Are covered bonds different from securitization bonds? A comparative analysis of credit spreads

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May 20, 2022

Abstract

This study compares credit spreads and pricing determinants of securitization *vis-à-vis* covered bonds. Our analysis reveals that although ratings are the most important pricing determinant for ABS and MBS, investors place relatively more importance on contractual, macroeconomic, and banks' characteristics rather than ratings in pricing covered bonds. We find evidence of a mispricing effect in structured finance markets: ABS and MBS have higher credit spreads than similarly rated public covered bonds and mortgage covered bonds, and security prices reflect information beyond credit ratings. We find no evidence of borrowing costs affecting banks' choice between securitization and covered bonds.

Keywords: credit spreads; securitization; covered bonds; mispricing; cost of borrowing.
JEL classification: F34; G01; G12; G24

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Funding information:
Fundação para a Ciência e Tecnologia, Grant/Award Number: UIDB/00731/2020.

We thank the editor (John A. Doukas), an anonymous referee, Douglas Cumming, Michael Goldstein, Kewei Hou, Bruno Kamdem, William Megginson, Cláudia Ribeiro, João Santos, and Anthony Saunders for their helpful comments and suggestions. We would also like to thank participants in the European Financial Management Association 2021 Annual Conference, the 2021 Portuguese Finance Network International Conference, the Eastern Finance Association 2021 Annual Meeting, the 10th Accounting and Finance Conference of the Catholic University of Portugal-Porto, and the 2018 Xmas Workshop on Accounting and Finance in Porto for helpful comments on earlier drafts. Financial support from Fundação para a Ciência e Tecnologia (through project UIDB/00731/2020) is gratefully acknowledged.
The data that support the findings of this study are available from Dealogic, Refinitiv, and Moody's Analytics. Restrictions apply to the availability of these data, which were used under license for this study. Data are available from the authors with the permission of Dealogic, Refinitiv, and Moody's Analytics.

1. Introduction

Securitization and covered bond markets have become important sources of (re)financing for a wide variety of bank assets in recent decades. The reduction in securitization issuance after the beginning of the 2008 financial crisis was accompanied by a growing demand for covered bonds, a funding instrument that has been used as a close substitute by European banks (Surti, 2010; Campbell, 2013; Markmann, 2018). Covered bond issuance in Europe increased significantly from less than €100 billion in the mid-1990s to €350 billion in 2006 (Packer *et al.*, 2007). In 2010, for the first time ever covered bond issuance exceeded the volume of senior unsecured bonds in European markets, with a total issuance of €610.3 billion.[1] Marques and Pinto (2020) point out that the volume of securitized assets in Europe increased 947% in the 2000-2008 period, from €78.2 billion to €818.7 billion. Despite the important role played by securitization in the development of the 2008 financial crisis, between 2009 and 2020, a total of €2,527.1 billion of securitized instruments were issued.[2]

Despite the relevance of securitization and covered bond markets as two of the largest security markets for bank debt financing (Choudhry, 2004; Loutskina, 2011; Marques and Pinto, 2020), there is no empirical study that compares credit spreads and the pricing determinants of securitization bonds with those of covered bonds and examines whether the cost of borrowing affects banks' choice between these two funding instruments. These analyses are even more important in a context where securitization and covered bonds have been used as complementary instruments in enhancing the effectiveness of monetary policy and the integration of capital markets (Carbó-Valverde *et al.*, 2017; Boesel *et al.*, 2018; Markmann, 2018),[3] and both central banks and the European Commission point to the need for a well-functioning – simple, transparent and standardized (STS) – securitization market in the European Union due to its key role as a funding and risk transfer instrument, improving efficiencies in the financial system (BoE and ECB, 2014; EU2402, 2017).[4]

[1] In this study, we define Europe as countries belonging to the European Union. For further analysis, see European Covered Bond fact book 2021 (http://www.ecbc.eu/). See also section 3 of the Online Appendix.
[2] In the U.S., after a sharp decrease of 61% between 2007 (€2,404.9 billion) and 2008 (€933.6 billion), the volume of securitization products grew to €3,350.1 billion in 2020, an increase of 258%. Securitisation Data Report, European Structured Finance, Q4: 2020; Securities Industry and Financial Markets Association (https://www.sifma.org/).
[3] Since 2009, the European Central Bank (ECB) has relied on both instruments, through direct purchases in primary and secondary markets, as a way to restore bank funding and enhance the transmission of monetary policy (Bluwstein and Canova, 2016): three covered bond purchase programmes (CBPP) announced in 2009, 2011 and 2014, along with an asset-backed securities purchase programme (ABSPP), announced in 2014.
[4] According to the European Commission, the development of an STS securitization market constitutes a building block of the Capital Markets Union and contributes to the Commission's priority objective of supporting job creation and a return to sustainable growth (EU2402, 2017).

Securitization and covered bonds are security-designed instruments whereby financial assets are pooled together, with their cash flows, and converted into negotiable securities to be placed in financial markets (Schwarcz, 2011). Although both use the same collateralized assets and allow banks to access low-cost capital market funding, they have differences. The key difference is that while in a traditional securitization transaction the assets are typically transferred to a Special Purpose Vehicle (SPV) created for the sole purpose of holding those financial claims, through a true sale; in covered bonds, the cover-pool assets typically remain on the bank's balance sheet and investors have a priority claim against the collateral assets in case of default (Gorton and Metrick, 2013; Prokopczuk et al., 2013). Covered bonds are thus dual-recourse bonds, with a claim on both the bank issuer and a cover-pool of assets, which are 'ring-fenced' to give investors greater protection (Larsson, 2013; Markmann, 2018). Under this framework, we raise the following questions: *To what extent are securitization and covered bonds priced by common characteristics*? *Do covered bonds and securitized tranches with similar characteristics have different credit spreads? Do covered bond transactions allow originating banks to reduce borrowing costs vis-à-vis securitization deals?* In this paper, we answer these questions by using a unique sample of securitization bonds (5,437 tranches worth €1,878.7 billion) – asset-backed securities (ABS) and mortgage-backed securities (MBS) – and covered bonds (13,915 tranches worth €3,476.6 billion) – public covered bonds (PCB) and mortgage covered bonds (MCB) –, issued by European banks in the 2000-2020 period. The European market is a sound laboratory to implement these analyses. First, covered bonds are a European product par excellence. More than 250 years old, they play a fundamental role in long-term funding for mortgage or public-sector loans. In contrast, there has essentially been no covered bond issuance in the U.S. between 2000 and 2020, with €4 billion in 2006 and €8.86 billion in 2007 (Larsson, 2013).

This paper contributes to four strands of the literature. First, we extend bond pricing literature. Despite the significant attention devoted by extant literature to the analysis of corporate bond credit spreads, limited research has been carried out in structured finance markets.[5] Vink and Thibeault (2008), Buscaino *et al.* (2012), and Fabozzi and Vink (2012) find credit rating as the most important determinant of securitization bond credit spreads. An *et al.* (2011) and Marques and Pinto (2020) show that contractual characteristics other than credit ratings, as well as originating banks' credit risk proxies and macroeconomics factors, are also important in

[5] Schwarcz (2011) emphasizes that covered bonds should be viewed as a financing tool that belongs, as does securitization, to structured finance. See also Leland (2007) and Fabozzi *et al.* (2006).

pricing such securities. Breger and Stovel (2004), Koziol and Sauerbier (2007), Kempf *et al.* (2012), and Prokopczuk *et al.* (2013) study the determinants of covered bond credit spreads issued by German banks. Research focused on international markets is scant. A few exceptions are Prokopczuk and Vonhoff (2012) and Gürtler and Neelmeier (2018), who find that country-specific differences, liquidity, and macroeconomic factors affect credit spreads. However, none of these works considers issuing banks' accounting and market characteristics. We believe our study is the first to analyze the pricing of subcategories of securitization and covered bonds and whether covered bond prices reflect additional information other than credit ratings, taking into consideration the potential self-selection by banks between issuing ABS *versus* PCB and MBS *versus* MCB.[6] In addition, we examine the impact on credit spreads of the rules and regulations implemented on the conduct of credit rating agencies and securitization markets in the European Union (e.g., Regulation (EU) No 462/2013 and Regulation (EU) No 2017/2402) as a response to the 2008 financial crisis.

Second, we contribute to the literature that examines a mispricing phenomenon in bond markets. As ABS and MBS are close substitutes for PCB and MCB, respectively, relying on these securities may become a robust way of analyzing such a phenomenon. Cornaggia *et al.* (2017) show that, in the U.S., asset-backed bonds exhibit higher yields than similarly rated corporate bonds. Marques and Pinto (2020) find that security prices reflect information beyond credit ratings, and that while collateralized debt obligations (CDOs) tranches exhibit, on average, higher credit spreads, investment-grade ABS and MBS typically offer similar or lower compensation than rating-matched corporate bonds. We extend Cornaggia *et al.*'s (2017) and Marques and Pinto's (2020) work by comparing subcategories of securitization and covered bond credit spreads across credit ratings, controlling for macroeconomic factors, contractual and banks' characteristics.

We extend a growing body of literature that studies banks' debt choices. Extant literature is mostly focused on why banks use securitization *vis-à-vis* traditional funding alternatives (e.g., Greenbaum and Thakor, 1987; Affinito and Tagliaferri, 2010; Cardone-Riportella *et al.*, 2010; Casu *et al.*, 2013; Farruggio and Uhde, 2015). Limited empirical research has been carried out in this area to examine why banks use securitization over covered bonds. The two exceptions are: Carbó-Valverde *et al.* (2017), who find that while banks are more likely to use MCB when they have liquidity needs, the use of MBS is associated with risk management. Boesel

[6] Our analysis uses a dataset of securitization and covered bonds, developed based on a hand-matching procedure between bonds extracted from DCM Analytics and banks' characteristics drawn from BankFocus. As in Marques and Pinto (2020), we use endogenous switching regression models to mitigate potential self-selection problems.

et al. (2018) show that banks with a covered bond programme are less willing to use securitization to improve their liquidity/funding position. To the best of our knowledge, this paper is the first to examine whether the cost of borrowing affects banks' choice between securitization and covered bonds. One strand of the literature argues that by minimizing the costs related to financial distress and bankruptcy, securitization allows banks to lower borrowing costs (Goldberg and Rogers, 1988; Rosenthal and Ocampo, 1988; Gorton and Souleles, 2007; Ayotte and Gaon, 2011). On the other hand, Larsson (2013), Carbó-Valverde *et al.* (2017) and Boesel *et al.* (2018) point out that due to the dual-recourse feature of covered bonds, along with the originating banks' requirement of maintaining the cover pool's quality and the 'overcollateralization' level, they have an associated lower default and liquidity risk.

Finally, we contribute to a recent body of literature, mostly focused on covered bonds, which explores the impact of the ECB's asset purchase programmes (APP) on euro area bank funding conditions. So far, the literature has focused on the effects of the covered bond purchase programmes (CBPP) on the secondary market (e.g., Szczerbowicz, 2015; Gibson *et al.* 2016; Markmann and Zietz, 2017; Gürtler and Neelmeier, 2018). We extend this literature by focusing on primary market spreads, examining the impact of the third CBPP, the ABSPP and the pandemic emergency purchase programme (PEPP) on credit spreads, controlling for banks' characteristics, and using endogenous switching regression models to take into consideration banks' choice between the subcategories of securities.

We begin our analysis by examining the determinants of securitization and covered bond credit spreads. Our findings document that securitization and covered bond tranches are priced differently. While credit ratings are a major pricing determinant for ABS and MBS, we show that variables other than credit rating are relatively more important for investors in determining PCB and MCB credit spreads. However, the reliance of investors on credit rating when pricing securitization bonds reduced significantly after the 2008 financial crisis. As in Prokopczuk and Vonhoff (2012) and Gürtler and Neelmeier (2018), we show that factors important for ABS and MBS pricing, such as time to maturity, transaction size, creditor rights and legal enforcement, and yield curve slope, are also important for determining credit spreads on covered bonds. Remarkably, we find non-linear (convex) relationships between credit spreads and maturity for both PCB and MCB. The number of banks involved and their reputation, financial and sovereign debt crises, market volatility, and banks' characteristics like capital adequacy and loan ratios, are also relevant drivers for covered

bond credit spreads. In addition, we find that while the introduction of a mechanism to ensure higher quality and transparency of credit ratings – Regulation (EU) No 462/2013 – led to significant reductions in MBS, PCB and MCB credit spreads; the introduction of a legislative framework to create STS securitizations – Regulation (EU) No 2402/2017 –, has had the opposite effect.

Next, we compare securitization and covered bond credit spreads across credit ratings and over time. We find evidence of a mispricing effect in structured finance markets. Our findings document that ABS and MBS tranches have, on average, higher credit spreads than rating-matched PCB and MCB alternatives, in line with the hypothesis that investors should demand larger spreads for holding securities with larger systematic risks. On the other hand, the dual protection nature of covered bonds leads investors to perceive that PCB and MCB have an associated lower risk *vis-à-vis* comparable securitization bond tranches. Our results also show, in line with Cornaggia *et al.* (2017) and Marques and Pinto (2020), that ratings are not perfect measures of credit quality, and security prices reflect information beyond credit ratings across asset classes for specific rating categories. We check the robustness of our results by computing the average treatment effect of credit spreads for ABS *versus* PCB and MBS *versus* MCB and results are qualitatively similar.

Regarding banks' debt choices, we find that European banks do not choose between ABS and PCB or MBS and MCB deals to manage their cost of borrowing. The choice between these two financing solutions depends instead on exogenous factors – e.g., financial crises, the ECB's APP and regulations – and the objectives to be achieved by banks – liquidity needs *versus* credit risk management and regulatory capital arbitrage. Results are robust when considering a sub-sample of switchers – banks that use both securitization and covered bond deals during our sampling period – and when using endogenous switching regression models. Findings at the deal level suggest that: (*i*) larger and more profitable banks, and those with lower capital adequacy ratios choose securitization *vis-à-vis* covered bonds; (*ii*) banks use securitization deals when looking for long-term financing and larger debt borrowing; and (*iii*) banks with higher non-performing loan ratios prefer ABS over PCB.

Finally, we examine the impact of the ECB's APP on credit spreads. In line with Beirne *et al.* (2011), Szczerbowicz (2015), and Gibson *et al.* (2016), we find that the first CBPP led to a narrowing of PCB and MCB spreads. Concerning the second CBPP, contrary to Szczerbowicz (2015), but in parallel to Gürtler and Neelmeier (2018), we find a widening effect on spreads. Our results show a significant negative impact of the

third CBPP on both PCB and MCB credit spreads, while the ABSPP reached the ECB goal of reducing spreads for MBS only. In addition, we show that although it did not affect MBS credit spreads, the PEPP led to a reduction in both PCB and MCB credit spreads.

This paper is organized as follows. Section 2 reviews the literature and presents the research hypotheses. Section 3 describes the methodology and variables we use. Section 4 examines the determinants of credit spreads for securitization and covered bonds. It also analyzes if the market prices bonds differently across asset classes, when controlling for credit ratings. Section 5 examines if covered bonds reduce banks' cost of funding and section 6 concludes the paper.

2. Literature review and hypotheses

2.1. The financial economics of securitization and covered bonds

Covered bonds are hybrid financial debt instruments with characteristics of both senior unsecured corporate bonds and securitization securities, issued specifically by banks. Extant literature suggests that securitization and covered bonds can be used by banks, namely, to: (*i*) increase liquidity and diversify funding sources; (*ii*) reduce funding costs *vis-à-vis* traditional corporate bonds; and (*iii*) improve banks' ability to manage funding and interest rate risk. However, and contrary to securitization, covered bonds do not allow banks to transfer credit risk; obtain new profit opportunities, by recognizing accounting gains when the market value of the loans exceeds book value; and to benefit from regulatory capital arbitrage (e.g., Rosenthal and Ocampo, 1988; Jones, 2000; Ambrose *et al.*, 2005; Cross, 2008; Surti, 2010; Affinito and Tagliaferri, 2010; Casu *et al.*, 2013; Farruggio and Uhde, 2015; Carbó-Valverde *et al.*, 2017; Boesel *et al.*, 2018).

Despite the above-mentioned advantages, securitization also has shortcomings. The transition from the traditional 'originate-to-hold model' to the 'originate-to-distribute model', as well as its reliance on credit markets as a continuing source of credit, has been blamed by academics and practitioners for the 2008 financial crisis. If the originator does not hold the credit it originates, but distributes the loan and its risks to other entities through securitization, the originator has a reduced incentive to monitor the credit granting process. Thus, this model brings with it a major principal-agent problem in the credit screening process, because the credit incentives of the originator are not aligned with those of the entity that ultimately holds the loan (Brunnermeier, 2009; Demyanyk and Van Hemert, 2011; Purnanandam, 2011). Prior research also documents that the use of

securitization was associated with increased problems in renegotiating distressed assets and failures in valuing complex securitization instruments (Benmelech and Dlugosz, 2009; Michalak and Uhde, 2012).

However, recent regulations were implemented in the European Union as a response to these challenges. First, Regulation (EU) No 462/2013 introduced a common regulatory framework to credit rating activities, with the aim of mitigating conflicts of interest, and ensuring high quality and sufficient transparency of credit ratings and the rating process. It also has the objective of mitigating the risk of over-reliance on credit ratings.[7] Second, Regulation (EU) No 2017/2402 creates a specific framework for STS securitization, with the aim of addressing the risks inherent in highly complex, opaque and risky securitization, establishing a more risk-sensitive prudential framework, and reducing information asymmetries between originators/issuers and investors.[8]

Regarding covered bonds, notwithstanding their benefits when compared to securitization,[9] there are concerns that a high number of bank assets, which are pledged to special creditors, and therefore would not be available in case of bank insolvency, would make banks more vulnerable in case of market turmoil and lead to further destabilization of the system (Schwarcz, 2011). Recently, Arif (2020) finds that the systemic risk of smaller banks increases after the issuance of covered bonds.

2.2. Hypotheses

2.2.1. The pricing of securitization and covered bonds

Despite the similarities between securitization and covered bond transactions, there are important differences to consider (Larsson, 2013; Carbó-Valverde *et al.*, 2017; Boesel *et al.*, 2018; Markmann, 2018). First, the 'bankruptcy remoteness' feature provided by the instrumental SPV in securitization, isolating cash flow generating assets from the originator's balance sheet, is not available in on-balance-sheet funding such as covered bonds (Ayotte and Gaon, 2011). Second, securitization deals are structured in different tranches with different risk-return profiles; i.e., tranches are issued as subordinated, varying seniority and maturity claims,

[7] Regarding structured finance products, Regulation (EU) No 462/2013 establishes that issuers or related third parties must (*i*) engage at least two different credit rating agencies for the provision of credit ratings; and (*ii*) provide investors with sufficient information, namely on the quality and performance of the underlying assets.

[8] Regulation (EU) No 2017/2402 imposes that (*i*) originators or sponsors should not take advantage of the fact that they could hold more information than investors and potential investors on the assets transferred to the SPVs; and (*ii*) investors and potential investors must have the ability of to exercise due diligence and thus make an informed assessment of the creditworthiness of a given securitization instrument.

[9] The fact that covered bond issuing banks must keep any underlying cover pool collateral on their balance sheet mitigates problems associated with moral hazard and informational asymmetry between the banks and investors.

created to generate differential interests in the pool (Marques and Pinto, 2020). Third, credit enhancement mechanisms other than overcollateralization, such as excess spread, cash reserve accounts, or a third-party guarantee may be assigned to the SPV, to improve the credit rating of ABS and MBS (Fabozzi *et al.*, 2006). Fourth, while in ABS and MBS the pool of assets is fixed or static, the cover pools are usually dynamic. Finally, covered bonds are not pass-through structures.

The off-balance sheet feature of securitization causes the spread of issued securities to depend mostly on the assets pledged as collateral and on the credit enhancement mechanisms used (Liu *et al.*, 2018). Therefore, credit ratings are the most important pricing factor for securitization bonds (Buscaino *et al.*, 2012; Fabozzi and Vink, 2012; Marques and Pinto, 2020). Due to the dual-recourse feature of covered bonds, their spread depends not only on the cover-pool of cash flow generating assets and the level of overcollateralization but also on banks' accounting and financial characteristics (Larsson, 2013). This leads us to hypothesize:

Hypothesis 1a (H1a): securitization and covered bonds are priced differently and, contrary to ABS and MBS, investors rely more on factors other than credit ratings when pricing PCB and MCB.

Hypothesis 1b (H1b): rules and regulations implemented as a response to the 2008 financial crisis reduced investors' reliance on credit ratings when pricing ABS and MBS.

2.2.2. Mispricing

Extant empirical literature shows evidence of a mispricing effect in bond markets. Wojtowicz (2014) documents that CDO tranches have higher spreads compared to similarly rated corporate bonds. Cornaggia *et al.* (2017), using data of ratings for U.S. bonds show that bond prices reflect additional information other than credit ratings across asset classes, and that securitization tranches offer higher yields than similarly rated corporate bonds. Marques and Pinto (2020) document that while European CDO tranches have, on average, higher credit spreads than rating-matched alternatives, investment-grade ABS and MBS typically offer similar or lower compensation than corporate bonds.[10]

These results can be explained based on two different strands of the literature. Brennan *et al.* (2009), Coval *et al.* (2009a,b), and Wojtowicz (2014) argue that securitization bonds carry large systematic

[10] Related research showing that Treasury bonds trade at a premium relative to comparable securities includes Fleckenstein *et al.* (2014), who find that Treasury bonds are almost always overvalued relative to Treasury Inflation-Protected Securities, and Lewis *et al.* (2021), who show that Treasury securities trade at a premium relative to comparable – with the same same credit risk – guaranteed U.S. corporate bonds. See also Doukas and Han (2021) for an analysis on the relationship between the capital asset pricing model on sentiment and market mispricing.

risks *vis-à-vis* comparable securities, which are relatively neglected by credit ratings. As credit ratings are constructed to reflect only physical default probabilities (S&P) or expected losses (Moody's), they ignore whether a security is likely to default in extreme economic conditions. Under this framework, Coval *et al.* (2009b) argue that this implied information loss may be a source of mispricing and securities correlated with the market should offer higher spreads than securities with the same credit rating whose payoffs have a lower correlation with the market (e.g., covered bonds). Brennan *et al.* (2009) corroborate this argument and show that this mispricing effect increases with the subordination level. Arnold *et al.* (2021) show that banks did not compensate investors for counterparty risk exposure before the 2008 financial crisis, when issuing structured finance products. The segmentation of financial markets might also contribute to bond mispricing. As pointed out by Duffie and Rahi (1995) and Riddiough (1997), market imperfections may lead to the segmentation of financial markets and the appearance of arbitrage opportunities, which may be exploited by originators when designing securitization bonds. Limits imposed by preferences and investment mandates and/or regulation are mentioned as the common types of arbitrage opportunities that usually arise when market segmentation exists (Allen and Gale, 1989, 1991; Fleckenstein *et al.*, 2014; Lewis *et al.*, 2021). We thus raise the following hypotheses:

Hypothesis 2a (H2a): Structured finance bonds are mispriced - characteristically similar covered bonds and securitized tranches have different credit spreads.

Hypothesis 2b (H2b): Credit ratings are not sufficient determinants of credit spreads for both bond types.

2.2.3. Banks' cost of borrowing

If there is a mispricing effect, we would expect that one bond type has a lower/higher credit spread than the comparable alternative. Security design literature provides robust theoretical arguments that structured finance transactions do matter because they reduce market imperfections and frictions. Diamond (1993), Winton (1995), and Glaeser and Kallal (1997) argue that structuring activities based on the design and issuance of securities with different degrees of seniority reduces monitoring costs and adverse selection problems. Riddiough (1997), DeMarzo and Duffie (1999), Fulghieri and Lukin (2001), and DeMarzo (2005) point out that pooling assets and issuing different securities against the pool of cash flows allows banks to reduce asymmetric information costs. According to Duffie and Rahi (1995) and DeMarzo (2005), originators may be

required to design securitization transactions with different classes of securities to match investors' risk-reward profiles, and the market will place a premium on them *vis-à-vis* comparable bond alternatives.

Extant theoretical literature on securitization suggests that originators with high-quality assets may be able to reduce their borrowing costs through securitization, by minimizing the costs related to financial distress and bankruptcy (Greenbaum and Thakor, 1987; Goldberg and Rogers, 1988; Fabozzi *et al.*, 2006). Empirically, Lemmon *et al.* (2014) find evidence consistent with ABS reducing financing costs. Under this framework, we would expect that securitization bond deals are associated with lower overall borrowing costs than comparable covered bond deals. We thus propose:

Hypothesis 3 (H3): Securitization bond deals have lower borrowing costs than comparable covered bond deals.

However, compared to securitization and traditional corporate bonds, covered bonds have a dual protection nature (Cross, 2008). Moreover, banks are required to maintain the quality of the cover pool and the level of 'overcollateralization', which reduces default and liquidity risk for bondholders (Carbó-Valverde *et al.*, 2017; Boesel *et al.*, 2018). In addition, the loan-to-value of the cover loans is relatively conservative, typically ranging from 60% (for commercial loans) to 80% (for residential loans), which provides a safety cushion against the potential cyclical fluctuations in the market value for the cover pool of assets. Moreover, covered bonds are subject to tight regulatory control, are subject to preferential treatment under Basel III and Solvency II, and do not foster overreliance on complex mathematical models. According to Boesel *et al.* (2018) and Markmann (2018), the sum of these properties makes covered bond deals an important vehicle for long-term funding with a conservative risk-return profile, providing banks cheap access to funding (Schwarcz, 2011; Szczerbowicz, 2015). These arguments would have an expected opposite effect to what H3 predicts.

In addition, as the 2008 financial crisis significantly impacted bond credit spreads and pricing processes (Marques and Pinto, 2020) and market regulations changed considerably with a higher impact on the securitization market, it is particularly important to observe how credit spreads and the cost of borrowing compare across rating classes in normal *versus* crisis times.

3. Data, methodology, and variable definition

3.1. Sample selection

We use the DCM Analytics database to select individual bonds issued by European banks in the 2000-2020 period. Although information is available on several types of bonds, we include only those with a deal-type code of "asset-backed security", "mortgage-backed security", and "covered bond". We also require that securities are issued by banks located in countries from the European Union and that the tranche size (in € million) be available. As the unit of observation is a single tranche, multiple securitization tranches from the same transaction appear as separate observations. Hence, to perform a transaction-level analysis in section 5 we aggregate tranche-level data.

In covered bonds, collateral is most typically composed of mortgages and public sector loans, both considered as high quality loans (Gürtler and Neelmeier, 2018). Thus, we classified as PCB those with 'Public Loans' as collateral description. Similarly, covered bonds collateralized by mortgages were classified as MCB. To compare securitization with covered bonds, we exclude CDO and retained ABS backed by public sector loans only. This allows us to compare what is comparable, namely ABS with PCB and MBS with MCB. Additionally, we exclude synthetic securitization bonds, whole-business securitizations, perpetual bonds, bonds with additional features such as step-up, caps, or floors, and bonds classified as "fixed rate convertible to floating rate note", "fixed rate adjustable", "fixed rate extendible", "floating rate note extendible", and "floating rate note convertible".

Whereas we intend to examine how credit spreads and pricing of ABS and MBS compare with those of similarly rated PCB and MCB, we select from our full sample those issues that have the necessary information to compute the credit spread. We include only bond tranches classified as either fixed rate bonds or variable rate bonds with yield to maturity information. For variable rate bonds, only those quoted on the following indices are included: Euribor, Euro Libor, USD Libor, and GBP Libor. To maximize the survival rate, we search in Datastream for yield to maturity information for those bonds with missing values. As DCM Analytics and Datastream do not have a common identification code, we hand-match borrowers' names. Finally, in order to take possible outliers into account, we winsorize the data for transaction size, maturity, and credit spread at the 1% and the 99% levels.

These screens yield a sample of 19,352 bonds (14,790 transactions) worth €5,355.3 billion, of which 720 tranches (169 transactions worth €177.6 billion) are classified as ABS bonds, 4,717 tranches (841 transactions worth €1,701.1 billion) as MBS, 7,091 tranches (7,031 transactions worth €1,484.3 billion) as

PCB, and 6,824 tranches (6,749 transactions worth €1,992.2 billion) as MCB.[11] Panel A of Table 1 presents the tranche allocation to originating (for securitization) or issuing (for covered bonds) banks in a particular country, while Panel B provides information in relation to identifying the biggest players and their relative importance in securitization and covered bond markets. Panel A shows that ABS collateralized by public loans are concentrated in five countries (Spain, Italy, Greece, Germany and the U.K. account for 91.8% of total value), with Spain accounting for more than half of the entire market. Regarding PCB, Germany, Spain, and Belgium represent 65.6%, 11.8%, and 7.1% of the total value, respectively. MCB reveal a less concentrated country pattern *vis-à-vis* MBS, with Germany (24.7%), France (24.4%), Spain (20.3%), Italy (9.1%), and the U.K. (6.2%) receiving the highest shares of all issuance. MBS are significantly concentrated in the U.K. and the Netherlands, which account for 57% of all issuance by volume. Panel B shows that the top ten ABS and MBS originators contributed to a weight of 66.1% and 62.5% in all issuance by volume, respectively. It is interesting to note that 4 banks (Banco Santander, S.A., BBVA, S.A., Lloyds Banking Group plc, and ABN AMRO Group NV) are in the top 10 for both securities, and that the U.K. Asset Resolution Ltd, a U.K. holding company established in October 2010 as a bad bank to hold the two run-off elements of the two nationalized banks Bradford & Bingley plc and Northern Rock plc, accounts for 11.1% of all MBS issuance by volume. Regarding covered bonds, the top 10 PCB issuers were involved in around 62.1% of all deals, a higher fraction when compared with 38.8% for MCB deals. Finally, only two banks (Commerzbank AG and SFIL-Société de Financement Local) are in the top 10 for both PCB and MCB.

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

3.2. Methodology and variables

To examine if securitization and covered bonds are differently priced, and which characteristics are predominant in determining ABS and MBS *versus* similarly rated PCB and MCB credit spreads, we use the model described in equation (1).[12] The dependent variable is the *credit spread*, in basis points. We employ OLS regression techniques and adjust for heteroskedasticity. Due to time varying risk premia and

[11] Each transaction (or deal) is composed of several tranches, each with a different risk-return profile. This structuring and subordination effect is most important in asset securitization (see Table 3).

[12] We use a reduced-form model along the lines of existing pricing models for corporate and securitization bonds (Campbell and Taksler, 2003; Chen *et al.*, 2007; Fabozzi and Vink, 2012; Marques and Pinto, 2020).

cross-country differences, we estimate standard errors clustered by year and country or by year and bank, when controlling for bank characteristics

$$Credit\ spread_{i,t} = \alpha_0 + \beta_1 Rated_{i,t} + \sum_{n=2}^{21} \beta_n\, Rating\ dummy_{n,i,t} + \gamma\, Contractual\ characteristics_{i,t} + \varphi\, Macroeconomic\ factors_t + \omega\, Bank\ characteristics_{i,t-1} + \varepsilon_{i,t} \quad (1)$$

A discussion of the variables used follows. Table 2 provides the detailed definitions and sources for all the variables used, as well as the expected impact of explanatory variables on credit spreads. A discussion of extant empirical literature on the determinants of bond credit spreads and summary descriptive statistics are presented in sections 1 and 3 of the Online Appendix, respectively.

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

3.2.1. Credit Spread

Credit spread corresponds to the option adjusted spread (OAS), defined as the margin yielded by the security at issue above a corresponding currency treasury benchmark with a comparable maturity.[13] Considering that covered bonds typically have fixed-rate coupons, whereas ABS and MBS have, predominantly, floating-rate coupons (see section 3.3), it is necessary to account, in credit spread computation, for the fact that the fixed rate bond carries interest rate risk, whereas a floater does not. In addition, within a securitization transaction, there can be both fixed-rate and floating-rate tranches. Following Marques and Pinto (2020), to ensure comparability of credit spreads at issuance we converted floating rate bonds to fixed rates using fixed-for-floating rate swaps. This conversion was implemented per tranche, using the appropriate quote for the swap matching the maturity of the bond and taken at the issuance date.[14]

3.2.2. Credit rating

In our sample, all bonds have at least one credit rating assigned by S&P or Moody's, which is converted as follows: AAA=Aaa=1, AA+=Aa1=2, and so on until D=21 (Cornaggia *et al.*, 2017). If a tranche has two credit ratings, we computed the average. We use rating dummies in regression analyses. As first-loss tranches in securitization are typically not rated, we include the dummy variable *rated*, equal to 1 if the bond

[13] Fabozzi and Vink (2012) stress that the OAS is the most common measure used by financial intermediaries to correct the normal yield spread for embedded options (e.g., the prepayment option), usually included in structured bonds.

[14] The data on daily swap curves for maturities between 3 months and 50 years as well as the 12 interest rate market benchmarks used (EUR Libor, USD Libor and GBP Libor, with 1M, 3M, 6M, and 12M reference rates), were drawn from Datastream.

has a credit rating, and 0 otherwise. To examine whether a different rating assigned by S&P and Moody's has any statistically significant impact on credit spreads, we use, as in Gabbi and Sironi (2005), a dummy variable – *rating discordance* – equal to one if the two ratings have a different numeric equivalent value, and zero otherwise. We expect rating agencies' discordance to lead to a higher credit spread.

3.2.3. Contractual characteristics and macroeconomic factors

Following the line established in earlier studies (Gabbi and Sironi, 2005; Chen *et al.*, 2007; Vink and Thibeault, 2008; Fabozzi and Vink, 2012; Marques and Pinto, 2020), this study considers the following contractual characteristics: (*i*) maturity and the logarithm of maturity; (*ii*) transaction size; (*iii*) tranche rank; (*iv*) fixed rate; (*v*) number of banks; and (*vi*) bank reputation.

Since securitization and covered bonds are backed by loans to public sector entities and mortgages, it is highly likely that the investors' risk assessment depends on macroeconomic factors (Beirne *et al.*, 2011; Prokopczuk and Vonhoff, 2012; Gürtler and Neelmeier, 2018). We thus use the yield curve slope and market volatility to control for these factors. In addition, to account for country differences we include country risk, creditor rights and enforcement variables in our baseline regression model (Fabozzi and Vink, 2012; Boubakri and Ghouma, 2010; Markmann, 2018). Finally, to examine the impact of the supply side conditions of the corporate debt market on credit spreads, we include dummies for *financial crisis* and *sovereign crisis* and use year dummy variable.

The development of the European market for covered bonds and securitization was significantly increased by the ECB's extraordinary action implementing two CBPPs in 2009 and 2011 (CBPP1 and CBPP2), and more recently (2014) CBPP3 and ABSPP. As of 1 November 2019, the Eurosystem restarted net purchases under both CBPP3 and ABSPP. Finally, the ECB's PEPP was announced on March 18, 2020, as a temporary APP of private and public sector securities.[15] It is important to control for these variables because, as pointed out by Lewis *et al.* (2021), major shocks that affect the liquidity of corporate bonds impact the patterns of changes in mispricing. To examine the impact of the announcement of these APPs on credit spreads, we use four dummy variables: CBPP1, CBPP2, CBPP3/ABSPP, and PEPP.

Finally, to access the impact of rules and regulations on credit spreads, we use two dummies: *EU462* to examine the impact of Regulation (EU) No 462/2013 on credit rating agencies; and *EU2402* to examine the

[15] For further details on the ECB's asset purchase programmes see https://www.ecb.europa.eu/mopo/implement/app.

impact of the Regulation (EU) No 2402/2017 on securitization. As the securitization market is impacted more heavily by these regulations, resulting in the reduction of information asymmetries between originators and investors, we expect a negative impact of these variables on credit spreads and a reduction in investors' reliance on credit ratings in the crisis period.

3.2.4. Originating/issuing banks' characteristics

Although securitization employs bankruptcy remote SPVs, Gorton and Souleles (2007), Longstaff and Rajan (2008), and Marques and Pinto (2020) show that the originator's accounting and market characteristics matter in pricing the securities issued by the SPV. Consistent with other studies on the reasons for financial firms using securitization (Affinito and Tagliaferri, 2010; Cardone-Riportella *et al.*, 2010; Farruggio and Uhde, 2015) and securitization *versus* covered bonds (Carbó-Valverde *et al.*, 2017; Boesel *et al.*, 2018), we include variables measuring banks' type (*loan ratio*), size (log *total assets*), liquidity (*liquid assets to deposits & ST funding*), credit risk (*non-performing loans ratio*), profitability (*return on assets*), and regulatory capital (*capital adequacy ratio*). We collect bank specific accounting and market data in the fiscal year ending just prior to bond issuance from BankFocus. As DCM Analytics does not provide an identification code, we hand-matched ABS and MBS originators with BankFocus by using the issuer-parent's name. For covered bonds, data from BankFocus is merged with bond information from DCM Analytics by hand-matching issuers' names.

3.3. Univariate analysis

Table 3 describes the sample of bond tranches by asset class. This section constitutes the most exhaustive such comparison in the literature. Almost all of the pair-wise comparisons indicate statistically significant differences between the common pricing variables.

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

Regarding the relative pricing of securitization *versus* covered bond tranches, Table 3 shows that the average credit spreads are economically and statistically higher for securitization bonds (107.0 bps) than they are for covered bonds (48.4 bps). Similar results are obtained for subsamples: ABS (139.2 bps) and MBS

(102.1 bps) have higher average credit spreads than PCB (35.6 bps) and MCB (61.7 bps), respectively.[16] This can reflect differences in credit rating: average credit ratings for PCB (1.4 | AAA) and MCB (1.8 | AA+) are significantly better than for ABS (5.6 | A) and MBS (4.3 | AA-). We can thus conclude that banks have an incentive to maintain high quality mortgages on their balance sheets in covered bonds, giving a positive signal to the markets.

A securitization tranche of an average size matures in 34.4 years, which is a long period if we compare it with the average 5.9 years for covered bonds. Similarly, ABS (25.9) and MBS (35.7) have higher average maturities than PCB (5.6) and MCB (6.3). This can be explained by the fact that contrary to covered bonds, ABS and MBS have a pass-through nature that leads to maturity being virtually the same as that of the underlying pool of assets. The observed level of the number of banks participating in the issuing syndicate provides indirect evidence that MBS lending may be considered relatively riskier than MCB lending. However, opposite findings are presented for ABS *versus* PCB.

The average tranche size does not differ significantly between subcategories of securitization and covered bonds. As expected, namely due to higher economies of scale in relation to issuance costs, the average transaction size exhibited by covered bond issuances is lower than the average transaction size exhibited by ABS and MBS transactions. The structuring and tranching nature of securitization deals is also reflected in a larger number of tranches per transaction *vis-à-vis* covered bonds. In typical PCB and MCB transactions, the average number of tranches per transaction is 1.0, which is smaller than the average of 4.9 for ABS and 6.9 for MBS. Similarly, while the tranche rank is 1.0 for covered bonds, ABS and MBS exhibit average tranche ranks of 2.9 and 3.7 respectively.

As for continuous variables, discrete variables detailed in Table 3 clearly suggest that securitization and covered bonds are fundamentally different financial instruments. Therefore, w would expect the impact on pricing to be bond-specific.

4. The pricing of securitization *versus* covered bonds

4.1. Are securitization and covered bonds differently priced?

[16] We also compare the evolution of credit spreads in section 3 of the Online Appendix, by considering a pre-crisis period from January 1, 2000 through to September 14, 2008, and a crisis period from September 15, 2008 (the first trading day after Lehman Brothers' bankruptcy filing the day before) through to December 31, 2020.

We use the Chow test to examine whether the credit spreads associated with securitization and covered bonds are influenced similarly by common pricing characteristics; i.e., we are testing if the pricing characteristics in equation (1) are significant across bond types and, if so, whether they have the same coefficient values. Marques and Pinto (2020) document that securitization and corporate bonds are differently priced. We perform the same methodology to examine if subcategories of securitization and covered bonds are priced in segmented markets. We conclude that securitization and covered bonds are distinct financial instruments and that ABS and MBS, as well as MBS and MCB, are financial instruments influenced differently by common pricing characteristics: the Chow test statistics of 95.5 for securitization *versus* covered bonds, 2.83 for ABS *versus* MBS, 32.2 for PCB *versus* MCB, 50.3 for ABS *versus* PCB, and 33.3 for MBS *versus* MCB, are all higher than the critical levels. Therefore, we examine the determinants of credit spreads for each bond type separately in section 4.2, while controlling for the banks' choice of issuing ABS over PCB and MBS over MCB.

Table 4 presents the results of estimating equation (1) using the samples discussed in section 3.3. We start by comparing credit spreads among securities in the same category. To do that we use equation (1) and create one dummy variable set equal to 1 if the tranche is an MBS or an MCB, and 0 otherwise – models [1] and [2]. Furthermore, to directly compare securitization and covered bonds with the same collateral, we also include two dummy variables set equal to 1 if the tranche is an ABS or an MBS, and 0 otherwise – models [3] and [4]. Results presented in column 1 of Table 4 suggest that MBS issued by European banks are, on average, associated with 28.4 bps lower credit spreads than ABS. Regarding covered bonds, we find that credit spreads between PCB and MCB do not differ significantly (model [2]). Regression results for models [3] and [4] show that ABS and MBS dummy variables are associated with statistically significant 41.8 bps and 41.1 bps increases in credit spreads, respectively, meaning that both ABS and MBS have higher spreads than comparable covered bonds.

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

We also examine whether our results are robust when controlling for the bank characteristics presented in Table 7 and for different economic cycles by considering a pre-crisis period from January 1, 2000 through to September 14, 2008, and a crisis period from September 15, 2008 (the first trading day after the Lehman Brothers' bankruptcy filing the day before) through to December 31, 2020. In line with previous findings, we

show that: (*i*) MBS have lower credit spreads than ABS in both pre-crisis and crisis periods (models [1a] and [1b]); (*ii*) credit spreads between PCB and MCB do not differ significantly in both periods (models [2a] and [2b]); and (*iii*) ABS and MBS have higher spreads than PCB and MCB, respectively, and this difference increases significantly in the crisis period (models [3a], [3b], [4a] and [4b]).

Overall, our results are in line with the arguments of both global financial crisis and covered bond literature. As covered bonds mitigate principal-agent problems underlying the originate-to-distribute business model, coupled with the fact that covered bonds have a dual protection nature and banks are required to maintain the quality of the cover pool and the level of 'overcollateralization', investors require lower yields when investing in PCB and MCB. In section 4.3., we investigate this further by comparing credit spreads per rating classes.

Regarding the impact of credit ratings on securitization *vis-à-vis* covered bond credit spreads, Table 4 shows that while for ABS and MBS, rated bonds have lower credit spreads, in model [2] the impact of rated dummy on credit spread is insignificant. The insignificance of rated variable for covered bonds can be explained by the fact that almost all are issued with a rating and 90% of PCB and 84% of MCB have a rating classification of A+ or higher (see section 2 of the Online Appendix).[17] Additionally, securitization and covered bonds have different rating distributions: while for securitization bonds there are observations for the entire rating spectrum, non-investment grade PCB and MCB are practically nonexistent. We also estimate models [1] and [2] considering only rated and credit rating dummies as independent variables and find that models yield adjusted R^2 values of 0.31 and 0.03, respectively. This confirms credit ratings as the most important determinant of credit spreads in ABS and MBS, but not for covered bonds. Furthermore, the adjusted R^2 value increases, on average, 0.13 for securitization bonds and 0.37 for covered bonds in models with the inclusion of additional contractual, macroeconomic variables and banks' characteristics, which shows that variables other than credit rating are relatively more crucial in determining covered bond credit spreads.[18] This result corroborates extant empirical literature, mostly focused on German covered bonds, which find that as the

[17] It is also important to notice that under CBPP1, CBPP2, and CBPP3, only covered bonds with a rating classification of BBB- or higher are eligible for ECB purchase.

[18] To test the robustness of our results, we re-estimate models [3] and [4] by including interaction terms between ABS and MBS dummies, respectively, and credit rating variables. Untabulated results show that the significance and magnitudes of the coefficients are higher for the interactions, which reinforces the importance of ratings as a primary credit spread determinant in securitization tranches.

probability of default is marginal, credit ratings do not have a significant impact on credit spreads (e.g., Koziol and Sauerbier, 2007; Kempf *et al.*, 2012). As expected, we find that while in the pre-crisis period investors relied almost exclusively on credit ratings when pricing asset-backed claims, in the crisis period, there is a reduction in investors' reliance on credit ratings (differences in adjusted R^2 of 0.01 in model [1a] *vis-à-vis* 0.21 in model [1b]). This shows that rules and regulations implemented as a response to the 2008 financial crisis, namely the enhanced regulation of credit rating agencies, and the creation of a framework for an STS securitization in the European Union contributed to mitigating the risk of over-reliance on credit ratings (EU462, 2013; EU2402, 2017).

So far, we corroborate H1a, H1b, H2a and H2b: (*i*) ABS and PCB as well as MBS and MCB are priced differently and while credit rating is the most important pricing factor in securitization bonds, investors rely more on contractual, macroeconomic and banks' characteristics rather than credit ratings when pricing covered bonds; (*ii*) investors' reliance on credit rating when pricing ABS and MBS reduced significantly after the 2008 financial crisis; (*iii*) there is a mispricing effect explained by an information loss associated with credit ratings and/or the segmentation of securitization and covered bond markets, and (*iv*) investors do rely on information beyond the assigned credit rating for both security instruments.

4.2. Bond pricing and banks' choice

Results in Tables 3 and 4 show that covered bonds and securitized tranches have significantly different characteristics (e.g., the average maturity of securitized bonds is 34 years *versus* about 6 years for covered bonds and the last have AA+/AAA average ratings *versus* AA-/A average ratings for securitized bonds). Therefore, selection is important in this context. Additionally, in our sample, banks can choose between ABS and PCB, and between MBS and MCB. For example, Banco Santander, S.A. issued €204,713.4 billion of bonds over the 2000-2020 period, using both securitization – ABS (€24.4 billion) and MBS (€53.1 billion) – and covered bonds – PCB (€11.1 billion) and MCB (€116.0 billion), switching 55 times between both deal types (see Table 8). As the choice between securitization and covered bonds may be endogenous to credit spreads, we use an endogenous switching regression model (Lokshin and Sajaia, 2004) to study pricing, taking into consideration the potential self-selection by banks between issuing the two bond types. We perform a full information maximum likelihood (FIML) method on the credit spread samples of our model specifications – models [5] and [6] of Table 5 – simultaneously with a probit selection equation, where the choice between

securitization and covered bonds is a function of contractual and bank characteristics, and macroeconomic factors. The empirical model consists of the following three equations:

$$Credit\ spread\ Securitization_{i,t} = \alpha_0 + \beta_1 Rated_{i,t} + \beta_2 Rated * Rating_{i,t} + \beta_3\ Rating\ discordance_{i,t} + \gamma\ Contractual\ characteristics_{i,t} + \varphi\ Macroeconomic\ factors_t + \omega\ Bank\ characteristics_{i,t-1} + \varepsilon_{i,t} \quad (2)$$

$$Credit\ spread\ Covered\ Bonds_{i,t} = \alpha_0 + \beta_1 Rated_{i,t} + \beta_2 Rated * Rating_{i,t} + \beta_3\ Rating\ discordance_{i,t} + \gamma\ Contractual\ characteristics_{i,t} + \varphi\ Macroeconomic\ factors_t + \omega\ Bank\ characteristics_{i,t-1} + \varepsilon_{i,t} \quad (3)$$

$$I^*_{i,t} = \delta_0(Credit\ spread\ Securitization_{i,t} - Credit\ spread\ Covered\ Bonds_{i,t}) + \beta_1 Rated_{i,t} + \beta_2 Rated * Rating_{i,t} + \beta_3\ Rating\ discordance_{i,t} + \gamma\ Contractual\ characteristics_{i,t} + \varphi\ Macroeconomic\ factors_t + \omega\ Bank\ characteristics_{i,t-1} + u_{i,t} \quad (4)$$

where the third equation models bond selection: if $I_i^* > 0$, then firm *i* issues an ABS or an MBS; otherwise it issues PCB or MCB. We adjust for heteroscedasticity and estimate standard errors clustered by year and bank.[19] The Wald test statistics of independent equations lead us to reject the hypothesis of equations being independent for models [5] and [6].

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

Model [5] presents pricing regression results for a sample of 403 ABS and 2,193 PCB, while model [6] uses a sample of 1,902 MBS and 3,094 MCB. Regarding the impact of credit risk on credit spread, Table 5 shows that while for securitization bonds, rated bonds have lower credit spreads, the impact of rated dummy on credit spread is insignificant for PCB or significant and positive for MCB. As expected, the higher the credit risk, the higher the credit spread for all bond types. However, the coefficients of these variables for PCB and MCB have much lower magnitudes when compared to those for both ABS and MBS. These results corroborate our hypothesis (H1) that investors rely more on factors other than ratings when pricing covered bonds. In addition, we do not find evidence of credit rating discordance between S&P and Moody's substantially affecting credit spreads. This result may be explained by the fact that: (*i*) in securitization, tranches are created to achieve a particular credit rating; and (*ii*) the proportion of bonds with rating discordance is relatively small: 9.2% for securitization bonds and 4.4% for covered bonds (see Table 3).

We find, in line with Marques and Pinto (2020), a convex relationship between maturity and credit spreads for MBS. Interestingly, a similar relationship appears strongly significant for covered bonds. This

[19] We implement a FIML method to simultaneously estimate binary and continuous parts of the model in order to yield consistent standard errors. For further analysis, see Lokshin and Sajaia (2004).

"smile" effect can be explained by liquidity risk associated with short-term bonds and by covered bond market effects, namely higher market competition by banks and investors for standard, medium-term maturities (e.g., the ECB defined a time to maturity interval of 3-7 years as one of the eligibility criteria in CBPP1). The influence of *transaction size* on credit spread is negative and significant for securitization securities, but insignificant for PCB. This suggests that increasing the transaction size of an ABS or an MBS by €100 million will reduce the required credit spread by 48.3 and 16.4 bps, respectively, which indicates a positive price liquidity effect related to the size of the deal. On the contrary, MCB have higher spreads, which can be explained by the fact that larger issues means higher asset pools on the balance sheet, since banks are responsible for maintaining sufficient assets on its balance sheet and the level of overcollateralization to meet investor's needs.

The tranche rank only affects MCB, suggesting that investors associate an increase in the number of tranches with a decrease of credit risk. This can be explained by the fact that in MCB tranches are usually designed for different maturities rather than for credit quality. The influence of currency risk on credit spread is insignificant for MBS, but positive and significant for ABS, PCB and MCB. Contrary to what is expected, but in line with the results presented by Marques and Pinto (2020), issuers raise funds via ABS and MBS at a lower credit spread through fixed priced issues than through floating rate issues. As expected, the greater the *number of banks* and the better the reputation of the banks involved, the lower the credit spread for covered bonds. However, these factors do not affect credit spreads in ABS and MBS.

As expected, *country risk* is significantly positively related to spread for MBS – in line with the results presented by Marques and Pinto (2020) – and for both PCB and MCB. The impact of the creditor rights index is negative and significant, as expected, for bonds backed by mortgages, but insignificant for ABS and PCB. As we expected, covered bonds issued in countries with a strong legal enforcement system pay lower yields. On the contrary, there is a significant positive impact of enforcement on MBS credit spreads.

The *financial crisis* dummy is associated with significant increases in credit spreads for covered bonds but not for securitization bonds, which shows that during the 2008 financial crisis only securitization transactions with high quality asset pools were implemented; while the start of the European sovereign debt crisis has imposed a significant increase in credit spreads for PCB, MBS, and MCB of 55.5 bps, 78.0 bps, and 58.4 bps, respectively. The relationship between credit spread and the slope of the Euro swap curve, *EUSA5y-*

Libor3M, is significant and negative for all bond types, meaning a steeper Euro swap curve is associated with lower credit spreads. Credit spread and market volatility are significantly positively related for covered bonds. These results are in line with those of Beirne *et al.* (2011) and Prokopczuk and Vonhoff (2012), who found a significant and positive relationship for MCB, but different from those of Gürtler and Neelmeier (2018), who present an insignificant relationship for PCB.

Results also show that while the first and the third CBPP (*CBPP1* and *CBPP3/ABSPP* dummies) had a reducing effect on European covered bond credit spreads, the second CBPP (*CBPP2* dummy) is associated with significant 28.5 bps and 38.9 bps increases in PCB and MCB credit spreads, respectively. Regarding securitization bonds, we find that CBPP1 and CBPP2 do not contribute to a credit spread reduction for both ABS and MBS. In fact, we find that the ECB asset purchases of covered bonds during both CBPP1 and CBPP2 fed through into MBS asset prices, thus leading to an increase in credit spreads. Concerning ABSPP, we find that despite the insignificant impact on ABS credit spreads, this programme led, on average, to a 62.5 bps reduction in MBS credit spreads, which is in line with the ECB objective of easing funding conditions for credit institutions. Finally, we show that despite not affecting MBS credit spreads, the PEPP dummy is associated with significant reductions of 56.3 bps and 62.0 bps in PCB and MCB credit spreads, respectively, showing that this APP was effective in mitigating the risks imposed by the coronavirus (COVID-19) outbreak to the proper functioning of the monetary policy transmission mechanism.

Our findings are similar to those presented by Beirne *et al.* (2011), Szczerbowicz (2015), Markmann and Zietz (2017), and Gürtler and Neelmeier (2018), for the impact of CBPP1 on credit spread: the first CBPP led to a narrowing of both PCB and MCB credit spreads. For CBPP2, contrary to Szczerbowicz (2015) and Gibson *et al.* (2016), but in line with Markmann and Zietz (2017) and Gürtler and Neelmeier (2018), we find a significant positive relationship between CBPP2 dummy and credit spreads for PCB. In addition, we find that the second CBPP has a significantly positively influence on MCB credit spread. Thus, our results regarding the second CBPP are not consistent with the ECB objective of promoting the easing of funding conditions for credit institutions and enterprises. These findings can be explained by the fact that in the second programme the demand was significantly lower than the announced amount; whereas the planned amount was completely exhausted during the first programme, during the second programme the total amount of purchased covered bonds only reached €16.4 billion of €40 billion. Additionally, in December 2011, the ECB announced the three

year jumbo Longer-Term Refinancing Operations (LTROs) and settled its first tranche, with the second tranche being settled in March 2012, which had a longer impact on the euro-denominated covered bond market with a significant decrease of public issuance in 2011 and 2012.

Considering the impact of regulations on credit spreads, we find that both *EU462* and *EU2402* dummies do not impact ABS pricing. As we expected, the introduction of a mechanism to mitigate credit rating agencies' conflicts of interest, ensuring higher quality and transparency of credit ratings, led to significant reductions in MBS, PCB and MCB credit spreads. On the contrary, there is a positive relationship between *EU2402* dummy and credit spreads. These results show that the introduction of a legislative framework to create STS securitizations, establishing a more risk-sensitive prudential framework, increased credit spreads. This can be explained by the fact that this regulation came into force recently, requiring that investors had a period of adaptation, namely to be able to make their own due diligence and informed assessment of the creditworthiness of a given securitization instrument.

Results in Table 5 show that the impact of banks' characteristics is different for securitization *vis-à-vis* covered bond securities. Regarding ABS, detailed in model [5], banks' capital adequacy ratio and loan ratio have a significant negative impact on credit spreads. Similar results are obtained for MBS, in Model [6]. We also find, as expected, that the higher the bank's liquidity ratio, the lower the MBS credit spread. Contrary to what we expected, non-performing loans ratio negatively impacts credit spreads. This might mean that banks with a higher proportion of non-performing loans have to resort to higher credit enhancement mechanisms to be able to issue bonds with relatively lower yields.

Results reported for PCB in model [5] indicate, as expected, that loan ratio and credit spread have a significant positive relationship, while banks with more regulatory capital pay lower credit spreads. As for MBS, we find a significantly negative relationship between non-performing loans ratio and PCB credit spreads. Finally, model [6] shows, as expected, that banks with higher profitability and more regulatory capital pay lower credit spreads. We also find that the higher the loan ratio, the higher MCB credit spreads.

To examine if characteristically similar bond tranches that differ by bond type have different credit spreads [H2a] we computed the average treatment effect (ATE) for credit spreads of ABS *versus* PCB and MBS *versus* MCB. We used models [5] and [6] and obtained the correct standard errors (as we account for the errors in the selection equation) for these ATEs through bootstrapping. We show, as presented in Table 4, that

ABS issued by European banks are, on average, associated with 85.8 bps higher credit spreads than PCB. Similarly, as the ATE is 23.00 bps, with a 1% significance level, MBS have higher spreads than comparable MCB.

Finally, it is important to note that investors do consider factors other than credit ratings, some of them already considered by rating agencies in assessing ratings, in pricing both securitization and covered bonds, which corroborates H2b. We examine further H2a and H2b in the next section.

Although a thorough analysis of the determinants of debt financing choice between securitization and covered bonds is beyond the scope of this paper, Table 5 presents some interesting results. Findings suggest that banks choose ABS *vis-à-vis* PCB when they have higher loan and liquidity ratios and are more profitable. Model [5] also shows that banks with lower capital adequacy prefer ABS over PCB, which is in line with the idea that banks use securitization to adjust capital ratios. Banks choose MBS *versus* MCB – model [6] – when they are relatively larger and more profitable. Additionally, banks with a higher proportion of net loans in total assets, as well as with higher liquidity and capital adequacy ratios prefer MCB rather than MBS. These results corroborate those of Carbó-Valverde *et al.* (2017) and Boesel *et al.* (2018): banks are more likely to issue MCB *versus* MBS for liquidity reasons, while banks that aim to meet regulatory capital requirements would prefer securitization. In addition, we show, as expected, that banks use securitization deals when looking for long-term financing and larger debt borrowing because of the potential economies of scale in relation to issuance costs. Our results are in line with security design literature: originating banks design securitization transactions with different classes of securities – tranching – to reduce market imperfections and to match investors' risk-reward profiles (Duffie and Rahi, 1995; DeMarzo, 2005). Finally, the implementation of Regulation (EU) No 2402/2017 increased the likelihood of banks choosing MBS over MCB. We consider that further analysis of banks' choice between securitization and covered bonds is an important avenue for future research.

4.3. Securitization versus covered bond credit spreads by rating scales

Previous results show that, when controlling for credit rating and other contractual and macroeconomic factors (Table 4), as well as for the banks' choice between issuing the two bond types (Table 5), securitization bonds have higher yields than comparable covered bonds and bond prices reflect information beyond credit ratings, which corroborate both H2a and H2b. In this section, we examine this further by focusing on investment grade rating scales. Table 6 presents the results of estimating equation (1) using a sample of 5,437

securitization bonds and 13,915 covered bonds, model [7], as well as the sub-samples by rating classes (see Table 1 of the Online Appendix) – models [7a] to [7j] –, where a dummy variable *securitization*, equal to 1 if the bond is an ABS or an MBS, and 0 if it is, instead, a PCB or an MCB, is included as an additional regressor. The results suggest that securitization bonds are associated with higher credit spreads than covered bonds. These results hold for sub-samples created based on whether the bond is issued in the pre-*versus* crisis period or when re-estimating model [7] for the sub-samples of comparable covered and securitization bonds: ABS and MBS have higher credit spreads than PCB and MCB, respectively.

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

Models [7a] to [7j] indicate that securitization bonds are issued with significantly higher credit spreads than covered bonds with identical credit ratings for AA, AA-, A+, A, A-, and BBB rating classes. In line with Brennan *et al.* (2009), we show that the difference in spreads increases as rating deteriorates. For the remaining rating classes, securitization bond credit spreads do not differ significantly from those of covered bonds. When comparing securities backed by public sector loans, AAA, AA+, A, and BBB ABS have higher credit spreads than PCB, while for the remaining rating classes coefficients are statistically insignificant. Concerning MBS *vis-à-vis* MCB, our results show that MBS offer higher yields than similarly rated MCB for the majority of rating classes – the exceptions are AA+ and AA- rating classes.

As a robustness check, we also calculate the ATE for all bonds as well as for investment grade rating classes. As selection is important in studying the pricing, we use endogenous switching regression models to take into consideration the potential self-selection by banks between issuing the two bond tranches. We thus use equations (2) to (4) and obtain the standard errors for the ATE through bootstrapping. Results presented in Table 6 are qualitatively the same as those obtained through OLS.[20]

Overall, our results corroborate H2a, that characteristically similar securitization and covered bond tranches have different spreads, with securitization bonds being issued, on average, with significantly higher credit spreads than covered bonds with identical credit ratings; and H2b, that credit spreads reflect information beyond credit ratings. Therefore, our results are in line with those of Cornaggia *et al.* (2017) and Marques and Pinto (2020). In fact, bond prices reflect additional information other than credit ratings across asset classes in

[20] Since for some rating classes the ATE outcome is not possible to obtain due to a small number of observations, we prefer to keep the results in OLS and use the ATEs as robustness checks.

both normal and crisis times, which can be explained by the fact that ratings methodologies are based on physical default probabilities (or expected losses) that do not capture risk premia. A rating is a measure of total, individual bond risk and is not a measure of systematic risk that investors price. We thus show that systematic risk is relatively more important for securitization than for covered bonds; i.e., it constitutes a larger fraction of total risk.

4.4. Robustness checks

We perform a number of additional robustness checks that further control for results in Tables 4 and 5. First, we re-estimate our models for sub-samples created according to ECB eligibility criteria for purchase under CBPP1, CBPP2, CBPP3, ABSPP and PEPP. We corroborate our previous results regarding the impact of ECB APP in credit spreads. Second, we test the robustness of our results by re-estimating our models for sub-samples after removing bonds issued in countries – Greece, Italy, Ireland, Portugal and Spain (GIIPS) – that were significantly affected by the European sovereign debt crisis. Third, we re-estimate our models focusing on specific countries that aggregate much of the sample per bond type (see Panel A of Table 1). Finally, we run estimations including year multiplied by country fixed effects. Overall, estimates are not driven by the exclusion of GIIPS or countries with low tranche allocation rate, and the inclusion of year*country fixed effects.

5. Bond issuance and banks' cost of borrowing: a deal-level analysis

In this section, we focus on the originating/issuing banks' cost of borrowing and their accounting and market characteristics. Our goal is to examine which financing structure, if any, allow banks to raise debt with a lower cost of borrowing.

5.1. Banks' characteristics

After applying the procedures mentioned in section 3.2.4., we identified 406 and 5,182 banks that were originators and issuers of securitization and covered bonds, respectively. Of these banks, 177 were originators of securitization bonds only, 1,806 were issuers of covered bonds only, and 3,605 were classified as switchers, the latter representing 64.5% of all banks. Table 7 reports characteristics of banks segmented into five categories according to their issuance record.

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

Contrary to covered bonds, in securitization various classes are created to generate differential interests in the pool, such that the senior investors have priority rights over subordinated investors; that is, deals are structured with the aim of each tranche meeting a desired investor's risk-return profile. Therefore, the cost of borrowing is determined by the combination of the different tranches' credit spread. We use the weighted average spread (WAS), calculated as the sum of the product of the weight of each tranche in the transaction size and the tranche's credit spread, as a measure of the total cost of borrowing. We find that the average WAS for securitization transactions does not differ significantly from that of covered bond transactions. Similar results are obtained when comparing banks using securitization or covered bonds only. Results presented in Table 7 also show that financial firms that use securitization are larger and have, on average, a higher proportion of loans to total assets than covered bond issuers have. Also, the mean percentage of liquid assets to deposits and short-term funding for banks that use securitization (30.5%) is significantly lower than for covered bond (49.4%) users, which seems to indicate that banks that engage in securitization present lower liquidity. Financial firms using securitization have, on average, higher capital ratios and profitability than those using covered bonds. Finally, the non-performing loans ratio is lower for all banks that use securitization *vis-à-vis* covered bonds (3.0% *versus* 3.9%). There results hold when comparing banks that originate securitization bonds only with those that issue covered bonds only.

5.2. Banks' cost of borrowing: securitization versus covered bond deals

We examine which of the two financing transactions have the lowest borrowing cost by using the model specified in equation (5). The dependent variable is the WAS, in basis points, and we create dummy variables set equal to one if the transaction is an ABS (*versus* a PCB) or an MBS (*versus* an MCB) deal. We employ OLS regression techniques and adjust for heteroskedasticity. Standard errors are clustered by year and bank.

$$WAS_{i,t} = \alpha_0 + \beta_1 ABS_{i,t} + \beta_2 MBS_{i,t} + \gamma\ Contractual\ characteristics_{i,t} + + \varphi\ Macroeconomic\ factors_t + \omega\ Bank\ characteristics_{i,t-1} + \varepsilon_{i,t} \quad (5)$$

Models [8a], [8b], [11a] and [11b] report estimates of this equation, using the samples presented in Table 7 for two periods: pre-crisis and crisis period. The results suggest that, holding other factors constant, the WAS does not differ significantly between ABS and PCB and MBS and MCB.

****** Insert Tables 8 and 9 about here ******

In previous models, ABS and MBS dummies may suffer from sample selection bias because we only observe borrowing costs for the bond type that banks choose; we do not observe counterfactual borrowing costs. To account for this problem, we estimate models [9] and [12] considering a sample of transactions closed by switchers, banks that employ both securitization and covered bonds, over the sampling period. Table 8 provides information on the top 10 switchers and their relative importance in securitization and covered bond markets. Results in Table 9 suggest that while ABS deals collateralized by public loans in Europe by switchers are associated with lower WAS when compared with PCB (model [9]); the WAS does not differ significantly between MBS and MCB (model [12]).

Finally, as the choice between securitization and covered bond transactions may be endogenous – that is, banks determine whether they want to access the securitization/covered bond market and when or banks that securitize assets/use covered bonds are those that in fact have access to this market – we use endogenous switching regression models, as presented in section 4.2. We use as our selection equation the model specified in equation (4) while WAS regressions follow the model specified in equation (5). We calculated the expected values of WAS for securitization and covered bond transactions conditional on the debt choice through bootstrapping and computed the ATE for the WAS of ABS *versus* PCB and MBS *versus* MCB. Results in models [10] and [13] show that the WAS does not differ significantly between securitization and covered bond deals backed by both public loans and mortgages. Thus, we do not corroborate H3.

Regarding the banks' choice, findings at the deal level suggest that larger and more profitable banks and those with lower capital adequacy ratios choose securitization *vis-à-vis* covered bonds. Models [10] and [13] also show that banks use securitization deals when looking for long-term financing and larger debt borrowing. Fabozzi *et al.* (2006) point out that securitization deals have higher transaction costs – both up-front (e.g., with rating agencies, underwriters, setting-up the SPV, and arrangers) and ongoing (e.g., with trustees auditors and servicers) costs – *vis-à-vis* other bond issuances. Therefore, banks choose ABS and MBS for larger debt borrowings because of the economies of scale on issuance costs. Finally, model [10] shows that banks with higher non-performing loan ratios prefer ABS rather than PCB.

We can draw a major conclusion from our results: European banks do not choose between ABS and PCB or MBS and MCB deals to manage their cost of borrowing. The choice between these two financing solutions may depend on investors' appetite over time (e.g., ECB APP), exogenous factors like financial crises,

and the objectives to be achieved by banks, particularly with regard to increasing liquidity and/or diversifying funding sources *versus* adjustments in the debt maturity structure, credit risk management and regulatory capital arbitrage.

6. Summary and conclusions

The paper compares credit spreads and the pricing of securitization bonds – ABS and MBS – to that of covered bonds – PCB and MCB –, using a cross-section of European bonds issued by banks in the 2000-2020 period. We examine if there is a mispricing effect on bond markets and whether credit spreads convey information beyond credit ratings across securitization and covered bonds. At the deal level, we also study whether similar banks can achieve differing borrowing costs by issuing different types of asset-backed claims and what the determinants of banks' bond choices are.

Our results are relevant for investors and bank supervisors. We show that securitization and covered bonds are priced differently. Our results show evidence of a mispricing effect between securitization and covered bond tranches, which increased in the crisis period. When implementing a deal-level analysis, we find that ABS backed by public loans and MBS are not used as a mechanism for reducing banks' cost of borrowing. Rather, contractual – maturity and transaction size – and bank characteristics – banks' size, profitability, and capital adequacy – significantly influence the decision to issue securitization *versus* covered bonds. Finally, the choice between securities backed by public loans is driven by credit risk management motivations. We consider that an analysis focused on the determinants of banks' choice between securitization and covered bonds and the impact that such a choice might have on banks' capital structure is an important avenue for future research.

Our results are also relevant for policy makers. A correct security pricing is vital for a properly functioning bond market. Credit ratings may be limited in this purpose, as we show that credit spreads incorporate additional information beyond credit ratings. Given the contracting complexity of securitization and covered bond transactions and the frequent unavailability of detailed information about European collateral pools, many investors do not have the expertise to price these bonds correctly and have to rely on credit ratings (Brennan *et al.*, 2009; Coval *et al.*, 2009a,b; Pagano and Volpin, 2012). We also show that rules and regulations implemented in relation to the conduct of credit rating agencies and securitization markets in the European Union, as a response to the 2008 financial crisis, allowed investors' reliance on credit ratings to be

reduced, but have not eliminated the mispricing effect. Therefore, standardization and reduction of complexity coupled with increased transparency of credit ratings alone may not avoid the mispricing effect on structured finance markets. Our results imply that, in line with Arnold *et al.* (2021), desirable policies should help investors to form realistic expectations by enabling them to make an informed assessment of the creditworthiness of a given securitization instrument.

Several investors present evidence of 'rating inflation' in securitization products in the run-up to the 2008 financial crisis (Griffin *et al.*, 2013; Cornaggia *et al.*, 2017). This led legislators and regulators to propose that ratings should be applied consistently across asset classes. We show that a standardized credit rating approach transversal to all bond classes can be dangerous as we document differences in credit spreads between securitization and covered bonds, by rating scales and over time.

Finally, we conclude that bond markets respond efficiently to the announcement of asset purchase programmes when there is a clear rationale for central bank intervention. We identify an easing of bank funding conditions through the emission of PCB and MCB due to the announcement and implementation of CBPP1 and CBPP3, but not for CBPP2. This indicates that market participants largely expected the programme or that it was not equipped to solve the prevalent sovereign debt crisis. Additionally, although PEPP caused spreads to fall for covered bonds, this did not happen for securitization. Similarly, we find negative spillovers of both CBPP1 and CBPP2 on MBS credit spreads. The response to the 2008 financial crisis, the subsequent European sovereign debt crisis and the COVID-19 pandemic created a suite of tools for crisis response. This work contributes to the discussion on how these tools might be implemented and how effective they have proven to be.

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Table 1 Geographic distribution and top originating/issuing banks

This table presents the tranche allocation to originating/issuing banks in a particular country - Panel A -, and provides information on the biggest players and their relative importance in securitization and covered bond markets, by bond type - Panel B. Data are for tranches with credit spread and tranche amount available, closed by European banks during the 2000-2020 period

Panel A: Geographic distribution

Geographic location of originator/ issuer	Securitization Bonds					
	ABS			MBS		
	Number of tranches	Total value [€ Million]	Percent of total value	Number of tranches	Total value [€ Million]	Percent of total value
Austria						
Belgium				45	43 006	2.53
Cyprus						
Denmark						
Finland				13	8 485	0.50
France	22	3 645	2.05	156	41 933	2.46
Germany	136	12 823	7.22	329	77 152	4.54
Greece	21	15 115	8.51	39	15 245	0.90
Ireland	1	172	0.10	187	58 744	3.45
Italy	81	24 258	13.66	424	178 201	10.48
Luxembourg	1	115	0.06			
Netherlands	19	4 468	2.52	856	378 142	22.23
Portugal	19	6 146	3.46	110	38 858	2.28
Spain	353	99 087	55.80	804	272 838	16.04
Sweden						
United Kingdom	67	11 749	6.62	1 754	588 531	34.60
Total	**720**	**177 578**	**100.00**	**4 717**	**1 701 135**	**100.00**
Geographic location of originator/ issuer	**Covered Bonds**					
	PCB			MCB		
	Number of tranches	Total value [€ Million]	Percent of total value	Number of tranches	Total value [€ Million]	Percent of total value
Austria	87	21 920	1.48	164	31 544	1.58
Belgium	692	105 184	7.09	189	58 340	2.93
Cyprus				1	1 000	0.05
Denmark	1	1 000	0.07	8	7 750	0.39
Finland	6	3 650	0.25	49	35 364	1.78
France	85	55 178	3.72	1 029	485 209	24.36
Germany	5 830	973 448	65.58	3 828	492 271	24.71
Greece	2	1 250	0.08	7	6 250	0.31
Ireland	17	12 340	0.83	41	24 011	1.21
Italy	104	35 632	2.40	597	181 584	9.11
Luxembourg	1	37	0.00			
Netherlands	12	11 808	0.80	116	83 999	4.22
Portugal	2	2 500	0.17	42	35 005	1.76
Spain	146	175 414	11.82	490	403 616	20.26
Sweden	65	17 246	1.16	102	23 769	1.19
United Kingdom	41	67 741	4.56	161	122 505	6.15
Total	**7 091**	**1 484 348**	**100.00**	**6 824**	**1 992 218**	**100.00**

(Continues)

Table 2 (Continued)

Panel B: Top originators/issuers

Securitization Bonds	**ABS**			**MBS**	
	By value of deals	**By number of deals**		**By value of deals**	**By number of deals**
Banco Santander, S.A.	19.2%	7.9%	Lloyds Banking Group plc	13.0%	5.0%
La Caixa	10.4%	6.4%	UK Asset Resolution Ltd	11.1%	4.6%
Banco Popular Espanol, S.A.	7.6%	6.0%	Banco Santander, S.A.	11.0%	5.7%
BBVA, S.A.	7.1%	5.0%	ABN AMRO Group NV	7.6%	1.9%
Banco de Sabadell, S.A.	5.3%	6.1%	Royal Bank of Scotland Group plc	6.5%	3.6%
Lloyds Banking Group plc	4.0%	2.8%	Rabobank Nederland	4.1%	3.1%
UniCredit SpA	3.9%	5.3%	Barclays plc	3.7%	1.7%
Millennium BCP	3.0%	1.4%	Deutsche Bank AG	2.1%	0.6%
Eurobank Ergasias, S.A.	2.8%	1.1%	ING Groep NV	1.8%	0.6%
ABN AMRO Group NV	2.7%	0.6%	BBVA, S.A.	1.7%	1.5%
Covered Bonds	**PCB**			**MCB**	
	By value of deals	**By number of deals**		**By value of deals**	**By number of deals**
Commerzbank AG	11.2%	10.4%	BPCE, S.A.	7.7%	6.9%
Landesbank Baden-Wuerttemberg	9.4%	16.8%	Banco Santander, S.A.	5.9%	1.8%
Conf. Espanola de Cajas de Ahorros, S.A.	9.1%	0.8%	UniCredit SpA	4.0%	6.8%
Norddeutsche Landesbank Girozentrale	7.7%	11.7%	La Caixa	3.9%	1.0%
Landesbank Hessen-Helaba	5.5%	6.4%	BBVA, S.A.	3.6%	0.8%
BayernLB Holding AG	4.7%	7.6%	Commerzbank AG	3.5%	10.1%
DZ Bank AG	3.9%	7.2%	Caisse de Refinanc. de l'Habitat, S.A.	3.2%	2.3%
SFIL-Société de Financement Local	3.8%	2.0%	BFA Tenedora de Acciones, S.A.	2.5%	0.7%
Dexia, S.A.	3.6%	7.8%	SFIL-Société de Financement Local	2.3%	2.6%
DekaBank Deutsche Girozentrale	3.1%	2.7%	Aareal Bank AG	2.3%	5.4%

Table 3 Definition of variables, sources, and the expected impact on credit spread.

This table presents the definition of variables, sources and the expected impact on credit spread. The following characters mean: – = negative impact on the credit spread | + = positive impact on the credit spread | NL = Not linear | ? = the impact cannot be clear determined following extant literature

Variable	Description	Source	Expected impact on credit spread			
			ABS	MBS	PCB	MCB
Dependent Variables						
Credit spread	Margin yielded by the security at issue above a corresponding currency treasury benchmark with a comparable maturity (OAS). Floating rate bonds were converted to fixed rates using fixed-for-floating rate swaps.	DCM Analytics and Datastream				
WAS	Weighted average spread, calculated as the sum of the product of the weight of each tranche in the transaction size and the tranche's credit spread.	Authors				
Independent variables:						
Contractual characteristics						
ABS	Dummy equal to 1 if the bond is an asset-backed security, and 0 otherwise.	DCM Analytics				
MBS	Dummy equal to 1 if the bond is an mortgage-backed security, and 0 otherwise.	DCM Analytics				
PCB	Dummy equal to 1 if the bond is a public covered bond, and 0 otherwise.	DCM Analytics				
MCB	Dummy equal to 1 if the bond is a mortgage covered bond, and 0 otherwise.	DCM Analytics				
Rated	Dummy equal to 1 if the bond has a credit rating from S&P or Moody's, and 0 otherwise.	DCM Analytics	-	-	-	-
Rating	Bond rating based on the S&P and Moody's rating at the time of bond issuance. The rating is converted as follows: AAA=Aaa=1, AA+=Aa1=2, and so on until D=22.	DCM Analytics	+	+	+	+
WAR	Weighted average rating, calculated as the sum of the product of the weight of each tranche in the transaction size and the tranche's rating.	Authors				
Rating discordance	Dummy equal to 1 if S&P and Moody's assign a different credit rating for the same tranche, and 0 otherwise.	DCM Analytics	+	+	+	+
Maturity	Maturity of bonds, in years.	DCM Analytics	NL	NL	+	+
WAM	Weighted average maturity, calculated as the sum of the product of the weight of each tranche in the transaction size and the tranche's maturity.	Authors				
Transaction size	Bond transaction size. Transaction size is converted into Euro millions when necessary.	DCM Analytics	-	-	-	-
Tranche rank	Ordinal variable that ranges from 1 to 26 depending on the seniority of the tranche within the deal - a proxy of the subordination level.	DCM Analytics	+	+	-	-
Number of tranches	The number of tranches per transaction.	DCM Analytics	-	-	+	+
Currency risk	Dummy equal to 1 for bonds that are denominated in a currency different from the currency in the deal's nationality, and 0 otherwise.	DCM Analytics	+	+	+	+

(Continues)

Table 4 (Continued)

Variable	Description	Source	Expected impact on credit spread			
			ABS	MBS	PCB	MCB
Fixed rate	Dummy equal to 1 if a bond is fixed price, and 0 otherwise.	DCM Analytics	+	+	+	+
Number of banks	The number of banks participating in bond issuance, as bookrunners, underwriters or servicers.	DCM Analytics	-	-	-	-
Bank reputation	EMEA bookrunners rank according to Thomson Reuters League Tables. Ranks range from 1-best to 25-worst. If the bank does not appear in the league table it is rated 26.	Thomson Reuters DMI	-	-	-	-
Callable	Dummy equal to 1 if the bond has a call option, and 0 otherwise.	DCM Analytics	+	+	+	+
Macroeconomic factors						
Volatility	The Chicago Board Options Exchange Volatility Index (VIX).	Datastream	+	+	+	+
EUSA5y-Libor3M	The difference between the five-year Euro swap rate and the 3-month Libor rate.	Datastream	-	-	-	-
Country risk	S&P's country credit rating at close. The rating is converted as follows: AAA=1, AA+=2, and so on until D=22.	S&P Global Ratings	+	+	+	+
Financial crisis	Dummy equal to 1 if the issue date belongs to the 2007-2008 financial crisis period (from September 15, 2008 - Lehman Brothers' bankruptcy filing date - through to April 23, 2010), and 0 otherwise.	Authors	+	+	+	+
Sovereign crisis	Dummy equal to 1 if the issue date belongs to the European sovereign debt crisis (from April 24, 2010 through to December 31, 2014), and 0 otherwise.	Authors	+	+	+	+
Creditor rights	Measured using La Porta, Lopez-de-Silanes, Shleifer and Vishny's (1998) indices. We use four creditor rights variables (no automatic stay on assets; secured creditors first paid; restrictions for going into reorganization; management does not stay in reorganization) and added up the scores to create an index as in Esty and Megginson (2003).	LLSV (1998)	-	-	-	-
Enforcement	Measured using La Porta, Lopez-de-Silanes, Shleifer and Vishny's (1998) indices. We use five enforcement variables (efficiency of judicial system; rule of law; corruption; risk of expropriation; risk of contract repudiation) and added up the scores to create an index.	LLSV (1998)	-	-	-	-
CBPP1	Dummy equal to 1 if the bond was issued during the first CBPP (from May 7, 2009 through to June 30, 2010), and 0 otherwise.	ECB	?	?	-	-
CBPP2	Dummy equal to 1 if the bond was issued during the second CBPP (from October 6, 2011 through to October 31, 2012), and 0 otherwise.	ECB	?	?	-	-
CBPP3 / ABSPP	Dummy equal to 1 if the bond was issued during the third CBPP or the first ABS Purchase Programme (from September 4, 2014 through to December 19, 2018 & from November 1, 2019 through to December 31, 2020), and 0 otherwise.	ECB	-	-	-	-

(Continues)

Table 5 (Continued)

Variable	Description	Source	Expected impact on credit spread			
			ABS	MBS	PCB	MCB
PEPP	Dummy equal to 1 if the bond was issued during the Pandemic Emergency Purchase Programme (from March 18, 2020 through to December 31, 2020), and 0 otherwise.	ECB	-	-	-	-
EU462	Dummy equal to 1 if the bond was issued after the Regulation (EU) No 462/2013 came into force (from June 20, 2013 through to December 31, 2020), and 0 otherwise.	European Comission	-	-	-	-
EU2402	Dummy equal to 1 if the bond was issued after the Regulation (EU) 2017/2402 came into force (from January 1, 2019 through to December 31, 2020), and 0 otherwise.	European Comission	-	-	?	?
Banks' characteristics						
Total assets	Banks' total assets measured in Euro million.	BankFocus	-	-	-	-
Loan ratio	The ratio of net loans to total assets.	BankFocus	+	+	+	+
Liquid assets to deposits & ST 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.	BankFocus	-	-	-	-
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.	BankFocus	-	-	-	-
Return on assets	The net income divided by total assets.	BankFocus	-	-	-	-
Non-performing loans ratio	The ratio of total non-performing (or doubtful) loans to gross loans.	BankFocus	+	+	+	+

Table 6 Univariate statistics - pricing features associated with bonds compared

This table reports summary statistics for a sample of securitization – ABS and MBS – and covered bonds – PCB and MCB –, issued during the 2000-2020 period. We test for similar distributions in contractual characteristics using the Wilcoxon rank-sum test for continuous variables and the Fisher's exact test for discrete ones. a indicates significant difference at the 1% level between all securitization and covered bond tranches. b indicates significant difference at the 1% level between ABS and PCB tranches. c indicates significant difference at the 1% level between MBS and MCB tranches. For a definition of the variables, see Table 2

Variable of interest	Securitization Bonds			Covered bonds			Variable of interest	Securitization Bonds			Covered bonds		
	All	ABS	MBS	All	PCB	MCB		All	ABS	MBS	All	PCB	MCB
Univariate analysis - continuous variables													
Credit spread (bps)							**Transaction size (€ Million)**						
Number	5 437	720	4 717	13 915	7 091	6 824	Number	5 437	720	4 717	13 915	7 091	6 824
Mean	107.0 [a]	139.2 [b]	102.1 [c]	48.4 [a]	35.6 [b]	61.7 [c]	Mean	1 909.6 [a]	1 020.8 [b]	2 045.3 [c]	263.5 [a]	220.4 [b]	308.3 [c]
Median	69.1	74.6	68.4	33.3	24.5	45.0	Median	994.2	649.8	1 005.0	100.0	100.0	100.0
Rating [1-22 weak]							**Tranche size (€ Million)**						
Number	5 079	651	4 428	12 650	6 555	6 095	Number	5 437	720	4 717	13 915	7 091	6 824
Mean	4.5 [a]	5.6 [b]	4.3 [c]	1.6 [a]	1.4 [b]	1.8 [c]	Mean	345.5	246.6	360.6	249.8	209.3	291.9
Median	3.0	5.0	3.0	1.0	1.0	1.0	Median	71.2	72.7	71.2	100.0	100.0	100.0
Tranche rank							**Number of banks**						
Number	5 437	720	4 717	13 915	7 091	6 824	Number	5 437	720	4 717	13 915	7 091	6 824
Mean	3.6 [a]	2.9 [b]	3.7 [c]	1.0 [a]	1.0 [b]	1.0 [c]	Mean	2.7 [a]	1.9 [b]	2.8 [c]	2.2 [a]	2.1 [b]	2.3 [c]
Median	3.0	3.0	3.0	1.0	1.0	1.0	Median	2.0	1.0	2.0	1.0	1.0	1.0
Maturity (years)							**Country risk [1-22 weak]**						
Number	5 437	720	4 717	13 915	7 091	6 824	Number	5 437	720	4 717	13 915	7 091	6 824
Mean	34.4 [a]	25.9 [b]	35.7 [c]	5.9 [a]	5.6 [b]	6.3 [c]	Mean	1.8 [a]	2.2 [b]	1.7 [c]	1.4 [a]	1.2 [b]	1.7 [c]
Median	36.0	29.6	36.8	5.0	5.0	5.0	Median	1.0	1.0	1.0	1.0	1.0	1.0
Number of tranches							**Creditor rigths**						
Number	5 437	720	4 717	13 915	7 091	6 824	Number	5 437	720	4 717	13 915	7 091	6 824
Mean	6.6 [a]	4.9 [b]	6.9 [c]	1.0 [a]	1.0 [b]	1.0 [c]	Mean	2.6 [a]	2.3 [b]	2.7 [c]	2.6 [a]	2.8 [b]	2.3 [c]
Median	6.0	5.0	6.0	1.0	1.0	1.0	Median	2.0	2.0	2.0	3.0	3.0	3.0
Univariate analysis - dummy variables													
Fixed rate							**Currency risk**						
Nr. of tranches	5 437	720	4 717	13 915	7 091	6 824	Nr. of tranches	5 437	720	4 717	13 915	7 091	6 824
Nr. d=1	235 [a]	74 [b]	161 [c]	12 466 [a]	6 497 [b]	5 969 [c]	Nr. d=1	1 202 [a]	31 [b]	1 171 [c]	1 233 [a]	582 [b]	651 [c]
% of total	4.3%	10.3%	3.4%	89.6%	91.6%	87.5%	% of total	22.1%	4.3%	24.8%	8.9%	8.2%	9.5%
Rating discordance							**U.K. borrowers**						
Nr. of tranches	5 427	710	4 717	13 915	7 091	6 824	Nr. of tranches	5 437	720	4 717	13 915	7 091	6 824
Nr. d=1	501 [a]	59 [b]	442 [c]	616 [a]	154 [b]	462 [c]	Nr. d=1	1 821 [a]	67 [b]	1 754 [c]	200 [a]	39 [b]	161 [c]
% of total	9.2%	8.3%	9.4%	4.4%	2.2%	6.8%	% of total	33.5%	9.3%	37.2%	1.4%	0.5%	2.4%
Callable							**Pre-crisis period**						
Nr. of tranches	5 437	720	4 717	13 915	7 091	6 824	Nr. of tranches	5 437	720	4 717	13 915	7 091	6 824
Nr. d=1	3 408 [a]	466 [b]	2 942 [c]	1 536 [a]	987 [b]	549 [c]	Nr. d=1	3 320 [a]	389 [b]	2 931 [c]	9 095 [a]	5 858 [b]	3 237 [c]
% of total	62.7%	64.7%	62.4%	11.0%	13.9%	8.0%	% of total	61.1%	54.0%	62.1%	65.4%	82.6%	47.4%

Table 4 Regression analyses of the determinants of credit spreads

This table presents the results of an OLS regression analysis of the determinants of bond credit spreads for: (*i*) a sample of 5,437 securitization bonds, of which 720 are ABS and 4,717 MBS – model [1]; and (*ii*) a sample of 13,915 covered bonds, of which 7,091 are PCB and 6,824 MCB – model [2]. Models are re-estimated for two periods: a pre-crisis period from January 1, 2000 through to September 14, 2008, and a crisis period from September 15, 2008 (the first trading day after Lehman Brothers' bankruptcy filing the day before) through to December 31, 2020. For a definition of the variables, see Table 2. ***, ** and * indicate that the reported coefficients are significantly different from zero at the 1%, 5% and 10% levels, respectively. The *t*-statistics reported in parentheses are based on heteroskedasticity-consistent standard errors. We estimate standard errors clustered by year and country in models [1], [2], [3] and [4], and by year and bank in models [1a], [1b], [2a], [2b], [3a], [3b], [4a] and [4b]

Dependent variable:	[1]	[1a]	[1b]	[2]	[2a]	[2b]	[3]	[3a]	[3b]	[4]	[4a]	[4b]
.	Securitization bonds	Securitization bonds | pre-crisis	Securitization bonds | crisis	Covered bonds	Covered bonds | pre-crisis	Covered bonds | crisis	ABS vesus PCB	ABS vesus PCB | pre-crisis	ABS vesus PCB | crisis	MBS versus MCB	MBS versus MCB | pre-crisis	MBS versus MCB | crisis
Independent variables:												
Intercept	75.88	169.86	15.81	200.57 *	215.56 ***	423.61 ***	-96.44	130.75	85.60	-11.76	-102.51 **	171.70 **
	(1.13)	(1.13)	(0.12)	(1.78)	(3.53)	(5.85)	(-0.74)	(1.14)	(0.24)	(-0.20)	(-2.36)	(2.02)
MBS	-28.39 **	-20.15 *	-34.65 **							41.07 ***	20.41 ***	78.91 ***
	(-2.12)	(-1.92)	(-2.15)							(4.60)	(2.93)	(6.56)
MCB				-0.01	1.13	4.92						
				(0.00)	(0.59)	(1.27)						
ABS							41.83 **	44.18 *	121.19 ***			
							(2.04)	(1.85)	(3.86)			
Rated	-113.96 ***	-95.28 *	-128.22 ***	5.00	2.31	6.30	-22.31 ***	-10.46	-81.27 **	-16.05 ***	-3.01	-21.74 **
	(-5.97)	(-1.93)	(-3.96)	(1.32)	(0.56)	(1.15)	(-2.68)	(-0.52)	(-2.39)	(-2.56)	(-0.64)	(-1.96)
AA+	5.81	9.23	8.08	-1.18	-6.07	-5.99 *	1.42	13.36	-0.13	0.52	-1.03	-4.44
	(0.82)	(0.68)	(0.60)	(-0.27)	(-1.35)	(-1.76)	(0.36)	(1.08)	(-0.01)	(0.10)	(-0.22)	(-0.89)
AA	8.72 *	12.38 ***	12.50	8.47 *	-2.74	-6.00	-15.07	20.73	-26.95	6.03	2.74	10.05
	(1.93)	(2.62)	(1.00)	(1.86)	(-0.56)	(-0.77)	(-1.25)	(1.32)	(-1.51)	(1.57)	(0.7)	(1.07)
AA-	26.31 ***	-13.42	47.12 ***	4.87	6.88	3.40	-3.78	-5.36	25.02	13.93 **	8.45 *	8.87
	(2.57)	(-0.61)	(2.61)	(1.04)	(1.25)	(0.63)	(-0.75)	(-0.28)	(1.24)	(2.23)	(1.86)	(1.15)
A+	38.11 ***	39.12 ***	48.44 ***	10.73 **	11.46	5.40	2.69	57.32	-30.86	24.60 ***	20.33 ***	26.48 ***
	(4.86)	(3.68)	(3.66)	(2.34)	(1.26)	(0.47)	(0.18)	(1.46)	(-1.40)	(4.91)	(3.69)	(2.63)
A	35.50 ***	29.15 ***	39.84 ***	8.29	10.53	-0.14	-4.19	24.83	-39.26	24.85 ***	20.65 ***	28.52 ***
	(6.76)	(5.35)	(3.37)	(1.43)	(1.29)	(-0.01)	(-0.39)	(1.26)	(-1.51)	(4.88)	(5.31)	(3.02)
A-	66.73 ***	33.40 ***	67.01 ***	28.98 **	15.40 *	41.01 ***	1.95	18.49 **	-12.62	60.28 ***	28.48 ***	62.62 ***
	(5.36)	(2.87)	(3.10)	(2.07)	(1.7)	(2.59)	(0.15)	(2.11)	(-0.50)	(5.67)	(3.02)	(3.74)
BBB+	66.49 ***	53.27 ***	88.23 ***	18.72 ***	-13.63 *	23.95 *	6.33	16.62	10.91	46.99 ***	32.28 **	45.22 **
	(7.43)	(4.29)	(3.84)	(3.13)	(-1.74)	(1.8)	(1.39)	(0.66)	(0.30)	(4.72)	(2.43)	(2.09)
BBB	73.10 ***	73.73 ***	99.54 ***	50.04 ***		59.80 **	46.12 *	108.87 **	6.25	61.81 ***	61.20 ***	100.50 ***
	(11.86)	(9.82)	(6.34)	(2.86)		(2.31)	(1.94)	(2.22)	(0.14)	(11.23)	(10.27)	(5.85)
BBB-	100.76 ***	79.02 ***	103.88 ***	46.06 *		62.51	35.56	68.52 ***	9.54	93.06 ***	74.22 ***	91.00 ***
	(9.30)	(9.67)	(6.60)	(1.66)		(1.44)	(1.45)	(2.63)	(0.28)	(7.63)	(8.41)	(5.41)
BB+	215.18 ***	214.70 ***	211.46 ***				221.96 ***	219.32 ***	185.89 ***	209.57 ***	211.45 ***	208.49 ***
	(12.63)	(13.28)	(6.99)				(4.65)	(5.84)	(2.78)	(12.73)	(9.47)	(5.33)

(Continues)

Table 4 (Continued)

Dependent variable:	[1]	[1a]	[1b]	[2]	[2a]	[2b]	[3]	[3a]	[3b]	[4]	[4a]	[4b]
.	Securitization bonds	Securitization bonds | pre-crisis	Securitization bonds | crisis	Covered bonds	Covered bonds | pre-crisis	Covered bonds | crisis	ABS vesus PCB	ABS vesus PCB | pre-crisis	ABS vesus PCB | crisis	MBS versus MCB	MBS versus MCB | pre-crisis	MBS versus MCB | crisis
BB	234.26 ***	284.09 ***	216.59 ***				228.39 ***	385.68 ***	224.10 **	222.42 ***	254.23 ***	183.23 ***
	(14.21)	(10.75)	(6.30)				(4.03)	(3.46)	(2.09)	(14.47)	(14.92)	(5.51)
BB-	217.34 ***	220.09 ***	192.35 ***	147.96 *		163.61 **	121.30 ***	111.94 **	58.02	218.85 ***	219.85 ***	206.27 ***
	(10.65)	(7.19)	(8.44)	(1.93)		(2.25)	(2.61)	(2.23)	(1.53)	(10)	(6.46)	(7.66)
B+	148.62 ***	523.81 ***	121.65 **				24.86	542.02 ***	18.18	136.74 ***		99.61
	(3.90)	(16.42)	(2.12)				(0.26)	(8.75)	(0.20)	(3.32)		(1.23)
B	205.53 ***	211.38 ***	156.23 **	87.83 *		112.36 ***	136.68	231.47 ***	58.74	186.10 ***		145.96 ***
	(5.01)	(3.33)	(1.98)	(1.91)		(3.84)	(1.26)	(4.34)	(0.42)	(7.27)		(3.70)
B-	272.49 ***	568.10 ***	192.52 ***				266.08	1068.08 ***	112.75 ***	274.66 ***	315.43 ***	233.82 ***
	(5.07)	(2.97)	(6.24)				(1.33)	(14.83)	(2.65)	(11.27)	(41.47)	(7.17)
CCC+	29.91		81.90 ***				-11.48		91.26 **	-9.54		15.55
	(1.00)		(2.89)				(-0.19)		(2.30)	(-0.35)		(0.43)
CCC	212.32 ***	292.42 ***	32.15 **				161.76 ***			193.65 ***	274.23 ***	-29.87 **
	(4.71)	(5.00)	(2.05)				(5.01)			(3.20)	(4.39)	(-2.25)
CCC-	281.07 ***	336.69 ***	12.65				259.92 ***	366.56 ***	1.51	263.85 ***	316.53 ***	-4.20
	(5.65)	(14.56)	(0.78)				(2.88)	(14.68)	(0.08)	(5.07)	(8.91)	(-0.28)
CC	280.63 ***	275.04 ***	293.79 ***				144.25	241.53 **	297.87 ***	308.71 ***	282.30 ***	88.73
	(6.33)	(5.29)	(4.63)				(1.60)	(2.28)	(10.56)	(7.78)	(6.2)	(0.81)
D	196.73 ***	188.70	154.30 **				132.18 **	194.33	-55.40 **	159.68 **		82.68
	(4.65)	(1.38)	(2.48)				(1.99)	(1.47)	(-2.29)	(2.23)		(1.10)
Bank characteristics	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Contractual characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Macroeconomic factors	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	5 437	1 153	1 146	13 915	2 124	3 124	7 811	1 389	1 162	11 541	1 888	3 108
Adjusted R^2	0.44	0.55	0.49	0.41	0.23	0.52	0.30	0.50	0.37	0.45	0.69	0.46
Rated and rating dummies as independent variables only												
Adjusted R^2	0.31	0.54	0.28	0.03	0.02	0.04	0.16	0.39	0.16	0.25	0.63	0.25
Differences in adjusted R^2	0.13	0.01	0.21	0.37	0.22	0.49	0.15	0.10	0.21	0.20	0.07	0.46

Table 5 Endogenous switching regression models

This table presents the results of estimating endogenous switching regression models on: (*i*) a sub-sample of 403 ABS and 2,193 PCB – model [5]; and (*ii*) a sub-sample of 1,902 MBS and 3,094 MCB – model [6]. Sub-samples include observations with available accounting and market information on banks that closed ABS, MBS, PCB, and MCB in the 2000-2020 period. We implement the full information maximum likelihood (FIML) method to simultaneously estimate binary and continuous parts of the model to yield consistent standard errors. For a definition of the variables, see Table 2. ***, ** and * indicate that the reported coefficients are significantly different from zero at the 1%, 5% and 10% levels, respectively. The *z*-statistics reported in parentheses are based on heteroskedasticity-consistent standard errors. We estimated standard errors clustered by year and bank. Average treatment effects for credit spreads of ABS *versus* PCB and MBS *versus* MCB were obtained through bootstrapping

Dependent variable:	[5]		[6]	
Credit spread (bps)	ABS	PCB	MBS	MCB
Independent variables:				
Intercept	1 086.46	284.08 ***	174.18 ***	128.29 ***
	(1.29)	(6.94)	(3.50)	(3.66)
Rated	-371.30 ***	-2.54	-96.05 ***	7.59 **
	(-3.66)	(-0.49)	(-5.83)	(2.33)
Rating*rated	14.38 ***	2.10 *	14.11 ***	2.66 ***
	(7.18)	(1.83)	(18.83)	(3.91)
Rating discordance	-43.97	3.65	-7.11	-2.75
	(-1.50)	(0.71)	(-1.11)	(-0.51)
Maturity	0.60	1.06 *	0.94 ***	1.21 ***
	(0.19)	(1.72)	(3.29)	(3.00)
Log maturity	-47.92	-6.90 **	-38.46 ***	-11.19 ***
	(-0.60)	(-2.19)	(-4.82)	(-4.34)
Log transaction size	-24.14 *	-0.31	-8.22 ***	9.11 ***
	(-1.78)	(-0.42)	(-3.54)	(11.23)
Tranche rank	6.21	-6.11	0.51	-19.67 ***
	(1.02)	(-0.91)	(0.87)	(-3.32)
Currency risk	202.54 *	15.11 ***	6.79	13.57 ***
	(1.88)	(5.10)	(1.42)	(4.64)
Fixed rate	-460.01 **	7.54 **	-11.48 *	11.00 ***
	(-2.10)	(2.41)	(-1.79)	(3.85)
Number of banks	-1.97	-0.15 ***	-1.09	-2.27 ***
	(-0.28)	(-2.43)	(-1.40)	(-4.24)
Bank reputation	-0.79	0.38 ***	-0.12	0.24 *
	(-0.57)	(2.79)	(-0.48)	(1.78)
Country risk	2.47	6.85 ***	7.47 ***	2.36 ***
	(0.11)	(2.97)	(4.07)	(2.61)
Creditor rights	31.09	0.60	-2.74 ***	-2.83 ***
	(0.72)	(0.28)	(-2.33)	(-2.50)
Enforcement	2.69	-6.10 ***	4.20 ***	-3.86 ***
	(0.23)	(-6.44)	(6.27)	(-6.82)
Financial crisis	37.46	32.16 ***	-7.10	37.32 ***
	(0.63)	(5.61)	(-0.53)	(8.14)
Sovereign crisis	24.97	55.51 ***	78.04 ***	58.43 ***
	(0.36)	(10.69)	(8.23)	(18.60)
Volatility	-2.29	1.09 ***	-0.23	1.49 ***
	(-1.49)	(5.52)	(-0.67)	(10.00)
EUSA5y-Libor3M	-0.48 **	-0.06 ***	-0.22 ***	-0.01 ***
	(-1.99)	(-3.12)	(-4.33)	(-3.51)
CBPP1	16.89	-6.02 **	32.17 ***	-8.97 **
	(0.37)	(-1.91)	(2.50)	(-2.22)
CBPP2	-27.65	28.48 ***	29.33 ***	38.91 ***
	(-0.49)	(2.49)	(3.29)	(8.05)

(Continues)

Table 5 (Continued)

Dependent variable:	[5]		[6]	
Credit spread (bps)	ABS	PCB	MBS	MCB
CBPP3/ABSPP	161.11	-33.29 ***	-62.53 ***	-27.80 ***
	(0.58)	(-3.81)	(-4.65)	(-6.49)
PEPP		-56.34 ***	47.26	-61.99 ***
		(-4.19)	(1.45)	(-9.87)
EU462	-97.61	-34.36 ***	-26.05 **	-35.10 ***
	(-0.32)	(-4.91)	(-2.20)	(-8.65)
EU2402	130.94	39.35 ***	51.03 ***	26.75 ***
	(0.43)	(4.22)	(3.56)	(5.76)
Log total assets	-12.83	-0.30	-0.43	0.09
	(-0.69)	(-0.26)	(-0.30)	(0.10)
Return on assets	16.40	2.40	-2.54	-9.57 ***
	(0.51)	(0.58)	(-0.67)	(-2.85)
Loan ratio	-3.74 *	0.32 ***	-0.67 ***	0.62 ***
	(-1.84)	(3.35)	(-4.19)	(7.73)
Liquid assets to deposits & ST funding	-0.67	-0.04	-0.47 ***	0.00
	(-0.99)	(-1.03)	(-5.10)	(-0.10)
Capital adequacy ratio	-1.73 ***	-1.32 ***	-0.87 **	-0.08 **
	(-4.84)	(-3.35)	(-1.95)	(-2.30)
Non-performing loans ratio	-0.72	-1.15 ***	-1.73 **	0.04
	(-0.24)	(-2.68)	(-2.30)	(0.09)

Dependent variable: Probability of observing:	ABS versus PCB	MBS versus MCB
Independent variables:		
Intercept	-19.12 ***	-21.04 ***
	(-2.63)	(-6.43)
Rated	-2.24	-2.27 ***
	(-1.55)	(-5.01)
Rating*rated	0.03	0.11 *
	(0.52)	(1.83)
Rating discordance	0.31	0.52
	(0.42)	(1.31)
Maturity	0.18 ***	0.20 ***
	(4.63)	(5.65)
Log maturity	-0.09	0.88 ***
	(-0.26)	(2.92)
Log transaction size	1.24 ***	1.17 ***
	(6.31)	(8.12)
Tranche rank	1.78 ***	1.27 ***
	(4.56)	(3.35)
Currency risk	0.52	-0.26
	(0.83)	(-0.75)
Fixed rate	-3.90 ***	-5.79 ***
	(-6.69)	(-6.96)
Number of banks	-0.42 ***	-0.11
	(-4.97)	(-1.02)
Bank reputation	-0.11 ***	0.01
	(-3.33)	(0.76)
Country risk	0.10	0.05
	(1.24)	(0.54)
Creditor rights	0.06	0.12
	(0.20)	(1.08)
Enforcement	0.20	0.22 ***
	(1.46)	(3.45)

(Continues)

Table 5 (Continued)

Dependent variable: Probability of observing:	ABS versus PCB		MBS versus MCB	
Financial crisis	2.65		0.32	
	(1.34)		(0.34)	
Sovereign crisis	1.61	***	-0.64	
	(2.80)		(-1.41)	
Volatility	-0.04		-0.07	***
	(-1.02)		(-3.53)	
EUSA5y-Libor3M	-0.01		0.00	
	(-0.80)		(-1.03)	
CBPP1	-0.63		0.57	
	(-0.76)		(0.64)	
CBPP2	-1.00	*	-0.26	
	(-1.73)		(-0.47)	
CBPP3	0.30		-0.27	
	(0.53)		(-0.59)	
PEPP	-3.97	***	-3.04	***
	(-4.57)		(-3.42)	
EU462	0.17		0.07	
	(0.36)		(0.16)	
EU2402	0.81		1.34	**
	(1.14)		(2.41)	
Log total assets	-0.03		0.24	***
	(-0.21)		(3.30)	
Return on assets	1.10	***	0.62	***
	(2.64)		(4.40)	
Loan ratio	0.05	***	-0.03	***
	(3.44)		(-4.03)	
Liquid assets to deposits & ST funding	0.02	***	-0.01	**
	(3.02)		(-1.94)	
Capital adequacy ratio	-0.05	***	-0.09	**
	(-2.75)		(-1.95)	
Non-performing loans ratio	0.08		0.02	
	(0.89)		(0.80)	
Number of observations	2 596		4 996	
Average treatment effect	85.75	***	22.99	***
	(4.70)		(9.09)	
Wald chi2	1 107.12	***	2 095.92	***
Log pseudolikelihood	-13 765.83		-26 846.25	
Wald test of indep. equations	5.02	*	13.56	***

Table 6 Regression analyses of credit spreads by rating category

This table presents the results of an OLS regression analysis of the determinants of bond credit spreads for a sample of 5,437 securitization bonds and 13,915 covered bonds with available information on credit rating. Models [3] and [4] of Table 4 are re-estimated for a sample including both securitization and covered bonds simultaneously – model [7] – as well as sub-samples by rating scales – models [7a] to [7j]. *Securitization*, *ABS*, and *MBS* are dummy variables. In the top panel, we compare all securitization bond with all covered bond credit spreads. In the middle panels we separate the sample between the pre- and crisis periods, while in the bottom panels, we compare ABS with PCB and MBS with MCB credit spreads, respectively. For each panel we also calculate the average treatment effect (ATE) using equations (2) to (4) of an endogenous switching regression model. We obtain the standard errors for the ATE through bootstrapping. ***, ** and * indicate that the reported coefficients are significantly different from zero at the 1%, 5% and 10% levels, respectively. The *t*-statistics (OLS) as well as the *z*-statistics (ATE) reported in parentheses are based on heteroskedasticity-consistent standard errors. Due to time varying risk premia and cross-country differences, we estimate standard errors clustered by year and country

Dependent variable: Credit spread (bps)	[7] All bonds	[7a] AAA / Aaa	[7b] AA+ / Aa1	[7c] AA / Aa2	[7d] AA- / Aa3	[7e] A+ / A1	[7f] A / A2	[7g] A- / A3	[7h] BBB+ / Baa1	[7i] BBB / Baa2	[7j] BBB- / Baa3
Securitization *versus* covered bonds											
OLS / Securitization	39.02 ***	-1.18	-6.88	30.24 **	11.60 ***	43.69 *	62.11 ***	110.63 ***	39.06	174.67 ***	68.63
	(4.37)	(-0.20)	(-0.40)	(2.06)	(2.65)	(1.88)	(3.95)	(2.83)	(1.11)	(4.14)	(1.09)
Average treatment effect	58.45 ***	5.25 ***	48.59 ***	9.04 *	41.93 ***	22.32 ***	19.77 **	33.92 **	71.19 ***		
	(31.41)	(4.08)	(8.45)	(1.74)	(4.12)	(2.98)	(2.28)	(2.23)	(7.37)		
Number of observations	19 352	12 353	1 128	835	489	492	685	214	364	571	183
Adjusted R^2	0.39	0.32	0.46	0.47	0.30	0.34	0.38	0.47	0.65	0.37	0.56
Securitization *versus* covered bonds | pre-crisis											
OLS / Securitization	30.13 ***	2.94 ***	-20.31	27.44	17.56	67.21 **	67.45 ***	117.07 ***	82.47 ***	222.73 ***	
	(3.95)	(2.48)	(-1.11)	(1.60)	(0.68)	(2.11)	(4.24)	(2.99)	(2.89)	(3.37)	
Average treatment effect	57.10 ***	16.58 ***	29.87 ***	20.21 ***			18.38 ***			74.33 **	
	(24.73)	(14.99)	(4.04)	(5.89)			(2.99)			(1.99)	
Number of observations	12 415	7 870	723	546	266	261	466	79	260	459	
Adjusted R^2	0.38	0.10	0.18	0.21	0.16	0.25	0.26	0.38	0.56	0.29	
Securitization *versus* covered bonds | crisis											
OLS / Securitization	59.32 ***	1.80 ***	21.19	50.78 ***	14.84	62.45 **	48.16 *	82.44 *	66.8	148.14 ***	98.52
	(4.2)	(2.47)	(0.77)	(2.49)	(0.38)	(2.21)	(1.71)	(1.68)	(1.03)	(2.73)	(1.23)
Average treatment effect	53.84 ***	18.50 ***	38.86 ***	28.38 ***	58.06 ***	43.73 ***	37.80 ***	39.14 **	47.56 **		
	(17.35)	(4.39)	(4.91)	(2.93)	(4.42)	(3.20)	(2.06)	(2.01)	(2.00)		
Number of observations	6 937	4 483	405	289	223	231	219	135	104	112	101
Adjusted R^2	0.36	0.36	0.42	0.39	0.32	0.31	0.44	0.49	0.54	0.46	0.66
ABS *versus* PCB											
OLS / ABS	41.83 **	30.64 **	10.29 **	30.53	-112.94	25.88	85.25 **	65.90	-23.3	77.99 **	
	(2.04)	(2.04)	(2.27)	(1.55)	(-1.04)	(0.75)	(2.23)	(0.94)	(-0.28)	(2.02)	
Average treatment effect	103.41 ***	11.05 ***		-16.64	20.96	74.57 ***	20.04 ***				
	(11.48)	(2.68)		(-0.88)	(0.94)	(3.12)	(2.94)				
Number of observations	7 811	6 008	361	115	131	93	110	41	146	74	
Adjusted R^2	0.30	0.24	0.46	0.52	0.32	0.61	0.35	0.72	0.45	0.45	
MBS *versus* MCB											
OLS / MBS	41.07 ***	4.20 ***	-15.31	51.15 ***	12.25	44.10 **	72.90 ***	159.95 ***	78.27 **	140.11 ***	82.14 **
	(4.60)	(2.97)	(-0.78)	(4.19)	(0.45)	(2.24)	(4.22)	(3.43)	(2.06)	(3.64)	(2.22)
Average treatment effect	40.28 ***	10.46 ***	42.93 ***	13.91 ***	40.88 ***	6.94	17.09 **	38.40 **	41.39 ***		
	(23.83)	(6.68)	(6.57)	(2.69)	(3.98)	(0.87)	(1.97)	(2.28)	(2.84)		
Number of observations	11 541	6 345	767	720	358	399	575	173	218	497	157
Adjusted R^2	0.45	0.36	0.47	0.50	0.35	0.36	0.45	0.46	0.65	0.46	0.52

Table 7 Descriptive statistics for WAS and banks' characteristics

This table presents descriptive statistics for WAS and bank's characteristics. Our sample includes 5,588 transactions, of which 406 are securitization deals and 5,182 are covered bond deals. 177 and 1,806 transactions were closed by securitization originators only or covered bond issuers only, respectively. The switchers issued 3,605 of total transactions. We test for similar distributions in banks' characteristics across samples via the Wilcoxon rank-sum test. ***, **, and * indicate significant difference at the 1%, 5%, and 10% levels, respectively. For a definition of the variables, see Table 2

Variable of interest		All originators/issuers			Originators/issuers of			Switchers
		Securitization bonds	Covered bonds		Securitization bonds only	Covered bonds only		Securitization and Covered bonds
WAS_t (bps)	Mean	65.9	60.4		78.3	61.4		59.6
	Median	47.1	48.9		57.2	54.2		44.4
	Number	406	5 182		177	1 806		3 605
Total $assets_{t-1}$ (€ million)	Mean	717 541.7	526 033.3	***	691 000.0	298 000.0	***	654 000.0
	Median	404 000.0	442 000.0		449 000.0	215 000.0		500 000.0
	Number	406	5 182		177	1 806		3 605
Loan $ratio_{t-1}$	Mean	57.8%	44.5%	***	55.2%	44.9%	***	45.2%
	Median	61.94%	45.01%		61.03%	48.36%		43.33%
	Number	406	5 182		177	1 806		3 605
Liquid assets to deposits & ST $funding_{t-1}$	Mean	30.5%	49.4%	***	30.6%	54.0%	***	45.9%
	Median	22.19%	49.31%		18.54%	46.92%		48.67%
	Number	406	5 182		177	1 806		3 605
Capital adequacy $ratio_{t-1}$	Mean	13.3%	13.0%	***	14.2%	14.0%	**	12.5%
	Median	12.5%	12.30%		12.94%	12.50%		12.30%
	Number	406	5 182		177	1 806		3 605
Return on $assets_{t-1}$	Mean	0.7%	0.2%	***	0.6%	0.2%	***	19.6%
	Median	0.76%	0.17%		0.80%	0.18%		17.70%
	Number	406	5 182		177	1 806		3 605
Non-performing loans $ratio_{t-1}$	Mean	3.0%	3.9%	***	3.6%	3.5%	*	4.0%
	Median	2.00%	3.53%		2.46%	3.12%		3.69%
	Number	406	5 182		177	1 806		3 605

Table 8 Top 10 switchers

This table provides information on the top 10 switchers, banks that employ both securitization and covered bonds in the sampling period, and their relative importance in these markets, by bond type. Data are for deals with WAS and tranche amount available, closed by European banks during the 2000-2020 period

Issuer/issuer parent	Number of switches	Number of ABS deals	ABS deal amount [€Million]	Number of MBS deals	MBS deal amount [€Million]	Number of PCB deals	PCB deal amount [€Million]	Number of MCB deals	MCB deal amount [€Million]
Banco Santander, S.A.	55	9	24 444.1	29	53 141.8	12	11 089.5	130	116 038.0
BBVA	27	9	15 350.0	15	41 881.0	40	22 922.7	50	69 004.0
La Caixa	24	7	11 357.5	7	27 957.0	11	7 200.0	67	74 101.3
UniCredit SpA	20	4	2 671.4	6	39 194.7	91	17 931.7	477	96 172.5
Banco de Sabadell, S.A.	19	8	7 984.4	8	7 317.7	2	650.0	40	29 702.2
ING	18			9	48 259.1	2	3 000.0	46	34 783.1
Deutsche Bank AG	15	5	1 237.2	25	43 779.4	9	1 665.0	39	22 133.0
Banco Popular Espanol, S.A.	14	6	9 428.6	2	6 685.0	6	9 145.0	41	25 574.9
ABN AMRO Group NV	13	2	6 043.5	15	43 994.5	1	1 250.0	30	23 403.5
Royal Bank of Scotland Group plc	13			16	64 057.1	4	5 808.4	10	15 212.4

Table 9 Regression analyses of the cost of borrowing: securitization *versus* covered bonds

This table presents the results of OLS – models [8a], [8b], [9], [11a], [11b] and [12] – and endogenous switching regression model (ESRM) – models [10] and [13] – analyses of the determinants of transactions' weighted average spreads (WAS) for the samples in Table 7. In models [8a], [8b], [11a] and [11b] we consider a pre-crisis period from January 1, 2000 through to September 14, 2008, and a crisis period from September 15, 2008 (the first trading day after Lehman Brothers' bankruptcy filing the day before) through to December 31, 2020. *ABS* and *MBS* are dummy variables. Concerning ESRM, we implement the full information maximum likelihood (FIML) method to simultaneously estimate binary and continuous parts of the model in order to yield consistent standard errors. For a definition of the variables, see Table 2. ***, ** and * indicate that the reported coefficients are significantly different from zero at the 1%, 5% and 10% levels, respectively. Both *t*-statistics and *z*-statistics reported in parentheses are based on heteroskedasticity-consistent standard errors. We estimated standard errors clustered by year and bank. Average treatment effects for credit spreads of ABS *versus* PCB and MBS *versus* MCB were obtained through bootstrapping

Dependent variable:	[8a]		[8b]		[9]		[10]			[11a]		[11b]		[12]		[13]			
WAS (bps)	OLS		OLS		OLS		ESRM			OLS		OLS		OLS		ESRM			
	ABS vs PCB | pre-crisis		ABS vs PCB | crisis		ABS vs PCB | switchers		ABS		PCB	MBS vs MCB | pre-crisis		MBS vs MCB | crisis		MBS vs MCB | switchers		MBS		MCB	
Independent variables:																			
Intercept	163.65	**	444.32	**	-98.40		-1443.39		231.13	*** 53.71		252.21	***	88.10		128.57	**	197.47	***
	(2.12)		(2.26)		(-0.74)		(-1.41)		(5.53)	(1.22)		(3.36)		(1.20)		(2.32)		(4.77)	
ABS	-82.30		-39.48		-118.80	**													
	(-1.07)		(-1.10)		(-2.34)														
MBS										16.38		34.54		-6.07					
										(1.55)		(1.13)		(-0.40)					
WAM	1.43	***	-3.18	***	-0.13		-0.36		0.13	-0.33		-2.40	***	-1.26	***	-0.37	*	-0.62	**
	(3.47)		(-5.59)		(-0.2)		(-0.34)		(0.42)	(-1.41)		(-5.99)		(-4.48)		(-1.89)		(-2.39)	
Log transaction size	-2.29		-0.42		0.90		-3.74		-0.59	1.78	*	3.79	**	5.08	***	-10.10	***	7.47	***
	(-1.62)		(-0.26)		(0.66)		(-0.29)		(-0.80)	(1.78)		(2.04)		(2.74)		(-2.82)		(8.17)	
Number of tranches	14.97		14.25	**	21.62	**				-0.53		5.51	**	1.00		2.34	*	-12.72	**
	(0.88)		(2.02)		(2.06)					(-0.34)		(2.32)		(0.51)		(1.64)		(-2.03)	
Number of banks	0.19		0.97		0.49		3.98		0.35	-0.46		-0.45		-0.88		-0.87		-1.46	***
	(0.56)		(0.61)		(0.8)		(1.04)		(1.04)	(-0.86)		(-0.48)		(-1.18)		(-0.49)		(-2.49)	
Bank reputation	-0.09		0.43		1.02	**	2.14	**	0.77	*** 0.01		-0.27		-0.03		-0.10		0.77	***
	(-0.48)		(0.93)		(2.1)		(1.97)		(5.37)	(0.08)		(-1.00)		(-0.10)		(-0.32)		(5.39)	
Country risk	0.88		10.32	***	24.75	***	35.40	**	5.79	** -0.84		3.47	**	4.40	***	5.14	*	-1.64	
	(0.14)		(3.16)		(5.11)		(2.30)		(2.35)	(-0.37)		(2.15)		(2.50)		(1.89)		(-1.46)	
Creditor rights	3.04		-7.48	*	-10.66		-24.16		1.90	2.15		-0.93		-0.70		4.19		-0.62	
	(0.79)		(-1.91)		(-1.62)		(-0.96)		(0.80)	(0.89)		(-0.44)		(-0.26)		(1.38)		(-0.43)	
Enforcement	-1.89		-7.19		1.49		19.15		-7.46	*** 0.03		-2.72	**	-1.80		3.16	***	-6.00	***
	(-1.40)		(-1.55)		(0.56)		(1.40)		(-7.67)	(0.03)		(-2.27)		(-1.24)		(3.41)		(-9.99)	
Financial crisis			-83.19	***	18.97		-67.94		1.59			-44.44	***	37.39	***	4.07		-1.87	*
			(-2.75)		(0.88)		(-1.45)		(1.11)			(-3.28)		(3.15)		(1.05)		(-1.77)	
Sovereign crisis			-57.61	***	60.43	***	-26.02		40.60	***		-12.39		87.19	***	61.44	***	57.80	***
			(-2.61)		(2.62)		(-0.67)		(10.03)			(-1.13)		(9.05)		(6.51)		(18.95)	
Volatility	0.55		1.36	***	1.09	*	1.07		1.71	*** 0.69	*	1.01	***	0.93	***	-0.42	**	2.42	***
	(1.41)		(2.79)		(1.73)		(0.94)		(12.91)	(1.92)		(3.65)		(2.77)		(-2.21)		(21.8)	

(Continues)

Table 9 (Continued)

Dependent variable: .WAS (bps)	[8a] OLS ABS vs PCB | pre-crisis	[8b] OLS ABS vs PCB | crisis	[9] OLS ABS vs PCB | switchers	[10] ESRM ABS	[10] ESRM PCB	[11a] OLS MBS vs MCB | pre-crisis	[11b] OLS MBS vs MCB | crisis	[12] OLS MBS vs MCB | switchers	[13] ESRM MBS	[13] ESRM MCB
EUSA5y-Libor3M	-0.14 ***	0.08 *	-0.01	0.32	0.02	-0.18 ***	0.09	-0.04	-0.15 ***	0.13 ***
	(-3.62)	(1.70)	(-0.14)	(1.10)	(1.50)	(-4.51)	(1.50)	(-0.88)	(-3.54)	(9.43)
Switcher	-3.64	1.20		14.25	-3.62	-9.43 **	15.10 ***		11.01 **	1.44
	(-0.70)	(0.18)		(0.70)	(-1.39)	(-2.38)	(2.92)		(1.98)	(0.54)
CBPP1		-18.00 **	-2.25				-22.76 ***	-2.55		
		(-1.99)	(-0.12)				(-3.51)	(-0.27)		
CBPP2		33.56 **	27.40				36.34 ***	48.53 ***		
		(2.22)	(0.93)				(3.80)	(3.64)		
CBPP3/ABSPP		-37.73 ***	42.69				-17.85 ***	51.74 ***		
		(-2.55)	(1.35)				(-2.79)	(4.49)		
PEPP		-5.99	-68.57				2.79	-49.01		
		(-0.31)	(-1.13)				(0.16)	(-1.08)		
EU462		-43.40 ***	-85.11 **				-44.88 ***	-57.26 ***		
		(-3.66)	(-2.33)				(-5.19)	(-6.55)		
EC2402		25.55 *	64.11				-4.17	60.73 ***		
		(1.73)	(1.07)				(-0.45)	(3.17)		
Log total assets	-0.78	0.00	0.86	4.88	4.31 ***	-0.16	-2.24	-0.55	-2.31	1.04
	(-0.30)	(0.00)	(0.14)	(0.69)	(2.77)	(-0.13)	(-0.87)	(-0.21)	(-1.35)	(0.82)
Return on assets	-13.29 ***	4.65	17.70	13.42	4.61	6.23	4.68	12.87	-2.59	7.55 **
	(-2.51)	(0.46)	(1.14)	(0.81)	(0.88)	(1.35)	(0.58)	(1.20)	(-0.41)	(1.95)
Loan ratio	0.21	0.11	0.02	4.43	0.38 ***	0.10	0.31	0.32	-0.87 ***	0.73 ***
	(1.18)	(0.47)	(0.04)	(1.49)	(3.79)	(0.61)	(1.32)	(1.53)	(-3.26)	(7.49)
Liquid assets to deposits & ST funding	0.13	-0.08	-0.34	0.72 *	0.04	-0.06	-0.09	-0.21	-0.43 ***	0.10 **
	(1.59)	(-0.91)	(-1.09)	(1.79)	(0.96)	(-0.82)	(-0.69)	(-1.46)	(-2.59)	(2.15)
Capital adequacy ratio	-5.65 ***	0.41	1.85	24.92	-0.67 *	-2.50 **	-1.06 **	0.22	-3.37 ***	-2.01 ***
	(-3.17)	(0.60)	(0.63)	(1.44)	(-1.64)	(-1.96)	(-2.02)	(0.30)	(-3.52)	(-6.25)
Non-performing loans ratio	-0.89	-2.10	-5.69 **	-2.71	-0.70	-0.44	-0.47	-1.34	-0.31	0.31
	(-1.36)	(-1.35)	(-2.25)	(-0.74)	(-1.57)	(-0.59)	(-0.47)	(-1.04)	(-0.24)	(0.59)
Dependent variable: Probability of observing:				ABS versus PCB					MBS versus MCB	
Independent variables:										
Intercept				-11.31 ***					-30.31 ***	
				(-3.67)					(-3.61)	
WAM				0.16 ***					0.20 ***	
				(6.80)					(4.21)	
Log transaction size				0.90 ***					1.92 ***	
				(6.68)					(3.59)	
Number of tranches									2.64 ***	
									(6.16)	

(Continues)

Table 9 (Continued)

Dependent variable:									
Probability of observing:				ABS versus PCB				MBS versus MCB	
Number of banks				-0.48	***			-0.98	***
				(-5.24)				(-4.86)	
Bank reputation				-0.06	***			-0.04	
				(-3.09)				(-1.58)	
Country risk				-0.12				0.04	
				(-1.22)				(0.39)	
Creditor rights				0.58	**			0.25	
				(1.94)				(0.78)	
Enforcement				-0.22	***			0.28	***
				(-2.53)				(2.69)	
Financial crisis				0.44	***			0.24	
				(3.15)				(1.00)	
Sovereign crisis				0.45				-0.36	
				(1.02)				(-0.55)	
Volatility				0.00				-0.06	***
				(0.30)				(-2.90)	
EUSA5y-Libor3M				0.00				0.00	
				(-1.54)				(-0.74)	
Switcher				-1.07	***			-2.79	***
				(-2.47)				(-5.62)	
Log total assets				0.69	***			0.36	***
				(3.45)				(2.45)	
Return on assets				0.68	**			0.49	**
				(2.37)				(2.20)	
Loan ratio				-0.01				0.01	
				(-0.57)				(0.57)	
Liquid assets to deposits & ST funding				0.01				0.00	
				(0.87)				(0.03)	
Capital adequacy ratio				-0.11	***			-0.39	***
				(-3.37)				(-2.96)	
Non-performing loans ratio				0.15	***			0.03	
				(3.39)				(0.58)	
Number of observations	1 224	984	1 096	2 208		1 030	2 350	1 954	3 380
Adjusted R^2	0.19	0.46	0.48			0.26	0.40	0.51	
Average treatment effect				3.68				-7.08	
				(0.28)				(-0.34)	
Wald chi2				182.52	***			418.31	***
Log pseudolikelihood				-11334.71				-17903.11	
Wald test of indep. equations				1.67				4.71	**