

Securitisation and SME credit availability in the EU

Does securitisation exacerbate the procyclicality of SME financing in the EU?

JAN LITJENS

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Securitisation and SME credit availability in the EU: Does securitisation exacerbate the procyclicality of SME financing in the EU?

Abstract:

This paper analyses the relationship between securitisation and SME financing through the bank lending channel in combination with the procyclicality of both. Using securitisation issuance data on a national level, panel survey data on SME financing conditions at the firm level, and the output gap as a proxy for the business cycle, I find that both securitisation and SME credit availability are procyclical. Furthermore, I find a positive relationship between securitisation and credit availability, supporting policy to stimulate securitisation in the EU. Lastly, I do not find conclusive answers to the question if securitisation amplifies the procyclicality of SME credit constraints. Concluding, I can say that securitisation could alleviate SME credit constraints during economic downturns, however due to the found procyclicality of securitisation, the effect of securitisation levels in a country on SME credit availability in times of crisis is unclear.

Keywords:

Assets securitisation, SME financing, Capital Markets Union, Business cycles

Author:

Jan Litjens (41043)

Tutor:

Federica Romei, Assistant Professor, Department of Economics

Examiners:

Mark Sanctuary, Researcher, Department of Economics

Kelly Ragan, Assistant Professor, Department of Economics

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List of abbreviations

(R)MBS: Residential mortgage-backed securities	OECD: Organization for Economic Cooperation and Development
ABS: Asset-backed securities	SAFE: Survey on the Access to Finance of Enterprises
AFME: Association for Financial Markets in Europe	SIFMA: Securities Industry and Financial Markets Association
CB: Covered bonds	SME: Small and medium-sized enterprise
CDO: Collateralised debt obligation	SPV: Special purpose vehicle
CMU: Capital Markets Union	STS securitisation: Simple, transparent and standardised securitisation
ECB: European Central Bank	US: United States of America
EMU: Economic and Monetary Union	
EU: European Union	
GDP: Gross domestic product	

1. Introduction

"This agreement marks another big step towards the creation of a Capital Markets Union. It will help build a sound and safe securitisation market in the EU, bringing real benefits to investment, jobs and growth. It will free up bank lending so that more financing can go towards supporting our companies and households."

Above quote is from Valdis Dombrovskis, Vice-President of the European Commission, made on 30 May 2017. The occasion for this is an agreement between the European Parliament, the Council, and the Commission on a new package of legislation named Simple, Transparent, and Standardised securitisation (STS). This package is part of a larger initiative of the European Commission, the Capital Markets Union (CMU). Reviving the EU securitisation market is one of the cornerstones of this pivotal project of the Commission.

Securitisation is a way to 'free up bank lending'¹ as stated by Dombrovskis. Shortly said, securitisation denotes a process of pooling and repackaging illiquid assets into financial products tradeable to investors. The investors receive the future cash flows of the assets that are used as collateral while the bank issuing the security receives the present value. In this way banks transfer the risk to the investor and free up capital, which they needed to retain to cover this risk. This capital subsequently can be used to fund additional lending. A typical example of a type of assets that is often used for this are household mortgages.

A bank having lend to a number of households, then has these mortgages as assets on their balance sheet including a claim against the houses in case of default. These assets are financed through liabilities, either equity or debt. A bank could securitise these assets. A common way to do this is by setting up a special purpose vehicle (SPV), which is a new company completely separated from the bank. The bank packages the mortgages together (pooling), often with total values beyond a billion euros, and sells it to this SPV for the current value of the future mortgage payments. The SPV buys the pool of mortgages with money from the bank. The SPV subsequently sells so-called mortgage-backed securities (MBS) on the capital markets. These MBS are securities that pay out the future mortgage payments to the investor that bought it. This has three consequences/advantages:

- First, the investor can easily buy a part of the future mortgage payments and the bank can easily sell it, because this market is very liquid.

¹ Another way to do this are covered bonds. The main difference between securitisation and covered bonds is that with covered bonds the assets do not move off of the balance of the bank. Investors have a so-called dual recourse, meaning that in case of default on their payments they have a claim on both the underlying assets and the bank itself.

- Secondly, the securities are sold and priced using the rating of the assets and not the rating of the bank that originated them.
- Thirdly, in case the mortgages fail, the bank is no longer responsible and thus the risk lies with the investors.

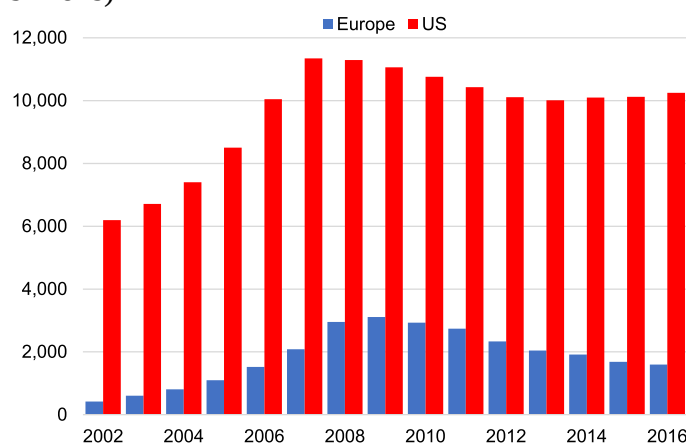
The latter is mostly important due to the financial regulations. For all sorts of assets, a bank has on its balance sheet, it must have capital and liquidity reserves. The higher the risk of an asset, the more capital and liquidity a bank must keep. This is because banks are highly leveraged, meaning that a relatively small change in value of assets could lead to a situation of insolvency. Through securitisation banks can move the assets and thus the risk off of their balance sheets and can use the freed-up capital for new activities.

In the years running up to the United States subprime mortgage crisis this process went off the rails in the US mortgage market. The demand for asset-backed securities grew exponentially. This had the effect that banks and other financial institutions needed to originate more mortgages. They knew that any mortgage they would sell to a household could be securitised and resold within a matter of days to investors (often other banks), without bearing barely any risk in the meanwhile. This led to the fact that mortgages became much cheaper and the rules looser. Households that actually could not afford it, were given mortgages leading to rising default rates. Especially when the house prices subsequently fell, more and more people could not pay back their mortgages.

While this crisis originated in the US it quickly reached the European financial sector. This was not because the same process of over mortgaging had been happening to the same degree, it was because many European banks had bought the securities backed by US mortgages. Actually, default rates for low-risk European originated securitisation products did not exceed 0.1% while those in the US reached 16%. Riskier securitisation products from the EU were at 0.2% during the crisis, while those in the US reached up to 62%. (European Commission, 2017a)

Even though the EU-originated securitisations were not nearly as flawed as those in the US, the EU market was also severely affected during the financial crisis. While the US market has largely bounced back since, the EU market has not. This is shown in figure 1-1, which also shows that the level of securitisation in the EU is far lower than in the US while the two economies are comparable in size.

Figure 1-1: securitisation in Europe and US compared (outstanding amounts in USD billions)



Source: (Marqués-Ibáñez, 2017) with data from AFME and SIFMA

During the financial crisis not only securitisation was affected. Bank funding for small and medium enterprises (SMEs)² dried up, which proved detrimental because of a lack of alternative funding sources. SMEs are crucial for the EU, representing two-thirds of private sector employment (European Commission, 2017a). Thus, countermeasures were desperately needed.

The plan of the EU to improve the situation and prevent it from happening again in a future downturn was based upon the diversification of funding sources for SMEs. This seems logical when making a comparison to the US. In the US the share of bank lending to SMEs is much lower than in the EU (40% vs 70%)³. US SMEs are less reliant on banks and instead, achieve in much larger degree funding directly through the capital markets or through private investors.

Initial plans within the CMU captured in its 2015 action plan indeed focused on stimulating alternative funding sources, such as venture capital and public listings (European Commission, 2015b). However, as the development of the CMU progressed securitisation as a solution was given more prominence and priority, as can be seen in the 2017 mid-term review (European Commission, 2017b). And now, as illustrated by the opening quote, securitisation regulation was one of the first initiatives to be adopted under the CMU.

This seems to show that the focus on the diversification of funding channels diminished, given the fact that securitisation is mostly a bank funding tool. At first sight it seems

² EU definition of SMEs “The category of micro, small and medium-sized enterprises (SMEs) is made up of enterprises which employ fewer than 250 persons and which have an annual turnover not exceeding € 50 million, and/or an annual balance sheet total not exceeding € 43 million.” (Commission, 2003)

³ Based on market research by Euler Hermes (Boata, Dib, & Livinec, 2019).

that with this shift the dependence on bank lending does not decline, leaving SMEs vulnerable to shocks in the banking sector.

This intuitive inconsistency was the initial motivation for the topic of this thesis. On the one side the goal is to make SMEs less dependent on bank financing, because: “High bank dependency means that enterprises, and particularly SMEs, have difficulties accessing alternative funding sources when they cannot get credit from banks” (European Commission, 2015a). On the other side policies are initiated to revive securitisation with the argument that it will increase bank lending to SMEs. The EU claims that reviving the EU securitisation market to pre-crisis issuance levels would lead to banks being able to provide additional credit to corporates of more than € 100 billion annually (European Commission, 2015b).

This all leads to the question: *Does securitisation exacerbate the procyclicality of SME financing in the EU?* I attempt to answer this question on the basis of an empirical analysis of the following four hypotheses. These hypotheses originate from an assessment of SME credit conditions in the EU, the European securitisation market and relevant literature.

H1: Securitisation is procyclical

H2: SME credit constraints are procyclical

H3: Securitisation alleviates SME credit constraints

H4: Securitisation amplifies the procyclicality of SME credit constraints

The remainder of this thesis is structured as follows. Chapter 2 expands on the European securitisation market and the financing conditions for EU SMEs. Chapter 3 sets out and reviews the relevant literature. The hypotheses are formulated on the basis of these two chapters. Chapter 4 describes the data used for analysis. Chapter 5 tests the four hypotheses through empirical analysis. Lastly, chapter 6 concludes and discusses the limitations of this thesis and avenues for future research.

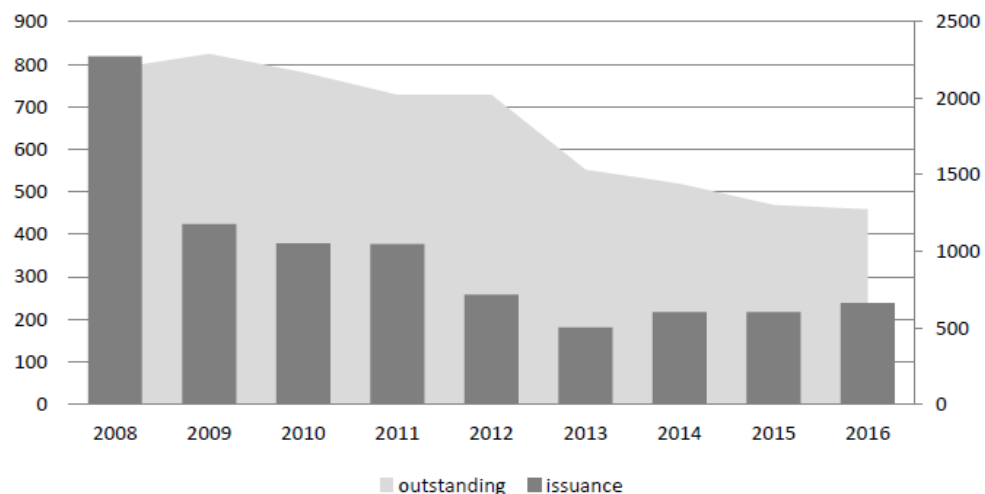
2. Securitisation and SME lending in the EU: market & policy

2.1. EU securitisation market

Globally, securitisation took a dive during the financial crisis. This while only in the US the market was deeply flawed.⁴ This has led to policy makers and academics suggesting that the EU collapse cannot be fully explained by market factors and also had to do with a fear and distrust towards the instrument (Altomonte & Bussoli, 2014; BoE & ECB, 2014; European Commission, 2017a). The fear and distrust helped to subdue securitisation after its collapse and indirectly led to a decrease through stricter regulations.

In the years running up to the financial crisis, securitisation in the EU grew at a near constant rate of growth. Issuance plunged after 2008 and is now at approximately a quarter of the pre-crisis level. Outstanding securitisation has gone down to approximately half of what it was pre-crisis. In the year 2018 € 269 billion was issued in the EU with € 1.2 trillion in securitisation outstanding at the end of 2018 (AFME). See figure 2-1 below for an overview of securitisation development in the EU since the crisis.

Figure 2-1: securitisation issuance/outstanding in the EU (€ billion)



Source: (European Commission, 2017a) with data from AFME

⁴ Default rates for low-risk European originated securitisation products did not exceed 0.1% while those in the US reached 16%. Riskier securitisation products from the EU were at 0.2% during the crisis, while those in the US reached up to 62%. (European Commission, 2017a)

The continuing subduing of securitisation demand in the EU cannot be explained by its quality. Credit rating upgrades of securitisations are far more common than downgrades and as mentioned before default rates have never been worrying. Besides the suggested global distrust, other factors need to be found to explain it. Because distrust would not explain why the US market bounced back quicker and to a larger degree.

One of these other factors, is the changed regulatory environment. In response to the crisis stricter regulation has further undermined the market. Securitisation products have been blamed for the crisis and therefore received relatively unfavourable capital requirements in the post-crisis banking regulation. (Altomonte & Bussoli, 2014)

Not all countries in the EU have developed securitisation markets. Most of EU securitisation originates from the UK with a market share of around 26% of outstanding securitisations. The Netherlands (14%), Italy (12%), Spain (12%) and France (9%) also contribute significantly. Belgium and Germany are each responsible for about 5%; Ireland, Greece, Portugal for around 2% and the rest is negligible. This geographical distribution has remained quite constant over time.

Residential mortgage-backed securities (RMBS) structurally represent the majority of the EU securitisation market with a share of around 50%. Household mortgages are commonly used as collateral because they are rather standard with long and regular payment streams. Asset-backed securities (ABS) represent around 30% of securitisation. Most of the ABS use either car loans or consumer loans as collateral. Collateralized debt obligations (CDO), a type of ABS that could also include mortgage debt represents around 9%. Lastly, SME securitisations represent around 8% of the market (European Commission, 2017a).

2.2. SME funding in the EU

SMEs are often called the backbone of the economy and this is especially the case for Europe. In the EU SMEs represent around 99% of all businesses and they are responsible for over 50% of all non-financial sector production. SMEs provide around two-thirds of private sector employment and over five years, starting in 2011, 85% of new jobs were created by SMEs. The latter shows the crucial role SMEs have played in the recovery from the crisis. (European Commission, 2011, 2017a)

In comparison to large companies and multinationals, SMEs have much more difficulties with accessing the necessary finance. This is also seen as one of the main obstructions for growth for SMEs. This trouble with accessing finance is a structural problem but was exacerbated significantly during the crisis. EU SMEs have faced harsher constraints during the crisis, both in terms of quantity and pricing since the crisis (European Commission, 2015a). This is mainly explained by the reliance of EU SMEs on banks, so when banks deleveraged and became stricter with lending, the SMEs did not have many alternatives. This is shown by the fact that, compared to the

US, EU SMEs, receive about five times less funding from capital markets. (European Commission, 2015b)

Market research finds that, besides the differences in finance market structure, the total amount of investable financing for non-financial corporation is smaller in the EU than in the US, this including both bank and capital markets sources (BCG & AFME, 2015).

The contraction of SME finance during the financial crisis was caused by demand and supply side factors. On the demand side, there was lower profitability and higher risks of default by SMEs. On the supply side increased risk aversion and liquidity problems in the banking sector led to deteriorating finance conditions.

Since around 2014, financing conditions for SMEs have improved. However, the OECD finds that there are still plenty of profitable and solvent SMEs that could use additional funds but are not able to retrieve them. (OECD, 2019b)

Thus, SMEs in the EU have more difficulties with funding than larger companies in the EU. And, EU SMEs have more difficulties with funding than SMEs in the US. This is largely due to more extensive information asymmetries. Modigliani and Miller stated already in 1958 that if markets are perfect and without friction it would not matter what kind of funding a firm uses. The cost of capital would be the same for internal funding – either own resources or retained profits – or external funding – such as bank lending and direct capital market financing. However, it turns out that due to information asymmetries funding decisions do make a difference.

This dependency on bank lending stems from the fact that information asymmetries between the suppliers and demanders of finance for SMEs are much larger outside of the bank lending channel. In the EU there is a traditionally long and close relationship between firms and their main bank, which gives the banks more information and thus a comparative advantage. Over two-thirds of SMEs in the EU do not seek beyond their main bank for funding. (European Commission, 2015a) On the other side, capital markets access through for example public stock offerings or private equity, is much harder for SMEs in the EU.

The negative effects of a large reliance on banks for funding are threefold. First, it weighs on growth and recovery because of pre-crisis bank lending contributed to the unsustainable accumulation of debt and a banking sector that has been considerably less supportive of economic growth. Second, high bank dependency leads, especially for SMEs, to difficulties accessing alternative funding sources when the bank lending supply dries up. Third, bank lending dependence makes the economy more vulnerable when bank lending tightens. Capital markets have shown to be much better shock-absorbers, because they are more dynamic. (European Commission, 2015a)

2.3. Capital markets union

In the Five Presidents' Report⁵ the Capital Markets Union (CMU) is addressed as follows: "It will ensure more diversified sources of finance so that companies, including SMEs, can tap capital markets and access other sources of non-bank finance in addition to bank credit." (Juncker, Tusk, Dijsselbloem, Draghi, & Schulz, 2015) The Five Presidents' Report provides 10-year strategy (2015-2025) for deepening economic, financial, and fiscal integration in the EMU after the crisis. The plan is the successor of the first EMU reform plan which was revealed in 2012 at the height of the sovereign debt crisis and lasted for three years. The first plan was mostly focused on risk reduction and recovery operations for both the banking sector and sovereigns. The second plan looks more at the long-term architecture of the EMU.

Together with the Banking Union and the European Systemic Risk Board (ESRB), the Capital Markets Union is part of the Financial Union⁶ pillar of this long-term architecture. Together, these three components need to ensure financial stability in the EU through further integration. Since capital markets have become much more globalised, the EU considers it to be foolish to keep regulating them on a national level.

The CMU is an action plan published in 2015 consisting of a large variety of policy proposals of which the first legislation has been introduced this year.

Before the financial crisis, the EU was not as prominent in financial affairs in Europe. This even though the objective of creating an EMU was already established in the 1992 Treaty of Maastricht. This was because the general integration process was much less developed as now. Only in 2009 the Lisbon Treaty came in to effect, making most legislation procedures possible by qualified majority instead of unanimity.

2.4. EU securitisation policy

Two pieces of legislation regarding securitisation have been proposed and passed under the umbrella of the CMU with the aim of safely reviving the market. Creating a safer market mostly links to a more simple and transparent market. The complex and opaque nature of securitisation products in the run up to the crisis is often named as the reason that the market could get so out of hand. Investors, regulators, and even issuers did often not know well enough what they were selling, purchasing or supervising.

The first piece of legislation is a specific securitisation regulation with rules for risk retention, due diligence and reporting (European Union, 2017b). In this regulation a label has been introduced named simple, transparent, and standardised (STS)

⁵ Named after the authors' positions, who are the presidents of the following five EU institutions: European Commission, European Council, European Parliament, European Central Bank, Eurogroup (not an official EU institution established in the Treaty on the Functioning of the European Union).

⁶ The other two pillars being an Economic Union and a Fiscal Union.

securitisations. In order for a securitisation product to obtain this label, it has to comply with a stricter set of criteria. But the issuer of this product is rewarded with lower capital requirements. The hope of the European Commission is that this label eventually will become a golden standard and contain all securitisation products in the EU.

The second piece of legislation is an amendment to the capital requirements regulation for banks and investment firms (European Union, 2017a). The amendment makes the capital requirements more appropriate to different securitisation characteristics and makes the capital requirements in general lower. This leads to banks having to retain less reserves on their balance sheet, making it possible for them to lend more and thus leverage more with the use of securitisation products.

3. Literature review

Following the financial crisis, in which both securitisation and SMEs came to the foreground, the academic literature on the topics grew significantly. Securitisation became the accused and SMEs the victim. As discussed, the securitisation market collapsed, and SME lending dried up. Several strands of literature grew out of this unusual period.

The four hypotheses set out in this thesis come from these different strands of literature and will be discussed below. First, literature on the procyclicality of securitisation and bank leverage is discussed. Second, the procyclicality of SME financing conditions is covered. Third, the relationship between securitisation and (SME) financing is discoursed. Last, the hypothesis that securitisation amplifies the procyclicality of SME financing is deducted.

3.1. Securitisation and the business cycle

Goodhart (2010) states: “banking is inherently procyclical” and Rochet (2008) states “Financial systems have an intrinsic tendency to exacerbate business cycle fluctuations rather than smoothing them out”. This is because during heights of the business cycle asset prices and profitability rise. During downturns risks rise due to rising defaults and non-performing loans. During economic good times risks and volatility are lower leading to banks seeking for further leverage to maintain profitability. During the last crisis it became abundantly clear that the opposite is also the case, banks greatly deleveraged due to the increasing risks.

Goodhart (2010) subsequently argues that due to the lax regulation in the EU under Basel II, banks were able to use mortgage-backed securities to increase their leverage in the years running up to the crisis. Rochet (2008) suggests as well that the capital requirements under Basel II could lead to additional procyclicality. Beccalli, Boitani, and Di Guilianantonio (2015) see the high level of leverage using off-balance sheet securitisation as a procyclical factor. They find that banks that are more involved in securitisation, have a more procyclical leverage. However, this is partially due to accounting rules specific to the US and it is unclear to what degree this holds for the EU.

3.2. SME financing in booms and downturns

As the second chapter explains, SME financing contracted during and after the crisis. This is partially due to cyclicity of credit as discussed above, but also due to the fact that smaller firms are more vulnerable to credit constraints stemming from the business cycle, due to their high level of specialisation and narrow geographical location. Iyer,

Peydró, da-Rocha-Lopes, and Schoar (2013) find that the credit supply reduction in Portugal during the crisis is stronger for smaller firms because these firms are less able to compensate the bank lending crunch through alternatives.

Langfield and Pagano (2016) argues that the reliance on bank lending is associated with more systemic risk and amplifies credit cycles. Banks overextend and misallocate credit when asset prices are on the rise and have to ration further when prices drop, which again hits smaller firms the hardest due to their lack of alternatives.

However, there is also research showing the benefits of bank reliance. Beck, Degryse, De Haas, and Van Horen (2018) and Bolton, Freixas, Gambacorta, and Mistrulli (2016) show that relationship-based lending by banks alleviates credit constraints during an economic downturn, with the effect being strongest for smaller firms.

3.3. Securitisation, (SME) credit availability and the business cycle

Carbo-Valverde, Degryse, and Rodríguez-Fernández (2015) shows that there was a relationship between securitisation activity and credit supply in Spain before and during the financial crisis. Furthermore, they find that firms with a lending relationship to banks that are more involved in securitisation (ABS) have seen their credit constraints relaxed before the crisis. However, they also show that securitisation aggravates the deterioration of credit conditions during the crisis in 2007-08. Lastly, they also find that for covered bonds the same positive effect is seen before the crisis, but that during the crisis covered bonds dampened the deterioration of financing conditions instead of exacerbated it.

Kaya and Masetti (2019) shows as well that there is a relationship between securitisation activity and credit constraints. They use survey data from SAFE, the same as used in this paper, and analyse on a country basis for the 5 largest eurozone countries. In contradiction to Carbo-Valverde et al. (2015) they do not find the same effect for covered bonds. Lastly, they do not assess how the relationship between securitisation and credit constraints change for different times of economic development. They conclude that their research provides empirical support for the EU policies attempting to revive the securitisation market.

Di Patti and Sette (2016) find that subdued securitisation in Italy resulted in lower credit growth and more credit constraints through lower acceptance rates and a higher interest rate. They look at the securitisation activity of banks in the pre-crisis period in relation to credit supply to firms after the crisis and find a negative relationship. This indicates that securitisation exacerbated the procyclicality of credit conditions.

El Khoury (2009) and Altunbas, Gambacorta, and Marques-Ibanez (2009) find that securitisation helped banks change their lending policy from an 'originate to hold' model to an 'originate to distribute' or 'originate, repackage and sell' model. The change has allowed banks to free up capital that was otherwise needed for regulatory

compliance which is used for increased lending. Altunbas et al. (2009) finds also that securitisation improved the capacity of banks to increase their lending supply. But this capacity depends, among others, on the business cycle conditions. This result on the basis of ABS issuance and banks' balance sheets for approximately 3.000 banks since 1999 indicates amplification of the procyclicality of credit conditions.

Gambacorta and Marques-Ibanez (2011) show that during the crisis banks with a larger dependence on market funding, such as securitisation, restricted their lending supply more strongly in both the US and the EU prior to the crisis. This was because their use of market funding affected the monetary transmission mechanism. Meaning that monetary policy decisions, i.e. the lowering of the interest rate, during the crisis had a greater effect on these banks.

In contrast to the previous papers, Kara, Marques-Ibanez, and Ongena (2016) actually finds that the effect of securitisation on financing conditions for firms is limited. Lastly, a discussion paper by the Bank of England and the European Central Bank (2014) argues that securitisation also improves non-bank lending. This because non-bank financial institutions can use the securitisation market for their lending to corporates as well.

3.4. Positioning of the thesis

This thesis mainly builds upon the paper by Carbo-Valverde et al. (2015), which looks at the relationship between securitisation and credit availability during different economic situations. I expand on their work by looking specifically at SMEs and taking apart the three elements underneath: the relationship between securitisation and SME credit availability, the procyclicality of securitisation, and the procyclicality of SME credit availability; and analysing them separately. Regarding the relationship between securitisation specifically, I build upon the work of Kaya and Masetti (2019), using the same data and method of empirical analysis, but with an expanded time horizon and scope. Furthermore, I look beyond the relationship and combine it with the other elements described above. Lastly, I provide the link with recent EU legal initiatives to put it in a current policy perspective.

4. Data

To answer the research questions and test the hypotheses, several datasets have to be combined. First, a representation of financing conditions for SMEs is necessary. This is provided through the Survey on the Access to Finance of Enterprises (SAFE), a semi-annual survey done by the European Commission in collaboration with the European Central Bank. Secondly, the data regarding securitisation activity is provided by the Association for Financial Markets in Europe (AFME), which is a branch organisation for the European wholesale financial markets. Thirdly, to represent the business cycle, I use output gap data from the OECD database as a proxy. Lastly, beyond the main factors, other variables showing the circumstances for the countries and specific firms are extracted from these datasets and from Eurostat. Examples of these controls are bank leverage and SME bankruptcy rates on a country level and the size of the firm and its economic outlook on a firm level.

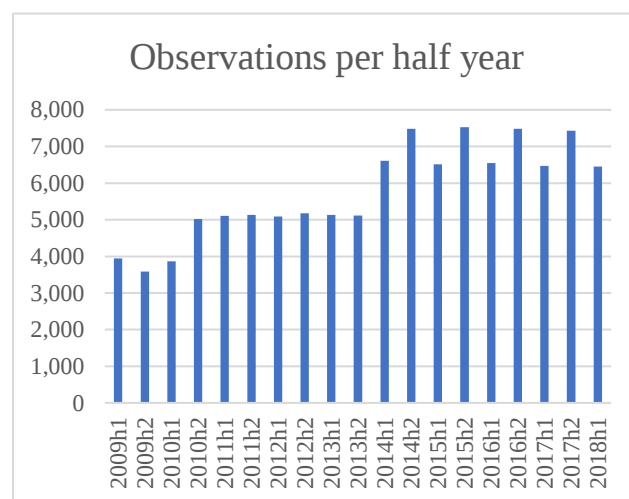
The dataset is limited to 9 eurozone countries: Belgium, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal, and Spain. This limitation is partially because of the availability of data from the SAFE survey. Only 11 countries were surveyed in all waves from the start. In 2 of the countries, Austria and Finland, there was nearly no securitisation activity and therefore these were also cut from the sample, leaving the 9 countries. These include the largest 6 countries of the eurozone. Also, they represent nearly all securitisation activity and thus are a good representation for analysing the effects of EU policy on securitisation.

Outside of the eurozone and still in the EU is of course the UK, which is to a large degree the financial centre of the EU. The UK was responsible for 22% of the value of securitisations issued in 2018. However due to their also high level of financial sector assets it is not the country with the highest degree of securitisation.

The dataset starts in 2009 and ends at the first half of 2018, because the SAFE survey was first conducted in 2009 and the last survey wave available is from the first half of 2018. See table 4-1 and figure 4-1 below for a breakdown of the final dataset by country and over time. This is after all corrections made discussed in the sections below. The figure shows that the sample contains more observations during the second half of the time period. The table shows that the breakdown by country is representative to a degree, with the most observations coming from the four largest member states. The consequences of the sample composition are further discussed in the limitations section.

Table 4-1: observations by country

Country	No. of observations	Portion (%)
Belgium	6,813	6.21
France	17,072	15.57
Germany	17,268	15.74
Greece	8,734	7.96
Ireland	6,465	5.89
Italy	19,031	17.35
The Netherlands	8,006	7.30
Portugal	8,495	7.75
Spain	17,791	16.22
Total	109,675	100

Figure 4-1: observation breakdown over time

4.1. SME credit constraints

The SAFE survey has been conducted since the second half year of 2009 and is carried out alternatively on behalf of the ECB and the European Commission (Directorate-General Internal Market, Industry, Entrepreneurship and SMEs)⁷. Of the 19 waves in total, 11 were on behalf of the ECB and 19 were in cooperation with the European Commission. The ECB rounds cover only a limited number of countries while the European Commission round covers all EU countries. This limits the sample size to the countries included in both survey rounds.

The survey intends to provide evidence on financing conditions faced by SMEs during the past six months. It covers all sizes of firms with at least one employee but mainly focuses on SMEs, which is therefore the largest part of the sample. The large firms are only included in the survey for comparison. They are excluded from this study. Only firms that fall within the EU definition of an SME – less than 250 employees and less than €50 million annual revenue – are kept⁸.

Another restriction made by me on the dataset is that all firms need to be: “[A]n autonomous profit-oriented enterprise, making independent financial decisions.” (ECB

⁷ The first two surveys in 2009 were executed by Gallup, from 2010 till half 2014 the rounds were done by IPSOS MORI, and from the second half of 2014 onwards Panteia in cooperation with GDCC carried out the surveys. (ECB, 2018)

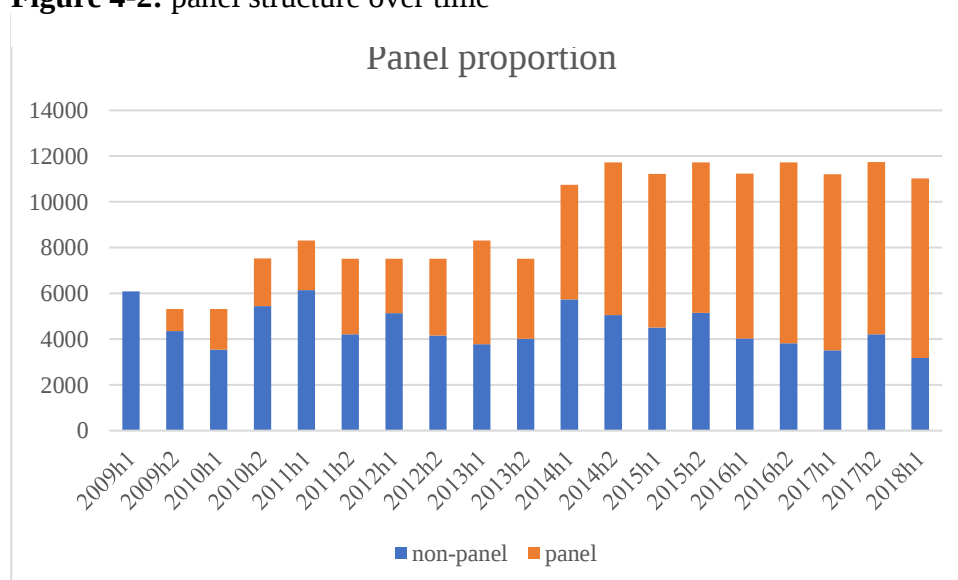
⁸ The third condition of the EU definition – total assets less than 43 million euro – cannot be checked because the data is not available. However, it is unlikely there will be many firms with a larger balance sheet will still be in the sample because of the other conditions and because of the exclusion of holding companies and financial sector companies in the sample.

& European Commission, 2019) This means that subsidiaries, branches, and non-profits are excluded.

The interviews are generally conducted over a time period of five weeks and are mostly done over the phone using computer-assisted telephone interviewing. The interviewee in each company was either a general manager, financial director or chief accountant.

The sample of companies were randomly selected from the Dun & Bradstreet business register if this was available, otherwise local sources were used. The stratification of firm sizes (micro, small, medium) was done on the basis of contribution to employment in a country. The stratification of economic sectors was done on the basis of first level NACE classification⁹. The dataset did not provide sufficient information on firm industries, therefore a comparison on the basis of sector was not possible.

Figure 4-2: panel structure over time



The dataset has a panel component. Firms were asked in each survey if they would be willing to participate again in the future. Some firms participated in more than 10 waves, but there are also many firms that participated only once. See figure 4-2 below for an overview of the proportion of panel participants in each survey round. The proportion is approximately evenly distributed over firm size. The first time a panel firm participated it is not yet recorded as a panel firm and therefore the figure underestimates the number of panel participants.

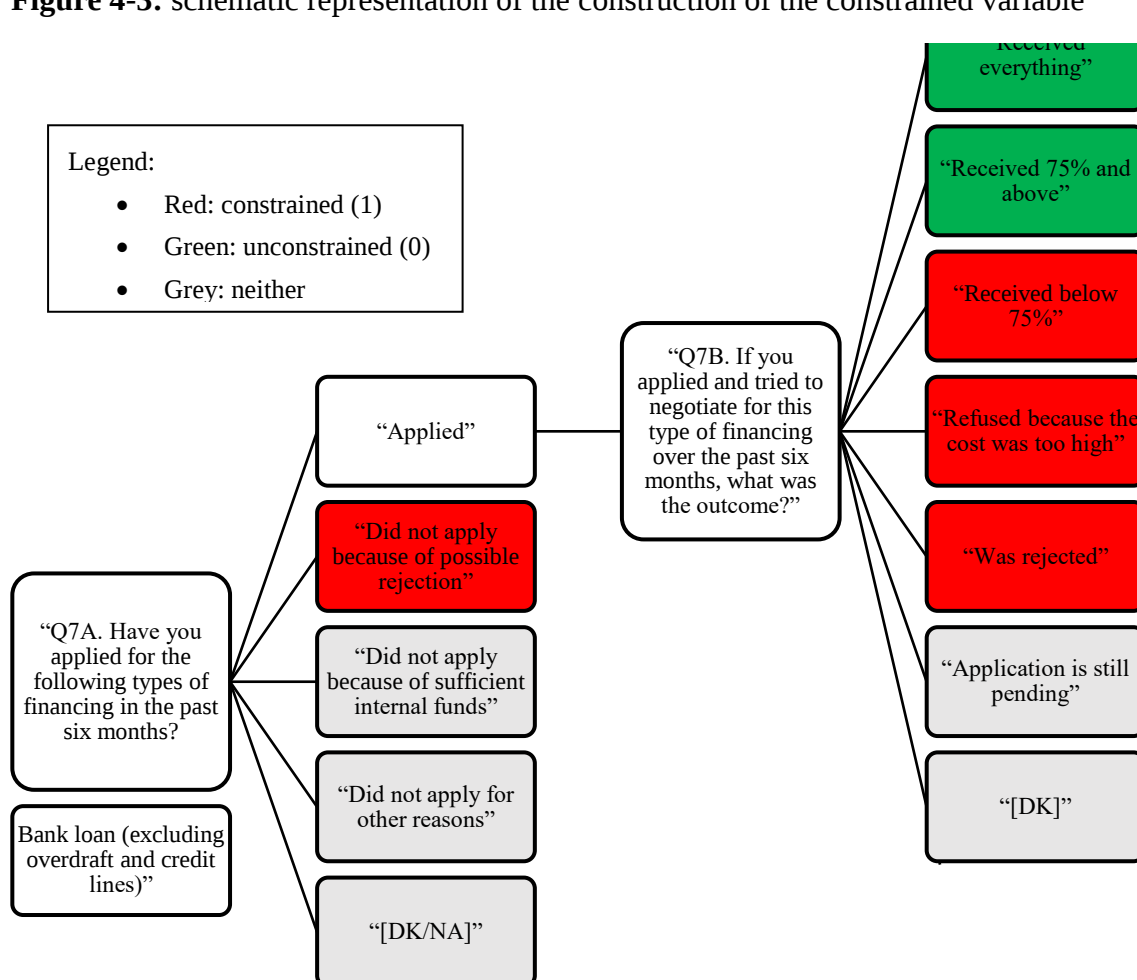
Categorization of credit constrained

The main variable taken from the survey is credit constrained. This is a binary variable constructed on the basis of two questions in the survey. The variable indicates if a firm

⁹ The following NACE classes were excluded. A: agriculture, forestry and fishing; K: financial and insurance activities; O: public administration and defence, compulsory social security; P: education; Q: human health and social work activities; T; U; 64.20.

has faced credit constraints relating to bank lending in the last six months. The variable is constructed by classifying answers to the survey either as constrained, unconstrained or neither. Figure 4-3 shows through a schematic representation how the variable is constructed. Subsequently, in figure 4-4 the results of this constructed variable are shown for all 9 countries over the time period in question. It shows that the level of constraints varies noticeably by country but less over time. SMEs in Greece, Ireland, and the Netherlands are most likely to face constraints.

Figure 4-3: schematic representation of the construction of the constrained variable



Note: In the first wave (2009h1), no difference was made between receiving above 75% and below. It was just referred to as “received part of it”.

Access to finance as a problem

The constructed constrained variable is the main variable used for analysis; however, another variable is also used to assess credit constraints for SMEs. This variable is not specific to constraints arising from bank lending. However, since bank lending is the largest source of financing for SMEs, this does provide limited information. The indicator is based on the on the following question in the survey.

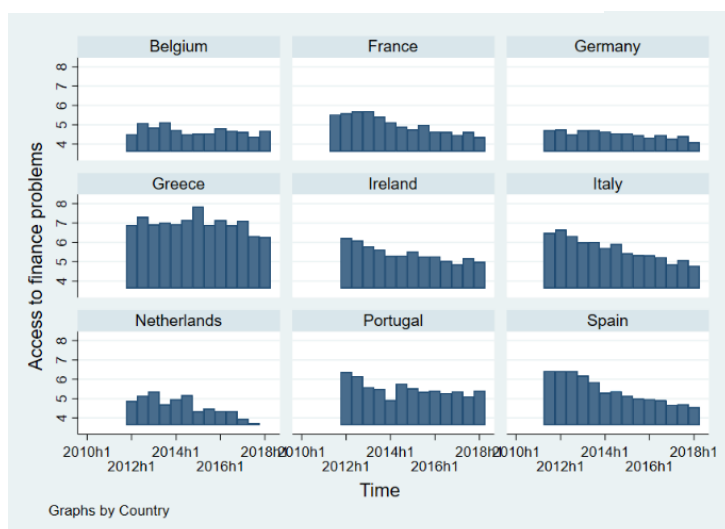
“How important have the following problems been for your enterprise in the past six months? Please answer on a scale of 1-10, where 1 means it is not at all important and 10 means it is extremely important.” (ECB & European Commission, 2019)

This question was only introduced into the survey in 2012 and therefore covers a shorter time period and a smaller sample. Figure 4-5 shows the evolution of the indicator over time and by country. It clearly shows that the general trend is downwards indicating improving access to finance. Also, the indicator varies noticeably by country. The Netherlands and Ireland show much less issues with access to finance in general than bank lending constraints. This could be indicative that alternative financing sources are more developed in these countries.

Figure 4-4: percentage of SMEs constrained over time by country



Figure 4-5: access to finance as a problem over time by country

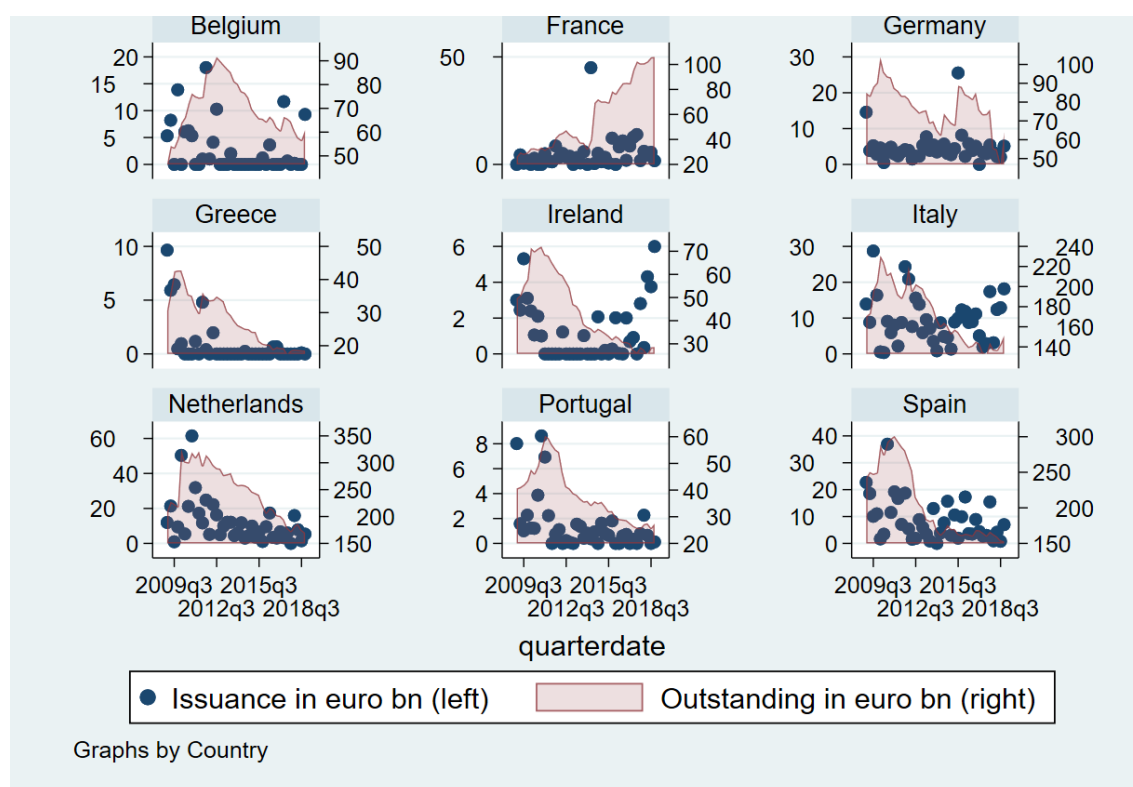


4.2. Securitisation

For the securitisation data the quarterly reports from the Association for Financial Markets in Europe (AFME) are used. This branch organisation collects the data from their members and other parties¹⁰.

In figure 4-4 below, the securitisation issuance and outstanding amounts is presented over time and by country. This shows an overall downward trend for securitisation issuance and outstanding amounts in the EU¹¹. Securitisation levels in the nine countries differ greatly as discussed in chapter 2. Furthermore, it shows that securitisation is increasing in France, diverging from the overall trend in the EU. Lastly, it shows that in many quarters, there was no securitisation issuance at all. This is because securitisation issues are mostly done in large transactions, often above € 1 bn, which occur erratic.

Figure 4-6: securitisation issuance and outstanding over time by country



¹⁰ Reported sources by AFME: Bloomberg, Bank of America-Merrill Lynch, Citigroup, Dealogic, Deutsche, JP Morgan, Macquarie, RBS, Refinitiv, Unicredit, AFME & SIFMA

¹¹ If the data for the years running up to the crisis would have been available, it would show an even stronger decrease. This because by 2009, the securitisation market had already collapsed to a large degree.

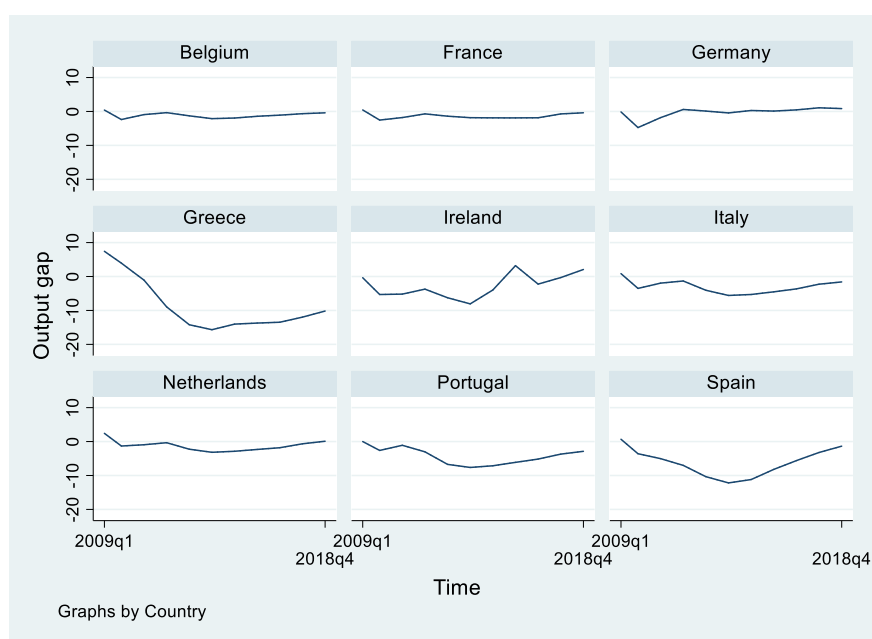
4.3. OECD output gap

The OECD output gap data is used as proxy for stance of the business cycle in the countries in question. The output gap is the percentual difference between an economies' actual output and its potential output. Output gap data is commonly used as a proxy¹², even though it is not ideal. The output gap is difficult to estimate and usually comes with high margins of error, which is mostly because potential output and structural unemployment are unobservable. It does, however, follow closely the financial cycle (Borio, 2017).

The output gap data used from the OECD follows a production function approach instead of the HP-filter approach (Beffy, Ollivaud, Richardson, & Sédillot, 2006; Giorno, Richardson, Roseveare, & Van den Noord, 1995; Turner et al., 2016). The output gap data from the OECD is annual. To match the semi-annual dataset, I have estimated the semi-annual data through linear interpolation. With this I make the assumption that the output gap is smooth and that there are no outliers. This assumption makes sense since the production function approach of the OECD inherently will provide smooth results. When the output gap is below zero this means that actual GDP is below estimated potential GDP indicating that the economy is in a downturn.

In figure 4-5 below, the output gap per country is shown over the last ten years. The sovereign debt crisis that hit the Mediterranean member states is clearly visible.

Figure 4-7: Output gap over time by country



¹² For example: (Dabla-Norris, Minoiu, & Zanna, 2015; Marcucci & Quagliariello, 2009)

4.4. Other variables

OECD SME scoreboard

For control variables regarding the (SME) lending market in a country, data from the OECD SME scoreboard¹³ is used. The SME scoreboard is an annual publication with data on financing conditions for SMEs (e.g. interest rate) and the economic situation of SMEs (e.g. bankruptcy rate). A complete list of the controls and their effects is shown in the next chapter.

Financial sector assets

To be able to compare securitisation issuance between countries it is necessary to put it in perspective to the country's financial sector. In order to do this, I use the financial balance sheet data from the Eurostat Financial flows and stocks dataset¹⁴. The data is annual, I have interpolated it to convert it to semi-annual data.

Banking sector leverage & GDP growth

Both are retrieved from the OECD. The indicator used for the banking sector leverage is the ratio between the financial assets and equity of the banking sector. The GDP growth is the usual one, taken from the national accounts data. Bank leverage is annual data. GDP growth is quarterly data that is converted into semi-annual data.

Covered bonds

Covered bonds issuance data is annual data retrieved from the European Covered Bond Council (ECBC) fact book¹⁵.

¹³ The OECD uses the same SME definition as the EU.

¹⁴ This data is compiled and classified in accordance with the European System of Accounts. For more information, see https://ec.europa.eu/eurostat/cache/metadata/en/nasa_10_f_esms.htm

¹⁵ The ECBC is a representative organisation for the covered bond industry, including issuers, analysts, investment bankers, rating agencies and other stakeholders. ECBC members represent over 95% of covered bonds outstanding.

5. Empirical Analysis

To test the main two hypotheses and the two sub hypotheses, I estimate four regressions. First, I test the relationship between the business cycle and securitisation, and secondly, the relationship between the business cycle and SME credit constraints. Third, the relationship between securitisation and SME credit constraints, and lastly, the moderated relationship with securitisation being a moderating factor between the business cycle and SME credit constraints are tested. For each of these four analyses, robustness checks are conducted. Also, different types of securitisation are checked.

5.1. Procyclicality of securitisation

To analyse the impact of the business cycle on securitisation, I estimate the following baseline regression:

$$\frac{\text{Securitisation Issuance}}{\text{Financial sector assets}_{ct}} = \beta_0 + \beta_1 \text{Outputgap}_{ct} + \beta_2 Y_{ct} + \beta_3 Z_t$$

The dependent variable is total securitisation issuance as a percentage of total financial sector assets per country and per semester. By taking securitisation as a percentage of the total financial sector assets, the level of securitisation issuance is measured. Why I am using the issuance instead of the outstanding assets is discussed in the previous chapter. The level of securitisation issuance is regressed on the output gap as a measurement for the business cycle state in a country. As control variables I use two country-specific variables and a global variable. The country-specific variables are GDP growth and the level of leverage in the banking sector. The global variable is the policy interest rate of the ECB. The regression is a panel regression with firm-specific and country-specific controls. A panel regression is possible since all variables are available for each country each year.

Beyond the baseline regression, I have executed the regression for five subcategories of securitisation and for covered bonds issuance, using the same methodology each time. As an additional check I have also looked at securitisation outstanding. Lastly, I have regressed the level of securitisations retained as a percentage of financial sector assets. In order to check if the business cycle has a different effect on the percentage of securitisations issued that is not sold externally. This data is not available on a country-level and thus national securitisation issuance is multiplied by the average overall.

Table 5-1: regression results for procyclicality of securitisation

	Total issuance /assets	ABS issuance /assets	CDO issuance /assets	SME issuance /assets	RMBS issuance /assets	Covered bonds issuance /assets	Total outstanding /assets
Output gap	0.0556*** (0.00850)	0.0205** (0.00606)	0.0299** (0.00720)	-0.00361 (0.00297)	0.00898 (0.00814)	0.0133 (0.0124)	5.727* (2.363)
GDP growth	0.0000395 (0.0140)	-0.00415 (0.00204)	-0.00527 (0.00273)	0.00590 (0.00439)	0.00364 (0.00861)	0.0000616 (0.00876)	-2.465 (5.506)
Bank Leverage	-0.00466 (0.00338)	-0.000789 (0.000726)	-0.00468 (0.00278)	0.00285 (0.00150)	-0.00195 (0.00201)	0.0133*** (0.00177)	0.508 (1.203)
ECB rate	0.443* (0.180)	0.0423 (0.0497)	0.0925 (0.0675)	0.0593 (0.0503)	0.249* (0.103)	0.125 (0.194)	218.1 (106.9)
N	180	180	180	180	180	180	180

Notes: Standard errors robust to heteroskedasticity are in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The results show a positive relationship between the output gap and the total level of securitisation issuance. The first column shows a significant positive coefficient at a 0.1% level. This result indicates that securitisation is indeed procyclical, since the output gap is a proxy for the business cycle, which provides evidence for the first hypothesis. Furthermore, the results indicate that GDP growth and bank leverage levels do not have a significant effect. However, the policy rate of the ECB does have a significant positive effect at a 5% confidence level.

These results therefore provide strong for the first hypothesis. Especially for the used time period this is the expected result, since in the last 10 years securitisation issuance has dropped as a result of the financial crisis.

Furthermore, column two to five show the results for five different types of securitisation. Of these four, only asset-backed securities (ABS), and collateralised debt obligations (CDO) show significant results for the output gap in the same direction as total issuance. SME securitisation goes in the same direction but is not significant. Somewhat surprisingly, the residential mortgage-backed securities (RMBS) does not show a significant relationship. This is unexpected because RMBS accounts for about half of securitisation issuance.

As a comparison I have also run the regression for covered bonds issuance, which does not show a significant relationship. This is some support for covered bonds as a safer instrument in times of crisis, as argued by for, among others, Carbo-Valverde et al. (2015). However, covered bonds are not covered in depth in this thesis.

Lastly, I have regressed the output gap on securitisation outstanding, see last column. This shows a significant positive result at 5%, indicating that the level of outstanding

securitisation is also procyclical. The coefficients are not comparable because the amount outstanding is far larger than the amount issued each period. Logically, outstanding amounts will always react less severe to any changes, because of the relatively long periods the securities take to mature.

5.2. Procyclicality of SME credit availability

To analyse the impact of the business cycle on SME credit constraints I estimate the following baseline regression:

$$\text{constrained } (0|1)_{ict} = \beta_0 + \beta_1 \text{Output gap}_{ct} + \beta_2 X_{ict} + \beta_3 Y_{ct} + \beta_4 Z_t$$

The dependent variable *constrained* is a binary variable that has the value 1 if firm *i* in country *c* at time *t* is credit constrained and the value 0 if not. As discussed in the previous chapter, a firm is considered to be credit constrained if either one of the following issues applies. (1) It applied for a bank loan but was rejected, given less than 75% of the loan, or the firm declined the loan due to too high costs. (2) It did not apply for a bank loan because it was discouraged. A firm is not considered to be constrained if it received at least 75% of the loan.

As in the previous regression, the output gap is taken as a proxy for the status of the business cycle and is the main independent variable. Besides this, several sets of control variables are included. X_{ict} is a vector containing firm-specific control variables. Y_{ct} is a contains country-specific control variables. Z_t is a single global control variable. The baseline is again a panel regression; however, the panel identifier is different now. As described in the previous chapter, the SAFE survey was partially a panel dataset with firms recurrently participating. Since the dependent variable is binary a probit model¹⁶ is used. A probit model is necessary because it respects the boundaries (0/1) of the dependent variable, it allows for different rates of change at the low and high ends of the spectrum and it controls for heteroskedasticity.¹⁷ Using a probit model means that the independent variables thus predict the probability that a firm is credit constrained.

The firm-specific variables also come from the SAFE survey, providing a better picture of the firms in question. In total 30 firm-specific variables are included referring to 14 aspects of the firms. All 14 aspects are of a categorical nature and are included as one or more dummy variables. For more information see table 5-2 below.

¹⁶ Probit is a portmanteau combining the words probability and unit. The model and its name are most commonly accredited to Chester Bliss (1934).

¹⁷ For a dichotomous dependent variable, one could also use a logit regression with the same benefits. In contrast to a probit regression, a logit regression does not use a normal distribution and instead has thinner tails. It is unlikely that a logic regression would result in different outcomes.

Table 5-2: firm-specific control variables

Aspect	Variable(s)	Aspect	Variable(s)
Firm age	• Younger than 5 years (+)	Firm outlook	• Increased (+) • Decreased
No. of employees	• Less than 10 (+) • Between 10 and 50 (+)	Firm capital	• Increased • Decreased (+)
Access to public financial support	• Increased (-) • Decreased (+)	Credit history	• Increased (-) • Decreased (+)
Ownership	• Individually/family owned	Economic outlook	• Increased (-) • Decreased (+)
Previous purpose of financing	• Investment in fixed capital (-) • Working capital • Employees (+) • New products (+) • Refinancing • Other (-)	Revenue	• Less than €500,000 (+) • Between €500,000 and €2 million (+) • Revenue up • Revenue down (+)
Bank loan need	• Increased (-) • Decreased	Profit	• Profit up • Profit down (+)
Debt-to-assets	• Up (+) • Down (+)		

Note: (+) indicates a significant positive coefficient, (-) indicates a significant negative coefficient

Most of the controls show very logical results. If the credit history of a firm improves, it is less likely that the firm is constrained. If profit or revenue are down, a firm is more likely to be constrained.

What the controls also clearly show is that the smaller the firm the more likely it is to be constrained. Size indicators for employees and revenue both show this. Also, younger firms are more likely to be constrained. A counterintuitive result is that if an entrepreneur has a more positive outlook on the firm's future this actually increases the likelihood the firm is constrained. However, if the entrepreneur has a more positive outlook on the economy in general this does translate to lower likelihood of credit constraints.

The country-specific control variables Y_{ct} are a combination of national accounts, banking sector status and SME lending conditions variables. The first in the form of GDP growth, the second through bank leverage, both the same as in the previous regression. Lastly, there are 6 variables from the OECD SME scoreboard included. These provide a completer picture of the SME lending market conditions making it able to specifically focus on credit constraints for the SMEs. The OECD SME scoreboard data is not available for 2018, thus if these variables are included the sample shrinks with one semester (5%). See table 5-3 for more information. The global control variable Z_t is again the policy rate of the ECB.

Table 5-3: country-specific controls from the OECD SME scoreboard

Bankruptcy number SMEs	Outstanding business loans total (-)
Bankruptcy change SMEs (-)	Short-term lending as percentage of total for SMEs (-)
Growth- and venture capital (+)	Interest rate spread (+)

(+) indicates a significant positive coefficient

(-) indicates a significant negative coefficient

The country controls show one surprising result and some more expected results. Surprising is that bankruptcy change has a negative coefficient, indicating that a higher increase in SME bankruptcies would be correlated with lower credit constraints. The more expected results are the negative relationship of outstanding business loans, the negative relationship with short-term lending proportion, and the positive relationship with interest rate spread. All three are indicative of a general credit contraction in which loans go down, duration of lending goes down and prices go up. Lastly, it shows a positive relationship between growth- and venture capital and credit constraints. This is most likely explained by firms using growth- and venture capital as an alternative when they cannot receive financing from banks.

For the results of the probit regression including the control variables see table 5-4 below.

Table 5-4: Procyclicality of credit constraints and access to finance problems

	Credit constrained (average margins)	Access to finance problems
Output gap	-0.00789*** (0.000755)	-0.0832*** (0.0171)
GDP growth	0.00774*** (0.00130)	0.0474 (0.0291)
ECB rate	-0.00540 (0.01123)	-0.283 (0.346)
Bank leverage	0.00108*** (0.000403)	0.00637 (0.0126)
N	23100	60160

Notes: First row predictions dy/dx with delta-method standard errors in parentheses. Standard errors robust to heteroskedasticity.

Because it is a probit model, the average marginal effects are provided instead of the coefficients in the first column. In the second column the coefficients for panel regression with the access to finance variable is provided.

The results show a negative relationship between the output gap and the probability an SME is facing credit constraints. The first column shows a negative marginal effect significant at a 0.1% confidence level. This means that the model predicts that on average a 1% increase of the output gap in a country at a given time would lead to a 0.8% decrease in the likelihood that an SME in that country is facing credit constraints. As the output gap is a proxy for the business cycle this indicates that SME credit constraints are indeed procyclical, providing evidence for my second hypothesis.

The second column shows the same effect. Now the dependent variable is to what degree SMEs consider access to finance a problem for their firm on a scale of 1-10. The results indicate that an increase in the output gap makes access to finance less problematic for SMEs. The sample for this regression is nearly three times as large because there are more firms that conveyed their trouble with access to finance in general than there are firms that applied for bank lending in the time periods.

Next to the baseline regression including all control variables, I have executed checks where only parts of the control variables are included, the direction and significance of the results remained the same.

5.3. Securitisation and SME credit availability

The relationship between securitisation and SME credit availability is expected to be positive¹⁸ due to the results found by others, most notable by Kaya and Masetti (2019) who used the same data for SME credit constraints, albeit for a different time period and sample size.

To analyse the relationship between securitisation issuance as a percentage of financial assets and SME credit constraints, I estimate the following baseline regression:

$$constrained(0|1)_{ict} = \beta_0 + \beta_1 \frac{SecIss}{FSass_{ct}} + \beta_2 X_{ict} + \beta_3 Y_{ct} + \beta_4 Z_t$$

As in section 5.2, the dependent variable *constrained* is binary variable that has the value 1 if firm *i* in country *c* at time *t* is considered to be credit constrained and the value 0 if not. See the previous chapter for its construction. As in the previous regression there are again firm-specific, country-specific and global control variables. However, the output gap is now a country-specific control part of vector Y_{ct} instead of the main predictor variable.

The regression is again estimated using a panel probit regression and therefore the average margins are calculated and presented in table 5-5 below. Besides presenting the baseline regression results, I also show the results when using a different dependent

¹⁸ The relationship is negative if you look at credit constraints. Credit availability and credit constraints are used as antonyms throughout this thesis.

variable, which is access to finance problems. Since this is not a binary variable a regular panel regression is estimated.

Table 5-5: securitisation and credit constraints/access to finance problems

	Total issuance/ FS assets	Output gap	GDP growth	ECB rate	Bank leverage
Credit constrained (average margins)	-0.0243*** (0.00479)	-0.00683*** (0.000774)	0.00641*** (0.00132)	-0.000386 (0.0113)	0.00124** (0.000403)
N	23100				

Notes: First row predictions dy/dx with delta-method standard errors in parentheses. Second row coefficients with standard errors robust to heteroskedasticity. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The results show a negative relationship between level of securitisation issuance and the probability an SME is facing credit constraints. The first column shows a negative average marginal effect significant at 0.1% level. This means that the model predicts that on average a 1% increase of the level of securitisation issuance in a country at a given time this would lead to a 0.02% decrease in the likelihood that an SME in that country is facing credit constraints. Even though this relationship is small in nature it provides evidence for my second hypothesis that securitisation improves SME credit availability. This result is robust to the three vectors of firm-specific, country-specific, and global variables.

Identification assumptions

There are many factors that predict the availability of credit for SMEs. These can be categorised into firm characteristics, financial sector/market specifics, and macroeconomic factors. To identify the relationship between securitisation and SME credit availability I make use of several sets of control variables, one for each of the categories.

The state of the financial institutions and the overall lending market plays a large role in the prediction of credit availability. I attempt to control for this in several ways. First, by using banking controls, such as the leverage ratio. Ideally, this would have been included more extensively, however I try to capture this also by including lending market factors. These go beyond the banking sector and include other types of financing, however the specific bank data was not available. The market lending controls include the amount of outstanding loans, the interest rate spread, and growth- and venture capital. Together these provide a picture of the lending conditions in the market.

For the firms, I include an extensive set of firm-specific controls; such as firm age, revenue development, and credit history. These are there to represent the main risk-assessment that banks make before lending in an attempt to exclude the explicit decision-making process at the bank and instead focus on underlying factors, i.e.

securitisation. Furthermore, I include general controls for the situation of SMEs in a country at the time, which would also weigh in on its decision. Most notably, I use bankruptcy figures that represent the risk of lending to SMEs. Lastly, because the dataset partially consists of panel data, I can control for unobserved firm-specific variation.

Regarding macroeconomic influences I control for the economic situation by using the output gap and I use the ECB policy rate to control for the monetary policy environment.

I assume that by controlling for these three categories of influencing factors I can identify the relationship in questions. However, due to the macro-level analysis there are undoubtedly factors I could not consider. An example of this is the relationship between the firms and the banks, which is better considered in the Carbo-Valverde (2015) paper using firm level analysis. Also, due to the survey nature of the data I have to assume that the survey questions adequately represent the actual situations, which is also questionable. These limitations are further discussed in the concluding section of this thesis.

Finally, to check if the causal relationship goes from securitisation to SME credit availability and not vice-versa, Kaya and Masetti (2019) do a Granger causality test. Their test confirms the hypothesised causality direction and rejects the opposite direction. Since my analysis has a similar scope, I assume that this holds for my analysis as well.

Different types of securitisation, covered bonds and outstanding

In this subsection, I go more into depth regarding different types of securitisation. Furthermore, I look at covered bonds.

The regressions used to estimate the relationships are the same as the baseline regression (panel probit with the same controls) with the only difference being the main independent variable. In table 5-6 below, the average margins are presented for the different types. Lastly, in this table the results for covered bonds issuance are also presented for comparison purposes.

Table 5-6: different types of securitisation and SME credit constraints

Credit Constrained	ABS	CDO	SME	RMBS	Covered bonds
Type as % of FS assets (average margins)	-0.0806*** (0.0197)	-0.0194 (0.0123)	-0.0312** (0.0120)	-0.0315*** (0.00796)	-0.0285*** (0.00512)
	23100	23100	23100	23100	23100

Notes: First row predictions dy/dx with delta-method standard errors in parentheses.

Second row coefficients with standard errors robust to heteroskedasticity.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The results indicate that asset-backed securities (ABS), SME securities, and residential mortgage-backed securities (RMBS) have a significant average marginal effect on credit constraints. Since ABS and RMBS are the largest subcategories of securitisation these are clearly the main driver between the results found for total securitisation. The results also show that ABS have the largest effect. SME securitisation does not have a greater effect than the other types of securitisation. This indicates that securitisation of SME loans does not necessarily have a larger effect on SME credit constraints than the securitisation of unrelated household mortgages. This is most likely explained by banks having a wide range of activities and funding sources for these activities and that these are not specifically connected.

For covered bonds a similar effect is found as for securitisation, both in terms of direction and in terms of magnitude. This indicates that covered bonds can work in similar way as a funding tool for loans, even though it does not involve the transfer of risk.

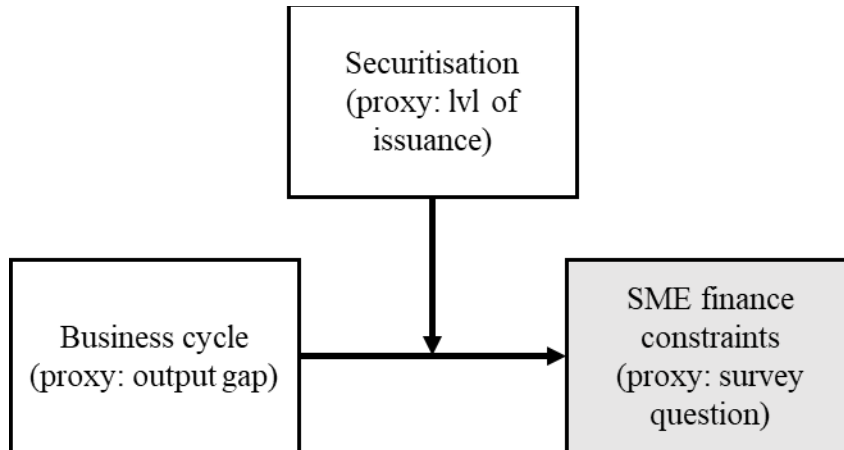
5.4. Moderation of Securitisation on procyclicality of SME credit availability

Lastly, to test the fourth hypothesis of the thesis, a moderated regression is run. The goal is to analyse the effect securitisation has on the procyclicality of SME credit availability. This is on the basis of the results of the previous regressions. These indicated procyclicality of both securitisation and SME credit availability. Furthermore, a significant positive relationship between securitisation and credit availability was found. This indicates that in an economic boom, i.e. when the economy is above its potential, securitisation activity is more prominent and SME credit should be more available. The opposite is the case for a downturn in the economy, lower levels of securitisation issuance and a higher likelihood of an SME facing credit constraints.

To see if the procyclicality of SME credit constraints is affected by the level of securitisation in a country, the following probit regression is estimated, which is also illustrated by figure 5-1.

$$\begin{aligned} & constrained(0|1)_{ict} \\ &= \beta_0 + \beta_1 \frac{SecIss}{FSass_{ct}} + \beta_2 Output\ gap_{ct} + \beta_3 \frac{SecIss \times Output\ gap}{FSass}_{ct} \end{aligned}$$

Figure 5-1: schematic representation of moderated relationship



In this regression the interactive effect or moderation corresponds to the β_3 slope, while the effects of securitisation and the output gap correspond to β_1 and β_2 respectively. If β_1 is statistically significant it means that the effect of the output gap on SME credit availability is dependent to a degree on the level of securitisation (Jaccard, Wan, & Turrisi, 1990).

Table 5-7: moderated relationship output gap, securitisation, and credit constraints

	constrained	margins (dy/dx)
Output gap	-0.0886*** (0.00910)	-0.0135*** (0.0015552)
Total issuance/FS assets	-0.00223 (0.0353)	-0.0286435*** (0.0048983)
Output gap × securitisation	0.0319*** (0.00708)	
<i>N</i>	23100	

The results of the above probit panel regression show significant marginal effects for the level of securitisation and the output gap, reconfirming the results from section 5.2 but not the same for section 5.3. The coefficient for the interaction factor is significantly positive, in contrast to the negative values for output gap and the level of securitisation issuance. This is an indication that securitisation dampens the effect of the output gap on credit constraints.

The marginal effect of the interaction factor is not available because you cannot estimate a separate effect for the interaction. The value of the interaction factor is not able to change independently of the values of the two components. (Williams, 2012) Therefore, instead of presenting the marginal effect in a table, it can only be shown in a plot. The contour plot for the predicted marginal effects is shown in figure 5-2¹⁹.

¹⁹ The controls are not included in this case because I do not have access to sufficient computing power to find the marginal effects of the interaction term in that case. However, we have seen that the significance of the interaction term was robust to the controls in the outcome of the regression which indicates that if the controls were included in the prediction this would not significantly alter the result.

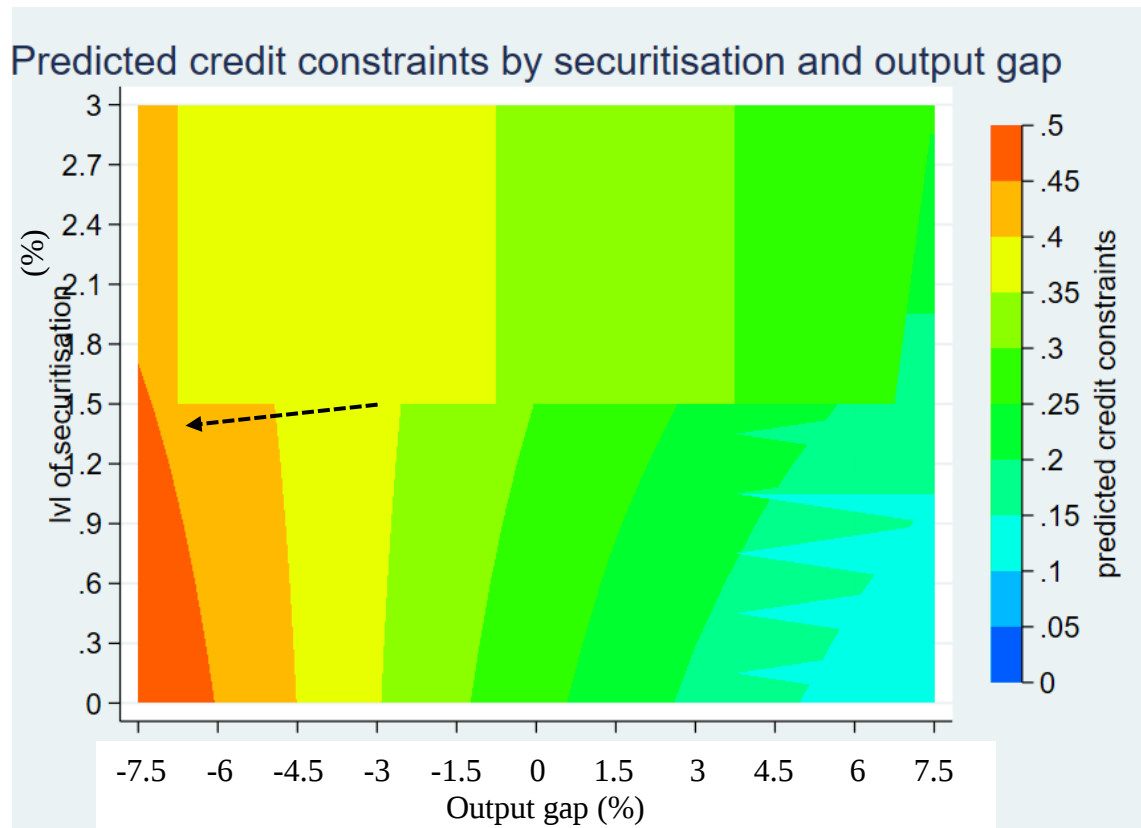


Figure 5-2: predicted marginal effects of securitisation, output gap and their interaction

The figure shows mixed results. First it shows a clear distinction between a level of securitisation issuance above 1.5% and below. Above 1.5% securitisation issuance there does not seem to be an interaction effect. For any level of securitisation issuance above 1.5% the effect of the output gap on SME credit constraints is unaffected by securitisation issuance. Below 1.5% level of securitisation issuance the interaction effect is there. However, it shows the opposite effect than what was expected, also from the regression results. It appears to be that below -4.5% output gap, the higher the level of securitisation, the lower the predicted likelihood of SME credit constraints. For an output gap above -3% it seems that the higher the level of securitisation issuance, the higher the predicted likelihood of credit constraints. This would actually mean that the level of securitisation has a dampening effect on the procyclicality of SME credit constraints, the opposite of what was expected. At a given low output gap, increased securitisation reduces credit constraints.

The above is largely due to the fact that it is a static analysis. As section 5.1 shows, securitisation is in itself procyclical. So, in the case of an economic downturn the movement on the plot in figure 5-2 is not only to the left but also downwards. The arrow gives an indication of the proportion in which these two would move together on the basis of the regression in 5.1. If indeed we follow the direction of the arrow (left and

down) we see a quicker rise in credit constraints, then in the case of just an output gap decrease. This result is the case for any arrow drawn in the bottom left (<1.5 & < -3) of the plot.

The question remaining is if a structural higher level of securitisation actually has an amplifying impact on the procyclicality of SME credit constraints. This question cannot be answered following the empirical analysis in this thesis and would be very hard to analyse. If one would compare a country with structurally high levels of securitisation, such as Spain, with a country with structurally lower levels of securitisation, such as France, there will always be many country specifics for which you could not control. The same goes for an analysis comparing a country with different levels of securitisation over time, since it would be nearly impossible to find what level of securitisation is structural and what level cyclical.

6. Conclusion

On the basis of an overview of securitisation and SME lending in the EU and a review of relevant literature, chapters 2 and 3 respectively, I set up four hypotheses. For the three of the four hypotheses I found indicative support through the analysis of chapter 5 on the basis of the data described in chapter 4.

Using firm-level panel data from an EU & ECB survey for SMEs and national securitisation data from AFME in combination with control variables, I estimate four regressions.

First, I find indicative support that securitisation is procyclical, as I hypothesised on the basis of relevant literature and market information. Second, I find indicative support that SME credit constraints are procyclical, as well as hypothesised. Third, I find indicative support that securitisation alleviates credit constraints for SMEs. Last, the analysis of securitisation as an amplifier of the procyclicality of SME credit constraints is inconclusive.

Table 6-1: the four hypotheses and their post-analysis assessment

H1	Securitisation is procyclical	Supported
H2	SME credit constraints are procyclical	Supported
H3	Securitisation alleviates SME credit constraints	Supported
H4	Securitisation amplifies the procyclicality of SME credit constraints	Inconclusive

Does securitisation exacerbate the procyclicality of SME financing in the EU?

Concluding from the assessments of the four hypotheses, I can say that securitisation can alleviate credit constraints for SMEs also during economic downturns. However, I also find indications that securitisation is procyclical and therefore might in turn increase the procyclicality of SME financing. A definitive answer will only become available through further analysis and/or the test of time.

Besides finding results on the hypotheses I find two other results. The analysis of covered bonds in comparison to securitisation for hypothesis 1 and 3 shows some indication that covered bonds are indeed a less procyclical instrument with a largely similar positive effect which is in line with the literature. Furthermore, I do not find any indication that the type of securitisation plays a significant role in the effects on SME credit availability.

Limitations

The degree of confidence of the results in this thesis and the possibility to extrapolate the results is limited in several ways by the data used. First of all, the SME data, most notably, the credit constraints are on the basis of a survey with a relatively small sample. The use of perception data inherently leads to bias. Furthermore, the sample size is not fully representative of country size and sector structure. The bias resulting from this could have been alleviated through the use of weights, however the survey only introduced country weights in 2014, leading to a significant shrinkage of the sample size if used.

The time period used also gives way to bias. The previous financial crisis was more than ever characterised by securitisation. This most likely affected the results for the procyclicality of securitisation. However, the largest drop in securitisation issuance happened in 2007 and 2008 and therefore this bias should be limited. Still, it would be difficult to assess to what degree these results would also hold for a shock of a less bank related nature, even though we know that financial services are inherently procyclical. Since securitisation on the scale it is now is a relatively recent phenomenon, it is difficult to assess this. Perhaps looking further at the crisis of the early 2000's in comparison would be an avenue to pursue.

Avenues for future research

Even though this thesis has further added to growing amount of literature assessing the relationship between securitisation and SME lending, there are still further assessments that could improve the confidence and extension of the results. Most notably, would be to use actual micro-lending data for SMEs instead of perception data. However, currently a comprehensive dataset for this is not available.

As has become clear during the analysis of the fourth hypothesis, to assess if securitisation amplifies SME credit constraints a dynamic approach needs to be taken, which would be a valuable future assessment.

Furthermore, it would be valuable to assess the impact of the securitisation policies by the EU under the Capital Markets Union in the future, since they have only been implemented four months ago. It would especially be interesting to see how the relationship between securitisation and SME credit availability develops in a new economic downturn. So far, nearly all research done on this topic is related to the previous financial crisis, making it near impossible to predict how the relationship develops in different circumstances.

Additionally, in this thesis the role of the government in securitisation beyond legislation has not been discussed. The ECB has started purchasing increasing portions of securitisation products issued by banks and in the US the majority of securitisation is issued through the government-sponsored agencies Fannie Mae and Freddie Mac. It

would be interesting to assess how these government interventions affect securitisation and its consequences for SME lending.

Lastly, discussion within the EU on the European Secured Note (ESN) initiative is ongoing. The ESN would be a new financial instrument that attempts to combine the best features of securitisation and covered bonds. The European Covered Bond Council claims that the ESN would have anti-cyclical features (ECBC, 2019). If this instrument would be developed it would be interesting to assess its effects on the cyclicity of SME financing conditions.

7. References

- Altomonte, C., & Bussoli, P. (2014). *Asset-backed securities: The key to unlocking Europe's credit markets?*
- Altunbas, Y., Gambacorta, L., & Marques-Ibanez, D. (2009). Securitisation and the bank lending channel. *European economic review*, 53(8), 996-1009.
- BCG & AFME. (2015). *Bridging the growth gap, investor views on European and US capital markets and how they drive investment and economic growth.*
- Beccalli, E., Boitani, A., & Di Giuliantonio, S. (2015). Leverage pro-cyclicality and securitization in US banking. *Journal of Financial intermediation*, 24(2), 200-230.
- Beck, T., Degryse, H., De Haas, R., & Van Horen, N. (2018). When arm's length is too far: Relationship banking over the credit cycle. *Journal of Financial Economics*, 127(1), 174-196.
- Beffy, P.-O., Ollivaud, P., Richardson, P., & Sédillot, F. (2006). New OECD Methods for Supply-side and Medium-term Assessments.
- Bliss, C. I. (1934). The method of probits—a correction. *Science*, 79(2053), 409-410.
- Boata, A., Dib, G., & Livinec, M. (2019). *European SMEs: Filling the bank financing gap.*
- BoE & ECB. (2014). *The case for a better functioning securitisation market in the european union.*
- Bolton, P., Freixas, X., Gambacorta, L., & Mistrulli, P. E. (2016). Relationship and transaction lending in a crisis. *The Review of Financial Studies*, 29(10), 2643-2676.
- Borio, C. (2017). Secular stagnation or financial cycle drag? *Business Economics*, 52(2), 87-98.
- Carbo-Valverde, S., Degryse, H., & Rodríguez-Fernández, F. (2015). The impact of securitization on credit rationing: Empirical evidence. *Journal of Financial Stability*, 20, 36-50.
- Commission, E. (2003). Commission recommendation of 6 May 2003 concerning the definition of micro, small and medium-sized enterprises. *Official Journal of the European Union*.
- Dabla-Norris, E., Minoiu, C., & Zanna, L.-F. (2015). Business cycle fluctuations, large macroeconomic shocks, and development aid. *World development*, 69, 44-61.
- di Patti, E. B., & Sette, E. (2016). Did the securitization market freeze affect bank lending during the financial crisis? Evidence from a credit register. *Journal of Financial intermediation*, 25, 54-76.
- ECB. (2018). *Survey on the access to finance of enterprises: Methodological information on the survey and user guide for the anonymised micro dataset November*. Frankfurt am Main: European Central Bank.
- ECB & European Commission. (2019). *Annex 3: methodological information on the survey.*
- ECBC. (2019). European Secured Note (ESN).
- El Khoury, G. (2009). Procyclicality of the banking system: the prudential and accounting framework of the procyclicality of bank balance sheet. *The Business Review*, 14(139-149).

- European Commission. (2011). *An action plan to improve access to finance for SMEs*. (SEC(2011) 1527 final). Brussels.
- European Commission. (2015a). *Commission Staff Working Document: Economic analysis accompanying the document Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Action Plan on Building a Capital Markets Union*. (SWD(2015) 183). Brussels: European Union.
- European Commission. (2015b). *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Action Plan on Building a Capital Markets Union*. (COM(2015) 468). Brussels: European Union.
- European Commission. (2017a). *Commission Staff Working Document: Economic analysis accompanying the document Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: on the Mid-Term Review of the Capital Markets Union Action Plan*. (SWD(2017) 224). Brussels: European Union.
- European Commission. (2017b). *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: on the Mid-Term Review of the Capital Markets Union Action Plan*. (COM(2017) 292). Brussels: European Union.
- Regulation (EU) 2017/2401 of the European Parliament and of the Council of 12 December 2017 amending Regulation (EU) No 575/2013 on prudential requirements for credit institutions and investment firms, (2017a).
- Regulation (EU) 2017/2402 of the European Parliament and of the Council of 12 December 2017 laying down a general framework for securitisation and creating a specific framework for simple, transparent and standardised securitisation, and amending Directives 2009/65/EC, 2009/138/EC and 2011/61/EU and Regulations (EC) No 1060/2009 and (EU) No 648/2012, (2017b).
- Financial flows and stocks.*
- Gambacorta, L., & Marques-Ibanez, D. (2011). The bank lending channel: lessons from the crisis. *Economic Policy*, 26(66), 135-182.
- Giorno, C., Richardson, P., Roseveare, D., & Van den Noord, P. (1995). Estimating potential output, output gaps and structural budget balances.
- Goodhart, C. (2010). Is a less pro-cyclical financial system an achievable goal? *National Institute Economic Review*, 211(1), 81-90.
- Iyer, R., Peydró, J.-L., da-Rocha-Lopes, S., & Schoar, A. (2013). Interbank liquidity crunch and the firm credit crunch: Evidence from the 2007–2009 crisis. *The Review of Financial Studies*, 27(1), 347-372.
- Jaccard, J., Wan, C. K., & Turrisi, R. (1990). The detection and interpretation of interaction effects between continuous variables in multiple regression. *Multivariate behavioral research*, 25(4), 467-478.
- Juncker, J. C., Tusk, D., Dijsselbloem, J., Draghi, M., & Schulz, M. (2015). *Completing Europe's Economic and Monetary Union*. Brussels: European Commission.
- Kara, A., Marques-Ibanez, D., & Ongena, S. (2016). Securitization and lending standards: Evidence from the European wholesale loan market. *Journal of Financial Stability*, 26, 107-127.

- Kaya, O., & Masetti, O. (2019). Small-and Medium-Sized Enterprise Financing and Securitization: Firm-Level Evidence from the Euro Area. *Economic Inquiry*, 57(1), 391-409.
- Langfield, S., & Pagano, M. (2016). Bank bias in Europe: effects on systemic risk and growth. *Economic Policy*, 31(85), 51-106.
- Marcucci, J., & Quagliariello, M. (2009). Asymmetric effects of the business cycle on bank credit risk. *Journal of banking & finance*, 33(9), 1624-1635.
- Marqués-Ibáñez, D. (2017). Securitisation, credit risk and lending standards revisited. *Research Bulletin*, 32.
- Modigliani, F., & Miller, M. H. (1958). The cost of capital, corporation finance and the theory of investment. *The American*, 1, 3.
- OECD. (2019a). Banking sector leverage (indicator). doi:10.1787/027a0800-en
- OECD. (2019b). *Financing SMEs and Entrepreneurs 2019*.
- Rochet, J.-C. (2008). Procyclicality of financial systems: is there a need to modify current accounting and regulatory rules? *Financial Stability Review*, 12, 95-99.
- Turner, D., Cavalleri, M. C., Guillemette, Y., Kopoin, A., Ollivaud, P., & Rusticelli, E. (2016). An investigation into improving the real-time reliability of OECD output gap estimates.
- Williams, R. (2012). Using the margins command to estimate and interpret adjusted predictions and marginal effects. *The Stata Journal*, 12(2), 308-331.