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# How integrated regional financial markets are in Europe? A first gauge based on active securitised loans

*Julián Moral-Carcedo*, Carlos Llano-Verduras***

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## Abstract:

Little is known about the degree of integration of financial markets at subnational level in the EU. This article provides new evidence on interregional loan flows within Europe. Building on the "Loan Level Initiative" launched by the ECB, with more than 35 million active loans, we built a georeferenced dataset of securitised loans, covering the period 2014-2018 and the 166 European NUTS 2 regions for which data exists. After reviewing the complex nature of the dataset, we explored its geographical dimension, and conduct an econometric analysis focused on explaining the regional demand for such loans, using different explanatory variables related to the geographic and the socio-economic features of the regions, and alternative panel data specifications (classic versus spatial econometric ones).

**Keywords:** Capital flows; loans; securitized loans; European financial integration.
**JEL Classification:** O33; O34; J16.

## ¿Cuán integrados están los mercados financieros regionales en Europa? Un primer indicador basado en préstamos titulizados activos

## Resumen:

Poco se sabe sobre el grado de integración de los mercados financieros a nivel regional en la UE. Este artículo proporciona un primer vistazo a los flujos de préstamos interregionales dentro de Europa. Partiendo de la base de datos «Loan Level Initiative» lanzada por el BCE, que permite acceder a información de más de 35 millones de préstamos activos, construimos un conjunto de datos georreferenciados de préstamos titulizados, capaz de cubrir el periodo 2014-2018 y las 166 regiones europeas NUTS 2 para las que dichos datos existen. Tras depurar y explorar el conjunto de datos, en este artículo exploramos su dimensión geográfica, mediante un análisis gráfico y econométrico centrados en explicar la demanda regional de dichos préstamos, utilizando variables geográficas y socio-económicas, y empleando diferentes especificaciones de datos de panel, clásicos y con elementos de econometría espacial.

**Palabras clave:** Flujos de capital; préstamos; préstamos titulizados; integración financiera europea.
**Clasificación JEL:** O33; O34; J16.

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## 1. Introduction

The aim of this paper is to provide new evidence about the subnational financial integration in Europe, by exploring the "Loan Level Initiative", a new dataset containing more than 35 million active securitized loans. Covering the period 2014-2018 and 166 European NUTS 2 regions, we analyse the regional demand for such loans, using different panel data models and explanatory variables related to the geographic and the socio-economic features of the regions.

Capital mobility, and integrated capital markets facilitate risk sharing across sectors and countries, helping to cushion economic shocks on consumption and investment. In line with (Baele, et al., 2004), it can be said that financial markets are integrated when different agents, irrespective of their place of residence, share a common set of rules, are treated equally, and have equal access to the existing set of financial instruments. Despite the progress made in removing the obstacles to capital mobility in Europe, there is evidence about a high degree of home bias in capital flows, as has been commented by several authors (Feldstein & Horioka, 1980; Valiante, 2016). While the cross-border integration of European capital markets has increased in recent years, risk sharing remains below the values observed in the United States (European Commission, 2015). This home bias is a key puzzle in open macroeconomics, but not restricted only to capital flows as it is also found in other flows like migration, trade of goods or services.

French & Poterba (1991) were the first to document a lack of diversification in equity investing highlighting a domestic bias in share's owners across countries.(Lewis, 1999) goes one step further concluding that individuals underperform hedging risks across countries. More recently (Dahlquist & Robertsson, 2001) show how foreign investors tend to penalize firms with low market liquidity, with little presence in international markets and with a dominant owner, typically small and medium enterprises, pointing to an institutional investor bias, as foreign investors typically are mutual funds or other institutional investors. Although this home bias is well documented, this literature focuses mainly on cross-country analysis. Spatial disaggregation at the sub-national level remains off the research radar due to data scarcity.

The available information on the interconnectedness of financial institutions and between them and the rest of the agents within the EU is far from optimal. Some previous work has attempted to explore financial integration between markets using asset return data, which are readily available even daily. For example, in (Worthington & Higgs, 2010) stock market indices for 11 European countries are analysed using Granger causality tests and VAR procedures to examine causal relationships among these markets.

To the best of our knowledge, there is no complete and homogeneous source for tracking region-to-region (R2R) credit flows within or between countries in the EU, with the ability to link the sub-national units such as regions (NUTS 2), provinces (NUTS 3) or cities (NUTS 5). Within countries, no information is available regarding the region where the economic agents taking/issuing the credit/debit are located. For cross-border flows related to loans, although very good data are available at the country level, it is difficult to disaggregate such flows at the sub-national level.

As commented, the aim of this article is to shed light into the financial relations in Europe, offering new evidence about the interregional flows of loans. Of course, we do not expect to obtain a full detailed and accurate picture of the complex financial interrelations in the EU. More humbly, the intention is to explore a new dataset (ECB-EDW), the "Loan-level Initiative" recently launched by the European Central Bank (ECB) and explore the geographical dimension of such immense and innovative dataset, and to evaluate to what extent it can (partially) fill the gap about the interregional financial integration in Europe.

New instruments in the financial market became more important in the cycle of finance-investment and savings-financing, and financial innovation like securitization has played a key role in increasing the variety and complexity of available assets allowing investors to diversify their funds and hedge more efficiently.

The loan-level initiative establishes specific loan-by-loan information requirements both for asset-backed securities (ABSs) and for non-marketable debt instruments backed by eligible credit claims accepted as collateral in Euro system credit operations. The aim of that initiative is to add transparency to the

financial sector in Europe after the big crisis in 2008. It includes different types of loans: residential mortgage-backed securities (RMBSs), ABSs backed by small and medium-sized enterprise (SME) loans, consumer ABSs, auto loan ABSs and leasing ABSs, ABSs backed by credit card receivables, etc.

The exploration and data provision of this innovative dataset is conducted by the European Datawarehouse and the ECB[1]. The dataset is currently being used with the BigNOMICS Project[2], and initiative developed by the JRC-Ispra (Italy), where they have analysed the regional dimension of the mortgage loans with the objective of analysing the local drivers of loan-mortgages defaults in seven EU countries.

In principle, this new data source could potentially provide useful insights for tracking the interregional flows of short-term capital movements, both within and between EU28 countries and to explore if these financial instruments have had a positive effect on the volume of interregional/international financial interrelationship. However, as indicated in the next section, the current layout of the dataset faces some limitations in the proper identification of the territorial origin of the capital flow (the region emitting the loan), as well as in terms of the overall representativeness of the true levels of loans in Europe. In any case, the information related to the destination side of the flows is extremely rich, allowing for analyse the financial exposure of some regions to a variety of different assets.

This is precisely the intention of our econometric analysis, able to open the black box of the regional demand of (securitized) loans for different European countries at the same time. This is conducted by means of different panel data specifications, where the regional demand for loans is modelled against different explanatory variables related to the geo-graphic and the socio-economic features of the region. Such analysis encompasses standard panel data specifications as well as spatial econometric ones, taking the form of a spatial error panel model with fixed effects (Elhorst, 2003).

The rest of the article have the following structure: in the second section, we revise the state of the art with respect to the knowledge of the financial linkages at the country and sub-national level. Then, we describe the dataset and the methodology used. Next, we analyse the results obtained, first developing a descriptive analysis, and then by a panel data econometric analysis, with the aim of exploring the geographical dimensions of the data obtained. The paper finish with a concluding sector defining potential extensions of this original first incursion in this complex and relevant topic.

## 2. Background

### 2.1. Financial integration in Europe

The degree to which an economy's financial system is developed determines the level of development and well-being of its members. For the development of business activities and for households' access to durable consumer goods and adequate housing, the availability of financial resources at acceptable cost, maturity and volume conditions is fundamental.

In advanced economies, the degree of development of their financial system can be observed both in the number and volume of financial agents and assets available to non-financial agents (savers and investors) and in the depth of financial linkages (between firms, households, and financial intermediaries) and the degree of development of their financial markets. Financial intermediation involves not only the simple transfer of resources from one agent to another, but also the transfer of risk (Obstfeld, 1994). Thus, in developed financial systems, the greater availability of different asset types allows agents for transfer risk, and investors for diversifying risk in a more efficient manner. In this process of transferring risk from some agents to others, the securitization of loans, both with and without collateral, has been an instrument that

[1] https://ec.europa.eu/jrc/communities/en/community/big-data-and-forecasting-economic-developments
[2] https://www.ecb.europa.eu/stats/financial_corporations/list_of_financial_institutions/html/index.en.html

had experienced a wide expansion in recent years, and that has become most notorious, maybe with negative connotations, due to the subprime crisis.

With increasingly more open economies and the substitution of restrictions on international capital transactions by a common, and clear, set of norms regulating financial flows lead to developed financial systems that are also characterized by deeper financial interrelations with non-resident agents. Although their positive, and controversial, potential effect on economic growth, capital mobility also has some associated risks (Arif-Ur-Rahman & Inaba, 2020; Bonfiglioli, 2008; Feldstein & Horioka, 1980).

Easing capital mobility increase financial integration between markets in different countries, who become increasingly financially interconnected. The process of financial integration results in a convergence of prices and returns (Valiante, 2016) and intensified cross-border financial activity (Bonfiglioli, 2008). Price convergence and intense cross border flows is reached when similar market participants face a common set of rules, have equal access to the set of financial instruments and are treated equally when they are active in the market regardless of their region of origin (Baele, et al., 2004). From a geographical point of view, the existence of financial flows between agents located in different regions within and between countries is a consequence of the openness and integration of the financial systems of different countries. With the suppression of all kinds of administrative and transaction costs (information, transformation, currency conversion, formal reporting obligations, etc.), as well as the perception of risk differentials depending on the location of the investor and the debtor, the intensity of these flows is expected to increase, as well as the convergence in prices and returns in instruments that are available to all resident in the integrated area.

Deep financial linkages between agents throughout the economy should be catalysed by a common regulatory framework, a single supervisor, a single currency (as in the European Monetary Union), a single payment system, the freedom to open subsidiaries and invest in financial institutions, and a single tax system. As in (Hobza & Zeugner, 2014) is pointed, the strength of financial linkages among euro area countries increased significantly in the pre-crisis period, leading to the emergence of a "euro bias" in cross-border holdings of various financial assets. The authors cite the role of German banks in financing the Spanish construction sector as an example of this "euro bias".

Just as the exchange of goods and services in the EU has intensified, facilitated by a common regulatory framework, bilateral financial flows have also increased, and to some extent the two factors are interrelated. For example, it is generally accepted that the surplus countries, which also act as intermediaries for flows from the rest of the world, have financed the current account deficits and investment surpluses in the euro area periphery (Hobza & Zeugner, 2014; Waysand, et al., 2010).

In any case, although equity, bond and interbank markets in Europe appear to be highly integrated, there is still a long way to go to achieve a truly unique financial system. As (Dahlquist & Robertsson, 2001) suggests, a clear institutional investor bias exists. Interbank and credit markets in Europe became more fragmented after the 2008 crisis (Mayordomo, et al., 2015). This is especially true in peripheral countries, where financing costs are higher, even after the ECB's Securities Market Program (SMP) and Long-Term Refinancing Operation (LTRO). It is not only the interbank market that is fragmented. Corporate transactions are also affected by a country bias. As pointed by (Umber, et al., 2014), for mergers and acquisitions in Europe, national borders seem to be a strong barrier.

Some attempts to shed light on this "black box" are reported in Table 1 which presents a selection of papers. In all of them, problems of data limitations have been reported, with reference to the lack of consistency in the reported value of transactions between debtors and creditors, the absence of data for some transactions, the lack of information for non-reporting countries, etc. Our analysis is not an exception, as we will explain in the following section.

**Table 1.**
**Estimation of financial interrelationships in Europe. Previous experiences**

| Work | Countries | Time span |
|---|---|---|
| (Hobza & Zeugner, 2014) Gross financial flows (portfolio investment, other investment, FDI and reserve assets.) | Germany, Greece, Spain, France, Italy, Austria, Portugal, Benelux, Rest of EA, Poland, Sweden, UK, Rest of EU, and Non-EU (detailed for Switzerland) | average 2004- 2006<br>average 2007- 2009<br>average 2010-2012 |
| (Waysand, et al., 2010) Bilateral external financial asset and liabilities, excluding reserve assets and derivatives. | Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, United Kingdom | 2001-2008 |
| (Kubeleca & Sa, 2012) Bilateral external assets and liabilities (foreign direct investment, portfolio equity, debt, and reserves) | Germany, Spain, France, Italy, Portugal, UK, Rest | 1980-2005 |

## 2.2. Securitized loans

According to (Pinto & Alves, 2016), the first European securitization transaction was a RMBS, issued in the UK in 1987. Soon, other countries such as Spain and France begin to issue ABS, in the early 1990s, followed by Finland, Sweden, Ireland, Italy, and Germany, in the mid-1990s. From the late 1990s, securitization really began to take off, supported by legislative changes in many countries. The introduction of the Euro in 1999 increased the importance of the European securitization market, who is, in fact, a collection of distinct markets. Securitization was hit by the subprime crises in the 2007-2009 period, but since 2010 the number of asset securitization bonds is around 80 per year. This historical development of the securitization market helps to understand the peculiarities in the disaggregation of the data at a country level.

Banks' liquidity needs and risk diversification are the theoretical determinants of securitization (Farruggio & Uhde, 2015). Therefore, the actual liquidity needs of banks and the cost of alternative funding sources, such as traditional retail deposits, should influence the securitization process. Loan activity is also expected to generate high securitization activity, so the main drivers of securitization should be the same as for loans (high activity in the housing market, increase in new car sales, consumer purchases, etc.).

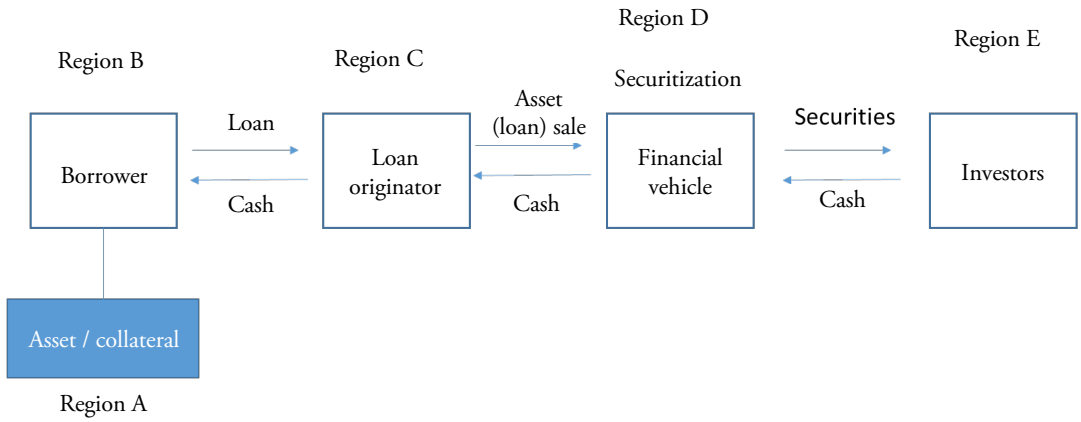
In this line, (Bannier & Hänsel, 2008), with data from the period 1997-2004, shows that the issuance of collateralized loan obligations (CLOs) appears to be an appropriate funding tool for large banks with low liquidity and high risk, as securitization is also a risk transfer tool. In their study, these authors also find a significant "reverse" regulatory arbitrage effect: banks with low Tier 1 capital securitize significantly less than banks with high Tier 1 capital.

In this study, we analyse data in the EDW repository on securitized asset-backed loans. By securitization operation some income generating assets as loans are pooled and transformed into tradable securities. These securities are sold to institutional investors, financial intermediaries, or, highly unusual, directly to the public. This operation transforms illiquid assets into securities, that ideally have lower risks than the original illiquid asset (throughout diversification of individual risks or by insurance if the operation count with third-party credit enhancers), providing liquidity to the original lender. In addition, securitization also acts as a risk transfer mechanism, transferring credit risk from the lender to the financial vehicle and ultimately to the purchasers of the securitized loans, as the bursting of the housing bubble in 2007-08 taught us.

As mentioned above, securitized loans are mainly purchased by investment funds and institutional investors. In recent years, other agents such as the ECB have emerged as active buyers, but their role is marginal in the ABS market. The Asset Purchase Programs (APP) is part of the ECB's set of monetary

policy instruments, and among other instruments, the ECB counts with the Asset-Backed Securities Purchase Program (ABSPP), under which the ECB purchases eligible asset-backed securities. Between November 21, 2014 and June 2022, the Eurosystem conducted net purchases of asset-backed securities under the APP, accumulating a value of 30,000 million euros in March 2020[3]. While significant in absolute terms, this represents only 1.2% of the total cumulative purchases of the APP, which essentially comprises Public Sector Purchase Program (PSPP) assets, and only 3% of the outstanding balance of active (outstanding) loans in the EDW database (the EDW database does not include all the ABS issued in the Euro Area).

**FIGURE 1.**
**The geographical dimension of securitized loans**




**Source:** Own elaboration.

Figure 1 provides a simple illustration of the financial flows involved in a typical securitization transaction. The spatial dimension of this process is also highlighted in this figure. In a securitization operation, it is possible to identify 4 types of agents and their spatial locations (which in some cases may be the same), together with the location of the collateral used in the original loan operation. These different locations are key determinants in identifying where financial flows originate and terminate in this study. From a purely financial point of view, in the securitization process we can identify a debtor (original borrower) located in region B and a creditor located in region E (final investors). The rest of the agents in the operation are intermediaries in the credit investment operation. Ideally, if region B and region E are known, as well as the value of the securitized assets, we will have a direct indicator of financial linkages at the regional level. Identifying and assessing this flow was the main objective of this exploratory analysis.

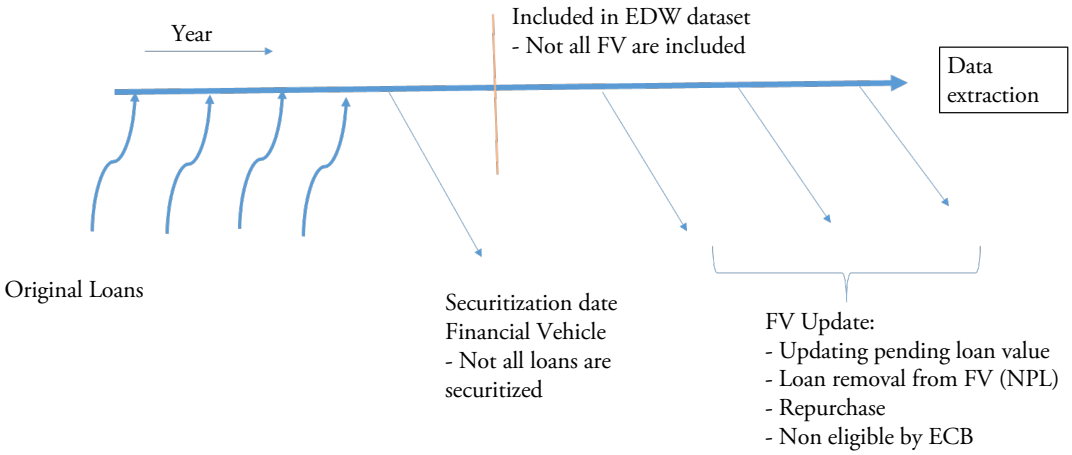
However, to put our feet on the ground and advance the results, the database used in this study (EDW) only allows us to identify the regions D (legal address of the financial vehicle) and B/A (region where the debtor is located or the place where the collateral is located). Although the database contains information on the originator of the loan, this information cannot be decoded due to the anonymization of the data. Therefore, in practice, the regions C and E in Figure 1 cannot be identified, which limits the potential use of this source for the original objective of the analysis, i.e., to truly follow the origin-destination financial flows (loans) in Europe.

It is also necessary to mention the temporal dimension of securitized loans. Several important dates must be kept in mind because of their impact on the valuation of the financial operations collected in the EDW database. Figure 2 summarizes the temporal scheme of a securitized loan and how the main milestones are recorded by the dataset before it is extracted and analysed, to facilitate the understanding of the

[3] See original data in the url https://www.ecb.europa.eu/mopo/implement/app/html/index.en.html#abspp

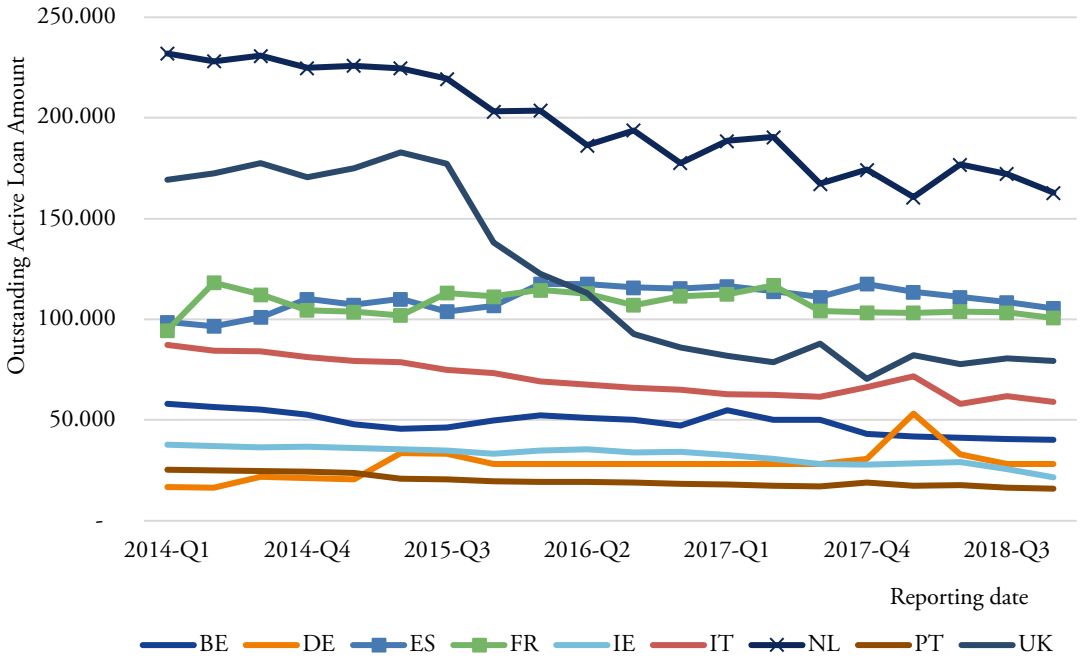
information contained in the dataset. The database contains the valuation of the outstanding debt on the loans contained in a financial vehicle at a given date after the date on which the financial vehicles were created. It is expected that the value of the outstanding debt will become smaller and smaller over time (see Figures A.1 and A.2 in the appendix), therefore, the value of the financial vehicle will decrease naturally over time. When the financial vehicle is created, loans that were previously issued are grouped together, so that the same financial vehicle may contain different generations of loans, issued at different dates. Thus, when the economy is in a credit expansion phase, it is expected that the number and volume of financial vehicles will be greater, which will naturally lose volume, as the underlying loans are cancelled or even lose their value due to default. In this article, we will consider the evolution of the amount of active loans in the EDW database as the indicator of the financial interrelationship among regions, and therefore, the value reported represent the value of pending debt in a given year irrespective of the origination date. As Figures 3 and 4 make clear, the consideration of one or the other approach is important in understanding the dynamics of the loan data collected in the database and their relationship to the credit dynamics observed in each country. For example, the reduction in the volume of outstanding collateralized mortgage loans located in Spain does not imply that lending in Spain is declining over time, but rather that the outstanding value of loans embedded in the financial vehicle is declining. As an example, the outstanding value of mortgage loans with collateral in Spain in 2006 still represents 3.5% of the outstanding value at the end of 2018 of all loans included in the financial vehicle. The expansion of mortgage lending in Spain and Ireland, linked to the housing bubble prior to 2008 is still discernible in the database, although the composition of the financial vehicle at the end of 2018 shows a high weight of loans with collateral in France granted from 2014 onwards.

**FIGURE 2.**
**Scheme summarizing the securitization process of loans**



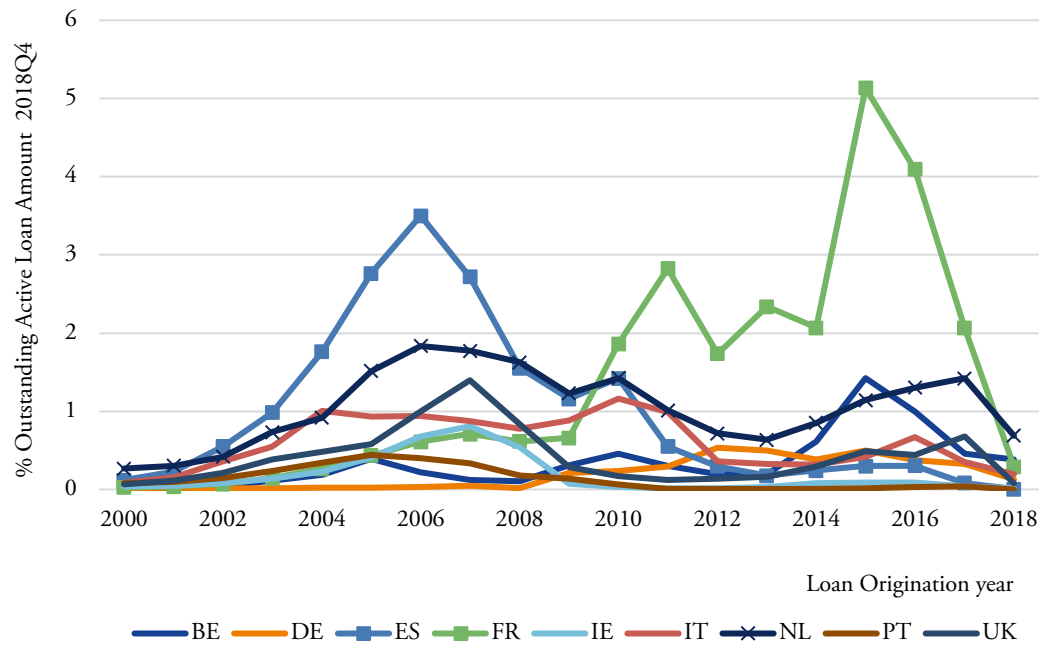

**Source:** Own elaboration.

FIGURE 3.
**Evolution of the outstanding active loans amount 2014 -2018. Quarterly date. Value at the end of the period. Only RMBS data**




**Source:** European DataWarehouse, EDW.

FIGURE 4.
**Breakdown (% over total value) of outstanding active loan value in 2018 Q4 by origination date. Only RMBS data**




**Source:** Own elaboration with European DataWarehouse (EDW) data.

# 3. Methods and materials

## 3.1. Description of the EDW/ECB dataset

European DataWarehouse (EDW) is a data repository where securitized assets info is collected, validated, and made available for download detailed, standardized and asset class specific loan-level data (LLD) for Asset-Backed Securities (ABS) transactions and private whole loan portfolios. According to EDW, the number of active loans in the EDW database was 35.5 million in Q1 2019, irrespective of the date of issuance, while the outstanding balance of active (outstanding) loans was €867 billion. This is a huge amount of very detailed information for quantifying interregional financing flows.

As the data come from securitization of loans, it is needed to consider the characteristics of this financial operation. In particular, it is important to remark that securitization is an operation that does not affect all loans, and therefore, the data can exhibit some degree of lack of representativeness in some credit segments. Another important fact is the limited number of financial institutions that are active in the securitization market as this type of operation is not accessible to small banks. Moreover, in some countries, securitization is an unusual operation. Therefore, some countries and financial institutions are not represented in the database.

Table 2 shows the evolution of the amount of active loans in the EDW database and their geographical distribution. Two main features should be highlighted. First, the amount of active loans is decreasing, as new deals are not large enough to offset the effect of loan repayments over time (the average amount per deal has decreased from €1.5 billion to €1.3 billion). And second, there are significant differences across countries that are unrelated to the country's economic importance as measured by GDP. This latter feature indicates the role played by institutional factors (regulation, banking culture...) on the practice of securitization between countries.

Table 2.
Active loans amounts. 2013-2019. Millions €

| | 2013-Q4 | 2014-Q4 | 2015-Q4 | 2016-Q4 | 2017-Q4 | 2018-Q4 | 2019-Q1 |
|---|---|---|---|---|---|---|---|
| Austria | - | - | - | - | - | - | - |
| Belgium | 77,758 | 70,102 | 66,770 | 65,536 | 64,648 | 64,730 | 67,454 |
| Germany | 29,990 | 55,936 | 73,715 | 79,703 | 85,867 | 84,637 | 84,875 |
| Spain | 138,276 | 142,997 | 136,621 | 145,929 | 149,804 | 136,795 | 131,588 |
| Finland | 440 | 692 | 706 | 860 | 1,086 | 1,174 | 1,022 |
| France | 142,034 | 125,323 | 142,776 | 147,259 | 132,714 | 135,759 | 147,436 |
| Ireland | 38,490 | 36,802 | 33,561 | 34,387 | 28,259 | 21,822 | 21,950 |
| Italy | 133,481 | 143,827 | 133,222 | 128,042 | 130,235 | 131,529 | 126,658 |
| Luxembourg | - | - | 2,000 | 2,000 | 2,000 | 2,140 | 2,140 |
| Netherlands | 251,552 | 235,259 | 212,259 | 185,487 | 180,902 | 165,100 | 165,172 |
| Norway | 181 | 189 | 154 | 90 | 42 | 12 | 10 |
| Portugal | 32,532 | 29,818 | 26,623 | 24,665 | 25,002 | 21,338 | 19,777 |
| Sweden | - | - | - | - | - | - | - |
| United Kingdom | 172,070 | 184,262 | 154,720 | 99,433 | 83,317 | 94,595 | 99,201 |

**Source:** EDW Data availability report 2019Q1. All loans valued in Q4 unless data for 2019 year.

In terms of risk transfer, the bank is likely to securitize only high-quality loans and retain the riskiest tranche (first loss piece) due to information asymmetries between the issuing bank and investors. There-

fore, the relationship between securitization and bank risk is ambiguous. This policy ensures that the characteristics of the securitized loans are skewed towards the characteristics of high-quality loans, and therefore the loans included in the financial vehicle are not fully representative of all loans.

Summing up, securitisation affects the dataset quality in (EDW, European Datawarehouse data availability report q1 – 2019, 2019):

- Loans are securitized only if they meet the "eligibility criteria" and not to make the dataset representative of the financial flows in Europe.
- Lenders are only represented in the database if one of their deals is active. It is important to keep in mind that not all the lenders are securitizing loans to the same extent.
- Loans may be subject to repurchase by the originator after a loan modification. Thus, loans leave the securitized pool when they are repurchased.
- The securitized loans in the database may have been originated long before their securitization. The composition of the pool is therefore subject to "survivor bias", as securitization eligibility criteria typically exclude delinquent loans at deal origination. The securitized pool may therefore perform better than the average loans of the same vintage and originator. This "survivor bias" can be exacerbated by loan repurchases when a loan is repurchased by the originator from the securitization fund. This can occur when a securitized loan may need to be repurchased for technical or performance reasons.
- When a pool has amortized to less than 10% of its original amount, the originator can repurchase it using a "clean-up call" that interrupts the time series for the remaining loans, even if they have not yet been fully repaid or the workout process is not yet complete.

From a practical point of view, the limitations mentioned above make it necessary to be cautious about the representativeness of the data. Not all loans of a given type are included. Another caveat is the possible existence of breaks in the series due to changes in the composition and valuation of the loans included in the EDW reporting financial vehicles. Extracting data at different points in time could show differences (fortunately of little significance) due to these changes in deal composition. When querying data in the EDW database, the following time dimensions should be considered: date of query, reporting period (deals should update information at least quarterly), and origination date of loans.

**Table 3.**
**Summary of data issues**

| Variable | Issue | Possible solution |
|---|---|---|
| Lender information | In most cases, only NAME, EDCODE | Need additional info about lenders |
| | No geographic info directly | |
| Borrower | NUTS3: Auto, Consumer Finance, Lease (obligor) , Public Sector, RMBS (warranty location) | Additional info about borrowers |
| | NUTS2: SME (warranty and loan) | |
| | Country: Credit card (indirectly), CMBS (loan) | |
| Financial flow | Amount of loanCountry: Credit card (indirectly), CMBS (loan) | No relevant issues, only error treatment is needed |
| Financial flow | Origination date<br>Amount of loan | No relevant issues, only error treatment is needed |
| | Origination date | |

**Source:** Own elaboration based on EDW database.

As mentioned above, the EDW contains additional complexities compared to most of the territorial datasets usually analysed in spatial economic analysis. One corresponds to the purely geographical dimension and the other to the temporal one. We summarize here (Table 3) the most relevant aspects of the treatment given in this article, leaving the details to the Appendix.

As mentioned above, several agents are involved in the securitization process. Therefore, different locations are involved in the financial flows. The basic variables needed to estimate interregional financial flows are the geographical location of the lender and the borrower at the NUTS 2 level, the amount of the loan issued, and the origination date. Due to anonymity issues, the EDW database does not provide all this information, but just the one corresponding to the loan amount and the origination date. However, the geographical location of the loan collateral is available at different levels (country, region, city...), which can be used as a proxy for the location of the lender. Thus, we use the collateral location as the destination of the financial flow. It is reasonable to expected that the location of the collateral and the location (residence) of the borrower will be the same in the case of mortgages on primary residences, but this is not guaranteed and there may be differences in some other cases (e.g., mortgages on land or business credit).

Geographic information in EDW database is provided using NUTS (1/2/3 digits) 2006 classification. Such information is translated into the NUTS 2016 classification. In certain cases, the reclassification is not feasible, and only country code is provided. As an indication of the relevance of the lack of identification problem in the RMBS loans data, only it has been possible to assign a NUTS 2 code to borrower location on 76.8% of the total outstanding loan value (in date 2019Q1).

The location of the lender is more problematic, as no direct information is contained in the dataset. In the EDW database, the loan originator identification is coded and there is no way to decode it. In the securitization process, a lender (a EDCODE identifies the pool) takes a set of conduit loans (originator), pools them together, and sells them as bonds. In this study, the "origin" of the financial flow will be the address of the Financial Vehicle Corporation identified by an EDCODE.

Since the EDW database does not directly provide this address (only the country is identifiable), we combine this data source with the European Central Bank (ECB) and Bank of England (BOE) registries of Financial Vehicle Corporations (FVCs) using the ISIN code that uniquely identifies each FVC. An ISIN code (International Securities Identification Code) is a 12-digit code whose primary purpose is to identify securities such as stocks and bonds.

The location of the lender is obtained by combining information on the EDCODE from the EDW database and the ISIN trade code from the European Central Bank and the Bank of England. By combining these datasets, it is possible to obtain the address where the financial vehicle is legally located. This address is geo-positioned (Lat, Long coordinates) using the Open Street map API, and then a NUTS 2 code is assigned to each EDCODE.

Regarding the temporal dimension, the EDW database contains two possible time variables: i) the date of loan origination; ii) the date of the update of the balance sheet values of the financial vehicle (FV).

According to these dimensions, there are two alternative ways of presenting the information on financial flows between European regions: the vintage approach, where we attend to the loan origination date, and the balance sheet approach, where we consider the outstanding valued of all loans irrespective of the origination date. Given that the objective of this study is to quantify cross-border financial flows and that the EDW database refers to securitized assets, it was decided to present the information according to the "balance sheet" approach. This choice is intended to ensure that the values provided truly reflect the value of the financial flow between the debtor and the creditor in each period, which includes not only the amount of the loans granted in each period, but also all the loans previously granted but not yet repaid by the debtor. In sum, the values shown on a given date are valuations of all loans securitized to date, regardless of their origination date, at their current value. The location of the borrower is proxied with the location of the collateral (RMBS) and the location of the lender is proxied by the legal address of the financial vehicle.

## 3.2. Econometric analysis

Despite the data limitations, the analysis of the drivers of regional credit demand yields interesting results. In this section we develop a simple model of regional credit demand to identify the role of some of the variables traditionally used in credit demand modelling. In this exercise, we will only consider the total volume of loans by region (destination) and year. We will consider the data of all types of loans, valued at their current value at the time considered, regardless of the year in which the loans were generated, expressing the values in millions of euros.

The database allows to build a panel data for the years 2014-2018 and 166 European NUTS2 regions. Unfortunately, some regions do not have data for all the years considered and are removed from the panel. Remarkably, we find a notable dispersion in regional credit volumes. The maximum value of loans is located at the Italian region ITC4 in the 2014 year with a value of 67,810 million €. The minimum in the panel is AT34 with a near zero value of 0.000386 in 2016.

The demand for credit is mainly related to the level of economic activity. The purchase of durable consumer goods is usually financed by loans, and the demand for housing by owner-occupiers is usually financed by mortgages, which makes both types of loans highly pro-cyclical. As a suitable variable to measure the level of activity, the GDP or the unemployment rate at regional level NUTS2 is considered. On the other hand, the volume of credit is negatively influenced by the perceived risk of the operation. This risk perceived by the lender depends mainly on factors related to the individual characteristics of the debtors (personal income, type of employment contract, guarantees, etc.), although it may also be due to adverse macroeconomic characteristics affecting the general credit policy of financial institutions.

**Table 4.**
**Regional credit demand: selected explanatory variables**

| Variables | Description |
|---|---|
| Densityit | Population density by NUTS 2 region (Persons per Km2). Eurostat |
| Ageit | Median age of regional population [MEDAGEPOP]. Eurostat |
| GDPit | Regional GDP. ESPON Database. |
| Unemployment rateit. | Unemployment rate by NUTS2 regions. Eurostat |
| Wage (real) it | Real Wage. Own calculations based on Eurostat data: Compensation of employees by NUTS 2 regions, and Employment by region. Wage is divided by country Purchasing power parities (PPPs) from Eurostat. |
| BUSINESSi | Business sophistication. European Commission 2019. Composite index by regions composed by Employment in the "Financial and insurance activities; real estate activities; professional, scientific and technical activities; administrative and support service activities" sectors (K-N) as % of total employment. GVA in the "Financial and insurance activities; real estate activities; professional, scientific and technical activities; administrative and support service activities" sectors (K-N) as % of total GVA SMEs with innovation co-operation activities as share of total number of SMEs, SMEs introducing marketing or organizational innovation as share of total number of SMEs. Only data for 2019 year. |
| RCIi | Regional competitiveness index by NUTS2 European Commission 2019. Only data for 2019 year |

TABLE 4. CONT.
**Regional credit demand: selected explanatory variables**

| Variables | Description |
|---|---|
| Housing Prices $_{ct}$ | Residential property prices - Real - Index, 2010 = 100. BIS (Bank for international Settlements). Only country data. |
| NPL $_{ct}$ | Bank nonperforming loans to total gross loans (%). Country level data World Development Indicators. World Bank |
| COASTi | Dummy variable that takes the value of 1 if the NUTS2 region is located in the coastal zone. |

**Source:** Own Elaboration with EDW data.

Since the credit flows analysed are measured at the level of NUTS 2 regions and are mainly composed of securitized mortgages, it is necessary to have a regional indicator of credit risk that considers personal characteristics. In our analysis, this indicator will be the real wage rate and the regional median age, which not only have a direct impact on the likelihood that a loan applicant will be considered insolvent by a credit institution but are also indicators of regional economic activity. Another risk indicator considered in this analysis is the non-performing loan ratio, but this indicator is measured only at the country level, so it will only capture country-specific factors.

In addition to these variables, other factors are expected to influence the level of credit in each NUTS 2 region when explaining regional credit volumes. Among these factors, we will include population density to see if different patterns of credit demand are observed between regions with low and high population density. Another variable included aims to capture specific regional factors such as the Regional Competitiveness Index published by the European Commission and the Business Sophistication Index as a measure of the weight of the financial sector and real estate activities at the regional level.

We include residential property prices published by the Bank for International Settlements, given our focus on securitized mortgages. This variable is measured at the country level as an index with 2010=100 and therefore only reflects the evolution of house prices, but it is uncapable of capturing the region with the highest prices. To the best of our knowledge, there are no equivalent indicators at the regional level with the necessary spatial coverage.

For simplicity, and considering the exploration nature of this analysis, we study two alternative panel data specifications, one using random effects (equation 1) and the other fixed effects (equation 2).

$$L_{i,t} = \beta_0 + X_{i,t}\beta + X_i\beta' + X_{ct}\beta'' + T_t + v_i + \varepsilon_{i,t} \quad (1)$$

$$L_{i,t} = \beta_0 + X_{i,t}\beta + X_i\beta' + X_{ct}\beta'' + T_t + \varepsilon_{i,t} \quad (2)$$

Where $L_{i,t}$ is the volume of loans (log of the current value in year t of total loans reported in the EDW database) in region i and year t. $X_{i,t}$ is the set of variables with regional and time variation, with values observed in region i (i=1,..,n) and time t (t=1,…,T) (Unemployment rate, regional GDP, median age, population density, and real wage rates). $X_{ct}$ is the set of variables that are observed at country level in year t, as he *Housing Prices*, or the Non-Performing loans ratio. $T_t$ are yearly time effects, included to capture common trends in regional credit demand, as for example the potential effects of the ECB's APP program. Finally, it is necessary to remark that, since $X_i$ includes the variables observed at regional level, it could not be included in a fixed effect panel data specification.

In addition, to account for the possible effect of spatial dependence on interregional credit flows, two alternative specifications based on spatial error panel models with fixed effects (Elhorst, 2003) are considered.

$$L_{i,t} = \beta_0 + X_{i,t}\beta + X_i\beta' + X_{ct}\beta'' + \mu_i \quad + \epsilon_{i,t}$$

$$\epsilon_t = \lambda W\epsilon_t + \varepsilon_t$$

where W is the n × n row-standardized interaction (Queen contiguity) or spatial weight matrix, λ represents the intensity of spatial autoregressive parameter and $\varepsilon$ is a T × 1 idiosyncratic error vector of well-behaved disturbances.

## 4. Results

### 4.1. Descriptive analysis

Figure 4 shows the financial linkages at the regional level derived from the EDW data by applying the location methodology of flows described in the annex, including all types of loans. As can be seen, the financial flows in the database are mainly internal flows with origin and destination in the same country, as in the case of Spain or Italy. However, the figure also highlights the importance of Luxembourg as a financial centre, which indeed has significant links with the Netherlands, the United Kingdom, Germany, and Austria (see Table 5 for the detail).

Figure 4.
**Interregional financial flows. Current Loan values (mean, all dates)**

**Source:** own elaboration based on EDW dataset. Note: Only financial flows with origin and destination identified at NUTS2 level.

Moreover, Figure 5 maps the spatial distribution of the outstanding value of the loans in 2018Q4 included in the dataset. The regional distribution of loans clearly shows similar patterns in nearby regions,

with a significant spatial correlation (Moran 0.3006, p=0.001). Focusing on more local patterns, results show different patterns. In the case of the French, Italian and Spanish regions, location in coastal areas and the capital of the state seem to boost the credit levels of nearby regions. The latter factor is also observed in the case of Portuguese regions. In the case of the Italian regions, it also seems evident that the northern regions have a higher demand for credit.

FIGURE 5.
**Regional distribution of loans (Valued in 2018Q4 Euro Millions) and spatial correlation measures**

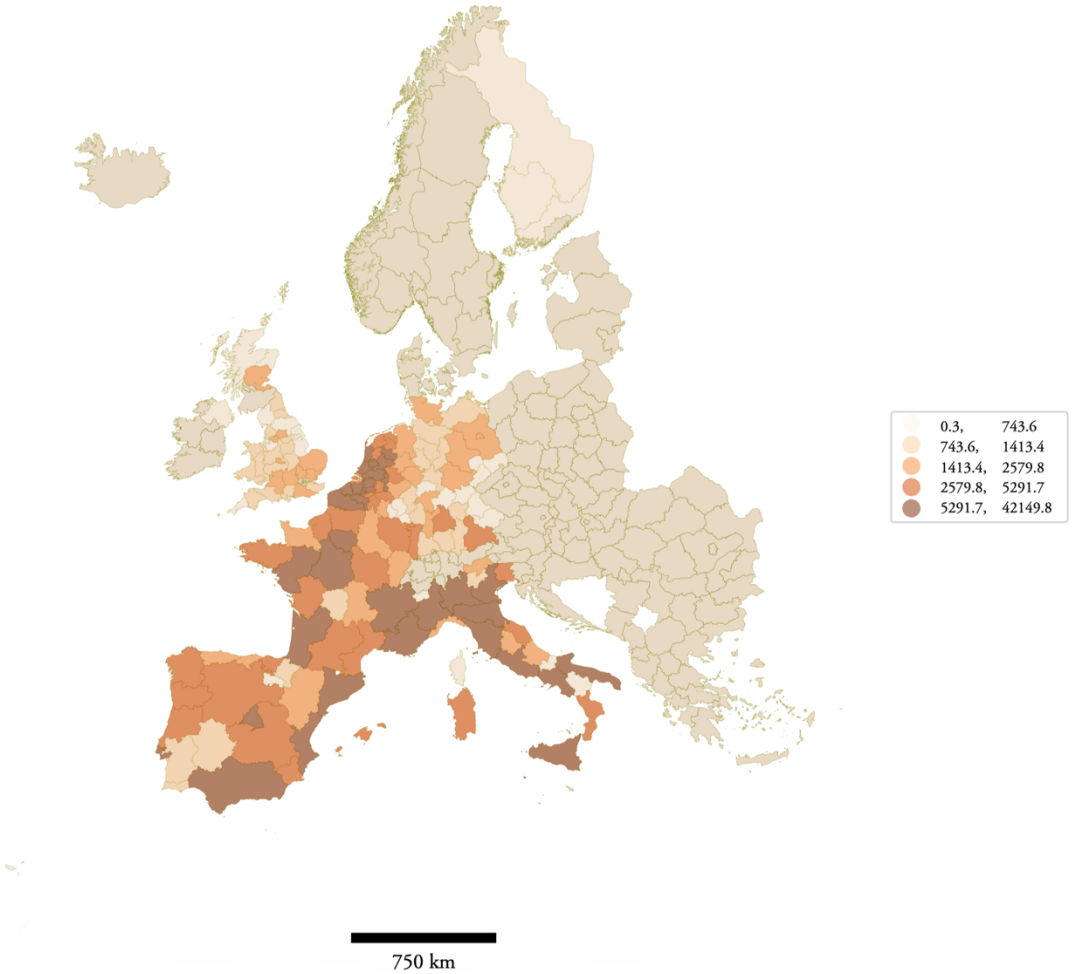
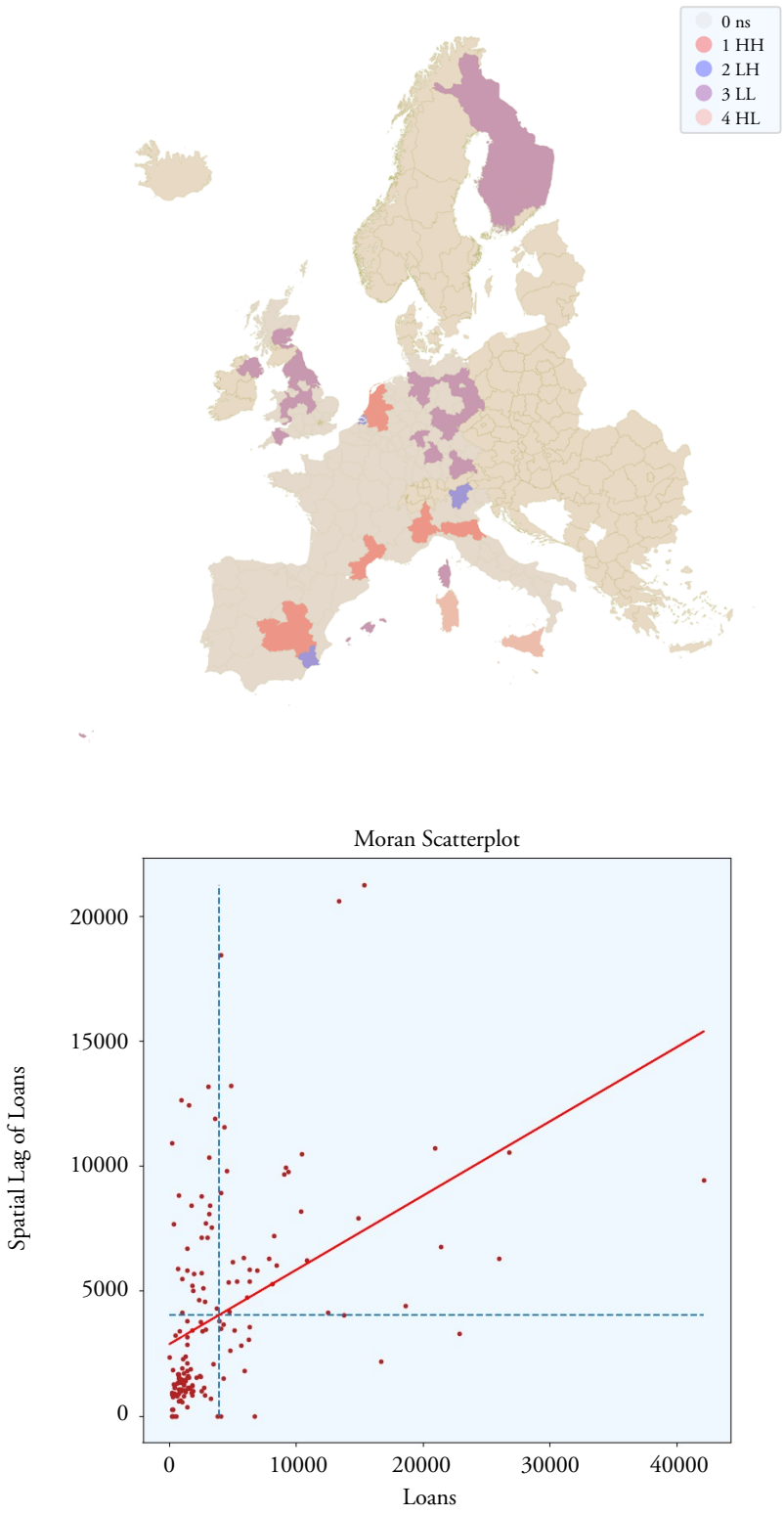


**Figure 5.** CONT.
**Spatial correlation (Queen contiguity used as spatial weights)**




**Source:** Own elaboration with EDW data. HH: High value of the variable, High value of the Spatial lag; HL: High value of the variable, low value of the Spatial lag; LH: Low value of the variable, High value of the Spatial lag, LL: Low value of the variable, Low value of the Spatial lag.

TABLE 2.
**Country location of collateral assets (rows) vs location of Financial Vehicles (columns). Number of EDCODES with identifiable location**

| All assets | BE | DE | ES | FR | IE | IT | LU | NL | PT | UK | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Austria | | | | | | | 1 | | | | 1 |
| Belgium | 13 | | | | | | 1 | | | | 14 |
| Finland | | | | | 4 | | | | | | 4 |
| France | | | | 40 | | | | | | | 40 |
| Germany | | 28 | | | | | 55 | | | | 83 |
| Ireland | | | | | 19 | | | | | | 21 |
| Italy | | | | | | 163 | | | | | 163 |
| Luxem-bourg | | | | | | | 1 | | | | 1 |
| Netherlands | | | | | | | 4 | 65 | | | 70 |
| Portugal | | | | | 7 | | | | 32 | | 40 |
| Spain | | | 150 | | 1 | | | | | | 151 |
| Sweden | | | | | 1 | | | | | | 1 |
| UK | | | | | | | 11 | | | 17 | 28 |
| Total | 13 | 28 | 150 | 40 | 32 | 163 | 73 | 65 | 32 | 17 | 617 |

**Ne:** The location of the financial vehicle is obtained combining information about EDCODE from EDW database and ISIN deal code from the European Central Bank and the Bank of England. More details are given in the annex.

## 4.2. ECONOMETRIC RESULTS

In this section, we present the results of the econometric analysis, where we model the drivers of regional credit demand using the EDW/ECB data for the period 2014-2018 and 166 European NUTS2 regions considering the total volume of credit by region (destination) and by year. The estimation results are presented in Table 6, in two alternative models, whether GDP or unemployment is included to capture the effect of economic activity on credit demand.

To start with, it is necessary to make a warning about the low goodness of fit in some specifications (mainly M1-RE; M2-RE; M3 and M4) and the high dispersion of the credit data mentioned above suggest caution in interpreting the results. At first glance, the estimated coefficients for some variables (for example, the coefficients for unemployment or population density) may seem contradictory. Recalling the singular characteristics of the dataset, it is important to keep in mind the high concentration of EDW loan data, both spatially and temporally, and by type of assets. Mortgage loans have the largest weight in the database and are highly concentrated in some regions and countries.

Interestingly, the estimation results of the specifications based on the spatial error panel model confirm the existence of significant effects derived from the proximity between regions. However, the estimated effects of the variables on credit demand are qualitatively like those obtained with classic non-spatial approaches.

As mentioned in previous sections, the case of Spain is one of the most significant due to the weight of securitized mortgages in the database whose collateral is in Spain. Probably, the signs of the coefficients estimated for the unemployment and the population density is driven by some features of the database commented before, such as the biased presence of certain countries in the database. Therefore, it is necessary to recognize that the results are strongly conditioned by the quality of the information available and that the credit data at the European level are not sufficiently representative to guarantee the robustness of the results.

TABLE 6.
Loan demand drivers. Summary of panel data estimations

| | Model 1 (M1) | | | | Model 2 (M2) | | | | Model 3 (M3) | | Model 4 (M4) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Panel OLS | | Random Effects | | Panel OLS | | Random Effects | | Spatial error model | | Spatial error model | |
| C | 1.431100 | | 3.498400 | | -2.918100 | | -0.064200 | | | | | |
| | 3.922200 | - | 2.902100 | - | 3.079000 | - | 2.726800 | - | | | | |
| Real Wage | 0.167800 | ** | 0.019800 | | 0.122800 | ** | 0.029200 | | 0.0177651 | ** | 0.0196843 | ** |
| | 0.070900 | - | 0.031100 | - | 0.041100 | | 0.028900 | - | 0.0068125 | - | 0.0069012 | - |
| Pop- density | 0.000045 | | 0.000200 | | -0.000093 | | 0.000500 | ** | 0.0003626 | * | -0.0005165 | ** |
| | 0.000200 | - | 0.000300 | - | 0.000300 | - | 0.000200 | - | 0.0001885 | - | 0.0001426 | - |
| GDP | 0.000004 | | 0.000005 | * | | | | | -0.0000005 | | | |
| | 0.000003 | - | 0.000003 | - | | | | | 0.0000012 | - | | |
| Unemployment | | | | | 0.246100 | ** | 0.030100 | * | | | 0.0107348 | ** |
| | | | | | 0.038200 | - | 0.017000 | - | | | 0.0052535 | - |
| Age | 0.147600 | ** | 0.026500 | | 0.161100 | ** | 0.095700 | * | 0.0004279 | | -0.0195904 | |
| | 0.054600 | - | 0.063900 | - | 0.042800 | - | 0.052300 | - | 0.0175007 | - | 0.0188209 | - |
| Business | 0.507900 | | 1.385800 | | 0.484100 | | 1.512900 | | | | | |
| | 0.385100 | - | 1.216600 | - | 0.408200 | - | 1.091200 | - | | | | |
| RCI | 0.417100 | | -0.082000 | | 2.877600 | ** | -0.054200 | | | | | |
| | 0.477200 | - | 2.006100 | - | 0.484700 | - | 1.739900 | - | | | | |
| Housing prices | -0.071400 | ** | 0.002900 | | -0.041200 | ** | 0.006000 | * | -0.0087334 | ** | 0.0024116 | |
| | 0.013000 | - | 0.002100 | - | 0.010300 | - | 0.003400 | - | 0.0019105 | - | 0.0018709 | - |
| NPL | 0.070300 | ** | 0.003400 | | 0.144400 | ** | 0.001500 | | -0.0108617 | ** | -0.021131 | ** |
| | 0.031700 | - | 0.011800 | - | 0.023900 | - | 0.011000 | - | 0.0051043 | - | 0.005504 | - |
| Coast | 0.516700 | ** | 1.427900 | ** | 0.438500 | ** | 1.313200 | ** | | | | |
| | 0.230400 | - | 0.491400 | - | 0.201300 | - | 0.396000 | - | | | | |

TABLE 6. CONT.
**Loan demand drivers. Summary of panel data estimations**

| | Model 1 (M1) | | | | Model 2 (M2) | | | | Model 3 (M3) | | Model 4 (M4) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Panel OLS | | Random Effects | | Panel OLS | | Random Effects | | Spatial error model | | Spatial error model | |
| lambda (Spatial error model) | | | | | | | | | 0.7979349 | ** | 0.7086296 | ** |
| | | | | | | | | | 0.0194901 | - | 0.0256049 | - |
| R-squared | 0.4674 | | 0.0698 | | 0.5661 | | 0.0713 | | 0.0054 | | 0.1011 | |
| Log-likelihood | -1433.6 | | 341.88 | | -1354.3 | | 326.22 | | -1662.012 | | -1769.424 | |
| Cov. Est. | Clustered | | Clustered | | Clustered | | Clustered | | | | | |
| No. Observations | 774 | | 774 | | 774 | | 774 | | 515 | | 525 | |
| Haussman Test | p-Value: 0.01761 | | | | p-Value: 0.00000 | | | | | | | |
| Effects: | Time | | Time | | Time | | Time | | Entity | | Entity | |

**Source:** Own elaboration. Note: Panel models are estimated with time effects. Std. errors are indicated below the estimated coefficients (** significant al 5% level, * significant at 10% level). Spatial error model estimated using PySAL library for python (Rey & Anselin, 2007).

TABLE 7.
**Loan demand drivers. Robustness check. Pooled regression and Cross-section regression (mean values of the variables at regional level) estimation**

| | Model 5 | | Model 6 | | | Model 7 | | | Model 8 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Pooled | | Pooled | | | Cross Section | | | Cross Section | |
| C | -0.44710 | | -5.17710 | ** | | -5.80130 | * | | -8.26720 | ** |
| | 1.28670 | - | 1.27860 | - | | 3.33360 | - | | 3.11580 | - |
| Real Wage | 0.17270 | ** | 0.14650 | ** | | 0.25540 | ** | | 0.17340 | ** |
| | 0.01480 | - | 0.01400 | - | | 0.03460 | - | | 0.03570 | - |
| Pop- density | 0.00009 | | 0.00003 | | | 0.00030 | | | 0.00007 | |
| | 0.00020 | - | 0.00010 | - | | 0.00040 | - | | 0.00040 | - |
| GDP | 0.00001 | ** | | | | 0.00000 | * | | | |
| | 0.00000 | - | | | | 0.00000 | - | | | |

TABLE 7. CONT.
Loan demand drivers. Robustness check. Pooled regression and Cross-section regression (mean values of the variables at regional level) estimation

| | Model 5 | | Model 6 | | | Model 7 | | | Model 8 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Pooled | | Pooled | | | Cross Section | | | Cross Section | |
| Unemployment | | | 0.21090 | ** | | | | | 0.27960 | ** |
| | | | 0.01800 | - | | | | | 0.05090 | - |
| Age | 0.16910 | ** | 0.18780 | ** | | 0.31970 | ** | | 0.27220 | ** |
| | 0.02590 | - | 0.02440 | - | | 0.06950 | - | | 0.06380 | - |
| Business | 0.58550 | ** | 0.55660 | ** | | 0.70900 | | | 0.48800 | |
| | 0.19520 | - | 0.18250 | - | | 0.51670 | - | | 0.47310 | - |
| RCI | -0.06500 | | 1.85640 | ** | | -0.12790 | | | 2.92260 | ** |
| | 0.26670 | - | 0.28650 | - | | 0.73720 | - | | 0.83500 | - |
| Housing prices | -0.06250 | ** | -0.03220 | ** | | -0.10380 | ** | | -0.05780 | ** |
| | 0.00530 | - | 0.00560 | - | | 0.01580 | - | | 0.01700 | - |
| NPL | 0.04630 | ** | 0.10730 | ** | | 0.01030 | | | 0.12330 | ** |
| | 0.01810 | - | 0.01660 | - | | 0.05530 | - | | 0.05120 | - |
| Coast | 0.52460 | ** | 0.44210 | ** | | 0.82190 | ** | | 0.71270 | ** |
| | 0.12570 | - | 0.11790 | - | | 0.32480 | - | | 0.29970 | - |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| R-squared | 0.4508 | | 0.5151 | | | 0.6164 | | | 0.6718 | |
| Log-likelihood | -1449.2 | | -1401 | | | -335.95 | | | -322.98 | |
| Cov. Est. | Unadjusted | | Unadjusted | | | Unadjusted | | | Unadjusted | |
| No. Observations | 774 | | 774 | | | 166 | | | 166 | |

**Source:** Own elaboration. Std. errors are indicated below the estimated coefficients (** significant al 5% level, * significant at 10% level).

Among the specifications considered, the only robust result seems to be the negative effect of housing prices on credit demand and the positive effect of real wages. In all cases, the effect of regional median age has a negative impact on credit demand. For the remaining variables, the sign of the coefficients and their significance depend on the panel data specification. The coefficient of the NPL variable seems to have the correct sign in the models that consider spatial correlation, although in the case of population density the results are far from robust.

## 5. Conclusions and limitations

There is clear evidence of a growing degree of regional integration in terms of trade of goods and services in Europe. However, the measurement of the corresponding to capital flows is scarce, due to lack of data. The aim of this study is to explore a new dataset on securitized asset-backed loans in Europe, recently launched by the ECB, and managed by the EDW.

Our analysis is very transparent in its description of the advantages and disadvantages of these novel dataset. Most of the flows included in the dataset are intra-national. However, while some countries are over-represented in the data in terms of the value of loans/GDP ratio, in other cases, such as German regions, there is no information on the type of loan that predominates in the EDW database, i.e., RMBS. Moreover, within each country, it is not possible to break down the origin of the flows by the different branches that multi-regional financial institutions have. Almost all flows are attributed to the head office of the financial institutions issuing the assets. Consequently, the "fuzzy" picture obtained from our research emphasizes the intra-national nature of financial flows, as well as the high concentration in the source regions within each of these countries.

Given the limitations, the results obtained provide interesting information on the spatial pattern of the loans included and give some indications on the degree of fragmentation of the financial system in Europe. In particular, the results show that the securitization market in Europe is not yet fully developed, as not all EU countries participate to the same extent, despite its benefits in providing liquidity and redistributing risk.

Given the innovative but limited scope of this analysis, the need for further extensions is clear. The study of the integration of the European financial markets, and in the euro area, is essential in an environment of frequent tensions in the global and European bank system. More information is needed to determine whether this decline can be explained by more local factors, given the enormous regional concentration that can be deduced from the EDW data for the set of countries for which data are available. The potential effects of BREXIT on the structure of international financial flows in Europe, as well as the effect on the volume of total credit, is a key issue, given the considerable weight of the assets generated in the UK.

Given the importance of knowing more about the regional characteristics of credit flows, we believe that the European authorities should increase the quantity and quality of publicly available data. Information from cross-border payment systems (such as TARGET2), combined with the territorialized credit information currently published by the ECB and national central banks, can help to shed new light on these interrelationships across regions.

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