# Measuring shadow banking in Ireland using granular data[1]

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## 1. Introduction

Over the past few decades, financial intermediation and leverage have broadened from the traditional realm of regulated commercial banks towards an array of other financial institutions. Collectively, these other intermediaries have become known as the shadow banking system (McCulley, 2007). These entities provide alternative sources of funding and investment options for market participants and increase the liquidity of asset markets. Financial innovation hastened the shift to shadow banking and was, in turn, stimulated by it (Cecchetti and Schoenholtz, 2010). The shadow banking system has become a critical part of the infrastructure of the modern financial system but has not been subject to the same levels of oversight and regulation as banks. It has become a significant focus of attention in both official and academic circles as it emerged as one of the main reasons for the financial crisis. Highly leveraged shadow banks with illiquid assets suffered from the loss spiral effect forcing them to deleverage due to higher margin requirements and falling asset prices. At the onset of the financial crisis the future for the shadow banking system appeared uncertain. However, the FSB has reported that it has recovered it pre-crises peak, rising to $60 trillion worth of assets in 2010 (FSB 2011a).

Much of the recent debate has focused on the definition of shadow banking and the types of activities undertaken by entities classified as part of this sector. The FSB provides a wide-ranging definition that can be narrowed to a focus on:

- leverage;
- credit risk transfer;
- maturity transformation;
- liquidity transformation;
- deposit-gathering.

This paper applies this definition of shadow banking data to the Irish financial sector. It employs granular data on financial vehicle corporations (FVCs), money market funds (MMFs) and investment funds (IFs) available to the Central Bank of Ireland. This bottom-up approach facilitates the classification of entities engaged in shadow banking activities – any top-down definition inevitably excludes entities that engage in shadow banking and/or includes some that do not. The use of granular data sheds light on categories, such as hedge funds and exchange-traded funds (ETFs), where there is some debate as to whether they undertake these activities. However, there are also a number of data gaps that mean a complete assessment is not possible.

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The paper focuses on measurement and definitional issues related to shadow banking and provides a framework for analysis. It seeks to classify entities within the shadow banking sector, and does not make an assessment of risk or address other financial stability implications. The paper is structured as follows: Section 2 looks at definitions of shadow banking. Section 3 provides an overview of data sources, while Section 4 analyses the shadow banking behaviours of the financial sub-sectors covered. Section 5 provides results of the analysis, while Section 6 looks at interconnectedness between shadow banking and banks. Section 7 identifies data gaps and potential improvements while Section 8 concludes.

## 2. Defining shadow banking

### 2.1 Literature review

The FSB took a lead last year in directing official efforts in the area of shadow banking. A task force was formed, fulfilling a mandate provided by G20 leaders at their Seoul summit of November 2010,[3] which defined shadow banking as "*the system of credit intermediation that involves entities and activities outside the regular banking system*" (FSB 2011a). The task force saw it as "*essential to cast the net wide*" but that the focus of attention should narrow to "*risks created by maturity/liquidity transformation, flawed credit risk transfer and leverage*". The European Commission tightened the definition in their Green Paper of March 2012,[4] with shadow banking defined as those entities that "*operate outside of the banking system and engage in one of the following: accepting funding with deposit-like characteristics, performing maturity and/or liquidity transformation, undergoing credit risk transfer and using direct or indirect financial leverage*" and/or engage in activities that "could act as important sources of funds for non-bank entities", including "*securitisation, securitised lending and repurchase transactions (repos)*". Various speeches by central banking and regulatory officials support the FSB definition, including Bernanke (2012), Constancio (2012), Macklem (2012) and Tucker (2012).

The focus of academic literature following the onset of the financial crisis has tended towards securitisation activities and money market funds. This has fed definitions that confine shadow banking to instruments that essentially substitute for money. Prominent among these is Gorton and Metrick (2010), who define shadow banking in the broadest sense as including "*investment banks, money market mutual funds, and mortgage brokers.....repos, and more esoteric instruments such as asset backed securities (ABSs), collateralised debt obligations (CDOs), and asset-backed commercial paper (ABCP)*". Morgan Ricks (2010) also focuses on these instruments when he defines shadow banking as "*maturity transformation that takes place outside of the social contract*". Gennaiolli et al (2010) define shadow banking more narrowly as "*securitised banking" which "refers to origination and acquisition of loans by financial intermediaries, the assembly of these loans into diversified pools, and the financing of these pools with external debt*". Poznar et al (2010) also concentrate on securitisation and money market funds, but include credit hedge funds under their definition of "*financial intermediaries that conduct maturity, credit, and liquidity transformation without explicit access to central bank liquidity or public sector credit guarantees*".

There remains considerable debate over the definition of shadow banking, for example, whether maturity mismatch is a concern where longer-term assets are liquid. Some literature restricts analysis to particular instruments or factors such as "run risk" or the existence of credit support. Nevertheless, the FSB definition, which was published in late 2011, has

[3] The G20 communique requested that the FSB develop, in collaboration with other international bodies, recommendations to strengthen the oversight and regulation of shadow banking.

[4] European Commission (2012).

garnered a degree of consensus. For the purposes of this paper, the FSB definition of shadow banking behaviour is applied.

## 2.2 Applying the definition to aggregated data

The FSB definition, though intuitive, poses operational challenges as the behaviours do not readily fit with common statistical classifications. As Table 1 shows, FVCs and MMFs tend to be seen as shadow banks but funds are classified into categories that are, for the most part, not readily associated with shadow banking activity, i.e. equity funds, bond funds, real estate funds, hedge funds, mixed funds and other (a residual category),[5] broken down by open- and closed-funds.[6] There is some debate surrounding hedge funds and ETFs in particular, as the former could be seen as highly leveraged, and the latter are seen to attract investors that put a premium on instant redemption while investing in longer-term and less liquid assets. The extent to which these categories can be regarded as shadow banking is not clear from aggregate data sources. Real estate funds and private equity funds would be expected to engage in maturity and liquidity transformation, investing liquid funds from investors into longer-term less liquid assets. Like ETFs, private equity funds straddle a number of the statistical classifications, outlined above. Meanwhile, fund types not readily identified with shadow banking, such as equity and bond funds, may include a minority of entities that engage in leverage or maturity and/or liquidity transformation.

Table 1 also highlights that common statistical classifications within aggregate data may not be appropriate for identifying shadow banking activity. A move to granular data significantly improves analysis of the behaviour of individual entities within these statistical classifications.

Table 1

**Statistical Classifications and Defining Shadow Banking Behaviours**

| | Leverage | Credit Risk Transfer | Maturity Transformation | Liquidity Transformation | Deposit Gathering |
|---|---|---|---|---|---|
| FVCs | √ | √ | ? | √ | X |
| MMFs | ? | X | ? | ? | √ |
| Exchange traded funds | ? | ? | ? | ? | X |
| Equity funds | ? | ? | ? | ? | X |
| Bond funds | ? | ? | ? | ? | ? |
| Hedge funds | ? | ? | ? | ? | X |
| Mixed funds | ? | ? | ? | ? | X |
| Real Estate funds | X | X | X | X | X |
| Private Equity funds | X | X | X | X | X |

[5] These fund types are defined according to Regulation (EC) No. 958/2007 of the ECB, 27 July 2007.

[6] Open-end funds allow the fund to issue and redeem shares / units, allowing investors to withdraw funds. Closed-end funds have a fixed number of shares / units which means that investors must sell shares / units to another investor.

In addition, entities themselves choose what category they report under and there can be classification issues for entities on the borderline of fund types. Firstly, deposit-type funding is identified with money market funds rather than bond funds. Where bond funds invest primarily at the lower end of the yield curve, the classification depends on judgement calls as to the quality and liquidity of money market holdings. Secondly, hedge funds are not defined by holdings, unlike other categories, but less precisely by an unconstrained investment strategy and performance fees. Hedge fund holdings overlap with other fund types meaning that some may be classified as mixed funds in particular, and vice-versa. Thirdly, the "other" fund category, as a residual, may inevitably cover funds where classification is not straightforward. For FVCs, there is some scope for borderline entities to fall outside the definition, but investigations to date suggest that these would not significantly distort the data. Real estate and private equity funds may engage in one or more of these behaviours but are not part of a credit intermediation process, as is required under the FSB definition.

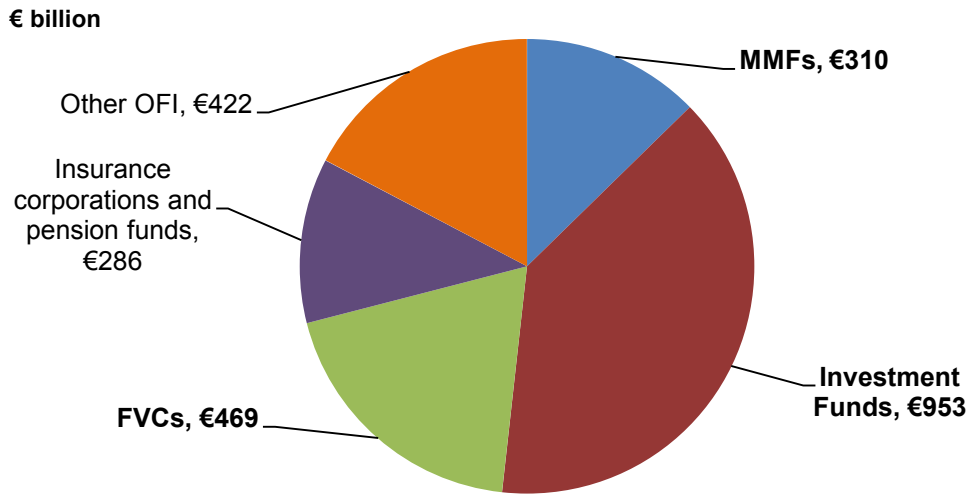
## 3. Data sources

### 3.1 Granular data

Total assets of financial sector amounted to €3.5 trillion in Q1 2012, a large multiple of Irish GDP (€129 billion in 2011).[7] Within this, credit institutions accounted for €1.1 trillion, which means that 69 per cent of activity took place outside of the regular banking system. Granular data are available within the Central Bank of Ireland for investment funds, financial vehicle corporations and money market funds. These entities account for €1.7 trillion of total assets or 72 per cent of non-bank activity,[8] as seen in Chart 1.

Chart 1

**Breakdown of Non-Bank Intermediaries in Ireland for Q1/2 2012**




Notes: IF , MMF and FVC data ref. Q2, 2012.

[7] Quarterly Financial Accounts, Central Bank of Ireland: http://www.centralbank.ie/polstats/stats/qfaccounts/Pages/Data.aspx

[8] Of the remainder, insurance corporations and pension funds account for €286 billion and can carry out banking-type activities but this cannot be quantified at this time. Other miscellaneous intermediaries account for the rest, comprising mostly leasing corporations and treasury management operations, both likely to engage in shadow banking activity, which again cannot be quantified at this time.

Stocks, transactions and revaluations are reported on a quarterly basis for IFs and MMFs, alongside standard profit and loss data. Individual securities are reported for equities and bonds. FVC data are provided on a somewhat less comprehensive basis. Bond and equity securities are mostly reported by ISIN codes and so can be cross-referenced against an ECB database – the centralised securities database (CSDB), which has detailed attribute information for each security. However, derivative securities tend not to be ISIN coded. Derivatives are reported according to their mark-to-market value rather than nominal or notional amounts outstanding, which means that only gains and losses at a point in time are measured, rather than underlying exposures.

### 3.2 Survey additions

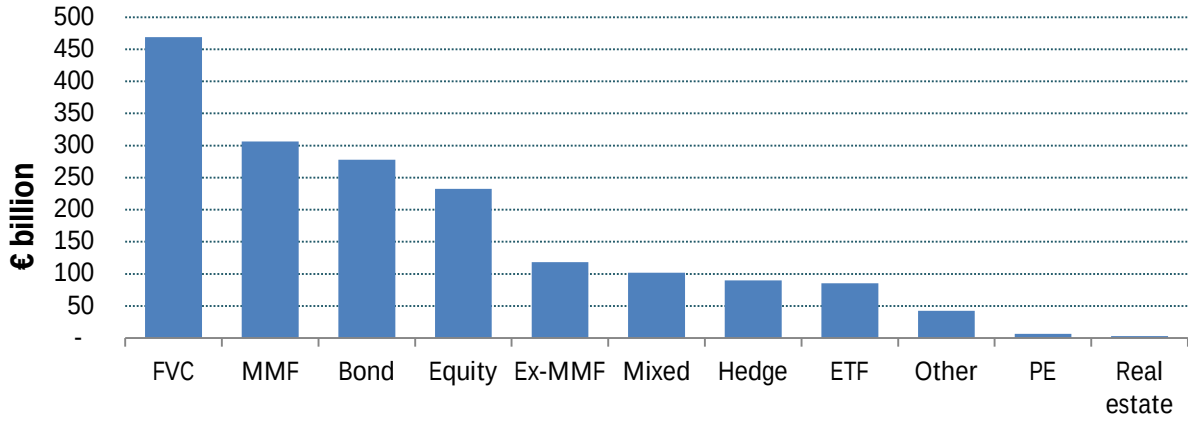
Some data gaps have been filled by a number of one-off surveys in Q1 2012, focusing on a more targeted categorisation of instruments and entities through the identification of repurchase agreements, reverse repos, ETFs and private equity funds.[9] Not all private equity funds are covered in statistical reporting requirements however, with industry contacts suggesting that at least as many are outside the reporting population.

### 3.3 Framework for analysis

For the purposes of this paper, shadow banking behaviours are sub-divided into an MMF category and nine IF sub-categories. This facilities better classification of the granular data. A separate category is included for bond funds that reclassified from MMFs in November 2011 ("ex-MMF"). The new data categories are shown in Chart 2 below, as measured by total assets. This provides a comprehensive framework for analysis.

Chart 2

**Total Assets by Fund Types and FVCs in Q2 2012**




## 4. Shadow banking behaviours

### 4.1 Leverage

Leverage plays a role in the credit intermediation process in two ways.

[9] The Q1 2012 survey on repos and reverse repos should be seen as tentative, as holdings vary significantly between points in time.

Firstly, an entity can take on leverage and pass this on as credit to other entities. This reflects the extension of credit though purchases of debt securities and derivatives on the asset side, financed on the liability side by debt security issuance, short and long term loans,[10] and various types of derivatives. This type of leverage is prevalent across all the financial sub-sectors examined. For financial vehicle corporations, such leverage largely arises from the issuance of debt securities under securitisation activities. The vast majority of these entities are over 90 per cent leveraged.

For investment funds, leverage on the liability side is linked to credit extension as follows: it is defined as the difference between the gross and net asset value of an entity, adjusted to exclude other accounts payable.[11] Derivatives are included as mark-to-market losses represent debt due in the short term. Leveraged IFs are split between those involved in credit intermediation and others. Credit intermediation is deemed to have taken place, where leverage is used to fund debt security and derivative assets. It is assumed that where leverage is used, it funds these assets in proportion to overall balance sheet holdings. Derivative positions on the liabilities side may be linked to similar positions on the asset side, but a firm relationship could not be established. In table 2 below, leverage is divided into two categories for IFs and MMFs, i.e. entities with leverage on the liability side of between 20 per cent and 100 per cent of net asset value, and those leveraged over 100 per cent. The leverage figures are adjusted to reflect the portion of assets involved in credit intermediation.

From the analysis in Tables 2a and 2b, all IF categories contain leveraged entities. Hedge funds, ETFs and mixed funds all feature prominently, though most of the funds in these categories are not leveraged(even when no thresholds are applied). The relatively large number of leveraged ETF entities is consistent with a “leveraged ETFs” investment strategy, which employs derivative and debt instruments to magnify the returns from the index being tracked. This leverage is almost entirely driven by derivative mark-to-market losses on swaps.[12] A relatively smaller number of hedge funds account for most of the leverage in both categories, however. Derivatives play a large role in driving this leverage, but short-term loans are more prominent at leverage rates of above 100 per cent. Reverse repurchase agreements (reverse repos) account for much of these short-term loans, however, and these can be used to accumulate leverage rapidly.[13] A number of mixed funds are highly leveraged, and use reverse repos, indicating largely unconstrained investment strategies similar to hedge funds. Overall, long-term loans only play a very small role in leverage. Finally, the analysis shows that a small number of leveraged funds exist in categories not normally associated with leverage (e.g. bond and equity funds), with derivatives playing a significant role.

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[10] Short-term loans are defined as loans expiring within one year.

[11] These are mostly accounted for by unsettled trades and margins (i.e. collateral) on derivatives.

[12] These tend to be offset to a greater or lesser extent by mark-to-market gains on swaps on the asset side but the balance is more volatile than for most debt-funded asset purchases.

[13] The main motivation behind their use is to turn securities assets into cash for a short period so as to purchase more assets. Of the €9.6 billion of reverse repos in the industry, over half are accounted for by hedge funds and most of the remainder by mixed funds. In both cases, these reverse repos account for around 40% of total leverage. A small number of equity, bond and other funds also employ reverse repos.

Table 2a

**20 to 100% Leverage by Fund Type in Q2 2012**

| € bn | 20–100% | | | | | | |
|---|---|---|---|---|---|---|---|
| | **No of funds** | **Leverage amount** | **Total assets** | **Average leverage** | **Short Term Loans** | **Derivatives** | **of which Swaps** |
| Hedge | 35 | 4.8 | 19.0 | 36% | 1.9 | 2.8 | 2.7 |
| Mixed | 27 | 3.5 | 9.5 | 62% | 2.9 | 0.6 | 0.3 |
| ETF | 61 | 2.2 | 9.1 | 51% | 0.0 | 2.2 | 2.2 |
| Bond | 19 | 0.8 | 2.5 | 57% | 0.2 | 0.6 | 0.2 |
| Equity | 8 | 0.3 | 1.0 | 36% | 0.1 | 0.1 | 0.1 |
| Residual[1] | 3 | 0.7 | 2.0 | 50% | 0.2 | 0.5 | 0.5 |

1 Includes Ex-MMF, Other & Real Estate funds

Table 2b

**>100 per cent Leverage by Fund Type in Q2 2012**

| € bn | >100% | | | | | | |
|---|---|---|---|---|---|---|---|
| | **No of funds** | **Leverage amount** | **Total assets** | **Average leverage** | **Short Term Loans** | **Derivatives** | **of which Swaps** |
| Hedge | 7 | 4.5 | 7.4 | 162% | 3.3 | 1.2 | 1.0 |
| Mixed | 9 | 0.8 | 1.4 | 138% | 0.8 | – | – |
| Equity | 2 | 0.7 | 1.4 | 114% | 0.6 | 0.1 | 0.1 |
| Other | 3 | 0.2 | 0.3 | 184% | 0.2 | – | – |
| Residual[1] | 3 | 0.2 | 0.3 | 194% | – | 0.2 | 0.2 |

1 Includes Ex-MMF, Bond & Real Estate funds

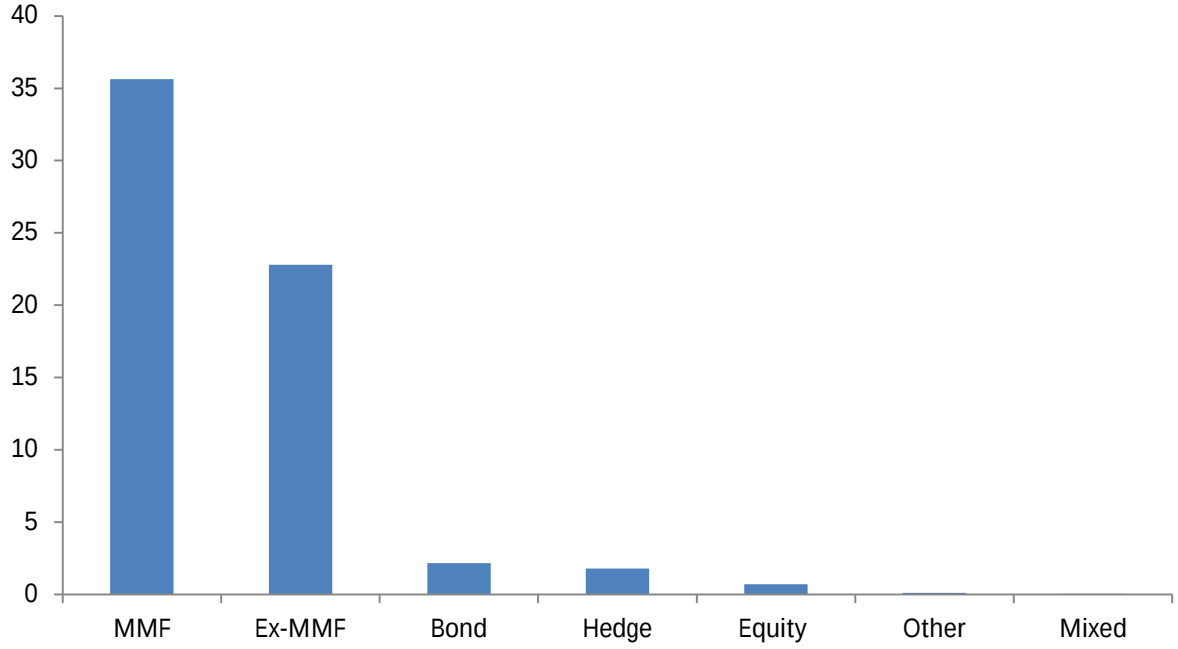
The leverage ratios chosen here are for illustrative purposes only. In terms of sensitivity of results to alternative ratios, if a leverage ratio of above 10 per cent were chosen, an additional 25 funds would be included while a ratio of 30 per cent would see the number of significantly leveraged funds decline by 27.

The second way that an entity can take on leverage is by lending funds to other entities without taking debt onto its balance sheet. This takes place almost exclusively through

repurchase agreements (repos),[14] whereby the credit intermediation takes place through the lending of cash balances. These instruments fit the behaviour of deposit gathering entities, explored in section 4.5, since the principal of the investment is protected while a fixed return is earned. These entities, as lenders, have a distinctly different profile to leveraged entities outlined below, with MMFs and ex-MMFs featuring prominently (Chart 3).

Chart 3

**Repurchase agreements in Q1 2012**




## 4.2 Credit risk transfer

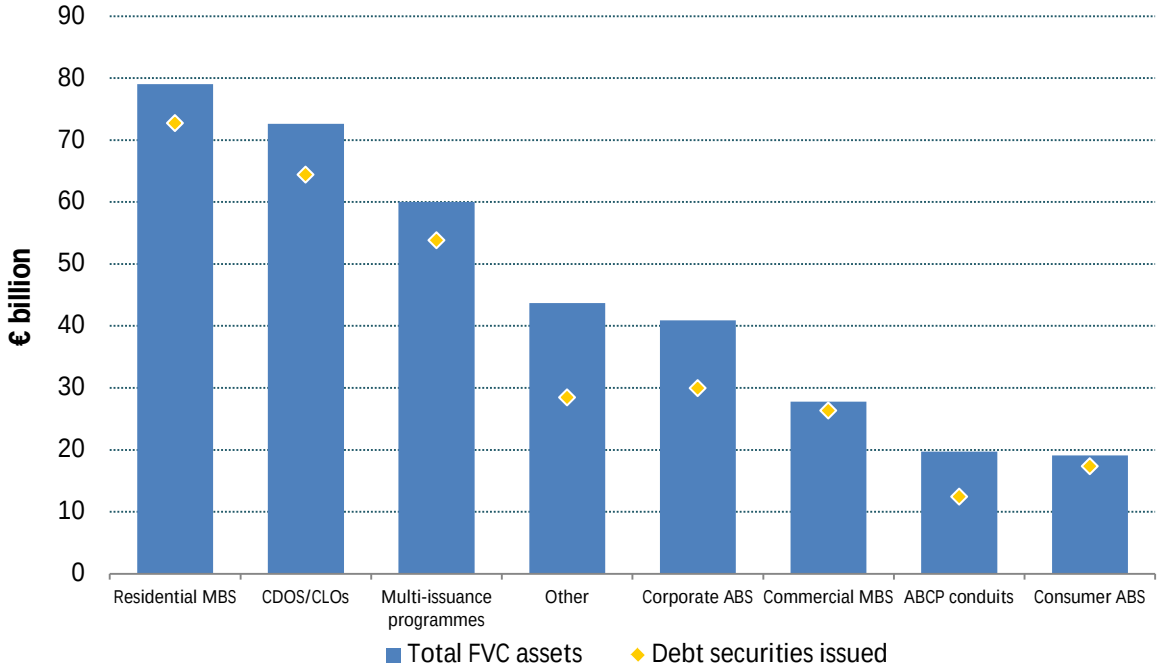
Securitisation is a financial innovation where the credit risk of an asset is transferred from the balance sheets of institutions to investors in asset-backed securities via securitisation vehicles known as FVCs.[15] This allows originators, including banks, to turn illiquid assets into funding. These entities are almost entirely financed by the issuance of short and long term debt securities but their asset profiles are very heterogeneous. As Chart 4 shows, credit risk has been transferred, and new credit generated, across a range of economic sectors and activities, including residential and commercial mortgages, consumer and corporate debt, asset backed commercial paper and different types of bond and loan obligations.

[14] A repo is essentially a collateralised short-term loan, where debt securities are received by the seller in return for cash subject to a repo agreement to reverse the transaction at a set price in the future, irrespective of fluctuations in the value of the debt securities. These are recorded according to the party exposed to the risk.

[15] See Godfrey & Jackson (2011).

Chart 4

**Total Assets of FVCs by Activity and Debt Securities Issued in Q2 2012**




Note: excludes NAMA (Irish Government SPV)

Credit risk transfer for IFs is difficult to pinpoint due to the lack of data on nominal positions of derivatives. Nevertheless, credit derivatives, used to transfer risk from one party to another, are separately recorded, which provides some very tentative evidence. This activity appears to be quite limited in that mark-to-market positions in these derivatives were just €152 million on the asset side and €15 million on the liability side in Q2 2012, and used by just 174 funds. Overall, there is not much evidence to support the perception that hedge funds in particular are, as a category, aggressively engaging in large positions vis-à-vis governments and corporates. However, changes in the market value of these derivatives tend to be small relative to nominal derivative positions and, therefore, firm conclusions cannot be drawn.

### 4.3 Maturity transformation[16]

Maturity transformation turns short term funding into asset holdings of longer term maturities. Mismatches can pose systemic run risks during times of financial stress. Of all FSB defined behaviours examined, maturity transformation encompasses the highest number of entities, at 662.

[16] While liquidity and maturity transformations often co-exist, the FSB definition allows maturity transformation to occur separately from liquidity transformation. This differs from classic banking theory, which emphasises the liquidity transformation function of banks. Moreover, in the literature, maturity and liquidity transformation are often intertwined. The FSB focuses specifically on systemic risk, however, which includes the risks of markets turning illiquid during a financial crisis and intensifying investor flight as assets are sold at distressed prices.

### *4.3.1 FVCs*

Maturity transformation can be inferred to a limited extent for financial vehicle corporations. On the liability side a full maturity profile is available, as debt securities issued by FVCs can be matched against the centralised securities database. Less detail exists on the assets side, as a maturity profile is not available for securitised loans, which comprise around half of all assets. These are generally considered to be long term, however. Securities other than shares account for one quarter of assets and their maturity profile is available through matching against the CSDB. Deposit and loan claims, around one-sixth of assets, are not broken down by maturity but these are predominately short term. The funding profile of FVCs based on available CSDB data indicates significant redemptions in the next 5 years. Most of the funding for commercial mortgage backed securities vehicles and a large portion of asset backed commercial paper conduit funding is due within 5 years. For other FVC types, consumer and corporate asset backed securities have most funding due within 5 years but these are backed by debt such as credit cards, car loans and non-financial corporation loans. For vehicles based on longer-term securitised loans, such as residential mortgage backed securities, most of their funding is also long-term.

### *4.3.2 Investment funds*

Coverage of maturity transformation in investment funds is more comprehensive with maturity information available for almost all debt securities held. For these funds, maturity transformation is defined as the extent to which longer-term assets (debt securities of over one year and long term loans) are funded by short-term liabilities (shares/units in issue for open-end funds, short-term loans and derivatives).[17] Closed-end funds are excluded as investors do not have the right to redeem their share/units directly from the fund. A minimum threshold is applied, that at least 20 per cent of long-term assets are funded by short-term liabilities, so as to exclude funds for which maturity transformation is not a defining characteristic.

Table 3

**Maturity Transformation by Fund Type in Q2 2012**

| | **>20%** | | | |
|---|---|---|---|---|
| | **Number of funds** | **Long term debt held (€ bn)** | **Total assets (€ bn)** | **Average %** |
| Bond | 342 | 84.2 | 103.7 | 81.2% |
| Mixed | 120 | 26.5 | 35.9 | 73.7% |
| ETF | 49 | 21.5 | 22.7 | 94.7% |
| Hedge | 63 | 20.6 | 29.4 | 70.1% |
| Other | 21 | 9.4 | 18.4 | 51.1% |
| Equity | 60 | 8.8 | 12.3 | 71.6% |
| Ex-MMF | 6 | 2.0 | 4.1 | 48.9% |

[17] Where long-term assets exceed long-term liabilities, the difference is covered by short-term funding. Results are sensitive to the definition of long-term assets, which we define as a maturity of over one year.

Maturity transformation activity, according to the definition above, is substantial and takes place across a wide range of fund categories, as shown in Table 3. Bond funds account for the majority of this activity, reflecting the very limited amount of longer-term loans on the liability side. At the same time, most bond funds remain outside the measure. Hedge funds, mixed funds and, surprisingly, equity funds are also prominent, with the latter possibly reflecting funds at the borderline of the equity and mixed funds classifications. Interestingly, some hedge funds, not classified as shadow banking under the leverage behaviour, are included here.

The results are not markedly sensitive to the choice of threshold, since most of these funds are substantially invested in longer term debt. For example, if the threshold is reduced to 10 per cent, 60 funds are excluded and, if increased to 30 per cent, 51 extra funds are included.

### 4.4 Liquidity transformation

The available data provides very limited information on this type of activity and only limited inferences can be drawn. Liquidity transformation occurs when liquid assets are pooled together and invested in illiquid assets. The FVC sector engages in liquidity transformation by definition, funding securitised loans that are not traded in financial markets with the issuance of debt securities that are. For IFs and MMFs, indicators such as the ratio of transactions flows to stocks, issuance/redemption dates, ratings and bid-ask spreads were examined but no inferences could be drawn.

### 4.5 Deposit gathering

Deposit gathering activity brings a sizeable and distinct set of entities into shadow banking, most notably money market funds, but also some bond funds. The rationale for including this activity is that these entities are financed by short-term funding with the aim of providing investors with higher returns than would be available from ordinary bank deposit accounts. The expectation among investors is that access to their funds is similar to that of bank deposits and that the underlying capital investment is not at risk. The entities undertaking this activity are, however, lightly regulated compared to banks. They invest mostly in what are generally considered to be safe and liquid short-term assets, such as money market instruments and repos. Bond funds generally invest along the spectrum of the yield curve and would not generally be considered deposit gatherers. Some, however, invest predominantly in short-term instruments similar to those of MMFs. The composition of assets held by a fund is the key criterion for identifying deposit gathering activity, given investor expectations that their investment can be redeemed at short notice. Deposit gathering behaviour is defined for the purposes of this paper as occurring where over half of the assets of a fund are short-term.[18]

A change in the statistical definition of MMFs last year had a significant impact on what would be seen as shadow banking from a top-down approach. This change was implemented in the Irish data in November 2011, removing funds to the value of €104 billion from MMFs, almost exclusively to bond funds. The rationale was to bring the statistical definition into line with the supervisory definition at a euro area level. The new MMF definition is more focused in that it includes an investment strategy of maintaining the principal and earning a return in line with money market rates, and states that MMFs can only invest in

[18] Debt securities with residual maturity of less than one year, money market instruments, bank deposits or short term loan assets, including repos.

high-quality money market instruments.[19] For the purposes of measuring shadow banking, however, the new definition is problematic. A fund mostly, but not exclusively, invested in high-quality, highly-liquid money market instruments could be a deposit gatherer but not an MMF. Furthermore, an entity could behave as a deposit gatherer but would not be classified as an MMF because the investment strategy allows a broader range of activities.

Table 4

**MMF, Ex-MMF & Bond Fund in Q2 2012**

**MMF**

| Type of security | Asset |
|---|---|
| Bond & Notes | 11.2% |
| Deposit & Loans | 27.1% |
| MMIs | 61.0% |
| Other | 0.8% |

**Ex-MMF**

| Type of security | Asset |
|---|---|
| Bond & Notes | 17.0% |
| Deposit & Loans | 32.7% |
| MMIs | 48.5% |
| Other | 1.7% |

**Bond**

| Type of security | Asset |
|---|---|
| Bond & Notes | 73.3% |
| Deposit & Loans | 3.6% |
| MMIs | 2.9% |
| Other | 20.3% |

The ex-MMFs behave more like current MMFs relative to the rest of the bond fund category, to which they are now classified. A typical bond fund would not generally be expected to invest in money market instruments. Indeed for those bond funds that are not ex-MMFs, this type of investment is tiny, as shown in Table 4. Current MMFs are mostly invested in money market instruments, as expected, but the ratio is also high for ex-MMFs. A similar pattern is evident in the use of repos, which is actually higher for ex-MMFs than for MMFs, but negligible for bond funds. When the definition of deposit gathering behaviour is applied, the entities identified straddle funds across the MMF, ex-MMF and bond categories. Most current MMFs are included as expected but so are half of all bond funds that were formerly MMFs, as shown in Table 5. A small but not insignificant number of other bond funds are also included.[20]

Table 5

**Deposit Gathering by Fund Type in Q2 2012**

| | **>50%** | | | |
|---|---|---|---|---|
| | **Number of Funds** | **MMIs + cash and deposits (€ bn)** | **Total Assets (€ bn)** | **Average %** |
| MMF | 74 | 258.4 | 279.3 | 92.5% |
| Ex-MMF | 35 | 91.6 | 104.3 | 87.8% |
| Bond | 34 | 6.5 | 7.1 | 90.4% |

Note: MMIs are money market instruments

[19] It also requires the investment manager to take into account issues such as credit quality, asset class, counterparty risk and liquidity. This definition applies to all assets whereas the old definition covered 85 per cent of total assets.

[20] This excludes those funds that hold short-term assets as part of a winding down process.

The results are not particularly sensitive to different thresholds in our definition of deposit gathering. Reducing the threshold of short-term assets to 40 per cent of total assets brings in 11 funds (6 bond, 3 MMFs, 2 Ex-MMFs) while increasing it to 60 per cent takes out 6 funds (4 bond, 1 MMF and 1 ex-MMF).

## 5. Results

The results illustrate the extent to which existing categories need to be disaggregated in order to measure shadow banking behaviour as defined by the FSB. Around two-thirds of all FVCs, MMFs and IFs combined, by total assets, are identified as engaging in shadow banking behaviour.

Table 6

**Shadow Banking Behaviours by Size in Q2 2012**

| € billion | Total assets | Leverage (excl. repos) | Repos (Q1) | Credit risk transfer | Maturity transfor-mation | Liquidity transfor-mation | Deposit gathering |
|---|---|---|---|---|---|---|---|
| FVC's | **469.2** | 448.2 | | 469.2 | 47.5 | 469.2 | – |
| MMF's | **279.3** | – | 35.6 | – | – | ? | 279.3 |
| Bond funds | **111.6** | 2.8 | 2.1 | ? | 103.7 | ? | 7.1 |
| Ex-MMFs | **108.5** | – | 22.8 | ? | 4.1 | ? | 104.3 |
| Hedge funds | **41.6** | 26.4 | 1.7 | ? | 29.4 | ? | – |
| Mixed funds | **37.4** | 10.9 | 0.1 | ? | 35.9 | ? | – |
| ETF funds | **31.8** | 9.1 | – | ? | 22.7 | ? | – |
| Other funds | **18.7** | 2.2 | 0.1 | ? | 18.4 | ? | – |
| Equity funds | **12.6** | 2.5 | 0.7 | ? | 12.3 | ? | – |
| Private Equity funds | **–** | – | – | – | – | – | – |
| Real Estate funds | **–** | – | – | – | – | – | – |

Note: As entities may engage in a number of shadow banking activities, the sum of the categories may not equate to total assets

Table 6 populates table 1 on the basis of the analysis undertaken, with Chart 5 below updating Chart 1. The main conclusions are:

***FVCs*** – All are included in measurements of behaviours as expected with some additional information provided on maturity transformation by vehicle type;

***MMFs*** – Most engage in deposit gathering activity as expected but a small minority do not;

***Bond Funds*** – A quarter of the total engages in maturity transformation while smaller numbers are identified under leverage and deposit gathering;

***Ex-MMFs*** – Most of these engage in deposit gathering, measured by total assets, but are now classified as bond funds in published data;

***Equity Funds*** – Although not associated with shadow banking, a small number of funds are identified under both leverage and maturity transformation;

***Hedge Funds*** – Consistent with the public debate, almost half of the category is captured, though maturity transformation activity is as strong as leverage;

***Mixed Funds*** – Over one-third of these are captured, mostly under maturity transformation, though the leverage behaviour of a substantial minority is quite similar to hedge funds;

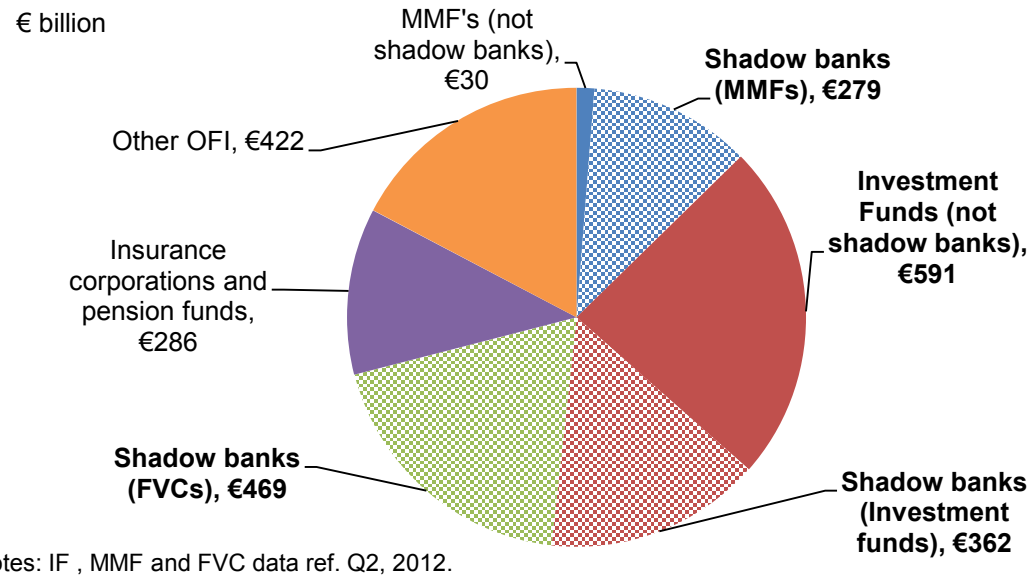
***ETFs*** – Almost half of the category is engaged in leverage and/or maturity transformation;

***Private Equity Funds and Real Estate Funds*** – These are not included in the FSB definition as they are not involved in the credit intermediation chain though may be included in other shadow banking definitions;

***Other Funds*** – Almost half of these are included though their share of shadow banking activity is much smaller once ETFs and private equity funds are removed.

Chart 5

**Breakdown of Non-Bank Intermediaries in Ireland in Q1/2 2012**




Notes: IF , MMF and FVC data ref. Q2, 2012.

## 6. Interconnectedness with banks

The data only provides limited detail on links between shadow banking activity and the banking sector.

For FVCs, disaggregation is available for deposit and loan claims and a portion of securitised loans still serviced by banks. Debt securities assets can be matched to MFIs[21] using ISIN codes but the amounts involved are relatively small. Share register information is not available to determine ownership for FVCs. Deposit and loan claims amounting to €3.9 billion can be linked to Irish banks, and €7.1 billion to other euro area banks, but no breakdown is available for the rest of the world. For securitised loans, €53.4 billion are serviced by Irish banks and €3.6 billion by German banks. In most cases, the servicer of the loans is also the originator.

For MMFs/IFs, a breakdown is available for asset holdings of debt and equities issued by banks. Deposits and loans are not available but banks are likely to be the major counterpart. A total of €63 billion is invested in bank assets, 80 per cent of which is investment in bonds by deposit gatherers. Funds involved in leverage account for the remainder. Fund ownership is collected but on a first known counterpart basis only. Banks directly own around half of all shares / units in deposit gatherers and around a quarter, on average, in other shadow banking entities. The existence of crossholdings between funds, and nominee accounts means that these shares may not accurately reflect the ultimate beneficial owner. The data, however, show that banking exposures are mostly situated outside the euro area, in particular, in the UK and US.

## 7. Data gaps

The analysis undertaken highlights the importance of granular data in understanding shadow banking behaviour. While the source data has improved considerably, primarily from the development of the euro area statistical framework, significant gaps still remain. In Ireland, the detailed granular information is only available for investment funds, money market funds and financial vehicle corporations,[22] meaning that a significant part of the other financial intermediaries sector is not covered. In particular treasury companies, leasing companies, some private equity funds and securitisation-type vehicles falling outside the FVC definition, are not covered.

Information on the measurement of liquidity transformation is a particular challenge. Ideally, securities databases could provide information on transactions per security, bid-ask spreads and credit ratings but this is a major operational challenge. Alternatively, reporting agents might be asked to classify securities according to particular liquidity buckets, but this probably represents an unacceptable reporting burden.

Limited information is available for derivatives, repos and securities holdings, both in terms of counterparties and volumes of activity. For derivatives, reporting on the basis of nominal positions, as well as mark-to-market, would provide a much clearer picture of the type of leverage used, particularly in the funds sector. Greater use of trade repository and central counterparty data could also be considered. Data gaps on security holdings are being addressed, however, in the context of a securities holding project underway at the ECB. This will improve counterpart information for securities where ISIN codes are reported – however, some domestic respondents use other codes, SEDOL or CUISIP, as their primary security identifier.

Gaps also exist in terms of identifying positions between financial sector entities, and particularly between entities within a common group structure, most of which operate on a

[21] Monetary and Financial institutions include MMFs but the latter holdings of IFs and other MMFs are minimal.

[22] Granular data collection will be expanded shortly to the Insurance sector, allowing an assessment of what shadow banking activities are undertaken in this sector.

cross-border basis. These gaps may be reduced through the development of international registers.

While some gaps need to be addressed through international initiatives, improvements can also be implemented at national level. As part of a project to implement ESA2010[23] changes, the Central Bank of Ireland is proposing a number of improvements to reporting forms in 2014. Enhancements to the identification of ETFs and private equity funds will be included. Expanded instrument coverage is also proposed for repos, reverse repos and other securitised lending. The potential for separately identifying unquoted securities and derivatives used for credit risk transfer will also be explored. Greater information may also be requested on the holdings of fund shares, but it is accepted that information on the ultimate beneficial owner may not be available to reporting agents. The securities holding project underway at the ECB offers potential in this regard.

For FVCs, the feasibility of collecting ownership structures by sector and geography is being explored. There is also scope to further expand asset and liability categories by maturity, sector and geography, and to enhance the reporting of securities by ISIN code.

## 8. Conclusions

The main purpose of the paper is to show the value of using granular data to measure shadow banking activity. This exercise represents a snapshot of shadow banking in Ireland at a particular point in time, according to the FSB definition. It also provides a framework for analysing these data. The results show that shadow banking activity does not fit neatly into the broad categories of published statistical data. Measurement is also sensitive to the various thresholds chosen in order to define shadow banking behaviours.

All Irish resident FVCs and most MMFs engage in shadow banking activity, though granular data is required to quantify the extent. All categories of IFs contain some shadow banking entities, although most categories fall outside the top-down definition. Measurement, therefore, requires access to granular data on a fund-by-fund basis to define and quantify shadow banking behaviours.

The statistical classification of IFs is problematic for the purposes of measuring shadow banking and, therefore, the creation of some alternative data categories needs to be considered. The recent reclassification of some MMFs highlights how borderline entities can significantly impact on a top-down measurement. Furthermore, the existence of broad investment strategies allows some types of funds (e.g. mixed) to engage periodically in shadow banking activities. It is important to note that classifying particular entities as falling within various types of shadow banking behaviours does not necessarily indicate major risks from a financial stability perspective. However, adherence to more than one behaviour, or being in excess of chosen thresholds, may indicate greater vulnerabilities. The framework and the dataset outlined in this paper may offer potential for refining the analysis of risk.

The paper shows that the shadow banking sector in Ireland is significant, with predominantly non-domestic risk exposures. This underlines the international nature of shadow banking and the need to share information across borders. The introduction of shadow banking measurement as a consideration when designing future reporting requirements would yield significant benefits in isolating shadow banking behaviours. A number of data gaps exist that can be addressed by measures that range from relatively easy to difficult and expensive to implement. On an international level, the development of share registers and data from

[23] European System of Accounts definitions as updated in 2010.

centralised clearing houses would provide key information on counterparties and indirect linkages that are currently missing. Initiatives are also required at national level, and the Central Bank of Ireland proposes expanding granular data collection in forthcoming revisions to reporting forms.

In summary, granular data clearly has an important role to play in efforts to measure and understand shadow banking and the risks therein, both at national and international level. These types of data should be more integrated with top-down approaches to fully understand the full extent of shadow banking activities and to better identify vulnerabilities.

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