DEBT FINANCING CHOICES: THEORY AND EVIDENCE FROM EUROPE *

João M. Pinto
Visiting Professor of Finance
Católica Porto Business School
Catholic University of Portugal

Mário C. Santos
Visiting Professor of Finance
Católica Lisbon School of Business and Economics
Catholic University of Portugal

Abstract

We examine the factors that influence borrower's choice between structured finance (SF) and straight debt finance (SDF). Using a sample of 12,075 Western European loans and bonds issued between 2000 and 2011, we find that borrowers choose SF when they seek long-term financing and funding cost reduction. Our results document that floatation costs, information asymmetry, and renegotiation and liquidation risks affect non-financial firms' financing decisions. We also find that banks choose securitization to raise relatively large amounts of debt and improve economic performance. Our overall findings support hypotheses of SF as mechanism for asymmetric information problem and principal-agent conflict reduction.

Key words: debt financing choice, security design, cost of borrowing, structured finance, straight debt finance, project finance, asset securitization, straight bonds.

JEL classification: F34; G01; G12; G21; G24

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1. Introduction

This paper examines how firms choose between structured finance (SF) and straight debt finance (SDF). For our study, structured finance includes project finance loans and asset securitization bonds while straight debt refers to straight bonds. Despite insightful predictions from the security design literature, the choice between SF and SDF has received relatively little academic analysis. Thus, this important firm decision may be unsatisfactorily explained.

It is well understood that in an economy *à la* Modigliani and Miller (1958), the decision between SDF and SF is irrelevant. If markets were perfectly competitive, liquid, and frictionless, tranching,[1] or the act of encapsulating an initiative or a pool of assets in an *ad hoc* organization, would not matter. It follows that market imperfections and frictions must generate the need for tranching and off-balance sheet financing. In this paper, we argue that in an imperfect markets framework, SF does matter because it reduces deadweight costs associated with market frictions.

Prior research on firm debt choices addresses the coexistence of bank and bond financing [Diamond (1991b), Rajan (1992), Besanko and Kanatas (1993), Chemmanur and Fulghieri (1994), Yosha (1995), Bhattacharya and Chiesa (1995), Holmstrom and Tirole (1997), Repullo and Suarez (2000), Bolton and Freixas (2000), and Fiore and Uhlig (2011)]. While some authors argue that bank financing holds a significant advantage [Diamond (1984), Boyd and Prescott (1986), Berlin and Loyes (1988), and Chemmanur and Fulghieri (1994)], Diamond (1991b) and Rajan (1992) predict a hump-shaped relationship between firm quality and debt source. Although this theoretical literature relates debt source preferences and firm characteristics, it pays little attention to the choice between structured and straight debt instruments.

Related empirical literature is also quiet on this debt financing choice. Houston and James (1996), Johnson (1997), Krishnaswami, Spindt, and Subramaniam (1999), Cantillo and Wright (2000), Denis and

[1] Tranching means the creation of multiple types of securities backed by firm's assets, or by the underlying asset pool, when considering asset securitization. See, e.g., Oldfield (1997), DeMarzo (2005), and Leland (2007) for further details.

Mihov (2003), and Altunbas Alper, and Marqués-Ibáñez (2010) relate the use of public bonds to characteristics such as firm size, age, leverage, liquidity, growth opportunities, and profitability; however, the focus of our paper is a different debt financing decision. Perhaps the most closely related work to ours is Altunbas et al. (2010), which investigates factors relevant to European firms' choices between corporate bonds and syndicated loans. Still, their study neglects project finance loans.

Another literature stream posits that SF reduces funding costs by mitigating agency problems and information asymmetries and by improving risk management [Finnerty (1988), Oldfield (1997), Caselli and Gatti (2005), DeMarzo (2005), and Fabozzi, Davis, and Choudhry (2006)].[2] Security design literature hypothesizes that: (*i*) different levels of debt seniority can mitigate agency problems [Allen and Winton (1995), Hart and Moore (1995), Winton (1995), Lacker (2001), and Sannikov (2013)]; (*ii*) design and issuance of securities with different degrees of seniority reduces monitoring costs [Diamond (1993), Winton (1995), and Glaeser and Kallal (1997)]; and (*iii*) financial intermediaries can reduce information asymmetry costs by pooling assets and issuing different types of securities against the pool of cash flows [Boot and Thakor (1993), Riddiough (1997), DeMarzo and Duffie (1999), and DeMarzo (2005)].

To examine which factors explain the choice between SF and SDF financing, we use a comprehensive sample of SF and SDF transactions issued in Western European countries between January 1, 2000 and December 31, 2011. Our sample contains 1,085 project finance loans worth €156.6 billion, 439 asset securitization bonds worth €140.7 billion, and 10,551 straight debt bonds worth €4,663.8 billion.

In line with SF literature, our results indicate that, *ceteris paribus*, the total cost of borrowing (TCB) is significantly lower for SF transactions than for SDF ones. Project finance loans to corporates and asset securitization bonds issued by banks are associated with statistically significant TCB reductions

[2] See Greenbaum and Thakor (1987) and Roever and Fabozzi (2003) for asset securitization, and Brealey, Cooper, and Habib (1996), Caselli and Gatti (2005), Esty (2003, 2004), and Corielli, Gatti, and Steffanoni (2010) for project finance.

of 32.85 bps and 235.42 bps, respectively.[3] Interestingly, the TCB is significantly higher for asset securitization bonds issued by corporates. We find the loan-to-value ratio[4] in asset securitizations to relate negatively and significantly to the TCB which suggests that lenders actually associate higher loan-to-values with reduced credit risk; i.e., the issuance of securities with varying seniority classes – structuring – reduces the TCB. We also document that the 2007-2008 financial crisis and the subsequently European sovereign debt crisis significantly impacts the economic cost of project finance loans, increasing the TCB by 140.39 bps.

Our results regarding corporate borrower choice between SF and SDF transactions support hypotheses related to information asymmetry, floatation cost, and renegotiation and liquidation risks. We find that corporate borrowers choose SF when they seek long-term financing and funding source diversification. Further, firms employing project finance over straight debt tend to be smaller and more levered; they also have lower asset tangibility and operate in countries with lower sovereign debt ratings. Firms prefer project financing when issuing relatively lower amounts of debt and loans do not face currency risk. Firms employing asset securitizations instead of straight debt are typically larger, more levered and less profitable; these firms also tend to have higher asset tangibility and more growth opportunities. Corporates seeking relatively higher amounts of debt and those operating in high sovereign credit risk countries prefer asset securitizations. Moreover, firms that access both SF and SDF markets differ fundamentally from those reliant on either market, alone.

Regarding financial firms, our results support the asymmetric information hypothesis. Asset securitization offers banks with more information asymmetry a cheap, credible way to relay information about receivables to investors. It, thus, also enables borrowers to obtain longer maturity funding. Our results document that smaller, less liquid, and better capitalized banks prefer asset securitization over straight debt. Asset securitization is also preferred when the bank seeks to obtain larger funding levels and

[3] Throughout the paper we use, interchangeably, the terms ‘financial firms’ and ‘banks’ as well as ‘non-financial firms’ and ‘corporates’.
[4] The empirical model includes a proxy for the 'loan-to-value' ratio specified as tranche size to transaction size.

improve overall economic performance – measured by return on equity and cost-to-income ratios. However, our findings do not support credit risk transfer and regulatory capital arbitrage hypotheses.

In line with mainstream SF and security design literature, our overall results support hypotheses of project finance and asset securitization transactions as mechanisms for asymmetric information problem and principal-agent conflict reduction.

This paper extends the literature on debt financing decisions in several ways. First, unlike prior research, our empirical analysis distinguishes between SF and SDF. SF is an economically significant, growing financial market segment. As such, it warrants separate examination. According to the Association for Financial Markets, the volume of securitized assets in Western Europe grew 1,342% from $78.2 billion in 2000 to $1,049.2 billion in 2008. In terms of project finance transactions, Esty and Sesia (2007) report that a record $57.8 billion in project financing was arranged in Western Europe in 2006, which compares with $45.7 billion in 2011. The U.S. market follows a similar trend. Second, to our knowledge, this study is the first to investigate factors underlying firm choices between straight debt and project finance and between straight debt and asset securitization. Third, our study explores financial and non-financial firms, individually. We investigate debt choices using a unique dataset of loans and bonds carefully assembled and hand-matched from multiple sources. Finally, unlike prior studies, we examine the debt choice using a more precise TCB measure proposed by Berg, Saunders, and Steffen (2015).

The remainder of this paper is organized as follows. The next section discusses theoretical and empirical background regarding SF and connects it with security design and debt choice literatures. Section 3 describes sample selection and key contracting characteristics of SF and SDF transactions. Section 4 examines if SF transactions reduce funding costs and discusses the determinants of TCB, accounting for self-selection between SF and SDF. Section 5 presents and analyzes the determinants of firm debt choices. Section 6 summarizes and concludes.

2. Literature review

2.1. The financial economics of structured finance

According to existing literature, primary motives for using SF include: (*i*) mitigating market imperfection costs; (*ii*) funding projects which otherwise could not be financed; (*iii*) reducing funding costs, when the reduction in the cost of funding is larger than the cost of the required credit enhancements; (*iv*) maintaining sponsors' financial flexibility through special purpose vehicle companies (SPVs); (*v*) more effectively transferring risk; and (*vi*) reducing tax expense through tax shields [Esty (2003), Caselli and Gatti (2005), DeMarzo (2005), Fender and Mitchell (2005), and Fabozzi et al. (2006)]. SF also carries disadvantages, especially when used inappropriately. As argued by Brunnermeier (2009), Coval, Jurek, and Stafford (2009), Gorton (2009), and Gorton and Metrick (2013), securitization played an important role in the development and propagation of the 2007-2008 financial crisis.

2.2. The design of structured finance transactions

Diamond (1984), Gale and Hellwing (1985), Williamson (1987), and Boyd and Smith (1994) develop models that show that standard debt contracts are *quasi* optimal contracts. Allen and Winton (1995), Hart and Moore (1995), Winton (1995), and Lacker (2001) provide interesting results on how different levels of debt seniority can mitigate agency problems. Winton (1995) and Lacker (2001) models can be applied to explain certain SF features. In asset securitization, two or more tranches are issued with different degrees of seniority. The originator typically retains the 'first loss' tranche. Further, some tranches include 'credit enhancement' whereby a third-party guarantees additional losses up to a fixed amount.

Regarding adverse selection, Diamond (1993), Winton (1995), and Glaeser and Kallal (1997) argue that structuring, or subdividing securities into tranches with varying degrees of seniority, reduces monitoring costs. Boot and Thakor (1993), Riddiough (1997), DeMarzo and Duffie (1999), and DeMarzo (2005) show that a financial institution can reduce information asymmetry costs by pooling assets and issuing different security classes against the asset pool's cash flows. DeMarzo and Duffie (1999) develop a model similar to Boot and Thakor's (1993). They argue that the optimal tranche in asset-backed securities is the senior one and the issuer retains the first loss tranche and any unsold fraction of the senior tranche. Another stream of literature describes the impact of asymmetric information on firm's debt

maturity choices. When information about the true quality of a firm's assets is asymmetrically distributed between insiders and outsiders, financing decisions, particularly short-term debt issues, may signal firm asset quality information, e.g., Flannery (1986) and Diamond (1991a, 1993).

Allen and Gale (1988, 1991, and 1994) argue that in asset securitization, two portfolios of securities paying the same amount may have different prices. Fulghieri and Lukin (2001) point out that securitization issuers may prefer to issue a security with high information sensitivity if they intend to maintain a residual equity position in the asset pool. Using optimal risk allocation models, Benveniste and Berger (1987) show that securitization can improve risk sharing and increase project funding by avoiding the Myers (1977)-type underinvestment problem.

2.3. Determinants of firms' debt choices

To date, the choice between SF and SDF has been relatively neglected by the literature. Research on debt financing choices primarily focuses on the choice between public and private debt. Such literature offers three hypotheses. The flotation costs hypothesis, which posits that because small public debt issues are not cost-efficient, firms issue public bonds only for larger borrowings [Houston and James (1996), Krishnaswami et al. (1999), Esho, Lam, and Sharpe (2001), and Denis and Mihov (2003)]. The renegotiation and liquidation hypothesis, which argues that borrowers with a higher probability of financial distress are far less likely to borrow publicly [Berlin and Loyes (1988), Chemmanur and Fulghieri (1994), Cantillo and Wright (2000), Esho et al. (2001), Denis and Mihov (2003), and Fiore and Uhlig (2011)]. The information asymmetry hypothesis, which suggests that firms facing higher incentive problems from information asymmetry are expected to borrow privately [Diamond (1984, 1991b), Boyd and Prescott (1986), Krishnaswami et al. (1999), Denis and Mihov (2003), and Fiore and Uhlig (2011)].

Several empirical studies investigate financial firm choice of debt instrument, particularly asset securitization. This research suggests on the following motivations: (*i*) liquidity – Cardone-Riportella, Samaniego-Medina, and Trujillo-Ponce (2010) and Casu, Clare, Sarkisyan, and Thomas (2013) show that banks use asset securitization to increase liquidity; (*ii*) credit risk – several authors [Minton, Sanders, and Strahan (2004), Minton, Stulz, and Williamson (2009), and Casu et al. (2013)] argue that banks utilize

SPVs to remove loans from their balance sheet and consequently transfer credit risk to other investors; (*iii*) capital arbitrage – Minton et al. (2004, 2009) and Casu et al. (2013) show that financial firms securitize to ease capital requirements; and (*iv*) performance – Affinito and Tagliaferri (2010) and Cardone-Riportella et al. (2010) suggest that banks securitize to recognize profits when the loans' market values exceed their book values. Additionally, Minton et al. (2004), Uzun and Webb (2007), Cardone-Riportella et al. (2010), and Casu et al. (2013) show that characteristics like bank type and size influence securitization decisions.

3. Data description

3.1. Sample selection

Our sample includes individual loan and bond offer data from the Thomson Reuters Dealscan and Dealogic DCM Analytics databases for the 2000-2011 period. The databases offer contracting characteristics of SF and SDF transactions. DCM Analytics contains information on publicly traded asset securitization (AS) and straight debt (SD) bonds while Dealscan details project finance (PF) loans. SF in our sample includes AS bonds and PF loans. Although DCM Analytics includes several bond types, we retain only those with a deal type code of "corporate bond-investment-grade", "corporate bond-high yield", "asset-backed security" (ABS), and "mortgage-backed security" (MBS). Perpetual bonds and bonds with additional features such as step-up, caps, or floors were excluded from our sample. While Dealscan contains historical information about syndicated loans and related banking instruments, we examine only loans with a deal specific purpose code of "project finance". We also require, for both databases, that the borrower/issuer country belongs to Western Europe[5] and that the tranche size (in Euro million) be available. We retain only issues with complete credit spread data. These screens yield a sample of 1,085 PF loans worth €156.6 billion, 439 AS bonds worth €140.7 billion, and 10,551 SD bonds worth €4,663.8 billion. PF loans are issued exclusively to non-financial firms; 102 (337) AS tranches are issued by corporates (banks); and 3,453 (7,098) SD bonds are issued by corporates (banks). PF and AS

[5] For this study, we define Western Europe as Austria, Belgium, Cyprus, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxemburg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom.

transactions typically consist of several tranches funding the same SPV. Because the unit of observation is a single issue or a single loan tranche, multiple issues from the same transaction appear as separate observations in our database. Therefore, we consider the transaction tranche our unit of observation.

To investigate how Western European firms choose between SF and SDF, we link debt choice to firm attributes observed in the fiscal year ending just prior to debt issuance. Accounting and market data for non-financial firms is drawn from Thomson Reuters Datastream database while the same information for financial firms' comes from Bureau van Dijk Electronic Publishing's Bankscope database. Because Dealscan does not provide an identification code, we hand-match those sponsors with a controlling equity stake in the separate PF company with Datastream by using the sponsor name. Additionally, we link Datastream and Bankscore issuer information to DCM Analytics bond information by hand-matching issuer names and issuer-parent names for SD and AS bonds, respectively.[6] Finally, macroeconomic data, such as interest rate levels, market volatility, and the Euro swap curve slope is obtained from Datastream.[7]

3.2. Characteristics of structured finance versus straight debt finance transactions

Table 1 provides descriptive statistics for our sample of SF and SDF transactions between 2000 and 2011. Loans and bonds are grouped by debt type and by whether the borrower/issuer is a financial firm. We compare contract characteristics between debt types using the nonparametric Wilcoxon rank-sum test for continuous variables and Fisher's exact test for discrete variables. The same tests assess contract characteristic differences between financial and non-financial firms.

****** Insert Table 1 about here ******

The total cost of borrowing (TCB) corresponds to the economic cost of credit for the financing instrument based on available information at the time of issue. Previous empirical studies commonly use the all-in-spread-drawn (AISD) as a proxy for the cost of capital in syndicated loans [Kleimeier and

[6] Considering that in SF transactions the borrower is a special purpose company settled up to take on the initiative, we assigned AS and PF deals with sponsors ('Borrower/Issue-Sponsor') in a PF transaction and originators in an AS transaction ('Issuer Parent'). This method allows matching the deals with the ultimate party responsible for the financing choice decision between SF and SDF transactions.

[7] We link macroeconomic information with debt characteristics (DCM Analytics and Dealscan) on the active date (PF loans) or issue date (AS bonds and SD bonds).

Megginson (2000), Sorge and Gadanecz (2008), and Gatti, Kleimeier, Megginson, and Steffanoni (2013)]. AISD is defined as the rate spread over the 3-month LIBOR at closing plus the facility fee. Similarly, the margin between a bond's contractual yield and that of a comparable maturity treasury benchmark commonly proxies for a bond's economic cost of credit [Gabbi and Sironi (2005), Vink and Thibeault (2008), and Sorge and Gadanecz (2008)]. However, these measures are imperfect proxies. For PF loans, the AISD measure does omits material fees such as commitment fees and up-front fees. Bonds also carry additional fees such as management fees.

We compute PF TCB as proposed by Berg et al. (2015). In contrast to AISD, our method accounts for other fees, as well. PF loans are typically benchmarked to the 3-month LIBOR rate while bonds are benchmarked to comparable maturity government securities (e.g., German Bunds). In other words, the benchmarks, themselves, differ in credit risk between debt types; one includes unsecured short term credit risk while the other reflects the risk-free government borrowing cost. Following Thomas and Wang (2004) and Sorge and Gadanecz (2008), we adjust for the benchmarks' risk differences by adding to the LIBOR spread on PF loans the difference between the three-month Euro LIBOR and the three-month German Treasury bill at loan issuance.[8] After this adjustment, our TCB measures are more comparable between bonds and loans.

The mean (median) TCB for SD is 160.30 bps (99.40 bps); mean (median) TCB for PF and AS are 205.43 bps (166.36 bps) and 151.94 bps (101.38 bps), respectively. The Wilcoxon rank-sum test rejects the null hypothesis that the TCB is identically distributed for PF loans and SD bonds. In contrast, TCB for AS and SD bonds is not significantly different at the 1 percent level. When assessing TCB differences separately for bank and non-bank subsamples, we find: (*i*) mean TCB is economically and

[8] For loans, the total cost of borrowing (TCB) is the sum of the LIBOR spread, facility fee, and up-front fee divided by maturity, plus the annual fee and difference between 3-month LIBOR and 3-month German Treasury yield at the time of closing the loan. For bonds, the TCB is the spread at issue over the comparable maturity, risk-free government security plus the management fee. Prior literature has used AISD, defined as the spread paid by the borrower over 3-month LIBOR at closing plus the facility fee, to measure loan TCB. Because term loans represent almost 93% of PF in our sample and we only have one observation with available information on utilization and cancellation fees, the main difference between the AISD and our TCB is the up-front fee. On average, our measure of TCB is 38.35 bps higher than the AISD for PF loans and 3.02 bps and 2.70 bps higher than the credit spread for AS and SD bonds, respectively.

statistically lower for corporate PF loans (205.43 bps) than corporate SD bonds (215.18 bps); (*ii*) unlike banks, corporates face higher average TCBs when issuing SD bonds (215.18 bps) than AS bonds (168.71 bps); and (*iii*) whereas SD TCBs are economically and statistically lower for banks (133.60 bps) than for corporates (215.18 bps), AS TCBs are statistically indistinguishable between firm subsets.

AS bonds average credit rating (4.34) is significantly lower than that of SD bonds (5.50). This suggests that SD transactions may be inherently riskier. However, it can also reflect the country risk rating as SD issuers are, on average, located in riskier countries than AS issuers (1.75 versus 1.44). A similar pattern is observed when comparing AS and SD bonds for financial and non-financial firms. The average credit rating for SD bonds issued by non-financial firms (7.60) is significantly higher than the corresponding value for financial firms (4.48). AS bond credit ratings do not vary significantly between banks and corporates. Regarding country risk, we find that PF borrowers are, on average, located in far riskier countries than issuers of other debt types.

The mean (median) PF transaction size of €399.57 million (€210 million) is significantly less than the SD mean (median) transaction size of €611.91 million (€325 million). On the contrary, mean (median) AS size of €819.38 million (€455.47 million) significantly exceeds SD size. This can be explained by the fact that PF is typically loan based or buy-and-hold project bond based. The pattern persists when comparing PF loans with SD bonds issued for non-financial firms, separately. However, the difference in transaction size between non-financial AS bonds and SD bonds is insignificant. Regarding financial firms, SD bonds exhibit lower mean (median) transaction size of €477.08 million (€250 million) than AS bonds €717.77 million (€450 million). Finally, non-financial firm bonds, in general, are larger than bank bonds.

For SD bonds, the average loan-to-value ratio – the ratio of the tranche size to the transaction size – is 87.39%, which significantly exceeds that of AS bonds (39.41%) and PF loans (47.84%). This finding remains significant even after subdividing our sample between corporates and banks. We also find that loan-to-value ratio is economically and statistically lower for bank (38.12%) than for corporate (43.66%) AS bonds. In contrast, average loan-to-value in non-financial SD is lower than that for bank SD, (78.40%

versus 91.75%). These results can be explained by the fact that SF transactions typically include a much larger number of tranches than SDF ones; an average SDF transaction includes 1.81 tranches while average PF and AS transactions have 3.06 and 4.22 tranches, respectively. Thus, we conclude that SF transactions benefit more from tranching.[9]

An average AS bond matures over 21.3 years while average PF loans and SD bonds mature in 13.87 years and 6.88 years, respectively. In contrast to traditional secured bonds in which repayment capacity stems from the issuer's ability to generate sufficient cash flows, AS bond repayment prospects depend primarily on assets pledged as collateral for the issue. Therefore, AS maturities typically reflect maturities of such underlying collateral pools which tend to be longer term. Mean (median) SD maturity for non-financial firms is 9.10 (7.04) years. Financial firm SD bonds have shorter mean (median) maturities 5.80 (5) years. However, the difference in maturities between AS bonds issued by corporates and banks is statistically insignificant.

For SD bonds, the average number of participating banks is 3.71, which is significantly larger than the AS bond average (2.45) but smaller than the PF loan average (8.94). The pattern persists when analyzing financial and non-financial firms, separately. This is consistent with the view that banks attempt to maximize the number of PF participants to spread out risk.

PF loans are very frequently fully secured through a guarantee (94.20%). In this sense, they are similar to AS bonds. Fixed interest rates are an important distinguishing characteristic of SD; 67.88% of our SD sample has fixed rates compared with 0% of PF loans and 27.11% of AS bonds.

Currency risk varies significantly between AS and SD bonds; 31.66% of AS bonds in our sample are subject to currency risk compared to a mere 22.64% of SD bonds. PF loans are even less likely to bear currency risk (11.34%) than AS. Finally, the fraction of AS bonds issued by UK firms, 39.86%, is significantly higher than that for SD transactions, 16.92%. In both AS and SD samples, U.K. issuers are significantly less likely to be financial firms.

[9] Due to subordination credit enhancement mechanism, in AS senior tranches are relatively larger than junior ones.

4. Cost of funding and borrowing choice

Both financial and non-financial firms in our sample issue AS and SD bonds while only non-financial ones borrow with PF. In this section, we begin to examine what factors affect a firm's choice to issue one debt type over another. Extant literature on SF and security design leads us to hypothesize that SF transactions reduce funding costs. To test this hypothesis, we subject our overall sample of SF and SDF transactions to OLS regression analysis in order to determine whether SF transactions are more or less expensive than SDF transactions, after controlling for other micro and macro pricing factors. Then, we expand the model to account for self-selection between SF and SDF.

4.1. Total cost of borrowing and the debt financing choice

If SF transactions facilitate lower funding costs relative to traditional funding sources, TCB for SD bonds should exceed that of PF loans and AS bonds. Additionally, security design literature predicts that the presence of different AS tranches with varying degrees of seniority reduces deadweight transaction costs associated with principal-agent problems. Regarding financial institutions, extant suggests that a bank can reduce asymmetric information costs by pooling assets and issuing different securities against the associated pool of cash flows. In this case, TCB and loan-to-value ratio should be negatively related for AS bonds. In AS transactions, various credit enhancement mechanisms improve the security's credit rating and reduce the risks transferred to investors. One way to mitigate credit risk is to subordinate smaller tranches such that they provide credit support to the most senior tranche. In contrast, we expect to find a positive relationship between TCB and the loan-to-value ratio for PF loans. A higher loan-to-value ratio implies greater risk for lenders as that loan constitutes a larger share in their portfolio.

We test if and how debt type and loan-to-value ratios relate to TCB via OLS, adjusting for heteroskedasticity. Because our study employs tranche-level observations, we expect correlation between standard errors for tranches within the same security. We, thus, cluster standard errors by transaction. The base empirical model[10] for this section is:

[10] We identify possible instrumental variables for the TCB based on available literature, in particular Kleimeier and Megginson (2000), Gabbi and Sironi (2005), Longstaff, Mithal, and Neis (2005), Chen, Lesmond, and Wei (2007),

$$TCB_{i,t} = \alpha_0 + \beta_0 AS_i + \beta_1 PF_i + \beta_2 AS * loan\,to\,value_{i,t} + \beta_3 PF * loan\,to\,value_{i,t} + \beta_4 SD * loan\,to\,value_{i,t} + \beta_5 Contracting\,characteristics_{i,t} + \beta_6 Macro\ factors_t + \varepsilon_{i,t}\ , \quad (1)$$

where the subscripts refers to debt facility *i* at time *t*. AS, PF, and SD are indicator variables set to 1 if the facility is an AS bond, a PF loan or an SD bond, respectively, and 0 otherwise. Contracting controls include transaction size, maturity, number of participants, and whether the deal is subject to currency risk. We control for macroeconomic factors such as borrower country risk, whether issuance occurs within the crisis period, interest rate levels, market volatility, and Euro swap curve slope. We also include industry, year, and country fixed effects. In this section, we do not distinguish between financial and non-financial firms' attributes because of the significant sample size reduction that it would impose. N would decline from 12,075 to 1,638 observations.

Despite numerous empirical studies[11] identifying credit rating as an important determinant of borrowing costs, we are forced to omit it from our primary model because of data unavailability. The Dealscan database provides credit rating information for only 44 PF loan tranches whereas DCM Analytics includes this information for 439 AS tranches and 10,551 SD tranches. Thus, we first estimate a complete model using equation (1). Then, we estimate a subsequent model controlling for credit ratings.

Models [1] and [2] of Table 2 estimate equation (1) for a sample of 1,085 PF loans, 439 AS bonds, and 10,551 SD bonds. The second model includes, as additional controls, a dummy variable to indicate whether the security is rated and the interaction between that variable and credit rating (rated*rating). Results suggest that, *ceteris paribus*, SF loans and bonds are associated with a lower TCB. However, when re-estimating these models for financials and non-financials, separately, two interesting results stand out. First, whereas model [2a] shows that the AS dummy variable is associated with a statistically significant 235.42 bps drop in TCB for financial firms, model [2b] shows that same

Sorge and Gadanecz (2008), Vink and Thibeault (2008), Corielli *et al.* (2010), and Gatti *et al.* (2013), and references therein. Opinions gathered during verbal discussions with top investment bank employees support our choices.

[11] Refer to Collin-Dufresne, Goldstein, and Martin (2001), Hull, Predescu, and White (2004), Gabbi and Sironi (2005), and Longstaff *et al.* (2005) for SD bonds, among others, and Hu and Cantor (2006), Vink and Thibeault (2008), and Buscaino, Caselli, Corielli, and Gatti (2012) for AS bonds.

significantly and positively affects non-financial firm TCB. Second, model [2b] documents a statistically significant, 32.85 bps reduction in non-financial firm TCB associated with the PF dummy.

****** Insert Table 2 about here ******

Regarding bonds issued by financial firms, our results mirror Rosenthal and Ocampo (1988), Roever and Fabozzi (2003), Calomiris and Mason (2004), and Fabozzi and Kothari (2007). These authors point out that AS reduces funding costs by offering a low cost, credible way to disseminate information about the firm's receivables to investors. Empirically, these findings diverge from those presented by Hu and Cantor (2006) and Maris and Segal (2002), who find that securitization credit spreads are higher than those of SD bonds. Concerning PF, we corroborate arguments of Esty (2003) and Caselli and Gatti (2005) who state that PF enables sponsors to reduce funding costs.

The loan-to-value ratio behaves differently for AS bonds than for PF loans. We find that TCB and loan-to-value are significantly, positively related for PF loans (models [2] and [2b]), but unrelated in AS transactions (models [2], [2a], and [2b]). However, when we run models that exclude credit rating information (models [1], [1a], and [1b]), we find that the influence of loan-to-value on TCB is negative and significant. This finding suggests that lenders associate an increase in loan-to-value with significant credit risk reduction. The insignificance of the loan-to-value coefficient for AS bonds in models [2], [2a], and [2b] is of little importance because loan-to-value tends to be similar within AS rating classes and the coefficients on the macro and micro pricing factors are largely analogous in models with and without rated and rated*rating variables. Additionally, in AS the size of junior tranches are determined in order to meet the rating objective for the most senior tranche.

In line with Diamond (1993), Winton (1995), and Glaeser and Kallal (1997), we find evidence that AS securities reduces monitoring costs. Additionally, our results corroborate Boot and Thakor (1993), Riddiough (1997), DeMarzo and Duffie (1999) and DeMarzo (2005). A financial intermediary can reduce asymmetric information costs by pooling assets and issuing different types of securities against the associated pool of cash flows.

4.2. Determinants of the debt financing choice

In the previous section, we document that bank-issued AS bonds and corporate PF loans reduce funding costs. In this section, we focus on which factors affect a new borrower's choice between SF and SDF. We also ask how loan-to-value affects TCB for AS bonds and PF loans separately, once controlling for other variables. As described in Section 3, our sample includes debt issued by Western European borrowers between the years 2000 and 2011. Our sample period includes the 2007-2008 financial crisis and subsequent European sovereign debt crisis which have been affecting Western Europe since 2008. Thus, we cannot rule out that a flight to quality may have left many borrowers in these countries credit-rationed. As a result, the probability of observing SF deals with relevant pricing information (i.e., our sample selection) may not be random but rather determined by the same risk characteristics that enter our pricing regressions. To account for this possibility, we employ a generalized Tobit model, following Heckman (1979). We perform maximum likelihood estimation of our model alongside a simultaneous probit selection equation. In the selection equation, the probability of issuing debt is a function of both micro and macroeconomic variables.

We observe TCB when a tranche is an SF loan or bond versus an SD bond. Then we fit a binomial probit model that predicts the loan's probability of being arranged as an SF transaction. The Heckman selection model assumes that there exists an underlying relationship,

$$y_i = X_i\beta + u \tag{2}$$

The dependent variable, however, is not always observed. Rather, the dependent variable for observation *i* is observed if

$$s_i = I(z_i\gamma + v \geq 0) \tag{3}$$

where:

$$u \sim N(0,\sigma)$$
$$v \sim N(0,1)$$
$$Corr(u,v) = \rho$$

Equation 2 is the determination, or outcome, equation and equation 3 is the selection equation. When $\rho \neq 0$, standard regression techniques applied to the equation 2 yield biased results. Heckman provides consistent, asymptotically efficient estimates for all the parameters in such models. In our

context, the selection indicator, s_i, equals one if the tranche belongs to an SF transaction and zero, otherwise.

Choice between SF and SDF affects a firm's cost of capital through leverage implications. In SF, a firm typically transfers a subset of assets into a bankruptcy-remote corporation or other special purpose vehicle (SPV). That SPV then issues debt to finance the specific project for which it was generated. Indeed, Leland (2007) notes that such separation of activities "…offers the advantage of optimizing the separate capital structures…" allowing for greater financial benefits from leverage. In this sense, the same factors affecting the differences in TCB for SF and SDF will also affect the choice between either.

Following prior debt pricing studies [refer to Section 4.1], we fit the following model (4). We use a full maximum-likelihood procedure, adjust for heteroscedasticity, and cluster standard errors by transaction to jointly estimate β, γ, and ρ.

$$TCB_{i,t} = \alpha_0 + \beta_0\, loan\,to\,value_{i,t} + \beta_1\, Contracting\,characteristics_{i,t} + \beta_2\, Macro\ \ factors_t + u_{i,t} \quad (4)$$

We assume credit spread is observed if

$$\gamma_0 + \gamma_1\, Contracting\,characteristics_{i,t} + \gamma_2\, Macro\ \ factors_t + v_{i,t} > 0 \quad (5)$$

We test the effect of five contract characteristics and five macroeconomic variables on a firm's choice between SF and SDF. Table 3 details these variables, their expected directional effect, and the effect observed in our results. To determine whether we can estimate a single regression including both PF and AS debt for non-financial firms, we test for a structural break using the Chow test. Essentially, we are testing whether pricing factors in Equation (4) are significant for both PF and AS transactions and, if so, whether they have the same coefficient values.

The Chow test statistic of 3.99 exceeds its critical value, indicating that PF and AS debt are priced in segmented markets. Thus, we cannot include the two in a single regression. Instead, we investigate what affects the probability of a new non-financial borrower choosing between PF loans and SD bonds and between AS bonds and SD bonds, separately. For financial firms, we assess what factors affects the choice between AS and SD bonds.

****** Insert Table 3 about here ******

According to the flotation costs hypothesis [Houston and James (1996), Krishnaswami et al. (1999), Esho et al. (2001), and Denis and Mihov (2003)], small public debt issues are not cost-effective. Therefore, firms choose public debt over private when the issue is sufficiently large. This suggests that firms may choose PF over SD for relatively small amounts of debt. Conversely, considering that structuring an AS transaction is costlier than SDF [Fender and Mitchell (2005), Fabozzi et al. (2006), and Cardone-Riportella et al. (2010)], we might expect that relatively small AS issues would also not be cost-effective. Thus, we expect firms to choose AS for relatively large amounts of debt to economize on scale.

Flannery (1986) and Diamond (1991a, 1993) point out that when information about the true quality of firm's assets is asymmetrically distributed, outsiders may perceive short-term debt issues as a signal of assets quality. Thus, we hypothesize that a borrower seeking relatively longer-term funding will choose SF over SDF to reduce information asymmetry problems and enable longer-term borrowing.

Esty (2003) and Corielli et al. (2010) characterize PF as most commonly used (*i*) for capital-intensive facilities or utilities with relatively transparent cash flows, (*ii*) to secure longer-term funding, (*iii*) in riskier countries. We, thus, expect that corporates from countries with higher sovereign credit risk are more likely to utilize PF. Conversely, following the results presented in Table 1, we expect AS issuers to be located in less risky countries than SD issuers.

There is broad consensus that SF, specifically AS, played an important role in the development and propagation of the 2007-2008 financial crisis [e.g., Brunnermeier (2009), Coval et al. (2009), and Gorton (2009)]. We, thus, expect that bank bonds issued during the crisis are more likely to be arranged as SDF transactions.[12] We have no observations for AS bonds issued by corporates during the crisis. Also, given the important role of Public-Private Partnerships (PPPs) in reducing government borrowing, we expect government and public sector entities to rely more on PF during the sovereign debt crisis.

[12] The capability of AS to repackage risks and create 'secure' assets from a risky collateral led to a rapid growth in the issuance of structured securities, most of which were perceived by investors as near risk-free financial assets. But when during the financial crisis investors realized that these securities were actually far riskier than originally perceived by investors and certified by rating agencies there was a flight from AS bonds to traditional securities.

Several authors [Rosenthal and Ocampo (1988) and Fabozzi and Kothari (2007)] point out that a key economic motivation for banks to use AS is improved management of credit, interest rate, and prepayment risks. Thus, we expect higher interest rates, steeper Euro swap curve slope, and more market volatility support bank AS. Contrary, we expect these macroeconomic factors to negatively influence the probability of a corporate choosing SF over SDF.

In AS transactions, securities are structured into different classes; these classes are offered to capital markets, individually. Their risk profiles vary with cash flow claim priority and presence of credit enhancement mechanisms. Junior tranches, especially the first-loss tranche, are typically unrated. Conversely, SD bonds issued in public debt markets are usually rated. We, thus, expect that the probability of observing a rated tranche to be higher for SD bonds than for AS ones.

According to Hill (1996), Riddiough (1997) and Fabozzi et al. (2006), firms with high-quality assets and with low credit ratings may be able to reduce financing costs through securitization. This occurs because AS bonds can have higher credit ratings or be otherwise less risky than the originator's general obligations. We thus expect that a bond's credit rating relates positively to the choice of AS over SD; i.e., the higher the credit rating the higher the probability of a firm choosing AS vis-à-vis SD.

4.3. Results

Table 4 reports results for three models: model [3] involves non-financial firms' choice of PF loans over SD bonds; model [4] involves non-financial firms' choice of AS bonds over SD bonds; and models [5] and [5a] involve financial firms' choice of AS bonds over SD bonds.

****** Insert Table 4 about here ******

We begin by estimating the determination equation in models [3] and [4] for non-financial firms. Model [3] omits credit ratings because we could only obtain 44 PF loan ratings. As expected, non-financial firm models document a positive relationship between TCB and loan-to-value for PF loans and negative one for AS bonds.

Regarding AS bonds issued by financial firms, model [5] shows that TCB and loan-to-value are significantly and negatively related. This suggests that lenders associate a loan-to-value increase with a

significant credit risk reduction. When controlling for AS tranche credit risk in model [5a], the relationship loses significance. Given that loan-to-value ratios tend to be similar within AS rating classes and that macro and micro pricing factor coefficients are largely similar in sign and in significance for both models, our results are in line with the mainstream security design literature – structuring reduces funding costs by mitigating information asymmetries [Boot and Thakor (1993), Riddiough (1997), DeMarzo and Duffie (1999), and DeMarzo (2005)].

Next, we examine coefficient signs and magnitudes for the explanatory factors Z in our selection equations. For non-financial institutions, models [3] and [4] show that borrowers choose SF over SDF when they seek long-term financing. Our results reflect predictions from Flannery (1986) and Diamond (1991a, 1993): when information about the true quality of a firm's assets is asymmetrically distributed between insiders and outsiders, short-term debt issues may be perceived by market participants as assets quality signals. Our findings indicate that asymmetric information problems can be reduced using transactions specifically structured through an SPV and secured by ring-fenced assets which produce cash flows solely to support the transaction. Our results corroborate those of Houston and James (1996), Krishnaswami et al. (1999), Esho et al. (2001), and Denis and Mihov (2003). According to the flotation costs hypothesis, firms choose PF loans over SD bonds when issuing relatively small amounts of debt. Contrary to what expected, transaction size does not influence the probability of observing an AS bond over an SD bond.

Regarding country risk, the results are exactly as expected. Transactions by corporates in countries with higher sovereign credit risk are more likely to be arranged as PF loans, while AS transactions are more common for firms in less risky countries. Also, debt exposed to currency risk is less likely to be structured as PF. Additionally, due to AS bonds' prominent role in the development and propagation of the 2007-2008 financial crisis, the crisis dummy variable reflects a lower probability of observing this debt type during the crisis. While the Euro swap curve slope relates positively to probability of AS financing, it reduces the probability of choosing PF over SD. Finally, as expected, a bond's credit risk negatively influences the probability of a firm choosing AS bonds instead of SD bonds.

Models [5] and [5a] reveal that banks prefer AS when seek longer-term funding, issue relatively higher amounts of debt, and face currency risk. Unexpectedly, the country risk variable is positive and significant at the 1% level. This suggests that a sponsor located in a riskier country is more likely to finance with AS than with SD. This may be because a financial institution's credit rating often correlates to its country's sovereign debt rating [Zaghini (2014)]. Accordingly, banks with high-quality assets located in riskier countries stand to gain the most in credit rating improvement through securitization. As expected, interest rate levels, market volatility, and Euro swap curve slope positively influence the probability of observing an AS bond versus an SD bond. Unexpectedly, the crisis proves to be irrelevant to a bank's financing decision between AS and SD bonds. Trends in the European financial system can help explain this phenomenon. Since the Lehman Brothers collapse, European governments began guaranteeing bank debt. Additionally, from the second half of 2009 onward, many banks have used their own securitization programs to obtain resources under ECB covered bond purchase programs.

Overall, our findings confirm the expected relationships detailed in Table 3. In model [4], the likelihood-ratio test for $\rho = 0$ and Wald test for rho=0 lead us to accept the hypothesis of equations (4) and (5) above being independent. In contrast, we reject this hypothesis for models [3], [5], and [5a].

5. Firms' characteristics and the choice of debt

This section presents univariate and multivariate analysis examining firm choice between SF and SDF debt. Because PF and AS transactions are priced in separate markets (refer to section 4.2), we assess, individually, determinants of choosing PF over SD and AS over SD. We analyze financial firm debt choice distinctly from debt choice of non-financials as the two borrower types vary importantly across fundamental characteristics.

5.1. Non-financial firms

Previous empirical studies document significant relationships between corporate bond financing and non-financial firm characteristics such as size, leverage, profitability, liquidity, growth opportunities, and financial distress [Houston and James (1996), Krishnaswami et al. (1999), Cantillo and Wright (2000), Denis and Mihov (2003), and Altunbas et al. (2010)]. Building on this literature, we investigate

how non-financial firm characteristics influence the choice between SF and SDF while controlling for contractual characteristics and macroeconomic factors. We use a unique dataset, compiled from three different data providers (Dealscan, DCM Analytics, and Datastream). It includes 1,638 PF loans, AS bonds and SD bonds issued by 259 public non-financial firms between 2000 and 2011.

5.1.1. Univariate analysis

Table 5 reports characteristics of non-financial firms that were sponsors in a PF transaction, originators in an AS transaction, or issuers in an SDF transaction. We subdivide these firms into six categories according to their borrowing record within our sample period. The PF and SD subsample is categorized as issuing: (I) only PF loans; (II) only SD bonds; and (III) both PF loans and SD bonds. Similarly, the AS and SD subsample is categorized as issuing: (IV) only AS bonds; (V) only SD bonds; and (VI) both AS and SD bonds.

****** Insert Table 5 about here ******

On average, borrowers that used only PF loans are smaller and have lower short-term debt levels, higher current ratios and lower asset tangibility than those accessing SD markets, exclusively. These results are not surprising. PF is of great demand when it does not substantially impact the balance sheet or the creditworthiness of the sponsoring entity. Financial leverage, return on assets, and market-to-book ratios do not differ at the 1% significance levels for the two subsets of firms.

As expected, firms utilizing both markets are much larger than those reliant on either, exclusively. With average size of €74.6 billion, firms in category [III] have borrowing needs and capacity to use both SD and PF markets extensively. They have relatively higher asset tangibility but lower current ratios and market-to-book ratios than firms using only PF loans or SD bonds. Firms that used simultaneously PF loans and SD bonds have lower levels of debt maturing in the short term when compared with firms that issued corporate bonds only. Financial leverage and return on assets are similar for firms in categories [I], [II] and [III].

Borrowers that use only AS bonds are typically smaller, more levered, have higher asset tangibility, and have lower short-term debt levels than those using only SD bonds. However, the small

number of bond observations (N=17) for firms in category [IV] undermines in-depth analysis. Again, firms accessing both AS and SD markets are much larger than those employing only one debt type. In category [VI], the mean (median) firm size is €140.4 billion (€167.1 billion), compared with mean (median) size of €6.6 billion (€5.6 billion) and €39.5 billion (€16.7 billion) for the AS only and SD only subsamples, respectively. Category [VI] firms have lower asset tangibility but higher short-term debt levels than firms using only AS or SD bonds. Firms that access both markets are less levered than AS-only issuers and have lower current ratios than SD-only issuers. Finally, market-to-book and return on assets ratios are similar for firms in categories [IV], [V] and [VI].

5.1.2. Multivariate analysis

To investigate how Western European firms choose between PF and SD or between AS and SD, we link these choices to firm characteristics observed immediately prior to debt issuance. Following existing literature, we focus on firm characteristics that reflect transaction costs, renegotiation and liquidation risks, and information asymmetries. For this analysis, we utilize a logistic regression model.[13] Our dependent variable, choice of debt, is a binary variable equal to 1 if the firm issues a PF loan or an AS bond and 0 if it, instead, issues an SD bond. Next, review prior literature to identify specific non-financial firm characteristics to use as explanatory variables (refer to Table 3).

Active monitoring by a lender can help mitigate agency costs associated with moral hazard [Diamond (1984, 1991b)]. Diamond (1984) and Boyd and Prescott (1986)] argue that banks are more efficient monitors than public bond markets. Thus, firms with higher information asymmetry may naturally prefer bank loans to corporate bonds. Firm size and market-to-book ratio are commonly used as proxies for incentive problems related to information asymmetries [Krishnaswami et al. (1999), Esho et al. (2001), Denis and Mihov (2003), and Altunbas et al. (2010)]. We expect firms facing high information asymmetry costs to choose PF because banks can more efficiently reduce such costs through monitoring. Additionally, Boot and Thakor (1993), Riddiough (1997), DeMarzo and Duffie (1999), and DeMarzo

[13] The logistic regression is used in cases of dichotomous dependent variable (in our case, PF versus SD or AS versus SD). An alternative to the logistic regression analysis is a probit regression. We find similar results using either model; our probit analysis is available upon request.

(2005) argue that AS reduces asymmetric information costs by pooling assets and issuing different securities against the pool of cash flows.

We also use market-to-book ratio to gauge a firm's growth potential. As identified by Smith and Watts (1992) and Barclay and Smith (1995), expected future growth increases a firm's market-to-book. This forward-looking ratio reflects investor expectations about a firm's cash flow potential. Because such cash flows allow the firm to securitize assets, we expect a positive association between market-to-book and the probability of choosing AS over SD. Regarding borrower choice between public and private debt, Altunbas et al. (2010) find that European firms with higher market-to-book ratios tend to choose the public, corporate bond market over the private, syndicated loan market.

The renegotiation and liquidation hypothesis suggests that borrowers facing higher financial distress probability are less likely to borrow publicly [Berlin and Loyes (1988) and Chemmanur and Fulghieri (1994)]. Empirically, while some authors document a positive relationship between public debt issuance and proxies for borrower financial distress [Houston and James (1996), Johnson (1997), Krishnaswami et al. (1999), Cantillo and Wright (2000), and Denis and Mihov (2003)], Esho et al. (2001) and Altunbas et al. (2010) find a negative association between financial leverage and public debt issuance. Because of restrictive covenants, direct credit monitoring, and ex post renegotiation, SF transactions more closely resemble private placement bonds than SD (publicly offered) bonds [Kwan and Carleton (2010)]. These characteristics make SF more effective in mitigating agency conflicts between borrowers and lenders. Thus, SF transactions seem particularly well suited for risky borrowers with high agency costs of debt. We use *debt to total assets* and *short-term debt to total debt* to proxy for a borrowers' level of financial constraint. Firms with more *debt to total assets* likely face higher financial risk. Therefore, renegotiation may be more complicated using public debt [Berlin and Loeys (1988) and Chemmanur and Fulghieri (1994)]. Considering that both PF loans and AS bonds are off-balance sheet transactions, we predict that higher levered firms will choose SF over SD to improve or maintain key financial ratios [Caselli and Gatti (2005) and Fabozzi et al. (2006)]. This argument is even stronger for

short-term debt to total debt, as it is a more direct proxy for firms' financial distress [Diamond (1991b) and Esho et al. (2001)].

Asset tangibility, proxied for by *fixed assets to total assets*, reflects a firms' liquidation value. All else equal, higher asset tangibility increases a creditor's expected recovery in default. Because PF is most commonly used for off-balance sheet capital-intensive projects, we expect this ratio to negatively influence the probability of a sponsoring firm choosing a PF loan over a SD bond. Conversely, we expect the probability of a non-financial firm choosing AS over SD to increase with the proportion of fixed assets; a higher ratio implies more cash flows eligible for securitization.

Profitability is measured as *return on assets*. According to Denis and Mihov (2003), profitable firms are more likely to utilize public debt to signal managerial aptitude for generating earnings. We, thus, expect *return on assets* to relate negatively to the probability of SF issuance. C*urrent ratio* measures a firm's ability to pay short-term obligations. Altunbas et al. (2010) report a positive relationship between the current ratio and the likelihood of borrowing through bond markets instead of syndicated loan markets.

In addition to the transaction size (refer to Section 4.2), firm size can also test the flotation cost argument. Empirical studies document a positive relationship between public debt financing and firm size [Houston and James (1996), Krishnaswami et al. (1999), Esho et al. (2001), and Denis and Mihov (2003)]. Thus, we expect smaller firms to choose PF over SD. Only relatively large firms who would benefit from economies of scale would prefer AS over SD.

We control for debt contracting characteristics, namely, transaction size, time to maturity, and whether debt is subject to currency risk. Because financing choice may be sector-specific, we use dummy variables to control for industry factors. We also account for macroeconomic conditions using proxies for sovereign default risk, financial crisis, interest rate levels, market volatility, and Euro yield curve slope. A final dummy variable identifies firms that employ multiple debt types within our sample period (Categories [III] and [VI]).

We model the choice between PF and SD and between AS and SD as follows:

$$Choice\ of\ debt_{i,t} = \alpha_0 + \beta_0\, Corporate\ characteristics_{i,t-1} + \beta_1\, Contracting\ characteristics_{i,t} + \beta_2\, Macro\ \ factors_t + \varepsilon_{i,t} \quad (6)$$

Table 6 reports results from logistic regressions of Equation (6). Model [6] predicts 279 firms' choice between PF and SD instruments; model [7] predicts 216 firms' choice between AS and SD. The models assess 1,617 and 1,198 transactions, respectively. Firm financial characteristics are measured at the year prior to debt issuance.

****** Insert Table 6 about here ******

We find that smaller firms are more likely to raise funds through PF than SD; in contrast, larger firms prefer AS over SD bonds. As expected, firms choose AS when issuing larger amounts of debt to benefit from economies of scale. In line with previous empirical studies, we find transaction size to negatively affect the probability of issuing PF loans instead of public bonds. We, thus, corroborate the flotation costs hypothesis.

Regarding the asymmetric information hypothesis, we find that firms with potential asymmetric information problems, relatively smaller ones, prefer PF loans. However, the market-to-book ratio does not affect the probability of observing PF over SD. Concerning the choice between AS and SD, we find high market-to-book firms tend to choose AS bonds. This makes sense as market-to-book proxies for information asymmetry. Conversely, when we use firm size as a proxy for information asymmetry, our results show that smaller firms choose SD over AS. At first, these findings appear to deviate from existing literature. However, AS transactions are complex and involve significant due diligence, negotiation, and legal procedures. Hence, structuring an AS deal is costlier than traditional financing. Therefore, it makes sense that only relatively large firms' could absorb AS issuance costs efficiently. We conclude that firm size is too noisy as proxy for information asymmetry. Finally, our results support security design literature [Flannery (1986) and Diamond (1991a, 1993)] which predicts that SF reduces asymmetric information problems and enables borrowers to obtain funding with longer maturities.

Results document that more levered firms tend to choose SF over SD. This finding is unsurprising because SF allows sponsors to maintain financial flexibility and protect their credit capacity through off-

balance sheet financing. We, thus, interpret high financial leverage as a financial distress factor [Esho et al. (2001)] and not as a reputational factor [Houston and James (1996), Johnson (1997), Krishnaswami et al. (1999), Cantillo and Wright (2000), and Denis and Mihov (2003)]. The argument is even stronger for AS transactions as we report a positive relationship between short-term debt level and likelihood to access AS markets. Thus, in accord with the renegotiation and liquidation hypothesis, we find that SF transactions, specifically AS, more effectively mitigate agency conflicts between borrowers and lenders.

As expected, higher asset tangibility is negatively associated with firm preference of PF over SD but positively associated with firm preference of AS over SD. This supports the prediction from earlier information asymmetry literature: private borrowers have significantly lower asset tangibility than public issuers [Denis and Mihov (2003)].

We find that while profitability reduces likelihood of accessing AS bonds market, it does not affect the choice between PF and SDF. Our results mirror those of Denis and Mihov (2003), who report that profitable firms are more likely to issue public rather than private debt. However, our findings contradict those of Altunbas et al. (2010), who show that profitability increases firms' likelihood of choosing syndicated loans over public debt. Additionally, a higher *current ratio* positively affects the probability of observing an AS bond rather than an SD bond.

We also find that firms which employ both PF and SD within our sample period are more likely to choose PF loans when issuing new debt. Sponsors that have already participated in PF face lower transaction costs. This is no surprise as PF transactions are expensive to orchestrate and take longer to execute [Esty (2003, 2004) and Fabozzi et al. (2006)].

Finally, all macroeconomic variables appear relevant in the financing choice between AS and SD bonds. Contrary to our expectations, both risk free rate and EUSA5y-Libor3M variables relate positively to firm likelihood of accessing AS bonds markets. As existing literature predicts, in periods of higher volatility, firms tend toward SDF.

By comparing SF and SDF debt choices, we find strong evidence that SF facilitates the reduction of the deadweight costs from asymmetric information problems and principal-agent conflicts. This debt

source allows sponsors/originators to maintain financial flexibility by creating non-recourse vehicle entities to carry the debt. In turn, this helps sponsors protect their credit standing and future access to financial markets. Our results show that firms utilizing PF are smaller, more levered, and have lower asset tangibility than SD issuers. Firms that prefer AS over SD, tend to be larger, more levered, and less profitable and have higher proportions of fixed assets and more growth opportunities.

5.1.3. The impact of the 2007-2008 financial crisis on the borrowers' choice

Table 6 includes re-estimation of model [6] for two sub-periods to examine whether debt financing choices change over time. Specifically, all transactions before the Lehman Brothers bankruptcy on September 14, 2008 constitute the pre-crisis period while transactions thereafter occur in the crisis period. Because we do not observe AS issuance during the crisis period, this section only analyzes firm choice between PF loans and SD bonds.[14]

Results from models [6a] and [6b] show interesting changes in firm attributes and macroeconomic factors between the two sub-periods. Regarding non-financial firm characteristics, *log total assets* loses significance over the crisis period. However, financial leverage and sovereign credit risk begin to positive influence the probability of observing a PF transaction during the crisis. In contrast, the Euro swap curve slope no longer affects the likelihood of PF issuance; nor does a firm's participation in both SD and SDF markets. We, thus, note that explanatory factors in borrower choice between PF and SD shift from marketability factors (size and *switchers*) to default factors (leverage and country risk). The statistical significance of leverage may relate to the fact that during the crisis, banks lost lending capacity. Hence, corporates may have shifted toward off-balance sheet funding via PF to preserve key financial ratios and funding conditions. The significant positive relationship between country risk and the likelihood of observing a PF transaction during the crisis period is not surprising as rating agencies downgraded sovereign ratings for several Western European countries (e.g., Belgium, Greece, Ireland, Italy, Portugal, and Spain). Moreover, PF transactions, especially PPPs, played an important role in reducing the need for government borrowing and shifting project risk to the private sector.

[14] Even in the bank subsample, we only observe 20 AS issues during the crisis.

5.2. Financial firms

Expanding on previous literature, we investigate how financial firm characteristics influence the choice between AS and SD, controlling for contractual characteristics and macroeconomic factors. Our sample includes 6,883 AS and SD bonds issued by 238 Western European publically traded banks between 2000 and 2011.

5.2.1. Univariate analysis

Table 7 reports financial firm characteristics. We divide these firms into three categories, according to their issuance record within our sample period. Banks in category (VII) issue only AS bonds; those in (VIII) issue only SD bonds; and those in (IX) issue both.

****** Insert Table 7 about here ******

Banks that use AS bonds only are, on average, smaller than those exclusively borrowing through SD. However, the latter banks have lower ratios of loans to assets, loans to deposits and short-term funding, and equity to assets. Regarding economic performance, the results are inconsistent. While the average bank using only SD financing has a lower return on equity it also incurs less overhead per dollar of income. Finally, the ratio of liquid assets to deposits and short-term funding is statistically indistinguishable at the 1% level between the two subsets of banks. Note, however, that a small sample size (N=20) in category [VII] reduces the power of our tests.

Financial firms accessing both AS and SD bond markets within our sample period are dramatically larger than those that use either, exclusively. The mean (median) size of banks in category [IX] is €672.3 billion (€444.9 billion), compared to €21.5 billion (€2.1 billion) and €202.6 billion (€43.0 billion) for categories [VII] and [VIII], respectively. Category [IX] banks have lower ratios of loans to assets, loans to deposits and short-term funding, and capital to assets than do banks that use only AS or SD. Banks that use only SD bonds have a lower ratio of liquid assets to deposits and short-term funding and enjoy better economic performance. Finally, despite having a lower cost-to-income ratio, AS only issuers have lower return on equity than banks that issue both AS and SD.

5.2.2. Multivariate analysis

Following the existing literature, we focus on characteristics that reflect liquidity, credit risk, regulatory capital arbitrage, and performance. We control for bonds' contractual attributes and macroeconomic factors. For this analysis, we also choose a logistic regression model. Our dependent variable, *choice of debt*, takes the value of 1 if the bank issues an AS bond and 0 if it issues a SD bond. Below, we identify which firm characteristics to use as explanatory variables.

Following earlier studies (refer to Table 3), we proxy for liquidity using two variables. *Liquid assets to deposits and short-term funding* gauges risk of deposit run-off events such as bank-runs. It measures what percentage of short-term funding withdrawal can be met through liquid assets. Higher ratios denote less exposure to liquidity risk. The second ratio, *loans to deposits and short-term funding,* reflects what portion of the (typically longer-term) loan portfolio is funded through potentially short term liabilities. A higher ratio corresponds to more liquidity risk. We expect less liquid banks to choose AS over SD bonds [Cardone-Riportella et al. (2010) and Casu et al. (2013)].

The *non-performing loans* ratio measures what fraction of the loan portfolio is non-performing. Lower ratios correspond to better asset quality. Because this ratio reflects a bank's risk profile, it may shed light on whether Western European banks transfer credit risk through AS. If this were the case, we would expect banks with lower asset quality to securitize more.

The capital arbitrage hypothesis suggests that banks securitize to adjust their regulatory capital ratios. Accordingly, a firm with less capital has greater incentive to securitize. We employ two variables to test this prediction. The *capital ratio* is defined as total book equity divided by total book assets; it measures loss-absorbing capacity of a bank's equity buffer. The *capital adequacy ratio* is defined as Tier 1 plus Tier 2 capital divided by risk-weighted assets. This ratio stems from Basel II guidelines; it isolates the strongest sources of capital and adjusts the asset base for risk-characteristics.

We use two proxies for bank performance to determine whether economic performance affects a bank's propensity to securitize. Despite a higher *return on equity* ratio indicates better economic performance, it also reflects bank risk-taking. As such, we take care not to overweight the ratio in our analysis. The *cost-to-income* ratio reflects efficient bank operation. Previous empirical studies [Affinito

and Tagliaferri (2010) and Cardone-Riportella et al. (2010)] document that banks securitize to improve economic performance. If this were the case, we would expect banks with lower economic performance to securitize more.

As controls, we include the borrowing bank's general attributes. First, we assess the impact of size. We expect the probability of choosing AS over SD to increases with bank size, because only relatively large financial firms who would benefit from economies of scale would prefer AS over SD. Second, we include the loan-to-asset ratio to assess whether asset composition affects the decision to securitize. Minton et al. (2004) argue that commercial banks are less likely to securitize than investment banks and other finance companies. However, Casu et al. (2013) find that the loan-to-asset ratio does not affect banks' propensity to securitize. Thus, the impact of loan-to-assets on banks' choice between AS and SD bonds cannot be determined clearly from the existing literature. We also control for debt contracting characteristics and macroeconomic conditions. Finally, we include a dummy variable, *switchers*, to identify financials that use both types of debt instruments within our sample period (Category [IX]). The model is specified as follows:

$$\begin{aligned} Choice\ of\ debt_{i,t} = {} & \alpha_0 + \beta_0\, Bank\ characteristics_{i,t-1} + \beta_1\, Contracting\ characteristics_{i,t} \\ & + \beta_2\, Macro\ \ factors_t + \varepsilon_{i,t} \end{aligned} \tag{7}$$

Non-performing loan and capital adequacy ratios provided by Bankscope are scant compared with other financial firms' characteristics. Thus, we estimate model [9] with the reduced sample of 5,312 transactions by banks for which these ratios are available. model [8], in contrast, omits these two variables to include the full sample of observations. Table 8 reports the logistic regression results.

****** Insert Table 8 about here ******

Six financial firm attributes significantly relate to choice of debt type. Unexpectedly, we find that smaller banks are more likely to raise funds in the AS bond market than the SD bond markets. Overall, our results corroborate the asymmetric information hypothesis. First, AS offers banks with higher information asymmetry (smaller banks) a low-cost, credible way to relay information to investors [Hill (1996)]. Second, in line with security design literature [Flannery (1986) and Diamond (1991a, 1993)], the

use of AS transactions reduces asymmetric information problems and enables borrowers to obtain funding with longer maturities.

Less liquid banks, those with higher *loans to deposits and short-term liabilities*, appear more likely to issue AS. This finding supports liquidity as an economic motivation of AS transactions. Regarding performance, we document both *return on equity* and *cost-to-income* ratios motivate banks to securitize instead of issuing SD. This finding supports the notion that banks securitize to improve economic performance.

Contrary to what we expected, results document that banks with higher asset quality choose AS over SD bonds. Therefore, our findings cannot support the idea of AS as a credit risk transfer mechanism. The literature regarding credit risk motivation is mixed. Cumming (1987) and Flannery (1994) argue that banks with more risky loan portfolios may securitize more. However, Greenbaum and Thakor (1987), Kohen and Santomero (1980), Flannery (1989), and Blum (1999) argue that banks have incentives to securitize high-quality loans and retain riskier ones. Our results align with the latter school of thought.

Our logistic model cannot confirm the regulatory capital arbitrage hypothesis. While a higher ratio of equity to assets is positively associated with choosing AS over SD, the *capital adequacy ratio* bears no significant relationship with AS choice. Even when we re-estimate models [8] and [9], replacing the capital adequacy ratio with the Tier 1 capital ratio, the results do not change.[15] Hence, we do not find conclusive evidence that Western European banks use AS to adjust their capital ratios. One explanation for this regards European banks' tendency to bear more risks from securitization. Unlike banks elsewhere, particularly in the U.S., European banks employ more of an originate-to-hold model than an originate-to-distribute one. As such, they typically hold not only the first loss tranche but also other junior tranches. Therefore, any risk-shifting effect is likely to be small for European banks.

[15] The Tier 1 capital ratio is defined under Basel rules as shareholders' equity plus perpetual non-cumulative preference shares divided by risk-weighted assets and off-balance sheet items.

Again, because small AS issues are not cost-efficient; banks choose AS over SD bonds only for relatively large issues. Of note, the *switcher* coefficient, statistically significant in model [8], becomes insignificant in model [9].

Overall, our results demonstrate that banks issuing AS instead of SD are smaller, less liquid, and have higher levels of equity in total asset. We find that banks prefer AS transactions for long-term financing, and larger issues. A possible motivation for AS issuance is enhanced profitability. Finally, our results do not conclusively support credit risk transfer or regulatory capital arbitrage hypotheses.

6. Summary and conclusions

This paper provides empirical evidence on firms' borrowing decisions, namely on the factors that influence a borrower's choice between structured finance (SF) and straight debt finance (SDF). The paper supports the notion that SF matters to financial and non-financial firms because it creates value. We document reduced total borrowing costs for SF deals with the exception of non-financial asset securitization issues. In particular, our results are consistent with the use of SF to reduce information asymmetry, agency costs, excess free cash flow problems, and principal-agent conflicts.

Our results document that non-financial firms which prefer project finance to straight debt are smaller, more levered, and have lower proportions of tangible, fixed assets. Non-financial firms that choose asset securitization over straight debt are larger, less profitable, more levered, have higher proportions of tangible fixed assets, and have more growth opportunities. Our findings support floatation cost, information asymmetry, and renegotiation and liquidation hypotheses from the mainstream debt financing choice literature. We also find evidence consistent with the notion that SF transactions, especially asset securitization, are more effective in mitigating agency conflicts between borrowers and lenders. Finally, we find that transaction cost considerations lead firms that use both project finance and straight debt during our sample period to choose project finance for new debt.

Examining financial firm choice between asset securitization and straight debt, we find that those who securitize are smaller, exhibit lower liquidity, and have higher equity to assets ratios. We find that banks securitize to raise relatively larger amounts of debt and improve overall economic performance.

Our results support prior research suggesting liquidity and profitability considerations drive securitization. Our logistic model cannot confirm credit risk transfer and regulatory capital arbitrage hypotheses. Hence, we do not find evidence that Western European banks use asset securitization to adjust capital ratios or that regulatory capital restrictions prevents such practice. One potential explanation is that unlike banks in other financial systems, European banks retain a larger share of riskier tranches from the securitization. Therefore, securitization removes less risk from European bank balance sheets.

Finally, our results support the security design literature prediction that asset securitization reduces monitoring costs by creating different security classes with different degrees of seniority. We also confirm the predictions of Flannery (1986) and Diamond (1991a): borrowers choose SF over SD for long-term financing.

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Table 1: Descriptive statistics for structured finance and straight debt finance transactions

Variable of interest	Structured Finance Transactions						Straight Debt Finance Transactions		
	Project Finance (PF) Loans			Asset Securitization (AS) Bonds			Straight Debt (SD) Bonds		
	All (*N = 1,085*)	Financial firms (*N = 0*)	Non-Financial firms (*N = 1,085*)	All (*N = 439*)	Financial firms (*N = 337*)	Non-Financial firms (*N = 102*)	All (*N = 10,551*)	Financial firms (*N = 7,098*)	Non-Financial firms (*N = 3,453*)
Continuous variables:									
Total cost of borrowing (bps)[1]	205.43 [a] (166.36)	- -	205.43 [c] (166.36)	151.94 (101.38)	146.86 [e] (97.18)	168.71 [d] (112.62)	160.30 [a] (99.40)	133.60 [e,f] (69.35)	215.18 [c,d,f] (159.70)
Credit rating [1-22 weak][2]	6.32 (7)	- -	6.32 (7)	4.34 [b] (3)	4.24 [e] (3)	4.71 [d] (5)	5.50 [b] (5)	4.48 [e,f] (5)	7.60 [d,f] (7)
Transaction size (€ million)	399.57 [a] (210.00)	- -	399.57 [c] (210.00)	819.38 [b] (455.47)	717.77 [e,f] (450.00)	1,155.10 [f] (818.97)	611.91 [a,b] (325.00)	477.08 [e,f] (250.00)	889.07 [c,f] (500.00)
Loan-to-value[3]	47.84% [a] (40.74%)	- -	47.84% [c] (40.74%)	39.41% [b] (23.13%)	38.12% [e,f] (22.22%)	43.66% [d,f] (29.93%)	87.39% [a,b] (100%)	91.75% [e,f] (100%)	78.40% [c,d,f] (100%)
Time to maturity (years)	13.87 [a] (15.00)	- -	13.87 [c] (15.00)	21.30 [b] (17.12)	21.50 [e] (14.26)	20.64 [d] (22.71)	6.88 [a,b] (5.04)	5.80 [e,f] (5.00)	9.10 [c,d,f] (7.04)
Number of tranches	3.06 [a] (3)	- -	3.06 [c] (3)	4.22 [b] (4)	4.26 [e] (4)	4.11 [d] (4)	1.81 [a,b] (1)	1.87 [e,f] (1)	1.67 [c,d,f] (1)
Number of banks	8.94 [a] (6)	- -	8.94 [c] (6)	2.45 [b] (2)	2.18 [e,f] (2)	3.33 [d,f] (2)	3.71 [a,b] (3)	3.12 [e,f] (2)	4.91 [c,d,f] (4)
Country risk [1-22 weak]	2.02 [a] (1)	- -	2.02 [c] (1)	1.44 [b] (1)	1.54 [e,f] (1)	1.13 [d,f] (1)	1.75 [a,b] (1)	1.87 [e,f] (1)	1.51 [c,d,f] (1)
Discrete variables:									
Guarantee	94.20% [a] (1,022)	- -	94.20% [c] (1,022)	100.0% [b] (439)	100.00% [e] (337)	100.00% [d] (102)	3.74% [a,b] (390)	2.16% [e,f] (156)	7.00% [c,d,f] (242)
Fixed rate issue	0.0% [a] (0)	- -	0.0% [c] (0)	27.11% [b] (119)	15.13% [e,f] (51)	66.67% [d,f] (68)	67.88% [a,b] (7,164)	57.14% [e,f] (4,053)	89.94% [c,d,f] (3,104)
Currency risk	11.34% [a] (123)	- -	11.34% [c] (123)	31.66% [b] (139)	34.72% [e,f] (117)	21.57% [d,f] (22)	22.64% [a,b] (2,385)	17.69% [e,f] (1,256)	32.81% [c,d,f] (1,133)
U.K. borrowers	19.17% (208)	- -	19.17% [c] (208)	39.86% [b] (175)	25.51% [e,f] (86)	87.25% [d,f] (89)	16.92% [b] (1,783)	11.78% [e,f] (838)	27.48% [c,d,f] (950)

Notes: Each cell contains means and parenthetic medians for continuous variables' and percents and parenthetic levels for discrete variables'. We test for similar distributions in contract characteristics using the Wilcoxon rank-sum test for continuous variables and the Fisher's exact test for discrete ones. [1] For loans, the total cost of borrowing (TCB) is the sum of the LIBOR spread, facility fee, and up-front fee divided by maturity, plus the annual fee and difference between 3-month LIBOR and 3-month German Treasury yield at the time of the issue. For bonds, the TCB is the spread at issue over the comparable maturity, risk-free government security plus the management fee. [2] Loan and bond ratings are based on S&P and Moody's ratings at debt issuance; the rating is converted as follows: AAA=Aaa=1, AA+=Aa1=2, and so on until D=22; credit rating information exists for only 44 PF loans. [3] Represents the ratio of the tranche size to the transaction size of a given loan or bond. [a] indicates significant difference at the 1% level between PF loans and SD bonds. [b] indicates significant difference at the 1% level between AS bonds and SD bonds. [c] indicates significant difference at the 1% level between non-financial firms' PF loans and non-financial firms' SD bonds. [d] indicates significant difference at the 1% level between non-financial firms' AS bonds and non-financial firms' SD bonds. [e] indicates significant difference at the 1% level between financial firms' AS bonds and financial firms' SD bonds. [f] indicates significant difference at the 1% level between the subsamples of financial and non-financial firms.

Table 2: Regression analyses of the total cost of borrowing and the debt financing choice

Dependent variable:	[1]	[2]	[1a]	[2a]	[1b]	[2b]
Total cost of borrowing (bps)	All loans and bonds	All loans and bonds	All bonds | Financial firms	All bonds | Financial firms	All loans and bonds | Non-financial firms	All loans and bonds | Non-financial firms
Independent variables:						
Intercept	292.44 **	307.35 **	768.64 **	666.27 **	302.96 **	181.51 **
	(4.91)	(5.88)	(11.98)	(10.49)	(5.15)	(3.78)
AS	-119.99 **	-105.39 **	-257.17 **	-235.42 **	59.72	127.86 **
	(-4.57)	(-4.69)	(-7.76)	(-7.75)	(1.64)	(4.68)
PF	-152.01 **	-132.66 **			-49.25 **	-32.85 *
	(-7.21)	(-6.56)			(-3.29)	(-2.49)
AS * loan to value	-116.17 **	0.96	-102.40 **	-29.04	-126.93 *	-65.53
	(-5.93)	(0.05)	(-4.93)	(-1.44)	(-2.19)	(-1.46)
PF * loan to value	15.10	22.10 *			5.46	19.69 *
	(1.38)	(2.08)			(0.57)	(2.09)
SD * loan to value	-203.81 **	-144.67 **	-332.82 **	-275.96 **	-26.58 *	3.40
	(-8.49)	(-7.58)	(-11.54)	(-10.43)	(-2.00)	(0.35)
Log transaction size	-10.83 **	0.46	-8.04 **	-1.74	-27.68 **	-9.39 **
	(-7.61)	(0.33)	(-5.28)	(-1.15)	(-8.99)	(-3.53)
Maturity	-1.09 **	-0.64 **	-1.03 *	-0.73	-0.02	0.76 **
	(-3.77)	(-2.62)	(-2.03)	(-1.71)	(-0.07)	(3.38)
Number of banks	-3.10 **	-3.25 **	-5.90 **	-5.46 **	1.96 **	0.48
	(-5.78)	(-6.90)	(-6.88)	(-6.84)	(3.57)	(1.03)
Country risk	36.35 **	38.26 **	33.56 **	34.80 **	34.13 **	31.18 **
	(8.47)	(9.59)	(5.86)	(6.24)	(5.97)	(6.48)
Currency risk	-37.45 **	-10.82 *	-49.14 **	-23.52 **	-11.36	7.48
	(-6.20)	(-2.21)	(-7.45)	(-3.80)	(-1.74)	(1.55)
U.K. borrowers	80.25 *	85.19 **	-139.13 **	-51.41 **	30.71	37.35
	(2.24)	(3.00)	(-8.09)	(-2.72)	(0.94)	(1.29)
Crisis	111.54 **	93.01 **	73.65 **	67.84 **	138.86 **	110.98 **
	(5.29)	(4.88)	(2.91)	(2.78)	(4.38)	(4.31)
Risk free rate	0.16	0.05	0.08	0.02	0.16	-0.03
	(1.92)	(0.65)	(0.89)	(0.24)	(1.83)	(-0.36)
Volatility	1.15 *	1.50 **	0.42	0.59	2.03 **	2.19 **
	(2.34)	(3.54)	(0.73)	(1.11)	(3.31)	(4.73)
EUSA5y-Libor3M	-0.18	-0.31 **	-0.31 **	-0.36 **	-0.17	-0.45 **
	(-1.82)	(-3.69)	(-2.95)	(-3.75)	(-1.82)	(-6.25)
Rated		-247.39 **		-157.76 **		-315.09 **
		(-24.19)		(-14.26)		(-29.09)
Rated * Rating		28.98 **		15.05 **		40.15 **
		(37.29)		(13.90)		(44.00)
Industry fixed effects	Yes	Yes	No	No	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	12,075	12,075	7,435	7,435	4,640	4,640
Adjusted R^2	0.27	0.40	0.35	0.39	0.25	0.61

Notes: Table 2 presents the results of OLS regressions analyzing the determinants of total cost of borrowing (TCB). Models [1] and [2] reflect the full sample of 1,085 PF loans, 439 AS bonds, and 10,551 SD bonds. Models [1a] and [2a] isolate the 337 AS bonds and 7,098 SD bonds issued by financial institutions. Models [1b] and [2b] focus, instead, on the 1,085 PF loans, 102 AS bonds, and 3,453 SD bonds issued by non-financial firms. For loans, the TCB is the sum of the Libor spread, facility fee, and up-front fee divided by maturity, plus the annual fee and difference between 3-month Libor and 3-month German Treasury yield at the time of the issue. For bonds, the TCB is the spread at issue over the comparable maturity, risk-free government security plus the management fee. AS equals 1 if the tranche is an AS bond and 0, otherwise. PF equals 1 if the tranche is a PF loan and 0, otherwise. SD equals 1 if the tranche is an SD bond and 0, otherwise. Loan-to-value represents the ratio of the tranche size to the transaction size. Log transaction size is the natural logarithm of the transaction size measured in € million. Maturity is the debt maturity, in years. Number of banks is the number of financial institutions participating in the transaction. Country risk is the S&P's country credit rating at closing date; the rating is converted as follows: AAA=Aaa=1, AA+=Aa1=2, and so on until D=22. Currency risk equals 1 for debt denominated in a different currency than that of the borrower's home country and 0, otherwise. U.K. borrowers equals 1 if the borrower's home country is the U.K. and 0, otherwise. Crisis equals 1 if the issue date falls within the crisis period (September 15, 2008 – December 31, 2011) and 0, otherwise (January 1, 2000 – September 14, 2008). Risk free rate is the yield on a 3-month German Treasury bill. Volatility is the Chicago Board Options Exchange Volatility Index (VIX). EUSA5y-LIBOR3M is the difference between the five-year Euro swap rate and the 3-month LIBOR rate. Rated equals 1 if the facility has a credit rating and 0 otherwise. Rating is the S&P and Moody's rating at debt issuance; the rating is converted as follows: AAA=Aaa=1, AA+=Aa1=2, and so on until D=22. The *t*-statistics reported in parentheses are based on heteroskedasticity-consistent standard errors clustered by transaction. ** and * denote statistical significance at the 1% and 5% levels, respectively.

Table 3: Definition of variables, expected impact, and findings

Variables	Description	Literature	Expected Impact			Findings		
			PF loans vs SD bonds | Non-financial firms	AS bonds vs SD bonds | Non-financial firms	AS bonds vs SD bonds | Financial firms	PF loans vs SD bonds | Non-financial firms	AS bonds vs SD bonds | Non-financial firms	AS bonds vs SD bonds | Financial firms
Contract characteristics								
Log transaction size	Natural logarithm of the transaction size measured in € million.	Houston and James (1996) | Krishnaswami et al. (1999) | Esho et al. (2001) | Denis and Mihov (2003) | Fender and Mitchell (2005) | Fabozzi et al. (2006) | Cardone-Riportella et al. (2010)	-	+	+	-	+	+
Maturity	Maturity of loan or bond, in years.	Flannery (1986) | Diamond (1991, 1993)	+	+	+	+	+	+
Currency risk	Dummy equal to 1 for debt denominated in a different currency than that of the borrower's home country and 0, otherwise.		?	?	?	-	I	+ / I
Rated	Dummy equal to 1 if the facility has a credit rating and 0 otherwise.	Davidson et al. (2003) | Fabozzi et al. (2006)	NA	-	-	NA	I	I
Rated * Rating	Interaction between rated dummy variable and rating. Rating is the S&P and Moody's rating at debt issuance; the rating is converted as follows: AAA=Aaa=1, AA+=Aa1=2, and so on until D=22.	Hill (1996) | Riddiough (1997) | Carow et al. (1999) | Davidson et al. (2003)	NA	-	-	NA	-	I
Macroeconomic factors								
Country risk	S&P's country credit rating at closing date; the rating is converted as follows: AAA=Aaa=1, AA+=Aa1=2, and so on until D=22.	Gatti (2008) | Megginson (2010)	+	-	-	+ / I	-	?
Crisis	Dummy equal to 1 if the issue date falls within the crisis period (September 15, 2008 – December 31, 2011) and 0, otherwise.	IMF (2008b) | Benmelech and Dlugosz (2009) | Brunnermeier (2009) | Shin (2009)	+	-	-	I	-	I
Risk free rate	The three-month German Treasury bill at the time of the signing of the loan or issuing the bonds - a proxy for the general level of interest	Rosenthal and Ocampo (1988) | Davidson et al. (2003) | Fabozzi and	-	-	+	I	+ / I	+
Volatility	The Chicago Board Options Exchange Volatility Index (VIX). VIX reflects a market estimate of future volatility.	Rosenthal and Ocampo (1988) | Davidson et al. (2003) | Fabozzi and	-	-	+	I	- / I	+ / I
EUSA5y-Libor3M	The Euro swap curve slope. Obtained as the between the five-year Euro swap rate and the 3-month LIBOR rate.	Rosenthal and Ocampo (1988) | Davidson et al. (2003) | Fabozzi and	-	-	+	-	+	+
Non-Financial Firms' characteristics								
Log total assets	Natural logarithm of firm total assets measured in € million.	Houston and James (1996) | Krishnaswami et al. (1999) | Esho et al. (2001) | Denis and Mihov (2003) | Altunbas et al. (2010) | Cardone-Riportella et al. (2010)	-	+	NA	-	+	NA
Debt to total assets	The ratio of total debt to total assets.	Esho et al. (2001) | Caselli and Gatti (2005) | Fabozzi et al. (2006) | Altunbas et al. (2010) | Kwan and Carleton (2010)	+	+	NA	+	+	NA
Short-term debt to total debt	The ratio of short-term debt to total debt. Short-term debt measures debt maturing within 1 year.	Esho et al. (2001) | Caselli and Gatti (2005) | Fabozzi et al. (2006) | Altunbas et al. (2010) | Kwan and Carleton (2010)	+	+	NA	I	+	NA
Fixed assets to total assets	The ratio of fixed assets to total assets.	Caselli and Gatti (2005) | Fabozzi et al. (2006)	-	+	NA	-	+	NA

(Continued)

Table 3: Definition of variables, expected impact, and findings

(continued)

Variables	Description	Literature	Expected Impact			Findings		
			PF loans vs SD bonds | Non-financial firms	AS bonds vs SD bonds | Non-financial firms	AS bonds vs SD bonds | Financial firms	PF loans vs SD bonds | Non-financial firms	AS bonds vs SD bonds | Non-financial firms	AS bonds vs SD bonds | Financial firms
Non-Financial Firms' characteristics								
Market to book ratio	The sum of book value of liabilities and market value of equity divided by the book value of assets.	Krishnaswami et al. (1999) | Esho et al. (2001) | Denis and Mihov (2003) | Altunbas et al. (2010)	+ / -	+	NA	I	+	NA
Return on assets	The net income before preferred dividends minus preferred dividend requirement, divided by total assets.	Denis and Mihov (2003)	-	-	NA	I	-	NA
Current ratio	Current assets divided by current liabilities.	Altunbas et al. (2010)	-	?	NA	I	+	NA
Financial Firms' characteristics								
Log total assets	Natural logarithm of the banks' total assets measured in € million.	Minton et al. (2004, 2009) | Cardone-Riportella et al. (2010) | Casu et al. (2013)	NA	NA	+	NA	NA	-
Loan ratio	The ratio of loans to total assets.	Minton et al. (2004) | Casu et al. (2013)	NA	NA	?	NA	NA	I
Liquid assets to deposits and short-term funding	The ratio of the value of liquid assets to short-term funding plus total deposits. Liquid assets include cash and due from banks, trading securities and at fair value through income, loans and advances to banks, reverse repos and cash collaterals. Deposits and short term funding includes total customer deposits and short term borrowing.	Calomiris and Mason (2004) | Affinito and Tagliaferri (2010) | Casu et al. (2013)	NA	NA	-	NA	NA	I
Loans to deposits and short-term funding	The ratio of loans to short-term funding plus total deposits. Deposits and short term funding includes total customer deposits and short term borrowing.	Affinito and Tagliaferri (2010) | Cardone-Riportella et al. (2010) | Casu et al. (2013)	NA	NA	+	NA	NA	+
Capital ratio	The total book equity divided by total book assets.	Minton et al. (2004) | Uzun and Webb (2007) | Affinito and Tagliaferri (2010) | Casu et al. (2013)	NA	NA	-	NA	NA	+
Return on equity	The net income divided by total book equity.	Minton et al. (2004) | Affinito and Tagliaferri (2010)	NA	NA	-	NA	NA	-
Cost-to-income ratio	The total noninterest expense divided by net operating income.	Affinito and Tagliaferri (2010) | Cardone-Riportella et al. (2010) | Casu et al. (2013)	NA	NA	+	NA	NA	+
Non-performing loans ratio	The value of non-performing loans divided by total loans. Non-performing loan is the sum of borrowed money upon which the debtor has not made his or her scheduled payments for at least 90 days.	Calomiris and Mason (2004) | Minton et al. (2004, 2009) | Casu et al. (2013)	NA	NA	+	NA	NA	-
Capital adequacy ratio	Tier 1 + Tier 2 capital, which includes subordinated debt, hybrid capital, loan loss reserves and valuation reserves, as a percentage of risk-weighted assets and off-balance sheet risks.	Calomiris and Mason (2004) | Minton et al. (2004, 2009) | Uzun and Webb (2007) | Affinito and Tagliaferri (2010) | Casu et al. (2013)	NA	NA	-	NA	NA	I

Notes: A "–" indicates negative impact on the probability of a sponsor to choose PF loans over SD bonds for non-financial firms or AS bonds over SD bonds for all firms. A "+" indicates positive impact on the probability of a sponsor to choose PF loans over SD bonds for non-financial firms or AS bonds over SD bonds for all firms. An "I" indicates insignificant impact. A "?" indicates the sign cannot be determined clearly and an "NA" indicates that information about this variables is not available.

Table 4: Estimates of the pricing models of PF loans and AS bonds

Dependent variable: Total cost of borrowing (bps)	[3] PF loans | Non-financial firms	[4] AS bonds | Non-financial firms	[5] AS bonds | Financial firms	[5a] AS bonds | Financial firms
Independent variables:				
Intercept	77.767 (1.75)	1,293.548 * (2.04)	-1,158.511 ** (-6.06)	-1,157.065 ** (-5.24)
Loan to value	15.329 ** (2.70)	-94.360 * (-2.20)	-39.459 * (-2.39)	-23.228 (-1.39)
Log transaction size	-47.571 ** (-5.57)	-7.877 (-0.25)	13.789 * (2.10)	14.084 * (2.26)
Maturity	4.644 ** (4.70)	-1.817 (-0.29)	15.751 ** (7.09)	13.896 ** (5.17)
Number of banks	1.431 ** (3.54)	-7.144 (-1.29)	-7.595 (-1.70)	-6.189 (-1.37)
Country risk	29.456 ** (3.99)	-196.848 ** (-5.13)	-103.291 (-1.94)	-83.045 (-1.33)
Currency risk	-85.529 ** (-3.88)	70.243 (1.55)	77.119 (1.91)	70.924 * (1.98)
U.K. borrowers	106.375 ** (4.80)	-440.800 ** (-8.01)	21.295 (0.33)	47.128 (0.57)
Crisis	140.390 ** (5.79)		-35.238 (-0.25)	-26.103 (-0.16)
Risk free rate	-0.141 * (-2.04)	0.279 (1.18)	0.705 ** (2.97)	0.690 ** (3.05)
Volatility	1.724 * (2.52)	0.138 (0.04)	8.803 ** (3.60)	8.577 ** (3.61)
EUSA5y-Libor3M	-0.709 ** (-6.15)	-0.542 (-0.68)	1.054 ** (2.87)	0.898 * (2.13)
Rated		-277.892 ** (-5.55)		-23.156 (-0.54)
Rated * Rating		36.622 ** (2.99)		19.309 ** (3.38)
Industry fixed effects	Yes	Yes	No	No
Country fixed effects	Yes	Yes	Yes	Yes
Dependent variable: Probability of observing:	PF loans (versus SD bonds)	AS bonds (versus SD bonds)	AS bonds (versus SD bonds)	AS bonds (versus SD bonds)
Independent variables:				
Log transaction size	-0.294 ** (-11.05)	0.137 (1.36)	0.078 ** (3.78)	0.074 ** (3.58)
Maturity	0.032 ** (10.57)	0.043 ** (7.98)	0.059 ** (10.71)	0.059 ** (10.68)
Country risk	0.145 ** (6.31)	-0.248 * (-1.98)	0.108 ** (3.98)	0.092 ** (3.21)
Currency risk	-0.749 ** (-8.52)	-0.229 (-1.14)	0.243 * (2.29)	0.266 * (2.45)
Crisis	-0.046 (-0.28)	-8.518 ** (-14.41)	0.014 (0.05)	-0.012 (-0.04)
Risk free rate	-0.001 (-0.41)	0.001 (0.62)	0.003 ** (4.48)	0.003 ** (4.52)
Volatility	0.004 (0.96)	0.011 (0.60)	0.021 ** (2.74)	0.023 ** (3.02)
EUSA5y-Libor3M	-0.003 ** (-4.51)	0.006 ** (3.74)	0.005 ** (5.09)	0.005 ** (5.23)
Rated		-0.034 (-0.13)	0.209 ** (3.00)	0.117 (0.72)
Rated * Rating		-0.093 ** (-3.66)	-0.023 * (-2.08)	0.033 (1.50)
Number of observations	5,060	4,127	17,289	17,289
Censored observations	4,025	4,025	16,952	16,952
Uncensored observations	1,035	102	337	337
rho	0.974	-0.675	0.995	0.992
Wald test (rho=0) PI-value	0.000	0.495	0.000	0.000
Log likelihood	-8,022.657	-956.002	-3,185.584	-3,167.572

Notes: Table 4 presents the results of estimating a Heckman (1979) selection model on: (*i*) a sample of 1,085 PF loans – model [3]; (*ii*) a sample of 102 AS bonds issued by non-financial firms – model [4]; and (iii) a sample of 337 AS bonds issued by financial firms – models [5] and [5a]. For loans, the total cost of borrowing (TCB) is the sum of the Libor spread, facility fee, and up-front fee divided by maturity, plus the annual fee and difference between 3-month Libor and 3-month German Treasury yield at the time of the issue. For bonds, the TCB is the spread at issue over the comparable maturity, risk-free government security plus the management fee. Loan-to-value represents the ratio of the tranche size to the transaction size. Log transaction size is the natural log of the transaction size measured in € million. Maturity is the maturity of loans or bonds, in years. Number of banks is the number of financial institutions participating in the transaction. Country risk is the S&P's country credit rating at debt issuance; the rating is converted as follows: AAA=Aaa=1, AA+=Aa1=2, and so on until D=22. Currency risk equals 1 for debt denominated in a different currency than that of the borrower's home country and 0, otherwise. U.K. borrowers equals 1 if the borrower's home country is the U.K. and 0, otherwise. Crisis equals 1 if the issue date falls within the crisis period (September 15, 2008 – December 31, 2011) and 0, otherwise (January 1, 2000 – September 14, 2008). Risk free rate is the yield on a 3-month German Treasury bill. Volatility is the Chicago Board Options Exchange Volatility Index (VIX). EUSA5y-LIBOR3M is the difference between the five-year Euro swap rate and the 3-month LIBOR rate. Rated equals 1 if the facility has a credit rating and 0, otherwise. Rating is the S&P and Moody's rating at debt issuance; the rating is converted as follows: AAA=Aaa=1, AA+=Aa1=2, and so on until D=22. When estimating model [4], the variable crisis was omitted because of collinearity. We perform maximum likelihood estimations on our TCB samples simultaneously with a probit selection equation. The *z*-statistics reported in parentheses are based on heteroskedasticity-consistent standard errors clustered by transaction. **, * denote statistical significance at the 1% and 5% level, respectively.

Table 5: Descriptive statistics for non-financial firms

Variable of interest	Non-financial firms categorized according to choice of debt issuance					
	[I] PF loans only (*N = 273*)	**[II] SD bonds only (*N = 937*)**	**[III] PF loans and SD bonds (*N = 407*)**	**[IV] AS bonds only (*N = 17*)**	**[V] SD bonds only (*N = 1,017*)**	**[VI] AS bonds and SD bonds (*N = 164*)**
Total assets (in € million)	16,306.10 [a,b] (7,028.98)	46,650.27 [a,c] (16,678.68)	74,588.95 [b,c] (46,099.00)	6,633.08 [d,e] (5,583.26)	39,487.92 [d,f] (16,697.66)	140,383.40 [e,f] (167,076.40)
Debt to total assets	36.72% (33.29%)	36.12% (37.82%)	36.36% (35.35%)	61.85% [d,e] (68.78%)	36.02% [d] (36.16%)	34.55% [e] (40.30%)
Short-term debt to total debt	26.47% [a] (18.62%)	33.60% [a,c] (31.21%)	24.78% [c] (22.79%)	4.04% [d,e] (2.14%)	29.63% [d,f] (24.96%)	46.00% [e,f] (45.08%)
Fixed assets to total assets	30.45% [a,b] (26.02%)	35.15% [a,c] (33.79%)	48.80% [b,c] (53.52%)	87.47% [d,e] (88.64%)	39.50% [d,f] (38.38%)	32.05% [e,f] (33.51%)
Market to book ratio	1.33 [b] (1.20)	1.39 [c] (1.15)	1.28 [b,c] (1.23)	1.08 (1.07)	1.32 (1.19)	1.71 (1.13)
Return on assets	3.34% (3.30%)	4.44% (3.47%)	3.46% (3.24%)	-2.13% (3.21%)	4.24% (3.46%)	4.59% (3.47%)
Current ratio	1.43 [a,b] (1.11)	1.13 [a,c] (1.00)	0.96 [b,c] (1.01)	1.00 (0.93)	1.11 [f] (1.02)	0.97 [f] (0.97)

Notes: Each cell contains means and parenthetic medians. We test for similar distributions in non-financial firms' characteristics across samples via the Wilcoxon rank-sum test. [a] denotes statistical difference at the 1% level between 'PF loans only' and 'SD bonds only' samples. [b] denotes statistical difference at the 1% level between 'PF loans only' and 'PF loans and SD bonds' samples. [c] denotes statistical difference at the 1% level between 'SD bonds only' and 'PF loans and SD bonds' samples. [d] denotes statistical difference at the 1% level between 'AS bonds only' and 'SD bonds only' samples. [e] denotes statistical difference at the 1% level between 'AS bonds only' and 'AS bonds and SD bonds' samples. [f] denotes statistical difference at the 1% level between 'SD bonds only' and 'AS bonds and SD bonds' samples. Short-term debt includes debt maturing within 1 year. Market to book ratio is defined as the sum of book value of liabilities and market value of equity divided by the book value of assets. Return on assets is defined as net income before preferred dividends minus preferred dividend requirement, divided by total assets. Current ratio is defined as current assets divided by current liabilities.

Table 6: Determinants of non-financial firms' choice

Dependent variable:	PF loan = 1, SD bond = 0	PF loan = 1, SD bond = 0	PF loan = 1, SD bond = 0	AS bond = 1, SD bond = 0
Choice of debt	[6]	[6a] Pre-crisis period	[6b] Crisis period	[7]
Independent variables:				
Intercept	4.892 ** (3.62)	10.388 ** (5.03)	-0.152 (-0.08)	-867.352 ** (-4.29)
Log total assets	-0.163 * (-2.40)	-0.317 ** (-2.94)	-0.118 (-1.10)	32.935 ** (3.94)
Debt to total assets	0.026 ** (3.15)	0.005 (0.39)	0.045 ** (4.36)	1.881 ** (4.08)
Short-term debt to total debt	-0.008 (-1.40)	-0.014 (-1.75)	-0.006 (-0.70)	1.048 ** (4.72)
Fixed assets to total assets	-0.033 ** (-4.75)	-0.050 ** (-4.65)	-0.026 ** (-2.65)	3.213 ** (4.41)
Market to book ratio	0.116 (0.67)	-0.285 (-1.05)	0.653 (1.35)	14.734 * (2.14)
Return on assets	-0.014 (-0.59)	0.020 (0.43)	-0.052 (-1.95)	-0.697 ** (-3.42)
Current ratio	0.096 (0.61)	-0.553 (-1.58)	0.301 (1.67)	92.761 ** (4.52)
Log transaction size	-0.806 ** (-8.24)	-0.720 ** (-5.76)	-1.069 ** (-6.37)	5.900 ** (2.92)
Maturity	0.086 ** (6.13)	0.094 ** (5.70)	0.110 ** (4.16)	0.378 ** (5.99)
Country risk	0.088 (1.26)	-0.245 (-1.63)	0.189 ** (2.59)	
Currency risk	-1.424 ** (-4.23)	-0.827 * (-2.00)	-1.937 ** (-4.00)	0.635 (0.53)
Crisis	0.661 (1.29)			
Risk free rate	0.001 (0.26)	-0.002 (-1.00)	0.004 (0.87)	0.169 ** (5.24)
Volatility	-0.014 (-1.08)	-0.004 (-0.15)	0.027 (1.37)	-1.889 ** (-2.86)
EUSA5y-Libor3M	-0.007 ** (-3.15)	-0.016 ** (-4.58)	0.004 (1.02)	0.299 ** (4.53)
Switcher	0.674 * (2.42)	1.176 ** (2.94)	0.468 (1.11)	
Industry fixed effects	Yes	Yes	Yes	No
Number of observations	1,617	835	782	1,198
Log pseudo-likelihood	-556.124	-256.989	-249.376	-8.721
Wald statistic	225.57 **	145.47 **	97.99 **	328.46 **
Correct predictions	83.76%	86.59%	86.45%	99.50%
Pseudo-R^2	0.360	0.420	0.411	0.918

Notes: Table 6 presents results of logistic regressions which predict non-financial firms' choice between debt types. In models [6], [6a], and [6b], the dependent variable equals 1 when a firm issues PF and 0 when it issues SD. In model [7], the dependent variable equals 1 when a firm issues AS and 0 when it issues SD. Models [6a] and [6b] investigate, separately, the pre-crisis (January 1, 2000 through September 14, 2008) and crisis (September 15, 2008 through December 31, 2011) sub-periods. Log total assets is the natural logarithm of firm total assets measured in € million. Short-term debt measures debt maturing within 1 year. Market to book ratio is defined as the sum of book value of liabilities and market value of equity divided by the book value of assets. Return on assets is defined as net income before preferred dividends minus preferred dividend requirement, divided by total assets. Current ratio is defined as current assets divided by current liabilities. Log transaction size is the natural logarithm of the transaction size measured in € million. Maturity is the maturity of loans or bonds, in years. Country risk is the S&P's country credit rating at debt issuance; the rating is converted as follows: AAA=Aaa=1, AA+=Aa1=2, and so on until D=22. Currency risk equals 1 for debt denominated in a different currency than that of the borrower's home country and 0, otherwise. Crisis equals 1 if the issue date falls within the crisis period (September 15, 2008 – December 31, 2011) and 0, otherwise (January 1, 2000 – September 14, 2008). Risk free rate is the yield on a three-month German Treasury bill. Volatility is the Chicago Board Options Exchange Volatility Index (VIX). EUSA5y-LIBOR3M is the difference between the five-year Euro swap rate and the 3-month LIBOR rate. Switcher is an indicator variable equal to 1 if firms used both debt instrument types within our sample period and 0, otherwise. When estimating model [7], variables country risk, crisis, and switcher were omitted because of collinearity. The z-statistics reported in parentheses are based on heteroskedasticity-consistent standard errors clustered by transaction. ** and * denote statistical significance at the 1% and 5% levels, respectively.

Table 7: Descriptive statistics for financial firms

Variable of interest	Financial firms categorized according to choice of debt issuance		
	[VII] AS bonds only (*N = 20*)	[VIII] SD bonds only (*N = 1,909*)	[IX] AS bonds and SD bonds (*N = 4,954*)
Total assets (in € million)	21,539.81 [a,b] (2,104.40)	202,649.00 [a,c] (43,003.40)	672,345.30 [b,c] (444,861.00)
Loan ratio	69.31% [a,b] (68.85%)	55.06% [a,c] (54.40%)	34.60% [b,c] (34.12%)
Liquid assets to deposits and short-term funding	29.90% (40.95%)	26.34% [c] (24.20%)	32.46% [c] (30.41%)
Loans to deposits and short-term funding	119.14% [a,b] (133.99%)	107.32% [a,c] (89.28%)	73.30% [b,c] (62.71%)
Capital ratio	27.39% [a,b] (19.49%)	5.33% [a,c] (4.99%)	3.56% [b,c] (2.59%)
Return on equity	2.88% [a,b] (2.09%)	10.30% [a,c] (10.88%)	7.67% [b,c] (10.30%)
Cost-to-income ratio	48.92% [a,b] (49.42%)	60.59% [a,c] (59.46%)	71.47% [b,c] (69.45%)

Notes: Each cell contains means and parenthetic medians. The test for similar distributions in financial firms' characteristics across samples is the Wilcoxon rank-sum test. [a] denotes statistical difference at the 1% level between 'AS bonds only' and 'SD bonds only' samples. [b] denotes statistical difference at the 1% level between 'AS bonds only' and 'AS bonds and SD bonds' samples. [c] denotes statistical difference at the 1% level between 'SD bonds only' and 'AS bonds and SD bonds' samples. Loan ratio is defined as loans divided by total assets. Liquid assets include cash and due-from accounts, fair value trading securities, loans and advances to banks, reverse repos, and cash collaterals. Deposits and short-term funding includes total customer deposits and short-term borrowing. Capital ratio is defined as total book equity divided by total book assets. Return on equity is defined as net income divided by total book equity. Cost-to-income ratio is defined as total noninterest expense divided by net operating income.

Table 8: Determinants of financial firms' choice

Dependent variable:	AS bond = 1, SD bond = 0	
Choice of debt	[8]	[9]
Independent variables:		
Intercept	-15.150 **	-7.899
	(-4.05)	(-0.96)
Log total assets	-0.485 *	-0.812 *
	(-2.15)	(-2.41)
Loan ratio	0.023	-0.017
	(0.87)	(-0.28)
Liquid assets to deposits and short-term funding	-0.051	-0.074
	(-1.51)	(-0.86)
Loans to deposits and short-term funding	0.002	0.012 **
	(1.25)	(-4.75)
Capital ratio	0.210 *	0.433 **
	(2.36)	(4.17)
Return on equity	-0.014 **	-0.023 **
	(-3.82)	(-2.65)
Cost-to-income ratio	0.016 *	0.018 *
	(1.98)	(2.53)
Non-performing loans ratio		-0.696 **
		(-3.48)
Capital adequacy ratio		0.063
		(0.86)
Log transaction size	0.416 **	0.173
	(3.41)	(1.26)
Maturity	0.177 **	0.259 **
	(6.46)	(4.43)
Country risk	0.010	-0.581 *
	(0.04)	(-2.18)
Currency risk	0.809	-1.088
	(1.39)	(-1.15)
Crisis	0.973	0.749
	(0.76)	(0.28)
Risk free rate	0.015 **	0.016 *
	(3.78)	(2.51)
Volatility	0.033	0.113
	(0.72)	(1.48)
EUSA5y-Libor3M	0.010	0.014 *
	(1.85)	(2.50)
Rated	0.626	-2.113 **
	(0.70)	(-3.55)
Rated * Rating	-0.093	-0.046
	(-1.47)	(-0.50)
Switcher	4.363 **	3.054
	(2.75)	(1.77)
Number of observations	6,883	5,312
Log pseudo-likelihood	-190.484	-71.835
Wald statistic	188.77 **	231.31 **
Correct predictions	99.20%	99.57%
Pseudo-R^2	0.662	0.778

Notes: Table 8 presents the results of logistic regressions predicting financial firms' choices of debt. The binary dependent variable equals 1 if the bank issues an AS bond and 0 if issues an SD bond. Log total assets is the natural logarithm of firm total assets measured in € million. Loan ratio is defined as loans divided by total assets. Liquid assets include cash and due-from accounts, fair value trading securities, loans and advances to banks, reverse repos, and cash collaterals. Deposits and short-term funding includes total customer deposits and short-term borrowing. Capital ratio is defined as total book equity divided by total book assets. Return on equity is defined as net income divided by total book equity. Cost-to-income ratio is defined as total noninterest expense divided by net operating income. Non-performing loans ratio is defined as nonperforming loans divided by total loans. Capital adequacy ratio is defined as the total adequacy ratio under Basel rules. Log transaction size is the natural logarithm of the transaction size measured in € million. Maturity is the maturity of loans or bonds, in years. Country risk is the S&P's country credit rating at debt issuance; the rating is converted as follows: AAA=Aaa=1, AA+=Aa1=2, and so on until D=22. Currency risk equals 1 for debt denominated in a different currency than that of the borrower's home country and 0, otherwise. Crisis equals 1 if the issue date falls within the crisis period (September 15, 2008 – December 31, 2011) and 0, otherwise (January 1, 2000 – September 14, 2008). Risk free rate is the yield on a three-month German Treasury bill. Volatility is the Chicago Board Options Exchange Volatility Index (VIX). EUSA5y-LIBOR3M is the difference between the five-year Euro swap rate and the 3-month LIBOR rate. Rated equals 1 if the bond has a credit rating and 0, otherwise. Rating is the S&P and Moody's rating at debt issuance; the rating is converted as follows: AAA=Aaa=1, AA+=Aa1=2, and so on until D=22. Switcher is an indicator variable equal to 1 if firms used both debt instrument types within our sample period and 0, otherwise. The *z*-statistics reported in parentheses are based on heteroskedasticity-consistent standard errors clustered by transaction. **, * indicate that the reported coefficient is statistically significant at the 1% and 5% level, respectively.