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How ‘special’ are international banks sponsoring Irish-resident SPEs?*

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Abstract

This paper focuses on cross-border debt issuance linking banks and shadow banking entities, providing new evidence associated with the characteristics of international banks sponsoring Irish-resident SPEs. Our empirical results show that banks sponsoring Irish-resident SPEs are larger and financially weaker across a range of indicators compared to other banks. We analyse how these indicators evolve following debt issuance through Irish-resident SPEs, where the impact is concentrated in the short-term and largely dissipates after a year. This contrasts with the impact of debt issuance elsewhere, which is sustained beyond a year. However, a key purpose of banks issuing debt through Irish-resident SPEs may be to access debt markets elsewhere. We observe banks markedly increasing their issuance volumes in debt markets elsewhere after issuing debt through Irish-resident SPEs.

JEL classification: G21, G01, G15.

Keywords: International banking, cross-border debt issuance, special purpose entities (SPEs), Irish non-bank financial sector, shadow banking.

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Non-technical summary

In this paper, we provide new evidence associated with the characteristics of international banks sponsoring Irish-resident SPEs. Our contribution to the literature comes by means of bringing together elements from several lines of work focusing on SPE securitisation, bank debt issuance and cross-border debt issuance by firms other than banks, to study a broadly unexplored cross-border dimension of debt issuance linking banks and shadow banking entities, specifically SPEs. Our findings point to several 'special' features of international banks that sponsor Irish-resident SPEs:

First, these banks are larger and grow at a slower pace than banks that are not active in debt markets and, particularly, banks that carry out debt issuance activities elsewhere. They also tend to have riskier loan portfolios, be less profitable and less capitalised by means of their Tier 1 regulatory capital ratios. Furthermore, they tend to have thinner stable sources of funding, face higher costs of funding and present higher debt ratios.

Second, these results are also apparent when we split our sample into before and after debt issuance through Irish SPEs. In the ex-ante sample, banks that issue debt through Irish-resident SPEs are larger and have thinner levels of stable funding compared to banks that only issue other debt. In the ex-post sample, debt issuance through Irish-resident SPEs is related to significant changes in a broader set of bank-level indicators. For example, banks that issue debt sponsoring Irish-resident SPEs tend to be much larger in size and have considerably lower levels of stable funding compared to banks that only issue other debt.

Third, any effect of debt issuance through Irish-resident SPEs on most bank-level characteristics appears to be concentrated in the short-term but largely dissipates within a year. This contrasts with the effect of other types of debt issuance, which is sustained beyond a year across almost all indicators.

Finally, a key purpose of banks issuing debt through Irish-resident SPEs may be to access debt markets more generally. We observe these banks markedly increasing their issuance volumes in debt markets elsewhere after issuing debt through Irish-resident SPEs. Our empirical results also indicate that international banks tend to capture a larger share of debt markets following their first debt issuance sponsoring Irish-resident SPEs, suggesting complementary, rather than substitution, effects.

1 Introduction

As financial markets become increasingly globalised, an ever larger share of bank debt issuance is conducted across borders. Such flows can represent new funding channels for banks and can allow credit risks to be diversified internationally across a larger range of investors. Moreover, debt securities represent a considerable portion of international cross-border positions, with cross-border bank credit and bond issuance accounting for a significant share of total credit (Lane (2014)). Within this environment, special purpose entities (SPEs) have seen significant debt security issuance. For banks, debt issuance through SPEs has diversified away from debt funding secured on large mortgage pools, as was the case before the financial crisis of 2007–2008, to smaller pools of collateral based on various types of non-mortgage loans and debt securities (Golden and Hughes (2018)).

SPEs are legal entities with narrow, specific, and/or pre-defined financial objectives, such as the segregation of risks, assets and/or liabilities, or as a cash conduit, whose directors have no discretionary powers as defined by the terms of the SPE contract or arrangement. The sponsor of the SPE refers to the entity on whose behalf the SPE was established. For example, if a bank decides to set up an SPE in order to remove mortgages from its balance sheet, engaging an administration firm to actually set up the SPE, it is the bank which is considered the sponsor.¹

Banks, in particular, issue debt securities through SPEs in various ways.² In doing so, they may alter their own financial risk profiles, typically through the transfer of risk, reducing tax obligations, lower funding costs by ring-fencing assets and/or improving liquidity by issuing debt collateralised by non-liquid assets. Securitisation is a particular form of these activities, where assets, or the risk associated with these assets, are transferred to investors in SPE debt securities. The transfer of credit risk may benefit banks in terms of meeting capital requirements and lending portfolio management, and so can ultimately facilitate credit to the real economy. Debt issued through such financing activities can also broaden the universe of securities, providing investors with a higher degree of diversification and tailored investment opportunities. Nevertheless, these activities can also be a source of uncertainty in financial markets. The relative opacity

¹This does not however refer to a charitable trust that owns shares of the SPE in an orphan vehicle structure. In this structure, the charitable trust exercises only technical ownership, holding the equity in the SPE but its actions are completely governed by the specific provisions of a contract.

²Figures 1 to 3 illustrate structures typically employed by banks issuing debt through SPEs.

of certain SPE structures can exacerbate the re-pricing of potential risks surrounding information asymmetries between investors and sponsors, limiting the availability of funding sources for banks relying heavily on SPE financing at times of market stress.

Ireland is a major global channel for cross-border financial flows through SPEs. Irish-resident SPEs engaged in securitisation amounted to €398 billion of total assets over 848 vehicles in 2016Q4 accounting for 22 per cent of the euro area total. Total assets in non-securitisation SPEs were €342 billion in 2016Q4 over 937 vehicles. Bank-sponsored vehicles represent around half of securitisation SPEs and a quarter of non-securitisation SPEs, in terms of total assets. By 2016Q4, mortgage-backed securitisation accounted for 29 per cent of the assets of bank-sponsored vehicles with the remainder based on debt securities, derivatives, consumer or corporate loans. Within non-securitisation SPEs, most bank-sponsored vehicles engage in either external financing or are used by the sponsor to undertake investments on its behalf (Barrett, Golden, and Maqui (2017)).

In this context, this paper focuses on a broadly unexplored cross-border dimension of debt issuance linking banks and shadow banking entities, providing new evidence associated with the characteristics of international banks that sponsor Irish-resident SPEs. Our results aim to address a lesser-known area of the international financial system.

We construct a unique database on Irish-resident SPEs reporting to the Central Bank of Ireland by combining granular-level securities information on SPEs with debt issuance and sponsor bank balance sheet information from the S&P Global Market Intelligence database and the Centralised Securities Database (CSDB) collected by the European Central Bank (ECB). Our dataset includes 734 international banks from 19 countries over the period 2005Q1–2016Q4, yielding a total of 35,232 bank-quarter observations. We identify a total of 258,856 debt issuances through Irish-resident SPEs and debt activity elsewhere.

Focusing on a broad range of bank-level indicators, including size, growth, profitability, corporate valuation, loan risk profile, solvency, funding structure and cost of funding, we study the extent to which different bank features characterise international banks that sponsor Irish-resident SPEs. We address this question from three main angles. First, we empirically analyse how these differ from both banks that carry out debt issuance activities elsewhere and banks that are not active in debt markets over the sample period. Second, we further show how bank characteristics evolve following debt issuance through Irish-resident SPEs and compare these patterns to banks that issue debt elsewhere. Third, we

assess access to debt markets elsewhere by international banks before and after issuing debt through Irish-resident SPEs, controlling for macroeconomic developments through time fixed effects, distinguishing between banks from advanced and emerging economies.

Our empirical evidence indicates that international banks that sponsor Irish-resident SPEs are larger and exhibit weaker characteristics across a range of bank-level financial indicators relative to banks that carry out debt issuance activities elsewhere and banks not active in debt markets over the sample period, after controlling for country differences. Our results also show that any meaningful effect on bank characteristics is concentrated in the short term following debt issuance through Irish-resident SPEs compared to banks that issue debt elsewhere, controlling for time effects, with access to debt markets elsewhere increasing after issuing debt through Irish-resident SPEs, particularly in the case of banks from emerging economies.

We add to the existing literature by bringing together elements from several lines of work on SPE securitisation, bank debt issuance and cross-border debt issuance by other types of firms (i.e. non-financial corporations). Previous academic literature on SPEs has focused primarily on securitisation activity, and, to the best of our knowledge, has not covered the cross-border dimension. Our main contribution therefore comes by means of bridging these perspectives.

The first strand of the related literature focuses on securitisation SPEs. Gorton and Souleles (2007) find that the benefits of securitisation for US sponsor banks largely derive from banks avoiding potential bankruptcy costs. Nevertheless, investors shun debt securities issued by the SPE if the risks of bankruptcy are too high. Similarly, Skarabot (2001) models the optimum asset structure of firms based on SPEs reducing bankruptcy costs. Carbó-Valverde, Marqués-Ibañez, and Rodríguez-Fernández (2012) find that solvency, cash-flow and cost indicators affect debt issued by Spanish banks through SPEs only with a significant lag, implying imperfect risk transfer that may be of value for higher risk banks. Also focusing on the Spanish banking sector, Almazan, Martín-Oliver, and Saurina (2015) find that banks engaging in securitisation have stronger growth opportunities, liquidity constraints, costlier funding options and restricted access to capital markets. Furthermore, small and medium-sized banks and non-listed banks have the strongest incentives to securitise as they are more likely to face adverse selection problems. Gornicka and Zoican (2016) draw a relationship between higher capital requirements and the use of SPE funding and, similarly, Irani, Iyer, Meisenzahl, and Peydró (2018) observe a

significant relationship between capital adequacy and the transfer of loans from banks to non-banks in the US.

Second, focusing on debt issuance from the bank perspective, our work relates to a number of papers analysing the impact of bank-level indicators on issuance decisions. Carbó-Valverde, Rosen, and Rodríguez-Fernández (2017) find that covered bonds are usually used for liquidity purposes, compared to mortgage backed securities which are associated with agency issues, where the interests of the counterparties are misaligned. Camba-Méndez, Carbó-Valverde, and Rodríguez-Palenzuela (2014) study financial reputation as a determinant of bank debt issuance, highlighting the importance of credit ratings. Similarly, van Rixtel, Romo-González, and Yang (2016) show that banks with higher ratings are more likely to issue debt, with unsecured debt being particularly high for stronger banks.

Third, there are many examples analysing the relationship between firm-level characteristics and cross-border issuance of equity, for firms or financial entities other than banks. Underlying factors determining corporate funding decisions tend to differ between the domestic and the cross-border dimensions. Claessens and Schmukler (2007) focus on firm-level balance sheet indicators when analysing the motivations behind equity issuance abroad. They find that firms participating in international markets tend to be larger, grow faster, have higher returns and more foreign sales. Also focusing on firm-level balance sheet indicators, DeAngelo, DeAngelo, and Stulz (2010) find market-timing and corporate life cycles to be significant drivers of domestic equity issuance. Some work also focuses on emerging economies, where issuance abroad is more prominent. Fuertes and Serena (2017), analyse how financial market indicators and firm-level characteristics of debt guarantors determine bond issuance decisions between alternative offshore options. They find that firms with poorer credit quality, less ability to absorb issuance costs and more information asymmetries choose relatively lightly regulated debt issuance options such as Eurobonds. Mizen, Packer, Remolona, and Tsoukas (2012), examine the relationship between financial environment and firm-level information and onshore/offshore decisions in Asia, and find market depth to be the strongest determinant.

For the purposes of our analysis and methodology, we follow the empirical approach in Gozzi, Levine, and Schmukler (2010), who examine firm-level determinants of cross-border debt and equity issuance. We track their model structures through the various stages, which allows for some cross-comparison of results. Gozzi, Levine, and Schmukler

(2010) find that only a small portion of firms issue debt or equity abroad and that the impact on their characteristics is broadly similar to domestic debt issuance. We find that incentives for banks are more skewed in that debt issuance in general has a positive impact on performance as measured by a broad range of bank-level indicators, though this is not observed when it comes to debt issuance through Irish-resident SPEs.³ This may point to the ‘speciality’ of cross-border debt issuance relating banks and shadow banking entities. In line with the empirical findings for firms issuing abroad in Gozzi, Levine, and Schmukler (2010), we find that banks increase debt issuance elsewhere following debt issuance through Irish-resident SPEs.

Our findings point to several ‘special’ features of international banks that sponsor Irish-resident SPEs. These banks exhibit significant relative balance sheet weakness compared to banks that are not active in debt markets over the sample period, which is more pronounced compared to banks that carry out debt issuance elsewhere. In median terms, after controlling for macroeconomic developments through time fixed effects, international banks that sponsor Irish-resident SPEs are larger, slower growing, less profitable, less valuable and less capitalised. They tend to have riskier loan portfolios, thinner stable sources of funding, face higher costs of funding and exhibit higher levels of indebtedness. When we split the sample into before and after debt issuance through Irish-resident SPEs, after controlling for other effects, we find that relative weaknesses through thinner levels of stable funding exist in both sub-samples. Banks that issue debt through Irish-resident SPEs are also larger compared to banks that only issue other debt in both sub-samples. Debt issuance through Irish-resident SPEs is related to larger ex-post changes in these variables, while we also find significance in a broader set of bank-level characteristics, namely higher indebtedness, lower regulatory capital and loan portfolio risk.

Our empirical results also indicate that, compared to not issuing debt, the significance of covariance patterns of debt issuance through Irish-resident SPEs on most bank-level indicators is concentrated in the short-term and is either dissipated or reversed in the longer-term, whereas, for debt issuance elsewhere, is sustained in the long-term. Moreover, we find that, controlling for other effects, international banks markedly increase their issuance volumes in other debt markets after issuing debt through Irish-resident SPEs, capturing larger market shares, particularly in the case of banks from emerging economies.

³Bank-level indicators include: size, growth, profitability, corporate valuation, loan risk profile, solvency, funding structure and cost of funding.

Our findings resonate with the different strands of the literature, in particular regarding securitisation SPEs where we find similar evidence of relative weakness in banks issuing debt through SPEs. Moreover, we coincide with Gorton and Souleles (2007) in that, while banks that sponsor Irish-resident SPEs are riskier than other banks, our indicators do not necessarily imply a high risk of bankruptcy. Our results are particularly close to those of Almazan, Martín-Oliver, and Saurina (2015) regarding the characteristics of banks engaging in securitisation though not their finding that larger banks are less likely to employ SPEs. This may be particular to the cross-border dimension of our analysis, and in line with the literature on cross-border firm issuance where larger firms are more likely to issue abroad.

The remainder of the paper is organised as follows. Section 2 describes the data. Sections 3 to 5 present our empirical results. Section 3 analyses the characteristics of international banks that sponsor Irish-resident SPEs. Section 4 analyses the evolution of bank characteristics and performance following debt issuance through Irish-resident SPEs, and compares these patterns to banks that carry out debt issuance activity elsewhere. Section 5 examines the debt issuance activity of international banks that sponsor Irish-resident SPEs. We conclude in Section 6.

2 Data

In order to analyse the characteristics of international banks that sponsor Irish-resident SPEs, we construct a dataset covering international banks sponsoring and issuing debt through Irish-resident SPEs, that carry out debt activities elsewhere and that are not active in debt markets over the sample period. The dataset includes all consolidated banks with available Legal Entity Identifier (LEI) codes, with full data coverage in the S&P Global Market Intelligence database, incorporated in those countries corresponding to international banks that sponsor Irish-resident SPEs in the first place.^{4,5,6} We focus on debt issuance in public markets and exclude private placements. Debt issuance information is matched with bank-

⁴The LEI code is a 20-digit alpha-numeric code developed by the International Organisation for Standardisation. It enables unique identification of legal entities engaging in financial transactions.

⁵The consolidation criteria is discussed in further detail in this section. Full coverage and LEI code availability are crucial aspects of our sampling exercise, as they allow for more detailed balance sheet and income statement information and a more precise and transparent matching process.

⁶The list of countries includes: Austria, Belgium, Canada, China, France, Germany, Greece, Italy, Japan, Netherlands, Poland, Portugal, Russia, Spain, Switzerland, Turkey, United Arab Emirates, United Kingdom and United States.

level balance sheet and income statement data.⁷ Table 1 describes the variables employed in our analysis and their sources.

Our data on bank debt issuance combines several data sources. Debt issuance through Irish-resident SPEs is collected from security-level information on debt issuance within Central Bank of Ireland SPE statistics.⁸ Debt issuance activity elsewhere is gathered from the S&P Global Market Intelligence database, from which we extract transaction-level information on debt issuance with an original maturity of more than one year.⁹ These two sources are then matched at the ISIN level with information on security-by-security debt issuance dates and volumes available from the Centralised Securities Database (CSDB).¹⁰ This allows for a precise and timely aggregation of debt issuance volumes at the bank-level and at quarterly frequency.

We collect information on balance sheet, income statement and debt issuance at the bank consolidated level, that is, the top tier consolidated reporting bank within a corporate structure. This assumes financing decisions are concentrated at this level. This criteria is preferred over the consideration of the ultimate parent or the subsidiary structure, as a representative mid-point between highly integrated financial structures and decentralised financing decisions, respectively.

We argue that, even in the case of financing decisions being coordinated across borders between parents and subsidiaries, it is the bank at the consolidated level which represents funding decisions more accurately, as these will be ultimately reflected on its consolidated financial statement. Focusing on the bank consolidated level as the unit of observation also allows for a more comprehensive view of corporate decisions both in terms of cross-border and cross-sector considerations, as it captures information on subsidiaries located outside

⁷Quarterly balance sheet and income statement information feeding into our bank-level indicators is linearly interpolated using data at the quarterly, semi-annual and yearly frequencies.

⁸Our sample includes securitisation SPEs and non-securitisation SPEs reporting to the Central Bank of Ireland since 2009Q4 and 2015Q3, respectively. Most debt securities are issued long-term, however, ameliorating potential sample bias.

⁹For consistency, given that S&P Global Market Intelligence does not cover data on debt issuance with a maturity of less than one year, our dataset does not include commercial paper issuance with such short-term maturities. We classify debt issuance as through Irish-resident SPEs or other debt activity based on these two reference data sources. For debt issuances identified in both, we consider the debt issuance to be through Irish-resident SPEs.

¹⁰The CSDB is sourced by EU National Central Banks (NCBs), internal sources of the European Central Bank (ECB) and other commercial data providers.

the country of residence and/or that are classified as other financial institutions (see Gozzi, Levine, and Schmukler (2010)).¹¹

The dataset covers 734 international banks from 19 countries over the period 2005Q1–2016Q4, yielding a total of 35,232 bank-quarter observations.¹² Of these, around 10 percent of banks sponsor Irish-resident SPEs over the sample period, while the remaining 90 percent either carry out debt activities elsewhere or are not active in debt markets over this period. At the security-level, the dataset identifies 258,856 debt issuances over the period 2005Q1–2016Q4, which translate into 8,458 quarterly observations. Of the total 8,458 debt issuances at the quarterly frequency, 537 reflect debt issuance through Irish-resident SPEs and 7,921 represent debt issuance activity elsewhere.

3 Which international banks sponsor Irish-resident SPEs?

In this section we study the characteristics of international banks sponsoring Irish-resident SPEs that issue debt at some point during the sample period, and compare them to both banks that only carry out debt issuance activities elsewhere and banks that do not issue debt over the sample period. Our analysis covers a comprehensive set of bank-level characteristics, including indicators of size, growth, profitability, valuation, loan portfolio risk, funding structure and cost of funding.

Table 2 presents the medians of respective bank-level variables for different categories of banks classified according to their debt issuance activity in columns (1) to (3), and reports median regressions of the different bank characteristics on a dummy variable that equals one for those banks that sponsor Irish-resident SPEs and zero otherwise. The following equation represents our regression specification:

$$Bank\ characteristic_{ijt} = \alpha^{Median} + \beta_1 IE\ SPE_{ij} + \theta_j + \epsilon_{ijt} \quad (1)$$

where the dependent variable *Bank characteristic* captures a set of characteristics for bank *i* in country *j* at time *t*, as indicated in the leftmost column of Table 2. The model is

¹¹By focusing on the bank consolidated level, our approach also avoids mixing different sectors which becomes a concern when focus is put on parent companies, as banking structures may be ultimately linked to other sectors of the economy including insurance, investment management or sovereign.

¹²Full data coverage of bank-level information and debt issuance data from S&P Global Market Intelligence starts in 2005Q1, therefore we restrict our sample to the period 2005Q1–2016Q4. Still, the sample period allows for a rich time-series dimension spanning 48 quarters and covering the economic cycle during both pre- and post-crisis periods.

estimated employing a median (i.e. quantile) regression analysis technique, where $\hat{\alpha}^{Median}$ is an estimate of the 50th quantile conditional on all other covariates being zero.¹³ The dummy variable *IE SPE* therefore captures the difference in medians between banks that sponsor Irish-resident SPEs and the two other categories of banks.¹⁴ Banks with *IE SPE* = 1 are those that issue debt through Irish-resident SPEs at some point during the sample period.¹⁵ Banks with *IE SPE* = 0 are those with either debt issuance activities elsewhere or with no debt issuance.¹⁶ θ_j is a set of country dummies that accounts for country differences when comparing bank-level characteristics across the different categories of banks.¹⁷ ϵ_{ijt} is the white noise error term. The estimated differences in medians are shown in column (4) or banks that issue debt elsewhere during our sample period and in column (5) for banks that are not active in debt markets over the sample period, with standard errors estimated through bootstrapping and clustering at the bank-level.

International banks that sponsor Irish-resident SPEs are considerably different compared to banks that are not active in debt markets over the 2005Q1–2016Q4 period.¹⁸ Comparing columns (1) and (3) in Table 2, they are larger and grow at a slower pace. These banks also tend to have riskier loan portfolios, be less profitable and less capitalised by means of their Tier1 regulatory capital ratios. As for the funding structure, banks that sponsor Irish-resident SPEs have thinner stable sources of funding in terms of their ratio of deposits to total assets, face higher costs of funding and present higher levels of indebtedness (a higher debt to total assets ratio). Also, these banks have considerably lower

¹³The median regression analysis is less vulnerable to the impact of outliers, as per the approach in Gozzi, Levine, and Schmukler (2010).

¹⁴This is, for *IE SPE* = 1, the constant α^{Median} is the median for *IE SPE* = 0, and the coefficient $\hat{\beta}_1$ is the difference in median terms between banks with debt issuance activity elsewhere and those that issue debt through Irish-resident SPEs.

¹⁵These include banks that issue debt both through Irish-resident SPEs and debt elsewhere.

¹⁶Banks with debt issuance activity elsewhere are those that do not issue debt through Irish-resident SPEs but that issue other debt at some point during the sample period. Banks with no debt issuance activity are those that do not issue debt neither through Irish-resident SPEs nor debt elsewhere over the sample period.

¹⁷The inclusion of country dummies addresses a potential concern regarding these comparisons, as they may also reflect country differences and not actual differences between cross-border issuance through Irish-resident SPEs and other debt issuance activities. For example, international banks issuing debt through Irish-resident SPEs may reflect mostly countries that tend to be more internationalised or share closer links to Ireland (for example, language, common legal framework or distance).

¹⁸As robustness checks, we run pre- and post-crisis sub-sample regressions in order to account for potential cyclicity. Empirical results hold robust and do not differ materially from the full-sample analysis.

market valuations relative to their book value, as measured by the price to book ratio.

Differences are more notable comparing banks that sponsor Irish-resident SPEs and banks that carry out debt issuance activities elsewhere over the sample period. In particular, differences between columns (1) and (2) in Table 2 indicate that international banks that sponsor Irish-resident SPEs tend to be considerably larger in size, exhibit lower growth and engage in riskier lending. Characteristics of international banks that sponsor Irish-resident SPEs are also different from banks that carry out debt issuance activities elsewhere in that they tend to be less profitable and have lower valuations. They are also less capitalised and more leveraged in median terms. Funding by international banks that sponsor Irish-resident SPEs is also less stable and more costly.

Most of the cross-bank differences in Table 2 are statistically significant and, where so, are all meaningful in their economic interpretation. For example, the results reported in column (5) show that, conditional on country dummies, the difference in median loan portfolio risk between banks that sponsor Irish-resident SPEs and those that are not active in debt markets over the sample period is 0.4 percent and statistically significant at the 1 percent level. This represents about a quarter of the median non-performing loans to total loans ratio of banks that are not active in debt markets over the sample period. Similar results are reflected by the provisioning of loan losses to risk-weighted assets ratio. In this case, the difference is around 12 basis points and also statistically significant at the 1 percent level, representing about a third of the median of banks with no debt issuance.

In terms of funding structure, the difference in median debt to total assets ratios between banks that sponsor Irish-resident SPEs and those that do not issue debt over the sample period is 3.9 percent, after controlling for country effects. This difference represents more than a third of the median debt to total assets ratio for international banks that are not active in debt markets over the sample period. The difference in the median deposits to total assets ratio between these two categories of banks is also sizeable and estimated at –14.1 percent, which accounts for a third of the median of this variable for banks that do not issue debt over the sample period. In terms of regulatory capital, the difference between banks that sponsor Irish-resident SPEs and banks that are not active in debt markets over the sample period is relatively minor, estimated at –13 basis points with a 10 percent level of significance. In median terms, banks that sponsor Irish-resident SPEs are significantly larger and have less growth opportunities compared to those that are not active in debt markets over the sample period. Differences are not significant in terms of

median profitability, valuation and cost of funding.

Median differences between banks that sponsor Irish-resident SPEs and those carrying out debt issuance activities elsewhere are formally tested in column (4) of Table 2. Results show that, controlling for country differences, banks that sponsor Irish-resident SPEs are significantly larger and grow at a slower pace in median terms. Differences are also significant in terms of median profitability, valuation and cost of funding. Regarding the latter, the difference in the median cost of funding between banks that sponsor Irish-resident SPEs and those with debt issuance elsewhere is 0.4 percent and statistically significant at the 1 percent level, which represents about a quarter of the median cost of funding of banks that only issue other debt.

In terms of loan portfolio risk, results indicate that, compared to banks issuing debt elsewhere, banks that sponsor Irish-resident SPEs engage in riskier lending as reflected by significant differences in both the ratio of non-performing loans to total loans and the provisioning of loan losses to risk-weighted assets ratio. The difference in median loan portfolio risk between banks that sponsor Irish-resident SPEs and those that issue debt elsewhere is 0.6 percent and statistically significant at the 1 percent level. This represents more than a third of the median non-performing loans to total loans ratio of banks carrying out debt issuance activities elsewhere.

Similar results are reflected in the provisioning of loan losses to risk-weighted assets ratio, where the difference is 16 basis points and also statistically significant at the 1 percent level. Looking at the funding structure, the difference in median indebtedness is estimated at 15.8 percent and significant at the 1 percent level, and, in actual terms, about 3 times the level of indebtedness of international banks that only issue debt elsewhere. The difference in the median deposits to total assets ratio between these two categories of banks is –33.5 percent, accounting for more than a third of the median of this variable for banks carrying out debt issuance activities elsewhere over the sample period. In terms of Tier 1 regulatory capital ratio, the difference between banks that sponsor Irish-resident SPEs and banks only issuing debt elsewhere is estimated at –16 basis points. This difference is statistically significant at the 1 percent level and it indicates that the level of capitalisation of international banks that sponsor Irish-resident SPEs is more than 10 percent lower, relative to the level of capitalisation of banks carrying out debt issuance activities elsewhere.

4 How do bank characteristics evolve following debt issuance through Irish-resident SPEs?

This section analyses the evolution of bank characteristics following debt issuance through Irish-resident SPEs. First, we compare the characteristics of international banks that sponsor Irish-resident SPEs relative to banks that carry out debt issuance activities elsewhere, making these comparisons before and after banks first issue debt through Irish-resident SPEs. By tracking bank characteristics over time, we are able to test whether banks that issue debt through Irish-resident SPEs differ from banks that only carry out debt issuance activities elsewhere before actually issuing debt through Irish-resident SPEs. This approach also enables us to analyse whether cross-bank differences, as reflected in Table 2, materialise after cross-border debt issuance via Irish-resident SPEs. Second, we provide a reasonably detailed dynamic analysis by studying the performance of banks over time after debt issuance, differentiating between issuance through Irish-resident SPEs and debt issuance activity elsewhere. This analysis allows us to better understand how debt issuance through Irish-resident SPEs affects international banks and whether these effects differ from those of debt issuance activity elsewhere.

Changes in bank characteristics after debt issuance through Irish-resident SPEs

Table 3 presents our empirical results based on OLS regressions for the same dependent variables capturing bank-level characteristics, as analysed previously in Table 2, on dummy variables that identify banks' debt issuance through Irish-resident SPEs. These regressions include those banks that issue debt through Irish-resident SPEs and a control group of banks that only carry out debt issuance activities elsewhere. Two dummy variables identify banks' debt issuance through Irish-resident SPEs, as in two equations in the following format:

$$Bank\ characteristic_{ijt} = \alpha + \beta_1 IE\ SPE_{ijt}^{Before|After} + \omega_{jt} + \epsilon_{ijt} \quad (2)$$

where the dependent variable *Bank characteristic* captures a set of characteristics for bank *i* in country *j* at time *t*, as indicated in the leftmost column of Table 3. The dummy variable $IE\ SPE^{Before}$ equals one before banks issue debt through Irish-resident SPEs and zero afterwards, as reflected in column (1) of Table 3. It is also zero for those banks in the control group. This dummy captures differences between banks that issue debt through Irish-resident SPEs and banks in the control group, in the period before debt issuance through Irish-resident SPEs. $IE\ SPE^{After}$ is a dummy variable that captures the period after debt issuance through Irish-resident SPEs, which equals one on the quarter of the first debt issuance through Irish-resident SPEs and in all subsequent quarters, as reflected in column

(2) of Table 3. The dummy variable equals zero before banks issue debt through Irish-resident SPEs and also for banks that do not issue debt through Irish-resident SPEs. This variable captures differences between banks that issue debt through Irish-resident SPEs and the control group after debt issuance takes place through Irish-resident SPEs. ω_{jt} is a set of country-quarter dummies accounting for country-time differences when comparing bank-level characteristics across the different categories of banks, and ϵ_{ijt} is the white noise error term.

The results in Table 3 indicate that there are some significant differences between banks that issue debt through Irish-resident SPEs and those that issue debt elsewhere in the period before issuing debt through Irish-resident SPEs. In particular, international banks that issue debt through Irish-resident SPEs are larger and have thinner levels of stable funding as measured by the ratio of deposits to total assets. Our empirical results also show that debt issuance through Irish-resident SPEs is related to significant ex-post changes in a broader set of bank-level characteristics. For example, banks that issue debt through Irish-resident SPEs tend to be much larger in size and have much lower levels of stable funding compared to banks that only issue debt elsewhere. Differences in the size of our point estimates appear to double, while negative differences in stable funding increase by around a half.

Other differences only become significant after issuance through Irish-resident SPEs takes place. International banks that issue debt through Irish-resident SPEs tend to become less capitalised and more indebted ex-post, at the 1 percent and 5 percent level of significance, respectively. There is also evidence of increased loan portfolio risk, as measured by the ratio of loan provisions to risk-weighted assets, although at the 10 percent level of significance.

Time patterns of bank characteristics after debt issuance activity

In this subsection, we address a second question regarding the relative effect of debt issuance through Irish-resident SPEs. In particular, we analyse whether there are differences, in terms of correlation, between debt issuance through Irish-resident SPEs and bank-level characteristics compared to debt issuance activities elsewhere. For this purpose, we contrast the evolution over time of bank performance following debt issuance through Irish-resident SPEs and debt issuance activities elsewhere. Although the analysis is not intended to formally identify the exogenous effects of debt issuance through Irish-resident SPEs on bank performance, our empirical results serve as a first step to help shine some

light on this question. We analyse the time-series dimension of a comprehensive set of bank-level characteristics following debt issuance implementing equations in the format of the following panel regression equation:

$$Bank\ characteristic_{ijt} = \alpha + \beta_1 Debt\ issuance_{ijt0,1,2,3,>3}^{IE\ SPE|elsewhere} + \pi_t + \epsilon_{ijt} \quad (3)$$

where the dependent variable *Bank characteristic* captures balance sheet characteristics for bank *i* in country *j* at time *t*, as indicated in the leftmost column of Table 4. Equation 3 includes series of dummy variables that track bank performance over time following each type of debt issuance activity (i.e. Irish-resident SPE debt or debt issuance elsewhere), at a quarterly frequency. The sample in these regressions includes only the banks that conduct the specific type of debt issuance under analysis in each case. The dummy variable $Debt\ issuance_{it_0}^{IE\ SPE|elsewhere}$, for example, equals one in the quarter in which a bank issues debt, and zero otherwise. It corresponds to the quarter of debt issuance as reflected in column (1). Similarly, we construct several other dummy variables identifying different time periods following the quarter in which a bank issues debt (i.e. $Debt\ issuance_{it_1}^{IE\ SPE|elsewhere}$ after one, $Debt\ issuance_{it_2}^{IE\ SPE|elsewhere}$ after two and $Debt\ issuance_{it_3}^{IE\ SPE|elsewhere}$ after three quarters). These are reflected in columns (2) to (4), respectively. Additionally, the dummy variable $Debt\ issuance_{it>3}^{IE\ SPE|elsewhere}$ corresponds to >3 quarters after debt issuance as reflected in column (5). It equals one, more than three quarters after a bank issued debt and zero otherwise. π_t is a set of quarter dummies accounting for time effects. ϵ_{ijt} is the white noise error term.

Since we want to focus on the within-bank correlation between bank characteristics and the different types of debt issuance, our regressions are estimated including bank-level fixed effects. With this approach we specifically compare each bank on a pre- and post-issuance through Irish-resident SPE basis. The regressions also include quarter dummies to control for time effects. The number of observations and banks included in our different regression analyses are reflected in columns (6) and (7), respectively.

The regression results in Table 4 indicate that the time-series evolution of bank-level characteristics presents differences between debt issuance through Irish-resident SPEs and debt issued elsewhere. Table 4 shows that banks increase in size following debt issuance through Irish-resident SPEs, but only in the short-term. The covariance of debt issuance elsewhere on bank size is more sustained and strongly significant over the long-term. Nevertheless, banks do not appear to be affected on a consistent basis in terms of their pace of asset growth by either type of debt issuance. Bank profitability is negatively

correlated with debt issuance through Irish-resident SPEs, which is particularly significant in the long-term, and differs from the correlation with debt issuance elsewhere both in terms of magnitude and sign. Debt issuance through Irish-resident SPEs also decreases bank valuation in the short-term. This effect is significantly reversed in the long-term, however, where it becomes positive and stands closer to the impact of debt issued elsewhere both in terms of magnitude and significance.

The correlation of debt issuance with loan portfolio risk presents some asymmetries comparing both types of issuance. The ratio of non-performing loans to total loans increases significantly in the short-term after debt issuances through Irish-resident SPEs, while it is reduced in the long-term following other debt issuance. The ratio of loan provisions to risk-weighted assets does not appear to be affected by either type of debt in the short-term. Banks' self-perceived risk, as proxied by the ratio of loan provisions to risk-weighted assets, is not proportionally adjusted in the long-term to compensate for the higher loan portfolio risk accumulated in the short-term. In the case of debt issued elsewhere, there is a significant reduction in banks' self-perceived risk, though this coincides with a long-term decrease in loan portfolio risk.

Regarding banks' funding structure, banks tend to reduce their levels of regulatory capital in the short-term following debt issuance through Irish-resident SPEs, although such effect does not appear to materialise immediately in the quarter of issuance. The correlation with the Tier 1 ratio following debt issuance through Irish-resident SPEs is different in sign compared to debt issued elsewhere. However, the correlation with debt issuance elsewhere is reversed in the long-term where bank capitalisation is significantly reduced. Moreover, both types of debt issuance are associated with increases in the level of indebtedness. The association is similar in magnitude but less significant and less prolonged, in the case of debt issued through Irish-resident SPEs in comparison to debt issued elsewhere. Banks' deposit levels, as a measure of stable funding, are negatively and significantly associated with debt issuance, although concentrated in the short-term in the case of Irish-resident SPEs and in the long-term in the case of debt issuance activities elsewhere. This points to certain timing differences in the degree of substitutability (or complementarity) between both sources of funding.

Finally, the cost of funding is significantly reduced in the quarter in which international banks issue debt through Irish-resident SPEs. This correlation is only temporarily significant and is reversed in the long-term, however. On the contrary, debt issuance elsewhere tends

to be followed by a more continuous decrease in the cost of funding of international banks, although it is also reversed in the long-term. This association is significant over time and much larger in absolute magnitude at the quarter of issuance compared to the effect of debt issuance through Irish-resident SPEs.

Overall, based on our sample of international banks, our findings from Table 4 suggest that cross-border debt issuance through Irish-resident SPEs and debt issuance activities elsewhere carried out by international banks are intrinsically different from each other. The correlation of debt issuance through Irish-resident SPEs with most bank-level characteristics is concentrated in the short-term, whereas the correlation of debt issuance elsewhere is sustained in the long-term.

5 Debt issuance activity of banks that sponsor Irish-resident SPEs

This section addresses two broad questions to test whether a key purpose for cross-border debt issuance by banks through Irish-resident SPEs may be to access debt markets elsewhere. First, we analyse whether debt issuance volumes by international banks are different comparing issuance through Irish-resident SPEs and issuance elsewhere. Second, we assess how access to debt markets elsewhere evolves after issuing debt through Irish-resident SPEs.

Volume differences between debt issuance through Irish-resident SPEs and other debt issuance activity

To analyse volume differences between debt issued through Irish-resident SPEs and debt issued elsewhere over the 2005Q1-2016Q4 period, we implement a median regression analysis that compares the median volume of debt issued through Irish-resident SPEs and debt markets elsewhere, distinguishing between international banks from advanced and emerging economies. Each median regression equation is defined in the following format:

$$Debt\ issuance\ volume_{ijt} = \alpha^{Median} + \beta_1 IE\ SPE_{ijt} + \theta_j + \epsilon_{ijt} \quad (4)$$

where the dependent variable *Debt issuance volume* is a continuous variable reflecting the volume of debt issuance in euro billion for bank i in country j at time t . The dummy variable *IE SPE* captures the difference in medians between debt volumes issued via Irish-resident SPEs and debt issuance elsewhere. Standard errors estimated through bootstrapping and clustering at the bank-level. θ_j is a set of country dummies that accounts for country

differences when comparing bank-level characteristics. ϵ_{ijt} is the white noise error term.

Table 5 reports the results of our median regression specification of the volume of debt issuance on the dummy variable that equals one for debt issuance through Irish-resident SPEs and zero otherwise (capturing differences between debt volumes issued through Irish-resident SPEs and other debt markets) and country dummies. The number of observations used to calculate the medians in each case is in parentheses. IE SPE debt issuance includes banks that issue debt through IE SPEs and also issue debt elsewhere at some point during the sample period. Debt issuance activity elsewhere includes debt issued elsewhere at some point during the sample period, excluding debt issued through IE SPEs.

Differences in debt issuance volumes between debt issued through Irish-resident SPEs and other debt markets are sizeable.¹⁹ When analysing debt issuance by all international banks included in our sample, in the case of banks from advanced economies, issuance volumes through Irish-resident SPEs tend to be significantly smaller than those conducted in markets elsewhere, as seen in column (1) and column (2), respectively. In particular, the median volume issued through Irish-resident SPEs over our sample period is more than 3 times lower than the median volume issued in debt markets elsewhere. This difference is robust to controlling for country dummies and statistically significant at the 1 percent level, as shown in column (3). Different results are obtained in the case of international banks from emerging economies, where debt issuance volumes through Irish-resident SPEs tend to be larger compared to debt issuance volumes elsewhere. In this case, the median volume issued through Irish-resident SPEs is about 1.8 times higher than the median volume issued in debt markets elsewhere, although such difference is not statistically significant, as seen in column (3).

The comparison between debt issuance volumes through Irish-resident SPEs and debt markets elsewhere also accounts for the fact that debt issuance activity by international banks not sponsoring Irish-resident SPEs might affect our results. Table 5 shows the median amount raised per issue in domestic and international markets, restricting the sample only to international banks that sponsor Irish-resident SPEs during our sample period. The results show that, for banks from advanced economies, debt issuance volumes through Irish-resident SPEs are even lower compared to debt issuance volumes elsewhere. For the subsample of banks that sponsor Irish-resident SPEs, the median volume issued through Irish-resident SPEs is more than 10 times lower than the median volume issued in debt

¹⁹Results are robust and broadly unchanged when using means.

markets elsewhere. This difference is robust when controlling for country dummies and statistically significant at the 1 percent level, as shown in column (3). In the case of international banks from emerging economies, the volumes of debt issuance through Irish-resident SPEs is again larger compared to debt issuance volumes elsewhere, within the subsample of banks that sponsor Irish-resident SPEs. In this case, the median volume issued through Irish-resident SPEs is around 1.6 times higher than the median volume issued in debt markets elsewhere, although this difference is not statistically significant.

Changes in other debt issuance activity after debt issuance through Irish-resident SPEs

In this subsection, we test how access to debt markets elsewhere evolves after issuing debt through Irish-resident SPEs. We compare the volume of debt issuance per quarter by international banks with issuance in debt markets elsewhere before and after issuing debt through Irish-resident SPEs, that is, whether access to debt markets elsewhere increases with debt issuance through Irish-resident SPEs. This analysis is also performed distinguishing between international banks from advanced and emerging economies. Since debt issuance volumes and ratios are censored at zero, we specify Tobit regression equations in the following format:

$$Debt\ issuance_{ijt} = \begin{cases} Debt\ issuance_{ijt}^* & \text{if } Debt\ issuance_{ijt}^* > 0 \\ 0 & \text{if } Debt\ issuance_{ijt}^* \leq 0 \end{cases}$$

$$Debt\ issuance_{ijt}^* = \alpha + \beta_1 IE\ SPE_{ijt>1} + \epsilon_{ijt} \quad (5)$$

where the dependent variable *Debt issuance* captures a set of measures of debt issuance activity for bank *i* in country *j* at time *t*. The first dependent variable analysed is the volume of debt issued elsewhere per quarter. The second dependent variable is the volume of debt issued elsewhere divided by total assets lagged by one period per quarter. The third dependent variable is the ratio of the volume of debt issued elsewhere per bank to the total volume of debt issued elsewhere per quarter in the market as a whole. For the three dependent variables, quarters without debt issuance activity are assigned a zero. The dummy variable *IE SPE* in equation 5 equals one on the quarter of the first debt issuance conducted through an Irish-resident SPE and in all subsequent quarters, and zero before. This variable captures discrete changes in issuance activity in debt markets elsewhere following debt issuance through Irish-resident SPEs.

Table 6 reports the mean of the three dependent variables indicated in the leftmost column before and after the first debt issuance through IE SPEs, in columns (1) and

(2), respectively. Column (3) reports the results of our Tobit regressions, as specified in equation 5, for the different dependent variables on the dummy identifying the period after the first debt issuance through IE SPEs and a constant, with standard errors reported in parentheses. Table 6 shows that there is an increase in issuance volumes in debt markets elsewhere per quarter after a bank first issues debt through an Irish-resident SPE. In the case of advanced economies, issuance volumes in other debt markets by these international banks averages €1.3 billion before issuing debt through Irish-resident SPEs and increases to €3.7 billion afterwards. A similar pattern is visible for international banks from emerging economies, with the average debt volume per quarter by banks issuing in other markets jumping from €0.1 billion to €0.2 billion following issuance through Irish-resident SPEs. In both cases, the Tobit regressions show that these differences are positive and significant at the 1 percent level.

The increase in the volume of issuance in debt markets elsewhere of international banks that sponsor Irish-resident SPEs for debt issuance purposes suggests that banks grow in size after issuing debt through Irish-resident SPEs. Table 6 reports estimates that reflect issuance volumes in debt markets elsewhere per quarter divided by the banks' total assets at the time of issuance. The Tobit regressions show that, when scaling the volume of debt issuance in debt markets elsewhere by the banks' total assets and accounting for the censored nature of the data, there is no evidence of a significant increase in banks' issuance volumes in debt markets elsewhere.

While these results indicate that international banks tend to issue more in debt markets elsewhere after obtaining funding through Irish-resident SPEs, this does not necessarily imply that banks increase their share in debt markets elsewhere after they issue debt through Irish-resident SPEs, relative to other banks. In other words, do banks capture a larger share in debt markets elsewhere following debt issuance through Irish-resident SPEs, irrespective of bank size?

The results from Table 6 show that banks indeed capture a larger share of debt markets elsewhere following their first debt issuance that sponsor Irish-resident SPEs. In advanced economies, each international bank that issue debt through Irish-resident SPEs accounts on average for 2.0 percent of the debt issued capital raised in debt markets elsewhere per quarter before that sponsor Irish-resident SPEs and this share increases to 2.3 percent afterwards. Similarly, in emerging economies, the average share in debt markets elsewhere accounted by each bank increases from 2.1 percent to 2.5 percent following the first debt

issuance through Irish-resident SPEs. In both cases, our Tobit regressions show that there is a statistically significant increase in the relative participation of banks in debt markets elsewhere following debt issuance through Irish-resident SPEs. This complements the results in Gozzi, Levine, and Schmukler (2010) for cross-border issuance, in the sense that banks increase issuance in debt markets elsewhere after issuing debt through SPEs, reflecting greater access to markets elsewhere. Therefore, we conclude that these results suggest complementary, rather than substitution, effects and that access to debt markets elsewhere may be a key purpose for banks issuing debt through Irish-resident SPEs.

6 Conclusions

In this paper we address a relatively opaque and unexplored area of the international financial system relating banks and cross-border shadow banking entities. We provide new evidence associated with the characteristics of international banks that sponsor Irish-resident SPEs and contribute to the literature by closing a gap between empirical work focusing on bank-level (firm-level) characteristics to explain patterns of (international) capital structure decisions and research on bank securitisation.

Our empirical results point to several ‘special’ features of international banks that sponsor Irish-resident SPEs. Controlling for other effects, we show that these banks (i) are larger and exhibit weakness across a wide range of bank-level indicators, relative to banks that carry out debt issuance activities elsewhere and banks not active in debt markets over the sample period,²⁰ (ii) show a short-term correlation that largely dissipates within a year following debt issuance through Irish-resident SPEs compared to banks that issue debt elsewhere and (iii) markedly increase their issuance volumes in debt markets elsewhere after issuing debt through Irish-resident SPEs, capturing larger market shares.

Risks within the sector are potentially heightened by the risk profile of banks that sponsor Irish-resident SPEs, namely weaker characteristics coupled with greater market shares in debt markets elsewhere. This requires close monitoring and further research in terms of analysing the potential for sponsors of SPEs to take on hidden risks and, more generally, regulatory adherence and global financial stability. Furthermore, international collaboration with the authorities in the jurisdictions of the sponsor banks is required to better understand the underlying rationale of SPEs and complement top-down analysis

²⁰Including size, growth, profitability, corporate valuation, loan risk profile, solvency, funding structure and cost of funding.

with detailed bottom-up studies looking at SPE business models.

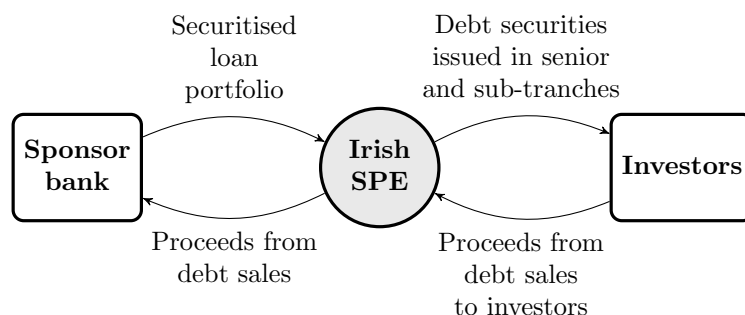
There is room for further research beyond the scope of this paper, including enhancing the analysis by capturing a broader SPE population and other countries, expanding the analysis to include macro-level indicators and exploring motivations more deeply on an individual SPE basis. Future research on Irish-resident SPEs at the Central Bank will help to address some of these areas.

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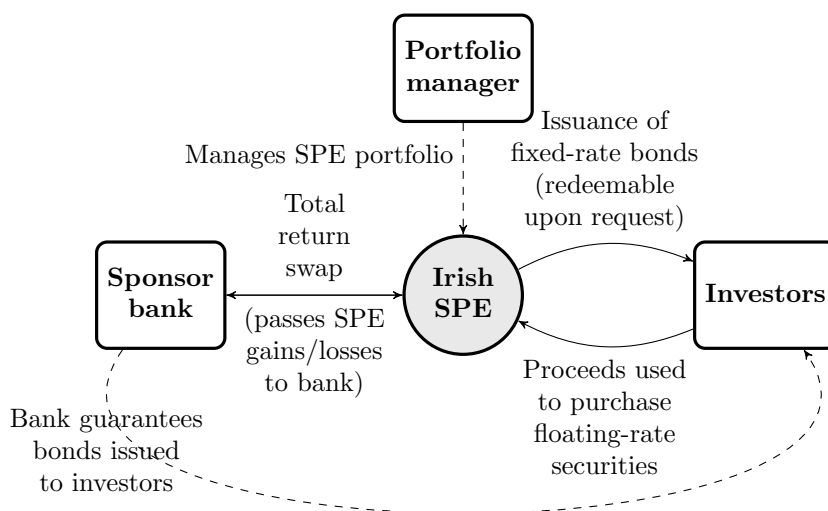
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Figure 1: Standard securitisation model. Turning cash-flows from non-transferable debt into transferable debt securities.



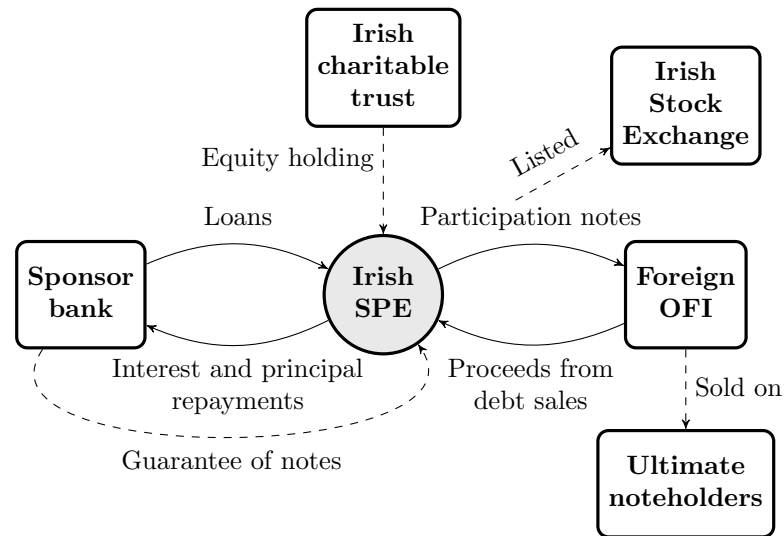
Note: The bank passes contractual debt to the SPE, which issues debt securities based on this loan portfolio, often tailored to investors in senior and subordinated tranches. The attractiveness for the sponsoring bank may include: receiving the proceeds of these debt issuances, reducing loan portfolios and earning servicing fee income.

Figure 2: Asset-backed debt funding model. Debt securities held by SPE, with returns split between bank and investors.



Note: The SPE holds a portfolio of long-term debt securities, purchased using cash flows from investors based on debt securities conditionally redeemable upon request and guaranteed by the sponsoring bank. The returns are split between the bank and investors in the SPE debt, with the bank exposed to margins between the floating and fixed rates, but also maturity mismatch and default risk within the portfolio.

Figure 3: External financing model. Bank places collateral into Irish SPE to secure cheaper funding.



Note: The sponsor bank transfers loans to the SPE which act as collateral, ring-fenced under the jurisdiction of Irish courts, for the participation notes issued by the SPE to investors through an intermediary. Investors are the beneficial owners of the assets, which are further protected by a charitable trust acting as the legal owner. The bank accesses cheaper funding by providing these reassurances to investors.

Table 1: Variable description.

Variable	Description	Source
Bank with IE SPE debt issuance	Dummy variable indicating 1 for banks issuing debt through an Irish SPE, and 0 otherwise.	Central Bank of Ireland statistics.
Bank with debt issuance elsewhere	Dummy variable indicating 1 for banks issuing debt elsewhere, and 0 otherwise.	S&P Global Market Intelligence.
Bank with no debt issuance	Dummy variable indicating 1 for banks that do not issue debt, and 0 otherwise.	S&P Global Market Intelligence.
TA	Natural logarithm of total assets.	S&P Global Market Intelligence.
TA growth	Quarter on quarter growth rate of total assets.	S&P Global Market Intelligence.
ROA	Return on assets ratio.	S&P Global Market Intelligence.
P/B ratio	Price to book ratio.	S&P Global Market Intelligence.
NPL/Loans	Non-performing loans to loans ratio.	S&P Global Market Intelligence.
LP/RWA	Loan provisions to risk-weighted assets ratio.	S&P Global Market Intelligence.
Tier 1 ratio	Regulatory Tier 1 capital to total assets ratio.	S&P Global Market Intelligence.
Debt/TA	Debt to total assets ratio.	S&P Global Market Intelligence.
Deposits/TA	Deposits to total assets ratio.	S&P Global Market Intelligence.
Cost of funds	Interest incurred on liabilities as a percent of average non interest-bearing deposits and interest-bearing liabilities.	S&P Global Market Intelligence.

Table 2: Bank characteristics by debt issuance activity.

Dependent variable:	Median			Median regression	
	(1) Banks with IE SPE debt issuance	(2) Banks with debt issuance elsewhere	(3) Banks with no debt issuance	(4) Coefficient on difference between (1) and (2)	(5) Coefficient on difference between (1) and (3)
<i>Bank characteristic</i>					
<i>Size</i>					
TA	19.376 [2,542]	13.074 [9,341]	16.281 [16,489]	3.955*** (0.085)	2.617*** (0.037)
<i>Growth</i>					
TA growth	0.759 [2,460]	1.598 [9,097]	1.431 [16,071]	-0.986*** (0.173)	-0.541*** (0.135)
<i>Profitability</i>					
ROA	0.390 [2,515]	0.668 [8,985]	0.530 [15,501]	-0.037** (0.017)	0.014 (0.011)
<i>Valuation</i>					
P/B	98.419 [1,843]	103.563 [7,228]	109.430 [9,609]	5.799** (2.439)	0.113 (2.112)
<i>Loan portfolio risk</i>					
NPL/Loans	2.733 [887]	1.411 [7,991]	1.606 [10,221]	0.547*** (0.129)	0.388*** (0.068)
LP/RWA	0.720 [2,249]	0.235 [7,791]	0.384 [13,516]	0.162*** (0.029)	0.117*** (0.019)
<i>Funding structure</i>					
Tier 1 ratio	11.219 [2,410]	12.930 [8,356]	11.663 [15,115]	-1.561*** (0.150)	-0.130* (0.075)
Debt/TA	18.514 [2,455]	5.512 [9,173]	10.592 [16,334]	15.830*** (0.709)	3.892*** (0.389)
Deposits/TA	48.024 [2,424]	82.577 [9,317]	71.240 [16,383]	-33.481*** (0.785)	-14.053*** (0.738)
<i>Cost of funding</i>					
Cost of funds	2.092 [2,264]	1.415 [7,031]	1.602 [14,466]	0.364*** (0.051)	-0.012 (0.031)

Note: Columns (1) to (3) report the median of different bank-level characteristics for different categories of banks classified according to their debt issuance activity over the 2005Q1-2016Q4 period. The number of observations used to calculate the medians is reported in brackets. Banks with IE SPE debt issuance activity are those that issue debt through IE SPEs at some point during the sample period. These include banks that issue debt both through IE SPEs and elsewhere. Banks with debt issuance activity elsewhere are those that do not issue debt through IE SPEs but that issue debt elsewhere at some point during the sample period. Banks with no debt issuance activity are those that do not issue debt neither through IE SPEs nor elsewhere over the sample period. Columns (4) and (5) report the results of median regressions of the different bank characteristics on a dummy variable identifying banks that issue debt through an Irish SPE and country dummies. Only the coefficient on the Irish SPE dummy variable is reported. Standard errors are estimated through bootstrapping with clustering at the bank-level and reported in parentheses. *, **, *** represent significance at 10, 5, and 1 percent, respectively.

Table 3: Before and after comparisons between banks that issue debt through IE SPEs.

Dependent variable:	Before debt issuance through IE SPEs dummy	After debt issuance through Irish SPEs dummy	After debt issuance dummy–before debt issuance dummy	No. of obs.	No. of banks
<i>Bank characteristic</i>	(1)	(2)	(3)=(2)–(1)	(4)	(5)
<i>Size</i>					
TA	1.724*** (0.434)	3.267*** (0.433)	1.542*** (9.564)	[18,112]	456
<i>Growth</i>					
TA growth	0.367 (0.705)	-0.488 (0.580)	-0.854 (1.117)	[17,636]	455
<i>Profitability</i>					
ROA	-0.093 (0.133)	-0.068 (0.083)	0.025 (0.047)	[17,146]	455
<i>Valuation</i>					
P/B	7.836 (12.331)	-8.661 (7.942)	-16.497 (1.842)	[10,906]	304
<i>Loan portfolio risk</i>					
NPL/Loans	-1.381 (1.321)	0.162 (0.512)	1.543 (1.266)	[10,694]	355
LP/RWA	0.203 (0.144)	0.158* (0.089)	-0.045 (0.090)	[14,937]	440
<i>Funding structure</i>					
Tier 1 ratio	-0.483 (0.918)	-1.277*** (0.392)	-0.794 (0.965)	[16,669]	450
Debt/TA	6.153 (3.838)	7.430** (2.930)	1.278 (0.113)	[17,873]	455
Deposits/TA	-15.231*** (4.809)	-22.984*** (4.933)	-7.754 (1.813)	[17,900]	452
<i>Cost of funding</i>					
Cost of funds	-0.295 (0.189)	-0.205 (0.204)	0.090 (0.161)	[15,878]	440

Note: Columns (1) and (2) report OLS regressions of different bank-level characteristics on dummies that identify debt issuance activity of banks through IE SPEs over the 2005Q1-2016Q4 period. The sample includes both banks that issue debt through IE SPEs and elsewhere at some point during the sample period. The before debt issuance through IE SPE dummy equals one before a bank issues debt through an IE SPE and zero otherwise. The after debt issuance through IE SPE dummy equals one on and after the quarter when a bank issues debt through an IE SPE and zero otherwise. Both dummies equal zero for banks that only issue debt elsewhere. The first debt issuance through an IE SPE during the sample period is used to identify banks' debt issuance activity through IE SPEs. Column (3) reports the difference between the coefficients on the after debt issuance through IE SPE dummy and the before debt issuance through IE SPE dummy, and the result of a Wald test of equality of these coefficients. F-statistics from these tests are in parentheses. All regressions include country-quarter dummy variables. Standard errors are robust, adjusted for clustering at the bank-level and reported in parentheses. *, **, *** represent significance at 10, 5, and 1 percent, respectively.

Table 4: Evolution of bank characteristics following debt issuance.

Dependent variable:	Quarter of debt issuance (1)	+1 quarter after debt issuance (2)	+2 quarters after debt issuance (3)	+3 quarters after debt issuance (4)	>3 quarters after debt issuance (5)	No. of obs. (6)	No. of banks (7)
<i>Bank characteristic</i>							
<i>Size</i>							
<i>TA</i>							
IE SPE debt	0.114** (0.054)	0.116** (0.052)	0.136** (0.052)	0.110** (0.051)	-0.041 (0.028)	[1,623]	42
Debt elsewhere	0.016 (0.021)	0.016 (0.021)	0.008 (0.021)	0.032* (0.019)	0.244*** (0.01)	[18,898]	477
<i>Growth</i>							
<i>TA growth</i>							
IE SPE debt	-1.381 (2.045)	0.156 (1.932)	0.926 (1.865)	-0.099 (1.841)	-0.859 (1.021)	[1,565]	42
Debt elsewhere	1.554 (4.107)	-0.102 (3.897)	-0.451 (3.829)	-0.196 (3.798)	1.012 (1.849)	[18,401]	476
<i>Profitability</i>							
<i>ROA</i>							
IE SPE debt	-0.050 (0.168)	-0.382** (0.167)	0.038 (0.160)	-0.021 (0.161)	-0.229*** (0.089)	[1,645]	42
Debt elsewhere	-0.084 (0.056)	-0.081 (0.055)	-0.088 (0.055)	-0.103** (0.053)	0.176*** (0.026)	[17,891]	476
<i>Valuation</i>							
<i>P/B</i>							
IE SPE debt	-14.485* (8.242)	-14.103* (8.046)	-0.337 (7.796)	-5.452 (7.558)	11.233** (4.492)	[1,297]	32
Debt elsewhere	0.184 (3.007)	-0.202 (3.002)	-0.072 (2.978)	4.877* (2.802)	9.835*** (1.512)	[11,405]	320
<i>Loan portfolio risk</i>							
<i>NPL/Loans</i>							
IE SPE debt	1.946*** (0.702)	1.395* (0.759)	-0.248 (0.737)	-0.412 (0.734)	-0.558 (0.477)	[473]	23
Debt elsewhere	0.136 (0.128)	0.101 (0.128)	0.123 (0.128)	0.078 (0.128)	-0.218*** (0.066)	[11,108]	373
<i>LP/RWA</i>							
IE SPE debt	-0.063 (0.169)	0.067 (0.173)	0.020 (0.162)	-0.155 (0.158)	0.160* (0.084)	[1,421]	36
Debt elsewhere	-0.001 (0.057)	0.041 (0.057)	0.078 (0.056)	0.070 (0.056)	-0.151*** (0.028)	[15,732]	463
<i>Funding structure</i>							
<i>Tier 1 ratio</i>							
IE SPE debt	-0.541 (0.397)	-0.958** (0.389)	-0.738* (0.380)	-0.751** (0.376)	-0.109 (0.206)	[1,554]	39
Debt elsewhere	-0.015 (0.222)	0.427* (0.220)	0.627*** (0.217)	-0.182 (0.200)	-1.293*** (0.105)	[17,472]	472
<i>Debt/TA</i>							
IE SPE debt	2.709** (1.127)	2.349** (1.091)	2.521** (1.078)	2.095* (1.082)	-0.247 (0.605)	[1,539]	42
Debt elsewhere	-0.597* (0.317)	-0.446 (0.310)	-0.242 (0.307)	0.464* (0.281)	2.540*** (0.147)	[18,656]	476
<i>Deposits/TA</i>							
IE SPE debt	-2.574** (1.187)	-1.731 (1.125)	-1.407 (1.090)	-1.434 (1.057)	0.239 (0.595)	[1,517]	39
Debt elsewhere	0.168 (0.379)	-0.645* (0.372)	-0.476 (0.369)	-0.534 (0.336)	-2.666*** (0.177)	[18,715]	474
<i>Cost of funding</i>							
<i>Cost of funds</i>							
IE SPE debt	-0.446*** (0.146)	-0.230 (0.150)	-0.119 (0.141)	0.196 (0.135)	0.524*** (0.069)	[1,412]	36
Debt elsewhere	-0.121*** (0.045)	-0.113** (0.045)	-0.115*** (0.044)	-0.104** (0.044)	0.220*** (0.021)	[16,689]	463

Note: Columns (1) to (5) report panel regressions of bank-level characteristics on dummies that identify debt issuance activity. The dummies in columns (1) to (4) equal one in the designated quarter and zero otherwise. The dummy in column (5) equals one after the third quarter in which a bank issues debt and zero before. The first debt issuance over the sample period is used to identify banks' debt issuance activity. Regressions are estimated with bank fixed effects, and include a constant and time dummies. Standard errors are reported in parentheses. *, **, *** represent significance at 10, 5, and 1 percent, respectively.

Table 5: Issuance volume by type of debt issuance activity.

Dependent variable:	(1) IE SPE debt issuance	Median (2) Debt issuance elsewhere	Median regression (3) Coefficient on difference between (1) and (2)
<i>Debt issuance volume</i>			
<i>All international banks</i>			
Advanced economies	141 [883]	428 [6,856]	-402*** (58)
Emerging economies	221 [12]	124 [456]	69 (110)
<i>International banks with IE SPE debt issuance</i>			
Advanced economies	141 [883]	1,778 [2,409]	-1,791*** (110)
Emerging economies	221 [12]	136 [147]	117 (76)

Note: This table analyses the median volume of debt issuance for different types of activity over the 2005Q1-2016Q4 period. The number of observations used to calculate the medians in each case is reported in brackets. IE SPE debt issuance activity includes both debt issued through IE SPEs and elsewhere at some point during the sample period. Debt issuance activity elsewhere includes debt issued elsewhere at some point during the sample period, excluding debt issued through IE SPEs. Column (3) reports the results of median regressions of the volume of issuance on a dummy identifying debt issuance through IE SPEs and country dummies. For brevity, only the coefficient on the debt issuance through IE SPE dummy is reported. Standard errors are robust, estimated through bootstrapping with clustering at the bank level and reported in parentheses. *, **, *** represent significance at 10, 5, and 1 percent, respectively.

Table 6: Debt issuance activity elsewhere by banks with IE SPE debt issuance.

Dependent variable:	Mean		Tobit regression (3)
	(1) Before debt issuance through IE SPE dummy	(2) After debt issuance through IE SPE dummy	
<i>Debt issuance</i>			
Quarterly volume of debt issued elsewhere per bank			
Advanced economies	1.317 [457]	3,660 [1,340]	2.971*** (633)
Emerging economies	103 [88]	223 [46]	644*** (246)
Quarterly volume of debt issued elsewhere/TA per bank			
Advanced economies	0.487 [335]	0.448 [1,097]	0.036 (0.070)
Emerging economies	0.370 [72]	0.371 [46]	0.604 (0.428)
Quarterly volume of debt issued elsewhere per bank/ total issuance volume of other debt			
Advanced economies	1.974 [440]	2.252 [1,213]	0.596** (0.252)
Emerging economies	2.085 [88]	2.533 [46]	7.156** (3.452)

Note: This table analyses debt issuance activity elsewhere by banks that issue debt through IE SPEs at some point over the 2005Q1-2016Q4 period. The first dependent variable analysed is the volume of debt issued elsewhere per quarter by these banks before and after their first debt issuance through IE SPEs. The second dependent variable analysed is the volume of debt issued elsewhere divided by total assets lagged by one period per quarter before and after their first debt issuance through IE SPEs. The third dependent variable analysed is the ratio of the volume of debt issued elsewhere per bank to the total volume of debt issued elsewhere per quarter before and after their first debt issuance through IE SPEs. For the three variables, quarters without debt issuance activity are assigned a zero. Columns (1) and (2) report the mean of the three dependent variables analysed before and after the first debt issuance through IE SPEs, respectively. The number of observations used to calculate the means in each case is reported in brackets. Column (3) reports the results of Tobit regressions of the different dependent variables on a dummy identifying the period after the first debt issuance through IE SPEs and a constant. The effect of a discrete change in the dummy variable on the expected value of the observed dependent variable is reported. Standard errors are reported in parentheses. *, **, *** represent significance at 10, 5, and 1 percent, respectively.

