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Mapping Market-Based Finance in Ireland

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Abstract

Market-based finance has grown rapidly in recent years – both in Ireland and internationally. This growing form of finance provides a valuable alternative to bank financing, supporting economic activity. But, like all forms of financial intermediation, market-based finance can also contribute to a build-up of financial vulnerabilities, which need to be monitored and – if necessary – addressed. The main contribution of this *Note* is to provide an overview of the market-based finance sector domiciled in Ireland. It outlines the size, growth and composition of the sector; describes the business models of the main entities involved; and sets outs how the sector is linked to the global economy and financial system. The *Note* also describes potential sources of vulnerability, which the Central Bank of Ireland – working with other authorities globally – monitors on a regular basis. From a financial stability perspective, a key priority internationally is deepening policymakers' understanding of the potential implications of a disruption in market-based finance on economic activity in a future period of stress. In addition, further consideration needs to be given to developing and operationalising the macroprudential policy framework for market-based finance.

1 Introduction

Market-based finance has grown rapidly in recent years and has become a central part of the international financial system. Otherwise referred to as non-bank financial intermediation, market-based finance can be defined as the raising of equity or debt through financial markets, rather than through the banking system.[3] Market-based finance provides a valuable alternative to bank financing for many businesses and households, supporting economic activity. But these activities may also give rise to financial vulnerabilities, which need to be monitored and – if needed – addressed.[4]

The market-based finance sector domiciled in Ireland is large by international standards. Given the rapid growth of these activities in recent years, Ireland has become one of the main global hubs

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[2] The views expressed in this *Note* are those of the authors and do not represent the official views of the Central Bank of Ireland or the European System of Central Banks (ESCB). We thank Benedetta Bianchi, Pierce Daly, Peter Dunne, Pawel Fiedor, Kitty Moloney, Brian Golden, Colm Kincaid, Fergal McCann and members of a number of Central Bank of Ireland committees for helpful comments and suggestions. Any remaining errors are our own.

[3] See, for example, Lane and Moloney, (2018). International organisations such as the Financial Stability Board (FSB) and the European Systemic Risk Board (ESRB) have recently decided to replace the term "shadow banking" with the term "non-bank financial intermediation". The change in terminology does not affect the substance or coverage of the FSB or ESRB's monitoring frameworks for this part of the financial system.

[4] The EU market-based finance sector comprises a number of diverse entities such as investment funds (including money market funds), securitisation vehicles and other non-securitisation vehicles engaged in a myriad of activities. The sector also includes a series of other diverse types of financial institutions, which fall within the so-called other financial institutions (OFI) residual reflecting the fact that balance sheet data are not currently collected for these types of entities. The OFI residual refers to the difference between the total financial sector according to the financial accounts and the subsectors for which primary statistics are available at the euro area level. See Grillet-Aubert et al. (2016) and ESRB (2019) for further details.

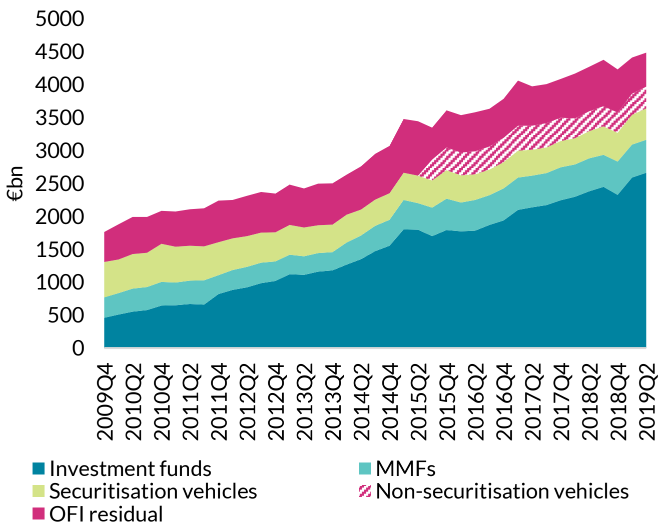
of market-based finance activities, with significant links to the international economy and financial system. Given its scale and diversity, understanding the composition and activities of non-bank financial institutions resident in Ireland is essential to assess the potential for financial vulnerabilities to emerge.

The main contribution of this *Note* is to provide an overview of the market-based finance sector domiciled in Ireland. The *Note* is structured as follows. Section 2 describes the size of the market-based finance sector domiciled in Ireland, including its composition and recent growth. Section 3 outlines the business models of non-bank financial institutions that form part of the sector in Ireland. Section 4 highlights the linkages of the sector to the domestic and global economy and financial system. Section 5 outlines potential sources of vulnerability that could emerge from market-based finance activities. Section 6 concludes by outlining key policy considerations for analysing and mitigating vulnerabilities and financial stability risks arising from market-based finance.

2 Size of the market-based finance sector in Ireland

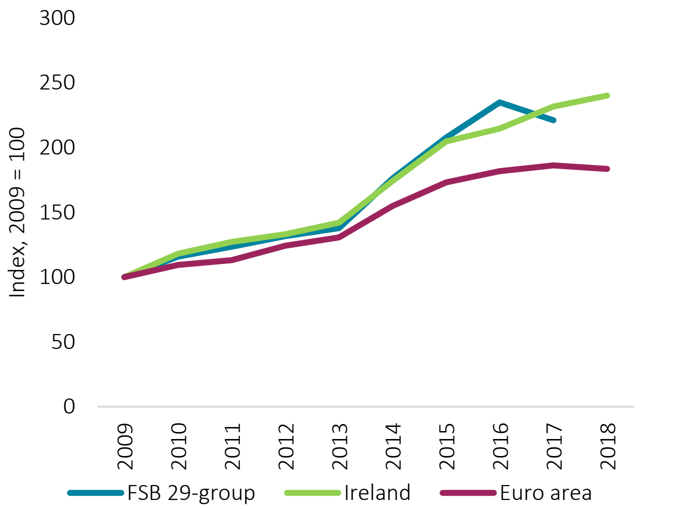
The market-based finance sector domiciled in Ireland has experienced rapid growth in recent years. The sector more than doubled from €1.8 trillion at the end of 2009 to approximately €4.5 trillion in the second quarter of 2019 (Figure 1). This significant growth is primarily driven by the investment fund industry domiciled in Ireland, which at the beginning of this period accounted for less than €800 billion and about half of the market-based finance assets, but has now increased fourfold to reach €3.2 trillion. In comparison, the assets of the other types of non-bank financial institutions engaged in market-based finance have remained broadly constant over the same period.

Figure 1: Irish domiciled market-based finance sector, total assets (2009 Q4 – 2019 Q2)



Source: Central Bank of Ireland, ECB Statistical Data Warehouse and authors' calculations.
Note: For a definition of the OFI residual, see footnote 4. Non-securitisation vehicles started reporting balance sheet data to the Central Bank of Ireland in Q3 2015. Before that, they are included in the OFI residual category in Figure 1. Reporting on securitisation vehicles to the ECB started in Q4 2009.

Figure 2: Comparative growth of the market-based sector (2009 – 2017)

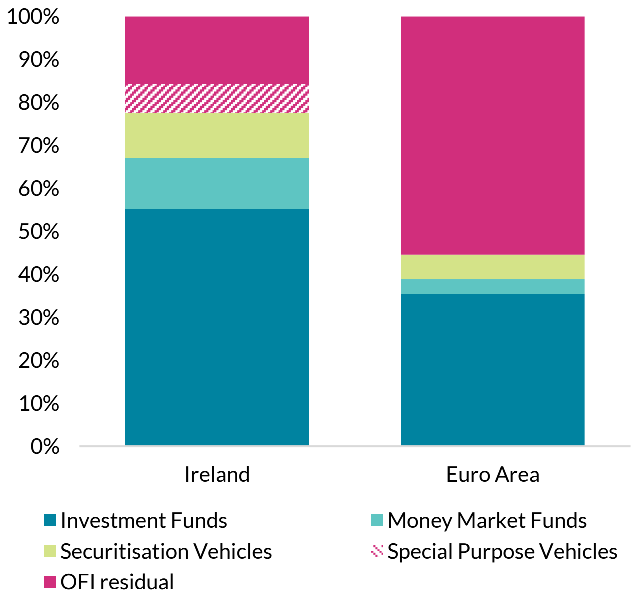


Source: Financial Stability Board, ECB Statistical Data Warehouse and authors' calculations.
Note: The index is based on current €. The FSB values (originally in US$) were converted into euro at the end-of-year exchange rate.
The FSB 29-group data are only available at a lag, with 2017 being the last available data point for this series.

The growth of the market-based finance sector in Ireland has been broadly consistent with trends observed globally, although the Irish domiciled sector has grown at a faster rate than the euro area. The global market-based finance sector has more than doubled in size since 2009, similar to the growth seen in Ireland (Figure 2). However, growth in the euro area has been at a slower pace. During the same period, the euro area market-based finance sector increased from €19 trillion to €36 trillion.

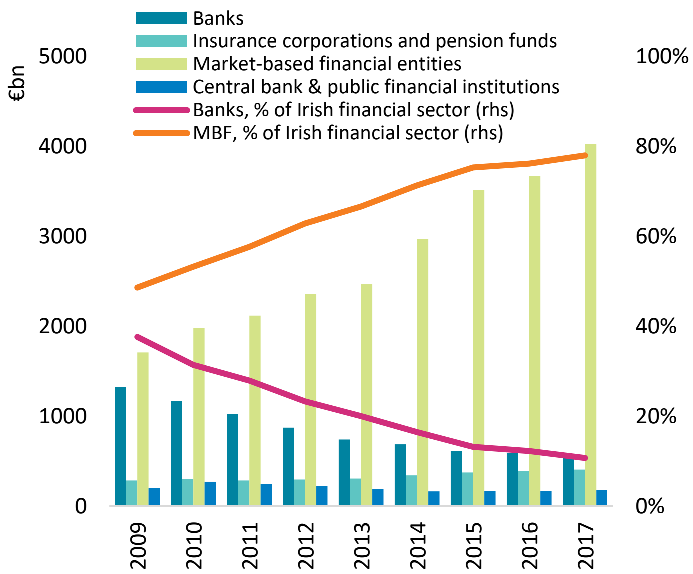
The composition of the sector in Ireland differs from the euro area. The market-based finance sector domiciled in Ireland is dominated by investment funds and money market funds, which account for around two thirds of total assets. In contrast, in the euro area as a whole, investment funds and money market funds account for around a third of total assets of the sector (Figure 3). Indeed, in the euro area, a residual category represents around half of the market-based finance sector's assets. This is made of several types of entities that are engaged in financial intermediation activities such as finance companies, financial leasing and other captive financial institutions, where balance sheet data are not readily available at a euro area level. The residual category in Ireland is smaller partly due to more comprehensive coverage of data collection.

Figure 3: Composition of the Irish and euro area market-based finance sectors (Q2 2019)



Source: Central Bank of Ireland, ECB Statistical Data Warehouse and authors' calculations.
Note: For a definition of the OFI residual, see footnote 4. Balance sheet data on entities classified within the OFI residual are not readily available at the euro area level as a whole. Irish domiciled non-securitisation SPVs are included in the OFI residual for the euro area.

Figure 4: Composition of Irish financial sector assets over time (2009 – 2017)

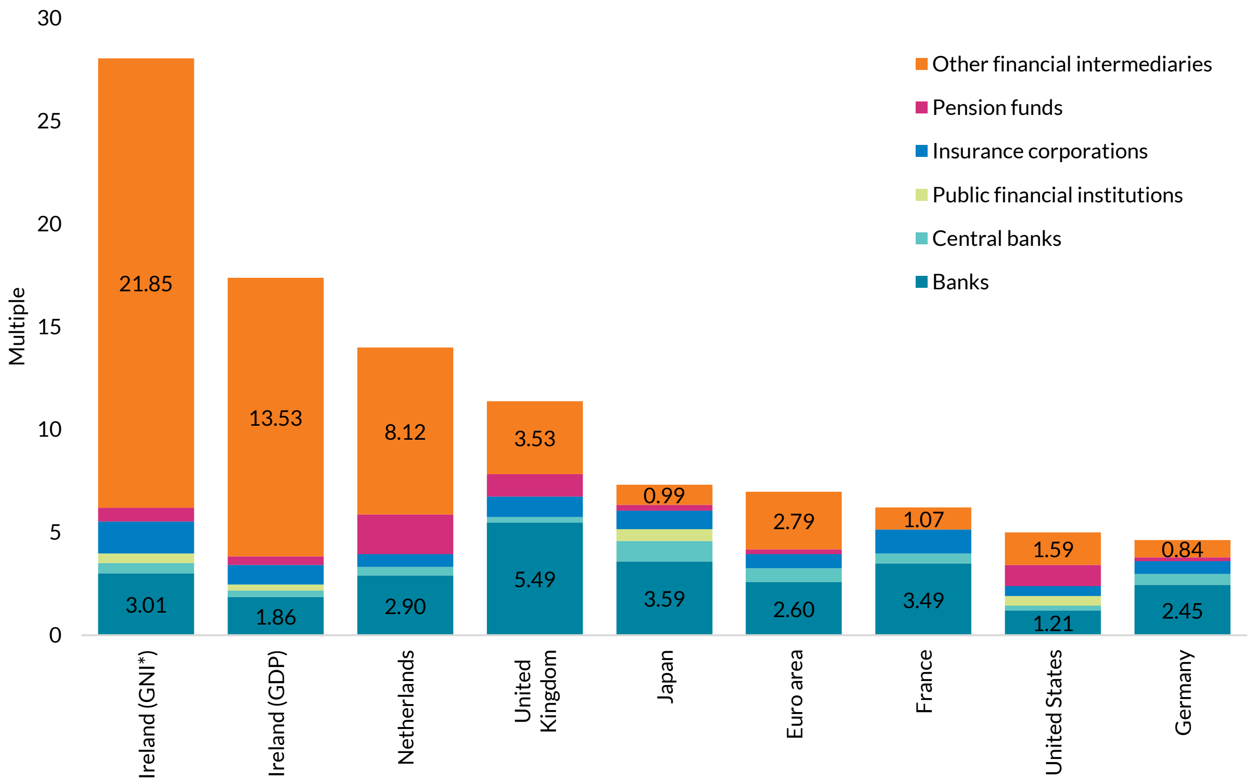


Source: Central Bank of Ireland data as submitted to the Financial Stability Board (FSB) and authors' calculations.

As a result of the substantial growth of the market-based finance sector, the structure of the Irish financial system as a whole has experienced significant changes over the last decade. As Figure 4 shows, it went from being broadly balanced between bank and non-bank financial activities a decade ago, to now being dominated by non-bank financial institutions. This structural shift in the composition of the Irish financial system occurred against the backdrop of the domestic banks deleveraging heavily as a result of the global financial crisis. In parallel, the investment fund sector domiciled in Ireland continued to grow rapidly, driven by cross-border flows and reflecting Ireland's role as a host for international asset management activities. By the end of 2017, non-bank financial intermediation accounted for close to 80 per cent of total Irish financial assets.

Ireland has now become one of the main centres internationally for hosting market-based finance activities.[5] The scale of the market-based finance sector in Ireland is reflected in both global and euro area comparisons. At a global level, Ireland is the sixth largest jurisdiction for non-bank financial intermediation activities according to the Financial Stability Board (FSB)'s 2018 annual monitoring exercise.[6] Ireland accounts for approximately 10 per cent of global money market fund (MMF) assets and 5 per cent of global investment fund assets (excluding MMFs). Within the euro area, Ireland is the third largest jurisdiction for market-based finance activities, after Luxembourg and the Netherlands, while Ireland hosts the second largest investment funds sector in the euro area. Overall, Ireland now accounts for approximately 12 per cent of the total assets of the euro area market-based finance sector. Within some specific segments of the market-based finance sector, Ireland plays an even more important role. For example, Ireland is the largest jurisdiction in the euro area for the domicile of securitisation vehicles, MMFs and exchange-traded funds (ETFs).

Figure 5: Financial assets by institution type as a multiple of the country's GDP (GNI*) in 2017, selected countries



Source: Financial Stability Board (2019), Global Monitoring Report on Non-Bank Financial Intermediation 2018, Central Statistics Office and authors' calculations.
Note: The FSB's definition of "Other Financial Intermediaries" contains the institutions defined in this *Note* as market-based finance, as well as other non-bank institutions engaged in financial intermediation. In the case of Ireland, it almost entirely comprises the market-based finance sector as shown in Figure 1. For presentation purposes, the Cayman Islands and Luxembourg are not shown but have the largest financial sectors as a percentage of GDP according to FSB (2019).

[5] There are a number of financial and non-financial determinants why non-bank financial institutions choose to locate in a given jurisdiction. For a discussion on these factors, see for example, Davies and Killeen (2018) who empirically examine location determinants employing EU firm-level data. In addition, Godfrey, Killeen and Moloney (2015) and Lane and Moloney (2018) discuss a number of factors which contribute to make Ireland a global hub for the domicile of non-bank financial institutions.
[6] See, for example, FSB (2019) which shows that Ireland is the sixth largest jurisdiction based on the narrow measure of non-bank financial intermediation (previously known as the shadow banking measure).

The non-bank financial sector in Ireland is also very large relative to the size of the economy. Total assets of financial institutions domiciled in Ireland stood at over 17 times GDP in 2017; this compares with 11 times for the UK, 7 times for the euro area as a whole and 5 times for the United States (Figure 5). Using the preferred measure of economic activity for Ireland, GNI*[7], this figure jumps to over 28 times GNI*. The size of the banking sector relative to the size of the economy is smaller than the UK and the euro area. In contrast, Ireland's market-based finance sector (based on the total assets of non-bank financial institutions) is around 13.5 times the value of the economy when measured by GDP, and almost 22 times when measured by GNI*. This compares with 2.8 times in the euro area and 1.6 times in the US.

3 Business models of non-bank financial institutions engaged in market-based finance

The types of entities that engage in market-based finance have very diverse business models. To understand how they ultimately support economic activity and, so, the types of vulnerabilities that they could pose, this section outlines the main business models of these entities, focusing on investment funds, securitisation vehicles and non-securitisation special purpose entities.

3.1 Investment funds

Investment funds are collective investment vehicles that provide asset management services to ultimate investors. Retail or institutional investors buy shares in the investment fund and those proceeds are then used by the fund to invest in underlying assets. These assets could be tradeable securities, such as bonds or equities, or physical assets, such as real estate. In return for those asset management services, investors pay fund management fees.

Within the broad category of investment funds, there is a wide variety of business models. Different types of investment funds cater to investors with varying investment objectives and risk appetites. There is no single way of categorising investment funds, but key aspects of their business models include the following dimensions: the investment strategies that they employ; whether they are offered to retail or institutional investors; whether they are actively managed or not; and the redemption profile of the fund.

One way of differentiating across different types of funds is through the investment strategies they employ (Figure 6):

- Equity funds invest in shares of corporations. Within this broad category, different funds specialise in particular segments of the market, for example specific regions, industries or company size. As funds invest in many different stocks, they provide an efficient way for investors to diversify their portfolios. Equity funds are the largest fund type in Ireland.
- Bond funds invest in debt securities. These include bonds issued by governments, financial corporations or non-financial corporations. As above, within the broad category of bond funds, different funds will specialise in particular segments of the market, for example specific credit ratings or industries. Bond funds are the second largest fund type in Ireland.
- Mixed funds have a more diversified portfolio, investing in both equities and debt securities. In doing so, they enable investors to take positions in the stock market, albeit with a more modest overall risk and return profile than what would typically be associated with funds that invest in equities alone.

[7] Modified Gross National Income (GNI*) is an additional measure of the level of the Irish economy developed by the Central Statistics Office (CSO) to take into account the disproportionate impact of globalisation on the measurement of the size of the Irish economy. For more information, see: https://www.cso.ie/en/releasesandpublications/in/nie/in-mgnicp/

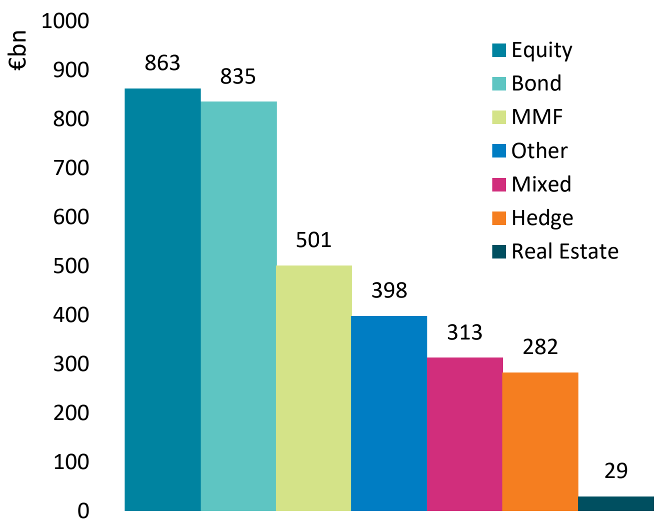
- Money market funds (MMFs) invest in debt securities that are highly rated, are particularly liquid, and have very short maturities. These securities typically include short-term government bills of advanced economies and short-term debt securities of large financial and non-financial corporations. Given the short-term nature of their investments, MMFs are often used as an alternative to bank deposits. Companies, for example, typically use MMF shares as a way to invest excess cash over short periods.

- Hedge funds are actively-managed investment funds that employ a wide range of strategies to achieve desired returns for investors. These strategies are diverse and include exploiting opportunities for profit arising in financial markets (e.g. event driven or directional strategies). In search for higher returns, hedge funds tend to engage in more complex activities than other fund types; they may short sell securities (employing long-short strategies), tend to make extensive use of financial derivatives and are usually leveraged.

- Real estate funds invest in real estate. They may buy properties with the intention of selling them at a later time at a premium, generate rental income from owned real estate, or fund the development of real estate projects with the aim of eventually selling or renting them. They can also obtain an exposure in real estate by investing in equities and debt securities of corporations such as property development companies and real estate investment trusts.

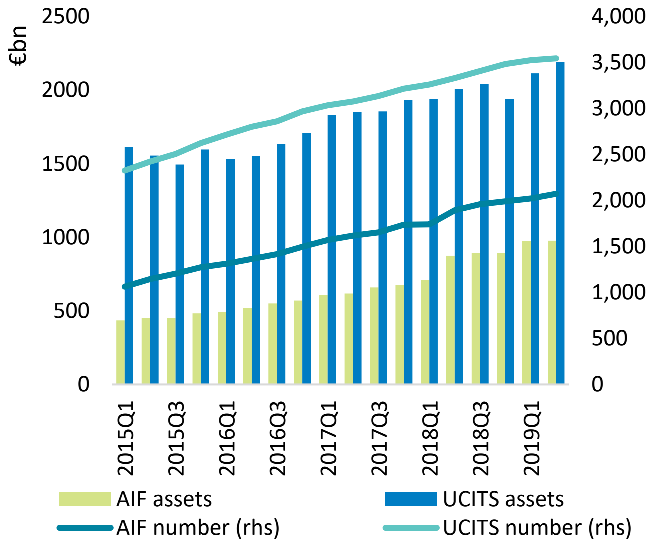
- 'Other' funds do not fit into any of the above categories, and have a range of different business models. In Ireland, the biggest group by far within this category of 'other' funds is represented by so-called Liability Driven Investment (LDI) funds. LDI investment strategies are designed to meet future liabilities of fund investors. LDI funds' investors are typically pension funds, which have a well-defined profile of future liabilities that they need to be able to cover.

Figure 6: Total assets of funds domiciled in Ireland, by fund type (Q2 2019)



Source: Central Bank of Ireland and authors' calculations.

Figure 7: Total assets and numbers of UCITS and AIF investment funds



Source: Central Bank of Ireland and authors' calculations.

Another key differentiation across investment funds is the extent to which they are targeted to retail or institutional investors. Although there is no specific data on this split, a proxy for that – albeit imperfect – is the regulatory framework under which they fall. Investment funds domiciled in the European Union are established under one of two regulatory frameworks. These are the Undertakings for Collective Investments in Transferable Securities (UCITS) Directive and the Alternative Investment Funds Managers Directive (AIFMD), which differ in requirements and scope. Whether an investment fund establishes itself under UCITS as opposed to the AIFMD is a proxy for whether it caters mainly to retail rather than professional investors. In the main, Alternative Investment Funds (AIFs) are targeted to a professional investor base due to the higher complexity of their activities and investments. By this proxy, two-thirds of Irish investment fund assets as at the second quarter of 2019 were targeted to retail investors, with UCITS funds accounting for approximately €2.2tn in assets and 3,500 funds, while AIFs sum up to close to €1tn and are around 2,000 in number (Figure 7). Most of equity, bond and mixed funds are established under UCITS, while hedge funds, property funds and 'other' funds are typically AIFs.

Another key dimension of funds' business models is whether they are closed-ended or open-ended. Closed-ended funds raise a fixed amount of capital by issuing shares. They have a finite closed-ended period and therefore do not provide for redemptions on a regular basis. In contrast, open-ended funds allow for redemptions of fund shares at a high frequency (e.g. daily, weekly, monthly, quarterly, etc). The majority of investment funds domiciled in Ireland are open-ended. However, there are some differences across fund types. For instance, many property funds domiciled in Ireland are set up as open-ended with limited liquidity (Figure 8.1). These funds offer redemption and/or settlement facilities on a less than quarterly basis (e.g. annually or semi-annually) or provide for a period of greater than 90 days between the dealing deadline and the payment of redemption proceeds.

The majority of Irish domiciled open-ended funds offer daily redemptions. Hedge funds, property funds and 'other' funds are notable exceptions, given that they are generally invested in less liquid assets and usually offer longer redemption frequencies (see Figure 8.2). While some property funds may have short redemption periods, they usually require at least a quarter to redeem shares. Property funds also show the largest percentages of funds that are closed-ended or open-ended with limited liquidity, as their investments are particularly illiquid. In Ireland, the property funds with daily-redeemable shares do not invest directly into real estate, but into real estate-related securities.

Most investment funds domiciled in Ireland are actively managed by asset managers. This means that the asset manager makes active investment allocation decisions, subject to the fund's mandate. This is especially the case for hedge funds, which are all actively managed. However, equity and bond funds also have a substantial proportion of passively-managed funds (Figure 8.3). This is where the funds simply track an index, reducing the asset management fees from the perspective of investors. These passively managed funds are made up mostly of ETFs (see Box A).

Box A: Exchange-Traded Funds

Exchange-Traded Funds (ETFs) are investment funds whose shares trade in secondary markets on exchanges. Most ETFs are passively managed and therefore track an index of securities. Their price typically changes together with movements in the price of the underlying securities in the index that they are tracking. One of the main characteristics of ETFs is their high liquidity in normal times, as they can typically be traded intra-day. They also provide an efficient way for investors to diversify their portfolio across a whole category of stocks and/or bonds (e.g. the S&P 500 index, which includes the top 500 listed corporations in the US) without having to physically hold or trade the underlying securities comprising the index.

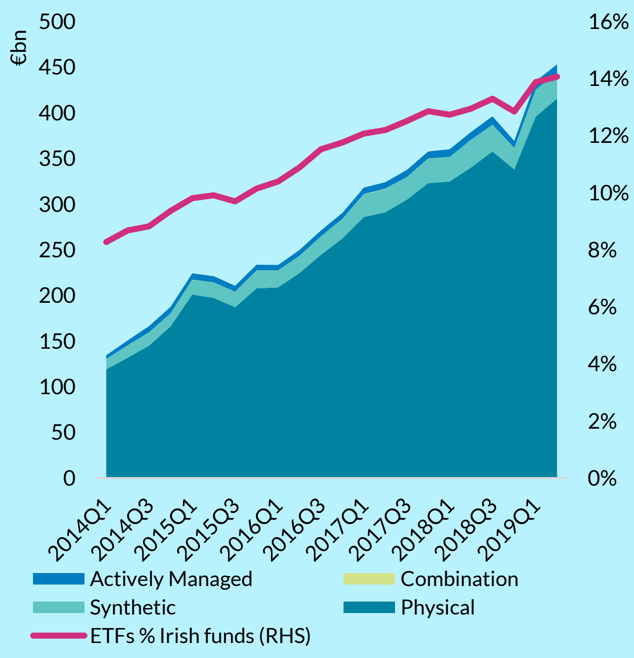
ETFs are traded in two separate markets. In the primary market, authorised participants (APs), usually bank groups and brokers, create and redeem shares of the fund in bulk, thus determining the supply of ETF shares. These are then traded in the secondary market by the other investors. Most of the trading activity happens in the secondary market. Irish domiciled ETFs are listed in regulated exchanges, usually either the London Stock Exchange, Euronext Dublin (Irish Stock Exchange) or both.

Ireland is one of the main locations for the domicile of ETFs internationally, and the largest in Europe, representing about two thirds of the total ETF market in the euro area. The assets of ETFs domiciled in Ireland have grown rapidly during the last five years, almost tripling since the beginning of 2014 to €450bn as at the second quarter of 2019. They now represent 14 per cent of all the assets of Irish investment funds, as opposed to 8 per cent at the start of the period (Figure A.1).

For Irish domiciled ETFs, the replication of exposures to an index is predominantly made via the physical purchase of the underlying assets. Some ETFs, called synthetic ETFs, may achieve the replication of an index by way of derivative contracts, which exposes them to a wider range of risks, including counterparty risk. However, they only represent a small share of the ETFs located in Ireland (Figure A.1). Irish domiciled ETFs mainly track equity and bond indices, with the majority of ETFs being equity funds and the rest government or corporate bond funds (Figure A.2).

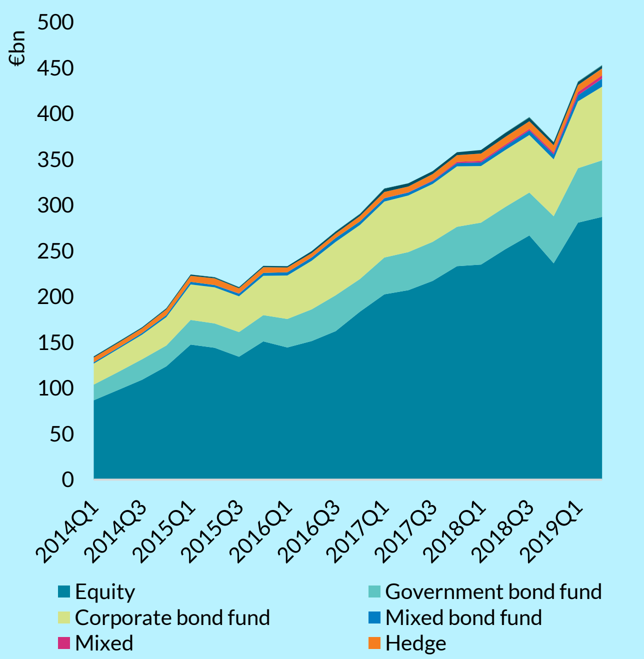
ETFs offer clear benefits to investors including diversification of portfolios, cost-related benefits and liquidity (as, in normal times, it is often the case that the liquidity in the ETF shares is higher than that of the underlying securities in the ETF). However, they could also be a source of amplification in times of stress.[8] For instance, activity in the primary market by APs is primarily driven by potential for profit from arbitrage opportunities. During market stress, APs may reduce their activity in this market or withdraw from the market altogether – adding to liquidity pressures in the market for ETFs as well as the underlying securities that the ETFs track.[9] This risk is likely to become more pronounced if the underlying assets in which ETFs invest are themselves particularly illiquid. Trading in ETFs rather than the underlying securities – like broader forms of passive investing – might also increase the correlation and co-movement in the returns of the securities making up a particular index.[10] Finally, the use of derivatives and securities lending by synthetic ETFs may also expose investors to counterparty risk.

Figure A1: Assets of Irish-domiciled ETFs, by ETF type (2014 Q1 – 2019 Q2)



Source: Central Bank of Ireland and authors' calculations.

Figure A.2: Assets of Irish-domiciled ETFs, by asset type (2014 Q1 – 2019 Q2)



Source: Central Bank of Ireland and authors' calculations.

There is also heterogeneity with respect to the base currency of investment funds domiciled in Ireland. The base currency is the currency used to compile the balance sheet, and often corresponds to the currency of denomination of the shares. The shares of half of all the Irish domiciled funds (by

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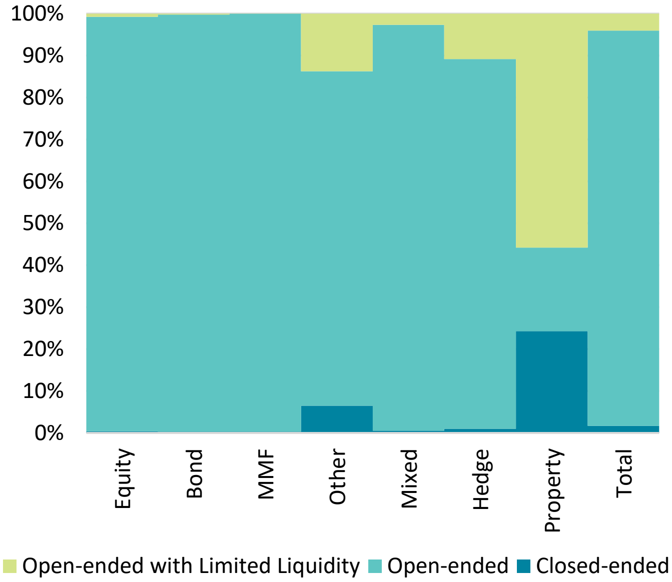
[8] See Grill et al. (2018).
[9] See Aquilina et al. (2019).
[10] See, for example, Sushko and Turner (2018).

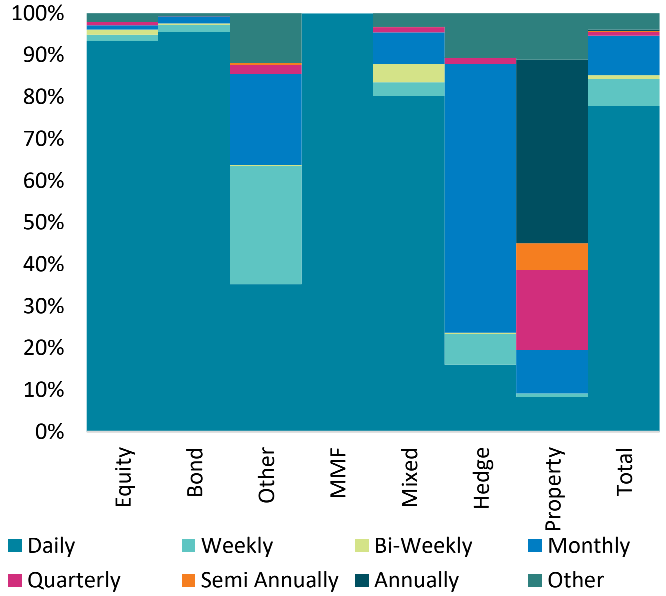
assets) are denominated in US dollars, and over a quarter in sterling, with the rest being denominated in euro. This is in line with the profile of the typical investors of Irish funds, who tend to be located in the US, UK and euro area. As shown in Figure 8.4, there is substantial heterogeneity with respect to the currency base by fund type. For example, most hedge, bond and equity funds have US dollars as the base currency, while 'other' funds have sterling as the base currency due to the presence of LDI funds. Property funds, most of which invest in Irish real estate, tend to have their base currency in euro.

Figure 8: Irish domiciled fund characteristics by type (by assets, Q2 2019)

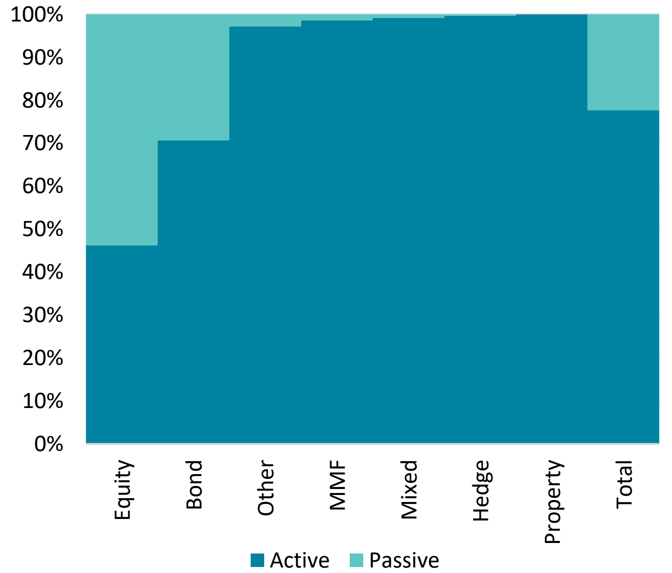
8.1 Redemption profile



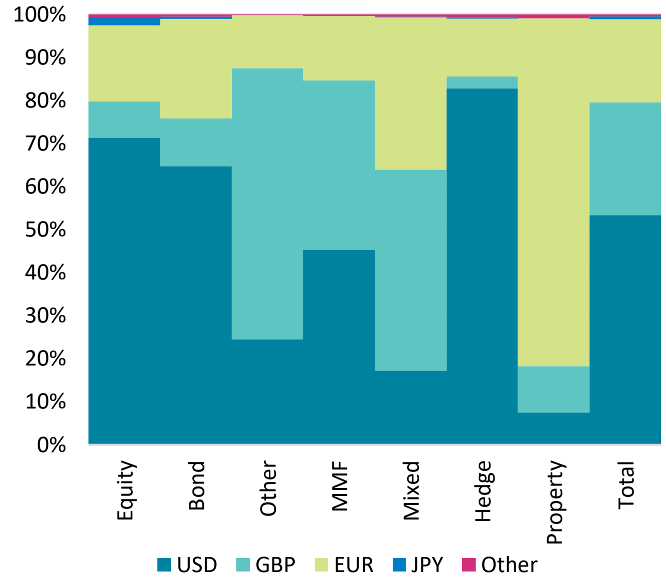
8.2 Dealing frequency of funds that are not closed-ended



8.3 Strategy (active vs. passive)



8.4 Currency of the fund

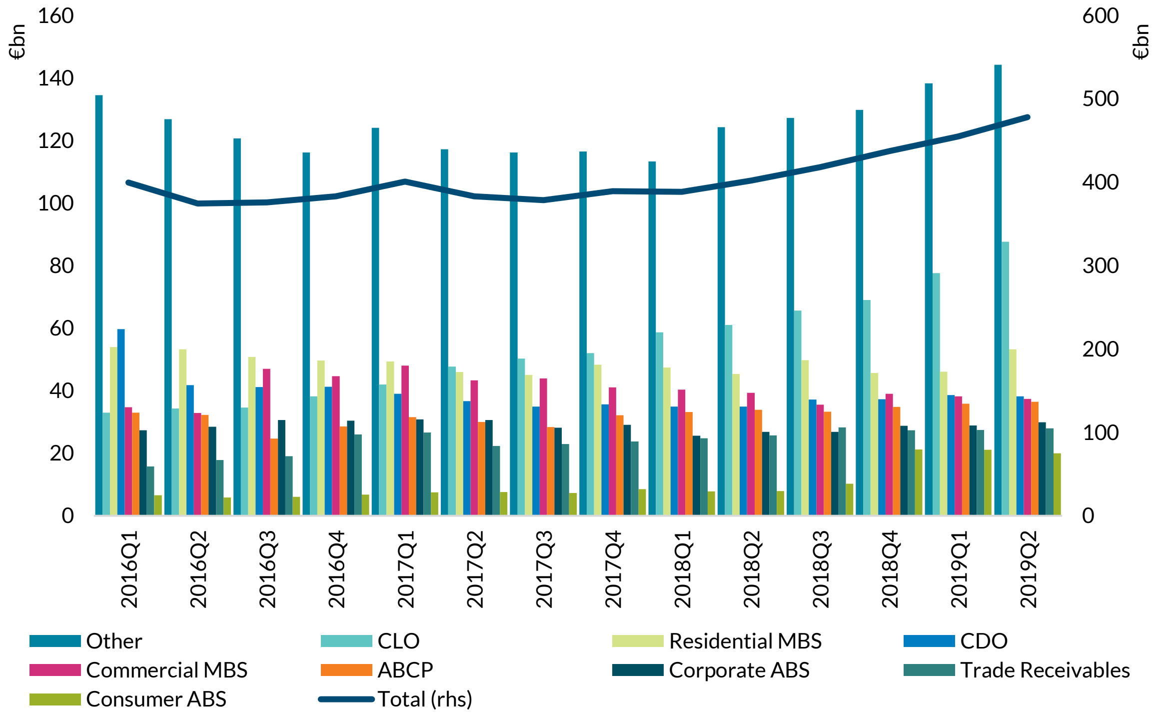


Source: Central Bank of Ireland and authors' calculations.

3.2 Securitisation vehicles

Securitisation vehicles are special purpose entities (SPEs) set up to engage in securitisation activity. Securitisation is the process of issuing new transferable securities backed by existing assets such as loans, mortgages, credit card debt or other assets, such as accounts receivables. Securitisation involves the transfer of assets and risk from the balance sheet of the vehicle's sponsor (the institution setting up the vehicle) to the vehicle's balance sheet. As noted above, Ireland is the largest jurisdiction in the euro area for the domicile of securitisation vehicles, with approximately €480 billion in assets, or 23 per cent of total euro area assets in the second quarter of 2019.[11] The number of securitisation vehicles domiciled in Ireland stood at approximately 1,050 in this period.

Figure 9: Irish domiciled securitisation vehicles' assets by securitisation type - business model (Q2 2019)



Source: Central Bank of Ireland and authors' calculations.

Securitisation can be an efficient way of risk sharing across the financial system or diversifying the funding base of financial institutions. Securitisation can enable sponsoring entities, such as banks, to free up their balance sheets by transfering risk to other investors, and can contribute to a more diversified funding base for sponsoring entities. Investors may also benefit by diversifying their portfolios to a wider asset pool than would otherwise be the case. Ultimate borrowers might also benefit from securitisation by gaining access to a wider range of investors, mediated by securitisation activity.

There are many different types of assets that are securitised through Irish domiciled securitisation vehicles. The securities issued by securitisation vehicles take the name of the underlying assets backing them and the cash flows associated with them. These include, for example, residential mortgage-backed securities (RMBS), commercial mortgage-backed securities (CMBS), consumer and corporate asset-backed securities (ABS), asset-backed commercial paper

[11] The Central Bank of Ireland has previously published a range of studies focused on Irish domiciled securitisation vehicles' activites. See, for example, Godfrey, Killeen and Moloney (2015), Kenny, Killeen and Moloney (2016), Fiedor and Killeen (2019), Galstyan, Maqui and McQuade (2019), Golden and Hughes (2018) and McCarthy et al. (2019).

(ABCP), collateralised debt obligations (CDOs) and collateralised loan obligations (CLOs). Figure 9 shows that the three largest categories of securitised assets include "other" securitisations, CLOs and RMBS. Along with CLOs, the "other" category has expanded strongly in recent quarters. As described in Golden and Hughes (2018), "other" securitisations comprise a plethora of assets including, for example, cash flows from nursing home receipts, royalty payments or life settlements. CLOs are a segment of the securitised market which has gained increasing attention from international regulators and policymakers in recent years. Box B focuses on CLO vehicles domiciled in Ireland.

Box B: Collateralised Loan Obligations[12]

Collateralised Loan Obligations (CLOs) vehicles are financial intermediaries that engage in the securitisation and repackaging of leveraged loans. Leveraged loans are non-investment grade loans provided to corporations that are highly indebted and/or are owned by private equity sponsors. CLO vehicles purchase syndicated leveraged loans typically originated by banks and bundle them together. They then issue debt securities (Collateralised Loan Obligations) backed by these loans as collateral. They typically issue different tranches of CLOs with different credit ratings, whereby the highest-rated tranches have seniority over the lower-rated ones.

As at the first quarter of 2019, the total assets outstanding of CLO vehicles domiciled in Ireland stood at €78bn, representing approximately two-thirds of the outstanding value of European CLO securities according to market sources. This compares to estimates of $700-800bn for the global market of CLOs (which is dominated by US vehicles). CLOs have been a key source of demand for global leveraged loans, a market with an estimated outstanding value of loans between $1.4tn and $2.2tn at end-2018.

In common with global trends, the assets of Irish domiciled CLOs have grown rapidly in recent years, as their value grew from €15.7bn as recently as the start of 2014 (see Figure 8 above). US and UK asset managers and private equity firms are ultimately responsible for setting up the vast majority of Irish-resident CLOs. The syndicated loans in the balance sheets of Irish domiciled CLOs provided funding to non-financial corporations located in the euro area, the US and the UK (Figure B.1). NFCs receiving syndicated loans were concentrated in a few specific industries: healthcare, chemicals, computer and electronics, professional services, media and retail represented more than half of the exposures throughout the period.

Backed by these assets, the debt securities – i.e., the Collateralised Loan Obligations – issued by Irish domiciled CLO vehicles stood at €67.6bn in the first quarter of 2019. The ultimate holders of 69 per cent of the above €67.6bn CLOs issued by these vehicles, or €46.5bn, can be identified through the European Securities Holdings Statistics (SHS). The largest investor locations among the holders identified were the euro area (€17.8bn), the US (€9.3bn), Japan (€7.5), and the UK (€7.2bn). More than half of euro-area investors were investment funds, followed by insurance corporations and banks.

Leveraged loans allow highly indebted corporations to obtain new funding, and the activity of CLOs contributes to increased demand for leveraged loans through a more diversified investor base. Therefore, CLOs can both facilitate financing to the real economy and spreading risks among different types of investors. However, in the underlying market for leveraged loans, there is also some evidence of increased risk-taking, lower credit quality and weaker covenants, which can pose vulnerabilities.

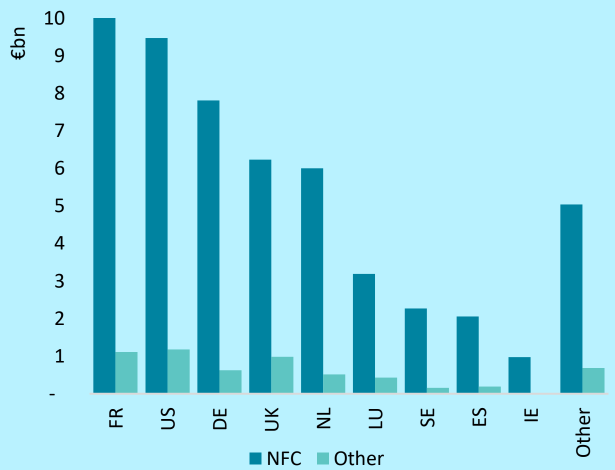
One potential source of vulnerability stems from a possible mispricing of risk. Consistent with global trends, the proportion of leveraged loans (in volume) held by Irish-domiciled CLOs with cov-lite contracts increased steadily in recent years to reach 84 per cent of the loans in the books of Irish CLOs

[12] This box builds on analysis by McCarthy et al. (2019) entitled "The Who's Who of Irish Collateralised Loan Obligations."

as of the second quarter of 2019 (Figure B.2).[13] At the same time, leverage ratios in the NFCs receiving credit have also increased, reducing their ability to repay their debts in case of a downturn. While these two factors combined might indicate decreasing credit quality and increased risk of losses to investors, the weighted average coupon rates on CLO securities have not moved significantly, and neither has the ratings distribution of the different CLO tranches.

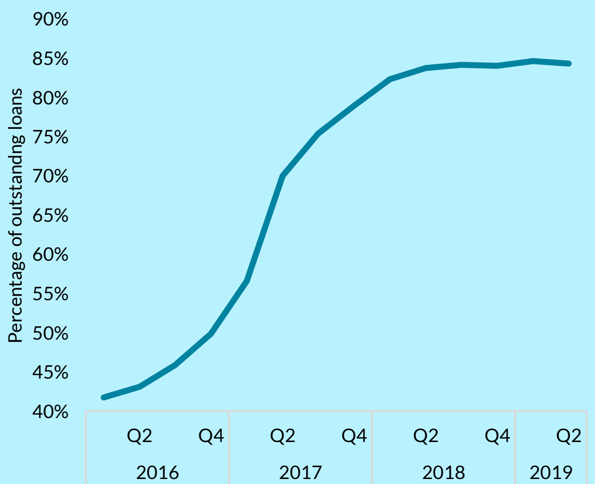
A second potential source of vulnerability stems from the relative illiquidity of the CLO market and the complexity in their linkages to other types of financial institutions. A sudden repricing of risk premia in financial markets could have a disproportionate impact on CLO securities due to their low liquidity and the higher risk nature of leveraged loans. An illiquid market implies that any fire-sale of CLO securities in a period of stress– for example, by investment funds with CLO investments experiencing redemptions – could result in a larger discount in their price, amplifying any market disruption. CLOs are also linked to banks through different channels (banks typically originate leveraged loans, some banks invest in CLOs directly, and some banks might act as sponsors to CLOs). A disruption in the CLO market could thus affect banks through loss of income on leveraged loan origination, mark-to-market losses on any CLO holdings or through sponsor linkages.

Figure B.1: Leveraged loans held by Irish CLO vehicles, by origin of exposure (Q2 2019)



Source: Central Bank of Ireland and authors' calculations.

Figure B.2: Cov-lite deals in the balance sheets of Irish domiciled CLOs (Q1 2016 – Q2 2019)



Source: Central Bank of Ireland and authors' calculations.

3.3 Non-securitisations vehicles

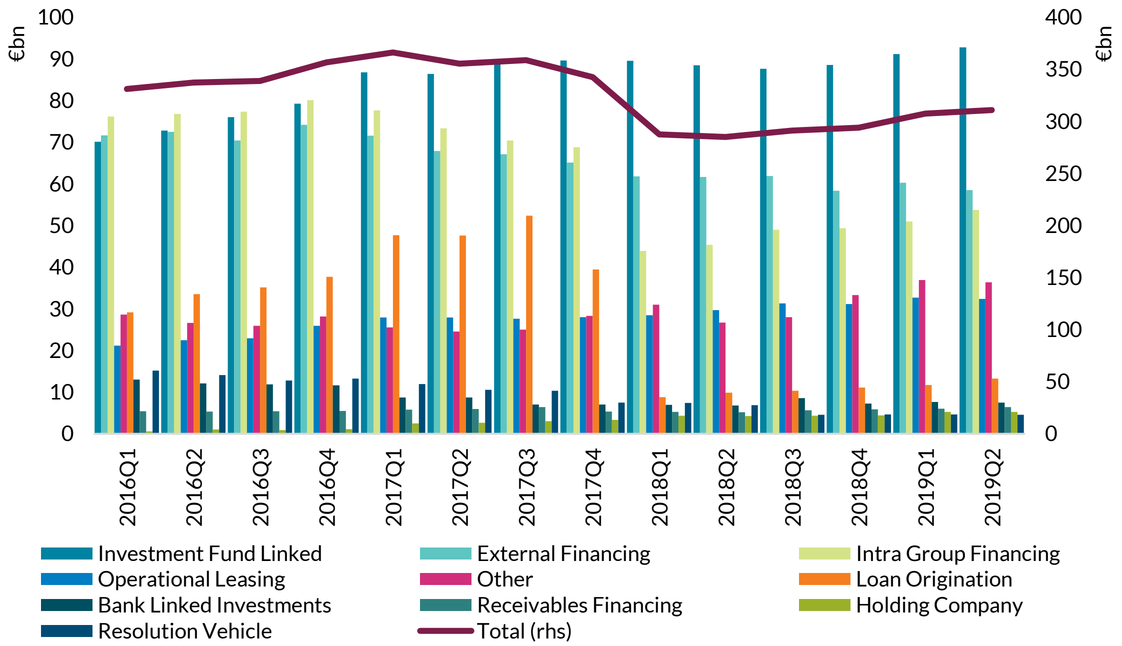
Beyond securitisation vehicles, Ireland is also host to a large number of other special purpose vehicles (SPVs) engaged in a range of diverse activities.[14] Similar to securitisation vehicles, these non-securitisation vehicles are not prudentially regulated by the Central Bank of Ireland as independent entities, but they are subject to data reporting requirements. Data on these entities were first collected by the Central Bank of Ireland in the third quarter of 2015 in order to deepen the understanding of their business models and potential financial stability risks associated with their activities. As shown in Figure 10, the total assets of Irish-domiciled SPVs amounted to €311bn at the end of June 2019.

This type of financial vehicle is a special legal entity, set up to fulfill narrow and specific objectives. Non-securitisation SPVs are set up under Irish law according to Section 110 of the Irish

[13] Covenants on a loan or bond protect creditors' interests by requiring the borrower to take lower risks. Covenant-light (or cov-lite) contracts represent contracts where covenants are rather weak, and investors do not require borrowers to be subject to financial maintenance tests to measure their debt servicing capacity.
[14] For further information on the activities of non-securitisation vehicles domiciled in Ireland, see Golden and Maqui (2018).

Taxes Consolidation Act (1997). The main types of activities relate to investment fund-linked SPVs, external financing and intra group transactions. Investment fund-linked SPVs are vehicles which are linked to investment funds and hold debt, equity, loans or other financial assets with the goal of capital appreciation, interest or dividend income. Intra-group financing vehicles are SPVs set up to facilitate loan funding from, and to, intra-group companies. In contrast, external financing vehicles act as intermediaries for the raising of funding obtained by external sources which are then provided to the parent as a loan. A more detailed discussion of the diverse business models and activities of these vehicles is included in Golden and Maqui (2018).

Figure 10: Irish domiciled non-securitisation vehicles' assets by type - business model (Q1 2016 - Q2 2019)



Source: Central Bank of Ireland and authors' calculations.

4 Domestic and international linkages of Irish domiciled entities engaged in market-based finance

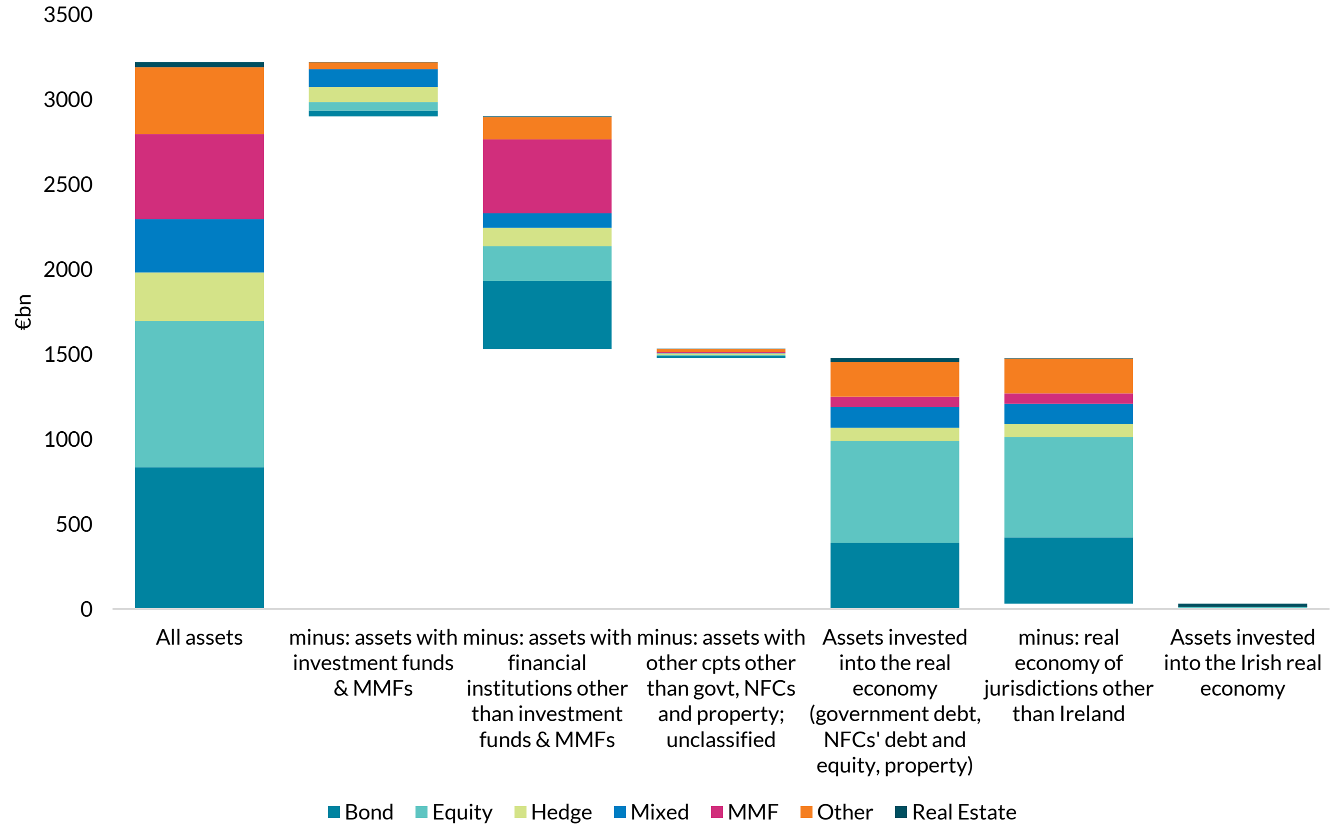
Understanding the role played by the market-based finance sector resident in Ireland – and, so, the potential vulnerabilities that might arise from these activities – requires a mapping of the investments of the entities in this sector. This section considers the links between different segments of the non-bank financial sector in Ireland and the global economy and financial system.

4.1 Investment funds

Around half of the Irish funds sector's investments provide debt and equity financing to global financial institutions, supporting economic activity indirectly. Over one trillion euro were invested in securities issued by financial institutions, excluding holdings of shares of other investment funds. A significant part of this was made up of bank debt securities, which are typically held by MMFs and bond funds. Irish-domiciled funds also had significant investments in other financial institutions, including special-purpose entities (for example, in the form of holdings of securitisations issued by these vehicles). In this way, Irish resident investment funds act as a key intermediary of capital within the financial system. They effectively channel investor savings towards financing of other financial institutions. This financing – in turn – is likely to support lending or other investments in the real economy by these financial institutions.

Around half of Irish funds' investments provide debt and equity financing to the real economy, supporting economic activity directly. The assets that Irish-domiciled investment funds directly invested into the real economy stood at €1.5 trillion at the end of June 2019 (Figure 11). For the purposes of this *Note*, we define real economy exposures as securities issued by non-financial corporations and the government as well as property and land. The majority of this exposure comes from equity and bond funds, which typically hold, respectively, equity and debt securities issued by non-financial corporations as well as government debt. While investments by the fund sector in the Irish real economy, standing at €32.8 billion, represented a small fraction of the total, it is nevertheless significant relative to the size of the Irish economy. This exposure to the Irish domestic economy was primarily from real estate funds (€19.0bn) and equity funds (€9.8bn) (see Box C for a more detailed description of the links between the market-finance sector and the Irish economy).

Figure 11: Total assets held by Irish domiciled investment funds, by fund type and exposure type (Q2 2019)

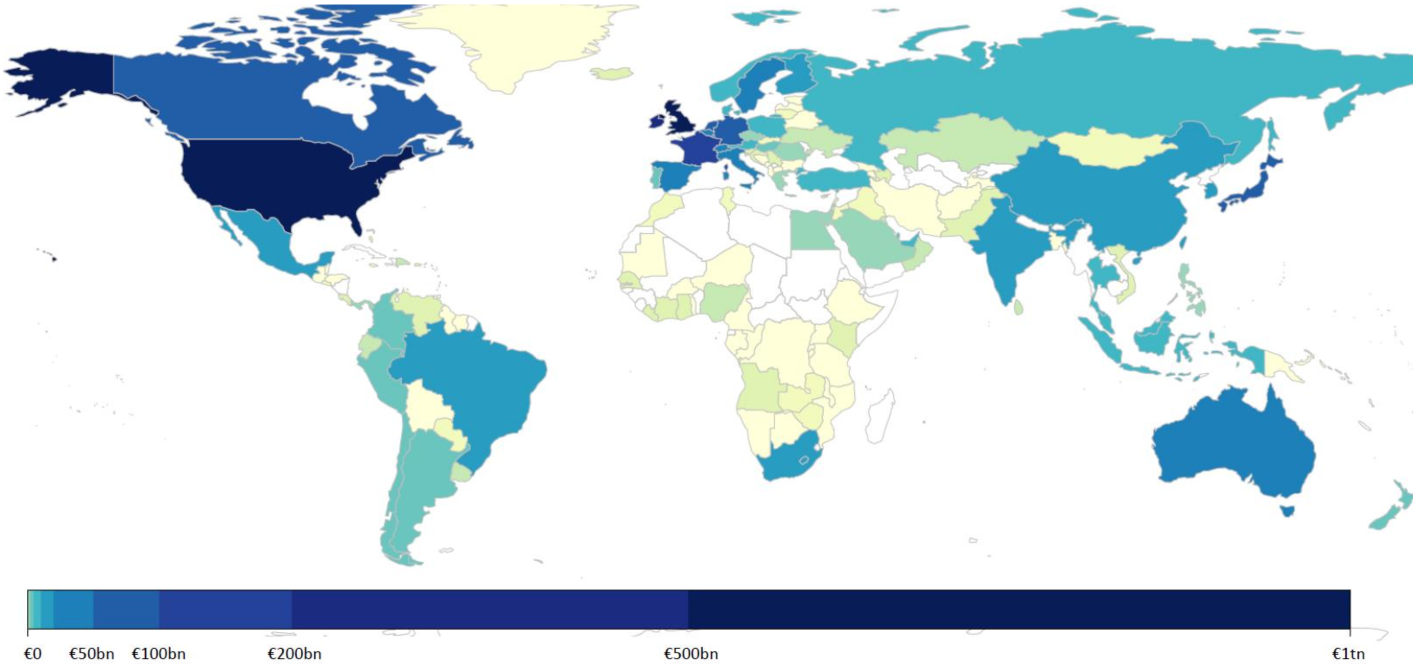


Source: Central Bank of Ireland and authors' calculations.
Note: For the purposes of this *Note*, we define real economy exposures as securities issued by non-financial corporations and the government as well as property and land.

The Irish domiciled funds sector is internationally oriented, with particularly significant investments in Europe and North America. Figure 12 shows how, at the end of 2018, Irish domiciled investment funds' assets were distributed across the world. The most significant exposures in nominal terms were to advanced economies, in particular the US, UK and other countries in the EU. However, they also had exposure to a number of emerging markets, from Asia to Central and South America.

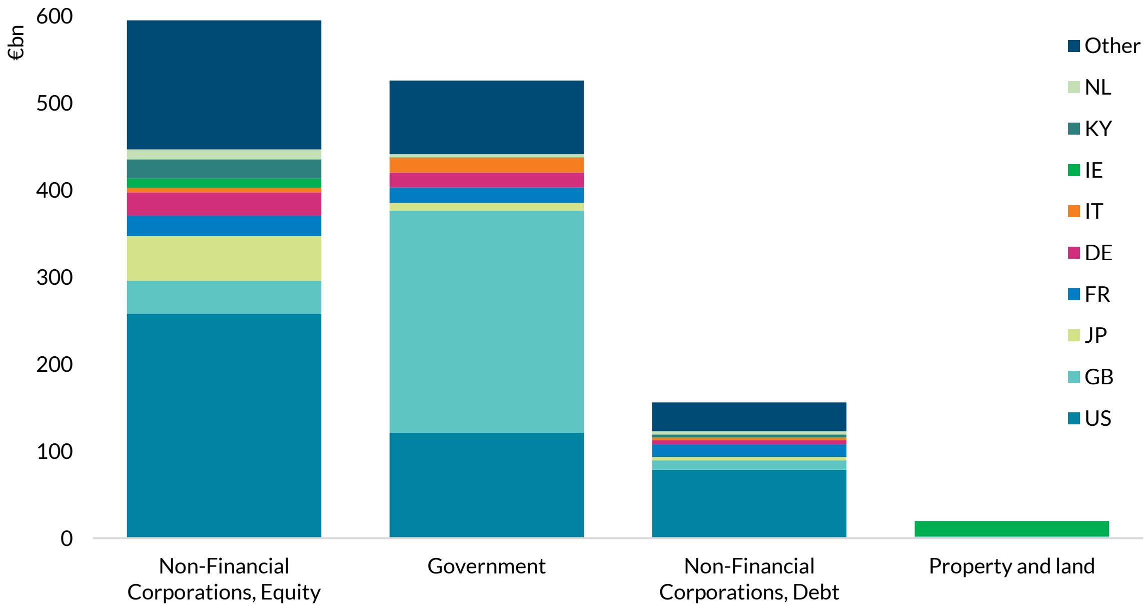
Irish domiciled funds provide direct financing to the real economies of a number of jurisdictions, mainly through investments in equities and government debt. Figure 13 describes in more detail the location of the direct exposures of Irish funds to the real economy. These related mainly to the United States and United Kingdom, followed by several countries in the euro area and Japan. While no other country made up a significant share of the fund sector's assets, Irish domiciled funds also have considerable exposure to real economy sectors in the rest of the world and emerging markets, especially through holdings of emerging market equities. About half of the non-financial corporate equity and debt securities held by Irish domiciled funds were issued by US corporations, while half of the sovereign debt held was issued by the UK government and a fifth by the US.

Figure 12: Irish domiciled investment funds' geographical distribution of exposures, total assets held, by country of assets, in € (Q4 2018)



Source: Central Bank of Ireland, World Bank and authors' calculations.
Note: Where GDP data for 2018 was not available, the value for 2017 was used. GDP data (in USD) was converted into Euro at the end-of-year exchange rate.

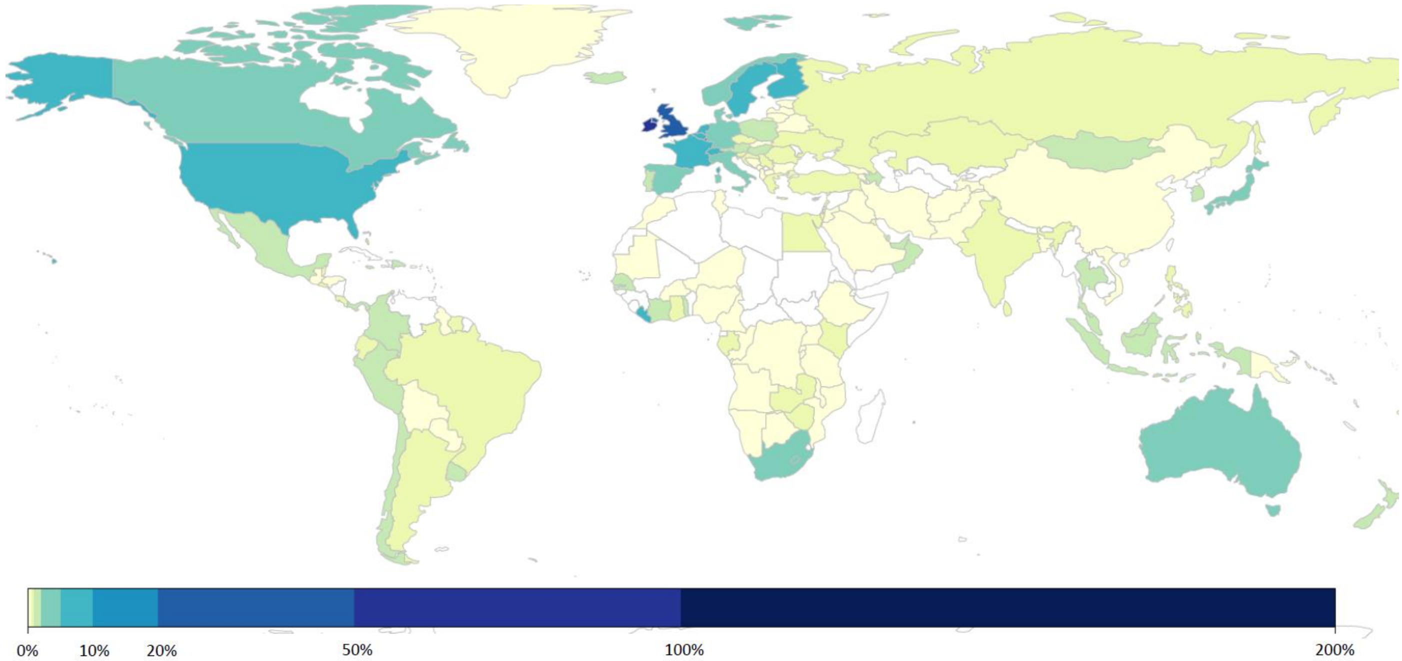
Figure 13: Irish investment funds' direct exposures to the real economy, by jurisdiction of exposure (Q4 2018)



Source: Central Bank of Ireland and authors' calculations.

Investments by the Irish-resident funds sector are material relative to the size of some recipient countries' economy. Figure 14 shows the size of Irish funds' investments relative to recipient countries' GDP. Assets held by Irish domiciled investment funds accounted for as much as 28 per cent of the economy of the UK, and more than 5 per cent of those of the US and a number of countries in Europe, including France, the Netherlands and Belgium. Irish investment funds' assets also represented a very large share of the economy of international financial centres, such as the Cayman Islands, the Marshall Islands and Luxembourg. However, as these countries are international financial centres, Irish funds' investments are likely unrelated to the domestic economy.

Figure 14: Irish domiciled investment funds' geographical distribution of exposures, total assets held, by country of assets, as a percentage of the country's Gross Domestic Product (Q4 2018)



Source: Central Bank of Ireland, World Bank and authors' calculations.
Note: Where GDP data for 2018 was not available, the value for 2017 was used. GDP data (in USD) was converted into Euro at the end-of-year exchange rate.

Table 1: Heatmap of funds' exposures by asset class, as a percentage of the total estimated value of the outstanding securities in that asset class (Q4 2018)

	Equity	Debt Securities			Property
	Listed Corporations	Government	Financial Corporations	Non-Financial Corporations	Professionally Invested CRE
IE	*2.0%	0.4%	0.5%	5.3%	*35.7%
EA (excl. IE)	1.5%	0.4%	2.1%	2.3%	0.0%
UK	1.5%	11.1%	3.0%	2.5%	0.0%
US	1.0%	0.7%	0.3%	1.5%	0.0%

Source: Central Bank of Ireland, World Federation of Exchanges, Bank for International Settlements and authors' calculations.
Note: CRE = Commercial Real Estate. *Due to data limitations, these numbers were estimated using different methodologies.
This table draws on data from a number of different sources to estimate the total outstanding market values. The data and underlying methodologies may not be fully consistent across these sources.

Investments by the Irish-resident funds sector account for a significant share of total investment in some markets, including the Irish commercial real estate market and the UK Gilt market. To understand the importance of Irish-domiciled investment funds for the functioning of the respective markets in which they invest, one metric is the size of Irish funds' investment relative to the total outstanding stock of investments in that market. Employing this metric, some markets emerge as particularly reliant on investments by Irish domiciled funds (Table 1). These are the Irish commercial property market and the UK government bond market. Irish funds also hold non-trivial shares of the outstanding stock of debt securities issued by financial and non-financial corporations in Europe.

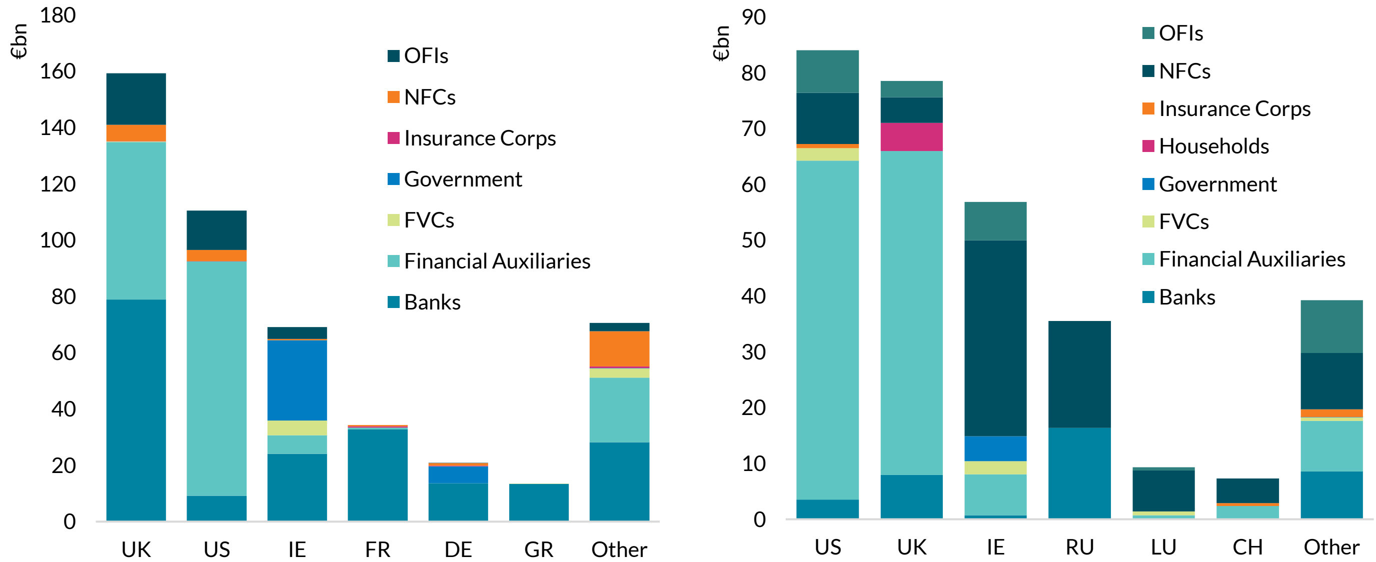
4.2 Special-purpose entities (securitisation vehicles and non-securitisation vehicles)

Securitisation vehicles domiciled in Ireland have substantial cross-border and cross-sector linkages, in particular through their sponsor entities. As shown in Figure 15.1, most of the entities active at the end of June 2019 were sponsored by banks or so-called financial auxiliaries (companies which provide auxiliary financial services and other financial advisory and consultative services, such as investment advisory firms). Most of the sponsors were domiciled in the UK, US, Ireland, France or Germany. While bank sponsors were mostly European, over half of US sponsors were financial auxiliaries. A substantial share of securitisation vehicles were sponsored by UK and US OFIs and investment funds. Almost half of Irish-sponsored vehicles were Irish government-sponsored securitisation vehicles and are related to the National Asset Management Agency (NAMA). A number of vehicles was also sponsored by Irish domiciled banks as a way of securitising certain assets in their balance sheets. This is explained in further detail in Box C.

Figure 15: Assets of financial vehicles, by country and sector of their sponsors (Q2 2019)

15.1 Sponsors of Irish domiciled securitisation vehicles, by country and type

15.2 Sponsors of Irish domiciled non-securitisation vehicles, by country and type



Source: Central Bank of Ireland and authors' calculations.

Unlike securitisation vehicles, which are mainly sponsored by banks, non-securitisation SPVs are predominantly sponsored by financial auxiliaries and NFCs. These non-securitisation SPVs also have substantial cross-border linkages, with most of the foreign sponsors domiciled in the UK, US and Russia. While about a third of non-securitisation SPVs assets were sponsored by UK and US financial auxiliaries, a substantial share of their assets were also sponsored by Irish and Russian domiciled NFCs (Figure 15.2).

Box C: Linkages between the Irish-resident market-based finance sector and the domestic economy[15]

Although the majority of assets of the Irish-resident market-based finance sector are domiciled abroad, the sector is also an important provider of financial services for the domestic economy and financial system. There are three key mechanisms through which the Irish-resident market-based finance sector supports domestic economic activity.

First, investment funds have emerged as some of the most active investors in the domestic commercial real estate market. Irish-resident investment funds hold around €18 billion in Irish property, accounting for about a third of the estimated stock of investable commercial real estate in Ireland.[16] The liabilities of these funds are mainly – though not entirely – foreign. Effectively, international capital is being deployed in the domestic commercial real estate market, channelled via investment funds. To support their investments in property, these funds borrow from a mix of domestic and international banks, shareholders loans and other financial institutions. While the vast majority of these institutions' investments are in the office, industrial and logistics sectors, more recently they have also been active investors in the private rental segment of the residential market.

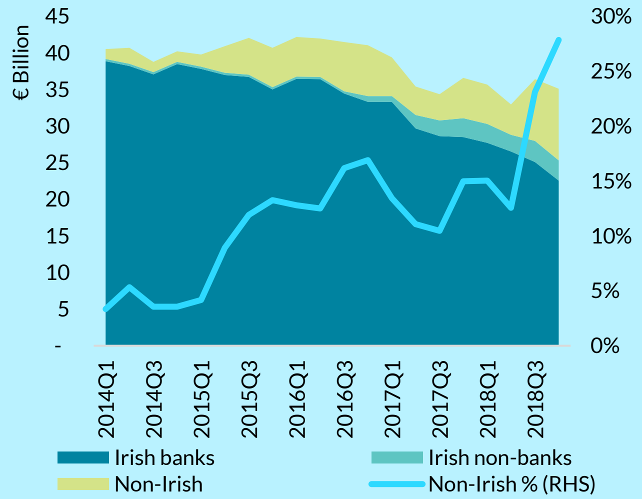
Second, Irish banks and non-bank entities securitise mortgage exposures for funding and liquidity purposes. The majority of residential real estate loans held by Irish securitisation vehicles are owned by vehicles sponsored by the Irish banks themselves. The Irish bank sponsors typically hold the debt securities issued by these vehicles (Figure C.1). This is called retained securitisation and these types of debt securities are traditionally used by banks as collateral, for example to access central bank liquidity. Securitisations can also be used by both banks and non-banks as an alternative source of funding. For example, non-bank mortgage lenders with no access to a deposit base can use securitisation markets to access funding that may not otherwise have been available. Overall, securitisation is an important source of liquidity and funding for the Irish mortgage market. At the end of 2018, around €35bn out of the €118bn Irish residential mortgages outstanding,[17] or 30 per cent of the total, was held by Irish-domiciled SPEs. The majority of that was retained securitisations by Irish banks.

Third, securitisation and non-securitisation special purpose entities have supported the gradual reduction of non-performing loans (NPLs) on banks' balance sheets, facilitating the post-crisis repair of the banking system. In recent years, banks in Europe, and in Ireland, have made extensive use of securitisations to reduce their exposure to NPLs, as well as selling NPLs to non-securitisation vehicles. High levels of NPLs adversely affect banks' profitability and weaken their financial position and credit quality. Selling these exposures means that the overall credit quality in the balance sheets of Irish banks has improved, allowing the banks to extend new credit lines to customers. These loan sales have typically been to vehicles with foreign sponsors. Foreign-sponsored vehicles now hold around €20bn of commercial real estate loans (Figure C.2), the vast majority of which are legacy, non-performing loans. More recently, banks have also started selling mortgage NPLs. The exposure of foreign-sponsored vehicles to residential mortgages has thus also risen, reaching just below €10bn at the end of last year (Figure C.1).

Overall, there are important and growing linkages between the Irish domiciled market-based finance sector and the domestic real economy. These are both through direct investments in real property assets and through allowing other financial institutions to lend to domestic households and businesses.

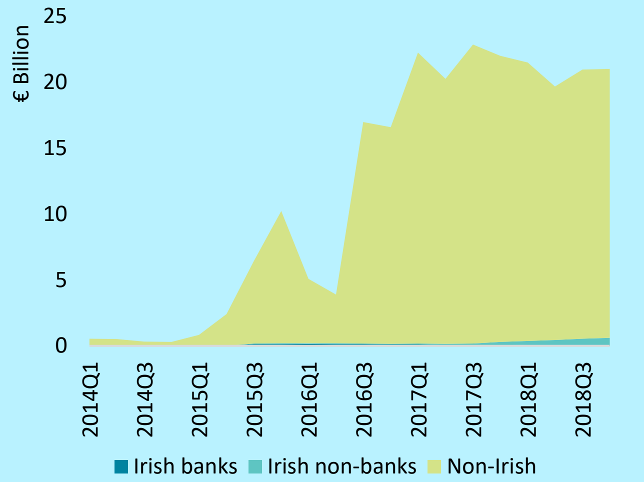
[15] This box is based on ongoing analysis by Coates et al. (forthcoming).
[16] For further details on the role of investment funds in the Irish real estate market, see, for example, Central Bank of Ireland (2019) and Coates et al. (2019).
[17] See Central Bank of Ireland Mortgage Arrears Statistics for further details.

Figure C1: Holdings of Irish residential real estate loans by Irish domiciled SPEs, by type of sponsor of the vehicle (Q1 2014 – Q4 2018)



Source: Central Bank of Ireland and authors' calculations.

Figure C.2: Holdings of Irish commercial real estate loans by Irish domiciled SPEs, by type of sponsor of the vehicle (Q1 2014 – Q4 2018)



Source: Central Bank of Ireland and authors' calculations.

5 Potential sources of vulnerability from market-based financing activities

While market-based finance activities complement the banking sector in providing alternative sources of financing, like all forms of financial intermediation, they can lead to financial vulnerabilities. Non-bank financial institutions can engage in liquidity transformation and employ leverage in support of their financial intermediation activities. They may also be strongly interconnected with the banking and insurance sectors in a range of markets including through funding, derivatives and securities financing transaction (SFT) markets. These characteristics can lead to a build-up of vulnerabilities within the financial system.

Ireland's role as a hub for international financial intermediation activities means that many of the intermediation chains involving Irish domiciled non-bank financial institutions can take place on a cross-border basis. As non-bank financial institutions are subject to varying degrees of prudential supervision depending on the regulatory regime of their host location, international surveillance exercises are required to better identify potential vulnerabilities and risks. On this basis, the Central Bank of Ireland actively participates in international monitoring exercises for the market-based finance sector as described in further detail in Section 6. Given the plethora of business models domiciled in the market-based finance sector in Ireland, the potential sources of vulnerability vary depending on their specific activities. This section examines in greater detail the potential sources of vulnerabilities linked to investment funds and securitisation vehicles separately.

5.1 Potential sources of vulnerability associated with investment funds

One potential source of vulnerability from investment funds stems from liquidity transformation. This can occur when open-ended funds are invested in less liquid assets, while allowing their investors the opportunity to redeem their shares at a higher frequency. In times of stress, these investment funds could be exposed to the risk of large redemption requests. Investment funds with significant liquidity mismatches may have to sell assets quickly and at a discount to fulfil redemptions. In turn, this may lead to fire sales of assets and a withdrawal of funding from other systemically important sectors (e.g. banks), impairing the functioning of key markets.

The degree of liquidity transformation among investment funds domiciled in Ireland varies depending on the type of fund. Table 2 outlines one measure of liquidity mismatch. This metric provides a high level overview of liquidity transformation guided by the FSB's definition in their international monitoring exercise. In measuring liquidity mismatch, this indicator takes into account both the market liquidity of funds' assets as well as the nature of funds' liabilities. On this metric, of all the categories of Irish-resident funds, bond funds appear more susceptible to liquidity mismatch. This reflects the fact that some funds are invested in illiquid bonds such as high-yield corporate bonds or emerging market bonds, whilst simultaneously offering daily redemptions. Despite the extreme illiquidity of their underlying assets, many Irish domiciled real estate funds have relatively long redemption frequencies, which mitigate, to some extent, the underlying risks. In addition to looking at average measures of liquidity mismatch, Figure 16.1 shows that – within each category of fund – there is significant dispersion. Therefore, there are pockets of funds that are particularly exposed to redemption risk.[18]

Further work is needed at an international level to measure and monitor developments in liquidity mismatches. For example, equities are usually classified as liquid instruments in international monitoring exercises as most equities are traded daily on regulated stock exchanges with a high volume. However, that may not always be the case, as some equity funds might invest in non-listed equities, with lower liquidity.

Table 2: Indicators of liquidity mismatch and leverage by Irish-domiciled fund type, (Q4 2018)

	Liquidity transformation	Leverage
Bond	1.58	1.11
Equity	1.17	0.99
Hedge	1.06	1.42
MMF	1.15	1.03
Mixed	1.17	1.15
Other	0.90	2.08
Real Estate	1.10	1.67

Source: FSB, Central Bank of Ireland and authors' calculations.
Notes: The liquidity transformation and leverage metrics above are guided by the methodology developed by the FSB. Liquidity transformation corresponds to (AUM - liquid assets [broad] + short term liabilities [≤ 30 days] + redeemable equity [≤ 30 days]) / AUM. The leverage metric corresponds to AUM / NAV. Liquid assets are defined in this *Note* as cash, deposits, government and bank debt (advanced economies), or equities (advanced economies).

A second potential source of vulnerability from investment funds stems from the possibility of excessive leverage. Leverage in investment funds can be a source of risk in a scenario where rapid deleveraging can give rise to spillovers 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. Again, this may lead to fire sales of assets and a withdrawal of funding from other systemically important sectors (e.g. banks), impairing the functioning of key markets.

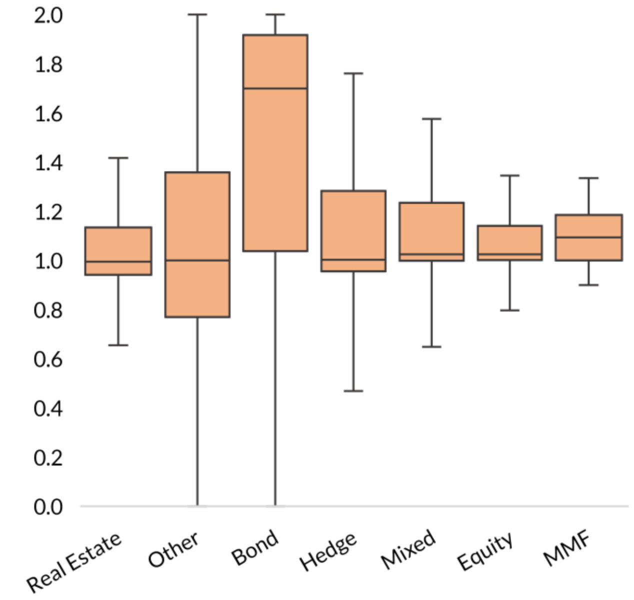
The degree of leverage among investment funds domiciled in Ireland also varies depending on the type of fund. 'Other' funds domiciled in Ireland have significant leverage. The leverage for these type of funds is primarily driven by the size of the LDI funds in Ireland. LDI funds seek to replicate the pay-out profile of liability exposures of pension funds by investing in different maturities of government debt. The LDI sector engages in leverage via derivatives and SFTs. Beyond 'other'

[18] Liquidity analysis of Irish domiciled bond funds and MMFs was also presented in Metadjer and Moloney (2017). Investment funds domiciled in Ireland have a range of liquidity management tools available to them. A description of such liquidity management tools is provided in Daly and Moloney (2017). Shaw and Dunne (2017) also consider risks related to investment funds' activities and find that risks vary significantly depending on the investment focus of the fund.

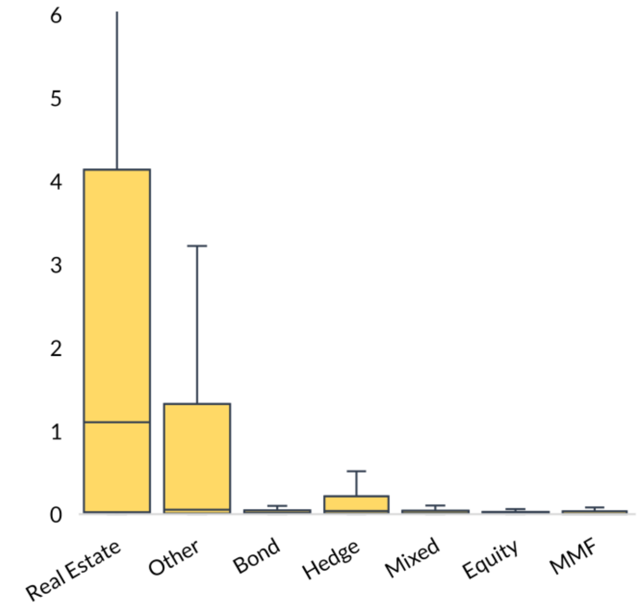
funds, the average leverage of Irish resident funds that invest in the domestic CRE market has increased in recent years and there is evidence of a pocket of highly levered funds that require closer scrutiny. Leverage of these funds is predominantly from loans, with over half coming from financial institutions such as bank loans. The remainder stems from shareholder loans and borrowing from other third parties.[19] In terms of the distributions of the leverage indicator, 'other' funds and real estate funds have both elevated levels and a wide distribution of leverage (Figure 16.2).

Figure 16: Distribution of liquidity transformation and leverage risk metrics, by fund type (Q4 2018)

16.1 Distribution of liquidity transformation risk metric, by fund type



16.2 Distribution of leverage risk metric, by fund type



Source: Central Bank of Ireland and authors' calculations.
Notes: Leverage capped at 6 in Figure 16.2 for presentation purposes. Some outliers, in particular for real estate funds, are above this threshold. The liquidity transformation and leverage metrics above are guided by the methodology developed by the FSB. Liquidity transformation corresponds to (AUM - liquid assets [broad] + short term liabilities [≤ 30 days] + redeemable equity [≤ 30 days]) / AUM. The leverage metric corresponds to AUM / NAV. Liquid assets are defined in this *Note* as cash, deposits, government and bank debt (advanced economies), or equities (advanced economies). Boxes represent the inter-quartile range, with the middle line being the median value. Outliers are not shown.

Further work is required to measure and monitor developments in leverage in a more comprehensive manner. For example, the leverage metric in Table 2 focuses on balance sheet leverage. In practice, investment funds also take on leveraged positions through off-balance sheet instruments, like derivatives. Therefore, simple metrics of leverage may not provide a comprehensive picture of trends in the sector. The International Organization of Securities Commissions (IOSCO) is developing a framework to help measure leverage used by investment funds in a more comprehensive manner.

Given their interconnectedness with the global financial system, Irish domiciled funds could act as transmitters of shocks, both globally and domestically. The transmission of shocks could occur both directly and indirectly, to the international financial system and to the domestic economy. As described in Section 4, investment funds domiciled in Ireland can hold a large share of total outstanding amounts in certain asset classes. Interconnections between investment funds and global banks mean that an adverse shock to market-based finance may amplify shocks to other parts of the financial system. Links between banks and funds are also a key component of

[19] See Central Bank of Ireland (2019) and Coates et al. (2019) for further detail on the leverage and activities of real estate funds.

international monitoring exercises for the market-based finance sector and therefore continuous close scrutiny of these linkages is required.[20]

5.2 Potential sources of vulnerability associated with securitisation vehicles

One potential source of vulnerability associated with securitisation vehicles stems from the possibility of mispricing of risk. Assessing the risk of securitisations can be complex. It requires not only an assessment of the risk of individual underlying loans, but also of the correlation in the risk of these loans. This can be difficult to assess, especially when structural changes in the markets mean that historical data may not provide an accurate reflection of potential future trends. This was one of the issues associated with the mispricing of risk of mortgage-backed securities in the run-up to the crisis. As highlighted in Box B, CLOs are currently facilitating the provision of credit to highly indebted corporations, which are particularly vulnerable to shocks. This is taking place in the context of structural changes in the underlying market for leveraged loans, with a gradual and persistent weakening of covenants, which may make history a less useful guide to future losses. Such concern is why a number of authorities internationally are assessing the risks associated with CLOs, including the pricing of risk in the CLO and leveraged loan markets.

Another potential source of vulnerability associated with SPEs stems from the possibility of contingent liability risks for sponsors. As the financial crisis demonstrated, banks were subject to step-in risk and provided support to unconsolidated entities even in the absence of contractual obligations to do so.[21] Credit and liquidity lines provided by banks to SPEs act as an additional channel for the transmission of shocks between the banking and market-based finance sectors. In the run-up to the crisis, some forms of securitisations involved a significant mismatch between the maturity of assets and the maturity of the liabilities. Currently, this is less of an issue for SPEs based in Ireland. The average duration of liabilities of Irish-resident securitisation vehicles is relatively long. Moreover, regulatory developments such as the specific framework for simple, transparent and standardised ('STS') securitisation introduced in 2019 and the Basel Committee on Banking Supervision's guidelines on step-in risk, which are due to be introduced in 2020, will improve transparency for monitoring risks in this part of the market-based finance sector.

6 Conclusions and policy considerations

The resilience of market-based finance in its current scale – both in Ireland and internationally – remains untested in times of stress. The growth in market-based finance means that these sources of financing have become increasingly important, both as a means of financing financial institutions and as a means of financing the real economy directly. Relative to a decade ago, potential disruptions in the provision of market-based finance are likely to have a more material macro-financial impact. At the same time, changes in the nature of financial intermediation complicates the assessment of these risks. The past is unlikely to be a good guide to the future, as these markets may behave differently now than they have in the past.

From a financial stability perspective, a key priority internationally is deepening policymakers' understanding of the potential implications of a disruption in this form of finance on economic activity. Gauging the links between market-based finance and the domestic or global economies and financial systems – as per the contribution of the *Note* – is part of that process. Stress-testing segments of the market-based finance sector to understand the potential impact of the collective behaviour of these entities is an additional element of that. Both the Central Bank of Ireland and

[20] For a discussion on risks from the interconnectedness between banks and non-bank financial institutions, see, for example, Abad et al. (2017).
[21] See, for instance, BCBS (2017).

international authorities have been taking forward work on stress testing elements of the non-bank financial sector, in some cases as part of system-wide stress testing approaches.[22]

Given the international nature of the sector domiciled in Ireland, an important component of monitoring frameworks includes international engagement and cooperation. The Central Bank of Ireland already actively engages with international organisations such as the FSB and ESRB, that conduct top-down annual monitoring exercises to assess potential risks to global or European financial stability from market-based finance activities. In addition, there are a number of ongoing international policy initiatives aimed at enhancing the policy framework in the areas of liquidity and leverage of investment funds. Both the FSB and the ESRB have published policy recommendations in the area of liquidity mismatch and leverage in funds in recent years.[23] Given its broad mandate, the Central Bank of Ireland has been an active contributor to these international workstreams.

Further consideration needs to be given to developing and operationalising the macroprudential policy framework for the market-based finance sector.[24] While the macroprudential policy toolkit for the banking sector is operational, there are currently no active macroprudential policies in place covering the market-based finance sector as a whole – in Ireland and in most other countries. Indeed, beyond Article 25 of the AIFMD, which allows for the imposition of macroprudential leverage limits on part of the investment fund sector, there are currently no ex-ante EU-wide macroprudential policies available to authorities to activate for the market-based finance sector. Moreover, no EU country has so far activated Article 25 of the AIFMD. As the macroprudential authority for Ireland, the Central Bank of Ireland has – and will continue to – engage with EU authorities such as the ESRB to progress the development of a macroprudential framework for the market-based finance sector.

[22] See, for example, Fiedor and Katsoulis (2019) which develops a macroprudential stress testing framework for investment funds based on Central Bank of Ireland data. The Bank of England has also undertaken analysis on system-wide stress simulation. See, for example, Aikman et al. (2019) and Baranova et al. (2017).
[23] For further information on these recommendations, see FSB (2017) and ESRB (2018).
[24] For an overview of macroprudential policy beyond banking in the EU, see ESRB (2016).

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List of abbreviations

ABCP = Asset-Backed Commercial Paper

ABS = Asset-Backed Security

AIF = Alternative Investment Fund

AIFM = Alternative Investment Fund Manager

AIFMD = Alternative Investment Fund Managers Directive

AP = Authorised Participant

AUM = Assets Under Management

Bn = billion

CDO = Collateralised Debt Obligation

CMBS = Commercial Mortgage-Backed Security

CLO = Collateralised Loan Obligation

CRE = Commercial Real Estate

CSO = Central Statistics Office

EA = Euro area

ECB = European Central Bank

EU = European Union

EUR = Euro

ESRB = European Systemic Risk Board

ETF = Exchange-Traded Fund

FSB = Financial Stability Board

FVC = Financial Vehicle Corporation

GBP = British pound

GDP = Gross Domestic Product

GNI* = Modified Gross National Income

IE = Ireland

IOSCO = International Organization of Securities Commissions

IMF = International Monetary Fund

JPY = Japanese Yen

LDI = Liability-Driven Investment

MBF = Market-Based Finance

MMF = Money-Market Fund

NAMA = National Asset Management Agency

NBFI = Non-Bank Financial Intermediation

NFC = Non-Financial Corporation

NPL = Non-Performing Loan

OFI = Other Financial Intermediary

OTC = Over The Counter

RMBS = Residential Mortgage-Backed Security

SFI = Special Financial Institution

SFT = Securities-Financing Transaction

SPE = Special-Purpose Entity

SPV = Special-Purpose Vehicle

STS = Simple, transparent and standardised

Tn = trillion

UCITS = Undertaking for Collective Investment In Transferable Securities

USD = United States Dollar

Banc Ceannais na hÉireann
Central Bank of Ireland

Eurosystem