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The Influence of Securitization on the Capital structure of US Nonfinancial Firms

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PREFACE AND ACKNOWLEDGEMENTS

Firstly, I would like to mention that I studied with pleasure at the Erasmus University of Rotterdam for slightly more than five years. I think that this period contains valuable experiences that form the basis for the rest of my life. This thesis forms the end of this turbulent and enjoyable period, though the end of a period forms the beginning of another.

Secondly, I would like to thank my supervisor Dr Jan Lemmen. His patience, expertise and quick feedback have been of a good help in this process and I am grateful for that. The result of this process is the Master Thesis. However, the route to get at the final thesis is far more interesting. In this process you struggle, learn and put in the hard work to make it. Sometimes you make progress in difficult times, in a way that you did not plan before. You learn to work in situations that you did not expect to occur.

One of the lessons that I learned in this process is that success is not achieved alone. In times of doubt, which were accompanied with sleepless nights, there were some persons that helped me to get through. I would like to thank my parents and siblings for keeping me motivated in difficult times. Furthermore, I especially thank my twin brother. He has been of good help and a source of inspiration in this writing process, as I have seen him struggling just before me.

I see the writing of a Master Thesis as a challenging and a valuable experience. I learned to improve my academic writing and the world of research itself. In front of you lies the result of a process that lasted approximately six months. It reflects hard work, times of doubt and finally an end of a pleasant educational process.

ABSTRACT

The existing academic literature forms a hot debate on the costs and benefits of securitization. I try to add to this debate, by investigating the relationship between securitization through asset-backed securities and the capital structure of nonfinancial firms in the United States for the fiscal years 2013 and 2014. For these years, I find that securitization is a significant funding source as on average, it makes up 14.07 percent of a nonfinancial firm's debt. Furthermore, I find that the securitization market is recovering towards its peak level of 2007, as I find that the amount of securitization debt through asset-backed securities is approximately $160 billion on average for the years 2013 and 2014. I study the relationship between securitization and capital structure by using data from SEC Edgar and Compustat. I retrieved the data manually through looking for the words "securitiz (e)", "special-purpose entity" or "off-balance (-) sheet" in the 10-K fillings. In studying this relationship, I control for several other influences, such as profitability, tangibility, market-to-book ratio, firm size and industry median leverage. After controlling for these effects, I find evidence that securitization does affect the capital structure of a nonfinancial firm in a positive way. As the significant coefficient for securitization is approximately 0.055. This indicates that securitization leads to a slightly higher amount of debt in the capital structure compared to firms that do not use securitization at all.

Keywords: Securitization; capital structure; off-balance sheet; special purpose vehicle
JEL Classification: G23, G31

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1 Introduction

1.1 Introduction and research question

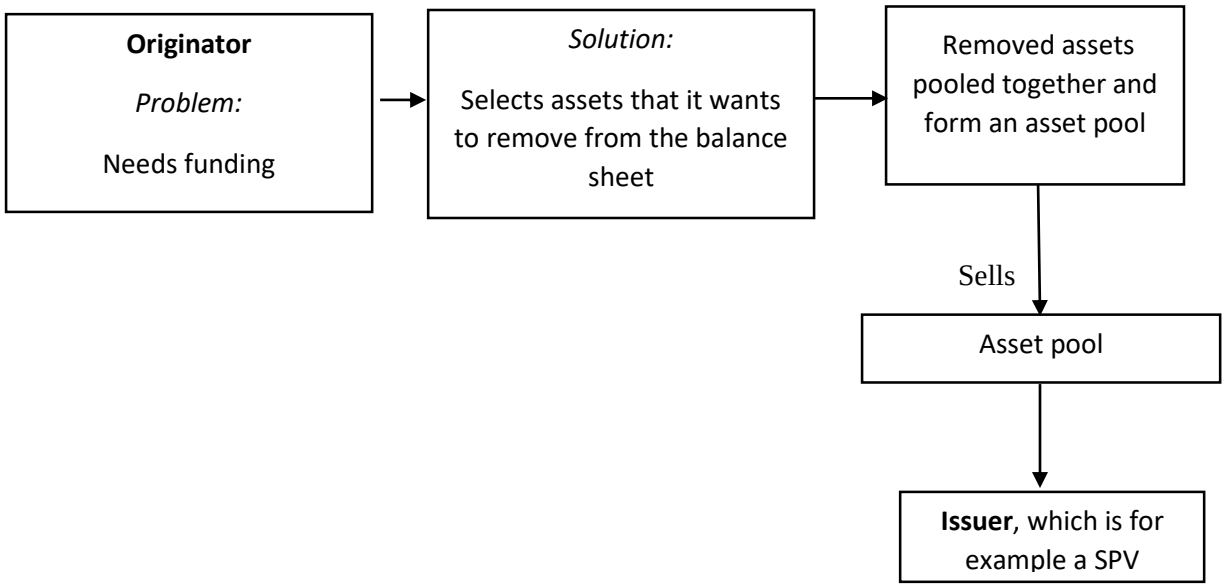
With the evolution of structured finance activities, several parties, such as originators, stakeholders, legislators, financial intermediaries, managers, regulators and credit rating agencies have to deal with major challenges since recent years. An example of such a challenge is that "(…) most credit rating agencies downgraded the ratings of many asset-backed securities(ABS), which show the deficiencies in credit rating agency models originally used to determine the ratings (Revisions to the Basel Securitisation Framework, 2013)". Furthermore, the recent financial crisis shows that the previous regulatory frameworks, Basel II in Europe and the situation before the Dodd-Frank Wall Street Reform and Consumer Protection Act (hereafter Dodd-Frank Act) in the United States had deficiencies as well. This has affected securitization markets extensively, leading to misalignment of incentives and conflicts of interest. This misalignment of incentives led to a weaker due diligence process in securitization and as a final result investors lost confidence in structured finance activities, or more specifically securitization. This is reflected in the fact that in 2007, the securitization market came to a virtual standstill as a direct impact of the subprime mortgage default and crash in ABSs (Baig and Choudhry, 2013).

In response, new regulatory frameworks have been designed, to tackle the problems of misalignments in incentives and conflicts of interest. In Europe, first Basel II.5 was designed and subsequently also Basel III, which will become effective in January 2018. For the United States, the Dodd-Frank Act, accepted in 2010, is the most recent financial reform of legislation to make necessary changes in the securitization framework. In this research, I will look at the process of 'securitization' and its effect on the capital structure of nonfinancial firms in the United States, in the post-crisis period (fiscal years 2013 and 2014).

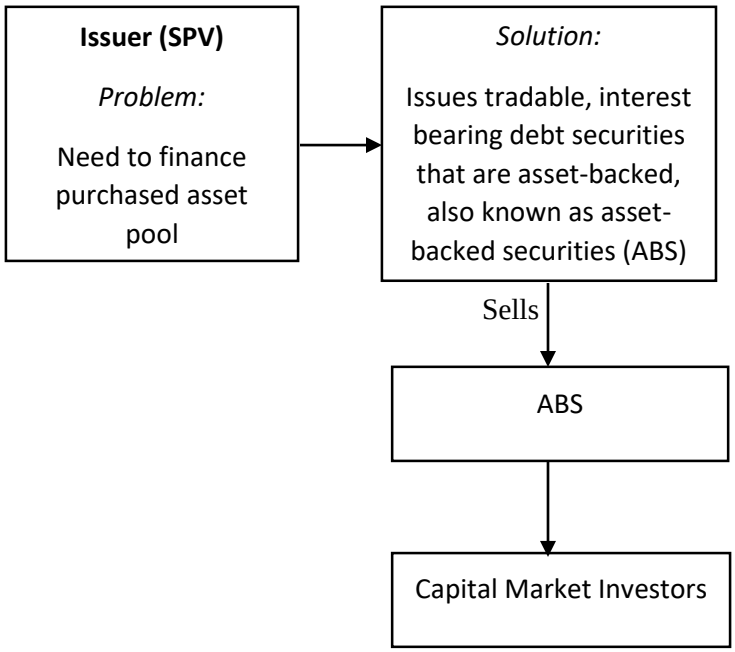
Securitization is a framework in which some illiquid assets such as, credit card, accounts receivables, or car loans of a financial institution or corporation are transformed into a package of securities backed by these assets (Baig and Choudhry, 2013 ; Riachi & Schwienbacher, 2015). This package of securities is then divided into smaller pieces, also known as tranches. Each tranche then has a different risk profile. It is also sold separately to meet the different needs of investors. In that sense, securitization is an interesting financial innovation that creates liquidity. This liquidity can be achieved through various forms of securitization, although the basic securitization process looks as follows:

Figure 1: Basic overview of the securitization process in two steps

Step 1: Originator recognizes problem of funding, selects assets to remove from the balance sheet, which form an asset pool. The asset pool is then sold to an issuer. This issuer is often a special purpose vehicle (SPV), which purchases the assets and enables the off-balance sheet treatment.



Step 2: The issuer needs to finance the purchase of the assets and does so, by issuing tradable, interest-bearing securities. These tradeable, interest-bearing securities are then sold to capital market investors.



In this figure, the basic process of securitization is shown in case of an ABS, although there are two other major classes that make up the securitization market as well. According to Vink & Thibeault (2007), the securitization market consists of three main classes: asset-backed securities ("ABS"), mortgage backed securities ("MBS") and collateralized debt obligations (CDO). ABS are securitizations backed by consumer products, such as car loans, consumer loans and credit cards, MBS are securitizations backed by mortgages and CDO are securitizations backed by debt obligations. This paper will mainly focus on ABS, which thus have other underlying assets than mortgages. If we look to the securitization market as a whole, the current academic literature is divided into two sides:

On the one hand, we have several academic works that are positive about the effects of securitization. These works focus on the aspect of liquidity enhancements, among others. This is shown for example by An et al. (2009) and Nadauld & Weisbach (2012). An et al. (2009) find that securitization leads to substantial value creation in the case of commercial mortgages. They ascribe this value creation to liquidity enhancements, regulatory arbitrage, price discrimination and risk diversification that occur in the pooling and tranching steps in the securitization process. Furthermore, Nadauld & Weisbach (2012) find that securitization leads to a reduction in the cost of capital, as they found lower spreads for collateralized loan obligations. While Ambrose et al. (2005) are also positive about securitization in the case of analyzing banks, as securitization (…) transfers credit and interest rate risk, increases liquidity, augments fee income and improves capital ratios. Altunbas et al. (2009) also focus on banks and find that securitization activity has strengthened banks' capacity to supply new loans and modified the effectiveness of the bank lending channel. This capacity to supply new loans though, depends upon business cycle conditions and the risks positions of the banks. Finally, Aiyar et al. (2015) find that securitization can reduce funding costs because it can produce securities that cater to risk return preferences of investors.

On the other hand, there are also studies (Fender & Mitchell, 2005; Coval et al. 2009; and Downing et al. 2009), that have raised concerns about the rise of securitization, as its benefits and problems are still unclear. Coval et al. (2009) are more skeptical towards securitization as they find that the market for structured credit appears to have serious structural problems. Downing et al. (2009) find that assets sold to special purpose vehicles will be of lower quality than assets that are not sold to SPVs. This suggests that the market for mortgage-backed securities is a market for 'lemons'. Although for this a countermeasure exists, as nowadays originators are required to keep the worst tranche on their balance sheet. This worst tranche is first in seniority, when losses are made. Nevertheless, this does not take away the incentive for originators to sell the worst tranche to the SPV.

As the previous paragraph makes clear, the current literature is divided into two sides, which has evolved into an academic debate. In this research, I do not refrain from this debate, but try to add additional information through studying how securitization affects the capital structure of nonfinancial firms. This brings us to the main research question of this paper:

H1:**"*Does securitization affect the capital structure of nonfinancial firms in the United States?"***

Studying this aspect of securitization in the existing literature is interesting, as the existing literature is "relatively still small and fundamental questions remain open" (Gorton & Metrick, 2012). This question is part of the gap in the existing literature and through studying it, I hope to achieve my main goal. The main goal in this paper is to extend the small literature by providing more clarity regarding the effectiveness of securitization on capital structure. In order to do so, I focus on ABS from nonfinancial firms, in the United States for the fiscal years 2013 and 2014. This research question is answered through a unique methodology that combines elements of Lemmon et al. (2014) and Frank & Goyal (2009). I follow Lemmon et al. (2014) in the data collection method, while Frank & Goyal (2009) provide guidance in terms that they have identified reliable factors to analyze the capital structure of firms.

This unique methodology will be used on securitization data from nonfinancial firms for specifically the fiscal years 2013 and 2014, because it is interesting to see how the securitization market has developed after the recent financial crisis and its peak of $180 billion in 2007 (Bord & Santos, 2015). Secondly, research about the effects of securitization on the capital structure for this particular period is interesting, as new accounting regulations are in effect since 2010. These new accounting regulations increased the requirements to be fulfilled to keep securitized transactions off-balance sheet. It is interesting to see how this development might have consequences for the capital structure of nonfinancial firms. In section 3.3 these new regulations for the accounting treatment are further explained. Finally, this research also provides insights in the business of corporate lending and has implications for practitioners.

In the past, we have seen an evolution in the securitization market when "(...) the corporate loan securitization market grew from $20 billion in 2003 to $180 billion in 2007, which could affect the business of corporate lending" (Bord & Santos, 2015). Currently, the size of the corporate loan market is somewhat smaller compared to 2007. However, this does not mean that securitization is less relevant for financial institutions, investors, legislators and other stakeholders as previously "(…) securitization users obtained about 20% of total debt financing through securitization" (Lemmon et al., 2014). If we look to each of the stakeholders that are interested in the outcomes of this study, the implications are intertwined. For legislators, the outcomes are of great importance, as they have to construct the laws that determine the regulatory framework underlying the securitization process. This research will thus possibly provide them

new insights for developing a new regulatory framework. This regulatory framework is of course interrelated to the interests of other parties, such as financial intermediaries. For financial intermediaries, securitization has a transformative effect, as it can result in an off-balance sheet treatment. This is in contrast with their former role, as before securitization and several other financial innovations, financial intermediaries used to make loans for customers and hold them on their balance sheets to maturity. This research thus questions the former functioning of financial intermediaries, which also holds for originators. In case the trust in securitization is regained, this will lead to a higher amount of financial intermediaries and originators needed in the future and making their former role unnecessary. Finally, this study also has important implications for managers and shareholders of firms that are looking to attract new capital. They will be able to retrieve insights that can help them to co-decide, whether their company should apply securitization at all and if so to what extent.

In this research, I find 129 unique firms that use securitization between the fiscal years of 2013 and 2014. The average total amount of debt that these firms have borrowed through securitization programs equals $160 billion, which is significantly lower than the peak of 2007. However, it suggests that securitization is regaining trust, as it is a rapid increase since 2009, when the size of the securitization market was only $80 billion. The main findings of my paper show that securitization does influence the capital structure of nonfinancial firms in the United States for the fiscal years 2013 and 2014. I find a positive and significant coefficient for securitization of approximately 0.055, indicating that securitization leads to a slightly higher amount of debt in the capital structure compared to firms that do not use securitization at all.

The remainder of this research is organized as follows: in Section 2, the process of securitization is further explained. Section 3 deals with theoretical background and literature review regarding securitization and capital structure. Subsequently, Section 4 deals with the research design, including a description of the sample, variables, data and methodology. Section 5 presents the empirical results together with an analysis and limitations. Finally, Section 6 gives a conclusion together with directions for future research.

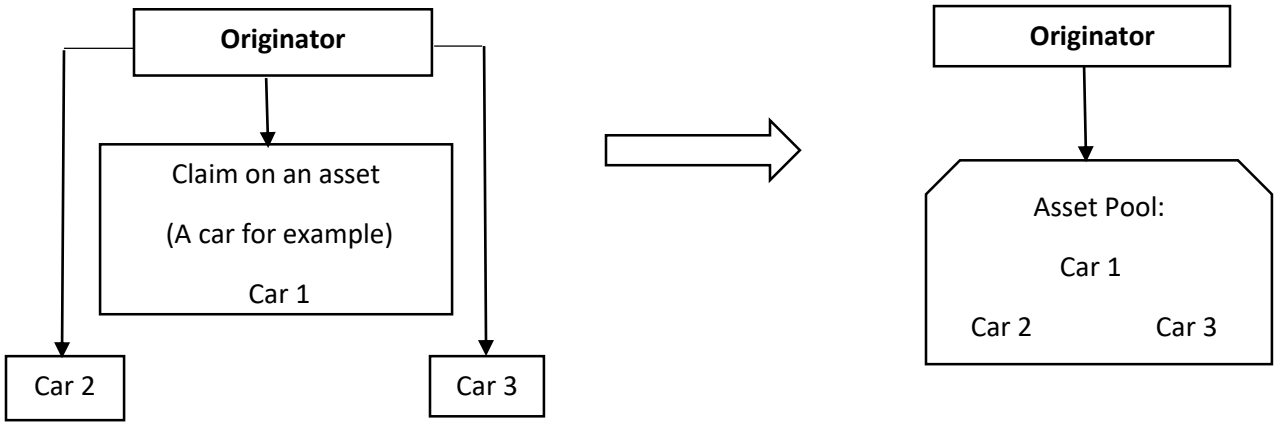
CHAPTER 2 The Process of Securitization

Although, securitization is already briefly explained in the introduction, this chapter explains securitization more extensively as it is a highly complex financing technique. Securitization is complex process as it involves several different steps, transactions and parties. In this section, I will focus more specifically on the processes of tranching and pooling and the role of the SPV. Finally, I will provide a schematic overview of the securitization process, so that the whole securitization process is clear.

2.1 Pooling

As explained in the introduction, the securitization process starts with an originator that seeks funding and wants to remove assets from the balance sheet. It does so, by selling it to an issuer (often an SPV) for various reasons. Thus, actually what the originators sell is a claim on the asset or assets to the issuer. In most cases, it is a claim on assets, because the firm then eliminates the costs associated with setting up multiple small securitizations instead of one big securitization. This is achieved by the originator narrowing the securitized transaction down to a specific asset pool. And this specific asset pool usually consists of assets that the originator has already created, (…) thus eliminating the risk inherent in creating assets (Kothari, 2006). Furthermore, in removing a specific asset pool the originator also reduces perceived risks, as a specific pool is less risky than an entity wide pool. In short, the pooling process in securitization is selling a large pool of claims on similar assets at once, as is visible below:

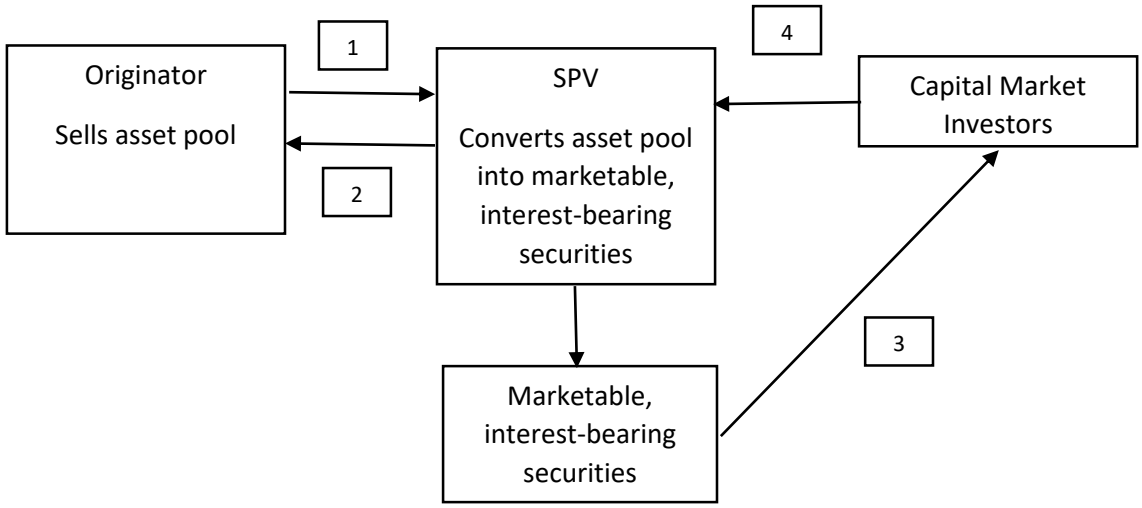
Figure 2: The pooling of assets in the securitization process



2.2 The SPV

Subsequently, this specific asset pool is sold to an issuer. This issuer is an entity that is set up for two purposes, as it enables the securitization for the originator, while it also helps in legal and accounting issues. Nevertheless, the role of the SPV is limited, as SPVs have no other purpose than facilitating the transaction(s) for which they are created. They can make no substantive decisions; the rules governing them are set down in advance and carefully circumscribe their activities (Gorton & Souleles, 2005). SPVs are thus very limited in their actions and function as an intermediary between the originator and capital market investors. For the originator, they are of use, as they enable the transaction. They do so, by converting the asset pool into marketable, interest-bearing securities and sell these to capital market investors. This allows the SPV to finance the purchase of the asset pool from the originator, as is visible below:

Figure 3: The role of the SPV and transactions involved in securitization



In the end, we have thus four transactions in the securitization process:

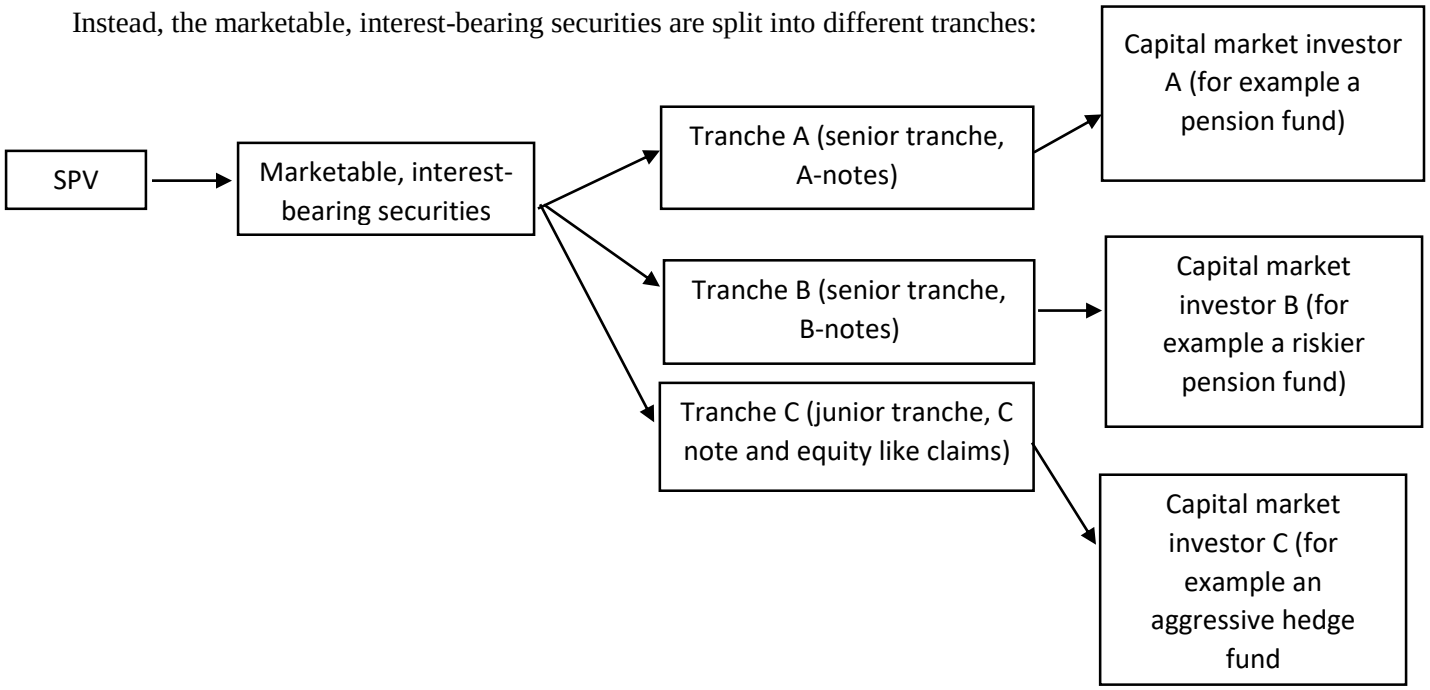
- 1: Cash outflow from the originator, that sells an asset pool to a SPV.
- 2: The SPV purchases the asset pool and finances this through selling marketable interest-bearing securities, representing a cash outflow for the SPV and a cash inflow for the originator.
- 3: This transaction represents the sale of marketable, interest-bearing securities from the SPV to capital market investors, resulting in a cash outflow for the SPV.
- 4: This transaction represents a cash inflow for the SPV, as it receives money from capital market investors, which the SPV uses to finance the purchase of the asset pool.

2.3 Tranching

In this section, we specifically look at the process of tranching. This process occurs alongside the conversion process of the asset pool into marketable, interest-bearing securities and is thus done by the SPV. Tranching takes the form of a capital structure for the SPV, with some senior rated tranches sold to investors in the capital markets (called A notes and B notes), a junior security (called a C note) which is typically privately placed, and various forms of equity-like claims (Gorton & Souleles, 2005). As a result, tranching enables credit enhancement, because the risk of loss due to default of the underlying borrowers is separated in tranches. In short, tranching is the process of dividing the marketable, interest-bearing securities into smaller pieces, based on the different risk profiles of the securities. This enables to sell the securitization transaction to a diverse group of different investors, with different risk profiles.

Figure 4: Tranching in the securitization process

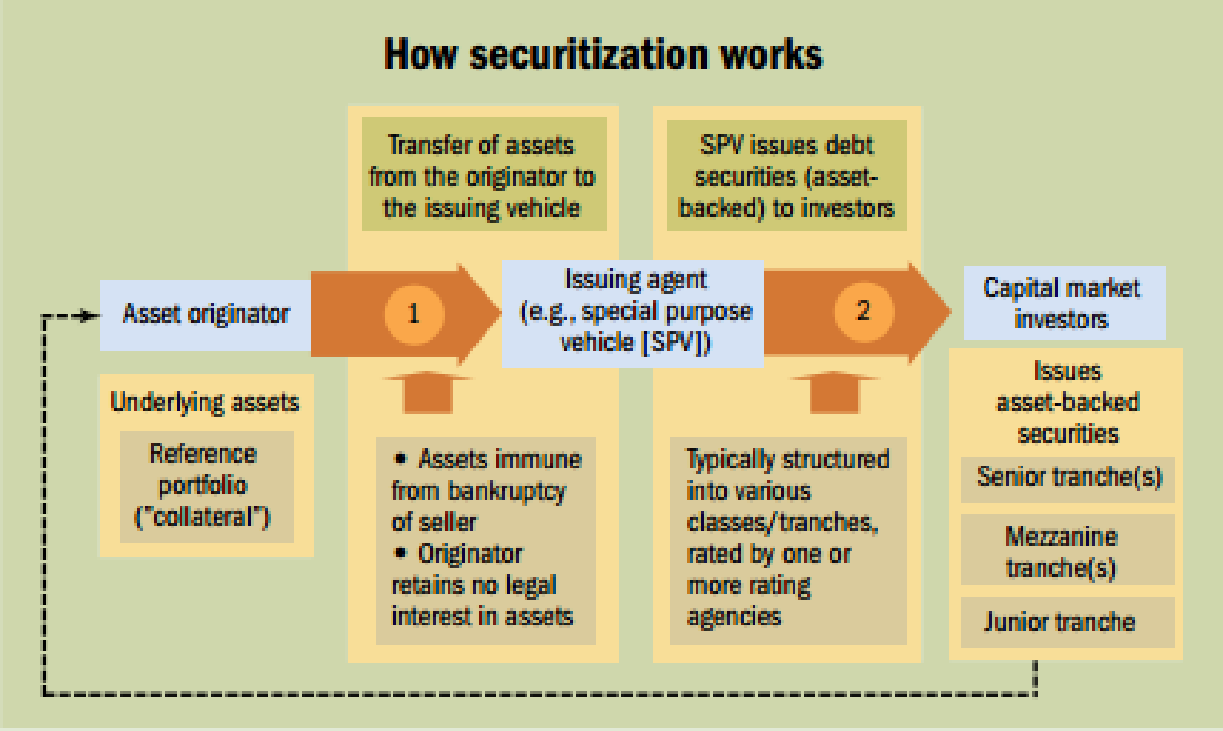
Instead, the marketable, interest-bearing securities are split into different tranches:



2.4 Schematic overview of securitization

To summarize, the basic process of securitization comes down to an originator that wants to remove assets from its balance sheet. Therefor an SPV is set up that makes realization of this off-balance sheet treatment possible. The SPV buys the assets from the originator and holds the legal interest in these assets. However, to make this purchase possible, the SPV issues interest-bearing debt securities that are sold to capital market investors, that in return receive interest payments. Thus, in the end, securitization consists basically of two steps: 1) the sale of a pool of assets from the originator to the SPV and 2) a sale of debt-securities that are linked to this pool of assets from the SPV to capital market investors. This is also summarized in the figure below:

Figure 5: How securitization works



Source: Jobst (2008)

CHAPTER 3 Theoretical Background and Literature Review

In this section the existing literature on capital structure and securitization is provided. First, I explain additional issues in the complex process of securitization. Secondly, I will briefly elaborate on recent regulatory developments in the securitization framework. Thirdly, I provide a short description of the possible accounting treatments of securitization. Fourthly, I describe the benefits and problems that are related to securitization, where the problems of securitization are divided in two subsections. In section 3.5.1 I describe the behavioral problems related to securitization and in section 3.5.2 I describe the structural problems related to securitization. In Section 3.6, I will address the main theories that form the academic debate on securitization. Finally, section 3.7 concludes the current academic literature and explains how I developed my hypothesis from it.

3.1 Additional issues with securitization

Additional issues around the basic securitization process arise. An example is overcollateralization, which occurs when the amount of the two steps in the securitization process are not equal in size. This common situation is basically that the book value of the assets that are sold to the SPV are bigger than the funding that has been raised by the SPV from the debt-bearing securities. To account for this difference, the originator holds an equity interest in the SPV, which is called overcollateralization or retained interest. The consequence of this issue is that it contributes to the credit enhancement of the asset-backed securities.

Another additional issue of securitization is that the SPV sells the asset-backed securities in different classes, also called tranches. These tranches of asset-backed securities are rated by one or more rating agencies. An important aspect to rate these tranches, is to look at the seniority of these asset-backed securities. For example, tranches are separated in a senior tranche of the asset-backed securities, a mezzanine tranche of asset-backed securities and a junior tranche of asset-backed securities. The junior tranche absorbs losses first, as it is the lowest class of securities. The senior tranche thus has a buffer against these losses on the asset pool, as other tranches come first. This is taken into account by the credit rating agencies, allowing the higher classes of the asset-backed securities to get a higher rating

Previously, the use of securitization by financial firms in the form of mortgages (MBS) dominated securitization usage. However, this has changed significantly since the recent financial crisis, as nonfinancial firms also eagerly use ABS to finance themselves. However, the type of assets that they securitize do somewhat differ from financial firms. Nonfinancial firms mainly securitize accounts receivables, because they liquidate relatively quickly.

3.2 Recent regulatory developments in the securitization framework

The regulatory framework in the United States to apply securitization, has undergone a severe change by implementation of the Dodd-Frank Act. The act is a major reform of the securitization market and adopted by the US Securities and Exchange Commission ("SEC") (Levitin, 2013). In this section, we look at three important parts of this act and the 'Volcker Rule', which are important for ABS securitization.

It was in 2010, when US Congress passed the Dodd-Frank Act. From the whole Dodd-Frank Act, particularly Title IX is important as it states that originators of the securitization process, should preserve at least five percent of the credit risk that is involved in the transaction. This is also known as 'skin-in-the-game'. The premise underlying 'skin-in-the-game' is that if the parties engaged in securitization are required to retain some credit risk on the securitized loans, they will be incentivized to ensure that the securitized loans are of higher quality (Levitin, 2013). Furthermore, this so-called 'skin-in-the-game' requirement is intended to provide sponsors with a meaningful incentive to monitor and control the quality of securitized assets and align the interests of the sponsor (originator) with those of investors (Meyerson et al. 2014).

Thus, there are two main reasons for adopting the previous regulatory framework with this specific rule. The first reason is that it should help to reduce the lender moral hazard problem in securitization. This moral hazard problem occurs at the lender side, as they could easily resell loans to possible naive securitizers, which had little incentive to carefully screen potential borrowers (Bubb & Kaufman, 2009). The second reason for including the skin-in-the-game rule in the Dodd-Frank Act, is that it should provide a solution for the misalignment of incentives and information asymmetries between originators and investors. This misalignment of incentives is identified as one of the reasons, why the securitization market experienced a downturn in the financial crisis (Levitin & Wachter 2012, Levitin & Wachter 2013).

Besides the new skin-in-the-game principle, focusing on risk retention, the Dodd-Frank Act also adopted several laws on ABS due diligence. Two of these laws are of particular importance. First, the Dodd-Frank Act states that all issuers of registered ABS will be subject to reporting requirements. As a consequence, the SEC is authorized to disclose asset-level and loan-level data on ABS (Basel Committee on Banking Supervision, 2011). In other words, issuers (which are often SPVs) are required to provide more information on securitization transactions, which decrease the information asymmetry between originators and investors. This should help investors to make better decisions. Additionally, the Dodd-Frank Act also has consequences for the originator. To be more specific, Dodd-Frank Section 942(b), requires that originators should disclose asset-level information (Arca et al., 2015). This is complemented

by Section 945 Rule 193, which states that a general review underlying ABS and a disclosure of the prospectus of a specific asset pool are also required. In other words, the originator must provide more information to the SEC, when it wants to do a securitized transaction.

Finally, sections 619 (the Volcker Rule) and 621 of the Dodd-Frank are of importance for the securitization market. The Volcker Rule affects securitization directly, as it restricts banks to do proprietary trading of ABS, while Section 621 deals with possible conflicts of interest that could arise in securitization transactions.

The benefits (reducing asymmetric information and improving alignment of incentives) of the Dodd-Frank are clear. However, there is also resistance against Dodd-Frank. New regulations – including risk-retention rules and the Volcker rule – could reduce liquidity and discourage securitization because banks will be subject to stricter capital, liquidity, leverage and disclosure requirements (Wiemken & Erturk, 2013). Nevertheless, the Dodd-Frank Act is still in implementation, so the exact consequences of stricter due diligence and risk retention rules are not clear yet.

Currently, there are already new regulatory proposals outstanding. These new regulatory proposals are constructed with the idea to develop a new universal treatment for ABS. The legislation between the EU and US is still different, where the EU has the concept of Simple, Transparent and Standard ("STS"), while the US has the concept of Simple, Transparent and Comparable ("STC"). The goal of the STS and STC is to reform and harmonize the existing rules on risk retention and due diligence (Jones et al., 2015). This harmonization also be the case for accounting policies, as we have the International Financial Reporting Standards (IFRS) in the EU, while the US has Generally Accepted Accounting Principles (GAAP). This is a question that will not be answered here, although the accounting treatment of securitization has also seen recent changes, to which we turn now.

3.3 Accounting treatment

Asset securitization raises several issues regarding its accounting treatment. These issues come forth from the question whether securitization qualifies for an off-balance sheet accounting treatment or not. In case a firm issues asset-backed securities, it has to decide whether the transfer of assets should be recorded as a sale of the pool of assets or as a form of collateralized borrowing. In the former case, the consequence is that higher performance and capital ratios are achieved due to the removal of illiquid assets from the balance sheet, while the related liabilities are not removed. In the latter case, the situation of treating securitization as a collateralized borrowing, the procedure is that both the assets and related liabilities remain on the balance sheet. It is clear that these treatments are completely different. In order to determine which treatment is appropriate, the Financial Accounting Standard Board (FASB) has issued

statements that determine in which situation the SPV is treated as off-balance or consolidated. Before 2010, guidelines for the right treatment were the financial accounting standards (FAS) 140 and FASB Interpretation no. 46.

FAS 140 is a replacement of the former FASB statement no. 25 Accounting for Transfers and Servicing of Financial Assets and Extinguishments of Liabilities. The FAS 140 offers standards regarding how to differentiate between the transfer of financial assets as sales or as secured borrowings. To account the transfer of financial assets as sales, the transferor has to surrender control over those assets in exchange for other beneficial interest in the assets. The transferor surrenders control over the financial assets, if certain conditions are met. In short, these conditions include that the transferred assets have been isolated from the transferor, the transferee has the right to pledge or exchange the assets and that the transferor does not maintain effective control over the transferred assets. The interpretation of FASB no. 46 complements these rules by providing standards regarding the consolidation of business enterprises as variable interest entities.

The FAS 140 and interpretation of FASB no. 46 are not in effect anymore, as they were followed up in 2010 by FAS 166 and 167. These new statements were issued to protect investors better from companies that try to elongate the use of off-balance sheet entities. FAS 166 offers better protection by requiring more information about the transfer of the financial assets. Moreover, it changes the requirements for de recognition of financial assets and eliminates the concept of qualifying special purpose entities.

FAS 167 then, is a rewriting of interpretation FASB no. 46. It improves the standards for determining when an entity is not sufficiently capitalized or controlled through voting rights. This improves the decision making with respect to the issue whether a firm is the primary beneficiary of a variable interest entity. A firm is the primary beneficiary of a variable interest entity when two conditions are met. These conditions include that the firm has "(…) a)…the power to direct the activities of a variable interest entity that most significantly impacts the entity's economic performance and b) the obligation to absorb losses of the entity that could potentially be significant to the variable interest entity or the right to receive benefits from the entity that could potentially be significant to the variable interest entity" (SFAS No.167, 2009).

3.4 Benefits of securitization

In the previous part, the process and accounting treatment of securitization are explained. In this section, we take a look why securitization is applied by nonfinancial firms. This is important, as securitization has an important role in the United States, "(…) as of April 2011, there was $11 trillion of outstanding securitized assets, including residential-mortgage backed securities (RMBS), other ABS and asset-backed

commercial paper (ABCP). This is substantially more than the size of all outstanding marketable U.S. Treasury securities—bonds, bills, notes, and TIPS combined[1]".

This passage indicates the size of securitization in the economy of the U.S and reveals that the motivations for using securitization are diverse, because as we have seen, the securitization market consists of three different types of securitization products. It can be used to finance a residential-mortgage (RMBS), a company (long-term ABS) or for short-term financing needs (ABCP). Although the capital-structure irrelevance theory of Modigliani & Miller (1958) suggests that securitization doesn't make any sense in terms of value creation (funding a company for example) or destruction. Nevertheless, the current literature has identified several benefits to apply securitization:

1. Minimizing bankruptcy costs and costs of financial distress

A part of the securitization process is that a SPV is involved for legal and accounting purposes. In certain circumstances, this can result in off-balance sheet financing. This off-balance sheet financing usually happens simultaneously with traditional on balance sheet financing techniques. As a result, a firm can be financed through different techniques (both off- and on-balance). In the situation of securitization being treated off-balance sheet, a part of the control rights to business decisions of a firm are separated from financing decisions. As it is the SPV that holds the legal interests in the assets. Furthermore, the only purpose of the SPV is to make the securitization possible, besides that it has no other purpose. In other words, the SPV cannot make business decisions, while it is the owner of the securitized assets. The legal form of the SPV is thus constructed in such a way, that it cannot go bankrupt. This feature has advantages in the situation, when it actually is the originator of securitized assets that goes bankrupt. As in a bankruptcy, the control over assets is transferred to its creditors. This process becomes shorter and cheaper for the originator as the SPV enables the originating firm to keep certain assets off balance, due to the fact that the SPV has the control rights over the securitized assets. In the end, the originator has less assets on the balance sheet, reducing its bankruptcy costs. This benefit of securitization is analyzed by Gorton & Souleles (2005) and the conclusion of their analysis is that securitization arises to avoid bankruptcy costs. The same holds in less radical cases, suggesting that securitization also leads to diminishing costs of financial distress.

2. Enhance opportunities for financing

Additionally, securitization is a way for firms to enhance opportunities for financing. This feature results from the separation of credit risk between the originator and the credit risk of the SPV. The SPV has a

[1] U.S. Department of the Treasury, "Monthly Statement of the Public Debt of the United States: January 31, 2011," (January 2011). < http://www.treasurydirect.gov/govt/reports/pd/mspd/2011/opds012011.pdf>

different credit rating than the originating firm, as it only holds the claims on the underlying assets. The result is that capital market investors, which buy the securities of the SPV, are only exposed to the risks of the underlying assets to which these securities are linked. They are not exposed to the risk of the originating firm. This is totally different, in the situation where a company issues bonds. The bonds are then receiving a credit rating based on the financial condition of the whole company, while in securitization the credit rating is based only on the underlying assets. Thus, the advantage that securitization offers, is that it provides an opportunity to issue securities with a higher credit rating than that the issuing company has. This results in additional financial benefits, as a higher credit rating allows access to a bigger part of the debt market.

3. Improved liquidity and expanded borrowing capacity

Another beneficial characteristic of securitization is that it transforms illiquid assets into liquid securities. The originator selects the illiquid assets that it wants to remove from the balance sheet which are then converted by the SPV into liquid asset-backed securities that can be sold into securities markets. A critical feature of securitization is that in fact a firm receives cash from outside investors. In order to be able to receive this cash, the firm generates cash flows that result from a specific asset pool. Although, actually that is done by the SPV. In return, the originating firm receives the proceeds of the sale of assets. The benefit is that the originating firm does not need to wait for customers to pay to obtain cash flows. As a consequence, this improved liquidity can also lead to expanded borrowing capacity. It is possible that the situation arises that a firm is short in liquidity. Securitization could help then to overcome this shortage in liquidity due to shorter waiting time to obtain cash flows. This can lead for example to enabling a firm to take on additional net present value projects, which it would not be able to undertake without securitization. Other options include invest in riskier activities or paying off debt.

4. Off-balance sheet financing and accounting benefits

In section 2.2 we have seen that there are two possible accounting treatments for originating firms that apply securitization. In case the originator can record the securitization as a sale, it is off-balance sheet financing as it allows to remove the underlying assets from the balance sheet, while the proceeds from the sale of these underlying assets are recorded as cash. As a consequence, the originating firm obtains various accounting benefits. The first accounting benefit is that the firm has a lower amount of leverage, as no liability is recorded. Secondly, "(…) the receivables are removed from the books even though the customers have not paid, so efficiency ratios such as days-sales outstanding are improved and it is easier to hide changes in credit policy" (Dechow & Shakespear, 2009). The third accounting benefit is that the firm does not need to classify the received cash as a cash flow from financing activities, but either as a

cash flow from operating or investment activities. Finally, "managers are required to fair-value the future cash flows retained by the firm, but these cash flows are not traded in active markets, so the sales treatment provides flexibility in valuing the retained asset and determining the size of the gain recorded in the income statement" (Dechow & Shakespear, 2009). These accounting benefits are not available, when the firm is obliged to apply the accounting treatment of securitization as a collateralized borrowing.

To conclude, the existing literature has identified several sources through which securitization offers benefits that might increase firm value through lowering the cost of capital. This suggests that it has a positive effect on the capital structure and in terms of lending behavior as it expands options to attract liquidity. The following table summarizes an important part of the current literature on the benefits of securitization:

Table 1: Reasons to apply securitization and their benefits

Study	**Reason to apply securitization**	**Benefit**
Gorton & Souleles (2005)	Separation of the credit risk of the originating firm from the credit risk of the SPV	Minimizing bankruptcy costs and costs of financial distress
Lemmon et al. (2014)	Separation of the credit risk of the originating firm from the credit risk of the SPV etc.	Minimizing bankruptcy costs and costs of financial distress
Cardone-Riportella et al. (2010)	Transformation of illiquid assets into liquid securities	Improved liquidity and expanded borrowing capacity
Dechow & Shakespear (2009)	Financial statements management	Off-balance sheet financing and accounting benefits
Ambrose et al. (2005)	Provide evidence consistent with either the capital arbitrage or reputation explanation for securitization	Securitization transfers credit risk and interest rate risk, increases liquidity, augments fee income and improves capital ratios
Altunbas et al. (2009)	Strengthen bank capacity	Securitization is a way to offer new loans and thus increasing capacity. This capacity however, depends on the risk positions of the bank and business cycle conditions

Aiyar et al. (2015)	To help small and medium sized enterprises	Securitization can reduce funding costs, because it can produce securities that cater to the risk return preferences of investors

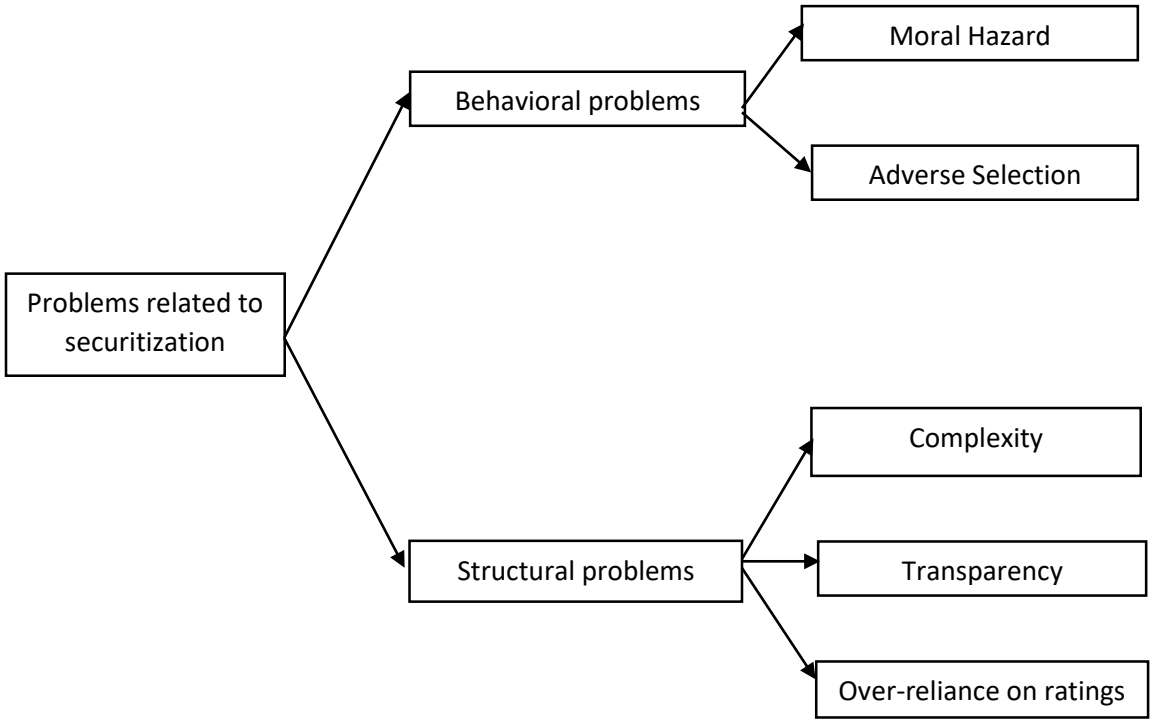
3.5 Problems with securitization

In this section, we will look at the behavioral problems of moral hazard and adverse selection, which are persistently linked to securitization. Moral hazard can be interpreted here as loan originators who do not hold the credit risk and are compensated through the sale of loans (Levitin, 2013). While adverse selection arises in the securitization market, because of an information asymmetry between the buyers and sellers of securitized transactions. The buyers have more information than the sellers about the assets that they want to remove from the balance sheet. Akerlof (1970) was one of the first that illustrated the concept of adverse selection. He provides a more comprehensive description of adverse selection and the relation between quality and uncertainty, with examples from the automobile (also called lemons market) and insurance market[2].

Recent studies that make the link between securitization and the problems of moral hazard and adverse selection include Benmelech et al. (2012) or Downing et al. (2009). If we look to other works in the existing literature, securitization is also associated with three types of structural problems (complexity, transparency and over-reliance on credit ratings), which can also be seen below:

[2] These examples can be found at https://www.jstor.org/stable/pdf/1879431.pdf

Figure 6: Categorization of problems related to securitization



3.5.1 Behavioral problems of securitization

1. Moral hazard

The moral hazard problem of securitization is identified in several recent works (Keys et al. 2008; Downing et al. 2009; Bubb & Kaufman, 2014) and finds its origin in the recent financial crisis. This occurs through different perspectives. An important work within this literature is from Keys et al. (2008), as they analyzed the incentives of financial intermediaries to properly screen borrowers. Their research focuses on banks, but the same principle holds more or less for firms. As a firm sells illiquid assets in the securitization process and removes these from their balance sheet, it no longer has the risk of default for these assets. This risk of default is in hands of the SPV, as it has the legal interests in the assets. The effect is that securitization creates distance between the issuer and buyer. As a result, the issuer has less incentives to screen the buyers of the asset-backed securities. Keys et al. (2008) find that the amount of incentives that the screeners have depends on a certain credit score cutoff rule. In this credit score cutoff rule, they find a discontinuity. Their argument is that "(…) this discontinuity in the default rate is evidence that securitization really did create lender moral hazard in screening" (Bubb & Kaufman, 2014).

2. *Adverse selection*

The argument that securitization entails adverse selection, starts with the idea that securitization creates additional layers, compared to regular financing techniques. There is only a small piece of literature that comes up with this idea and then especially focuses on adverse selection and securitization in the mortgage market. Several works that are included into this small piece of literature are Drucker & Mayer (2008); Nadauld & Sherlund (2009); Keys et al. (2010); Seru & Vig (2010). They find that the adverse selection problem results from the idea that securitization leads to lower lending standards. As a result, the adverse selection problem can be found in the collateral pools from the mortgage-backed securities. Thus, (…) because economics of the structuring process creates incentives for deal arrangers to purchase a portfolio of loans that will provide the cheapest funding for a deal (Nadauld & Sherlund, 2009).

Keys et al. (2010) identify another source for the adverse selection. They claim that strategic adverse selection occurs, because the originators can choose which assets they want and do not want to keep on the balance sheet. This freedom enables them to keep the higher quality of assets on their balance sheet, while only offering assets of worse quality to investors. Although, accounting regulations came with countermeasures for this strategic adverse selection problem, implying that originators must offer the complete pool of loans.

Despite these regulations, securitization still creates a distance between a lender and a borrower compared to traditional on-balance sheet financing. Furthermore, securitization sometimes enables an off-balance treatment that also is a fruitful source for the agency problem of adverse selection. These characteristics suggest that securitization has also structural problems, to which we turn now.

3.5.2 Structural problems of securitization

Previous literature also comes with structural problems of securitization that led to the downturn of its market in the recent financial crisis. The structural problems can be deduced from the complexity and loss in transparency that are associated with securitization. These problems arise, because of the creation of different tranches in the process of securitization. As noted before, separate classes of pooled assets with different credit risk are created. This can become even more complicated, when tranches of several securitization transactions are combined. Then we actually have re-securitizations and as a consequence, it is more difficult to obtain a clear idea of the risk and return profile as a final investor. In other words, the transparency of securitizations is lost in the tranching process, which has a negative consequence. The effect is that investors start to rely heavily on credit ratings, which is more transparent. The recent financial crisis shows that this was actually a bad idea, as for securitization, tranching causes the ratings of structured securities to function differently than occurs with traditional corporate bond ratings. The

difference between both, is that the structured security acts more persistent compared to corporate bonds. Thus in case of a downgrade, the structured security is less affected. As a consequence, "(…) investor reliance on ratings, unless supported by other risk measures, can lead to mispriced and mismanaged risk exposures as well as unfavorable market dynamics if theses exposures have to be unwound" (Fender et al., 2008).

3.6 Main theories and academic debate

Since the financial crisis of 2007 and 2008 a hot debate has started among academics, with respect to the effectiveness of securitization. The benefits and costs of securitization are described in sections 2.3 and 2.4. From these sections we have seen that on the one hand, An et al. (2009) and Nadauld & Weisbach (2012) show that securitization can create value. While on the other hand other academic research (Downing et al. 2009 ; Benmelech et al. 2012) and the recent financial crisis show that securitization can be damaging as well as there were problems with the assessment of risk and accurate pricing of securitized transactions. The majority of the existing academic research focuses on the negative effects of securitization and in particular the behavioural problems of moral hazard and adverse selection, as is visible on the next page.

Table 2: Previous research that forms the academic debate on the effects of securitization.

Authors	**Positive or negative about effects of securitization**	**Findings**
Lemmon, Liu, Mao and Ning (2014)	Positive	For nonfinancial users, securitization appears to have functioned quite well by helping to reduce financing frictions without exacerbating incentive problems.
Loutskina & Strahan (2009), Mian & Sufi (2009)	Negative	Reduced incentives to appropriately screen borrowers.
Downing et al. (2009)	Negative	Incentives to securitize low quality assets.
Piskorski et al. (2010), Agarwal et al. (2011)	Negative	Increased impediments to renegotiating distress loans.
Thomas (1999)	Positive	The preliminary investigation into the wealth effects of securitization has come to the conclusion that, at least for our sample at large, frequent and recent securitizers, significant positive returns are available to shareholders and no negative returns are available for bondholders.
Uzun & Webb (2007)	Negative	Whether securitization is applied, depends on the size of a bank. Bank size has been found to be a significant determinant of whether a bank securitizes. Furthermore, securitization has been found to be negatively related to the bank's capital ratio, although this result is mainly due to credit card securitization.
Benmelech et al. (2012)	Positive	The findings indicate that adverse selection in the securitization of corporate loans is at best weak.
An et al. (2009)	Positive	Securitization creates value, which derives it from liquidity enhancements, regulatory arbitrage, price discrimination and risk diversification for commercial mortgage-backed securities.
DeMarzo (2005)	Negative	In case an issuer has superior information about the value of its assets, it is better off selling assets separately than as a pool due to the information destruction effect of it.

In this research, my goal is to add to this academic debate by extending it through analysing the effects of securitization on the capital structure and lending behaviour of nonfinancial firms. This is valuable, as a major part of the academic literature focuses on mortgage-backed securities, financial firms and banks, while I focus on asset backed securities and nonfinancial firms. Additionally, I study a relatively new period (fiscal years 2013 and 2014), which can be considered as the aftermath of the financial crisis. This

period is especially interesting, as it shows whether securitization has a future. Thirdly, another part of the existing literature focuses on the determinants of securitization usage, while I extend this part through analysing the effects of securitization.

3.7 Conclusion and hypotheses

The existing literature is still mixed about whether securitization brings net positive or net negative effects compared to on balance sheet financing. An interesting work from the existing literature is Lemmon et al. (2014), as it is one of the works that is actually positive about the effects of securitization. Furthermore, they also include the reliable corporate capital structure variables from Frank and Goyal (2009). Thus Lemmon et al. (2014) is one of the works that is most similar to this paper. Their results show that nonfinancial firms using securitization are larger, have a significant amount of accounts receivables to finance and are in the middle of the credit rating distribution. Moreover, nonfinancial firms are also able to manage the information asymmetry problems that are often related to all types of securitization. As a result, the benefits of securitization seem to exceed the costs of securitization for a nonfinancial firm. I would thus expect that securitization has a positive influence on the capital structure of nonfinancial firms. Given the previous literature, I form the following hypothesis with respect to securitization and capital structure:

H1:**"*Does securitization affect the capital structure of nonfinancial firms in the United States?"***

CHAPTER 4 Research Design

In this section, I will further elaborate on how I test the theoretical relations in an empirical study. Furthermore, I will describe the data collection process, the variables that I use to answer my hypotheses and the sample that I use for that. Finally, I provide summary statistics and give a description of my methodology.

4.1 Data Collection, Sample and Summary Statistics

This study is limited to nonfinancial firms from the United States (US), for the fiscal years of 2013 and 2014. This sample of nonfinancial US firms is collected from Compustat, where I exclude financial firms (SIC codes between 6000 and 6999), firms involved in major mergers and regulated utility firms (SIC codes between 4900 and 4999). I use this specific period as the literature on securitization for the post-crisis period is still limited. Furthermore, possible signs that a new evolution in the securitization market is coming could be identified. Such an evolution has occurred before: "It has grown from a non-existent industry in 1970 to $6.6 trillion as the second quarter of 2003" (Cowan, 2003). Though, this amount is from the whole securitization market. The focus of this study is on the total amount of securitized nonfinancial debt and especially asset backed securities, thus excluding mortgages. In the years hereafter, the whole securitization market made a spectacular decline. More specifically, "the amount of securitized nonfinancial debt peaked at more than $170 billion in 2006, before declining to less than $80 billion by 2009 in the aftermath of the financial crisis" (Lemmon et al., 2014).

I manually collect the data for this study from various databases, which include mainly Compustat and SEC's EDGAR electronic filing system. Compustat is used for collecting information regarding both the dependent variables and control variables. The dependent variables are four different definitions of leverage, while the control variables include median industry leverage, market-to-book ratio, tangibility, profitability, firm size, firm age and the S&P long-term domestic issuer credit rating.

Finally, from SEC's EDGAR electronic filing system, I retrieve the 10-K fillings of nonfinancial firms. In these 10-K filings, I look whether a firm has initiated a securitization program in the past. This can be seen for example by the amount of borrowing (debt) in the special purpose entity (SPED). Although, my exact approach to identify securitization users, is through manually searching in the 10-K fillings for key words that suggest the use of securitization by a company. The specific words that I look for in the 10-K filings are "securitz (e)", "special purpose entity" or "off (-) balance sheet". In case I find the related word "variable interest entity (VIE)", I decide to not include this firm in my sample of securitization users. The argument for that is that a "special purpose entity" is a particular type of a VIE. The objection is thus that a VIE is not necessarily a special purpose entity as other forms are also possible, such as swaps.

Additionally, if applicable, I collect other details on the securitization program such as to what extent a company makes use of their securitization program ("Limit") and the ratio of securitized debt to total assets. This information was however not always available, as some companies do not mention their limit and outstanding borrowing. As a consequence, I have a selection bias since only companies that are positive about their securitizations are more likely to report the use of securitization that in the databases. I will tell more about this selection bias in section 6.2.

Another issue that occurred during the data collection process is that sometimes companies mention in later 10-K fillings that their securitization program ended a year before. The other possibility occurred as well, which is that a firm mentions that it wants to apply securitization in the future. This results in an unbalanced panel, which I will explain in the methodology section, section 3.3. Now, I will provide an example to illustrate a common observation of a company that applies securitization. This example is the firm Teleflex Incorporated. In their 2014 10-K filling they mention that they make use of securitization as follows[3]:

"In addition, we have an accounts receivable securitization facility under which we sell a security interest in domestic accounts receivable for consideration of up to $50.0 million to a commercial paper conduit. As of December 31, 2014, the maximum amount available for borrowing under this facility was $45.3 million. This facility is utilized from time to time to provide increased flexibility in funding short term working capital requirements. The agreement governing the accounts receivable securitization facility contains certain covenants and termination events. An occurrence of an event of default or a termination event under this facility may give rise to the right of our counterparty to terminate this facility. As of December 31, 2014 and 2013, we had $4.7 million of outstanding borrowings under our accounts receivable securitization facility".

Based on this fragment and the rest of the 2014 10-K of Teleflex Incorporated, I record the limit of the securitization facility to be $50.0 million. As the maximum amount available was $45.3 million at the 31st of December 2014, I calculated that the amount of borrowing is $4.7 million. This is a relatively straightforward example of a 10-K filling mentioning securitization. In some fillings, beside the problems of not mentioning their limit and amount of borrowing outstanding, they also had European securitization facilities. Fortunately, in most cases they stated the amount in U.S dollars according to the current exchange rate, otherwise, I applied the exchange rate at the fiscal year end date (31 December 2013 or 31 December 2014). The full amount of the securitization facility is then completely in U.S. dollars.

[3] Retrieved from: https://www.sec.gov/Archives/edgar/data/96943/000009694315000023/tfx-20141231x10k.htm

To sum up I have two different samples, namely nonfinancial firms that make use of securitization and nonfinancial firms that did not make use of securitization (the control group).

I will compare these two groups over time. In order to do this, the Compustat file will be merged with the SEC's EDGAR database. This process of merging these databases is based on the central index key (CIK) code and filing date, as is similar to the methodology of (Lemmon et al., 2014). This is however not the final dataset as further necessary restrictions are added, regarding missing values and outliers.

A first restriction is that an observation does not miss any information on the important control variables, which include for example market value of equity, total assets, operating income and accounts receivable.

Second, it is necessary to know whether the observation did make use of securitization or not. In the process of data collecting, it occurred several times that the 10-K wasn't available. These firms were of course deleted from the dataset, as well as firm that provided unclear information on securitization in their 10-K filing.

The final step is to correct for outliers. I do this by excluding firms with a negative market-to-book ratio and applying winsorization at the 0.5^{th} and 99.5^{th} percentiles. In the end, the total sample includes 114 firms that have used securitization in 2013 and 116 firms in 2014. The number of firms that did not use securitization in these years count up to 4305 firms. Form this total sample, I created a subsample that include only firms with information on all (accounting) variables. As a result, the final sample holds 60 and 63 firms that do not use securitization in 2013 and 2014, while the number of firms applying securitization is reduced to 87 firms in both 2013 and 2014.

Table 3A – Summary statistics total sample

This table presents the summary statistics for each fiscal year on securitization usage by nonfinancial and nonutility firms. The data is retrieved from Compustat and SEC's EDGAR database. The column "Number of firms using securitization" indicates how many firms apply securitization in that fiscal year. The "Fraction of all firms" shows the percentage of all firms in the sample that make use of securitization. Then "SPED" is the amount of debt that is related to securitization activity, where the "Total SPED" column reports the total amount of borrowing (debt) the securitization firms have together in a specific year. After that some key ratios are reported, where "Firm D" and "Firm A" are the debt and assets that the firm has, without securitization debt. Then "Total D" and "Total A" are the debt and assets of the firm including securitization debt. "Limit" is then the maximum amount of debt according to the securitization facility that a firm can borrow. The data mentioned below, is measured at the end of a fiscal year. Finally all ratios are winsorized at the 0.5^{th} and 99.5^{th} percentiles.

	2013	2014	Average
Number of firms **not** using securitization	2149	2156	2152.5
Number of firms using securitization	114	116	115
Fraction of all firms	5.30%	5.38%	5.34%
Total SPED ($ millions)	134079	187519	160799
Average SPED	1176	1616	1396
Firm D / Firm A	42.30%	41.80%	42.05%
Total D / Total A	43.34%	42.87%	43.11%
SPED / Total A	3.10%	5.04%	4.07%
SPED / Total D	13.69%	14.45%	14.07%
Limit / Total D	21.49%	20.13%	20.81%
Limit / Total A	7.21%	6.05%	6.63%
SPED / Limit	54.90%	57.90%	56.40%

From Table 3A, several important characteristics are visible. First, the fraction of nonfinancial firms using securitization compared to firms not using securitization is slightly increasing from 5.30 to 5.38%. This is a first indication that securitization can look positive at its future as the relative number of firms using securitization has risen. Second and more importantly, is the amount of debt that the firms using securitization have together. If we compare this to the levels before and during the financial crisis, a remarkable pattern is visible. As Lemmon et al. (2014) find that in 2006, $174 billion of securitization debt was outstanding, whilst this amount was $90 billion in 2009, it seems that the securitization market has revived with amounts of $134 billion in 2013 and almost $188 billion in 2014. Furthermore, if we relate this also to Gorton & Metrick (2012), these numbers seem to be consistent. As they find that the total amount of asset-backed securities was $151 billion in 2009, while decreasing to $107 billion in 2010. Thirdly, the percentages of SPED divided by the limit of the securitization program show that the

firms that do use securitization are not making use of its full capacity with percentages of 54.90% and 57.90%. They leave almost the half of the securitization unused. Fourthly, the percentages of total debt divided by total assets, which are 43.34% and 42.87% in 2013 and 2014 respectively, seem to correspond with the existing literature that highly risky firms do not make use of securitization. This is also confirmed by looking at the S&P long-term domestic issuer credit ratings of the securitization users:

Table 3B – Summary statistics S&P long-term domestic issuer credit rating and firm age for the final sample, that include information on all control variables

This table present the summary statistics for the subsample that includes only the firms having data on the S&P long-term domestic issuer credit rating from Compustat. "Average credit rating" shows the S&P long-term domestic issuer credit rating, where the numerical value is based on a scale from 1 (AAA) till 22 (D). The "Average firm age" is in years, which starts from 1950 as firm data from Compustat is available since this year.

	2013	2014	Total
Number of firms **not** using securitization	60	63	123
Average S&P long-term domestic issuer credit rating (numerical value)	BBB- (10.05)	BBB- (10.08)	
Average firm age (in years)	36.91	36.83	
Number of firms using securitization	87	87	174
Average credit rating Average credit rating (numerical value)	BB+ (10.75)	BB+ (10.76)	
Average firm age (in years)	41.91	42.10	

As noted before, the number of firms that include an S&P long-term domestic issuer credit rating reduces the number of observations significantly. In table 3B however, we have the final sample that will be used to answer the research question. Information on important key ratios and the other variables follows in Table 5.

The average numerical value with respect to the S&P long-term domestic issuer credit rating is approximately 11 (10.75 in 2013 and 10.76 in 2014), which corresponds with a BB+ rating and suggests that very risky firms do not make use of a securitization program in the post-crisis years. Table 4 below shows how firms are distributed across industries:

Table 4 – Securitization usage and industry

This table displays how the sample of securitization users is distributed over different industries, according to the SIC Division Structure:

Number	**Industry Classification**	**Amount of securitization users**
1	Mining (SIC codes 1000-1499)	10
3	Manufacturing (SIC codes 2000-3999)	76
4	Transportation, Communications, Electric, Gas and Sanitary Services (SIC codes 4000-4999)	48
5	Wholesale Trade (SIC codes 5000-5199)	6
6	Retail Trade (SIC codes 5200-5999)	6
7	Services (SIC codes 7000-8999)	24
9	Nonclassifiable (SIC codes 9900-9999)	4
Total		174

This table shows that according to the SIC Division classification, a significant part of the firms that securitize come from two different industries. This is reflected in the fact that 71.3% (124 / 174) of the securitizing firms come from the 'manufacturing' or 'transportation, communications, electric, gas and sanitary services' industry. However, this is a result that is not addressed in this paper and holds specifically only for this industry classification method. More important are the summary statistics regarding key ratios and regression variables:

Table 5 – Summary statistics key ratios and regression variables

This table gives an overview of the summary statistics of important ratios, the control variables and the dependent variables. It presents the descriptive statistics of variables measured in the fiscal years 2013 and 2014. The last column, 'Non-S' reports the average of all the firms that do not make use of securitization at all (either 2013 or 2014). The calculated ratios have been winsorized at the 0.5th and 99.5th percentiles. The *, **, *** indicate a significant difference between securitization and non-securitization users, at respectively the 10%, 5% and 1% level.

	Mean	Median	Std. Dev	25th Pctl	75th Pctl	Non-S Mean
Total Debt / Total Assets	0.439	0.359	0.483	0.286	0.484	0.339
Debt in current liabilities / Total Debt	0.088	0.050	0.119	0.010	0.118	0.07***
Operating income before depreciation / Total Assets	0.123	0.114	0.064	0.087	0.147	0.125***
Control Variables						
Median industry leverage [C1]	0.266	0.126	0.386	0.024	0.336	0.321***
Market-to-book ratio [C2]	1.255	1.031	1.015	0.779	1.432	1.262***
Tangibility [C3]	0.393	0.337	0.253	0.176	0.621	0.399**
Profitability [C4]	0.123	0.114	0.064	0.087	0.147	0.125***
Firm size (log of assets) [C5]	18.54	18.302	2.616	16.569	20.476	17.977***
S&P long-term domestic issuer credit rating [C6]	10.481	10.000	2.866	8.75	13.000	10.08
Firm Age (in years from 1950) [C7]	39.818	40.000	22.037	19.000	65.000	36.837***
Dependent variables						
1. Total Debt to Market Value of Assets [TDM]	0.367	0.323	0.210	0.214	0.500	0.341***
2. Total Debt to Book Value of Assets [TDB]	0.381	0.345	0.252	0.268	0.465	0.339

The summary statistics and the mean-median difference test provide several interesting insights, regarding the group of securitization users and the control group. A mean difference test is a test where you want to investigate whether the mean of two independent samples are equal. It basically looks as follows: $Y_1 \sim n(u_1, \sigma_1)$

$Y_2 \sim n(u_2, \sigma_2)$

Where u is the mean and σ^2 is the variance and the hypothesis is $H_0: u_1 = u_2$ (Dalen & de Leede, 2009).

Firstly, we can see that the mean level of the ratio total debt divided by total assets is higher among the securitization group (0.439) than the control group (0.339). However, the difference between both groups is not significant, which means that securitization firms do not necessarily have a higher total debt to total assets ratio. Though, if we look to the first control variable, median industry leverage, the matched control group of non-securitization users has a significantly higher level of leverage than the securitization firms. This suggests that the leverage ratio among the control group is actually somewhat higher than the leverage ratio securitization firms, implying that securitization firms are not high risk firms. Thirdly, we see that almost all the other control variables, which are based on Frank & Goyal (2009), show significant differences between the two groups. Based on these significant differences, we can conclude that a firm that securitizes seems to be older in firm years, bigger in firm size, slightly less profitable, slightly less tangible and having marginally less growth opportunities. However, in some cases, the differences seem minimal. Finally, a remarkable pattern is visible between the proxies for capital structure. Table 5 shows that there are significant differences among the ratio of total debt to the market value of assets and the long term debt to market value of assets ratio. The matched control group shows significantly lower levels of these two (market) ratios, suggesting that they have relatively less debt in their capital structure than securitizing firms. Furthermore, interesting is that there are no significant differences between the two group if we look to the ratios that include the book value of assets. Although, I still include them in this paper for robustness purposes and investigate their use through a cross correlation table.

4.2 Description of variables

In this section, I describe all the variables that I use in this study. First, I describe the dependent variables together with several control variables. Finally, I also describe additional control variables that I use and give definitions of the independent variables that are collected from Compustat and SEC's EDGAR.

I use two different forms of leverage, to proxy for the capital structure of a nonfinancial firm. These different forms of leverage are 1) the ratio of total debt to market value of assets (TDM) and 2) the ratio of total debt to book value of assets (TDB).

In these specifications of capital structure, total debt consists of two parts. The first part is the total amount of debt in current liabilities and the second part is the total amount of long term debt. Thus both proxies 1) and 2) consist of both parts of debt. Additionally, I wanted to include two other proxies as well, that include only long-term debt. However, this give collinearity issues. For proxy 2) book value is measured as the amount of common shares outstanding multiplied by item BKVLPS (book value per share) in Compustat. Finally, market value is specified as the total fiscal market value, also known as item

MKVALT in Compustat. A summary of the dependent variables and their exact specifications is also shown below in Table 6A.

Table 6A – Description dependent variables

The table below shows an overview of the proxies that I use for measuring capital structure. All the data regarding the capital structure of a firm are collected from Compustat.

Variable Name	Definition
TDM capital structure 1	the ratio of total debt to market value of assets (TDM)
TDB capital structure 1	the ratio of total debt to book value of assets (TDA)
Where the exact specifications are as follows:	
Book value	Is defined as the number of common shares outstanding times the book value per share (item BKVLPS in Compustat).
Market value	Is the item MKVALT in Compustat, which is the total fiscal market value.
And total debt consists of the sum of:	
Debt in current liabilities	Debt in Current Liabilities – Total
Long term debt total	Long term debt total, Compustat item DLTT

The effect of securitization on capital structure will be approached through these four dependent variables. However, to investigate this relationship I will correct for several other influences. In order to do so, I use all reliable control variables for market leverage, following Frank & Goyal (2009) to measure capital structure. The first control variable is 'Median Industry Leverage', which measures the median leverage level from a particular industry. It is the first core factor from Frank & Goyal (2009) and accounts for the effect that when the median firm in the industry has a high level of leverage, other firms tend to have a high level of leverage as well. It is defined as the median of total debt to market value of assets by SIC code and by year. Thus, it intends to control for industry effects, where industry is defined at the four digit SIC-code of a firm. The second core factor is the 'Market-to-book' ratio, measured as the ratio of the market value of assets to the total book value. The market value of assets is then defined as the sum of the market value of equity plus short-term debt plus long-term debt plus preferred-liquidation value minus deferred taxes and investment tax credit. Book value is already specified in Table 6A above. The market value of assets is included, to account for differences in growth opportunities. A higher

market to book ratio suggests that a firm has more growth opportunities, as the market value of the firm is more favorable than its accounting value. As a consequence, firms with a higher market to book ratio tend to have a higher level of leverage and this control variable accounts for that effect. The third core factor is 'tangibility', which measures the relative amount of tangible assets that a firm has. If a firm has relatively more tangible assets, it is easier to get access to financing. This results in the effect that when a firm has a higher tangibility, it tends to have a higher level of leverage. Tangibility is defined as the ratio of net property, plant and equipment to total assets, item 6 of Compustat. The fourth core factor is 'profitability', which is the ratio of operating income before depreciation (item 13 of Compustat) to total assets (item 6 of Compustat). It accounts for the effect, that when a firm has a higher profitability, a firm tends to have a lower level of leverage. The fifth core factor is 'firm size', which is measured as the log of total assets. The total assets are deflated to the applicable year (2013 or 2014) using the GDP deflator. Firm size captures the effect that a bigger firm, should have relatively easier access to (debt) financing. The relationship is thus that a larger firm tends to have a higher level of leverage. I also control for this effect when studying the relationship between securitization and capital structure. The definitions of these core control factors are also summarized below in table 6B:

Table 6B – Description core control variables

This table shows the core factors that I use to control for the most important influences that could influence the measurement of the relationship between securitization and capital structure. These five core factors are from Frank & Goyal (2009). They find that these were the most reliable in measuring capital structure, when considering a market-based proxy for capital structure while tangibility, profitability and firm size have been found to be only reliable for a book value based proxy for capital structure.

Core Factor	**Influence**	**Description**	**Expected Sign** ('+' = positive relationship, '-' = negative relationship, '0' = neutral relationship)
Median industry leverage [C1]	Firms in industries in which the median firm has high leverage tend to have high leverage.	Is the median of total debt to market value of assets, by SIC code and by year. Industry is then defined at the four-digit SIC code level in the main results	+

Market-to-book ratio [C2]	Firms that have a high market-to-book ratio tend to have lower leverage.	Market-to-book ratio, is the ratio of the market value of assets to Compustat item 6, assets (AT)	-
Tangibility [C3]	Firms that have more tangible assets tend to have higher leverage.	Is the ratio of Compustat item 8, net property, plant and equipment (PPENT), to Compustat item 6, total assets (AT)	+
Profitability [C4]	Firms that have more profits tend to have lower leverage.	Is the ratio of Compustat item 13, operating income before depreciation (OIBDP), to Compustat item 6, total assets (AT)	-
Firm size [C5]	Firms that are large (in terms of assets) tend to have high leverage.	Is the log of Compustat item 6, total assets (AT), deflated to 2013 or 2014 dollars using GDP deflator	+

Source: Frank and Goyal (2009)

In case of measuring the proxies of capital structure that include the book value of assets, I apply an adjustment. This adjustment is based on Frank & Goyal (2009), as they found that firm size, the market to book ratio and the effect of inflation were not reliable in case of measuring the book value of assets. However, in addition I extend their approach, by using three additional control variables as well, which are commonly used in the literature on securitization (Kisgen, 2006 ; Lemmon et al. 2014). These variables include the S&P long-term domestic issuer credit rating and firm age. The S&P long-term domestic issuer credit rating is added to account for the differences in credit rating and thus creditworthiness between firms.

Furthermore, Lemmon et al. (2014) find that firms are more likely to use securitization, when they are concentrated in the middle of the credit quality distribution. The argument is that firms with a high rating already have good access to the credit markets, while firms with low ratings cannot use securitization as they are limited in their actions through existing creditors or face agency problems. Finally, I also include firm age as a control variable. The intuition behind this control variable, is that older firms have had more opportunities to retain their earnings and build up a strong(er) reputation compared to younger firms. I

thus expect that firm age affects the relationship between securitization and capital structure in a positive way. An overview of the three additional control variables and their definitions is provided below in table 6C:

Table 6C – Description additional control variables

In this table I present the additional control variables that I include, in extension to the six core factors from Frank & Goyal (2009). The variable 'Business Cycle' is obtained from the World Bank, while S&P long-term domestic issuer credit rating and Firm age are from the Compustat database.

Additional variable	**Description**	**Expected Sign** ('+' = positive relationship, '-' = negative relationship, '0' = neutral relationship)
S&P long-term domestic issuer credit rating [C6]	Is the current domestic long-term credit rating, issued by the credit rating agency Standard & Poor's (SPLTICRM). It reflects the overall creditworthiness of a company, apart from repaying individual obligations. It is a discrete variable that can take on a value between 1 and 20: AAA, AA+, AA, AA-, A+, A, A-, BBB+, BBB, BBB-, BB+, BB, BB-, B+, B, B-, CCC+, CCC, CCC- and anything below CCC- respectively.	+
Firm age [C7]	This is set to 66 for the first fiscal year that accounting data was available for a firm in Compustat, as this data is available since 1950.	+

Finally, I describe the independent variables that I include in this study to test my research question. These are the securitization variables, which are the intensity of securitization usage and the limit of the securitization facility. I also add a dummy variable for using securitization itself, in order to add robustness by controlling for the amount of securitization facility. The intensity of securitization is measured through two different ratios, which are the amount of the securitization facility to the total assets of the firm and the amount of the securitization used compared to the limit of the securitization facility. I expect that securitization has a positive influence on the capital structure of a nonfinancial firm, due to the interesting and distinguishing benefits of securitization compared to traditional on balance sheet financing and the fact. To summarize the independent variables that I use, I provide table 6D below:

Table 6D – Description independent variables

This table summarizes the 'securitization' variables that I use in my study. They each measure the intensity of securitization. Three different specifications are used, for robustness purposes. The data regarding each independent variable is obtained through manually checking the 10-K filings of each firm in the SEC EDGAR database. From this database, I collected the amount of securitization usage in millions of US dollars.

Independent variable	**Description**	**Expected Sign** ('+' = positive relationship, '-' = negative relationship, '0' = neutral relationship)
Intensity of securitization, specification 1: Amount of securitization / total assets [SEC 1]	An intensity variable of securitization that is the ratio of securitized debt to Compustat item 6, Total Assets (AT). This variable is displayed in percentages (%).	+
Intensity of securitization, specification 2: Amount of securitization / limit of the securitization facility [SEC 2]	An intensity variable of securitization, that shows how much of the total capacity of the securitization facility is used. This variable is displayed in percentages (%).	+

Unfortunately, the data on the third independent variable of the intensity of securitization was not available for every firm that applies securitization. This can be explained through the fact that not all firms have a limit on their securitization program, or that firms do not report this limit. As a result, for the third specification, the final sample for investigating the relationship between capital structure and securitization is reduced from 174 firms to 88 firms, which can be seen in table 6E on the next page.

Table 6E – Summary statistics independent variables

This table reflects the summary statistics of the three different specifications for securitization. As is visible, there are less observations for the third specification for the intensity of securitization, which is due to the fact that a smaller number of firms report the limit of their securitization facility in the their 10-K fillings. All the numbers have been winsorized at the 0.5^{th} and 99.5^{th} percentiles.

	Mean	Median	Std. Dev	25th Pctl	75th Pctl	Number of firms
Amount of securitization / Total Assets (in %), [SEC 1]	0.099	0.018	0.341	0.008	0.047	174
Amount of securitization / Limit of securitization facility (in %), [SEC 2]	0.547	0.544	0.310	0.270	0.857	88

From this table, we can see that the intensity of securitization is significant in size, for all the three specifications of securitization intensity. In terms of total assets, securitization is only ten times smaller in size on average. This implies that securitization is a significant financing form, which is also confirmed by the fact that it makes up almost 19% of the total debt that these firms have. Moreover, it implies that securitization is relevant for the whole capital structure of a firm.

Finally, if we look to the third specification of the intensity of securitization the remarkable result is that nonfinancial firms do use only 55% of their securitization facility on average. This suggests that firms are conservative in using the full facility, as they keep a significant part of the capacity open for possible use in future years.

4.3 Methodology

In order to measure the (positive) influence of securitization on capital structure, I use panel data regressions. I use the methodology of panel data regressions, since the dataset has two dimensions. The first dimension is a cross-sectional dimension, as I have a sample of different nonfinancial firms. The second dimension is a time-series dimension as the different nonfinancial firms are analyzed over two years (2013 and 2014). However, as mentioned before, several firms mention a securitization facility of earlier years, leading to an unbalanced panel. Therefore, I need quantitative data from various databases, which include Compustat, and SEC's Edgar for the 10-k fillings of nonfinancial firms. Based on this quantitative data, I will use panel data regressions in order to answer my first hypothesis whether securitization affects the capital structure of a nonfinancial firm. These different panel data regressions exist of one of the three different specifications of securitization, several control variables and dummy

variables for robustness issues. Thus, with respect to the first proxy of capital structure (TDM), the econometric model looks as follows:

$$\text{TDMLeverage } 1 = \alpha_i + \beta_1 * SEC\ 1 + \beta_2 * \text{Median industry leverage} + \beta_3 * \text{Market to book ratio} + \beta_4 * \text{Tangibility} + \beta_5 * \text{Profitability} + \beta_6 * \text{Firm size} + \beta_7 * \text{S\&P long} - \text{term domestic issuer credit rating} + \beta_8 * \text{Firm age} + \varepsilon_i$$

This econometric model is extended by another econometric model that measures securitization through a different specification. That specification of securitization is the ratio of the amount of securitization to the limit of the securitization facility (SEC 2) in order to add robustness:

$$\text{TDMLeverage } 1 = \alpha_i + \beta_1 * \text{SEC } 2 + \beta_2 * \text{Median industry leverage} + \beta_3 * \text{Market to book ratio} + \beta_4 * \text{Tangibility} + \beta_5 * \text{Profitability} + \beta_6 * \text{Firm size} + \beta_7 * \text{S\&P long} - \text{term domestic issuer credit rating} + \beta_8 * \text{Firm age} + \varepsilon_i$$

Although, now I still need to control for industry, time and firm-specific influences. This means that industry fixed effects, time fixed effects and firm fixed effects should be added. However, I decided to include only industry fixed effects and period fixed effects, as firm fixed effects might be less meaningful. Firm fixed effects might be less meaningful, because it is difficult to determine for what difference between firms we want to control for.

$$\text{TDMLeverage } 1 = \alpha_i + \beta_1 * SEC\ 1 + \beta_2 * \text{Median industry leverage} + \beta_3 * \text{Market to book ratio} + \beta_4 * \text{Tangibility} + \beta_5 * \text{Profitability} + \beta_6 * \text{Firm size} + \beta_7 * \text{S\&P long} - \text{term domestic issuer credit rating} + \beta_8 * \text{Firm age} + \beta_9 * \text{Industry } Dummy_{[\textit{where industry is based on the SIC division structure}]} + \beta_{10} * \text{Year } Dummy_{[2013=1,2014=0]} + \varepsilon_i$$

Additionally, the issue of a possible non-linear relationship between securitization and capital structure will be investigated. Therefore, I apply a log transformation to the securitization and capital structure variables:

$$\ln \text{TDMLeverage } 1 = \alpha_i + \beta_1 * \ln \text{SEC } 1 + \beta_2 * \text{Median industry leverage} + \beta_3 * \text{Market to book ratio} + \beta_4 * \text{Tangibility} + \beta_5 * \text{Profitability} + \beta_6 * \text{Firm size} + \beta_9 * \text{S\&P long} - \text{term domestic issuer credit rating} + \beta_{10} * \text{Firm age} + \beta_{11} * \text{Industry } dummy_{[\textit{where industry is based on the SIC division structure}]} + \beta_{12} * \text{Year } dummy_{[2013=1,2014=0]} + \varepsilon_i$$

This is the final regression, although I first check for multicollinearity issues, through a cross-correlation table. I suspect multicollinearity to be an issue between the variables of business cycle and inflation expectations, as I think they are relatively similar. Nevertheless, this final regression is also used for another specification of securitization, which is securitization divided by the limit of the securitization

facility (SEC 2). This other specification of securitization is also regressed on another variant of capital structure, namely the amount of total debt divided by the book value of assets (TDB):

$$\ln \text{TDBLeverage } 1 = \alpha_i + \beta_1 * \ln SEC2 + \beta_2 * \text{Median industry leverage} + \beta_3 * \text{Market to book ratio} + \beta_4 * \text{Tangibility} + \beta_5 * \text{Profitability} + \beta_6 * \text{Firm size} + \beta_9 * \text{S\&P long} - \text{term domestic issuer credit rating} + \beta_{10} * \text{Firm age} + \beta_{11} * \text{Industry } dummy_{[\textit{where industry is based on the SIC division structure}]} + \beta_{12} * \text{Year } dummy_{[2013=1,2014=0]} + \varepsilon_i$$

Furthermore, I also apply a regression for the control group, where capital structure (TDM) is regressed on the control variables:

$$\ln \text{TDMLeverage } 1 = \alpha_i + \beta_1 * \text{Median industry leverage} + \beta_2 * \text{Market to book ratio} + \beta_3 * \text{Tangibility} + \beta_4 * \text{Profitability} + \beta_5 * \text{Firm size} + \beta_6 * \text{S\&P long} - \text{term domestic issuer credit rating} + \beta_7 * \text{Firm age} + \beta_8 * \text{Industry } dummy_{[\textit{where industry is based on the SIC division structure}]} + \beta_9 * \text{Year } dummy_{[2013=1,2014=0]} + \varepsilon_i$$

I believe that these regressions allow to test for a causal relationship between securitization and capital structure, as several variables have been identified in the previous literature to have a strong relationship with either one of them. Thus, the regressions control for influences that have been identified as determinants of securitization usage in the existing literature. Therefore, I believe the panel data regressions imply a causal relationship rather than just being a correlation between securitization and capital structure. To summarize the research design for the main research question, I include a predictive validity framework in Appendix A.

CHAPTER 5 Empirical Results and Analysis

In this section I describe the results concerning securitization and how it affects the capital structure of nonfinancial firms. The summary statistics of the variables that I used in the panel data regressions are reported in Table 5. In order to answer the research question accurately, I use three unique regression models for the capital structure specifications TDM and TDB. Thus in total, I have six regression models to test the influence of securitization on capital structure. The results of these panel data regressions are described in section 5.1 for the TDM capital structure proxy and in section 5.2 for the TDB capital structure proxy. Finally, section 5.3 discusses the robustness of the results.

5.1 Securitization and capital structure proxy TDM

The relationship between securitization and the ratio of total debt divided by market value of assets is presented in table 7. In studying this relationship, I control for all five core factors (median industry leverage, market-to-book ratio, tangibility, profitability and firm size, as identified by Frank & Goyal (2009). Additionally, I also control for the influence of credit rating and firm age in examining the research question. Regression (1) includes all these control variables and tests the influence of the intensity of securitization on the capital structure proxy TDM. The intensity of securitization is then constructed as the amount of securitization divided by the total assets of the firm. While, regression (2) uses the exact same model, except that it uses another specification for the intensity of securitization. More specifically, regression (2) measures securitization as the amount of securitization divided by the securitization facility limit. Finally, regression (3) presents the control group and thus examines the relation between TDM and all the control variables. If the research question is correct then there should be a significant coefficient for the securitization variable. In case a firm uses securitization, one would expect that the capital structure of that firm is positively affected, as securitization minimizes financing costs by reducing expected bankruptcy costs and providing access to segmented credit markets (Lemmon et al., 2014).

TABLE 7

Securitization and the influence on Capital Structure, specification TDM

Table 7 presents the regression results on how securitization affects the capital structure of nonfinancial firms, where the capital structure of a firm is specified as the ratio of total debt to market value of assets. The regressions were performed on observations in a period from 2013 – 2014. Regression (1) includes all the firms that apply securitization, while regression (2) contains only the firms that also report the limit of their securitization facility. Finally, regression (3) includes only the control group (the firms that do not apply securitization). The T-statistic of each coefficient is given in the parentheses, and the two-tailed significance levels are reported by the *, **, *** marks with a significance value of respectively; 0.10, 0.05 and 0.01.

	Dependent Variable: ln (TDM Leverage)		
	Estimation Method: Panel Least Squares		
Variables	(1)	(2)	(3)
ln(SEC 1)	0.063** (2.19)	-	-
ln(SEC 2)	-	0.059 (1.18)	-
Median industry leverage	0.075 (1.20)	0.093 (1.24)	0.146*** (3.03)
Market-to-book ratio	-0.011*** (-0.32)	-0.112* (-1.82)	-0.149*** (-4.79)
Tangibility	0.115 (0.99)	-0.106 (-0.97)	0.096 (0.97)
Profitability	-0.296 (-0.62)	-1.201* (-1.81)	0.022 (0.05)
Firm Size (log of total assets)	0.045*** (4.24)	0.037** (2.63)	0.010 (1.09)
Credit Rating	0.049*** (6.03)	0.053*** (4.77)	0.027** (2.25)
Firm Age	0.002* (1.92)	-0.001 (-0.40)	-0.001 (-0.83)
N	174	88	123
Adjusted R^2	41.87%	55.11%	60.46%
Year fixed effects	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes

If we look to regression (1), only the control variables market to book ratio, firm size, credit rating and firm age appear to have a significant relationship with capital structure proxy TDM. This is in contradiction with Frank & Goyal (2009), as the control variables median industry leverage, tangibility and profitability should be significant as well. However, most importantly is the positive and significant coefficient of securitization of 0.063 at the 5% significance level. This implies that securitization does

influence the capital structure in a positive way. In other words, according to regression (1) nonfinancial firms seem to achieve net benefits from securitization usage.

Remarkably, the positive effect of securitization on the capital structure remains in regression (2), although it is not significant when securitization is measured as ratio of the securitization facility limit. This is however a different way of measuring securitization as an intensity variable. It suggests that for the firms reporting the limit of their securitization facility, securitization does not affect their capital structure. From regressions (1) and (2) we can conclude that securitization does influence the capital structure of a firm, although when the firm has a limit on its securitization facility the relationship does not hold.

Regression (3) is the model of the control group, where in addition the effect of median industry leverage has a significant effect on the capital structure proxy TDM. Nevertheless, the results concerning the control variables seem worrisome, as all control variables should have a significant effect. Though the model that Frank & Goyal (2009) use, includes several more variables and are examined for publicly traded firms over a longer period. The result that credit rating is found to be significant in all estimation models, should not come as a surprise. Lemmon et al. (2014) and Rosegg (2016) find that credit rating is a significant determinant of securitization usage and especially nonfinancial firms in the middle of the credit rating distribution are more likely to use securitization.

More closely related is Lemmon et al. (2014) and finding a significant effect of credit rating and firm size on securitization is in correspondence. Although Lemmon et al. (2014) uses an indicator variable as dependent variable and thus does not use an intensity variable of securitization usage. This could also explain why I have relatively high adjusted R^2 in my estimation models, compared to them. However, this is a subjective process, as this specific methodology for analysing the effect of securitization on capital structure is not seen before. Furthermore, in the models, I find heteroscedasticity. I control for this effect through the use of White standard errors. In addition, I investigated the issue of autocorrelation through a Durbin-Watson test. The models have approximately a Durbin-Watson statistic of 0.40, which suggests positive autocorrelation to be present. I tried to correct for the presence of autocorrelation through applying a first differences transformation, although this results in a significant drop of observations. Probably, the White diagonal standard errors and covariance correct for autocorrelation, although I am not completely sure of that. Thus a first limitation of this research is the possible presence of autocorrelation.

Besides the aspect of autocorrelation, I observed how the relationship between securitization and capital structure is in the case of cross-section random effects, in addition to the econometric model described in section 4. I decided to do so, because the Hausman test did indicate that the use of fixed effects is not

preferred for regressions (2) and (3). If the p-value for the test is less than 1%, this indicates that the random effects is not appropriate and that the fixed effects model is to be preferred (Brooks, 2014).

The results of the estimation models with cross-section random effects can be found in Appendix D. For the TDM capital structure proxy, we can see that securitization appears to have an insignificant effect on capital structure in all regressions. This puts doubt on the claim that securitization does influence the capital structure of nonfinancial firms. Perhaps the investigation of the relationship between the ratios of total debt divided by the book value of total assets and securitization can help to form a final conclusion.

5.2 Securitization and capital structure specification TDB

Table 8 presents the results of the panel least squares for the investigation of the relationship between securitization and capital structure that is represented through the ratio of total debt to the book value of assets. The regressions follow the similar structure as is the case in table 7. Regression (1) examines the effect of the intensity of securitization (measured as the amount of securitization divided total assets) on the capital structure specification TDB. Then, regression (2) differs from regression (1) in the sense that it measures the intensity of securitization as the amount of securitization divided by the limit of the securitization facility. Finally, regression (3) is the regression for the control group, where we only look to the effect of the control variables on capital structure.

TABLE 8

Securitization and the influence on Capital Structure, specification TDB

Table 8 presents the regression results on how securitization affects the capital structure of firms. In the table, the capital structure of a firm is specified as the ratio of total debt to book value of assets. The regressions were performed on observations in a period from 2013 – 2014. Regressions (1) and (2) include all the firms that apply securitization, while regression (3) contains only the firms that also report the limit of their securitization facility. Finally, regression (4) includes only the control group (the firms that do not apply securitization). The T-statistic of each coefficient is given in the parentheses, and the two-tailed significance levels are reported by the *, **, *** marks with a significance value of respectively; 0.10, 0.05 and 0.01.

	Dependent Variable: ln (TDB Leverage)		
	Estimation Method: Panel Least Squares		
Variables	(1)	(2)	(3)
ln (SEC 1)	0.051*** (1.87)	-	-
ln (SEC 2)	-	0.07 (1.53)	-
Median industry leverage	0.049 (0.97)	0.097 (1.21)	0.09** (2.12)
Tangibility	-0.015 (-0.14)	-0.109 (-0.99)	-0.014 (-0.15)
Profitability	-0.202 (-0.44)	-0.065 (-0.08)	0.190 (0.40)
Credit Rating	0.042*** (4.87)	0.061*** (6.28)	0.011 (0.88)
Firm Age	0.001 (0.86)	-0.001 (-0.46)	0.001 (-0.95)
N	174	88	123
Adjusted R^2	41.41%	34.60%	18.71%
Year fixed effects	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes

Interestingly, similar results arise, compared to the TDM specification for capital structure. This is somewhat surprising, as there is a significant difference between measuring capital structure through the market value or book value of assets. In Appendix B, I provide a cross correlation table, which shows that the correlation between TDM and TDB is 0.68. This shows that multicollinearity should not be an issue, although an exact benchmark to name two variables collinear does not exist.

The results of table 7 and 8 show that securitization does influence the capital structure of a nonfinancial firm, although this only holds when the nonfinancial firm does not have a limit on its securitization facility. The null hypothesis that securitization does not influence the capital structure of a nonfinancial

firm can be rejected, as I find that one specification of securitization has a significant effect on capital structure, either measured through TDM or TDB.

5.3 Robustness of estimation models

Several issues of statistical inference are already addressed for robustness purposes. First, I already mentioned that I have included a cross correlation table in Appendix B, to address the issue of multicollinearity. If we look to the cross correlation table as a whole, this suggests that multicollinearity is absent. Secondly, the variables for securitization (SEC 1 and SEC 2) and capital structure (TDM and TDB) displayed a skewed distribution (non-normality), which is corrected through applying a log transformation for each of these variables. As a result, the skewness and kurtosis for these variables is significantly reduced, which can be seen in Appendix F. Additionally, I winsorized the variables at the 0.005 and 0.995 thresholds to further remove the non-normality of the regression variables as is seen in similar studies (Lemmon et al., 2014 ; Rosegg, 2016). Thirdly, as mentioned before, heteroscedasticity is tackled through the use of White standard errors. Nevertheless, autocorrelation remains a problem, as the Durbin Watson statistic was approximately 0.40, while a value around 2 is desired. The data includes only two years' time, so if autocorrelation is present, then the effect should be limited.

Further exploration of autocorrelation through a Breusch-Pagan LM test, Pesaran scaled LM or Pesaran CD test were unfortunately unable, as non-zero cross-section means were detected in the data, so that the test employs centered correlations computed from pairwise samples. Fourthly, all models include year fixed effects and industry fixed effects, to account for unobserved heterogeneity or omitted variable bias.

Fifthly, I repeated the analysis with cross-section random effects, as in Appendix C, the Hausman test indicates that the fixed effects model was not preferred for regressions (2) and (3). The results of the estimation models with cross-section random effects can be found in Appendix D. Finally, I also conducted the analysis, where securitization is modelled as an indicator or dummy variable, which is listed in Appendix E.

5.4 Limitations

A first limitation of the research is that the number of observations is limited, although this research specifically focuses on the effect of securitization on capital structure in the years after the financial crisis. This could be easily extended through including the fiscal year 2015 as well. Furthermore, this data has been manually collected through searching in10-K fillings for specific words that indicate the use of securitization and therefore is not completely free of error. However, this could easily be prevented

through the use of textual analysis tools such as perl or python, which also helps to extend the number of observations.

More important is the exclusion of firm fixed effects in this research, next to year fixed effects and industry fixed effects. Although, including firm fixed effects next to industry fixed effects resulted in collinear issues, as they are perfectly collinear. Nevertheless, analyzing the influence of securitization on the capital structure of a firms with firm fixed effects, year fixed effects and industry fixed effects is possible, however this would result in a cross-classified random effects model with the condition that a firm belongs to multiple industries. Another possibility is to use fixed effects vector decomposition, in which the fixed effects are explained through other variables. Including firm fixed effects next to industry and year fixed effects could be interesting, as this controls for example for an optimistic CEO versus a pessimistic CEO or changes in the board. However, these suggestions are more appropriate when investigating the determinants of securitization usage.

A third limitation is that there is potentially a selection bias in the data collection process. There is a possibility that only the nonfinancial firms that are positive about their securitization usage report it in their 10-K fillings. This selection bias could be corrected in several ways, such as acquiring data from another source, repeating the research for Europe or comparing the ratings between firms that securitize and do not securitize. Further research should thus be conducted to see whether the selection bias is an issue in the data collection process.

The fourth limitation of this research is the exclusion of inflation expectations, which is indicated by Frank & Goyal (2009) as a reliable variable for measuring capital structure through the TDM specification. I exclude inflation expectations because of collinearity issues with the business cycle variable that I want to incorporate as well. Furthermore, for book leverage, the impact of firm size, the market-to-book ratio, and the effect of inflation are not reliable (Frank & Goyal, 2009). Thus, this potential omitted variable bias is avoided through measuring the effect of securitization on capital structure through the TDB specification.

The final limitation of this research is the possible existence of autocorrelation. As the value of the Durbin-Watson statistic in the estimation models was around 0.40, which suggests positive autocorrelation. As a consequence, the coefficient estimates are still unbiased, but they are inefficient (Brooks, 2014). It is however difficult to deduce whether this limitation is present, as I have only 2 years of time series data.

CHAPTER 6 Conclusions

In this research I have investigated whether the capital structure of a nonfinancial firm in the United States is influenced by the use of securitization in the post-crisis period (fiscal years 2013 and 2014). I find that the capital structure is influenced by securitization in a positive way. Although this result is not completely robust, as there were some methodological issues. These issues include the presence of autocorrelation. Furthermore, the effect of securitization on capital structure is significant and positive in certain circumstances. These circumstances include that securitization is measured as a percentage of total assets or as an indicator (dummy) variable. If we look to these findings and the existing literature on capital structure, they are in contradiction with the capital structure irrelevance theory of Modigliani & Miller. Their theory suggests that the use of securitization does not create nor eradicate value. However, if we compare the findings with more recent literature, the results support the view of Lemmon et al. (2014) that securitization is a valuable form of financing, as I find a positive and significant effect on capital structure. An explanation for that is the selection bias as described in section 5.4. An alternative explanation, is that applying securitization is beneficial in certain circumstances. As we have seen in the previous literature, firms applying securitization were mostly firms that have a credit rating in the middle of the credit rating distribution (Lemmon et al. 2014; Rosegg, 2016).

Though, the results of this study should be interpreted with care, as several limitations have been identified. These limitations include, a relatively low number of observations, the (small) presence of autocorrelation, a possible selection bias, the absence of firm fixed effects next to industry fixed effects and year fixed effects and finally the exclusion of inflation expectations in the model. In the future, these findings can be improved by taking into account these effects more properly and including the European securitization market to add robustness.

Nevertheless, the findings have several implications for corporations, regulators and investors. For the investors, the findings imply that they should still proceed with care, when they want to invest in a company that uses securitization. The same holds for corporations, as securitization is still a complex financing technique. This is reflected in the fact that regulators in the US and Europe are creating new regulatory frameworks, that intend subject to make the process of securitization more simple and transparent.

6.1 Directions for future research

This paper specifically looks at securitization and its influence on capital structure for nonfinancial firms in the US in the post-crisis period. Future research should extend how securitization influences capital structure exactly. Although, future research should not exclusively focus on this aspect. There is a lot more about securitization that we still do not know and in this research, we see that the securitization market is recovering in size since its collapse in the financial crisis. The causes of this downturn have been identified and now is the time to reshape the regulatory frameworks, to make securitization more simple and transparent to prevent such a debacle to happen again in the future. This can be achieved through proper evaluation of the deficiencies in the previous regulatory framework and for that financial institutions, investors, corporations and regulators should work closely together. Finally, this work addresses the message that financial innovations in the future should be adopted with care.

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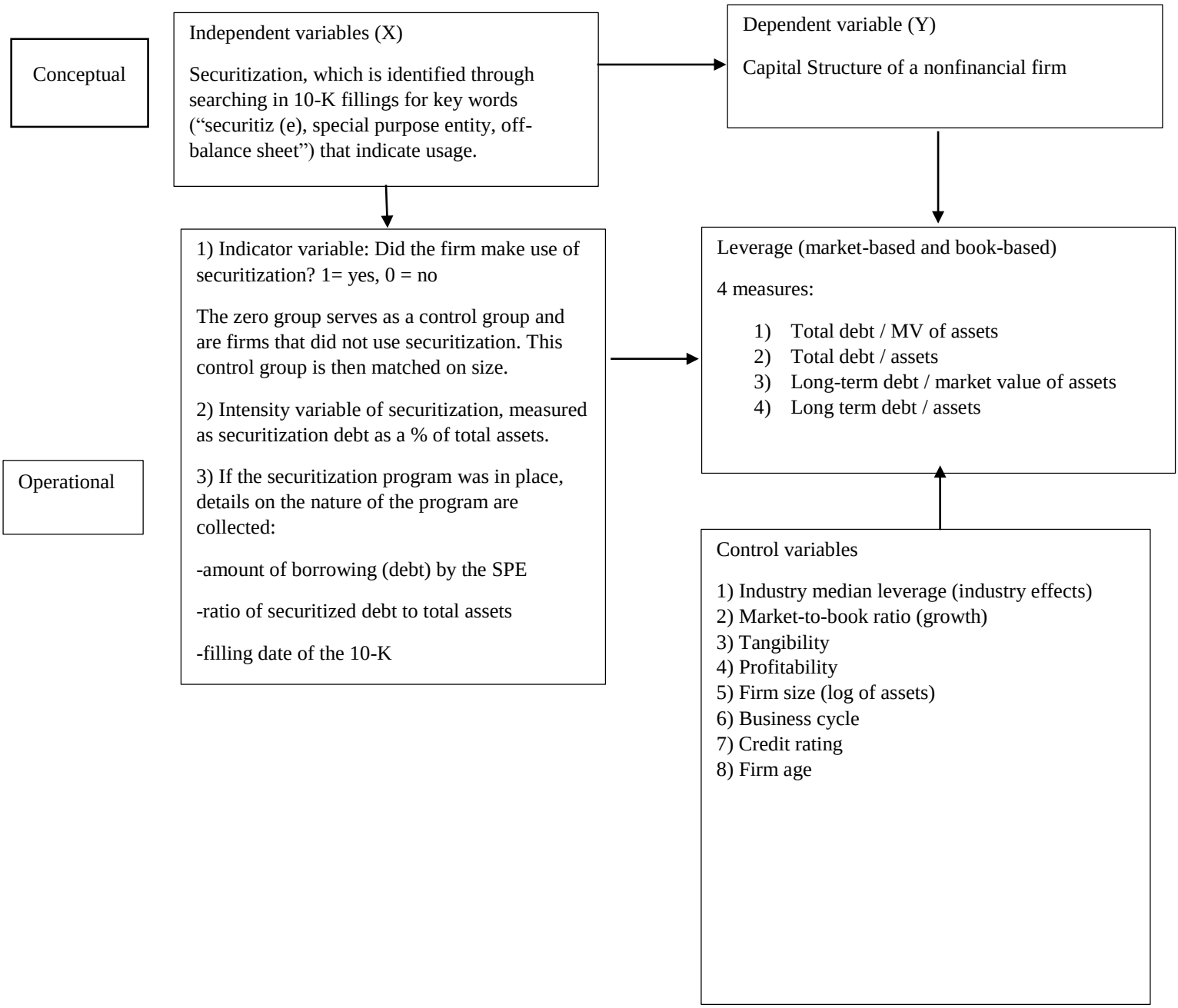
APPENDIX A Predictive validity framework main research question

Database: All firms in Compustat, excluding financial firms (SIC codes between 6000 and 6999) and regulated utilities (SIC codes between 4900 and 4999). This database is supplemented with information on securitization taken directly from firms'10-K filings, obtained from the SEC EDGAR Database. The final dataset is then retrieved through merging the Compustat and the data on usage of securitization from SEC's EDGAR through the CIK code and filing date.



APPENDIX B Multicollinearity – Cross-correlation table

Correlations:

	ln (sec 1)	ln (sec 2)	Mil*	Mkttb**	Tangibility	Profitability	Firm size	Credit rating	Firm age	TDM	TDB
ln (sec 1)	1.00	0.78	0.11	0.17	-0.27	0.17	-0.29	0.15	-0.23	0.04	0.18
ln (sec 2)	0.78	1.00	0.06	0.09	-0.13	-0.06	-0.06	-0.07	-0.17	0.03	0.09
Mil*	0.11	0.06	1.00	-0.04	0.13	0.20	-0.28	0.25	0.16	0.21	0.23
Mkttb**	0.17	0.09	0.04	1.00	-0.28	0.71	-0.41	-0.11	-0.15	-0.57	0.17
Tangibility	-0.27	-0.13	0.13	-0.28	1.00	-0.11	0.33	-0.09	0.02	0.23	-0.02
Profitability	0.17	-0.06	0.20	0.71	-0.11	1.00	-0.48	0.03	0.00	-0.41	0.16
Firm size	-0.29	-0.06	0.28	-0.41	0.33	-0.48	1.00	-0.56	0.30	0.19	-0.12
Credit rating	0.15	-0.07	0.25	-0.11	-0.09	0.03	-0.56	1.00	-0.36	0.41	0.40
Firm age	-0.23	-0.17	0.16	-0.15	0.02	0.00	0.30	-0.36	1.00	-0.08	-0.17
TDM	0.04	0.03	0.21	-0.57	0.23	-0.41	0.19	0.41	-0.08	1.00	0.68
TDB	0.18	0.09	0.23	0.17	-0.02	0.16	-0.12	0.40	-0.17	0.68	1.00

*Mil = Median industry leverage

**Mkttb = Market-to-book ratio

APPENDIX C Hausman test – random versus fixed effects

Table 7 TDM	Regression	[1]	[2]	[3]
Cross-section random	P-value	0.000	0.346	0.228
	Chi-Square Statistic	(43.22)	(8.95)	(9.36)
	Chi-Square d.f.	8	8	7
	Firm Fixed effects preferred?	Yes	No	No

Table 8 TDB	Regression	[1]	[2]	[3]
Cross-section random	P-value	0.002	0.248	0.150
	Chi-Square Statistic	(23.90)	(7.86)	(8.11)
	Chi-Square d.f.	8	6	5
	Firm Fixed effects preferred?	Yes	No	No

APPENDIX D Results estimation models with cross-section random effects

Specification TDM:

TABLE 9

Securitization and the influence on Capital Structure, specification TDM

Table 10 displays the regression results on how securitization affects the capital structure of firms. In the table, the capital structure of a firm is specified as the ratio of total debt to market value of assets. The regressions were performed on observations in a period from 2013 – 2014. Regressions (1) and (2) include all firms that apply securitization, while regression (3) contains only the firms that also report the limit of their securitization facility. Finally, regression (4) includes only the control group (the firms that do not apply securitization). The T-statistic of each coefficient is given in the parentheses, and the two-tailed significance levels are reported by the *, **, *** marks with a significance value of respectively; 0.10, 0.05 and 0.01.

	Dependent Variable: ln (TDM Leverage)		
	Estimation Method: Panel EGLS (Cross-Section Random Effects)		
Variables	(1)	(2)	(3)
ln(SEC 1)	0.011 (0.47)	-	-
ln(SEC 3)	-	0.047 (1.04)	-
Median industry leverage	0.170*** (2.62)	0.104 (1.21)	0.103* (3.03)
Mktbk	-0.064** (-2.13)	-0.207*** (-3.25)	-0.160*** (-5.96)
Tangibility	0.066 (0.57)	-0.176 (-1.39)	0.130 (1.28)
Profitability	0.083 (0.24)	-0.471 (-1.14)	-0.254 (-0.66)
Firm Size (log of total assets)	0.048*** (3.86)	0.035** (2.00)	0.007 (0.54)
Credit Rating	0.039*** (3.87)	0.043*** (3.22)	0.020 (1.60)
Firm Age	0.001 (0.58)	-0.000 (-0.15)	-0.001 (-1.04)
N	174	88	123
Adjusted R^2 (weighted statistics)	24.27%	42.62%	48.69%
Year fixed effects	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes

Specification TDB:

TABLE 10

Securitization and the influence on Capital Structure, specification TDB

Table 11 displays the regression results on how securitization affects the capital structure of firms. In the table, the capital structure of a firm is specified as the ratio of total debt to book value of assets. The regressions were performed on observations in a period from 2013 – 2014. Regressions (1) and (2) include all the firms that apply securitization, while regression (3) contains only the firms that also report the limit of their securitization facility. Finally, regression (4) includes only the control group (the firms that do not apply securitization). The T-statistic of each coefficient is given in the parentheses, and the two-tailed significance levels are reported by the *, **, *** marks with a significance value of respectively; 0.10, 0.05 and 0.01.

	Dependent Variable: ln (TDB Leverage)		
	Estimation Method: Panel EGLS (Cross-Section random effects)		
Variables	(1)	(2)	(3)
ln (SEC 1)	0.005 (0.23)	-	-
ln (SEC 3)	-	0.037 (0.93)	-
Median industry leverage	0.118* (1.93)	0.104 (1.62)	0.027 (2.12)
Tangibility	-0.05 (-0.45)	-0.238 (-1.63)	-0.008 (-0.08)
Profitability	0.111 (0.33)	-0.278 (-0.48)	-0.042 (-0.11)
Credit Rating	0.033*** (3.53)	0.044*** (3.63)	0.009 (0.89)
Firm Age	-0.000 (-0.03)	-0.000 (-0.09)	-0.002 (-1.41)
N	174	88	123
Adjusted R^2	19.97%	16.71%	7.49%
Year fixed effects	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes

APPENDIX E Results estimation models with securitization as an indicator variable

TABLE 11

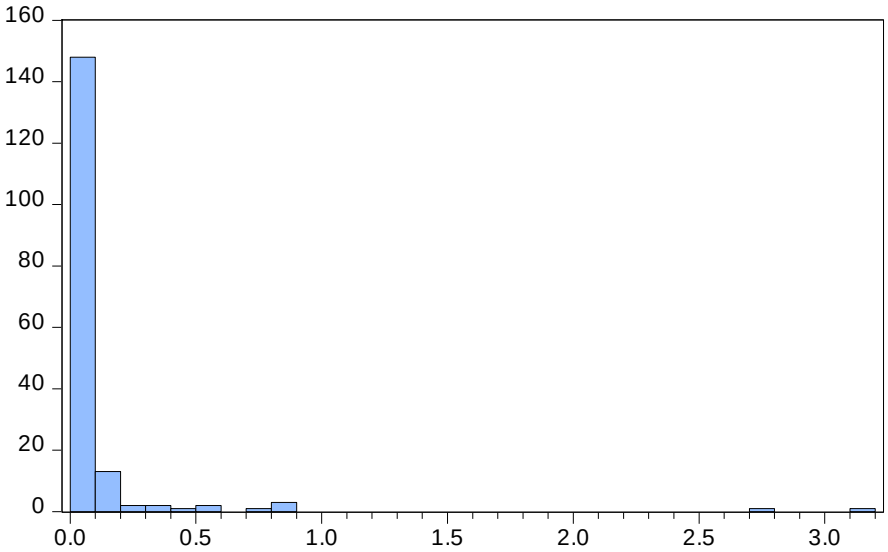
Securitization and the influence on capital structure, where securitization is an indicator variable

Table 12 presents the regression results on how securitization affects the capital structure of firms. The regressions were performed on observations in a period from 2013 – 2014. SECDUM is the securitization indicator or dummy variable. Regression (1) includes the estimation model, where capital structure is specified as total debt divided by the market value of assets (TDM). Regression (2) includes the estimation model, where capital structure is specified as total debt divided by the book value of assets (TDB).The T-statistic of each coefficient is given in the parentheses, and the two-tailed significance levels are reported by the *, **, *** marks with a significance value of respectively; 0.10, 0.05 and 0.01.

	Dependent variable: ln (TDM Leverage)	Dependent variable: ln (TDB Leverage)
	Estimation Method: Panel Least Squares	Estimation Method: Panel Least Squares
Variables	(1)	(2)
SECDUM (1= yes, 0 = no)	0.011 (0.43)	0.048** (2.00)
Median industry leverage	0.117** (2.50)	0.033 (1.17)
Market-to-book ratio	-0.067** (-2.01)	-
Tangibility	0.120 (1.63)	-0.079 (-1.20)
Profitability	0.181 (0.45)	0.980*** (4.21)
Firm size	0.032*** (4.47)	-
Credit Rating	0.048** (7.65)	0.023*** (4.31)
Firm Age	0.001 (1.30)	-0.000 (-0.18)
N	297	297
Adjusted R^2	46.56 %	23.95%
Year fixed effects	Yes	Yes
Industry fixed effects	Yes	Yes

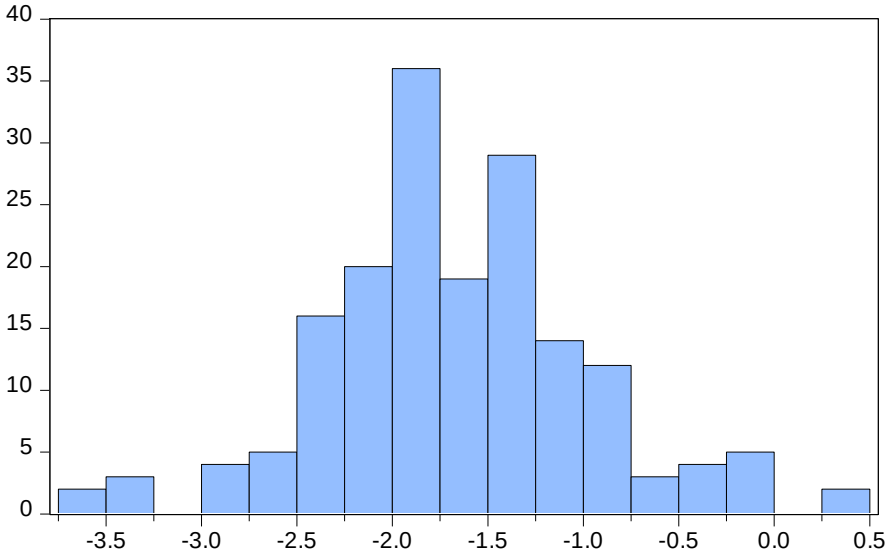
APPENDIX F Histograms of capital structure and securitization variables

- Securitization 1: amount of securitization / total assets



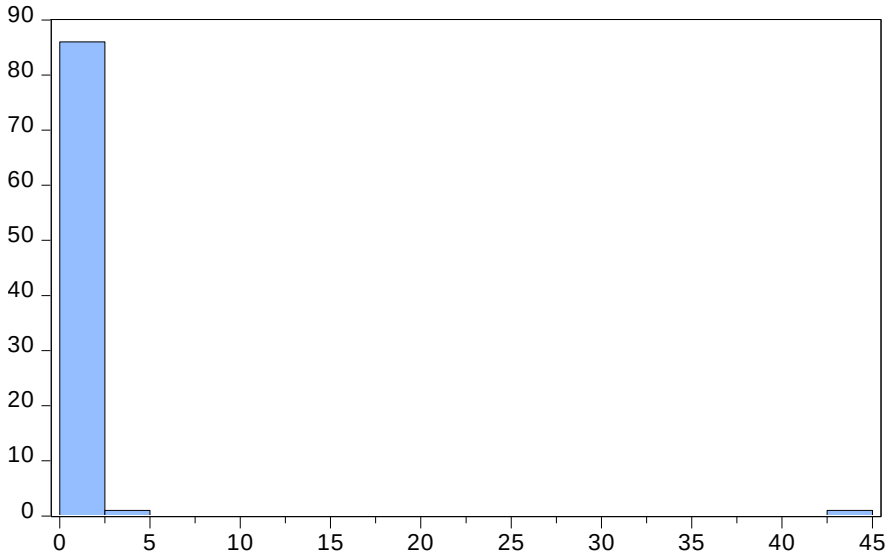
Series: SEC_1	
Sample 2013 2014	
Observations 174	
Mean	0.098725
Median	0.018040
Maximum	3.188927
Minimum	0.000236
Std. Dev.	0.340695
Skewness	7.172852
Kurtosis	59.78409
Jarque-Bera	24869.19
Probability	0.000000

- Ln_securitization 1: log (amount of securitization / total assets)



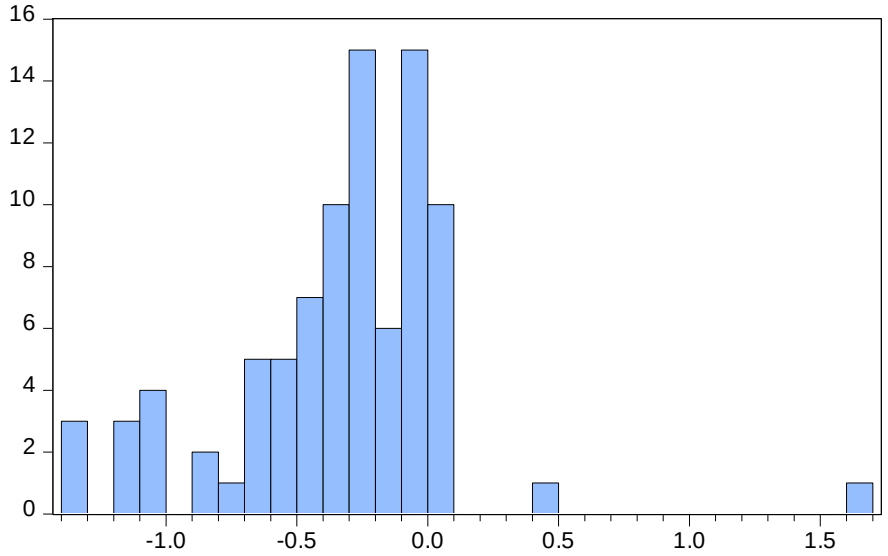
Series: SEC1_LN	
Sample 2013 2014	
Observations 174	
Mean	-1.664090
Median	-1.743762
Maximum	0.477183
Minimum	-3.609941
Std. Dev.	0.701368
Skewness	0.162116
Kurtosis	3.825789
Jarque-Bera	5.706140
Probability	0.057667

- Securitization 2: amount of securitization / limit of securitization facility



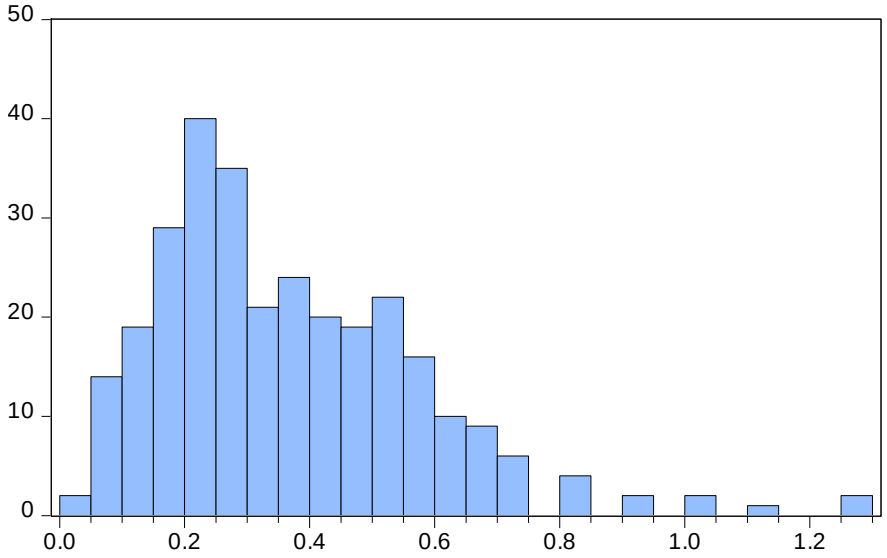
Series: SEC_2	
Sample 2013 2014	
Observations 88	
Mean	1.061251
Median	0.552727
Maximum	43.55376
Minimum	0.042000
Std. Dev.	4.598242
Skewness	9.120450
Kurtosis	84.78716
Jarque-Bera	25746.86
Probability	0.000000

- Ln_securitization 2: log (amount of securitization / limit of securitization facility)



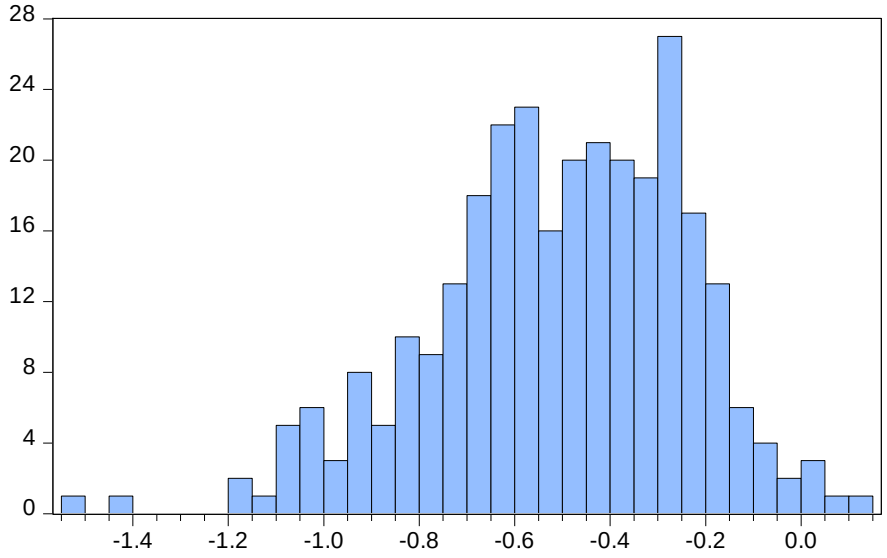
Series: SEC2_LN	
Sample 2013 2014	
Observations 88	
Mean	-0.339399
Median	-0.257527
Maximum	1.639026
Minimum	-1.376751
Std. Dev.	0.425462
Skewness	0.396220
Kurtosis	7.568705
Jarque-Bera	78.83710
Probability	0.000000

- Capital structure 1: total debt divided by market value of assets(TDM)



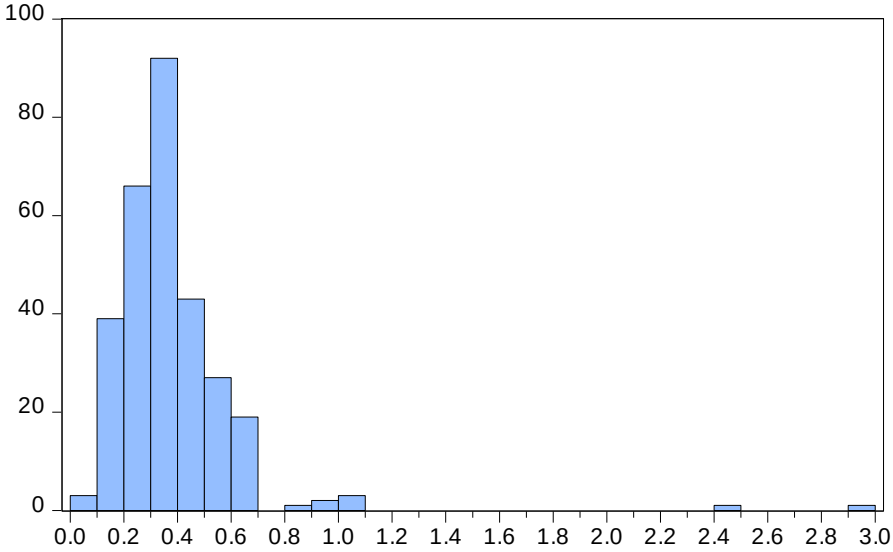
Series: D1_TDM	
Sample 2013 2014	
Observations 297	
Mean	0.366722
Median	0.322906
Maximum	1.258946
Minimum	0.030067
Std. Dev.	0.209810
Skewness	1.144345
Kurtosis	4.969709
Jarque-Bera	112.8334
Probability	0.000000

- Ln_capital structure 1: log[total debt divided by market value of assets(TDM)]



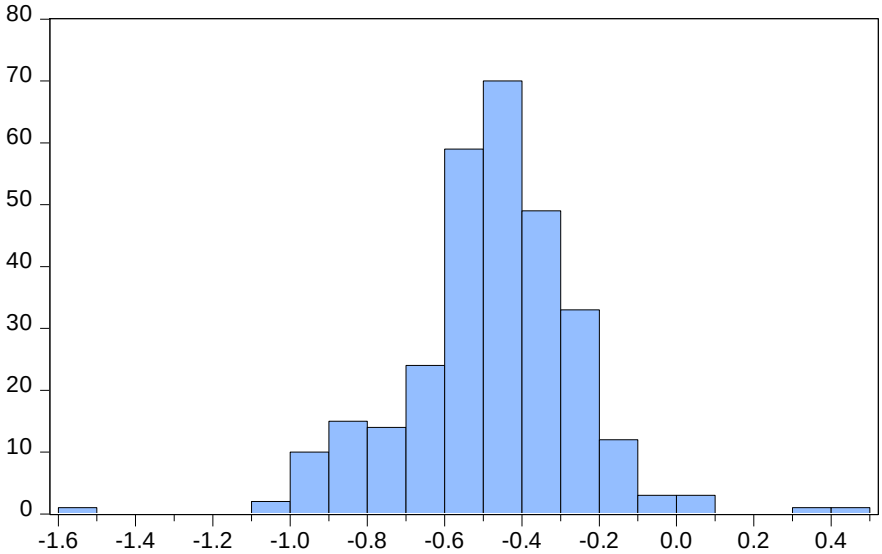
Series: D1_TDM_LN	
Sample 2013 2014	
Observations 297	
Mean	-0.509792
Median	-0.490924
Maximum	0.100007
Minimum	-1.521912
Std. Dev.	0.267501
Skewness	-0.527737
Kurtosis	3.381139
Jarque-Bera	15.58376
Probability	0.000413

- Capital structure 2: total debt divided by book value of assets(TDB)



Series: D2_TDB	
Sample 2013 2014	
Observations 297	
Mean	0.381278
Median	0.345144
Maximum	2.925137
Minimum	0.031226
Std. Dev.	0.252470
Skewness	5.586479
Kurtosis	51.48355
Jarque-Bera	30634.19
Probability	0.000000

- Ln_capital structure 2: log [total debt divided by book value of assets(TDB)]



Series: D2_TDB_LN	
Sample 2013 2014	
Observations 297	
Mean	-0.476359
Median	-0.461999
Maximum	0.466146
Minimum	-1.505483
Std. Dev.	0.221054
Skewness	-0.216047
Kurtosis	5.725198
Jarque-Bera	94.21597
Probability	0.000000

APPENDIX G Data collection

In this research, I collected the data first from Compustat. I applied several filters on the data and after that I merged the data with SEC EDGAR database, based on the CIK number. The following steps were taken to arrive at the total and final sample:

1. Filter for the fiscal years 2013 and 2014 [13686 observations remaining]
2. Filter on ISO currency code, excluding Canadian firms [10891 observations remaining]
3. I applied several filters for complete data:
    a. Assets total [10891 observations remaining]
    b. Book value per share [10221 observations remaining]
    c. Long-term debt total [10191 observations remaining]
    d. Investment tax credit [10057 observations remaining]
    e. Operating income after depreciation [10017 observations remaining]
    f. Operating income before depreciation [10007 observations remaining]
    g. Net property, plant and equipment – Total [9999 observations remaining]
    h. Preferred stock liquidating value [9994 observations remaining]
    i. Deferred taxes [9676 observations remaining]
    j. CIK number [9496 observations remaining]
    k. 'Active' status mark only [9118 observations remaining]
    l. Price close annual calendar [8420 observations remaining]
    m. Price close annual fiscal [8412 observations remaining]
    n. Data date, limited to 2013-12-31 and 2014-12-31 only [6321 observations remaining]

4. After that I applied the merge with SEC EDGAR base, in several cases the CIK number was invalid. This resulted in a total of 230 observations that did apply securitization and 4305 observations that did not apply securitization.