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Are asset securitization bonds different in the United States *versus* Europe?

Dissertation presented to the Universidade Católica Portuguesa to obtain the Master's degree in Finance

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Resumo

Esta dissertação pretende analisar as operações de titularização de ativos (securitization, em gíria anglo-saxónica), com especial destaque para os respetivos benefícios e motivações, bem como as suas principais desvantagens. É ainda apresentada a história e a evolução deste segmento de mercado financeiro, tanto nos Estados Unidos como na Europa. Analisa-se criticamente o impacto e implicações da crise financeira de 2007-2008 neste processo e as medidas económicas e financeiras implementadas pelos bancos centrais.

Com base numa amostra de operações desenvolvidas nos Estados Unidos da América, no Reino Unido e na Europa Continental, entre 1 de janeiro de 2000 e 31 de dezembro de 2016, no presente trabalho examina-se (1) como é que as características comuns determinantes do *spread* das obrigações titularizadas se comparam entre Estados Unidos da América (EUA) e Europa Ocidental (EO); (2) se o *spread* das obrigações nos EUA são superiores aos da EO; (3) se o *spread* e os respetivos determinantes foram significativamente afetados pela crise financeira de 2007-2008 e, finalmente; (4) se o programa de compra de obrigações titularizadas implementado pelo BCE reduziu significativamente os *spreads* de crédito das obrigações emitidas nos EUA face à EO.

Concluiu-se que o *spread* é efetivamente superior nos Estados Unidos do que nas outras áreas geográficas. Também se encontrou uma relação pouco significativa entre o período de crise e o aumento dos *spreads*, e as medidas do BCE foram, para algumas tipologias, bem sucedidas e de acordo com os seus objetivos.

Palavras-chave: Rendimento fixo; Obrigações; Titularização de ativos

Abstract

This dissertation intends to analyse the securitization process, with emphasis on its major benefits and motivations and its disadvantages. We present the history and evolution of this segment of financial markets, both in the United States and in Europe. We critically analyse the securitization impact on the 2007-2008 financial crisis as well as the economic and financial consequences of the securitization purchase programs implemented by central banks.

Using a sample of asset securitization (AS) bonds issued in the United States, United Kingdom and Continental Europe between January 1st, 2000 and December 31st, 2016, we examine (1) how do common pricing characteristics compare between AS bonds in the United States (US) *vis-à-vis* Western Europe (WE); (2) if the credit spread on AS bonds issued in the US is higher than for those issued in WE; (3) if AS bond credit spreads and pricing processes were significantly affected by the 2007-2008 financial crisis and, finally; (4) if the Asset-Backed Securities Purchase Programme reduced significantly AS bond credit spreads both in the US and WE.

According to expectations, the spread is always higher for bonds issued in the US rather for bonds issued in Europe. We also found an insignificant relationship between the period of crisis and the increase in spreads, and the measures of the European Central Bank were, for some typologies, successful and in line with its objectives.

Keywords: Fixed income; Bonds; Securitization

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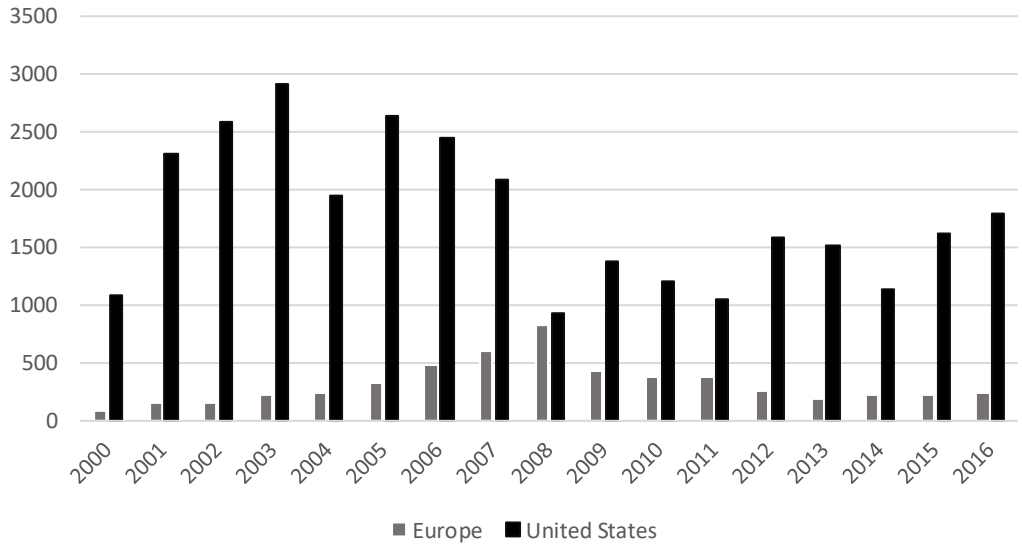
1. Introduction

According to the data information provided by the Securities Industry and Financial Markets Association (SIFMA) and the Association of Financial Markets in Europe (AFME)[1], in 2016, €237,6 billion of securitised product were issued in Europe and €1 792,9 billion in the United States (US). Therefore, we can *a priori* conclude that Europe[2], when compared with the US, does not rely as much on this financial instrument. This fact can also be observed in *Graphic 1*, where we present the historical volume of securitization issuance in both economic zones[3].

Graphic 1 - Historical volume of securitization issuance



Source: Data from SIFMA, 2010 and AFME, 2017

[1] The values extracted from the reports stated and presented are all denominated in billions of euros. The US volumes were converted from dollar to euro based on the $/€ exchange rates as of quarter-end.

[2] Europe includes the following countries: Finland, Lithuania, Austria, Latvia, Belgium, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain and Switzerland.

[3] Although the volume issued from Europe and the US only slightly combine in 2008, as this is considered a crisis year, relying on assumptions based on this period can lead to a biased conclusion.

Taking in consideration these amounts and the evolution between 2000 and 2016, a research focused on asset securitization bonds' differences between the United States and Europe and, if any, provides creation of value to the existing literature.

To our knowledge, no full-scale empirical study examining how credit spreads and pricing processes compare between Asset Securitization (AS) bonds issued in these two regions has already been made. Furthermore, the European market is, after the US market, one of the largest markets for AS but it has been neglected by the existing literature.

To an accurate development of this theme, firstly, is important to determine if asset securitization markets and financial characteristics are different across these two areas and how do they are reflected in spread determination.

In addition, it is also investigated how credit spreads and pricing processes compare not only between sub-classes of AS bonds but also between bonds issued in the US vis-à-vis Europe. Finally, it is also analysed the impact of the 2007-2008 financial crisis on spreads and pricing processes as well as the effect of the European Central Bank asset-backed securities purchase program on the issuance and pricing of asset securitization bonds.

The purpose of this thesis is to answer the following questions analysed: (1) how do common pricing characteristics compare between AS bonds in the United States (US) vis-à-vis Western Europe (WE); (2) if the credit spread on AS bonds issued in the US is higher than for those issued in WE; (3) if AS bond credit spreads and pricing processes were significantly affected by the 2007-2008 financial crisis and, finally; (4) if the Asset-Backed Securities Purchase Programme reduced significantly AS bond credit spreads both in the US and WE.

Based on our sample, we conclude that the spread is effectively higher in the US than in Europe. The crisis of 2007-2008 increased spreads and the program developed by the European Central Bank to mitigate this situation had the expected results of reducing spreads, although just for some areas and typologies. This study is organized as follows: in chapter 2, we present the literature review, to comprehend the process of securitization and its respective advantages and weaknesses. It is crucial to recall the history of this financial instrument and how it has contributed to the financial crisis.

In chapter 3, are raised the secondary research questions that underlie our main question are raised, and the hypotheses to be tested. We base our expected results on previous studies and, subsequently, in chapter 4, we present the sampling procedure and define our variables that are relevant to our model.

In chapter 5, we present our analysis of variables and present a preliminary response to our questions. The final conclusions are then presented in chapter 6, based on econometric analysis.

2. Literature Review

2.1 Securitization

Securitization is a *"process by which an entity pools together its interest in identifiable future cash flows, transfers the claims on those future cash flows to another entity that is specifically created for the sole purpose of holding those financial claims, and then utilizes those future cash flows to pay off investors over time"* (Fabozzi and Kothari, 2007). It represents a special category of **Structured Finance**[4] (SF), which is a type of debt capital markets' transactions.

Figure 1 – Standard process of securitization

In a simplified approach, represented in *Figure 1*, the cooperation initiates with the owner of the asset[5], further referred as the originator[6], which transfers the underlying pool of assets to a **Special Purpose Vehicle** (SPV)[7], in exchange of immediately cash. SPV is a legal entity, created by the originator for a specific purposes, usually to isolate risk (Gorton and Souleles, 2007).

[4] Structured Finance consists on a set of techniques to create a product that encounters the requirements of the owner of the asset, to fulfil its funding requests. It can be employed by financial or nonfinancial institutions, whenever the traditional or other forms of funding are expensive or inexistence. Offers flexibility in terms of contract characteristics, such as maturity, design and asset types (Fabozzi et al.,i, 2006). It creates value by limiting asymmetric information and agency costs and, when the benefits of reduced costs overcome its corresponding costs, SF can contribute to cost reduction of funding by improving credit quality and risk management.

[5] Usually Loans

[6] Usually Banks

[7] Or Special Purpose Entity (SPE)

In this stage, the SPE initiates the process of **Asset Securitization** (AS). Assets are pooled together, characterized by different risk-return profiles, with their cash flows, and converted into negotiable securities[8]. Tranches may vary in terms of maturity and seniority, backed by the credit payment performance of securitized assets and, mostly, based on floating-rate coupons (Pinto et al., 2017).

Converting these individual assets into new securities and issuing them into the market to investors, allows the SPV access to the capital needed to acquire the asset in the first place.

Afterwards, the investor chooses the product that best suits its preferences, benefiting from the payment of the principal and interest on the bonds. In this transaction, investors classically assume the risk of cash flows of the pooled assets (credit risk), instead of the default risk of the originator (Pinto, 2017). As the assets are no longer available to the assets' owner, it provides safety and protection to the investors.

This complex transaction is not appropriated for a typical minor financial intermediary, due to the required considerable capital injection, legal processing and due diligence.

2.1.1 Benefits

The first advantage related to the securitization process is the specialization and scope of comparative advantages. According to Thomas (1999), banks could decrease its funding, specializing in asset sourcing, where they acquired comparative advantages.

[8] This definition is common among numerous authors, considering that this is a process of structured finance technique that allows credit to be provided directly through market mechanisms, rather than through financial intermediaries.

Likewise, the process of pooling assets into more homogeneous products, turns lending into more transparent products. Rosenthal and Ocampo (1988) verified that this reduction in uncertainty, allows third parties, such as investors and credit agencies, to perform a more correct risk assessment of the underlying asset.

Considering the direct benefits of securitization, the first that can be evidenced is the **off-balance sheet treatment** (Fabozzi and Roever, 2003; Rosenthal and Ocampo, 1988; Leblanc and Cummings, 2003). When selling the asset based on a true sale mechanism, the originator has the opportunity to release its non-performing credits from its balance-sheet, transferring them and the respective risk to the SPV. This method of financing allows the banks to improve its return on equity (Wolfe, 2000; Jobst, 2006; Martínez-Solano, et. al, 2009) and other significant financial ratios.

The removal of non-tradable loans from the balance sheet, allows the banks to convert these into market securities, generating a direct source of **liquidity** (Fabozzi and Roever, 2003; Jobst, 2006; Goldberg et al., 1988; Martínez-Solano, et. al, 2009; Leblanc and Cummings, 2003; Loutskina, 2011; Clarkson and Rouyer, 2002), through the transaction of the tradable debt securities to the SPE. In its turn, this new availability of income permits the financing of new loans (Fuchita et al., 2009), thus improving liquidity position and promoting business growth.

Another major motivation for the practise of this mechanism is the **risk transference** (Thomas, 1999; Jobst, 2006; Clarkson and Rouyer, 2002). In other words, the banks have the opportunity to withdraw from its financial reports the illiquid assets, which can alter the whole risk structure of the bank due to the fact that these useless loans are being sold to a distinct entity (Martínez-Solano et. al, 2009).

As the banks no longer assume the risk of the underlying loans, the securitization process allows a major **reduction of costs** (Thomas, 1999; Rosenthal and Ocampo, 1988; Jobst, 2006; Davidson et. al, 2004) for most of its stakeholders, for instance, the originators, the investors and to the complete market in general (Goldberg et al., 1988).

Firstly, this cost decrease occurs immediately in the placement of the loan in the market. As the banks dispends less capital to trade new securities, is possible to diminish the cost of lending, that, otherwise, with traditional debt constrains, would not be possible (Fabozzi and Roever, 2003).

As the assets are transferred to the SPV to isolate risk, the bank will not continue to elaborate an extensive and detailed risk assessment, thus saving on administrative and bureaucratic costs. Also, pooling the assets together allows its transformation into a product with higher credit quality and with a minor cost than if they were issued individually by the originators (Fabozzi and Roever, 2003).

In addition, securitization also reduces asymmetric information (Martínez-Solano et. al, 2009) as the credit agencies continuously monitor the quality of the underlying assets included in the security sold by the SPV.

Finally, allows banks to diversify their sources of income (Fabozzi and Roever, 2003; Jobst, 2006; Goldberg et al., 1988; Leblanc and Cummings, 2003; Loutskina, 2011) and eliminates the opportunity cost of the originators' financial assets (Thomas, 1999), improving asset management and profitability (Goldberg et al., 1988; Martínez-Solano et. al, 2009).

In summary, the main advantages of the securitization process are the following: (i) Off-balance sheet treatments, (ii) Liquidity, (iii) Risk Transference and (iv) Cost Reduction.

2.1.2 Disadvantages

There are downside effects associated to this method and these instruments, as testified in the worst economic disaster since the Great Depression of 1929. To analyse the disadvantages of this financing technique, is important to remember that, in the period of 2000's, securities were backed, predominantly, by mortgages' loans.

Primary, is the creation of the SPV and the sale of the asset's pool. It can be useful in guaranteeing the continuity of the originator but, on the other hand, due to the transference of the risk, the banks have no further incentive to regulate and validate the conditions under which the loan was granted, much less to assure that it will be fulfilled.

Before the crisis, the lack of regulation and with the rise of liquidity previously mentioned, encouraged banks to increase its number of loans. The banks, with no incentives to control the risk to be incurred, instead of grouping assets into different tranches with distinct risk types, used this technique to set subprime and other types of loans grouped, regardless of their credit quality (Fuchita et al., 2009).

By deceiving the market, investors were not aware of the true quality of the bonds, believing that were investing in high quality securities, however, these products were mispriced and reflected an overestimated price and quality, originating the *Lemons Problem*[9].

[9] If the consumers are not able to distinguish the quality of the products (good versus bad) in the market, they are only willing to pay a fixed price for the asset (p_f). With this, the owners of superior product will ask for p_g and the remaining will sell for p_b. As the sellers recognize the quality of the product, the following assumption remains in the market: $p_g < p_f < p_b$. So, the good product' sellers will have incentive to leave the market as they do not accept pf, remaining only the offers of the bad products. As consumers began to realize the true quality of the product, the market will eventually collapse (Akerlof, 1970).

In this work it will be explain in more detail the relation of the disadvantages of the securitization process and the financial crisis of 2007[10].

2.2 Types of securities

The securities issued through securitization can be classified into three major typologies: Asset-backed securities (ABS), Mortgage-backed securities (MBS) and Collateralized debt obligations (CDO).

ABS is a debt security collateralized by a pool of assets (other than mortgages), typically constituted by consumer products, such as car loans and credit cards (Vink and Thibeault, 2008). It provides to the issuer of the securities, for example banks or corporations, the possibility of transforming illiquid assets into immediately cash.

According to (Fabozzi et al., 2008)**,** MBS are "aggregations of large numbers of mortgage loans with similar (but not identical) characteristics". This instrument allows banks, which are the only issuer, to have more freedom in lending money to the mortgages' consumers, without being concerned whether the borrower will or not fulfil its obligations.

Finally, CDO are backed by a pool of debt obligations/bonds, that can include approved credits of, for example, mortgages, consumables or personal credit. **It** is frequently originated in multiple countries and tend to be riskier than both ABS and MBS also, it is the most complex and diversified financial product in the way that it can also include ABS, MBS and other CDO (Vink and Thibeault, 2008).

Using data provided in Structured Finance International magazine, published by Euromoney Institutional Investor, Vink and Thibeault (2008)

[10] *See 2.4* **The 2007-2008 Financial Crisis**

conclude that, as securitized assets are collateralized by distinct types of debt obligations, pricing factors should also diverge.

In these three major classes of financial instruments, yields tend to be different as they are backed by distinct categories of assets. According to Pinto and Alves (2017), average credit spreads are higher for CDO, contributing to a lower interest in this product, having fewer participants and lowest average tranche size.

Also, Vink and Thibeault (2008) found that average spreads are statistically and significantly lower for MBS, than for ABS and CDO. This conclusion is in line with the previously literature (Pinto and Alves, 2017), concluding that CDO, due to its more diverse underlying assets, incurs in higher risks.

2.3 History of securitization

2.3.1 United States

The remarkable history of securitization starts in 1970, in the US, when the Government National Mortgage Association (Ginnie Mae) issued for the first time MBS to the market. At the time, the most common security was backed by residential loans, as an US government encouragement programme for home ownership (Adams, 2005).

Along with this institution, Federal National Mortgage Association (Fannie Mae)[11] was also providing this type of service and, later, the company Federal Home Loan Mortgage Corporation (Freddie Mac) was created by the US Government, remaining, nowadays "the primary financing mechanism for all government-insured or government-guaranteed mortgage loans" (www.ginniemae.gov).

[11] Fannie Mae was created in 1938, in order to correct the chaos of the Great Depression of 1929. In 1968, the Housing and Urban Development divided Fannie Mae into two distinct institutions: Fannie Mae and Ginnie Mae, providing affordable access to house credit.

2.3.2 Europe

In Europe, the first transaction occurred only in 1987, in the United Kingdom (UK). The firsts to join the UK, was Spain and France. Shortly, also Finland, Sweden, Ireland, Italy and Germany started using this different source of funding (Adams, 2005).

All these countries based its issuances on residential mortgages until 1990 and, once the process of securitization was simplified, it allowed the increase of diversity of underlying assets, including car and consumer loans (Fabozzi and Choudhry, 2004)

In the spread of securitization in Europe, is important to consider the unification of the Euro Zone in 1999 (www.ecb.europa.eu). This market continued to growth rapidly and, even if without incrementing the euro as a currency, the UK were still the principal issuer of this economic zone.

Although considering this as a unified zone in this dissertation, the European countries diverge in terms of legal systems and political environment, leading to real differences in securitization methods and restrictions (Adams, 2005).

2.3.3 US vis-à-vis Europe

Even if both regions use the same structure, the method differentiates across economic zones, essentially in terms of methodology and characteristics.

2.3.3.1 Market characteristics

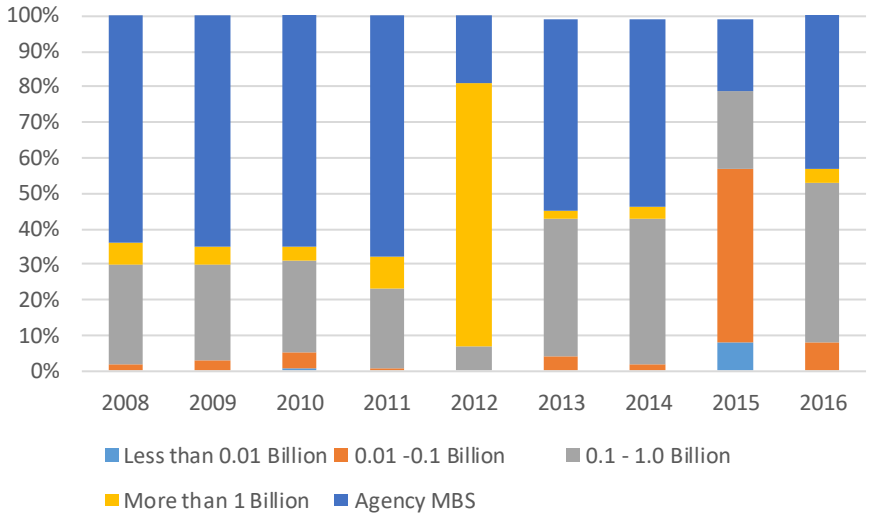
In a preliminary analysis, the differences on this distinct appropriation of this financial instrument arises immediately from the issuance volume and respective deal sizes, assets used as collateral and by rating of securities issued.

As previously mentioned[12], the US securitization market and its respective size is much larger than the European one: in 2016, €237.6 billion and €1,792.9 billion os securities were issued in Europe and the US, respectively[13].

Considering the securitization issuance by deal size[14], none of the markets is characterized by transactions with amounts below € 0,1 Billion, with exception of the year 2015.

As seen in Graphic 3, the US has preference to issue tranches' amounts between €0,1 and €1 Billion, being the most significant group, the MBS issued by Agencies[15]. In case of Europe, that is explained in Graphic 4, focus its number of issuances in transactions typically with major volumes (superior to €1 Billion).

Graphic 2 - US securitisation issuance by deal size



Source: Data from AFME, 2008-2016

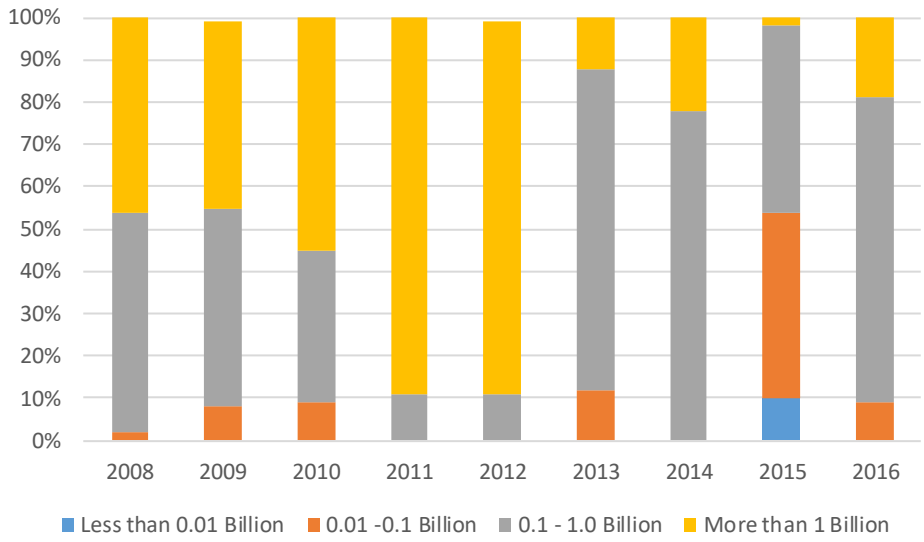
[12] *See 1.* **Introduction**

[13] Source: SIFMA, 2010 and AFME, 2017

[14]The European data includes all asset classes – ABS, CMBS, RMBS and euro-denominated CDOs. US data includes ABS, non-agency CMBS and RMBS, and US dollar-denominated CDOs. US agency MBS, which includes agency CMBS and RMBS, is shown separately. All data except for CDOs is included based on the country of collateral

[15] These are US Government Sponsored Enterprises (GSE), such as Ginnie Mae, Fannie Mae and Freddie Mac, which create agency-MBS.

Graphic 3 - European securitisation issuance by deal size



Source: Data from AFME, 2008-2016

When this typology of operations emerged, the predominant assets used as collateral were residential mortgages. In most recent periods, the major securities issued in the US16 were still backed by house loans, yet under the sponsorship of by the previously mentioned governmental agencies.

Considering alternative products with government guarantees, interest in non-collateralized products was expected to decline because of the lack of protection afforded to investors. Thus, the issuance of non-agency RMBS and Commercial MBS (CMBS[17]) were reached in 2007, consisting of €166,6 Billion and €399,2 Billion, respectively

Considering ABS and CDO, the respective issuances peaked, once more, in 2007. The financial distress brought insecurity to the market, representing a

[16] US ABS issuance includes auto, credit card, home equity, student loan, equipment leases, manufactured housing, and other; and US CDO issuance numbers only include US-denominated issuance regardless of the country of collateral and may include European transactions which are denominated in US dollars

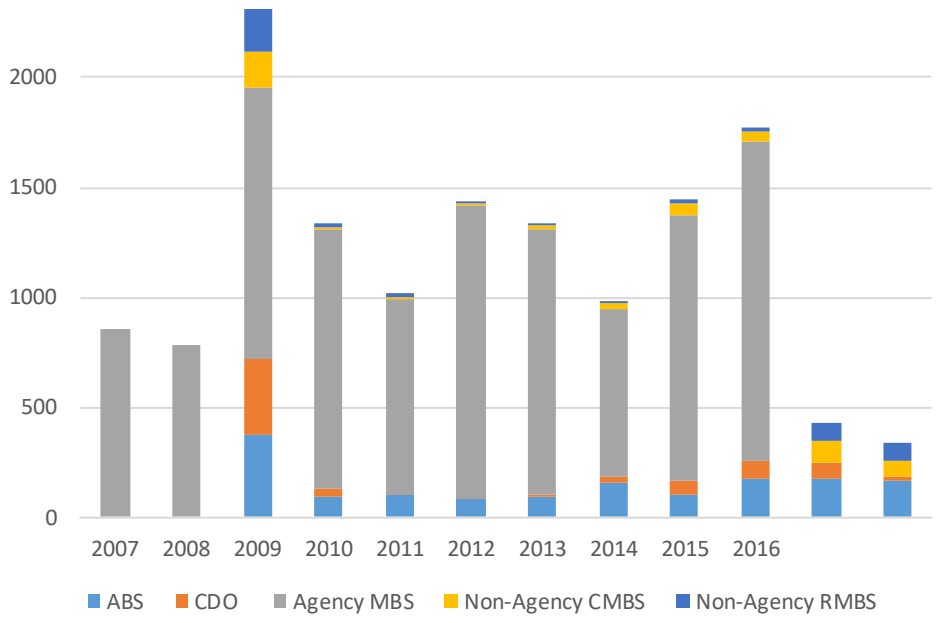
[17] Type of mortgage-backed security that is secured by mortgages on commercial properties, instead of residential real estate

massive decrease on the demand for CDO, as testified in 2009, when only €1,6 Billion were issued. Agency MBS, as being the most trustful due to the governmental security, were the most used type of asset securitization in all periods presented. In 2016, MBS issuance achieved its maximum, representing an issuance of €1 460 Billion.

Considering now the issuance by collateral, we can conclude that, according to Graphic 6, Residential mortgages is the collateral most used by European markets, being the Commercial mortgages approximately null.

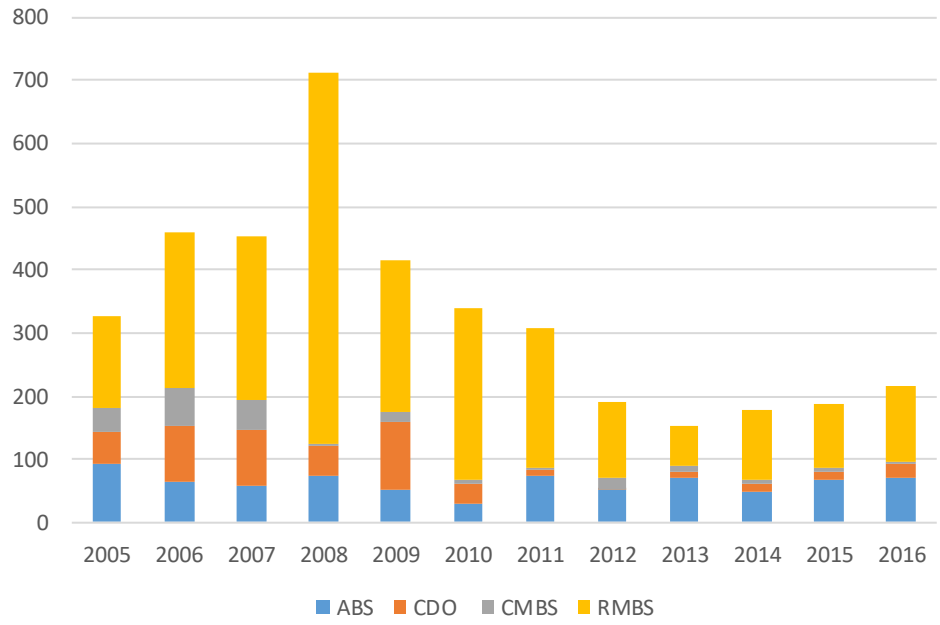
RMBS reached its maximum amount transacted in 2008, contemplating a value of €585,3 Billion, however, declining its performance ever since. ABS maintained a constant evolution, issuing, on average, €59,6 billion in the 9-year period.

Graphic 4 - US issuance by collateral



Source: Data from AFME, 2007-2016

Graphic 5 - Europe issuance by collateral

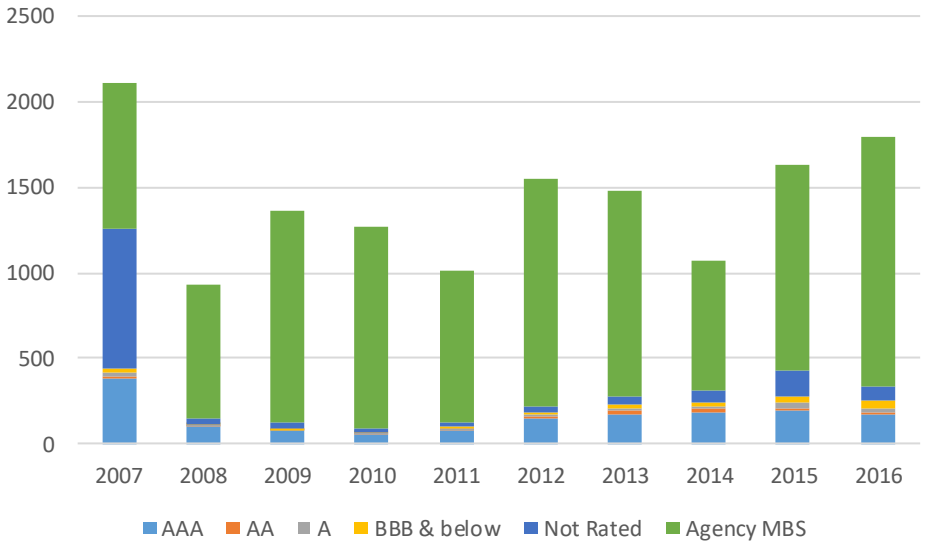


Source: Data from AFME, 2005-2016

On Graphic 7 and 8, it is possible to analyse the American and European securitization market by issuance by rating. In this category, it is possible to conclude that, which predominates in both markets, are triple-A ratings.

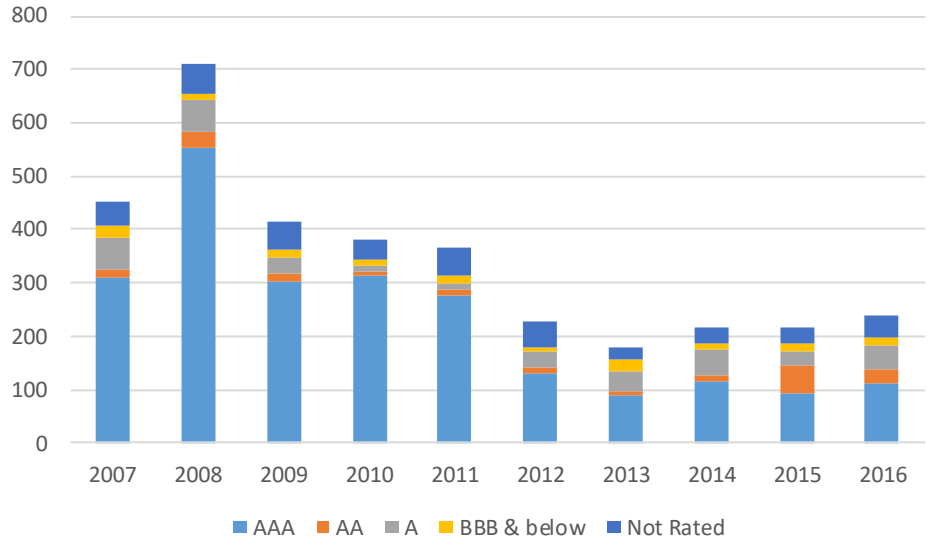
Other rates, such as AA, A or BBB & below are almost insignificant, concluding that this market is not homogeneous, presenting great discrepancies. Considering the Not Rated products, it represented, in 2007, nearly 40% of the total US issuance, having no influence in Europe.

Graphic 6 - US issuance by rating



Source: Data from AFME, 2007-2016

Graphic 7 - Europe issuance by rating



Source: Data from AFME, 2007-2016

In an overall breakdown, the US' volume represent more than double of that in Europe. Nonetheless, when investigating the deal size of individual tranches, the European market is characterized by transactions above €1 Billion while the US markets have lower individual amounts, ranged between €0,1 and €1 Billion.

So, most US' MBS market is operationalized by governmental agencies, being able to afford to the economic agents a product with a risk equivalent to a treasury bond. In Europe, the agents focus also on RMBS, however, without GSEs, investors tend to prefer a lower risk product rated as AAA.

2.3.3.2 Government intervention

Regarding the distinctive characteristics between the US and European markets, it's possible to immediately evidence that, in Europe, there is no government supported agency that stimulates the securitization processes.

These are US Government Sponsored Enterprises (GSEs), such as Ginnie Mae, Fannie Mae and Freddie Mac, that create agency-MBS, being responsible for the timely payment of the principal and interest on the bonds and bear the credit risk of the underlying loans, contributing to a risk of default practically negligible (www.invesco.com).

These entities are responsible for guarantees, providing banks and investors protection and representing an incentive to the intensification of activity. When mortgages are issued by GSEs, it indirectly finances the mortgage market. Although it does not directly affect yields, mortgage rates tend to be lower than if they were issued by private companies (Passmore et al., 2002).

The lack of governance warranties contributes to the great difference between these two major markets and, unlike Europe, the US presents a more unified market in terms of definitions of concepts (Adams, 2005).

2.3.3.3 Securitization purposes

In the US, securitisation and the respective government's support worked as an incentive strategy for consumption of real state and making it possible for all social ranks.

The majority of the European countries used this financial instrument with the objective of reducing public budget deficits (Adams, 2005). Also, Europe' securitization did not have a purpose for consumption or any specific purpose other than its beneficial use for banks, as a tool to expand regulation and diversification of capital sources.

2.3.3.4 Others

According to Phil Adams (2005), American consumers have more predisposition to acquisition of debt, resorting to this type of products more frequently and, consequently, a greater tendency not to fulfil its debt commitments.

2.4 The 2007-2008 financial crisis

To properly explain the 2007-2008 financial crisis, is important to understand the factors that lead to this event. Even if it is not possible to point only to one undoubted cause, this event was due to a set of factors.

One of the most evident factors of this crisis, which tends to be devalue, was the cumulative deregulation on derivatives[18] (Laeven and Valencia, 2008). Even if derivatives only appeared in 1990, in 1982, the US government started the financial deregulation of, firstly, savings and loan companies, allowing banks to apply individuals' savings in uncertain investments.

[18] These financial instruments, considered as weapons of mass destruction (by George Soros), are securities in which respective prices can depend on every underlying asset (without exception), such as possibility of bankruptcy or raining in a certain day.

In 2000, the Commodity Futures Modernization Act (CFMA) written by the US government, banned the regulation of any type of derivatives, leading to the concentration of the power in financial markets and appropriation of misconduct (e.g.: commercial banks' employees sold stock of companies with high probabilities of bankruptcy as if it were a prodigy investment).

As previously mentioned, the goal of the US politics, was to provide any person or family the opportunity of the American dream[19]. To achieve this goal, the Federal Open Market Committee, through its mechanism to increase money supply in the market, lowered the federal funds rate. According to Board of Governors of the Federal Reserve System in the US, this is the interest rate at which depository institutions trade federal funds (balances held at Federal Reserve Banks) with each other overnight[20].

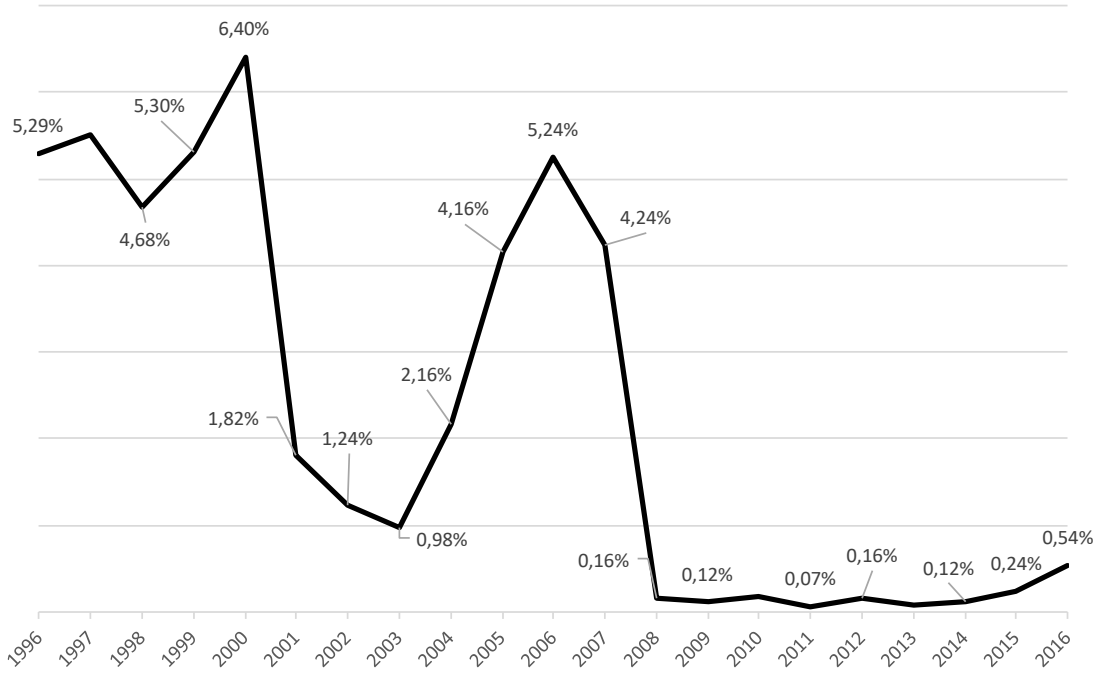
Based on the Effective Federal Funds Rate[21], this method to increase liquidity was severe, throwing the rate of 6,4%, in 2000, to 1,82%, in 2001. This drop of 4,58 percentage points exposed in the market a massive increase of accessible money, which, consequently, became an incentive for banks to lend.

[19] The belief that "everyone was going to have an opportunity and the chance to live a life with some decency and some dignity and a chance for some self-respect" (Hochschild, 1995)

[20] When a depository institution has surplus balances in its reserve account, it lends to other banks in need of larger balances. In simpler terms, a bank with excess cash, which is often referred to as liquidity, will lend to another bank that needs to quickly raise liquidity (https://fred.stlouisfed.org/series/FEDFUNDS)

[21] Data refers to values of the closing annually rate.

Graphic 8 - Evolution of effective federal funds rate



Source: Data from FRED, 2017

This incentive, along with the lack of control by the banks (provided by the off balance-sheet treatment of the sold assets), supported the irresponsible growth of the American mortgage market (Fuchita et al., 2009).

MBS once started as a set of reliable mortgages backing the security, with triple-A classification by major credit rating agencies (Moody's, Standard and Poor's or Fitch) and backed up by the US government.

As an individual product, this single debt type was simple and were evaluated as stable, providing relatively low income to the investors. Nonetheless, grouping a set of mortgages, improves the risk and return profile of the security when compared to the credit of single asset when originated (Fabozzi and Roever, 2003).

Eventually, financial intermediaries started grouping different types of risk class assets into securities (Fuchita et al., 2009), assuming to be "good substitutes" for the often safe securities (Pinto et al., 2013).

The central problem of the situation is that, with the lack of risk analysis and evident access to credit, the credit quality assessment was not trustful, being the securities "far riskier than originally perceived by investors and certified by rating agencies" (Pinto et al., 2013).

At this point, it is important to refer that, even if the bank ensuring credit to any individual, credit rating agencies should intervene in the market by assigning appropriated ratings.

Still, as the "credit rating agencies were paid by the originators of the assets to evaluate the underlying credit quality of the financial products being created" (Fuchita et al., 2009), these agencies had the possibility and motivating to delight its customers, whom, in return, took the advantage of being able to choose who best qualified their products.

According to Fuchita et al. (2009), the market only recognised this market failure when the housing prices eventually began to decline, due to the oversupply of houses and the excessive leverage which characterized the market. The bonds became worthless, due to the lack of periodic repayments to its issuers and investors.

On 15th of September of 2008, when the investment bank Lehman Brothers declared bankruptcy, representing the largest insolvency in history. This event led to financial difficulties for banks, which, in turn, made it difficult for companies (and consumers) to access credit, triggering a sharp increase in unemployment in the Euro Area[22], as in the United States[23].

[22] Available at https://www.bportugal.pt/page/estatisticas-da-area-do-euro?mlid=2348

Even if the crisis unrolled in the US, it was accountable for global economic and financial impacts, leading to the impacts and consequences of the collapse of the mortgage market in Europe.

The responses of central banks differed between the United Stated and Europe, considering that the underlying assets and securitization processes and characteristics are also distinct (Fuchita et al., 2009).

2.4.1 United States

Considering the abrupt end of the credit boom, central banks[24] were responsible for the implementation of monetary policies[25], maintaining employment and price stability, to recover and preserve conditions in financial markets (www.federalreserve.gov).

The Federal Reserve, the central bank of the United States, implemented three distinct groups of tools: (i) provision of short-term liquidity to banks and financial institutions; (ii) provision of liquidity directly to borrowers and investors; and (iii) supported new market operations.

With these measures, the government sought to mitigate the impact of the crisis on the normal functioning of markets, setting a downward pressure on longer-term interest rates and easing overall financial conditions (www.federalreserve.gov).

These measures agree with the market and economic agents' outlook, considering that the consequences were being interpreted primarily as a short-term liquidity problem (Fuchita et al., 2009).

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[23] Available at https://www.abi.org/newsroom/chart-of-the-day/number-of-unemployed-for-over-26-weeks-since-1969-2

24 Federal Reserve Bank (Fed) in the US and European Central Bank (ECB) in Europe

25 Monetary policy operates by steering short-term interest rates, thereby influencing economic developments, in order to maintain price stability for the euro area over the medium term (www.ecb.europa.eu)

2.4.2 Europe

In Europe, the global financial crisis, due to globalization, reached the markets on the day of the Lehman collapse. European markets also suffered from a sovereign crisis on May of 2010, due to the bailout countries.

Soon after the announcement of September 2008, in order to reduce the "tensions in the euro money market", the ECB (European Central Banks) implemented liquidity improvement measures, reduced interest rates to "historical low levels" and monitoring the European money market conditions (www.ecb.europa.eu).

The objective of ECB was to promote its long-term principles, such as: (i) price stability, (ii) control of financial markets and (iii) minimization of general losses. According to (Rajendra and Pratt, 2008), the extraordinary European policy, based on the extension of deposit guarantees, aimed the continuity of the banking system as a provider of sources of funding.

On May of 2009, the Governing Council of the European Central Bank (ECB) launched the first Purchase programme for euro-denominated covered bonds (CBPP1). According to the ECB, the aim of the programme was to (i) contribute to easing funding conditions for credit institutions and enterprises and to (ii) encouraging credit institutions to maintain and expand their lending to customers, simulating activity in this market section (www.ecb.europa.eu).

The first impact felt in the market was caused by the wave of confidence that this surprise announcement brings to the market, leading to a recovery of the primary market and a tightening of spreads in the secondary market (Beirne et al., 2011).

At the same time (end of 2009), the first events that developed the European sovereign crisis began to show off signs in the market. First, the collapse of

the Icelandic banking system, also severely affecting Greece, Portugal, Ireland, Spain and Italy.

The announcement of these countries that were not in the financial conditions to repay the governmental debt, eventually defeated the slight security prevailing in European financial markets.

In a snowball effect, a large government debt that was present in many European countries reality, followed by the bankruptcy of large financial institutions, developed a crisis of mistrust in the European market.

On October of 2011, ECB launched the second purchase programme, CBPP2, prevailing the objectives implemented in CBPP1.

The Asset-Backed Security Purchase Programme (ABSPP) was implemented on November of 2014, with the objective of providing banks with the necessary diversified funds, helping in the availability of credit, stimulating the real economy.

According to the study realized by the ECB, these two measures represented, in overall, a spread tightening for covered bonds, being testified in the differences of spreads between eligible and non-eligible ABS.

Other banks also intervened in the market in a globally scale, such as the Bank of England and the Bank of Japan. Overall, there was a set of fund injection realized by central banks: €100 Billion from the ECB (www.ecb.europa.eu) and "smaller amounts of $5 Billion from the Bank of Japan and $2 Billion from the Federal Reserve" (Fuchita et al., 2009).

2.5 Determinants of credit spread

As the main objective of this work is to compare spreads and pricing processes of asset securitization bonds in the U.S. vis-à-vis Europe, next we

discuss the existing literature on this subject not only for securitization but also for corporate bonds.

2.5.1 Corporate Bonds

Considering corporate bonds, Chen et al. (2007) present liquidity as a "key determinant in yield spreads". Based in more than 4 000 corporate bonds over a 9-years period, the authors found that liquidity explains more than 50% of the cross-sectional variation in yield spread level, being this result more influential than the credit ratings. These authors found that, yield spreads reduce as an improvement in liquidity occurs, and determined that more illiquid bonds earn higher yield spreads.

Using transactions between 2003 and 2009, Bao et al. (2011) confirm that illiquidity is an important variable in the determination of spreads, determined a positive relation between this two factors. Illiquidity is especially vital in this dissertation, due to the consequences of occurrences in the summer of 2007.

Opting for a simple model based on "a quarterly sample of 394 US corporations' credit premia for the period 1986–1998", Flannery et al. (2012) conclude that Capital Structure influences credit spreads, mainly based on the impact of investors' expectations about future leverage of firms. Even if this relation could be either positive or negative, the results indicate a robust positive correlation.

Furthermore, using a different perspective by means of leverage ratios, Collin-Dufresne and Goldstein (2001) develop a model where firms adjust their ratios to reflect variations in asset value. The results are in accordance with those presented in the previous mentioned paper, indicating that market prices would reflect the variations on these ratios.

In an attempt of determining the broad factors that affect corporate bond pricing, Gabbi and Sironi (2005) based their investigation on spreads of Eurobonds issued by major prestigious companies between 1991 and 2001. The research has proven the increasing support and accreditation, by investors, in rating companies and their judgements. In this way, Credit Rating enters as a variable that emerges in bonds' prices, presenting a pattern of growth in spreads when credit rating becomes worse.

Longstaff et al. (2005) use data of credit default swaps within a 5-years prospect, "to provide evidence about the size of the default and non-default components in corporate spreads". By using credit default swap premia to measure this component, the authors determine that Default Risk influences significantly corporate bond spreads.

Whether if the security ranks below other securities regarding claims on assets or earnings (junior security) has a positive but not significant impact on spreads of CB, even after controlling for bond ratings, according to Gabbi and Sironi (2007).

The variables that stand out the most when it comes to corporate bonds are: (i) Liquidity, (ii) Leverage ratios, (iii) Credit Rating. Even so, this authors similarly underlined the succeeding: (iv) Bond volatility (Chen et al., 2007), (v) Debt Maturity, (vi) Credit Risk and (vii) Information Asymmetry (Daniels et al., 2010), (viii) Interest Rate (Collin-Dufresne and Goldstein, 2001), (ix) Equity volatility (Campbell and Taksler, 2003), (x) Governmental issuance (Elton et al., 2001), (xi) Intermediation process (Carey and Nini, 2007), (xii) transaction size, (xiii) tranche to transaction, (xiv) maturity, (xv) risk free rate and (xvi) volatility (Pinto et al., 2017).

2.5.2 Asset Securitization Bonds

Taking into account the existing literature regarding the pricing process of asset securitization bonds, the major factors that influence spreads are (i) default risk, (ii) transaction size, (iii) year of issuance (Pinto et al., 2015) (Vink and Thibeault, 2008) (Moody's, 2005), (iv) recovery risk, (v) number of tranches, (vi) number of underwriters, (vii) number of credit rating agencies, (viii) whether or not the issue is retained, (ix) type of interest rate, (x) tranching, (xi) maturity, (xii) currency of the loan (Vink and Thibeault, 2008), (xiii) management fees and (xiv) collateral type (Pinto et al., 2017).

Firstly, considering the default and recovery risk variables, such as time to maturity, credit rating and country risk, we can conclude that, through the analysis of the following authors, Pinto et al. (2015), Vink and Thibeault (2008) and Hu and Cantor (2005), the impact of the variable Maturity differs across investigations.

Pinto et. al, (2015) concluded that, in general, maturity has an insignificant impact on credit spreads, due to the match of maturities between the securities issued and the assets used as collateral. Nonetheless, for Vink and Thibeault (2008), it differs among type of security. For ABS the authors proved that there is a positive relationship of maturity with spread and a negative correlation for MBS and CDOs.

If there is a credit rating agency involved, is assumed that the bond is rated, we can appropriate the results of Vink and Thibeault (2008) on the number of credit rating agencies on the impact of a Rated Security has on its spreads. In this way, we conclude that, if security is rated, it implies less risk, being for CDOs a significant and negative relation. On the other hand, it is insignificant for ABS and MBS.

Also based on Vink and Thibeault (2008) investigation, there was a present pattern of increase on spreads as the credit rating deteriorated. And, for Country Risk, Pinto et al. (2015) found that the coefficients are insignificant for AS transactions, due to the intrinsic characteristics of the transactions.

Considering factors related more directly to the characteristics of the securities, namely marketability variables, for instance: transaction size, number of tranches, number of banks and fixed or floating rate issue, the results are, once again, distinct results differ between types of securitization.

According to Pinto et al. (2015), there is a negative and statistical significance of transaction size and tranche to transaction ratio with the evolution of spreads on AS.

For Vink and Thibeault (2008), the results on transaction size are also significant and negative for ABS and MBS and a relation insignificant and positive for CDOs, justified as an "evidence of a positive price liquidity effect related to the size of the entire issue".

The number of financial intermediaries participating in the issuance only appears to have a negative and significant impact for MBS, being insignificant for ABS. For CDOs, the results have proven to be insignificant and positive, probably due to difference in evaluation criteria by investors and capital markets (Vink and Thibeault, 2008).

The same authors also evidence a strong positive relation for ABS and MBS, between the issues that are fixed priced and the credit spreads, easily explained by the protection of non-fluctuating rates.

The variable Currency Risk associated as a systematic risk variable, has a positive and significant relationship with all asset securitization categories.

According to Pinto et al. (2015), there is no significant relation between whether AS bond has a call option or not. However, when considering Corporate Bonds (CB), the authors found a strong positive relationship with credit spreads.

Using the findings of Pinto et al. (2015), on general AS bonds, the risk free rate has an insignificant relationship with the determination of spreads. Also, market volatility has a significant and positive impact on spreads of loans and bonds.

The five-year Euro swap rate and the 3-month Libor rate, namely the slope of the Euro swap curve (Hu and Cantor, 2006) is significantly and negatively related to credit spread (Pinto et al., 2015).

Esty and Megginson (2002) assumed that common law systems provided stronger creditor rights, being these two variables related in the same level to the determination of credit spreads.

As far as macroeconomic impacts are concerned, based on Criado and Rixtel (2008) and Pinto et al. (2017), the 2007 crisis enlarged spreads and that, based on Watfe (2015), the European Central Bank's asset purchase programs generally lower sovereign bond spreads.

2.6 Previous Studies

As previously referred, there is no study examining how credit spreads and pricing processes compare between Asset Securitization (AS) bonds issued between these two regions. However, Carey and Nini (2007) offered evidence that interest rates on syndicated loans are indeed different among the United States and Europe, "with interest rate spreads smaller in Europe by about 30 basis points (bps) on average".

Also, the data proved that there is home bias in the securitized market, considering the United States, Europe and Asia as the major markets. When borrowers issue outside its residential market, the tendency is to issue in Europe. The authors believe that this fact is due to historical data and because Europe tends to be a cheaper market.

The final conclusions were that asymmetric information, regulation, portfolio diversification effects, even against the expected results, does not perform differently across the location of the agents. When considering firm size and borrower financial characteristics, "the price difference across markets remains statistically and economically significant".

What we intend with this work is to see if, as for the syndicated loan market studied by these authors, the securitization operations in the US and Europe have similar credit spreads and if the pricing process is similar or not.

3. Research Questions and Hypothesis

Based on the literature review we can expect that (i) asset securitization bonds' characteristics differ significantly per typology (ABS *versus* MBS *versus* CDO); (ii) differ significantly per geographic zone (US *versus* UK *versus* CE); (iii) the 2007-2008 financial crisis impacts significantly the spreads; and (iv) the ECB' ABS purchase programme impacts spreads, namely in the Euro Area.

Analysing the market data for the US *versus* Europe, is apparent that these markets are distinct in economic and financial matters, mainly derived from macroeconomic and policy differences, such as the governmental intervention on the market, motivations for the use of securitization and preferences of economic agents (Adams, 2005).

So far there is no full-scale study examining how credit spreads and pricing processes compare between the U.S. and Europe. We try to fill this gap in literature. Thus, we raise the following research questions and hypotheses:

(1) How do common pricing characteristics compare between AS bonds in the United States *vis-à-vis* Western Europe (WE)?

Hypothesis 1: *Credit spreads and princing characteristics differ significantly between AS bonds issued in the US versus WE.*

Carey and Nini (2007) show that the credit spread is higher for syndicated loans issued in the US *vis-à-vis* in Europe. We thus raise a second question:

(2) Is the credit spread on AS bonds in the US higher than the credit spread on AS bonds in WE?

Hypothesis 2: *AS bonds credit spread is higher in the US than in WE.*

It has been shown that the 2007-2008 financial crisis and the subsequent European sovereign debt crisis had an irreversible impact on the global economy, leading to abruptly increase of bond credit spreads (Criado and Rixtel, 2008; Gorton and Metrick, 2012[26]; Caprio et al.,2010).

In this way, it is imperative to include an investigation to perceive the impact of these events, focusing on whether the 2007-2008 financial and the subsequent European sovereign debt crisis affected significantly AS bond credit spreads and pricing determinants. We thus raise a third question:

(3) Are the credit spread and pricing processes of AS bonds significantly affected by the 2007-2008 financial?

Hypothesis 3: *The 2007-2008 financial crisis and the subsequent European sovereign debt crisis affected significantly AS bonds credit spread and pricing determinants.*

To mitigate the impacts and consequences of the 2007-2008 financial crisis, central banks were forced to intervene in the financial markets. As the processes and characteristics of securitization are distinct, their measures would also have to be appropriate to their products and, therefore, the results will be diverse (Fuchita et al., 2009).

In our fourth question, we seek to understand which the real impact of these measures on credit spreads was, testing whether if this impact reverberated into a significant reduction in credit spreads.

(4) What was the impact of the Asset-Backed Securities Purchase Programme on AS bond credit spreads?

Hypothesis 4: *Asset-Backed Securities Purchase Programme reduced significantly AS bond credit spreads both in the US e and WE.*

[26] Specifically related to ABS

The study carried out by the European Central Bank[27] on the impact of CBPP and ABSPP in the economy, based on European data, concluded that its measures fulfilled the general intervention objective: a spread tightening for covered bonds, as desired, in which are going to ground the expectations on these data.

Also, Claessens et al. (2010) evidenced that the overall measures fulfilled the general intervention objective, both in a matter of market stabilization and confidence.

In conclusion, it is important to note that this analysis will seek to answer all these questions, either positively or negatively, and that this analysis will also be performed considering the three different asset securitization bonds' issuances; i.e., ABS, MBS and CDO.

[27] Available at www.ecb.europa.eu/paym/groups/pdf/bmcg/150127/2015-01-27-Item-3-2.pdf?01c15557a8aa45e3164e28ccd2760b74

4. Data and Descriptive Statistics

4.1 Sample Selection and Data

For a complete, consistent and value-added investigation, it is important that the sample on which we base the conclusions is adequate and reliable. In this way, the extraction of our database from DCM Analytics, which is *a competitive benchmarking system covering the Global Debt Capital Markets*[28], must be adequate.

To determine our sample, it is first important to extract the complete data. This included detailed information regarding bond securities issued, such as ABS, MBS and CDO, between January 1, 2000 and December 31, 2016.

As the extracted data included several types of assets as collateral, codes were assigned by typology of security, for an easier evaluation, namely: (1) asset-backed securities, (2) Mortgage-backed securities and (3) Collateralized debt obligations.

In the first extraction performed, our database included ninety-seven thousand records of extracted issuances. Then, we performed the following screens: (i) remove perpetual and to be announced (TBA) types of maturities; (ii) remove synthetic CDOs; (iii) considering de variable rate, only the following indices were included: Euribor, Libor and USD Libor; and (iv) we decided to withdraw the outliers referring to Credit Spread and Transaction Size, truncating the date in the 1% and 99% percentile.

In this chapter, it is important to note that since both (1) United States and (2) United Kingdom have a market-based financial system, we decided to separate Western Europe into two sub-regions: United Kingdom and (3)

[28] Available at http://www.biblioteca.porto.ucp.pt/sites/default/files/files/Biblioteca/GD_UserGuide.pdf

Continental Europe. The latter, developed around a bank-based financial system, does not resemble US as UK does.

After applying all these procedures, our sample consists of 91,459 bonds, worth 87,514 USD billion. In detail, we have 47,150 ABS bonds (52%), 27,671 MBS bonds (30%) and 16,638 CDO bonds (18%) corresponding, respectively, to the value of 42,314 USD billion, 26,555 USD billion and 9,610 USD billion.

4.2 Description of Variables

We use, in our econometric analyses, credit spread, in basis points, as the dependent variable.

For an easier description and interpretation of the independent variables, we present table 1, with the description of the variable, the expected results and the literature review on which we base these signs.

We decided to present this summarised literature review, even if our objective is not to conclude about the impact of variables, but rather to determine whether there is a gap between credit spreads between the United States and Europe.

The characters on this table have the subsequent meaning: + | positive impact on credit spread; -| Negative impact on the credit spread; i| Insignificant impact on the credit spread; ? |Sign cannot be clearly determined from the existing literature.

Table 1 - Definition of variables and expected signs

Variable	Description	Empirical Literature	Expected Results		
Dependent Variable:			ABS	MBS	CDO
Credit Spread (bps)	Spread at issue over comparable risk-free government security with a comparable maturity				
Independent Variables:					
Time to maturity	Natural Log of the maturity (in years) of the security	(Pinto et al., 2015); (Vink and Thibeault, 2008); (Hu & Cantor, 2005)	+ i	-	- i
Transaction size	Natural Log of the of the transaction size (in USD million)	(Pinto et al., 2015); (Vink and Thibeault, 2008; (Hu & Cantor, 2005)	-	-	+ i
Tranche to transaction	Ration of tranche size to the transaction size (%)	(Pinto et al., 2015); (Vink and Thibeault, 2008); (Hu & Cantor, 2005)	+	-	-
Number of banks	Number of financial intermediaries participants in the bond issuance	(Vink & Thibeault, 2008); (Pinto et al., 2015)	- i	-	+ i
Callable	Dummy equal to 1 if the security has call option, 0 otherwise	(Pinto et al., 2015)	i	i	i
Rated	Dummy equal to 1 if the bond is rated, 0 otherwise	(Vink & Thibeault, 2008)	-	+	+
Credit Rating	Bonds rating at the time of issuance, based n Standard & Poor's Rating Scale: (1) AAA, (2) AA+, (3) AA,…, (22) D	(Vink & Thibeault, 2008)	-	-	-
Fixed Rate	Dummy equal to 1 if the bond is fixed priced, 0 otherwise	(Vink & Thibeault, 2008)	+	+	- i
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	(Pinto et al., 2013)	?	?	?
Currency Risk	Dummy equal to 1 for securities that are denominated in a currency different from the currency in the deal's nationality, 0 otherwise	(Vink & Thibeault, 2008); (Pinto et al., 2015)	+	+	+
Risk Free	The yield on a United States Treasury Bond for the United States and the yield on a German Treasury bill for Europe, at the time of issuing the bonds	(Pinto et al., 2017)	- i	- i	- i
Volatility	The Chicago Board Options Exchange Volatility Index (VIX). VIX reflects a market estimate of future volatility	(Pinto et al., 2017)	+ i	+ i	+ i
Euso5y-Libor3m	Difference between the five-year Euro swap rate and the 3-month Libor rate, namely the slope of the Euro swap curve (a proxy of the expectations about the future evolution of interest rates)	(Hu & Cantor, 2006)	+	+	+
Subordinated Debt	Security that ranks below other securities with regard to claims on assets or earnings (junior security)	(Gabbi & Sironi, 2007)	+ i	+ i	+ i
GDP per capita	Measure of the total output of a country that takes the gross domestic product (GDP) and divides it by the number of people in that country	(Goswami et al., 2009)	- i	- i	- i
Common Law	Common law dummy takes the value 1 for common-law countries and the value 0 for others	(Esty & Megginson, 2002)	-	-	-
Creditor Rights	Creditor rights are measured using La Porta, Lopez-de-Silanes, Shleifer and Vishny's (1998) and Spamann's (2010) indices	(Esty & Megginson, 2002)	-	-	-
Crisis	Dummy equal to 1 if the security was issued in the crisis period (September 16, 2000 to December 31, 2016), 1 otherwise	(Criado and Rixtel, 2008); (Pinto et al., 2017); (Gorton and Metrick, 2012); (Caprio et al.,2010).	+	+	+
ABSPP	Dummy equal to 1 if the security were issued in the ECB' ABS purchase programme period (September 4, 2014 to December 31, 2016), 0 otherwise	(Watfe, 2015); (Claessens et al., 2010)	-	-	-

5. Univariate analysis

5.1 Descriptive statistics

To perform a statistical analysis, we start by comparing bond pricing characteristics per regions (Table 1 - US, UK and Continental Europe); secondly, we compare characteristics by security type (Table 3 - ABS, MBS and CDO); and, finally, we perform a more complete and crossed-data analysis of this information, comparing security type per region (Table 4, Table 5 and Table 6).

We also present t-tests and Fisher's exact tests (Table 2) comparing the values of each variable of interest, intersecting information, namely US *versus* UK, UK *versus* Continental Europe and US *versus* Continental Europe.

5.1.1 Descriptive statistics by Deal Nationality

With the results across economic zones and the significance tests presented on Tables 2 and 3, it is proven that, in a first analysis, the spreads are economically and statistically higher in US (91,70), than they are in UK (67,69) and CE (-9,06).

Following this information, another important variable to mention is the Credit Rating, which is also economically and statistically lower for the US (3,63), than they are for the UK (4,33) and CE (4,68), suggesting that the bonds average rating is lower in CE *vis-à-vis* the US and UK.

This result goes according to the statistical significance of the Country Risk variable, which is, in its turn, higher for the CE (1,76) than for the UK (1,35) and the US (1,09). In this way, it might seem logical that the number of financial intermediaries participating in this process would be superior in CE. Despite that, this variable is not economically and statistically significant, presenting the same value for all geographical areas.

In terms of dummy variables, only two situations are relevant: in the US, a much higher rate of issues is fixed priced (35% versus UK 8% and CE 9%) and, on the other hand, UK have a higher proportion of issuances (48% versus 1% for US and 5% for CE) of securities that are denominated in a currency different from GBP (British Pound Sterling).

Table 2 - Univariate statistics – Credit Spread determinants differentiated by United States, United Kingdom and Continental Europe

Variable of interest	DEAL NATIONALITY			Variable of interest	DEAL NATIONALITY		
	US	UK	CE		US	UK	CE
Univariate Analysis - continuous variables							
Credit Spread (bps)				**Country Risk**			
Number of observations	53 466	5 105	7 863	*Number of observations*	53 156	5 066	7 834
Mean	91,70	67,69	-9,06	*Mean*	1,09	1,35	1,76
Standard Deviation	453,70	187,64	255,53	*Standard Deviation*	0,66	1,29	1,84
Median	67,40	62,44	-30,40	*Median*	1,00	1,00	1,00
Minimum	-662,30	-536,50	-581,90	*Minimum*	0,00	0,00	0,00
Maximum	63 744,22	2 004,50	2 864,20	*Maximum*	10,00	11,00	20,00
Time to Maturity (years)				**Credit Rating**			
Number of observations	53 457	5 105	7 858	*Number of observations*	51 153	4 675	6 905
Mean	25,71	28,21	26,74	*Mean*	3,63	4,33	4,68
Standard Deviation	10,37	15,27	19,40	*Standard Deviation*	3,42	3,75	4,15
Median	29,99	31,91	23,45	*Median*	1,00	3,00	3,00
Minimum	0,03	0,92	0,99	*Minimum*	0,00	0,00	0,00
Maximum	91,00	99,00	94,08	*Maximum*	21,00	21,00	21,00
Transaction size (USD million)				**Number of tranches**			
Number of observations	53 466	5 105	7 858	*Number of observations*	53 466	5 105	7 863
Mean	835,05	2 792,35	1 276,20	*Mean*	9,28	8,07	4,81
Standard Deviation	668,07	4 398,28	2 183,29	*Standard Deviation*	6,76	4,90	2,57
Median	683,92	1 019,75	720,84	*Median*	8,00	7,00	4,00
Minimum	0,25	2,64	0,09	*Minimum*	1,00	1,00	1,00
Maximum	20 467,76	33 365,34	37 897,90	*Maximum*	59,00	26,00	18,00
Tranche size (USD million)				**Number of banks**			
Number of observations	53 466	5 105	7 863	*Number of observations*	53 466	5 105	7 863
Mean	197,79	336,53	340,15	*Mean*	0,02	0,02	0,02
Standard Deviation	414,01	850,53	1 155,54	*Standard Deviation*	0,25	0,29	0,35
Median	45,00	75,00	59,01	*Median*	0,00	0,00	0,00
Minimum	0,00	0,74	0,00	*Minimum*	0,00	0,00	0,00
Maximum	20 467,76	25 292,00	30 476,32	*Maximum*	7,00	6,00	11,00
Tranche to transaction (%)							
Number of observations	53 466	5 105	7 863				
Mean	0,28	0,20	0,30				
Standard Deviation	0,37	0,26	0,35				
Median	0,07	0,08	1,00				
Minimum	0,00	0,00	0,00				
Maximum	1,00	1,00	1,00				
Univariate Analysis - dummy variables							
Callable				**Rated**			
Nº of issues with data available	53 466	5 105	7 863	*Nº of issues with data available*	53 466	5 105	7 863
Nº of issues with dummy =1	36 043	2 716	4 026	*Nº of issues with dummy =1*	51 107	4 672	6 892
% of data available	0,67	0,53	0,51	*% of data available*	0,96	0,92	0,88
Fixed Rate				**Currency Risk**			
Nº of issues with data available	53 466	5 105	7 863	*Nº of issues with data available*	53 466	5 105	7 863
Nº of issues with dummy =1	18 531	424	738	*Nº of issues with dummy =1*	574	2 430	367
% of data available	0,35	0,08	0,09	*% of data available*	0,01	0,48	0,05

Table 3 - Tests of significance for the difference in values among United States, United Kingdom and Continental Europe

Variable of interest	Geographic Zone		
	US versus UK	UK versus Continental Europe	US versus Continental Europe
Continuous variables: two-sample *t* -tests assuming unequal variances			
Credit Spread (bps)	7,32 *	19,68 *	28,90 *
Time to Maturity (years)	-15,00 *	7,33 *	-6,29 *
Transaction Size (USD millions)	-40,80 *	25,69 *	-12,57 *
Tranche Size (USD millions)	-21,34 *	7,75 *	-12,92 *
Tranche to Transaction (%)	26,31 *	-19,07 *	-0,05
Country Risk	-13,91 *	-16,62 *	-33,58 *
Credit Rating	-12,26 *	-5,56 *	-20,88 *
Number of Tranches	6,52 *	45,01 *	97,66 *
Number of Banks	-1,15	-0,26	-1,42
Dummy variables: Fisher's exact test (p-values)			
Callable (0/1)	0,000 #	0,199	0,000 #
Rated (0/1)	0,893	0,000 #	0,000 #
Fixed Rate (0/1)	0,000 #	0,002 #	0,000 #
Currency Risk (0/1)	0,000 #	0,000 #	0,000 #

For continuous variables, * indicate significant difference at the 5% level, respectively, between the two respective zones. For dummy variables, # indicates that the proportion of tranches for which dummy = 1 differ significantly between the two zones.

5.1.2 Descriptive statistics by Deal Type

Table 4 presents our univariate results comparing the three different bond types. We can conclude what was previously evidenced[29]: the Credit Spread is higher for CDOs (157,78), following ABS (84,69) and MBS (19,96). In this way, it is possible to validate that CDOs include more risk, due to its diversity of assets used as collateral. The same can be concluded based on the highest value of Credit Rating.

A typical MBS issuance presents a highest maturity (30 years), when compared to ABS (25 years) and CDO (22 years). The same logic also applies when considering the transaction size, presenting, respectively, USD 1 495 million, USD 930 million and 587 million USD.

[29] By Vink and Thibeault (2008) and Pinto and Alves (2017)

In this case, we observe that most of the sample is rated (US 96%, UK 93% and CE 93%) and that only a small percentage is exposed to currency risk (1% for the US, 7% for UK and 14% for CE).

Table 4 - Univariate statistics - Credit Spread determinants differentiated by ABS, MBS and CDO

Variable of interest	TYPE OF SECURITY			Variable of interest	TYPE OF SECURITY		
	ABS	MBS	CDO		ABS	MBS	CDO
Univariate Analysis - continuous variables							
Credit Spread (bps)				**Country Risk**			
Number of observations	36 205	19 292	10 937	*Number of observations*	35 882	19 238	10 936
Mean	84,69	19,96	157,78	*Mean*	1,20	1,17	1,19
Standard Deviation	199,92	161,63	940,89	*Standard Deviation*	1,06	0,83	0,85
Median	63,22	32,30	98,62	*Median*	1,00	1,00	1,00
Minimum	-658,70	-1 136,60	-654,90	*Minimum*	0,00	0,00	0,00
Maximum	13 367,00	6 336,50	63 744,22	*Maximum*	20,00	20,00	10,00
Time to Maturity (years)				**Credit Rating**			
Number of observations	36 192	19 291	10 937	*Number of observations*	34 659	17 926	10 148
Mean	24,63	30,74	22,31	*Mean*	3,99	2,62	5,20
Standard Deviation	10,60	11,90	15,05	*Standard Deviation*	3,41	3,14	4,02
Median	29,99	30,07	13,09	*Median*	3,00	1,00	4,00
Minimum	0,06	0,08	0,03	*Minimum*	0,00	0,00	0,00
Maximum	61,24	94,08	99,00	*Maximum*	21,00	21,00	20,00
Transaction size (USD million)				**Number of tranches**			
Number of observations	36 205	19 287	10 937	*Number of observations*	36 205	19 292	10 937
Mean	930,18	1 494,95	586,97	*Mean*	10,71	5,65	7,19
Standard Deviation	726,82	2 772,73	630,03	*Standard Deviation*	6,01	7,29	2,59
Median	789,00	770,00	455,74	*Median*	11,00	3,00	7,00
Minimum	0,25	0,09	1,19	*Minimum*	1,00	1,00	1,00
Maximum	9 689,34	37 897,90	20 001,70	*Maximum*	42,00	59,00	22,00
Tranche size (USD million)				**Number of banks**			
Number of observations	36 205	19 292	10 937	*Number of observations*	36 205	19 292	10 937
Mean	126,51	484,87	94,48	*Mean*	0,03	0,02	0,00
Standard Deviation	249,33	977,78	306,50	*Standard Deviation*	0,30	0,27	0,10
Median	34,64	227,39	30,00	*Median*	0,00	0,00	0,00
Minimum	0,00	0,00	0,00	*Minimum*	0,00	0,00	0,00
Maximum	6 534,27	64 698,19	16 601,70	*Maximum*	7,00	11,00	7,00
Tranche to transaction (%)							
Number of observations	36 205	19 292	10 937				
Mean	0,17	0,52	0,17				
Standard Deviation	0,26	0,45	0,24				
Median	0,05	0,44	0,06				
Minimum	0,00	0,00	0,00				
Maximum	1,00	1,00	1,00				
Univariate Analysis - dummy variables							
Callable				**Rated**			
Nº of issues with data available	36 205	19 292	10 937	*Nº of issues with data available*	36 205	19 292	10 937
Nº of issues with dummy =1	29 272	10 732	2 781	*Nº of issues with dummy =1*	34 635	17 919	10 117
% of data available	0,81	0,56	0,25	*% of data available*	0,96	0,93	0,93
Fixed Rate				**Currency Risk**			
Nº of issues with data available	36 205	19 292	10 937	*Nº of issues with data available*	36 205	19 292	10 937
Nº of issues with dummy =1	9 729	8 851	1 113	*Nº of issues with dummy =1*	444	1 445	1 482
% of data available	0,27	0,46	0,10	*% of data available*	0,01	0,07	0,14

5.1.3 Descriptive statistics by Deal Nationality and Deal Type

The following tables present a more particular analysis, in which we cross the type of security by indicated geographical area.

Analysing ABS, based on table 5, we realize that the Credit Spread is higher in the US (90,75) than in UK (81,29) and CE (5,61).

Concerning Time to Maturity, the difference is evident when we compare the three economic regions: 25 years for bonds issued in the US versus 15 years for bonds issued in UK 16 years for bonds issued in CE.

Again, in terms of currency risk, it is only relevant to the UK, considering that 27% of the data available are securities that are denominated in a currency different from GBP (British Pound Sterling).

Based on the characteristics of the MBS, as presented in table 6, we can conclude that the average Credit Spread is higher for bonds issued in UK (50,11 bps), followed by US (32,14 bps) and EC (-49,98 bps).

Regarding the variable time to maturity, we show that it is higher in CE (37 years) compared to UK (33 years) and the US (28 years). Is is also important to highlight that the number of fixed-rated MBS in the US (70%) is much higher than those for EC and UK, with 4% and 3%, respectively.

Regarding CDOs, Table 7 shows that the credit spread, on average, is more similar between US (191,19 bps) and UK (119,84 bps), and higher than that for EC (56,53 bps). They also present the highest credit rating, proving that they are, effectively, and across regions, the most complex product, involving more risk.

Table 5 - Univariate statistics - Credit Spread determinants of ABS, differentiated by United States, United Kingdom and Continental Europe

Variable of interest	ABS			Variable of interest	ABS		
	US	UK	CE		US	UK	CE
Univariate Analysis - continuous variables							
Credit Spread (bps)				**Country Risk**			
Number of observations	33 048	653	2 504	*Number of observations*	32 740	653	2 489
Mean	90,75	81,29	5,61	*Mean*	1,11	1,68	2,20
Standard Deviation	183,12	193,85	344,72	*Standard Deviation*	0,76	2,10	2,48
Median	66,71	64,55	-18,54	*Median*	1,00	1,00	1,00
Minimum	-658,70	-347,39	-576,80	*Minimum*	1,00	0,00	0,00
Maximum	4 364,96	1 652,00	2 731,60	*Maximum*	10,00	10,00	20,00
Time to Maturity (years)				**Credit Rating**			
Number of observations	33 039	653	2 500	*Number of observations*	31 909	577	2 173
Mean	25,45	15,92	16,03	*Mean*	3,96	4,28	4,31
Standard Deviation	10,10	11,31	11,95	*Standard Deviation*	3,34	3,48	4,26
Median	29,99	10,08	11,82	*Median*	3,00	3,00	3,00
Minimum	0,06	1,00	0,99	*Minimum*	0,00	1,00	0,00
Maximum	61,24	47,97	69,92	*Maximum*	21,00	15,00	21,00
Transaction size (USD million)				**Number of tranches**			
Number of observations	33 048	653	2 504	*Number of observations*	33 048	653	2 504
Mean	922,16	1 070,87	999,37	*Mean*	11,38	3,88	3,72
Standard Deviation	680,19	902,73	1 144,36	*Standard Deviation*	5,84	2,36	2,23
Median	784,65	799,70	700,00	*Median*	12,00	3,00	3,00
Minimum	0,25	5,00	1,53	*Minimum*	1,00	1,00	1,00
Maximum	7 089,87	4 716,07	9 689,34	*Maximum*	42,00	12,00	13,00
Tranche size (USD million)				**Number of banks**			
Number of observations	33 048	653	2 504	*Number of observations*	33 048	653	2 504
Mean	108,21	305,83	321,35	*Mean*	0,03	0,07	0,02
Standard Deviation	200,64	356,82	532,64	*Standard Deviation*	0,30	0,48	0,21
Median	31,00	188,98	94,01	*Median*	0,00	0,00	0,00
Minimum	0,00	2,84	0,00	*Minimum*	0,00	0,00	0,00
Maximum	5 000,00	2 354,79	6 534,27	*Maximum*	7,00	4,00	4,00
Tranche to transaction (%)							
Number of observations	33 048	653	2 504				
Mean	0,15	0,38	0,40				
Standard Deviation	0,23	0,35	0,39				
Median	0,04	0,22	0,21				
Minimum	0,00	0,00	0,00				
Maximum	1,00	1,00	1,00				
Univariate Analysis - dummy variables							
Callable				**Rated**			
Nº of issues with data available	33 048	653	2 504	*Nº of issues with data available*	33 048	653	2 504
Nº of issues with dummy =1	27 852	248	1 172	*Nº of issues with dummy =1*	31 894	577	2 164
% of data available	0,84	0,38	0,47	*% of data available*	0,97	0,88	0,86
Fixed Rate				**Currency Risk**			
Nº of issues with data available	33 048	653	2 504	*Nº of issues with data available*	33 048	653	2504
Nº of issues with dummy =1	9 177	209	343	*Nº of issues with dummy =1*	98	176	170
% of data available	0,28	0,32	0,14	*% of data available*	0,003	0,27	0,07

Table 6 - Univariate statistics - Credit Spread determinants of MBS, differentiated by United States, United Kingdom and Continental Europe

Variable of interest	MBS US	MBS UK	MBS Continental Europe	Variable of interest	MBS US	MBS UK	MBS Continental Europe
Univariate Analysis - continuous variables							
Credit Spread (bps)				**Country Risk**			
Number of observations	12 191	3 457	3 645	*Number of observations*	12 910	3 418	3 631
Mean	32,14	50,11	-49,98	*Mean*	1,02	1,25	1,60
Standard Deviation	150,17	163,73	180,91	*Standard Deviation*	0,30	1,01	1,46
Median	45,78	58,75	-58,20	*Median*	1,00	1,00	1,00
Minimum	-631,10	-434,48	-541,10	*Minimum*	0,00	1,00	1,00
Maximum	1 343,01	1 090,40	1 209,70	*Maximum*	6,00	11,00	20,00
Time to Maturity (years)				**Credit Rating**			
Number of observations	12 191	3 457	3 644	*Number of observations*	11 484	3 213	3 230
Mean	28,02	33,33	37,34	*Mean*	1,61	4,08	4,76
Standard Deviation	7,88	12,41	17,94	*Standard Deviation*	2,03	3,61	4,10
Median	29,98	35,00	37,36	*Median*	1,00	3,00	3,00
Minimum	0,75	0,92	3,38	*Minimum*	0,00	0,00	0,00
Maximum	51,77	61,96	93,99	*Maximum*	15,00	21,00	21,00
Transaction size (USD million)				**Number of tranches**			
Number of observations	12 191	3 457	3 645	*Number of observations*	12 191	3 457	3 645
Mean	776,58	3 730,94	1 851,08	*Mean*	4,88	9,25	4,79
Standard Deviation	719,25	5 012,91	3 689,04	*Standard Deviation*	8,38	5,23	2,26
Median	612,03	1 457,47	1 104,90	*Median*	1,00	8,00	5,00
Minimum	0,59	42,50	0,09	*Minimum*	1,00	1,00	1,00
Maximum	12 551,21	33 365,34	69 516,14	*Maximum*	59,00	26,00	18,00
Tranche size (USD million)				**Number of banks**			
Number of observations	12 191	3 457	3 645	*Number of observations*	12 191	3 457	3 645
Mean	518,32	399,66	454,03	*Mean*	0,01	0,02	0,03
Standard Deviation	701,37	923,47	1 611,05	*Standard Deviation*	0,16	0,28	0,46
Median	306,47	91,30	63,35	*Median*	0,00	0,00	0,00
Minimum	0,00	0,07	0,00	*Minimum*	0,00	0,00	0,00
Maximum	12 551,21	25 292,00	64 698,19	*Maximum*	4,00	6,00	11,00
Tranche to transaction (%)							
Number of observations	12 191	3 457	3 645				
Mean	0,70	0,16	0,27				
Standard Deviation	0,43	0,23	0,35				
Median	1,00	0,07	0,07				
Minimum	0,01	0,00	0,00				
Maximum	1,00	1,00	1,00				
Univariate Analysis - dummy variables							
Callable				**Rated**			
Nº of issues with data available	12 191	3 457	3 645	*Nº of issues with data available*	12 191	3 457	3 645
Nº of issues with dummy =1	6 624	1 948	2 161	*Nº of issues with dummy =1*	11 481	3 212	3 227
% of data available	0,54	0,56	0,59	*% of data available*	0,94	0,93	0,89
Fixed Rate				**Currency Risk**			
Nº of issues with data available	12 191	3 457	3 645	*Nº of issues with data available*	12 191	3 457	3645
Nº of issues with dummy =1	8 594	96	161	*Nº of issues with dummy =1*	44	1 346	55
% of data available	0,70	0,03	0,04	*% of data available*	0,004	0,39	0,02

Table 7 - Univariate statistics - Credit Spread determinants of CDO, differentiated by United States, United Kingdom and Continental Europe

Variable of interest	CDO US	CDO UK	CDO Continental Europe	Variable of interest	CDO US	CDO UK	CDO Continental Europe
Univariate Analysis - continuous variables							
Credit Spread (bps)				**Country Risk**			
Number of observations	8 229	995	1 714	*Number of observations*	8 228	995	1 714
Mean	191,19	119,84	56,53	*Mean*	1,11	1,45	1,45
Standard Deviation	1 283,88	242,94	219,64	*Standard Deviation*	0,60	1,41	1,23
Median	111,83	82,00	16,58	*Median*	1,00	1,00	1,00
Minimum	-643,90	-536,50	-485,10	*Minimum*	0,00	0,00	0,00
Maximum	63 744,22	2 004,50	966,40	*Maximum*	6,00	10,00	9,00
Time to Maturity (years)				**Credit Rating**			
Number of observations	8 229	995	1 714	*Number of observations*	7 762	885	1 502
Mean	23,28	18,48	19,85	*Mean*	5,23	5,24	5,04
Standard Deviation	13,51	17,13	19,48	*Standard Deviation*	3,98	4,27	4,07
Median	12,23	13,54	13,17	*Median*	4,00	3,00	3,00
Minimum	0,03	2,00	1,94	*Minimum*	0,00	0,00	0,00
Maximum	91,00	99,00	93,03	*Maximum*	15,00	15,00	20,00
Transaction size (USD million)				**Number of tranches**			
Number of observations	8 229	995	1 714	*Number of observations*	8 229	995	1 714
Mean	571,82	661,12	616,58	*Mean*	7,40	6,72	6,43
Standard Deviation	413,18	1 367,17	790,13	*Standard Deviation*	2,52	2,49	2,79
Median	461,09	451,44	437,50	*Median*	7,00	7,00	6,00
Minimum	3,00	2,64	3,50	*Minimum*	1,00	1,00	1,00
Maximum	3 984,00	20 001,70	6 609,60	*Maximum*	22,00	17,00	16,00
Tranche size (USD million)				**Number of banks**			
Number of observations	8 229	995	1 714	*Number of observations*	8 229	995	1 714
Mean	82,83	137,36	125,45	*Mean*	0,00	0,00	0,01
Standard Deviation	160,46	782,17	344,07	*Standard Deviation*	0,05	0,00	0,24
Median	30,00	30,53	32,20	*Median*	0,00	0,00	0,00
Minimum	0,00	0,20	0,31	*Minimum*	0,00	0,00	0,00
Maximum	2 835,00	16 601,70	5 992,47	*Maximum*	3,00	0,00	7,00
Tranche to transaction (%)							
Number of observations	8 229	995	1 714				
Mean	0,16	0,20	0,22				
Standard Deviation	0,23	0,26	0,28				
Median	0,06	0,07	0,08				
Minimum	0,00	0,00	0,00				
Maximum	1,00	1,00	1,00				
Univariate Analysis - dummy variables							
Callable				**Rated**			
Nº of issues with data available	8 229	995	1 714	*Nº of issues with data available*	8 229	995	1 714
Nº of issues with dummy =1	1 568	520	693	*Nº of issues with dummy =1*	7 734	883	1 501
% of data available	0,19	0,52	0,40	*% of data available*	0,94	0,89	0,88
Fixed Rate				**Currency Risk**			
Nº of issues with data available	8 229	995	1 714	*Nº of issues with data available*	8 229	995	1714
Nº of issues with dummy =1	760	119	234	*Nº of issues with dummy =1*	432	908	142
% of data available	0,09	0,12	0,14	*% of data available*	0,05	0,91	0,08

In general, we can conclude that these geographic zones represent indeed distinct characteristics (Hypothesis 1) which may derive from, among others, markets of different sizes, macroeconomic issues, and political and legal variances. With this, it is important to note that the US contains a much more significant sample of 53,466 observations compared to 5,105 and 7,863 for the UK and CE, respectively.

We can also, with this primary assessment, conclude that the average Credit Spread of bonds issued in the US is higher than the average Credit Spread of bonds issued in CE (Hypothesis 2) and that ABS, MBS and CDO exhibit different pricing characteristics, pointing out that they are different financial instruments in terms of spreads, pricing determinants and inherent characteristics.

6. Regression analysis

To answer our main research question, we perform an OLS regression analysis Our initial model is the following:

$$Credit\ Spread_i = \alpha + \beta_1\ US_i + \beta_2\ Continental\ Europe_i + \beta_3\ ABS_i + \beta_4\ CDO_i + \beta_5\ Crisis\ Period_i + \beta_6\ Time\ to\ Maturity_i + \beta_7\ Transaction\ Size_i + \beta_8\ Tranche\ to\ Transaction_i + \beta_9\ Number\ of\ Banks_i + \beta_{10}\ Callable_i + \beta_{11}\ Rated_i + \beta_{12}\ Credit\ Rating_i + \beta_{13}\ Fixed\ Rate_i + \beta_{14}\ Country\ Risk_i + \beta_{15}\ Currency\ Risk_i + \beta_{16}\ Risk\ Free_i + \beta_{17}\ Volatility_i + \beta_{18}\ Euso5y\text{-}Libor3m_i + \beta_{19}\ Subordinated\ Debt_i + \beta_{20}\ GDP\ per\ capita_i + \beta_{21}\ Common\ law_i + \beta_{22}\ Creditor\ Rights_i + \varepsilon_i$$

6.1 Regression results

6.1.1 *How do common pricing characteristics compare between AS bonds in the United States vis-à-vis Continental Europe (CE)?*

The model [1a] in table 8, which represents our base model, estimates the impact of our base variables on determining the credit spread.

The results suggest, for a level of significance of 1%, that Credit Spread of bonds issued in Continental Europe is lower than that for bonds issued in the United Kingdom and that bond spreads issued in UK and US do not differ significantly. We can also observe that ABS and CDO have higher Credit Spreads than MBS.

The remaining outcomes that are statistically significant, such as Callable and Rated, are contrasting to what was predicted by previous investigations. In our model, the first variable positively affects the spreads and the second, negatively. Although both statistically significant at a level of 1%, in case where the bond issue is rated has much more substantial impact.

We also found that the sign and significance of the coefficients for the variable fixed rate, positive and significant, risk free ad creditors rights, both negative and significant, as well as for subordinated debt, positive and insignificant, and common law, negative and insignificant, are in line with the expected results based on the existing literature.

To validate the coherence of these results and bearing in mind the impact of the 2007-2008 financial crisis and the subsequent sovereign debt crisis on AS securities, in model [1b] we replaced dummies Continental Europe and US added per the interaction between these variables and a dummy variable set equal to 1 if the bond is issued during the pre-crisis period - from January 1, 2000 through to September 14, 2008) and 0 if issued during the crisis period (September 15, 2008 through to December 31, 2016).

Results on model [1b] show that the spreads of bonds issued in CE are effectually lower than those of bonds issued in the UK, and that bond spreads of bonds issued in the US do not differ significantly from bond spreads issued in the UK, proving that our previous results are robust over time. From this regression we can also perceive, in a preliminary way, that the crisis in continental Europe has increased AS bond spreads.

Considering that spreads differ among security types and that ABS, MBS and CDO have different characteristics, in section 6.1.2 we perform analyses in isolation for each type of security.

Considering the variables used as controls in all models, we can conclude that, in general, they affect credit spread with the same sign and impact expected based on the existing literature, apart from Currency Risk, Risk Free, Volatility, Subordinated Debt and Creditor Rights (see Table 8).

Table 8 - Regression analyses of the determinants of credit spreads

	[1a]	[1b]
Dependent Variable:		
Credit Spread (bps)	**US, UK and Continental Europe**	**US, UK and Continental Europe**
Independent Variables:		
Intercept	355,19 ***	369,58 ***
	(4,84)	(5,10)
US	-0,70	
	(-0,90)	
Continental Europe	-99,38 ***	
	(-8,82)	
US pre-crisis		3,96
		(0,60)
US crisis		-17,99
		(-0,98)
Continental Europe pre-crisis		-116,68 ***
		(-10,52)
Continental Europe crisis		-92,68 ***
		(-6,69)
ABS	11,21 ***	8,33 ***
	(3,51)	(2,59)
CDO	77,42 ***	75,37 ***
	(6,66)	(6,19)
Crisis Period	-32,15	
	(-1,25)	
Time to maturity	-29,74 ***	-30,74 ***
	(-17,13)	(-18,12)
Transaction size	-2,44 *	-2,21
	(-1,65)	(-1,54)
Tranche to transaction	4,30	4,91
	(0,98)	(1,14)
Number of banks	5,16	4,63
	(1,35)	(1,19)
Callable	11,87 ***	10,51 ***
	(4,75)	(3,89)
Rated	-460,50 ***	-459,47 ***
	(-8,41)	(-8,36)
Credit Rating	24,45 ***	24,39 ***
	(28,65)	(28,50)
Fixed Rate	20,10 ***	20,99 ***
	(3,38)	(3,43)
Country Risk	-6,23 ***	-7,42 ***
	(-3,75)	(-4,85)
Currency Risk	-58,97 ***	-59,03 ***
	(-6,71)	(-6,66)
Risk Free	-34,66 ***	-35,60 ***
	(-6,99)	(-7,25)
Volatility	-0,41	0,14
	(0,88)	(0,34)
Euso5y-Libor3m	-0,65 ***	-0,63 ***
	(-8,95)	(-8,60)
Subordinated Debt	10,46	14,65 **
	(1,60)	(2,56)
GDP per capita	0,01 ***	0,01 ***
	(9,28)	(8,37)
Common Law	-12,34	-14,68
	(-1,02)	(-1,20)
Creditor Rights	-3,82 **	-6,98 ***
	(-2,27)	(-4,08)
Year Fixed Effects	yes	yes
Number of observations	62 329	62 329
Adjusted R-squared	7,28	7,29
Overall F-test	309,95	308,4

6.1.2 *Is the credit spread on AS bonds in the US higher than the credit spread on AS bonds in CE?*

Table 9 shows that bond credit spreads are higher in the US *versus* UK and CE, in both pre-crisis and crisis periods, and that ABS issued in the UK have higher spreads than those issued in CE. Again, these results remain over time.

Regarding MBS, Table 10 shows that bond credit spreads are higher in the United States *vis-à-vis* CE in both pre-crisis and crisis periods and bond credit spreads do not differ significantly between MBS issued in the US versus UK. Finally, while bond credit spreads are higher for MBS issued in the UK versus CE in the pre-crisis period, during the crisis it can be observed a convergence process.

Table 11 shows the results considering CDOs. We find that despite spreads do not differ significantly between CDOs issued in the US *versus* UK and UK and CE, CDOs' spreads are higher for transactions closed in the US *vis-à-vis* CE.

We can therefore conclude that the credit spreads of ABS, MBS and CDO issued in the US are higher than the credit spreads of the same securities issued in CE.

Table 9 - Regression analyses of the determinants of credit spreads of ABS, differentiated by United States, United Kingdom and Continental Europe

	[2]	[3]	[4]
Dependent Variable:			
Credit Spread (bps)	**US versus UK**	**UK versus CE**	**CE versus US**
Independent Variables:			
Intercept	1 737,31 ***	649,64 ***	918,14 ***
	(7,42)	(3,77)	(6,31)
US pre-crisis	184,97 ***		
	(5,42)		
US crisis	323,00 ***		
	(4,84)		
UK pre-crisis		53,12 *	
		(1,82)	
UK crisis		56,64 *	
		(1,90)	
Continental Europe pre-crisis			-92,74 ***
			(-4,01)
Continental Europe crisis			-82,99 ***
			(-3,28)
Time to maturity	-15,36 ***	-67,49 ***	-21,65 ***
	(-6,26)	(-9,39)	(-8,96)
Transaction size	-5,89 ***	-10,59	-7,58 ***
	(-3,86)	(-1,50)	(-4,34)
Tranche to transaction	-25,90 ***	-8,21	-27,75 ***
	(-4,99)	(-0,34)	(-4,21)
Number of banks	7,56 **	18,69	9,26 **
	(2,11)	(1,21)	(2,38)
Callable	0,08	-0,31	-1,20
	(0,02)	(-0,02)	(-0,30)
Rated	-657,72 ***	-468,14 ***	-566,31 ***
	(-3,88)	(-4,61)	(-4,80)
Credit Rating	21,19 ***	19,79 ***	20,90 ***
	(40,92)	(10,39)	(41,07)
Fixed Rate	21,22 ***	107,49 ***	19,18 ***
	(6,29)	(9,97)	(5,66)
Country Risk	-3,04 ***	-6,91 ***	-3,01 ***
	(-3,15)	(-3,07)	(-2,75)
Currency Risk	-48,99 ***	-3,09	55,48 **
	(-3,81)	(-0,15)	(2,45)
Risk Free	-34,55 ***	21,48	-42,95 ***
	(-9,10)	(1,49)	(-12,19)
Volatility	0,18	2,31 ***	-0,26
	(0,49)	(2,80)	(-0,73)
Euso5y-Libor3m	-0,53 ***	-0,81 ***	-0,64 ***
	(-13,32)	(-3,14)	(-16,17)
Subordinated Debt	17,36 *	-43,56 ***	-0,62
	(1,81)	(-2,88)	(-0,07)
GDP per capita	-0,02 ***	0,00 ***	0,01 ***
	(-5,28)	(4,18)	(6,19)
Common Law		-7,36	-54,81 **
		(-0,28)	(-2,06)
Creditor Rights	28,50 **	-2,76	-10,29 ***
	(2,26)	(-0,41)	(-3,77)
Year Fixed Effects	yes	yes	yes
Number of observations	32 194	2 743	33 783
Adjusted R-squared	24,65	17,93	22,59
Overall F-test	194,95	56,65	196,38

Table 10 - Regression analyses of the determinants of credit spreads of MBS, differentiated by United States, United Kingdom and Continental Europe

	[5]	[6]	[7]
Dependent Variable:			
Credit Spread (bps)	**US versus UK**	**UK versus CE**	**CE versus US**
Independent Variables:			
Intercept	400,88 ***	361,21 ***	68,15
	(3,99)	(4,59)	(0,77)
US pre-crisis	28,14		
	(0,95)		
US crisis	80,73		
	(1,23)		
UK pre-crisis		136,39 ***	
		(12,08)	
UK crisis		21,77	
		(1,30)	
Continental Europe pre-crisis			-79,93 ***
			(-7,87)
Continental Europe crisis			-25,79 *
			(-1,76)
Time to maturity	-41,12 ***	-18,91 ***	-47,47 ***
	(-12,15)	(-4,84)	(-13,32)
Transaction size	-2,72	-2,47	-1,27
	(-1,63)	(-0,96)	(-0,72)
Tranche to transaction	0,88	-17,56 ***	11,31 **
	(0,18)	(-2,62)	(2,38)
Number of banks	-12,36	-8,75	-12,47
	(-1,13)	(-0,62)	(-1,63)
Callable	16,03 ***	14,25 ***	17,71 ***
	(5,20)	(2,98)	(5,38)
Rated	-118,13	-388,10 ***	-197,55 ***
	(-1,16)	(-16,02)	(-2,89)
Credit Rating	15,90 ***	19,03 ***	14,92 ***
	(20,67)	(21,58)	(19,97)
Fixed Rate	62,14 ***	60,58 ***	62,60 ***
	(18,31)	(2,71)	(17,33)
Country Risk	2,03	-11,39 ***	-4,54 *
	(0,83)	(-4,62)	(-1,86)
Currency Risk	-88,99 ***	-87,06 ***	67,32 ***
	(-12,85)	(-11,41)	(2,88)
Risk Free	-8,06 *	17,47 *	-12,62 ***
	(-1,93)	(1,88)	(-3,42)
Volatility	0,45	1,68 ***	0,61 *
	(1,10)	(3,72)	(1,81)
Euso5y-Libor3m	-0,43 ***	-0,60 ***	-0,56 ***
	(-9,16)	(-5,76)	(1,81)
Subordinated Debt	50,92 ***	-38,12 ***	49,03 ***
	(9,95)	(-6,33)	(8,66)
GDP per capita	0,00	0,00 ***	0,00 ***
	(-0,79)	(5,42)	(5,57)
Common Law		0,70	27,11 **
		(0,01)	(2,24)
Creditor Rights	17,65	-6,01 *	4,98 **
	(1,59)	(-1,86)	(2,58)
Year Fixed Effects	yes	yes	yes
Number of observations	14 656	6 386	14 694
Adjusted R-squared	40,25	59,24	41,21
Overall F-test	141,3	155,91	170,33

Table 11 - Regression analyses of the determinants of credit spreads of CDO, differentiated by United States, United Kingdom and Continental Europe

Dependent Variable:	[8]	[9]	[10]
Credit Spread (bps)	**US versus UK**	**UK versus CE**	**CE versus US**
Independent Variables:			
Intercept	1 636,03 ***	784,11 ***	723,75 **
	(5,69)	(4,67)	(2,43)
US pre-crisis	107,31		
	(1,56)		
US crisis	247,34		
	(1,36)		
UK pre-crisis		-24,99	
		(-0,85)	
UK crisis		-10,64	
		(-0,35)	
Continental Europe pre-crisis			-198,08 ***
			(-4,66)
Continental Europe crisis			-202,05 *
			(-1,72)
Time to maturity	-26,54 ***	-35,51 ***	-32,03 ***
	(-5,70)	(-5,36)	(-7,12)
Transaction size	0,12	-19,47 ***	-2,30
	(0,02)	(-3,68)	(-0,33)
Tranche to transaction	-0,66	-31,34 **	-11,03
	(-0,03)	(-2,29)	(-0,54)
Number of banks	75,58 *	-7,22	0,14
	(1,65)	(-1,46)	(0,01)
Callable	-30,88 **	-13,51	-24,83 **
	(-2,16)	(-1,36)	(-2,10)
Rated	-408,98 ***	-534,43 ***	-395,53 ***
	(-7,63)	(-10,81)	(-7,26)
Credit Rating	34,86 ***	33,88 ***	34,24 ***
	(10,36)	(32,12)	(10,58)
Fixed Rate	-20,56	60,68 ***	0,31
	(-1,26)	(5,28)	(0,02)
Country Risk	-12,10	-0,51	-17,17 **
	(-1,21)	(-0,10)	(-2,55)
Currency Risk	-116,42 ***	48,70 **	70,90 ***
	(-7,11)	(2,51)	(-4,08)
Risk Free	-77,36	28,23	-96,62 **
	(-1,59)	(1,22)	(-2,32)
Volatility	-0,47	2,83 ***	-0,51
	(-0,14)	(3,09)	(-0,21)
Euso5y-Libor3m	-1,18 *	-0,60 **	-1,30 **
	(-1,76)	(-2,54)	(-2,20)
Subordinated Debt	42,06 *	-47,21 ***	31,39 *
	(1,90)	(-5,51)	(1,71)
GDP per capita	-0,02	0,00	0,00
	(-1,54)	(1,12)	(0,66)
Common Law		10,60	1,13
		(0,66)	(0,04)
Creditor Rights	-8,48	-2,88	-28,60 ***
	(-0,27)	(-0,45)	(-5,30)
Year Fixed Effects	yes	yes	yes
Number of observations	8 646	2 340	9 216
Adjusted R-squared	3,04	64,9	3,29
Overall F-test	83,77		88,44

6.1.3 *Are the credit spread and pricing processes of AS bonds significantly affected by the 2007-2008 financial crisis and the subsequent European sovereign debt crisis?*

The impact of the crisis and its consequences were felt beyond the financial markets, reaching the global markets. In this way and in consideration of the studies analysed to carry out this work, we expect that, first, the crisis will significantly increase spreads and, secondly, that the ECB program, namely the ABSPP, will fulfil its objectives, reducing the AS bond credit spreads for transactions closed in the Euro Area.

Analysing US transactions, Table 12 shows that, contrary to what we expected, the financial crisis decreased ABS spreads by 143,21bps and MBS spreads by 140,63 bps. However, the financial crisis does not impact CDO spreads in the US.

In the UK, the results of sign and magnitude are the opposite of what was expected for ABS, negative and insignificant, and MBS, negative and significant. Table 13 shows that the financial crisis increased the credit spread for CDOs.

Considering only the Euro Zone, the crisis period does not impact on credit spreads.

In this way, we can conclude that these results are dissenting among typology and across geographic zone, being unclear and against the expected results, being as expected in the spreads of CDOs in the UK and in MBS in the Eurozone.

Table 12 - Regression analyses of the determinants of credit spreads of ABS, MBS and CDO in United States with crisis and ABSPP

	[14]	[15]	[16]
Dependent Variable:			
Credit Spread (bps)	**ABS**	**MBS**	**CDO**
Independent Variables:			
Intercept	860,04 ***	229,53 ***	-479,71
	(4,45)	(3,30)	(-0,53)
Crisis period	-143,21 ***	-140,63 ***	-84,37
	(-11,36)	(-19,35)	(-0,72)
ABSPP	-4,50	29,48 ***	-166,32
	(-0,64)	(6,47)	(-1,12)
Time to maturity	-22,84 ***	-50,17 ***	-39,12 ***
	(-8,21)	(-13,68)	(-6,54)
Transaction size	-5,13 ***	-9,66 ***	7,32
	(-2,89)	(-5,81)	(0,89)
Tranche to transaction	-18,87 ***	21,45 ***	33,54
	(-3,71)	(4,22)	(1,45)
Number of banks	21,05 ***	-4,45	108,91 **
	(5,32)	(-0,41)	(2,17)
Callable	-10,42 **	5,10	-8,98
	(-2,39)	(1,54)	(-0,82)
Rated	-690,93 ***	-3,99	-422,60 ***
	(-3,82)	(-1,17)	(-8,06)
Credit Rating	20,75 ***	15,32 ***	35,31 ***
	(37,29)	(14,44)	(8,21)
Fixed Rate	16,49 ***	60,15 ***	-12,29
	(4,45)	(18,83)	(-0,80)
Country Risk	-6,10 ***	-1,78	-18,17 *
	(-5,28)	(-0,85)	(-1,69)
Currency Risk	-66,29 ***	-21,42	-131,52 ***
	(-2,69)	(-0,51)	(-6,52)
Risk Free	-14,12 ***	7,47 ***	-17,57
	(-5,74)	(3,30)	(-0,46)
Volatility	2,93 ***	3,50 ***	5,25
	(6,35)	(12,95)	(1,42)
Euso5y-Libor3m	-0,32 ***	-0,20 ***	-0,47
	(-7,89)	(-6,17)	(-0,67)
Subordinated Debt	56,12 ***	106,16 ***	91,35 ***
	(7,77)	(18,36)	(4,69)
GDP per capita	0,00 *	0,00 ***	0,02
	(1,72)	(3,43)	(1,52)
Creditor Rights	-6,92 ***	-13,57 ***	30,04
	(-3,44)	(-5,81)	(1,45)
Year Fixed Effects	no	no	no
Number of observations	31 617	11 482	7 761
Adjusted R-squared	20,17	35,15	2,44
Overall F-test	189,89	213,6	130,63

Table 13 - Regression analyses of the determinants of credit spreads of ABS, MBS and CDO in United Kingdom with crisis and ABSPP

	[17]	[18]	[19]
Dependent Variable:			
Credit Spread (bps)	**ABS**	**MBS**	**CDO**
Independent Variables:			
Intercept	306,38	327,63 ***	-117,03
	(1,20)	(3,20)	(-0,26)
Crisis period	-31,06	-58,28 **	95,50 *
	(-1,01)	(-2,50)	(1,70)
ABSPP	56,45 *	13,76	86,06 **
	(1,84)	(0,48)	(2,01)
Time to maturity	-27,94 **	-3,18	-14,67
	(-2,48)	(-0,60)	(-1,12)
Transaction size	-10,48 *	-3,51	-17,19 *
	(-1,78)	(-1,07)	(-1,73)
Tranche to transaction	32,37 *	-31,41 ***	-39,13
	(1,73)	(-2,68)	(-1,47)
Number of banks	21,94 ***	53,10 ***	
	(2,71)	(7,84)	
Callable	19,23 *	8,97	-51,42 ***
	(1,74)	(1,42)	(-2,71)
Rated		-379,79 ***	-588,23 ***
		(-26,64)	(-6,00)
Credit Rating	25,98 ***	22,15 ***	33,22 ***
	(11,19)	(19,47)	(22,95)
Fixed Rate	69,89 ***	66,12 ***	-15,82
	(5,04)	(4,16)	(-0,77)
Country Risk	1,67	1,70	9,23
	(0,46)	(0,48)	(0,93)
Currency Risk	-48,55 ***	-106,05 ***	-48,98 **
	(-3,53)	(-16,78)	(-2,30)
Risk Free	14,21	32,99 ***	18,38
	(1,41)	(6,80)	(1,10)
Volatility	0,76	0,35	6,25 ***
	(0,69)	(0,48)	(4,75)
Euso5y-Libor3m	-0,42 **	-0,67 ***	-0,83 ***
	(-2,58)	(-5,74)	(-2,82)
Subordinated Debt	-58,84 ***	-60,60 ***	-50,81 ***
	(-3,68)	(-9,74)	(-3,16)
GDP per capita	0,00	0,00 **	0,01 ***
	(-0,11)	(1,92)	(3,12)
Creditor Rights	-16,92	4,33	130,86 **
	(-0,63)	(0,27)	(-0,26)
Year Fixed Effects	no	no	no
Number of observations	577	3 174	885
Adjusted R-squared	54,76	59,95	59,15
Overall F-test	22,35		54,23

Table 14 -Regression analyses of the determinants of credit spreads of ABS, MBS and CDO in Euro zone with crisis and ABSPP

	[20]	[21]	[22]
Dependent Variable:			
Credit Spread (bps)	**ABS**	**MBS**	**CDO**
Independent Variables:			
Intercept	460,49 ***	91,91	918,43 ***
	(2,77)	(1,01)	(8,28)
Crisis period	-14,81	32,36	-23,03
	(-0,32)	(1,56)	(-0,52)
ABSPP	64,20 ***	136,31 ***	137,12 ***
	(2,84)	(4,05)	(4,31)
Time to maturity	-73,30 ***	-30,35 ***	-45,63 ***
	(-9,37)	(-4,75)	(-6,05)
Transaction size	-8,44	5,30	-24,24 ***
	(-1,18)	(1,48)	(-5,28)
Tranche to transaction	-18,49	-18,92 **	-36,01 **
	(-0,61)	(-2,02)	(-2,17)
Number of banks	-10,07 *	-2,11	0,18
	(-1,83)	(-0,28)	(0,22)
Callable	0,84	16,34 **	2,30
	(0,07)	(2,33)	(0,05)
Rated	-466,15 ***	-365,27 ***	-422,66 ***
	(-4,41)	(-9,55)	(-23,59)
Credit Rating	18,48 ***	17,45 ***	33,96 ***
	(9,12)	(15,16)	(23,54)
Fixed Rate	72,59 ***	17,90	81,20 ***
	(4,15)	(0,50)	(6,00)
Country Risk	-6,68 *	-27,95 ***	-9,38 **
	(-2,01)	(-6,28)	(-2,17)
Currency Risk	58,27 *	114,18 ***	111,51 ***
	(1,67)	(4,60)	(6,90)
Risk Free	37,67 ***	36,18 ***	5,37
	(4,01)	(6,22)	(0,49)
Volatility	3,79 ***	2,48 ***	3,14 ***
	(4,45)	(4,75)	(3,34)
Euso5y-Libor3m	-0,77 ***	-0,95 ***	-1,04 ***
	(-8,45)	(-10,08)	(-4,97)
Subordinated Debt	-50,34 **	-34,02 ***	-47,88 ***
	(-2,56)	(-3,69)	(-4,18)
GDP per capita	0,01 ***	0,00 ***	0,00
	(6,89)	(6,79)	(1,21)
Common Law	-36,21	2,55	20,87
	(-1,19)	(0,24)	(1,21)
Creditor Rights	0,71	-12,63 ***	-8,13 ***
	(0,10)	(-3,64)	(-1,31)
Year Fixed Effects	no	no	no
Number of observations	2 166	3 212	1 455
Adjusted R-squared	15,35	53,77	67,32
Overall F-test	59,75	107,82	

6.1.4 *What was the impact of the Central Banks' Quantitative Easing programmes on AS bond credit spreads?*

The agreement with the objectives of the European Central Bank, as the regulatory bank, its asset purchase programmes should have an impact on the market lowering the sovereign bond spreads.

In fact, according to previously noted authors[30], the ABSPP period (from September 4, 2014 to December 31, 2016) improved and attenuated credit spreads.

Considering the United States in table 12, the ECB' program achieved the expected results in ABS and CDO, but not significant. In the case of MBS, the ABSPP increased the spreads.

On the other hand, in the UK represented on table 13, this program increased the spreads for all typologies.

Finally, the Euro Zone in table 14, has the same interpretation as the UK: the program was not effective in any typology.

Finally, we conclude that ABSPP have the desired impact for the spreads of ABS and CDOs issued in the United States.

6.2 Robustness checks

6.2.1 Floating or fixed rate

To validate the previous results, we then present robustness results tests. Firstly, we divide the model by typology, broken down by type of rate: floating or fixed priced.

Model [11] in table 15, shows that, for floating rate, US spreads are higher than in the UK for pre-crisis period, not being robust when comparing the

[30] Watfe (2015) and Claessens et al. (2010)

crisis period. Also, the results of CE are robust over time, being the spreads in CE lower than in the UK over the both periods. In fixed priced securities, the spreads do not diverge over time.

Considering MBS, on model [12], the results for CE are, again, robust over period of pre-crisis and during crisis, for floating and fixed rate. The spreads of bonds from the US are not robust, evidencing discrepancies in the floating type of rate, during crisis. The remaining values are not statistically significant.

Model [13] shows the results for CDOs and, in terms of fixed good prices, the results do not diverge and are not statistically significant. In terms of floating rate, the results are robust over time, presenting no discrepancies across outcomes from the first estimated model.

In this robustness test, the results based on fixed rate are not significant, as showed on table 15. ABS and MBS only show divergence in the US during crisis, with the remaining results robust over time.

6.2.2 Issuer Parent

Subsequently, we introduced the financial characteristics of the issuer parent, the originator, in our baseline models. We introduce Total Assets (in the sense that the financial products have as collateral these assets), net loans over total assets ratio and loan to deposit ratio (as liquidity measure), cost in relation to its income, equity to total assets ratio and, finally, liquid assets to deposits.

Adding the characteristics of the banks in the models (table 16, 17 and 18), we can conclude that, for ABS, the results are robust. The only discrepancy observed is in the UK versus CE column, not being statistically significant and, therefore, concluding that they do not differ. The same results occur in

the CDO typology. As for MBS, the basis is identical, but the discrepancy is observed when comparing US versus UK.

Table 15 - Regression analyses of the determinants of credit spreads of ABS, MBS and CDO by Type of Rate

Dependent Variable:	[11] ABS		[12] MBS		[13] CDO	
Credit Spread (bps)	**Floating**	**Fixed**	**Floating**	**Fixed**	**Floating**	**Fixed**
Independent Variables:						
Intercept	575,81 ***	825,65 ***	781,06 ***	913,05 ***	739,56 ***	911,65 ***
	(3,59)	(3,99)	(12,74)	(3,48)	(2,88)	(2,92)
US pre-crisis	70,63 ***	-18,96	-1,20	20,95	53,73 **	38,20
	(4,17)	(-1,16)	(-0,16)	(0,32)	(2,25)	(1,00)
US crisis	-71,57 ***	46,27	-98,84 ***	-82,40	66,79	97,79
	(-3,09)	(0,96)	(-6,94)	(-0,94)	(0,57)	(1,34)
Continental Europe pre-crisis	-39,72 **	-62,97	-105,48 ***	-329,09 ***	-150,05 ***	-39,77
	(-1,67)	(-0,85)	(-10,04)	(-3,68)	(-4,27)	(-0,78)
Continental Europe crisis	-89,41 ***	-83,01	-28,23 *	-172,13 ***	-163,49 ***	84,85
	(-3,53)	(-0,91)	(-1,73)	(-2,81)	(3,86)	(1,59)
Time to maturity	-66,93 ***	15,60 ***	-40,96 ***	-37,00 ***	-24,86 ***	-63,00 ***
	(-20,02)	(6,66)	(-9,09)	(-9,18)	(-5,36)	(-5,45)
Transaction size	-4,65 **	-14,83 ***	-4,36 **	-4,77 **	-5,17	-17,86
	(-2,19)	(-6,45)	(-2,20)	(-2,18)	(-0,84)	(-1,56)
Tranche to transaction	-8,61	-39,68 ***	-14,46 **	14,99 **	-6,53	-69,21
	(-0,99)	(-6,05)	(-2,38)	(2,22)	(-0,31)	(-1,50)
Number of banks	-3,00	3,34	-21,07 *	-17,47	-3,92	15,07
	(-0,29)	(1,11)	(-1,79)	(-1,46)	(-0,32)	(0,48)
Callable	-3,73	4,02	11,90 ***	21,66 ***	-26,49 **	-18,44
	(-0,76)	(0,79)	(3,14)	(5,45)	(-2,17)	(-1,14)
Rated	-593,32 ***	-446,51 ***	-367,59 ***	4,89	-442,89 ***	-150,11 ***
	(-4,63)	(-2,73)	(-11,28)	(0,31)	(-8,04)	(-8,12)
Credit Rating	21,88 ***	17,57 ***	18,23 ***	15,37 ***	34,27 ***	32,35 ***
	(36,18)	(22,60)	(24,34)	(11,82)	(11,43)	(11,70)
Country Risk	-5,52 ***	-2,83 ***	-8,12 ***	-5,23	-11,79 *	-6,22 *
	(-3,35)	(-2,66)	(-4,08)	(-0,69)	(-1,70)	(-1,66)
Currency Risk	-34,35	45,02 **	-75,37 ***	-71,36 *	-78,22 ***	-16,41
	(-1,63)	(2,24)	(-10,24)	(-1,68)	(-5,02)	(-0,59)
Risk Free	-54,52 ***	1,41	-30,60 ***	-5,24	-90,24 **	-16,28
	(-14,05)	(0,24)	(-8,32)	(-1,01)	(-2,02)	(-0,80)
Volatility	0,62	0,32	-0,73 *	1,21 ***	-0,29	1,30
	(1,55)	(0,63)	(-1,88)	(3,17)	(-0,11)	(0,66)
Euso5y-Libor3m	-0,78 ***	-0,17 ***	-0,61 ***	-0,32 ***	-0,27 *	-0,42
	(-17,78)	(-2,62)	(-10,98)	(-6,70)	(-1,89)	(-1,55)
Subordinated Debt	-2,17	-2,75	-20,99 ***	89,56 ***	22,31	22,04
	(-0,22)	(-0,40)	(-4,17)	(12,95)	(1,19)	(1,09)
GDP per capita	0,01 ***	0,00	0,00 ***	-0,01	0,00	0,00
	(5,32)	(0,42)	(5,59)	(-1,15)	(0,42)	(-0,75)
Common Law	-10,65	-61,94	22,37 *	25,05	2,79	1,84
	(-0,44)	(-0,81)	(1,85)	(0,38)	(0,11)	(0,07)
Creditor Rights	-8,29 ***	3,61	-1,23	-54,76	-26,00 ***	-13,85
	(-2,67)	(0,44)	(-0,56)	(-2,34)	(-4,98)	(-1,22)
Year Fixed Effects	yes	yes	yes	yes	yes	yes
Number of observations	25 562	8 798	9 575	8 293	9 140	961
Adjusted R-squared	24,08	39,26	62,24	26,64	3,39	45,44
Overall F-test	273,62	57,12	243,54	50,47	95,72	

Table 16 - Regression analyses of the determinants of credit spreads of ABS with Issuer Parent Characteristics, differentiated by United States, United Kingdom and Continental Europe

	[2b]	[3b]	[4b]
Dependent Variable:			
Credit Spread (bps)	**US versus UK | Issuer Parent**	**UK versus CE | Issuer Parent**	**US versus CE | Issuer Parent**
Independent Variables:			
Intercept	1 580,75 ***	287,71	287,08 *
	(9,95)	(1,58)	(1,77)
US before crisis	239,06 ***		
	(4,75)		
US during crisis	283,66 ***		
	(3,15)		
UK before crisis		-49,75	
		(-0,96)	
UK during crisis		-1,56	
		(-0,03)	
Continental Europe before crisis			-81,64 **
			(-2,03)
Continental Europe during crisis			-99,91 ***
			(-2,85)
Time to maturity	-13,66 **	-85,42 ***	-23,54 ***
	(-2,46)	(-9,28)	(-4,50)
Transaction size	-4,08 *	-11,36	-5,34 **
	(-1,69)	(-1,59)	(-2,32)
Tranche to transaction	-19,29 *	-52,19 ***	-29,62 ***
	(-1,82)	(-3,00)	(-2,70)
Number of banks	-5,08		-3,67
	(-0,60)		(-0,40)
Callable	2,90	15,65	4,08
	(0,50)	(1,43)	(0,74)
Rated	-896,16 ***	-412,59 ***	-470,63 ***
	(-65,99)	(-3,98)	(-3,61)
Credit Rating	19,26 ***	14,86 ***	18,58 ***
	(20,03)	(8,15)	(20,88)
Fixed Rate	6,89	84,53 ***	5,99
	(1,24)	(4,16)	(1,08)
Country Risk	-2,35	0,57	0,22
	(-1,47)	(0,28)	(0,13)
Currency Risk	-4,26	6,73	50,79 **
	(-0,24)	(0,41)	(2,03)
Risk Free	-41,72 ***	29,39	-51,82 ***
	(-6,45)	(1,43)	(-8,87)
Volatility	0,55	2,31 **	-0,26
	(0,85)	(2,60)	(-0,45)
Euso5y-Libor3m	-0,59 ***	-0,59 ***	-0,70 ***
	(-8,52)	(3,09)	(-10,07)
Subordinated Debt	29,30	-45,35 **	15,08
	(1,56)	(-2,52)	(0,94)
GDP per capita	-0,16 ***	0,00 **	0,01 ***
	(-2,81)	(2,59)	(4,63)
Common Law		19,38	-36,76
		(0,44)	(-1,00)
Creditor Rights	25,43	4,43	-9,76 **
	(1,37)	(0,62)	(-2,01)
Total Assets	-0,34	7,22 **	5,32 **
	(-0,14)	(2,31)	(2,05)
Net loans / Total Assets	0,20	1,07 **	0,89
	(0,83)	(2,02)	(0,41)
Loans / Deposits	1,27	-26,42 ***	1,70
	(0,38)	(-2,92)	(0,58)
Cost to Income	-0,06	1,52 ***	0,48 ***
	(-0,34)	(4,14)	(2,96)
Equity / Total Assets	-1,56	7,30 ***	0,29
	(-0,56)	(2,68)	(0,12)
Liquid Assets / Deposits	-0,12	0,82 **	-0,12
	(-0,99)	(2,55)	(-1,10)
Year Fixed Effects	yes	yes	yes
Number of observations	12 996	1 158	13 668
Adjusted R-squared	13,21	62,43	15,59
Overall F-test		52,05	107,73

Table 17 - Regression analyses of the determinants of credit spreads of MBS with Issuer Parent Characteristics, differentiated by United States, United Kingdom and Continental Europe

Dependent Variable:	[5b]	[6b]	[7b]
Credit Spread (bps)	**US versus UK | Issuer Parent**	**UK versus CE | Issuer Parent**	**US versus CE | Issuer Parent**
Independent Variables:			
Intercept	184,32 (1,23)	208,92 (1,56)	529,29 *** (3,20)
US before crisis	-36,44 (-0,74)		
US during crisis	42,84 (0,41)		
UK before crisis		132,81 *** (5,24)	
Uk during crisis		49,42 ** (1,99)	
Continental Europe before crisis			-82,53 *** (-3,85)
Continental Europe during crisis			-76,14 *** (-2,88)
Time to maturity	-34,75 *** (-6,69)	-1,34 (-0,23)	-43,97 *** (-8,42)
Transaction size	-10,74 *** (-3,27)	-10,95 *** (-2,89)	-3,69 (-1,05)
Tranche to transaction	58,90 *** (5,68)	-29,25 ** (-2,36)	55,84 *** (5,99)
Number of banks	-36,59 (-0,77)	-24,47 (-1,52)	-35,09 (-1,59)
Callable	14,78 ** (2,02)	18,59 ** (2,27)	24,48 *** (3,01)
Rated	-72,04 *** (-5,34)	-399,47 *** (-21,64)	-331,28 *** (-3,07)
Credit Rating	19,33 *** (15,24)	18,35 *** (12,84)	17,19 *** (13,84)
Fixed Rate	27,49 *** (4,20)	81,66 * (1,72)	27,62 *** (3,80)
Country Risk	0,67 (0,19)	-8,30 ** (-2,51)	-11,76 ** (-2,10)
Currency Risk	-53,83 *** (-4,69)	-61,42 *** (-4,83)	53,64 (1,30)
Risk Free	-10,93 (-1,33)	30,94 ** (2,07)	-15,96 ** (-2,14)
Volatility	-1,41 * (-1,77)	2,31 *** (3,29)	-0,26 (-0,45)
Euso5y-Libor3m	-0,55 *** (-6,57)	-0,65 *** (-4,24)	-0,54 *** (-6,13)
Subordinated Debt	36,01 *** (4,71)	-39,31 *** (-3,84)	37,68 *** (4,61)
GDP per capita	0,01 (0,84)	0,00 *** (3,83)	0,00 *** (3,42)
Common Law		-13,10 (0,49)	-10,79 (-0,42)
Creditor Rights	3,69 (0,19)	-19,17 *** (-3,49)	-11,07 ** (-2,45)
Total Assets	8,59 * (1,95)	7,04 ** (2,56)	0,68 (0,23)
Net loans / Total Assets	0,48 (0,09)	0,22 (0,46)	1,05 *** (2,86)
Loans / Deposits	19,84 (0,66)	-1,52 (-0,10)	-20,40 * (-1,68)
Cost to Income	0,01 (0,04)	0,55 * (1,79)	0,97 *** (3,38)
Equity / Total Assets	0,60 (0,68)	0,20 (0,26)	0,55 (0,36)
Liquid Assets / Deposits	-0,03 (-0,26)	-0,07 (-0,27)	-0,11 (-1,11)
Year Fixed Effects	yes	yes	yes
Number of observations	4 579	2 603	4 524
Adjusted R-squared	44,30	56,07	42,84
Overall F-test			58,92

Table 18 - Regression analyses of the determinants of credit spreads of CDO with Issuer Parent Characteristics, differentiated by United States, United Kingdom and Continental Europe

	[8b]	[9b]	[10b]
Dependent Variable:			
Credit Spread (bps)	**US versus UK | Issuer Parent**	**UK versus CE | Issuer Parent**	**US versus CE | Issuer Parent**
Independent Variables:			
Intercept	687,12 (1,14)	1 279,10 *** (3,17)	769,03 ** (2,36)
US before crisis	290,47 * (1,89)		
US during crisis	269,48 (0,75)		
UK before crisis		-8,90 (-0,14)	
Uk during crisis		76,61 (1,23)	
Continental Europe before crisis			-160,18 ** (-2,48)
Continental Europe during crisis			-19,54 (-0,34)
Time to maturity	-26,75 (-1,31)	-69,17 *** (-3,33)	-40,16 ** (-2,52)
Transaction size	11,31 (0,97)	-18,87 (-1,35)	14,69 (1,45)
Tranche to transaction	-9,01 (-0,27)	12,83 (0,49)	-18,20 (-0,60)
Number of banks	63,40 (1,30)		50,41 (0,67)
Callable	-68,69 *** (-4,33)	-42,38 * (-1,86)	-38,02 ** (-2,06)
Rated	-482,10 *** (-5,91)	-594,01 *** (-10,17)	-410,09 *** (-4,89)
Credit Rating	34,09 *** (16,16)	30,97 *** (12,73)	32,60 *** (15,64)
Fixed Rate	-6,58 (-0,19)	63,42 *** (2,72)	42,20 * (1,86)
Country Risk	-9,20 (-1,43)	-17,45 *** (-3,23)	-11,35 * (-1,99)
Currency Risk	-34,04 (-1,12)	7,03 (0,18)	-18,01 (-0,57)
Risk Free	-19,79 (-0,58)	24,42 (0,53)	-74,71 *** (-2,89)
Volatility	1,85 (0,97)	1,62 (1,19)	-1,31 (-0,67)
Euso5y-Libor3m	-0,68 * (-1,76)	-0,92 * (-1,75)	-1,06 *** (-2,89)
Subordinated Debt	-4,81 (-0,29)	-26,85 (-1,62)	-13,21 (-0,80)
GDP per capita	-0,01 (-0,60)	0,00 (0,95)	0,01 * (1,74)
Common Law		-32,65 (-0,66)	-27,19 (-0,46)
Creditor Rights	68,26 (102)	0,25 (0,01)	-19,40 * (-1,69)
Total Assets	-6,99 (-0,90)	-3,26 (-0,61)	-6,39 (-1,04)
Net loans / Total Assets	0,67 (1,08)	-1,55 ** (-2,47)	0,25 (0,44)
Loans / Deposits	-23,61 (-1,56)	16,10 (1,25)	-6,81 (-0,49)
Cost to Income	0,34 (0,44)	-2,14 *** (-3,67)	0,64 (0,99)
Equity / Total Assets	-0,52 (-0,46)	-3,75 *** (-3,87)	0,24 (0,19)
Liquid Assets / Deposits	0,23 (0,81)	-1,07 *** (-3,00)	0,11 (0,44)
Year Fixed Effects	yes	yes	yes
Number of observations	861	476	927
Adjusted R-squared	60,17	69,89	59,79
Overall F-test			

7. Conclusions

This dissertation studies asset securitization, analysing its general characteristics, main advantages and disadvantages and compare spreads and pricing characteristics of ABS, MBS and CDOs among bonds issued in the US *versus* UK *versus* Continental Europe. We conclude that it is a complex process that allows originators to transfer risks to market participants, increase liquidity and reduce funding costs, when compared with traditional debt instruments. Nevertheless, the unaccountable use of this financial product increases misperceptions of risk and asset valuation, contributing to the 2007-2008 financial crisis.

To analyse how credit spreads and pricing factors compare between securitization products and among markets, we use a dataset of transactions closed in the US, UK and Continental Europe in the 2000-2016 period.

Our results are in congruence with the fact that the spreads are different, reaching higher values in the United States, followed by United Kingdom and, finally, Continental Europe (except for CDOs, where bonds issued in Continental Europe present higher credit spreads than those closed in the UK).

However, our results differ from the impact of the crisis and ABSPP. The crisis only increased the spreads, as expected, of CDOs in the UK and in MBS in the Eurozone. ABSPP have the desired impact only for the spreads of ABS and CDOs issued in the United States.

This dissertation contributes to the non-existent literature regarding the securitization process in Europe. It also concludes that spreads are effectively different, being larger in the United States. Since our objective was only to determine if spreads are distinct across regions, it would be important to realize where these differences come from.

Thus, it would be important for field, a more detailed investigation of the whole history of the European securitization process, and the main differences between these economic zones. Prospecting the impact of government guarantees on the European process and how it could be beneficial, or not, for this market area.

We also concluded that the crisis had a significant impact on the drastic increase in spreads and that ABSPP had the desired impact, nevertheless, in any case, separately: for CDOs in the United States and MBS in the UK and Eurozone.

References

Adams, P. (2005). An Introduction to the European Securitization Markets. *BizEd*, *4*(4), 58–58.

AFME/esf. 2008. Securitisation Data Report Q4:2008. Available at http://www.sifma.org/wp-content/uploads/2017/05/afme-esf-securitisation-data-report-2008-q4.pdf (30/12/2017 16h 17M)

AFME/esf. 2009. Securitisation Data Report Q4:2009. Available at http://www.sifma.org/wp-content/uploads/2017/05/afme-esf-securitisation-data-report-2009-q4.pdf (30/12/2017 16h 18M)

AFME/esf. 2010. Securitisation Data Report Q4:2010. Available at http://www.sifma.org/wp-content/uploads/2017/05/afme-esf-securitisation-data-report-2010-q4.pdf (14/10/2017 16h 00M)

AFME/esf. 2011. Securitisation Data Report Q4:2011. Available at http://www.sifma.org/wp-content/uploads/2017/05/afme-securitisation-report-2011-q4.pdf (30/12/2017 16h 19M)

AFME/esf. 2012. Securitisation Data Report Q4:2012. Available at https://www.sifma.org/wp-content/uploads/2017/05/afme-securitisation-data-report-q4-2012.pdf (30/12/2017 16h 19M)

AFME/esf. 2013. Securitisation Data Report Q4:2013. Available at https://www.sifma.org/wp-content/uploads/2017/05/afme-securitisation-data-report-fourth-quarter-2013.pdf (30/12/2017 18h 103M)

AFME/esf. 2014. Securitisation Data Report Q4:2014. Available at https://www.sifma.org/wp-content/uploads/2017/05/afme-securitisation-data-report-fourth-quarter-2014.pdf (30/12/2017 16h 20M)

AFME/esf. 2015. Securitisation Data Report Q4:2015. Available at

https://www.sifma.org/wp-content/uploads/2017/05/afme-securitisation-data-report-fourth-quarter-2015.pdf (30/12/2017 16h 20M)

AFME/esf. 2016. Securitisation Data Report Q4:2016. Available at https://www.sifma.org/wp-content/uploads/2017/03/Europe-Securitisation-Quarterly-2017-03-09-AFME-SIFMA-1.pdf (30/12/2017 16h 20M)

AFME/esf. 2017. Securitisation Data Report Q1:2017. Available at https://www.afme.eu/globalassets/downloads/data/securitisation/2017/afme- stn-q1-2017-securitisation-data-report.pdf (14/10/2017 17h 21M)

Akerlof, G. A. (1970). The Market for "Lemons": Quality Uncertainty and the Market Mechanism. *The Quarterly Journal of Economics*, *84*(3), 488. https://doi.org/10.2307/1879431

American Bankruptcy Institute. 2018. Number of Unemployed for Over 26 Weeks, Since 1969. Available at https://www.bportugal.pt/page/estatisticas-da-area-do-euro?mlid=2348 (07/04/2018 17:30M)

Banco de Portugal. 2018. Estatísticas da área Euro. Available at https://www.bportugal.pt/page/estatisticas-da-area-do-euro?mlid=2348 (07/04/2018 17:30M)

Bao, J., Pan, J., & Wang, J. (2011). The Illiquidity of Corporate Bonds. *Journal of Finance*, *66*(3), 911–946. https://doi.org/10.1111/j.1540-6261.2011.01655.x

Board of Governors of the Federal Reserve System (US), Effective Federal Funds Rate [FEDFUNDS], retrieved from FRED, Federal Reserve Bank of St. Louis. Available at https://fred.stlouisfed.org/series/FEDFUNDS

Campbell, J. Y., & Taksler, G. B. (2013). American Finance Association Equity Volatility and Corporate Bond Yields, *58*(6), 2321–2349.

Caprio, G., Demirg??-Kunt, A., & Kane, E. J. (2010). The 2007 Meltdown in structured securitization: Searching for lessons, not scapegoats. *World Bank*

Research Observer, *25*(1), 125–155. https://doi.org/10.1093/wbro/lkp029

Carey, M., & Nini, G. (2007). Is the corporate loan market globally integrated? A pricing puzzle. *Journal of Finance*, *62*(6), 2969–3007. https://doi.org/10.1111/j.1540-6261.2007.01298.x

Chen, L., Lesmond, D. A., & Wei, J. (2007). Corporate yield spreads and bond liquidity. *Journal of Finance*, *62*(1), 119–149. https://doi.org/10.1111/j.1540-6261.2007.01203.x

Claessens, S., Ariccia, G. D., Igan, D., & Laeven, L. (2010). Lessons and Policy Implications from the Global Financial Crisis. *IMF Working Papers*, 1–40. https://doi.org/10.5089/9781451963021.001

Clarkson, B., & Rouyer, S. (2002). Securitization and its Effect on the Credit Strength of Companies Securitization and its Effect on the Credit Strength of Companies, (March).

Collin-Dufresne, P., & Goldstein, R. S. (2001). Do credit spreads reflect stationary leverage ratios? *Journal of Finance*, *56*(5), 1929–1957. https://doi.org/10.1111/0022-1082.00395

Criado, S., & Rixtel, A. Van. (2008). Structured Finance and the Financial Turmoil of 2007-2008: An Introductory Overview. *SSRN Electronic Journal*, (0808), 46. https://doi.org/10.2139/ssrn.1260748

Daniels, K., Diro Ejara, D., & Vijayakumar, J. (2010). Debt Maturity, Credit Risk, and Information Asymmetry: The Case of Municipal Bonds. *The Financial Review*, *45*(3), 603–626. https://doi.org/10.1111/j.1540-6288.2010.00263.x

Davidson, A., Sanders, A., Wolff, L.-L., & Ching, A. (2004). *Securitization: Structuring and Investment Analysis*. Retrieved from http://books.google.com/books?id=_pF3YdzCxr0C&pgis=1

DCM Analytics - User Guide. Available at

http://www.biblioteca.porto.ucp.pt/sites/default/files/files/Biblioteca/GD_UserGuide.pdf (25/05/2018 11:51M)

Elton, E., Gruber, M., Agrawal, D., & Mann, C. (2001). Explaining the rate spreads on corporate bonds. *The Journal of Finance*, *56*(1), 247–277.

European Central Bank. 2017. Asset purchase programmes. Available at https://www.ecb.europa.eu/mopo/implement/omt/html/index.en.html#abspp (26/12/2017 16:43M)

European Central Bank. 2010. Covered bond purchase programme completed Available at https://www.ecb.europa.eu/press/pr/date/2010/html/pr100630.en.html (07/01/2018 17:08M)

European Central Bank. 2017. Economic and Monetary Union in Europe: political priority versus economic integration? Available at https://www.ecb.europa.eu/press/key/date/2001/html/sp010223.en.html (26/12/2017 15:02M)

European Central Bank. 2015. Impact of ABSPP and CBPP3. Available at https://www.ecb.europa.eu/paym/groups/pdf/bmcg/150127/2015-01-27-Item-3-2.pdf?01c15557a8aa45e3164e28ccd2760b74 (26/12/2017 16:50M)

European Central Bank. 2018. Monetary Policy. Available at https://www.ecb.europa.eu/mopo/html/index.en.html (07/01/2018 17:02M)

European Central Bank. 2012. The Euro Area Sovereign Debt Crisis. Available at https://www.ecb.europa.eu/pub/pdf/scpwps/ecbwp1419.pdf (20/01/2018 16:55M)

Eurostat. 2017. Unemployment Rate: Euro area (EA11-2000, EA12-2006, EA13-2007, EA15-2008, EA16-2010, EA17-2013, EA18-2014, EA19). Available at http://ec.europa.eu/eurostat/web/lfs/data/database (05/12/2018 12h 00M)

Fabozzi, F. J. ., Bhattacharya, A., & Berliner, W. (2008). *Mortgage Backed Securities*.

Fabozzi, F. J., & Choudhry, M. (2004). *The Handbook of European Structured Financial Products*. Retrieved from http://books.google.com/books?id=j-d4J6CzQtcC&pgis=1

Fabozzi, F. J., Davis, H. a., & Choudhry, M. (2006). *Introduction to Structured Finance*.

Fabozzi, F. & Kothari, V. (2007) *Securitization: The tool of financial transformation.*

Federal Reserve Bank. 2017. The Federal Reserve's response to the financial crisis and actions to foster maximum employment and price stability. Available at https://www.federalreserve.gov/monetarypolicy/bst_crisisresponse.htm (07/01/2018 17:03M)

Flannery, M. J., Nikolova, S. S., & Ôztekin, Ô. (2012). Leverage expectations and bond credit spreads. *Journal of Financial and Quantitative Analysis*, *47*(4), 689–714. https://doi.org/10.1017/S0022109012000300

FRED. 2017. Board of Governors of the Federal Reserve System (US), Effective Federal Funds Rate. Available at https://fred.stlouisfed.org/series/FEDFUNDS (25/11/2017 17h 30M)

Fuchita, Y., Herring, R., & Litan, R. (2009). *Securitization After the Mortgage Meltdown*. *Nomura institute of capital markets research*. https://doi.org/10.1007/3-540-28139-8_2

Gabbi, G., & Sironi, A. (2005). Which factors affect corporate bonds pricing? Empirical evidence from eurobonds primary market spreads. *European Journal of Finance*, *11*(1), 59–74. https://doi.org/10.1080/1351847032000143422

Ginnie Mae. 2016. Our history. Available at

https://www.ginniemae.gov/about_us/who_we_are/Pages/our_history.asp (26/11/2017 15h 01M)

Goldberg, H. H., Burke, R. W., Gordon, S., Goldberg, H. H., Burke, R. W., Gordon, S., … Watson, M. D. (1988). AND CORPORATE FINANCIAL HEALTH. *Journal of Applied Corporate Finance*.

Gorton, G., & Metrick, A. (2012). Securitization. *NBER Working Paper*, 94. https://doi.org/10.3386/w18611

Gorton, G., & Souleles, N. (2007). Special Purpose Vehicles and Securitization. *The Risks of Financial Institutions*, *I*(January), 549–602. https://doi.org/10.2139/ssrn.713782

Hochschild, J. (1995). *Facing up to the American dream*.Invesco. 2016. The Invesco White Paper Series: September 2016. Available at https://www.invesco.com/static/us/institutions/contentdetail?contentId=5c123295a283e410VgnVCM100000c2f1bf0aRCRD&dnsName=us (30/12/2017 19h 24M)

Hu, J., & Cantor, R. (2006). The relationship between issuance spreads and credit performance of structured finance securities. *Journal of Fixed Income*, *16*(December), 5–20.

Jobst, A. A. (2006). Asset securitisation as a risk management and funding tool: What small firms need to know. *Managerial Finance*, *32*(9), 731–760. https://doi.org/10.1108/03074350610681943

Laeven, L., & Valencia, F. (2008). Systemic Banking Crisis: A New Database. *IMF Working Paper*, (224), 1–78. https://doi.org/10.1057/imfer.2013.12

Leblanc, C. P., & Cummings, C. T. (2003). Risk Sharing in Securitization. *Journal of Professional Issues in Engineering Education and Practice*, *127*(2), 1–2.

Longstaff, F., Mithal, S., & Neis, E. (2005). Corporate Yield Spreads: Default Risk

of Liquiidty? New evidence form the credit default market. *Journal of Finance*, *60*(5), 2213–2253. https://doi.org/10.1111/j.1540-6261.2005.00797.x

Loutskina, E. (2011). The role of securitization in bank liquidity and funding management. *Journal of Financial Economics*, *100*(3), 663–684. https://doi.org/10.1016/j.jfineco.2011.02.005

Martínez-Solano, P., Yagüe-Guirao, J., & López-Martínez, F. (2009). Asset securitization: effects on value of banking institutions. *The European Journal of Finance*, *15*(2), 119–136. https://doi.org/10.1080/13518470802466188

Moody's. (2005). The Relationship between Par Coupon Spreads and Credit Ratings in US Structured Finance, (December).

Moody's: Investors Service. 2017. Rating Symbols and Definitions. Available at https://www.moodys.com/researchdocumentcontentpage.aspx?docid=PBC_79004 (10/10/2017 14h 35M)

Passmore, W., Sparks, R., & Ingpen, J. (2002). GSEs, mortgage rates, and the long-run effects of mortgage securitization. *Journal of Real Estate Finance and Economics*, *25*(2–3), 215–242. https://doi.org/10.1023/A:1016577809655

Pinto, João; Alves, P. (2016) The Economics of Securitization: Evidence from the European markets. *Investment Management and Financial Innovations, 13(1).*

Pinto, J. M. M. C. C. (2017). Are Covered Bonds Different from Asset Securitization Bonds ? Are Covered Bonds Different from Asset Securitization Bonds ?*, 1–49.

Pinto, J. M., Marques, M. O., & Megginson, W. L. (2017). A comparative analysis of ex ante credit spreads: structured finance versus straight debt finance. *N/a*, (405), 1–57.

Pinto, J., Marques, M., & Megginson, W. (2013). A theoretical and empirical analysis of structured finance. https://doi.org/10.1016/S0277-9536(01)00122-

8

Roever, W. and F. Fabozzi (2003), "A Primer on Securitization", The Journal of Structured and Project Finance, Vol. 9, No. 2, pp. 5–20

Rosenthal, J., & Ocampo, J. (1988). Analyzing the Economic Benefits of Securitized Credit. *Journal of Applied Corporate Finance*, *1*(3), 32–44.

Straight debt. (n.d.) *Wall Street Words: An A to Z Guide to Investment Terms for Today's Investor by David L. Scott*. (2003). Available at https://financial-dictionary.thefreedictionary.com/straight+debt (26/11/2017 15h 39M)

Thomas, H. (1999). A preliminary look at gains from asset securitization. *Journal of International Financial Markets, Institutions and Money*, *9*(3), 321–333. https://doi.org/10.1016/S1042-4431(99)00014-1

United States Department of Labor (USDL). 2017. Databases, Tables & Calculators by Subject, Labor Force Statistics from the Current Population Survey. Available at https://data.bls.gov/pdq/SurveyOutputServlet (18/12/2017 22h 05M)

Vink, D., & Thibeault, A. (2008). ABS, MBS, and CDO Pricing Comparisons, 27–46.

Wolfe, S. (2000). Structural effects of asset -backed securitisation, *369*(December 2014), 37–41. https://doi.org/10.1080/13518470050195119