



Banc Ceannais na hÉireann
Central Bank of Ireland

Eurosystem

Financial Stability Notes

An Lonn Dubh:

**Disentangling Market Liquidity Risk for
Irish Investment Funds**

Pawel Fiedor and Stamatoula Fragkou

Vol. 2021, No. 5

An Lonn Dubh: Disentangling Market Liquidity Risk for Irish Investment Funds

Paweł Fiedor and Stamatoula Fragkou¹

Central Bank of Ireland

July 2021

Abstract

In recent years, the Central Bank has been building its capabilities to develop a macroprudential stress-testing framework for investment funds. A key dimension of building that framework over time will be incorporating the differential liquidity of asset markets to which investment funds are exposed. As a first step in that direction, in this *Note*, we investigate the heterogeneity of market liquidity risk for investment funds domiciled in Ireland. We achieve this by utilizing the previously published *An Lonn Dubh* baseline stress test. We show the effects of varying liquidity shocks across domestic and international asset markets when investment funds face substantial redemptions. Our findings underline Irish domiciled funds' sensitivity to illiquidity in equity and debt markets. Further, liquidity strains applied exogenously to US equity, US bank debt, or UK government debt markets, lead to a particularly high volume of 'second round' losses for funds, reflecting the material exposures of the Irish fund sector to those asset classes. We outline the implications of these results for the continued development of the stress-testing framework, financial stability surveillance, and macroprudential regulation. Finally, our findings also shed light on the potential externalities that funds' behaviour can impose on financial markets in the face of large redemption shocks and a contraction in market liquidity.

1 Introduction

In this note, we extend *An Lonn Dubh* – a macroprudential stress-testing framework for investment funds – to shed light on the heterogeneous behaviour of market liquidity risk. In particular, by estimating the effects of varying liquidity parameters we provide evidence of market liquidity risk arising from the exposures held by Irish-domiciled funds.² One drawback of existing studies is that assuming the same liquidity for different asset categories can lead market liquidity risk to be estimated in a biased way (Bouveret, 2017). We address this by assessing the impact of distinct levels of liquidity in various asset markets independently. We achieve this by varying price impact factors for the Irish investment funds' exposures to equity and debt markets.^{3,4} While financial stability events tend to be characterised by increased correlations between liquidity of various assets, idiosyncratic shocks to liquidity of particular markets can also occur and have a significant impact. There is evidence of the heterogeneity of liquidity risk in the literature, with studies

¹ Market-Based Finance, Paweł.Fiedor@centralbank.ie and Stamatoula.Fragkou@centralbank.ie . All views expressed in this note are those of the authors alone and do not represent the views of the Central Bank of Ireland.

² See Fiedor, P. and Katsoulis, P. , *An Lonn Dubh: A Framework For Macroprudential Stress Testing of Investment Funds*, Vol. 2019, No2

³ A price impact factor refers to the effect an investor faces when trading an asset. A sell-off of an amount of an asset will reduce the price of the assets by the value of the price impact factor multiplied by the value of the assets sold.

⁴ The focus is on the exposures to equities and debt securities as these two types of assets represent a substantial fraction of the holdings of Irish domiciled funds.

showing that the impact of sales on prices depends on the market in question. In particular, Ellul et al. (2011), Feldhütter (2012), and Cetorelli et al. (2016) provide empirical estimates of the price impact in various bond markets. Additionally, Duffie (2010) also provides an overview of the empirical findings around the price impact of large sales in various markets. In this note, we provide evidence of the heterogeneity of market liquidity risk by incorporating a range of market-specific price impact parameters across the markets in which funds invest. While the ESMA (2019) stress test of European funds empirically estimates price impact factors for different asset categories, our analysis remains agnostic about what the liquidity conditions would be under market stress. Instead, we investigate the sensitivity of Irish funds to changes in liquidity of various assets. In particular, we quantify the losses of Irish funds that would be triggered by redemption shocks for a range of liquidity conditions in equity and debt markets. We keep the redemption shocks uniform across fund categories to hone in on the effects of varying liquidity conditions. Usefully, we can use overall fund losses as a proxy for the effects investment funds have on the markets in which they invest, a question of some importance to policymakers. This is due to funds' exercising pressure on markets being a function of the redemptions and losses they face. Thus, our approach – once incorporated into macroprudential stress testing framework – can aid the assessment of how investment funds can propagate illiquidity in financial markets. This is achieved by assessing funds' exposures to domestic and international markets when acting under liquidity strains.

Our analysis focuses on the losses arising in the total assets of Irish funds.⁵ These losses are the result of the redemption shocks, the holdings of the funds, and the liquidity conditions in the underlying equity and debt markets. We focus on equity and debt securities as these represent a substantial fraction of the total assets held by Irish investment funds. We show that Irish funds are more sensitive to redemption shocks under liquidity constraints in the US and other non-EU equity markets than other equity markets. The losses arising from the exposures to these markets are concentrated among equity and hedge funds. One of the key drivers of this sensitivity are the Irish funds' exposures to US and RoW equity markets. Specifically, 73% of Irish domiciled funds' investments in equity arise from the US and RoW markets (see Table 1). Turning to the liquidity of debt markets, Irish funds are more vulnerable to redemption shocks under liquidity strains in corporate debt markets (including bank debt) than in government debt markets (with the exception of UK government debt). The losses under illiquidity in bank debt markets are concentrated in bond and money market funds. Our results suggest that liquidity conditions in non-EU equity markets, bank debt, and UK government debt are crucial to the potential transmission of shocks by Irish-domiciled investment funds in response to large redemptions. These findings are mainly driven by the size and structure of Irish domiciled funds' exposures, as the model dynamics we employ are relatively straightforward.

Our stress test model extends the Central Bank's stress test capacity for funds and contributes to the wider objective of developing toolkits to investigate and reveal threats funds' can pose to the stability of the financial system. Our framework is one building block to address previous Financial Stability Assessment Program (FSAP) recommendations (No. 16/312), which highlight that "the Bank should build internal capacity allowing for more frequent stress testing with respect to market shocks for Money Market Funds (MMFs), and Investment Funds that avail of significant leverage". Thus, the results of our analysis provide information for future stress testing, macroprudential surveillance, and supervisory engagement. The main findings can also give useful background to the current discussions around the policy framework for market-based finance (Donnery, 2021, Makhoulouf, 2020, and Lane, 2020). We also contribute to the literature by identifying the sensitivity of the effects arising from redemption shocks to market illiquidity across markets. Despite the rise of macroprudential stress-testing for market-based finance (Baranova et al., 2017, Baranova et al., 2019, Aikman, 2019 and Gourdel et al., 2019), the heterogeneity of market liquidity risk has received relatively little attention. The policy-relevance of our work is further underlined by the recent growth of market based finance activity in the euro area and internationally (ECB/2019/No

⁵ See for details Table 1 which provides the holdings of assets of all Irish-domiciled funds

2323), which signifies the need for continued development of the analytical framework for monitoring of potential system-wide vulnerabilities arising from these entities.

2 Model

We investigate the effects of heterogeneous market liquidity risk using the *An Lonn Dubh* stress test framework (Fiedor & Katsoulis, 2019). The employed model starts with an exogenous redemption shock uniformly affecting all investment funds. To fulfil these redemptions, funds sell their assets while trying to maintain their portfolio composition and consequently their investment strategy. The sales have a price impact on the assets held by funds, and lead to a revaluation of the funds' net asset value (NAV) per share. These are the first round losses we present in the following section. As funds' investors are sensitive to negative shocks to the NAV per share, an analogous round of the model follows starting with an endogenous redemption shock based on investors' sensitivity to the negative returns of the funds. The resulting losses constitute the second round losses that are also presented in the following section.

This analysis comprises a reverse stress test highlighting sensitivity a priori. The redemption shocks materialised during March 2020 would be well within the range of parameters analysed in our study. However, a key difference between our approach and the March 2020 experience is that we apply a uniform redemption shock across all funds, whereas in March 2020 redemption shocks were concentrated on funds with exposures to less liquid assets (Financial Stability Review, 2020). The main way in which this study departs from Fiedor & Katsoulis (2019) is in varying the price impact factor independently for equity and debt markets. The price impact factor (PIF) represents the reduction in the price of an asset following an amount of sales. Similar to Greenwood et al. (2015), we use a price impact parameter of 10^{-13} as a baseline scenario. This value means that a sell-off of ten billion euro of assets in a specific category would reduce the price of these assets by ten basis points. We deviate from this baseline in order to probe the sensitivity of funds to illiquidity in equity and debt markets. To test liquidity risk heterogeneity in the market, we apply a range of price impact factors separately for each market (up to the extreme scenario of a 10^{-11} price impact factor), while holding all other markets constant. This price impact parameter means liquidity a hundred times worse than normal, or that a sell-off of a hundred million euro of assets in a given category would reduce their price by ten basis points. This is an extreme scenario on par with those that can appear in a severe crisis.

We base our results on Irish fund data reported for the end of September 2019, containing both the characteristics and holdings of Irish-domiciled investment funds. In Table 1 we show the holdings of assets of all Irish-domiciled funds and we compare these with those of 2020 (see Table 2) to identify any potential change in the structure of Irish funds asset holdings. Additionally, Figures 1 & 2 display structural information on Irish domiciled funds by disaggregating market share and asset holdings. Figures 1&2 reveal Irish domiciled funds' concentration in equity and debt markets where the latter holds 50% of total assets held in funds' portfolios. Despite the COVID-19 outbreak leading to substantial redemption pressures, assets held by Irish domiciled funds do not indicate any significant change in the portfolios composition. Figures 3&4 illustrate that equity and debt securities comprise 82 per cent of total assets.

For the scope of our analysis, funds are classified into seven self-reported categories: bond, equity, hedge, money market, mixed, real estate, and other funds. We group the asset holdings into eighteen categories, following Fiedor & Katsoulis (2019). In particular, equities are grouped by region, while debt securities are grouped by the category of issuer (governments, banks, asset managers, non-financial corporations, and others) and also region in the case of government debt (EU, UK, US, and the 'Rest of the World'). Equity and debt securities comprise 89% of asset holdings while the remaining 11% accounts for minor holdings and there is not one substantial driver (see Figure 1&2).

In the following section, we estimate the losses Irish-domiciled funds face when acting under redemption pressures. These losses are in relation to the total assets values as indicated in Table 1.

From a financial stability perspective, our ultimate objective is to assess the possible externalities that funds' behaviour can impose on financial markets, rather than the volume of losses funds' investors face. Nonetheless, fund losses – especially the magnitude of 'second round' losses – offer a convenient proxy for spillover effects, vastly reducing the dimensionality of the results. In principle, *An Lonn Dubh* allows for the disaggregation of the effects funds have on prices in separate markets. While we omit such details in the interest of brevity and clarity of this *Note's* message, such an exercise can be useful for policy-makers in implementing different scenarios. Spillover effects can be considered in future studies with more specific research questions.

3 Results

Our analysis concentrates on the heterogeneity of market liquidity risk and the key findings underline the effects of varying liquidity in domestic and international financial markets. Figures 5 & 6 display the first and second round losses of Irish funds following uniform redemption shocks ranging from 1 to 10 per cent. First round losses display a linear relationship with shock size. That is, a change in liquidity leads to a similar volume of losses funds. For very high levels of liquidity risk, some of the second-round losses increase non-linearly with the shock size. This reflects the endogenous impact of funds on equity and debt markets, and the consequent spillover effects.

In Figure 5, each plot provides a sensitivity analysis for liquidity risk of a given (regional) equity market. Looking at first round losses, as we decrease the liquidity from the baseline level (blue line), through medium illiquidity (orange line), to severe illiquidity (green line), the volume of losses increases. A similar pattern emerges for second-round losses. The degree to which funds' losses increase depends on the market for which we vary the liquidity. This highlights the sensitivity of the Irish-domiciled funds to the market liquidity of various markets. Regarding equity, the volume of Irish funds' exposures is the most vulnerable under illiquidity in the US and other non-EU markets. These findings are mainly driven by the size and structure of Irish domiciled funds' exposures to the US and non-EU markets as these hold a substantial portion of funds' total assets.⁶ Under the extreme scenario of severe illiquidity ($PIF=10^{-11}$) in either of these two markets we observe substantial second round losses, signifying potential for spillover effects.

Figure 6 provides a sensitivity analysis of the liquidity of various debt markets. Irish funds are the most vulnerable when liquidity strains apply to the corporate debt markets (in particular issued by asset managers and banks). Conversely, Irish funds are less sensitive to the liquidity of most government debt markets, with a notable exception being the UK debt market (given the sizable exposure they have to this market). Government debt usually indicates a relatively low risk, as these securities are considered highly liquid. However, this analysis is done to illustrate the potential of the model to incorporate different types of liquidity shocks. Indeed, government bond markets are not immune from bouts of illiquidity (Habib et al., 2020). Losses appearing in the case of illiquidity due to exposures to asset managers', banks and UK government debt markets, propagate spill over effects in the form of significant second round losses.

In Figures 7 & 8, we present results aggregated for all Irish-domiciled funds. Figures 7 & 8 illustrate the sensitivity of various fund types to the liquidity of US equity and bank debt markets respectively. Such analysis can aid a targeted macroprudential surveillance of liquidity mismatch risk in the fund sector. In Figure 7, each subplot represents the losses in a given category of funds following uniform redemption shocks ranging from 1 to 10 per cent, under varying liquidity conditions in the US equity market (similar to Figures 5 & 6). It turns out that equity, hedge, and mixed funds are the most vulnerable to illiquidity in the US equity market. In Figure 8, we provide equivalent results for the liquidity of the bank debt market. In this case, money market and bond funds react the most to liquidity strains arising in the bank debt market.

⁶ See table 1 where we show Irish domiciled funds' holdings.

4 Concluding Remarks

In recent years, the Central Bank has been building its capabilities to develop a macroprudential stress-testing framework for investment funds. A key dimension of building that framework over time will be incorporating the differential liquidity of asset markets to which investment funds are exposed. As a first step in that direction, in this *Note* we extend the capabilities of the current stress test framework for Irish domiciled funds and we contribute to the Central Bank's wider objective for developing stress testing toolkit for funds. Our analysis counts for a range of price impact parameters to reflect market liquidity risk heterogeneity.

The results illustrate that Irish funds are sensitive to redemption shocks under illiquidity in the US equity and bank debt markets. The former triggers significant losses for equity and hedge funds, while the latter leads to significant losses in bond and money market funds.

Our results point to two specific issues. First, Irish funds appear to be sensitive to the liquidity of UK government debt, given significant exposures to that market. Second, since money market funds take part in the funding of the banking sector and are sensitive to market liquidity of bank debt, shocks to these funds or bank debt markets could lead to self-reinforcing dynamics as seen during the financial crisis of 2008, and to some extent in 2020.

Continued development of this approach can be useful for stress testing, macroprudential surveillance, and supervisory engagement. In particular, an understanding of the key sensitivities of Irish-domiciled funds with respect to liquidity risk can help in lowering the dimensionality of future stress testing exercises (e.g. through concentrating the exercise on these markets). Further, continued development of this approach contributes to the macroprudential surveillance of the sector, and are in line with the IMF Country Report (No. 16/312) recommendations in offering insights to market liquidity risk, and the potential for distortions arising in the financial markets with respect to Irish funds.

References

- Aikman, D., (2019), *Stress testing market-based finance*, presented at Financial Resilience and Systemic Risk, LSE Institute of Global Affairs Financial Markets Group Conference, London
- Baranova, Y., Coen, J., Lowe, P., Noss, J., and Silvestri, L. (2017), *Simulating stress across the financial system: the resilience of corporate bond markets and the role of investment funds*, Bank of England (BoE) Financial Stability Paper No. 42
- Baranova, Y., Douglas, G., and Silvestri, L., (2019), *Simulating stress in the UK corporate bond market: investor behavior and asset fire sales*, Staff Working Paper No. 803 Bank of England (BoE),
- Bouveret, A., (2017) *Liquidity Stress Tests for Investment Funds: A Practical Guide*, International Monetary Fund (IMF), Working Paper Series, No. 226
- Cetorelli, N., Duarte, F., and Eisenbach, T. (2016), "Are asset managers vulnerable to fire sales?" Federal Reserve Bank of New York
- Cunliffe Jon, (2017), *Market-based finance: a macroprudential view*, Asset Management Derivatives Forum, Dana Point, California
- Donnery, Sharon, (2021), *Financial Stability Remarks*, Virtual Workshop at the Central Bank of Ireland, Central Bank of Ireland
- Duffie, D., (2010), *Asset price dynamics with slow-moving capital*, Journal of Finance, Vol.65, pp.1238–1268
- European Securities and Markets Authority, (2019), *Stress simulation for Investment Funds*, ESMA Economic Report
- European Securities and Markets Authority, (2019), *Guidelines on stress test scenarios under the MMF Regulation*, ESMA Report,
- Ellul, A., Jotikasthira, C. and Lundblad, C.T., (2011), *Regulatory pressure and fire sales in the corporate bond market*, Journal of Financial Economics, Vol. 101(3), pp.596-620
- Feldhütter, P., (2012), *The Same Bond at Different Prices: Identifying Search Frictions and Selling Pressures*, The Review of Financial Studies, Vol. 25(4), pp. 1155–1206
- Fiedor, P., and Katsoulis, P., (2019), *An Lonn Dubh: A framework for macroprudential stress testing of Investment Funds*, Financial Stability Notes, Vol. 2019, No.2
- Financial Stability Review I (2020), Central Bank of Ireland
- Gourdel R., Maqui, E., and Sydow, M., (2019), *Investment funds under stress*, European Central Bank (ECB), Working Paper series No 2323
- Greenwood, R., Landier, A., and Thesmar, D. (2015), *Vulnerable banks*, Journal of Financial Economics, Vol. 115(3), pg. 471–485
- Habib, M., Stracca, L., and Venditti, F., (2020), *The fundamentals of safe assets*, ECB Working Paper Series, No 2355
- International Monetary Fund (2016) *Ireland: Asset management and financial stability*, Financial Sector Assessment Program (FSAP) technical note, IMF Country Report No. 16/312

Makhlouf, G., (2020), *Making the case for macroprudential tools for the market-based finance sector: lessons from COVID-19*, speech for Bruegel online event on "The need for market-based finance after COVID-19"

Lane, P., (2020), *Pandemic central banking: the monetary stance, market stabilization and liquidity*, speech for Monetary and Financial Stability Policy Webinar

Tables and Figures

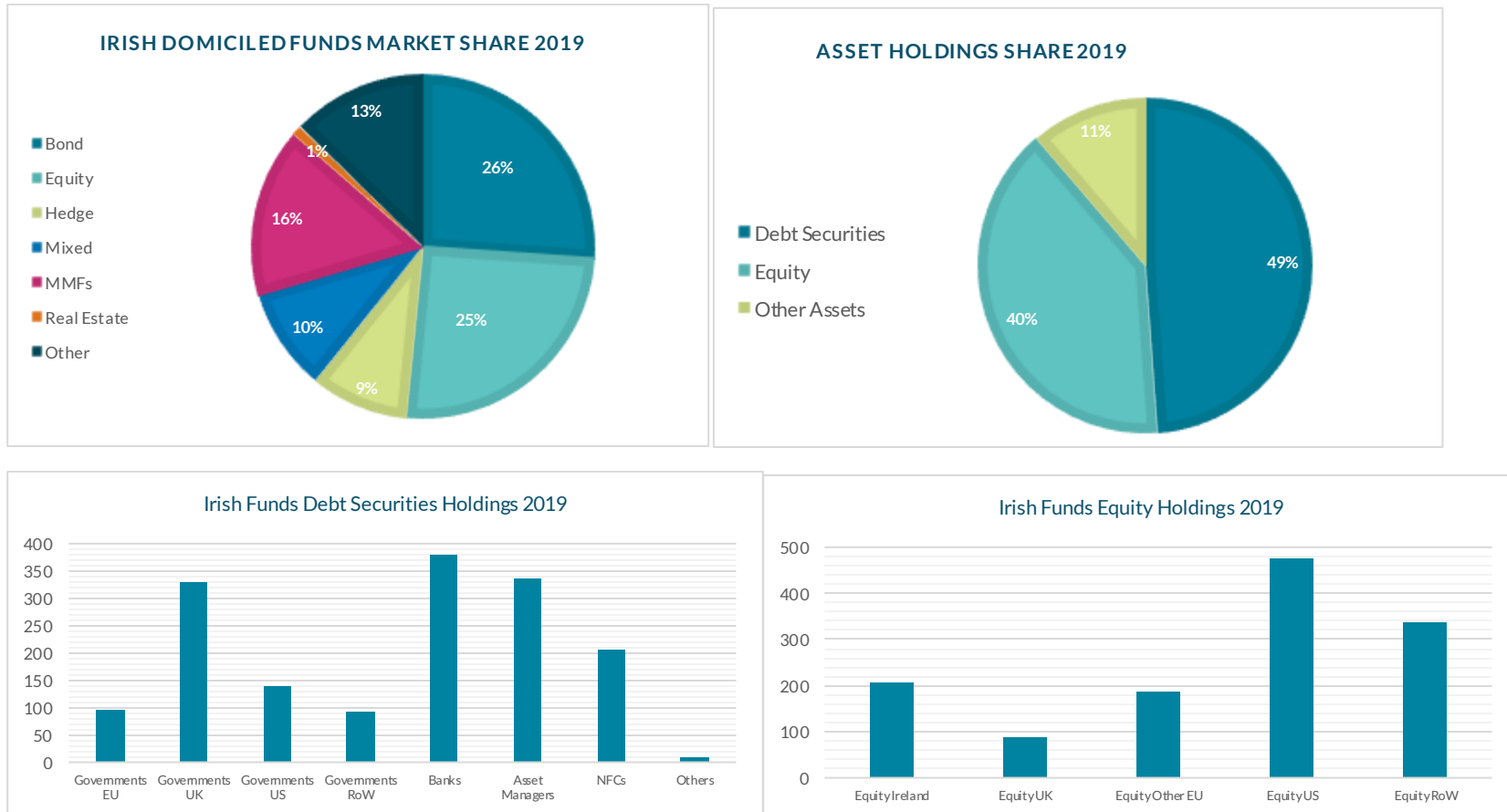
Table 1: Holdings of assets of all Irish-domiciled funds in eighteen aggregate categories used in the model **at the end of September 2019**, reported in billions of euro. Total value of assets of all funds involved in the presented stress test exceeds € 3.5 trillion. Debt securities and equities represent around forty and thirty per cent respectively, of all assets of Irish- domiciled funds. MMFs denote money market funds. Values denoted by * removed for confidentiality purposes. Source: Authors' calculations using Central Bank of Ireland data.

Instrument	Sector	Region	Bond	Equity	Hedge	Mixed	MMFs	Real Estate	Other	Total
Cash instruments	All	All	45.89	30.92	45.67	23.36	65.61	1.53	61.53	274.51
Debt securities	Governments	EU	64.55	0.87	1.92	10.47	12.87	*	3.91	*
Debt securities	Governments	UK	46.54	0.58	2.06	54.96	13.57	*	212.07	*
Debt securities	Governments	US	71.71	5.98	13.41	11.63	31.14	*	4.66	*
Debt securities	Governments	RoW	84.29	0.21	0.66	5.37	1.58	0.00	0.35	92.47
Debt securities	Banks	All	90.14	1.12	1.34	15.32	270.89	*	1.44	*
	Asset									
Debt securities	Managers	All	245.74	1.43	15.28	17.90	40.65	0.30	14.38	335.68
Debt securities	NFCs	All	148.82	3.87	6.31	15.92	23.80	0.09	5.66	204.48
Debt securities	Others	All	6.20	*	0.14	0.39	3.29	0.00	0.27	*
Equity Ireland	All	Ireland	23.67	34.17	41.66	72.55	0.51	2.01	31.67	206.23
Equity UK	All	UK	1.90	58.92	7.54	14.86	0.00	0.58	2.98	86.78
		Other								
Equity Other EU	All	EU	3.27	123.89	24.33	29.54	0.00	1.21	5.45	187.69
Equity US	All	US	9.72	343.56	85.52	24.23	*	2.03	10.55	*
Equity RoW	All	RoW	5.83	259.12	41.47	22.80	0.00	1.22	6.99	337.43
Securities										
Borrowing	All	All	4.75	0.77	*	4.23	96.16	*	10.32	117.79
Property and land	All	All	0.00	0.00	0.00	0.00	0.00	20.91	0.00	20.91
Derivatives	All	All	7.42	21.79	20.42	10.68	*	0.02	53.77	*
Other assets	All	All	57.85	10.96	17.96	5.63	0.93	0.89	22.04	116.26
Total	All	All	918.30	*	*	339.86	561.41	30.83	448.03	3524.00

Table 2: Holdings of assets of all Irish-domiciled funds in eighteen aggregate categories used in the model **at the end of September 2020**, reported in billions of euro. Total value of assets of all funds involved in the presented stress test exceeds € 3.5 trillion. Debt securities and equities represent around forty and thirty per cent respectively, of all assets of Irish-domiciled funds. MMFs denote money market funds. Values denoted by * removed for confidentiality purposes. Source: Authors' calculations using Central Bank of Ireland data.

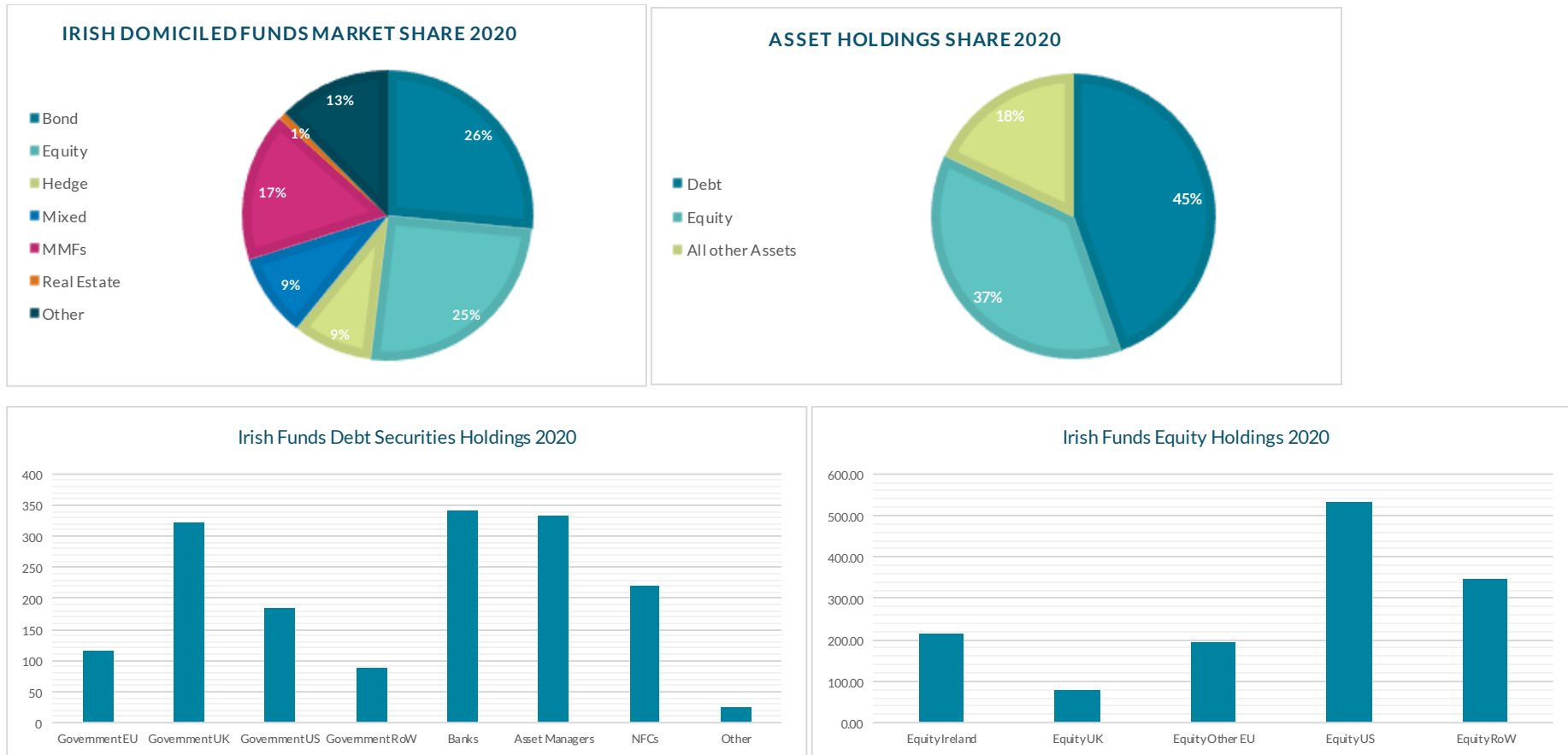
Instrument	Sector	Region	Bond	Equity	Hedge	Mixed	MMFs	Real Estate	Other	Total
Cash instruments	All	All	46.71	33.54	41.48	22.29	89.60	1.88	66.82	302.33
Debt securities Government	Governments	EU	69.63	0.53	5.05	11.62	24.04	*	3.97	*
Debt securities Government	Governments	UK	46.98	0.29	2.21	50.10	10.81	*	211.87	*
Debt securities Government	Governments	US	72.98	3.22	7.93	11.52	84.44	*	3.74	*
Debt securities Government	Governments	RoW	82.25	0.13	0.91	4.49	1.32	0.00	0.56	89.66
Debt securities	Banks	All	97.44	1.22	1.77	13.08	226.94	0.02	1.42	*
	Asset									
Debt securities	Managers	All	247.03	0.98	13.12	17.35	36.08	0.38	17.62	332.56
Debt securities	NFCs	All	170.20	3.76	10.73	18.73	9.83	0.12	6.40	219.78
Debt securities	Others	All	7.67	0.02	0.07	0.46	17.44	*	0.42	*
Equity	All	Ireland	27.41	34.44	40.82	72.60	1.04	3.16	36.69	216.15
Equity	All	UK	2.10	52.05	6.64	14.91	*	0.64	2.91	*
Equity	All	Other EU	4.48	119.15	28.00	32.51	*	1.46	7.15	*
Equity	All	US	8.96	397.57	84.38	26.91	0.00	1.76	15.12	534.70
Equity	All	RoW	4.44	267.81	40.32	23.79	*	1.50	7.64	*
Securities Borrowing	All	All	3.05	0.66	3.28	3.21	101.76	0.00	9.56	121.51
Property and land	All	All	*	*	*	*	*	20.35	*	*
Derivatives	All	All	5.80	4.18	17.35	9.00	0.00	0.02	27.01	63.37
Other assets	All	All	71.16	11.16	20.58	7.24	2.13	0.88	37.66	150.82
Total	All	All	968.29	*	*	339.79	605.43	32.24	456.57	3,657.66

Figure 1 & 2: In 2019 Irish Domiciled Funds Structural information on market share and asset holdings, display that almost 50% of Irish funds are debt and equity funds, while equity and debt securities holdings comprise 89% of total assets held in Irish domiciled funds' portfolios.



Source: Central Bank of Ireland Statistics Department, September 2019

Figure 3 & 4: In 2020 Irish Domiciled Funds Structural information on market share and asset holdings, display that almost 50% of Irish funds are debt and equity funds, while equity and debt securities holdings comprise 81% of total assets held in Irish domiciled funds' portfolios as reported in the end of September 2020.



Source: Central Bank of Ireland Statistics Department, September 2020

Figure 5: Aggregate losses of Irish-domiciled funds following redemption shocks from 1 to 10 per cent. First and second round losses shown for various levels of liquidity of equity markets, from normal liquidity ($PIF = 10^{-13}$) to severe illiquidity ($PIF = 10^{-11}$). Irish funds display high sensitivity to illiquidity in the US and other non-EU markets, where substantial second round losses occur, signifying a potential for spillover effects.

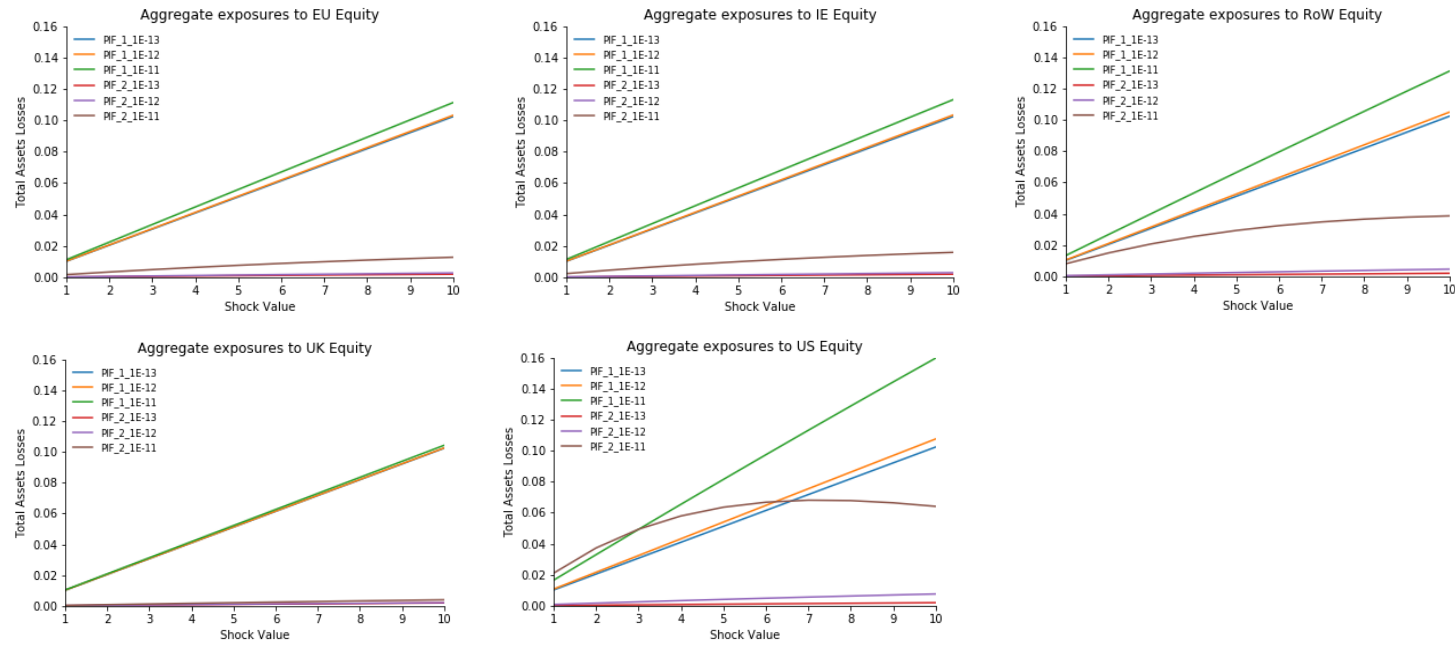


Figure 6: Aggregate losses of Irish-domiciled funds following redemption shocks from 1 to 10 per cent. First and second round losses shown for various levels of liquidity in various debt markets, from normal liquidity ($PIF = 10^{-13}$) to severe illiquidity ($PIF = 10^{-11}$). Irish funds sensitivity to liquidity is concentrated on bank, asset manager, and UK debt markets, where spillover effects, in the form of significant second round losses, appear.

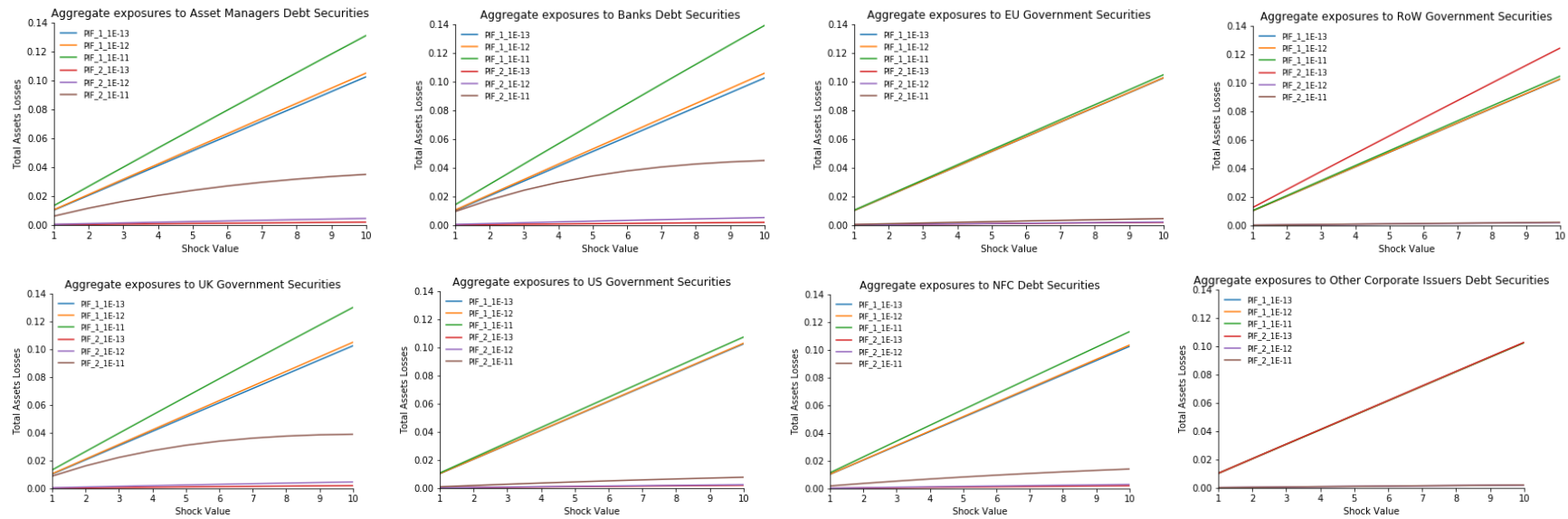
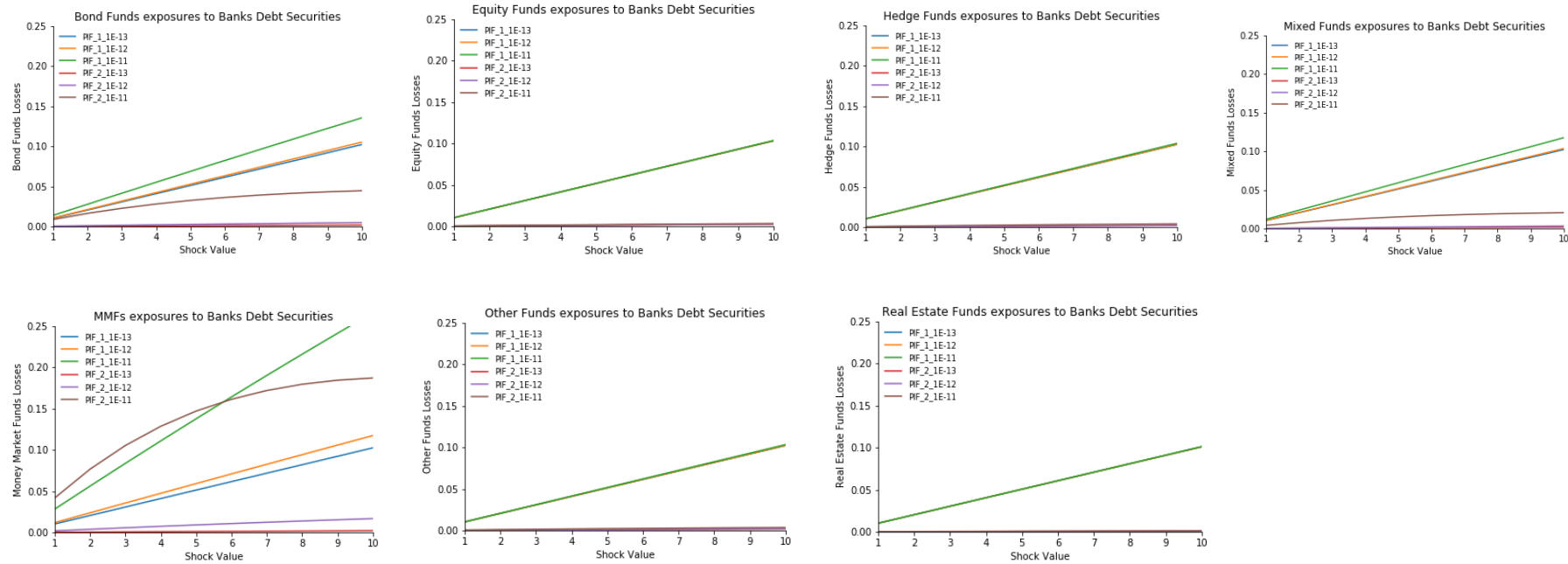


Figure 8: Losses of Irish-domiciled investment funds by category, following uniform redemption shocks (from 1 to 10 per cent of assets), under varying liquidity conditions, from normal liquidity ($PIF = 10^{-13}$) to severe illiquidity ($PIF = 10^{-11}$), in the bank debt market. Money market and bond funds are the most sensitive to the illiquidity in the bank debt market.





Banc Ceannais na hÉireann
Central Bank of Ireland

Eurosystem