The impact of post-crisis regulations on the primary market spread of asset-backed securities: Evidence from the EU securitisation market

Erasmus School of Economics
MSc Economics & Business: Financial Economics
20th of October, 2016

Abstract

In this paper, I have examined the relationship between post-crisis regulations and the primary market spread of asset-backed securities. Specifically, the 5 percent risk retention rate and due diligence & disclosure legislations were observed. Controlling for other determinants of the primary market spread of asset-backed securities I found that, ceteris paribus, regulations decreased the primary market spread significantly over the period 2010-2015. Therefore, I conclude that because of post-crisis regulations, the asymmetric information problem in an asset-backed security declined since investors accept less yield considering that the risk of default has decreased. I conclude further that the 5 percent risk retention rate legislation was a signal to investors in the securitisation market to stabilise the market by gaining more trust while, the due diligence & disclosure legislation was an actual method to mitigate directly the asymmetric information problem. Hence, to minimise the asymmetric information problem in an asset-backed transaction, I recommend to policymakers to extend the due diligence legislation (instead of the 5 percent risk retention rate) when developing a new regulatory framework.

Name:	Auke de Haan[1]
Supervisor Erasmus:	Hans Haanappel
Supervisors ABN AMRO:	Adriaan Wessels
Student number:	410865

[1] E-mail: dehaanauke@gmail.com. I would like to thank Hans Haanappel for his support as a supervisor and the valuable feedback that helped me improve the paper greatly. Furthermore I would like to thank Adriaan Wessels and Marc van Lent for access to their database on asset-backed securities. All omissions and errors are my own.

Table of contents

1. Introduction

Securitisation – its back: Once a cause of the financial world's problems, securitisation is now part of the solution – The Economist (2014).

Securitisation is the technique to sell assets such as account receivables to an established special purpose vehicle ("SPV"), which in turn uses the non-liquid assets as collateral[2] for securities issued to investors. The repayment does not depend on the overall financial strength of the parent company ("originator") (Riachi & Schwienbacher, 2015; Vink & Thibeault, 2007; Fabozzi, 2013). Hence, an asset-backed security is created by pooling loans and receivables through a process known as securitisation (Fabozzi, 2013). According to Vink & Thibeault (2007), the securitisation market consists of three main classes: asset-backed securities ("ABS"), mortgage-backed securities ("MBS"), and collateralised debt obligations ("CDO")[3].

A number of studies have considered securitisation as a positive development. Empirical studies find evidence that asset securitisation creates value by increasing liquidity, reducing credit and improving leverage ratios (Ambrose, Lacour-Little, & Sanders, 2005). This results is consistent with other research in this discipline. According to Altunbas et al. (2009), securitisation activity has strengthened banks' capacity to supply new loans and modified the effectiveness of the bank lending channel. In addition, securitisation can reduce funding costs because it can produce securities that cater to the risk return preferences of investors (Aiyar, Al-Eyd, Barkbu, & Jobst, 2015).

Securitisation became an important method for funding loans to households and businesses, in the years leading up to the financial crisis[4] during 2002-2006 (Campbell, Covitz, Nelson, & Pence, 2011). During this period, the global securitisation market grew rapidly with amounts outstanding peaking at US$11 trillion in the United States ("US") and €2 trillion in

[2] A corporation pools loans or receivables and uses the pool of assets as collateral for the issuance of a security. Hence, the securities issued are backed by collateral (Fabozzi, 2013).

[3] Securitisation backed by consumer products such as car loans, consumer loans and credit cards are called ABS. Securitisation issues backed by debt obligations are called CDO and securitisation backed by mortgages are called MBS (Fabozzi et al., 2005; Vink & Thibeault, 2007).

[4] Unless otherwise stated, in this paper the pre-crisis period is defined as 2004 till 2007. The global sub-prime mortgage crisis ("crisis") period is defined as 2007-2009 (Altomento & Bussoli, 2014; "ESMA Report on Trends, Risks and Vulnerabilities," 2015). Although the end of the crisis is set more arbitrarily, general research states the year 2009 as the end of this crisis. The post-crisis period is defined as 2010 and forward. According to some research (such as "ESMA Report on Trends, Risks and Vulnerabilities," 2015) the year 2010 was also the start of the Euro Sovereign crisis. However, this paper will only focus on the 2007-2009 crisis period.

Europe ("EU") (ECB & BoE, 2014). Moreover, the MBSs in the US represents the largest segment of the fixed-income market in the world in 2006 (Altunbas et al., 2009). During the financial crisis (2007-2009) ("crisis"), the number of securitised financial products fell dramatically in the US and EU. In 2007, the securitisation market came to a virtual standstill as a direct impact of the subprime mortgage default and the crash in ABSs (Baig and Choudhry, 2013).

The majority of consumer credit is provided by securitisation however, according to many researches unregulated securitisation fuelled the mortgage bubble in 2008 (Levitin, 2013). The reason for this was the decline in originators´ screening standards in the securitisation process (Demiroglu & James, 2012). Since banks have private information on the quality of the loans they securitise, investors may require compensation as investors do not observe this information. Therefore securitisation raises issues of information asymmetries and misaligned incentives between the banks and investors (Sarkisyan & Casu, 2013). Due to information asymmetry, prices of ABSs move down below their book value which is called "lemon discount[5]" (Akerlof, 1970; James, 2010; Sarkisyan & Casu, 2013). One variant to solve the asymmetric information problem when structuring securitisation transactions is to "signal" the quality of the assets being securitised by retain some of the securitised portfolio. One example is retained interest, which is defined as the loss exposure on the off-balance sheet securitised asset that the originator should retain on their balance sheet (Chemla & Hennessy, 2011).

The crisis revealed that credit ratings often did not adequately reflect the risk of certain structured finance asset classes. Most credit agencies downgraded the ratings of many ABSs which shows the deficiencies in credit rating agency models originally used to determine the ratings (*Revisions to the Basel Securitisation Framework*, 2013). Another study conducted by the Basel Committee (*Report on asset securitisation incentives*, 2011), describes that poorly underwritten residential mortgages in certain countries contributed significantly to the global financial crisis. Comprehensive policies on securitisation may have prevented market participants in those countries that have not experienced a significant degree of distress.

In response to the financial crisis and the global economic downturn, the Federal Reserve ("Fed") and other major central banks have aggressively used a mix of traditional as well as less

[5] Term used by Akerlof (1970). As an example he used the car market as an example for the asymmetric information problem where good cars may be driven out of the market by the lemons.

traditional policy actions (Duygan-Bump, Parkinson, Rosengren, Suarez, & Willen, 2013). Supervisors can help financial institutions and markets to avoid the broad-based issues and disruptions experienced in recent years and potentially help restore securitisation markets (*Report on asset securitisation incentives*, 2011). Furthermore, according to Sarkisyan & Casu (2013) a key issue that regulators are trying to address relates to the alignment of incentives to minimise asymmetric information problems. However, a downside of these regulations is discussed in a paper written by Wiemken & Erturk (2015) of Standard & Poor's, which states that regulations could reduce liquidity and discourage securitisation because financial institutions will be subject to stricter capital, liquidity, leverage, and disclosure requirements. Moreover, although the global securitisation market is rebounding in terms of issuance (Wiemken & Erturk, 2015), some researches (Nawas & Vink, 2016) argue that ABSs recovery has been slow due to the increase of regulations.

Numerous regulatory developments have been proposed in the US and EU over the past few years. However, due diligence and risk retention requirements are the main regulations affecting both US and EU ABSs (Altomento & Bussoli, 2014; Arca et al., 2015). The objective of the due diligence & disclosure policy[6] is to enhance the understanding of the transaction, the risks and the structural features for an investor (Nawas & Vink, 2016). The risk retention legislation[7] requires an ABS sponsor to retain at least 5 percent of the credit risk in the assets collateralizing the issuance (Arca et al., 2015). Since, European originators already retain most of the junior tranches[8] on their balance sheet, one could ask themselves if there is any impact caused by the risk retention legislation in the EU?

A lot of information and characteristics of an ABS is embedded in the primary market spread ("spread") such as duration, spread convexity (which measures the rate of change of duration as spreads change), and the implied probability of default (Fabozzi, Martellini, & Priaulet, 2005). The spread represents the price for the risk taken on by the lender on the basis of

[6] Enacted by the ECB and Bank of England in the EU (effective dates between 2013 and 2014, depended on the specific underlying asset of the security) and by the SEC in the US under the Dodd Frank Section 941(effective date for MBS in 2015 and ABS in 2016) (Arca et al., 2015).

[7] Adopted by the European Commission under 405 CRR and Article 5 of the AIFMR (effective date on July 2014), and US in the Dodd Frank Section 941 (effective dates between 2014 and 2016 which depends on the specific underlying asset of the security) (Arca et al., 2015).

[8] A tranche means one of several related securities issued simultaneously. Many of the recent issues of global bonds have two tranches that differ by maturity date and coupon rate (Fabozzi, 2013). For more information see Chapter (2) - The process of securitisation.

information at the time of issue (Vink & Thibeault, 2007). Since the objective of policymakers is to make the securitisation market more resilient and sustainable (Nawas & Vink, 2016), will the regulations decrease the default rate[9] and thus the spread? Via the spread, this paper will test post-crisis regulations such as the 5 percent retention rate and due diligence & disclosure.

Both the 2007 to 2009 financial crisis and the disruptions associated with the sovereign debt crisis in Europe highlight the vulnerability of short-term credit markets (Duygan-Bump et al., 2013). This paper evaluates two post-crisis regulations in the EU implemented by the European Central Bank and European Commission ("ECB" and "EC" respectively): the 5 percent retained interest and due diligence & disclosure policy. I attempt to demonstrate the (unintentional) impact of government or central bank interventions in the ABS market to support financial markets during times of financial recovery. Furthermore, I found it interesting to investigate whether both regulations caused the spread of an ABS to decrease and if so, does this mean that moral hazard[10] declined? Going further, how big was the impact of these new regulations? Specifically, this paper observes the impact of post-crisis regulation in the EU on the spread of ABSs over the period 2010 till 2015. Since the risk retention legislation is not fully adopted in the US, this paper is restricted to the EU region. Therefore, unfortunately it is not possible to examine statistically the impact of post-crisis regulations on the US ABS spread. However, this paper will describe the US securitisation market theoretically.

1.1 Research objective

A growing body of literature evaluates the impact of various policy interventions during the crisis. The purpose of this paper is to conduct a quantitative study of the implementation of post-crisis regulations on the spread of ABSs in the EU. The two observed regulatory factors in this paper are:

1. Risk retention; and
2. Due diligence & disclosure

[9] Default rate or loss rate is defined as the loss of principal due to default. Default risk refers to the risk that the issuer of a bond may be unable to make timely principal and/or interest payments (Demiroglu & James, 2012; Fabozzi, 2013).

[10] Moral hazard can be interpret here as loan originators who do not hold the credit risk and are compensated through the sale of the loans (Levitin, 2013).

Although securitisation is a well-discussed topic, research on the impact of post-crisis ABS policies is limited. Most empirical studies, observe the impact of ABS liquidity programs in the US, Term Asset-Backed Securities Loan Facility ("TALF") (Duygan-Bump et al., 2013), or in the EU, Asset Purchase Programme ("ABSPP") (Aiyar et al., 2015), on the spread of ABS. Therefore, I found the following research questions interesting:

- Is there a significant relationship between post-crisis regulations and the spread of ABS?
- Which legislation (risk retention or due diligence & disclosure) shows the strongest correlation with the ABS spread?
- Which specific underlying asset (e.g. automobile loans, consumer loans, account receivable, credit card receivables or MBS) in an ABS shows the highest significant relationship with the post-crisis regulations?

All these questions and others are merged in the following research question of this paper:

"Did the implementation of post-crisis regulations decrease the primary market spread of ABSs in the EU?"

An empirical study will be conducted to test the significance of above question to achieve an understanding of the impact of new policies on ABSs. The reason for this paper to focus on ABSs instead of MBSs or CDOs is based on two considerations. First, MBSs and CDOs are issued mainly by financial institutions while ABSs is issued by both corporations and financial institutions. Second, the variety of assets is much wider with ABSs than MBSs or CDOs (Vink & Thibeault, 2007).

This study emphasizes important unanswered questions to provide directions for future research. As such, both literature and statistical study should prove useful to researchers, as well as standards setters, policy makers, and regulators as they debate the economic consequences of past and future regulatory choices. The contribution of this paper to research (indicating a 'research gap') is distinguished in four points summarised below:

I. *Post-crisis regulations*: Most studies are investigating the impact of liquidity programmes (such as ABSPP) and the impact on several characteristics of an ABS.

II. *Spread:* Although most studies focus on different characteristics of ABSs (such as price), this study will concentrate on the spread.

III. *ABS type*: a large body of research is available within the field of one particular ABS product (or MBS). However, this study provides an overview of different types for ABSs such as automobile loans, consumer and commercial loans, credit card receivables, and infrastructure loans.

IV. *New time period*: This study will observe data from 2010 till 2015 (which is denoted in this paper as the post-crisis period).

In summary, securitisation is a well-discussed topic in research. However, most research is outdated and is not specifically focused on post-crisis policies. This research will therefore contribute to science.

2. The process of securitisation

In this paper the term ABS will be thoroughly discussed and before going deeper into the literature, I will first start illustrating the theory behind a securitisation transaction to provide the reader some essential background information.

Typical securitisation process

Securitisation is a framework in which some illiquid assets such as, credit card, account receivables, or car loans of a financial institution or corporation are transformed into a package of securities backed by these assets (Riachi & Schwienbacher, 2015; Baig and Choudhry, 2013).

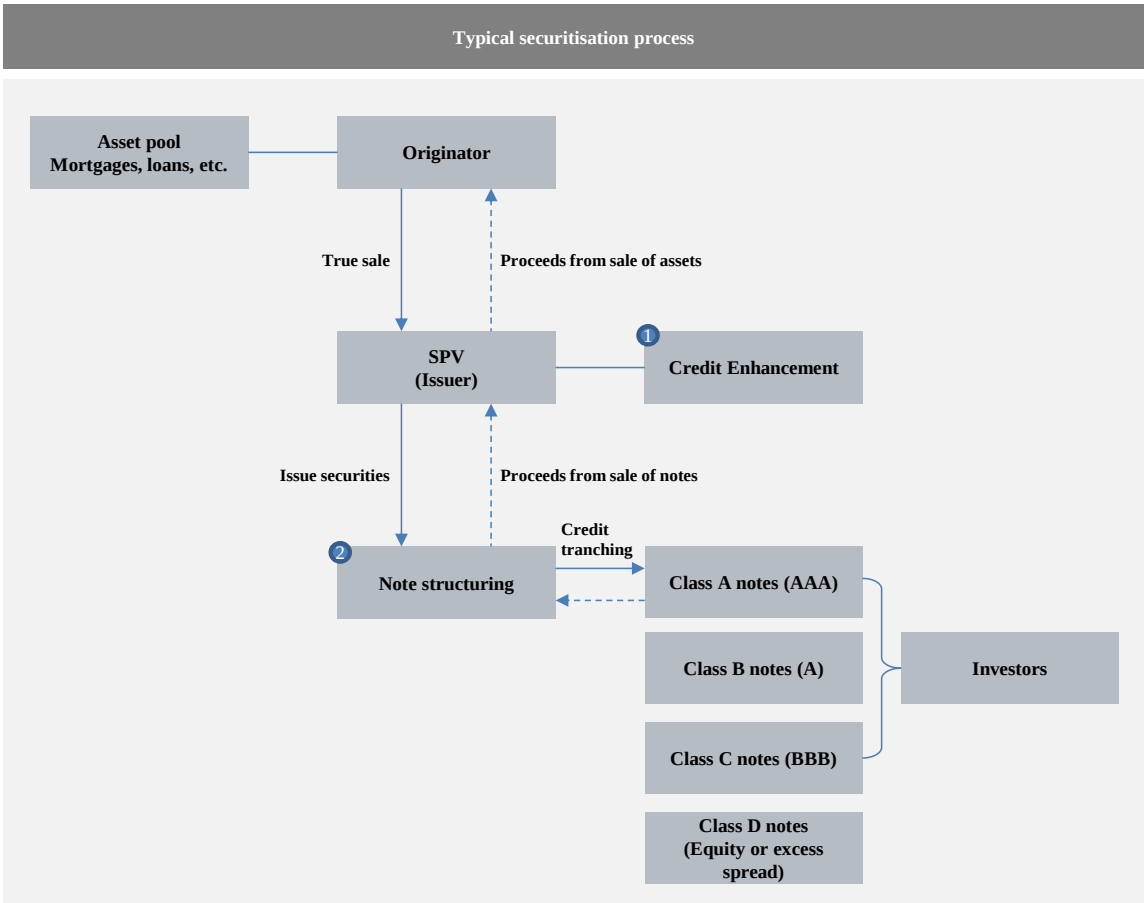

Figure (1) - Securitisation Process. Source: Baig and Choudhry (2013)

In a securitisation transaction, the loan assets are packaged together, their interest payments are used to service the new bond issue and the underlying loan may be sold on to the markets (Altunbas, Gambacorta, & Marques-Ibanez, 2009). Bonds securitising mortgages are usually

treated as a separate class (MBS). However, this paper will mainly focus on ABSs which are known for other underlying assets than mortgages. The type of asset class backing a securitised bond issue determines the method used to analyse and value it (Baig and Choudhry, 2013). The main classes of ABSs in the market are: Commercial ABS and Consumer ABS (credit cards and consumer loans). Below I will describe the process of securitisation, the nature of the SPV structure, and credit enhancement as illustrated in Figure (1).

Mechanics of Securitisation

According to Baig and Choudhry (2013), the securitisation process involves a number of participants. The firm whose assets are being securitised is called the originator. In this paper an originator is defined as the party who is seeking to raise funds and originates the loans. This could be a financial institution or any other corporation (Fabozzi, 2013). Usually, the issuers will acquire the assets from the originator by establishing a SPV. This purpose of this company (SPV) is to issue the security and ensures that the underlying asset pool is held separate from the other assets of the originator. The assets that have been transferred to the SPV will not be affected if the originator is declared bankrupt which is known as "bankruptcy remote". Conversely, if the underlying assets begin to deteriorate in quality and the particular bonds are downgraded, investors have no recourse to the originator.

The Process of Securitisation

The terminology to describe a sale of the underlying asset from the balance sheet of the originator is "true sale" which ensures their isolation from the bankruptcy or insolvency of the originator (Deacon, 2004). This asset is sold to the separate legal entity which is the issuer of the note: the SPV. According to Baig and Choudhry (2013), a representative ABS process involves:

- Undertaking due diligence on the quality and future prospects of the assets;
- Setting up the SPV and then effecting the transfer of assets to it;
- Underwriting of loans for credit quality and servicing;
- Determining the structure of the notes, including how many tranches are to be issued, in accordance to originator and investor requirements;
- The notes being rated by one or more credit rating agencies; and
- The placing of notes in the capital markets.

Credit Enhancement - Figure (1) - Bullet 1

The credit rating of the initial originator becomes irrelevant to the investor when the asset is structured within an SPV framework. However, credit enhancement, in which a third-party guarantee of credit quality is obtained, is a common process. When the SPV includes credit enhancement the notes issued are rated at investment grade up to AAA-grade. Hence, the lower the quality of the assets being securitised, the greater the need for credit enhancement. This is often done by overcollateralization, where the nominal value of the assets in the pool is in excess of the nominal value of issued securities (Baig and Choudhry, 2013). Another example of credit enhancement is "Pool insurance" defined as to cover the risk of principal loss in the collateral pool an insurance company is assigned to provide an insurance policy (Baig and Choudhry, 2013).

Note Tranching - Figure (1) - Bullet 2

As shown in Figure (1), the notes issued in a securitisation transaction are rated differently to reflect the degree of credit risk of the asset pool. Tranching is the process of structuring a security deal into senior and subordinate note classes (Deacon, 2004). These tranches (or bond classes) are issued by the SPV to investors and are entitled to the cash flows from the portfolio of loans. A tranche means one of several related securities issued simultaneously (Fabozzi, 2013). The lowest rate is designate to the most junior tranche and the senior note is usually rated AAA. The most junior note is sometimes nonrated and is called the first-loss piece since it absorbs initial losses. Although the first-loss piece is a bond, it is often referred as the equity piece and is usually retained by the originator (Baig and Choudhry, 2013).

Primary market spread

As already defined in the introduction the primary market spread ("spread") represents the price for the risk taken on by the investor on the basis of information. Specifically, the spread is the difference between the margins yielded by the security at issue above a corresponding benchmark. The floating benchmark could be the London Interbank Offered Rate ("LIBOR") or Euro Interbank Offered Rate ("EURIBOR"). Hence, the spread is reported, in basis points ("bps"), as a margin above the benchmark (Vink & Thibeault, 2007).

Conclusion

Securitisation is a complex mechanism which involves a number of steps to complete. The main concept is to establish a SPV to transfer the assets from the balance of the originator. Bondholders are therefore not exposed to firm specific risks. External advisors are required to be sure that the transfer is true legal and to obtain financial and legal advice. Furthermore, credit rating agencies will qualify the assets, and also whether any enhancements have been made to the assets that will raise their credit quality.

The above description is concise and does not pertain to be exhaustive. There are many varieties with respect to the process and structuring of securitisations. However, these are not mentioned here as this introduction only aims to provide some essential background.

3. Literature Review

The Literature Review summarises the literature that is related to determinants on the spread of ABSs including current regulations. The Literature Review is divided in two chapters. In Chapter (3.1), I will discuss the reason why institutions securitise certain assets and furthermore why these institutions may retain some or all the tranches of an ABS on their balance sheets. Moreover, Chapter (3.1) will address the question of which variables determine the ABS spread and describes the differences in the US and EU securitisation market. Chapter (3.2) will focus on key reforms of the regulatory treatment of securitisation and is structured as follows. Firstly, Chapter (3.2) will answer the question why policymakers think it is necessary to implement regulations and demonstrates the potential danger of securitisation namely, the asymmetric information problem. Secondly, I will discuss two legislations: risk retention and due diligence & disclosure. In addition, I also compare the EU and US security legislation with each other. Thirdly, I will zoom in on the relationship between post-crisis regulations and the ABS spread. Finally, Chapter (3.2) summarises and compares new published regulatory developments in the US and the EU. Chapter (3.3) will conclude the Literature Review.

3.1 Impact of internal and external factors on the ABS primary market spread

This Section will first discuss why institutions securitise certain assets (Section (3.1.1)) and retain a part of the issuance on their balance sheet (Section (3.1.2)). In Section (3.1.3) the determinants of the spread of ABSs are discussed. In Section (3.1.4) the ABS market between the US and EU will be compared and specifically the difference in the ABS spread. Finally, Section (3.1.5) concludes Chapter (3.1) of the literature.

3.1.1 The decision to securitise

This Section will describe the reason for companies to issue a security. Main question of this section: what drives securitisation?

According to Baig and Choudhry (2013), the need for banks to realise finance from the assets on their balance sheet is the driving force behind securitisation. Securitisation as a funding tool, can enable banks to access a broader range of investors by tailoring different tranches of an ABS to investors' preferences and risk appetite (ECB & BoE, 2014). Moreover, securitisation

has a key role for banks to optimise their funding between a mix of wholesale, interbank and retail sources. This is because the securitisation process separates the credit rating of the originating institution from the credit rating of the issued notes (Baig and Choudhry, 2013). Typically, most of the bonds issued directly by the originating bank itself will be more lower rated than the notes issued by SPVs.

Another important factor for financial institutions to undertake securitisation is to improve the risk-weighted capital ratios (Ambrose et al., 2005; Cardone-Riportella, Samaniego-Medina, & Trujillo-Ponce, 2010; Scopelliti, 2014). When securitised assets have been sold to the SPV, the credit risk exposure on these assets for the originator is reduced significantly (Ambrose et al., 2005 and Scopelliti, 2014). In the banking sector, credit risk transfer through securitisation can be beneficial to the economy since it can free up bank capital, allowing banks to extend new credit to the economy (ECB & BoE, 2014). Furthermore, credit risk transfer could cause a reduction on regulatory capital requirements, which is defined in literature as regulatory capital arbitrage (Ambrose et al., 2005; Demyanyk & Van Hemert, 2011; Duygan-Bump et al., 2013). However, Cardone-Riportella et al. (2010), who analysed the reason why Spanish banks securitised in the period 2000-2007, find no evidence to support the hypotheses regarding credit risk transfer and regulatory capital arbitrage since these banks have retained an increasingly large share of the risks associated with securitisation.

Finally, banks try to mitigate the issue of maturity mismatches through securitisation. The business to fund long-term assets with short-asset liabilities is called asset-liability management ("ALM"). However, a permanent problem of the ALM is the maturity mismatch and this funding "gap" could be mitigated via securitisation as the originating bank receives funding from the sale of the assets, and the economic maturity of the issued notes frequently matches that of the assets (Baig and Choudhry, 2013).

Conclusion – Section 3.1.1 – "Securitisation is an important funding tool for originators"

To conclude, to realise value from the assets on the balance sheet is the driving force behind securitisation. Other motivations for (financial) institution to securities their assets as described in this section are: Credit risk transfer, regulatory capital arbitrage, and mitigation of the funding gap.

Although securitisation has many advantages, a large number of originators in the EU still retain a portion of their loans in their portfolio (Ambrose et al., 2005; Scopelliti, 2014). Therefore, the next Section answers the following question: what are the motivations for originators to retain some or all of the ABS tranches in their portfolio?

3.1.2 The decision to retain securitisation issuance

In the US, the crisis caused a decrease in the volumes of securitisation issuances while in the EU, institutions continued to issue securitised products but by retaining most of the tranches on their balance sheets (Scopelliti, 2014). In Europe, only 30 percent of the new issuance was retained by originators before the crisis. During the crisis, the share of new issuance retained increased to 90 percent (Scopelliti, 2015). In 2014, the rate of new market placement is about 40 percent (Altomento & Bussoli, 2014).

Ambrose et al. (2005) note two possible theories for retaining securitisation: minimize regulatory capital and asymmetric information to securitise less profitable loans. The first theory to decide to hold an asset in securitised form is to minimise regulatory capital (or maximise efficient capital) requirements and because existing regulatory capital levels are too high, originators would only securitise the least risky loans (Calem & LaCour-Little, 2004). The second theory of Ambrose et al. (2005) discusses if originators may take advantage of asymmetric information to securitise less profitable loans. As explained in the introduction, asymmetric information exist when the purchasers of securitised debt set credit standards higher in order to protect themselves against the possible lemons market outcome if we assume that the lender is better informed about the borrower's credit quality as suggested by Akerlof (1970). This theory described that originators will use inside information to selectively securitise loans and therefore, originators will securitise loans with lower expected profitability. This is also known as the moral hazard problem. However, this theory has been rejected because Ambrose et al. (2005) find that lenders sell lower-risk loans while retaining higher-risk loans for their portfolio. Thus, instead of misusing asymmetric information, Ambrose et al. (2005) find another reason that originators retain tranches on their balance sheet; to preserve their reputation for credit quality. This could also be interpreted as the "skin in the game" mechanism; obtaining a higher credit rating for a securitisation deal, in order to signal the quality of the underlying assets (Demiroglu & James, 2012; G. Gorton & Pennachi, 1990).

During the crisis, regulatory policy significantly affected the decisions of originators about what types of security to issue and whether to transfer or to retain the credit risk of the underlying assets (Scopelliti, 2014). Since, originators could pledge in the refinancing operations of the ECB to access additional liquidity. Therefore, between 2007 and 2010, institutions retained mostly those securities which could fulfil the eligibility standards of the ECB (Scopelliti, 2014). In the crisis and post-crisis period securitisation transactions have been structured exclusively as collateral for central bank refinancing (Aiyar et al., 2015; Liberadzki, 2015; Scopelliti, 2014). A recent example in the EU is the ECB ABSPP, starting from the 4th quarter of 2014. The program has been implemented by the ECB aimed to purchase senior tranches of ABSs in both primary and secondary markets[11] to provide credit to the economy by increasing flows of capital into banks (Janssen & King, 2015). Given their liquidity needs, originators retained those products which were eligible as collateral for monetary policy operations such as the ABSPP (Scopelliti, 2014).

Conclusion - Section 3.1.2 - "Originators retain tranches to signal quality to investors"
Unlike the US, European institutions have retained an increasingly large share of the risks associated with securitisation. One reason is, by only securitise the least risky loans originators minimise their regulatory capital. To issue securitised assets to make advantage of asymmetric information is not a proven motivation. On the contrary, originators retain securitised products to preserve their reputation for credit quality to obtain a higher credit rating (known as skin in the game). Furthermore, originators in the EU retained those products which are eligible as collateral for monetary policy to create more liquidity.

3.1.3 Determinants of the primary market spread of ABSs

This Section will discuss internal and external variables who influence the ABS spread. The impact of regulatory variables will be excluded in this Section but will be later described in Chapter (3.2). The main research question of this section is: what are the determinants of the spread of an ABS? The outcome of this section will have a major contribution to the regression

[11] The primary market is where originators directly or indirectly issues new securities and the secondary market is where previously issued financial instrument are bought and sold (Warbey et al., 2015).

model used in the Methodology Chapter in this study: most of the control variables are based on this Section.

Most studies conclude that credit rating has a substantial impact on the spread. However, Vink & Thibeault (2007) conducted an empirical study about the relationship between the nature of the assets and the spread. They developed a model to predict how pricing characteristics affect the spread of ABSs. The explanatory variables are categorised in three main groups: default and recovery risk characteristics, marketability characteristics, and systemic risk characteristics. As shown in Figure (2), the most important group in explaining spread variability are default and recovery risk characteristics. Furthermore, marketability characteristics of the loan such as, type of market (Euromarkets or not), number of lead managers and type of interest rate (fixed or floating rate) explains a significant portion of the spreads' variability.

Another paper who discussed the spread determinants of ABS is the study of Fabozzi & Vink (2009). As well as the study of Vink & Thibeault (2007), Fabozzi & Vink (2009) categorised the variables in three components. However, they redefine the three explanatory variables into: credit risk, liquidity risk, and optionality risk. Both studies conclude that credit rating is a major factor in accounting for the overall primary market. However, according to Fabozzi & Vink (2009), the notion of pure reliance on credit ratings may be overstated. This is consistent with the results of the paper of Vink & Thibeault (2007). For example, both studies conclude that credit enhancement has a negative significantly impact on the spread. Furthermore, collateral variables such as credit card receivables, trade receivables, whole-business loans, and other loans are in both studies highly statistically significant, while trade receivables, whole business loans and other loans are significant positive, the variable credit card receivables is significant negative. Vink & Thibeault (2007) therefore suggest that, because credit card receivables are relatively easy to replace due to their homogeneous structure, the spread is significantly lower relative to issues with assets that cannot easily be obtained.

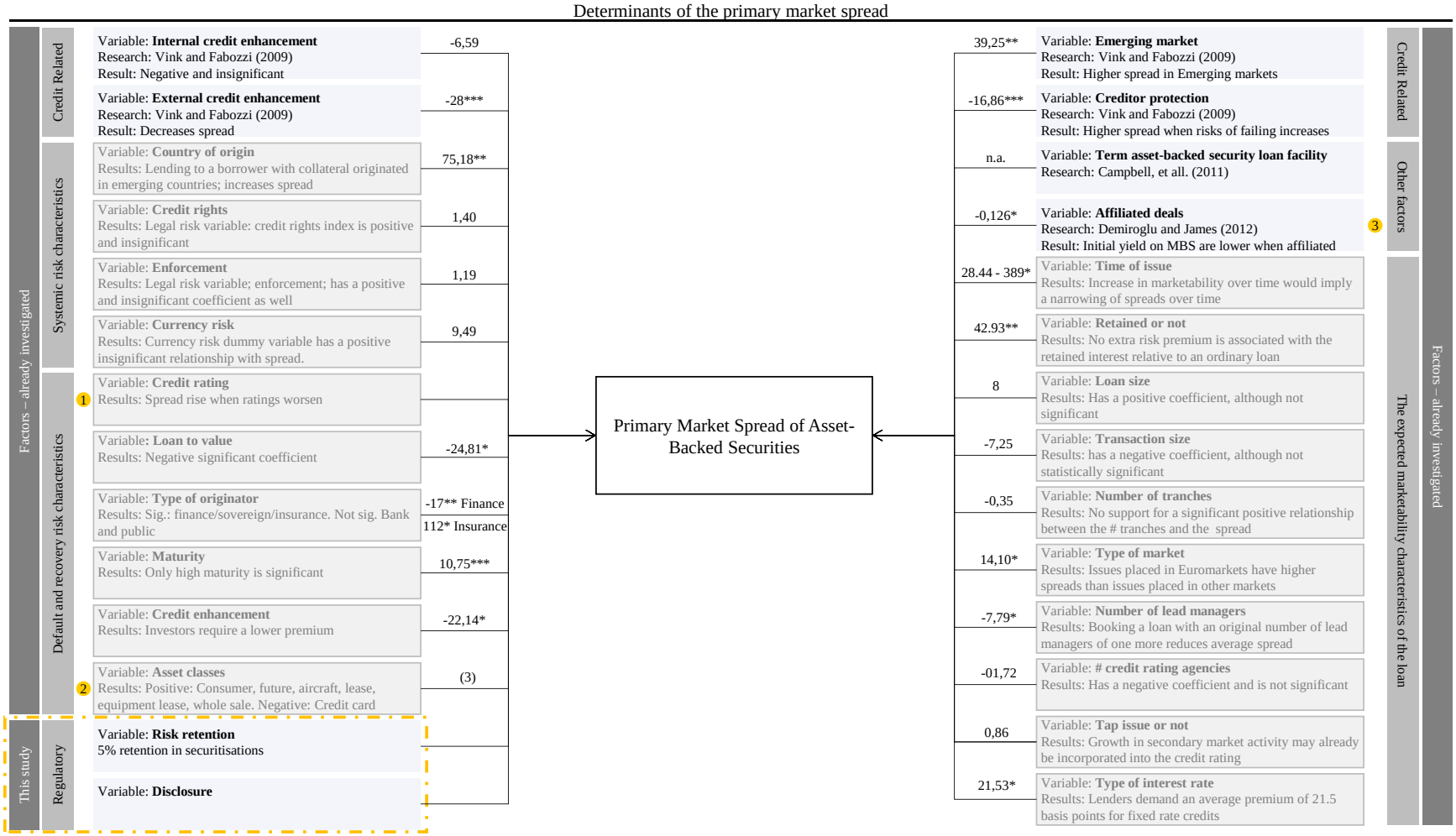

*Figure (2) - Determinants of the primary market spread. ***,** and * denote that the coefficient estimate is significantly different from zero at the 1%, 5%, and 10% level, respectively. Variables determined by the paper of Vink & Thebault (2007) are coloured grey. (1) Credit rating by Moody's: Aaa/Aa1= , Aa3/Aa3= 28.44* , A1/A2=51.6* , A3/Baa1= 78.75*, Baa2/Baa3= 146.25*, Ba1/Ba2= 367.51*, Ba3/B1= 389.53*. (2) Asset classes: Consumer= 9.70**, Credit Card= -16.81**, Future= 42.03*, Aircraft lease= 37.58*, Equipment lease= 16.71*, Other = 36.27*, Small business= 8.1, Whole business= 61.56*. (3) Paper only focussed on initial yields on MBS.*

Whole-business loans and future receivables, who have a negative impact on the spread, cannot be easily replaced and are therefore considered more risky. At lasts, Fabozzi & Vink (2009) demonstrate that bond market conditions, not liquidity[12], account for a substantial part of the spread of ABSs.

One particular direct factor on the spread of ABSs are the liquidity programs used by governments as a response to the potential collapse of the securitisation market during the crisis. The US liquidity program TALF, was announced in November 2008 providing loans for the purchase ABS backed by consumer and small business loans (Campbell et al., 2011). Ashcraft, Gârleanu, & Pedersen (2011), concludes that TALF reduced spreads of CMBS, but only by a small amount. The study of Campbell et al. (2011) is much broader and focussed on auto loans, credit card loans and student loans. They compared, for example, US and EU auto loans ABSs and conclude that US auto loans ABSs fell by about 50 bps more than spreads on European auto loans ABSs. Overall they describe that the US TALF program lowered spreads for several categories of ABSs.

On March 9, 2015 the ECB started its Quantitative Easing ("QE") programme aimed to stabilise the ABS prices. The programme, which will focus on investment grade bonds, has been left open-ended.

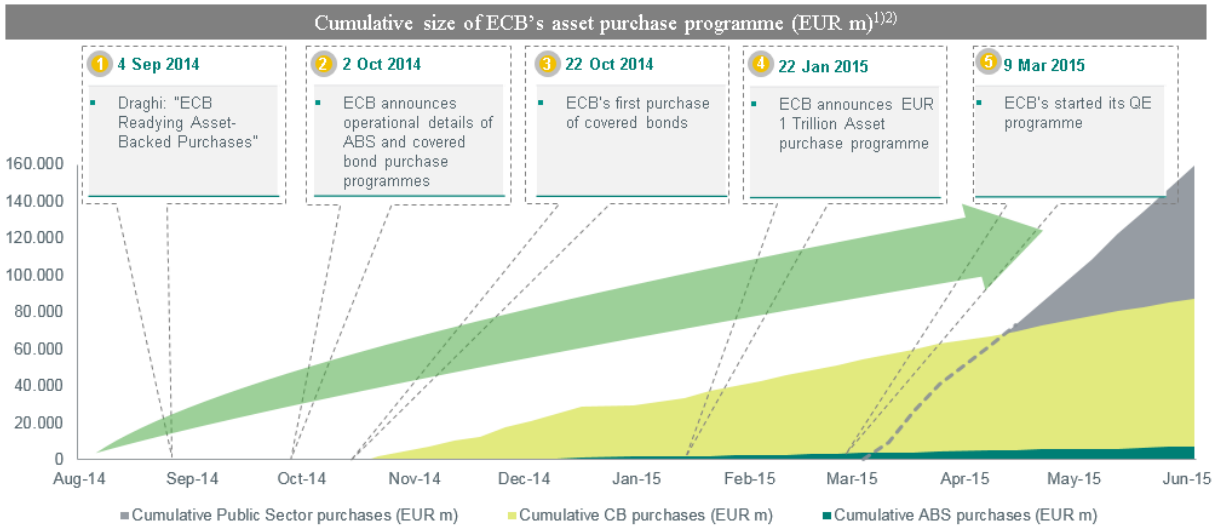

Figure (3) - Cumulative size of ECB's asset purchase programme (EUR m). Source: ECB, Bloomberg and ABN AMRO. (1) ECB third covered bond purchase program also referred to as ECB CBPP3. ECB ABS purchase program also referred to as ECB ABSPP. (2) Covered bonds also referred to as CBs.

[12] Liquidity is the degree to which a security can be bought or sold. Securities trade with different degrees of liquidity (Fabozzi, 2013).

It will continue until inflation moves towards 2 percent and to improve credit market conditions (Altomento & Bussoli, 2014). The ABSPP was established to enhance transmission of monetary policy in the EU by transforming relatively illiquid assets into more liquid securities. Figure (3) shows the cumulative size of the ECB's ABSPP and it is expected that the ECB will purchase EUR 30bn ABSs. The spread of Spanish AAA RMBS declined from 175 to 75 bps immediately after the announcement (Janssen & King, 2015).

Instead of a direct relationship between liquidity programs and the ABS spread, I propose an indirect effect of the liquidity programs on the ABS spread through retained interest. According to Aiyar et al. (2015), the ABSPP is the leading cause for originators to retain a high proportion of tranches on their balance sheet. Demiroglu & James, (2012) demonstrated that average spread are lower for deals who retained securitisation tranches. This could imply that, the ABSPP program increases retained interest, which mitigated the moral hazard problem (Chemla & Hennessy, 2011; Ozerturk, 2015) and as a consequence decreased the default rate and the yield (Demiroglu & James, 2012). In Figure (4), I propose a chain-reaction caused by the ABSPP.

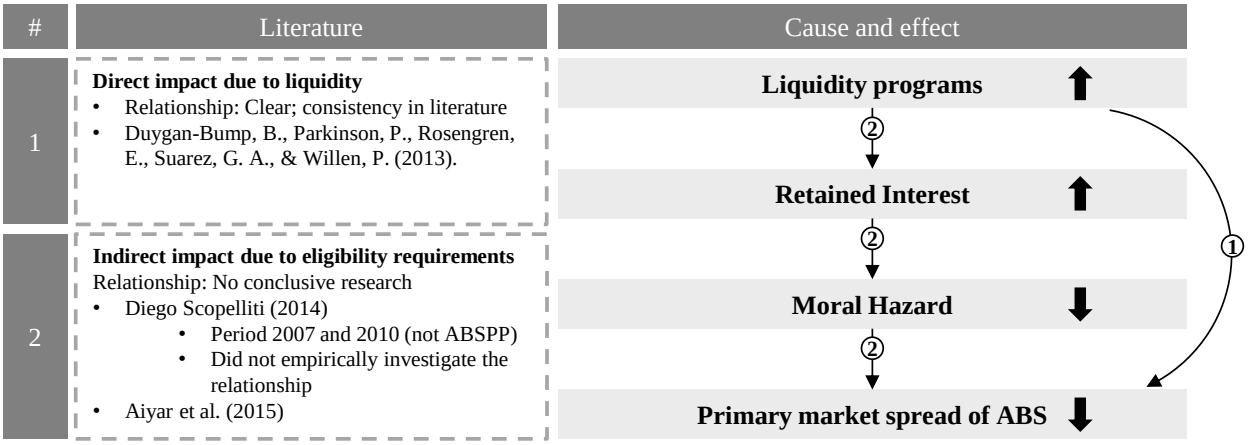

Figure (4) – Indicative literature framework.

However, Vink and Thibeault (2007) have empirical evidence demonstrating that retained interest have a strong positive significant impact on the spread of 42.93 bps in the period 2002-2005. They argue that this could be explained by a higher perceived risk on the part of the originator (Vink and Thibeault, 2007). Hence, literature offers contradictory findings about the relationship between retained interest and the spread of ABSs.

So far, I discussed a direct and indirect reactions on the adoption of liquidity programs. Since the proportion of retained interest was already substantial before the implementation of the liquidity program in the EU (as shown in Figure (5)), I conclude that a direct effect of the ABSPP is more plausible.

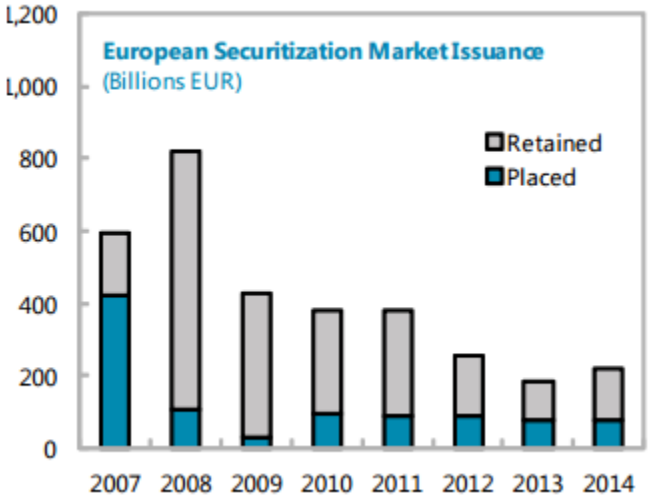

Figure (5) – European securitisation market issuance (Aiyar et al., 2015).

Hence, instead of an indirect relationship between ABSPP and the spread through retained interest, ABSPP has a direct impact on the spread by providing liquidity into the market. Furthermore, research has demonstrated that both TALF and ABSPP helped restore liquidity to the ABS market and drive down ABS spreads (Aiyar et al., 2015; Duygan-Bump et al., 2013).

Conclusion – Section (3.1.3) – "Credit rating is not the only variable for the determination of the ABS spread"

The purpose of Section (3.1.3) was to provide a theoretical overview of which variable influenced the ABS spread. Although credit rating by agencies is an important variable to determine the spread, it is not the only variable. First of all, the nature of the assets has a substantial impact on the spread. Specifically, the spread is significantly higher if the underlying assets cannot easily be replaced. Secondly, other relevant variables in explaining the spread are: loan to value, enhancement and type of originator. Furthermore, the TALF and ABSPP, decreased the ABS spread directly by providing more liquidity into the market. Lastly, literature has shown inconsistent conclusions concerning the relationship between retained interest and the spread of ABSs.

3.1.4 Differences in the US and EU securitisation market

This Section will discuss the differences in the US and EU securitisation market. The main relevant research questions addressed in this section are: (a) what are the differences between the US and EU securitisation market; and specifically, (b) what is the difference between the spread of ABS between the US and EU and the reason for this difference. This Section is important to theoretically understand how the spread in both regions (US and EU) would react differently on the adoption of post-crisis regulations.

Comparing the US securitisation market with the EU, one can conclude that the US securitisation market is relatively and absolutely large in volume. The outstanding stock is about 2.6 trillion which is double the size of the European market (Aiyar et al., 2015). The reason is that European firms tend to be highly leveraged and reliant on bank financing. Moreover, European companies have little equity when compared with the US, implying a higher average debt-to-equity ratio. When attracting debt, bank loans represent 80 percent of euro area companies' debt, whereas US companies use mostly bond financing such as ABS (Aiyar et al., 2015). Although the US market has a greater volume than the EU, the European ABS market is more liquid since the bid-ask spread is typically lower in the EU than the US ABS market (Chen, 2014).

Both the EU and US markets are dominated by RMBS and auto securitisations. The concentration in the European market is high; the majority of the market (81 percent) in 2014 is contributed to the Netherlands, Italy, Spain, Germany, and Belgium. Importantly, European firms retain more tranches on their balance sheet although the retained portion has shrunk as securitisation issuance has fallen. At its peak, the European securitisation market was evenly split between placed and retained securitisation (Altomento & Bussoli, 2014). As already discussed in Section (3.1.2) these retained securities can be used as collateral for funding from the ECB or signalling to prevent moral hazard (Demiroglu & James, 2012). Moreover, the default rate on ABSs in the EU was only around 1.4 percent between 2007 and the first quarter of 2013, whereas it was 17.4 percent in the US. Hence, the default rate in Europe was significantly lower than the US (Lewis, 2014).

Another difference between securitisation characteristics in the US and EU is regarding the quality of the collateral for a MBS. In the EU, the quality of the mortgage collateral is of

superior quality than in the US (Chen, 2014). This could be concluded from observing the lower average loan to value and higher recovery rates in the EU.

The difference in the ABS spread between the US and EU

EU AAA-rates securitised products continued to fall in 2014 dropping below 12 bps end-October. Which is significantly lower than the 5 year average of 93 bps. The spreads for US securitisation products ranged between 75 and 100 bps in the year 2014. According to Kern et al. (2015), a difference between the markets is caused by EU policymakers to promote the ABS market in the EU.

Conclusion – Section 3.1.4 - "Unlike the US, European lenders retain most of the tranches on their balance sheet"

To summarise, the US securitisation market is absolutely larger than the EU market but less liquid. Collateral on MBS in the EU is of higher quality than in the US and the default rate in the Eurozone is on average significantly lower than the US securitisation market. The main difference between both markets is the fact that the most European lenders retain most of their tranches on their balance sheet to mitigate the moral hazard problem, which compresses the ABS spreads. Thus, theoretically post-crisis regulations (such as the 5 percent risk retention rate legislation) had more impact on the US since the EU already retain large parts of tranches on their balance sheet. In addition to retained interest, the recent ECB ABSPP declined also the spread, which could be the reason why the spread of the US is higher than in the EU.

3.1.5 Conclusion Chapter 3.1

To summarise, Chapter (3.1) answer an important questions and provides this study with a comprehensive overview to build the regression model and subsequently, examine statistically the hypotheses. First of all, I demonstrate that there are generally at least four reasons for lenders to securitise; funding, credit risk transfer, regulatory capital arbitrage and to mitigate the funding gap. European originators retain most of their tranches on their balance sheet to mitigate the moral hazard problem by signalling quality. Furthermore, originators retained those products which were eligible as collateral for monetary policy. Section (3.1.2) shows that the spread of ABS is not only determined by the credit rating. Nature of the assets, loan to value, credit

enhancement and type of originator are important explanatory variables for the ABS spread. Lastly, liquidity programs, such as the ECB's ABSPP, decreased the spreads. There is some contradiction in literature about the impact of retained interest on the ABS spread. I proposed a framework, Figure (4), that I will examine statistically in this paper. This framework demonstrates that retained interest decreased the moral hazard problem and therefore compressed the ABS spread. Since EU originators retain most of their tranches on their balance sheet, post-crisis regulations could had a higher impact on the ABS spread in the US than the EU. Another difference is the volume of securitisation market, which is larger in the US market. However, the US market is less liquid than the EU ABS market. Furthermore, collateral for the MBS in the EU is of higher quality than in the US and the default rate in the EU is significantly lower than the US securitisation market.

3.2 Financial regulation and securitisation

This Chapter has been organised in the following way. First of all, I will describe the main downside of ABSs, the asymmetric information problem. Section (3.2.1) answers two questions: (a) The danger of securitisation: what is the main problem? (b) Why are regulations so important? In Section (3.2.2), I will describe two regulations: due diligence & disclosure and risk retention. Section (3.2.3) will also reviews the different regulations in both the EU and US and compares the two markets with each other. New proposed regulation in both the EU and US will be described in Section (3.2.4). Section (3.2.5), will elaborate on the impact of regulations on the spread of ABS. Finally, Section (3.2.6) will conclude Chapter (3.2).

3.2.1 Why regulations? The asymmetric information problem

The credit crisis (2007-2009) has increased calls for stricter regulations in credit markets (Keys, Mukherjee, Seru, & Vig, 2009). This section describes what makes securitisation dangerous and why regulation is important for the securitisation market.

The literature is consistent about the danger of securitisation; securitisation reduces the incentives of lenders to carefully screen borrowers (Dell'Ariccia, Igan, & Laeven, 2012; Keys et al., 2009; Mian & Sufi, 2009). According to Sarkisyan & Casu, (2013), originators have private information on the quality of the loans they securitise. This asymmetric information lead to

moral hazard problem by creating distance between the originators of loans and the investors who bear the final risk of default. Therefore, securitisation weakened lenders´ incentives to screen borrowers (Keys et al., 2009). According to James (2010), the credit crisis was a direct result of a decline in originators' screening that was fostered by the originate-to-distribute[13] ("OTD") model of securitisation.

Another evidence of moral hazard in the ABS market is the positive relationship between securitisation and mortgages defaults (Keys et al., 2009; Mian & Sufi, 2009). Moreover, since investors do not observe the private information on the quality of the loans, they may require a lemon discount which can drive the price of the resulting securities below their book value. Hence, besides moral hazard, securitisation can create adverse selection since low quality loans are securitised (Sarkisyan & Casu, 2013).

To help mitigate adverse selection and moral hazard, originators should be able to offer explicit contractual design features in order to sell ABSs (G. Gorton & Pennachi, 1990). Gorton & Pennacchi (1995) consider two possible features of loan sales to remain an incentive for the bank to screen and monitor borrowers: (i) offering an implicit guarantee on the value of the loan, and (ii) retaining a portion of the loan on the bank's balance sheet.

Therefore, regulators have proposed a number of rules to align the incentives associated with securitisation (Sarkisyan & Casu, 2013). However, according to Keys et al. (2009), stricter regulation fails to align lenders' incentives with the investors of MBS and market forces may have been more effective than regulation in mitigating moral hazard. One example of market forces are the number of lenders, which is associated with better quality of loans originated (Keys et al., 2009). This could suggest that more competition among participant reduces the moral hazard problem.

A large body of literature has been focused on the misalignment of incentives between originators and investors (Scopelliti, 2014). However, skin in the game, which require originators to hold some risk, does indeed help to mitigate the moral hazard problem (Keys et al., 2009; Sarkisyan & Casu, 2013). According to a paper written by the ECB & Bank of Engeland (2014) intervention in the ABS market will enhance long-term financial stability for securitised assets since there is clear evidence that securitisation markets could potentially damage financial

[13] The process of loans made for the objective of selling them into securitisation pools without the originator retain any risk on the assets (Levitin, 2013; Meyerson, Chorazak, Sloan, Palma, & Schueller, 2014).

stability. In Section (3.2.2), this study will describe several regulations that aim to reduce the moral hazard problem in the securitisation market.

Conclusion – Section 3.2.1 – "Securitisation causes moral hazard and adverse selection problems"

Securitisation leads to moral hazard problem by creating distance between the originators of loans and the investors who bear the final risk of default. Therefore, securitisation weakened lenders' incentive to screen borrowers. Moreover, adverse selection plays a role because low quality loans are securitised. Hence, to answer question (a), securitisation causes moral hazard and adverse selection problems due to asymmetric information. To help mitigating these problems regulations are necessary (answer question b). However, market forces seems to be another important instrument to reduce moral hazard. For example, a number of recent studies have demonstrated that retained interests is a signalling mechanism used to partially solve asymmetric information problems and to attract investors.

3.2.2 Regulation in the securitisation market

In response to the crisis numerous regulatory developments have been enacted or proposed in the EU and the US which had a significant impact on the regulatory treatment of securitisation transactions (Arca et al., 2015). This Section discusses the effect of regulations implemented by policymakers on securitisation. According to Arca et al. (2015), there are generally two regulatory instruments which will be discussed below: risk retention and due diligence. To obtain an overview of when exactly the legislation was effective, this Section includes two timelines for both policies. These dates will also be used in the regression model. Finally, this Section (3.2.3) compares the regulations with each other in both the US and the EU.

3.2.2.1 Risk retention

Risk retention is a well discussed topic and furthermore an important regulatory tool for policymakers. As discussed, there exist a general consensus among policymakers and scientific researches that risk retention, known as skin in the game, mitigates moral hazard (Levitin, 2013).

The reason is that originators had no incentive to apply prudent underwriting standards, since they were retaining none of the credit risk (James, 2010).

United States

The financial reform legislation passed by US Congress in 2010, Title IX of the Dodd-Frank Wall Street Reform and Consumer Protection Act, requires originators to retain at least 5 percent of the credit risk. The Dodd-Frank Wall Street Reform and Consumer Protection Act brought significant changes to financial regulations and specifically securitisation transactions in the US. The idea is to minimise asymmetric information and foster a better alignment of incentives since retained interest also expose originators to the risk of their securitised assets (Sarkisyan & Casu, 2013). This act is a major reform of the securitisation market and adopted by the US Securities and Exchange Commission ("SEC") (Levitin, 2013).

Europe

In Europe, risk retention is in place since 2011 but the effective date is July 3, 2014. Similar to the US, EU credit institutions must retain a material net economic interest of at least 5 percent of the securitised exposure. This law came into force under article 405 of the Capital Requirements Regulation ("CRR"). The new rules have direct effect in member states to reduce risk and are interpreted and implemented across member states (Arca et al., 2015).

Timeline

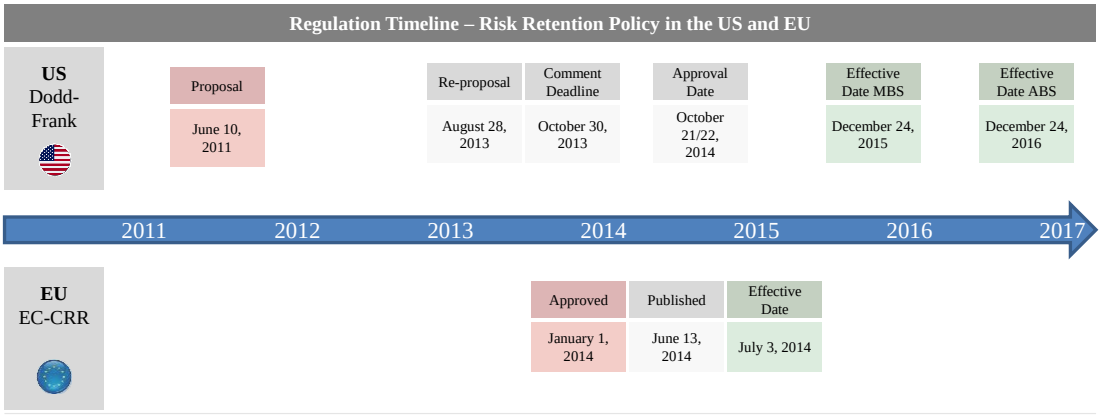

Figure (6) - Timeline Implementation of the Risk Retention legislation in the US and EU.

3.2.2.2 Due diligence

Originators may have the incentive to securitise loans that are riskier than the loans they retained on their balance sheet. The regulatory framework created an environment that align the incentives of the parties involved in securitisation to prevent selling "lemons". To better understand the risks posed by the underlying asset pools, the supervisor should require originators and investors to perform proper due diligence[14] (Arca et al., 2015). Due to robust due diligence, the investor knows the potential risk of loss and is able to make reliable and informed decisions (*Report on asset securitisation incentives*, 2011). This section will describe below the legislation in both the US and EU concerning due diligence in the ABS market.

United States

Several laws on ABS due diligence are adopted. Specifically, the Dodd-Frank Wall Street Reform and Consumer Protection Act ("Dodd-Frank Act"), states that all issuers of registered ABS will be subject to reporting requirements. The Dodd-Frank Act authorises the SEC to disclose asset-level and loan-level data on ABS (*Report on asset securitisation incentives*, 2011). Furthermore, Section 945 Rule 193 in the Dodd-Frank Act focused on the general review of assets underlying an ABS and to disclose the prospectus of a specific asset pool. Dodd-Frank Section 942(b) requires that originators should disclose asset-level information for ABS (Arca et al., 2015).

Europe

The European securities market regulator established enhanced disclosure requirements and transparency standards for the securitisation market. Under article 406 and 409 CRR of the EC, investors are obligated to have a thorough understanding of the transaction by obtaining information from the originator (Arca et al., 2015). Central banks (ECB and Bank of England) required loan-level information for ABS in the EU. Moreover, this information is a pre-condition for assessing ABS as eligible collateral for the ABSPP (Aiyar et al., 2015).

[14] The process on record and analyse information on positions and monitors and stress-tests the security (BlackRock, 2014).

Timeline

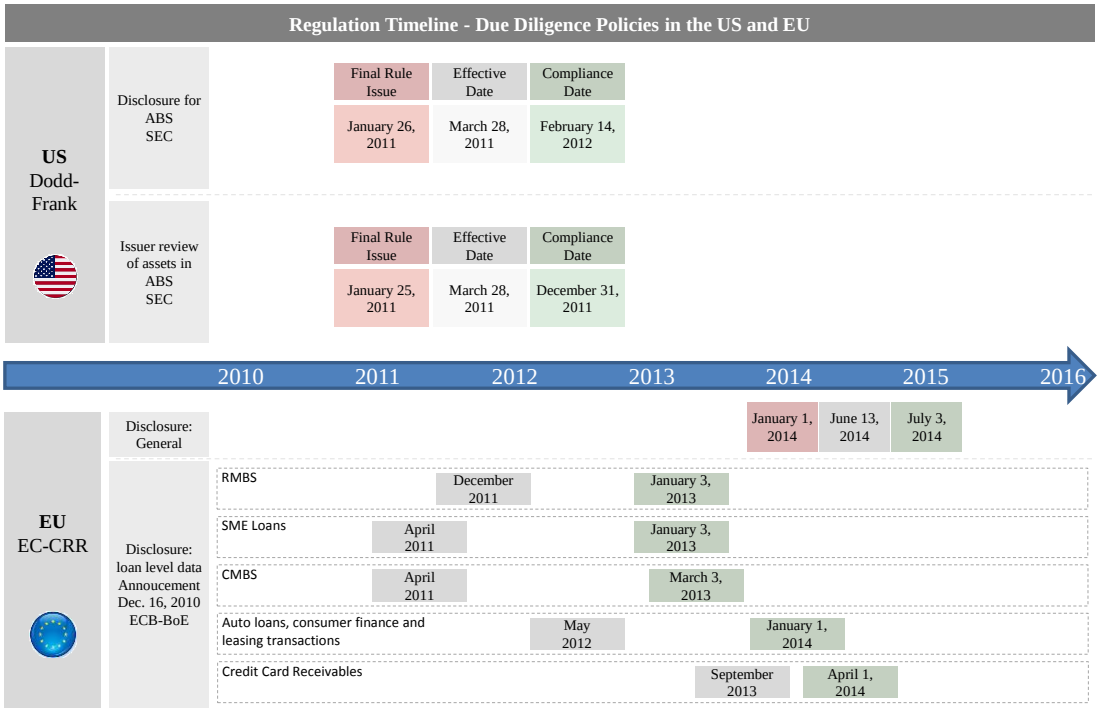

Figure (7) - Timeline Implementation of the Due Diligence legislation in the US and EU.

3.2.3 Difference in regulations in the US and EU securitisation market

The basic principal of the risk retention rule, whereas investors are required to hold the 5 percent retention, is to align the interests of investors in securitisation (Warbey, Goldfinch, & Graham, 2015). In the US, the risk retention rules is still not fully effective. One major difference between the two regions is concerning the calculation of the 5 percent risk retention rate. In the EU, calculating is based on the notional amount of underlying assets. Whereas in the US, interest is based on the fair value of the issued ABS classes. (Arca et al., 2015).

The main difference on the ABS due diligence legislation, is that the EU place the burden of compliance on investors while the US place it on the originator (Serravalli, Sullivan, & Merchant, 2014). Hence, in the EU investors must demonstrate they have a thorough understanding of the risks associated with their investments. Furthermore, there is no equivalent EU provision of the US Dodd-Frank Section 943, where the originator is required to disclose any repurchase activity of outstanding ABSs. Furthermore, the US legislation is more extended regarding third party due diligence reports. Under the Dodd-Frank Section 932, underwriters of

ABSs are required to make the findings and conclusions of any report of a third-party due diligence service provider public (Arca et al., 2015).

3.2.4 Revision to the securitisation framework

As described above, the EU and US ABS legislation are somewhat different. Therefore, the objective of policymakers is to develop a new universal and consistent treatment for all ABS. Several regulatory proposals are outstanding for the development of EU - Simple, Transparent and Standard ("STS") and US - Simple, Transparent and Comparable ("STC") (McCaw, 2015). The goal of the STS and STC is to reform and harmonise the existing rules on risk retention and due diligence (Jones et al., 2015) and to mitigate risks[15] (*Capital treatment for "simple , transparent and comparable" securitisations*, 2016). Furthermore, both securitisation frameworks could help to increase growth by incentivize banks to increase lending to SMEs (Krarup, 2016). However, both US and EU frameworks are approached differently (McCaw, 2015). Since ABS regulation is a major research topic in this paper, the next Section will discussed briefly the STS and STC. In addition, if implemented, the STS and STC will have a significant impact on the US and EU ABS market. Hence, this could potentially be an interesting topic for further research on the relationship between regulations and the ABS spread.

US - Simple, Transparent and Comparable securitisation ("STC")

In November 2015, the Basel Committee ("BIS") published a consultation paper on the capital treatment of STC securitisations. The objective of this proposal is to create a framework for simple, standard, and transparent securitisations for global financial institutions. Such securitisations would ultimately benefit from more favourably regulatory capital and liquidity treatment. This proposal cannot substitute the investors' due diligence but rather assist and identify in the financial industry's development of proper securitisation structures. To summarise the proposal of the STC briefly: the securitisation product should be (i) hologenetic with simple characteristics, (ii) transparent to provide investors with sufficient information on the underlying assets and (iii) enable a more straightforward comparison across securitisation products within an

[15] According to the revised securitisation framework, STC, published by The Basel Committee, these risks are related to asset risk, structural risk and operational risk.

asset class to assist investors in their understanding of such investments (*Capital treatment for "simple , transparent and comparable" securitisations*, 2016).

EU - Simple Standard and standardised securitisation ("STS")

The European Commission ("EC") is front running a similar exercise (called STS in Europe) by the Basel Committee. The proposed regulations have been provided to the European Parliament and Council for review. Once adopted, both regulations will be directly applicable on member states as of the enforcement date. In terms of due diligence, risk retention and transparency, the objective of the EC proposal is to uniform these rules. This securitisation framework will enhance the integration of the EU financial market and investment in this securitisation structure will benefit from preferential regulatory capital treatment (ECB & BoE, 2014).

Difference in STC and STS

Both STS (EC) and STC (BIS) look highly similar however there are some differences. Firstly, STC criteria are more general than the STS criteria. Secondly, BIS proposes that both sellers and investors are responsible for the compliance of the STC status. In the STS criteria, the seller is the only one who is responsible to claim the STC status. So far the regulations is only published by BIS, meaning that it must first be incorporated in European law via the EC. The full implementation will normally take years. Both STC and STC are designed to mitigate securitisation risks and to stimulate integration of securitisation markets ("ESMA Report on Trends, Risks and Vulnerabilities," 2015).

Conclusion – Section 3.2.2, 3.2.3, and 3.2.4 – "To mitigate the moral hazard problem caused by securitisation, numerous regulations have been enacted in both the US and EU"

Numerous regulatory developments have been enacted or proposed in the US and the EU over the past few years in response to the financial crisis to decrease the moral hazard problem. The idea behind risk retention is to minimise asymmetric information and foster a better alignment of incentives. The second regulation is due diligence. Due to robust due diligence, the investor knows the potential risk of loss and is able to make reliable and informed decisions. In the US, the major regulatory reform impacting securitisation transactions has been the Dodd-Frank Act while in the EU, the impact on securitisation transactions has come from various regulatory

reforms such as the Basel II and III Accords which were adopted by the EC. Comparing the two nation with each other shows that the EU place the burden of compliance on investors while the US place it on sponsors. Both US and EU proposed a new framework for uniform and transparent securitisations.

3.2.5 Regulations and the impact on the spread of ABSs

Generally, the impact of regulations could influence the lending spread assuming that banks would increase the spreads to prevent return on equity ("ROE") from falling when the capital regulation is tightened (Chun & Kim, 2012). Chun & Kim (2012), find that the spread increases to 9.1 bps for commercial banks to keep the ROE from falling over the period of 2005-2010 due to capital regulation. Could this also be the case for financial institutions issuing ABSs? If so, one would expect that the rate of ABSs increases due to capital regulations such as risk retention.

Christopher and James (2010), suggest that retention of even modest loss exposure by originators reduces moral hazard and is associated with significantly lower default rates on these securities. Hence, the main question of this section: does risk retention affects the ABS pricing? The literature is consistent concerning risk retention: skin in the game is important to mitigate moral hazard (Chemla & Hennessy, 2011; Demiroglu & James, 2012; Levitin, 2013). However, literature in inconsistent about the impact on the spread (i.e. widen or compressed).

Demiroglu & James (2012) demonstrate that affiliated deals, when a single originator also serves as MBS sponsor and servicer, have a lower default rate than mixed or unaffiliated deals. The reason is that originators retains both greater loss exposure and greater upside profit potential than in unaffiliated deals. Furthermore, they find that average yields are significantly lower on securities in affiliated deals relative to securities in unaffiliated deals. Demiroglu & James (2012) conclude that investors considered moral hazard when pricing MBS and therefore, skin in the game matters for performance. Based on the paper of Demiroglu & James (2012), this study expect that the spread of ABS will decrease when having skin in the game. The reason for this is that the expected loss for ABS with a mandatory 5 percent retention rate will be lower than the same product without the level of capital that the issuer is required to hold.

Conclusion – Section 3.2.5 – "The relationship between the 5 percent retention rate legislation and the spread of ABS seems to be negative"

Banks increased the spread because of regulations to prevent the ROE from falling down. Could we conclude the same for institutions in the ABS market? The asymmetric information is a more severe problem for the ABS product. Investors demand compensation for this moral hazard problem. Both due diligence and risk retention mitigates asymmetric information and therefore the risk declines. If this is the case investors usually demand a lower spread. Hence, this section can theoretically conclude that both regulations decreased the ABS spread. However, there is still no proven empirical evidence of this theory.

3.2.6 Conclusion Chapter 3.2

Asymmetric information leads to moral hazard problem which is a serious risks for investors investing in ABSs. Therefore, securitisation weakened lenders' incentive to borrow. Regulations are therefore necessary to mitigate this problem. Section (3.2.2) describes several regulatory developments in the US and EU ABS market over the past few years such as, due diligence and the risk retention. The latter is a well discussed subject in the existing literature. The risk retention legislation directly influenced the EU ABS market by demanding originators to retain 5 percent interest of the issuance. Although, theoretically skin in the game decreased ABS default rates and spreads, there is no conclusive empirical research. Due diligence pushes investors to better understand the risks posed by the underlying asset pools. However, there is no study about the relationship between post-crisis due diligence legislation and the ABS spread. If one can prove a negative correlation between legislations and the spread, one could suggest that both legislations mitigated the moral hazard problem in the ABS market. The main difference between the EU and US securitisation market, is that generally EU originator retain most tranches on their balance sheet. Lastly, US and EU policymakers proposed new frameworks to unify and simplify the securitisation markets.

3.3 Conclusion Literature Review

The objective of the Literature Review is to develop a framework of the current knowledge on the impact of post-crisis regulations on the ABS spread. In addition, this paper also compared both EU and US securitisation market. The goal was to known if there is any relationship between regulations and the ABS spread and to understand the reason.

Securitisation is mainly driven by four factors: funding, credit risk transfer, regulatory capital arbitrage and to mitigate the funding gap. Originator retain tranches on their balance sheet for two reasons; to preserve their reputation and to be eligible for monetary liquidity programs. Especially, the EU retained relatively more securitised assets than the US. The spread is dependent on multiple variables such as credit rating, the nature of the asset, loan to value, credit enhancement and type of originator. Liquidity programs such as TALF and ABSPP decreased the ABS spread significantly by increasing liquidity in the ABS market.

The asymmetric information could lead to a moral hazard problem in the ABS market since investors' bears the final risk of default. To mitigate this problem policymakers adopted several regulations in both the EU and US. This paper describes two policies: due diligence & disclosure and the 5 percent risk retention rate legislation. Both regulations intends to align the incentives of sponsors and ABS investors.

The risk retention policy requires originators to retain a financial interest and maintain skin in the game. One of the largest scientific contributions in this specific subject is from Demiroglu and James (2012). They conclude that investors consider moral hazard when pricing ABS. Thus, when the originator has no skin in the game investors will demand a higher yield because there is more risk involved. Although the study of Demirogly and James (2012) explains the mechanism of skin in the game and spread, it does not empirical prove that the 5 percent risk retention rate legislation could influence the spread directly. Moreover, Vink and Thibeault (2007) demonstrate empirically that the spread increased due to retained interest. Hence, there is contradiction in literature and so far not a single study describe how large the impact is of post-crisis regulations on the spread of any ABS. Besides risk retention, policymakers require originators and investors to perform proper due diligence to better understand the risks posed by the underlying asset pools. The objective of both regulations was to decrease the asymmetric information problem. However, can I therefore conclude that the ABS spread declined after the

implementation of post-crisis regulations since investors demand less yield due to a lower default risk?

I questioned whether this impact is significant in Europe because originators already retain most of the tranches on their balance sheet before the implementation of the regulations. Since originators in the US do not retain a portion of their loans in portfolio, I suggest that the impact of regulations, such as the risk retention legislation, has a larger impact in the US than in the EU. Interesting, is the difference between the impact on the EU and US market. Since the US market is larger but less liquid than the EU market the coefficient of regulations in the regression model will be different in both nations. Hence, because the EU market is more liquid and a large sum of issuance is retained, I can conclude theoretically, that the spread in the EU is lower than in the US. However, the risk retention regulation in the US will be effective as of December 24, 2016. Therefore, the empirical section will only focus on the EU ABS market.

To conclude, based on the literature, I assume that the risk retention regulation in the EU has only a small effect on the ABS spread since originators already retained a large proportion of the tranches on their balance sheet to signal quality to investors. The due diligence & disclosure should have a significant negative impact on the ABS spread because transactions are more transparent after the implementation. However, these conclusions are not substantiated by empirical research. To test these theoretical conclusions I will, in the next chapters, describe the methodology, statistics and the results.

4. Research question and hypotheses

In this Chapter, I will describe the research question and the several hypotheses that will be tested. All these questions are based on the literature. To better understand the potential relationships between several variables, I proposed a framework as shown in Figure (8). This framework will be elaborated below since it illustrates a comprehensive overview of the Literature Chapter and moreover, this figure clarifies the reason why this study includes particular hypotheses.

According to the literature, regulations could have a negative impact on the spread of ABSs since regulations mitigates the moral hazard problem. Hence, the objective of this paper is to answer empirically the main research question:

Research question: *Did the implementation of post-crisis regulations decrease the primary market spread of ABSs in the EU?*

This paper will tests two hypotheses to answer the research question. The goal is to obtain a comprehensive understanding of the several characteristics on the ABS spread. By using my theoretical framework as shown in Figure (8), I will answer the research question step by step.

Research question: *Did the implementation of new regulations decrease the asset-backed security spread in the primary market in the EU?*

Literature Framework

#	Literature	Hypotheses	Relationships; cause and effect
1	Relationship: **Consistency in literature** Diego Scopelliti (2014) • Period 2007 and 2010 (not ABSPP) • Aiyar et al. (2015)	**No hypothesis**	
2	Relationship: **Consistency in literature** **Negative correlation; "Skin in the game"** • Demirogly and James (2010) • Chemla and Hannessy (2011) • Ozerturk (2015)	**No hypothesis**	
3	Relationship: **Clear; consistency in literature** • Demiroglu and James (2012)	**No hypothesis**	
4	Relationship 2&4: **Inconsistency in literature** **Negative correlation** • Demirogly and James (2010) • Chemla and Hannessy (2011) & Ozerturk (2015) **Positive correlation** • Vink and Thibeault (2007)	**Hypothesis (1):** *Retained interest in has a negative significant impact on the primary market spread of EU asset-backed securities.*	
5	Relationship: **Clear; consistency in literature** • Duygan-Bump, B., Parkinson, P., Rosengren, E., Suarez, G. A., & Willen, P. (2013).	**No hypothesis**	
6 & 7	Relationship: **No scientific research available**	**Hypothesis (2):** *The primary market spread is significantly lower for regulated deals relative to unregulated deals in the EU for all asset- backed-securities.*	

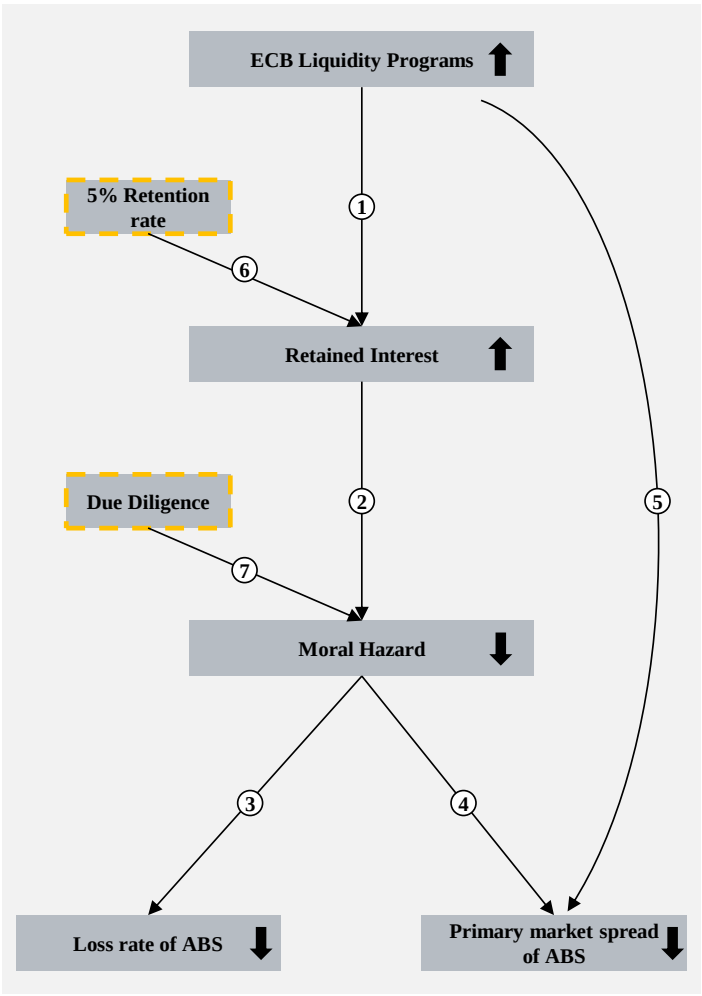

Figure (8) – Literature Framework

Figure (8) - First relationship

According to Diego Scopelliti (2015), one of the reasons for the retention behaviour during the crisis was due to the possibility of using securitisation products as collateral in the liquidity operations with central banks. As discussed in Section (3.1.1), the collateral framework defined by the ECB allowed for a set of eligible instruments, in particular for ABSs. A research conducted by the International Monetary Fund (2015) states that much of the issuance in Europe since the crisis has been retained by issuing banks for the primary purpose of using it as collateral with the ECB. Hence, European banks create internally-structured securitisations that can be used as collateral for liquidity generation via the ECB (OECF Journal, 2011 and IMF, 2015). The growing share of retained issuance shows the significant role the ECB is playing as liquidity provider to the European banking system. This is in line with other research such as Aiyar et al (2015) and Diego Scopelliti (2015). Since the literature is consistent about the positive relationship between liquidity programs and the level of retained interests, this study will not consider further examination.

Figure (8) - Second relationship

Retained issuance reduces the moral hazard problem as described in the Literature Chapter due to the mitigation of asymmetric information. One of the reasons is to preserve their reputation for credit quality. This could also be interpreted as the skin in the game mechanism; obtaining a higher credit rating for a securitisation deal in order to signal the quality of the underlying assets (Demiroglu & James, 2012; G. Gorton & Pennachi, 1990). Thus, when loan originators retain sufficient skin in the game they have incentives to carefully screen the asset that they originate with the intent to securitise as ABS (Demirogly & James, 2012). Because of the fact that sufficient literature demonstrate consistent results concerning the positive relationship between retained interest and moral hazard (Demirogly and James, 2010; Chemla and Hannessy, 2011; Ozerturk, 2015), this paper will not investigate this relationship further.

Figure (8) - Third relationship

According to Demirogly & James (2012) the default rate of ABSs decreases when the moral hazard problem mitigates. Specifically, they show that loss rates for affiliated deals are on average less than half the rates for unaffiliated deals. Affiliated deals, is defined when a single

originator also serves as ABS sponsor or servicer, in that way the originator retains both greater loss exposure than in unaffiliated deals. This clear scientific results is the reason for this study to not further investigate this relationship.

Figure (8) – Fourth relationship

Literature has emerged that offers contradictory findings about the connection between moral hazard and the spread of ABSs. To observe this correlation, this paper investigate the relationship between retained interest and the spread of ABS (link two and four). According to Demirogly, James (2010) and Chemla, Hannessy (2011) the two variables have a negative correlation while Vink and Thibeault (2007) demonstrated empirically that an increase in retained issuance will increase the spread due to an increase in risk. However, besides the contradiction, since theoretically the spread should decrease when risk is low, Hypothesis (1) is stated as follows:

Hypothesis (1): *Retained interest has a negative significant impact on the spread of EU ABSs.*

Figure (8) - Fifth relationship

Research demonstrated empirically that in both the US and EU special buy-up programmes of ABSs such as the AMLF and ABSP program decreased the spread of ABSs. Hence, due to the sufficient evidence regarding this relationship, this paper will not consider further examination.

Figure (8) - Sixth relationship

In this research one of the observed variables is the 5 percent retention rate legislation. So far no research is conducted on the relationship between the regulation and the ABS spread. I assume that the implementation of the 5 percent retention rate in the EU had a positive impact on the retained rate. Since originators are obliged to increase their retained proportion with 5 percent. Consequently, a higher retained proportion will mitigate the moral hazard problem due to the skin in the game mechanism. However, the relationship could be poor since EU originators already retained some of the asset due to other motivations (such as the ABSPP).

Figure (8) - Seventh relationship

Through disclosure and due diligence, asymmetries of information between seller and buyer may be better dealt. On the basis that price mechanism resolved opposed interest between sellers and buyers, the ABS spread could decrease through the mitigation of the moral hazard problem.

Both relationships six and seventh will be tested by incorporating two regulatory variables in the Vink and Thibeault (2007) multiple regression model. Specifically, the two observed regulatory variables are: 5 percent retention rate and due diligence & disclosure. As mentioned above, the objective of regulations is to decrease moral hazard. Consequently, the default rates declined due to the regulations as shown in Figure (8). Since the risk of default is lower, originators of ABSs could demand a lower spread. Hypothesis (2), is supported by Demiroglu & James (2012) and therefore phrased as:

Hypothesis (2): *The spread is significantly lower for regulated deals relative to unregulated deals in the EU for all ABSs.*

- **Hypothesis (A):** The 5 percent retention rate regulation decreased significantly the ABS spread in the EU.
- **Hypothesis (B):** The due diligence & disclosure regulation decreased significantly the ABS spread in the EU.
- **Hypothesis (C):** Both the 5 percent retention rate and due diligence & disclosure regulations decreased significantly the ABS spread in the EU.

There are a few stages as shown in Figure (6) and (7) before a regulation will be into force, namely; proposed, re-proposed, approved, published and finally, the effective date. This study will observe each event date and the impact on the spread. Interestingly, is on which date the impact on the spread will be most significant.

Conclusion

Based on the literature, this section observed and described a designed framework. Most relationships in this framework are significant and robust. However, inconsistent research have emerged about the effect of retained interest on spread. Accordingly, this paper will test Hypothesis (1). To answer the research question, this paper will examine one hypothesis, subordinated in A, B and C. The objective is to obtain empirical evidence concerning regulatory characteristics that may affect the ABS spread by analysing Hypotheses (2), (A) and (B). The conjunction of both favourable regulations will be tested by observing Hypotheses (C).

5. Methodology

This Chapter provides explanation of the model that will be used and the several calculations that will be made. In order to get a cohesive and detailed insight in the effect of several regulations on the spread of ABSs in the EU market, a multiple regression model is used. This chapter will describe the calculations and how both hypotheses are tested.

Multiple regression model

To test the hypotheses (1) and (2), this study will use the Vink and Thibeault (2007) regression model to determine the spread of ABSs. They demonstrated, empirically, the relationship between the nature of the assets and the spread. By doing so, they also provide predictions on how other pricing characteristics affect spread. Below the Vink & Thibeault (2007) multiple regression model:

$$\begin{aligned} SPREAD_i = {} & \beta_0 + \beta_1 CREDIT\ RATING_i + \beta_2 LOAN\ TO\ VALUE_i + \beta_3 TYPE\ ORIGINATOR_i \\ & + \beta_4 MATURITY_i + \beta_5 ENHANCEMENT_i + \beta_6 NATURE\ OF\ ASSETS \\ & + \beta_7 TIME\ OF\ ISSUE + \beta_8 LOAN\ SIZE_i + \beta_9 TRANSACTION\ SIZE_i \\ & + \beta_{10} \#\ TRANCHES_i + \beta_{11} TYPE\ MARKET + \beta_{12} \#\ LEAD\ MANAGERS_i \\ & + \beta_{13} \#\ RATING\ AGENCIES_i + \beta_{14} TAP_i + \beta_{15} RETAINED_i \\ & + \beta_{16} TYPE\ INTEREST_i + \beta_{17} COUNTRY\ ORIGIN_i + \beta_{18} CREDITOR\ RIGHTS_i \\ & + \beta_{19} ENFORCEMENT_i + \beta_{20} CURRENCY\ RISK_i \\ & + \mu_i \qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad Formula\ (1) \end{aligned}$$

The dependent variable is the SPREAD (primary market spread) represents the price for the risk taken on by the lender on the basis of information at the time of issue. According to Vink and Thibeault (2007) the control variables (the determinants of ABS) can be categorised with respect to three main groups of explanatory variables: default and recovery risk, expected marketability and systemic risk characteristic. Based on Vink & Thibeault (2007), this study will use to same categories, however three adjustments will be made to potentially enhance the quality of the model for this study and perhaps further research. The adjustment is based upon the literature.

The first adjustment is concerning insignificant variables in past research. As illustrated in Figure (2) a few variables in the Vink & Thibeault (2007) were insignificant and moreover, there

is no corresponding literature backing up the relationship between the variables and the spread. For the aforementioned reasons this study will exclude all insignificant variables in Formula (1). The second adjustment is the impact of ABSPP on the spread. Since the study of Vink & Thibeault (2007) is relatively out-dated, they could not investigate the relationship between the ABSSP and the spread. Accordingly, this study will include the ABSPP variable into the regression model, since past empirical literature has demonstrated that the ABSPP provides the securitisation market with more liquidity. The third adjustment is regarding the regulatory variables. To demonstrate the potential relationship between regulatory variables and the ABS spread, I will add two new variables to Formula (2). Therefore, the last category, 'regulatory characteristics', will be added in this study. Hence, the new (adjusted Vink & Thibeault (2007) model) multiple regression model that will be used is:

$$
\begin{aligned}
SPREAD_i = {} & \beta_0 + \beta_1 RETENTION_i + \beta_2 DUE\ DILIGENCE_i + \beta_3 CREDIT\ RATING_i \\
& + \beta_4 LOAN\ TO\ VALUE_i + \beta_5 TYPE\ ORIGINATOR_i + \beta_6 MATURITY_i \\
& + \beta_7 ENHANCEMENT_i + \beta_8 NATURE\ OF\ ASSETS + \beta_9 RETAINED_i \\
& + \beta_{10} LOAN\ SIZE + \beta_{11} TRANSACTION\ SIZE + \beta_{12} \#TRANCHES_i \\
& + \beta_{13} \#LEAD\ MANAGERS_i + \beta_{14} \#RATING\ AGENCIES_i + \beta_{15} PROSPECTUS \\
& + \beta_{16} COUNTRY\ ORIGIN_i + \beta_{17} ABSPP_i + \beta_{18} YEAR + \beta_{19} RET.APPROVED \\
& * DD\ EFFECTIVE + \beta_{20} DD\ AUTO * DD\ EFFECTIVE \\
& + \mu_i \qquad\qquad Formula\ (2)
\end{aligned}
$$

In conclusion, the SPREAD is the observed dependent variable, RETENTION and DUE DILIGENCE are the independent variables. In order to test the relationship of the dependent and independent variables, 16 control variables are included. All variables are described in Table (1). The definition of these variables will be discussed in the Descriptive Statistics Chapter.

Table (1)
Defining the variables used in this paper

This table provides a description of the main variable, including the control variables, used in this paper.

#	Variable	Type	Definition
	SPREAD	Continuous (time series)	Represents the price for the risk taken on by the lender of the basis of information at the time of issue.
	Regulatory characteristics (independent variables)		
1	RETENTION	Dummy	Is the EU 5 percent risk retention legislation and is defined in three variables as discussed below.
	RET.APPROVED	Dummy	Is the date of approval of the risk retention legislation; January 1, 2014.
	RET.PUBLISHED	Dummy	Is the publication date of the risk retention legislation; June 13, 2014.
	RET.EFFECTIVE	Dummy	Is the effective date of the risk retention legislation; July 3, 2014.
2	DUE DILIGENCE	Dummy	Is the general due diligence & disclosure legislation of the EC (under article 406 of the CRR).
	DD LOAN BY LOAN	Dummy	Due diligence - Loan by Loan information announcement on December 16, 2010.
	DD SME	Dummy	Due diligence - Publication SME and CMBS on April 2011.
	DD AUTO	Dummy	Due diligence - Publication Auto, consumer, finance, leasing ABS on May 2012.
	DD CREDIT CARD	Dummy	Due diligence - Publication Credit card receivables on September 2013.
	DD EFFECTIVE	Dummy	Due diligence - Effective date SME on March 1, 2013.
	Default and recovery risk characteristics (control variables)		
3	CREDIT RATING	Dummy	Captures the difference in both issuers´ creditworthiness and bonds´ seniority and reflects the likelihood of a borrower defaulting on a loan. Table (3) presents an overview of all credit rating dummy variables.
4	LOAN TO VALUE	Continuous	The ratio (in %) of the retained part divided by the total issue amount of the transaction.
5	TYPE ORIGINATOR	Dummy	Type of seller of the ABS. I use four types of originators: Lease, Bank, Finance house and other.
	LEASE	Dummy	Issues defined as financial leasing service company.
	BANK	Dummy	Issues originated by financial institutions that accept deposits.
	FINANCE HOUSE	Dummy	Issues of firms that granted loans to both individuals and corporations.
	OTHER	Dummy	Issues of other types than LEASE, BANK and FINANCE HOUSE.
6	MATURITY	Continuous	Is the date (defined in years) on which the life of an ABS ends.
	LOWMATURITY	Dummy	Securities maturing in 5 years.
	MIDMATURITY	Dummy	Securities maturing between 5 and 10 years.
	HIGHMATURITY	Dummy	Securities maturing above the 10 years.
7	ENHANCEMENT	Continuous	Overcollateralization ; where the nominal value of the assets in the pool is in excess of the nominal value of the security
8	NATURE OF ASSETS	Dummy	Is the underlying collateral of the security. I categorized six different types of asset: auto, lease, consumer, credit card, commercial and infrastructure ABS.
	AUTO	Dummy	Securities secured by automobile loans.
	LEASE	Dummy	Securities secured by lease loans.
	CONSUMER	Dummy	Unsecured loans granted to individuals and used for different purposes.
	CREDIT CARD	Dummy	Securities secured by credit card receivables.

#	Variable	Type	Definition
	COMMERCIAL	Dummy	Securities secured by commercial loans.
	INFRASTRUCTURE	Dummy	Securities secured by infrastructure leases, which are agreements between an owner (lessor) and a user (lessee), whereby the lessee makes a periodic payment to the lesser for the use of the product.
	Expected marketability characteristics (control variables)		
9	RETAINED	Dummy	Part of the ABS that is retained on the originators balance sheet. Value is in €m.
10	LOAN SIZE	Continuous	Is the face value of the loan tranche in €m.
11	TRANSACTION SIZE	Continuous	Is the total transaction value in €m.
12	#TRANCHES	Continuous	Is the total number of tranches in one transaction.
13	#LEAD MANAGERS	Continuous	Is the total number of financial institutions participating in the loan issuance management group.
14	#RATING AGENCIES	Continuous	Is the number of rating agencies involved in rating the issue.
15	PROSPECTUS	Dummy	Shows if the transaction disclosed a prospectus.
	Systemic risk characteristics (control variables)		
16	COUNTRY ORIGIN	Dummy	Shows in which country the ABS was issued. In this study, I observe 13 different countries. There are therefore 13 dummy variables (France, Austria, Sweden, Germany, Italy, Finland, Spain, Holland, Portugal, Switzerland, Norway, Greece and Poland).
17	ABSPP	Dummy	Is the start date of the ECB ABSPP; 22 October 2014.
18	YEAR	Dummy	Dummy variable for each year (2010 – 2015) to capture the bond market conditions and development.

Testing the hypotheses

The coefficients of this multiple regression model can be estimated by OLS (Stock & Watson, 2012). This study will use the F-test to show the significance of the model. If the Null Hypothesis is rejected, we can assume that at least some of the variables used in the regression have effects on the dependent variable that are not equal to zero. Testing will be done using SPSS (statistic software). Furthermore, the coefficients of the new regulatory variables will be tested for significance by performing the T-test on the coefficient.

Hypothesis (1), is about the relationship between retained interest and the ABS spread. Although the literature is inconsistent about the impact of retained interest on the spread, most recent research demonstrated that retained interest have a negative impact on the spread. As explained in the Literature Chapter, the risk for investors mitigates if the originator has skin in the game. Therefore Hypothesis (1) can be tested as follows:

$$H_0\colon \beta_9 = 0 \; vs.$$
$$H_1\colon \beta_9 < 0$$

The main research question of this thesis will be tested by Hypothesis (2). First Hypothesis (A), will test the relationship between the 5 percent risk retention rate legislation and the spread. According to the Literature Chapter, risk retention will decrease risk. Consequently, the spread will decrease as well since the risk is incorporated in the price. However, since EU originators already retain a large proportion of tranches on their balance sheet, the relationship is expected to be poor. Still, the legislation could provide a strong signal to the securitisation market and therefore the hypothesis states a negative relation between the spread and risk retention. I believe, based on the literature, that the due diligence legislation does have a strong negative relationship with the spread since originators are mandatory to provide investors with proper information. Therefore, Hypothesis (2, A, B) will be tested as follows:

$$H_0\colon \beta_1 = 0 \ {}^{and}\!/_{or} \ \beta_1 = 0 \ vs.$$
$$H_1\colon \beta_2 < 0 \ {}^{and}\!/_{or} \ \beta_2 < 0$$

Hypothesis (2, C) can be tested by observing the interaction terms:

$$H_0\colon \beta_{19} = 0 \ {}^{and}\!/_{or} \ \beta_{20} = 0 \ vs.$$
$$H_1\colon \beta_{19} < 0 \ {}^{and}\!/_{or} \ \beta_{20} < 0$$

In summary, this study categorised all variables in groups that are meaningful for the pricing of asset securitisation issues. For each group, a set of variables was chosen derived from existing theoretical and empirical evidence. The first three groups are based on the study of Vink and Thibeault (2007). Three adjustments were made. First of all, all insignificant variables in the Vink & Thibeault (2007) study were excluded. Secondly, the ABSPP variable was included. Thirdly, the last group, 'regulatory characteristics', was added in this study. The research question will be tested and answered with Hypothesis (2) in three steps. First I determine the impact on the spread of an ABS caused by the risk retention legislation after controlling for other pricing characteristics. Second, I wish to provide empirical evidence on the relationship between due diligence and the spread of the EU ABS market. The conjunction of both regulations will be tested by observing Hypotheses (C). To assure and verify the quality of the methodology, this

study conducts several robustness tests. Below in Section (5.1) these robustness tests are described.

5.1 Statistical validity

This Section will describe the process of verifying the regression model. In addition, in order to confirm the finding, this study will conduct a number of robustness checks. According to Stock & Watson (2012) there are four least squares assumptions in the multiple regression model:

1. The conditional distribution of U_i given $X_{1i}, X_{2i}, \dots, X_{ki}$ has a mean of zero
2. $(X_{1i}, X_{2i}, \dots, X_{ki}, Y_i), i = 1, \dots, n,$ are independently and identically distributed
3. Large outliers are unlikely
4. No multicollinearity

When the four least assumptions are satisfied, the OLS estimators are unbiased, consistent, and normally distributed in large samples. The estimators are consistent and normally distributed when *n* is large. To tests these assumptions, four statistical validity checks will be performed and described in this study (homoscedasticity, adjusted R Square, multicollinearity and autocorrelation).

Homoscedasticity

The error term U_i is homoscedastic if the variance of the conditional distribution of U_i given X_i is constant for $i = 1, \dots, n$ and in particular does not depend on X_i. Otherwise, the error term is heteroskedastic.

Measure of Fit in multiple regression – the adjusted $\overline{R}^2$

This study will use the R-squared. As there are more than one dependent variables, the fit of the model is determined by the $\overline{R}^2$ (Adjusted R Square). By using the $\overline{R}^2$, we can test the fitness of the model as it present a suitable explanation of the changes in the independent variables and shows that there could be a strong association between variables.

Multicollinearity

Multicollinearity is about the linear relation of the explanatory variables. If there is close linear relation between two or more of these variables, estimation results are less precise. An indication for the linear relation of two explanatory variables is the correlation (Stock and Watson, 2012). This study will observe the correlations between the variables and multicollinearity might be an issue if there are large correlations. In this study several dummy variables are included such as, credit rating, asset classes, country origin and maturity. Several categories will be omitted to avoid collinearity. Another method is investigating the Variance Inflation Factor (VIF). VIF above ten shows that the model could suffer from multicollinearity.

Autocorrelation

By applying the Durbin-Watson test one can test if the independent variables are autocorrelated; if X_{it} is correlated with X_{is} for different value of s and t. The Null Hypothesis of the Durbin Watson test is that there is no autocorrelation, the alternative hypothesis is that there is a degree of first-order correlation.

6. Data

This section describes what data will be used in order to do the required estimations and how this data is obtained.

This study will only focus on the primary market spread. Secondary spread which are typically derived from pricing matrices are difficult to obtain (Vink and Fabozzi, 2009). The primary market spread is a more accurate measure not only for the risk premium demanded by investors but also of the actual cost. Furthermore, only EU ABS transactions are of interest since all EU legislation (risk retention and due diligence) is fully adopted. This is in contrast with the US were the risk retention policy will be effective per December 24, 2016.

The database is obtained from Concept ABS, an online database and market news service company. Concept ABS includes all publicly offered deals since January 2003. The database comprises primary market details and is dedicated to EU ABS and contains different types of ABS, MBOs and CDOs. Since this study observes only ABSs, only the following asset types were included: Auto, Consumer, Credit Card, Lease, Commercial and Infrastructure ABS. To test the validity of the data, some transactions were checked with the published prospectus. Of each transaction, all tranche-level data is available. Thus, detailed quantitative data is available per tranche such as, spread, credit rating, loan to value, size, maturity, currency, nature of the asset, time of issue, number of lead managers, type of yield and country origin. Importantly, the data includes if the tranche was marketed or retained. Marketed securities are publicly traded and sold to third-party investors. These securities are not privately placed or issuer/arranger retained or re-issues or re-securitisations. Furthermore, all non-EU countries were excluded from the database.

Based on the detailed description of the originator, the type of originator was added manually to the database. After carefully screening, the originators were allocated into four categories: LEASE, BANK, FINANCE HOUSE and OTHERS. The Descriptive Statistics Chapter will define each type extensively. Secondly, the transaction size of each tranche is denoted in local currency (such as GBP, SEK, CHF, NOK and DKK). In Excel, the loan size data was converted (with respect to the correct exchange rate on that specific date) into the Euro currency. The two regulatory variables (due diligence and risk retention) were added manually into the database.

To summarise, this study will focus on the primary market transactions for EU ABSs. The data was obtained from Concept ABS and was transferred to Excel. Excel was used to verify and adjust data if necessary. Only data in the observed period was included (2010 to 2015) and transactions originated in non-EU countries were deleted. The type of originator and the regulatory variables were added manually and each transaction size was converted to Euro. SPSS was used to assess the econometric relationship between the ABS spread and regulations.

7. Descriptive statistics

In this Chapter I will discuss all 19 variables (including 1 dependent, 2 independent and 16 control variables) and describe, based on the literature, what the expected coefficients will be. Secondly, I will summarise and analyse the database by observing the mean, median, standard deviation, min, max and number of observations of each variable as shown in Table (2). Thirdly, I will study the relationship between the variables in the database. The objective of this Chapter is to obtain a comprehensive understanding of the database. In order to analyse the data, this Chapter will first describe how I cleaned the database. I will continue with describing the statistics of the dependent variable (SPREAD), independent variables (RENTENTION and DUE DILIGENCE) and control variables. As explained in the Methodology Chapter, the control variables are allocated into three buckets; default and recovery risk characteristics (CREDIT RATING, LOAN TO VALUE, TYPE OF ORIGINATOR, MATURITY, ENHANCEMENT and NATURE OF ASSETS), expected marketability characteristics of the loan (RETAINED, LOAN SIZE, TRANSACTION SIZE, #TRANCHES, #LEAD MANAGER, #RATING AGENCIE and PROSPECTUS) and systematic risk characteristic (COUNTRY ORIGIN, ABSPP and YEAR).

Cleaning of the database

The total database consists of 1,141 transactions of ABSs, MBSs and CDOs over the period 14th January, 2010 till 10th November, 2015. Since this paper observes only ABSs, I excluded all MBSs and CDOs out of the database. Although Concept ABS focusses on EU transactions, some non-European transactions were also included. Therefore, I removed all non-Europe transactions out of the database (such as China, Singapore and Australia). The sub-sample dataset (below denoted as database), without MBSs, CDOs and non-European transactions, consist of 349 transactions with 971 tranches.

Table (2)
Summary of statistics

This table provides a statistical overview of all the variables, including the control variables, used in this paper. Altough the database only includes 349 transactions, all variables is based on tranche level data.

Variable	N	Mean	Median	Std.Dev.	Mode	Max	Min
# Transactions	349						
# Tranches	971						
Dependent variable							
Fixed and floating spread (bps)	738	156	110	159	150	2.000	0
Floating spread (bps)	572	124	95	102	150	1.000	0
Maturity =<5 years (bps / floating)	472	120	91	100	70	1.000	0
Maturity >5 years (bps / floating)	26	171	145	125	300	590	10
Default and recovery risk							
Credit rating class (1-21 weak)	698	3,5	1,0	3,2	1,0	19,0	1,0
Not rated	273						
Total	971						
Loan to value (%)	349	40%	20%	42%	100%	100%	0%
Type originator	349						
Bank	106						
Lease	116						
Finance house	103						
Other	24						
Maturity (years)	702	3,4	2,9	2,8	3,0	33,0	0,5
Low maturity =<5 years (years)	638	2,8	2,6	1,1	3,0	5,0	0,5
Mid maturity >5 and <10 years (years)	54	7,6	6,9	2,4	6,4	15,0	5,2
High maturity >5 years (years)	10	20,2	20,0	4,9	20,0	33,0	15,7
Loans with credit enhancement	785	16%	13%	13%	1%	58%	0%
Asset type per transaction	349						
Auto ABS	192						
Consumer ABS	28						
Credit Card ABS	57						
Lease ABS	45						
Commercial ABS	10						
Infrastructure ABS	17						

Table (2) - Continued

Variable	N	Mean	Median	Std.Dev.	Mode	Max	Min
Marketability characteristic							
Retained (Euro millions)	543	290	85	502	917	3.503	0
Loan tranche size (Euro millions)	961	307	132	425	500	3.503	0
Transaction size (Euro millions)	349	855	686	777	800	5.832	0
Number of tranches	971	3	3	1	2	16	1
Number of lead managers	349	2,0	2,0	1,1	1,0	7,0	1,0
Number of credit agencies	349	2,1	2,0	0,5	2,0	4,0	1,0
Prospectus	920						
Systemic risk characteristics							
Countries per transaction	346						
France	39						
Austria	2						
UK	73						
Sweden	4						
Belgium	2						
Germany	106						
Italy	51						
Finland	4						
Spain	25						
Holland	8						
Portugal	11						
Ireland	0						
Switzerland	7						
Norway	8						
Greece	1						
Poland	2						
Scotland	1						
Slovakia	1						
Denmark	1						
ABSPP - 22 Oct. 2014	213						
Time of issue per tranche							
2010	91						
2011	160						
2012	159						
2013	211						
2014	178						
2015	172						

Dependent variable: the primary market spread

The number of observations with respect to the SPREAD in my database is 738. This is not equal to the number of tranches due to missing values in the database. The average spread is 156 bps with a standard deviation of 110 bps. The standard deviation is high since the spread reflects all securities of different maturities. Moreover, the sample includes fixed rates. Therefore, fixed interest rates are filtered out since the floating rate is the spread over a particular benchmark. The fixed rates do not show the particular benchmark and therefore it is not possible to calculate the spread. The average floating spread is 124 bps and the standard deviation is 102 bps. In addition, I divided the database into low maturity (<5 years) and high maturity (>5 years). The database consist primarily of low maturity transactions (n = 472). The average spread of the low maturity (120 bps) is seemingly lower than the high maturity (171 bps). Which is in line with the literature since investors demand compensation for the illiquidity nature of long term maturity securities. Moreover, the standard deviation of low maturity (100 bps) is lower than the high maturity (125 bps), which is argumentative since the maturity range of high maturity transactions is larger than low maturity transactions. However, the maximum observed low maturity spread (1000 bps) is almost double of the maximum high maturity spread (590 bps). There could be many reasons for this such as time of issue and credit rating. Figure (9) shows the development of the spread over the observed 5-year period. As explained in the literature, both credit rating and maturity have a large impact on the spread. Therefore, Figure (9) illustrates only low maturity, high credit rating

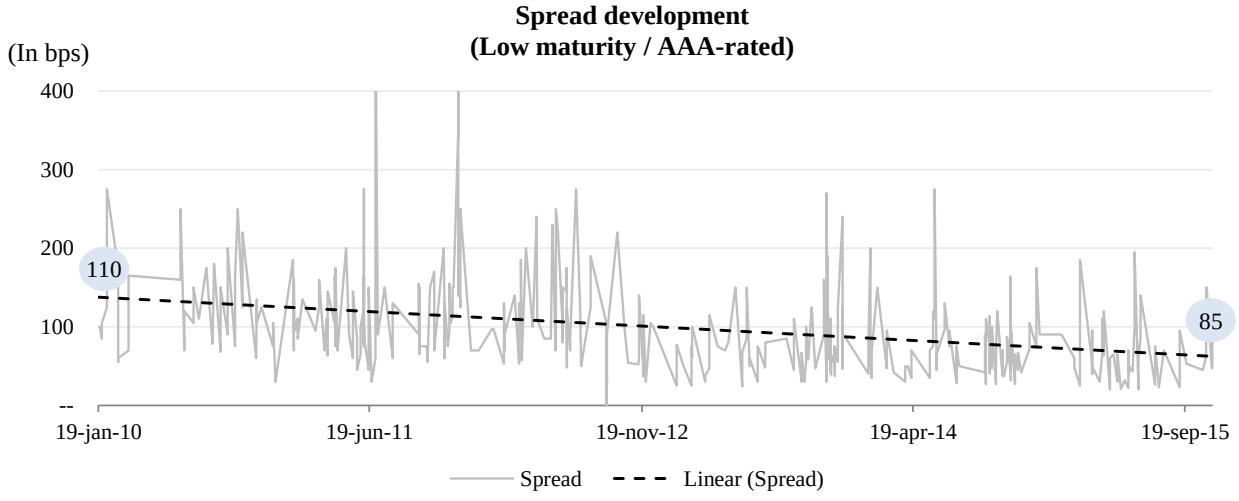

Figure (9) – Spread development (in bps). The observed period is: 2010 – 2015. The graph shows only the spread of AAA-rated ABSs with a maturity of <5 years.

securities. I cannot conclude any statistical significant relationship so far, however, on average the spread seems to be declining over the years.

Independent variables: regulatory characteristic

As explained the regression model in this paper is based on the Vink & Thibeault (2007) study. The two independent variables described in this section are the one of interest and will extend the Vink & Thibeault (2007) regression model.

The variable, RETENTION, is defined as the EU 5 percent risk retention rate legislation and is a dummy variable, whereas value 1 denotes the time after the date of adoption of the legislation. This study observes three different dates: the approved date (January 1, 2014), published date (June 13, 2014) and effective date (July 3, 2014). As shown in Figure (10) a large proportion of the total ABS value was already retained throughout the last 5 year. Still, I believe that, based on the literature, the legislation will provide the market with more transparency, and moreover, mitigates risks. Expected is that the approved and published date will not have a robust relationship with the spread since the policy was not fully implemented and not mandatory for originator to hold 5 percent retention rate of the transaction on their balance sheet. However, the effective date should have a negative significant coefficient.

DUE DILIGENCE is the general due diligence & disclosure legislation of the EC. Under this article (406 of the CRR) originators are required to present information to investors. Furthermore, the ECB announced on December 16, 2010, the requirement of loan-by-loan information for ABS in the EU. This study will use multiple dummy variables with different dates for different asset types. A summary of the implementation timeframes template introduced by the ECB and EC is set out on Figure (6) and (7). Both policies are intended to increase transparency and contribute to more informed risk assessments of an ABS. Since the objective is to mitigate asymmetric information and therefore risks, originator demand a lower spread. Thus, expected is that the coefficient is significant negative.

Control variables: default and recovery risk characteristics

This Section will describe the following control variables: CREDIT RATING, LOAN TO VALUE, TYPE ORIGINATOR, MATURITY, ENHANCEMENT and NATURE OF ASSET.

These variables are focused on the default and recovery risk characteristics of an ABS transaction.

CREDIT RATING is defined as an evaluation of the likelihood of a borrower defaulting on a loan. In this database the number of credit rating classes is 698. Hence, 273 tranches are not rated. Credit rating of the three agencies is converted to a comparable scale as shown in Table (2). Hence, "CREDIT RATING" are dummy variables, whereas number 21 is an extremely low credit grade (equivalent to Standards & Poor's D). However, the lowest credit rating observation is 19. The average credit rating class is 3.5 (standard deviation of 3.2) and de median is 1. As shown in Table (3), this median is equal to the highest rating of all three agencies. According to Vink & Thibeault (2007), lower spreads are associated with higher bond rating. This is in line with other research Megginson (2001), Lymch and Puri (2003) and Gabbi and Sironi (2005). Hence, I expect a negative significant coefficient for value 1 till 4 and a positive significant coefficient for value 11 till 16. Somewhere between the values 4 and 11, the coefficient will change from negative to positive.

Table (3)
Credit rating scale

Table (3) represents the converted CREDIT RATING dummy variable in column (1).

Value	Moody´s	Standard & Poor's	Fitch
1	Aaa	AAA	AAA
2	Aa1	AA+	AA+
3	Aa2	AA	AA
4	Aa3	AA-	AA-
5	A1	A+	A+
6	A2	A	A
7	A3	A-	A-
8	Baa1	BBB+	BBB+
9	Baa2	BBB	BBB
10	Baa3	BBB-	BBB-
11	Ba1	BB+	BB+
12	Ba2	BB	BB
13	Ba3	BB-	BB-
14	B1	B+	B+
15	B2	B	B
16	B3	B-	B-
17	Caa1	CCC+	CCC+
18	Caa2	CCC+	CCC+

19	Caa3	CCC-	CCC-
20	-	CC	CC
21	-	D	D

The variable LOAN TO VALUE is defined as the ratio (in percentages) of the retained part divided by the total issue amount of the transaction. The average loan to value is 40 percent and the standard deviation is 42 percent. Interestingly, the average loan to value in 2010 was 70 percent, while in 2015 it was 44 percent. Some transactions have a loan to value ratio of 100 percent, which means that all tranches of that particular issue were retained. As explained in the literature the motivation of some originators to retain all of the tranches is to create an eligible transaction for the ECB ABSPP. A higher loan to value, means lower risk for the investor since there is a higher buffer when the bond is into default. This risk mitigation is incorporated into the ABS spread and is therefore expected to be lower. Thus, a negative significant coefficient is expected.

TYPE ORIGINATOR is the type of seller of the assets which comprise the collateral for the security. In this database four types of originators are individually assigned in each transaction. Hence, the number of originators is the same as the number of transactions (n = 349). The four dummy variables are: LEASE, BANK, FINANCE HOUSE and OTHER. LEASE is defined as financial leasing services. BANK are financial institutions that accept deposits and use their funds principally to purchase financial assets such as loans and securities. FINANCE HOUSE includes issues of firms that granted loans to both individuals and corporations. OTHER are energy or construction companies. A major part of the originators are lease companies for example UniCredit Leasing. UniCredit Leasing, an Italian based company, offers the opportunity for companies and individuals to acquire, through lease financing, a wide range of products such as equipment and cars. UniCredit issued on the 9th of November, 2015. According to the prospectus of the deal, the notes are backed by a portfolio of motor vehicle and equipment lease receivables. Hence, in the database this transaction is denoted as a lease ABS. The number of originators per type is shown in Table (4). According to Vink & Thibeault, financial institutions have more experience and are stronger than corporates. In line with this argument, I expect that the variables BANK and FINANCE HOUSE do have a negative significant coefficient. Furthermore, expected is that LEASE and OTHER have therefore a poor relationship with the ABS spread.

Table (4)
Asset securitisation issues by class categorized by type of originator

This table gives an overview of the ABS market in the EU. Specifically, the matrix consists of ABS from January 1, 2010 until December 31, 2015. Total amount of 349, is the total number of transactions in this period.

Row Labels	Bank	Finance house	Lease	Other	Grand Total
Auto ABS	20	71	100	1	**192**
Commercial ABS	3			7	**10**
Consumer ABS	32	23	1	1	**57**
Credit Card ABS	38	7			**45**
Infrastructure ABS	1		1	15	**17**
Lease ABS	12	2	14		**28**
Grand Total	**106**	**103**	**116**	**24**	**349**

MATURITY is defined in years and affects the bond's default risk premium (Vink & Thibeault, 2007). Although the database is very extensive and detailed, some variables such as maturity do have missing values. Maturity accounts for 702 values out of 971 tranches. The average maturity of the total database is 3.4 years. However, I divided the database in low maturity data (<5 years), mid maturity (between 5 and 10 years) and high maturity data (>10 years). Hence, three dummy variables were constructed: LOW MATURITY is 1 if the issue matures between 0 and 5 years, MID MATURITY are transactions with a maturity between the 5 and 10 years, and HIGH MATURITY is 1 if the loan matures after 10 years. The number of low maturity observations is 638 (high maturity is 64). The average low maturity transactions is 2.8 (high maturity is 9.6) and the minimum data point is 0.5 year (maximum is 33 years). The literature is consistent about maturity's impact on loan pricing; since borrowers may face costly liquidation at maturity, there is a strong positive relationship (Vink & Thibeault, 2007). Hence, I expect that both the low and high maturity coefficient is significant positive.

ENHANCEMENT is the process of overcollateralization. This is the technique of enhancing the quality of the transaction, where the nominal value of the assets in the pool is in excess of the nominal value of the security. In the database credit enhancement is denoted as a percentage. For each asset class, the originator evaluates the trade-off between the cost of enhancement versus the reduction of the spread required to sell the security (Fabozzi and Roever, 2003). Therefore, a negative coefficient is expected. One reason for an insignificant relationship is that the enhancement is already embedded in the credit rating.

The model also includes the NATURE OF ASSET, which is the last default and recovery risk characteristic in this study. This control variable is defined as the underlying collateral of the security. The database consist mostly of auto ABS (n = 192). The least type of ABS is the infrastructure ABS (n = 17), as shown in the Table (4). One example of an infrastructure ABS type in the database is the security originated by UK based Heathrow Airport in February, 2015 (total value of €750m). The primary purpose of this security was to raise funding from external sources. In this particular case the collateral is the aircraft. According to Vink & Thibeault (2007), securitisation may lead to inefficient hold-ups if the firm cannot easily replace the underlying asset by resorting to outside markets. Therefore, I expect a lower spread for securities backed by assets that can be easily replaced (auto and credit card asset) relative to ones with assets that cannot easily be obtained (infrastructure and commercial ABS).

Control variables: the expected marketability characteristics of the loan

The second set of control variables are reflecting the expected marketability of the security. In this section I will discuss the following variables: RETAINED, LOAN SIZE, TRANSACTION SIZE, #TRANCHES, #LEAD MANAGERS, #RATING AGENCIES and PROSPECTUS.

In this database, RETAINED is a dummy variable. Hence, if RETAINED equals 1, the tranche is retained on the balance sheet. This part (also called equity), will absorbs the first losses on the whole loan. In total, 543 tranches were retained over the past 5 years. The average amount of retained issuance is €290m. Interestingly, as shown in Figure (10) the cumulative retained proportion over the years declined rapidly relatively to the marketed share. In 2010, 70 percent of the total EU ABS were retained while in 2015 this proportion was only 44 percent. A reason could be that investors demand less skin in the game since post-crisis due diligence regulations caused more transparent transactions. Therefore, the asymmetric information problem is declined and there is no need for retention. Another argument could be that the bond market recovered as a whole after the crisis. Either way, since skin in the game declines the moral hazard problem and decrease default losses, I assume that the relationship between retained and spread is significantly negative.

LOAN SIZE is the face value of the loan tranche. The average tranche size is €307m and the maximum size is €3,503m. According to Vink and Thibeault (2007) the ABS liquidity will be improved by a higher transaction issue. Moreover, a larger issue is associated with less uncertainty. Thus, a negative coefficient of loan size is expected.

TRANSACTION SIZE is the total transaction issue. The average transaction size in this database is €855m. The larges transaction is €5,832m which was issued in 2011 by an Italian bank (Intesa Sanpaolo). Again, there is a positive relationship between the size of the entire issue and

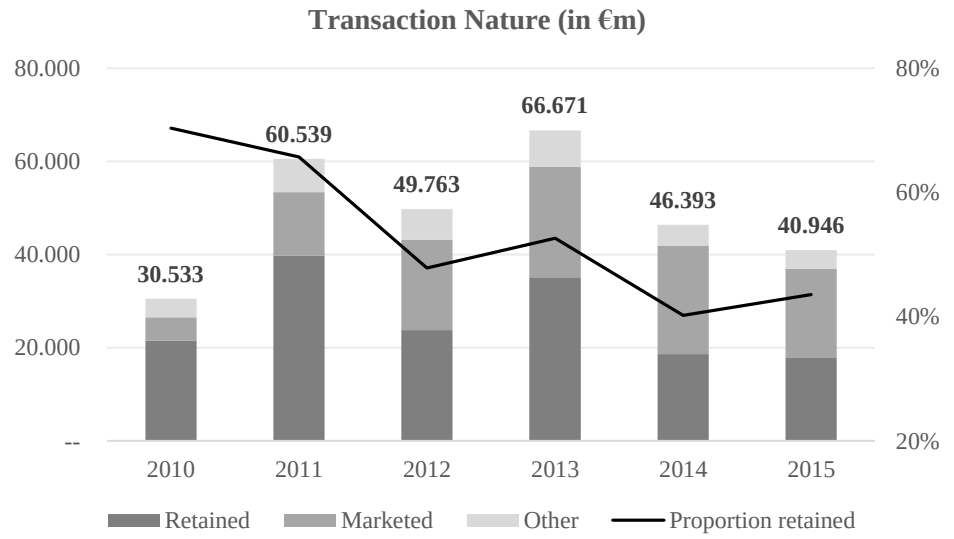

Figure (10) – Transaction nature in €m.

market liquidity. Firla-Cuchra (2005) found, after controlling for credit rating, a significant and negative relationship between the transaction size and spread. In line with this result, I expect a negative relationship between the transaction size and spread.

#TRANCHES is included to analyse the impact of tranching on the spread. The database contains of 349 transactions. Each transaction consist of a number of tranches. In total the number of tranches are 971 with an average of 3 per transaction. Firla-Cuchra and Jenkinson (2006) argue that the main motivation for tranching are market factors such as greater investor sophistication. They found a significant negative relationship between the spread and the number of tranches. Hence, I will therefore expect a negative coefficient of the number of tranches.

The control variable #LEAD MANAGERS, represents the number of financial institutions participating in the issuance of the loan. Each transaction is represented by at least one lead manager (n = 349).The average amount of lead manager per transaction is 2.0. Firla-Cuchra (2005) argue that a larger syndicate transaction is able to achieve a better result or lower

spread. In line with this motivation, the coefficient of this variable is expected to be significant negative.

#RATING AGENCIES represents the number of rating agencies per transaction. All transactions were rated by at least one agency (Moody's, Fitch, Standards and Poor's and others). The average amount of agencies per transaction is 2.1. According to Vink & Thibeault (2007), these credit rating agencies suffer from conflict of interest since they are paid by the originators they are supposed to rate objectively. Therefore, a larger number of credit rating agencies will increase a more accurate rating and reducing the potential conflict of interest. Thus, a negative significant coefficient is expected.

The last variable in this category is PROSPECTUS. If the originator disclosed a prospectus prior to the completion of the transaction this dummy variable is equal to one and zero otherwise.

Control variables: systemic risk characteristics

The country in which the assets are originated, is represented by COUNTRY ORIGIN. The database includes 19 EU countries. Therefore, the model includes 19 dummy variables, so if the ABS is issued in Italy, the variable ITALY is equal to 1. The top 10 number of issues per country are shown in Figure (11). The most transactions were issued in Germany (total of 106) and the least in Greece. As explained above, market conditions such as liquidity will decrease the ABS spread. Therefore, I expect that the coefficient of Germany, UK and Italy are significant negative. However, since the European financial market is highly integrated, I foresee that the relationship is not very strong.

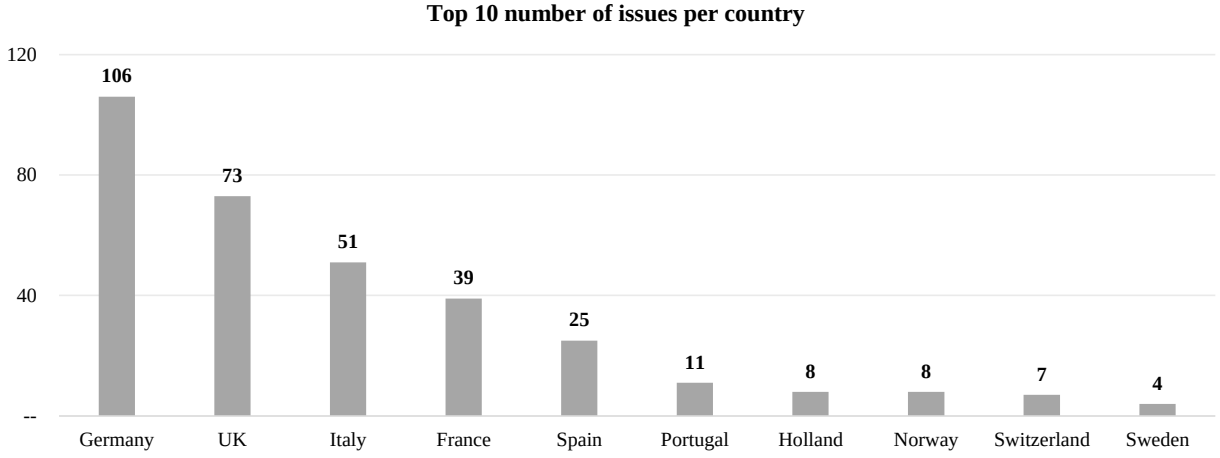

Figure (11) – Top 10 number of issues per country.

In addition to the Vink & Thibeault (2007) model, I add the ABSPP dummy variable to know if the ECB ABSPP had any impact on the spread. In this study ABSPP denotes 1 if the transaction was issued after 22 October 2014. This date reflects the first purchase of covered bonds by the ECB.

Next to COUNTRY ORIGIN and ABSPP, the model also includes the year when the transaction was issued. The dummy variable YEAR should capture the variations in the ABS market conditions. The database includes securities issued over the period 2010 – 2015. YEAR 2010: value is 1 if ABS transaction was issued in 2010, zero if not. For each year a dummy variable is include, thus the YEAR variable consists of 5 dummy variable. Due to an increase in liquidity and market recovery, I expect that the more recent years have a negative impact on the ABS spread. Thus, a narrowing of the spread over time.

8. Results

This Chapter will interpret and summarise the findings. Everything in this Chapter is based on the results of the data analysis. Hence, the result is directly related to the obtained data that was collected and analysed. This Chapter is organised as follows. Firstly, the Discussion Section (8.1) will discuss the results of the ordinary-least squares ("OLS") model. Secondly, I will test the validity of the model by observing the fit, model significance, degree of multicollinearity, autocorrelation and heteroscedasticity (Section 8.2). In addition, I will examine the robustness of the model in Section (8.3). Lastly, I will discuss the limitations of this empirical study and suggestions for further research, in Section (8.4) and (8.5), respectively.

8.1 Discussion

The objective of this Section is to test the validity of the economic theory discussed in the Literature Chapter by answering the general question; what are the determinants of the ABS spread? This Chapter will described the coefficients of each independent and control variables and the relationship with the dependent variable. I will start with the independent variables. Importantly, this section will also discuss if the coefficients are significant with respect to the three alpha (denoted α) levels (1%, 5% or 10%). For this Section, all regressors and coefficients are summarised in Table (5), column (1). As described in the Descriptive Statistics Chapter the variables are categorised in four groups (one category for the independent variables and three categories for the control variables. This Section will use the same structure, accordingly.

Table (5)

Ordinary least squares regression analyses of asset-backed securities

*This table presents the results of all the regressions. The dependent variable in all regressions is "SPREAD", which represents the primary market spread of ABSs in Europe. The spread is the premium above the benchmark. The method of estimation is an OLS multiple regression analysis. All the variables used are described in Table (1). The table shows the unstandardized coefficient and t-statistic. Significance levels: *** for 1%, ** for 5%, and * for 10%.*

Variable	OLS (1)	Finance houses (2)	Lease (3)	Bank (4)	Low maturity (5)	Auto ABS (6)	Consumer ABS (7)	Credit ABS (8)	2010 - 2013 (9)	Germany (10)	UK (11)	Year (12)	Interaction (13)
CONSTANT	187,18***	22,70	197,97***	205,00**	175,68***	204,71***	61,88	156,90***	124,31**	285,71***	132,48***	178,02***	187,18***
	5,69	,19	5,33	2,48	5,83	4,97	,54	8,69	2,43	6,26	6,73	5,33	5,69
DD LOAN BY LOAN	-4,41	-31,48	-2,25	11,60	-6,97	-1,73	-	31,33***	-2,73	16,77	19,42	-	-4,41
	-,32	-,65	-,14	,41	-,52	-,10	-	3,05	-,20	1,00	1,48	-	-,32
DD SME	-1,19	43,79	,38	-5,79	-2,47	9,97	-59,80	-14,01**	-1,46	-1,17	-4,79	-	-1,19
	-,10	1,14	,03	-,28	-,21	,69	-1,24	-2,16	-,12	-,07	-,62	-	-,10
DD AUTO	-26,06**	-48,76	-28,22**	-32,98*	-22,65**	-31,80**	33,88	-	-31,41***	-47,12***	-30,14***	-39,80***	-26,07**
	-2,50	-1,64	-2,00	-1,84	-2,22	-2,45	,80	-	-2,92	-3,38	-3,49	-2,67	-2,50
DD CREDIT CARD	13,17	-	-1,52	-8,63	12,73	-11,74	-51,21	-	9,21	-7,91	9,15	-	13,17
	1,01	-	-,08	-,44	1,00	-,71	-1,12	-	,68	-,50	,88	-	1,01
DD EFFECTIVE	-28,02**	-11,94	-34,75**	-	-29,37**	-22,50	-	-	-21,06*	-,37	-13,47	-	-
	-2,23	-,45	-2,22	-	-2,40	-1,50	-	-	-1,67	-,03	-1,32	-	-
RET.APPROVED	-21,04*	2,90	-5,39	-30,37	-17,93	-,07	-	-25,70***	-	1,67	-4,76	-20,73	-
	-1,88	,11	-,34	-1,36	-1,64	,00	-	-3,72	-	,11	-,52	-1,16	-
CR= 1-2	-84,47***	-	-82,86***	-44,93**	-84,25***	-96,66***	-89,30*	-98,80***	-69,33***	-144,93***	-71,03***	-83,56***	-84,47***
	-9,37	-	-6,48	-2,27	-9,29	-5,83	-2,05	-12,93	-5,65	-9,15	-9,58	-9,20	-9,37
CR= 3-4	-23,55**	-12,08	-46,88***	-11,45	-23,92**	-40,33***	-16,26	-38,11***	-9,09	-63,37***	-10,92	-21,37**	-23,55**
	-2,18	-,48	-3,60	-,47	-2,23	-3,10	-,46	-3,72	-,58	-4,68	-1,14	-1,98	-2,18
CR= 7-8	100,13***	-	-	121,98***	-	-9,10	251,60***	29,72	161,13***	-	-1,95	102,76***	100,13***
	2,78	-	-	2,79	-	-,13	3,55	1,52	3,47	-	-,07	2,86	2,78
CR= 9-10	59,26***	56,47	101,07***	27,50	66,67***	123,62***	-14,37	72,98***	43,84*	199,14***	106,17***	62,93***	59,26***
	3,39	1,44	3,90	,80	3,76	2,99	-,28	6,97	1,94	4,98	8,47	3,59	3,39
CR= 11-12	167,21***	166,90***	182,89***	75,49	185,18***	175,72***	55,01	181,88***	114,81**	-	220,83***	169,51***	167,21***
	6,98	4,28	3,92	1,13	7,21	4,28	,70	16,57	2,57	-	15,26	7,07	6,98
CR=15-16	294,58***	272,10***	-	-	300,48***	-	-	285,99***	-	-	327,11***	296,66***	294,58***
	8,82	5,82	-	-	9,20	-	-	24,95	-	-	22,11	8,88	8,82
LOAN TO VALUE	-,19*	-,09	-,03	,01	-,19*	-,23	-	-,13	-,29**	-,20	,13	-,21**	-,20*
	-1,71	-,26	-,20	,04	-1,72	-1,51	-	-1,31	-2,18	-1,19	1,19	1,83	-1,71
FINANCE HOUSE	-10,26	-	-	-	-7,02	-4,61	-	13,30	-24,78**	29,72***	-11,19	-9,67	-10,26
	-1,25	-	-	-	-,89	-,49	-	1,18	-2,48	2,71	-1,59	-1,18	-1,25

Variable	OLS (1)	Finance houses (2)	Lease (3)	Bank (4)	Low maturity (5)	Auto ABS (6)	Consumer ABS (7)	Credit ABS (8)	2010 - 2013 (9)	Germany (10)	UK (11)	Year (12)	Interaction (13)
BANK	-23,34**	-	-	-	-17,61*	-10,13	8,17	-	-18,89*	3,45	7,04	-23,01	-23,34**
	-2,24	-	-	-	-1,86	-,75	,28	-	-1,69	,17	,80	-2,19	-2,24
MATURITY	7,76***	19,23**	19,59***	-	8,46***	7,22	-	4,71**	9,84***	9,27	5,76**	7,97***	7,76***
	2,67	2,15	3,66	-	2,85	1,44	-	2,50	2,71	1,51	2,50	2,73	2,67
MID MATURITY	-48,97**	-22,79	-34,38	-19,10	-	-26,24	-2,74	-67,63***	-79,37**	-	-12,09	-50,20**	-48,97**
	-2,38	-,31	-,69	-,83	-	-,65	-,07	-3,95	-2,58	-	-,67	-2,46	-2,38
HIGH MATURITY	-173,52***	-	-	-81,53**	-	-	99,46	-	-213,04***	-	-229,84***	-173,98***	-173,52***
	-3,30	-	-	-2,22	-	-	1,39	-	-3,47	-	-6,24	-3,31	-3,3
ENHANCEMENT	,57*	-1,06	,87**	-1,42*	,71**	1,36***	-,24	1,30***	,62	,08	1,97***	,54	,57*
	1,70	-1,08	2,28	-1,80	2,19	2,80	-,18	3,82	1,50	,16	5,60	1,63	1,70
LEASE	21,21	-	2,77	18,28	22,11	-	-	-	18,79	32,45	33,01	21,51	21,22
	1,56	-	,16	,70	1,62	-	-	-	1,15	1,26	2,37	1,60	1,57
CONSUMER	55,03***	24,74	-	49,32*	48,71***	-	-	-	65,60***	-	-	55,69***	55,03***
	4,47	,74	-	1,93	3,93	-	-	-	4,17	-	-	4,56	4,47
CERDIT CARD	13,63	25,04	-	-27,95	12,74	-	-	-	-7,79	-	-3,71	13,15	13,63
	1,23	,66	-	-1,56	1,22	-	-	-	-,53	-	-,54	1,18	1,23
COMMERCIAL	110,00***	-	-	45,15	111,75***	-	-	-	135,43***	-	-	109,69***	110,00***
	4,65	-	-	1,17	4,98	-	-	-	5,04	-	-	4,60	4,65
RETAINED	16,27*	35,14	15,28	-18,05	16,70**	22,60**	-	-2,16	35,34***	2,05	-3,97	16,53*	16,27*
	1,93	,95	1,61	-,93	2,03	2,08	-	-,42	3,24	,21	-,61	1,94	1,93
LOAN SIZE	,04***	-,02	,03**	,01	,03***	,04**	,02	,00	,01	,10***	,01	,04***	,04***
	3,29	-,41	2,21	,29	2,79	2,03	,99	-,69	,61	5,59	,44	3,41	3,29
TRANSACTION SIZE	-,02***	-,01	-,03***	,00	-,02***	-,02**	-	,00	-,01	-,08***	-,01	-,02***	-,02***
	-3,78	-,34	-3,49	-,34	-3,11	-2,16	-	,30	-1,10	-6,56	-1,48	-3,83	-3,78
#TRANCHES	12,80***	22,19**	10,41**	2,73	12,09***	8,38**	31,76*	-	8,87**	35,10***	5,42*	12,77***	12,80***
	4,69	2,25	2,43	,39	4,46	2,05	2,04	-	2,41	6,27	1,85	4,68	4,69
#LEAD MANAGERS	-7,48**	-6,87	-7,29**	-4,10	-7,08**	-8,11**	25,95	-1,10	-10,00**	-16,56***	-,52	-7,41**	-7,48
	-2,15	-,59	-2,09	-,40	-2,19	-2,11	1,45	-,33	-2,46	-3,32	-,16	-2,11	-2,15
#RATING AGENCIES	-3,88	-4,48	-2,11	8,49	-2,14	-8,80	49,28	-13,58**	-3,33	-14,71*	-21,45***	-3,37	-3,88
	-,57	-,17	-,25	,52	-,32	-1,04	1,14	-2,64	-,41	-1,89	-4,03	-,50	-,57
ABSPP	-12,69	-	,84	-	-15,81*	-10,33	-102,17***	5,57	-	-8,99	10,21	-19,95	-12,69
	-1,32	-	,04	-	-1,66	-,80	-3,30	,78	-	-,65	1,28	-1,31	-1,32
PROSPECTUS	-34,49	12,97	-72,92***	-24,03	-34,62*	-46,14	-46,59	-	13,89	-111,95***	-	-35,18*	-34,49
	-1,62	,23	-2,79	-,39	-1,67	-1,60	-,81	-	,31	-3,71	-	-1,66	-1,62
FRANCE	-1,56	3,38	-,87	21,38	,81	,59	-2,18	-33,49***	12,85	-	-	-1,91	-1,56
	-,13	,13	-,04	,97	,08	,05	-,05	-3,56	,88	-	-	-,16	-,13

Variable	OLS (1)	Finance houses (2)	Lease (3)	Bank (4)	Low maturity (5)	Auto ABS (6)	Consumer ABS (7)	Credit ABS (8)	2010 - 2013 (9)	Germany (10)	UK (11)	Year (12)	Interaction (13)
AUSTRIA	-40,49	-	-50,63*	-	-38,77	-26,80	-	-	-5,34	-	-	-36,61	-40,49
	-1,45	-	-1,90	-	-1,48	-,77	-	-	-,16	-	-	-1,34	-1,46
SWEDEN	98,22***	24,75	-	178,90***	79,61***	-16,71	175,75***	-	94,48***	-	-	98,67***	98,22***
	4,21	,36	-	4,60	3,35	-,41	3,58	-	3,59	-	-	4,23	4,21
GERMANY	-5,40	-	-	-	-	-	-	-		-	-	-6,16	-5,41
	-,54	-	-	-	-	-	-	-		-	-	-,62	-,54
ITALY	-17,23	19,68	-7,95	5,22	-17,38	10,30	-	-	-9,83	-	-	-16,03	-17,23
	-1,25	,54	-,50	,13	-1,38	,58	-	-	-,49	-	-	-1,16	-1,25
FINLAND	33,48*	11,11	-	-	35,09*	40,18*	-	-	-3,89	-	-	30,93	33,48*
	1,69	,34	-	-	1,87	1,88	-	-	-,12	-	-	1,56	1,69
SPAIN	-22,92	-39,67	65,94***	-27,48	-6,44	-20,04	35,78	-	-17,69	-	-	-21,82	-22,92
	-1,49	-,95	2,91	-,85	-,44	-1,00	,75	-	-1,09	-	-	-1,41	-1,49
HOLLAND	-23,15	56,96	-43,03**	52,33	-19,69	-33,94**	10,36	-	-19,87	-	-	-21,39	-23,16
	-1,48	,97	-2,49	1,41	-1,37	-1,84	,29	-	-1,09	-	-	-1,36	-1,48
PORTUGAL	19,04	-	-	62,18*	7,91	88,31	8,92	-	20,95	-	-	21,39	19,04
	,80	-	-	1,84	,33	1,56	,20	-	,79	-	-	,90	,80
SWITZERLAND	-1,94	-	-	39,84	-,12	-	-	52,22***	61,94	-	-	-2,16	-1,95
	-,04	-	-	,57	,00	-	-	4,24	1,03	-	-	-,05	-,04
NORWAY	-6,59	,16	-	83,60*	-4,88	-1,99	-	-	7,28	-	-	-4,09	-6,59
	-,42	,01	-	1,69	-,34	-,11	-	-	,39	-	-	-,27	-,42
GREECE	-118,20**	-	-	-19,19	-120,58**	-	-	-93,02***	-106,30*	-	-	-115,65**	-118,20**
	-2,08	-	-	-,27	-2,17	-	-	-3,97	-1,79	-	-	-2,04	-2,08
POLAND	-25,22	41,69	-	-	-25,91	-41,60	-	-	-	-	-	-24,67	-25,22
	-,62	,67	-	-	-,66	-,97	-	-	-	-	-	-,61	-,62
2010	-	-	-	-	-	-	-	-	-	-	-	5,37	-
	-	-	-	-	-	-	-	-	-	-	-	,53	-
2011	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-
2012	-	-	-	-	-	-	-	-	-	-	-	15,30	-
	-	-	-	-	-	-	-	-	-	-	-	1,13	-
2013	-	-	-	-	-	-	-	-	-	-	-	-5,61	-
	-	-	-	-	-	-	-	-	-	-	-	-,33	-
2014	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-
2015	-	-	-	-	-	-	-	-	-	-	-	9,14	-
	-	-	-	-	-	-	-	-	-	-	-	,62	-
RET.APPROVED*DD EFFECTIVE	-	-	-	-	-	-	-	-	-	-	-	-	-21,04* -1.88

Variable	OLS (1)	Finance houses (2)	Lease (3)	Bank (4)	Low maturity (5)	Auto ABS (6)	Consumer ABS (7)	Credit ABS (8)	2010 - 2013 (9)	Germany (10)	UK (11)	Year (12)	Interaction (13)
DD AUTO*DD EFFECTIVE	-	-	-	-	-	-	-	-	-	-	-	-	-28,02**
	-	-	-	-	-	-	-	-	-	-	-	-	-2,23
Adjusted R square	,626	,558	,690	,677	,621	,501	,676	,981	,589	,797	,930	,627	,626
F-statistic	18,30	5,83	15,51	8,21	18,91	9,15	4,59	165,85	12,12	25,01	67,76	18,33	18,30

Several dummy variables were excluded to avoid collinearity: CR=5-6, CR=13-14, OTHER, LEASE, LOW MATUIRTY, AUTO, INFRASTRUCTURE, RET.PUBLISHED, RET.EFFECTIVE, UK, BELGIUM, IRELAND, SCOTLAND, SLOVAKIA, DENMARK.

Independent variables: regulatory characteristics

This section will describe the two independent variables which are denoted as regulatory characteristics. To obtain an understanding of when the adoption of both regulations had an impact on the ABS spread, I included several dummy variables. The dummy variables reflect the time of implementation and the status of the regulation as shown in Figure (6) and (7). First of all, RETENTION has a somewhat poor relationship with the spread. On average, the spread decreased with 21 bps after approving the legislation on 1 January, 2014. This negative relationship was expected. Moreover, even the poor quality of the coefficient (α = 10%) was expected since most originators already retain a large portion of tranches on their balance sheet as shown in Figure (10).

Two dates regarding the implementation of the due diligence regulation show a negative strong significant relationship with the spread. First of all, the publication date (May 2012) for due diligence concerning auto, consumer, finance and lease ABSs decreased the spread on average with 26 bps. Secondly, the effective date (March 2013) for mandatory publication of information during an ABS transaction for SME (small medium enterprises) had an even higher negative coefficient (28 bps) on the ABS spread. All other dates such as the announcement of the Loan by Loan information and several other effective dates do not have a significant impact on the spread and are therefore not meaningful to discuss.

Control variables: default and recovery risk characteristics

Here I will analyse the default and recovery risk characteristics of the model. First of all CREDIT RATING. In the OLS multiple regression model column (1), almost all CREDIT RATING dummies are significant different at the α = 1% level. As expected, lower spreads are associated with higher bond ratings. This is in line with the literature.

I proposed a negative relation between the dummy variable LOAN TO VALUE and the spread. As shown in column (1), this expectation is correct. However the coefficient is very poor (α = 10%). Still this indicates that a higher loan to value mitigates the risks associated with default. Consequently, this variable decreased on average the ABS spread.

Four different dummy variables were incorporated in the model concerning TYPE OF ORIGINATOR (dummies LEASE and OTHER were excluded to avoid collinearity). In line with expectations, financial institutions (dummies BANK and FINANCE HOUSE), have more

experience with originating ABSs. Therefore, the spread is relatively lower for transactions issued by these institutions. Although, the variable BANK does have a significant (α = 5%) relationship with the spread, FINANCE HOUSE is insignificant. The variable MATURITY is positive statistical significant (α = 1%), and shows that, on average one year increase in maturity increase the spread with 7.8 bps. Hence, with respect to illiquidity, investors demand a higher return for higher maturity. Surprisingly, the HIGH MATURITY dummy has a lower coefficient than the MID MATURITY dummy. Normally, there is an upward trend of the yield curve. A negative yield curve could indicate that demand for long-term maturities increased. In contradiction with the literature, the variable CREDIT ENHANCEMENT has a positive relationship with the spread. This means that a higher credit enhancement increases spread. One explanation for this effect could be that originators incorporate the cost of enhancement in the price. However, the relationship is very poor (α = 10%).

Vink & Thibeault (2007) find a significant positive effect of consumer loans and negative coefficients of securities backed by credit cards on the ABS spread. The theory behind this is that the risk is lower for ABSs with an easily replaced asset. In this study, I found that both CONSUMER and COMMERCIAL coefficients are positive significant. Investors demand, on average, a premium of almost 110 bps concerning commercial ABSs. Although CREDIT CARD has a much lower premium, the coefficient is not significant. Hence, these findings are relatively comparable with the Vink & Thibeault (2007) model.

Control variables: the expected marketability characteristics of the loan

This section will elaborate on the results of the expected marketability characteristics of the loan.

RETAINED shows a positive significance effect on the ABS spread. This finding is in line with the study of Vink & Thibeault (2007). They argue that a positive coefficient indicates that the issue retained by the originator is related to an increase in risk. The investor demands therefore a higher yield. Nevertheless, this is in contradiction with my own expectation.

Both dummy variable, LOAN SIZE and TRANSACTION SIZE, are significant different from zero. However, there is a surprisingly contradiction since LOAN SIZE has a positive significant value while TRANSACTION SIZE has a negative coefficient. As explained in the Descriptive Statistics Chapter, I expected that both variable have a negative coefficient since they provide more liquidity. According to DeMarzo and Duffie (1990), illiquidity depends also

on the sensitivity to the issuer's private information. However, this does not explain the contradiction between the two coefficients. Another reason could be that most large loan sizes were retained by the originator. Since the RETAINED coefficient is marginally positive, this could explain why the LOAN SIZE coefficient is also positive.

Controlling for other pricing characteristics, the dummy variable # TRANCHES is positive significant. This indicates that the number of tranches could increase the ABS spread. This is in conflict with my expectations. Be that as it may, one reason could be that more tranches are associated with more subordinated tranches which have typically a higher spread than senior tranches.

The number of lead managers (# LEAD MANAGERS) on an ABS transaction has a negative significant coefficient; on average per extra lead manager the spread decreased, ceteris paribus, with 7.48 bps. This result is in line with the theory. # RATING AGENCIES shows no significant relationship with the ABS spread. However, previous research did not find any significant values as well.

ABSPP has a negative impact on the spread since the ECB program provides the ABS market with liquidity. However, the relationship is surprisingly not significant. The reason for this could be that only a particular set of ABS is eligible for the ECB to buy. The eligibility criteria is extensive and to obtain a stronger relationship with the ABSPP and the spread, I could adjust the data in such a way to only select, for example, high quality ABS. Therefore, the robustness tests section will discuss the ABSPP variable further in different analyses.

The dummy variable PROSPECTUS is, as expected, significant negative. This illustrates that transparency of a transaction will increase if the originator discloses information. Therefore, investors accept less spread since the risk of default declines. Unfortunately, the relationship is very poor between the two variables.

Control variables: expected systematic risk characteristics

This section discuss the COUNTRY ORIGIN dummy variables which is categorised in the expected systematic risk characteristics of the spread. Only the dummy variable SWEDEN, FINLAND and GREECE show significant variables. Surprisingly, transactions issued in Greece seems to decrease the spread. However, the number of transactions in Greece is small in this

database so this result is ambiguous. The variable SWEDEN shows the highest unstandardized coefficient, with almost an increase of 100 bps on an average transaction.

Conclusion

Table (5) presents the results of my empirical study. To ensure the validity of the relationship between regulation and the spread, I control for other characteristics that potentially impact the spread of ABS. These characteristics are organised in four groups. Overall, most coefficients have a significant impact on the spread and the results are relatively comparable with the finding of the Vink & Thibeault (2007) study. The default and recovery risk characteristics shows the strongest relationship with the spread, such as the credit rating and maturity. Hence, as expected, the spread is not only dependent on these variables. The marketability characteristics of the transaction have also a strong impact on the ABS spread. However, LOAN SIZE and TRANSACTION SIZE shows contradictory results. Concerning systematic characteristics, only some countries show significant impact on the spread. Surprisingly, transactions originated in Greece have a lower spread than other countries. Both regulatory variables have a negative effect on the ABS spread. The latter, is an important result for this research and will be discussed further in the Conclusion Chapter.

8.2 Statistical validity of the model

In this section I discuss the statistical validity of the model in terms of fit, model significance, degree of multicollinearity and autocorrelation. Moreover, I will observe if the model predictions are more volatile in particular time-windows. In other words, is there heteroskedasticity related to the ABS spread?

Fit

81.4 percent of the variance is explained by the model (R square = .663). As there are more than 1 dependent variables, the fit of the model is determined by the Adjusted R Square (Adj. R Square = .626). The model therefore has good fit as it presents a suitable explanation of the changes in the dependent variable and shows that here is a strong association between variables.

Model significance

The F-test shows that the model is significant; the Null Hypothesis stating that all the coefficients are equal to zero is rejected (P=.000, F=18.304). This indicates that at least some of the variables used in this model have effects on the dependent variable (spread) that are not equal to zero.

Degree of multicollinearity

Several variables were excluded to avoid collinearity. To check for multicollinarity between the variables the variance inflation factor ("VIF") was used. For all the variables the value of the VIF was below 10. Furthermore, I checked the correlation between each variable (independent and control) and the dependent variable. I found that most predicted variable have correlation with the outcome. The correlation between the variable are also correlated but not higher than .70, which shows that this model did not suffer from multicollinearity.

Autocorrelation

The Durbin-Watson test is used to test for serial correlation. The Null Hypothesis of the Durbin Watson test is that here is no autocorrelation. The first-order correlation is the alternative hypothesis. This case refers to a situation where an observation is affected by the one immediately before. The Durbin-Watson statistic value is 1.655 and since this value is close to zero, I can reject the Null Hypothesis, since there is no evidence of first-order positive autocorrelation. This means that the spread on a particular day is not correlated with the spread of the day before.

Assumptions

As discussed in the Statistical Validity Section (5.1), I will check the regression for four statistical assumptions such as the normal distribution, heteroscedasticity and outliers. In other words, the normal distribution of the error term should have a mean of zero and large outliers are unlikely.

The first assumption was tested by observing the normal probability plot in SPSS (P-P plot). All the dots are reasonably close to the best fit. The normal distribution of the residuals is also shown in the histogram plot. Moreover, when observing the scatterplot of the variables, I

can conclude that there is a rectangular distribution, with most of the dots clustered in the centre. There is no clear systematic pattern to the dots, hence this regression does not violate the first assumption. In addition, I can conclude that, after visual inspection of the scatterplot, no heteroscedasticity occurs in this analysis. Outliers can also be detected from the scatterplot. Typically, outliers are defined in cases where the standardised residual lies between the 0.3 and -0.3. There are only a few outliers visual on the scatterplot, so no need for adjustments. Moreover, I examined the unusual cases in the database to observe the Casewise Diagnostic. There are only three cases with high residual values. To check if these cases have an oversized influence on the results of the regression, I observed the Cook's distance. Since the Cook's distance is far below 1 (.289), I can conclude that these cases does not influence the results.

Conclusion

The adjusted R square tells us if the regressors are good at predicting the values of the dependent variable. However, in this study the main goal is to determine if the regulatory predictors are statistically significant and not how precise the model is. Nevertheless, the adjusted R square has a good value of .626. The F-statistics shows that at least one of the coefficient is statistical different from zero. The model does not suffer from multicollinearity, autocorrelation and after visually inspect the scatterplot, no heteroscedasticity occurs. The four least squares assumptions has been tested such as, the error term has conditional mean of zero, the regressors are independently and identically distributed, and large outliers are unlikely.

8.3 Robustness checks

In this Section, I analyse the variations of the specifications reported in column (2) – (11). The objective is to ensure that the results as presented in Section (8.1) are robust by observing whether similar results are obtained with several model specification issues. First, the regressions (column (2) – (4)) based on type of originator will be discussed. Second, I will focus on transaction with maturities lower than 5 years (column (5)). Third, I will discuss regressions with securities backed by different types of assets (column (6) – (8)). Fourth, this paper ensures the robustness of the results for different time periods by observing column (9). Last, column (10) – (11) shows the regressions of countries, Germany and the UK. Primarily, the focus of the robustness tests are on the regulatory variables.

Column (2) – (4): Type of originator

Overall, most credit ratings variables show significant levels at all different originators. However, regression (2), Finance house, is a poor regression with many insignificant coefficients. ENHANCEMENT is somewhat significant negative concerning bank transactions. This is in line with the literature. The dummy variable PROSPECTUS is significant (α = 1%) negative for transactions originated by lease companies. The regulatory variables show consistent results with the first regression. RISK RETENTION has a negative coefficient for both LEASE and BANK regressions, however the significance level is very poor. DUE DILIGENCE is significant negative for both LEASE and BANK. When observing the country dummy variables, I can conclude that for lease originators, transaction issued in the Netherlands and Austria had a negative impact on the spread.

Column (5); Low maturity

Regression (5) shows on average similar results with the first OLS regression. PROSPECTUS has again a negative coefficient, but is only marginally significant. Both regulatory variables have a negative impact on the spread. However, RISK RETENTION shows again an insignificant coefficient. The coefficient of the ABSPP variable is significant negative.

Column (6) – (8); Asset type

Column (6) – (8) test the implications of different types of assets on the spread. Comparing the results of each asset type with the general first regression, the same conclusions can be drawn. However, regression (7) is not a good regression since most coefficient are insignificant. I would like to emphasize that the dummy variable DUE DILLIGENCE is significant negative for AUTO ABS. Interestingly, for consumer ABS the ABSPP coefficient is significant and decreased the spread on average with, 102 bps. Further, for AUTO ABS a negative coefficient is shown for transactions issued in the Netherlands. In France and Greece spreads were on average lower for credit ABSs.

Column (9); Time period

The results over the period 2010 – 2013 shows similar results in comparison to the first regression. However, transactions originated by finance houses have a negative relationship with

the spread over that specific period. The variable DUE DILIGENCE is again significant, which shows the consistency of this variable over the number of observed regression so far.

Column (10) – (11); Country origin

Column (10) and (11) are focussed on transactions issued in Germany and the UK. Both regressions show consistent results. In both countries the spread decreased after implementation of the due diligence legislation. Hence, both DUE DILIGENCE coefficients are significantly negative. For regression (10) GERMANY, the PROSPECTUS dummy variable is significant negative ($\alpha = 1\%$). In other words, on average the spread in Germany decreased when originators disclose additional information.

Column (12); Year

Column (12) includes several time dummy variables to understand the bond market development over the 2010 – 2015 period. Thus, each dummy variable refers to the year in which an ABS is launched. According to Standard & Poor's (2006), securitisation is a fast growing sector of capital markets around the world. So, an increase in marketability over time would increase issues' liquidity and would imply a narrowing of spreads over time. The outcome of the regressions could also potentially have an impact on the independent variables since the spread could have changed due to bond market developments instead of the observed regulatory variables. Hence, the outcome of regression (12) is important for the conclusion in this paper. However, no time dummy variables are significant and therefore I cannot conclude, based in these dummy variables, that marketability of ABS increased over time. Moreover, the regulatory variable DD Auto is still significantly negative.

Column (13); Interaction

The last Column of the regression output shows the results of regression (13). This regression includes two interaction terms. The two variables are the RET.APPROVED*DD EFFECTIVE and DD AUTO*DD EFFECTIVE. Since both coefficient are significantly negative, I can conclude that the independent variables interact which each other. Hence, the effect of one of the variables differs depending on the level of the other variable. The combination of due diligence and the 5 percent risk retention rate particularly have an effect on the ABS spread. Hence, the

interaction shows that the effect of due diligence on the ABS spread is greater if the 5 percent risk retention rate is also in place. Next, if there is more regulation focused on the disclosure of information the ABS spread will decrease further.

Conclusion

As robustness check, I performed ten OLS regressions for the ABS spread. The regressions are based on asset type, type of originator, maturity, time period and country origin. Most default and recovery risk & marketability characteristics are significant for all regressions. The highest coefficient for most regressions is dummy variable CR=15-16, which reflects the poor credit rating. On average this variable increased the spread with almost 300 bps. Dummy variable CR=1-2 decreased the ABS spread with almost 106 bps on all regressions. Further, for some regressions, ABSPP and PROSPECTUS show significant values as well. The regulatory variables are similar to the results presented in Section (8.1). Thus I conclude that, due diligence legislation had a negative impact on the ABS spread. The last regression shows that the effect of due diligence regulation on the ABS spread is greater if the 5 percent risk retention rate is implemented.

8.4 Testing the hypotheses

After discussing all the results thoroughly, this section will answer the hypotheses formulated in Chapter (4). The main research question in this study will be answered in the Conclusion Chapter (11). First, I will discuss Hypothesis (1):

Hypothesis (1): *Retained interest has a negative significant impact on the spread of EU ABSs.*

I reject the hypothesis since the RETAINED coefficient has a positive significant (α = 10%) effect. Therefore, I conclude that the retained interest has a positive impact on the spread of EU ABSs. The positive coefficient indicate that the issue retained by the originator is related to an increase in risk.

Let me emphasize again that the retained interest is a different variable than the 5 percent risk retention rate. The 5 percent risk retention rate is the date of the legislation while the retained interest variable is the actual proportion of the amount hold on the balance sheet by the

originator. Moreover, before the 5 percent risk legislation the amount of retained interest was already substantial. Below, I will discuss both legislations which is included in the Hypothesis (2). However, before answering Hypothesis (2), I will first zoom in on each three sub-hypothesis:

Hypothesis (A): *The 5 percent retention rate regulation decreased significantly the ABS spread in the EU.*

With a significance level of $\alpha = 10\%$, I can conclude that the 5 percent retention rate regulation did decrease the EU ABS spread. However, only the approval date of the regulation had a significant effect on the spread. Thus, the date of the actual requirement of holding 5 percent on the balance sheet did not had a significant effect on the ABS spread. Therefore, I assume that the 5 percent retention rate regulation is more likely a signal to investors. This may be observed by analyst and investors as an important trust signal to recover the ABS market –after the crisis- with compelling regulation. In addition, this also explains the contradiction between the answers of Hypothesis (1) and Hypothesis (A).

Hypothesis (B): The due diligence & disclosure regulation decreased significantly the ABS spread in the EU.

With $\alpha = 5\%$ significance, I can conclude that the due diligence & disclosure regulation decreased the ABS spread in the EU. Of all the different types of due diligence regulation on the ABS market observed in this paper, only two dates had a significant effect on the ABS spread. First of all the publication date of the regulation of auto, consumer, finance and leasing ABS on the 1st of May, 2012. Secondly, the effective date of the regulation of due diligence on ABS for SME originators on the 1st of March, 2013 regulations decreased the ABS spread after the date.

Hypothesis (C): Both the 5 percent retention rate and due diligence & disclosure regulations decreased significantly the ABS spread in the EU.

Regression (13) includes two interaction terms to understand the relationship among the variables in the model and to test Hypothesis (C). Both interaction terms have the theoretical reasons to expect a significant effect on the dependent variable. The first regression term is the multiplication between variables RET.APPROVED and DD EFFECTIVE. The coefficient is negative and statistically significant, therefore I can accept the hypothesis that implementing both regulation leads to a lower spread. Specifically, I expect a decrease of 21.04 bps in the spread after the implementation of both policies, all else equal. The second interaction terms underlines this conclusion since the coefficient of DD AUTO and DD EFFECTIVE is also significantly positive. In this case, after both due diligence regulations the spread decreased with 28.02 bps, all else equal.

Hypothesis (2): *The spread is significantly lower for regulated deals relative to unregulated deals in the EU for all ABSs.*

After answering all three sub-hypotheses with regards to Hypothesis (2), I can now answer Hypothesis (2) as well. Based on the statistical conclusions of the Hypothesis (A), (B) and (C), I can significantly accept Hypothesis (2) since deals which are subject to regulation have a lower spread than unregulated deals (all else equal).

Conclusion

Section (8.3) provides the reader with specific and direct answers to the main hypotheses formulated in Chapter (4). First of all, if a part of the security is retained the spread is on average higher to compensate the originator for the increased risks. Secondly, both the 5 percent risk retention rate and due diligence (regulation focused on auto, consumer, finance, SME and leasing ABS) individually have, on average, a negative effect on the ABS spread. Thirdly, the interaction term shows that the effect of due diligence on the ABS spread is greater if the 5 percent risk retention rate is also in place. To conclude, on average, the spread is significantly lower for regulated deals relative to unregulated deals in the EU for all ABSs, all else equal.

9. Limitations

This Chapter will discuss the limitations of this thesis and the importance of these limitations. Moreover, I will suggest ways how to combat these limitation in future research.

Firstly, the development of the spread over time could be effected by market liquidity or other bond market conditions. When adding these time series data, one could obtain a better view on the effect of these variables on the ABS spread. Importantly, the main question is if the effect of the regulatory variables (retention rate and due diligence) change when we add these time series data into the model. This could lead to a different outcome that described in this paper. However, the regression model in this study did incorporate the time of the issuance to capture the variation in the bond market conditions. Still, it would increase the quality of this paper to extract the time series data such as market liquidity in the EU from Bloomberg and include these variable in the database. Secondly, to enhance the models goodness of fit (improve the adjusted R^2), one could add a numerous of omitted variables such as macro-economic variables into the model such as currency risk or interest rate risk. However, for this research only the relationship between regulatory variables and the ABS spread is of interest. Moreover, most of these risks are already reflected in the credit rating of an ABS.

Lastly, there are some limitations concerning the database. The database is limited to non-US ABSs and dated after 1998. In addition, this paper excluded MBS and CDO in the database, while post-crisis regulation could affect these securities as well. Unfortunately, some data misses several key variables such as the spread. Hence, a more comprehensive database with a higher amount of observation could have an impact on the quality of this paper. Further, by increasing the time horizon with several years, one could obtain more data and perhaps better results.

Conclusions

There are several limitations in this paper. First, although this study did include the year in which an ABS is launched, it would still be interesting to include other variables which reflect bond market conditions. This could have an impact on the results. Further, the model could be improved by adding other variables and the quality of the dataset could be enhance when adding other types of ABS or increasing the time horizon. Lastly, to increase the time horizon in this study could have increased the quality of this research.

10. Recommendations for further research

The goal of this Chapter is to discuss potential types of further research suggestions in the field of this thesis. The impact of regulations on ABSs is an interesting topic, since this research concludes that regulations does have a significant effect on the ABS spread. Hence, further research could build on these findings and examine this theory in a new environment (time or market conditions). Below, I will elaborate further on this item more specifically.

As explained in Chapter (3.2) the ABS regulations is continuously changing; reforming existing rules in a uniform way to all securitisations and for all types of regulated investors. New ABS regulations is already in the pipeline and this could have a significant effect on the ABS spread. It would be interesting what the effect is of new regulations on the ABS spread. Will the spread decrease further? Or did the current effective regulations already decreased the asymmetric information problem substantially that it would not make any different. In the end, researches could calculate via my regression model how much regulation would be sufficient to minimise the asymmetric information problem for ABSs by observing the ABS spread. This could be done by adding new regulatory variables into the model and calculating the significance level of the coefficients. In addition to regulations, observing the spread of other (new) types of ABS could also be interested. In this research MBO, CLO and CDO where ignored while there are several regulations focussed on particular these securities. Hence, one could include these securities in the database and add the dummy variable into the model to observe what the effect is of regulations on these securities and compare the results with my thesis.

Another recommendation for further research is to compare global ABS economies with each other. As already pointed out in Section (3.2.3) the US ABS market differs on several areas greatly from the EU ABS market. First of all, originators in the EU already retained a large proportion of their tranches on their balance sheet during the crisis. As explained the reason for this was due to the possibility of using securitisation products as collateral for liquidity programmes of central banks. This study assumes, based on the literature, that there is poor relationship between the 5 percent retention rate and the retained interest variable in the EU. However, in the US the crisis determined the collapse of securitisation market so there could be a correlation between 5 percent retention rate and retained interest in the US. To conclude, I expect

a stronger relationship between the 5 percent retention rate and retained interest for ABSs in the US than in the EU. An interesting hypothesis is therefore:
The 5 percent retention rate has a higher impact on the spread in the US than in the EU.

The new draft regulation features some crucial differences from the existing regulatory framework. However, it also includes a potentially more significant change to the requirements for due diligence to be carried out by originators, sponsors and original lenders (Warbey, Goldfinch, & Graham, 2015).

Conclusion

There are several areas to extend this research further. Most research can build on my framework to add more variables into the model, such as (new) regulatory variables. ABS regulation is continuously changing and is therefore always interested for researches (or policymakers) to observe the effects of these regulations. Second, this study could be tested in new economic environments. Interestingly, could the impact of regulations be stronger in a regression? Or examine the theoretical model in another economic market such as the US and compare the results with other ABS markets. According to Chen, 2014, the US market differs greatly from the European market in size, liquidity and the proportion of retained interest. This raises the question of which securitisation market, US or EU, perceived the most severe consequences of regulations (such as the 5 percent retained interest policy) in the post-crisis period? Observing both coefficients of the regulatory variables could answer the above stated questions. Lastly, one could expanding the dataset to add more (new) ABSs and compare the results with every type of ABS. To summarise, further research could observe new regulations, several other (new) ABS types and compare different markets (US vs EU).

11. Conclusion

My motivation to write this thesis was to understand the relationship between post-crisis regulations and the ABS spread. Through this relationship, I would understand if these regulations could reduce the asymmetric information and the moral hazard problem.

In the literature, I demonstrated that the driving force behind securitisation is to obtain funding. Other motivations are: credit risk transfer, regulatory capital arbitrage, and mitigation of the funding gap. Originators retain securitised products to preserve their reputation for credit quality to obtain a higher credit rating, known as skin in the game. Furthermore, originators in the EU retained those products which are eligible as collateral for monetary policy to create more liquidity. The main determinant of the ABS spread is the credit rating of the issued security. However, other variables such as credit enhancement, loan to value, type of originator and the nature of the asset also have a substantial impact on the ABS spread. There is some contradiction in the literature about the effect of retained interest on the ABS spread. The skin in the game mechanism could decrease the ABS spread since the originator participate in the loss of default. However, according to other researches retained interest increased spread due to a higher perceived risk on the retained part of the originator.

Securitisation leads to moral hazard problem by creating distance between the originators of loans and the investors who bear the final risk of default. Moreover, adverse selection play a role because low quality loans are securitised. Therefore, policymakers proposed a number of regulations to align the incentives associated with securitisation. In this paper I observed two regulatory variables: the 5 percent risk retention rate and due diligence & disclosure. The 5 percent risk retention rate legislation means that originators must retain a material net economic interest of at least 5 percent of the securitised exposure. And due to robust due diligence & disclosure, the investor knows the potential risk of loss and is able to make reliable and informed decisions. I questioned what the impact is of both regulations on the ABS spread.

According to the Literature Chapter there are two reason why the ABS spread should increase after implementation of the risk retention legislation. First of all, the increase in perceived risk caused the originator to increase the spread to compensate for this risk. Second, the originator will demand a higher spread to prevent the ROE from falling. The main reason for the ABS spread to decrease is because moral hazard will decrease after adoption of the risk

retention regulation. Therefore, the default rate will decrease as well and accordingly, investors accept less premium. However, since EU originators already retained a large part of the transaction on their balance sheet, I expect a weak relationship with the ABS spread.

Because of due diligence & disclosure, investors understand the potential risk of loss and is able to make reliable and informed decisions. Moreover, it provides to originator an incentive to enhance the quality of the transaction since they are exposed to transparency. Hence, I expect a strong negative relationship with the implementation of this legislation and the ABS spread. If this is the case, I can conclude that the due diligence & disclosure legislation decreased the asymmetric information dilemma and therefore, the moral hazard problem.

Based on the literature, I developed a multiple regression model and incorporated several regulatory variables into the model. The outcome is consistent with the theory. First of all I will discuss the risk retention legislation. The null hypothesis is rejected in favour of the alternative. In other words, after the implementation of the 5 percent risk retention rate regulation the ABS spread significantly declined ($p = .06$). Specifically, after the approval of the regulation, on the 1st of January 2014, the spread declined. The effective date did not had any significant effect on the ABS spread. However, if at least one of the tranches in an ABS transaction were retained, the spread increased significantly ($p = .05$). The reason is that originators perceive more risk. Therefore, Hypothesis (1) is rejected and Hypothesis (2, A) is not. This shows a contradiction in the findings. Because, to actual retain a part of the transaction did increase the spread, while the approval of the legislation decreased the spread. It seems that the legislation only gave a signal to the ABS market that policymakers take the potential danger of ABS seriously. For investors this signal was sufficient to obtain trust in the ABS market that caused the ABS spread to decrease.

Due diligence & disclosure increased significantly ($p = .01$) the ABS spread after both the publication and effective date of this particular legislation. This indicates that an increase in due diligence did decrease the moral hazard problem by enhancing the transparency of an ABS transaction. Moreover, if the originator actually disclose the prospectus the spread decreased significantly ($p = .10$). Hence, as opposed of the risk retention legislation, the due diligence legislation had a consistent negative significant effect on the ABS spread (both legislation and actual act of disclosing the prospectus). Therefore, I can accept Hypothesis (2, B) and (2, C). Besides the regulatory variables, the ABSPP did not significantly affect the ABS spread. However, for consumer ABSs the spread decreased significantly ($p = .00$) due to the

implementation of the ECB ABSPP. Transactions issued in the Nordics (Sweden and Finland) increased the spread and transactions in Greece decreased the ABS spread significantly. Lastly, I will finally answer the research question:

Research question: *Did the implementation of post-crisis regulations decrease the primary market spread of ABSs in the EU?*

Based on the empirical study conducted in this paper my answer is: The implementation of post-crisis regulations decreased, on average, the ABS spread significantly in the EU over the period 2010 - 2015. In summary, I have been able to show that post-crisis regulations have a significant decreasing impact on the ABS spread by decreasing the asymmetric information problem. Thus, investors demand less compensation due to a lower risk profile of the security. The contribution to the field regarding regulation on ABSs is firstly the additional evidence found for security pricing. More importantly, however, is the evidence that I find with respect to which specific regulation has a higher effect on the asymmetric information problem and the ABS spread. The due diligence & disclosure legislation had a significantly stronger effect to decrease the asymmetric information problem. Hence, I would recommend to policymakers to extend the due diligence legislation (instead of the risk retention) when developing a new regulatory framework. Finally, this paper contributes to the debate on the importance of worldwide regulation and the behaviour of the ABS market on these new policies.

12. References

Aiyar, S., Al-Eyd, A., Barkbu, B., & Jobst, A. A. (2015). Revitalizing Securitization for Small and Medium-Sized Enterprises in Europe. *IMF Staff Discussion Note*.

Akerlof, G. a. (1970). The Market for "Lemons": Quality Uncertainty and the Market Mechanism. *The Quarterly Journal of Economics*, *84*(3), 488–500. doi:10.2307/1879431

Altomento, C., & Bussoli, P. (2014). Asset-backed securities: The key to unlocking Europe's credit markets? *Bruegel*.

Altunbas, Y., Gambacorta, L., & Marques-Ibanez, D. (2009). Securitisation and the bank lending channel. *European Economic Review*, *53*(8), 996–1009. doi:10.1016/j.euroecorev.2009.03.004

Ambrose, B. W., Lacour-Little, M., & Sanders, A. B. (2005). Does Regulatory Capital Arbitrage, Reputation or Asymmetric Information Drive Securitization? *Journal of Financial Services Research*, *28*(1), 113–133. doi:10.1007/s10693-005-4358-2

Arca, E., Cohen, L., Hemphreys, P., Dillon, D., Lewis, S., Craughan, J., … Kelson, E. (2015). Summary of key EU and US regulatory developments relating to securitization transactions. *Hogan Lovells*.

Ashcraft, A., Gârleanu, N., & Pedersen, L. H. (2011). *Two Monetary Tools: Interest Rates and Haircuts*. *NBER Macroeconomics Annual* (Vol. 25). doi:10.1086/657530

BlackRock. (2014). Securitisation: A Tool for European Growth, (March).

Calem, P. S., & LaCour-Little, M. (2004). Risk-based capital requirements for mortgage loans. *Journal of Banking & Finance*, *28*(3), 647–672. doi:10.1016/S0378-4266(03)00039-6

Campbell, S., Covitz, D., Nelson, W., & Pence, K. (2011). Securitization markets and central banking: An evaluation of the term asset-backed securities loan facility. *Journal of Monetary Economics*, *58*(5), 518–531. doi:10.1016/j.jmoneco.2011.05.003

Capital treatment for "simple , transparent and comparable" securitisations. (2016). Basel Committee on Banking Supervision.

Cardone-Riportella, C., Samaniego-Medina, R., & Trujillo-Ponce, A. (2010). What drives bank securitisation? The Spanish experience. *Journal of Banking & Finance*, *34*(11), 2639–2651. doi:10.1016/j.jbankfin.2010.05.003

Chemla, G., & Hennessy, C. (2011). Optimal skin in the game: optimal mechanism and security design. *Centre for Economic Policy Research*, *No. 8403*.

Chen, T. (2014). Q & A on European ABS Opportunities. *Brandywine Global Investment Management, LLV*.

Chun, S. E., & Kim, H. (2012). The Impact of Strengthened Basel III Banking Regulation on Lending Spreads : Comparisons across Countries and Business Models, (April), 1–11.

Dell'Ariccia, G., Igan, D., & Laeven, L. U. C. (2012). Credit Booms and Lending Standards: Evidence from the Subprime Mortgage Market. *Journal of Money, Credit and Banking*, *44*(2-3), 367–384. doi:10.1111/j.1538-4616.2011.00491.x

Demiroglu, C., & James, C. (2012). How Important is Having Skin in the Game? Originator-Sponsor Affiliation and Losses on Mortgage-backed Securities. *Review of Financial Studies*, *25*(11), 3217–3258. doi:10.1093/rfs/hhs095

Demyanyk, Y., & Van Hemert, O. (2011). Understanding the subprime mortgage crisis. *Review of Financial Studies*, *24*(6), 1848–1880. doi:10.1093/rfs/hhp033

Duygan-Bump, B., Parkinson, P., Rosengren, E., Suarez, G. A., & Willen, P. (2013). How Effective Were the Federal Reserve Emergency Liquidity Facilities ? Evidence from the

Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility. *The Journal of Finance*, *LXVIII*(2), 715–737. doi:10.1111/jofi.12011
ECB, & BoE. (2014). The case for a better functioning securitisation market in the European Union, (May), 1 – 28.
ESMA Report on Trends, Risks and Vulnerabilities. (2015). *European Securities and Markets Authority*, (2).
Fabozzi, F. J. (2013). *Bond Markets, Analysis, and Strategies* (Eighth Edi.).
Fabozzi, F. J., Martellini, L., & Priaulet, P. (2005). *Advanced Bond Portfolio Management*.
Fabozzi, F. J., & Vink, D. (2009). Non-US Asset-Backed Securities : Spread Determinants And Over-Reliance On Credit Ratings. *Yale ICF Working Paper*, (09), 1–10.
Gorton, G. B., & Pennacchi, G. G. (1995). Banks and loan sales Marketing nonmarketable assets. *Journal of Monetary Economics*, *35*(3), 389–411. doi:10.1016/0304-3932(95)01199-X
Gorton, G., & Pennachi, G. (1990). Financial Intermediaries and Liquidity Creation. *The Journal of Finance*, *45*(March 1990), 15213.
James, C. M. (2010). Mortgage-Backed Securities: How Important Is "Skin in the Game"? *FRBSF Economic Letter*.
Janssen, P., & King, J. (2015). European ABS : Solid fundamentals and technical tailwinds. *M&G Investments*, (October).
Jones, R., Petch, T., Storey, O., Wicker, O., Bacon, H., Ellicott, S., … Warna-Kula-Suriya, S. (2015). The New EU Securitisation Regulation: A Step in the Right Direction, but Many Unanswered Questions.
Kern, S., Lapresa, L., Mazzacurati, J., Mcgoldrick, P., Omari, Y. El, Renzis, T. De, … Vinel, A. (2015). Trends Risks Vulnerabilities. *European Securities and Markets Authority*, (1), 1–66.
Keys, B. J., Mukherjee, T., Seru, A., & Vig, V. (2009). Financial regulation and securitization: Evidence from subprime loans. *Journal of Monetary Economics*, *56*(5), 700–720. doi:10.1016/j.jmoneco.2009.04.005
Krarup, Th. (2016). Key points on STS securitisation, (152), 1–2.
Levitin, A. J. (2013). Skin-in-the-Game: Risk Retention Lessons from Credit Card Securitization. *George Washington Law Review*, *81*(3), 813–855.
Lewis, S. (2014). High-quality securitisation for Europe The market at a crossroads. *AFME Finance for Europe*, (June).
Liberadzki, K. (2015). Covered Bonds in Europe: Issuing and Markets, *3*(9), 209–220. doi:10.17265/2328-7144/2015.0910.002
McCaw, K. (2015). Global ABS Conference 2015: key themes, (September 2015), 12–15.
Meyerson, L., Chorazak, M., Sloan, S., Palma, L., & Schueller, J. (2014). Securitization After Dodd-Frank: A Summary of the Final Credit Risk Retention Rules. *Simpson Thacher*, 1–17.
Mian, A., & Sufi, A. (2009). the Consequences of Mortgage Credit Expansion : Evidence From the U . S . Mortgage Default Crisis. *The Quarterly Journal of EconomicsQuarterly Journal of Economics*, *124*(4), 1449–1496. doi:doi: 10.1162/qjec.2009.124.4.1449
Nawas, M., & Vink, D. (2016). Securitization Pricing in a post-crisis market. *Nyenrode Business Universiteit, The Netherlands*, (June), 64–67.
Ozerturk, S. (2015). Moral Hazard, Skin in the Game Regulation and Rating Quality. *Working Paper*.
Report on asset securitisation incentives. (2011). *Bank for International Settlements*.
Revisions to the Basel Securitisation Framework. (2013). *Basel Committee on Banking*

Supervision. Basel Committee on Banking Supervision.
Riachi, I., & Schwienbacher, A. (2015). Investment, firm performance and securitization: Evidence from industrial companies. *Finance Research Letters*, *13*, 17–28. doi:10.1016/j.frl.2015.03.007
Sarkisyan, A., & Casu, B. (2013). Retained Interests in securitisations and implications for bank solvency. *European Central Bank*, (153).
Scopelliti, A. (2014). *Money, Regulation & Growth: financing new growth in Europe*.
Serravalli, F., Sullivan, D., & Merchant, C. (2014). Financial instruments, structured products & real estate insights - Risk Retention. *FSR Insights*, (January).
Vink, D., & Thibeault, A. E. (2007). An empirical analysis of asset-backed securitization, (07), 1–62.
Warbey, J., Goldfinch, J., & Graham, C. (2015). CLOs & European Risk Retention: New Securitisation Regulation. *CLO Group - Milbank*, *44*(November), 1–5.
Wiemken, J. M., & Erturk, E. (2015). The U . S . Leads The Global Securitization Rebound , But Interest Rate Hikes Could Threaten That Trend, 1–13.