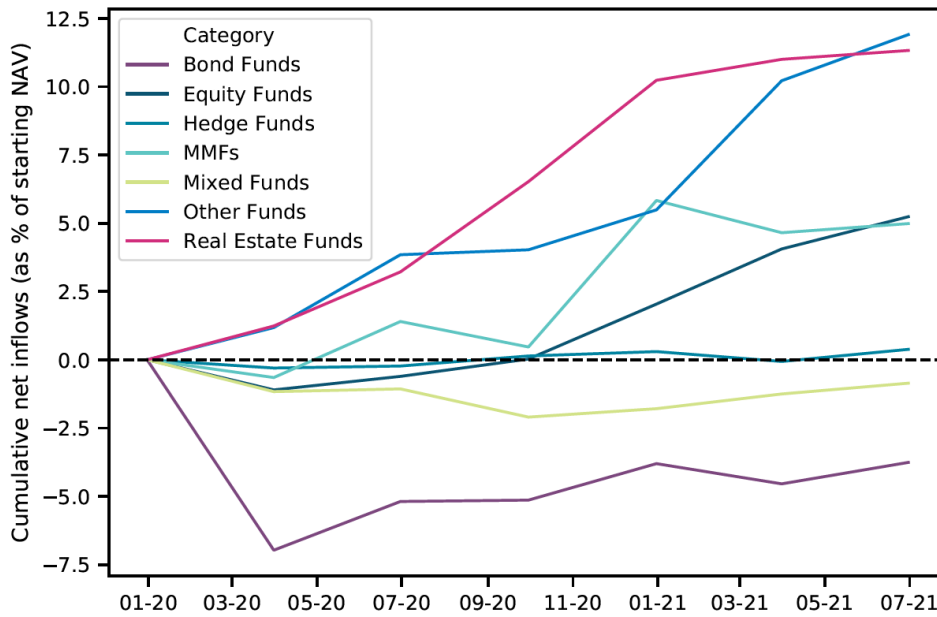
Net subscriptions to Irish IFs and MMFs



Source: Central Bank of Ireland.

Chart 9: Cumulative net flows into Irish investment funds as a share of starting AUMs

Net flows into investment funds domiciled in Ireland as a share of AUMs



Source: Central Bank of Ireland.

Notes: Net flows are calculated as subscriptions to the fund less redemptions from the fund.

3.1 Leverage in investment funds

Leverage in investment funds can be a source of financial vulnerability, as rapid deleveraging in response to adverse shocks can give rise to spill-overs across the financial system. For example, in periods of stress, when asset prices fall, investment funds may either seek to keep their leverage at a target level by selling assets, or be forced to do so by creditors. This may lead to forced sales of assets – known as *fire sales* – and a withdrawal of funding from other systemically important sectors (e.g. banks). This could impair the functioning of key markets, with ultimate implications for the real economy via wealth and investment effects or through the cost and availability of financing.

Challenges in measuring investment fund leverage remain. For example, the leverage metric employed in this section focuses on conventional leverage (on-balance sheet debt relative to equity). This is what is referred to when speaking of simple measures of leverage. In practice, investment funds also take on leveraged positions through the use of derivatives and securities financing transactions

Investment funds with high levels of leverage could be forced to sell assets over a short period of time in the event of adverse shocks.

(SFTs). This is known as synthetic leverage.¹⁰ Therefore, simple metrics of leverage may not always provide the full picture of trends in the sector. Further work is required to measure and monitor developments in leverage and synthetic leverage in a more comprehensive manner.

There are significant differences in leverage levels across different fund types, with Irish real estate funds being the most highly leveraged fund type in Ireland. The value of debt for real estate funds is around 79 per cent of equity (Chart 10).¹¹ Real estate funds with high levels of leverage are more vulnerable to CRE price falls and pose both direct risks to the providers of debt finance to funds (which include Irish banks) as well as indirect risks to the market if it were to trigger a collective selling behaviour by funds. ‘Other’ funds and hedge funds also have significant amounts of leverage (at around 57 and 30 per cent respectively). Leverage in ‘other’ funds is primarily driven by the size of LDI funds, which make up the majority of the assets held by these funds. LDI funds seek to replicate the pay-out profile of the liability exposures of pension funds by investing in government debt with different maturities. The LDI sector engages in leverage via derivatives and securities financing transactions (SFTs). Hedge funds have a particularly wide distribution of leverage, however the measure used does not capture fully the total level of leverage in these funds, as synthetic leverage is not being captured.

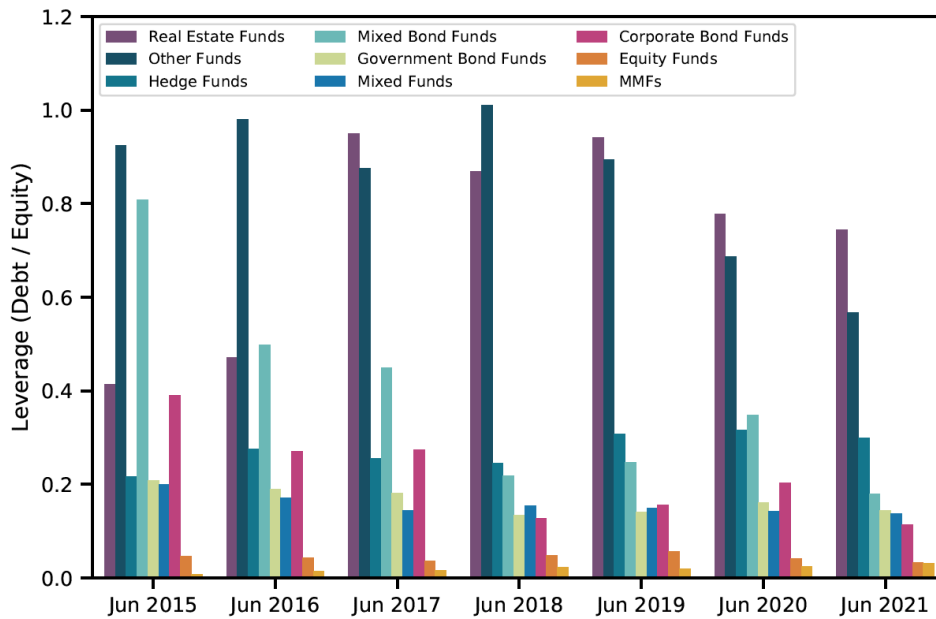
Irish real estate funds are the most highly leverage fund type in Ireland making them vulnerable to commercial real estate price falls.

¹⁰ See [ECB \(2017\) Financial Stability Report, Box 7: Synthetic leverage in the investment fund sector, May](#).

¹¹ 79 per cent refers to the value for funds that hold real property assets. If looking solely at funds that hold Irish real property assets, leverage amounts to 92 per cent (as in the recent Central Bank of Ireland Consultation Paper 145 [Macroprudential Measures for the Property Fund Sector](#)). Also in Figure 2 below, in order to compare with European data, we include all funds that self-identify as real estate funds that includes those that hold real estate equity as well. Leverage is calculated using the broader sample of real estate funds. Leverage calculated as debt over equity is defined as [(assets / equity) - 1] or [debt / equity].

Chart 10: Leverage across different types of Irish investment funds

Leverage across Irish IFs and MMFs



Source: Central Bank of Ireland.

Amongst the most leveraged fund types in Ireland, there has been a slight reduction in leverage levels over the past year. For example, the average levels of leverage across real estate, ‘other’ funds and hedge funds have fallen somewhat over the past year (Chart 10). There has also been a reduction in the levels of leverage at the upper end of the distribution for those fund types (see Annex Figure 1). For funds with investments in financial assets, to some extent, this may be due to rising asset valuations in global markets, not accompanied by a proportionate increase in levels of borrowing.

Looking across EU funds, some categories of Irish funds tend to be on the upper end of the distribution of leverage levels. Irish investment funds are on average more highly leveraged than their EU counterparts (see Annex Figure 2). This may be due to differences in business models or regulation, with further analysis required to understand fully the cross-European dispersion.¹² And, of course, while the relative position is a useful indicator, it does not – in and of itself – provide an assessment of the riskiness of levels of leverage in an absolute sense.

¹² For example, Ireland has a higher share of Liability Driven Investment (LDI) funds and hedge funds than other EU countries. These funds have business models dependent on using leverage.

Irish investment funds are on average more highly leveraged than their European counterparts.

3.2 Liquidity mismatch in investment funds

Liquidity mismatch exists when open-ended funds have liquid liabilities (e.g. allow investors to redeem their shares at a high frequency), but invest in less liquid assets. In times of stress, investment funds may face large redemption requests that force them to sell assets quickly and at a discount to market prices. These forced sales or fire sales may lead to a withdrawal of funding from other systemically important sectors (e.g. banks) and may impair the functioning of key markets. This can, in turn, impact the real economy in many ways. For example through wealth and investment effects or through the availability and cost of finance etc.

Investment funds have a range of LMTs at their disposal that they can use to manage liquidity risk. Some of the most common LMTs that may be available to fund managers include:

- **Anti-dilution levies:** An investment fund may levy a charge on investors subscribing or redeeming to offset costs of buying or selling assets. In the case of anti-dilution levies, the dealing costs adjustment takes place separately from the NAV (net asset value).
- **Swing pricing:** Swing pricing is a technique to address dilution and involves adjusting an investment fund's NAV in order to pass on the costs involved to those that are subscribing or redeeming in or out of the investment fund. In the case of swing pricing, the dealing cost adjustment takes place within the NAV.
- **Redemption gates:** used by fund managers to slow down the rate of redemptions to allow assets to be realised in a more timely and controlled manner.
- **Temporary suspension of redemptions:** where the investors in the fund are temporarily unable to redeem the capital they invested in the fund.

Liquidity is the ease with which an asset or group of assets can be converted to cash with little impact on their value. The liquidity of an asset can change over time, is difficult to measure and is impossible to predict with accuracy in all situations. In fact, an asset that is liquid in good times might become illiquid during crises, depending on the nature of the shock. Nonetheless, there are some

Investment funds have a range of liquidity management tools at their disposal to mitigate liquidity mismatch.

asset types – historically at least – that have proven to be more resilient in terms of liquidity than others. Box B sets out the approach to measuring liquidity for the funds sector in this analysis and how this compares with other measures used internationally.

Real estate funds have the largest share of investments in less liquid assets of all fund types, but liquidity mismatch is mitigated somewhat by the redemption profile and use of LMTs. Among Irish investment funds, real estate funds hold the largest share of their investments in less liquid assets (Chart 11). This share has been broadly constant over the past year. Property, of course, is more illiquid than the majority of the assets that funds invest in. It is a real (rather than financial) asset and it typically takes several months to sell property. Nevertheless, for real estate funds, vulnerabilities from liquidity mismatch are mitigated somewhat by a much less frequent redemption profile (Chart 12).

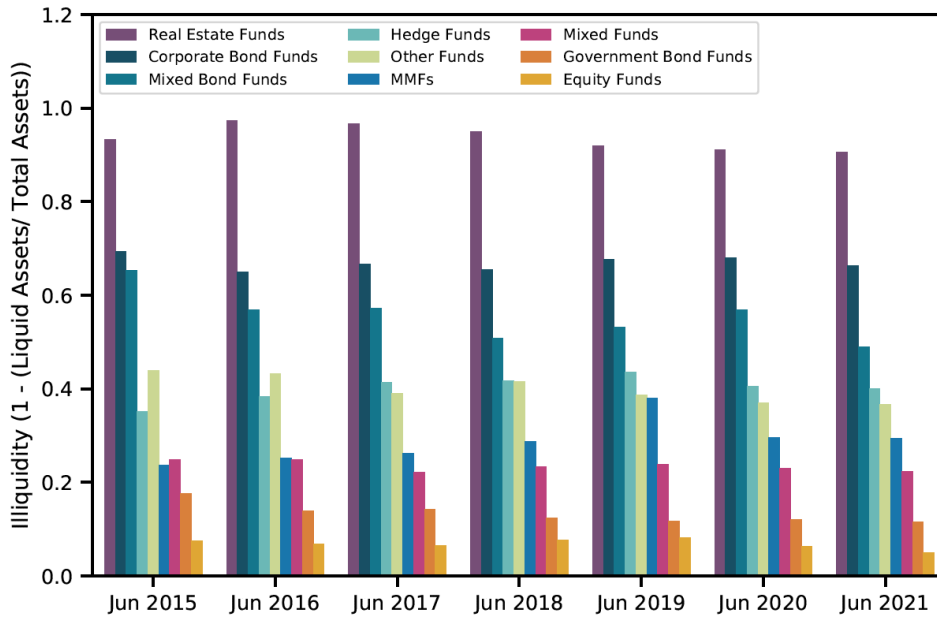
Bond funds – and, within that, corporate bond funds in particular – emerge as most vulnerable to liquidity mismatches. Corporate bond funds hold the second largest share of their investments in less liquid assets (Chart 11). Of course, corporate bonds are much more liquid than property, given that they are traded financial instruments. Still, corporate bonds are typically less liquid than government bonds or equities and are also more prone to bouts of illiquidity. For example, corporate bonds saw a sharp deterioration in market liquidity at the onset of the COVID-19 shock, with bid-ask spreads of euro-denominated, high-yield corporate bonds spiking to levels close to those observed during the global financial crisis (GFC). At the same time, the vast majority of corporate bond funds are daily dealing, pointing to a greater vulnerability from liquidity mismatches. Over the past year, there has been little change in the share of less liquid asset holdings across corporate bond funds (Chart 11). This is despite the fact that these experienced very large redemptions during the COVID-19 shock and faced challenges with liquidity management.

Real estate funds hold the largest share of illiquid assets.

Liquidity mismatch in real estate funds is somewhat mitigated by low redemption frequencies.

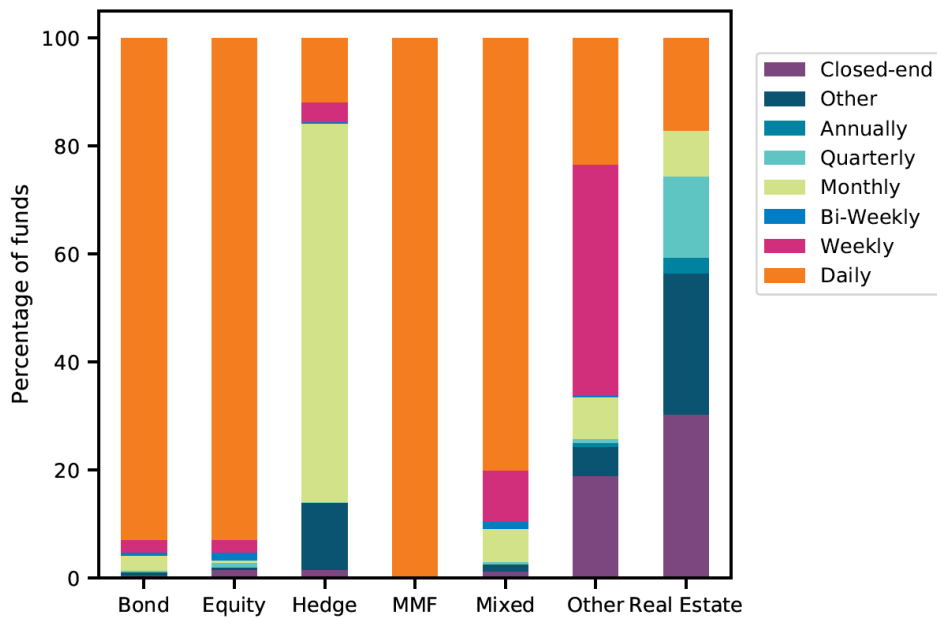
Corporate bond funds are particularly vulnerable to liquidity mismatch. At the onset of the COVID-19 shock, corporate bonds saw a sharp deterioration in market liquidity.

Chart 11: Holdings of less liquid assets across different types of Irish investment funds
 Holdings of less liquid assets, as a % of total assets



Source: Central Bank of Ireland.

Chart 12: Dealing frequency across different types of Irish investment funds
 Asset-weighted percentage of funds by dealing frequency



Source: Central Bank of Ireland.

Notes: Real Estate funds as defined by the European legislation includes investment funds investing in real estate related equities rather than real estate directly. Funds with direct investments in real estate are not daily dealing.

To complement the liquidity indicator of Irish corporate bond funds, an analysis of the structure of both the liquid and less liquid assets of these funds can help shed light on the potential market impacts in case of redemptions shocks. Understanding what type of

assets funds that are subject to liquidity mismatch hold, can shed light on the markets that may be affected if those funds were to face large redemptions.¹³ Corporate bond funds' liquid assets consist roughly of 50 per cent bank debt and 25 per cent each of government debt and equities. The composition of liquid assets is different for the 10 per cent most illiquid corporate bond funds: their liquid assets consist of more equity, and less of the other two categories than is the case for all corporate bond funds. In terms of the structure of corporate bond funds' less liquid assets, they consist of around 80 per cent debt securities, almost half of which is issued in the US, and over 40 per cent of which is issued by non-financial corporations.

Irish bond funds, real estate funds and hedge funds have a higher share of less liquid assets than their EU counterparts, but in other fund segments holdings of less liquid assets are similar to EU counterparts (see Annex Figure 4). A full comparison of liquidity mismatch in funds across Europe is not possible, as there is no equivalent information around redemption profiles. Nevertheless, the larger share of less liquid asset holdings for bonds funds in particular, which also have a daily-dealing structure, would be suggestive of vulnerability to liquidity stresses in some segments of the bond fund sector. This may partly explain some of the redemption volatility seen during the COVID-19 shock, as investors would be incentivised to firstly dispose of holdings in funds with less liquid portfolios (see Annex Figure 3).

In contrast to other investment funds, MMFs have become more liquid since the COVID-19 shock.¹⁴ MMFs are typically used by investors for cash management purposes and are active players in short-term funding markets. In March 2020, as the COVID-19 crisis began to unfold, some Irish MMFs saw a substantial increase in redemptions and a deterioration in the liquidity of their assets. This trend was similar to other MMFs globally. Since the COVID-19 crisis, the liquidity position of MMFs has improved, a trend that has persisted. For example, the maturity of the instruments held by Irish-resident MMFs remains shorter than it was in February 2020 (Chart 13) and there has been an increase in holdings of public debt (Chart 14). The main investors in Irish MMFs are Other Financial

Since the COVID-19 shock, the liquidity position of money market funds has improved.

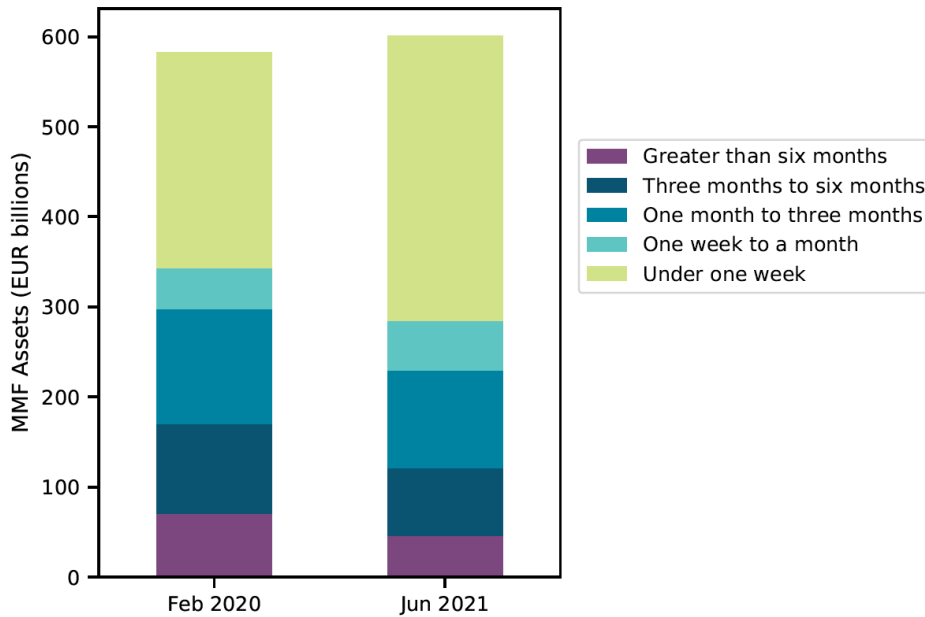
¹³ Please see [the section on the definition of liquid assets](#).

¹⁴ See FSB (2021) '[Policy proposals to enhance money market fund resilience](#)'

Institutions (OFIs) as well as NFCs.¹⁵ OFIs invest in MMFs to meet their own liquidity management needs, while NFCs use MMFs for short-term cash management purposes. So MMFs are highly interconnected with other parts of the financial system, both on the asset and the liability side.

Chart 13: The maturity of assets held by MMFs remains shorter than just before the onset of the COVID-19 shock

MMF asset holdings by residual maturity

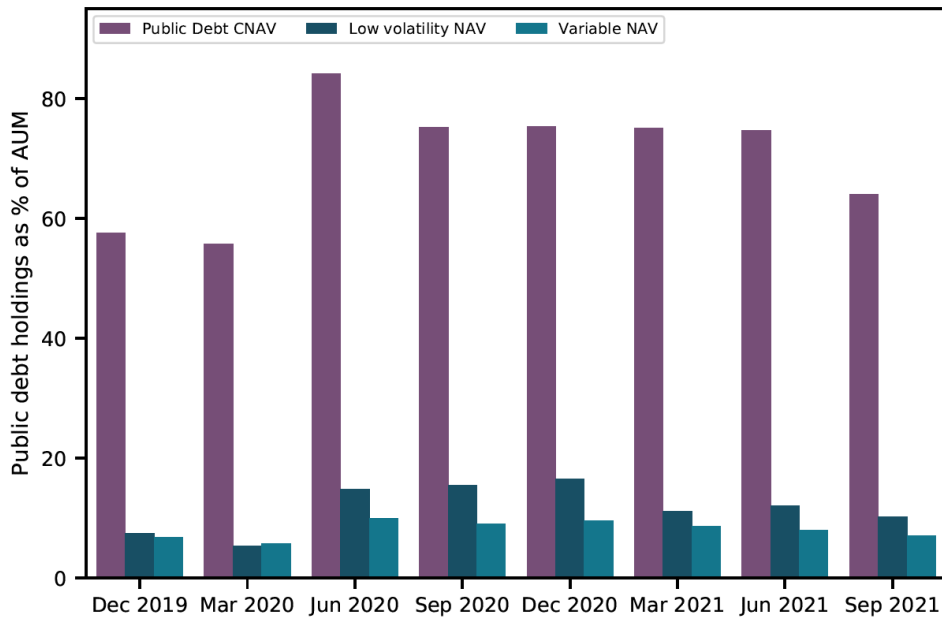


Source: Central Bank of Ireland.

¹⁵ OFIs are essentially institutional investors other than deposit taking corporations.

Chart 14: There has been an increase in MMFs holdings of public sector debt securities relative to the period before the COVID-19 shock

Public debt holdings as percentage of total AUM



Source: Central Bank of Ireland.

3.3 Characteristics of asset holdings of debt instruments

Trends in the credit quality of debt holdings by investment funds are a useful indicator of risk taking. From a financial stability perspective, holdings of securities with lower credit ratings may be more susceptible to shocks and also to propagating them. In case of market volatility, investors may be compelled to unwind their riskiest exposures first, for instance in investment funds holding lower-rated securities. Fund managers also may decide to sell their riskier holdings. This de-risk selling activity can result in feedback loops in the price of such lower-rated securities (can lead to further falls in the price). These dynamics can also affect the liquidity of such instruments in times of stress.

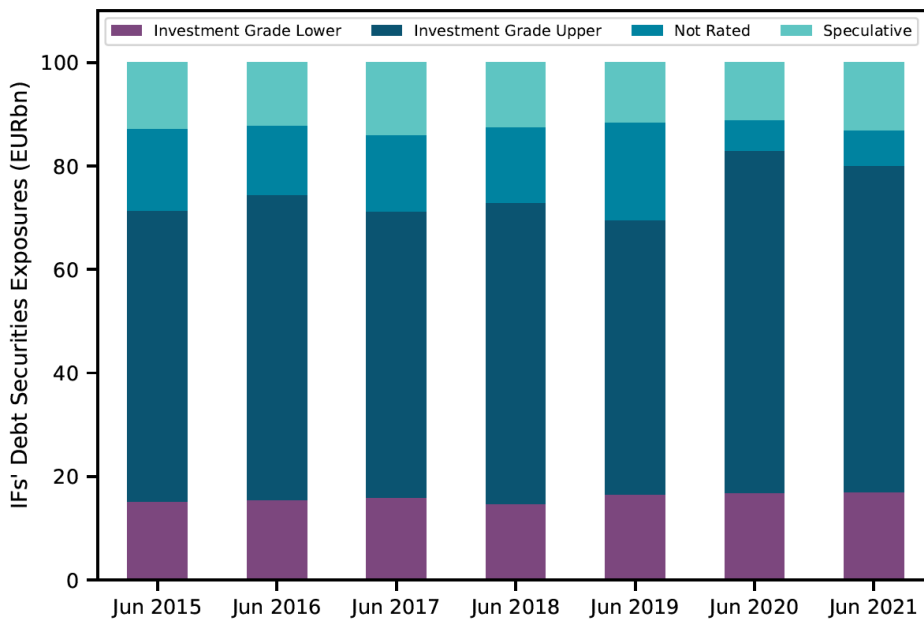
There has been no evident deterioration in the composition of Irish-based investment funds' debt holdings in recent years (Chart 14). In fact, relative to total debt securities held by Irish funds, holdings of upper investment-grade bonds increased from 53 per cent of debt securities in June 2019 to 63 per cent in June 2021, compared to a more modest increase in holdings of lower investment-grade debt

From a financial stability perspective, holdings of securities with lower credit ratings may be more susceptible to shocks.

(Chart 15).^{16,17,18} It should be noted that such a relative increase in upper investment-grade bond holdings can be partially explained by more debt holdings having an assigned rating, particularly between 2019 and 2020. Debt securities reported with no rating fell from 20 per cent of total debt securities to 7 per cent during that period. These could be securities with either no rating or with a rating not reported by the fund. Within the universe of investment funds, MMFs and ‘other’ funds hold more than 90 per cent of their debt securities in upper investment-grade instruments. Mixed funds hold over 65 per cent in upper investment-grade instruments, while bond and hedge funds both hold around 42 per cent. Bond and hedge funds have the largest shares of speculative instruments in their debt holdings at 21 and 18 per cent respectively.

Chart 15: Investment funds seem to have rotated their exposures into better rated bonds

Irish investment funds’ debt securities exposures by rating



Source: Central Bank of Ireland.

Notes: The increase in corporate debt funds’ assets between 2019 and 2020 is mostly to be ascribed to a large fraction of unrated securities becoming rated, mostly investment-grade. This is purely an effect of better reporting practices and should be viewed in that light.

¹⁶ Higher investment-grade bonds are those rated Aaa to A2 from Moody’s, or AAA to A from Standard & Poor’s.

¹⁷ Lower investment-grade bonds rated A3 to Baa3 from Moody’s, or BBB+ to BBB- from Standard & Poor’s.

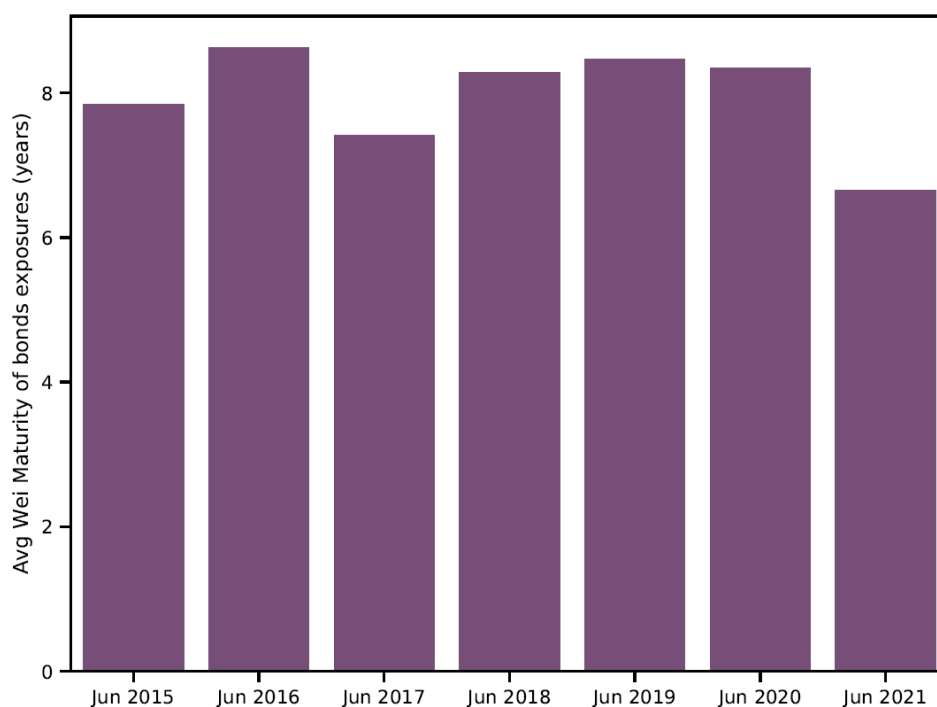
¹⁸ The increase in corporate debt funds’ assets between 2019 and 2020 is mostly to be ascribed to a large fraction of unrated securities becoming rated, mostly investment-grade. This is purely an effect of better reporting practices and should be viewed in that light.

The weighted average residual maturity of debt holdings has decreased over the last year. The weighted average maturity of debt instruments among Irish-based investment funds has been relatively constant since 2015 at around 7-8 years. However, over the last year, it has decreased to just above 6 years (Chart 16). It can be useful to look deeper into the maturities of holdings of Irish funds, in order to ascertain the structure of this change. In fact over one third of these exposures have a maturity lower than one year and one third have a maturity higher than 10 years. The share of short-term securities has been decreasing slightly over recent years, from 46 per cent at the end of 2014 to 33 per cent at the end of 2020. Overall, despite the low level interest rates environment and general search for yield dynamics, the maturity of bond holdings has not materially shifted toward longer-maturity bonds.

The weighted average maturity of debt instruments in Irish investment funds has decreased from between 7-8 years since 2015 to approximately 6 years in 2021.

Chart 16: Investment funds also seem to have reduced the average maturity of their bond exposures

Irish investment funds' average maturity of bond exposures



Source: Central Bank of Ireland.

There is significant heterogeneity across fund types with respect to the maturity of debt instruments. MMFs generally hold very short term debt instruments. Bond funds have debt instruments with a weighted average maturity of around 10 years. For mixed and 'other' funds the weighted average maturity stands at 14 and 22 years respectively. This can be explained by varying business models, investor types and regulation. For example, investors in MMFs are generally looking for cash-like instruments and MMFs themselves are subject to specific regulation (the MMFR). Other investment funds are subject to other regulations (such as UCITS or AIFMD) and have different business models. For example some funds are designed specifically for certain types of investors (retail v institutional) with varying objectives (capital growth v income generating), risk profiles (speculative v longer term investment) and timeframes.

Geographic exposures of funds can also shed light on potential vulnerability to shocks. Financial shocks can be specific to a particular region. The structure of Irish investment funds' corporate debt assets is a useful indicator of interconnectedness with specific

regions. For instance, almost 40 per cent of upper investment-grade debt holdings of Irish funds consist of securities issued in the UK and approximately one quarter relates to securities issued in the US and the EU. For speculative debt securities, the main exposures are to the US at around 36 per cent, while the EU (excluding Ireland) and the UK account for 23 and 8 per cent respectively. Shocks may also be related to, or propagated by, specific sectors of the economy. Upper investment-grade debt holdings of Irish funds are dominated by government-issued debt (57 per cent), while speculative debt instruments held by Irish funds are linked with OFIs (over 32 per cent) and NFCs (39 per cent). Bank debt held by Irish funds tends to be rated as upper investment grade (75 per cent), with only 7 per cent of these holdings rated as speculative.

4. Special Purpose Entities

SPEs are financial companies specifically created to fulfil a narrow purpose. For example, they may provide the underlying sponsor with better risk or liquidity management, ring-fencing and/ or facilitate selling a pool of assets to other companies, or they might provide favourable tax treatments.¹⁹ They usually have little physical presence in the jurisdiction in which they are domiciled and are part of a chain of financial entities, with an underlying sponsor that benefits from the creation of the SPE. SPEs are not authorised by the Central Bank. However, the activities of an individual SPE might be affected by certain regulations based on specific activities that they carry out (see Central Bank's [Consumer Hub](#)). For statistical purposes, SPEs are broken down by the Central Bank into two types: Securitisation SPEs - also called Financial Vehicle Corporations (FVCs) and Other SPEs.²⁰ FVCs fundamentally act as securitisation vehicles backed by the assets they hold. For the same reason, FVCs are usually categorized by the underlining assets on their balance sheets that are used to raise debt funding.

Irish SPEs are increasing in both size and heterogeneity. The main types of FVCs present in Ireland are entities engaged in CLOs, residential mortgage-backed securities (RMBS) and asset-backed commercial paper (ABCP). The Other SPEs group often comprises of less complex entities which are closer to the operational financing or tax efficiency needs of firms, such as Investment Fund Linked, Intra-Group Financing, and External Financing and Operational Leasing companies. Ireland has seen a sizeable increase in the number of SPEs over the last few years (Chart 2). Most notable in terms of trends over the past year has been the increase in CLOs. In Q4 2020, 79 CLOs with assets totalling around €31 billion moved from the Netherlands to Ireland as a result of changes in Dutch tax laws. This also explains strong growth in entities sponsored by UK firms, as the aforementioned CLOs are often set up by asset managers domiciled in the UK (Chart 17).

Although not authorised by the Irish Central Bank, the activities of individual special purpose entities may have some touch points with the Central Bank depending on their activities i.e. EMIR, the Prospectus Directive etc.

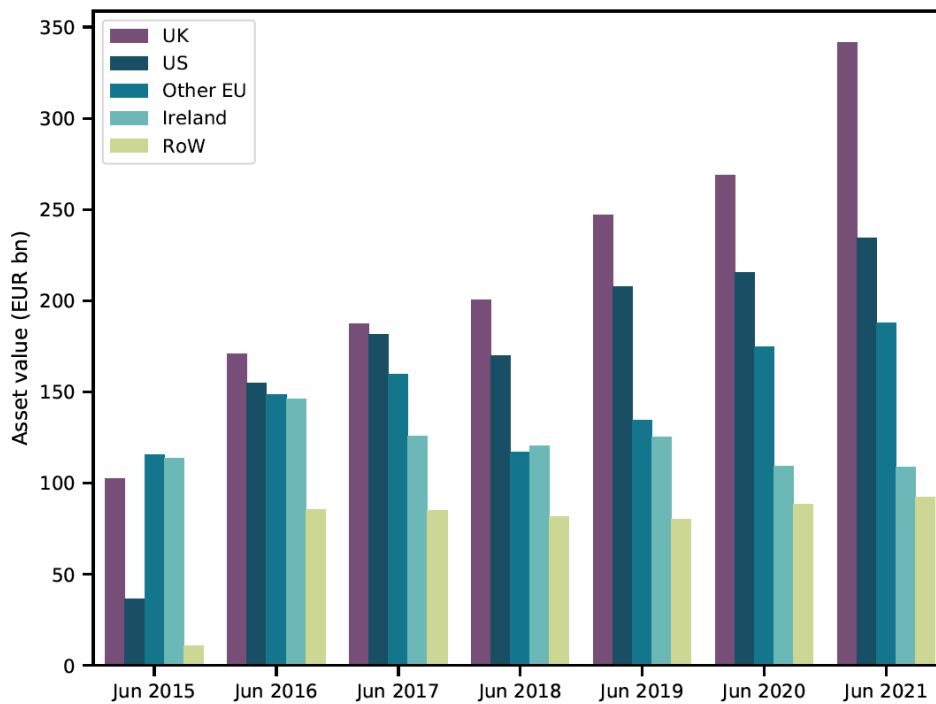
Due to a change in Dutch tax laws, 79 financial vehicle corporations engaged in collateralised loan obligations totalling approximately €31 billion relocated to Ireland in 2020.

¹⁹ See [Golden B. and P. Hughes \(2018\), "Shining a Light on Special Purpose Entities in Ireland", Central Bank of Ireland, Economic Letter Vol. 2018, No. 11.](#)

²⁰ For the purposes of data collection by the Central Bank, we only refer to Other SPEs which are registered under Section 110 of the Taxes Consolidation Act 1997.

Chart 17: The UK has emerged as a larger player in the sponsoring of Irish SPEs

Total Irish SPEs' assets by geography of sponsor



Source: Central Bank of Ireland.

Notes: Assets of SPEs with multiple sponsors from multiple geographies/sectors have been evenly distributed among each sponsors.

SPEs offer advantages to the economy by enabling firms to more efficiently manage their financial and operational risks. They also constitute an alternative financing channel (debt) to the traditional bank channel (loans). Furthermore, SPEs can be used to fund a specific project, which can be bankruptcy-remote from (legally separated from the bankruptcy of) the main company's balance sheet. These dynamics potentially open up a more flexible and tailored source of financing for firms, which allow them to ring-fence certain activities or risks and which can allow them to gain access to more attractive and efficient interest rates. Nonetheless, although there are touch points in the regulation, SPEs are not prudentially regulated as independent entities, although their underlying sponsor may be (for example if it is a bank or insurance company). SPEs are deeply intertwined with the financial sector and the real economy. The losses incurred by a SPE may propagate to its sponsor or investor. Sponsors can range from banks to OFIs and NFCs. Additionally, SPEs fund themselves mainly through debt, and can be exposed to complex financial instruments such as derivative contracts. Thus, as these entities provide an important source of debt

Special purpose entities' underlying sponsors may be regulated.

financing to the financial system and support financing of NFCs, they can have an impact on financial stability.

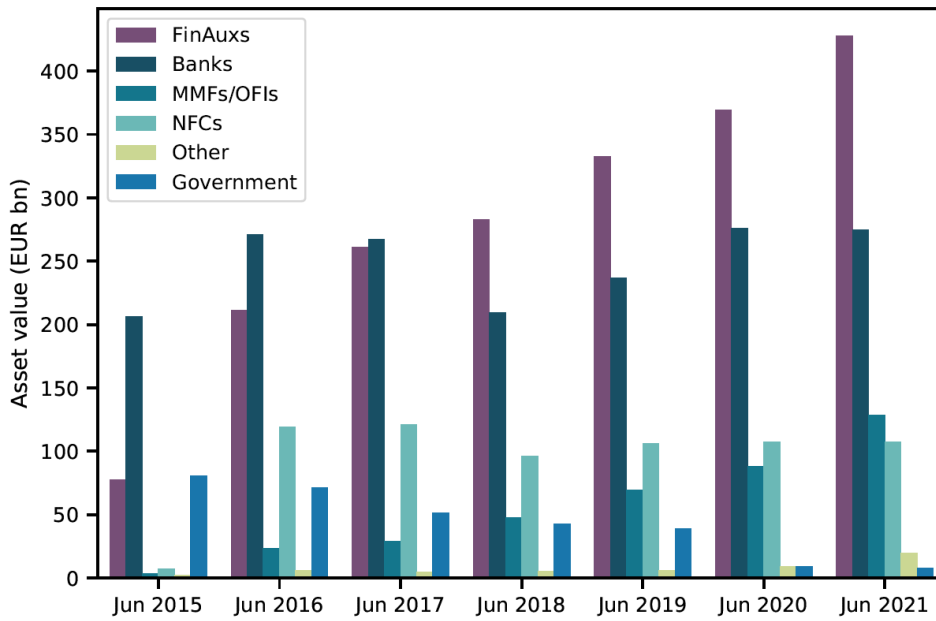
Irish-domiciled SPEs have largely international and financial sponsors (Chart 17). In particular, UK and US sponsors are increasingly choosing to set up such entities in Ireland. In fact, the assets of SPEs with UK and EU (excluding Ireland) sponsors have grown respectively by 38 per cent to €342 billion and 40 per cent to €188 billion between June 2019 and June 2021. The assets of SPEs sponsored by domestic institutions have declined by over 13 per cent to €108 billion during the same period. Much of this decline is due to the wind-down of NAMA (National Assets Management Agency) assets. On the one hand, such heterogeneity in sponsors' country of origin is positive from the perspective of risk diversification. On the other hand, it further adds to the potential for international spillovers and feedback loops in case of significant market volatility shocks in the sector. Irish SPEs are often set up by other international financial auxiliaries such as asset managers. This leads to a complex network of international sponsorship and ownership links, which can increase the importance of the sector from a systemic risk standpoint (Chart 18).²¹ It can also increase the complexity of the sector and make it more difficult to assess the financial stability risks. SPEs sponsored by OFIs have seen their asset value grow by 84 per cent to €128 billion between June 2019 and June 2021.

Irish special purpose entities are often set up by other financial auxiliaries such as asset managers which can lead to a complex network of international sponsorship and ownership links.

²¹ See [Barrett D., Golden B. and E. Maqui \(2016\), "New Data Collection on SPVs in Ireland: Findings and Implications for the Measurement of Shadow Banking", Bank for International Settlements Conference on "Statistical implications of the new financial landscape"](#).

Chart 18: Financial auxiliaries stand out as the largest sponsoring entities for Irish SPEs

Total SPEs' assets by sector of sponsor



Source: Central Bank of Ireland.

Notes: Assets of SPEs with multiple sponsors from multiple geographies/sectors have been evenly distributed among each sponsors. FinAuxs means financial auxiliaries. MMFs/OFIs denotes money market funds and other financial intermediaries.

Box A: Irish-resident Collateralised Loan Obligations' (CLOs) trends in 2020

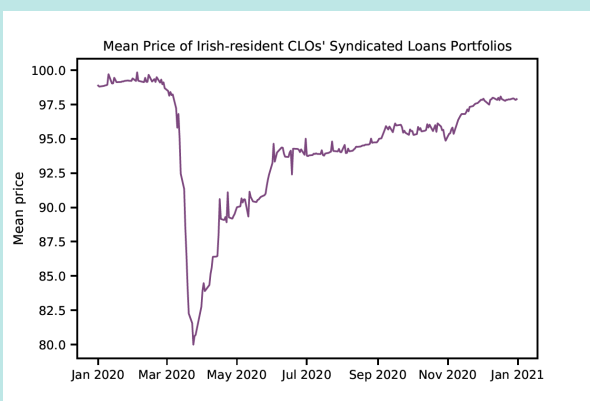
By Barra McCarthy (Statistics Division)

CLOs are marketable securities backed by a pool of syndicated loans to sub-investment grade borrowers, and have been highlighted as a potential source of vulnerability by the IMF, ECB and FSB (IMF, 2020; ECB, 2019; FSB, 2019). CLOs issue securities in tranches, which vary by risk and return. Disruption for CLOs present a source of refinancing risk for companies relying on the syndicated loan market, as CLOs are the primary purchasers of syndicated loans. A wide variety of financial institutions hold CLOs, with these institutions being open to downgrade, capital requirements and mark to market risks (ECB, 2019). At the end of 2020, nearly the entire European CLO industry is resident in Ireland. Despite this, links to the Irish financial sector and real economy are still limited.

In line with the syndicated loan market's experience of March 2020, loans packaged within Irish-resident CLOs saw significant declines in their average price, the average number of market makers providing quotes for loans, and a sharp increase in average bid-offer spreads. The peak of this distress occurred around the end of March, with 400 basis point bid-offer spreads, average loan prices of 20 per cent below par and the mean number of quotes per loan falling to 2 from 6 (Charts A).

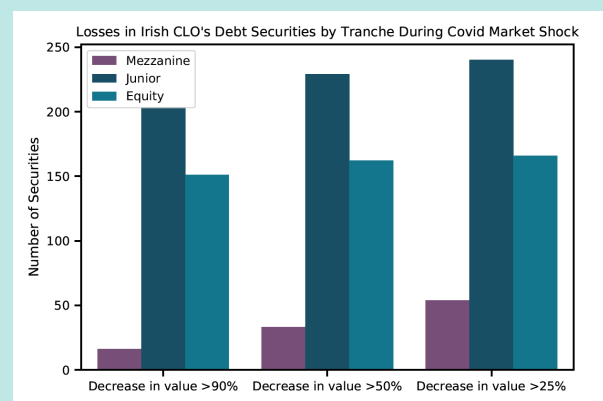
This led to steep declines in the value of CLO securities, primarily in junior and equity tranches, with many vehicles seeing these tranches' value fall to zero at the end of Q1 (see Chart B). This would be expected, as these tranches should absorb losses first and the COVID-19 pandemic presented a substantial shock. Sharp changes in value were absent from 'safe' senior tranches.

Chart A: Pricing of Irish resident CLOs' syndicated loan portfolios



Source: Financial Vehicle Corporation Return, Central Bank of Ireland; Markit Loans Dataset; Author's calculations.

Chart B: Extreme price changes were concentrated in junior and equity tranches



Source: Financial Vehicle Corporation Return, Central Bank of Ireland; Markit Loans Dataset; Author's calculations

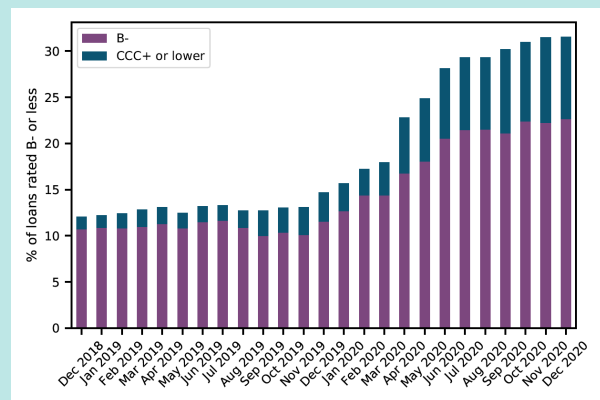
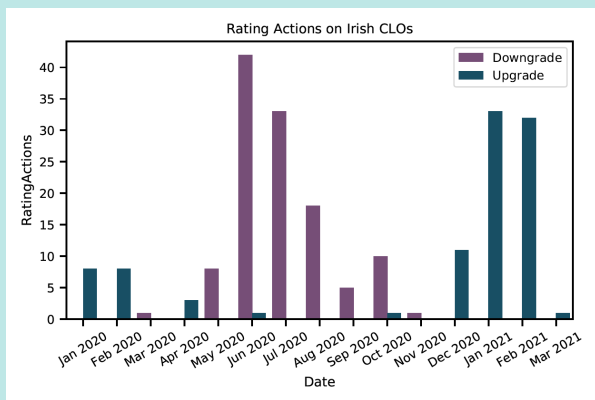
Over the remainder of 2020, the price and liquidity of these loans slowly recovered, but not fully to their pre-crisis level. Bid-offer spreads were still 30 basis points above their average level at the start of the year, while prices were on average 120-130 basis points lower (Charts A). This is despite the proportion of loans categorised as vulnerable to default (CCC+ or lower), and those just above that categorisation (B-) in the European market index, remaining significantly elevated above their pre-pandemic level (Chart D).

Rate changes by rating agencies roughly followed the performance of CLOs loan portfolios. Downgrades were concentrated over the summer and autumn of 2020, but following December, once the market returned to near its pre-COVID-19 level, only upgrades of CLO securities occurred (Chart C). This would suggest that downgrade risk brought on by COVID-19 had fully materialised by the end of the year. As with extreme price movements, downgrades were primarily in junior tranches of CLOs.

The temporary and limited impact of the COVID-19 shock on CLOs is also reflected in the small number that failed overcollateralization and interest coverage tests (Fitch, 2020). These tests are in place to protect the capital of more senior investors, and, if failed, divert money away from more junior investors. However, it is difficult to discern whether the limited number of failures is due to supportive monetary and fiscal policy or the robustness of the structures themselves. The fact that the CLO default rate for 2020 was less than 25% of its long term average suggests that business related policy supports played a strong role (S&P, 2021).

Chart C: Upgrades and Downgrades of CLOs

Chart D: Percentage of loans rated B- or lower in S&P European Leveraged Loan Index



Source: Financial Vehicle Corporation Return, Central Bank of Ireland; ESCB Ratings Dataset; S&P Global CLO Databank; Centralised Securities Database.

Source: S&P/LSTA Leveraged Loan Index; Leveraged Commentary & Data (LCD).

While CLOs experienced a turbulent 2020, the price and liquidity of their loan portfolios finished the year near to where they started. Downgrades and extreme price swings were concentrated in junior and equity tranches. This was accompanied by limited defaults, failures of overcollateralization and interest tests over the year. However, CLO defaults tend to lag corporate defaults, which have risen (S&P, 2021). Furthermore, the recovery of prices and

liquidity of syndicated loans has occurred despite the proportion of loans categorised as vulnerable to default and those one step above that categorisation remaining elevated. In addition, their resilience has been underpinned by extensive monetary and fiscal support, and it remains to be seen how borrowers and CLO securities will perform as this is unwound.²² Therefore, it is important to continue to monitor this sector during the post-COVID-19 recovery.

²² For more detail on monetary support, see [Holton S., Phelan G. and R. Stuart \(2020\) – “COVID-19: Monetary policy and the Irish economy”](#)

Box B: Liquidity Risk Metrics Explained

Liquidity risk can be measured with two broad classes of risk metrics: one is aimed at capturing liquidity profile and one is aimed at capturing liquidity transformation. The latter confronts the liquidity profile of the assets of investment funds with the liquidity of their equity (redemption terms) or maturity of debt liabilities. As most funds – with the clear exception of property funds, hedge funds and ‘other’ funds – are daily dealing, there’s little discriminatory power in looking at the dealing frequency of funds. The analysis in this *Monitor* concentrates on metrics of the liquidity profile of investment funds’ assets. In future editions, the *Monitor* may look at liquidity transformation metrics.

The liquidity profile risk metric measures the share of less liquid assets in total assets of funds. Achieving that requires a definition of asset liquidity. The proportion of liquid assets indicates how easily the fund can liquidate assets if a large redemption request was to occur. There are two types of such metrics: the first is a ‘narrow’ metric and the second a ‘broad’ metric of liquidity. In its *Global Monitoring Report*, the Financial Stability Board (FSB) divides the concept of liquidity, in the context of MBF, into narrow liquidity and broad liquidity.²³ In the narrow definition, liquid assets only includes cash and cash equivalents; in the broad definition, liquid assets include HQLAs (High Quality Liquid Assets). This can include cash and cash equivalents as well as certain debt and equity instruments that meet liquidity characteristics (subject to concentration limits and haircuts).

In the *EU Non-Bank Financial Intermediation Risk Monitor 2020*, the European Systemic Risk Board (ESRB) proxy for liquidity transformation with a metric calculated as total assets minus liquid assets (cash, government debt, debt securities issued by banks, equity and open-ended investment fund shares), as a share of total assets. Due to data limitations (EU data is not as granular as data available at the Central Bank), estimates are made for non-MMF funds’ holdings of non-euro area securities and deposits.

In this *Monitor*, liquid assets are defined as cash, deposits, advanced economies’ government debt, euro-zone bank short-term debt, and advanced economies’ equities. This follows international best practices set up by the Financial Stability Board for the purposes of their Non-Bank Financial Intermediation publications. The metric is then defined as the per cent of assets not considered to be liquid in total assets, i.e. $(\text{Assets} - \text{Liquid Assets})/\text{Assets}$. The small differences in the inclusion of assets in liquid assets category with the above measure is mainly due to higher granularity available to the Central Bank as opposed to the ESRB or the FSB, allowing for more granular classification of assets.

²³ See the [FSB’s Global Monitoring Report on Non-Bank Financial Intermediation 2020](#).

Table A: Liquid assets definitions across Non-Bank Financial Intermediation Monitors

Central Bank of Ireland	European Systemic Risk Board	Financial Stability Board
Cash, advanced economies' government debt, euro-zone short-term bank debt, and advanced economies' equities.	Cash, government debt, securities issued by banks and equity and open-ended investment fund shares. ²⁴	<ol style="list-style-type: none"> I. Narrow measure: cash and cash equivalents; II. Broad measure: HQLAs (see glossary).²⁵

²⁴ See the [ESRB NBF I Monitor 2021](#).

²⁵ See the [FSB Global Monitoring Report on Non-Bank Financial Intermediation 2020](#).

Glossary

AIMFD Alternative Investment Fund Managers Directive. Directive 2011/61/EU is a legal act of the European Union on the financial regulation of hedge funds, private equity, real estate funds, and other "Alternative Investment Fund Managers" in the European Union.

Leverage The use of debt to acquire additional assets, as captured by $(\text{Assets/Equity}) - 1$ or (Debt/Equity) . Taking $\text{Assets} = \text{Debt} + \text{Equity}$, this is the equivalent to D/E. A value of zero implies that $\text{Assets} = \text{Equity}$ and $\text{Debt} = 0$. Thus a value > 0 implies that there is debt on the balance sheet and presents it relative to equity.

Liquidity The ease with which an asset can be converted into ready cash without affecting its market price. The definition of such assets as liquid is somewhat arbitrary, given the absence of a standard consensus on the precise divide between liquid and non-liquid assets.

Upper Investment-Grade Securities Securities rated Aaa to A2 from Moody's, or AAA to A from Standard & Poor's.

Lower Investment-Grade Securities Securities rated A3 to Baa3 from Moody's, or BBB+ to BBB- from Standard & Poor's.

Financial Auxiliaries Companies which provide auxiliary financial services and other financial advisory and consultative services.

HQLA High-Quality Liquid Assets are cash or assets that can be converted into cash quickly through sales (or by being pledged as collateral) with no significant loss of value. This can include debt and equity instruments that meet certain liquidity characteristics (subject to concentration limits and haircuts).

MMFR EU Money Market Funds Regulation. Directive 2017/1131 is a legal act of the European Union on the financial regulation of money market funds in the European Union.

NAV Net asset value or the value of equity issued by the investment fund(s).

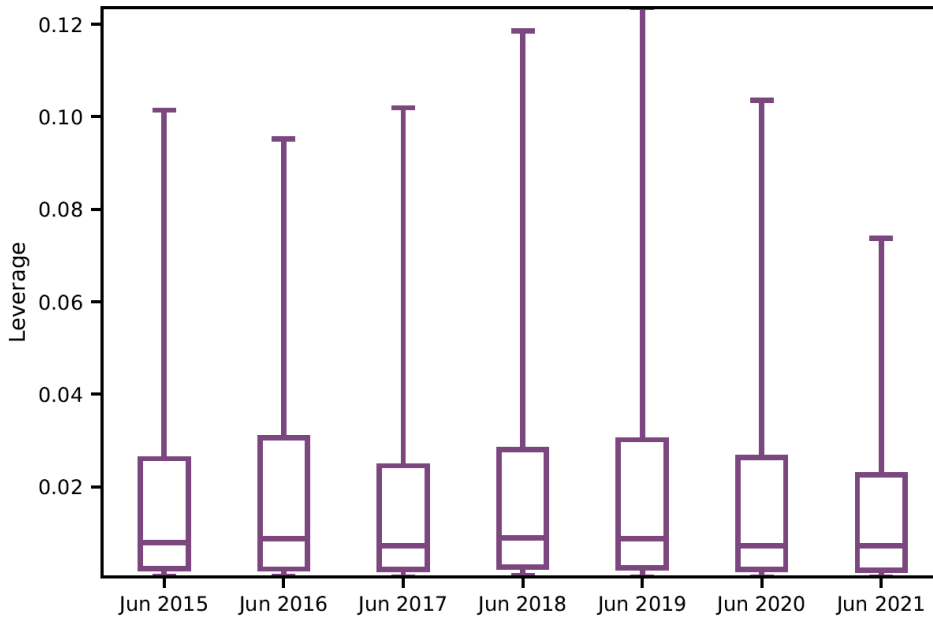
Synthetic Leverage stems from derivative instruments or securities financing transactions that create exposures contingent on the future value of an underlying asset, which becomes evident, for instance, when a derivative position's value moves strongly, potentially creating a profit or loss.

UCITS Undertakings for the Collective Investment in Transferable Securities. This refers to a regulatory framework that allows for the sale of cross-Europe mutual funds.

Annex

Figure 1 – Distribution of leverage across fund types

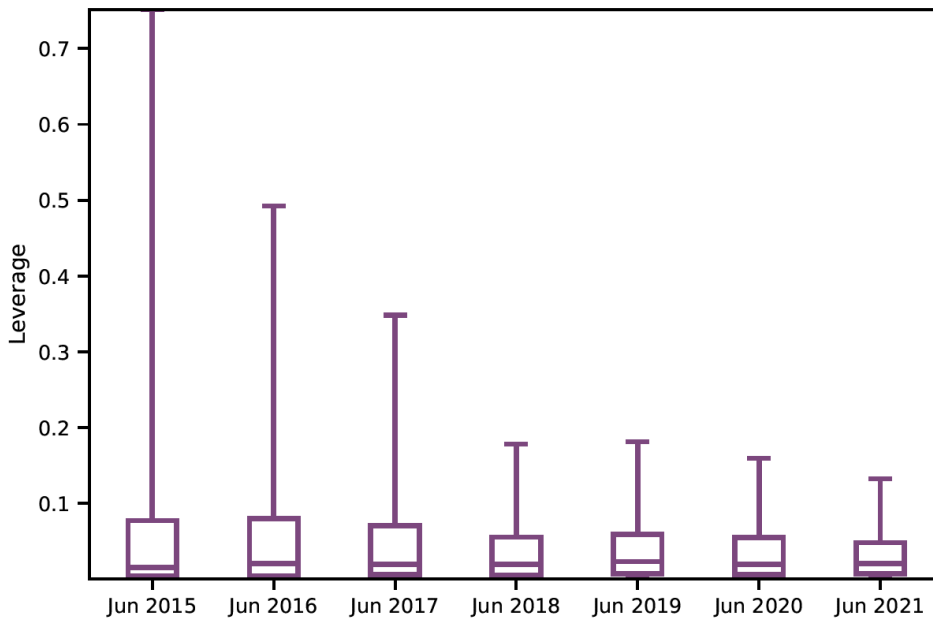
Distribution of Equity Funds' Leverage



Source: Central Bank of Ireland.

Notes: Leverage is computed as Debt over Equity. The distribution shows the 10th (lower whisker), 25th (lower box), 50th (horizontal line in box), 75th (upper box) and 90th (upper whisker) percentiles.

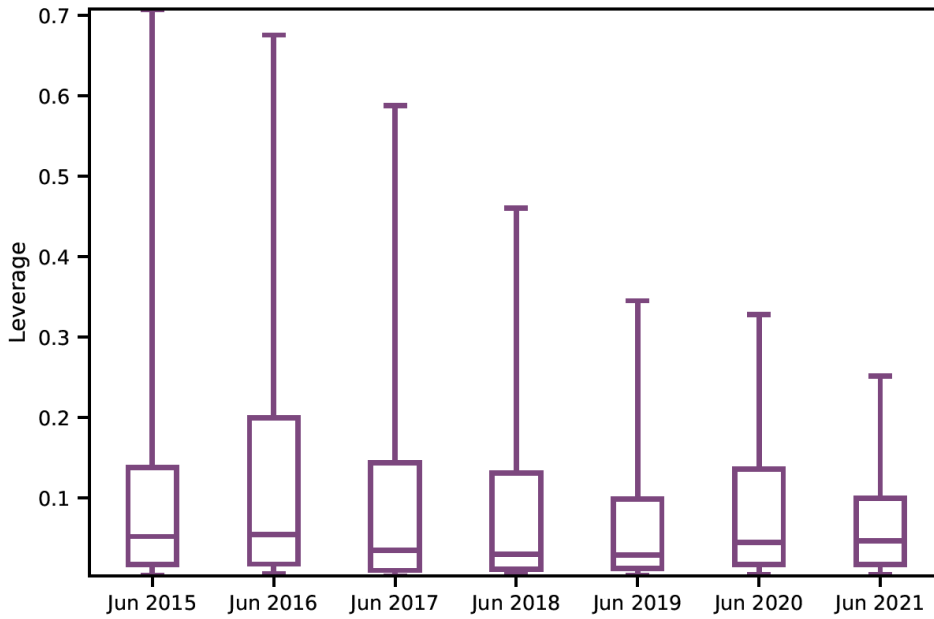
Distribution of Corporate Bond Funds' Leverage



Source: Central Bank of Ireland.

Notes: Leverage is computed as Debt over Equity. The distribution shows the 10th (lower whisker), 25th (lower box), 50th (horizontal line in box), 75th (upper box) and 90th (upper whisker) percentiles.

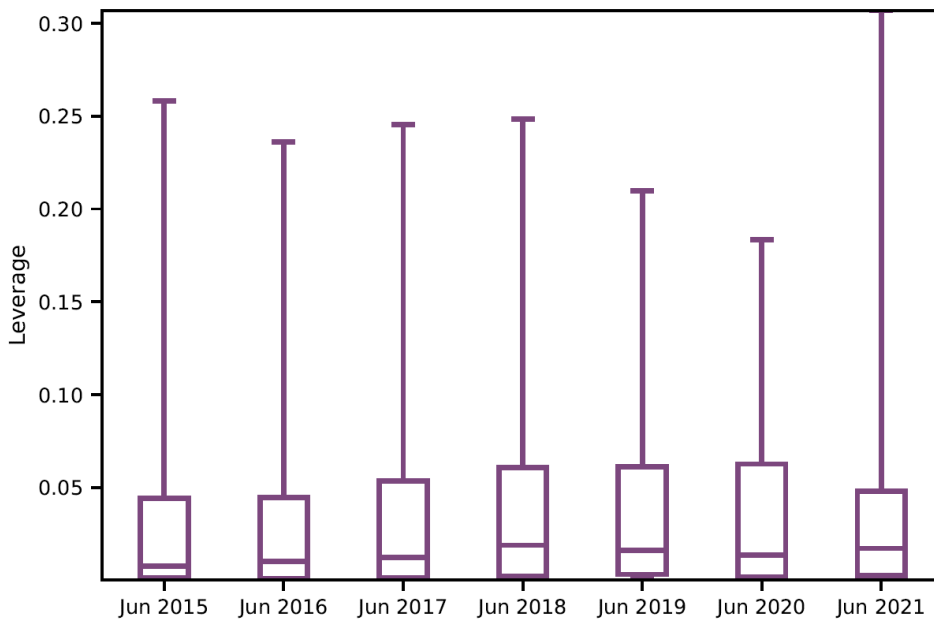
Distribution of Mixed Bond Funds' Leverage



Source: Central Bank of Ireland.

Notes: Leverage is computed as Debt over Equity. The distribution shows the 10th (lower whisker), 25th (lower box), 50th (horizontal line in box), 75th (upper box) and 90th (upper whisker) percentiles.

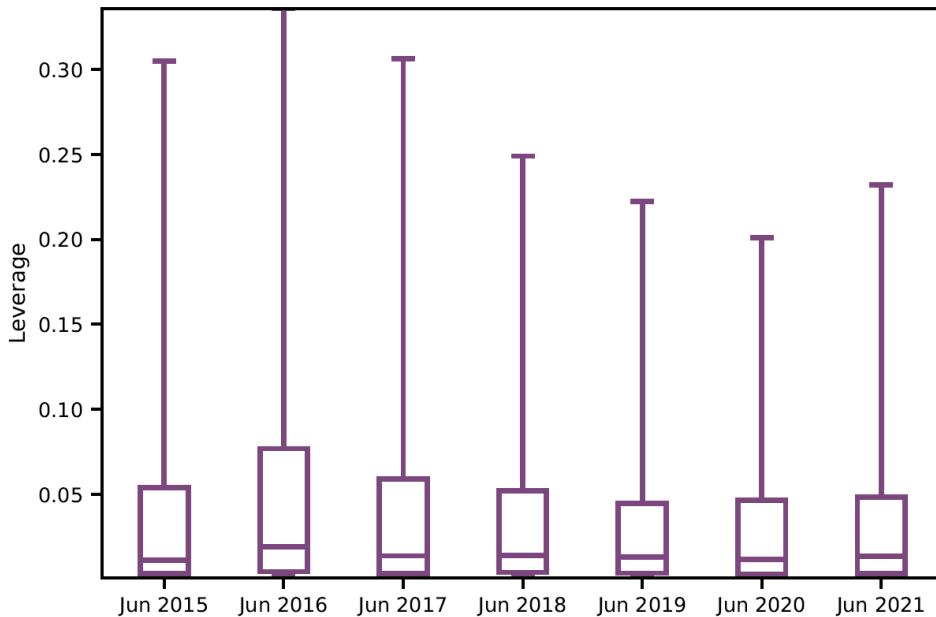
Distribution of Government Bond Funds' Leverage



Source: Central Bank of Ireland.

Notes: Leverage is computed as Debt over Equity. The distribution shows the 10th (lower whisker), 25th (lower box), 50th (horizontal line in box), 75th (upper box) and 90th (upper whisker) percentiles.

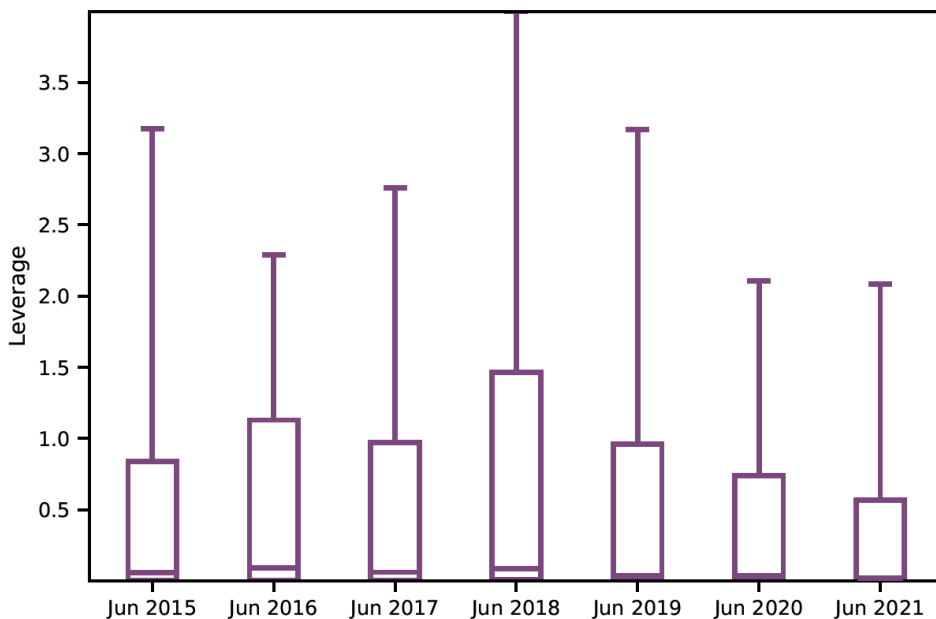
Distribution of Mixed Funds' Leverage



Source: Central Bank of Ireland.

Notes: Leverage is computed as Debt over Equity. The distribution shows the 10th (lower whisker), 25th (lower box), 50th (horizontal line in box), 75th (upper box) and 90th (upper whisker) percentiles.

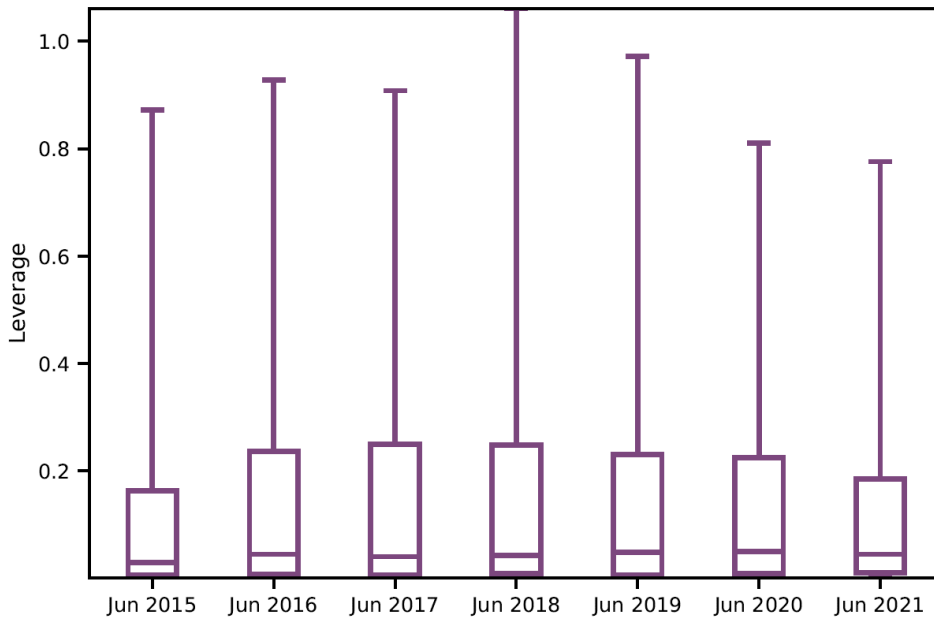
Distribution of Other Funds' Leverage



Source: Central Bank of Ireland.

Notes: Leverage is computed as Debt over Equity. The distribution shows the 10th (lower whisker), 25th (lower box), 50th (horizontal line in box), 75th (upper box) and 90th (upper whisker) percentiles.

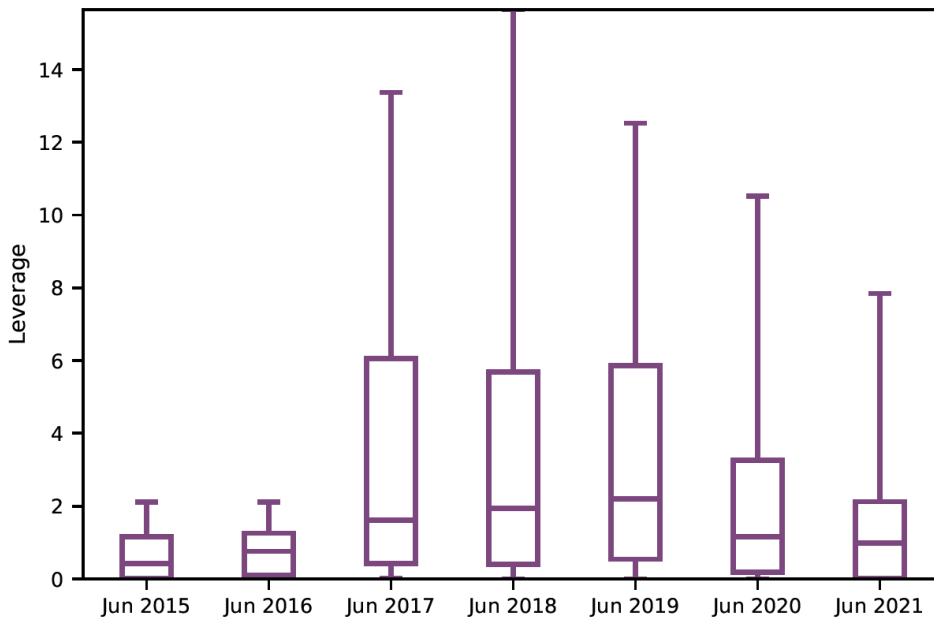
Distribution of Hedge Funds' Leverage



Source: Central Bank of Ireland.

Notes: Leverage is computed as Debt over Equity. The distribution shows the 10th (lower whisker), 25th (lower box), 50th (horizontal line in box), 75th (upper box) and 90th (upper whisker) percentiles.

Distribution of Real Estate Funds' Leverage

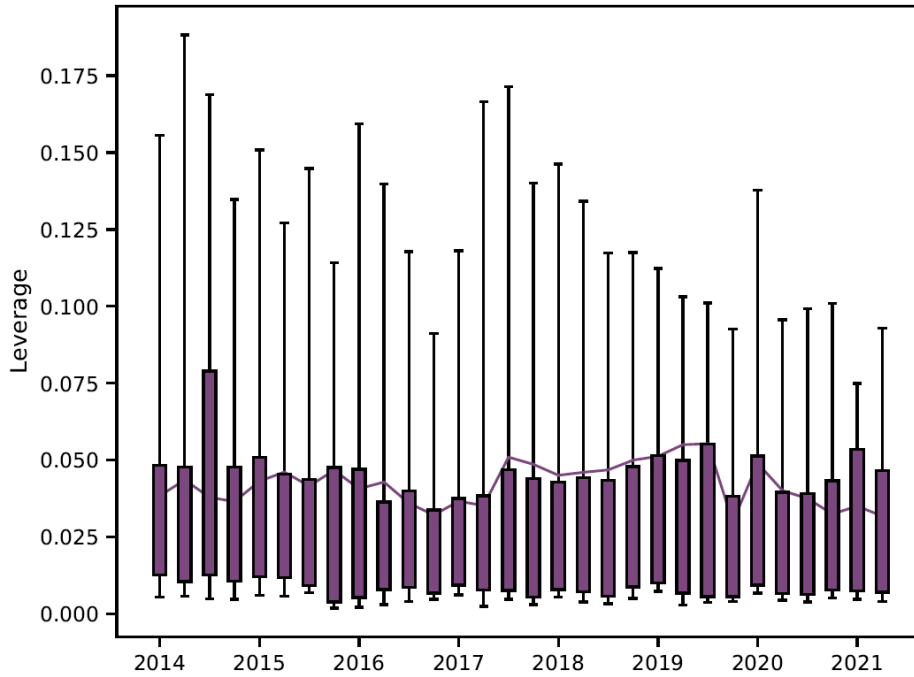


Source: Central Bank of Ireland.

Notes: Leverage is computed as Debt over Equity. The distribution shows the 10th (lower whisker), 25th (lower box), 50th (horizontal line in box), 75th (upper box) and 90th (upper whisker) percentiles.

Figure 2 – Irish funds leverage with a distribution of leverage in funds across EU countries

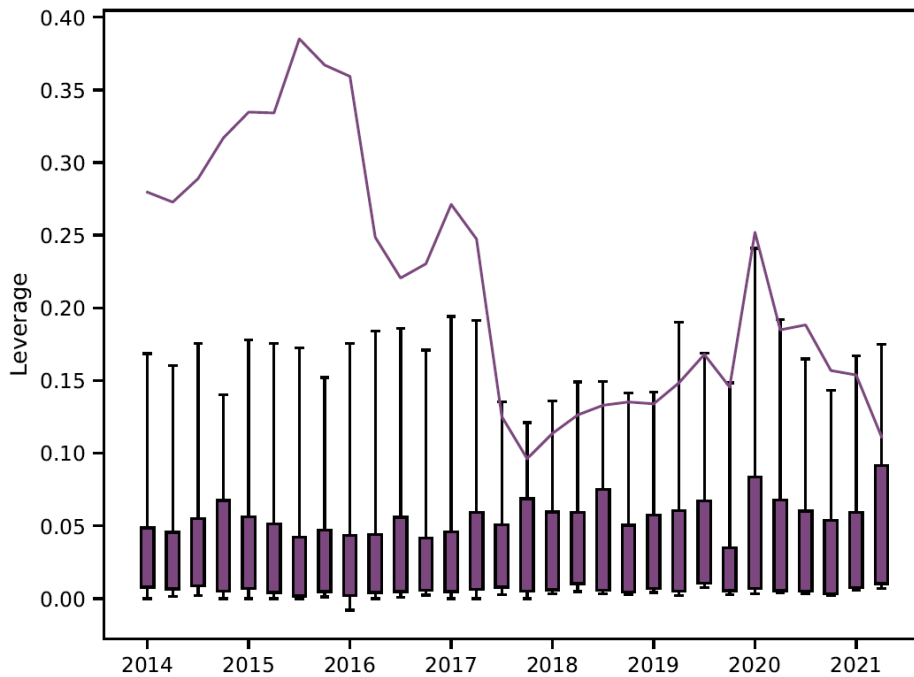
Equity Funds' Aggregate Leverage in Ireland (line) vs distribution in the rest of EU



Source: Central Bank of Ireland and European Central Bank.

Notes: Financial leverage is calculated as debt divided by total net asset value (equity). The box plots show the 90th, 75th, 25th and 10th percentiles of leverage for equity funds across other European countries. The line indicates Irish equity funds' aggregated leverage.

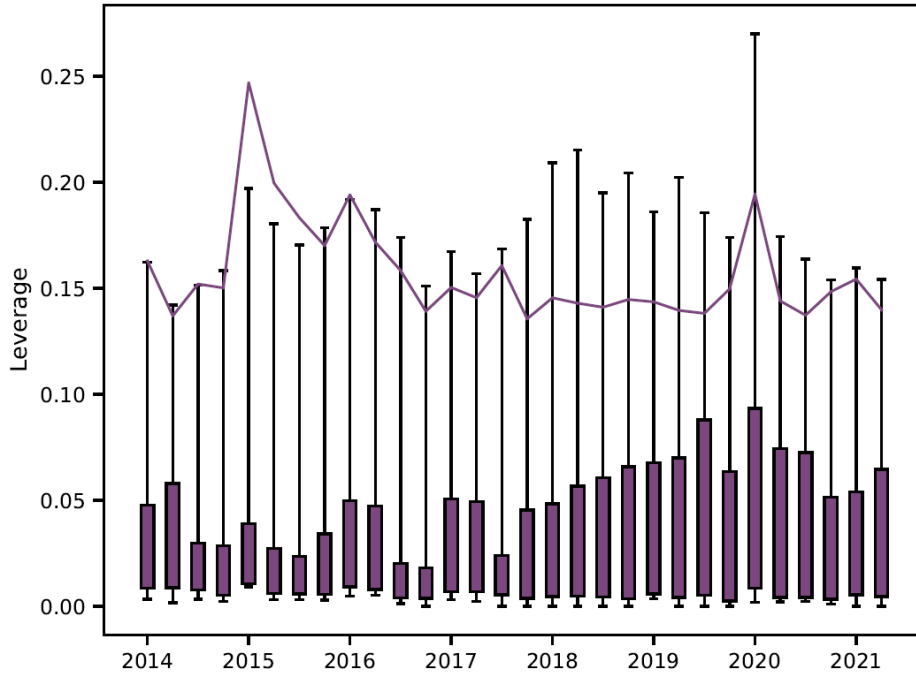
Bond Funds' Aggregate Leverage in Ireland (line) vs distribution in the rest of EU



Source: Central Bank of Ireland and European Central Bank.

Notes: Financial leverage is calculated as debt divided by total net asset value (equity). The box plots show the 90th, 75th, 25th and 10th percentiles of leverage for bond funds across other European countries. The line indicates Irish bond funds' aggregated leverage.

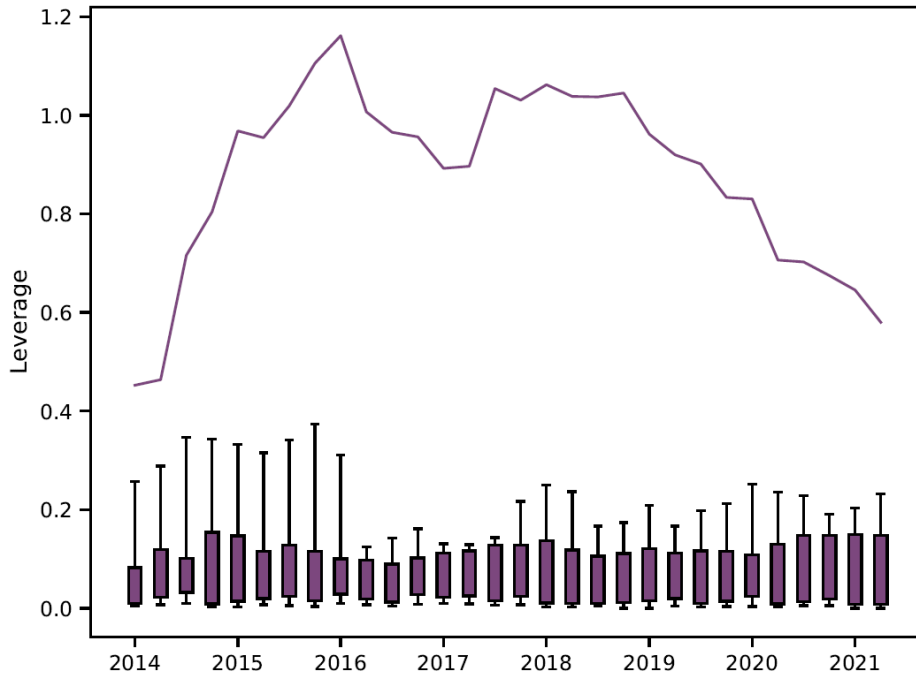
Mixed Funds' Aggregate Leverage in Ireland (line) vs distribution in the rest of EU



Source: Central Bank of Ireland and European Central Bank.

Notes: Financial leverage is calculated as debt divided by total net asset value (equity). The box plots show the 90th, 75th, 25th and 10th percentiles of leverage for mixed funds across other European countries. The line indicates Irish mixed funds' aggregated leverage.

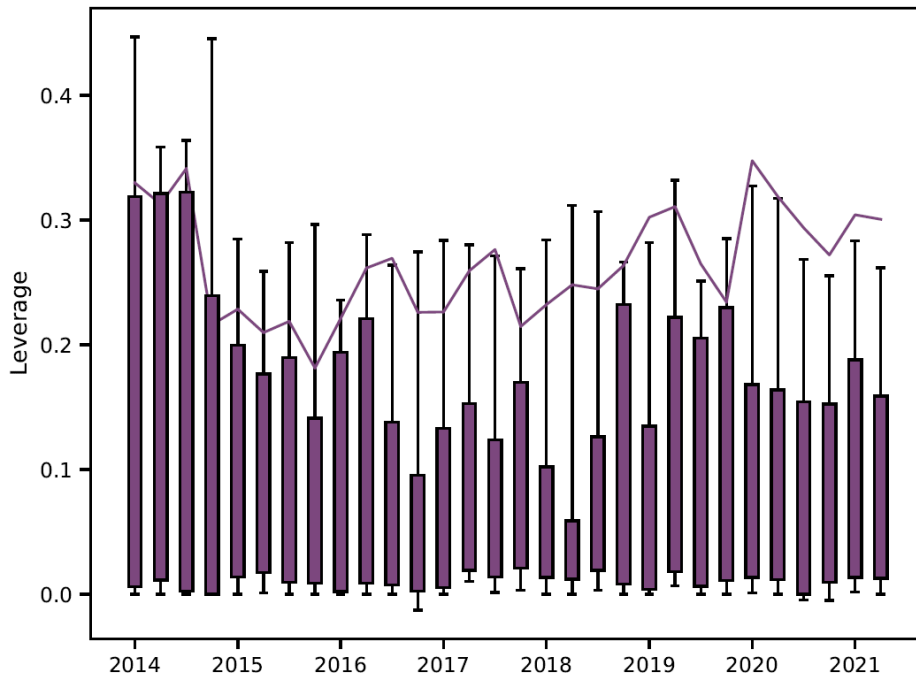
Other Funds' Aggregate Leverage in Ireland (line) vs distribution in the rest of EU



Source: Central Bank of Ireland and European Central Bank.

Notes: Financial leverage is calculated as debt divided by total net asset value (equity). The box plots show the 90th, 75th, 25th and 10th percentiles of leverage for other funds across other European countries. The line indicates Irish other funds' aggregated leverage.

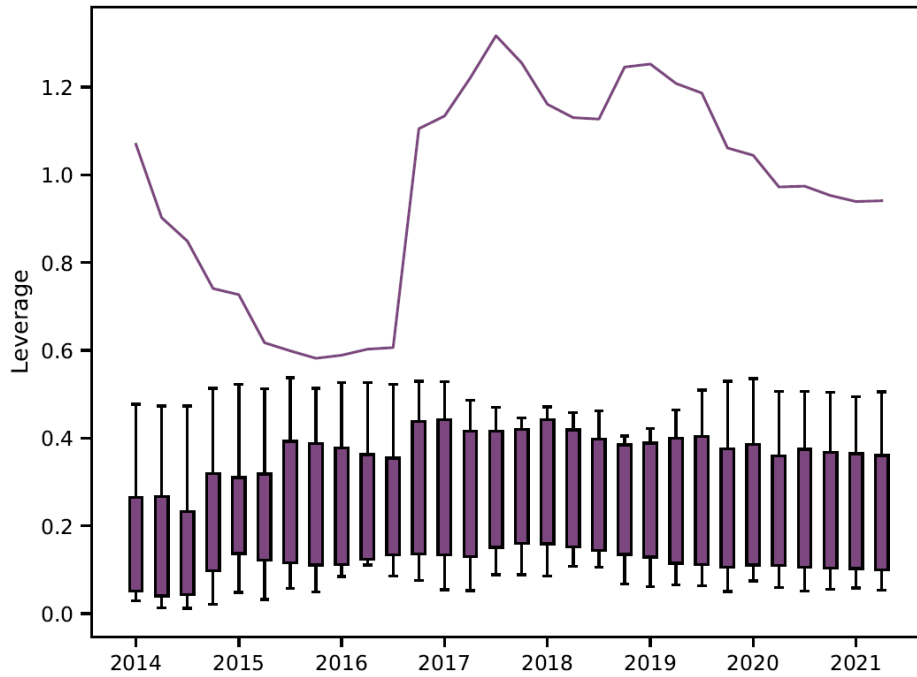
Hedge Funds' Aggregate Leverage in Ireland (line) vs distribution in the rest of EU



Source: Central Bank of Ireland and European Central Bank.

Notes: Financial leverage is calculated as debt divided by total net asset value (equity). The box plots show the 90th, 75th, 25th and 10th percentiles of leverage for hedge funds across other European countries. The line indicates Irish hedge funds' aggregated leverage.

Real Estate Funds' Aggregate Leverage in Ireland (line) vs distribution in the rest of EU

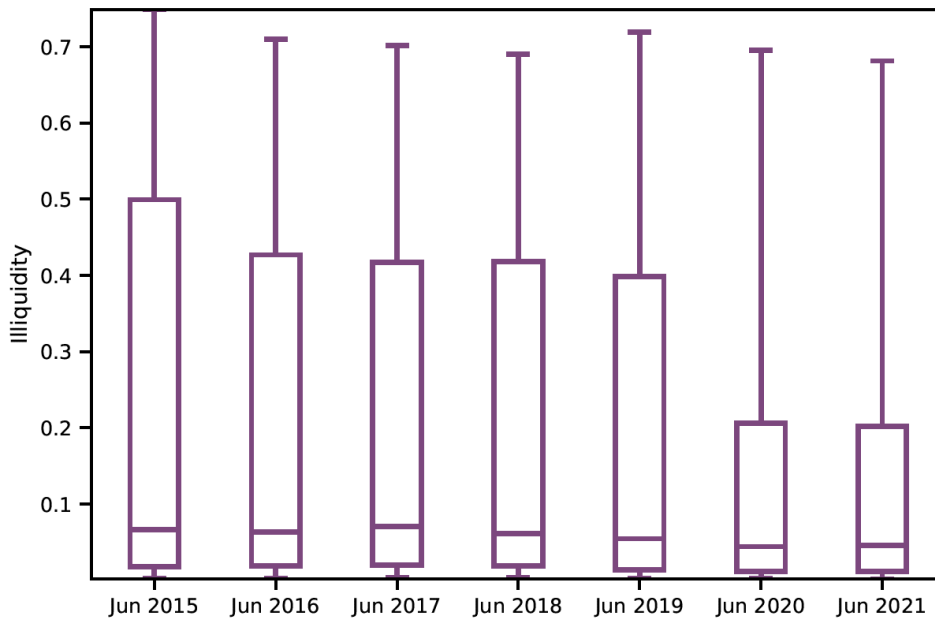


Source: Central Bank of Ireland and European Central Bank.

Notes: Financial leverage is calculated as debt divided by total net asset value (equity). The box plots show the 90th, 75th, 25th and 10th percentiles of leverage for real estate funds across other European countries. The line indicates Irish real estate funds' aggregated leverage.

Figure 3 – Distribution of the share of less liquid assets among fund categories

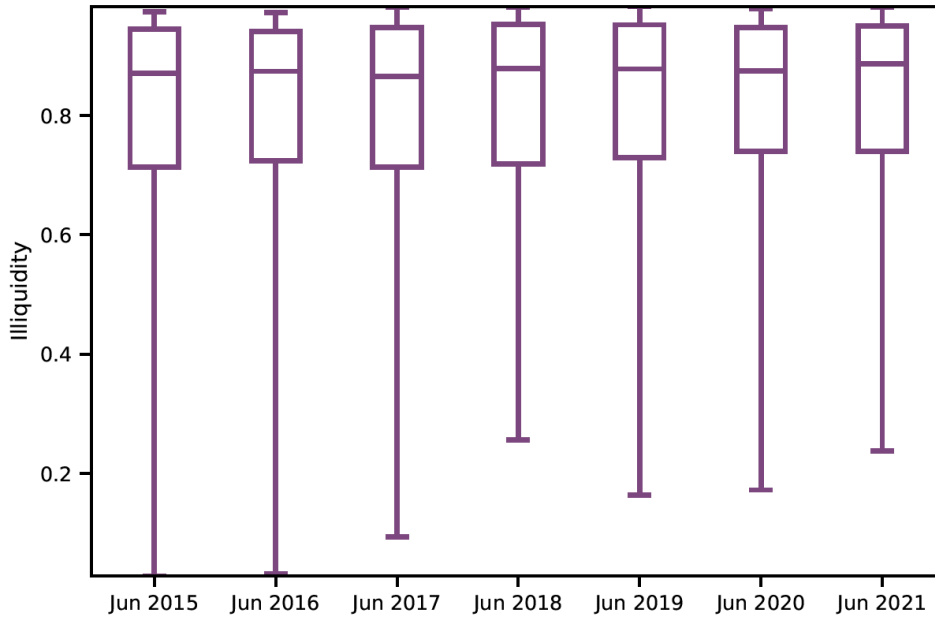
Distribution of Equity Funds' Illiquidity



Source: Central Bank of Ireland.

Notes: Illiquidity is calculated as $[(\text{Total Assets} - \text{Liquid Assets}) / \text{Total Assets}]$. Liquid assets are defined as Cash, advanced economies' government debt, euro-zone short-term bank debt, and advanced economies' equities.

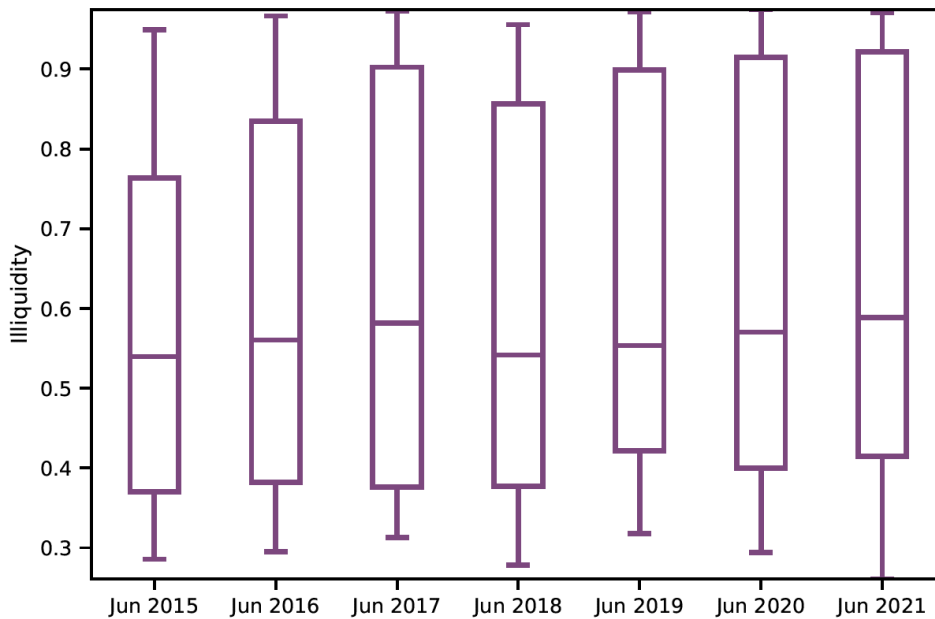
Distribution of Corporate Funds' Illiquidity



Source: Central Bank of Ireland.

Notes: Illiquidity is calculated as $[(\text{Total Assets} - \text{Liquid Assets}) / \text{Total Assets}]$. Liquid assets are defined as Cash, advanced economies' government debt, euro-zone short-term bank debt, and advanced economies' equities.

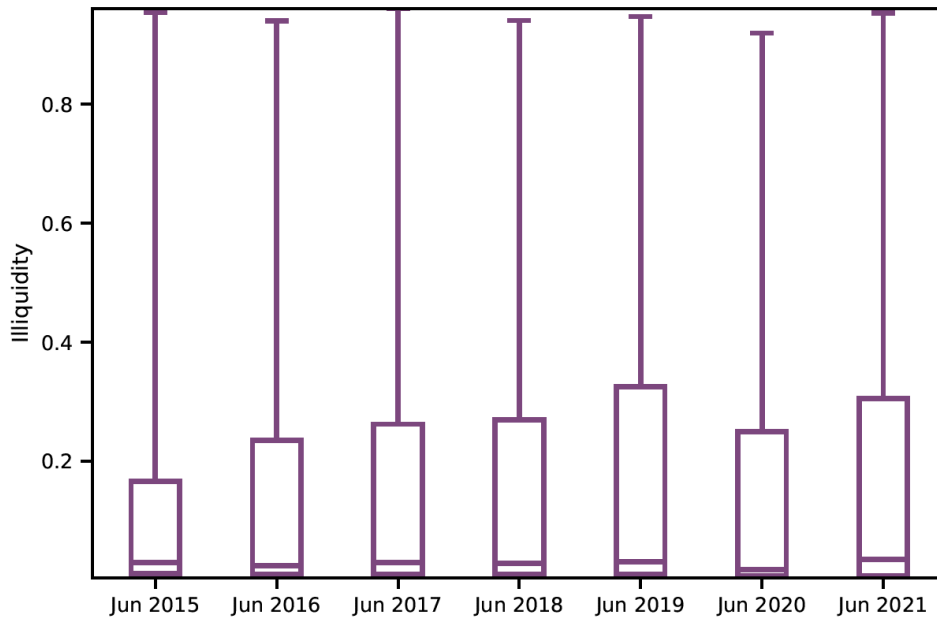
Distribution of Mixed Bond Funds' Illiquidity



Source: Central Bank of Ireland.

Notes: Illiquidity is calculated as $[(\text{Total Assets} - \text{Liquid Assets}) / \text{Total Assets}]$. Liquid assets are defined as Cash, advanced economies' government debt, euro-zone short-term bank debt, and advanced economies' equities.

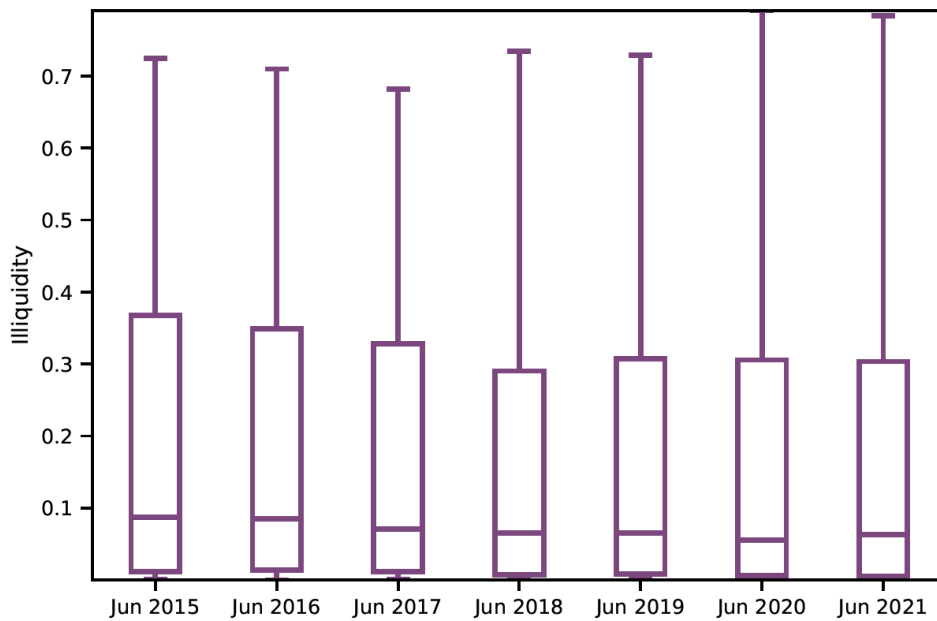
Distribution of Government Bond Funds' Illiquidity



Source: Central Bank of Ireland.

Notes: Illiquidity is calculated as $[(\text{Total Assets} - \text{Liquid Assets}) / \text{Total Assets}]$. Liquid assets are defined as Cash, advanced economies' government debt, euro-zone short-term bank debt, and advanced economies' equities.

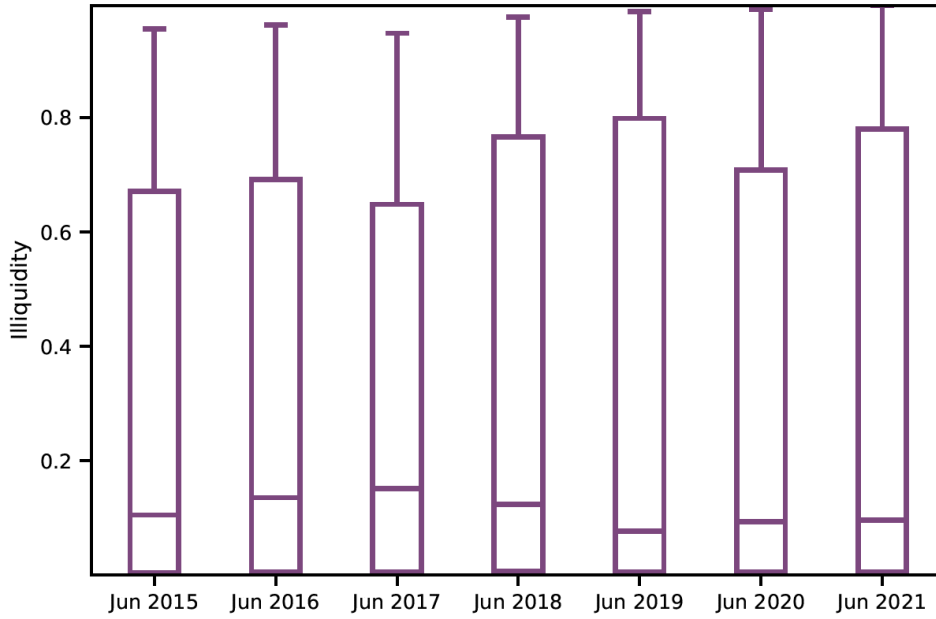
Distribution of Mixed Funds' Illiquidity



Source: Central Bank of Ireland.

Notes: Illiquidity is calculated as $[(\text{Total Assets} - \text{Liquid Assets}) / \text{Total Assets}]$. Liquid assets are defined as Cash, advanced economies' government debt, euro-zone short-term bank debt, and advanced economies' equities.

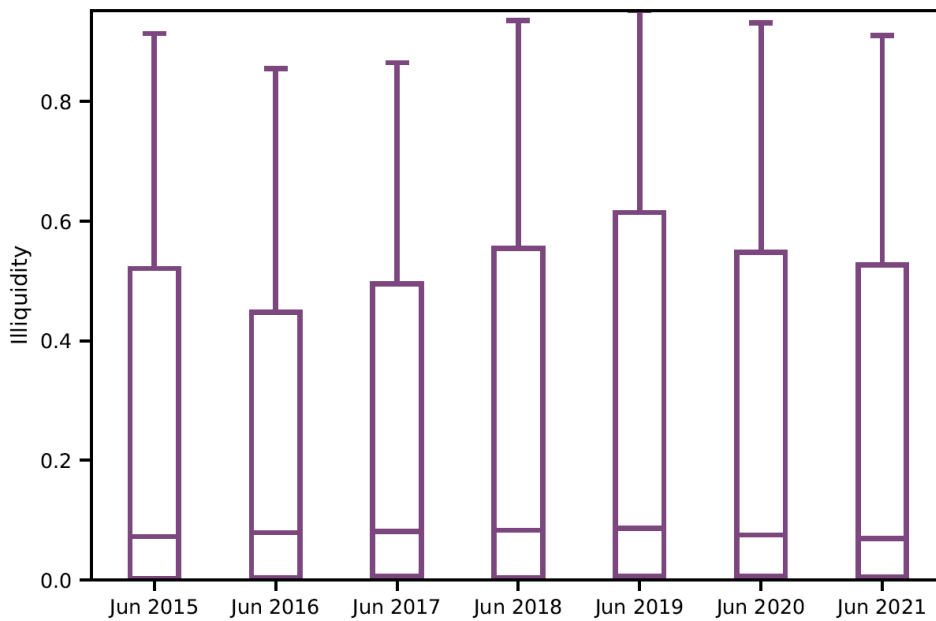
Distribution of Other Funds' Illiquidity



Source: Central Bank of Ireland.

Notes: Illiquidity is calculated as $[(\text{Total Assets} - \text{Liquid Assets}) / \text{Total Assets}]$. Liquid assets are defined as Cash, advanced economies' government debt, euro-zone short-term bank debt, and advanced economies' equities.

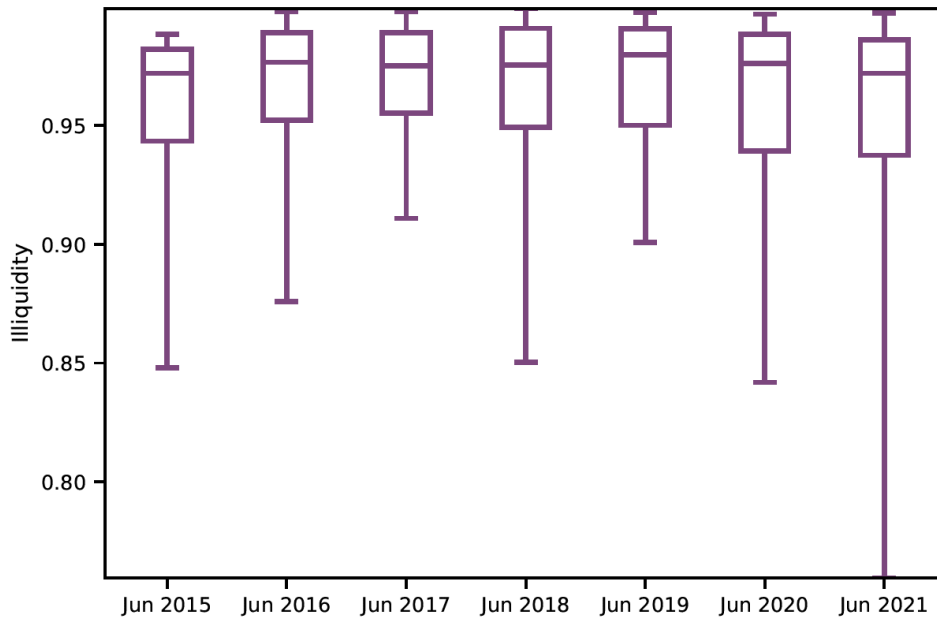
Distribution of Hedge Funds' Illiquidity



Source: Central Bank of Ireland.

Notes: Illiquidity is calculated as $[(\text{Total Assets} - \text{Liquid Assets}) / \text{Total Assets}]$. Liquid assets are defined as Cash, advanced economies' government debt, euro-zone short-term bank debt, and advanced economies' equities.

Distribution of Real Estate Funds' Illiquidity

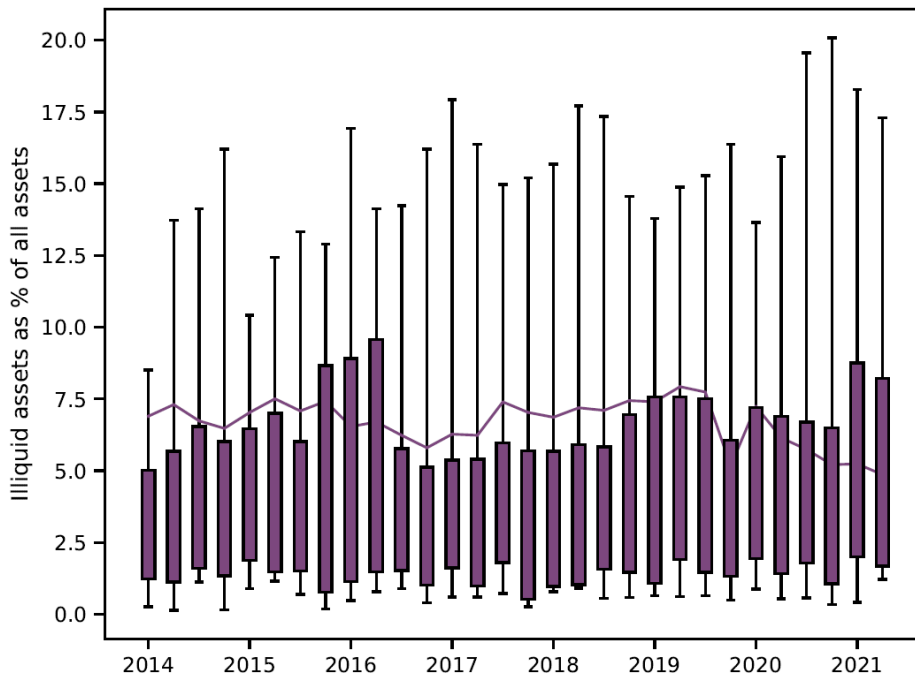


Source: Central Bank of Ireland.

Notes: Illiquidity is calculated as $[(\text{Total Assets} - \text{Liquid Assets}) / \text{Total Assets}]$. Liquid assets are defined as Cash, advanced economies' government debt, euro-zone short-term bank debt, and advanced economies' equities.

Figure 4 - Share of less liquid assets among Irish fund categories and the distribution of such across EU countries

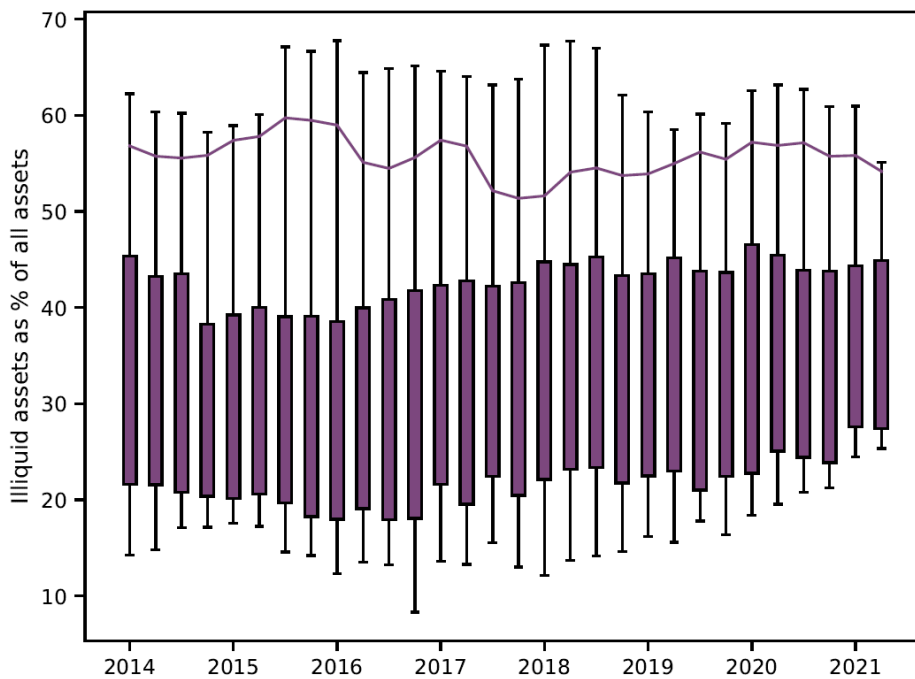
Illiquidity of Irish equity funds (line) compared to equity funds in the rest of the EU (distributions)



Source: Central Bank of Ireland.

Notes: Illiquidity is calculated as $[(\text{Total Assets} - \text{Liquid Assets}) / \text{Total Assets}]$. Liquid assets are defined as Cash, advanced economies' government debt, euro-zone short-term bank debt, and advanced economies' equities. Box plots show the 10th, 25th, 75th and 90th percentiles of illiquidity of equity funds across other European countries. Equity funds are those investment funds that self-identify as equity funds.

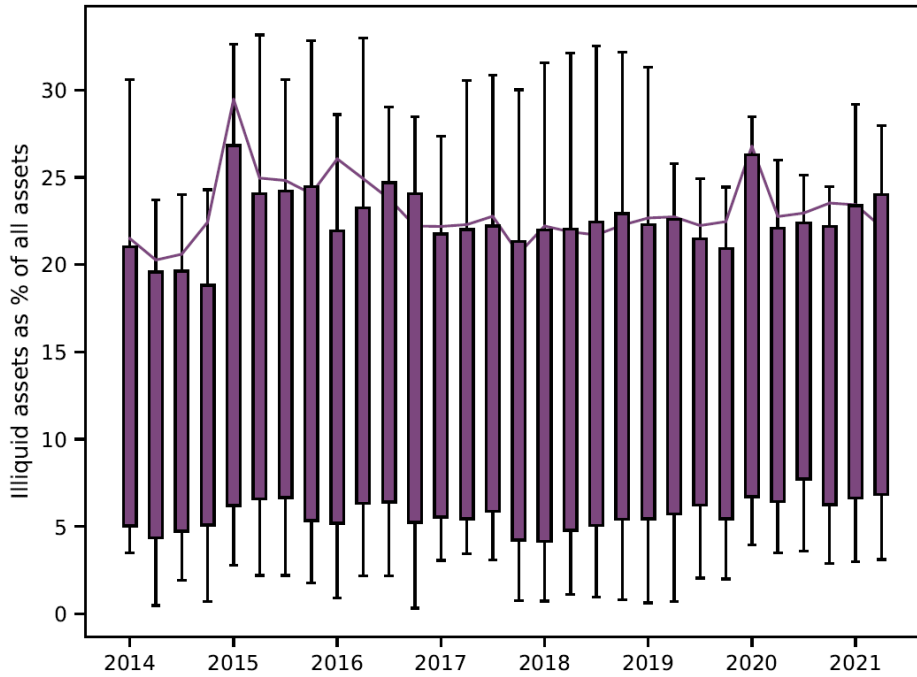
Illiquidity of Irish bond funds (line) compared to bond funds in the rest of the EU (distributions)



Source: Central Bank of Ireland.

Notes: Illiquidity is calculated as $[(\text{Total Assets} - \text{Liquid Assets}) / \text{Total Assets}]$. Liquid assets are defined as Cash, advanced economies' government debt, euro-zone short-term bank debt, and advanced economies' equities. Box plots show the 10th, 25th, 75th and 90th percentiles of illiquidity of bond funds across other European countries. Bond funds are those investment funds that self-identify as bond funds.

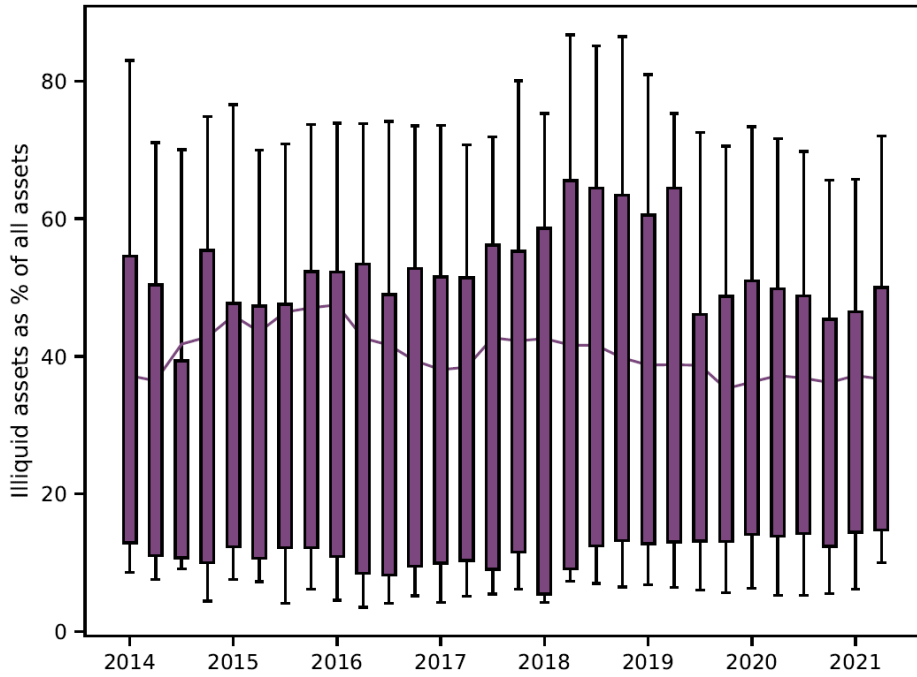
Illiquidity of Irish mixed funds (line) compared to mixed funds in the rest of the EU (distributions)



Source: Central Bank of Ireland.

Notes: Illiquidity is calculated as $[(\text{Total Assets} - \text{Liquid Assets}) / \text{Total Assets}]$. Liquid assets are defined as Cash, advanced economies' government debt, euro-zone short-term bank debt, and advanced economies' equities. Box plots show the 10th, 25th, 75th and 90th percentiles of illiquidity of mixed funds across other European countries. Mixed funds are those investment funds that self-identify as mixed funds.

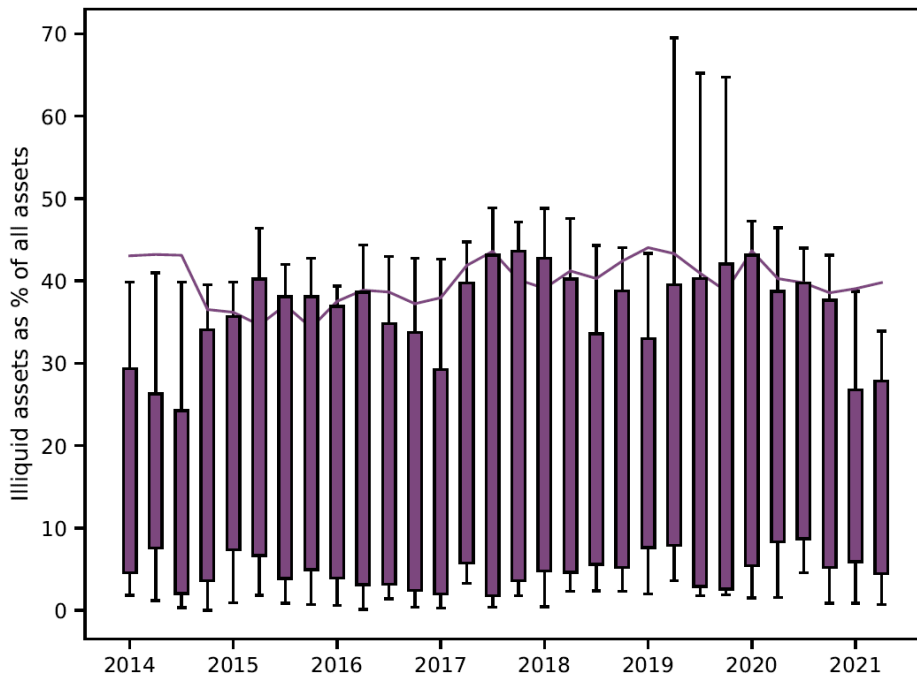
Illiquidity of Irish other funds (line) compared to other funds in the rest of the EU (distributions)



Source: Central Bank of Ireland.

Notes: Illiquidity is calculated as $[(\text{Total Assets} - \text{Liquid Assets}) / \text{Total Assets}]$. Liquid assets are defined as Cash, advanced economies' government debt, euro-zone short-term bank debt, and advanced economies' equities. Box plots show the 10th, 25th, 75th and 90th percentiles of illiquidity of other funds across other European countries. Other funds are those investment funds that self-identify as other funds.

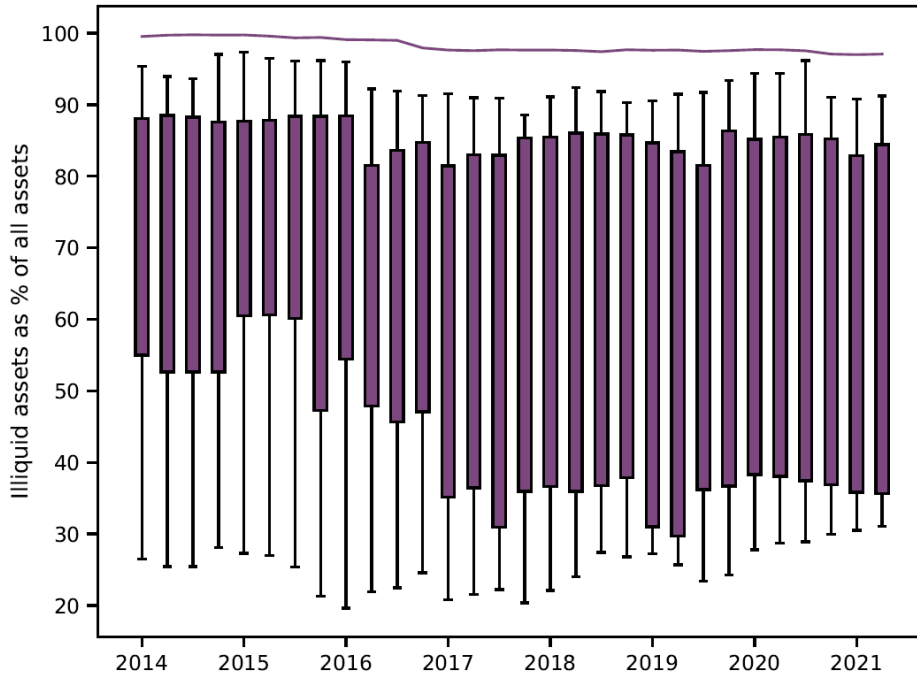
Illiquidity of Irish hedge funds (line) compared to hedge funds in the rest of the EU (distributions)



Source: Central Bank of Ireland.

Notes: Illiquidity is calculated as $[(\text{Total Assets} - \text{Liquid Assets}) / \text{Total Assets}]$. Liquid assets are defined as Cash, advanced economies' government debt, euro-zone short-term bank debt, and advanced economies' equities. Box plots show the 10th, 25th, 75th and 90th percentiles of illiquidity of hedge funds across other European countries. Hedge funds are those investment funds that self-identify as hedge funds.

Illiquidity of Irish real estate funds (line) compared to real estate funds in the rest of the EU (distributions)



Source: Central Bank of Ireland.

Notes: Illiquidity is calculated as $[(\text{Total Assets} - \text{Liquid Assets}) / \text{Total Assets}]$. Liquid assets are defined as Cash, advanced economies' government debt, euro-zone short-term bank debt, and advanced economies' equities. Box plots show the 10th, 25th, 75th and 90th percentiles of illiquidity of real estate funds across other European countries. Real estate funds are those investment funds that self-identify as real estate funds.



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