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Using bank loans as collateral in Europe: The role of liquidity and funding purposes

NBB Working Paper, No. 318

Provided in Cooperation with:
National Bank of Belgium, Brussels

Suggested Citation: Koulischer, François; Van Roy, Patrick (2017) : Using bank loans as collateral in Europe: The role of liquidity and funding purposes, NBB Working Paper, No. 318, National Bank of Belgium, Brussels

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Using bank loans as collateral in Europe : The role of liquidity and funding purposes

Working Paper Research

by François Koulischer and Patrick Van Roy

April 2017 No 318

NationalBank OF BELGIUM
Eurosystem

Editor
Jan Smets, Governor of the National Bank of Belgium

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ISSN: 1375-680X (print)
ISSN: 1784-2476 (online)

Abstract

We show that illiquid assets such as bank loans are used by euro area banks both as central bank collateral for short-term liquidity insurance purposes and for longer-term funding purposes for issuing covered bonds or asset-backed securities. We then explore the determinants of the choice of using bank loans for short-term liquidity insurance purposes or long-term funding purposes focusing on the case of Belgian banks. We find that (1) loan types are key to alleviating asymmetries of information; (2) regulatory requirements play a major role in the choices of banks, both directly and indirectly through clientele effects and (3) there are significant switching costs between the various uses of bank loans as collateral so historical decisions also determine the use of bank loans as collateral.

JEL classification: E52, E58, G01, F36

Keywords: Collateral, securitisation, bank loans, liquidity

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Acknowledgements

We thank Leah Dahmani, Maite de Sola Perea, Hans Dewachter, Stijn Ferrari, Sophie Helbig, Pierre Ledoyen, Joachim Keller, Yann Marin, Janet Mitchell, Daan Struyven and experts at ING Belgium, KBC, BNP Paribas Fortis and Belfius for valuable comments. All remaining errors are our own. This work was done while Koulischer was working at the National Bank of Belgium as a graduate intern.

The views expressed in this paper are those of the authors and do not necessarily reflect the views of the National Bank of Belgium or any other institution to which the authors are affiliated.

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1 Introduction

The use of collateral by banks can be seen as serving two purposes based on the time horizon of the collateral use. The first use of collateral is for short-term liquidity purposes, i.e. to manage short-term liquidity shocks using contracts such as repurchase agreements. The second use is for funding purposes, i.e. to issue long-term claims backed by collateral such as asset-backed securities or covered bonds.[1]

Based mostly on the U.S. experience, the literature has generally considered that financial intermediaries use liquid collateral such as cash or government securities for liquidity purposes but illiquid assets such as bank loans for funding purposes (see e.g. Loutskina & Strahan, 2009; Loutskina, 2011). In this paper we show that bank loans are commonly used by European financial institutions as collateral both for liquidity and funding purposes. In practice, the main use of bank loans for liquidity purposes is to serve as collateral in central bank open market operations since bank loans are not generally accepted as collateral in private markets for short-term funding. By pledging loans directly or by issuing ABSs backed by the loans, banks can obtain a liquidity insurance that may be used in cases of unexpected liquidity needs. When used for funding purposes, bank loans are pooled as collateral in ABSs or covered bonds.

By considering the use of bank loans in Europe both for liquidity and funding purposes, this paper contributes to the literature which has mostly focused exclusively either on funding purposes (Altomonte and Bussoli, 2014) or on liquidity purposes (Tamura and Tabakis, 2013; Nyborg, 2016). Our comprehensive approach is also key to comparing the use of bank loans across continents. For example, data from the Securities Industry and Financial Markets Association (SIFMA) suggest that the total value of securitised products using loans to firms or households as collateral was $10 trillion in the United-States in 2013 versus $1.5 trillion for Europe. While this would suggest that bank loans are rarely used as collateral in Europe, we show that ABSs represent only part of the use of loans as collateral since covered bonds

[1] ABSs and covered bonds are both assets issued using loans as collateral. These loans can be used to finance the interest payments on the asset and they may be seized in case of default by the issuer. The key difference between an ABS and a covered bond is that covered bonds offer a full recourse to the issuer in case of default of the collateral. In contrast, ABSs are issued as entities separate to the issuer so that, if all loans used as collateral were to default, the investors would not be able to seek reimbursements from the issuer. In this paper, we show that ABSs and covered bonds can be sold to private investors for funding purposes or be used as collateral at the central bank for liquidity purposes.

account for a significant share of the use for funding purposes while covered bonds are rarely used in the United-States. When liquidity purposes are also taken into account, we estimate in section 2 that around 30% of the outstanding bank loans to firms, households and governments are used as collateral for funding or liquidity purposes. A rough comparison with Flow of Funds data suggests that this ratio is closer to that of the U.S. than that suggested by the issuance of securitised products alone.

After establishing these stylised facts, section 3 provides a conceptual framework to gain a better understanding why banks may or may not have an incentive to use their bank loans as collateral. Using a numerical example, we show that under perfect information banks do not have any incentive to use their loans as collateral for liquidity or funding purposes. The argument here is similar to that of Modigliani and Miller (1958): if the bank changes the distribution of payoffs to its creditors, the creditors that experience an increase in the risk of their payoff will react by demanding a higher premium. Overall, this will counterbalance any potential gain from the lower funding cost required by investors with a lower risk.

There are however several reasons why bank loans may be valuable as collateral. On the liquidity side, bank loans pledged to the central bank can be valuable for intraday payment purposes or to insure the bank against unexpected liquidity shocks. It also provides insurance against larger market disruptions. On the funding side, bank loans may be attractive for the bank if their use as collateral alleviates asymmetries of information.

We then explore the micro-economic trade-offs faced by banks when using bank loans in section 4. To do so, we conducted a series of interviews with four large Belgian banks. Our analysis yields three conclusions. First, the type of borrower plays a key role in the choice of using the loan as collateral. While the theory is relatively agnostic on whether the loan is for instance a mortgage or a loan to a business, the data show that these characteristics are important to determine their use. This is partly driven by regulatory requirements but also arguably reflects different levels of information asymmetries with mortgage loans being easier to use as collateral in ABSs or covered bonds. Our second finding is that regulatory requirements play a central role in the use of bank loans as collateral and the influence of regulation is both direct and indirect. Examples of direct influence include the differences in regulatory treatment of assets by the liquidity regulation and the collateral rules of the

Eurosystem. Regulation may also have an indirect influence on the choice of banks through e.g. a 'clientele effect' whereby investors in products backed by collateralised loans prefer assets that are subject to lower capital requirements. Our third finding is that historical choices play an important role in the choices made by banks and switching costs between different types of collateral use are high. For example, some banks prefer to pledge their bank loans to the central bank by issuing ABSs while others pledge the loans directly. When asked whether they would consider switching to the other technology, all the banks interviewed emphasised that the costs in terms of adapting the reporting systems to the new collateral use would outweigh potential benefits in terms of lower haircut or everyday management costs.

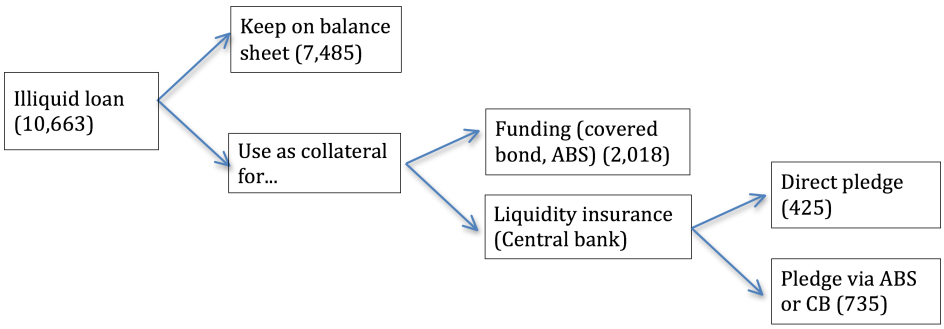
In addition to providing a European perspective to the analysis of the U.S. securitisation market of Loutskina and Strahan (2009) or Loutskina (2011), our paper also complements the existing literature on collateral use in private repo markets where authors such as Gorton and Metrick (2012) and Copeland et al. (2011) that document that securitised assets are often used as collateral in private markets. In Europe, Mancini et al. (2013) focus on the private tri-party repo market and their work suggests, as ours, that the provision of liquidity by the central bank plays a key role in this market. But our paper also underlines the key role played by non-marketable collateral instead of the high quality collateral used in the private market.

On the theory side, the loan-level analysis of the Belgian case provides some empirical support to the prediction of Dang et al. (2013) that, under specific conditions, lenders do not wish to know the exact quality of the collateral used. In line with their result, we find that banks tend to use loans mostly along key characteristics and do not discriminate finely among loans in a given category. Finally, our paper further illustrates the interaction of private and public supply of liquidity of Holmström and Tirole (1998).

2 Overview of the use of bank loans as collateral in Europe

This section gives an overview of how European banks use their loans as collateral. As illustrated in Figure 1, we wish to quantify how banks allocate their loans between four options. The first one is to keep the loans on their balance sheet (1). The second one is to use the loans as collateral for funding purposes, i.e. to issue an ABS or a covered bond to private

Figure 1: Bank funding and liquidity choice for bank loans (figures are for the euro area and in €billion)



investors (2). Alternatively, banks may also use their loans for liquidity purposes by pledging them directly to the central bank (3) or by pooling the loans in an asset backed security or a covered bond and then pledging the new asset to the central bank (4). As shown in Figure 1, we estimate using various data sources that around 30% of loans made by banks in the euro area are used as collateral. Of these, around two thirds are used for funding purposes and the rest is used for liquidity purposes.

As explained below, we compute these figures in three steps. First, we explore the structure of European banks' balance sheets. Second, we quantify the issuance of ABS and covered bonds by European banks. Third, we use data on collateral pledged by banks to the central bank to break down the total ABS and covered bonds into those used for funding and liquidity purposes (since ABS or covered bonds not pledged to the central bank must be used for funding purposes).

2.1 Bank balance sheets in the euro area

We show in Table 1 the aggregate balance sheet of banks in the euro area. Marketable assets (such as bonds and shares) represent 18% of total assets while loans account for 53% of the assets of banks (€17tn). Roughly a quarter of these loans are extended to firms, a third is extended to households and a tenth to government entities, together amounting to the €10.7 billion in Figure 1. The remainder of the loans (€6.4tn) are extended to the financial sector. On the liability side, deposits represent 53% of the total and money market instruments account for roughly 1% of the liabilities of banks.

Table 1: Balance sheet of Euro-area Monetary and Financial Institutions (MFI) as of January 2015

Amounts in € billion. Source: ECB Statistical Datawarehouse. Note: Non-marketable assets: Loans to euro area residents. Marketable assets: Securities issued by euro area residents. The category "Other" includes both marketable and non-marketable assets and mostly consists of loans to the financial sector.

Assets			Liabilities		
Marketable assets	5,802	18%	Equity	2,421	7%
Loans / non-marketable	17,095	53%	Deposits	17,073	53%
... to Gen. Govt	1,144	4%	Debt	4,121	13%
... to Households	5,220	16%	Other	8,676	27%
... to NFC	4,299	13%	Money market	482	1%
Other	9,394	29%			
Total	32,291	100%		32,291	100%

2.2 Issuance of ABS and covered bonds

We combine data from the Securities Industry and Financial Markets Association (SIFMA) and the European Covered Bond Council (ECBC) to gauge the issuance of covered bonds and ABSs by banks in the euro area. We compute for each country in the euro area the nominal value of ABSs and covered bonds outstanding in 2014. Our results, shown in Table 2, suggest that the total amount of ABSs and covered bonds issued in the euro area is €2,753 billion, of which around 45% are ABSs and 55% are covered bonds.

In terms of the country distribution of securities outstanding, the euro area ABS market is concentrated, with Spain, the Netherlands, Italy and Belgium accounting for around 80% of ABS issuance. These differences across countries are partly a result of different legal and historical environments in Europe. Countries such as Germany, Luxembourg or Austria have a long tradition of issuing covered bonds (or 'Pfandbriefe') for instance, whereas other countries tend to rely more on ABSs, as is the case in the United Kingdom and the United States.

The SIFMA data also provide a breakdown of ABSs by type of loan used as collateral. Assets secured by loans to Non-Financial Corporations (NFCs) and SMEs account for 10% of the ABSs outstanding. ABSs backed by residential mortgages (known as RMBSs) are more common, with a 60% share of the total ABSs issued. The remainder of the ABSs are backed by consumer loans (e.g. car loans, credit card loans).

Table 2: Total ABSs and covered bonds outstanding and total assets (2014, in EUR bn)

Country	Covered bonds	ABS	CB+ABS	Assets
AT	42.5	0	42.5	903
BE	8.2	114.9	123.1	1151
DE	452.2	104.9	557.1	8126
ES	364.9	245.1	610	2963
FI	29.8	0	29.8	622
FR	344.2	50.1	394.2	8540
IE	43	53.2	96.2	1109
IT	129	243.8	372.8	4076
LU	21.7	0	21.7	1017
NL	61	353.5	414.5	2518
PT	35.4	51.4	86.8	465
SK	4	0	4	64
Total	1535.9	1216.9	2752.9	32226

Source: Securities Industry and Financial Markets Association (SIFMA), European Covered Bond Council (ECBC) and ECB Statistical Datawarehouse.

2.3 Use of bank loans for liquidity purposes

The value after haircut of the assets pledged to the ECB in early 2015 is €1.8 trillion which represents approximately 6% of the total balance sheet of banks (Table 1).[2] Assuming an average haircut of 10% (Dreschler et al., 2013), this suggests that around €2tn (or 6.7%) of banks' assets are used as collateral at the central bank. The amount effectively borrowed against this collateral was €532bn at 2015Q1.[3]

The assets pledged as collateral to the Eurosystem can be classified in two broad categories. The first one includes assets such as government bonds, corporate bonds or uncovered bank bonds that are not backed by illiquid loans extended by banks. The second category consists of bank loan-related collateral, such as ABSs and covered bonds, which are both assets secured by illiquid loans, as well as loans pledged directly to the central bank. In what follows we will focus on the second category of assets.

Figure 2 shows the total amount of ABSs, covered bonds and bank loans pledged to the ECB as well as the proportion of these assets in the ECB's total collateral pool (right hand scale). These assets accounted for slightly less than 60% of the total pool in 2015Q1 (value after haircut), compared with only 35% in 2004. While there was increased use of loans at

[2] The valuation haircut determines the amount that may be borrowed from the collateral. For instance, an asset worth €100 with a haircut of 10% allows the bank to borrow up to €90.

[3] Source: ECB, https://www.ecb.europa.eu/paym/coll/charts/html/index.en.html

the start of the financial crisis (2007/2008), it is interesting to note that the figure has not come down since. This suggests that the use of loans reflects both a precautionary motive, as insurance against liquidity shocks, and a regulatory motive, with a strengthening of liquidity regulations since 2007/2008.

A first option is for banks to pledge their loans on an individual basis. As shown in Figure 2, the total amount of bank loans pledged on an individual basis at the ECB peaked at €668bn in 2012Q3 and stood at €362bn as of 2014Q4.[4] Assuming a 15% haircut (see appendix), this suggests that the total value of loans pledged is around €425 billion (= 362/0.85), as reported in Figure 1. Since only loans issued to non-financial corporations and public sector entities are eligible as collateral, this implies that around 10% of loans extended to euro area firms are pledged directly to the central bank (=€425bn /€4299bn, where €4299bn is the loans to NFC in Table 1).

A second option is for banks to securitise their loans and pledge them as ABSs. Banks pledged €304bn of ABS to the ECB in early 2015. This figure includes both ABSs backed by SME loans and those backed by mortgages.

A third and last option is for banks to use their loans to government entities or to households to issue covered bonds. The amount of covered bonds pledged to the ECB is around €320bn and similar to the levels of ABSs. Since both instruments are 'overcollateralised' (i.e. require more collateral than the instrument's face value), the amount of loans to issue ABSs and covered bonds in Figure 1 can be estimated to be at least equal to €735 billion (assuming a haircut of 15% on these types of securities, $(304 + 320)/0.85 = 735$).

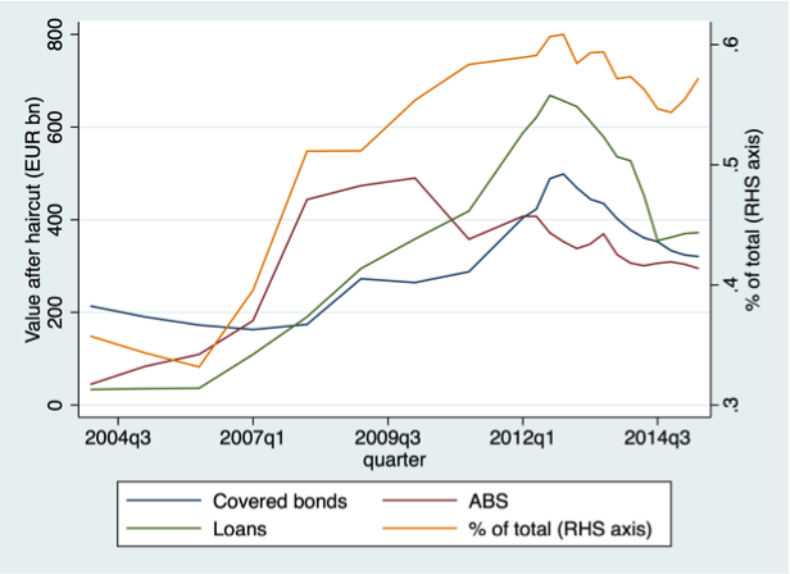
2.4 Use of bank loans for funding purposes

The €2,018 billion mentioned in Figure 1 is obtained by subtracting the €735 billion pledged to the central bank from a total amount of loans used for funding purposes of €2,753 billion in Table 2.

[4] The 2012Q3 figure also includes fixed term and cash deposits whereas the 2015Q1 figure only includes bank loans. The first available breakdown is in 2013Q1 where fixed term and cash deposits accounted for 27% of the total non-marketable assets pledged on an individual basis.

Figure 2: Bank loans used as Eurosystem collateral, 2004Q1-2015Q1

(Source: ECB). ABSs and covered bonds refer to the use of loans as collateral to issue assets that are then used as central bank collateral. Loans refer to the direct use of bank loans as collateral by banks (see "Non-marketable assets" in ECB statistics). The percentage of total is the sum of the value after haircut of all 3 asset classes divided by the total value of the collateral pledged to the ECB.



2.5 International perspective

The above analysis suggests that around 30% of loans made by banks in the euro area are used as collateral. Of these, two thirds are used for funding purposes.[5] Loans for liquidity purposes are pledged to the central bank using both securitisation (€735 billion) and direct pledges (€425 billion). With all the caveats related to cross-continent comparisons, one potential comparison point with the United-States could be constructed using Table L.108 from the U.S. Flow of Funds Statistics. This Table shows that there were $20 trillion worth of loans outstanding on the balance sheet of the domestic financial sector and $ 6.5 trillion worth of agency and GSE backed securities in 2015Q1. This suggests that the level of loan use as collateral in the U.S. is higher than in Europe but in similar orders of magnitude when both funding and liquidity purposes are included in the European figures.[6]

[5] The total ABS or covered bonds is €2,753 billion of which €735 billion are pledged to the central bank so the remaining €2,018 billion are used in the private market (Figure 1).

[6] While the Discount Window of the Federal Reserve also allows for the use of bank loans as collateral, the amounts borrowed as of 2014q4 are relatively limited with a daily average around USD 40 million. Bank loans such as consumer and commercial loans, residential and commercial real estate loans account for more than 90% of the collateral used in these transactions.

3 Conceptual framework

In the previous section we showed that banks in Europe use a significant fraction of their loans as collateral for liquidity and funding purposes. The facts presented raise a broader question: Why do banks use illiquid loans as collateral?

In this section, we provide a conceptual framework to help understand why banks could have an incentive to use bank loans as collateral. Our argument is set out in two steps: we first show that under perfect information there should not be any incentive for a bank to use its loans as collateral for liquidity or funding purposes. We then review several theories that could explain why a bank may instead have an incentive to use non-marketable collateral for liquidity or funding purposes.

3.1 Benchmark: No incentive for use of collateral under perfect information

Consider first the benchmark case where investors have perfect information on the bank's prospects. We can show that in this case there is no incentive for banks to use their loans as collateral either for liquidity purposes or for funding purposes.

Liquidity shock: With perfect information, if the bank faces a liquidity shock such as an outflow of deposits, private lenders in the interbank market should be willing to provide the necessary liquidity to the bank in the form of a short-term unsecured loan. The reason is that investors know that they will be paid back and even if there is a risk of default, this risk can be priced into the loan contract. Liquidity risk is therefore in most cases not an issue for any solvent bank.[7]

Funding purposes: Similarly, with perfect information on the quality of the assets of the bank, using loans as collateral for funding purposes would not create value for the bank. The reason for this is very similar to the argument of Modigliani and Miller (1958): by choosing to give some creditors privileged access to its balance sheet (the collateral), the bank changes the payoff received by other creditors who will, in response, raise their required return to

[7] Diamond and Dybvig (1983) show the existence of "bank run" equilibria when bank depositors have imperfect information on other participants' liquidity shocks. Public intervention supporting solvent but illiquid insitutions can however eliminate these equilibria.

compensate for the greater riskiness of their claims.

Suppose for instance that a bank funds two projects which both require an initial €100 investment. The first project is risk-free and is sure to yield €120, while the second yields €-100 with probability 1/2 and €340 with probability 1/2. The risk-free rate is 0 and the risk premium required for pursuing both projects simultaneously is 5%.

In this case the portfolio of the bank has a positive NPV of €28.6 (with each project having an expected payoff of 120 and an NPV of 14.3=120/1.05-100). The bank would thus be able to raise up to €228.6 by issuing an equity claim against these two projects.

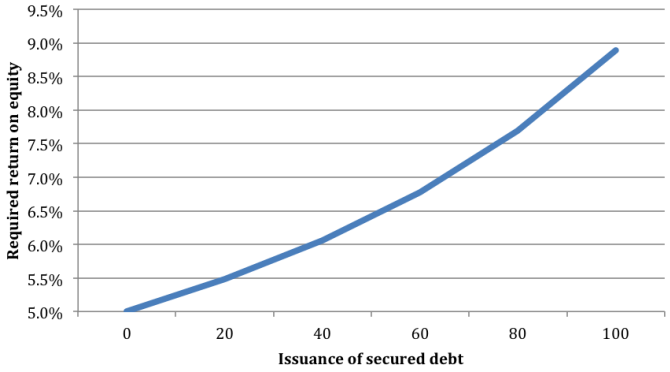
Since the bank owns two projects including a risk-free project and since the risk free rate is zero, the bank could think that by issuing a risk-free asset secured by the good project it could lower its funding cost. A debt claim that uses the good project as collateral would have the following payoff: in the event of failure, the debt holder would be sure to be paid back €100 by seizing the proceeds from the first project. That claim would therefore benefit from the risk-free required rate of return (0%). However, this securitisation would also change the payoff of the remaining liabilities. In case of success, the remaining liability holders would receive €360 (340 from the risky project plus 120 from the safe project minus a payment of 100 to the debtholders). The payoff in case of failure would instead be -80 (with the risky project yielding -100 and the safe project yielding 120 minus the reimbursement of creditors of 100). Since the total NPV of the payoff of the projects is still €228.6, if the bank issues €100 of covered bond then the remaining liability holders are willing to pay €128.6. The required return of the remaining creditors has however increased: while it was previously 5%, it is now equal to 9% (=140/128.6-1). Figure 3 shows the required return of equity holders for different levels of securitisation. The more securitisation increases, the higher the required return.

3.2 Value of using non-marketable collateral for liquidity purposes

By pledging collateral to the central bank, the bank receives a credit line that may be used to manage liquidity shortfalls. We explained above that under perfect information, liquidity shocks are not a problem as long as the bank is solvent since the bank is always able to obtain liquidity elsewhere. There are several reasons why this may not hold in practice, thus making

Figure 3: Higher asset encumbrance pushes up banks' funding costs

The figure shows a numerical simulation of the relationship between the required return on equity and the level of issuance of secured liabilities. As the asset encumbrance of the bank increases, the funding cost of the bank increases to compensate unsecured creditors for the lower quality of their recourse in the event of default.



credit lines valuable to banks.

A first reason is that banks use central bank money for intra-day payment (e.g. transfers from one bank to another). Having collateral is necessary to cover potential negative account balances during the day. A second reason is related to the over-the-counter nature of the interbank market for short-term funds. Banks must close each business day with a positive cash balance or face fines by the central bank. Banks that are in need of liquidity typically contact other banks that have excess cash to obtain a loan. But this process is time-consuming and the number of counterparties that can be contacted is limited so there is always a risk that the bank is unable to find a counterparty before the close of business. In this case, having the option of using a credit line from the central bank is valuable because it helps avoid potential penalties due to negative and uncovered account balances. A simple model where banks have a non-zero probability of not finding a counterparty and having a fine imposed on them would therefore be sufficient to explain why liquidity insurance is valuable to banks. Models along these lines may be found in the work of Poole (1968) and Bindseil (2004).

A third reason is related to contingency planning. In addition to the search costs described above, the money market has been shown to be sensitive to market stress. In stressed conditions, banks may refuse to lend to one another and hoard liquidity (Freixas et al., 2000; Rochet and Tirole, 1996). These situations are costly to the cash-strapped bank, which may have to fire-sell its assets or seek emergency liquidity from the central bank to meet its obligations.

In the worst case scenario, the bank could even default.

A credit line from the central bank can therefore be valuable to the bank because it reduces the likelihood of financial distress in the event of a liquidity shock. Such situations are particularly costly if the bank is forced to liquidate assets at fire-sale prices (Caballero and Simsek, 2013) or if the bank needs to obtain costly emergency liquidity assistance from the central bank or the government. Irani and Meisenzahl (2015) for example show that banks with a larger wholesale exposure prior to the 2007 crisis subsequently sell more of their syndicated loans on the secondary market.

Central bank credit lines are not without costs, however. One potential cost is a stigma effect, where banks that rely on central banks for their liquidity management may be perceived as stressed so that other banks refuse to lend to them.[8] A liquidity line from the central bank may also be costly to the bank if it raises its level of asset encumbrance. Since the liquidity line is secured, investors may be worried that in the event of default and if the bank borrows its credit line the collateral will be seized so that they are left with a smaller amount of assets to share among themselves. Finally, pledging assets to the central bank to obtain a liquidity line may also have an opportunity cost for the bank since these may not be used for other purposes.

3.3 Value of using non-marketable collateral for funding purposes

As for liquidity insurance purposes, we previously argued with a numerical example based on Modigliani and Miller (1958) that there should not be any incentive for the bank to use its non-marketable assets as collateral for funding purposes. The reasoning was that this merely changes the distribution of payoff among the financiers of the bank, so the return required by other financiers will adapt to reflect the change in payoff. In practice, there are several reasons why banks may nevertheless have an incentive to use non-marketable collateral for funding purposes.

A first reason is related to the limited liability of banks and the possibility for shifting risks outside the bank. In the example above, the net value of the bank in the downturn was

[8] The stigma effect may be more severe if the bank becomes dependent on the credit line to meet its daily liquidity needs.

€-80. The net value of the bank in this state of the world is in fact equal to the value of assets (20=120-100) minus the amount owed to the secured creditors, 100. But there there is limited liability , the equity holders would be protected from negative losses and the value of their shares would be either €0 or €360 so the €-80 negative net value of the firm would be passed on to other parties (e.g. the government, other financial intermediaries). In other words, with limited liability, extensive use of non-marketable collateral could change the final payoff of the bank's financiers and lead to risk shifting: creating risky claims whose downside is bound by the limited liability of the bank and its shareholders.

A second and related reason could be that securitisation makes it possible to overcome a debt overhang problem in which the bank is unable to fund new profitable investments (Myers, 1977). If the bank is undercapitalised, new investors may refuse to invest in profitable projects since their investment would be diluted by historical claimants. By using quality loans as collateral, the bank is able to overcome the debt overhang and can raise new funding. The new claimants therefore have a direct claim on the quality assets and are insulated from past unsuccessful investments by the bank.

More generally, information asymmetries between the bank and its creditors may create an incentive for using non-marketable assets as collateral. Myers and Majluf (1984) for example show that when existing financiers have a better knowledge of the bank's prospects than outsiders, the latter may require a financing premium. By using non-marketable assets as collateral and obtaining a credit rating from an outside agency, the bank may reduce the level of information asymmetries and the premium required by outsiders to fund the bank (Demarzo and Duffie, 1999).

The bank could also benefit from securitising its loans against potential incentive problems where the actions of the bank's managers are unobservable to debt holders. In such a setting, the use of unsecured debt may create an incentive for the bank to take on excessive risk. Since shareholders benefit mostly from the upside earnings potential, the manager could undertake risky investments to maximise the returns to shareholders at the expense of debt holders (Jensen and Meckling, 1976). Securitisation and the use of a rating from an external agency offers an opportunity to reduce this incentive for risk-taking since the loans are seized in the event of default so that the creditor is more insulated from future decisions by the bank's

managers.[9]

Issuing assets such as ABSs or covered bonds that are backed by non-marketable collateral could also be profitable for banks if it allows them to cater to a specific class of investors that would otherwise be unable or unwilling to fund its activities. For example, regulatory restrictions limit the capacity of banks, insurance companies or pension funds to purchase risky assets. This creates a so-called "clientele effect" where demand for low risk assets with a strong credit rating is particularly high (Berk and DeMarzo, 2007; Vayanos and Vila, 2009; Tirole, 2010).

3.4 The role of regulatory requirements

In addition to the factors cited above, regulatory requirements could also affect the use of bank loans both for liquidity and funding purposes.

Regarding liquidity purposes, Bindseil (2013) emphasizes the interaction between the central bank's collateral framework and that imposed by regulatory liquidity requirements such as the definition of "high quality liquid assets" (HQLA) in the Basel III liquidity coverage ratio. His model explains for example why banks tend to use the least liquid assets as central bank collateral. Koulischer and Struyven (2014) similarly show that when banks are constrained by collateral availability, it may be profitable for the banks to optimise the use of collateral at the central bank or in the private market depending on the valuation haircut imposed in the two markets.

Regarding funding purposes, there are two types of reason why regulation could influence the decision of banks. The first are through direct effects, such as by imposing banks to retain a specific level of ABSs issued on their balance sheet (Fender and Mitchell, 2009). The second type of effect is indirect, where regulatory requirements affect investors' demand for specific products. For example, Efing (2014) shows that regulatory considerations play a key role in ABS investment decisions by banks domiciled in Germany. Some authors have also argued that the capital requirements on ABSs would make them less attractive relative to

[9] In the case of ABS, the loans are transferred off the bank's balance sheet from the beginning of the transaction. With covered bonds, the assets remain on the bank's balance sheet and are used to cover the investors' claims in the case of failure by the bank.

Table 3: Use of bank loans for funding and liquidity purposes in Belgium (2015Q1)

Loan type	Outstanding (EUR bn)	% use funding	% use liquidity	% kept on BS
Mortgages	170	13%	29%	58%
Loans to NFC and PSE	160	1%	34%	65%
Total	330	7%	32%	61%

Source: National Bank of Belgium. Liquidity use includes retained securitisations for liquidity purposes.

other similar products like covered bonds.[10]

4 Loan-level determinants of the use of bank loans as collateral: The case of Belgian banks

In this section, we focus on the case of Belgium. We conducted interviews with Belgian banks and gathered additional data to explore the role of loan-level characteristics in the decision to use bank loans for funding or liquidity purposes. We explore how banks choose to allocate their loans between funding purposes, liquidity purposes or not using them as collateral.

In Table 3, we use data from the NBB's Central Credit Register for lending to firms and public-sector entities (PSEs) and aggregate data on loans to households for house purchases (mortgages) to summarise the use of loans for funding and liquidity purposes in Belgium.[11] Our estimates suggest that Belgian banks use almost 40% of their loans to households, firms and public sector entities as collateral. The use of loans for liquidity purposes accounts for four-fifths of the collateral used. In other words, for every €3 of loans issued by Belgian banks to households or firms, €1 is used as central bank collateral (and pledged either directly or through securitisations). There is also variation across loan types, since loans to firms or the public sector are rarely used for funding purposes. Mortgages, on the other hand are more amenable for use as collateral in the private market.

Belgian banks tend to use bank loans as collateral more intensively than the euro area average, with a 40% usage rate versus 25% for euro area banks. They also tend to use their loans more for liquidity purposes relative to their euro area peers. While euro area banks use

[10] See e.g. "EBA report on qualifying securitisation", European Banking Authority, June 26, 2015.

[11] Loans to Non-Financial Corporations (NFC) are typically composed of loans to small and medium enterprises (SMEs) and loans to corporates.

around 15% of their loans for funding purposes, we find that Belgian banks only use 7% of their loans for funding purposes.

To further explore the determinants of loan usage, we conducted interviews at the four largest Belgian banks: Belfius, BNP Paribas Fortis (BNPPF), ING Belgium (ING BE) and KBC. These banks collectively account for more than 80% of loans made in Belgium.

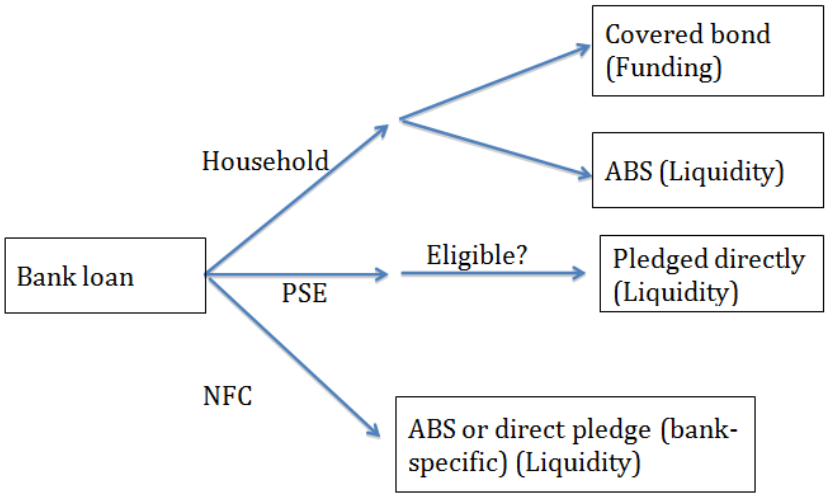
We find that there are three main determinants. First, the type of borrower (public sector, household or firm) plays a key role in the use of the loan. Covered bonds issued in the private market are almost exclusively backed by mortgage loans. Mortgages are also used to issue ABSs as central bank collateral. Loans to public sector entities are more likely to be pledged directly while loans to non-financial corporations are either pooled in an ABS that is pledged to the central bank or pledged on an individual basis. Second, regulatory requirements play a central role in banks' choices. The role played by regulatory requirements is both direct, through arbitrage between for instance liquidity regulation and the collateral framework of the central bank, and indirect by influencing the demand of investors. Third, we find that historical choices and switching costs are an important factor in the use of loans as collateral by banks. In the following subsections, we explore each finding separately.

4.1 Loan Type

An important criterion for determining the use of bank loans as collateral is the loan type. The three main types of loans that we consider are loans to households (and mortgages in particular), loans to public sector entities (PSE) and loans to Non-Financial Corporations (corporates and SMEs). Figure 4 summarises a 'typical' decision tree for using banks loans in Belgium. Mortgages are the most frequent type of loan used as collateral for funding purposes. But they are also used by banks for liquidity purposes.[12] Banks often issue ABSs backed by mortgages that are then used as collateral at the central bank. Public sector loans are mostly used for liquidity purposes. If they are eligible as collateral on an individual basis (and satisfy the minimum size criteria), banks pledge them to the central bank directly. Finally, the use of loans to non-financial corporations (NFCs) varied across banks, with some using these loans exclusively through ABSs, others only pledging them directly to the central bank or using

[12] PSE loans were used in only 2 covered bonds as of early 2015.

Figure 4: Typical decision rule of Belgian banks for using loans for funding and liquidity purposes



both ABSs and direct pledges. However, the NFC loans used for ABSs are mostly composed of loans that would not be eligible on an individual basis.

Mortgage loans. Most banks issue mortgage-backed covered bonds on the private market. A law allowing banks to issue covered bonds was introduced in 2012 in Belgium. The country has since experienced strong issuance, with high demand for covered bonds from institutional investors. Belgian banks have issued around €5bn of covered bonds per year since 2012 (Figure 5 in appendix). As 2015Q1, Belgian banks had issued 84 covered bonds for a total value of €15.9 billion.[13] The covered bonds issued by Belgian banks cover a wide range of maturities (Figure 6 in appendix), from 2 years to 25 years and a weighted average maturity of 7.5 years.

Belgian covered bonds have also benefited from strong demand and attractive yields for issuing banks. This is illustrated in Figure 7 in appendix, which shows that yields on short-dated covered bonds entered negative territory in April 2015.

According to the bank experts interviewed, there are at least five factors behind the strong demand for covered bonds. First, they benefit from more favorable treatment by the capital and liquidity rules than traditional securitisations. Second, covered bonds offer a "dual recourse" so that if the loans themselves were to be become non-performing, the bank would

[13]Data on covered bond issuance is available on the website of the NBB (`https://www.nbb.be/fr/supervision-financiere/controle-prudentiel/domaines-de-controle/etablissements-de-credit/listes-5`).

still be liable to investors. Third, covered bonds benefit from a good reputation and are viewed as "almost risk-free" securities. This contrasts with asset-backed securities in particular as they were badly affected during the 2009-2011 financial crisis. Fourth, covered bonds benefit from a standardised legal setting so they are less information-sensitive. Finally, the ECB's covered bonds purchase programme has also contributed to higher demand for these assets.

But covered bonds are not the only use of mortgage loans made by Belgian banks. Most banks also issue RMBSs (ABSs backed by mortgages) that are then pledged to the central bank. Since mortgages may not be pledged to the NBB on an individual basis, securitisation represents the only option to use these loans for liquidity insurance purposes. The RMBSs issued are rated by credit rating agencies and have to meet several criteria for example regarding the concentration of borrowers inside the pool, the diversity of borrowers in terms of sectors and riskiness of the claims used as collateral.

PSE loans. These loans are specific in the sense that for most banks they are not the core business and they do not lend themselves easily to securitisation, as an ABS built from PSE loans would suffer from a lack of diversification. As a result, the only options for banks are to use their claims on PSEs in a covered bond or to pledge them directly to the central bank. All banks interviewed in fact use this latter strategy. The main reason for doing so is that the reporting requirements are smaller for public sector loans, which can benefit from the credit rating of the federal government. To pledge loans to private sector firms, banks would instead have to provide their internal rating and obtain the approval of their credit rating model from the Eurosystem.

Loans to non-financial corporations (NFCs). Belgian regulations prevent banks from using NFC loans in covered bonds, as is the case in other countries. Since there is also little appetite in the private market for ABSs backed by NFC loans (especially in contrast with the market for covered bonds backed by mortgages), NFC loans can only be used for liquidity insurance as central bank collateral. The trade-off faced by banks which want to mobilise these loans for liquidity reasons is to put them in an ABS (pledged to the central bank) or to pledge them on an individual basis to the NBB.

4.2 Regulation

A second finding to emerge from the interviews, which is confirmed by data analysis, is that regulatory requirements play a key role in the choices made by banks.

A large part of the regulatory environment faced by Belgian banks is common to all banks in the euro area. Banks are subject to a liquidity regulation that requires them to hold a minimum stock of "high-quality liquid assets" to be used as collateral in case of turmoil. The rules regarding the use of bank loans as collateral are described in the "Règlement des crédits intrajournaliers et des opérations de politique monétaire de la Banque nationale de Belgique".[14] The main framework for the NBB's operations is in line with the rules of the Eurosystem: when pledging bank loans directly, the loan must have a probability of default (PD) lower than 0.4% (equivalent to a BBB- rating) and the borrower must be a non-financial corporation or a public sector entity.[15] ABSs must have a rating above BBB- and only the most senior tranche can be used as collateral. In addition, the National Bank of Belgium requires loans to be at least €100,000. We describe these rules in more detail in appendix 5.

There are many ways in which regulatory requirements could affect the use of loans by banks, and arguably the most direct one is by giving the bank the choice between options. The case of Belgium is interesting in this respect because it did not allow the issuance of covered bonds until 2012 as mentioned above. This feature illustrates the role of institutional factors in explaining the cross-country differences in the uses of covered bonds or ABSs that we documented in section 2.

In general, regulatory requirements can have direct and indirect effects on the choices made by banks. Direct effects occur when banks actively respond to regulatory requirements. Indirect effects occur when banks respond to demand from investors who are themselves influenced by regulatory requirements.

One example of a direct effect is the fact that most of the loans used as collateral in the ABSs pledged to the central bank would have been ineligible on an individual basis. To reach this conclusion (which was also confirmed in the interviews), we studied the issuance

[14] `https://www.nbb.be/doc/ts/enterprise/activities/monetarypolicy/reglementbx2009fr.pdf`

[15] The Probabilities of Default are taken from the banks' internal rating models after approval of the models by the central bank.

Table 4: ABSs issued by Belgian banks and backed by loans to non-financial corporations

Bank	Belfius	BNPPF	ING BE	Average
ABS Name	Mercurius	Esmee Master	Lion SME II	
Class A (senior) principal amount (€mn)	3200	4205	4776	4060
Junior principal amount (€mn)	924	2062	1812	1599
Number of Firms	38700	36864	34454	36673
Number of Claims	60500	79054	72447	70667
Mean loan size (k€)	68	79	91	79
Weighted average maturity (years)	9.6	10.3	7.2	9
% of claims (exposure-weighted) with borrower's PD> 0.4%	81.6%	78.6%	53.6%	71.3%

Source: ABS issuance prospectus.

prospectus of three ABSs backed by SME collateral and eligible as central bank collateral. The aggregate descriptive statistics in Table 4 suggest that a large share of the loans in the ABSs would not be eligible for use on an individual basis as they do not meet the two eligibility criteria of size and minimum default probability threshold.

In fact, a key takeaway from Table 4 is that the ABSs are primarily used to package small loans. The average size is €79,000, which is below the minimum size required to use a loan as central bank collateral. Assuming a symmetric size distribution, this suggests that more than half of the loans used in ABSs are ineligible.

Another criterion for eligibility is the default probability of the claim. An analysis of the ratings distribution of the claims securing the ABSs confirms that a significant share of the loans is not eligible on an individual basis. For example, about 50% of the claims in the ABS issued by ING Belgium have a default probability higher than 0.4%, which is the eligibility threshold. For the ABSs issued by BNP Paribas Fortis and Belfius, these percentages amount respectively to 79% and 82%.

These two analyses use aggregate information on the size of the loan or the credit rating of the borrower to determine eligibility. Since the eligibility is based on both the size and the rating, these estimates can therefore be interpreted as lower bounds for the proportion of the claims in the ABS that are ineligible. To have an additional sense of the eligibility of

the underlying claims, we also downloaded loan-level information on the content of one ABS deal from the European Datawarehouse. The analysis confirmed that ABSs are mostly used to package ineligible bank loans into eligible securities.

The prevalence of ineligible loans in securitised transactions is arguably unsurprising given that the effective haircut applied to ABSs is relatively high. As shown in Table 4, an average ABS is composed of loans worth €5.6 billion in total. The junior notes, which serve as a buffer in the event of defaults in the loan portfolios, account for 28% of the loans pledged and cannot be used as collateral. In other words, if a bank pools loans worth €100 into an ABS, €28 of these loans must be kept as "junior tranches" and only €72 may be issued as "Class A" notes, which are eligible to the central bank. Since the haircut on an ABS is set at 10%, this implies that from its initial €100, the bank will only be able to borrow €64.8 (=72*0.9), or an effective haircut of 39.5%. This figure should be put in perspective with the haircut on bank loans pledged on an individual basis, which range from 10% to 44% (Table 5 in appendix). While the effective haircut on an ABS is on the high end of this range, it must also be kept in mind that most loans would be ineligible for direct use (which is equivalent to a 100% haircut). ABSs thus provide an opportunity to reduce the effective haircut on loans that could not otherwise be used, but at the cost of a haircut that remains relatively high.

These computations do not take into account additional costs of issuing ABSs, such as the need to obtain a rating and other issuance costs. Interviews with bank experts confirmed that these costs are significant. On top of the credit rating and legal fees required for the issuance, the use of ABSs also generates regular reporting costs to rating agencies as well as the European Datawarehouse.

While the choice of the optimal use of collateral for liquidity purposes is an example of the direct effects of regulation, the interviews also suggested that regulation affects the use of collateral for funding purposes in an indirect way, by influencing the demand of investors.

For example, banks mentioned that none of their loans are currently being used as collateral in any ABS sold to the market, owing to the lack of demand. One of the reasons cited was that the capital and liquidity treatment of ABSs was perceived as being too harsh by investors (mainly other banks, insurance companies or pension funds) relative to covered bonds. The differences in capital rules across the two assets are also associated with the dif-

ferent reputations that these instruments have, with ABSs still under the impact of a negative stigma effect from the crisis.

4.3 Switching Costs and Historical Decisions

A third insight gained from the talks with banks is that historical decisions on pledging loans directly to the central bank or via an ABS, or past issuances of covered bonds play an important role in the choice of collateral use by banks. This suggests that there are important switching costs between the various options. For example, if a bank issues an ABS in order to use it as central bank collateral, it is unlikely to respond rapidly, for example, to changes in the haircut on credit claims or in eligibility criteria.

The two strategies (ABS versus pledging claims individually) in fact have different requirements in terms of reporting. ABSs must be rated by an external credit rating agency, and the pool of loans is also monitored regularly. The ECB also requires banks to submit information on the collateral used in the ABS to the European Datawarehouse. Using credit claims as collateral also imposes practical constraints on banks. They must report on a daily basis any changes to the loans used as collateral. When internal ratings are used, the models have to be approved by the Eurosystem. Banks must also pay a small fee for each loan used as collateral.

High switching costs and historical decisions are therefore also important in understanding why for instance some banks rely more on ABSs while others directly pledge individual credit claims instead.

5 Conclusion: Open questions and policy implications

We have explored the use of bank loans as collateral in Europe. While the use of collateral such as government debt or high-grade corporate bonds is well documented, there is much less evidence on the use of illiquid assets such as bank loans used as collateral. We find that banks make wide use of their loans as collateral, up to 30% in the case of the euro area. The use of this collateral serves two broad purposes. The first is for short-term liquidity purposes, i.e. to manage short-term liquidity shocks using contracts such as repurchase agreements. The

second use is for funding purposes, i.e. the issuance of long-term claims backed by collateral such as asset-backed securities. We then explore the micro determinants of the choice of using bank loans for funding or liquidity purposes focusing on the case of Belgian banks. We find that loan types are key to alleviating asymmetries of information; that regulatory requirements play a major role in the choices of banks, both directly and indirectly through clientele effects; and we find that there are significant switching costs between the various uses of bank loans as collateral so historical decisions also determine the use of bank loans as collateral.

These insighs are interesting because, arguably, they are not the core issues that the theoretical literature has focused on. While the literature tends to ignore frictions or transaction costs to focus on optimisation by agents, we find that "mechanical" constraints such as historical decisions and high switching costs are often first order. Similarly, we do not find any evidence of micro-level arbitrage between loan types when choosing what type of loan to use at the central bank, in contrast to the predictions of a typical adverse selection model.

More generally, the paper provides insight into the trade-off faced in the design of central bank collateral policy regarding bank loans. On the one hand, the regular use of bank loans as collateral can help generate information on loan quality and support the appropriate internal processes so that, in the event of a liquidity shock, the central bank can rapidly provide liquidity while ensuring that the collateral is sound. If the central bank has better information on loan prospects, for instance through regulatory activities, accepting bank loans can also mean efficient use of collateral and provide liquidity to the most illiquid assets, bank loans. On the other hand, our finding that regulation creates a pecking order suggests that the central bank could end up receiving the less liquid collateral. It could also lead to insufficient collateral holdings by banks if they know that they will benefit from liquidity support in a shock scenario. An integrated approach to these issues would be extremely useful and our paper represents a first step in this direction.

Finally, this paper underscores the need to take both funding and liquidity motives into consideration when looking at issues such as securitisation or the use of credit claims as central bank collateral. Since bank loans are used for different purposes, changing conditions for one purpose may lead to a substitution by banks. Our results also highlight the importance of the

loan types in the use of bank collateral so that policies that affect one type of product may not uniformly affect all types of loans. For instance, since covered bonds are mostly composed of mortgages, introducing a more favourable legal environment for these assets may encourage the issuance of mortgages but not loans to firms.

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Appendix

Central Bank Collateral Rules

Since bank loans are not allowed as collateral in most private market short-term lending platforms, the Eurosystem is the main provider of liquidity accepting the use of bank loans as collateral.

In practice, there are two ways of using bank loans as central bank collateral. The first one is to pledge the bank loans on an individual basis. In this case, only specific types of loans are eligible as collateral and the criteria used are (a) the borrower must be a non-financial corporation or a public sector entity. Loans to households and mortgages are thus not eligible on an individual basis. (b) The loan must have a probability of default (PD) lower than 0.4% (equivalent to a BBB- rating). The probability of default is computed from the internal model of the bank (approved by the regulator and reviewed by the market operations team) or by the in-house credit assessment of the central bank. For loans to public sector entities, banks have the additional option to apply the credit rating of the sovereign (mapped into a probability of default).[16] (c) Finally, there is a minimum size limit set at €500,000 for the Eurosystem, but where national central banks have the option to set a lower threshold (in Belgium, the threshold is €100,000). Once a loan is eligible, the size of the credit line depends on a haircut that varies with loan characteristics, most notably its PD and its residual maturity (see Table 5).

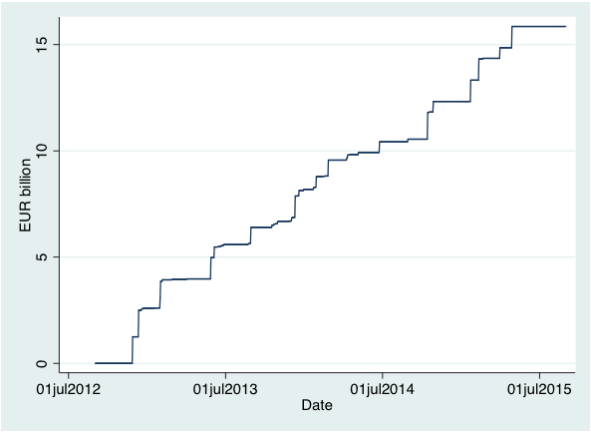
The second option is to pool the loans as collateral to issue a security backed by the loans (an asset-backed security or a covered bond). In the case of asset backed securities, the Eurosystem only accepts the senior tranche as collateral which must have a minimum rating of A- (the rating is determined by an external credit rating agency). The ABSs are also subject to regular reporting requirements on the pool of loans backing the asset. Covered bonds must have a minimum credit rating of BBB-.

[16] Public sector entities which are classified as being of "type 1" receive the rating of the sovereign whereas PSEs of "type 2" receive the rating of the sovereign minus 3 notches.

Table 5: ECB haircut schedule for non-marketable assets

Levels of valuation haircuts applied to eligible non-marketable assets				
		Asset categories		
Credit quality	*Residual maturity (years)*	Credit claims: Fixed interest payment and a valuation based on a theoretical price assigned by the NCB	Credit claims: Fixed interest payment and a valuation according to the outstanding amount assigned by the NCB	Non-marketable RMB debt
Steps 1 and 2 (AAA to A-)	0-1	8.0	10.0	24
	1-3	11.5	17.5	
	3-5	15.0	24.0	
	5-7	17.0	29.0	
	7-10	18.5	34.5	
	>10	20.5	44.5	
Credit quality	*Residual maturity (years)*	Credit claims: Fixed interest payment and a valuation based on a theoretical price assigned by the NCB	Credit claims: Fixed interest payment and a valuation according to the outstanding amount assigned by the NCB	Non-marketable RMB debt
Step 3 (BBB+ to BBB-)	0-1	15.5	17.5	Not eligible
	1-3	28.0	34.0	
	3-5	37.0	46.0	
	5-7	39.0	51.0	
	7-10	39.5	55.5	
	>10	40.5	64.5	

Figure 5: Issuance of covered bonds in Belgium



Issuance of covered bonds in Belgium

Belgian banks had issued €13.9bn worth of covered bonds in 2015Q1 and we estimate that this figure was €19.3bn by May 2015. Assuming an overcollateralisation ratio of 35%, this implies that the pool of loans used as collateral for these covered bonds amounted to €25.6 billion ($= 19.3/(1 - .35)$). Since these covered bonds were issued in the private market, the use of loans for funding purposes is €25.6 billion.

On the securitisation side, Belgian banks had issued €114.9 billion worth of ABS as of 2014 (source: SIFMA). ABSs backed by mortgage loans account for around three quarters of this amount while ABSs backed by loans to SMEs account for the remaining quarter. Securitised assets in Belgium are mostly retained on balance sheet and are not sold to the private market and these transactions have a liquidity purpose, i.e. their main goal is to create collateral that is eligible at the central bank. Belgian banks also use a significant share of their loans directly as central bank collateral.

The law allowing Belgian banks to issue covered bonds was introduced in 2012. By 2015, Belgian banks had issued 84 covered bonds for a total value of €15.9bn (data on covered bond issuance is publicly available on the NBB's website). Figure 5 shows the total amount of Belgian covered bonds outstanding since the law was introduced. Banks have regularly issued new securities and the total amount of covered bonds outstanding stood at €15.9bn in mid-2015.

As shown in Figure 6, the covered bonds have a wide range of maturities, from the 2-3

Figure 6: Distribution of maturities of Belgian covered bonds (2015Q2)

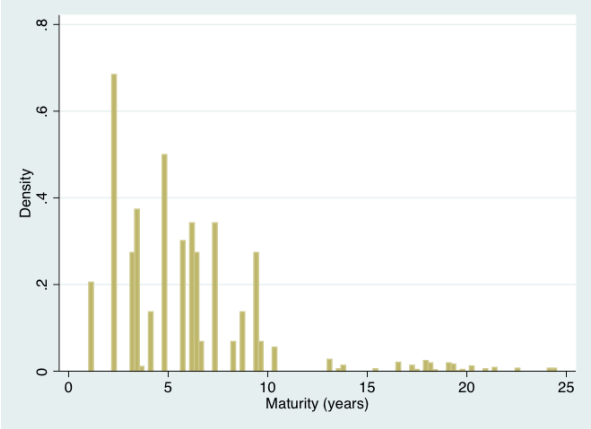
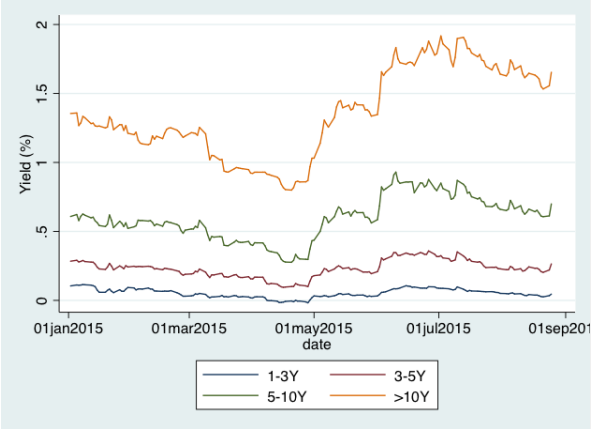


Figure 7: Yield on Belgian covered bonds by maturity group (Source: Bloomberg and authors' calculations)



year range to above 20 years.

The covered bonds issued by Belgian banks have also benefited from a favorable pricing from the market. In Figure 7, we downloaded data for 80 covered bonds from Bloomberg and took the average yield per maturity category. The figure shows that the interest rate commanded on covered bonds was relatively low, hitting zero for bonds with shorter maturities in April 2015. The yield on Belgian government debt with 10-year maturity was for instance 1.12 at the end of the sample period.

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RLP Brussels – Company's number: 0203.201.340
Registered office: boulevard de Berlaimont 14 – BE-1000 Brussels
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Layout: Analysis and Research Group
Cover: NBB AG – Prepress & Image

Published in April 2017