LUISS

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CONSOLIDATION IN THE BANKING SECTOR: EVIDENCE OF EFFICIENCY GAINS FROM MERGERS AND ACQUISITIONS

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Introduction

The purpose of this dissertation is to analyse merger and acquisition transactions for a selected sample of credit institution in Europe in order to determine whether they result in efficiency gains attributable to the transaction itself.

First, Chapter 1 presents the role of credit institutions within the financial system as financial intermediaries whose main goal is to facilitate the transfer of funds between market participants. Moreover, the description of the recently established Single Supervisory Mechanism and the classification of credit institutions between Significant and Less Significant serve as the first layer in order to understand how the sample of banks for the analysis has been chosen. Furthermore, the issue of overbanking is examined by providing several examples of the banking system in Europe compared to other economies. Within this framework, competition in the banking sector is so high that some institutions are not able to make any profits. Chapter 1 continues with a description of the consolidation process that the banking sector is undergoing, as a direct consequence of an overcrowded market; mergers and acquisitions transactions have a prominent role in the reduction of the overall number of credit institutions in the Euro Area. Finally, this Chapter presents a deep-dive of consolidation in the Italian banking sector, characterised by the recent BCC Reform.

Chapter 2 shows the descriptive analysis derived from a sample of credit institutions classified as Less Significant according to the SSM that were involved into a merger or acquisition transaction in a specific time frame. This chapter contains information regarding the size of the banks in terms of total assets and the size of the overall M&A transactions based on total assets. Moreover, the sample of banks is divided into sectors according to the different legal structures, easily recognizable from the name of the single credit institutions. In this specific sample, we recognize cooperative, savings banks and a residual sector of not classified institutions ("others"). A geographical breakdown of credit institutions into specific regions called NUTS is presented, as well as the geographical characteristics of the regions where all credit institutions are located, in order to analyse the characteristics of the areas in which most of the M&A transactions take place. Finally, Chapter 2 provides analyses on key variables for the sample of banks, such as ROE, ROA, NPL Ratio, CET1% and Cost-to-Income ratio; the purpose is to understand the differences between acquirers and acquired entities and to analyse trends for these indicators across the years. Moreover, the chapter

concludes with a focus on Italian and German non-performing loans ratio, to compare the situation of acquirers and acquired in those two countries and to try to understand whether merger and acquisitions are driven by different purposes.

In the end, Chapter 3 contains the econometric analysis to attempt to prove whether there are changes in the efficiency level for the banks that are involved in a merger or acquisition. The main reason for the introduction of econometrics is related to the fact that changes in efficiency after a merger cannot be attributed to the merger itself without having assessed causality. Therefore, a literature review is presented in order to explain which the state of the art is with regards this type of analysis. This chapter also provides for theoretical summaries of the two models used, namely Data Envelopment Analysis and Differences-in-differences, in order to help the reader in understanding the reason for the choice of such models for the purpose of this dissertation. Finally, the application of the models is made on a sample of credit institutions classified as Less Significant (for the sake of consistency with the previous chapter), with a focus on the consequences of M&A transactions in terms of efficiency gains.

Chapter 1: The banking sector over the years: overbanking and consolidation process

1.1 The financial system and its financial intermediaries

The financial system is a complex organization that aims at simplifying the transfer of funds between participants. Its function is considered to be critical, as it produces an efficient allocation of capital; indeed, by allowing funds to move from the ones without productive investment opportunities to those who instead have them, the transfer of capital is optimal. More in detail, the financial system could channel funds from households, firms and governments that are in excess of funds to the same parties that instead have a shortage of it. There are other functions the financial system performs that are also important, such as the functioning of the payment systems, the reduction of asymmetric information between the parties involved in a transaction and the possibility to match the intertemporal preferences of investors. Moreover, it is possible to distinguish two different areas in which the financial system operates: direct finance and indirect finance. The former works through financial markets, where savers lend money to borrowers directly, whereas the latter works through financial institutions that facilitate the exchange between the parties, as it is possible to see in Figure 1.

Figure 1 The Financial System
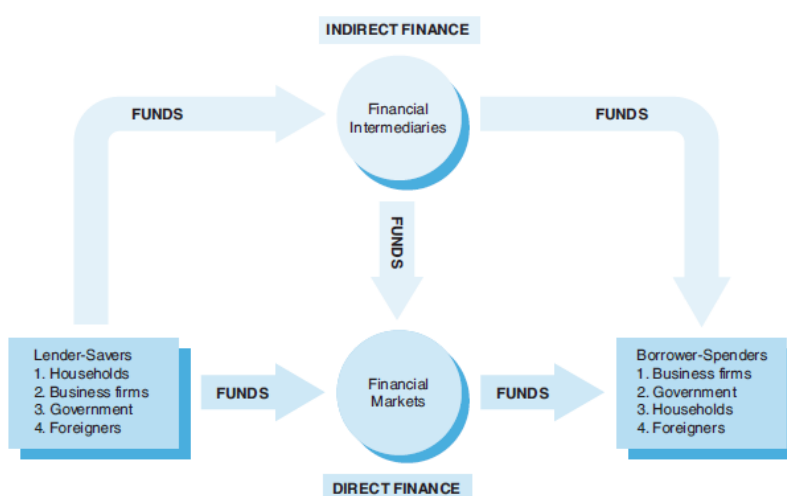
Source: The Economics of Money, Banking & Financial Markets

In financial markets, and therefore direct finance, it is essential that market players have the same preferences for the financial instruments` characteristics, such as maturity, currency and amount. If this is not the case, the parties would choose not to act. Instead, in the area of indirect finance financial institutions play an important role as one of their functions is to match the preferences of borrowers and savers. They engage in diversification of credit, transformation of currencies and of maturity of instruments.

Financial markets can be classified according to the issuance or maturity of the financial instrument. If the classification follows the issuance of instruments, then it is possible to divide financial markets in primary and secondary market. Primary market is a market where new issues of securities, such as a bond or a stock, are sold to initial buyers by the corporation or government agency borrowing the fund[1]. On the other side, the secondary market is where securities that had already been issued previously are sold again.

The financial instruments that are traded in financial markets have different maturities: there are instruments with short maturity (less than 1 year), that are traded in the Money Market and instruments with longer maturity (more than 1 year) that are instead traded in the Capital Market.

Money Market

The instruments that are traded in the money market have the following characteristics:

- High liquidity
- Low risk and Low yield
- Traded over-the-counter
- Wholesale market

The most important feature of this market is that instruments should be readily turned into cash at low cost. These instruments are treasury bills, commercial papers, overnight funds and Certificates of Deposits (CDs). Even though in theory there are no restrictions to participation in the money market, due to practices and elevated costs of entry, participation is restricted to few players, such as central and state governments, commercial banks, insurance companies, mutual funds and corporations.

[1] F.S. Mishkin, "The Economics of Money, Banking & Financial Markets"

Capital Markets

Capital markets are markets where longer term debt and equity instruments are traded. The main characteristics are:

- Less liquid
- Higher risk and return
- Traded in exchanges and over-the-counter

In this market securities are traded with the aim of raising medium and long term financing. The most important instruments are stocks, mortgages, corporate and government bonds. The participants in the capital markets are several: individuals, corporates and governments, who raise funds and sell them in the market. The recipients of those funds (funds suppliers) are typically pension funds, hedge funds, sovereign funds, individuals, corporates and governments as well, as it is possible to see from Figure 2.

Figure 2 Interchange of suppliers and users of funds in Capital Markets
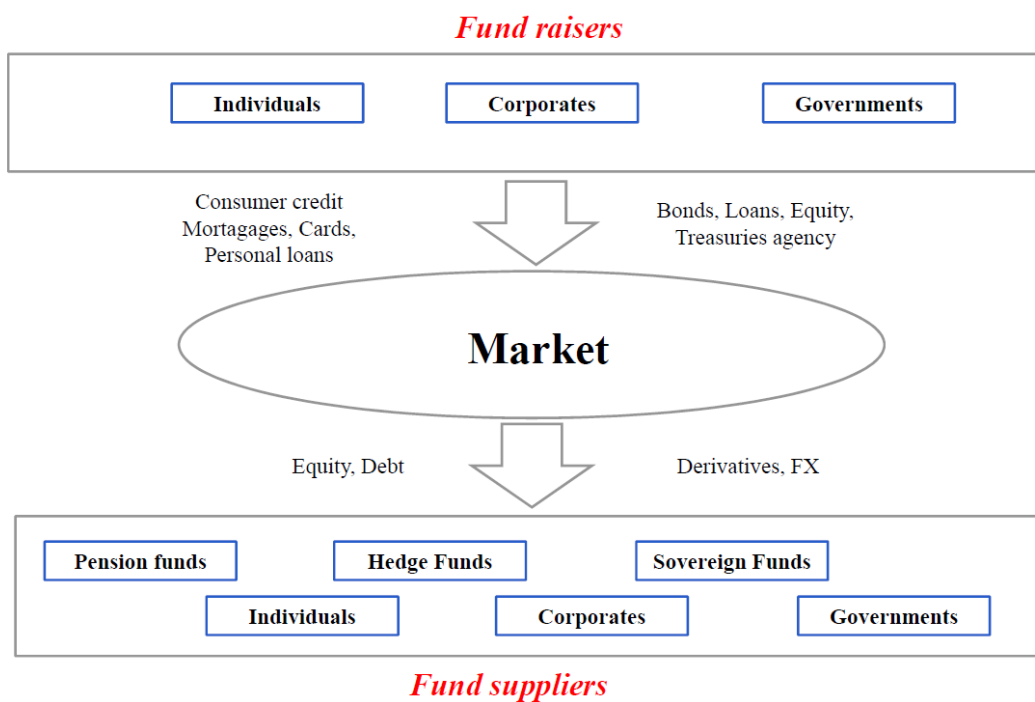
Source: Structured finance 2017-2018, financial markets Recap

Financial institutions conduct transactions on the side of indirect finance, within a financial system. The most common type is represented by financial intermediaries, whose main

purpose is to facilitate transactions in the financial system by reducing the cost of borrowing and lending for the market participants.

Transaction costs, indeed, are not negligible in the financial system, and are particularly high for small players (both savers and borrowers). This means that in case financial intermediaries did not exist, most of the transaction in the market would not take place at all. The first solution proposed by financial intermediaries to the problem of high transaction costs consists in bundling several funds coming from a large number of investors together; in this way, as the number of transaction increases the cost of transaction per single investment is reduced. We refer to this phenomenon as economies of scale. The second element that makes financial intermediaries fundamental for the functioning of the system is characterized by the development of expertise. Higher level of expertise is, then, translated into lower transaction costs, which allows financial intermediaries to offer cheap services to their customers. A third element that should be considered when dealing with the advantage of intermediaries is the risk sharing. Indeed they help reducing the risk of the investors` exposures by diversification. Portfolio diversification is a fundamental principle for managing risks. A portfolio that is well diversified has a lower volatility compared to a non-diversified portfolio, as the returns of some asset categories are not moving together (low or null correlation). Therefore, if a financial institution is able to invest in different categories of assets in more than one market, the overall risk of the customer is lower.

The importance of financial intermediaries can be also partially explained by the reduction in asymmetric information between the various market participants as a consequence of the institutions` activities. There are two types of asymmetric information: the first is *ex-ante*, that is before the occurrence of a transaction and that is referred to as adverse selection, while the second is *ex-post* (after the actual occurrence) and is called moral hazard. Adverse selection is defined as the problem created when potential borrowers who are the most likely to produce an undesirable (adverse) outcome are the ones who most actively seek out a loan and are thus more likely to be selected[2]. According to this definition, since the probability that a credit is a bad credit, lenders could also decide not to act at all, not considering the fact that good borrowers could exist in the market. The presence of financial intermediaries alleviates the problem of adverse selection, as they act as expert middlemen that possess

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[2] F.S. Mishkin, "The Economics of Money, Banking & Financial Markets"

higher amount of information regarding the quality of credits compared to the single savers and investors.

Moral hazard is defined as the risk that the borrower might engage in activities that are undesirable from the lender`s point of view, because they make it less likely that the loan will be paid back[3]. If a potential lender doubts that the amount of money returns, he/she may decide not to grant the loan. For this purpose, financial intermediaries are able to reduce the probability of hazard by engaging in monitoring activities and not increasing the costs for market participants.

Depending also on the markets in which they operate, namely primary or secondary market, intermediaries have different roles. Indeed, in the primary market those institutions provide:

- Advisory services with respect to: timing of issuance, size and type of the instrument, alternative financing options for both buyer/seller side;
- Administrative functions: they deal with regulatory authorities and should satisfy legal, regulatory and market requirements;
- Underwriting function[4]: financial intermediaries have the ability to purchase instruments from the issuers and to resell them in the market;
- Distribution: it is up to the intermediary to initiate a marketing strategy to promote the issuance in the market;
- Stabilization: after the launch of the instrument, the stabilization of price and the whole aftermarket phase should be dealt by the financial intermediary.

In the secondary market, instead, the roles of the intermediaries are the following:

- Research: the analysis of securities already present in the market and recommendation of purchase are on behalf of the intermediary;
- Brokerage: usually those institutions buy and sell on behalf of their clients and earn fees due to the discrepancy of bid-sell price;
- Trading: sometimes intermediaries buy and sell securities also on their behalf, acting as principals;

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[3] F.S. Mishkin, "The Economics of Money, Banking & Financial Markets"
[4] It is worth mentioning that the underwriting function of intermediaries could be either at commitment or at best efforts. If the intermediaries commit, in case securities are not sold then the underwriter bears the losses. If, instead, the underwriting process is at best effort it means that if the underwriter is not able to sell, the securities go back to the issuer, that bears the losses

- Market Making: usually dealers buy and sell as principals and earn fees due to the discrepancy of bid-sell price;

- Structuring: some intermediaries are also able to build their own instruments.

Financial intermediaries comprise different types of entities and could be divided into two macro-categories: depository and non- depository institutions. The former are financial intermediaries that are legally authorized to accept deposits from customers (legal or natural persons), pay a fixed or variable interest rate and usually make loans. The most common institution that falls into this category is the bank. On the contrary, non-depository institutions are not allowed by law to receive deposits from customers and they typically fund their lending through the sale of financial instruments in the market. In this category of financial intermediaries there are insurance companies, mutual funds, pension funds and investment banks.

According to the European Central Bank, there are five groups of financial institutions[5]:

- Monetary Financial Institutions (MFIs);
- Investment Funds (IFs);
- Financial Vehicle Corporations (FVCs);
- Payment Statistics relevant Institutions (PSRIs);
- Insurance Corporations (ICs).

The category that is in the interest of this dissertation is the one of MFIs, defined as resident undertaking that belongs to any of the following sectors[6]:

1. Central Banks;
2. Other MFIs.

While Central Banks are indicated as national Central banks of the respective EU member State, comprising the European Central Bank, in the second category (other MFIs) there are

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[5] European Central Bank website:
https://www.ecb.europa.eu/stats/financial_corporations/list_of_financial_institutions/html/index.en.html
[6] Regulation ECB/2013/33 concerning the balance sheet of the monetary financial institutions sector (recast)

credit institutions, defined in the Regulation as undertaking the business of which is to take deposits or other repayable funds from the public and to grant credits for its own account[7].

Banks, or credit institutions, are considered the most important intermediaries in the market, due to the fact that they carry out several tasks that help the well-functioning of the economy. Indeed, they support the payment system, which entails the exchange of goods and services (funds) for money or financial assets. Moreover, they allow customers (natural or legal persons) to store and save their money in accounts or to borrow them in case of need. In substance, banks operate in such a way that the pool of money coming in from depositors, typically short-term, is loaned out to borrowers for longer term loans. This activity, better known as maturity transformation, is a key task for the mismatch in the maturities of all the market participants and is also the way in which banks make the greatest portion of their profits. Indeed, they usually pay a lower interest rate for the deposits, that are liabilities, compared to the one they ask when granting a loan.

In the market there are different types of banks, which can be differentiated according to the activities and roles they have in the economy:

- Commercial banks are credit institutions whose main goal is to accept deposits and make loans. In particular, this category of bank is able to raise funds by issuing short-term debt (savings deposits, time deposits, payable deposits) that is used in order to grant long-term loans (commercial loans, consumer loans, mortgage loans);
- Investment banks perform several services for businesses and governments. They advise companies on several matters, such as issue of securities, underwriting process, facilitate M&A processes. They also act as brokers for institutional clients, focus on Initial Public Offerings (IPOs) and on share offerings, both private and public. However, as previously stated, they are non-depository institutions;
- Universal banks perform both commercial and investment bank activities.

Nonetheless, banks are much more diversified than that. Two commercial banks can perform different activities, but falling into the same category of banks. Indeed, there are several

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[7] Regulation ECB/575/2013 on prudential requirements for credit institutions and investment firms amending regulation

methodologies to divide credit institutions into different categories. There have been several studies to distinguish institutions according to their business models by running cluster analyses; one of them, carried out by the European Central Bank[8], has the aim of finding similarities and differences across institutions on the basis of their activities and the composition of profits. The results of the study produces four different business models, namely wholesale, traditional commercial, complex commercial and securities holdings banks, grouped due to their similarities of risk and performance indicators within each category[9].

Furtherly, banks could be also distinguished on the basis of their counterparts; there are some banks that are specialised in lending to a particular category in the market, such as Small and Medium Enterprises (SMEs), central banks, other banks, specific industries. Also, they could be different in terms of instruments they use in order to earn profits. There might be some credit institutions whose main source of profits does not rely on loans but rather on derivatives, and so on.

1.2 The SSM landscape and the classification into Significant and Less Significant Institutions

The banking sector is one of the most regulated[10], due to the fact that the activities of banks are essential for the functioning of the economy. On one hand, the level of economic and monetary integration between the states of the Euro area started decades ago, and several steps have been taken in order to foster integration and unified financial markets. Indeed, the introduction of the Single Market for the free trade in 1993[11], as well as the establishment of a single currency in 1999[12], symbolizes important achievements for the European community as a whole. On the other hand, the existence of a single entity that regulated and supervised

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[8]M. Farne, A. Vouldis "Business models of the banks in the Euro Area" ECB Working paper series 2017

[9] M. Farne, A. Vouldis "Business models of the banks in the Euro Area" ECB Working paper series 2017

[10] F.S. Mishkin, "The Economics of Money, Banking & Financial Markets"

[11]   European   Parliament,   "25   Years   of   the   EU   Single   Market", http://www.europarl.europa.eu/resources/library/media/20180116RES91806/20180116RES91806.pdf

[12]European Central Bank, "The process of European economic integration", Speech by Jean-Claude Trichet, September 2007

the banking sector was absent until recently. Only national rules and policies, different from one country to another, prevailed. Consequently, the banking system was fragmented and banks supervised in very different ways, notwithstanding the fact that are exposed to common risks. This is the case since all banks are subject to the same levels of interest rates, set by the European Central Bank and unique for all Europe. Moreover, the imbalance between integrated financial markets on one and the national-segmented regulation on the other side created problems among the various national authorities. In addition, the 2008 crisis highlighted the fact that the banking sector`s interconnectedness could cause damages (better known as spillover effects) outside the borders of a nation[13].

Therefore, a communication from European Commission to the European Parliament in 2012[14] highlights the importance of taking a decisive step in the regulation and supervision fields, and to create a Banking Union. In this note, the European Commission claims that notwithstanding the decisive steps already implemented in the Economic and Monetary Union (EMU), the mere coordination between supervisors is not sufficient to tackle all the risks in the Euro Area; a necessary step concerns the shift in supervision of banks to a European level. The main purpose is to restore confidence in the Euro Area and to give to the banking sector a more sound position. The harmonization of the rules across the countries in the Euro Area has the objective to reduce the distortions and disparities that existed due to different interpretations and applications of such rules. Moreover, the shift of supervision represents one element of the Union. It must be accompanied by a common system for deposit protection as well as integrated bank crisis management.

The Banking Union is composed of different elements:

- ❖ The Single Supervisory Mechanism (SSM)
- ❖ The Single Resolution Mechanism (SRM)
- ❖ The European Deposit Insurance Scheme (EDIS)

The Single Supervisory Mechanism represents the first pillar of the Banking Union, and consists of the transfer of some of the supervisory tasks at the European level from a national one. Under the SSM framework, the European Central Bank becomes responsible for the supervision of all banks that participate in the Banking Union, and for other important tasks:

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[13]Peltonen, T.A., Rancan, M., Sarlin P., "Interconnectedness of the banking sector as a vulnerability to crises", ECB Working Paper Series, 2015

[14] European Commission, "A Roadmap towards a Banking Union", 2012

grant and withdraw authorisation of banks, asses the purchase of their holdings, ensure compliance with minimum prudential requirements and adequacy of internal capital[15].

The second pillar is the Single Resolution Mechanism, and is the system that intervenes whenever a credit institution faces financial distress. The main purpose of this is to ensure the efficient resolution of failing banks, with low costs for taxpayers and for the real economy[16]. Indeed, a system for resolution of banks should be as important as a system for supervision of banks.

Finally, the main objective of the common deposit insurance scheme is to offer benefits in terms of uniform depositors` protection. If depositors have less incentives to withdraw their money when they are concerned about a bank`s solvency, insurance of deposits might reduce liquidity risk and a potential crisis[17]. Even though this protection scheme is not yet into place, the general opinion is that this third leg is necessary for the completion of the Banking Union. Indeed, without the EDIS, the architecture of the union is incomplete and might create asymmetries since there is a common framework for supervision and resolution but not for deposit protection. Therefore, depositors are not able to fully benefit from a unified system of protection[18].

However, the creation of the Banking Union should not jeopardise the successes of the single market that have been achieved during the years. Therefore, the banking union sets its rules in such a way that create a reinforcing mechanism with the already established principles of the single market contained in the Single Rulebook[19]. The Rulebook consists of a set of written regulations and harmonised prudential rules for the financial and banking sectors.

Within the framework of the Banking Union, these rules create a level playing field for all the credit institutions belonging to the EU countries, and are different according to the financial situation of a bank:

[15] European Central Bank, "Guide to Banking Supervision", November 2014

[16] European Central Bank, "Banking Union", https://www.bankingsupervision.europa.eu/about/bankingunion/html/index.en.html

[17] Carmassi, J., Dobkowitz S., Evrard J., Parisi L., Silva, A., Wedow M., "Completing the Banking Union with a European Deposit Insurance Scheme: who is afraid of cross-subsidisation?", Occasional Paper Series, 2018

[18] European Central Bank, "Financial Integration in Europe", 2016

[19] European Commission, "A Roadmap towards a Banking Union", 2012

**Figure 3** Single Rulebook`s legal proposals
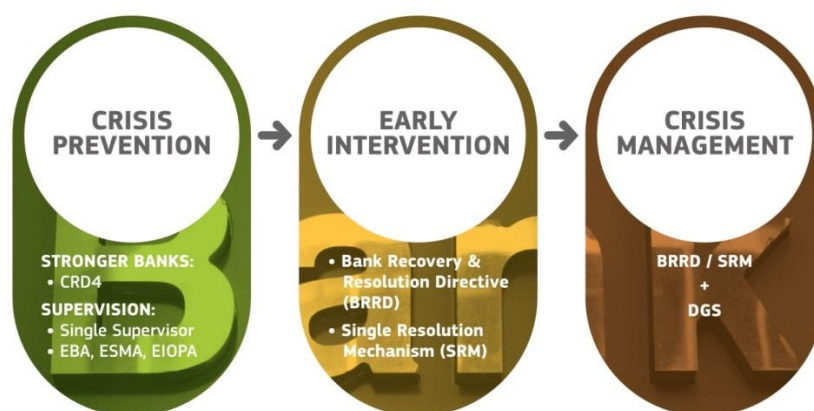
Source: European Commission, press release 9th March 2015 "restoring financial stability in the Eurozone"

As it is shown in the picture, CRD4 aims at ensuring safer banks while BRRD is a set of rules applied whenever a credit institution displays financial issues. Finally, in a crisis management situation, also the Single Resolution Mechanism, together with BRRD, is applied. What is also worth mentioning is that all these requirements concerning the Banking Union have been communicated through Regulations and not Directives[20].

The conduct of supervision and the responsibilities are divided between the SSM (centralized level) and the National Competent Authorities (national level). In this way, both the ECB and the NCAs play an active and pivotal role, and have also the duty to cooperate and coordinate the actions, as it is possible to see in Figure 4.

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[20] While regulations are directly enforceable, directives needed to be transposed into national law. This, of course, required more time and no certainty of being applied

Figure 4 Distribution of tasks between ECB and NCAs

Source: ECB Banking Supervision.
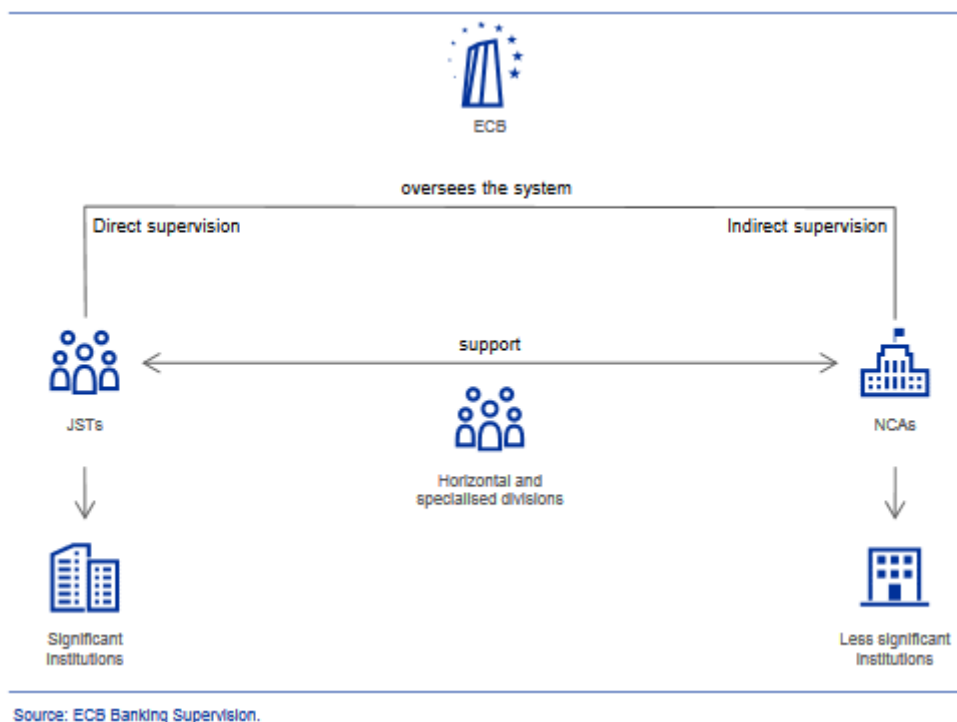
Source: Guide to Banking Supervision, ECB 2014

The different roles and responsibilities are, therefore, decided according to the criteria of significance of credit institutions, listed in the SSM Framework[21]. The criteria are based on size, economic importance, level of cross-border activities, presence of direct public financial assistance and if the entity is one of the three most significant credit institutions.

The framework sets also some quantitative thresholds for the abovementioned criteria. A supervised entity or a supervised group shall be classified as significant if:

i.   The total value of its assets exceeds EUR 30 billion

ii.   it is relevant for the economic sector, for the interconnectedness, for substantiality or complexity

iii.   the total value of its assets exceeds EUR 5 billion and the ratio of its cross-border assets/liabilities in more than one other participating Member State to its total assets/liabilities is above 20%

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[21] Regulation No 468/2014 of the ECB, establishing the framework for cooperation within the SSM between the ECB and national competent authorities and with national designated authorities (SSM Framework Regulation)

    iv.   it has requested/ received funding from the European Stability Mechanism[22] or from the European Financial Stability Facility[23]

    v.   It is one of the three most significant institutions in a participating Member State

To be qualified as a Significant Institution (SI), banks have to fulfil at least one of those criteria. The review for the significance is an on-going activity and the status of banks can change (the "migration" phenomenon). However, as the SSM Framework explains, the approach for migration is asymmetric, in order to avoid that some credit institutions fluctuate from Significant to Less Significant or vice versa too often. Indeed, when a Less Significant Institution (LSI) surpasses any of the criteria, it becomes a Significant Institution and the national supervisors have to hand over responsibility for direct supervision to the ECB[24]. If, instead, a Significant Institution does not exceed any threshold, it does not become immediately Less Significant. In this case, the ECB supervisory responsibility is terminated only if the institution does not meet any of the criteria for three subsequent years.

The separation between SIs and LSIs is important in terms of approach to supervision and in terms of characteristics of banks. If the ECB supervises directly an institution, a proper team called Joint Supervisory Team (JST) is formed; this team, composed by both members of ECB and of National Competent Authorities (NCAs), is responsible for the day-to-day supervision. On the contrary, there are no JSTs for Less Significant Institutions, since they are directly supervised by the respective Central Banks/ Supervisory Institutions of the Member States, and the ECB has an oversight function. This means that the NCAs carry out their supervisory activities using their own resources and decision-making procedures, while the ECB, and more in detail Directorate General Microprudential Supervision III, is responsible for the effective and consistent functioning of the SSM framework, and has to

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[22] The European Stability Mechanism is the European Institution in charge of recapitalizing credit institutions that are likely to be unable to meet the capital requirements established by the ECB

[23] The European Financial Stability Facility is an institution that provides financial assistance to countries in economic difficulties, for the purpose of financial stability

[24] Banking Supervision Website:
https://www.bankingsupervision.europa.eu/banking/list/criteria/html/index.en.html

make sure that the methodologies applied by the NCAs are in line with the high standards of supervision[25].

Moreover, the credit institutions that have been divided into the two categories can be very different. While SIs are "big" banks and a potential deterioration or failure can have a direct impact in the economy, LSIs are smaller, they typically operate on a regional level and therefore cannot impact the economy in a direct manner. However, if more than one "small" player deteriorates or fails, this could have an impact in the SSM world. Additionally, if we take into account the fact that at the end of 2017, according to the List of Supervised Entities published by the ECB, the number of SIs corresponds to 118, while the number of LSIs is 3155[26], it is easy to understand why it would be impossible to let a European Institution to supervise all those entities directly. These numbers are also important to understand that the world of LSIs is complex, and performing a deep/dive in how this system of credit institutions has changed over time could give us the idea of how it could change in the future and what impact it could have in the financial system.

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[25] SSM Supervisory Manual, European Banking Supervision: functioning of the SSM and Supervisory Approach, March 2018
[26] List of Supervised Entities, ECB, cut-off date 1st January 2018

1.2.1 The banking sector in Europe over the years

After the crisis in 2008 the banking sector in the Euro Area has changed resulting in a lower number of institutions overall[27], as shown in Figure 5.

Figure 5 Number of Credit institutions and foreign branches, 2008 and 2016
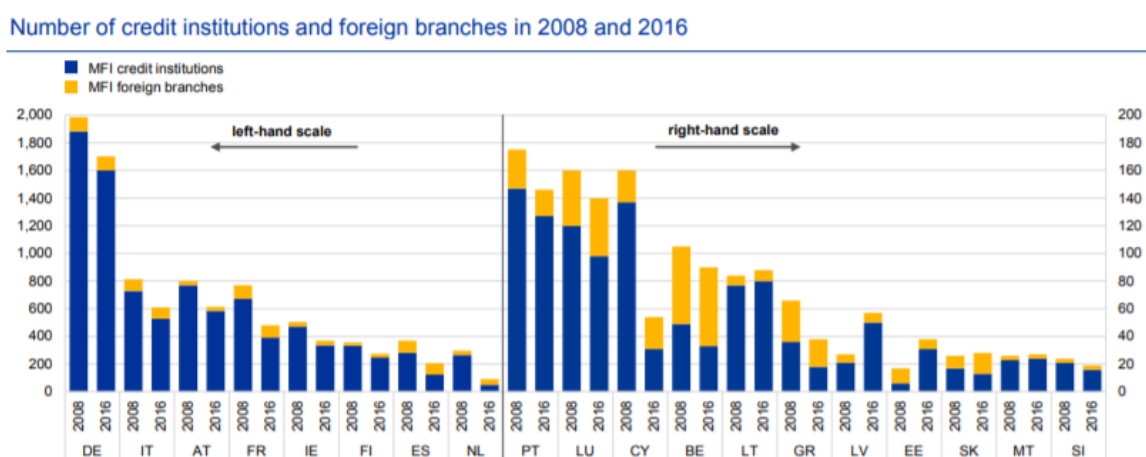
Source: European Central Bank, "Report on financial structures, October 2017"

The number of banks at the end of 2008 amounted to 6768 and declined to 5073, resulting in a decrease of 25% on an unconsolidated basis. On a consolidated basis, instead, the number of existing banks has changed from 2904 to 2290 in the period 2008-2016[28].

As it is possible to see in the picture, the countries with the highest number of banks are Germany, Italy and Austria, that account for the greatest portion in the Euro Area (67% of total). Notwithstanding the fact that those countries are the ones that have faced the greatest changes in the reduction of credit institutions, they remain the areas with the biggest banking sector. In terms of total assets, France and Germany continue to have the largest sector. In Figure 6 a representation of total assets on a country basis is shown for 2008 and 2016.

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[27] Source: European Central Bank, "Report on financial structures, October 2017"
[28] Source: European Central Bank, "Report on financial structures, October 2017"

Figure 6 Total Assets of the banking sector by country, 2016-2017
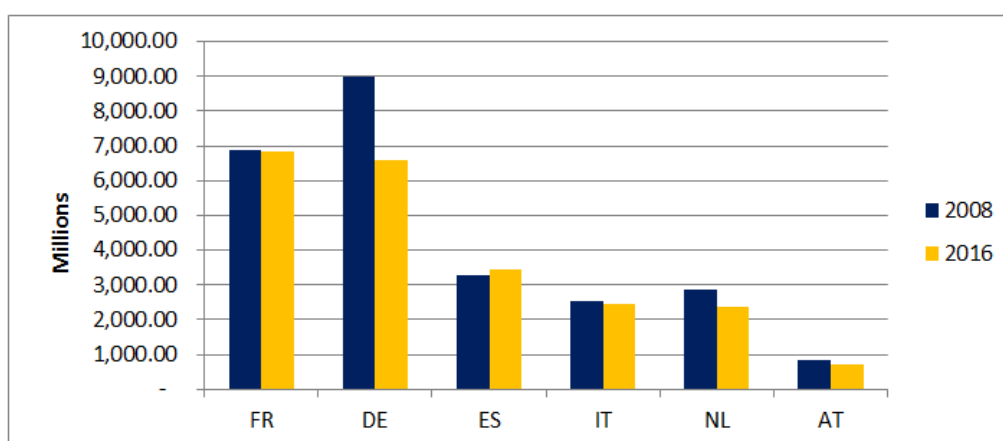
Source: European Central Bank SDW, author`s computations

Between 2008 and 2016 all the countries in the picture have experienced a decrease in the value of total assets of banks, with the exception of Spain (+5%). Moreover, the figures for Germany are the most interesting, as in 8 years total assets decreased by around 27%, from around €9 Trillion to less than €7 Trillion.

One question that is worth answering is related to the reasons why during the last decade this decreasing trend begun. The next section will go deeper in analysing how the banking sector has changed over time.

1.3 The issue of overbanking

Overbanking can be described as "*the excessive provision of banks or banking facilities; the granting of charters to an excessive number of banks, especially when this results in bank failures*"[29]. However, in practice the concept of overbanking is not univocally defined, as it could be interpreted in different manners.

It is true that the banking sector has changed in the past century; the supply of credit has increased and banks expanded into new businesses. As shown in Figure 7, bank loans in Europe increased during the 90s, compared to other economies such as the US and Japan.

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[29] Oxford Dictionary: https://en.oxforddictionaries.com/definition/overbanking

**Figure 7** Bank loans to GDP in the economies
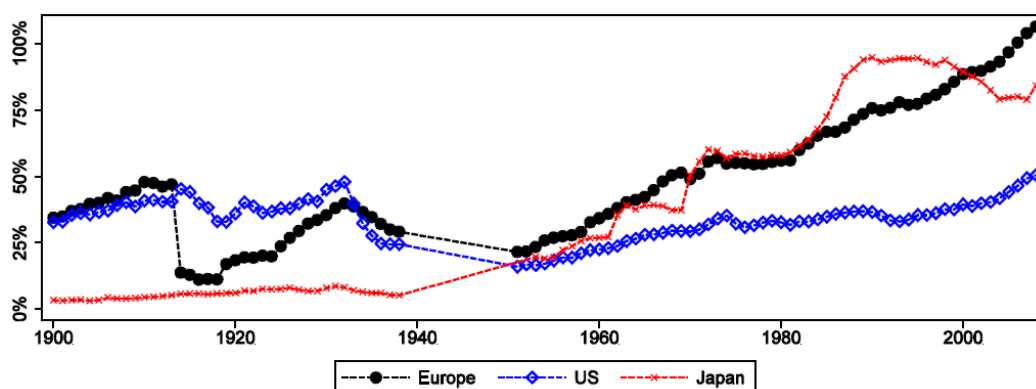
Source: Reports of the Advisory Scientific Committee, "Is Europe Overbanked", 2014

The figure reports how bank loans were stationary until the 50s both in Europe and US; after that, Europe started an upward trend, which resulted in a rise in the gap between the two economies.

Also, the balance sheets of banks have grown over the years, counting very high levels of total assets both for domestic and foreign owned banks, always compared to the GDP. In most of the European countries[30] the total assets of banks to GDP ratio is higher than 400%.This is not true for other countries such as the US, where the sum of total assets of domestic and foreign owned banks is around 83%, and Japan with 192%.

Another attempt to demonstrate that the Euro Area could be overbanked concerns counting the number of existing commercial banks with respect to the population, shown in Figure 8.

Figure 8 Commercial Banks per 100,000 Population
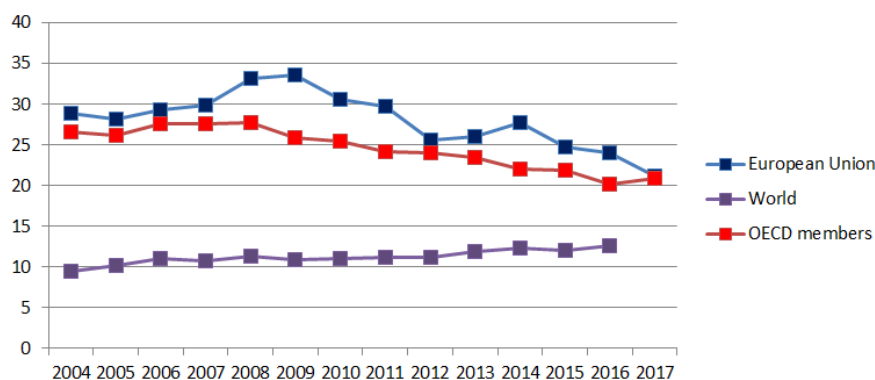
Source: World Bank Data, author`s computations

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[30] Luxembourg, Malta, Ireland, United Kingdom, Cyprus, Netherlands and Sweden

First, when comparing the data of the Euro Area and the World, it is not surprising that the number of commercial banks is higher in the former. The reason is that the world`s average number is affected by data of undeveloped countries, whose number of commercial banks per population is either low or null. Instead, likening the Euro Area results with the one of the OECD countries allows more comparability, since the latter generally involve the most developed countries[31]. Moreover, in the list of OECD there are most of the countries present also in the Euro Area, which means that the differences in the two lines in the figure is represented by countries that are in the OECD list but not in the Euro Area: being the OECD line lower compared to the other implies that in the Euro Area the number of commercial bank per population is higher than in other developed countries.

All in all, it is possible to affirm that the banking sector is significant in Europe (bank-biased), as it has been measured using the income and population of the respective countries. However, it is not possible to conclude that the banking sector is too large, as it should be compared to other sectors in the economy. Indeed, other markets (bonds and equity) should increase in size whenever institutions improve[32]. This phenomenon interested a lot of non-EU countries during the years. On the contrary, the EU became more bank-based when institutions improved.

As shown in Figure 9, the financial structure of some countries of the world, measured by taking the ratio between stocks and bonds market and bank credit, is plotter over fifteen years: in the bottom left side of the graph there are most of the European nations, showing that the equity and bond market values are low compared to the bank credit. Moreover, the structure of the system has not moved towards a market-based system, but has rather reinforced its bank bias.

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[31] Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States. Source: OECD
[32] Laporta R., Lopez-de-Silanes, F., Shleifer, A., "Law and Finance", 1997

Figure 9 Financial Markets over time (1995-2011)
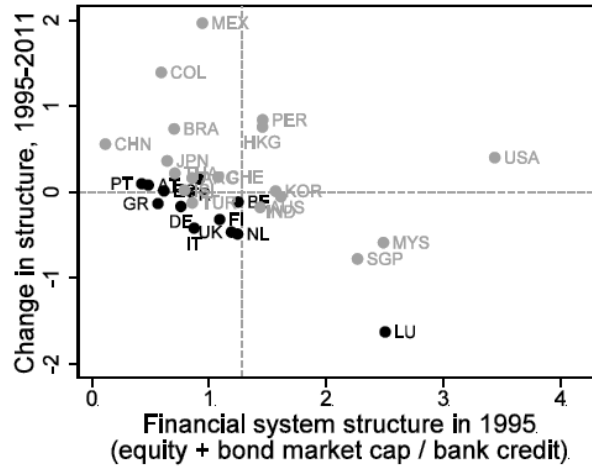
Source: Reports of the Advisory Scientific Committee, "Is Europe Overbanked", 2014

Also, the next figure represents the financial structure of some countries of the world in 2011, the last year of observation of the previous figure. The financial structure is measured with the same indicator as before:

Figure 10 Financial structure of European and other countries (2011)
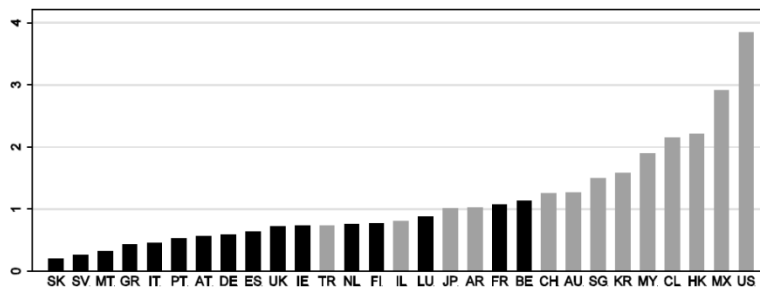
Source: Reports of the Advisory Scientific Committee, "Is Europe Overbanked", 2014

As all the black lines represent EU countries, it is clear that in most of the cases the combination of bond and equity markets are lower compared to the banking industry, with respect to the world. The only two exceptions are represented by France and Belgium, as they both share more advanced markets both for bonds and equity.

It is true that bank-based economies have the advantage of decreasing transaction costs due to their ability to gather data and subsequently monitor their client, thus mitigating the asymmetries of information in the market (also mentioned in the previous section). On the other side, systems that are overbanked have some drawbacks. For instance, literature

suggests that bank-based economies perform slightly better during normal business cycle, but suffer more and take more time to recover[33].

Another issue that could hamper financial stability, at least in principle, is related to competition across credit institutions in systems where there is higher supply than demand for banks. Also here literature presents different theories[34]: the traditional "competition-fragility" view states that competition of banks erodes market power and decreases margins. Banks, therefore, have more incentives to take more risks in order to increase their returns. A more recent view, the "competition-stability" view, supports instead the idea that the higher the market power in the loan market, the higher is the risk for banks. This is because an increase in interest rates makes it harder for customers to repay their loans; this could raise the interest of the borrowers to invest into riskier projects, thus increasing moral hazard (as stated in the first section, moral hazard should be reduced by the presence of financial intermediaries, not increased). The result of this study embraces both theories. On one side, banks with higher market power happen to have portfolios with higher risk. However, credit institutions that have the highest market power are also the ones that end up with lower risk exposures overall, due to the fact that they hold more capital, on average[35].

One of the most recent views regarding the matter of overbanking has been given by the ex-Chair of the Supervisory Board of the ECB Danièle Nouy. According to her, there is no clear definition of overbanking, and it could mean both that there are too many banks as well as that there are too many weak banks that do not exit the market[36]. In this situation, profits are squeezed and banks are not able to build up enough capital. From here, they could decide to engage in risky activities and to threat financial stability (similar to the "competition-fragility" view previously mentioned). Overbanking might also mean that the banking sector is too large compared to other sectors of the economy. This would cause distortion in human capital, as the banking sector attracts people that could have worked in more productive and efficient sectors. Another interpretation of overbanking refers to the presence of too many assets in the sector, implying that the economy is over-indebted.

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[33] Gambacorta L., Yang J. "Financial Structure and Growth", Bank of International Settlement 2014

[34] Berger A., Klapper L., Turk-Ariss R., "Bank competition and Financial Stability" Policy Research Working Paper 2008

[35] Berger A., Klapper L., Turk-Ariss R., "Bank competition and Financial Stability" Policy Research Working Paper 2008

[36] Banking Supervision Speech, "Too much of a good thing? The need for consolidation in the European banking sector" September 2017

In the light of all, the concept of overbanking appears to be complex to identify and analyse, as there is no current normative for a threshold indicating that the banking sector is "too much". However, what is sure is that a lot of banks in the Euro Area are not able to earn their cost of capital[37], which means that there are too many banks for the number of customers.

1.4 Consolidation in the Banking Sector

The presentation of the banking sector features in the Euro Area suggests that such a high number of banks in the market cannot last forever; indeed, if a market is overcrowded, some players must exit the market. However, with banks the situation is more complicated, as failure of a credit institution might represent one of the causes for a potential crisis.

Moreover, mainly after the 2008 crisis, the banking sector has undergone several changes in terms of new regulations (Basel III, CRDIV, BRRD), new challenges in terms of competitive framework and the need for digitalisation in order to survive. Individual banks could struggle in this specific market condition: they should review their business models, try to earn profits in a world of low interest rate environment, invest their capital to modernize their systems. All these actions could lead potentially to a bank failure.

The first problem that arises if a credit institution fails derives from the strong interconnectedness among banks, and the failure of one could in principle cause the failure of others. This, of course, would have serious consequences in the economy. Secondly, if a bank fails, confidence in the banking sector might be immediately undermined, and this could pose threats to the stability of the system as a whole. A lack of confidence in the system could, in turn, easily become a crisis. Fortunately, the recent creation of the Single Resolution Mechanism (already mentioned in Section 1.2) could hopefully smooth the process of banking failure.

Having mentioned this, exiting from the market is not the only practice possible in order to try to solve the issue of overbanking. Certainly, bank mergers and acquisitions could as well

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[37] Banking Supervision Speech, "Too much of a good thing? The need for consolidation in the European banking sector" September 2017

play a pivotal role by reducing the size of the sector and by increasing efficiency of the remaining players[38].

There is evidence that the banking sector is undergoing a process of consolidation since the 90s. As shown in Figure 11, within ten years of observation in Europe the amount of M&A deals (in US$) reached the peak in 2000 for all the categories, and then decreased but remained stable over the years. The yellow line, that represents France, Germany, Italy and Spain is the category characterised by the highest number of deals compared to the other countries in Europe (one example could be the merger between Paribas and Banque National de Paris in the year 2000). The result could have been predicted, as those countries are the ones with the highest number of credit institutions that suffered from high competition levels and were "forced' to merge or being acquired by another institution.

Figure 11 M&A value in Europe (1998-2004)
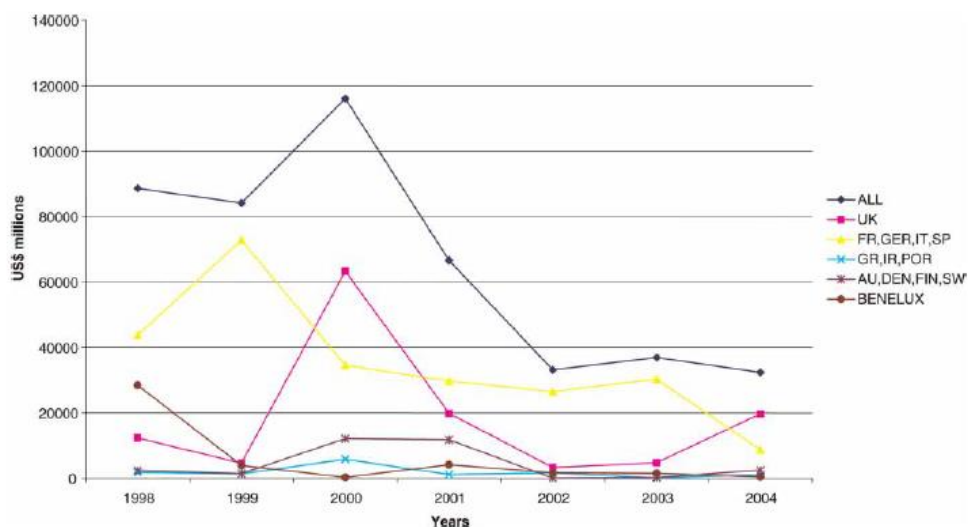
Source: Figueira C, Nellis J., "Bank M&A activity in the EU: much ado about nothing?",2007

In theory, the reason for a merger or an acquisition should be the one of increasing shareholders value. However, not always there is evidence that M&A activity actually leads

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[38] Banking Supervision Speech, "Too much of a good thing? The need for consolidation in the European banking sector" September 2017

to this result. On the contrary, there are studies that show how mergers and acquisitions do not increase at all the level of profitability and efficiency of banks.

More in detail, a paper carried out by studying some M&A activity in Italy during 1985-1996 stresses the fact that large and more efficient banks buy the smaller and inefficient ones. In this paper, mergers and acquisitions have been separated and therefore also results are different. For acquisitions in the Italian market, the main purpose seems to be the one of improving the loan portfolio situation of the acquired institutions, whereas the mergers` motives could be related to the quest for improvement of services. In terms of profitability (measured through ROE and ROA), there are no improvements in the years after the merger, while after an acquisition profitability drops on average. Efficiency, measured through labour and operative costs over gross income, decreases since all costs rise and remains permanently higher in mergers, but it has no impact on acquiring banks after the acquisition. [39]

Another element that is worth mentioning regarding consolidation refers to the differences between domestic (or national) M&A activity, and the cross-border one. There are many observations for domestic transactions in Europe since the early 90s, but very few for cross-border ones, as Danièle Nouy highlights in her speech regarding the issue of overbanking in Europe and the consolidation process in the banking sector. Notwithstanding the fact that financial and economic integration have reached a peak in the latest years, there are no signs of cross-border activity between banks.

There might be several obstacles related to cross-border activities. For sure they are riskier than the domestic ones as some barriers across different countries still remain, such as the language. Cross-border M&As are also more expensive, difficult to coordinate and complex for value creation. The participants must be confident that the after-merger or acquisition would create value, which is difficult in a situation where non-performing loans are still high within some regions, business models are not entirely sustainable and some categories of assets still represent almost a mystery[40]. Therefore, the fundamental element that would push

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[39] Focarelli D., Panetta F., Salleo C. "Why do banks Merge", Journal of Money Credit and Banking 2002
[40] Banking Supervision Speech, "Too much of a good thing? The need for consolidation in the European banking sector" September 2017

credit institutions to merge across border is confidence in the economic value those mergers could generate, and apparently, there is a lack of it.

However, cross-border mergers would not just solve the issue of overbanking, but would rather be useful for customers, as they would have more option to invest, more source of funding as well. Furthermore, the principle of diversification is essential in finance and for credit institutions. Cross-border M&A would help banks to diversify portfolios so making them safer.

In the next Chapters a study of M&A activities in the in Europe area will be carried out on the basis of real banking data, and the main purpose is to analyse the characteristics of those mergers and acquisitions in terms of specificities and potential gains, especially in terms of efficiency.

Box: The Italian Credit Cooperative Reform

In 2016, the Ministry of Finance and Economic Affairs completed the Decree-Law No 18 of February 2016 regarding Italian "*Banche di Credito Cooperativo*" (also known as BCCs). The Decree-Law, that under the Italian legal system must be adopted by the Government and sent to the Parliament the same day for the conversion within 60 days (otherwise declared invalid), concerns the Italian system of banks and their re-organization, and therefore is also in the interests of the ECB[41].The main purpose of the Decree-law is to make the Italian banking system more transparent and efficient in terms of government standards, and to eliminate weaknesses present in the BCC structure[42].

Indeed, the Governor of Bank of Italy Ignazio Visco highlights that the Italian banking sector has struggled for several years, and smallest institutions were the ones that suffered more in terms of capital requirements, liquidity, regulations and so on[43]. Therefore, the practice was to resolve banks through acquisitions by other banks in order to improve efficiency and be

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[41] The European Central Bank has the duty to provide its opinion regarding modifications, amendments and entrance of new laws and systems that could potentially change the banking sector

[42] Opinion of the ECB, 24th March 2016 on the reform of cooperative banks, a guarantee scheme for securitisations of non-performing loans and the lending capacity of alternative investment funds

[43] Italian Banking Association Annual Meeting, Speech by the Governor of Italy Ignazio Visco, 10th July 2018

recapitalized in a proper manner, being the other alternative liquidation. Even though small banks do not have impact in the economy, the resolution of several Italian banks would have for sure significance consequences on depositors and reputational damage to the country. Therefore, in order to raise the economic and financial strength of a big portion of the Italian banking system characterised by credit cooperatives, the solution concerns the creation of three different BCC groups (each led by a parent company), to which most of the cooperatives must adhere within a specified period of time.

More in detail, each BCC must[44]:

- Join a Cooperative Banking group or, under certain circumstances transform into a Joint Stock Company (S.p.A.)

Bigger BCCs (total assets higher than 200 Mln €) might decide not to join any of the groups, but will be forced to change their legal structure to an S.p.A. and to pay 20% more of extraordinary taxes on their reserves. Moreover, the BCCs that do not enter any group nor change their legal structure must be liquidated.

- Each of the newly created groups must be incorporated as a Joint Stock Company (S.p.A.) that has net assets of at least 1 Bn €. The primary function of the parent is to manage and coordinate the BCCs according to the "cohesion contracts", that set out the powers of the power company, such as:

  o Implementing strategic orientation and operational objectives of the group, adjusted according to the BCC in question;
  o Approve or reject the appointment of one or more of the BCC board members (under certain circumstances) up to the majority of the members;
  o Expel a BCC from the group, in case of a serious breach of the cohesion contract.

Other amendments of the Decree-law No 18 of February 2016:

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[44] Opinion of the ECB, 24th March 2016 on the reform of cooperative banks, a guarantee scheme for securitisations of non-performing loans and the lending capacity of alternative investment funds

- Changes in the capitalisation of individual BCCs, so that the maximum share capital that can be held in a single bank by one shareholders raises up to 100 000 € (it was 50 000 € before) and the minimum number of shareholders to form a BCC raised up to 500 (instead of 200).

All the above mentioned actions need the approval of the national competent authority, namely the Bank of Italy. It is the duty of any BCC to notify the authority of its intentions no more than 18 months after the entry into force of the provisions, by submitting both a proposal for cohesion contract and an indication of the group the single BCC would like to enter[45].

Whenever the BCC groups are created and authorized by Bank of Italy, at this point the shareholders of the various BCC have 90 days to sign the adhesion contract and to declare, therefore, to which of the groups the single institution would like to enter.

However, the newly established Italian Government decided to freeze the Italian BCC reform during the third quarter of 2018, when the small credit cooperatives were supposed to sign their cohesion contracts and to declare their choice with respect to which group to join. Indeed, the government succeeded in obtaining an amendment in the law which requires the BCC to sign their adhesion contracts not within 90 days, but in 180. This means that there has been a postponement of three months for the new setting of the Italian banking sector.

The deputy prime ministers of the Italian government, Matteo Salvini and Luigi Di Maio, have strengthened their position against the reform, as they believe that the cooperative banks are extremely tied to the territory they are located. According to them, the BCC reform would cancel the advantage of these credit institutions, namely the territorial nature and mutuality[46]. They claim that during the crisis the Italian cooperative banks were the ones that still were able to grant credit to households and small enterprises. Therefore, an alternative to the reform would include some interventions aimed at improving the profitability and efficiency of this sector.

Partially in agreeing with this view is the Professor and Economist Giovanni Ferri, who believes that it would be hard for the single BCCs to keep a certain degree of autonomy and

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[45] "Reform of Italian Cooperative Credit Banks", February 2017 https://www.lexology.com/library/detail.aspx?g=33f91f17-d272-471a-b1ef-e56d7d14a1d1
[46] https://www.ilsole24ore.com/art/notizie/2018-11-14/nuovo-vertice-palazzo-chigi-conte-e-vicepremier-bcc-112839.shtml?uuid=AEM3mggG&refresh_ce=1

to still play a pivotal role in the economy of their territory. Moreover, the Professor Ferri does not agree with the rules that the cooperatives who decide not to adhere to any group would have to apply. The "opting out" clauses are not proportionate and practically force all the credit institutions that have the choice not to enter any group to do so, in order to avoid the extremely high taxes and the change of company form. However, he also states that the reason why credit cooperatives are struggling in the market is *in primis* related to the unstable economies of the territory. Whenever a cooperative bank injects credit to a territory, and the territory itself fails, inevitably the bank will have trouble as well. For this reason, he concludes that the reform is necessary for the country[47].

Apart from the different viewpoints presented, the postponement of the reform might create uncertainty: not only at national level, but also at the European one. On this matter, the ECB provided its opinion with respect to the decision of the amendment[48], by stating that the most important objective to be preserved in the Law 18/2016 is the adaptation of the small BCCs into bigger groups. Moreover, the ECB stresses also the importance of the reform itself, as it is aimed at addressing the vulnerabilities of the Italian cooperative sector, and in particular the ability to absorb shocks and to become more efficient[49]. In few words, the European Central Bank is in favour to the reform and wishes that notwithstanding the amendments the Government requested, the law will be implemented, so the small BCC will be part of bigger and safer credit institutions.

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[47] http://www.vita.it/it/article/2016/02/15/riforma-bcc-attenzione-a-non-cancellare-un-modello/138305/

[48] Opinion of the ECB of September 2018, on the amendments to the reform of popolari banks and cooperative banks

[49] Opinion of the ECB of September 2018, on the amendments to the reform of popolari banks and cooperative banks

Chapter 2: The analysis of banks involved in M&A transactions

2.1 Differences between Mergers and Acquisitions and how they are treated in the analysis

This Chapter is going to focus on the study of mergers and acquisitions of a sample of banks classified as Less Significant Institutions under the Single Supervisory Mechanism. The next sections will provide a descriptive analysis of the credit institutions that have merged with or been acquired by other institutions, with a focus on the most critical variables that mark the performance of such banks.

Merger and Acquisitions are two transactions that are used in a strategic way to possibly increase the value of the company for the stakeholders[50]. The terms merger and acquisition are often used interchangeably, but the two transactions have some differences. First of all, in legal terms, a merger is defined as two or more companies joining together while an acquisition occurs when one company buys shares of another company to achieve a managerial influence[51].

Secondly, when speaking about mergers, the nature of the decision to form a new entity must be mutual. There is the need of the approval of the Board of Directors of a company in order to enter into a merger, whereas this is not the case for acquisitions. Indeed, these transactions could be differentiated in "friendly" acquisitions or "hostile" acquisitions (also known as hostile takeovers). Usually, also the scenarios for mergers and acquisitions are different. In mergers, it could be the case that companies that have similar terms (size, importance, positioning in the market) decide to merge and to form a new entity. This is usually done in order to facilitate the share information, resources (IT resources for instance) and technologies or to gain more market power within a specific industry. On the other side, when dealing with acquisitions, it is more probable that the acquiring entity is larger and stronger than the acquired one.

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[50] Abrams, H., "Mergers and Acquisitions: how do you increase the value of two companies joined together?", 2013
[51] European Central Bank, "Mergers and Acquisitions involving the EU banking industry: facts and implications", 2000

However, it must be noted that the abovementioned differences in mergers and acquisitions are not well perceived and observed in practice: on one side, the word "acquisition" is viewed negatively and for this reason some companies claim that they are conducting a merger while in reality is an acquisition. On the other side, it is very uncommon to find two companies in an industry that are very similar in terms of size, share of the market and that have intention to merge rather than compete[52].

In the light of all, this dissertation is going to consider mergers and acquisitions without distinguishing the differences concerning the nature of the transaction, since the main purpose of the analysis is to understand the general characteristics of credit institutions that enter into such activity under an analytical point of view, and not in terms of process or changes in ownership and management structure. Moreover, the study regarding efficiency that will be presented in Chapter 3 does not require mergers and acquisitions to be classified differently, as the final goal is to investigate how credit institutions perform in the periods after the actual operation.

2.2 The dataset

The data used in order to perform the descriptive analysis has been gathered by mainly three sources, namely SNL Financial database, Eurostat and Legal Entity Identifier Search. The former provides industry-specific financial market data, by including sector-specific performance metrics and financial statements as well as mergers and acquisitions data. Also, the SNL database allows the user to select multiple financial statements` items both from the Balance Sheet and Profit & Loss statements of the single entities that are under analysis. Eurostat, instead, has been used in order to integrate some regional specific data linked to the headquarters of the credit institutions under analysis. Finally, in order to link the information from SNL Financials to Eurostat, Legal Entity Identifier Search has been consulted. This database provides up-to-date information regarding the LEI codes[53] of credit institutions. LEI

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[52] Investopedia Dictionary, "What is the difference between Mergers and Acquisitions?", https://www.investopedia.com/ask/answers/021815/what-difference-between-merger-and-acquisition.asp

[53] Codes made of numbers and letters (usually 20 characters) to identify distinct legal entities

codes are 20-character long containing both numbers and letters, each of which is unique for identifying legal entities that participate in financial transactions. However, for the scope of this dissertation, data has been used in order to gather information regarding the location of banks (headquarters).

The sample involves credit institutions classified as Less Significant Institutions that entered into an M&A transaction between January 2015 and June 2018. The main reason for the choice of the period of analysis is related to the birth of the Single Supervisory Mechanism that allowed the distinction of credit institutions in Significant and Less Significant. The summary statistics for the sample are presented in the following table:

Table 1 Summary statistics for M&A

Year of M&A	Number of M&A	Number of Banks Involved	Countries Involved
2015	22	44	AT,DE,IT
2016	76	162	AT,DE,ES,IT
2017	107	222	AT,DE,FR,IT,SK
2018	17	37	IT,DE,NL
Total	222	465	7

Source: SNL Financial, author`s computation

Even though the study is concentrated in four years, it emerges from the table that the SSM LSI banking sector has undergone some changes due to the elevated number of M&A transactions, in total 222. It must be mentioned that this number is referred to the M&A involving credit institutions that exist in the database SNL and not to the total number of M&A in the LSI world, which means that the actual number is even higher. Also shown in Table 1 is the number of credit institutions involved in transactions for each of the years of analysis. For 2016, 2017 and 2018 the number of banks involved (third column) is more than the double compared to the number of M&A (second column). This means that in these years some transactions experienced that acquirer entities buy more than one credit institution that we can refer to as acquired.

Moreover, the table displays the countries where M&A transactions took place, for each year of observation[54]. There is no surprise that Austria, Germany and Italy are the ones that appear the most (>90% of M&A), since these are the countries with the highest concentration of Less Significant Institutions (84% at the end of 2016[55]). Therefore, these countries are also the ones that could possibly be overbanked, as discussed in the previous chapter, and for this reason the phenomenon of M&A is more common. Finally, in the dataset there is no presence of cross-border mergers.

In terms of size of the sample, Table 2 shows the sum of the total assets of the credit institutions (both acquirer and acquired entity) that entered into a merger or acquisition during the years of analysis.

Table 2 Total Assets of M&As

Year of M&A	Total Assets Involved (In Thousands)	Total Assets Acquirer (In Thousands)	Total Assets Acquired (In Thousands)
2015	€ 40,459,163.84	€ 32,416,373.84	€ 8,042,790.00
2016	€ 185,694,659.84	€ 111,937,949.38	€ 73,756,710.46
2017	€ 272,740,517.10	€ 167,311,339.00	€ 105,429,178.10
2018	€ 93,955,675.03	€ 50,703,366.85	€ 43,252,308.18
Total	€ 592,850,015.81	€ 362,369,029.07	€ 230,480,986.74

Source: SNL Financial, author`s computation

The size of the M&A transactions between 2015 and 2018 is equal to € 592.85 Billion overall. Table 2 shows that the sum of total assets is the highest in 2017 with € 272.74 Billion; this is also the year with the highest number of mergers and acquisitions (107). On the other side, both 2015 and 2018 report the lowest amount of assets involved due to the lower number of transactions. However, it is worth mentioning that despite 2018 reports only 17 M&A compared to 2015 that instead counts 22, the sum of total assets is higher in 2018. This means that the credit institutions involved are bigger in size. Indeed, the average size of banks for the different reported period increases. While in 2015 the average total assets of an acquirer was equal to 1.5 bln €, it reaches 3 bln € in 2018[56].

In Table 2 is also possible to notice the discrepancy in terms of size between acquirer and acquired entities over the years. The sum of total assets of acquirers, in fact, is bigger than the one of acquired entities for all the years of observation. While in 2015 the difference between

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[54] Data of acquired entities are missing for Spain, France and the Netherlands
[55] European Central Bank, "LSI supervision within the SSM", November 2017
[56] Author`s computation

the two sums is the highest (TA of acquirers is 4 times the one of acquired), it decreases over the years (TA of acquirers is 1.2 times the one of acquired). This is true also when looking at the averages of data. While in 2015 acquirers were on average 3.5 times bigger than acquired, in 2018 the discrepancy disappears. This suggests that the differences in terms of total assets between the acquirers and the acquired entities in the sample have decreased over time.

All credit institutions can be classified according to a business model, which is a definition aimed at distinguishing banks on the basis of the prevalent activities they carry out. For instance, the difference between retail and wholesale banking is crucial to understand: while the former is a model for which credit institutions provide services mostly to individuals (legal persons) and small enterprises, wholesale banking is more focused on services for large businesses (also international), institutional customers, high net worth investors. While the retail banks make small profits for a large volume of transactions, wholesale banks typically make higher profits but for a lower amount of transactions.

In the world of Less Significant Institutions, credit institutions are small and generally operate on a regional basis. Therefore, it is appropriate to state that their business models are more retail-oriented. In the dataset, there is also room for a further breakdown of banks on the basis of the different legal structures. Determining the different legal structures is not a complicated task, as it could be done by simply looking at name of each institution. For instance, most of the Italian banks have "*Credito Cooperativo*" or "*BCC*" inside their name, so they can be classified as Cooperative banks. Moreover, in Germany and Austria, all credit institutions that have in their name "*Raiffeisenbank*", "*Volksbank*" or "*VR*" (abbreviation for *Volksbank-Raiffeisenbank*) are Cooperative Banks as well. Cooperative banks could also be recognized in Germany by two letters at the end of some credit institutions, namely "*eG*". This is an abbreviation for "*eingetragene Genossenschaf*", which means "registered cooperative society" under German Law. The ones that, instead, have in their name "*Sparkasse*", "*Kreisparkasse*" or "*Stadtsparkasse*" are translated into Savings Banks. Finally, for Spanish credit institutions, the words "*Crédito Cooperativo*" and "*Caja Rural*" indicate that those banks are again cooperatives.

Savings and Cooperative banks have an important role in the banking system in several countries of Europe such as Austria, Germany and Italy. The banks belonging to these sectors are considered "unconventional", because of their business model and features[57]. In Germany, both savings and cooperative banks date back to the 19th century, and they became so popular that they expanded also into the adjacent countries. A peculiarity of these sectors in Germany is that they kept most of principles and regulations for more than 200 years, until today. Indeed, savings and cooperatives still adhere to the "regional principle", according to which banks cannot compete with others in the same banking group. Cooperation rather than competition allows the creation of networks within a group, not by law but by choice as institutions are still considered independent. Again, cooperation helps those small credit institutions to share costs but at the same time to provide several services to the customers. Austria has followed a similar pattern. Both cooperatives and savings represented the greatest slice of the country`s banking sector in terms of number of institutions. However, during the 20th century Austrian savings ceased to adhere to the regional principle, and credit institutions started operating on a larger scale, namely on a national level. Other reforms of those years allowed savings to split into different legal forms changed radically their business model, so that the real savings bank sector does not exist anymore.

In Italy, both savings and cooperative banks have been built up on the German model, but the sector did not become as strong as in Germany. On the contrary, the small credit institutions operating on a regional level were struggling with issues related to profitability and efficiency[58]. During 1990s the Italian law imposed the privatization of the savings bank sector[59], and the entities were transformed into Joint Stock Companies (S.p.A.). As the case of Austrian savings, the regional principle was abolished and savings started to offer their services on a national level. Instead, the cooperatives have survived over the years, and notwithstanding the issues related to profits and efficiency, they still operate on a regional basis. During the last couple of years, however, the reform of the BCC has required all the smallest cooperatives to join one of large banking group, as an attempt to restore the conditions of those banks.

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[57]Bülbül D., Schmidt R.H., Schuwer U. "Savings Banks and Cooperative Banks in Europe", Goethe University
[58] Bülbül D., Schmidt R.H., Schuwer U. "Savings Banks and Cooperative Banks in Europe", Goethe University
[59] Law n.218, 30.07.1990, known as Legge Amato-Carli

The following table (Table 3) displays the classifications into sectors and the average size of the banks included in the dataset.

Table 3 Sectors and average size of credit institutions involved in M&A

Country	No. Cooperative Banks	Avg. Total Assets (In Thousands)	No. Savings Banks	Avg. Total Assets (In Thousands)	No. Others	Avg. Total Assets (In Thousands)
AT	32	€ 4,012,768.41				
DE	238	€ 941,170.88	57	€ 2,627,803.05	2	€ 8,536,272.00
ES	2	€ 2,612,648.00				
FR					2	€ 8,916,000.00
IT	124	€ 1,224,645.05			4	€ 1,907,436.00
NL					2	€ 16,069,923.00
SK					2	€ 1,849,195.00
Sum	396	€ 2,197,808.09	57	€ 2,627,803.05	12	€ 7,455,765.20

Source: SNL Financial, author`s computations

It is clear that the majority of the institutions involved in M&A activities belong to the cooperative sector. Indeed, 85% of the sample in terms of number of banks and 76.4% in terms of total assets fall under this category. The number of savings banks, on the contrary, amounts to 12.5%, while 15% is the percentage of total assets of banks with respect to the total of the sample. Finally, the table shows the remaining institutions that were not classified into a sector, and as referred to as others. In terms of the share of assets, the banks that fall in this residual category sum up to around 9% of the total.

Table 3 shows also the average size of the credit institutions on the basis of the sector, and interesting results emerge. Comparing the three sectors, the biggest banks in the sample belong to the one classified as others. On the contrary, cooperatives and savings are smaller and more similar between each other, on average. This could be partially explained by the regional principle exposed above, as banks classified as others are not bound to adhere to it. When comparing cooperative banks across countries, it emerges that German banks are the smallest as their average size does not reach 1 bln €, whereas the country that has the biggest cooperatives is Austria, with an average size of 4 bln €. Austrian cooperatives are greater not only compared to cooperatives of other countries, but also to the average size of the whole sample, which is around 3 bln €. Another interesting comparison across countries is in the "others" column, for average of total assets. Indeed, the Dutch acquirer entity is, on average, 8 times bigger than the Italian and Slovakian one as well as 2 times bigger than the French acquirer.

One last interesting piece of information can be extrapolated by comparing the average total assets of banks among different sectors. This can be done only for Germany, the sole country in the sample with banks belonging to all sectors. Again, it is clear that cooperatives are very small, also compared to the other banks in the country belonging to the other sectors (institutions under the category of others are 9 times bigger than the cooperatives).

During the 1970s, Eurostat created some codes, called NUTS (Nomenclature of Territorial Units for Statistics), in order to identify and divide the European territory into smaller regions and to facilitate some regional and specific analyses. There are three levels of NUTS: NUTS1, NUTS2 and NUTS3, as shown in Figure 12.

Figure 12 Representation of NUTS
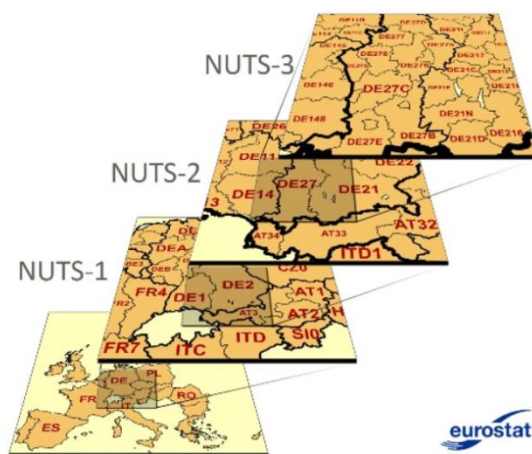
Source: Eurostat

NUTS1 corresponds to major socio-economic regions, and counts 104 different areas in Europe, NUTS2 are basic territories for the application of regional policies, and are 281 in total, while NUTS3 represent small regions for specific diagnoses and are currently 1348[60]. Therefore, NUTS3 is the most detailed and is the one used in order to locate the LSIs in the sample.

The distinction into regions is based on two principles: first, the population within a specific area. Indeed, the NUTS Regulation also defines some quantitative threshold for minimum

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[60] Eurostat website: https://ec.europa.eu/eurostat/web/nuts/background

and maximum population. Second, the division in areas also takes into account the administrative divisions of each state: this is done mainly for practical reasons and facilitates the presence and availability of specific data.

Figure 13 displays the locations of the banks that are in the dataset and their sectors, not accounting for the year of their merger or acquisition. The blue colour is for cooperative banks, red represents savings banks and orange are the ones that are the ones classified as "others". Moreover, the size of the bubbles depends on the total assets of the credit institutions[61], so that the biggest bubbles reflect the biggest banks in the sample.

Figure 13 Banks` locations and Sectors
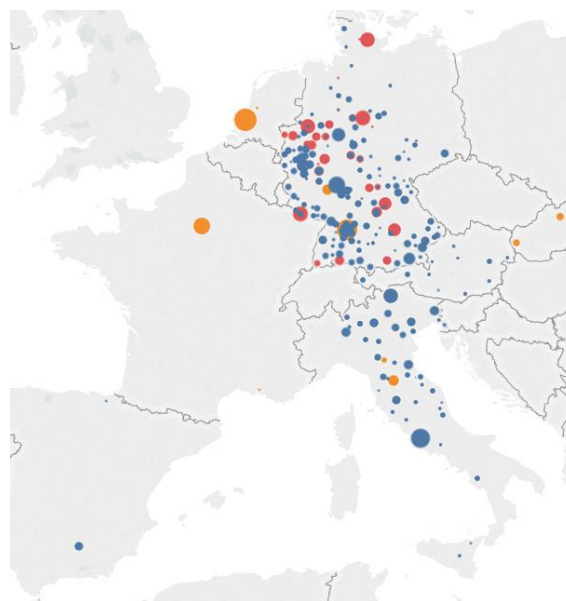
Source: Eurostat, SNL Financial, author`s computations
Notes: the three colours represent the sectors of banks, while the size of the bubble reflect the institutions` total assets the year prior to the M&A. Due to missing data, the n. of observation is 396

The first element that is worth to notice is the fact that the majority of the banks are situated in Germany, Italy and Austria, as anticipated previously. Secondly, it is clear that the number of cooperatives is the highest, as the blue colour is the most numerous and appears in most of

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[61] Total Assets of the year before their merger or acquisition

the countries, while savings banks are located only in Germany. It is also telling that, comparing the sizes of the bubbles according to their colour, there are several blue dots that are significantly smaller compared to the others. Indeed, cooperative banks are smaller than the other banks, on average. Even though the orange bubbles - representing the not classified entities in the sample - are very few, they are the biggest in terms of size.

In Italy, the biggest banks in the dataset are *Banca di Credito Cooperativo di Roma - Società Cooperativa* and *Banca Popolare dell'Alto Adige SCPA*, both cooperatives. In Germany, instead, the biggest are: *Frankfurter Volksbank eG* (cooperative), *Sparkasse Saarbrücken* (savings) and *LBS Landesbausparkasse Südwest* (others). Austrian banks are smaller on average, but the biggest in the sample is *Raiffeisenbank Kitzbühel - St. Johann eGen* and is, again, a cooperative bank. Furthermore, the big orange bank in France is *Rothschild & Cie* while in the Netherlands the other not classified bank is *Nationale-Nederlanden Bank N.V.*, the biggest of our sample in terms of total assets. Finally, it is worth specifying that all those entities are classified as acquirers in the analysis.

NUTS3 is not limited only to the separation Europe into different regions. Indeed, all the areas that are covered by NUTS are also classified according to an urban-rural typology, aimed at distinguishing areas on the basis of their characteristics. More in detail, Eurostat follows the OECD methodology to define a typology, which takes into account mainly two factors: administrative units and population share[62]. This approach ends up with the classification of region as:

- Predominantly Urban (PU)
- Intermediate (IN)
- Predominantly Rural (PR)

The largest cities fall under the category of urban, while the areas where low density of population and administrative units are the rural ones. The intermediate category is the mixed one, characterised by cities and countryside. This classification is interesting for the purpose of our analysis, as it indicates the areas with the greatest density of M&A.

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[62] Eurostat website: https://ec.europa.eu/eurostat/statistics-explained/index.php/Archive:Urban-rural_typology

The following figures represent the urban-rural typologies of acquirers on the left and acquired on the right. The blue dots are the banks in regions classified as predominantly urban (PU), the red dots are the ones classified as intermediate (IN), while green bubbles are the predominantly rural (PR) regions. Again, the size of the bubbles indicates the total assets of the credit institutions.

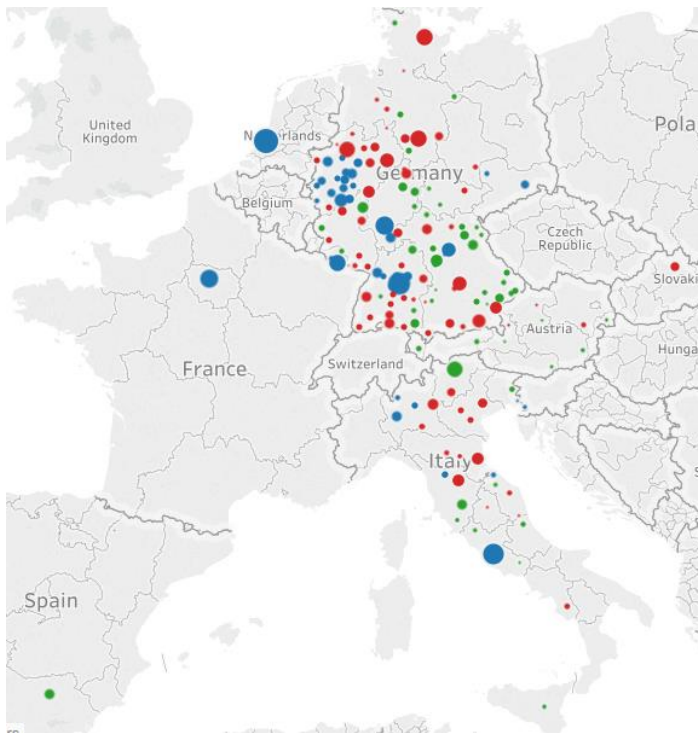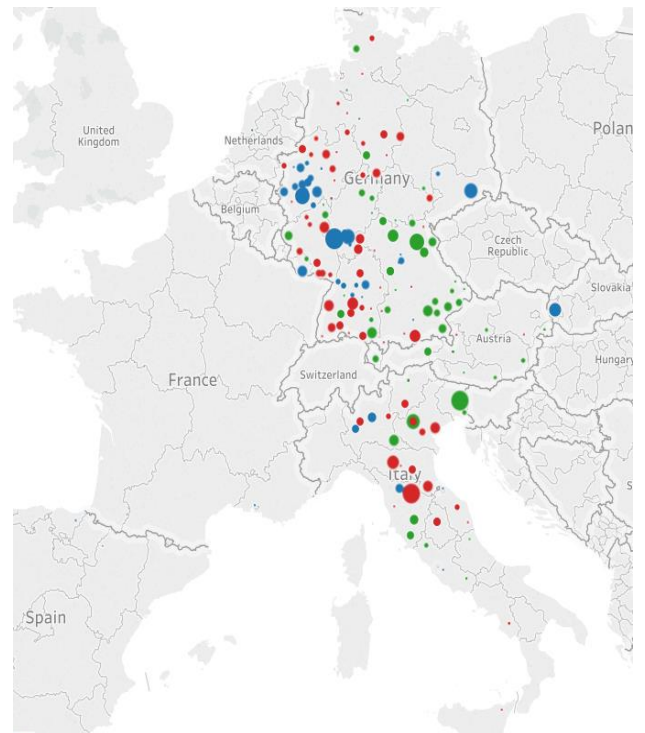**Figure 14** Urban/Rural Typology of Acquirers

Figure 15 Urban/Rural Typology of Acquired

Source: Eurostat, SNL Financial, author`s computations
Notes: the three colours represent the typologies of regions, while the size of the bubble reflects the institutions` total assets the year prior to the M&A.

First, the map on the left displays more banks with greatest bubbles, as acquirers are on average bigger in size compared to the acquired. Second, in both pictures the red dots are predominant, which indicates that most of the banks are located in areas classified as Intermediate. The following table shows the distribution of the mergers and acquisitions divided according to the urban-rural typology in numbers.

Table 4 Rural-Urban typology for M&A credit institutions

Country	No. Acquirers	No. Acquired	Total Assets Acquirers	Total Assets Acquired
PU	55	64	€ 144,140,595.79	€ 26,162,749.58
IN	93	98	€ 146,235,824.34	€ 31,204,255.98
PR	68	87	€ 71,992,608.94	€ 173,113,981.18
Sum	216	249	€ 362,369,029.07	€ 230,480,986.74

Source: Eurostat, SNL Financial, author`s computations

The first interesting result concerns the fact that both for acquirers and acquired entities, the majority of M&A take place in the areas classified as intermediate. At the second place we have rural areas and finally banks in urban regions. However, the situation changes when looking at the sum of total assets of those banks. The third column shows the sum of the total assets of the acquired entities in the three typologies, and it`s clear that the smallest banks, on average, are found in the rural areas, compared to the other two. This is because while the number of acquirers is the second highest in PR areas, the sum of assets is the lowest. The situation is different for acquired entities; here, banks that are situated in the rural areas have the greatest sum of assets, while for PU typology the assets are the lowest. Overall, the region with the highest value of M&A in terms of assets (acquirers and acquired entities together) is the Rural, followed by Intermediate and finally Urban.

In order to deepen the knowledge of the credit institutions involved in mergers and acquisitions in the sample and to attempt to understand the pattern of these transactions, several variables related to the banks` performances will be analysed.

2.3 Analysis of profitability, solvency, asset quality and efficiency in M&A

The following section is going to describe the main features of M&A activities and of the banks that enter into such operations. More in detail, variables for profitability, asset quality, solvency and efficiency are going to be evaluated to understand the position of credit institutions for the years between 2014 and 2018.

In terms of profitability, the indicators that are the most useful to understand how effectively a credit institution is managing its capital position and assets are, respectively, Return on Equity (RoE) and Return on Assets (RoA). While the numerator is identified in the Return after Tax and is identical for both ratios, the denominator is different. Equity, in banks, is represented by equity capital, which is aimed at avoiding that a credit institution takes excessive leverage and becomes insolvent.

RoE aims at measuring the shareholders` rate of return on their investment in the company, while RoA measures the operating efficiency for the company based on the bank`s profits from its total assets[63]. As credit institutions are financial intermediaries that provide several services to the public and serve an important role in the economy, banks` capital is highly regulated (Basel III). In this analysis, the denominator for RoE is the total equity. Instead, for RoA, the denominator is represented by total assets, that have already been introduced in the previous sections. Figure 16 and Figure 17 compare the two profitability ratios for all the banks in the sample throughout all the years.

Figure 16 Return on Equity
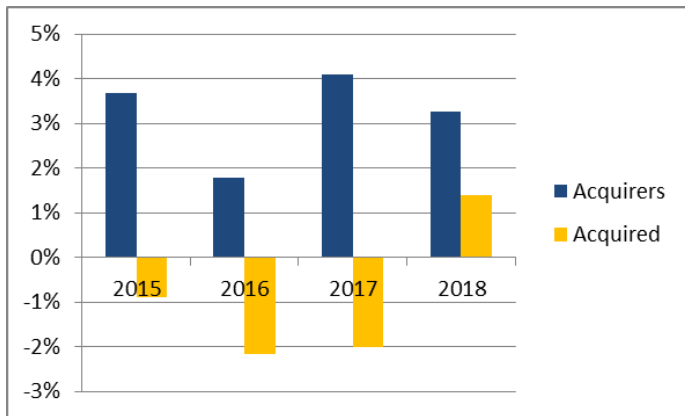
Figure 17 Return on Assets
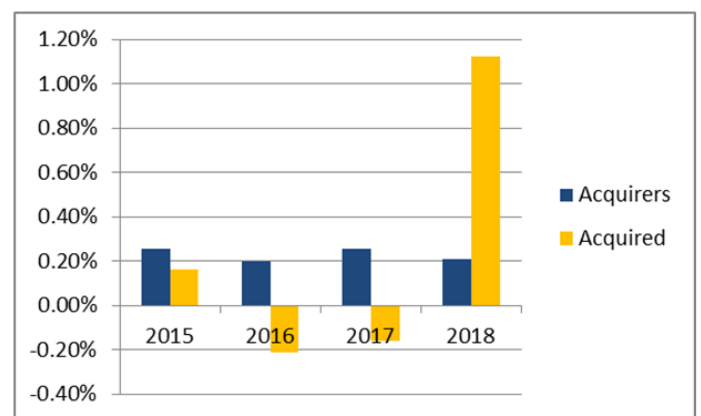
Source: SNL Financial, author`s computations
Notes: There are 380 observations for RoE and 385 for RoA
The different results for the acquired category in RoE and RoA in 2015 are explained by an outlier

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[63] Majed Abdel Majid Kabajeh et al., "The relationhip between the ROE, ROE, and ROI ratios within Jordanian Inruacne public companies market share prices", Internaltiona Journal of humanities and social science, 2012

When looking at the left picture, it is clear that acquirers are, on average, more profitable than acquired entities since they have higher ratios for all the observed periods. Indeed, while RoE for acquired entities is negative with exception of the banks involved in M&A in 2018, for acquirers it is always positive and around 3%. As far as RoA is concerned (Figure 17), the results are similar to the previous ones for 2015, 2016 and 2017, but in 2018 something changes. Acquired entities have, on average, greater RoA compared to the acquirers, and the difference between the two categories is around 90bps, which can be considered as significant. However, one must keep in mind that the number of transactions in 2018 is lower compared to the one of the previous years (17) and the result is mostly driven by one acquired entity with a high RoA (9.66%). Without this "outlier" in the sample, the average RoA for acquired entities would decrease to 0.05%.

Another important element used for the evaluation of a credit institution is the quality of its assets. Typically, in the balance sheet of a bank the greatest portion of assets is composed of loans, that represent the assets connected to the institution`s main source of profitability. Indeed, whenever a bank grants a loan to a customer, it is exposed to credit risk, namely the probability that the borrower defaults on the repayment of the loan itself. Even though banks have the expertise to analyse and understand the soundness of potential borrowers, it is highly probable that some of the loans granted will not be paid back. The probability of default on the borrower side depends on several elements; among these, there is the type of borrower. Indeed, if a bank lends money to another bank or to counterparty that has low probability of default, then the amount of lending should be considered to be safe. On the contrary, a loan granted to counterparty that is considered to be more risky has a higher probability of default. Therefore, the asset quality of a bank strictly depends on the quality of customers to which they are more exposed to.

When the customer is not able to meet its obligations, the loan becomes non-performing. Due to the fact that until recently there was no unique regulatory framework across Europe determining which loans (and exposures in general) are ought to consider non-performing, the European Central Bank published a guideline in this matter, referring to the European Banking Authority definition. According to the EBA, exposures are non-performing when:

- A material exposure that is more than 90 days past-due
- The debtor is assessed to be unlikely to pay its obligations in full without realisation of collateral, regardless the existence of any past-due amount or of the number of days past due[64]

Therefore, if there was a legal obligation to repay the credit institution and the customer did not meet the obligation for more than 90 days, the loan is classified as non-performing. Moreover, a loan can be classified as non-performing also with non-quantitative thresholds, but simply if the credit institution judges the customer to be unable to repay the amount borrowed[65].

Figure 18 shows the ratio between non-performing loans and total loans of banks, better known as NPL Ratio.

Figure 18 Non-performing Loans Ratio
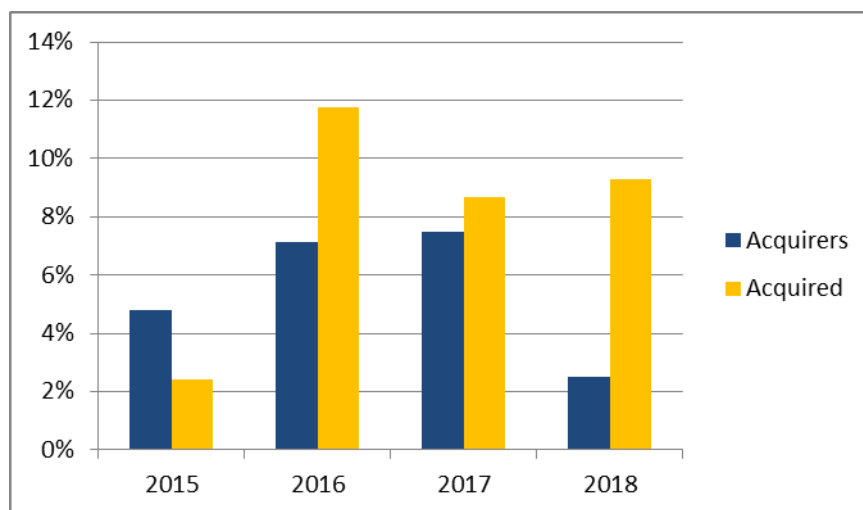
Source: SNL Financial, author`s computations
Notes: there are 185 observations for this variable

In this figure, the difference between acquirer and acquired entities in terms of asset quality is quite clear. With the exception of 2015, where acquired banks shows lower ratios on average[66], in all the remaining periods acquirers result to have a better asset quality than the others. Especially in 2016, there the average NPL Ratio for acquired banks is 11.75% and is

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[64] European Central Bank, "Guidance to banks on non-performing loans", March 2017
[65] Banks have both pre-defined automatic events as well as manual events in place to determine whether the customer is unlikely to pay (UTP)
[66] Missing data for the acquired entities

the highest in the whole sample. Moreover, in 2018 the difference between the two categories of banks is around 6.7% and is also the highest. By comparing this data with the official ECB statistics, other results emerge: Q4-2017 aggregate data for Less Significant Institutions indicate that the average NPL Ratio is equal to 3.83%[67]. By comparing this figure with the averages of our sample, it results that not only acquired entities, but also acquiring banks appear to have lower quality of assets for 2016 and 2017 (7.15% and 7.5% respectively). Finally, contrary to the previous figures of RoE and RoA, where the pattern indicated a convergence of indicators over time between acquirers and acquired, it is not the case for NPL Ratio.

The ability of credit institutions to operate in the system is not only determined by profitability; efficiency is an important factor that determines the capability of a bank to generate enough income by using its resources[68] in order to cover for expenses. This, in turn, distinguishes the banks that are sustainable in the medium-long term to the ones that are not. In a banking sector where income margins are squeezed due to high level of competition, credit institutions have to try to keep costs under control. There are different types of costs that banks have to deal with. First, there is the cost of funds, that is the cost associated with the repayment of a rate to the bank`s depositors. Since the greatest portion of the profits of banks is the difference between the interest rate they charge for loans and the interest that have to pay to depositors, banks try to keep cost of funds the lowest possible. Staff costs again represent a great portion of a bank`s expenses. Measures to cut costs in this area include the reduction of employees` benefits or reduction of staff (also as a consequence of automatization of operations), but there is the risk that this becomes counter-productive, and instead of improving efficiency they end up decreasing it. Another expense is reflected in the infrastructures, and more specifically branch costs. Branches, indeed, are very expensive in terms of investments. In the recent years, with the great increase of digitalisation and IT services, physical branches might not be the right solution for a credit institution that aims at improving efficiency. In order to grow and become more efficient, banks should deploy a lot of resources in digitalisation; even though this requires huge up-front investment, the

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[67] ECB website: https://www.bankingsupervision.europa.eu/banking/statistics/html/index.en.html

[68] Aguenaou. S, Lahrech. A, Bounakaya. S, "Analyzing banks` efficiency as a measurement of performance in the Moroccan context: Application of CAMEL framework", 2017

resulting customer services will improve cost-efficiency[69]. An additional solution to the problem of efficiency and cost-cutting measures is the usage of M&A. Banks that have limited possibilities in terms of organic growth might consider as a solution a merger or an acquisition, being the alternative in an adverse scenario the one of exiting the market[70].

Cost-to-income ratio is a variable that captures the relationship between costs and operating income of credit institutions and is shown in Figure 19.

Figure 19 Cost-to-Income Ratio
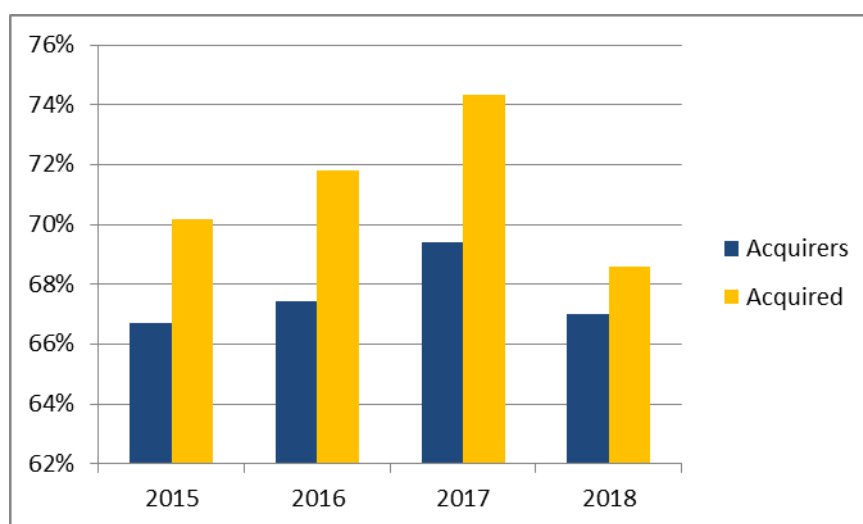
Source: SNL Financial, author`s computation
Notes: this is based on 361 observations

For all the four years of study, the cost-to-income ratio (CIR) observed is always lower for acquiring entities than the acquired ones, which means that usually the most efficient banks acquire the less efficient. More in detail, we see that in 2017 the target banks are the worst in the whole sample, since the average ratio reaches 74.3%; for the same year, acquirers instead have 69.4%. In the picture there is also another result that is worth mentioning. From 2015 until 2017, the average CIR is increasing for both acquirers and acquired entities, showing that the cost-cutting measures that banks should apply have not worked properly.

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[69]European Central Bank: "How can euro area banks reach sustainable profitability in the future?"
[70] European Central Bank, "Too much of a good thing? The need for consolidation in the European banking sector", Banking Supervision Speech, September 2017

There is another risk that is meaningful for the survival of a credit institution in the banking sector, namely solvency risk. Being solvent is a fundamental condition for a bank to survive in the market. A bank is solvent whenever it is sufficiently capitalized in order to absorb future asset shocks, with the available capital[71]. As previously anticipated, regulatory capital requirements have become more stringent for banks especially after the crisis and one of the main areas where regulation increased is in indicators related to solvency. Indeed, according to Basel III regulation, CET1%, a ratio composed by CET1 capital and Risk Weighted Assets, must always be greater than 4.5%. While Common Equity Tier 1 (CET1) is the capital that contains mostly retained earnings and common shares, Risk Weighted Assets are assets weighted on the basis of their risk.

The next figure displays the CET1 Ratios of the banks in the sample for the years of observation.

Figure 20 CET1% Ratio
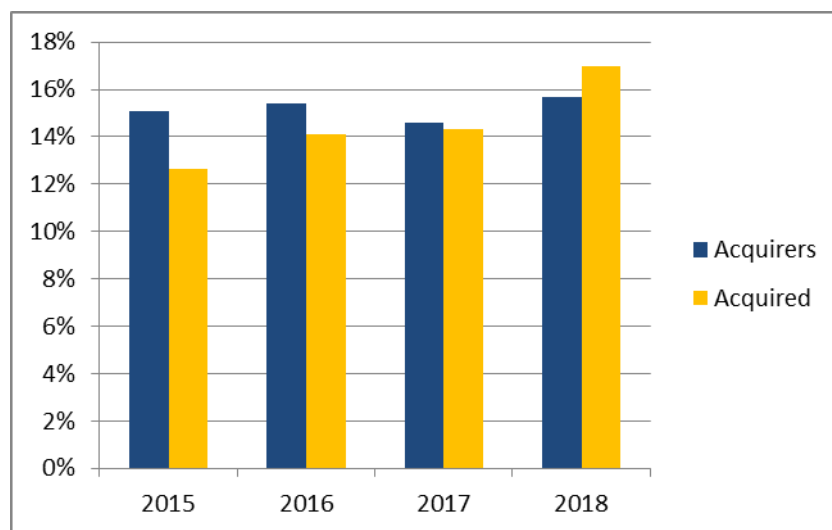
Source: SNL Financial, author`s computation
Notes: this is based on 294 observations

As it is possible to see in the picture, the ratio is typically higher for acquirer entities than acquired. Indeed, in the first three years of observation this is the case. The difference between the two parties involved in M&A is not big, however it must be noticed that with CET1% also a small number could make a difference, especially in times of crisis. The greatest disparity between acquirers and acquired can be observed in 2015, and is equal to

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[71] Pierret, D., "Systemic risk and the solvency-liquidity nexus of banks", University of Lausanne, 2015

243bps whereas in 2017 the two values are almost the same (14.5% and 14.3%). Finally, in 2018 we notice acquired entities having, on average, greater CET1% than acquired. The result is mainly driven by one acquired bank whose ratio is equal to 25.9%. In general, it must be said that there are no big fluctuations across the years and that the sample of banks can be considered solvent[72], with very few exceptions of some Italian cooperatives that report low levels of CET1%. When comparing the sample`s results with the ones published by the European Central Bank in Q4-2017 (14.6%) for Significant Institutions[73], the ratios of our sample of Less Significant Institutions is quite in line. Additionally, we might also conclude that the entities in the sample are better capitalized than the Significant Institutions.

In the next section, the sample of banks will be analysed on a country basis, in order to check whether there are some national specificities and peculiarities on the basis of the variables that have been already considered in an aggregated manner.

2.4 Analysis of profitability, asset quality and efficiency from a country perspective

Instead of aggregating all the countries in the sample and divide them across years, other interesting results may arise if data in sample is divided across counties and across years. Indeed, in this section, the profitability, asset quality and efficiency of the credit institutions is going to be examined on a country-basis perspective for some of the years of the analysis. More in detail, the RoE, NPL Ratio and CIR of Italy and Germany both of acquirers and acquired is going to be displayed and compared, for the banks that entered into a merger or acquisition in 2016 and 2017. Also, dividing the sample by country could also be a way to understand whether the drivers of M&A activities are the same or not. The aim of this deep-dive into Germany and Italy has, therefore, the purpose to analyse better the characteristics of the parties involved in M&A and to see if acquirers and acquired are the same in those countries and what are the discrepancies within the countries.

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[72] According to the Basel III Committee, the credit institutions are ought to have a CET1% greater than 4.5%, a mandatorty "capital conservation buffer" equal to 2.5% as well as "discretionary counter-cyclical buffer" up to 2.5%

[73] ECB website: https://www.bankingsupervision.europa.eu/banking/statistics/html/index.en.html

The main reason why those two countries and years have been selected is related to data availability. In fact, most of the M&A transactions are recorded in these two years for both countries (50 in Italy and 116 in Germany) and at the same time Germany and Italy are the countries with the lowest percentage of missing data in the sample.

First of all, we will analyse the profitability ratio RoE between the two countries, to better understand how the German and Italian banks that are involved into M&A transactions perform in terms of income after taxes compared to their equity.

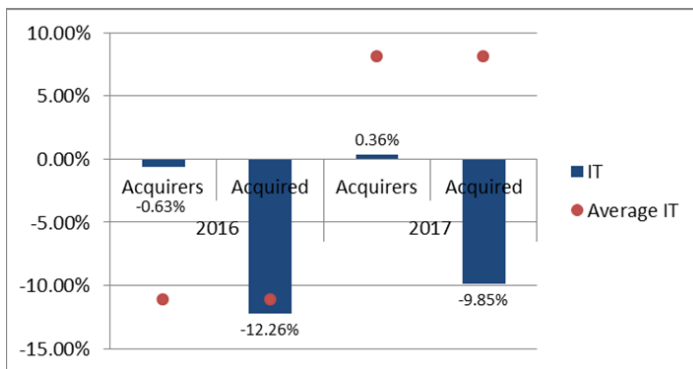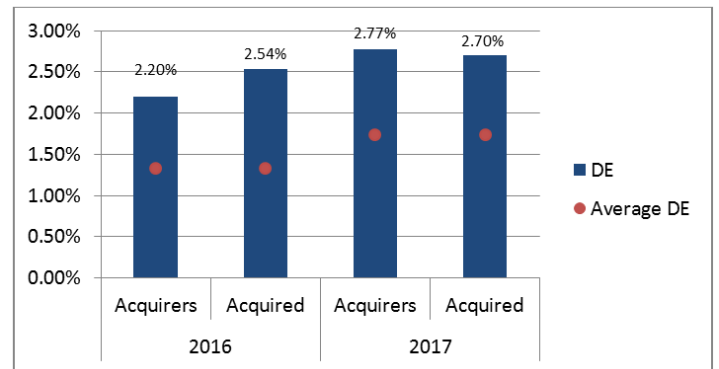**Figure 21** RoE of Italian banks

Figure 22 RoE of German Banks

Source: SNL Financial, ECB Supervisory banking statistics, author`s computations

When comparing Figure 21 and Figure 22 the first notable message is that the German banks in the sample have performed better in terms of profitability compared to the Italian banks. Indeed, for both the years of study, German credit institutions are able to maintain a positive ratio, which is not the case for Italy. Focusing more on the left picture, the difference of the ratios between the acquirers and acquired is striking, since for both 2016 and 2017 the acquired data show negative results. On the contrary, the figures for the acquirer entities improved from one year to the other, as from negative RoE it becomes low, but positive. Moreover, comparing the results of the sample to the ones provided by the ECB Statistics[74], it seems that the return on equity of acquired entities in 2016 is in line with the average of the country (-11.11%). However, 2017 experienced a jump in the ratio for the country, reaching

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[74] European Central Bank, "Supervisory banking statistics: fourth quarter 2016", April 2017 and European Central Bank, "Supervisory banking statistics: fourth quarter 2017", April 2018

positive RoE and equal to 8.13%, but the credit institutions in the sample did not manage to follow the trend, as RoE improved compared to the previous year but remained negative (-9.85%).

In Germany, instead, the situation is completely different. Not only the figures are positive for both acquirers and acquired, but they are also higher if compared to the average of the country for those years (1.33% and 1.74% in 2016 and 2017 respectively). Also, by again comparing the two groups of entities, there are no substantial differences in terms of profitability, which means that German acquired entities are not less profitable than the acquired.

It is also important to analyse the asset quality of the banks whenever we want to study the drivers of an M&A transaction. The next figure will show the NPL Ratio for Italian banks that entered into a merger or acquisition in 2016 and 2017.

Figure 23 NPL Ratio of Italian banks
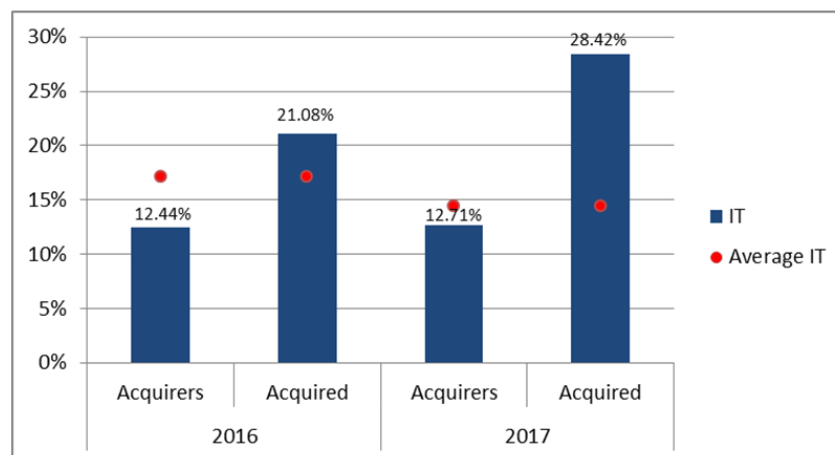
Source: SNL Financial, World Bank, author`s computations

From this picture, the first evidence that it is possible to extrapolate is that for both years, the NPL Ratio of acquirer entities is lower compared to acquired ones. Also, comparing the average of our sample to the average of the country for those years, other results can be stated. First of all, the acquirer banks have lower NPL Ratios compared to the ones of the country, on average. On the contrary, the banks that are acquired have much higher ratios

than the average of the country. Moreover, whereas the NPL Ratio decreased from one year to another for acquirers, the opposite happens for the other category into the analysis (NPL Ratio increased by 734bps from 2016 to 2017 for acquired). Also, comparing these results with the average NPL Ratio for Less Significant institutions (5.09% in 2016 and 3.83% in 2017[75]) it is of note that Italian banks have NPL Ratios much higher than the ones at the SSM Level.

The situation for German LSI is quite different:

Figure 24 NPL Ratio of German banks
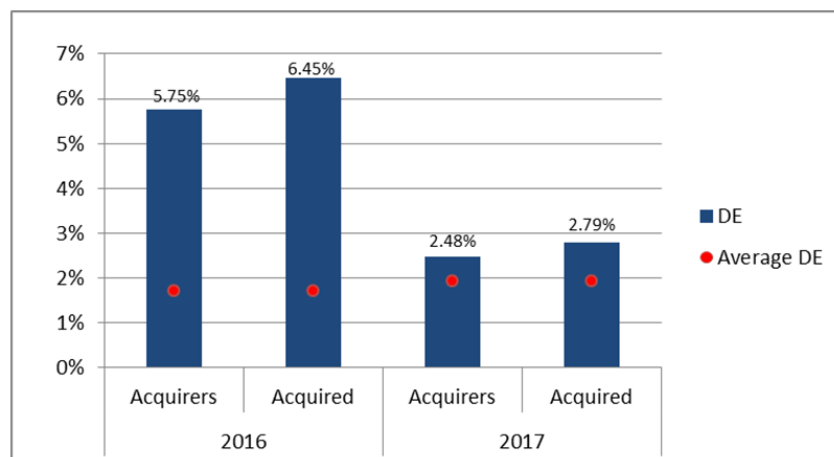
Source: SNL Financial, World Bank, author`s computations

Figure 24 shows that again on average acquirer entities have lower ratios compared to the others, which is true for both years. However, differently from the Italian case, the acquirer entities in the sample have higher ratios compared to the German average, and this is especially true for the year 2016. Also acquired entities have higher ratios than the average of the country, which is not surprising and at the same time is like the Italian case. However, when comparing these ratios with the averages in the SSM (6.17% in 2016 and 4.93% in 2017) it is possible to realize that German banks have on average a better quality of assets. Another element that is worth noticing and that is in contrast to the Italian data in the analysis is that the difference in terms of NPL Ratio between acquirers and acquired entities is

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[75] ECB website: https://www.bankingsupervision.europa.eu/banking/statistics/html/index.en.html
 And
https://www.bankingsupervision.europa.eu/ecb/pub/pdf/ssm.supervisorybankingstatistics_fourth_quarter_2016_201704.en.pdf

minimal. In fact, in 2016 there are only 71bps of lag and this is even lower in 2017, where the difference is 31bps. Since the acquirer and acquired entities are almost the same in terms of asset quality, the main driver of M&A must be different from the one in Italy, which is more related to the rescue.

The main conclusion from Figure 23 and Figure 24 is that one driver of M&A activity for Italy could be related to the attempt to save the most troubled banks in terms of asset quality and to englobe them in banks with better quality, in order to avoid the option of liquidation that could in principle have serious consequences in the economy. As, instead, German banks seem that they do not acquire banks to improve their asset quality, they might be doing it in order to increase Economies of Scale and possibly to become more profitable.

Finally, it is also useful to understand how effectively the banks in the sample are able to manage their costs and income, to better understand if another driver of M&A could be related to efficiency.

Figure 25 CIR of Italian banks
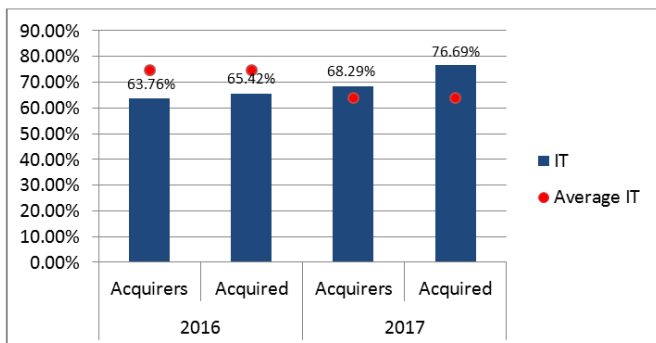
Figure 26 CIR of German banks
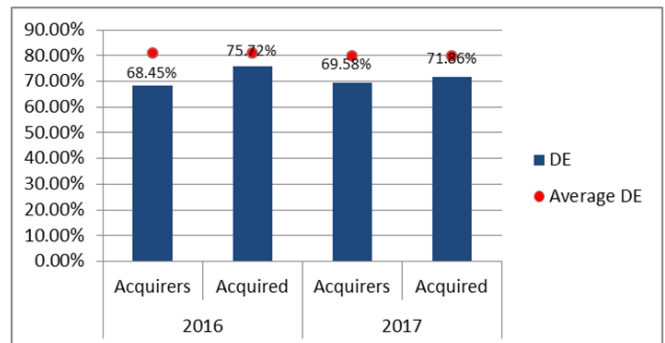
Source: SNL Financial, ECB Supervisory banking statistics, author`s computations

First, for the Italian banks in the sample, it appears that the difference in efficiency between acquirers and acquired is not significant. Notwithstanding the fact acquired entities have higher ratios for both 2016 and 2017, the ratios are still in line with the average of the country (74.65% and 63.9% for 2016 and 2017 respectively), and not distant compared to the acquirers. For German banks the situation is very similar, as again acquirers and acquirer have very similar CIR for 2016 and 2017. Moreover, it seems that the sample of banks involved in M&A has lower ratios compared to the one of the country, and this is true for

both acquirers and acquired. However, when comparing the two graphs and the results for efficiency of Italy and Germany, it appears that German banks perform worse than the Italian in terms of efficiency, since the ratios are higher. From the results of these pictures, therefore, we can conclude that German banks have an issue with efficiency, and therefore banks could be involved in M&A transactions in order to attempt to improve it.

In the next chapter the effects of mergers and acquisitions will be analysed, with a focus on efficiency. Indeed, the study of some banks prior and after an M&A transaction will help to understand whether this type of activity makes the banks more or less efficient.

Chapter 3: Empirical evidence of efficiency gains from M&A transactions

3.1 Literature Review

Several studies have been carried out regarding the relationship between M&A and efficiency of credit institutions over the years and in different parts of the world. However, the conclusions of the studies are often contradictory, as there is no certainty regarding the effect of efficiency after mergers and acquisitions.

First of all, two different approaches could be used when studying this topic: the first involves the analysis of the market values of a company before and after the transaction has been announced to the public[76]. The second stream involves accounting variables for efficiency and comparisons between banks that are involved in M&A in contrast to the ones that are not. This Chapter will follow the latter approach.

In the existing literature there are distinctions of papers that study the efficiency effects under a profit point of view and others that focus on costs efficiency instead. Moreover, while there are studies that find no evidence of improvement in efficiency, there are others that reach exactly the opposite conclusion. A paper that focuses on M&A activities for several banks in Greece, for instance, did not result in significant improvement in efficiency post-merger[77]. On the other side, a paper of M&A in the USA between the 80s and the 90s gets to the conclusions that there are significant efficiency gains arising from mergers and acquisitions, notwithstanding the fact that some credit institutions in the sample were less efficient than their peers prior to the transaction[78].

Several researches have compared some profitability figures pre- and post- M&A of banks involved in such transactions compared to a sample of credit institutions that were not merging, but again there is no consensus on the answer. Most of the times, these types of

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[76] Focarelli,D., Panetta F., Salleo C. "Why do banks merge?", 2002

[77] Halkos, G., Tzeremes N., "Measuring the effect of virtual mergers on banks' efficiency levels: A non-parametric analysis", 2013

[78] Akhavein, J. D., Berger A., Humphrey D., "The effects of megamergers on efficiency and prices: evidence from a bank profit function", 1997

studies are not able to determine whether the change in efficiency of a single credit institution is driven by changes in profit efficiency or by changes in market power[79].

The limitations regarding profitability indicators are also connected to the fact that they are considered short-term measures to calculate performances of credit institutions, and therefore lack comparability over time[80].

In order to attempt to overcome the limitations that are connected to the profitability ratios approach, there are papers that measure the efficiency of banks pre- and post- merger through the use of non-parametric approaches. The main advantage of these types of models is that it is possible to combine several production inputs and outputs and still provide for a single final score that measures the efficiency of a single bank from 0 to 1.

One application of the model described, referred to as Data Envelopment Analysis (DEA), has been carried out to study the effect of efficiency on a sample of Italian banks hit by the 2008 financial crisis[81]. Moreover, in order to allow comparability over time, a differences-in-differences regression is applied.

3.2 The Models

In the following section a detailed explanation on the DEA analysis and diff-in-diff panel regression will be described in order to better understand the choice of the models for the study of the impact on efficiency for banks involved in an M&A transaction.

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[79] Akhavein, J. D., Berger A., Humphrey D., "The effects of megamergers on efficiency and prices: evidence from a bank profit function", 1997

[80] Oberholzer, M. G. van derWesthuizen, "An empirical study on measuring efficiency and profitability of bank regions", 2004

[81] Barra, C., Destefanis S., Lubrano Lavadera G., "Risk and regulation: A difference-in-differences analysis for Italian local banks" 2016

3.2.1 Data Envelopment Analysis

Data Envelopment Analysis is a linear programming procedure for a frontier analysis of inputs and outputs commonly used to evaluate efficiency for a set of variables[82]. This model allows having multiple inputs and outputs to be analysed at the same time without assumptions regarding distribution of data.

In the DEA, individuals (in our case, banks) employ a set of inputs in order to produce a certain level of outputs. A bank might be more efficient whether is able to produce more output given the same amount of inputs, or if it uses lower amounts of input to get a certain volume of output. Furthermore, the model compares each producer with the best ones in order to obtain a relative efficiency score. In few words, through the DEA, we will try to assess which banks are the most efficient compared to other banks and compute an efficiency score based on this relation.

For instance, we consider three banks (A, B and C) that have one input (tellers) and two outputs (checks and loans); given an equal amount of input, the entities will produce different outputs shown in Figure 27.

Figure 27 Efficiency Frontier
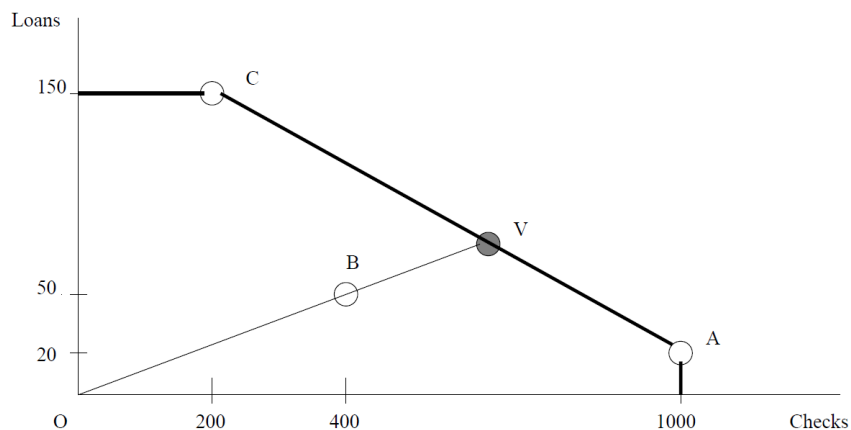
Source: Data Envelopment Analysis

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[82]Data Envelopment Analysis
http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.366.7016&rep=rep1&type=pdf

The bold black line is referred to as efficiency frontier, representing the maximum combination of outputs for a given set of inputs. This concept is extremely important, as efficiency is measured as relative distance to the frontier. In this example, while banks A and C are lying on the frontier and are therefore considered to be efficient, bank B is not.

Finally, the DEA model assigns banks with a score between 0 and 1, where the latter being the most efficient bank in the sample ("relative efficiency"). Therefore, the higher is the score, the higher the efficiency is. In this case, A and C will have a score of 1, while bank B a lower amount, representing its distance from the frontier. The example just shown is a one-input, two-output model, and therefore easy to represent in two dimensions. Even though models involving more inputs and outputs are more complex to show, the concept behind the idea of efficiency is the same.

Indeed, one of the advantages of DEA model is that there is no limit to the number of inputs and outputs chosen, and producers can be directly comparable across their peers. However, as all the existing models it has also limitations. First of all, as DEA is an extreme point technique, is it very sensitive to outliers. Secondly, it must be noted that the analysis is aimed at evaluating efficiency of a sample, not of the entire universe, and the entities that have the highest scores are the most efficient with respect to their peers, but not in absolute terms.

For our analysis of efficiency, the purpose is to compare a set of banks that are involved in an M&A transaction with the ones that instead do not merge for the years of the analysis. Therefore, the sample of entities has been chosen is composed of several less significant institutions in the countries where M&As have been observed. The DEA model is run on STATA.

3.2.2 Difference-in-differences

The second model used in order to attempt to measure whether there are any efficiency gains from entering into a merger or acquisition is represented by the difference-in-differences (diff-in-diff or DiD) model.

The diff-in-diff is a statistical technique that is developed across more than one reference period for entities that are divided into two different groups, namely the treatment and the

control group. The DiD is typically used to estimate a causal effect for a specific event that involves the treatment group by comparing changes over time across the two groups. As it is the case when testing new drugs that some patients are under treatment while others are only in "control", and the drug is considered to be effective if the patients in the treatment group show improvement in their status, so if banks in the sample that were involved into M&As display greater efficiency compared to the others (control group), then it means that mergers and acquisitions convey higher efficiency.

More in detail, the DiD requires data measured from both the treatment and control group at least one period prior to the event (the M&A) and one period after it. Moreover, the model has several assumptions. Apart from the typical assumptions of the OLS models[83], the DiD requires an additional one: in absence of treatment, the unobserved differences across the treatment and the control group are likely to remain constant over time[84]. This means that the trend in the average values of the variable at study for the two groups should be the same prior to the event. This assumption is called "Parallel trend", which is visible once plotting the above-mentioned averages. Therefore, controlling for other time-variant characteristics, any deviation from the parallel trend after the event must be attributed to the effects of the event itself, as time-invariant variables are wiped out by differencing them out over multiple reported periods. This can be understood intuitively by considering that time invariant characteristics affect the difference in the level of the average values for the two groups for each period, but cannot affect possible changes in these differences over time, which is what we are ultimately interested in as we are considering the existence of gains or losses caused by M&A transactions. In this analysis, if the trend of efficiency of both the treatment and control group is the same before M&As while changes after the transaction, then this change could be attributable only to the merger or acquisition.

The dependent variable in the DiD of this dissertation is represented by the output of the DEA model, that is the efficiency score of the entities in the sample. The averages of these scores will be analysed prior and after a mergers, in order to study possible changes in trends between merging and non-merging banks.

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[83] Outliers identification, iid testing, heteroscedasticity, multicollinearity and linearity
[84] Differences-in-differences estimation
https://www.mailman.columbia.edu/research/population-health-methods/difference-difference-estimation

3.3 The application of the models: data, methodology and results

The credit institutions examined in the following analysis are all Less Significant Institutions that entered into a merger or acquisition between 2014 and 2015. Moreover, we have considered only the cases where it is clear which is the acquirer and the acquired entity and all the entities for which data was incomplete have been deleted.

Finally, we ended up with 42 acquiring banks that belong to the group referred to as *treatment* for the regression (at least the same number of acquired entities). In this dataset, the majority of institutions belong to the sector of cooperative banks (37), then savings (3) and only two are others; with the exception of one bank from Slovenia, all the other banks are situated in Austria, Germany and Italy.

Bank level variables have been extracted from SNL Financial between the years 2012 and 2017. The reason for this choice is related to the need to have financial information of credit institutions for two years prior and after the M&A transaction, in order to be able to analyse efficiency in a longer time frame. For the purpose of the DiD, another group of entities has been created, referred to as *control* group. The control group is a sample of credit institutions that did not enter into any merger or acquisition transactions for the years of study. The main rationale behind the choice of the control group entities is the similarity to the banks that are in the treatment group. More in detail, from a larger sample of banks that existed between 2012 and 2017, we selected the control entities by keeping similar proportions of banks existing in the treatment group; for instance, in the treatment group 28 entities are located in Germany, while in the control there are 23. Another factor that has been considered is the size of banks: for this purpose, the variable of Total Assets has been selected.

For the Data Envelopment Analysis, efficiency has been measured on a bank-level basis by using Stata, selecting an input-oriented model with constant return to scale. The final score is calculated on the basis of the following variables:

- Input Variable: staff costs
- Output Variables: Net Fee and Commission Income (NFCI), customer loans

The reason why staff costs have been selected as an input for the DEA is related to the importance of this variable in the Profit & Loss statement of every credit institution, as a proxy for how efficiently a bank is managing its personnel in order to run its core tasks. Indeed, for a given level of output produced, higher staff costs imply lower efficiency. On the other side, NFCI is the profit component for income related to fees, whereas customer loans are considered proxies for interest income. That is because a credit institution is more efficient if, by employing a certain amount of input, it is able to produce higher NFCI and to grant a higher volume of loans (thus reaching more customers and possibly producing more interest income).

Summary statistics are presented in the following table.

Table 5 Summary statistics Data Envelopment Analysis

	Treatment group	Control group
Number of Banks	42	40
% of banks by Country	AT: 11.9% DE: 66.6% IT: 19%	AT: 22.5% DE: 57.5% IT: 20%
% of banks by Sector	Cooperative: 88.2% Savings: 7.1% Other: 4.7%	Cooperative: 67.5% Savings: 22.5% Other: 10%
Average Total Assets	€ 1,797,308.00	€ 1,859,377.10

Source: SNL Financial, author`s computation

The efficiency scores obtained from the DEA models will serve as the dependent variable for the Differences-in-Differences panel regression, as the purpose is to understand whether M&A transactions result in efficiency gains for the banks involved.

The model compares the average efficiency for the two groups of banks over time, that is the average DEA scores for both treatment and control group two years before and two years after the transaction. As previously explained, the rationale is that the non-observable characteristics are likely to be time invariant and therefore will not affect the difference between the mean efficiency scores of the two groups, whereas time variant differences could have an impact on it over time. Changes in efficiency of banks in the treatment group are captured by the variable called DiD in the regression, that is built as a product of year of

merger dummy (=1 for the years after the merger) and sample dummy (=1 if treatment group). According to this methodology, the variable DiD is equal to 1 if the bank belongs to the treatment group in a period after the acquisition.

Before running the DiD, we should verify that the assumption of the model are met. In section 3.2.2 we have already introduced the concept of parallel trend. In our analysis, parallel trend implies that both the treatment and the control group should have a similar trend in terms of efficiency score prior to the year of merger or acquisition, namely in the years between 2012 and 2013, as the sample includes M&A transactions between 2014 and 2015. Figure 28 shows the median of efficiency scores for the treatment and control groups.

Figure 28 Median Efficiency scores
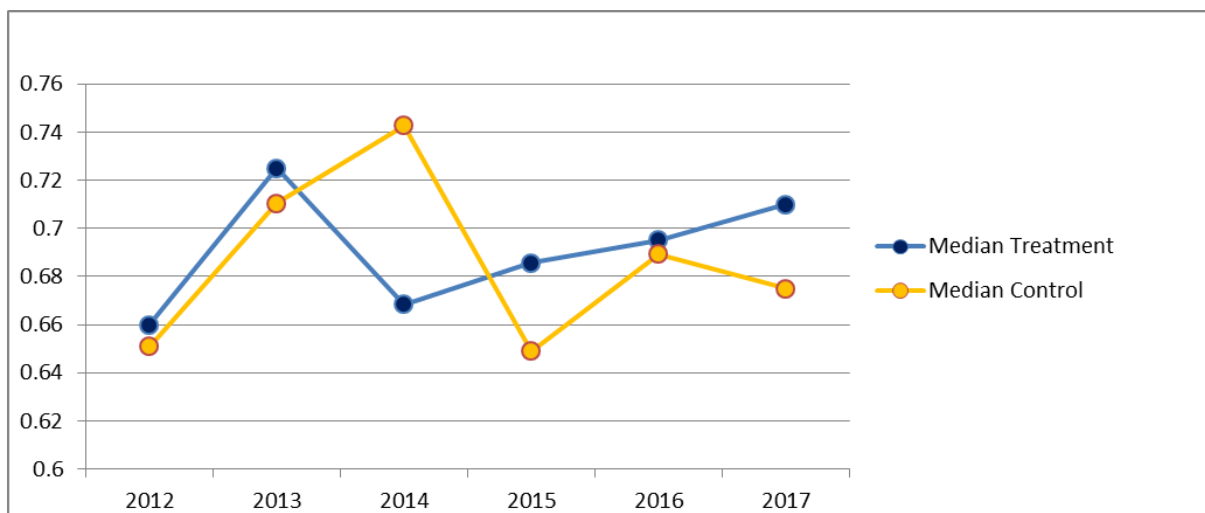
Source: SNL Financial, author`s computations

As it is possible to see, the median efficiency scores for both the credit institutions in the sample that were involved in mergers or acquisitions and the ones that were not have very similar trends in the years 2012 and 2013, with the treatment group having on average higher efficiency. However, in 2014 the situation changes since the treatment banks experience a decrease in efficiency, whereas the banks in the control group present an increasing trend. Finally, from 2015 on, credit institutions involved in M&A increase their average efficiency scores and continue to have them until the latest year under analysis. On the contrary, the control group does not have a clear path. This could already imply that there M&A

transactions lead to higher efficiency levels for the banks involved; however, in order to assess causality, the Differences-in-Differences model is run.

The results of the model are summarized in the following table:

Table 6 Difference-in-Differences model results

	Coefficient
Interaction Term	0.0304* (2.35)
Dummy Germany	-0.1526*** (-12.17)
Dummy Cooperative	-0.0374*** (-2.23)
Per Capita GDP (in Thous.)	-0.0024*** (-4.62)
Total Assets (in Mln)	0.0073** (3.05)
Fixed Assets	0.4709 (0.61)
Total Capital Ratio	-0.0057*** (-4.7)
Constant	0.9643*** (25.23)

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Source: SNL, Financial, Eurostat, STATA, author`s computations

The most important information in the table above is the interaction term (DiD), which captures the impact of being a participant into a merger or acquisition in the years after the transaction. The coefficient is significant at 5% level and positive, which means that these banks are facing efficiency gains. Efficiency gains are estimated to be, on average, around 3% of the DEA score.

Apart from this, more variables have been added to the model in order to control for other characteristics that might affect banks` performances over time. Dummy Germany is a dummy variable created for the credit institutions that are situated in Germany, not taking into account the groups to which they belong. The coefficient suggests that the German banks in the sample have, on average, lower efficiency level than the other banks. This is in line with the findings on efficiency for Germany in Chapter 2, despite the fact that efficiency was

calculated using cost-to-income ratio rather than with the DEA efficiency scores and confirms that DEA could be potentially a valid model for efficiency estimation. Even though the coefficient is significant, the magnitude is very small. Similarly, the Dummy Cooperative is a dummy variable created only for the banks that are in the cooperative sector, again not considering whether they belong to the treatment or control group. In the sample, those credit institutions have lower DEA scores compared to other banks. An interesting fact is extrapolated from the coefficient of the variable Total Assets; it can be interpreted as the higher the bank in terms of total assets, the higher are the gains in efficiency from a merger or acquisition, on average. On the other side, the coefficient for Total Capital Ratio states that the banks in the sample with the highest capital experience efficiency losses from M&A. Again, the magnitude is small (0.5%) though significant. Finally, the coefficient of the variable Per Capita GDP suggests that the regions with the highest GPD per capita (where regions are established on the basis of NUTS 3) are the ones that do not result in gains in efficiency, as the negative coefficient suggests.

All these results suggest that entering into a merger or acquisition results to be beneficial for credit institutions, on average. While total assets have a positive influence in the results, the GDP per capita as well as total capital ratio impact negatively.

As the sample of the banks include mostly credit institutions in Italy and Germany, it would be interesting to study if the impact of M&A transactions is different across these two countries. Therefore, the new interaction term DiD is the result of three dummy variables: (=1 for the years after the merger), sample dummy (=1 if treatment group) as in the previous regression; the third dummy (=1 if the bank is in Germany) will add another condition so that only the banks that are located in Germany are considered. So, the new DiD will be equal to one only if a bank belongs to the treatment group after the merger and if it is German. The results are summarised in Table 7.

Table 7 Difference-in-Differences model Germany results

	Coefficient
Interaction Term	-0.0589***
	(-3.66)
Dummy Cooperative	0.0212
	(1.17)
Per Capita GDP (in Thous.)	-0.0034***
	(-5.87)
Total Assets (in Mln)	0.0094***
	(3.48)
Fixed Assets	1.3282
	(1.55)
Total Capital Ratio	-0.0071***
	(-5.27)
Constant	0.8874***
	(21.17)

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Source: SNL, Financial, Eurostat, STATA, author`s computations

The coefficient of the interaction term is significant at 1% and is negative. The interpretation of the coefficient is that the German credit institutions that enter into a merger experience, on average, a decrease in efficiency of around 5% in the two years after the merger itself. This result is the opposite of the previous one, as in this case being involved in a merger or acquisition does not lead to any efficiency gains. However, concerning the other variables in the model, the results seem to be in line. Indeed, the coefficient for total assets suggests that the higher the credit institution in terms of size, the higher the gains in efficiency. Instead, total capital ratio has a negative influence on efficiency, as the negative coefficient suggests (-7%). Finally, GDP per capita is negative, which means that the regions with the highest GDP experience a decrease in efficiency. Finally, compared to Table 6, we omitted the variable Dummy Germany, as it was extremely correlated with the interaction term DiD.

The last regression that has been treated in this dissertation concerns the study of efficiency gains of credit institutions located in Italy. Here, the interaction term DiD is analogous to the one created for Germany (the only difference being to the country dummy).

Table 8 Difference-in-Differences model Italy results

	Coefficient
Interaction Term	0.0909**
	(2.99)
Dummy Cooperative	0.0089
	(0.49)
Per Capita GDP (in Thous.)	-0.0030***
	(-5.14)
Total Assets (in Mln)	0.0083**
	(3.02)
Fixed Assets	1.7672*
	(2.06)
Total Capital Ratio	-0.0071***
	(-5.20)
Constant	0.8617***
	(20.68)

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Source: SNL, Financial, Eurostat, STATA, author`s computations

The results show a positive and significant interaction term, which means that on average the credit institutions that are involved in M&A transaction in Italy result in efficiency gains in the two years after a merger. The increase in efficiency is around 9% in terms of DEA score. The control variables are the same of the previous models and also the results are very similar. The GDP per capita and total capital ratio have both negative and significant coefficients, meaning that these two variables have a negative impact on the efficiency of the banks. On the other hand, the coefficient for total assets is positive, which is again a sign that the biggest banks have higher gains in efficiency from merging.

From the results of the last two difference-in-differences it appears that while for the German banks at study it might not be convenient to enter in an M&A transaction as there are efficiency losses, for the Italian banks the situation is the opposite, as on average credit institutions are able to gain in terms of efficiency in the first two years from the merger. This is an interesting result, if connected to the current issue of the BCC reform and the attempt to restore the cooperative banks in Italy. According to this model, it would be convenient of the Italian cooperatives to merge, as they would result in being more efficient within two years from the transaction. Given these two opposite conclusions, it must be noted that the results of the general model that did not distinguish the location of credit institutions determines that

there are positive effects from merging, which means that the Italian trend in efficiency prevailed.

However, the results could have been driven by the sample chosen, as the outcome of the models is data-driven. The limitations of the model might concern the small sample of data as well as the number of years of study, both due to data unavailability. Further research might investigate the topic more extensively, in order to understand whether the same results could hold with a different sample of banks and assumptions.

Conclusions

The banking sector has undergone major changes over the latest decades. Compared to other economies, Europe results to be the most bank-based, as the supply of credit is the greatest, the number of commercial banks compared to the population is the highest and the financial structure is the least market-oriented. Within this framework, the level of banking competition is extremely high and several credit institutions are not able to earn their cost of capital; this could be referred to as overbanking. However, after the 2008 financial crisis, the introduction of new regulations (Basel III, CRDIV, BRRD) and the need to modernize banks` systems due to challenges in terms of digitalisation and business model could explain why some banks might struggle to survive. Indeed, since 2008 the overall number of banks has decreased by 25% in Europe, which is a clear sign of a consolidation trend, especially through mergers and acquisition transactions.

The descriptive analysis on profitability, solvency, asset quality and efficiency of a sample of Less Significant Institutions aims at studying the characteristics of the banks that are involved in M&A, to understand the background and the possible drivers of such transactions. On average, acquirer entities tend to be more profitable, more efficient and better capitalized than acquired banks. On a country basis perspective, German credit institutions result to be more profitable than the Italians as well as having far better asset quality (NPL Ratio), with small differences between acquirers and acquired entities. This might suggest that while the driver of M&A transaction in Italy could be linked to the rescue of troubled banks, the one for Germany is different. However, comparing the level of efficiency between the two countries, it appears that German banks perform worse than the Italians; this could also mean that M&A transactions in this country are performed in order to attempt to improve efficiency.

Finally, in order to understand whether M&A transactions lead eventually to efficiency gains for the banks involved, a difference-in-differences regression of a sample of credit institutions is presented. This model follows the logic of an existing literature of research papers aimed at studying the value of M&A in the banking sector (Barra 2016). The results of the regression suggest that, overall, credit institutions experience gains in efficiency within two years from the transaction itself. However, when dividing the sample on a country perspective, different conclusions can be reached. Indeed, for Italian credit institutions, being involved in and M&A produces positive and significant results in terms of efficiency, while in Germany the same transaction leads to efficiency losses.

References

Abrams, H., "*Mergers and Acquisitions: how do you increase the value of two companies joined together?*", 2013

Aguenaou. S, Lahrech. A, Bounakaya. S, "*Analyzing banks` efficiency as a measurement of performance in the Moroccan context: Application of CAMEL framework*", 2017

Akhavein, J. D., Berger A., Humphrey D., "*The effects of megamergers on efficiency and prices: evidence from a bank profit function*", 1997

Associazione nazionale enciclopedia della banca e della borsa, "*Trasformazione delle banche pubbliche*", http://www.bankpedia.org/index.php/it/129-italian/t/22830-trasformazione-delle-banche-pubbliche

Barone, N.,"*Banche, emendamento Lega smonta la riforma Renzi delle BCC*", Il sole 24 ore, Novembre 2018, https://www.ilsole24ore.com/art/notizie/2018-11-14/nuovo-vertice-palazzo-chigi-conte-e-vicepremier-bcc-112839.shtml?uuid=AEM3mggG&refresh_ce=1

Barra, C., Destefanis S., Lubrano Lavadera G., "*Risk and regulation: A difference-in-differences analysis for Italian local banks*" 2016

Berger A., Klapper L., Turk-Ariss R., "*Bank competition and Financial Stability*" Policy Research Working Paper, 2008

Bruno, R., "*Financial markets Recap*", Structured finance 2017-2018 slides

Bülbül D., Schmidt R.H., Schuwer U. "*Savings Banks and Cooperative Banks in Europe*", Goethe University, 2013

Carmassi, J., Dobkowitz S., Evrard J., Parisi L., Silva, A., Wedow M., "*Completing the Banking Union with a European Deposit Insurance Scheme: who is afraid of cross-subsidisation?*", Occasional Paper Series, 2018

Columbia University, "*Difference- in- difference Estimation*",

https://www.mailman.columbia.edu/research/population-health-methods/difference-difference-estimation

Data Envelopment Analysis,
http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.366.7016&rep=rep1&type=pdf

European Central Bank, "*Annual Report on supervisory activities*", 2017

European Central Bank, Regulation ECB/2013/33 "*concerning the balance sheet of the monetary financial institutions sector (recast)*", 2013

European Central Bank, Regulation No 468/2014, "*establishing the framework for cooperation within the SSM between the ECB and national competent authorities and with national designated authorities (SSM Framework Regulation)*", 2014

European Central Bank, "*Financial Integration in Europe*", 2016

European Central Bank, "*Guidance to banks on non-performing loans*", March 2017

European Central Bank, "*Guide to Banking Supervision*", November 2014

European Central Bank: "*How can euro area banks reach sustainable profitability in the future?*", November 2018

European Central Bank website, "*List of Financial Institutions*", https://www.ecb.europa.eu/stats/financial_corporations/list_of_financial_institutions/html/index.en.html

European Central Bank, List of Supervised Entities, cut-off date 1st January 2018

European Central Bank, "*Mergers and Acquisitions involving the EU banking industry: facts and implications*", 2000

European Central Bank, Regulation ECB/575/2013 "*on prudential requirements for credit institutions and investment firms amending regulation*", 2013

European Central Bank, "*Publication of supervisory data: Supervisory Banking Statistics*" April 2017, https://www.bankingsupervision.europa.eu/ecb/pub/pdf/ssm.supervisorybankingstatistics_fourth_quarter_2016_201704.en.pdf

European Central Bank, "*Report on financial structures, October 2017*",2017

European Central Bank, "*SSM Supervisory Manual: functioning of the SSM and Supervisory Approach*", March 2018

European Central Bank, "*Supervisory Banking Statistics*", https://www.bankingsupervision.europa.eu/banking/statistics/html/index.en.html

European Central Bank, "*Supervisory banking statistics: fourth quarter 2017*", April 2018

European Central Bank, "*The process of European economic integration*", Speech by Jean-Claude Trichet, September 2007

European Central Bank, "*Too much of a good thing? The need for consolidation in the European banking sector*", Banking Supervision Speech, September 2017

European Central Bank, "*What makes a bank significant?*", https://www.bankingsupervision.europa.eu/banking/list/criteria/html/index.en.html

European Commission, "*A Roadmap towards a Banking Union*", 2012

European Commission, "*Restoring financial stability in the Eurozone*", press release March 2015

European Parliament, "*25 Years of the EU Single Market*", http://www.europarl.europa.eu/resources/library/media/20180116RES91806/20180116RES91806.pdf

Eurostat, "*Archive: Urban-rural typology*", https://ec.europa.eu/eurostat/statistics-explained/index.php/Archive:Urban-rural_typology

Eurostat, "*Nomenclature of territorial units for statistics - background*", https://ec.europa.eu/eurostat/web/nuts/background

Farne, M., Vouldis A., "*Business models of the banks in the Euro Area*" ECB Working paper series 2017

Figueira C, Nellis J., "*Bank M&A activity in the EU: much ado about nothing?*", 2007

Focarelli D., Panetta F., Salleo C. "*Why do banks Merge*", Journal of Money Credit and Banking, 2002

Gambacorta L., Yang J.   "*Financial Structure and Growth*", Bank of International Settlement, 2014

Halkos, G., Tzeremes N., "*Measuring the effect of virtual mergers on banks' efficiency levels: A non-parametric analysis*", 2013

Investopedia Dictionary, "*What is the difference between Mergers and Acquisitions?*", https://www.investopedia.com/ask/answers/021815/what-difference-between-merger-and-acquisition.asp

Italian Banking Association Annual Meeting, Speech by the Governor of Italy Ignazio Visco, 10th July 2018

LEI_LOOKUP, http://www.lei-lookup.com/#!search

Majed Abdel Majid Kabajeh et al., "*The relationship between the ROE, ROE, and ROI ratios within Jordanian Insurance public companies market share prices*", International Journal of humanities and social science, 2012

Mishkin, F.S. "*The Economics of Money, Banking & Financial Markets*", 2013

Oberholzer, M. G. van derWesthuizen, "*An empirical study on measuring efficiency and profitability of bank regions*", 2004

Opinion of the European Central Bank, "*on the amendments to the reform of popolari banks and cooperative banks*", September 2018

Opinion of the European Central Bank, "*on the reform of cooperative banks, a guarantee scheme for securitisations of non-performing loans and the lending capacity of alternative investment fund*s", 24th March 2016

Orrick, Herrington & Sutcliffe LLP, "*Reform of Italian Cooperative Credit Banks*", February 2017, https://www.lexology.com/library/detail.aspx?g=33f91f17-d272-471a-b1ef-e56d7d14a1d1

Oxford Dictionary, "*Overbanking*", https://en.oxforddictionaries.com/definition/overbanking

Pagano, M., Langfield, S., "*Is Europe Overbanked?*", European Systemic Risk Board, Reports of the Advisory Scientific Committee 2014

Pierret, D., "*Systemic risk and the solvency-liquidity nexus of banks*", University of Lausanne, 2015

SNL Financial, https://www.spglobal.com/marketintelligence/en/campaigns/snl-financial

Straniero, M., "*Riforma BCC, attenzione a non cancellare un modello*", Vita, Febbraio 2016, http://www.vita.it/it/article/2016/02/15/riforma-bcc-attenzione-a-non-cancellare-un-modello/138305/

World Bank Database, Number of commercial banks per 100,000 Population

Summary

Chapter 1 The banking sector over the years: overbanking and consolidation process

The financial system is a complex organization that aims at simplifying the transfer of funds between participants. Its function is considered to be critical, as it produces an efficient allocation of capital; indeed, by allowing funds to move from the ones without productive investment opportunities to those who instead have them, the transfer of capital is optimal. More in detail, the financial system could channel funds from households, firms and governments that are in excess of funds to the same parties that instead have a shortage of it. There are other functions the financial system performs that are also important, such as the functioning of the payment systems, the reduction of asymmetric information between the parties involved in a transaction and the possibility to match the intertemporal preferences of investors. Moreover, it is possible to distinguish two different areas in which the financial system operates: direct finance and indirect finance. The former works through financial markets, where savers lend money to borrowers directly, whereas the latter works through financial institutions that facilitate the exchange between the parties. In financial markets, (direct finance), it is essential that market players have the same preferences for the financial instruments` characteristics, such as maturity, currency and amount. If this is not the case, the parties would choose not to act. Instead, in the area of indirect finance financial institutions play an important role as one of their functions is to match the preferences of borrowers and savers. They engage in diversification of credit, transformation of currencies and of maturity of instruments. The most common type is represented by financial intermediaries, whose main purpose is to facilitate transactions in the financial system by reducing the cost of borrowing and lending for the market participants.

Transaction costs, indeed, are not negligible, and are particularly high for small players (both savers and borrowers). This means that in case financial intermediaries did not exist, most of the transaction in the market would not take place at all. The first solution proposed by financial intermediaries to the problem of high transaction costs consists in bundling several funds coming from a large number of investors together; in this way, as the number of transaction increases the cost of transaction per single investment is reduced. We refer to this phenomenon as economies of scale. The second element that makes financial intermediaries fundamental for the functioning of the system is characterized by the development of

expertise. Higher level of expertise is, then, translated into lower transaction costs, which allows financial intermediaries to offer cheap services to their customers. A third element that should be considered when dealing with the advantage of intermediaries is the risk sharing. Indeed they help reducing the risk of the investors` exposures by diversification. Portfolio diversification is a fundamental principle for managing risks. A portfolio that is well diversified has a lower volatility compared to a non-diversified portfolio, as the returns of some asset categories are not moving together (low or null correlation). Therefore, if a financial institution is able to invest in different categories of assets in more than one market, the overall risk of the customer is lower. The importance of financial intermediaries can be also partially explained by the reduction in asymmetric information between the various market participants as a consequence of the institutions` activities. Adverse selection is defined as the problem created when potential borrowers who are the most likely to produce an undesirable (adverse) outcome are the ones who most actively seek out a loan and are thus more likely to be selected. The presence of financial intermediaries alleviates the problem of adverse selection, as they act as expert middlemen that possess higher amount of information regarding the quality of credits compared to the single savers and investors. Moral hazard, instead, is defined as the risk that the borrower might engage in activities that are undesirable from the lender`s point of view, because they make it less likely that the loan will be paid back. For this purpose, financial intermediaries are able to reduce the probability of hazard by engaging in monitoring activities and not increasing the costs for market participants.

Banks, or credit institutions, are considered the most important intermediaries in the market, due to the fact that they carry out several tasks that help the well-functioning of the economy. Indeed, they support the payment system, which entails the exchange of goods and services (funds) for money or financial assets. Moreover, they allow customers (natural or legal persons) to store and save their money in accounts or to borrow them in case of need. In substance, banks operate in such a way that the pool of money coming in from depositors, typically short-term, is loaned out to borrowers for longer term loans. This activity, better known as maturity transformation, is a key task for the mismatch in the maturities of all the market participants and is also the way in which banks make the greatest portion of their profits. Indeed, they usually pay a lower interest rate for the deposits, that are liabilities, compared to the one they ask when granting a loan.

The banking sector is one of the most regulated, due to the fact that the activities of banks are essential for the functioning of the economy. On one hand, the level of economic and

monetary integration between the states of the Euro area started decades ago, and several steps have been taken in order to foster integration and unified financial markets. Indeed, the introduction of the Single Market for the free trade in 1993, as well as the establishment of a single currency in 1999, symbolizes important achievements for the European community as a whole. On the other hand, the existence of a single entity that regulated and supervised the banking sector was absent until recently. Only national rules and policies, different from one country to another, prevailed. Consequently, the banking system was fragmented and banks supervised in very different ways, notwithstanding the fact that are exposed to common risks. This is the case since all banks are subject to the same levels of interest rates, set by the European Central Bank and unique for all Europe. Therefore, a communication from European Commission to the European Parliament in 2012 highlights the importance of taking a decisive step in the regulation and supervision fields, and to create a Banking Union. As the mere coordination between supervisors is not sufficient to tackle all the risks in the Euro Area, a necessary step concerns the shift in supervision of banks to a European level.

The conduct of supervision and the responsibilities are divided between the Single Supervisory Mechanism (centralized level) and the National Competent Authorities (national level), depending on whether the bank is classified as Significant Institution (SI) or Less Significant Institution (LSI). The separation between SIs and LSIs is important in terms of approach to supervision and in terms of characteristics of banks. If the ECB supervises directly an institution, a proper team called Joint Supervisory Team (JST) is formed; this team, composed by both members of ECB and of NCAs, is responsible for the day-to-day supervision. On the contrary, there are no JSTs for Less Significant Institutions, since they are directly supervised by the respective Central Banks/ Supervisory Institutions of the Member States, and the ECB has an oversight function. Moreover, the credit institutions that have been divided into the two categories can be very different. While SIs are "big" banks and a potential deterioration or failure can have a direct impact in the economy, LSIs are smaller and they typically operate on a regional level. At the end of 2017, according to the List of Supervised Entities published by the ECB, the number of SIs corresponds to 118, while the number of LSIs is 3155: therefore, it is important to understand that the world of LSIs is complex, and performing a deep-dive in how this system of credit institutions has changed over time could give us the idea of how it could change in the future and what impact it could have in the financial system.

There are several opinions regarding the fact that Europe might be overbanked: indeed, in most of the European countries the total assets of banks to GDP ratio is higher than 400%, the number of existing commercial banks with respect to the population is the highest if compared to other economies, and the ratio between stocks and bonds market and bank credit is extremely low. It is true that bank-based economies have the advantage of decreasing transaction costs due to their ability to gather data and subsequently monitor their client, thus mitigating the asymmetries of information in the market. On the other side, systems that are overbanked have some drawbacks. For instance, literature suggests that bank-based economies perform slightly better during normal business cycle, but suffer more and take more time to recover.

The presentation of the banking sector features in the Euro Area suggests that such a high number of banks in the market cannot last forever; indeed, if a market is overcrowded, some players must exit the market. However, exiting from the market is not the only practice possible in order to try to solve the issue of overbanking. Certainly, bank mergers and acquisitions could as well play a pivotal role by reducing the considerable size of the sector and by increasing efficiency of the remaining players.

Chapter 2 The analysis of banks involved in M&A transactions

There is evidence that the banking sector is undergoing a process of consolidation. Therefore, we study a sample of 222 mergers and acquisitions of banks classified as Less Significant Institutions under the Single Supervisory Mechanism between 2015 and 2018, with a focus on the most critical variables that mark the performance of such banks.

The size of the M&A transactions in the years under analysis is equal to € 592.85 Billion overall. 2017 registers the highest number of mergers as well the highest amount of total assets involved by taking into account both the acquirer and acquired entities. Over the years, we observe also that on average, the differences in terms of total assets between the acquirers and the acquired entities in the sample have decreased. We also manage to divide the sample of banks into sectors, depending on the legal structure of each credit institution. The majority of M&A involves cooperative institutions, followed by savings banks and finally a residual category referred to as "others". Comparing the three sectors, the biggest banks in the sample

belong to the one classified as others. On the contrary, cooperatives and savings are smaller and more similar between each other, on average.

The analysis continues with a focus on profitability, asset quality, solvency and efficiency. First, RoE aims at measuring the shareholders` rate of return on their investment in the company, while RoA measures the operating efficiency for the company based on the bank`s profits from its total assets. The results for the sample show that acquirers are, on average, more profitable than acquired entities since they have higher ratios for all the observed periods.

Another important element used for the evaluation of a credit institution is the quality of its assets. Typically, in the balance sheet of a bank the greatest portion of assets is composed of loans, that represent the assets connected to the institution`s main source of profitability. Indeed, whenever a bank grants a loan to a customer, it is exposed to credit risk, namely the probability that the borrower defaults on the repayment of the loan itself. Even though banks have the expertise to analyse and understand the soundness of potential borrowers, it is highly probable that some of the loans granted will not be paid back. Therefore, analysing non-performing loan ratios is fundamental to understand the asset quality of each credit institution. In our sample of M&A, acquirers result to have a better asset quality than the acquired entities, typically. Moreover, comparing the figures with the average NPL Ratio at the SSM level, it results that the quality of the assets of the banks in the sample (both acquirers and acquired) is much lower.

Furtherly, an indicator for banks` efficiency is added to the analysis, as efficiency is an important factor that determines the capability of a bank to generate enough income by using its resources in order to cover for expenses. This, in turn, distinguishes the banks that are sustainable in the medium-long term to the ones that are not since in a banking sector where income margins are squeezed due to high level of competition, credit institutions have to try to keep costs under control. The variable that captures the relationship between costs and operating income of credit institutions is the cost-to income ratio. For all the four years of study, the cost-to-income ratio (CIR) observed is always lower for acquiring entities than the acquired ones, which means that usually the most efficient banks acquire the less efficient.

Finally, there is another risk that is meaningful for the survival of a credit institution in the banking sector, namely solvency risk. Regulatory capital requirements have become more stringent for banks especially after the crisis and one of the main areas where regulation

increased is in indicators related to solvency. From the sample under analysis, the CET1 Ratio is typically higher for acquirer entities than acquired. Even if the difference between acquirers and acquired is not big for all the years, for this specific ratio also a small number could make a difference for banks. Moreover, when comparing the sample`s results with the ones published by the European Central Bank, it is possible to conclude that the entities in the sample are better capitalized than the average.

In order to analyse deeply the characteristics of the parties involved in M&A, the transactions are studied also across counties and across years. More in detail, profitability, asset quality and efficiency of credit institutions are confronted for Italian and German banks between 2016 and 2017. The first notable message is that the German banks in the sample have performed better in terms of profitability (RoE) compared to the Italian banks. Indeed, while German credit institutions are able to maintain a positive ratio for both 2016 and 2017, it is not the case for Italy. Moreover, for Italian banks the difference between acquirers and acquired entities are big, while in Germany there are no substantial differences in terms of profitability between the two groups of entities, meaning that acquired banks are not less profitable than the acquirers, on average.

As far as asset quality is concerned, for Italian banks the NPL Ratio of acquirer entities is lower compared to acquired one and also if compared to the country average. On the other side, acquired banks result to have lower asset quality than the average as ratios are higher. In Germany, the analysis of NPL Ratio shows that again that on average acquirer entities have lower ratios compared to the others. However, comparing the average results for the two counties, it is true that German banks have better asset quality than the Italians. Moreover, the difference in terms of ratio between acquirers and acquired is minimal in Germany, which could determine that while for Italy the main driver of an M&A transaction includes the rescue of the worst banks, in Germany the driver could be related to increase economies of scale and possibly to become more profitable.

Finally, an analysis of efficiency is performed for both acquirers and acquired entities in the two countries. First, for the Italian banks in the sample, it appears that the difference in efficiency between acquirers and acquired is not significant, which is the same in Germany. However, when comparing the results for efficiency of Italy and Germany, it appears that German banks perform worse than the Italian in terms of efficiency, since the cost-to-income ratios are higher. Therefore, we can conclude that German banks have an issue with

efficiency, and therefore banks could be involved in M&A transactions in order to attempt to improve it.

Chapter 3 Empirical evidence of efficiency gains from M&A transactions

In this final chapter, the effects of mergers and acquisitions are analysed, with a focus on efficiency. Indeed, the study of some banks prior and after an M&A transaction helps to understand whether this type of activity makes the banks more or less efficient.

First of all, several studies have been carried out regarding the relationship between M&A and efficiency of credit institutions over the years and in different parts of the world. However, the conclusions of the studies are often contradictory, as there is no certainty regarding the effect of efficiency after mergers and acquisitions.

For the purpose of this dissertation, two models have been chosen in the attempt to find significant results for M&A and efficiency. First, Data Envelopment Analysis (DEA) is a linear programming procedure for a frontier analysis of inputs and outputs commonly used to evaluate efficiency for a set of variables. This model allows having multiple inputs and outputs to be analysed at the same time without assumptions regarding distribution of data. In the DEA, individuals (in our case, banks) employ a set of inputs in order to produce a certain level of outputs. A bank might be more efficient whether is able to produce more output given the same amount of inputs, or if it uses lower amounts of input to get a certain volume of output. Furthermore, the model compares each producer with the best ones in order to obtain a relative efficiency score. In few words, through the DEA, we try to assess which banks are the most efficient compared to other banks and compute an efficiency score based on this relation. One of the advantages of DEA model is that there is no limit to the number of inputs and outputs chosen, and producers can be directly comparable across their peers. However, as all the existing models it has also limitations. First of all, as DEA is an extreme point technique, is it very sensitive to outliers. Secondly, it must be noted that the analysis is aimed at evaluating efficiency of a sample, not of the entire universe, and the entities that have the highest scores are the most efficient with respect to their peers, but not in absolute terms. For our analysis of efficiency, the purpose is to compare a set of banks that are involved in an M&A transaction with the ones that instead do not merge for the years of the analysis.

The second model used in order to attempt to measure whether there are any efficiency gains from entering into a merger or acquisition is represented by the difference-in-differences. The diff-in-diff is a statistical technique that is developed across more than one reference period for entities that are divided into two different groups, namely the treatment and the control group. The DiD is typically used to estimate a causal effect for a specific event that involves the treatment group by comparing changes over time across the two groups. As it is the case when testing new drugs that some patients are under treatment while others are only in "control", and the drug is considered to be effective if the patients in the treatment group show improvement in their status, so if banks in the sample that were involved into M&As display greater efficiency compared to the others (control group), then it means that mergers and acquisitions convey higher efficiency. The model has several assumptions: apart from the typical assumptions of the OLS models, the DiD requires an additional one: in absence of treatment, the unobserved differences across the treatment and the control group are likely to remain constant over time. This means that the trend in the average values of the variable at study for the two groups should be the same prior to the event. This assumption is called "parallel trend", which is visible once plotting the above-mentioned averages. Therefore, controlling for other time-variant characteristics, any deviation from the parallel trend after the event must be attributed to the effects of the event itself, as time-invariant variables are wiped out by differencing them out over multiple reported periods. The dependent variable in the DiD of this dissertation is represented by the output of the DEA model, that is the efficiency score of the entities in the sample. The averages of these scores are analysed prior and after a mergers, in order to study possible changes in trends between merging and non-merging banks.

The credit institutions examined are all Less Significant Institutions that entered into a merger or acquisition between 2014 and 2015. The sample is built on 42 acquiring banks that belong to the group referred to as *treatment* for the regression, and another group of 40 entities referred to as *control* group. The control group is a sample of credit institutions that did not enter into any merger or acquisition transactions for the years of study. The main rationale behind the choice of the control group entities is the similarity to the banks that are in the treatment.

In the DEA, the score for efficiency is calculated on the basis of one input, namely staff costs and two output variables, namely net fee and commission income and customer loans. The result of this model shows that treatment and control group have a parallel trend before the

M&A transaction and that, on average, the treatment group has higher efficiency. However, the trend changes as in the year after the transactions the treatment banks experience a decrease in efficiency, whereas the banks in the control group present an increasing trend. Finally, two years after the M&A the banks in the treatment group increase their average efficiency scores and continue to have them until the latest year under analysis, while control group does not have a clear path. This could already imply that there M&A transactions lead to higher efficiency levels for the banks involved; however, in order to assess causality, the Differences-in-Differences model is run.

The results of the DiD show that the banks involved in M&A experience efficiency gains attributed to the transaction itself, as the coefficient of the regression is positive and significant at 5%. Moreover, as some controls variable have been added to the model, it seems that while total assets have a positive influence in the results, the GDP per capita as well as total capital ratio impact negatively on efficiency.

The DiD model is also run separately for German and Italian banks, in order to understand whether the impact of M&A transactions is different across these two countries. For Germany, the coefficient is significant at 1% and negative. The interpretation of the coefficient is that the German credit institutions that enter into a merger experience, on average, a decrease in efficiency of around 5% in the two years after the merger itself. In Italy, instead, the results show a positive and significant interaction term, which means that on average the credit institutions that are involved in M&A transaction in Italy result in efficiency gains in the two years after a merger. The increase in efficiency is around 9% in terms of DEA score. The final consideration that should be added refers to the fact that the above mentioned results could have been driven by the choice of the sample since both the models are data-driven. Therefore, further research might investigate the topic more extensively, in order to understand whether the same results could hold with a different sample of banks and assumptions.