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TECHNICAL NOTE

ASSET MANAGEMENT AND FINANCIAL STABILITY

Prepared By
**Monetary and Capital Markets
Department**

This Technical Note was prepared by IMF staff in the context of the Financial Sector Assessment Program in Country. It contains technical analysis and detailed information underpinning the FSAP's findings and recommendations. Further information on the FSAP can be found at <http://www.imf.org/external/np/fsap/fssa.aspx>

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Glossary

AIFM	Alternative Investment Fund Manager
CBI	Central Bank of Ireland
CEPS—ECMI	Center for European Studies—European Capital Markets Institute
CIV	Collective Investment Vehicle
CNAV	Constant Net Asset Value
CSO	Central Statistics Office
DM	Developed Markets
ECB	European Central Bank
EM	Emerging Markets
ESMA	European Securities and Markets Authority
EU	European Union
FSAP	Financial Sector Assessment Program
FSB	Financial Stability Board
FVC	Financial Vehicle Corporation
GDP	Gross Domestic Product
HY	High Yield
IF	Investment Fund
IG	Investment Grade
IMF	International Monetary Fund
IMMFA	Institutional Money Market Funds Association
IOSCO	International Organization of Securities Commissions
MMF	Money Market Fund
NAV	Net Asset Value
OFI	Other Financial Intermediary
SEC	Securities and Exchange Commission
SPV	Special Purpose Vehicle
UCITS	Undertaking for Collective Investment in Transferable Securities
U.K.	United Kingdom
U.S.	United States

EXECUTIVE SUMMARY

This Technical Note takes stock of the risks to domestic and international financial stability associated with the asset management industry in Ireland. The study is motivated by a number of considerations: the Irish-domiciled asset management industry has grown rapidly since the last FSAP (in 2006), which recommended a review of industry activities; recently compiled security-level data allow for a richer analysis than was previously possible; and the analysis is in keeping with the broader global trend of increased supervision of asset management activities and entities.

Boasting a highly skilled English-speaking workforce, and a business and regulatory environment conducive to cross-border operations, Ireland has emerged as a globally significant hub for fund-based financial intermediation. The value of assets invested via Irish domiciled collective investment vehicles (CIVs) has risen from €770 billion in 2009 Q4 to €2.7 trillion in 2015 Q4, equivalent to 12.6 times GDP (4 times bank assets). It is now the domicile of choice for more money market and hedge fund assets than any other country in the euro area. The asset management industry has important cross border dimensions: most assets and liabilities are held offshore; key staff are typically located offshore; and asset managers from more than 50 countries have established CIVs in Ireland.

The analysis herein is structured along several lines. First, the potential for CIVs to either encounter or transmit stress is assessed by appraising: liquidity and ‘solvency’ risk for large money market funds (MMFs); liquidity risk in large Emerging Market (EM) and High Yield (HY) bond funds; and leverage concentration among investment funds (IFs) more broadly. Second, the issue of interconnectedness is examined through an assessment of the exposure of Irish domiciled CIVs to the domestic economy; geographical and sectoral concentration risk; and cross shareholdings. Third, data gaps are addressed, as they relate to key priorities in the broader effort to shine a light on financial intermediation conducted by asset managers.

Notwithstanding limitations in the scope of the analysis, most of the avenues for domestic financial instability that could emanate from Irish-domiciled MMFs and IFs appear to be contained at the present time. MMFs have established liquidity buffers well in excess of those required to withstand historical redemption shocks, and appear able to withstand the impact of large market shocks. Nevertheless, the high portfolio turnover associated with MMFs in general, and the prevalence of prime Constant Net Asset Value (CNAV) MMFs in Ireland in particular, means the risk of a widespread redemption shock cannot be ruled out. For the most part, large EM and HY bond funds appear able to accommodate plausibly-sized redemption shocks, although the inherent volatility in trading volumes suggests some caution. High levels of leverage are concentrated in a relatively small number of funds, though reporting conventions obscure an assessment of the true economic risk.

The potential for destabilizing spillovers from Irish domiciled money market and investment funds to the domestic economy appears limited. MMFs and IFs hold only a small share of their

portfolios in Irish assets, and only a small fraction of liabilities (typically share units) issued by Irish entities are held by such CIVs. From the perspective of geographical spillover risk, the main transmission channel would likely be a large-scale redemption shock emanating from the U.K. (which holds nearly half of all liabilities issued by Irish domiciled CIVs). Cross shareholdings, which are of interest because redemption shocks in one CIV could propagate through others, are concentrated in hedge and mixed funds, reflecting the greater representation of ‘Fund of Funds’ in this universe.

The Central Bank of Ireland has made important progress in addressing long-standing data gaps as they pertain to the asset management (and broader shadow banking) industry.

Outstanding priorities include: continuing to expand coverage of the remainder of the ‘Other Financial Intermediary’ sector (which in Ireland’s case is sizeable); measuring IF leverage in economically meaningful terms, as part of an EU-wide initiative; collecting data in a standardized form that would allow for CIV and sponsor links to be assessed in formal network mapping analysis; and attempting to gather more information on the characteristics of investors.

A number of initiatives could be helpful in further strengthening industry oversight (Table 1).

The authorities can realistically aim to achieve significant progress in all the areas covered by the initiatives in the near term, that is, within the next two years.

Recommendations	Relevant Agency
<i>Liquidity risk</i> — the Central Bank of Ireland should: monitor liquidity risk in MMFs and IFs with reference to (i) a minimum weekly liquid asset ratio, and (ii) characteristics and concentration of the investor base. More frequent liquidity stress tests should be informed by security level fund holdings.	CBI
<i>Market risk</i> — the Central Bank of Ireland should: build internal capacity that would allow for more frequent stress testing with respect to market shocks for MMFs, and IFs that avail of significant leverage.	CBI
<i>Leverage</i> — the Central Bank of Ireland should: strengthen oversight into the use of leverage by investment funds.	CBI
<i>Spillover risk</i> — the Central Bank of Ireland should: require evidence of communication from MMFs to investors with regard to contingent parental sponsor support; encourage MMFs to graduate away from the CNAV convention (beginning with new prime funds) to better reflect the variability in the value of underlying securities; and ensure appropriate risk management safeguards are in place where CNAV MMFs continue to operate.	CBI
<i>OFI Residual</i> —the Central Bank of Ireland and the Central Statistics Office (CSO) should: continue to cooperate in developing deeper insight into the ‘OFI residual’ composition.	CBI and CSO
<i>SPVs</i> — the Central Bank of Ireland should: examine whether the oversight of SPV governance arrangements should be stepped up, and the feasibility of a cap limiting the number of individual directorships.	Irish authorities
<i>Multilateral Cooperation</i> — the Central Bank of Ireland should: contribute to the development of standardized cross border data sharing arrangements pertaining to fund management activities/entities through relevant international fora; and advocate at the EU level for reporting conventions on leverage that would help to strengthen stability-related oversight of IFs.	CBI with EU authorities

INTRODUCTION¹

1. The analysis herein takes stock of the potential risks to financial stability associated with the Irish domiciled asset management industry.² The study is motivated by a number of considerations. First, following a period of robust growth, Ireland has now developed into one of the world's largest centers for non-bank financial intermediation. Any financial stability risks associated with asset management industry in Ireland would be important for Ireland and for international markets. Second, the analysis follows through on a recommendation from the previous (2006) FSAP to examine more closely the scope of potential risks posed by asset management activities in Ireland. Third, new security-level and supervisory data compiled by the Central Bank of Ireland (sourced directly from fund administrators), in its role as the securities regulator, allows for a richer degree of analysis than previously possible.³ Fourth, the analysis is in keeping with the broader global trend of increased supervision over the activities performed by asset managers and the collective investment vehicles (CIVs) they operate.⁴

2. Through CIVs, the asset management industry can play an important role in intermediating savings and investment (IMF 2015). Asset managers can efficiently channel financing to the real economy, serving as a 'spare tire' even when banks are distressed, thus helping to complete markets. CIVs operated by asset managers enable savers to build diversified portfolios best suited to their individual risk tolerance and long-term savings needs. From an issuer standpoint, financial intermediation conducted through CIVs can, in some circumstances, involve lower costs, fewer restrictions, and greater flexibility for firms compared with traditional bank-based financing.⁵

3. The worldwide shift toward non-bank financing since the global financial crisis has resulted in asset management activities—and the entities themselves—attracting increasing attention from regulators. This focus has been an extension of the broader global debate over shadow banking, and the designation of non-banks as systemically important financial institutions.⁶ Among the various issues raised in this dialogue, two principal concerns stand out. At the *activity* level, might asset managers contribute to disorderly market functioning (i.e., through imprudent

¹ Prepared by Bradley Jones, Monetary and Capital Markets Department, International Monetary Fund, in the context of the 2016 Ireland Financial Sector Assessment Program.

² The focus of this note is primarily concentrated on the collective investment vehicles (money market and investment funds) operated and managed by asset managers, rather than asset management firms themselves. The latter are typically offshore.

³ In other jurisdictions, these functions are rarely housed in one institution. This puts the Central Bank in a relatively unique position to perform stress testing of collective investment vehicles.

⁴ The CIV acronym is used throughout to describe both money market and investment funds.

⁵ This, however, may also expose firms to potentially more volatile market funding conditions.

⁶ A report by the Office of Financial Research (2013) which cited potential systemic risks emanating from the industry has spurred an active discussion among academics, supervisors, and the industry. A large number of qualitative analyses on this topic have since followed (see for instance, CEPS-ECMI, 2012; Elliott, 2014; Haldane, 2014; and Jones, 2015). IMF (2015) is one of the few studies to have addressed the issue in quantitative terms.

asset-liability management or excessive use of leverage), leading to an abrupt widening in risk premia and interruptions in the flow of financing to the real economy? ⁷ At the *entity* level, could stress experienced in one or a number of CIVs create spillovers so large as to require support from a parent sponsor? ⁸

4. Potential financial stability risks associated with asset management need to be carefully parsed in various respects. First, a distinction must be made between the types of risks that result purely from the presence of intermediating CIVs, and those that are merely a reflection of the behavior of underlying asset owners and would occur in the absence of intermediaries (Elliott, 2014; Novick and others, 2014). This is a non-trivial (but often overlooked) issue given most of the assets intermediated by managers are done so under highly constrained mandates; funds in which asset managers are afforded considerable discretion represent a minority of assets under management (Jones, 2016). Second, there is a great deal of heterogeneity in risk characteristics within the CIV universe that can render generalizations misleading. Third, while often conflated, the risks associated with a CIV and those pertaining to the asset manager itself are fundamentally different, and thus need to be addressed accordingly. Forth, though frequently discussed in similar terms, the risks in asset management and banking are also rather different. Along a number of dimensions, the asset management industry often has more attractive financial stability properties than its banking counterpart (Annex 1).⁹

5. The outline of this Technical Note is as follows. Section II provides an overview of the asset management industry in Ireland. In Section III, the scope of the analysis, key findings and associated limitations are discussed. Key policy proposals are set out in Section IV.

⁷ Asset managers have little control over when their liabilities might be called, but can manage their portfolio of assets in such a way as to withstand severe redemption shocks without impacting market conditions.

⁸ See Brady and others (2012) and Moody's (2010). The International Organization of Securities Commissions (IOSCO) Consultation Report (2012) also details the findings of the U.S. Securities and Exchange Commission (SEC) in relation to sponsor support: during the period August 2007-December 2008, SEC staff estimated that almost 20 percent of all U.S. money market funds (MMFs) received some support from their money managers or their affiliates. For the period 1980-2009, Moody's identified over 200 constant net asset value (CNAV) MMFs in the U.S. and Europe that benefited from sponsor support. The support peaked between 2007 and 2009 when over 60 funds (36 funds in the U.S., 26 in Europe) received sponsor assistance. Stress tests in the U.S. now require the asset management divisions of large bank holding companies to set aside capital to cover the risk that they may have to support certain investment vehicles during periods of market stress.

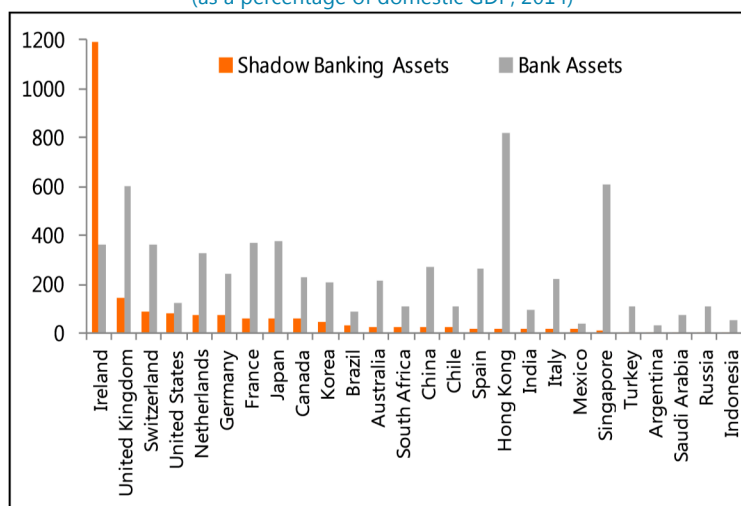
⁹ For instance: on the issue of liquidity risk, banks offer redeemability of deposits at par and on demand; in the case of CIVs, there is generally no presumption of redeemability at par (with the important exception of CNAV money market funds) and there are a host of mitigants available to fund managers when faced with an investor run. On solvency risk, banks are able to borrow substantial amounts of short-term debt (including demand deposit funding) on an on-going basis; they can gross up asset exposure via derivatives to a multiple many times higher than their equity capital; and they put their own balance sheet at risk when investing. By contrast, the most prominent CIVs such as bond and equity funds tend to be UCITs regulated and so have highly restricted access to borrowing; are constrained in the use of derivatives to gross-up portfolio leverage; and as pass-through vehicles, do not pose solvency risk for the sponsoring institution (i.e., investment risk is borne by the end investor, not the asset manager).

INDUSTRY BACKGROUND: ASSET MANAGEMENT IN IRELAND

6. Although accounting for just 0.3 percent of world GDP, Ireland has successfully promoted itself over recent decades as a key global center for international financial services.¹⁰ As a share of domestic GDP, Ireland has a large shadow banking industry and one of the world's largest banking sectors (Figure 1).¹¹ Ireland ranks as the fourth largest exporter of financial services in the European Union (EU).¹² Boasting a highly skilled English-speaking workforce, a competitive corporate tax regime, favorable 'ease of doing business' survey rankings, and a European regulatory environment that is conducive to cross-border operations, the sector is an important source of employment and related tax revenue.¹³

Figure 1. Worldwide Shadow Banking and Traditional Banking Assets (26 Countries)

(as a percentage of domestic GDP, 2014)



Source: Financial Stability Board.

¹⁰ Just over half of the institutions involved in international financial services are foreign-owned (with headquarters mainly in the United States, United Kingdom and Germany). These typically provide front, middle and back-office roles across a range of sub-sectors including banking and payments; asset management and servicing; insurance and reinsurance; and aircraft leasing and financing. Irish owned companies tend to focus on payments, financial technology, and services including business process outsourcing.

¹¹ In absolute US dollar terms, Ireland ranked third in the world by shadow banking assets as of December 2014, behind only the United States and United Kingdom in the (limited) 26 country sample of the Financial Stability Board (hereafter FSB, 2015). Shadow banking encompasses a broader range of activities than those conducted by the money market and other investment funds comprising the focus of this note. For instance, included under the FSB's (2015) definition of shadow banking are the following types of entities and vehicles: fixed income funds, mixed funds, credit hedge funds (economic function 1); finance companies, leasing companies, factoring companies, consumer companies (economic function 2); broker dealers (economic function 3); credit insurance companies, financial guarantors, monoclones (economic function 4); and securitization vehicles (economic function 5). The identification of an appropriate definition for shadow banking, and its implementation in an effective regulatory framework, are non-trivial issues (see for instance, FSB, 2011, 2013, 2015; and IMF, 2014).

¹² Republic of Ireland (2015).

¹³ Taxation has been a key part of Ireland's appeal for financial services and multinational corporations. Important elements include the 12.5 percent corporation tax rate for trading activities; a special tax regime for regulated investment funds and securitization vehicles; an extensive tax treaty network; tax incentives for technology

(continued)

7. The non-bank industry has become increasingly prominent in Ireland, particularly fund-based services.¹⁴ This shift has reflected industry dynamics and market conditions. Though banking has traditionally accounted for a significant share of overall Irish domiciled activity in international financial services, banks domiciled in Ireland have moved to shrink or slow the growth in balance sheets and retrench from principal investment activities (in line with global trends). On the asset management side, the post-2009 recovery in global asset prices has generated positive revaluation effects, while new investment flows have been attracted to CIVs, which can be distributed throughout the EU under the Undertaking for Collective Investment in Transferable Securities (UCITS) and Alternative Investment Fund Manager (AIFM) Directives.¹⁵ Ireland's highly competitive cross-border business environment, robust implementation of the EU's harmonized regulation of CIVs, and close ties with the large U.K. and U.S. funds management industries, have also contributed to this evolution.

8. The Irish domiciled asset management industry is now of global significance. The value of assets managed in Irish domiciled MMFs and IFs has risen from €770 billion in Q4 2009 to €2.3 trillion in Q4 2015, equivalent to 10.7 times GDP or nearly 4 times bank assets (Figure 2, left panel).¹⁶ The assets under management in Irish domiciled MMFs are second only to the U.S., accounting for 10 percent of the world total, and nearly half of the euro area total (Figure 2, right panel). Ireland accounts for 9 percent of global hedge fund assets, and more than two-thirds of the euro area total. By regional and global standards, it is also a significant domicile for bond and equity funds.¹⁷ There are over 4,000 funds and sub-funds listed on the Irish Stock Exchange, making it the largest in the world for fund listings.

investment; withholding tax exemptions for dividends and interest payments; and tax breaks for employees assigned to Irish based operations.

¹⁴ Other non-bank financial services, such as aircraft leasing and insurance, have also experienced solid growth.

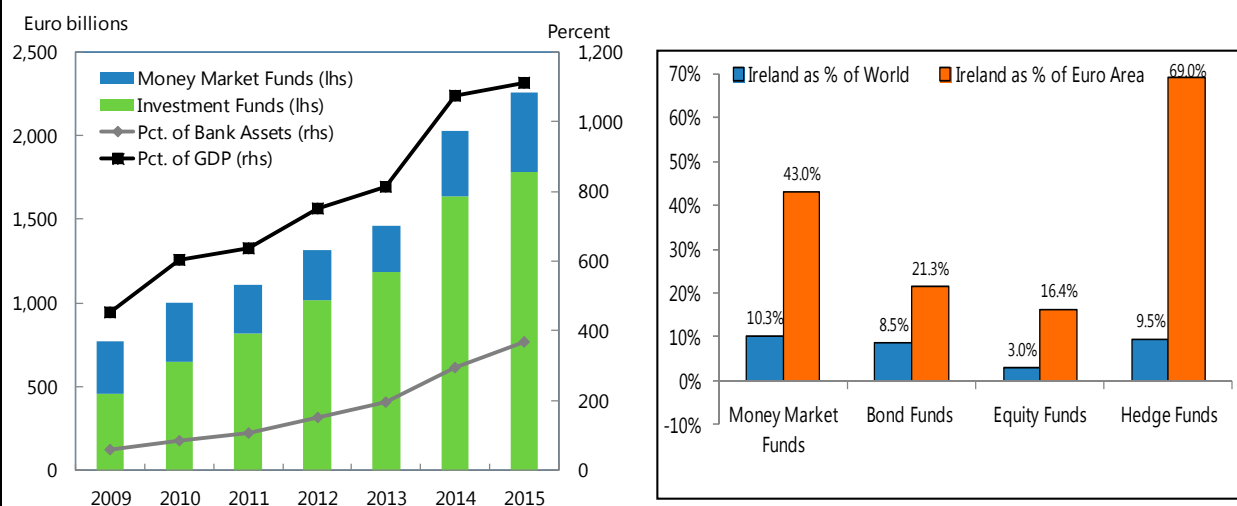
¹⁵ The UCITS Directive is a detailed, harmonized framework for investment funds that can be sold to retail investors throughout the EU. Originally introduced in 1985, the UCITS rules have been revised several times, most recently via the UCITS V Directive, which has applied from March 2016. UCITS funds account for around three quarters of the value of Irish domiciled CIV assets. The complementary AIFM Directive, established in 2011, seeks to create a harmonized EU framework for managers of alternative investment funds (by virtue of their risk, complexity, and illiquidity, AIFs are typically targeted at institutional investors). Both the UCITS and AIFM Directives aimed largely to ensure investor protection, and are required to be transposed into national EU country law.

¹⁶ Unlike MMFs and IFs, the value of assets intermediated through Irish Financial Vehicle Corporations (FVCs), which are established for the principal purpose of securitization and funded through public marketable debt, has only recently started to recover from the global financial crisis, a reflection of the broad based reduction in global securitization activity. As of December 2015, the value of assets intermediated through Irish domiciled FVCs stood at €431 billion, a 20 percent reduction from 2009 levels. FVCs are more closely aligned to shadow banking than conventional asset management *per se*, and are therefore tangential to the focus of this note.

¹⁷ According to Irish Funds (2015), within the fixed income and equity fund classifications Ireland is also the choice of domicile for half of the \$500bn exchange traded product industry in Europe.

Figure 2. Assets in Irish Domiciled Money Market and Investment Funds 1/

MMF and IF assets in absolute and relative terms MMF and IF assets in a regional and global context



Source: IMF Staff, CBI, ECB, ICI, European Fund and Asset Management Association, TheCityUK, Barclay Hedge.

1/ In terms of assets under management, investment funds (IFs) comprise bond funds (37 percent), equity funds (32 percent), mixed funds (13 percent), hedge funds (12 percent), real estate funds (1 percent), and other (5 percent). Reference to 'bank assets' includes all private deposit taking institutions in Ireland (both domestic and foreign owned subsidiaries).

9. There are important cross border dimensions to the asset management industry in Ireland. The assets and liabilities of Irish domiciled CIVs are largely offshore. The front, middle and back office staff are also often located abroad (particularly in the U.K. and U.S.), as are members of fund governing boards. Irish domiciled CIV assets are managed by around 900 asset managers from 50 countries.¹⁸ With respect to asset servicing (not a principal focus of this study), entities in Ireland act as administrator for around €3.6 trillion in CIV assets, nearly half of which are domiciled outside of Ireland. CIVs domiciled in Ireland fall under the purview of relevant EU wide and domestic regulation, where the Central Bank of Ireland is charged with supervision and oversight.¹⁹

¹⁸ Republic of Ireland (2015); PricewaterhouseCoopers (undated).

¹⁹ Virtually all MMFs in Ireland (and the EU) are regulated under the UCITS regime, while IFs, which include bond, equity, mixed, hedge, and real estate funds, are regulated pursuant to either the UCITS or AIFM Directives.

ASSET MANAGEMENT AND FINANCIAL STABILITY IN IRELAND

10. The analysis of financial stability issues associated with the Irish domiciled asset management industry is structured as follows. First, the potential for CIVs to either encounter or transmit stress is assessed through an appraisal of: liquidity and ‘solvency’ risk for MMFs;²⁰ liquidity risk in EM/HY bond funds; and leverage concentration among IFs. Second, the issue of interconnectedness (and resulting spillover risk) is examined through an assessment of the exposure of Irish domiciled CIVs to the domestic economy; geographical and sectoral concentration risk; and CIV cross shareholdings. Third, data gaps are addressed, as they relate to key priorities in the broader effort to shine a light on the evolving nature of financial intermediation conducted through asset managers.

A. CIVs and Possible Dislocations

11. For the large funds comprising the focus of this study, the analysis broadly suggests that Irish domiciled MMFs and EM/HY bond funds have established adequate buffers against stress events.²¹ According to available data, MMFs have liquidity positions (defined as the ratio of liquid assets to total assets) that are 2–3 times the industry standard, and 3–6 times higher than levels needed to withstand a repeat of the worst historical redemption shock experienced by each fund over the past decade (Figure 3).^{22,23} However, the high portfolio turnover associated with MMFs

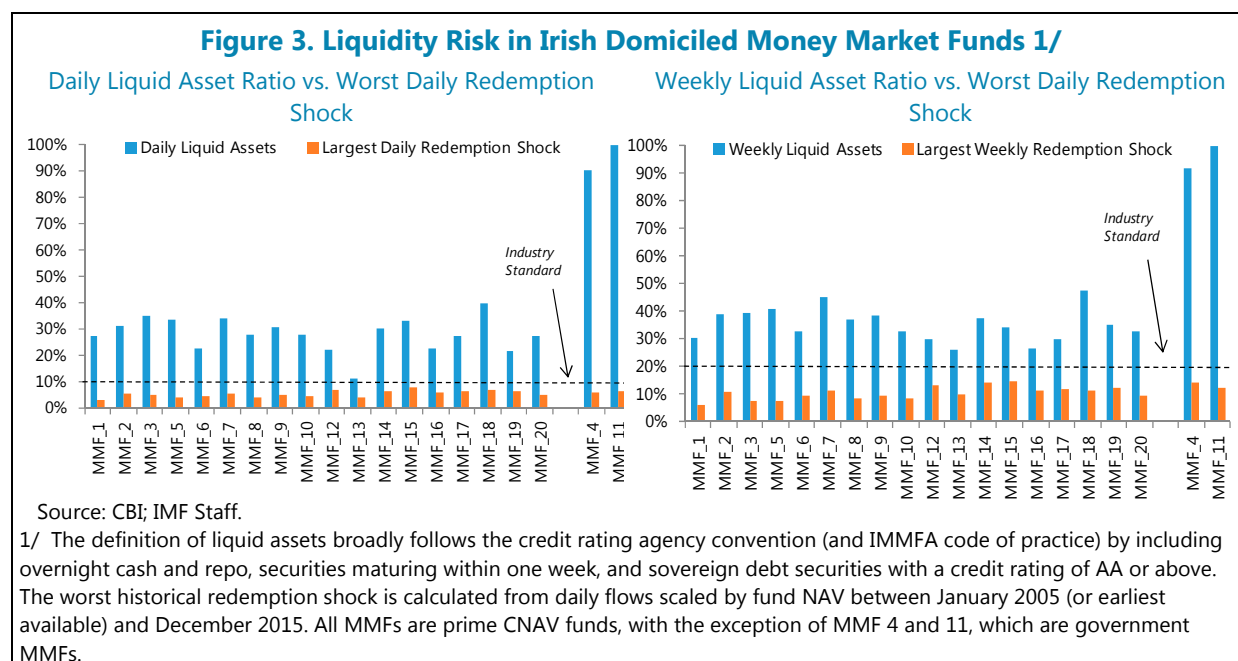
²⁰ By “solvency risk” we refer here to the risk of market shocks driving a wedge between the shadow NAV and CNAV.

²¹ Coverage in the MMF and bond fund liquidity analysis pertains to the largest funds. The sample of the 20 largest MMFs used in this study comprises 80 percent of Irish domiciled MMF assets. Individual funds range in asset size from €5 billion to €25 billion. The coverage rate for the sample of the 20 largest EM and HY bond funds is lower (46 percent of emerging market bond fund assets, and 36 percent of high yield credit assets), due to having to exclude funds for which greater than 10 percent of securities in the portfolio had no trading information available on the third party vendor platform that was used to complete this analysis. Individual bond funds range in asset size from €0.7 billion to €7 billion. Time and resource constraints meant it was beyond the scope of the study to extend coverage from the largest to all funds.

²² Under European Securities and Markets Authority (ESMA) guidelines, short-term MMFs are required to maintain a portfolio with a weighted average maturity not exceeding 60 days; a weighted average life not exceeding 120 days; and ensure no individual security has a maturity exceeding 397 days. By ‘industry standard’ liquidity buffers we refer to those listed in the Institutional Money Market Funds Association (IMMFA) code of practice and the 2013 European Commission MMF reform proposals (i.e. where a minimum buffer would consist of at least 10 percent daily liquidity and at least 20 percent weekly liquidity).

²³ Principal components analysis points to a complex (and possibly random) structure in redemptions across MMFs, evidenced by the first five factors explaining less than half of the variance in redemptions at the daily, weekly and monthly frequency.

in general,²⁴ and the prevalence of prime CNAV MMFs in Ireland in particular, means the risk of a widespread redemption shock cannot be entirely ruled out (regulatory momentum in the U.S. and EU is also encouraging a move away from the CNAV valuation approach).²⁵



12. For the most part, large EM/HY Irish domiciled bond funds (those invested primarily in emerging market debt and high yield credit)²⁶ appear positioned to accommodate plausibly-sized redemption shocks (Figure 4). However, this finding is more sensitive to assumptions over trading volumes (around which there will always be considerable uncertainty, particularly in fixed income markets) than for MMFs.²⁷ On a relative basis, emerging market debt funds appear to have

²⁴ Additionally, the results reported here rely on year-end security holdings, which may not be typical of their positions on a normal working day.

²⁵ For instance as part of the post-crisis financial system reforms in the United States, institutional prime MMFs (including institutional municipal MMFs) are to be required to maintain a floating NAV (rounded to the fourth decimal place) for sales and redemptions based on the current market value of the securities in their portfolios. Additionally, in June 2016, the Council of the European Union agreed on a negotiating stance on draft regulation on MMFs, aimed at restricting the use of the CNAV convention to those MMFs that invest 99.5 percent of their assets in public debt instruments, and those with a specific investor base solely outside the EU.

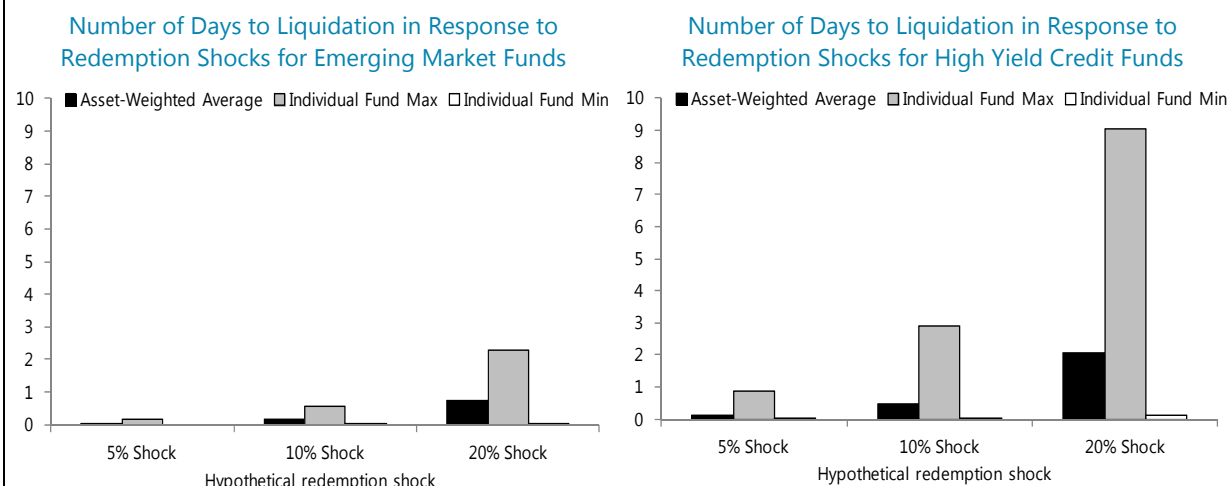
²⁶ This analysis focuses on emerging market debt and high yield credit funds in light of these market segments having been cited as the most vulnerable to liquidity-induced disruptions in a number of recent IMF Global Financial Stability Reports.

²⁷ No assumptions are made on trading volumes for the MMF liquidity analysis. For the analysis of bond fund liquidity, an advanced pricing algorithm developed by a third party vendor was utilized to estimate the expected number of days it would take to liquidate each individual security holding (dependent on the position size). The algorithm takes into account market depth, and takes as inputs recent (3-month) information on traded volume, turnover, price volatility, and bid-ask spreads). Three caveats apply with respect to the estimates for 'time to liquidation' metric: they are based on historical rather than forward looking data, thus the ability of market makers to continue offering liquidity in times of stress may be different from those recorded in the realized sample; the

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greater liquidity than high yield credit funds, evidenced by the shorter amount of time it would take for portfolio managers to liquidate (in a pro rata fashion) part of the portfolio in response to a redemption shock.²⁸

Figure 4. Liquidity Risk in Irish Domiciled Emerging Market and High Yield Bond Funds 1/



Source: CBI; IMF Staff.

1/ Charts depict the number of days it would take bond fund managers to liquidate, in pro rata fashion, 5, 10 or 20 percent of their portfolio following a redemption shock of the same magnitude. Asset sales are conservatively assumed to occur in pro rata fashion; a waterfall approach, in which the most liquid securities are divested first, would yield a shorter time to liquidation, but could also materially change the composition of the portfolio.

13. MMF stress tests show that very large increases in interest rates (risk free rates and/or credit spreads) would be needed for 'shadow' net asset values (NAVs) to meaningfully depart from amortized cost (constant) NAVs (Figure 5). A full portfolio revaluation was performed utilizing security level holding data (yield, coupon, maturity, and duration information) for the 20 largest Irish-domiciled MMF portfolios. The stress test was calibrated to various combinations of credit spread and risk free interest rate shocks, in increments of 15bps, 30bps, 60bps and 120bps respectively.²⁹ The results suggest that prime MMFs, which are broadly equally sensitive to credit

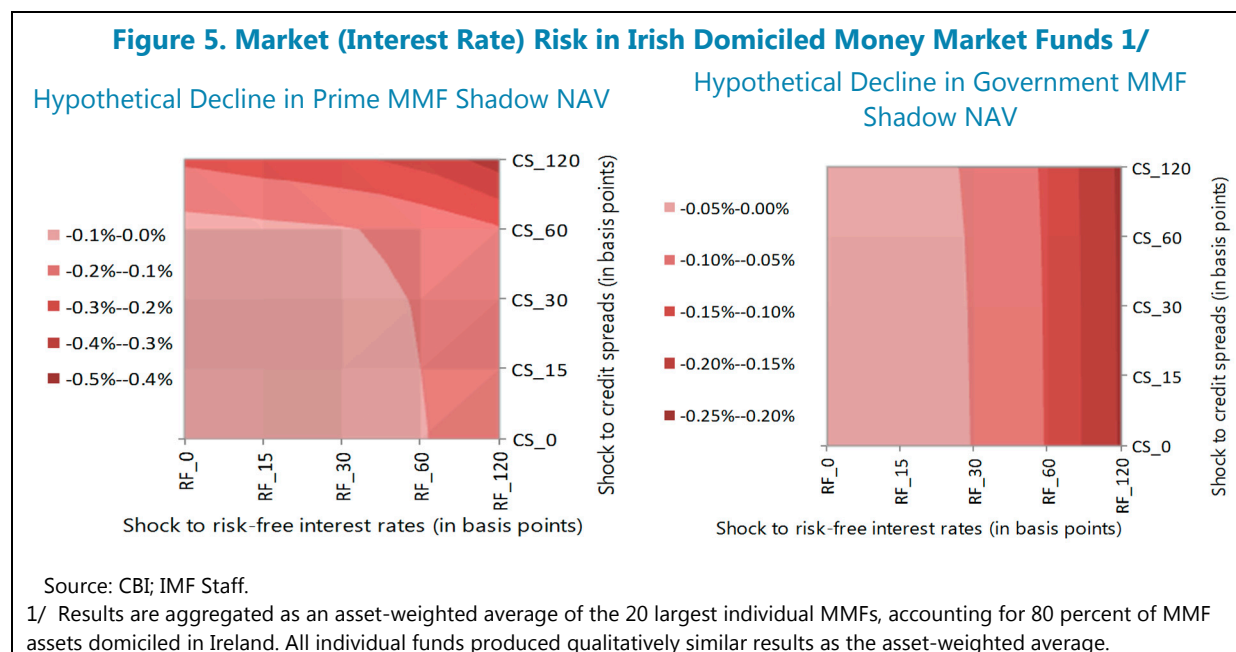
uncertainty associated with the ability to transact seamlessly is an increasing function of transaction sizes; and the time to liquidation is estimated on an individual security basis and does not explicitly model portfolio correlations.

²⁸ Asset sales are conservatively assumed to occur in pro rata fashion. A waterfall approach, in which the most liquid securities are divested first, would yield a shorter time to liquidation, but could also materially change the composition of the portfolio. This would be an undesirable outcome for managers who prefer that liquidity management not interfere with fundamental investment and asset allocation decisions and would materially disadvantage remaining investors.

²⁹ An alternative methodology may be to assign different sized shocks for securities of different ratings. However, given MMFs have a strong bias toward high quality securities (as a necessary condition to maintain an AAA—rating), the latter would be of less relevance than would be the case for fixed income funds with diverse credit exposure. It should also be noted that the impact of conventionally estimated duration on floating rate notes in a rising rate environment may be marginally understated for securities with longer maturities, but marginally overstated for other parts of the portfolio where holdings that were not recorded as paying a coupon were conservatively estimated as zero-coupon securities. Given these impacts work in offsetting directions and pertain only to some segments of

(continued)

and duration risk, would need to be subjected to a simultaneous 60 basis point shock to both credit spreads and risk free interest rates in order to experience a marked-to-market decline in excess of 0.2 percent (Figure 5, left panel). As expected, government MMFs are mostly exposed to duration risk, and would need to encounter a very large risk-free rate shock to produce a shadow NAV decline requiring immediate remedial action from the portfolio manager (Figure 5, right panel).³⁰



14. The use of leverage by Irish domiciled IFs appears to be most prominent in bond (and hedge) funds and, within bond funds, is highly concentrated (Figures 6 and 7). Leverage is of interest to financial supervisors given it can act as an accelerant of market stress, leading to fire sales during margin calls and, in extreme situations, threaten fund solvency. Across fund types, the ratio of leverage to NAV is highest for hedge funds (64 percent), but managers of these CIVs are typically regulated under the AIFM Directive where no limit on the use of leverage applies, and investors are more sophisticated, and daily redemption terms are relatively rare. With respect to leverage use in CIVs typically regulated under the UCITS Directive (where end investors may be retail and daily redemption terms are standard), the ratio of leverage to NAV is highest for bond funds (15 percent), but around 85 percent of bond fund leverage is accounted for by less than 5 percent of funds.³¹ These 'highly leveraged' bond funds—categorized as those with a leverage to NAV ratio in excess of 100 percent or with an absolute leverage figure in excess of €1 billion—have around half their exposure in sovereign debt and 86 percent in developed market debt securities. However, current

some portfolios, they will not alter the broad results. The code used to perform the stress tests was written in Stata and made available to the authorities.

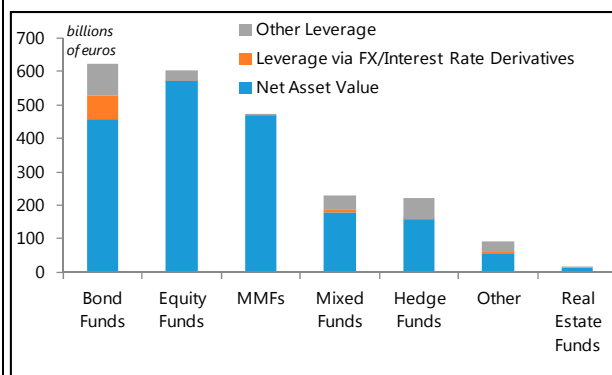
³⁰ In such instances, MMF investment managers are required to comply with the escalation procedures set out in the Central Bank UCITS Regulations (ref. Regulation 88).

³¹ A description of leverage calculation methods for supervisory purposes is described in Annex 2.

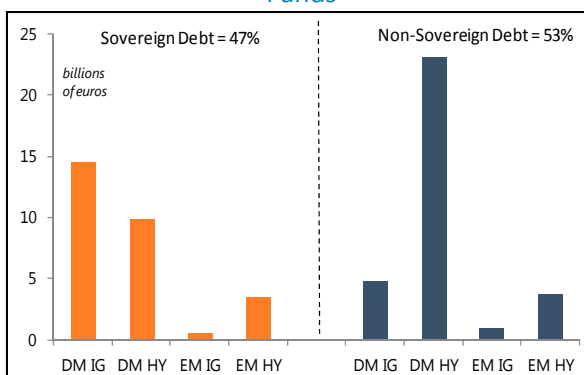
reporting conventions on the use of leverage obscure a detailed assessment of the associated true 'economic risk' (for instance, by failing to distinguish gross from net derivatives exposure, or leverage used for speculative vis-à-vis hedging purposes).

Figure 6. Leverage in Irish Domiciled Investment Funds 1/

Composition of Total Assets for IFs and MMFs



Portfolio Composition for 'Highly Levered' Bond Funds

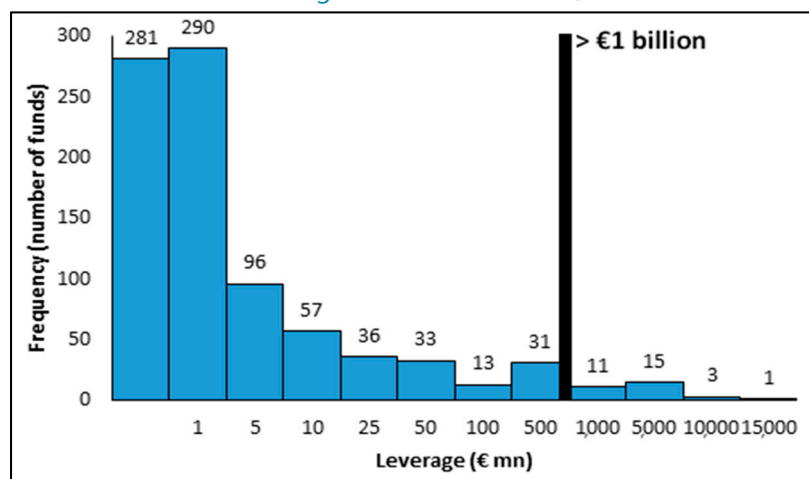


Source: CBI; IMF Staff

1/ Leverage is defined as the sum of securities lending, loans, overdrafts, margining, and derivatives with a negative market value. DM = developed markets; EM = emerging markets; IG = investment grade securities; HY = high yield securities.

Figure 7. Leverage Concentration in Irish Domiciled Bond Funds 1/

Distribution of Leverage Across Bond Funds, Absolute Terms

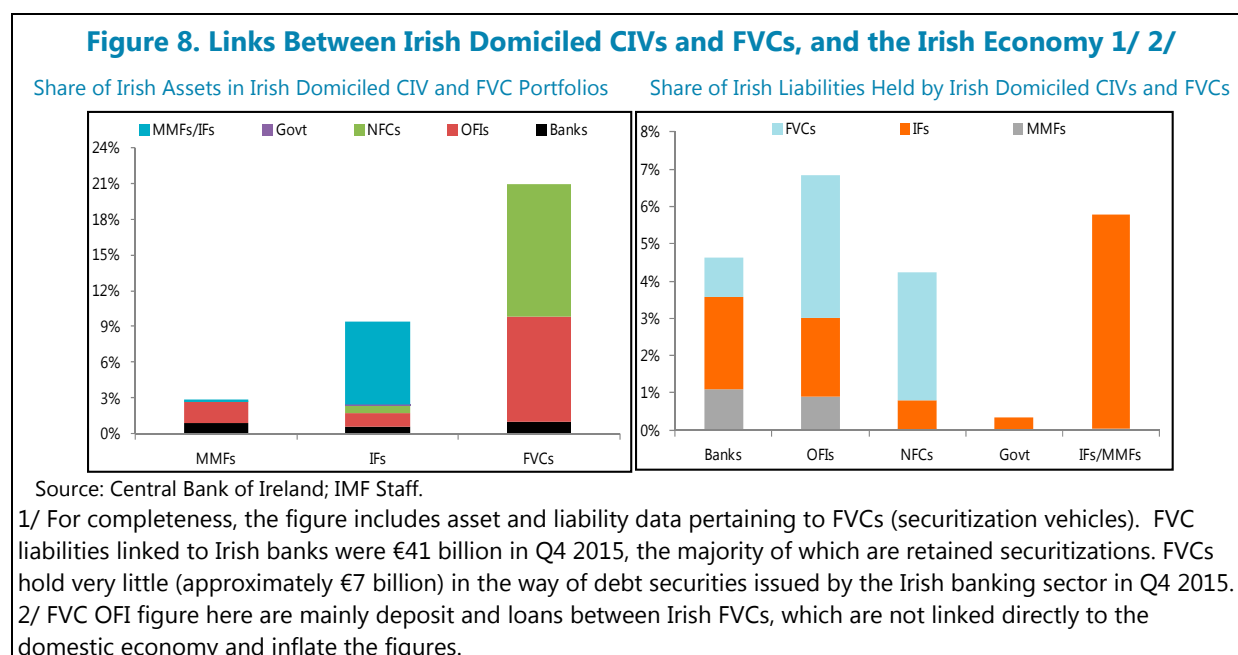


Source: Central Bank of Ireland; IMF Staff

1/ Across a population of 867 bond funds, 39 were categorized as 'highly leveraged', defined as those with a Leverage/NAV ratio in excess of 100 percent, and/or an absolute leverage figure in excess of €1 billion.

B. Spillovers

15. The potential for destabilizing spillovers from Irish domiciled MMFs and IFs to the domestic economy appears limited, consistent with earlier Central Bank analysis.³² MMFs and IFs hold only a small share of their portfolios in Irish assets (2.8 percent and 9.4 percent respectively), and only a small fraction of liabilities issued by Irish entities (banks, nonfinancial corporations, etc.) are held by domestically domiciled MMFs and IFs (Figure 8). From the perspective of geographical and sectoral spillovers (Figure 9), the main transmission channel would likely be a redemption shock emanating from the U.K. (which accounts for 45 percent of liabilities issued by MMFs and IFs, mostly held by other financial institutions).³³ On the asset side, the largest source of concentration risk is to the U.S. (and the nonfinancial sector in particular). With respect to cross shareholdings, which are of interest because redemption shocks in one CIV could propagate throughout others, hedge and mixed funds have the highest proportion of assets invested in other MMFs/IFs (Figure 10, left panel).³⁴ This reflects the greater representation of ‘Fund of Funds’ in the hedge and mixed fund categories. For instance, around one third of hedge and mixed funds have more than half of their portfolios invested in other MMFs and IFs (Figure 10, right panel). Many of these funds do not offer daily redemption terms.

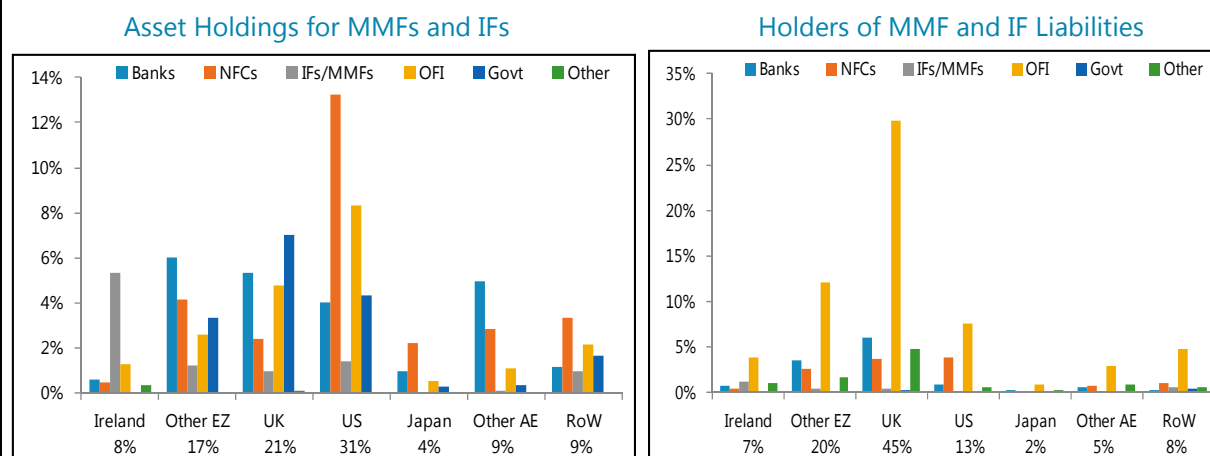


³² See most recently, Hallissey (2015). The liabilities of IFs are largely comprised of equity units which are reported on a first counterparty basis. As such, it is not possible to identify the ultimate beneficial holder.

³³ Although the risk that ‘Brexit’ could result in a liquidation of some of these holdings should not be dismissed, industry participants stressed that funds currently domiciled in the U.K. may seek to re-domicile in Ireland in order to avail of the highly advantageous EU passport.

³⁴ While hedge fund managers are typically regulated under the relatively less restrictive AIFM Directive, UCITS funds can also invest up to 100 percent of net assets in other UCITS funds, provided no more than 20 percent is invested in any single UCITS fund, and that this investment is limited to a maximum of 25 percent of the units of the underlying fund.

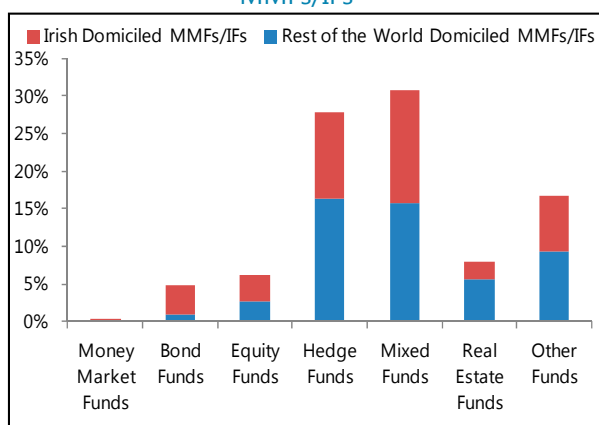
Figure 9. Asset and Liability Concentration for Irish Domiciled Money Market and Investment Funds



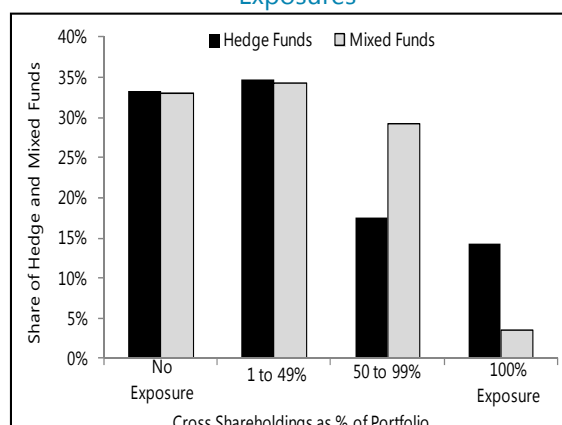
Source: Central Bank of Ireland; IMF Staff.

Figure 10. Cross Shareholdings for Irish Domiciled Money Market and Investment Funds

Share of MMF/IF Portfolios Invested in other MMFs/IFs



Share of Hedge and Mixed Funds with Different CIV Exposures



Source: Central Bank of Ireland; IMF Staff.

C. Data Gaps

16. The authorities have made important progress in addressing long-standing data gaps as they pertain to the asset management (and broader shadow banking) industry (Box 1).

These efforts will assist both in strengthening domestic supervisory capacity, and lighting a path forward for regional counterparts. Of particular note has been the collection of detailed (and timely) portfolio security holding data, establishing coverage of the special purpose vehicle sector, and more broadly, the pooling and sharing of CIV data across the 'Regulatory' and 'Central Banking' pillars at the Central Bank of Ireland, which has enabled the Markets Supervision Directorate and the Statistics Division to deepen their analysis of related activities.

Box 1. Recent Progress in Addressing Data Gaps

Financial Stability Architecture. The pooling and sharing of non-bank financial data across the 'Regulatory' and 'Central Banking' pillars of the Central Bank of Ireland have made important advances despite the operational and legal issues that needed to be addressed. As a result, different parts of the Central Bank of Ireland can now see the totality of the data compiled from CIVs. This allows the Markets Supervision Directorate and the Statistics Division to deepen their analysis of these activities.¹

Reporting Requirements. The European Central Bank (ECB) data strategy for the non-bank financial sector has focused on extending coverage and granularity on a phased basis. The first phase saw euro area domiciled investment funds report their balance sheets on a security-by-security basis from Q4 2008. The next phase increased visibility into securitization vehicles (FVCs) from Q4 2009, albeit reporting requirements remain slightly less detailed than for investment funds. ECB reporting requirements for both investment funds and FVCs were again expanded slightly in Q4 2014. Security-by-security reporting will be extended to the insurance sector in H1 2016, and early stage coverage is likely to extend to pension funds. The Central Bank of Ireland has implemented all of these initiatives, and by regional standards, has led the way in important respects.

First, the second version of the security-by-security reporting form for investment funds extended its remit from statistical purposes only to also include regulatory monitoring and financial stability analysis. This saw the introduction of important additional fields to the form, aimed at addressing data gaps in shadow banking supervision (as identified in the Central Bank's Quarterly Bulletin of Q4 2012; Godfrey and Golden, 2012). For example, the inclusion of maturity dates for each security allows for the development of measures identifying potential liquidity mismatches. Other new fields include the identification of performance pay, quarterly custodian reporting of fund/share holdings, significantly more detail on fund types and the characteristics of equity, debt, lending and derivative instruments. The new form was issued in Q1 2014, ahead of the ECB deadline. Some of these new fields were also incorporated into a second version of the FVC reporting form, also introduced in Q1 2014.

Second, the security-by-security reporting form for investment funds was extended in full to monthly reporting for money market funds from November 2014, replacing what had been much more limited reporting on an aggregated basis. Third, in a unique initiative, the Central Bank extended the FVC reporting form in full to other Special Purpose Vehicles (SPVs) from Q3 2015.² Ireland has a large 'other' categorization in its financial accounts, where data coverage is relatively weak. This sector amounted to €626 billion in Q4 2015 – however, preliminary estimates by the Central Bank of Ireland suggest the SPVs amount to around €322 billion. These data will play an important role in better understanding the behavior of these vehicles and their links to other entities (see Godfrey, Killeen and Moloney, 2015). The granularity of these data will also allow for a more refined definition of shadow banking in Ireland.³

^{1/} There are potential limits as to how such data can be used 'downstream' (i.e. in the case of regulatory sanction).

^{2/} Legislation in Ireland, commonly referred to as "Section 110", allows for favorable tax treatment of SPVs. Reporting was extended to all SPVs availing of Section 110.

^{3/} The FSB's shadow banking definition uses a prudential approach whereby a sector is included if there is doubt as to the nature of its activities. This resulted in the inclusion of the entire "Other" sector (€498 billion at end-2014) in the shadow banking total of €2.25 trillion.

17. This said, there is still work to be done in the broader effort to shine a light on the evolving nature of financial intermediation conducted by asset managers. At the international level, there is a case to be made for standardized agreements to facilitate more cross-border sharing of non-bank financial data, as national authorities are currently hindered by national legislation that does not always reflect the nature of cross border financial intermediation chains. At the domestic level, key priorities include: continuing to expand coverage of the remainder of the ‘Other Financial Intermediary’ (residual) sector of the financial accounts (which in Ireland’s case is sizeable); measuring leverage use in economically meaningful and risk adjusted terms; collecting data in a standardized form that would allow for CIV and sponsor links to be assessed in formal network mapping analysis; and further efforts to gather information on the investor base.

D. Issues Beyond the Scope of the Study

18. In addition to the caveats and limitations of the analysis discussed earlier, a number of issues were beyond the scope of this study. Each of these could legitimately constitute the basis of a future research agenda. No standalone assessment was made of: (i) concentration risk in the investor base (which could contribute to ‘run risk’) for IFs and MMFs; (ii) the ability and/or willingness of parent sponsors to provide support for MMFs in times of stress; (iii) exchange traded funds (which were subsumed into the broader analysis of bond funds); (iv) solvency risk for IFs arising from imprudent use of leverage; (v) the core economic function of (and potential stability or reputational risks posed by) the special purpose vehicles on which the Central Bank has only recently begun to compile data; (vi) the remainder of the ‘OFI residual’ in the national financial accounts; and (vii) the robustness of operational and capital provisioning arrangements for custodian banks in Ireland servicing Irish domiciled CIVs.

POLICY RECOMMENDATIONS

19. The main policy recommendations for the Irish authorities are as follows:

- a. Liquidity and Run Risk—increase monitoring, on the asset side, of liquidity risk in MMFs with reference to a minimum weekly liquid asset ratio and suitable indicators for other IFs; on the liability side, step up monitoring of the characteristics and concentration of the investor base.³⁵ More frequent liquidity-based stress tests should be informed by granular security level fund holdings.
- b. Market Risk—build internal capacity that would allow for more frequent stress testing with respect to market shocks for MMFs, and IFs that avail of significant leverage.

³⁵ While concentration risk pertains to CIV assets and liabilities, and from the perspective of run risk is even more important for the latter (hence it is an issue on which credit rating agencies place great import), regulators have historically tended to focus more on the former.

- c. Spillovers—to minimize spillover and moral hazard risk, the authorities should: (i) require evidence of communication from MMFs to investors that clearly spells out the nature of contingent parental sponsor support; (ii) in line with the general thrust of regulatory momentum in the U.S. and EU, encourage CNAV MMFs to graduate away from the CNAV accounting structure (beginning with new prime funds) to better reflect the inherent variability in the value of underlying security holdings; and (iii) ensure appropriate risk management safeguards are in place where CNAV MMFs continue to operate.
- d. Leverage in IFs—strengthen oversight into the use of portfolio leverage by IFs (particularly hedge and bond funds) via surveys, in such a way that could better distinguish: gross from net exposure; constrained from unconstrained potential loss; and hedging from speculation. The implementation of harmonized European standards on leverage reporting would be most desirable, and the authorities may wish to consider instigating a regional effort in this direction;
- e. OFI residual—continue to pursue cooperation between the Central Bank and the Central Statistics Office in developing a richer understanding of the components of Ireland’s relatively large ‘OFI residual;’
- f. SPVs—examine whether the governance structure (particularly board level appointments) associated with certain types of Irish domiciled special purpose vehicles might pose future reputational risks for Ireland;³⁶ and
- g. Multilateral cooperation—pursue full implementation of the standardized cross-jurisdictional data sharing arrangements as they pertain to CIVs operating under the AIFMD to strengthen supervisory oversight.³⁷

³⁶ In discussions with industry participants, the FSAP mission learned of instances where individuals were appointed to tens, and in some cases, hundreds, of SPV boards. In related discussions, questions were raised as to the suitability of such appointments. Oversight of governance arrangements for SPVs is currently beyond the purview of the Central Bank.

³⁷ Though there are EU level data sharing arrangements already in place under the AIFMD, it is widely acknowledged they do not yet work satisfactorily in practice.

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Annex I. Asset Management Characteristics

Banks vs. Asset Management: Distinguishing Risks at the <i>Entity</i> Level				
	Size	Concentration Risk	Spillovers to Financial Sector	Solvency Risk
Banks	Large by assets	High	High	Yes (as principal)
Asset Managers	Large by assets under management	Moderate/high	Moderate/low	No (as agent)

Banking vs. Asset Management: Distinguishing Risks at the <i>Activity</i> Level					
	Leverage via Borrowing	Portfolio Leverage via Derivatives	Counterparty Concentration Limits	Duration of Assets > Liabilities	Run Risk Mitigants
Banking	12.5x risk weighted assets	Yes	25%	Yes	Liquidity coverage ratio; deposit insurance; discount window
<i>EU Collective Investment Vehicles (CIVs):</i>					
UCITS Money Market Funds	No	Hedging only	5/10/40% rule, 20% group limit	Yes	Liquidity buffers; exit fees; payment in kind; gates; sponsor support
UCITS non-Money Market Funds	No	Limited (Commitment Approach: <100% of NAV)	5/10/40% rule, 20% group limit	Yes	Liquidity buffers; exit fees; payment in kind; gates
Alternative Investment Funds (Hedge/Private Equity)	Yes	No Limit	No	Moderate	Lockups; quarterly notice; gates; side pockets

Source: IMF Staff; Jones (2015).

Notes: The bottom three rows pertain to the regulation of EU investment management activities and is highly stylized (it does not account for various exemptions and provisions). The '5/10/40' rule states that a UCITS cannot invest more than 5 percent of its assets in securities issued by a single issuer. However, this limit can be increased up to 10 percent provided that where the 5 percent limit is exceeded, the exposure to these issuers, when added together, does not exceed 40 percent of the fund's assets. Liquidity buffers for money market funds are not currently mandated in the EU but are common place and under consideration as part of a set of proposed reforms under consideration with the European Parliament.

Annex II. Leverage Calculation Methods

UCITS Directive

The standard methodology for the calculation of a UCITS fund's exposure is the **commitment approach**. The global exposure under the UCITS Directive only takes into account financial derivatives and securities financing transactions (SFTs) that generate leverage. UCITS funds can apply netting and hedging arrangements to reduce their global exposure.

The calculation of leverage under the commitment approach can be summarized as follows:

$$\begin{aligned} &\text{Derivatives: sum of the equivalent positions in the underlying assets after netting and hedging} \\ &\quad \text{arrangements} \\ &\quad + \\ &\text{SFT: market value of the collateral received (including cash) when reinvested} \end{aligned}$$

UCITS funds should use a **VaR** method (relative VaR or absolute VaR approach depending on the investment strategy of the fund) when i) they engage in complex investment strategies which represent more than a negligible part of the fund's investment policy; ii) they have more than a negligible exposure to exotic derivatives; or iii) the commitment approach does not adequately capture the market risk of the portfolio.

VaR is to be calculated as follows:

Relative VaR

- VaR of the UCITS fund's current portfolio (which includes derivatives) compared to the VaR of an unleveraged reference portfolio. The portfolio VaR limit is twice the VaR of the unleveraged reference portfolio.

Absolute VaR

- Risk limited to maximum of 20 percent of NAV
- Specific requirements on confidence interval, holding period and effective observation period of risk factors

AIFMD

AIFMs have to calculate their exposures using two different methods.

The **commitment method** is similar to the commitment approach for UCITS, but with the important difference that AIFMs have to include all positions (not only derivative positions).

The **gross method** requires all the absolute values of the assets of the AIF to be summed without applying netting and hedging arrangements. Cash and cash equivalents are excluded for the purpose of the calculation.

- The leverage under the AIFMD commitment method is calculated in the following manner:

$$\begin{aligned}
 &\text{Direct positions: accounting value} \\
 &\quad + \\
 &\text{Derivatives: sum of the market value of the equivalent position in the underlying asset (after netting} \\
 &\quad \text{and hedging)} \\
 &\quad + \\
 &\text{SFT: market value of the collateral received (including cash) when reinvested} \\
 &\quad + \\
 &\text{Reuse of cash borrowing: the higher of the market value of the investment realized or the total} \\
 &\quad \text{amount of the cash borrowed}
 \end{aligned}$$

- The leverage under the AIFMD gross method is calculated as follows:

$$\begin{aligned}
 &\text{Direct positions: absolute value} \\
 &\quad - \\
 &\text{Cash equivalents}
 \end{aligned}$$