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FINAL THESIS

**ENTERPRISE RISK MANAGEMENT AND  
PERFORMANCE INCREASE IN THE BANKING  
SECTOR**

Theoretical aspects and empirical analysis on  
international banks

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# INTRODUCTION

The 2008 financial crisis represented a huge shock in the history of the banking sector. Analysis and studies conducted on this event highlighted that one of the major cause of this crisis is that financial institutions failed in effectively foreseeing and managing the risk of their activities.

On this base, in the last decade there has been a deep global, and European in particular, reconstruction of the banking sector, within which, through a series of regulatory actions, the international control bodies wanted to give greater stability and strength to the world's leading financial institutions.

In order to avoid another future crisis, after an initial phase of stabilisation, there has been a growing consensus that financial institutions' board of directors has to show a major commitment in actively managing risk, implementing an effective enterprise risk management in order to correlate strategic objectives to risk itself.

The attention that many scholars and such regulatory interventions address to the theme of Enterprise Risk Management (ERM), which since the mid-1990s has started to establish itself as a new risk management paradigm oriented to global risk management, pushes further towards the adoption, within banking institutions, of an integrated risk management system. With this in mind, risk management cannot be just a prevention system, but must be a complex process to support the implementation of corporate strategies, through appropriate business, organizational and management decisions. Implementing an effective ERM system means, in fact, implementing a suitable organizational model and information systems capable of supporting ERM processes.

This thesis therefore intends to illustrate the evolution and application of the holistic approach to risk management (ERM) within credit institutions, to present one of the main European control body, the European Banking Authority and to highlight how the selection of appropriate key performance indicators for the implementation of business strategies brings a competitive advantage to banks.



For this purpose, the work has been set up mixed-methods explanatory design, which implies collecting and analyzing quantitative and then qualitative data in two consecutive phases within one study.

Quantitative data refer to a group of international banks analyzed in a period from 2008 to 2016, which were elaborated through a linear regression on panel data in order to demonstrate how an active risk management, implemented together with the main key performance indicators, leads to competitive improvement in terms of performance. The qualitative part, on the other hand, is presented through a case study, demonstrating what has been deduced from the empirical part on quantitative data.

The thesis consists of three chapters: the first focusing on the post-crisis macroeconomic environment, one related to risk, enterprise risk management and empirical research carried out and the last one on the case study.

The first part includes an introduction of the European post-crisis banking environment, a presentation of the main financial institutions involved, as the European Banking Authority (EBA) and the financial institutions inside the SIFI, and a definition of what KPIs are.

The project then gives a definition of risk and Risk Appetite Framework (RAF) from a KPI perspective, that is useful to relate risk and performance. An analysis of the RAF will lead to the creation of a RAF-performance correlation model, where some of the main performance indicators will be evaluated and correlated in order to provide analytical evidence of the idea at the basis of this thesis.

This quantitative analysis will be integrated with a qualitative analysis, considering the UniCredit Group S.p.A., as case study, to suggest some strategic proposals and the subsequent implementation in order to strengthen its position.

Once the analysis is completed, some concluding remarks will be provided over the produced results, aiming to highlight that an active risk management and its incorporation inside the company decision processes leads to a performance increase.

# **CHAPTER 1**

## **ECONOMIC AND BANKING ENVIRONMENT**

Risk and Enterprise Risk Management are fundamental concepts within the banking sector that have been discussed for a long time. Enterprise risk management is a function of primary importance within bank: it is defined as the process of integrated management of all risks that a financial institution can afford to assume, whose assessments must take place in a holistic manner and be integrated all over the company. It requires that the culture of risk involves all the components of the bank itself, which must be aware and responsible for their actions.

This means that risk management is not confined to a mere corporate function with certain limits and responsibilities, but that spaces within each phase of the business process to indicate assumable risks and limits within which they can be managed in order to increase company performance.

These purely theoretical concepts are based on a system of rules, developed over the years, which allow the application of these principles.

Starting from 1974, the governors of the thirteen central banks of the more developed countries established the Basel Committee, a body operating within the Bank of International Settlements based in Basel. Through its guidelines the Committee provides a significant contribution in terms of banking supervision, whose broader objective is the legislation homogeneity of banking supervision in an increasingly globalized financial system.

The Committee main objectives are promoting and strengthening the stability of financial systems, thus encouraging the cooperation between supervisory authorities of the various legal systems, the harmonization of supervisory procedures and the conditions of competitiveness of institutions within the member countries.

The first attempts to regulate the bank's riskiness date back to the 1980s, resulting in the birth of the first Basel Accord (Basel I), subsequently becoming Basel II in 2004 and later on, in 2010, Basel III.

The evolution of the Basel Committee's guidelines shows a shift from a static and mathematical approach to risk to a codification and implementation of integrated risk

management in the company system. The aim is to create a more structured and articulated risk management, with the transition from static models (Basel I) to proactive, future-oriented solutions, where integrated risk analysis and dynamics takes a central role in bank processes (Basel II and III), with a strong incentive to develop an increasingly integrated and efficient internal control system.

In 1988 the Committee signed the Basel Accords (later defined as Basel I), introducing specific requirements regarding the capital endowment of banks, with the purpose to provide more rules to those financial institutions that acted in poorly regulated fields. The minimum capital requirements that each bank had to hold were necessary to deal with two types of risks: credit risk and market risk. So, this minimum capital represented the portion of capital to be held, depending on the degree of exposure to credit risk, to protect depositors from the risk that certain losses could jeopardize the payment of debts.

However, the extreme simplicity of the rules represented a big weak point of this system, which did not allow taking into account the real credit risk borne by the banking institutions and the extreme dynamism of the credit markets to which it corresponded.

Because of these inadequacies, in 2001 the Committee decided to develop a new document, which was approved on 28 June 2004 and became official on 1 January 2008.

The new agreement is described as an architecture based on three pillars, constituting a unitary and integrated system: capital requirements, prudential control and market discipline (Basel Committee on Banking Supervision, 2006).

The prudential regulation of Basel II marked the transition to legislation focused on the integrated risk vision, focusing attention, among other things, on the process of defining the bank's risk appetite and on Internal Capital Adequacy Assessment Process (ICAAP), which establishes the central role of corporate bodies in risk management and the importance of the internal control system in the implementation of an effective integrated risk management system.

All the weaknesses of Basel II, however, were highlighted by the time it came into force: this new prudential system, in fact, became official at the same time of the 2008 financial crisis.

Particularly, major limits referred to capital requirements, that are too weak to allow adequate coverage of the types of risks; insufficient quality and quantity of capital (around 2% of the weighted assets) compared to the required 8%; gaps in the equity regulations and insufficient reserves to cover the risks arising from trading activities and

liquidity shortages, as the banks had financed through the interbank market (Basel Committee on Banking Supervision, 2006).

The limits highlighted above along with credit institutions' weaknesses, such as weaknesses in terms of risk management, market transparency and quality of controls have convinced the institutions to make some changes.

The financial crisis of 2007 has pushed to strengthen the legislation, introducing a series of substantial reforms that, in 2010, gave rise to Basel III (Basel Committee on Banking Supervision, 2010, updated on June 2011). The long period of economic and financial crisis has therefore put a strain on the risk management systems adequacy, imposing timely metrics, governance and control systems adaptations.

Measuring, controlling and spreading their risk appetite through all the company members was what differentiated the banks who better withstood the market challenges to those who perished because of them.

The Basel III priority was to transform the risk management function from an organizational separated unit to a function integrated into the entire business process, by participating in the strategies formulation and corporate governance; the new regulation continues the path started by Basel II towards the effective adoption of enterprise risk management policies by the banking system. The objectives of the 2010 reform, indicated by the Committee, are the improvement of the management of banking risk and governance, the strengthening of their transparency and information as well as the ability of intermediaries to face shocks deriving from financial and economic tensions.

For this reason, it is necessary to find a balance between the specialization of the various risks measurement and the development of an integrated view of the same (Mieli, 2012), assessing and managing risks that had not been monitored in Basel II, first of all the liquidity risk (Basel III, 2010).

In addition, the need for micro and macro-prudential supervision emerged after the crisis. For this reason, starting from 2009 new financial-supervision oriented European bodies have been introduced, such as the European Systemic Risk Board (ESRB), whose task is to identify phenomena of systemic instability and of provide recommendations for corrective actions, the European Supervisory Authorities (ESA), whose aim is to achieve integration between the European Union member countries financial institutions by developing common techniques directly applicable in all EU member states.

They are divided into three sectors: the European Banking Authority (EBA), for the banking sector, whose main tasks are the coordination of national supervisory authorities to implement a consistent prudential treatment of European groups, to manage cross-border group crises and to protect consumers by controlling the development of financial assets; the European Insurance and Occupational Pensions Authority (EIOPA) and, for securities markets, the European Securities and Markets Authority (ESMA). (EU Commission, 2010, updated on September 2017). The crisis also highlighted the importance of systematically important financial institutions (SIFIs) management both in normal and crisis times, given their systemic importance and the potentially catastrophic consequences resulting from their failure. The Financial Stability Board has delegated the Committee to reform the Basel Core Principles (Basel Committee on Banking Supervision, 2012) to allow national supervisory authorities to anticipate possible SIFIs emergencies.

Among the requests addressed to these financial institutions, additional capital requirements were required to reduce the likelihood and impact of their failure, the preparation of the Recovery and Resolution Plans (RRPs), aimed at assessing their ability to cope with emergency situations and the strengthening of supervision of cross-border groups, through a joint assessment of risk profiles at a consolidated level and a definition of the supervisory interventions to be carried out.

A revision of Basel III is currently underway, called Basel IV (McKinseyCo., 2017), which is based on a more restrictive risk measurement for European banks, particularly credit and operational risks, which will lead to greater prudential provisions. The entry into force of the new rules has been postponed from January 1<sup>st</sup> 2019, assumed previously, to January 1<sup>st</sup> 2022n in order to give the supervisory authorities and credit institutions more time to adapt and to finalize the further regulatory steps necessary to implement the provisions.

Among the most relevant aspects is the introduction of an output floor set at 72.5%: this floor is a threshold identified to limit the discretion of the institutions that use, as an alternative to the standard model, internal models to calculate the risk. The threshold states that the capital requirements required, deriving from the use of the internal model, must not be less than 72.5% of those resulting from the use of the standard method.

## **1.1 SETTING THE SCENE: EBA AND SIFI**

### ***1.1.1 The European Banking Authority (EBA)***

The European Banking Authority (EBA) was established on 1 January 2011 as part of the European System of Financial Supervision (ESFS), replacing the Committee of European Banking Supervisors.

The EBA is a European Union specialised agency born to achieve a more integrated approach to EU banking supervision and, aiming to create a single market in the banking sector, worked on the creation of a homogeneous and common set of rules applicable to all EU banking institutions (European Banking Authority, 2016).

The EBA wants to ensure that these common rules are all understood and consistently applied by banking supervisors, in order to provide a high-quality supervision across the European Union, as well as strengthening oversight of those groups who operate in more than one EU State.

The EBA is a fundamental actor for financial stability across the Union, because it provides the regulatory framework for the integrity and efficiency of banking in the EU.

The core component of the European Union policy in relation to financial services is to achieve an integrated market for financial institutions, to address the need for stronger synergies within the EU and to face an increasingly globalised world market. It is of crucial importance for the European financial stability that financial institutions are safe and correctly regulated.

The rules developed by the EBA for the banking sector enable appropriate prudential oversight of credit institutions and foster the harmonisation of supervisory standards and practices amongst EU banking supervisors.

The EBA pursue the single market approach through a wide variety of EU financial and banking regulations and directives, as for example the capital requirements framework and the bank recovery and resolution directive (EU Commission, 2010).

The common framework developed by the EBA on the basis of EU legislation creates the conditions for all institution operating in the EU single market to efficiently and safely fulfil their role of lending into the real economy.

### ***1.1.2 The single rulebook***

According to the European Banking Authority presentation paper, the main task of the EBA is the creation of a single market for the EU banking sector. It does that by the creation of the EU single rulebook on banking (European Banking Authority, 2016), which is the common regulatory framework applicable to all the EU banking institutions in the same way.

This set of rules forms the regulatory infrastructure helping in the development of a single consistent market in banking and are provided by technical standards (TSs), guidelines and recommendations addressed to banking institutions and EU supervisors. These rules are applied throughout the in order to ensure that the core principles (Basel Committee on Banking Supervision, 2012) of the Basel international standards for banking are uniformly applied in all EU Member States. It also closes regulatory loopholes and contributes to the more effective functioning of the internal market.

Member State are allowed to apply different requirements only when are authorized by the European Union bodies, including the EBA, thus eliminating a large number of national options and discretions.

Creating a common EU culture of banking supervision is vital to ensure that the single rulebook is applied consistently by EU banking supervisors, reinforcing the efficiency of the EU single market and creating a European convergence of banking supervisory practices.

### ***1.1.3 The stress tests***

The European Banking Authority presentation paper highlights another important task of the EBA: the assessment of potential risks and vulnerabilities in the EU banking sector. The best way it can do that is through EU-wide stress tests, a major risk assessment tool that examines the resilience of financial institutions (European Banking Authority, 2016). The role of EBA, in cooperation with the European Systemic Risk Board (ESRB), the European Central Bank (ECB) and the Commission, is the definition of common methodologies for the stress tests, aiming to test the resilience of banks. The main objective in conducting an EU stress test in the banking sector is to provide a clear and

transparent picture of how well EU banks are capitalised and if they can withstand financial downturns (EU Commission, 2010).

#### ***1.1.4 Information disclosure***

The EBA disclose a framework which defines the common methodology for issuing and reporting the information for all European banks on their capital positions, providing proofs on their health.

Providing the same type of informations uniformly boosts the investors' confidence and thus creates a reliable single market.

This confidence provides in turn the conditions for EU banks to efficiently achieve their core purpose of supporting the real economy by providing finance to EU citizens and businesses.

More than that, the EBA develops an extensive series of technical standards and guidelines with common practices across Member States, and within them it also seeks to minimise divergent approaches that may emerge in resolution authorities (EU Commission, 2010).

If anyone doesn't apply the rules will be addressed with a series of recommendations setting out the actions that must be followed to comply with EU law.

The EBA also coordinates the activities of EU supervisory authorities in the case of any adverse development, which may seriously jeopardise the orderly functioning and integrity of financial markets or the stability of the financial system in the EU (European Banking Authority, 2016).



## **1.2 THE EBA COMPOSITION**

As stated by the presentation paper “*The European Banking Authority at a glance*”, the EBA is composed by the Board of Supervisors, the Management Board and the Resolution Committee (EU Commission, 2010, Article n° 6).

### ***1.2.1 Board of Supervisors***

The Board of Supervisors (BoS) is the main decision-making body of the EBA and is the one who brings together the banking supervisors of the 28 EU Member States. The Board of Supervisors decides on the EBA’s budget and takes all EBA’s policy decisions, including the adoption of draft technical standards, guidelines, opinions and reports.

They vote on the outputs and regulatory deliverables prepared by the EBA experts, working groups and committees, including recommendations, opinions and decisions in cases of breach of EU law, investigations and mediation.

The EBA Chairperson is at the top of the BoS and is responsible for all the policy of the decisions of the EBA.

### ***1.2.2 Management Board***

The Management Board (MB) takes decisions on operational matters of the EBA and is responsible for implementing its work programme.

All the EBA’s expected results are typically defined and discussed by technical groups, composed of technical experts from the EBA’s staff and EU supervisory and resolution authorities who provide their input into the EBA’s work. The EBA also cooperates with many other institutions and bodies at EU, as well as with institutions at Member State levels, as for example in cross-sectoral topics, where the EBA is called on to work jointly with the other European Supervisory Authorities.

### ***1.2.3 Resolution Committee***

The Resolution Committee (ResCo) has powers to make decisions on resolution matters. It is composed by a Chairperson and the heads of resolution authorities from 28 EU Member States.

It is a permanent internal committee of the EBA set up according to the requirements of the Banking Recovery and Resolution Directive (BRRD). It takes decisions regarding the tasks conferred on resolution authorities as prescribed in the directive (EU Commission, 2010).

Its main tasks are related to the role of the EU resolution authorities, as indicated in the Banking Recovery and Resolution Directive; it has decision-making power on financial institutions specifically. (EU Commission, 2014).

## **1.3 EBA'S TASKS AND DELIVERABLES**

Final decisions are generally adopted by the EBA Board of Supervisors, which votes almost always by simple majority, with the only exception of regulatory products such as technical standards, guidelines and recommendations, where the voting is by qualified majority. Since the establishment of the Single Supervisory Mechanism (SSM), a simple majority of both SSM members and non-SSM members is also required in order to achieve a qualified majority vote for the adoption of regulatory products. The EBA's technical standards have to be approved by the Commission and, in some cases, scrutiny by the European Parliament and the Council. After that they become directly applicable and binding across the EU.

Finally, the EBA can also act on its own initiatives regarding guidelines and recommendations, where it believes it's necessary to ensure the EU law and supervisory practices correct and consistent application.

The EBA produces regulatory guidelines and recommendations with the purpose of providing guidance to banking institutions, investment firms and competent supervisory authorities on the application of EU regulations and directives, which have to be respected by EU Authorities and financial institutions.

The EBA produce legal technical standards that specify aspects of an EU legislative text (directive or regulation) and aim at ensuring consistent harmonisation in specific areas. The EBA drafts binding technical standards, finally approved by the European Commission, whose contribution is helpful for the development of the single rulebook for banks in the EU (EU Commission, 2010).

The draft technical standards are formally adopted in few months by the European Commission and published in the *Official Journal of the European Union*, unless they are considered disproportionate or incompatible with EU law, in which case can be scrutinized by the European Parliament and the Council.

Following their publication in the Official Journal, these standards become legally binding and apply directly in all Member States: this means that, on the date they become official, they become part of the national law of the Member States.

Through publishing a wide range of reports for identifying and analysing trends in the financial and banking sectors, the EBA provides its views on supervisory and regulatory matters to EU institutions and national authorities.

These usually look at potential risks and vulnerabilities coming from the micro-prudential level and provides an assessment of them with a perspective that goes across borders and sectors.

## **1.4 SYSTEMICALLY IMPORTANT FINANCIAL INSTITUTIONS (SIFIs)**

Systemically important financial institutions (SIFIs) are financial institutions whose distress or disorderly failure, because of their size, complexity and systemic interconnectedness, would cause significant disruption to the wider financial system and economic activity (Financial Stability Board, 2018).

In 2009 the G20 Leaders, during the Pittsburgh Summit, delegated the Financial Stability Board to propose some possible measures to address too big-to-fail problems associated with SIFIs, resulting with the approval, the next year, of the Financial Stability Board Framework that aimed to reduce the problem of moral hazard of SIFIs (Financial Stability Board, 2011).

As stated by the FSB, the SIFI Framework main purpose is to face the systemic risks and the associated moral hazard problem. It provides an integrated set of policy measures to

address systemically important financial institutions in order to reduce the probability of SIFIs fall. Upon these, there is a requisite of additional loss absorption capacity, to reflect the greater risks that SIFIs pose to the global financial system, a need for more intensive and effective supervision, including through stronger supervisory mandates, resources and powers that are translated into higher supervisory expectations for firms' risk governance and internal controls frameworks, risk management functions, and risk data aggregation capabilities.

More than that, resolvability, recovery and resolution requirements are asked so that home and host authorities of SIFIs are better prepared to collaborate in case of a crisis; accordingly, SIFIs need a peer-based resolvability assessment process to periodically review their resolvability at the international level (Financial Stability Board, 2014).

The list of the 30 banks considered Systemically Important Financial Institutions is edited every year by the Financial Stability Board, a supranational entity, where all the G20 members are represented.

In the list published by the Financial Stability Board on November 21<sup>st</sup> 2017, there are also the global systemically important banks (G-SIBs): half of them are in Europe and 8 are in the Eurozone: Bnp-Paribas, Bpce, Société Générale and Credit Agricole, Ing, Deutsche Bank, Santander and Unicredit as the only Italian bank. The other 22 global systemic banks are: Hsbc, Jp Morgan Chase, Barclays, Citigroup, Bank of America, Credit Suisse, Goldman Sachs, Mitsubishi UFJ FG, Morgan Stanley, Agricultural Bank of China, Bank of China, Bank of New York Mellon, China Construction Bank, Industrial and Commercial Bank of China Limited, Mizuho, FG Nordea, Royal Bank of Scotland, Standard Chartered, State Street, Sumitomo Mitsui FG, UBS and Wells Fargo (Financial Stability Board, 2017).

#### ***1.4.1 Methodology for assessing the systemic importance of SIFIs***

The Committee is entitled by the Financial Stability Board to develop an assessment methodology whose valuable of assessing the importance of the SIFIs from both a quantitative and qualitative indicators point of view. (Financial Stability Board, 2010)

The committee response was the development of an indicator-based measurement approach for assessing the systemic importance of SIFIs, where the selected indicators reflect the different aspects of what generates negative externalities and makes a bank

critical for the stability of the financial system (Basel Committee on Banking Supervision, 2013).

However, since banks vary widely in their activities, structures and risk management, it is very difficult to measure global systemic importance across all banks with a measurement approach. That's the reason why the quantitative indicator-based approach can be supplemented with qualitative information that is incorporated through a framework for supervisory judgment.

#### ***1.4.2 Indicator-based measurement approach***

The Committee thinks that global systemic importance should be measured in terms of the impact that a bank's failure can have on the global financial system rather than the risk that a failure could occur. This can be thought of as a global, system-wide, loss-given-default concept rather than a probability of default concept.

The selected indicators reflect the size of banks, their interconnectedness, the lack of readily available substitutes or financial institution infrastructure for the services they provide, their global, or cross-jurisdictional, activity and their complexity (Financial Stability Board, 2009).

Since this assessment methodology aims to identify global systemic important banks that will be subject to internationally higher loss absorbency requirements, the Committee thinks that it is also appropriate to include a category that measures the degree of global activity. That is why they added a measure of complexity, since banks with greater complexity are likely to cause significantly greater disruption to the wider financial system and economic activity in case of failure.

The methodology proposed by the Committee gives an equal weight of 20% to each of the five categories of systemic importance: size, cross-jurisdictional activity, interconnectedness, substitutability/financial institution infrastructure and complexity. In those indicators where the Committee has identified multiple category, everyone of them is equally weighted. This means that, where there are two indicators in a category, each indicator is given a 10% overall weight; where there are three, the indicators are each weighted 6.67% (Basel Committee on Banking Supervision, 2013).

For each bank, the score for a particular indicator is calculated by dividing the individual bank amount by the aggregate amount for the indicator summed across all banks in the

sample. This amount is then multiplied by 10,000 to express the indicator score in terms of basis points.

The following table shows how the indicator-based measurement approach works:

<b>INDICATOR-BASED MEASUREMENT APPROACH</b>		
<b>CATEGORY (AND WEIGHT)</b>	<b>INDIVIDUAL INDICATOR</b>	<b>INDICATOR WEIGHTING</b>
Cross-jurisdictional activities (20%)	Cross-jurisdictional claims	10%
	Cross-jurisdictional liabilities	10%
Size (20%)	Total exposures as defined for use in the Basel III leverage ratio	20%
Interconnectedness (20%)	Intra-financial system assets	6,67%
	Intra-financial system liabilities	6,67%
	Securities outstanding	6,67%
Substitutability/financial institutions infrastructure (20%)	Assets under custody	6,67%
	Payments activity	6,67%
	Underwritten transactions in debt and equity assets	6,67%
Complexity (20%)	Notional amount of over-the-counter (OTC) derivatives	6,67%
	Level 3 assets	6,67%
	Trading and available-for-sale securities	6,67%

Figure 1: Indicator-based measurement approach  
(Source: Basel Committee on Banking Supervision, July 2013)

**1.4.3 Cross-jurisdictional activity**

With cross-jurisdictional activity the banks’ global importance can be captured. Cross-jurisdictional claims and cross-jurisdictional liabilities are the two measures that are important to define the bank’s activities outside its headquarter jurisdiction. The international impact of a bank’s distress or failure varies in line with the amount of cross-jurisdictional assets and liabilities. The more global a bank is, the more widespread will be the spill over effects from its failure, because of the difficulty of resolution coordination.

#### ***1.4.4 Size***

The idea at the base of this indicator is that the more global the activities of a bank are, the more its distress or failure will damage the global economy and financial markets. The larger the bank, the more difficult it is for its activities to be quickly replaced by other banks and so the greater the chance that its distress or failure would cause disruption to the financial markets in which it operates. For these reasons, size is therefore a key measure of systemic importance and it is measured by the total exposures used in the Basel III leverage ratio.

#### ***1.4.5 Interconnectedness***

The more a bank is connected with other bank's worldwide regarding its activities, the more will be its systemic impact. Following the logic of interconnection, in fact, the financial distress of one institution can materially increase the likelihood of distress at other institutions given the network of contractual obligations in which these firms operate.

Intra-financial system assets, intra-financial system liabilities and securities outstanding are the selected values to measure the level of interconnectedness of a bank.

#### ***1.4.6 Substitutability/financial institution infrastructure***

Substitutability means that, in case of failure, a bank is hard to be replaced. For example, the greater a bank's role in a particular business line, the larger the disruption will likely be following its failure, in terms of both service gaps and reduced flow of market and infrastructure liquidity. At the same time, costumers that have to find a replacement will suffer high costs, in a measure that is equal to the bank's market share.

Substitutability is measured by assets under custody, payments activity and underwritten transactions in debt and equity markets.

### ***1.4.7 Complexity***

This indicator means that the more complex a bank is, the greater are the costs and time needed to resolve the bank. Three indicators are used to measure complexity: notional number of over-the-counter derivatives, Level 3 assets and trading and available-for-sale securities (Basel Committee on Banking Supervision, 2013).

### ***1.4.8 Bucketing approach***

To be classified as G-SIB, a bank should have an indicator-based measurement approach score that exceeds a certain level.

The Committee analyses the banks' scores every year and, if necessary, reallocate SIFIs into different categories of systemic importance.

SIFIs will be initially allocated into four equally sized buckets based on their scores of systemic importance, with varying levels of higher loss absorbency requirements applied to the different buckets.

There is not neither a fixed number of SIFIs, nor their bucket allocations, but they will evolve over time as banks change their behaviour and scores. A particular aspect of this approach is that if a bank's score increases such that it exceeds the highest bucket top threshold, new buckets will be added to accommodate the bank, meaning that the buckets are fixed annually but they can be modified through the years. New buckets will be equal in size in terms of scores to each of the initial four populated buckets, and will have incremental higher loss absorbency requirements, with the aim to discourage the uncontrolled growth of banks as SIFIs. Since the moment that the Committee doesn't aim to develop a fixed list of SIFIs, it provides the possibility to review banks' status, to motivate them to change their risk profile and business models in order to reduce their systemic spill over effects. By developing these criteria, banks can migrate in and out of this status, and between categories of systemic importance, over time.

Banks are classified in 5 buckets: the lowest one requires a capital surplus of 1%, the bucket number 4 a capital surplus of 2,5% and the highest one a capital surplus of 3,5%. UniCredit is located in the bucket number 1, while actually there is no bank in the bucket number 5.



Although the bucket thresholds will be set initially such that bucket 5 is empty, if this bucket become populated in the future, a new bucket will be added to maintain incentives for banks to avoid becoming more systemically important. Each new bucket will be equal in size (in terms of scores) to each of the initially populated buckets and the minimum higher loss absorbency requirement for the new buckets will increase in increments of 1% of risk-weighted assets (for example, if bucket 5 should become populated, bucket 6 would be created with a minimum higher loss absorbency requirement of 4.5% etc) (Basel Committee on Banking Supervision, 2013).

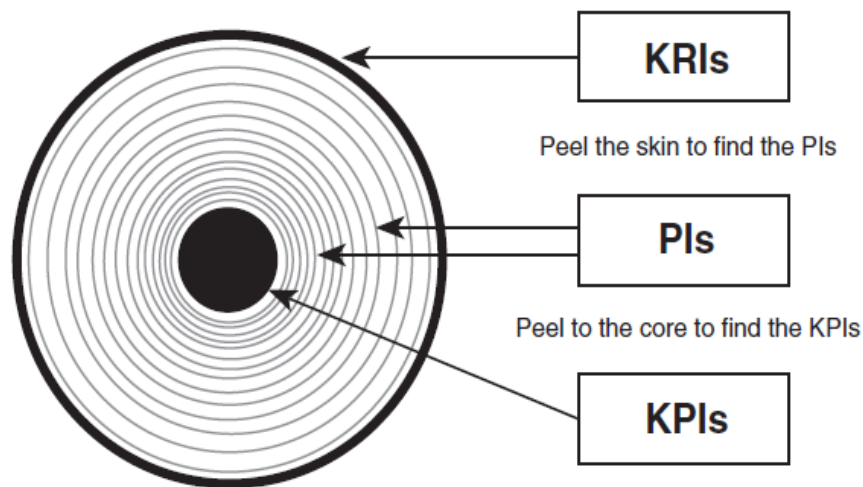
The following table shows the complete list of the SIFIs:

<b>BUCKET</b>	<b>SIFIs</b>
5° Bucket (3,5% Capital surplus)	Empty
4° Bucket (2,5% Capital surplus)	JP Morgan Chase
3° Bucket (2,0% Capital Surplus)	Bank of America
	CitiGroup
	Deutsche Bank
	HSBC
2° Bucket (1,5% Capital surplus)	Bank of China
	Barclays
	BNP Paribas
	China Construction Bank
	Goldman Sachs
	Industrial and Commercial Bank of China Limited
	Mitsubishi UFJ FG
Wells Fargo	
1° Bucket (1,0% Capital surplus)	Agricultural Bank of China
	Bank of New York Mellon
	Credit Suisse
	Groupe Crédit Agricole
	ING Bank
	Mizuho FG
	Morgan Stanley
	Nordea
	Royal Bank of Canada
	Royal Bank of Scotland
	Santander
	Société Générale
	Standard Chartered
	State Street
Sumitomo Mitsui FG	
UBS	
Unicredit Group	

Figure 2: G-SIBs as of November 2017 allocated to buckets corresponding to required levels of additional capital buffers

(Source: Financial Stability Board, November 21<sup>st</sup>, 2017)

## 1.5 KEY PERFORMANCE INDICATOR



*Figure 3: KPI representation*  
(Source: David Parmenter, 2007)

The success of a strategy is not only determined by its definition and documentation. Some of the greatest strategies, in fact, have been defined carefully with great thought and insight. Most companies and organisations are good at *defining* strategy, but very few are good at *successfully implementing* strategy.

One of the main reason why companies often fail in implementing strategies is because they are not able to develop meaningful objectives and their associated key performance indicators (KPIs). Without a good methodology to create objectives and KPIs, a strategy will never be successfully implemented (IntraFocus, 2014).

Key performance indicators (KPI) are a quantifiable measure a company uses to determine how well it meets the set operational and strategic goals and they are an important part of the information required to determine and explain how a company progresses towards its main goals (Lake, 2017).

David Parmenter defines KPIs as set of measures focusing on those aspects of organizational performance that are the most critical for the current and future success of the organization (Parmenter, 2017).

This means that different businesses have different KPIs, depending on how they measure performance, the criteria they use or their priorities. At the same time, the indicators usually follow industry-wide standards.

The three main types of performance measures are key result indicators (KRIs) (Committee of Sponsoring Organisation of Treadway Commission, 2010), that tell you how you have done in a perspective; performance indicators (PIs) tell you what to do and KPIs, that tell you what to do to increase performance dramatically (David Parmenter, 2017).

KPIs must have certain characteristic, in fact they should be:

- quantitative: They can be presented in the form of numbers;
- practical: They integrate well with company processes;
- directional: They help to determine if a company is getting better or worse;
- actionable: They can be put into practice to effect desired change (Lake, 2017).

To be valuable, a key performance indicator must be based on legitimate data and provide context that echoes business objectives. They must be defined in a way that they will be fulfilled despite the presence of factors beyond the company's control.

Before choosing the best key performance indicators, the company should have clearly defined the business processes and their requirements, qualitative and quantitative measurements of results and determined variances and adjusting processes to meet their short-term objectives.

A first thing to keep in mind when choosing the right key performance indicators are the factors management uses in managing the business and understand whether these factors help in assessing its progress against its stated strategies.

Even if they are in the same industry, companies do not necessarily choose similar KPIs to their competitors. What is more important is how relevant the indicators are to the business or its unit/division.

Even though there is not a specific number of KPIs a company needs, in general this number varies from four to ten for many types of businesses, and they must be crucial to the success of the business. Kaplan and Norton recommend no more than 20 KPIs (Kaplan, Norton, 1996). Hope and Fraser (Hope, Fraser, 2013) suggest fewer than 10 KPIs. The 10/80/10 rule proposed by Parmenter is also a good guide. That is, there are about 10 KRIs, up to 80 PIs, and 10 KPIs in an organization. Very seldom are more measures needed, and in many cases even fewer (Parmenter, 2017).

Companies should also review their objectives and strategies regularly and make necessary adjustments on their key performance indicators, because having too many

KPIs may decrease the attention paid to the truly important ones. This means that is preferable to have less crucial key performance indicators but well developed.

KPIs need to be constantly evaluated in order to understand if they are still relevant and aligned with priorities in business operations. If one or more KPIs no longer serve a useful purpose, they need to be modified or replaced.

Key performance indicators are important to a business because they help it focus on common goals and ensure those goals stay aligned within the organization, helping a business to stay on task and work on meaningful projects that will assist in reaching objectives faster.

While defining KPIs, the objective is always to identify those measures that meaningfully communicate that a result has been accomplished or that the company is working toward key goals.

Key performance indicators show how well a business is doing. Without KPIs, it would be difficult for a company's leaders to properly evaluate the business wealth and make operational changes if performance problems arise. Without well designated KPIs to reinforce the importance and values of business activities and tasks that are central to organizational success, it would be difficult to keep employees focused on their jobs.

KPIs can both highlight business successes or issues based on measurements of current and historical performance and point future outcomes, giving executives early warnings on possible business problems or hints on opportunities to maximize return on investment. This leads to a more proactive business operations management, with the potential to gain competitive advantages over less data-driven rivals.

Reh divides KPIs in two main categories saying that some indicators are lagging indicators and simply tell you how you have performed, and they have no value in predicting future performance; other measures are leading indicators offering guidance on future result. The goal is to have the right balance of both leading and lagging KPIs (Reh, 2017).

A good process for defining optimal KPIs consist in different phases, each one with particular tasks and objectives:

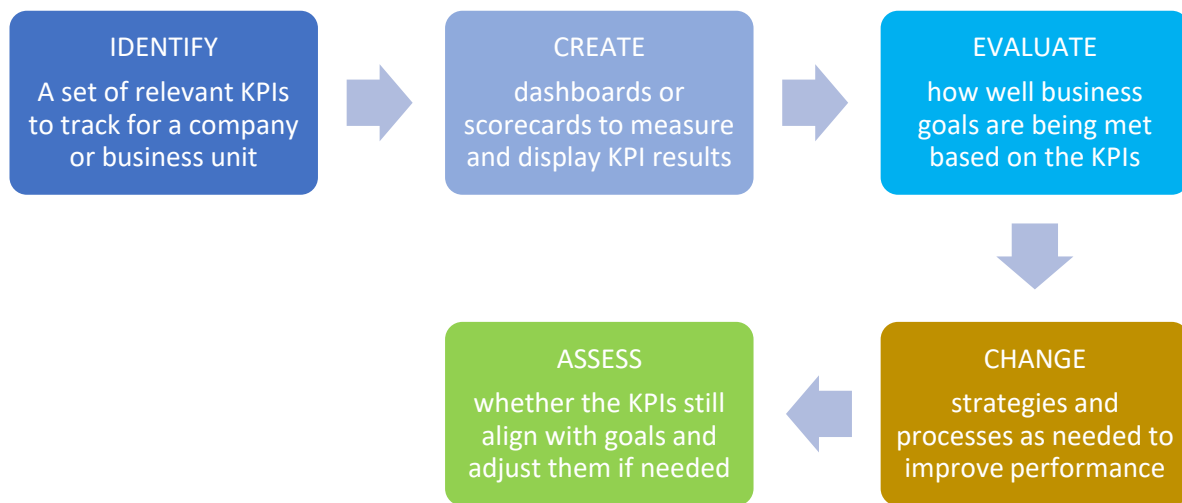


Figure 4: Steps to define optimal KPIs

(Adapted from: What is key performance indicators (KPIs)? Definition from WhatIs)

KPIs are normally prepared in real time, with even weekly ones available by the next working day, so it is important that measurement to be timely. One or two KPIs should be even updated daily or even every hour.

Most organizations will have five essential KPIs, which must be reported at least weekly in the balance scorecard, like for example performance measures that focus on completion. Projects that are running late and overdue reports should be reported to the senior management team each week. Such continuous reporting will revolutionize project and task completion in the organization, highly boosting performance.

However, continuously monitoring KPIs is not as easy as it may seem, because measurement initiatives are often viewed as managerial control devices and solely for the benefit of management, thus leading employees to respond with distrust to the implementation of performance measurement in their workplace.

Measurement can even become a source of division and conflict between managers and their employees, leading to diverse results wherein employees don't really understand why measurement are taken so often. There needs to be a consultative approach to measurement, one that promotes partnership, and obtains behavioural alignment, empowering all the people who work in the organization.

Performance improvement through KPIs definitions requires requires the establishment of an effective partnership between management, local employee representatives, unions representing the organization's employees, employees, major customers and major suppliers, a time-consuming path that will pay off better if the organization clearly defined and conveyed its vision, mission and values (Parmenter, 2017).

Managers and functional experts work together to propose a set of measures and to debate the relative importance of the various measures, since it takes considerable effort and time to develop a high-quality set of performance indicators.

A healthy process for identifying and implementing key performance indicators and linking them to the company's vision requires time and diligence and requires for the managers and contributors to regularly revisit and revise the measures.

To work properly, once key performance indicators have been identified, they should be clearly communicated to employees, so all levels of the organization understand which business metrics matter the most and what constitutes successful performance against them. This could include the entire workforce on broad corporate KPIs or smaller groups of workers on ones that apply to particular departments.

This process, based on a holistic approach, is a far from easy to be developed, but if the company can efficiently implement it will have a huge competitive advantage on its market.

The following image, proposed by Parmenter, better shows the linkages between mission, strategy and KPIs:

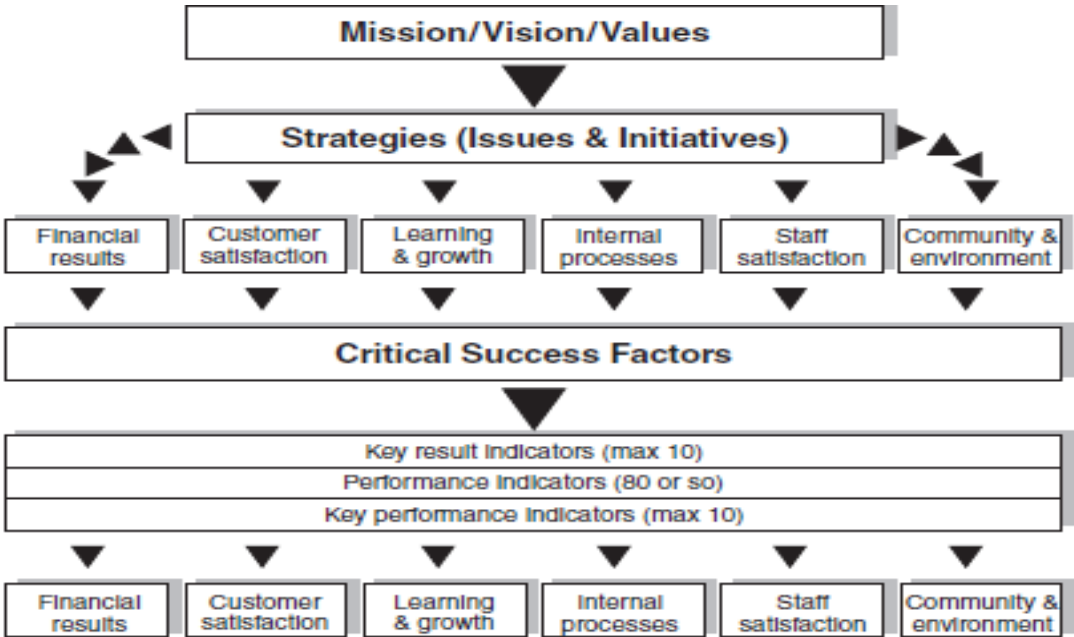


Figure 5: Journey from a Mission and Vision to Performance Measures that Work  
 (Source: David Parmenter, , 2017)

**1.5.1 KPIs in the banking sector**

Organization most crucial challenge is the selection of performance measurements and performance measurement systems play an important role in improving strategic plans, estimating the achievement of organizational targets and compensating managers. The final choice of right performance measurements depends on financial institutions belief of which factors are the most effective for banks successful performance. In banking sector there are some important indicators to achieve successful production and performance: the quality of administration data, installation of modern technologies, innovation of banking products and services, competitive cost structure, risk management, extensive information system, prominence of strategic planning and equity endowment.

Performance measurement and accounting systems are used for understanding past behavior, for accurate present decision-making and for planning and forecasting the future. There have been a lot of different macro-economical and industry based factors changing the competitive landscape of banks (Hellar, Cobb, Ines, 2002). Therefore the



design of performance measurements for this industry needs to be aligned with the changing business environment in order to serve the demand of accurate information. Even if the design phase is crucial for the metrics to be beneficial, also the use of performance measurement, in general and especially in banks, must be executed carefully. Since banks are for-profit organizations, the performance is measured mostly with financial indicators, but it is important for banks to consider also non-financial metrics. That's because it is crucial for banks to have a holistic understanding of the performance, in order to optimize the internal processes, to conduct the decided strategy and to achieve their the mission and vision. Since technology development allows the collection of all sort of data, it is more important to focus on the quality and relevance of the performance metrics rather than the quantity of them.

Harker and Zenios highlighted that even though the efficiency of financial institutes have been widely researched, there is unfortunately little knowledge about what drives the performance of these institutes. Understanding these drivers would then help managers to decide appropriate managerial actions. Since efficiency is usually translated as good use of resources, the measurement of these factors are linked with good planning of processes and optimizing them. In banking the efficiency is quite often considered as performing financially efficient and being profitable (Harker, Zenios, 2000).

The drivers for financial performance work as a starting point for setting metrics and measurements for performance improvement. For example, net interest margin refers to the pressure to lower interests even though banks rely mostly on interest based income; non-performing loans (NPLs) are bad for bank's profitability because of unpaid interests, higher provisions and realised losses; cost to income ratios have been high due to financial crisis but financial innovation can help banks improving these ratios over time. Also business model is a driver for profitability especially when banking perform different activities. The financial crisis has also affected on regulatory reforming by increasing capital requirements which reflects to bank's profitability.

According to PwC, banks usually measure their performance, especially financial performance, by financial ratios such as return on equity (ROE), net profit margin and return on investment (ROI). Usually banks' goal is to maximize shareholders' value and therefore these metrics because they are simple to understand and use in valuation. Profitability based performance measurement metrics such as Return on assets (ROA), Risk adjusted return on capital (RAROC), Return on equity (ROE) and EVA helps financial

institutions to translate their strategy into adequate functional level goals than net income based metrics because they measure also the operational efficiency of banks. Thanks to profitability-oriented performance measurement, management in banks understand what they can do to affect profits, monitor goals achievement and benchmark effects of different actions (PwC, 2011).

However, according to the European Central Bank (European Central Bank, 2010), even if ROE is the most common measure of banks' performance, it is only a proper indicator for profitability and equity capital. But the banking industry is an ever changing environment and especially during financial crisis, when ROE fluctuations have been caused entirely by operational performance, this wasn't helpful for the understanding of the potential trade-off between risk and return in performance. Profitability is important for banks to maintain their ongoing activities but to make ROE even more precise in its task there need to be a correlation with the risk of bank activities. As a solution to this problem, European Central Bank suggests that ROE should be refined and associated with other metrics: measures such as comparability, stability over time and the capacity to be forward-looking could be useful. In addition, risk returns, funding capacity, assets and own funds quality, cost of equity and capital allocation across business lines are beneficial complementary measures.

But rapidly changing banking services and other environmental drivers set continuously new demands for bank's performance measurement systems, resulting in the need to acquire data through new measures, together with the intensive competition in the industry, which is one of the main reason for the shift towards to a more holistic approach for performance management and measurement (Harker, Zenios, 2000).

Financial institutions had to create planning and controlling systems that can easily adapt to rapid changes in the markets and thus make it possible for the company to achieve its strategic and operative goals by providing adequate information (Zeman, Lukàcs, Hajòs, 2013).

For a long period of time, banking industry performance was traditionally measured only with a wide range of financial indicators, due to the nature of the business and focus on creating money. However, banks realized that relying only on financial indicators is inadequate in measuring their performance adequately.

They realized, in fact, that because of regulatory restrictions, weak economic conditions and low interest rates, they had to consider certain factors in their performance

measurement systems. As stated by Karr, major trends in the industry are enhancing profitability based reporting measurements, emphasizing the use of key performance indicators (KPI), improving profitability measurement and analysis of different customers and channels, aligning components of performance management process, enhancing systems support and automatization of performance management process and improving data quality and consistency (Karr, 2012).

In the past the main task of financial institutions was that of intermediators, but after the financial crisis in 2008 banks had to start emphasizing the role of risk management in all of their processes and in banking culture. The focus has shifted on harmonizing profitability reporting and other operations with risk management methods (P.T. Harker, S.A. Zenios, 2000). Nevertheless, only few of the financial institutions have aligned their strategy with operational risk management even though it is considered critical in identifying, evaluating and reducing risks.

There has been a shift towards metrics that helps to better assess future performance as well as analyse past performance. This has increased the use of business-unit specific KPIs which helps banks to get more holistic picture of performance and provide more accurate information for decision making and strategy work (Presecan, 2015). To get a better picture of branch-level performance financial institutions should aim to create metrics that are more sensitive for actual performance during the reporting period, reflect effectiveness of a branch as sales and service channel and are more sensitive to management's use of levers that affect performance of the branch.

In recent years banks' have been investing significantly in automating components of their performance management processes such as budgeting systems and stress testing systems in order to reduce operational costs, reducing production-cycle times, improving controls and updating application software packages due to lack of vendor support. They have invested also in building data management strategies as a response to regulatory reporting demands. Financial institutions should focus on building enterprise-wide data infrastructure which would help them to assess all the data gained about risks, finance, customer transactions, capital, treasury, profit and loss accounts, and human resources at once. This integrated data across products should improve consistency and accuracy of reporting as well as improve decision making. Financial institutions with effective data management and systematic analysis would also better understand customer behavior, identify market trends earlier and compare the performance of business units, teams and

individuals, which all are important advantages in the highly competitive industry. Faster data analysis would also improve targeting and pricing, credit and liquidity models, and capital planning of financial institutions giving more competitive advantage to them (KPMG, 2016).

# CHAPTER 2

## ENTERPRISE RISK MANAGEMENT: AN OVERVIEW

While running their business, companies have to decide the process they want to implement and the actions that this process requires to achieve its goals. Any of these action includes a certain level of uncertainty and, indeed, a certain level of risk.

Before analyzing how companies can manage risk, it is good to define risk and uncertainty in general and it is important to highlight the difference between these two words.

Frank Hyneman Knight, in his publication "Risk, uncertainty and profit", provides a first economic political explanation of the difference between risk and uncertainty: "Risk is a random phenomenon associated with the occurrence of an event or otherwise a future event in relation to fortuitous events. Risk is a form of uncertainty in which the subject is able to associate a probability with the occurrence of the harmful event for the subject making a choice. Risk is a random phenomenon corresponding to a situation in which the future is predictable and objectively measurable through the calculation of probabilities. It therefore distinguishes itself from the situation of uncertainty where the probability of the events is not measurable, and the future events are unpredictable." (Knight, 1921)

Starting from Knight definition, risk has been typically defined as the "possibility of danger, loss, injury or other adverse consequences" (Subramaniam et al., 2011). The notion of risk also implies that a choice influences the result and the achievement of objectives.

Although every human behavior is risky, some have a higher risk percentage. By risk we can also indicate the distribution of possible deviations from the expected results due to events of uncertain manifestation, internal or external to a system. In this definition, the risk has not only a negative meaning but also a positive one.

Enterprise and risk are an "indissoluble binomial" (Di Salvo, 2004): when it is constituted, in fact, a company inevitably generates general economic risk and all related risks. The latter, widely understood in economic/business studies as a business risk, is therefore

"condition of existence of all companies regardless from the object of his activity (Cagno, 2002).

Considering the risk of business actions is usually a duty of risk management, which aim is to identify potential risks in advance, analyse them and take precautionary steps to reduce the risk.

According to Nocco and Stulz (2006), a corporation can manage risks in one of two fundamentally different ways: (1) one risk at a time, on a largely compartmentalized and decentralized basis; or (2) all risks viewed together within a coordinated and strategic framework. The latter approach is often called "enterprise risk management," or "ERM" for short (Rocco, Stulz, 2006).

Companies that succeed in creating an effective ERM have a long-run competitive advantage over those that manage and monitor risks individually, since ERM creates value through its effects on companies at both a macro, or company-wide level, and a micro, or business-unit level.

At the macro level, ERM creates value by enabling senior management to quantify and manage the risk-return tradeoff that faces the entire firm. At the micro level, ERM becomes a way of life for managers and employees at all levels of the company (Rocco, Stulz, 2006).

Enterprise risk management (ERM) is a process that can help a company identify risk events and manage the related risks. Its main point is that firms address all their risks comprehensively and coherently, instead of managing them individually.

Raising an important milestone on the road of corporate governance developments, the Committee of Sponsoring Organizations of the Treadway Commission (COSO) define ERM as: "a process, effected by an entity's board of directors, management and other personnel, applied in strategy setting and across the enterprise, designed to identify potential events that may affect the entity, and manage risk to be within its risk appetite, to provide reasonable assurance regarding the achievement of entity objectives." (Committee of Sponsoring Organizations of the Treadway Commission, 2004).

This description evokes Anthony's widely quoted definition of management control: "the process by which managers assure that resources are obtained and used effectively and efficiently in the accomplishment of the organization's objectives." (Anthony, 1965). With the emphasis placed on the strategic role of ERM ('applied in strategy setting to provide

assurance regarding the achievement of entity objectives'), ERM is being advocated as a strategic management control system.

As it is now, ERM defines a process that combines the corporate's entire risk management activities in one integrated, holistic framework to achieve a comprehensive corporate perspective. Traditional approaches, in contrast, were generally based on a silo-based risk consideration and a department-by-department perspective (Kleffner, Lee and McGannon, 2003) where risks were measured in isolation. ERM aggregates all the risks across the entire firm, thereby taking into account interdependencies between risks, which allows for a better assessment of the firm's risk situation and further improves the decision process with respect to strategic and operative developments.

The main factor characterizing this type of management is risk: usually risk is considered as a bad thing or as the possibility of undesired outcomes. But risk-taking is of course an essential part of business activity; without a willingness to take risk there is generally very little expected reward (Stulz 2015).

Risk handling in traditional approaches, in fact, is generally rather defensive in that it concentrates on the protection of the firm against adverse financial scenarios. In ERM, the focus is shifted toward a more offensive handling through the integration of ERM into the corporate strategy and the decision process and is explicitly intended to contribute to increasing shareholder value (Meulbroek, 2002). ERM thus not only attempts to minimize risk but explicitly accounts for potential opportunities.

One of the larger distinctions is between those who see risk as largely defined independently from firm objectives (Miccolis, 2008. AS/NZS, 1995. Standard&Poor's, 2008) and those who explicitly defined risk in terms of achievement of organizational objectives (Institute of Internal Auditor, 2001. Committee of Sponsoring Organizations of the Treadway Commission, 2004). Another major distinction is between those who see risk as largely a problem to be mitigated (Standard & Poor's, 2008. RIMS, 2011) and those who see risk as a potential source of value creation (Perrin, 2001. Causalty Actuarial Society, 2003).

However, risk management is not born as it is now, but it transformed and changed through different phases. Historically, in fact, firms have managed different kinds of risk separately. This fragmentation of risk management was caused because different functions within a corporation handled different parts of risk management.

To witness this, in her researches Mikes (2009) talks about four types of risk management, every one of them implemented basing on the purposes and focus of each company.

The first type of risk management is risk silo management, encompassing the measurement and control of risk of various types across the organization; the second one is integrated risk management, defined as a risk management approach that applies the economic capital framework for the measurement, comparison, aggregation and control of risks; the third risk management type is risk-based management with its distinguishing aspect being a strong shareholder value rhetoric; the fourth and last one is the holistic risk management approach that incorporates non-quantifiable risks in addition to those that can be quantified (Mikes, 2008).

The fourth type of risk management is indeed the the most complete and future-oriented and the one on which many authors, starting from the 1970s, wrote a lot about.

Encompassing different industries, in fact, beginning with Kloman (Kloman, 1976), the author of "The Risk Management Revolution," many practitioners have advocated a coordinated approach to risk management.

Bannister and Bawcutt (Bannister, Bawcutt, 1981) proposed that risk management requires multiple disciplines working together to manage "future uncertainty".

Haines (Haines, 1992), in engineering, called for "the evolution toward a more holistic approach," which Haines terms, "total risk management". Haines proposed an approach with risk management an important part of the "overall managerial decision-making process, not a separate, vacuous act." He advocated a move from single-objective decision making to multiple-criteria decision making, to aid in achieving holistic and cross-disciplinary risk management. Haines proposed that risk management decisions should influence the "optimal allocation of the organization's resources."

The term Enterprise Risk Management firstly appeared with Holton in 1996, even though it did not offer a precise definition of it (Holton, 1996).

D'Arcy and Brogan, in 2001, offered one of the first definitions of Enterprise Risk Management (ERM): "The process by which organizations in all industries assess, control, exploit, finance and monitor risks from all sources for the purpose of increasing the organization's short- and long-term value to its stakeholders." (D'Arcy, Brogan, 2001).

In those days it begun to emerge a consensus about the core elements of ERM, even though it still wasn't clear what constituted ERM. ERM assumes that managing the risk



of a portfolio is more efficient than managing each risk separately. Also, ERM incorporates not only traditional risks like product liability and accidents, but also strategic risks such as product obsolescence or competitor actions. That's because often the most dangerous risks a bank faces lie in the strategic areas, due to the lack of historical data. Thus, every substantive decision within the firm involves risk management concerns. More than that, ERM assumes firms should not just look at risk as a problem to mitigate, but as a tool to manage in order to seek competitive advantage from it (Bromiley, McShane, Elzothek, Rustambekov, 2015).

## **2.1 COSO: ENTERPRISE RISK MANAGEMENT**

An important definition of Enterprise risk management has been given from the Committee of Sponsoring Organizations of the Treadway Commission (CoSO), which provided one of the most used template for risk management (Power, 2009). ERM deals with risks and opportunities affecting value creation or preservation and it is defined as follows: "Enterprise risk management is a process, effected by an entity's board of directors, management and other personnel, applied in strategy setting and across the enterprise, designed to identify potential events that may affect the entity, and manage risk to be within its risk appetite, to provide reasonable assurance regarding the achievement of entity objectives." (Committee of Sponsoring Organizations of the Treadway Commission, 2004).

In this definition the CoSO wants to represent some of the fundamental concept of ERM. Analyzing it in more detail, in fact, it is:

- a continuous process flowing through an entity in a constant manner, changing accordingly to the different phases of its growth. It is perfectly integrated inside every process of the company and, at its maximum level, it is part of the company culture;
- effected by people at every level of an organization: from the board of directors to the management and employees. So it is fundamental that everyone in the organization knows its responsibility and limitations of its role. In this way people allows the ERM to grow while, at the same time, it helps them to identify, evaluate and react to risk regarding the company's objectives;

- applied in strategy setting: different strategic choices are accompanied by different levels and types of risk and ERM is fundamental to support management in the evaluation and selection of the most appropriate strategy. There must be consistency between business strategies and risk management strategies: in an ERM system, in fact, strategy and risk are considered jointly: strategies must be formulated taking into account the acceptable risks for the company. Not doing so means that strategies are not formulated in the best way possible. Risk management is therefore integrated into strategic choices and business planning;
- applied across the enterprise, at every level and unit, and includes taking an entity level portfolio view of risk: the risks considered as a whole could be higher than the acceptable level of risk. It is essential to take into account every area, from the smallest to the biggest ones: the risks are not always directly proportional to the size and often the big losses originate from small units of the company;
- designed to identify potential events that, if they occur, will affect the entity and to manage risk within its risk appetite (Committee of Sponsoring Organizations of the Treadway Commission, 2004).
- The definition of ERM provided by COSO is purposefully broad and it focuses directly on achievement of objectives established by a particular entity and is a milestone and a base for defining enterprise risk management effectiveness.
- Erm is set up in such a way that each entity can use it as best it matches its characteristics in order to achieve its objectives, that can typically be:
  - strategic – high-level goals, coherent to its mission;
  - operations – effective and efficient use of its resources. Typically short-medium term objectives;
  - reporting – related to the reliability and timeliness of the data provided within the company reports, but also to the type and number of information contained;
  - compliance – compliance with applicable laws and regulations (Committee of Sponsoring Organizations of the Treadway Commission, 2004).
- The ERM is expected to provide reasonable assurance of achieving objectives related to reliability of reporting and compliance with laws, since they are within the entity's control.

On the other hand, achievement of strategic objectives and operations objectives is subject to external events that the entity cannot always control. Enterprise risk

management can provide reasonable assurance that the top management are made aware, in a timely manner, of the extent to which the entity is moving toward achievement of the objectives.

## **2.2 COMPONENTS OF ERM**

Enterprise risk management is a multidirectional, ongoing process in which almost any of the eight component that compose it does influence another.

These components are derived from the way management runs an enterprise and are integrated with the management process. These components, as articulated within the model proposed by the COSO, are: internal environment, objective setting, event identification, risk assessment, risk response, control activities, information and communication and monitoring.

The *internal environment* encompasses the tone of an organization, and focus on how people view and address risk, risk appetite and risk management philosophy, as well as integrity and ethical values, their skills and the company's culture.

*Objectives* are in line with the entity's mission and, thanks to ERM, consistent with its risk appetite.

*Internal and external events* threatening the achievement of an entity's objectives must be identified, making a clear distinction between risks and opportunities.

*Risks are assessed* and analyzed, considering likelihood and impact, in order to determine how they should be managed.

*Risk Response* – Risk can be avoided, accepted, reduced or shared and management develops a set of actions to align risks with the entity's risk tolerances and risk appetite. Risk responses are then carried out thanks to the implementation of policies.

*Information* at all level of the organization allows the diffusion of the objectives, the coordination between the business units and the implementation of the risks. Relevant informations are identified, captured and *communicated* in way that enable people to carry out their responsibilities. Effective communication also flows down, across, and up the entity.

Monitoring is accomplished through ongoing management activities, separate evaluations, or both (Committee of Sponsoring Organizations of the Treadway Commission, 2004).

The Committee of Sponsoring Organizations of the Treadway Commission also emphasises a direct relationship between objectives, which are what an entity strives to achieve, and enterprise risk management components, which represent what is needed to achieve them.

The relationship is depicted in a three-dimensional matrix, in the form of a cube:

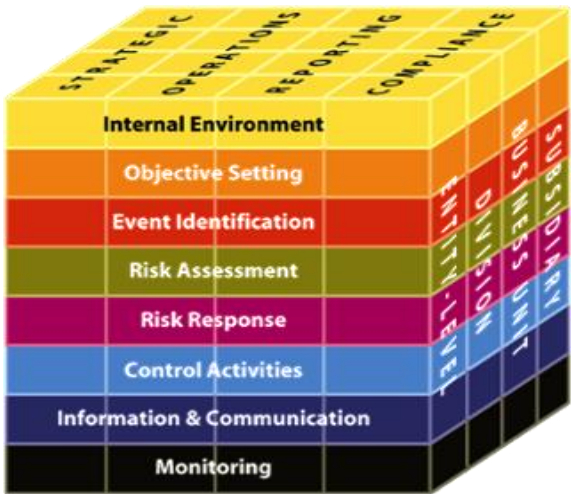


Figure 6: Relationship of objectives and components

(Source: Committee of Sponsoring Organizations of the Treadway Commission (COSO), September 2004)

**2.3 LIMITATIONS**

Limitations come from the fact that human judgment in decision making can't always be perfect, decisions on responding to risk and establishing controls need to consider the relative costs and benefits. Breakdowns can occur because of human failures such as simple errors or mistakes, controls can be circumvented by collusion of two or more people, and management has the ability to override enterprise risk management decisions.

These limitations preclude a board and management from having absolute assurance as to achievement of the entity's objectives (Committee of Sponsoring Organizations of the Treadway Commission, 2004).

## **2.4 RISK AND ERM IN BANKS**

A wrong view is that the main job of effective banks' risk management is to limit exposure to risk and the possibility of bad outcomes. However, such a view of risk management ignores the reality that banks cannot succeed without taking risks that are expected to have a profitable outcome (Stulz, 2015).

As a consequence, taking actions that reduce risk can be costly for shareholders when the lower risk is achieved mainly by avoiding valuable investments and activities with higher risk.

Banks are different from most industrial companies in the sense that they typically create value for shareholders through their liabilities as well as their assets. In particular, they attract deposits that provide most banks with a low-cost source of funding and the ability to issue deposits depends a lot on the perceived risk of the bank. For this reason alone, risk management is a critical part of the business model of banks in a way that it is not for non-financial firms (DeAngelo, Stulz, 2013).

The goal of risk management for banks, as stated by Stulz, is not to eliminate or minimize risk, but rather to determine the optimal level of risk, the level that maximizes bank value subject to the constraints imposed by regulators, laws, and regulations. A well-governed bank, in fact, has management tools able to identify and maintain this optimal amount of risk.

A bank should take any project for which it predicts to earn more than its cost of capital, considering also the costs associated with the impact of the project on the bank's total risk (Stulz, 2015).

## 2.5 DEFINING MAJOR RISKS FOR BANKS

The banking activity involves risk on a daily basis, so risk management can be considered the central component of the bank's activity. That's the reason why it is fundamental to define the main types of risk that banks face and must manage.

### 2.5.1 Market risk

Market risk can be defined as the risk of losses in on and off-balance sheet positions arising from adverse movements in market prices ([www.eba.europa.eu/regulation-and-policy/market-risk](http://www.eba.europa.eu/regulation-and-policy/market-risk)). The exposure to market risks characterizes both the portfolio of financial assets managed for trading and the portfolio of assets deriving from commercial transactions with customers, where the component relating to credit risk prevails.

There are five main categories in market risk (Sironi, 2005): *interest risk* - when the market value of the positions taken is sensitive to the trend in interest rates;

*volatility risk* - due to the connection between changes in the market values of positions taken and the changes in the volatility of the variables from which market risks derive (exchange rates, interest rates, share prices and goods);

*equity risk* - connected to the link between the market value of the positions taken and the performance of the stock markets;

*exchange rate risk* - which arises when the market value of the positions taken is sensitive to changes in exchange rates and therefore derives from the uncertainty relative to the future conversion rate;

*commodity risk* - when the market value of the positions taken is sensitive to changes in commodity prices (in the case of purchases/spot sales of goods, as well as options, futures, commodity swaps).

To measure market risk, reference is made to the maximum potential loss that a position or portfolio of positions may undergo, given a certain level of confidence, during a certain time interval. This potential loss is called value at risk (VaR) and makes it possible to summarize in a single value all the information relating to the bank's market in the various segments in which it operates.

In order to identify the maximum potential loss in a given time interval, it is necessary to define the distribution of the market values of the position over the considered time horizon and identify in it that X value such that the probability of recording a lower value is exactly equal; for example, 1% (in the case in which a confidence level of 99% was chosen); this X value is the lowest market value that the position can reach in 99% of cases (Sironi, 2005).

The value at risk is therefore identified as the difference between the expected market value of the position and the market value in the worst-case scenario (X) referred, in this example, to 99 percent of the cases.

### ***2.5.2 Credit risk***

Credit risk is defined as the risk that the debtor is unable to fulfill his obligations to pay interest and repay the principal debt.

Credit risk is a component of all lending activities and, as such, influences the investment choices of banks, financial intermediaries and bond investors ([www.borsaitaliana.it](http://www.borsaitaliana.it)).

In general, it is observed that the higher the credit risk, the higher the interest rate demanded by the bank as compensation for the greater exposure to this risk.

Credit risk is influenced both by the economic cycle and by events related to the debtor (in this case, there is a reference to issuer risk or specific risk); in general, it is reduced during periods of economic expansion, while it increases during periods of recession.

Although credit risk is largely defined as risk of not receiving payments, banks also include the risk of delayed payments within this category.

Often these cash flow risks are caused by the borrower becoming insolvent, so it is possible for the bank to avoid or at least to reduce such risk by conducting a thorough check and sanctions loans only to individuals and businesses that are not likely to run out of income over the period of the loan. Credit rating agencies provide adequate information to enable the banks to make informed decisions in this regard (Saita, 2000).

Credit risk is so important because the profitability of a bank is extremely sensitive to credit risks: a small rise, in fact, can produce a big impact on the bank profitability. Therefore, to deal with such risks banks have come up with a wide variety of measures, such for instance holding always a certain amount of funds in reserves to mitigate such risks.

For a bank it is very important to be able to effectively manage credit risk. That is because if at the individual level the probability of insolvency can be limited it becomes physiological and inevitable that some cases of insolvency occur when the number of borrowers increases; the same reasoning also applies with reference to the amount of the losses connected to the insolvency event, meaning the portion of credit that would not be recoverable.

The product between the probability of default of the counterparty (probability of default - PD) and the loss in the event of insolvency (loss given default - LGD) makes it possible to estimate the aggregated expected loss. The bank protects itself from the potential losses through provisions policy for risks, whose cost is reflected in the spread applied in customer financing transactions with respect to the cost of funding. That's why it is fundamental to correctly quantify the expected loss to define an adequate provision policy to cover credit risk.

However, credit risk is linked also to the simple deterioration of its credit, which is reflected in an increase in the probability of insolvency, even in the absence of the occurrence of the insolvency itself, and in a consequent increase in the expected loss; in this case, the risk is manifested through the insufficiency of the provisions previously made, no longer adequate to meet the higher level of expected loss (Saita, 2000).

Banks manage credit risk through a meticulous evaluation of the solvency and reliability of those applying for a loan or granting loans secured by guarantees. Investors wishing to hedge against credit risk may count on portfolio diversification, investing both in risky securities and in securities with lower risk exposure. A valid alternative, both for banks and for investors, used to manage credit risk efficiently is the use of particular derivative instruments called credit derivatives.

### ***2.5.3 Operational risk***

Operational risk can be defined as the risk of losses deriving from bankruptcy or inadequacy of internal processes, human resources and technological systems or deriving from external events (Basel Committee on Banking Supervision, 2011).

Due to the increasing complexity and sophistication of information and management systems, the increase in e-commerce, the concentration process in the financial sector and



the consequent integration of information systems, operational risk assumed more and more importance since the second half of the nineties. However, there is not a unique definition of this kind of risk and it is often defined in residual terms.

According to the New Basel Accord (otherwise known as Basel II), operational risk is a new type of risk that must be taken into account when calculating the banks' capital requirements (Basel Committee on Banking Supervision, 2011). The importance of this type of risk is high and increasing: it is sufficient to think to the damages caused by computer viruses as an example of inadequate or inefficient information protection controls (Basel Committee on Banking Supervision, 2001). The main categories of causal factors of operational risk are:

- production processes - where it is possible to connect all the losses deriving from inadequate procedures and controls, or to deficiencies in the risk measurement methodologies;
- human resources - which may be incompetent, negligent, distracted or may voluntarily violate internal rules and procedures to implement financial fraud;
- external factors - which include a very large set of events that are beyond the bank control (as for example changes in the negative political, regulatory and legislative environment);
- technological resources – due to the increasing dependence of the financial system and which may cause losses due, for example, to errors in IT programs or information systems.

Operational risk is linked to the various activities carried out by a financial institution and that is why it is not possible to choose to assume such risk, as it happens with credit and market risks.

It is difficult to effectively measure and manage operational risk because of the number of factors from which this type of risk may derive. In fact, it can happen that the losses attributable to this category of risk are difficult to quantify or even that some events related to operational risk are so rare that they have never been tested by the individual bank, making it difficult to assess the probability of occurrence.

Despite the differences with financial risks and the problems described, the measurement of operational risk must be consistent with the criteria adopted for the other types of risk, both in terms of methods of estimation, time horizon and confidence level, in order to

quantify the capital absorption linked to operational risk and to allow effective integration of risk measures.

#### ***2.5.4 Liquidity risk***

Liquidity risk can be defined as the risk that a security cannot be sold at a fair price with low transaction costs and in a short time.

This risk is inherent to the fractional reserve banking system. Therefore, in this system, only a percentage of the deposits received are held back as reserves, the rest are used to create loans. Therefore, if all the depositors of the institution came in to withdraw their money all at once, the bank would not have enough money. This situation is called a “bank run”. This has happened countless times over the history of modern banking (Ruozi, Ferrari, 2009).

Liquidity risk has been considered for a long time a secondary risk when compared to the are types of risks (market, credit and operational risks) and so it has been managed with less effort also because of a decade (1997-2007) of little if no tension at all.

However, the financial crisis showed how a proper capitalisation is not enough to guarantee the intermediaries' stability, which faced deep liquidity tensions due to the unexpected change in the market conditions.

This enlightened the importance of liquidity risk in the banking sector and showed how a lot of financial institutions under evaluated the importance of this type of risk.

So, an effective liquidity risk management is of crucial importance in order to avoid liquidity deficit at bank level, because it can be dangerous also at a systemic level.

Basing on the huge potential effects that liquidity risk can have inside the banking sector, there has been a deep restyling of the liquidity control system resulting in the introduction of two minimum requisites for liquidity risk inside Basel III, a short-term and a structural one (Basel Committee on Banking Supervision, 2010).

### ***2.5.5 The evolution of risk management in banks***

Enterprise risk management in banking sector has been the subject of discussion since the beginning of the millennium: since the early 2000s important evolutionary lines have been highlighted in risk management by financial institutions, connected to the development of a more systematic and integrated approach efforts to aggregate risks through appropriate mathematical models. In 2005, Standard & Poor's announced that the adoption of an effective integrated risk management system by financial intermediaries already represented a factor positively evaluated in the assignment of the rating (Standard&Poor's, 2005).

However, the 2008 financial crisis highlighted how the holistic approach to risk management was still far from being fully implemented within the banking system and how the lack of an effective overall view of corporate risk was one of the main problems that the banks have faced (Capuano, 2013).

In the same way, it also highlighted the fact that the banks that have exploited the information gathered through the whole company, thanks to a holistic approach to risk, have been the ones who did well in changing their business strategies (Senior Supervisory Group, 2009). As noted by the Senior Supervisors Group, the integrated risk management practices adopted by these groups of banks range from identification and risk analysis throughout the organization, to the development and application of internal assessment methodologies of exposures, to the alignment between the treasury functions and the risk management processes up to the use of a wide range of risk measures and more adaptive risk measurement systems (Senior Supervisory Group, 2008).

These practices were based on the qualitative and quantitative information sharing and the continuous dialogue between the top management, the risk carriers at the operational level and the internal control function, which allowed to identify in advance the sources of the most significant risks, so as to have enough time to assess the impact of these risks and the strategies development aimed at reducing the exposure to the risks themselves. This leads to the possibility to independently assess the quality of its assets, without exclusively relying on the evaluation of rating agencies.

It was clear by now that top management and board of directors had to understand the interdependencies between risks, which was not possible through the traditional silo-based approach, which did not show a correlation between risk and profit. This is because

this approach considered the various units of the bank as independent silos, each of which was in charge of managing the various components of risk separately and independently within the financial institution. The natural consequence of this approach, which does not consider the overall risk of the bank, is a potential misalignment between the implemented business strategies and the overall risk appetite.

In order to guarantee an effective and integral risk and bank management, a shift towards enterprise risk management has therefore become necessary.

In the years just before the crisis, the banking system moved towards the adoption of ERM systems for the measurement and management of risks, even though in a partial and non-uniform way.

In fact, it is widely believed that the presence of so-called silos in the banks' structure has damaged their performance during the financial crisis and tended to compartmentalize information (Senior Supervisory Group, 2008).

In 2010, the Basel Committee invites banks to avoid non-integrated organizational models and thus abandon silos, which prevent the effective information sharing through the organization and therefore lead to decisions that are not integrated at company level (Basel Committee on Banking Supervision, 2010). Within the Corporate Governance principles for banks (2015), he then stated that "risks should be identified, controlled and controlled on a bank-wide and individual entity basis" (Basel Committee on Banking Supervision, 2015).

In defining the basic principles of bank risk management, the Committee of European Banking Supervisors states that banks should identify, measure and manage all relevant risks in an integrated manner. It is also important to spread within the company a strong risk culture based on the holistic management of the relevant risks (Committee of European Banking Supervisors, 2011).

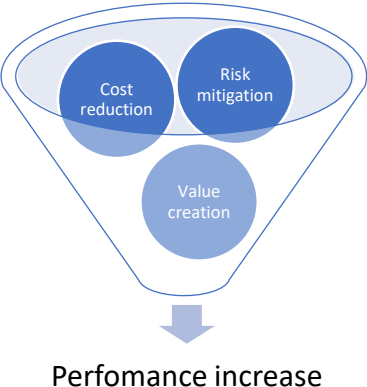
It is also stressed that risk management must not be an isolated function but must be an integral part of defining company strategies (Committee of European Banking Supervisors, 2010).

Integrated risk management means defining the bank risk appetite and risk tolerance limits, measures that are subjective and depend on top management and the board of director's risk aversion, on the financial situation and strategic choices. Speaking of SIFIs, in addition to the subjective component, there are also limits imposed by banking

regulations (see the regulations of the Basel Committee), which mainly ask for certain capital and liquidity requirements (Basel Committee on Banking Supervision, 2011). For the banks to succeed in this migration, it means completely restructuring their risk management models and integrating them within the decision-making process, thus abandoning the traditional compliance-based approach.

The substantial difference between the traditional risk management and the new enterprise risk management is the way in which it is incorporated within the bank: it is no longer an isolated function with defined objectives and responsibilities, but the result of the interaction of the different company functions for the holistic definition of risk. Its pivotal points are the risk culture, which must permeate every component of the bank, and ethics, aspects that the old risk management did not consider (Cerrone, 2013).

Enterprise Risk Management is a continuous and constantly evolving process, which therefore cannot result in a well-defined set of points, but a lot depends on the bank choices and characteristics (Standard&Poor's, 2006). This type of management, however, allows a future-oriented vision and does not focus on past performance: risk becomes an effective and important component in the strategic definition phase. Risk is no longer just a negative element to avoid or a probability that harmful events may occur, but an element that if shaped, controlled and exploited correctly allows the bank to have huge performance gains. Once implemented successfully, the benefits are numerous: it improves the bank's ability to align risk appetite with the strategy, minimize operational risks, decrease earnings volatility, increase capital efficiency, support a prudent decision-making process, allows the management of related risks, spreads culture and awareness of risk.



*Figure 7: Where companies are driving results  
(Source: Author elaboration)*

As reported by Ernst&Young, organizations achieve results from risk in three mainly interrelated ways: some companies focus on mitigating overall enterprise risk, while others focus on efficiency, reducing the overall cost of controls; still others look to create value, often through a combination of risk mitigation and cost reduction (Ernst&Young, 2012).

## **2.6 RISK APPETITE FRAMEWORK**

The new Basel III framework shows a new model through which banks can face risk management, based on a strong integration between finance and risk management functions. In this way, all the relevant risks can be managed according to the Basel III guidelines, which represents a link between a varied regulatory regime and a tool for the implementation of a real enterprise risk management system (Basel Committee on Banking Supervision, 2011).

However, banks often see compliance with these regulatory principles as an obstacle rather than an added value. Bearing witness to this is the research carried out by KPMG in 2013 on a sample of industries including the financial sector, and therefore banks, in which is said that the first cause of tension at company level is, according to 59% of respondents, regulatory pressure and changes in the regulatory environment (eg, Dodd-Frank, Basel III, etc) (KPMG, 2013).

The alignment between the principles of Basel III and the ERM also offers the possibility of changing perspective in the way to look at these standards; indeed, they can be accepted as a challenge and opportunity to reveal a competitive advantage if implemented correctly.

Banks that do not limit themselves to the minimal configuration but develop 360-degree business processes will undoubtedly have concrete competitive advantages, which can also result in the definition of best practices that competitors will be forced to follow.

If up to this moment a communion between ERM and compliance with the imposed regulations seemed incompatible, with a preference of the compliance side, Basel III also represents a turning point in this sense: it requires a global approach to risk and therefore a link with the ERM system. Compliance with regulations must therefore be viewed from

a strategic point of view and be part of the bank's overall ERM initiative, which results in effective synergy leading to efficient risk management that contributes to decision-making and strategic processes.

In fact, the Basel III framework considers almost all the bank's activities connected to the ERM and is therefore a fundamental step in the development of an integrated risk management system.

In order to achieve convergence between the ERM system and compliance with Basel III, continuous coordination and collaboration between the various company departments is required. The top management defines the objective and the guidelines of actions that the whole company applies and sets the tone by spreading the risk culture across the organisational levels.

The ability of banks to dynamically manage business risks and to maintain compliance with multiple regulations through an integrated approach is a source of competitive advantage, while ensuring continuity of the business and the achievement of strategic objectives.

An important tool to support the banks to define this convergence is the Risk Appetite Framework, introduced in 2006 and reviewed in 2011 by the Financial Stability Board, highlighting the delay in the adoption of effective RAF by the banking system, with particular reference to intermediaries of systemic importance (SIFIs) (Financial Stability Board, 2011).

It requires banks to formalize a framework for determining risk appetite, in which the risk/return objectives and operational limits deriving from them are defined as an a priori. Many institutions in the past defined the level of acceptable risk, even if generally in terms of the maximum regulatory capital percentage that the bank is willing to lose and therefore this is not an absolute novelty. However, asking banks to carry out a maximum acceptable risk level analysis is a major step forward because it obliges the top management to analyse in detail risks currently in place, to monitor their performance over time and to intensify the information flows between the risk control function and other corporate bodies.

On this basis, the Financial Stability Board intervened with the progress report on enhanced supervision of October 2011, in which it noted that the effective risk appetite frameworks (RAFs) were both actionable and measurable by both companies and supervisors. RAF is important for companies and supervisors and needs attention by both.

Framework for the "good" risk appetite framework entails how to supervise against these expectations (Financial Stability Board, 2011).

In light of these findings, the FSB launched a peer review on risk governance which was published in July 2013. Here it defines the Risk Appetite Framework as "The overall approach, including policies, processes, controls, and systems through which risk appetite is established, communicated and monitored. It includes a risk appetite statement, risk limits and an outline of the roles and responsibilities of those overseeing the implementation and monitoring of the RAF. The RAF should consider material risks to the firm, as well as to the firm's reputation vis-à-vis policyholders, depositors, investors and customers." (Financial Stability Board, 2013)

The RAF sets the firm's risk profile during implementation of the firm's strategy and the risks undertaken in relation to the firm's risk capacity. An effective RAF should provide a common framework and comparable measures across the firm for senior management and the board to communicate, understand, and assess the level of risk that they are willing to accept. It explicitly defines the boundaries within which management is expected to operate when pursuing the firm's business strategy. Firms that implement a RAF most effectively are those that incorporate the framework into the decision-making process and into the firm-wide risk management framework and both communicate and champion the framework throughout the organisation, starting from the top.

Implementing an effective RAF requires an appropriate combination of policies, processes, controls, systems and procedures to accomplish a set of objectives. The RAF should enable risk capacity, risk appetite, risk limits and risk profile to be considered at the legal entity level as well as within the group context (Single Supervisory Mechanism, 2016).

Managers should be flexible and apply their skills, experience and knowledge of the firm in assessing the adequacy of the RAF. This includes reviewing other materials, such as strategy and planning documents and board reports, to focus on of how the board determines, implements, and monitors its risk appetite to help ensure that risk-taking is aligned with the board-approved risk appetite statement.

According to the FSB, the more a RAF is effective the more it accomplishes different objectives simultaneously. Among the others, it is important to establish a process for communicating the RAF across and within the firm and to external stakeholders, as well as promoting a company-wide approach in order to create a synergy between the top



down and the bottom up approach. In this way it will be easier to embed risk appetite into the firm's risk culture and to create a tool to prevent excessive risky actions (Financial Stability Board, 2013).

While favouring the implementation of all these things, the RAF should also create a way to allow for the risk appetite statement to be used as a tool to promote robust discussions of risk and as a basis upon which the board, risk management and internal audit functions can effectively and credibly debate and challenge management recommendations and decisions (Basel Committee on Banking Supervision, 2015).

An effective and strong RAF should also be flexible enough to reactively respond to changing business and market conditions. That's because in this way the board of directors and the top management can modify the level of risk limits inside the different business units, in order to rapidly leverage on some opportunities provided by the market while at the same time remaining within the agreed firm-wide risk appetite.

In order to define its business model, it is of paramount importance that each institution defines its risk appetite. This is formalized through the definition of the RAF, which defines policies based on compliance with the risk limits assumable to achieve objectives consistent with its strategy from a prudential perspective.

The RAF therefore, considering the strategic plan, identified the relevant risks and defined the maximum risk that can be assumed, indicates the types of risk that the bank intends to assume; for each type of risk, it sets the risk objectives, any tolerance thresholds and operating limits under normal operating conditions and stress.

The definition of medium-long term objectives, however, is not sufficient: the RAF must be periodically updated, in order to always remain in line with the general principles imposed by the legislative bodies, to identify the most relevant risks and to respond quickly and effectively when important events occur, such as for example exceptional changes in the market context in which they operate or significant changes in the corporate configuration.

The RAF is composed by several phases and the main ones can be summarized as follows (AIFIRM, 2017):

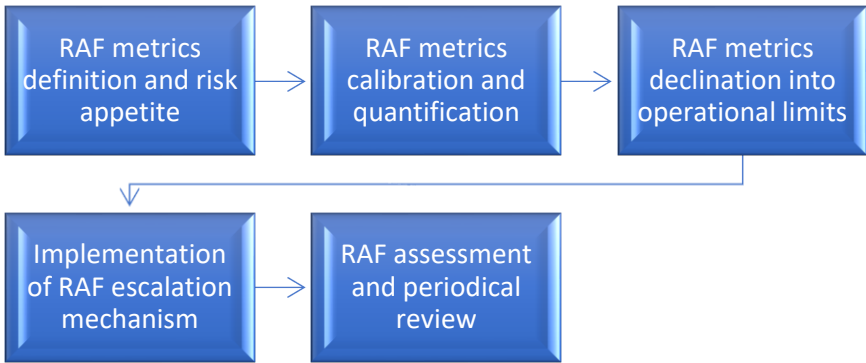


Figure 8: Main phases of the RAF process  
(Adapted from: AIFIRM, 2017)

Following the model proposed by the AIFIRM, each of these phases has its own peculiarities and together they cover all the functions necessary to implement an efficient framework for risk management.

The first phase is called "Definition of RAF metrics and risk appetite". It defines the risk appetite and the relevant risks, both measurable and non-measurable. For the former, the areas of analysis (capital adequacy, liquidity, etc.) and the RAF metrics are defined and the RAF metrics, while for the latter the qualitative indications are set out by direct monitoring.

The second phase is called "Calibration/quantification of the RAF metrics" and is the first implementation phase of the RAF that ends with the "Implementation of the escalation mechanisms" phase.

During the second phase specific rules are defined for the valorization of the RAF metrics of risk appetite, risk capacity and risk tolerance, also ensuring consistency with the values that these indicators assume in the context of other business processes.

Stress tests are important at this stage, indicating banks' capital adequacy and potential vulnerability due to certain types of risks. In this phase, the risk management function is used to assess in advance the impact of the scenarios on the defined RAF metrics and on the prospective adequacy of equity.

The third phase is defined as "Declination of the RAF metrics in operating limits" and it is the phase whereby the operating limits are defined. It must be consistent with the risk appetite and risk tolerance objectives, which are set at the overall group level or institution.

The fourth phase, "Monitoring and reporting of RAF metrics", requires monitoring and periodically control the trend of the risk profile, in order to verify any deviations from the levels of risk appetite and promptly notify the various stakeholders.

The fifth phase is defined as "Implementation of the RAF escalation mechanisms" and within it specific countermeasures are implemented that are helpful in case of exceeding the thresholds of risk appetite/tolerance/capacity, in order to mitigate the occurrence of particularly significant risks.

Finally, the sixth phase "Assessment and periodic review of the RAF", involves a review of the previous phases, which are periodically verified in terms of effectiveness and consistency with the business model and the strategies of the bank (AIFIRM, 2017).

### ***2.6.1 Corporate bodies and competencies in the RAF***

An appropriate system of governance, which defines roles and responsibilities within the organizational structure, is so fundamental that the phases of the RAF described above do not remain only a theoretical process and that risk awareness is not limited solely to risk management functions, but adequately spread throughout the structure.

In this sense, it is very important in this sense, as highlighted by the Single Supervisory Mechanism (Single Supervisory Mechanism, 2016), to develop a system that effectively manages to fill the gap between perceived risks and actual risks.

Effective governance, with reference to the RAF process, derives from the business models of each bank, which must however be subject to the limits imposed by regulations. The organ with strategic supervision function defines and approves the business model, the strategic guidelines, the risk objectives and the tolerance thresholds, the risk governance policies, the guidelines for the internal control system and the criteria for identifying the most significant transactions.

In the RAF area, it is also called to approve the risk management process, assessing its compatibility with the strategic guidelines and risk governance policies, periodically

assessing the adequacy and effectiveness of the RAF and the compatibility between the actual risk and the risk objectives.

The body with strategic supervision function must ensure consistency between the strategic plan, the RAF, the ICAAP<sup>1</sup>, the Recovery Plan, the budgets and the internal control system with reference to the evolution of the internal and external conditions in which the bank.

The management body understands all business risks and is able to identify and evaluate factors, as for example the complexity of the organizational structure, from which risks may arise. It involves the implementation of the risk management process, ensuring its consistency with risk appetite and risk governance policies, establishes operational limits to the assumption of the various types of risk consistent with the risk appetite, facilitates the development and dissemination at all levels of an integrated risk culture and establishes the responsibilities of the corporate structures and functions involved in the risk management process.

The body with management function also defines internal communications aimed at ensuring that the corporate bodies and corporate control functions fully understand and govern risk factors and verify compliance with the RAF and authorize any risk tolerance threshold overrun, providing, if necessary, the interventions implementation to ensure the completeness, adequacy, functionality and reliability of the internal control system. It also authorizes risk appetite overcoming and approves actions for risk reconciliation within the set objectives if there is a deviation of the risk profile from the risk appetite, informs the strategic supervisory body in case of risk threshold overruns tolerance and collaborates with strategic supervision function body to decide the initiatives to be taken to bring the risk profile within the risk capacity limits.

The control function body is responsible for monitoring the completeness, adequacy, functionality and reliability of the internal control system and the RAF.

The Risk Management Function is involved in the definition of the RAF, the risk governance policies and the various phases that constitute the risk management process as well as in setting operational limits for the assumption of the various types of risk. In this context, it has the task of periodically verifying the RAF adequacy, the risk

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<sup>1</sup> ICAAP: internal capital adequacy assessment process, a fundamental risk management tools for institutions credit. If reliable, this process can make a significant contribution to determining the capital and liquidity requirements as part of the process of review and prudential assessment.

management process and operating limits, proposing and updating over time the quantitative and qualitative parameters necessary for the RAF definition.

The Internal Audit Function periodically evaluates the completeness, adequacy, efficiency, effectiveness and reliability of the internal control system and IT system (Financial Stability Board, 2013). Specifically, within the RAF, it assesses the effectiveness of the RAF definition process, the internal overall scheme consistency and the company's operation compliance with the RAF, as well as the compliance with the strategies approved by the corporate bodies (Financial Stability Board, 2013).

### ***2.6.2 RAF integration with the other corporate governance processes***

The AIFIRM position paper highlights also the integration level between RAF and banks' corporate governance.

Although the integration between the RAF and the other corporate governance processes is not an absolute novelty and is already at a good point within many financial institutions, it is a major priority to be progressively implemented over time, as risk management is one of the fundamental points for the formation of the company economic results.

The need to coordinate RAF, strategic plan and budget requires the evolution of planning processes, with consequences on the methodologies analysis and support instruments. The RAF, moreover, introduced elements of strong innovation in banking practices as regards the planning activities. First, the RAF processes and the multiannual planning managerial choices are always going hand in hand. This means that the risks, assessed in advance, are no longer confined to equity and economic values, according to the bank's maximum risk-taking capacity, but fall within risk strategies consistent with the corporate business model.

In this sense, planning and definition processes of the RAF must be carried out in a coordinated and coherent way, in order to avoid overlaps and repetitions, so as to contribute to the formulation of the bank's positioning strategies in terms of risk/return. In addition to the strong interrelation found between the RAF and planning processes, one area in which the RAF is particularly impacting is that of the formulation of remuneration policies; in fact, the introduction of the EBA remuneration policy guidelines (European Banking Authority, 2016) consolidated a management trend, aimed at correlating the actual disbursement of the variable components of the management

remuneration to the achievement of the risk-adjusted performance targets and, in particular, to the indicators used in the RAF.

Following the 15<sup>th</sup> update of the circular number 263 (Bank of Italy, 2013), the risk control function is required to evaluate in advance the most significant transactions consistency with respect to the Risk Appetite Framework.

For this reason, the need has arisen to have an adequate model of interaction between the Chief Risk Officers structures and the other bank functions involved in the process and required the creation of a more structured system for the evaluation of the relevant operations, also in terms of exchange of information flows and completeness of evaluations.

### ***2.6.3 RAF areas and metrics***

By defining the RAF metrics, banks reveal the ways in which they summarize their risk/return objectives, so they are one of the most relevant aspects for risk mapping, which is the main output of the identification of potential vulnerability factors process.

The banks identify the RAF metrics on a continuous basis, to remain in line with the strategic dynamics and the risk culture dissemination degree in such a way as to envisage prospective scenarios of the competitive environment and its risk positioning.

The areas and types of RAF indicators are usually defined by banks in accordance with organizational set-ups and complexities, materiality of risks, known or emerging vulnerabilities following periodic stress tests.

An appropriate metrics selection must support the best understanding of risk nature that the top management intends to take. Therefore, the indicators choice should consider: the indicator of strategic importance given the operations and characteristics of the bank's exposures or balance sheet;

- the potential indicator impact on management and strategies;
- the indicator use in internal/external communication and in the internal management reporting model;
- the forecast framework reliability that the bank has activated on the indicator;
- the indicator volatility and/or its dependence on external events not under the control of the indicator adequacy with respect to what is used by peers;
- what is present in literature and what is required by the regulations;

- the calibration capacity, in which case the indicators choice should be consistent with the information set and with the tools and methodologies that the bank has available for the definition of risk appetite, risk tolerance and risk capacity;
- the ease of measurement of the risk profile and of any deviations with respect to risk appetite, tolerance and capacity;
- the bank's ability to effectively manage the indicator through management actions aimed at correcting it in the event of unwanted deviation from expected levels or exceeding tolerance thresholds.

As regards the definition of quantifiable risks, the RAF does not specify the indicators that each bank must consider, but refers to the Recovery Plan legislation issued by the EBA (European Banking Authority, 2015), which reports minimum indicators:

*Capital indicators:* This voice includes the Primary Tier 1 Capital (Common Equity Tier 1), the Total Capital Ratio and the Leverage Ratio;

*Liquidity indicators:* in which there are the Liquidity Coverage Ratio (LCR), the Net Stable Funding Ratio (NSFR) and the Cost of the wholesale financing (Cost of wholesale funding);

*Profitability indicators:* the main ones are the Return on Assets (ROA) Return on Equity (ROE) and the Cost of operating risk (given by the ratio between operating losses and net banking income); *Indicators of asset quality:* the growth rate of gross impaired loans and the coverage ratio are taken into consideration here.

Although these are the most widespread indicators, to a lesser extent reference is also made to market-based indicators, such as the rating under negative review, the Differential CDS spread and the Change in the share price (stock price variation).

As regards, for example, the most widespread practices of the Italian banking system in relation to the risk indicators most commonly used in the RAF, and in line with the best national and international market practices, the most frequent areas are the adequacy assets, liquidity, quantifiable risks, risks that are difficult to quantify and profitability and asset quality.

The previous description shows a high number of indicators, because the RAF metrics number and the granularity are one of the most important aspects within the Risk Appetite Framework. There is still an open debate on the effective amount of these metrics. Looking at the most commonly used best practices, it can be noted that RAF indicators within simplified frameworks settle in a range between 10 and 20, while,

according to the expectations and indications of the Single Supervisory Mechanism, the appropriate number of indicators should be between 20 and 30 (Single Supervisory Mechanism 2016). However, they are not defined exactly, leaving discretion to individual banks in relation to their priorities and strategies (AIFIRM, 2017).

#### ***2.6.4 RAF metrics calibration***

Once established what the RAF metrics are and what to do, it is important to understand how they are calibrated. To do this, the use of risk capacity, risk appetite and risk tolerance is used (Bank of Italy, 2013).

The risk capacity is defined as the maximum level of risk that can be assumed before breaching regulatory capital and liquidity needs and obligations constraints and also from a depositors, policyholders, other customers and shareholders perspective.

The Committee of Sponsoring Organisation of the Treadway Commission (COSO) defines risk appetite as the amount of risk, on a broad level, an organization is willing to accept in pursuit of value. Each organization pursues various objectives to add value and should broadly understand the risk it is willing to undertake in doing so. (COSO, 2012).

Further, risk tolerance is the intended maximum deviation from the permitted risk appetite; the tolerance threshold is set so as to ensure in any case the bank sufficient margins to operate, even under stress, within the maximum risk assumable (Financial Stability Board, 2013).

Taking these definitions as a starting point, it is considered optimal for banks to act below the maximum level of risk capacity, because acting at the limit would entail the real risk of exceeding the maximum threshold in case of violation of regulatory requirements or other constraints imposed by the shareholders or the supervisory authority, with consequent repercussions on the performance itself.

The risk capacity for the indicators for which there is a lower limit established by the regulations is defined by emphasising this level. The calibration of the risk capacity related to the indicators for which there is no minimum regulatory limit, if explicitly intended, can be calculated by means of integrated simulations of the bank's balance sheet, or by simulations of the bank's balance sheet in which the percentile representing the maximum risk limit assumable.



Following the calibration of the risk capacity metrics, the risk appetite and the risk tolerance are calculated simultaneously. These are realized through analysis of historical data or market benchmarks, also used for capacity calibration, together with scenario analysis or stress test, in order to identify threshold levels that can withstand market shocks or to better identify the sensitivity indicators to the various market factors.

These analyses are particularly important because risk tolerance is related to the stress scenario occurrence in which significant changes are made to the market variables and, consequently, to the bank's variables. Its calibration represents a delicate exercise as it determines the maximum deviation acceptable compared to risk appetite.

The reference to the Financial Stability Board definitions is important because banks that declare to use regulatory capital adequacy and liquidity indicators also calibrate their risk appetite, and in the majority of cases, risk tolerance and risk capacity. Since they are defined through tolerance thresholds, the bank that best manages to set its strategies just below the maximum limit, without ever exceeding it, will be the one with the best performance results.

These thresholds are identified and proposed through risk management to provide reference signals regarding the degree of achievement of risk objectives (MPRA, 2014).

They mainly identify three levels of adequacy of risk indicators:

- the appropriate risk threshold, where the indicators are in line with the risk objectives and therefore no corrective action is necessary;
- the prevalently appropriate risk threshold, where the indicators are not completely in line with the risk objectives, but they fall within the limits of tolerance and as a consequence the company is able to work under stress conditions. In such a situation, the possibility of corrective actions based on the margins size should be evaluated;
- the inadequate risk threshold, in which the indicators are not in line with the tolerance limits and the ability to work under stress conditions is compromised. To bring the indicators below these limits, immediate corrective actions are necessary to guarantee the safety of the company processes.

However, despite the convergence on the RAF metrics calibration method implemented by banks, there is not yet a univocal approach regarding the choice of the metrics to be calibrated for the various indicators selected in the RAF and the legislation in this sense does not pose specific requirements/constraints (MPRA; 2014).

### ***2.6.5 Communication, monitoring and reporting***

Such a complex framework cannot be effectively realized if the company does not have adequate indicators control and communication tools.

In consideration of the technological evolution and the broad range of possibilities that it offers in terms of business support, it is now inevitable that every company is equipped with an adequate information infrastructure, which play a fundamental role in ensuring robustness and timeliness in the risk management process, ensuring data integration and quality and timely providing all relevant information for each process stage.

In this regard, the Bank of Italy, in the 15th 2013 update of circular no. 263 (Bank of Italy, 2013), defines the information system as "an instrument of primary importance for the achievement of the strategic and operational objectives of intermediaries" because it depends on critical business processes, first of all the risk management process.

An efficient, flexible and integrated information system, in fact, allows all the people involved to have detailed, relevant and up-to-date information to support decisions for the correct implementation of the risk management process. A system of this magnitude must be appropriately implemented and managed, with particular attention to the data management system and the requirements for ensuring IT security.

Considering the increasing dependence of companies on the support of the information system, IT risks represent an emerging risk for all financial institutions and must be considered, along with other relevant risks, in the assessment of the overall exposure to risks (Single Supervisory Group, 2010).

Finally, the reporting function is important because it provides a holistic view of all the risk profiles to which the Bank is exposed, clearly highlights any deviations from the risk objectives, as well as violations of the tolerance thresholds, highlights the potential causes that determined the aforementioned discrepancies/violations through the results of monitoring operational limits and risk indicators and articulates summary documents with respect to the analysis performed.

### **2.6.6 RAF representation**

But how can a good risk appetite framework be identified?

First of all, no organisation should want to operate at its capacity, since there would be a very real risk of breaching these limits. In this regard, it is important that risk managers deeply understand the company capacity and how its daily activities expose the business to risk.

While capacity can be expressed in terms of capital or liquidity, the obligations an organisation has to its stakeholders, such as shareholders, the broader community or regulators, are the constraints that can be used to define capacity (Deloitte, 2014).

The risk profile can never be fully known, as it is a multidimensional set of sensitivities to a wide range of potential risk drivers. But risk profile can be estimated by pertinent, timely and accurate assessments of an organisation's exposure to risks, taken from many complementary perspectives across the organisation, including concentration risk and correlations across risk types or scenarios.

Furthermore, it is more important to know where and how the company is exposed to risk through the business cycle rather than knowing it for a particular point in time.

Through the implementation of risk appetite, the companies recognise and accept the risk/return trade-off, considering that they may fail to achieve their goals while still bearing the risk, thus continuing to include the risk appetite itself within the organisation's overall business model.

Risk appetite can't be limitless, so limits are defined to put individual risk-taking in a strategic and organisation-wide context and perspective. They translate strategic objectives into specific actions and control of risk-taking across and within the organisation's businesses. As stated by Deloitte, defining an organisation's risk appetite is more than just setting an upper risk appetite limit. A healthy risk appetite will drive the organisation not only to avoid excessive risk exposition, but also to take the right amount of risk to pursue its goals and outperform competitors, while simultaneously signalling when the level of risk taken is below the minimum useful level for efficient performance.

Accordingly, risk appetite is best understood as a range of strategically desired outcomes between the 'too much' and the 'not enough'. This approach makes risk appetite shift from a risk control mechanism to a strategic risk-taking mechanism. In practice there are

different ways of translating an organisation’s high-level risk appetite into a limit and reporting system. Obviously, it is very important that risk managers pay special attention to both the upper and lower range for potential overshooting or undershooting of the objectives (Deloitte, 2014).

Usually organisations operate a three-leg limit system with a hard-coded upper limit, a trigger, which if reached gives rise to escalation and appropriate corrective action, and a lower limit that defines the minimum risk that should be taken in order to generate sufficient revenues.

According to a study conducted by Deloitte on Risk Appetite Framework, an emerging and leading market practice seems to evolve towards a four-leg system with an upper and a lower risk appetite limit combined with related triggers, as it is shown in the following image.

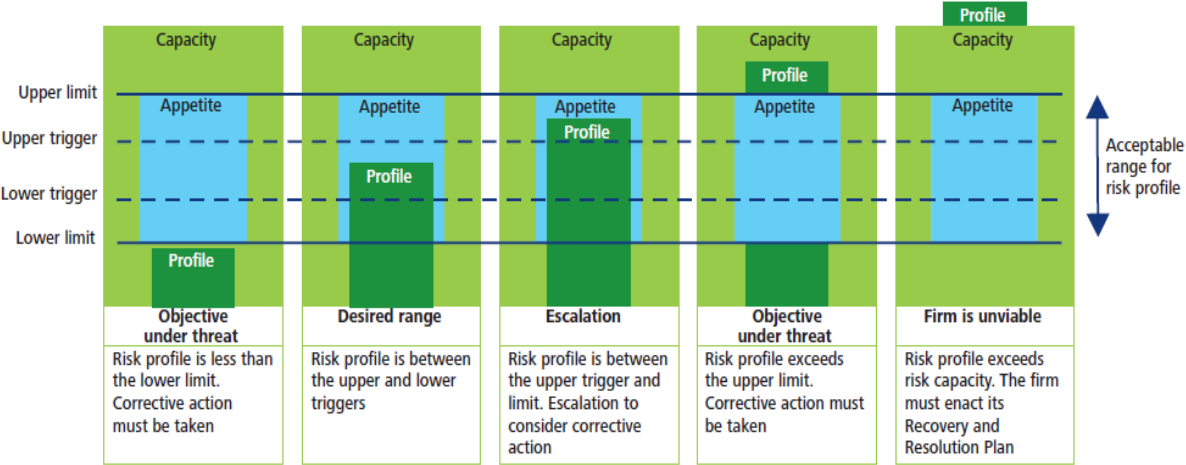


Figure 9: Risk appetite concepts at a glance  
(Source: Deloitte, 2014)

Breaching any of these thresholds may require a strategic reassessment of the business, its potential and the level of allocated capital and other resources. Depending upon the market environment, overshooting but also undershooting the strategic objective may be just the right thing to do. In such cases, the necessary corrective action is reformulating the strategy and the limits, not reducing or increasing the risk-taking. Whatever the organisation-specific solution to setting risk appetite limits may look like, an efficient and effective risk appetite framework should recognise and properly manage any deviations from the strategic business and risk objectives. Accordingly, a successful risk appetite framework represents the company convictions of their risk limits decisions.

To truly embed risk appetite within an organisation, a good solution is to hire and retain appropriately skilled people in the right roles (supported by the right systems); moreover, same importance has to put in place to processes and policies that set the strategic plan and objectives as well as the risk strategy and risk capacity. Further, firms should articulate and cascade risk appetite statements and limits, monitor and report the difference between the defined risk profile and appetite and control and correct the risk profile if it deviates from appetite. Finally, a reassessment of the risk appetite strategy may be necessary, in the light of changes in the business, competitive or control environments. (Deloitte, 2014)

The key stages in implementing and running a risk appetite framework need to be linked in order to achieve communication via an organisation-specific risk appetite language that everyone in the organisation can understand and use. The key stages can be represented in a graph like the one below.

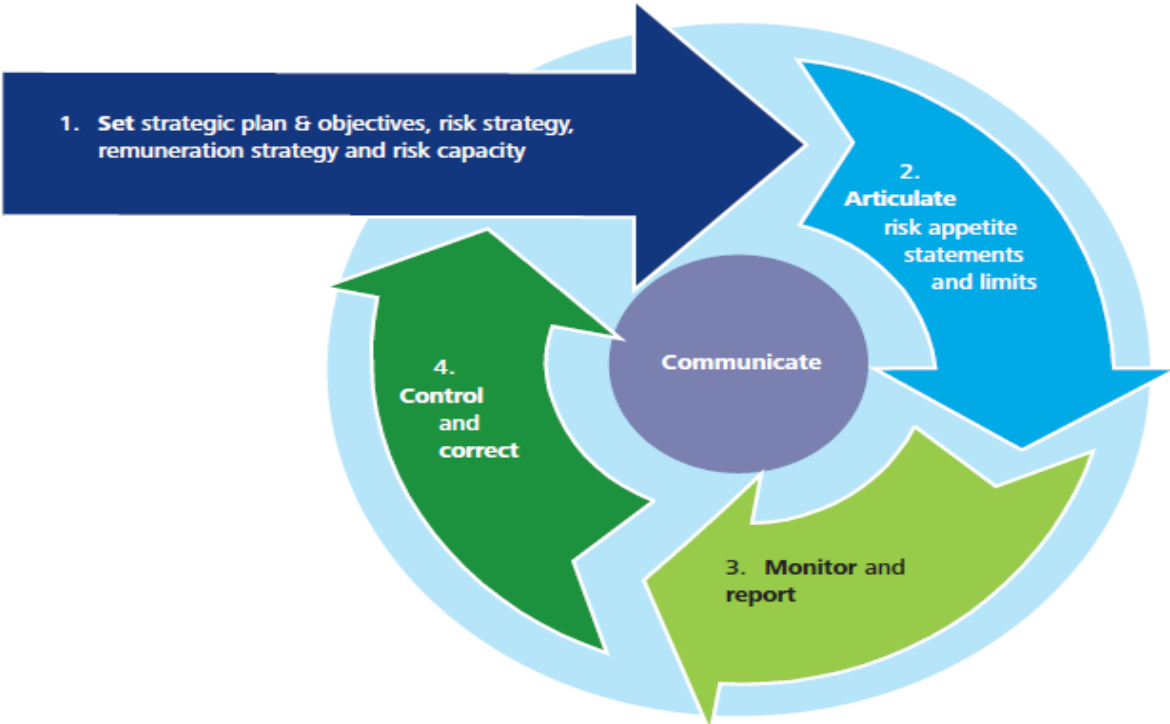


Figure 10: Implementing and running a risk appetite framework  
(Source: Deloitte, 2014)

A risk appetite framework implemented in this way allows the people who set strategy to accept in a conscious way the risks that are associated with the strategy and the underlying business model. People who take risks on behalf of an organisation know what

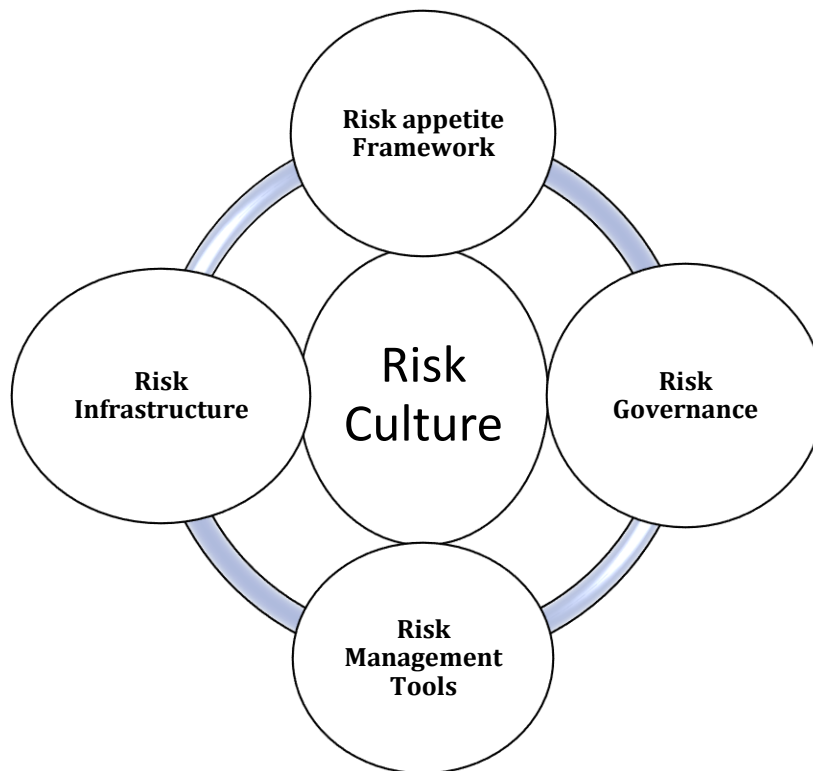
strategic objectives they are supporting and coherently translate these objectives in actions, keeping in mind the pre-set risk limits. Thanks to this model, an organisation is able to understand material risks of its action, along with the drivers of those risks. Such a framework is good to the extent that risk aware language as the key ingredient of its risk culture permeates the organisation, its decision-making processes and the understanding of its own performance.

Considering that it is important to manage the aggregated impact of risk-taking across an organisation, the process of setting up a risk appetite framework can be complex and time-consuming and will depend on the nature and complexity of the organisation. That's why only people who understand how and why their decisions affect an organisation's overall risk profile should perform limits calibration. In fact, a risk appetite framework built like this works properly if risk is fully permeated inside the company's culture and all people consider risk in the same way. (Deloitte, 2014).

Such an implementation of the risk appetite will further be a proactive defence mechanism but also a way to spread good risk culture throughout the organisation and improve the quality of risk-reward decisions.

One of the benefits of risk appetite frameworks is that they help organisations understand where they can afford to take more risk, in a controlled way that supports and not threatens their strategic objectives.

Making risk appetite work for an organisation implies well-considered change to four interlocking and mutually reinforcing elements (BaFin, 2012), in order to avoid the isolation of this risk management function: the risk appetite framework itself; its risk governance; the associated risk infrastructure; and its suite of risk management tools.



*Figure 11: Risk appetite frameworks & other elements of risk management  
(Source: Author elaboration)*

Figure 11 shows that risk culture is central to an organisation’s risk management and governance. An organisation’s risk management needs to be aligned to its business and risk strategy and how it positions itself in markets. The risk appetite framework is therefore the key way to link an organisation’s strategy and its management of risk.

The final picture will show an organisation’s risk appetite framework who will both support and be supported by its risk governance, its risk management tools its risk infrastructure and its risk culture.

So, it can finally be said that a genuine risk appetite framework should be dynamic, should underpin proactive ways of managing risk and setting and adjusting the organisation’s business.

# **CHAPTER 3**

## **ENTERPRISE RISK MANAGEMENT AND PERFORMANCE: AN EMPIRICAL ANALYSIS**

### **3.1 THE RELATIONSHIP BETWEEN RAF AND PERFORMANCE**

In the previous chapters it has been developed a descriptive and theoretical analysis of the object of study, illustrating the application and evolution of enterprise risk management practices in financial institutions, by examining the risk management weaknesses highlighted by the financial crisis. The main regulatory contributions that lead to the implementation of integrated risk management systems within financial institutions, as well as of the RAF, have also been presented.

In this chapter an empirical analysis is carried out with the aim to verify the presence of a relationship between the adoption of good risk management practices, such as the RAF, and the level of performance and risk of the banks, in order to understand if the implementation of the ERM can lead to positive performance effects. The main hypothesis on which the analysis is based is that the banks that can proactively and holistically manage risk have a better performance than those that, instead, limit themselves to managing risks according to a traditional silo-based perspective.

First, some theoretical and empirical studies that inspired the research will be reviewed; then, the sample used for the analysis will be described, together with the variables taken into consideration and the model of analysis. Finally, the results of the empirical analysis will be analysed.

#### **3.1.1 Literature on the relationship between risk management and performance**

After the catastrophic financial crisis that happened in 2008, the doctrine showed a growing interest in the role played by the bank's risk management function; in fact, among the main banking problems that emerged during the crisis, there are the shortcomings related to risk governance, intended as risk control by the board and management and as a monitoring tool of the configuration of internal control systems for the identification,



measurement and risk management. However, even if there are numerous theoretical and conceptual studies that deal with these issues, there are few empirical studies and they mainly address to the US banking sector.

One of them is the study of Ellul and Yerramilli (2013). Here, the authors propose, analysing a sample of 74 major US listed banks during the period 2000-2008, to verify whether the presence of a particularly authoritative and independent risk management function has influenced the risk and the performance of these financial institutions. In particular, the quality of the risk management system is measured by a specific indicator built by the authors, the risk management index (RMI), based on six risk governance variables; the analysis shows that the intermediaries in which a more robust and integrated risk management function (hence with a higher MRI) was present, even before the crisis, showed a lower tendency to acquire additional risks and consequently a better operating performance and a higher annual profitability in the years of financial crisis (Ellul, Yerramilli, 2013).

Other scholars like Aebi, Sabato and Schmid (2012) focus their attention on the characteristics of the risk governance of two samples of US banks during the financial crisis; in particular, they show that the banks in which the Chief Risk Officer reports directly to the board of directors have achieved a higher performance than those in which the organizational figure responds to the Chief Executive Officer, highlighting that there is a conflict of interest between these two subjects, presumably due to the fact that the latter may not consider risk management as a priority, having in fact greater interest in expanding the volume of revenues, assets and profits to increase its personal prestige (Aebi, Sabato, Schmid, 2012).

The study by Minton, Taillard and Williamson (2011), suggests that banks in which the percentage of independent members of the board of directors is higher also have a lower level of risk; furthermore, it should be noted that the experience of the members of the board is negatively correlated with the bank's performance while it is positively correlated with the risk of the same (in contrast to the view of international regulators, for whom a greater financial experience of the board should reduce the risk profile of the intermediary) (Minton, Taillard, Williamson, 2011).

Capuano, in his study conducted in 2013, develops an analysis aimed at assessing the effects of risk governance on the performance and risk of banks during the financial crisis in the European context. The measures taken into consideration refer to the

organizational units of the Chief Risk Officer and the board, with variables that aims to emphasises the importance attributed to the role of the CRO and the quality of the overall bank risk monitoring by the board through the Risk Committee.

The analysis shows that the presence of the CRO within the organization is not sufficient to reduce the level of risk of the bank (rather it contributes to increase it), while the fact that it is also an executive member of the board allows to mitigate the tendency of the bank to acquire excessive risks. Both the size of the remuneration of the CRO and the level of professional experience of the members of the Risk Committee do not seem to be useful for containing corporate risk but tend to increase it; the degree of hard work of this committee, on the other hand, makes it possible to increase the stability of the bank, reducing the level of risk.

The study indicates that the presence of the CRO is positively associated with the profitability of banks (expressed in terms of return on equity), while there is a negative relationship between the size of the remuneration of the CRO and the performance. Also, the number of meetings of the Risk Committee (measure of the degree of its activity) is reflected in a negative way on the performance of the banks of the sample, in contrast with the study of Aebi et al. (2012); differently there is a positive relationship between the degree of independence of the board of directors and the performance of the bank (Capuano, 2013).

Of notable importance is also the study conducted by Florio and Leoni (Florio, Leoni, 2017) where, through the analysis of a group of Italian listed companies, the focus is on ERM integration by considering the appointment of a chief risk officer (CRO), the presence of an internal control and risk committee (ICR committee), and the reporting frequency of the ICR committee to the board of directors (BoD), considering in particular the risk assessment frequency, depth, and methodology.

Moreover, a good ratio between cost and income is a proof of advanced ERM systems, that positively affect both ROA and firm value. Therefore, the sophistication of ERM systems as a whole, rather than just single elements, contributes to the improvement of firm performance.

Gatzert and Martin (2015), highlighted that particularly the company size is significantly positively related to the implementation of ERM in most empirical studies and, furthermore, that ERM generally has a (significant) positive impact on corporate value and performance (Gatzert, Martin, 2015).

Moreover, some of the minimum performance indicators listed in the 2017 *“Il ruolo del RAF nella governance delle banche”* published by the AIFIRM, taken by the Recovery plan drafted by the EBA, are used to demonstrate the correlation between risk management and the performance itself (AIFIRM, 2017).

Neisen and Roth (2017) provides a detailed comment on how, since 2012, the Basel Committee has increasingly pursued a revision of the calculation methods for risk-weighted assets and how this metrics is increasingly important to monitor the banks' performance. The authors aim is to convince banks to seriously take into consideration RWA in their monitoring activities, since the financial sector will soon face a new framework called "Basel IV" and not just a fine adjustment of the existing Basel III regulations.

Finally, hints on RWA and banks' performance are provided by Mohamad, Basah and Aziz (2018) through their analysis conducted on the RWA performance after recent global financial crisis in Malaysian banking system.

The present study takes the previewed literature as a starting point, with the aim of assessing the effects of certain risk variables on the performance of a group of banks that belonged to the SIFIs list in the reference period, in order to understand if the performance of these financial institutions is influenced by a coherent and integrated risk management.

### **3.1.2 Data sample and research method**

The sample of study is represented by 7 international banking institutions listed in the SIFIs classification between 2008 and 2016, for which financial statement data and information concerning corporate governance were collected with reference to the reference period.

<b>Bank Name</b>	<b>Country Code</b>
BNP Paribas	FR
Banco Santander	ES
CreditSuisse	CH
Deutsche Bank	DE
JP Morgan	USA
Monte dei Paschi di Siena	IT
UniCredit	IT

*Figure 12: List of sample banks  
(Source: Author elaboration)*

The data used in this report were obtained from the websites of the institutions examined (such as group and financial statements, corporate governance report, remuneration report), integrated with the data obtained from the Bloomberg database and from the EBA website.

The analyzed sample was selected through an analysis of the trend of the positions occupied by the main groups within the ranking drawn up annually by the FSB. The selection includes some international banks, including the Italian UniCredit Group S.p.A., on which a more in-depth analysis will be offered later.

The basic unit of analysis is therefore made up of the banking group and the consolidated financial statements represent the reference source of information.

This selection has depended on the greater availability of data and the desire to represent both national and international examples.

The reference period, as already mentioned, includes the years from 2008 to 2016, so as to include the period of manifestation of the financial crisis and the subsequent one, up to the present day.

An introductory assumption at the basis of empirical study is that bank performance is not easily predictable, mainly due to the fact that balance sheet performance indicators can be manipulated in order to attract market investors and funds.

Therefore, modelling approaches to such indicators have to cope with a low grade of statistical performance and parameter significance, mainly due to low linear separability of the phenomenon.

Further, it is important to note that the present analysis does not aims to directly predict a performance indicator magnitude, but instead its direction will be introduced.

Direction of the performance seems to be predictable by using variables related to risk appetite and costs sustained by a financial institution.

Main assumptions of the modelling framework are that:

- model should find simple and intuitive relation between performance and strategical variables that a financial institution can control;
- model must be able to identify the direction of the performance indicator using statistical significant relationship between dependent and independent variables;
- the framework should be general and applicable to any bank that presents the SIFI classification;
- model must predict direction with a good level of hit rate.

The model framework that fits to these assumptions in a good manner is a pooled OLS regression model on panel structured data, because not only time should be taken into account, but also different financial institutions are available in our dataset.

The model, starting from those used in the presented literature empirical analysis, have been autonomously developed, with the aim to provide some significant results with data at our disposal. In particular, the aim is to have a confidence level below 5%, which is a good threshold using small samples below 60 observations, as it is in this case where there are 55 observations

### **3.1.3 Variable measurement**

The empirical analysis is mainly composed of two phases: a first phase where a larger number of indicators, coming from the literature presented throughout the entire thesis, have been selected and analysed for every bank of the sample during the entire reference period. These data have then been gathered and summarized in average values for each year in order to demonstrate their average trend over the reference period thanks to the graphs reported below.

In the second phase a smaller number of these metrics, those who better fit in the used model of analysis, have been selected and correlated through a pooled OLS model, in order to show their trend and how they relate to the banks' performance.

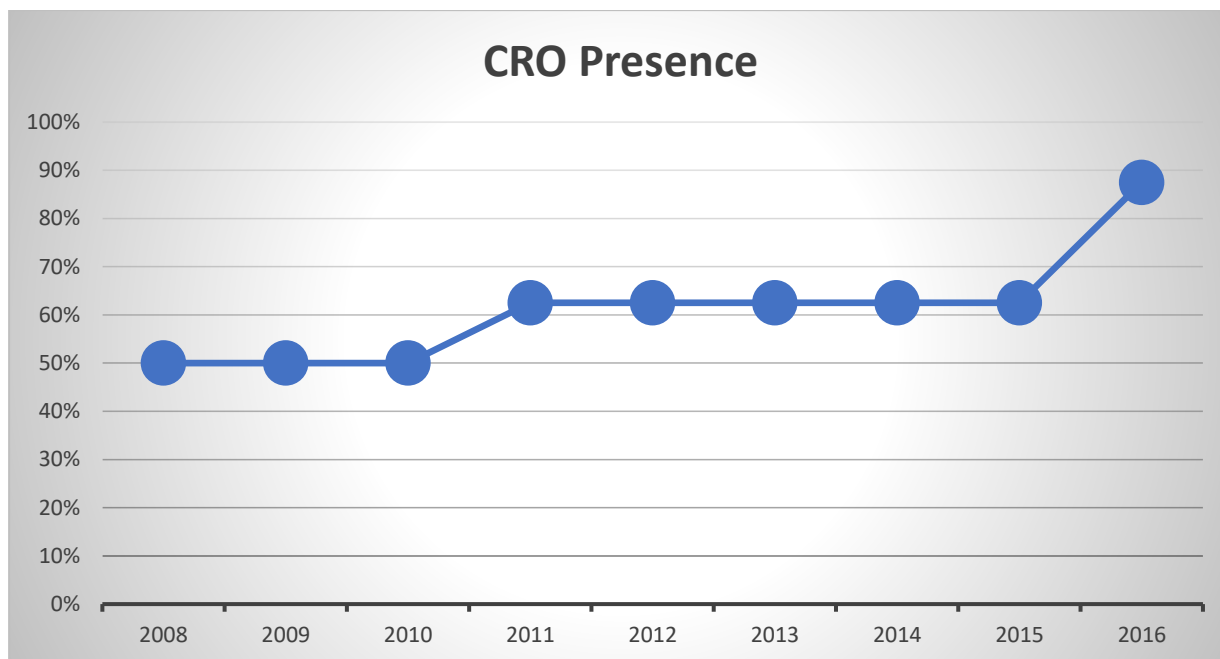
The dependent variable to be modelled is the rank or the direction of the ROE, defined as three clusters valued as 1 if ROE is positive, with -2 if ROE is negative and is less than 10% and with -1 in other cases.

Independent variable constructed using data gathered from the samples balance sheets and derived through mathematical formulas that are finally selected for the model are:

- Risk-Weighted Assets indicator: this variable is an indicator variable that points out the value of 1 if the RWA of a financial institution increases in time, while its value is -1 if RWA decrease in time. It has been considered because of the increasing importance given to this variable in the recent literature (Neisen and Roth, 2017; Mohamad, Basah and Aziz, 2018);
- Cost/Income Ratio Indicator: this variable is an indicator variable that shows 1 if cost/income ratio is above the average historical value for a given financial institution or shows value of -1 if cost/income ratio is below the historical average. This variable has been chosen in line with the analysis conducted by Capuano. (2013).
- Size variable: this variable identifies the largest and the lower banks of the basket; value 1 is used to indicate the largest bank, while -1 is used for indicating smallest bank in the basket. For any other bank the indicator is set to the null value.

### **3.1.4 Description of the sample**

In the first phase, based on the literature, the CRO presence variable has been taken into consideration. It is presented as a dummy variable equal to 1 if the figure of the Chief Risk Officer is present and zero otherwise. This person is responsible for ensuring that comprehensive and integrated information is provided to the top management, allowing an effective knowledge of the bank's risk profile. It has an all-round view of business risks and governs the risk in all the areas in which the banking group is organized. The presence of the CRO, measured by the variable in question, thus allows to oversee all the operational choices taken by the various business units, which entail the assumption of risks, thus allowing an integrated view of business risks and a correct understanding of the possible interrelationships existing between them.



*Figure 13: CRO presence*  
*Source: (Author elaboration)*

Figure 13, based on the analyzed sample, shows a progressive increase in the Chief Risk Officer presence since the years following the crisis. In 2016, the figure stands at about 90%, which shows that almost all banks are now aware of the importance of this figure and the attention that have to be paid to risk.

The CRO presence inside a financial institution is also a good proof of the existence of a complex ERM and thus correlates to a high percentage of the centrality of the CRO itself, to the committee experience and activity. Consequently, this complex framework is correlated to the bank size, meaning that the more developed is this system, the more the bank is big (Gatzert and Martin, 2015).

The ERM implementation is also correlated to the board independence, that indicates the percentage of independent members of the board of directors compared to the total of its members. Independence can be defined as the absence of relations with the bank and with the associated subsidiaries and companies, except for the office of member of the board of directors. The board of directors' independence and the objectivity of the judgments it expresses are closely related: independent directors, in fact, precisely by virtue of this characteristic, can make decisions that are in contrast with the board. Part of the doctrine therefore maintains that the degree of independence among the members of the board of directors is positively correlated with the company performance and contributes to a

better coverage of the risks (Minton, Taillard and Williamson, 2011); for others, however, there is a negative relationship between the number of independent directors and the bank's performance.

The analysis then takes into consideration the average ROE of the banks with its standard deviation and the ROA with its standard deviation.

Average ROE and ROA are considered as performance indicators, while their standard deviations are considered as risk indicators.

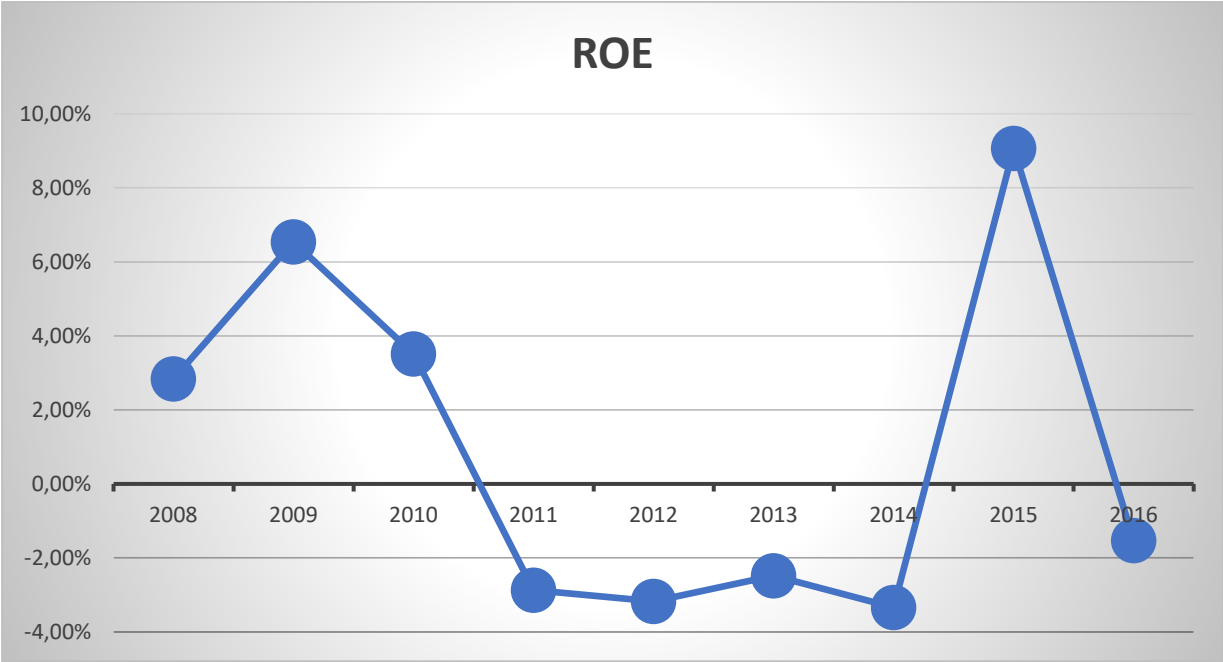
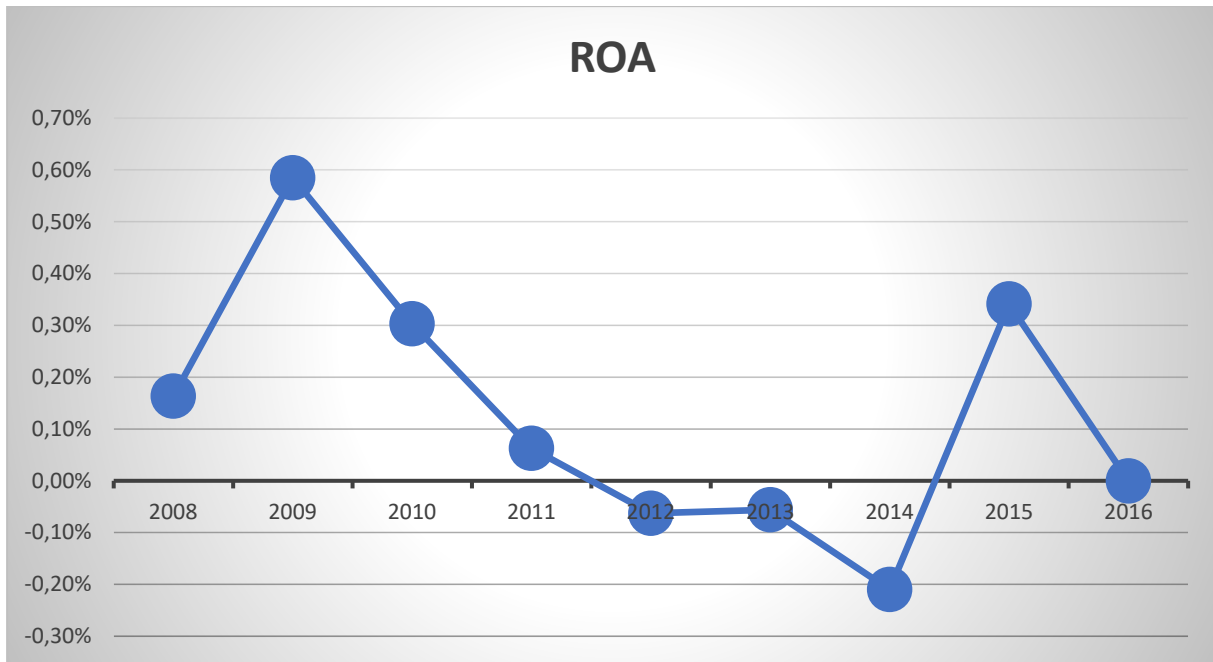


Figure 14: ROE as performance indicators  
(Source: Author elaboration)





*Figure 15: ROE and ROA as performance indicators  
(Source: Author elaboration)*

The trend of the two indicators is quite similar over time. Starting from a bad situation due to the 2008 crisis, both indicators show an increase in value in the following year 2009, with an average value of 7% for the ROE and of 0.59% for the ROA. Then, they both undergo a gradual decline until 2014, with a minimum peak of -3.34% for ROE and -0.21% for ROA, followed by a sudden rise in 2015 and then to decline again in the following year 2016 with a final average value of - 1.53% for ROE and 0% for ROA.

The wave pattern of the two variables is due to the high pre-crisis performance, followed by a negative post-crisis shock which still affects the performance of the analyzed sample, not allowing a constant and continuous increase of the variables.

To further refine the two variables even more precise and to take into consideration their volatility, two different variables were introduced in the analysis that allow the underlying risk to be taken into account; these risk-adjusted performance measures are the risk-adjusted return on equity (RAROE), and the risk-adjusted return on asset (RAROA). The first one is calculated as the ratio between the ROE and its standard deviation, the second is equal to the ratio between the value of the ROA and its standard deviation.

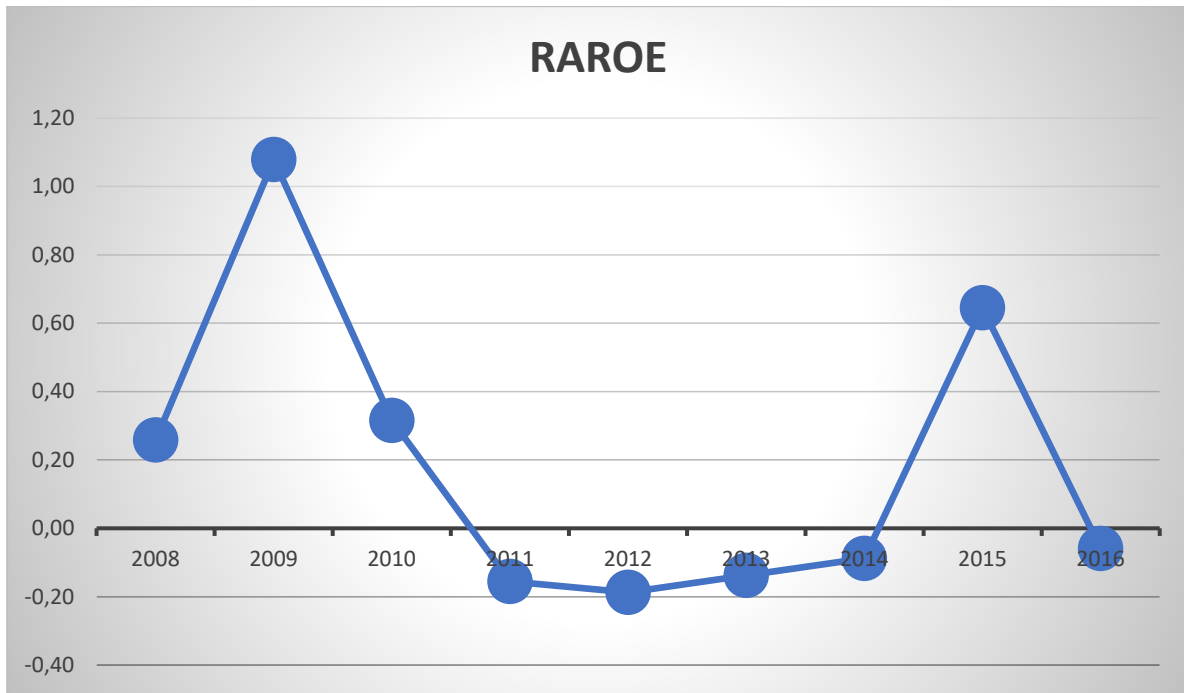


Figure 16: RAROE as risk-adjusted performance indicators  
(Source: Author elaboration)

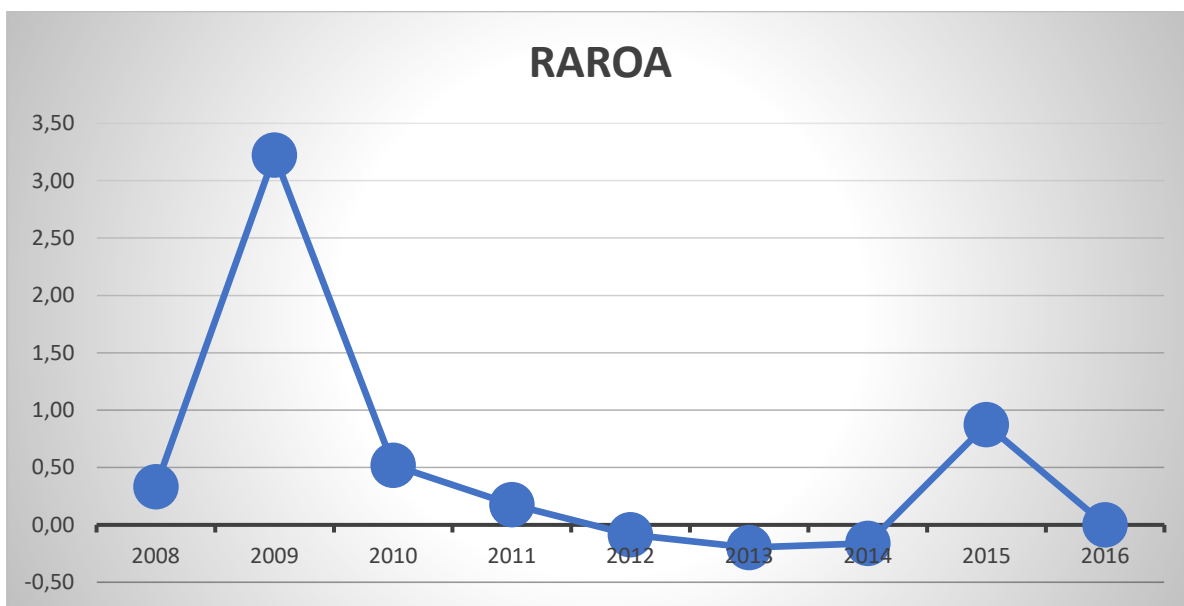


Figure 17: RAROE and RAROA as risk-adjusted performance indicators  
(Source: Author elaboration)

These two variables take into consideration the riskiness of the bank: in particular, they both pay attention to the trend of the performance variables and to the overall risk level of the bank's activities. The variables under review, in the reference period, substantially

confirm the indications of the ROE and the ROA, as shown by the similar performance shown in the two previous figures (Figure 16 and Figure 17).

After that, the standard deviation of the ROE and the ROA are examined.

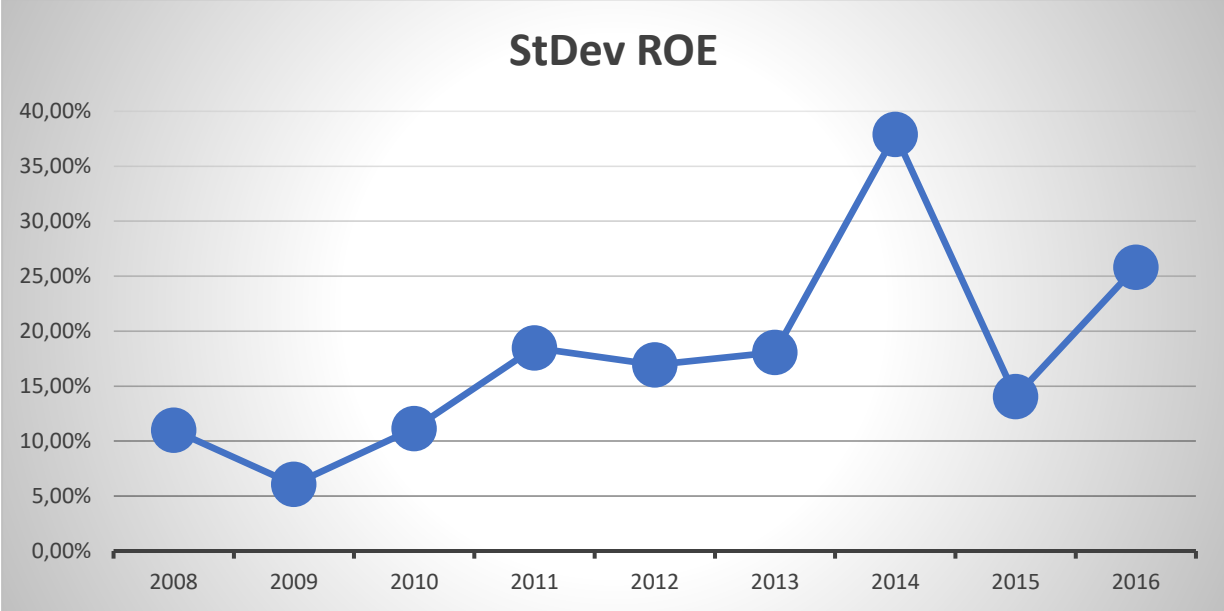


Figure 18: StDev ROE and StDev ROA as risk indicators  
(Source: Author elaboration)

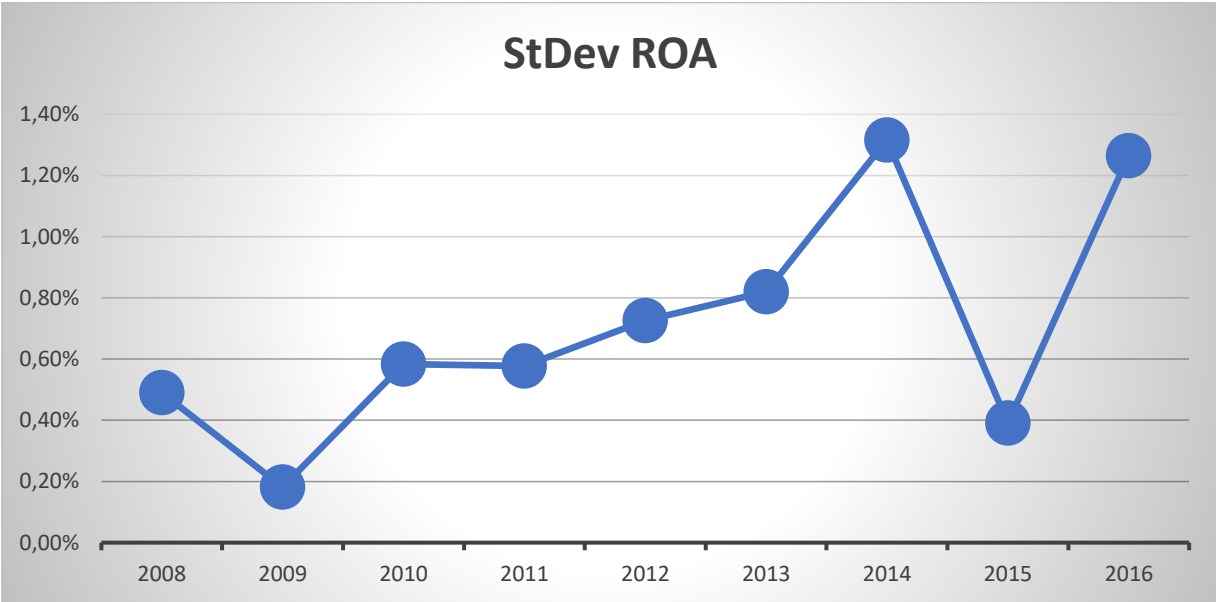


Figure 19: StDev ROE and StDev ROA as risk indicators  
(Source: Author elaboration)

The two variables show a similar trend also in this case. They show a decrease in the level of risk in 2009, with a value of 6.06% for the STDev ROE and 0.18% for the StDev ROA, and then present a progressively constant trend until 2014, with a peak of 37.90% for the StDev ROE and 1.32% for the StDev ROA, after which a sudden new decrease is evident until the final substantial increase in 2016, the year in which the two variables present a value respectively of 25.83% and 1.26%.

The Z-score index is a measure of the banks' solvency degree and is equal to the inverse of the probability of their insolvency. Therefore, it must be interpreted in a mirror-like manner with respect to the other two risk indicators: an increase in the index indicates, in fact, a reduction in the probability of default and the overall risk of the bank, and vice versa.

This is confirmed by the graphic trend of the variable, as shown in the figure below (Figure 20): in the years when StDev ROE and StDev ROA grow, thus indicating an increase in overall risk, the index under examination decreases, providing the same indication regarding the level of risk. In the years in which the two indicators show an increasing trend, the variable Z-score decreases, reaching a minimum average value of 1.85 in 2014, while it touches a point of maximum in the following year 2015, in contrast with the other two indicators. Likewise, in 2016 it decreases again up to an average value of 2.03, while StDev ROE and StDev ROA show a new increase.

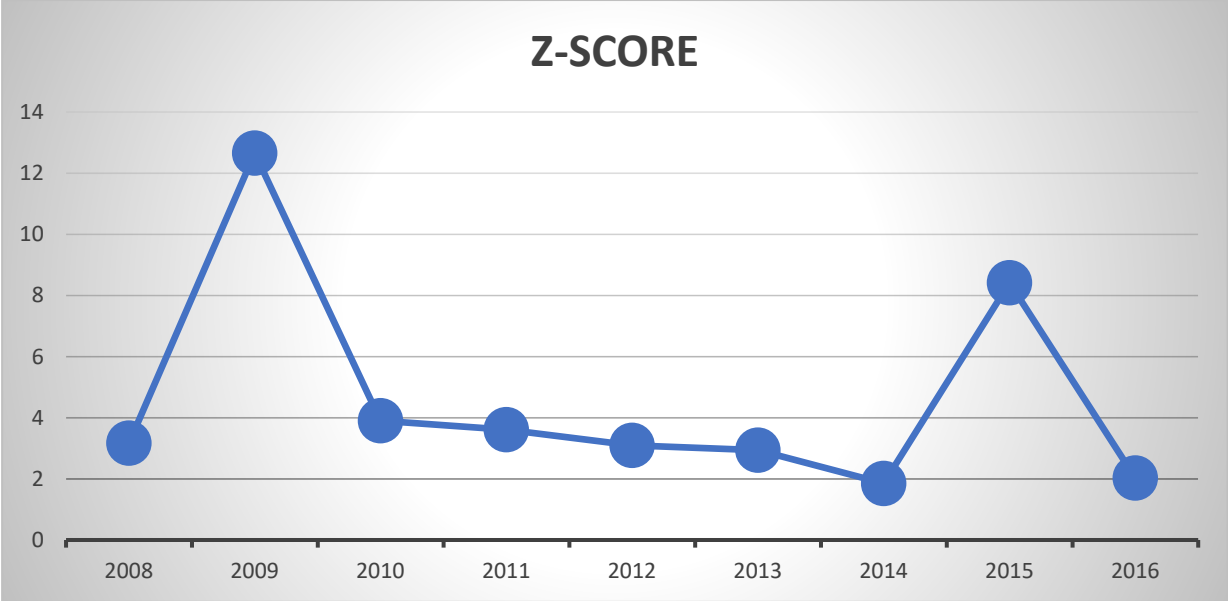


Figure 20: Z-score variable  
(Source: Author elaboration)

The analysis then focused on some control variables to verify the robustness of the relationships between the main variables: these factors could, in fact, influence the bank's performance and risk.

The first variable considered is Cost to income ratio. It is calculated as the ratio between the operating costs and the intermediation margin and represents an indicator of the managerial efficiency of the intermediaries: its reduction indicates, in fact, a lower incidence of costs compared to the wealth produced and therefore a higher level of efficiency.

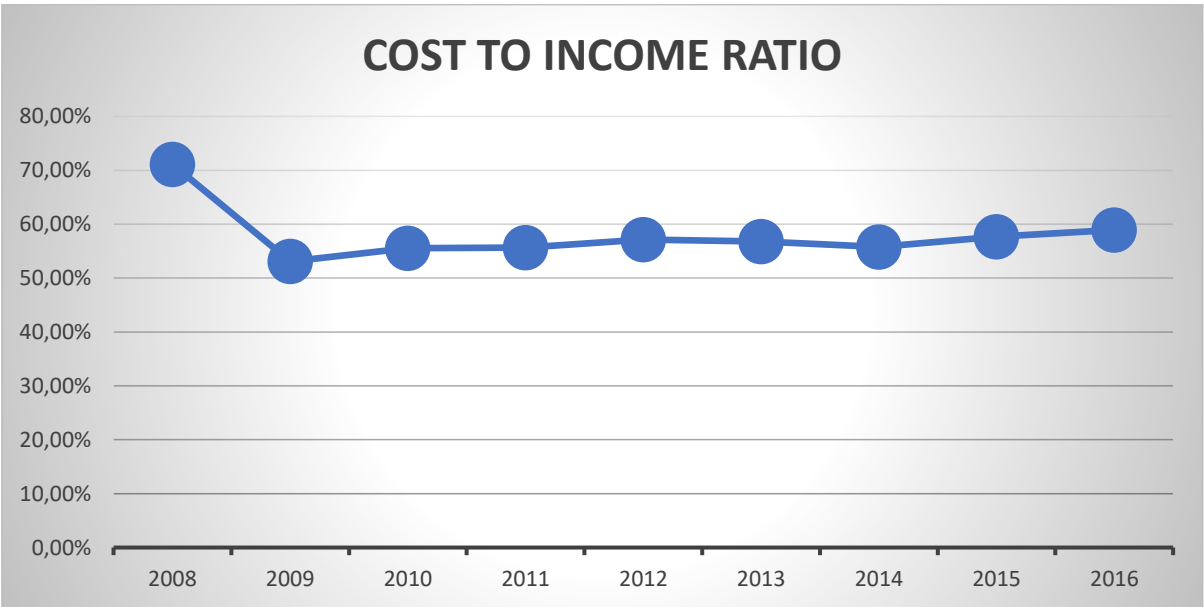


Figure 21: Cost to income ratio as control indicator

(Source: Author elaboration)

The graph shows a decreasing trend in the two-year period 2008-2009, with a minimum of 53.08%, in line with the financial crisis. After that period, the variable grows steadily, up to a value of 58.92% in 2016. The trend of the variable shows that the banks included in the sample have managed to maintain a good level of efficiency during the climax of the crisis. Another factor in favor of the increasing trend is the increase in expenses and the reduction in the intermediation margin in the same period.

Furthermore, the average of the variable over the reporting period is 65.33%, in line with the results presented by Capuano in its studies with reference to European banks (Capuano, 2013).

The Net Interest Margin variable constitutes the traditional source of revenue of the bank, deriving from its activity of collecting savings and providing credit. It represents a measure of bank profitability and is calculated as the ratio, in percentage terms, between the interest margin and the total asset value in the same year.

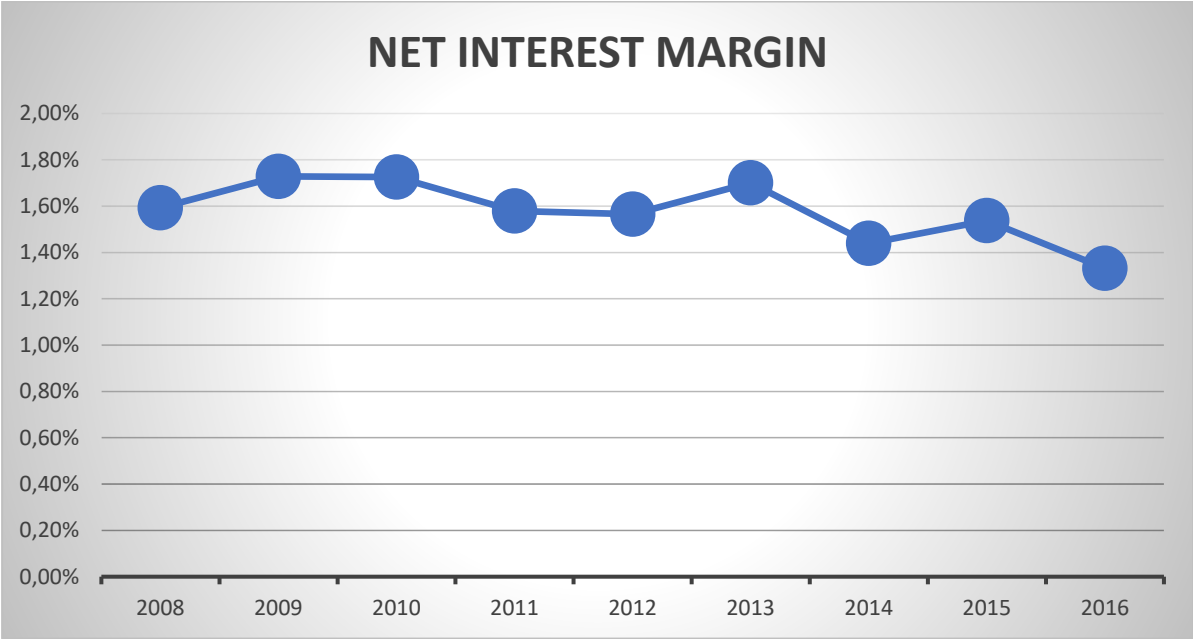
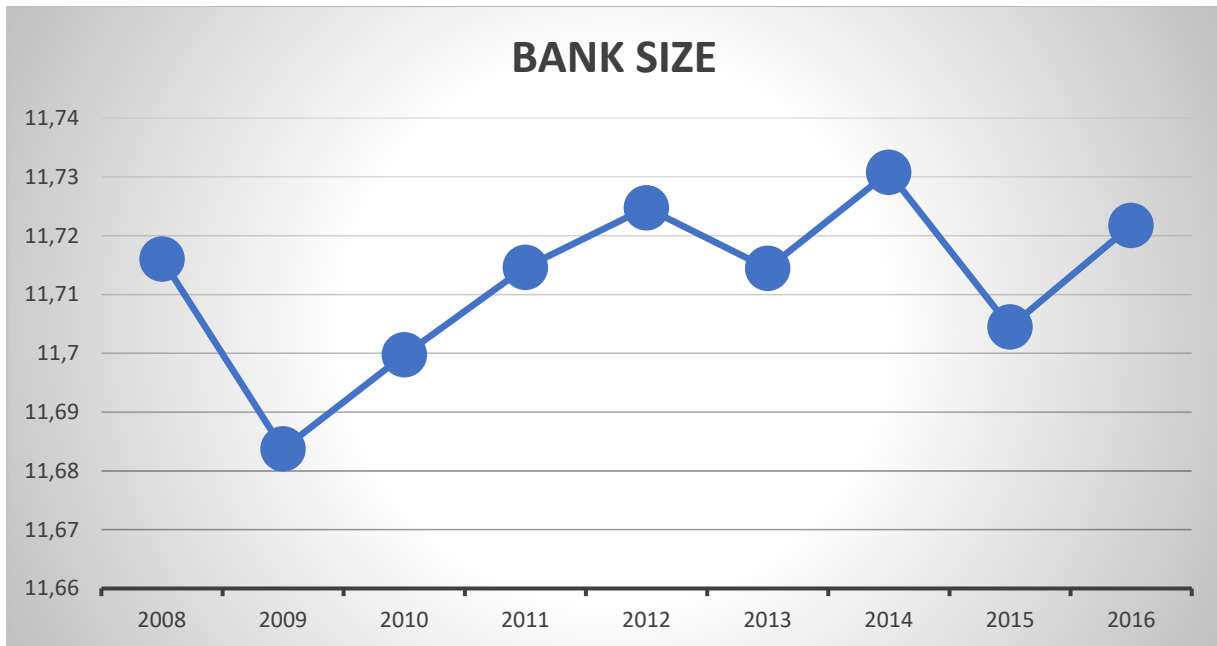


Figure 22: Net interest margin

(Source: Author elaboration)

The graph shows an undulating trend of the variable, albeit with a progressive decrease, with a minimum of 1.33% in 2016. The causes of this decline are to be found in the weak increase in loans, in the high incidence of impaired loans and in the increase in the cost of funding, as well as in the continuous increase in the average size of banking groups in terms of total assets (KPMG, 2011).

The Bank Size variable is calculated as the logarithm of the total assets and is used as a measure of the size of the bank, in order to check any systematic differences in performance or risk between banks of different size classes.

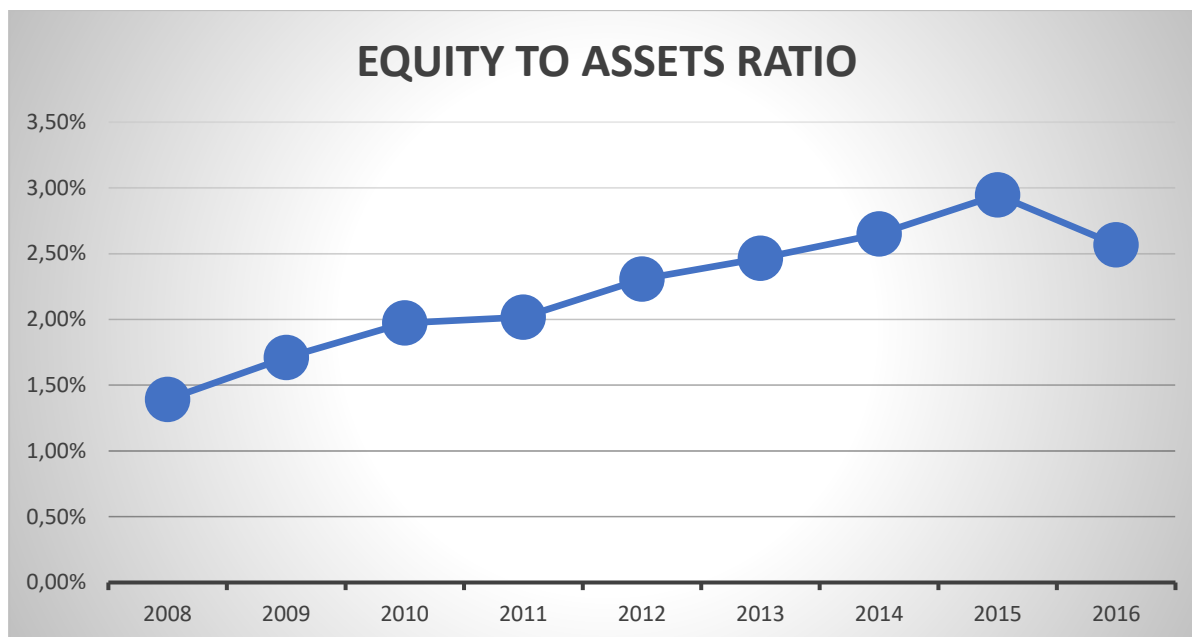


*Figure 23: Bank size variable*

*(Source: Author elaboration)*

The graphical representation of the trend of the variable shows a progressive increase in the average size of the sample banks, in terms of total assets, in the reference period, except for two very slight decreases in 2013 and 2015, probably due to the concentration strategies not perfectly implemented.

In line with the literature, the variable Equity to Asset ratio was considered, and it represents the ratio between equity and total bank assets in a given year. It therefore expresses the degree of capitalization of the intermediary: a deterioration of the variable in question indicates an increase in the debt, with a consequent increase in the level of risk for the bank.



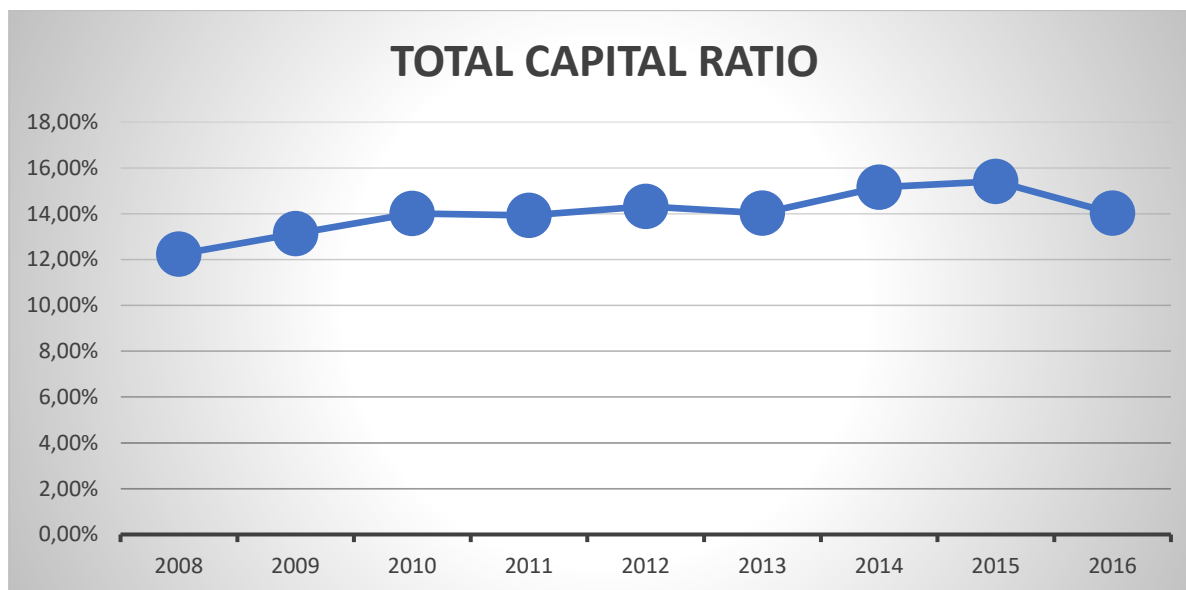
*Figure 24: Equity to Assets ratio*

*(Source: Author elaboration)*

The variable shows an average value over the reference period of 2.23%, lower than that of the sample of European banks analyzed by Capuano (2013) which instead stands at around 5%. The trend is mainly increasing, due to the increase in the degree of capitalization of the banks over the years. The cause of the downturn in 2016, where the value is 2.57%, is due to the increase in total assets of the sample banks.

At the basis of the First Pillar of the Basel prudential regulations, which provides, as a general requirement, the maintenance of an amount of the regulatory capital of at least 8% of the risk-weighted assets, there is the variable Total Capital ratio, an indicator of the solidity of the bank. It is calculated as the ratio between regulatory capital and risk-weighted assets: the higher the ratio, the greater the capital strength of the intermediary.





*Figure 25: Total capital ratio variable*

*(Source: Author elaboration)*

The trend of the variable since the years of the crisis is almost constantly increasing, except for a slight decrease in 2016, where the average value is 14.03% and indicates a correct capitalization of the sample banks.

The next two variables taken into consideration are Deposits and Loans, expressive of the activity traditionally carried out by the banks. The Deposit variable is determined the ratio between the volume of deposits and total assets, thus indicating the bank's direct collection capacity; the Loan variable is instead equal to the ratio between the loans disbursed and the total assets of the bank.

After a slight increase from 2008 to 2009, the deposit variable shows a decreasing trend up to 2012, the year in which the value stood at 26.31%, and then grew steadily up to the present day, with a value of 35.09% in 2016.

The Loans variable, on the other hand, shows an upward trend throughout the period of reference, surpassing the deposit variable in the years from 2010 to 2015, then presenting an average value almost similar in 2016, which stands at 34.04%. The trend of the two variables is particularly interesting in the period 2010-2015 where, as previously pointed out, the Loans variable exceeds the Deposits variable. This average overrun indicates, in fact, that at least a part of the latter has been financed through forms other than deposits

and, probably, less stable over time, highlighting the tendency of banks to increase their degree of risk.

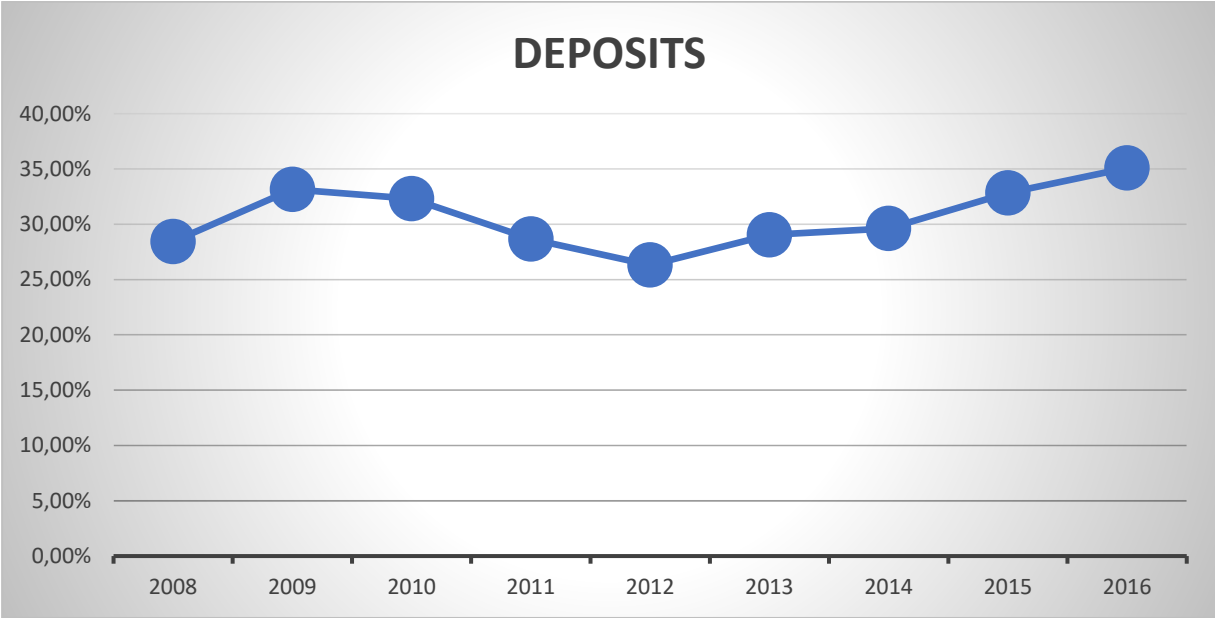


Figure 26: Deposits variable  
(Source: Author elaboration)

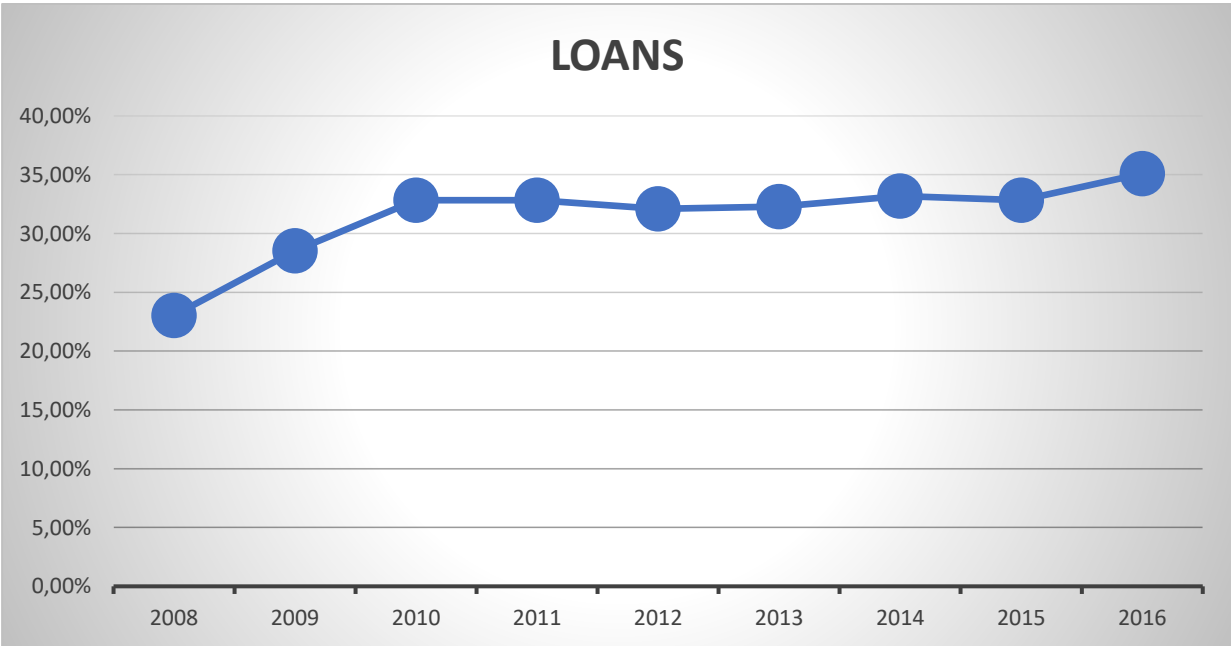


Figure 27: Loans variable  
(Source: Author elaboration)

## 3.2 THE EMPIRICAL ANALYSIS

After the first phase of data description and graphical representation, a more detailed selection of some of the previously mentioned variables was carried out, in order to develop an explanatory regression model.

Main assumption of the modelling framework is that:

- model should find simple and intuitive relation between performance and strategical variables that a financial institution can control;
- model must be able to identify the direction of the performance indicator using statistical significant relationship between dependent and independent variables;
- the framework should be general and applicable to any bank that presents the SIFI classification;
- model must predict direction with a good level of hit rate.

So, using a panel regression model, dependent variable to be modelled is the rank or the direction of the ROE, defined as three clusters valued as 1 if ROE is positive, with -2 if ROE is negative and is less the 10% and with -1 in other cases.

Independent variable constructed using data gathered from the samples balance sheets and derived through mathematical formulas that are finally selected for the model are:

- RWA indicator: this variable is an indicator variable that points out the value of 1 if the RWA of a financial institution increases in time, while its value is -1 if RWA decrease in time;
- Cost/Income Ratio Indicator: this variable is an indicator variable that shows 1 if cost income ratio is above the average historical value for a given financial institution or shows value of -1 if cost income ratio is below the historical average;
- Size variable: this variable identifies the largest and the lower banks of the basket; value 1 is used to indicate the largest bank, while -1 is used for indicating smallest bank in the basket. For any other bank the indicator is set to the null value.

Available data, thanks to the analysis carried out using the Excel software, led to the creation of the following table, containing the same values modeled for the correlation:

RWA (mln)	cost to income ratio	Cost Income Avg	Intercetta	RWA Level	Dummy Size	Dummy CostIncome	Model result on sample	RoE Rank	Hit Rate
67055	61,80%	65,62%	1,00	1	0	-1	1,12	1 1	76,4%
70129	61,80%	65,62%	1,00	1	0	-1	1,12	1 1	
75348	68,14%	65,62%	1,00	1	0	1	0,43	1 1	
65285	62,13%	65,62%	1,00	-1	0	-1	0,41	1 1	
69206	66,49%	65,62%	1,00	1	0	1	0,43	1 1	
56882	65,09%	65,62%	1,00	-1	0	-1	0,41	1 1	
50471	66,44%	65,62%	1,00	-1	0	1-	0,28	1 0	
42627	68,53%	65,62%	1,00	-1	0	1-	0,28	1 0	
41819	70,14%	65,62%	1,00	-1	0	1-	0,28	1 0	
257467	195,70%	93,88%	1,00	1	-1	2-	0,51	-2 1	
221609	73,00%	93,88%	1,00	-1	-1	-1-	0,19	1 0	
218702	71,10%	93,88%	1,00	-1	-1	-1-	0,19	1 0	
241753	88,50%	93,88%	1,00	1	-1	-1	0,52	1 1	
187000	91,30%	93,88%	1,00	-1	-1	-1-	0,19	1 0	
237800	71,50%	93,88%	1,00	1	-1	-1	0,52	1 1	
291400	72,40%	93,88%	1,00	1	-1	-1	0,52	1 1	
286947	98,20%	93,88%	1,00	-1	-1	1-	0,88	-1 1	
268045	83,20%	93,88%	1,00	-1	-1	-1-	0,19	-1 1	
333605	72,97%	75,07%	1,00	1	0	-1	1,12	1 1	
353103	70,76%	75,07%	1,00	1	0	-1	1,12	1 1	
396468	74,96%	75,07%	1,00	1	0	-1	1,12	1 1	
397382	71,62%	75,07%	1,00	1	0	-1	1,12	1 1	
356235	85,04%	75,07%	1,00	-1	0	1-	0,28	1 0	
1244659	0,00%	0,00%	1,00	1	1	1	1,03	1 1	
1198006	0,00%	0,00%	1,00	-1	1	1	0,32	1 1	
1174978	0,00%	0,00%	1,00	-1	1	1	0,32	1 1	
1221198	0,00%	0,00%	1,00	1	1	1	1,03	1 1	
1270378	0,00%	0,00%	1,00	1	1	1	1,03	1 1	
1387863	0,00%	0,00%	1,00	1	1	1	1,03	1 1	
1619287	0,00%	0,00%	1,00	1	1	1	1,03	1 1	
1485336	0,00%	0,00%	1,00	-1	1	1	0,32	1 1	
1476915	0,00%	0,00%	1,00	-1	1	1	0,32	1 1	
132408	63,10%	66,09%	1,00	1	0	-1	1,12	1 1	
120899	64,20%	66,09%	1,00	-1	0	-1	0,41	1 1	
109238	69,00%	66,09%	1,00	-1	0	1-	0,28	1 0	
105000	70,40%	66,09%	1,00	-1	0	1-	0,28	-2 1	
86941	64,40%	66,09%	1,00	-1	0	-1	0,41	-2 0	
81393	71,00%	66,09%	1,00	-1	0	1-	0,28	-2 1	
76220	75,30%	66,09%	1,00	-1	0	1-	0,28	-2 1	
70828	52,20%	66,09%	1,00	-1	0	-1	0,41	1 1	
65522	65,20%	66,09%	1,00	-1	0	-1	0,41	-2 0	
554005	63,10%	50,35%	1,00	1	0	1	0,43	-1 0	
540248	57,90%	50,35%	1,00	-1	0	1-	0,28	-1 1	
585621	40,01%	50,35%	1,00	1	0	-1	1,12	1 1	
577798	48,08%	50,35%	1,00	-1	0	-1	0,41	1 1	
588088	42,66%	50,35%	1,00	1	0	-1	1,12	1 1	
512532	62,13%	57,21%	1,00	1	0	1	0,43	1 1	
452388	55,60%	57,21%	1,00	-1	0	-1	0,41	1 1	
454850	58,80%	57,21%	1,00	1	0	1	0,43	1 1	
408904	42,90%	57,21%	1,00	-1	0	-1	0,41	-2 0	
409223	41,70%	57,21%	1,00	1	0	-1	1,12	1 1	
390599	61,10%	57,21%	1,00	-1	0	1-	0,28	-2 1	
387136	61,50%	57,21%	1,00	-1	0	1-	0,28	1 0	
390599	65,00%	57,21%	1,00	1	0	1	0,43	1 1	
387136	66,20%	57,21%	1,00	-1	0	1-	0,28	-2 1	

Figure 28: the dataset used

(Source: Author elaboration)

The regression development eventually led to the following results:

OUTPUT SUMMARY

<i>Regression statistics</i>	
R multiple	0,471
R square	0,222
R square corrected	0,176
Standard error	1,068
Observations	55

VARIANCE ANALYSIS

	<i>gdl</i>	<i>SQ</i>	<i>MQ</i>	<i>F</i>	<i>Significance F</i>
Regression	3	16,591	5,530	4,851	0,005
Residual	51	58,136	1,140		
Total	54	74,727			

	<i>Coefficients</i>	<i>Standard error</i>	<i>Stat t</i>	<i>P - Value</i>
Intercepts	0,421	0,145	2,906	0,0054*
RWA Level	0,355	0,146	2,438	0,0183*
Dummy Size	0,599	0,276	2,168	0,0348*
Dummy CostIncome	-0,346	0,154	-2,240	0,0295*

\* significant at the 0,05 level

Figure 29: Output summary

(Source: Author elaboration)

3.3 RESULTS

Model outcome as previously reported is the direction of the ROE indicator. Direction can be identified as the sign variable, which is compared with the sign of the model outcome. In order to measure the performance, the “in-sample” hit rate is calculated. Hit rate, computed as the total number of according signs between ranked ROE and model outcome under the total number of observations, is satisfactory and is reported in the following table:

Hit Rate
76%

Parameters are estimated using pooled OLS model on panel structured data and show a good level of statistical significance (all parameters are below the confidence level of 5%, which is a good threshold using small samples below 60 observations, as it is in this case where there are 55 observations) as reported in terms of p-values in table below:

<b>Parameters Results</b>		
	<i>Beta</i>	<i>P-Value</i>
Constant	0,421	0,0054*
RWA indicator	0,355	0,0183*
Size variable	0,599	0,0348*
Cost Income Indicator	-0,346	0,0295*

\* significant at the 0,05 level

Figure 30: Parameters Results

(Source: Author elaboration)

Also, signs are in line with the expected economic behaviour: an increase in risk, together with the bank ability to coherently manage it, show positive performance effect. That's because risk management, working properly, is able to mitigate risk itself, even though is it actually rising. This result is in line with the reference literature (Mohamad, Basah, Aziz, 2018), where a comparison between risk, RWA and performance is highlighted. Properly managing risk can be translated in a lower overall risk and thus a good RWA performance and so an overall performance increase.

A symmetrical consideration can be done on the relation between risk and costs. In line with Capuano (2013), high costs, due to inefficient risk management, erodes the cost/income ratio, thus showing an overall bank negative performance effect.

The model results indicate that risk also affects how much capital a bank can allocate on a specific activity, how much capital is wasted due to inefficiency and so how worst the performance will be.

Finally, Size effect also shows a positive effect for the basket leader and a negative effect for the smaller basket participant. The Bank Size variable shows a positive relationship with the performance expressed in terms of asset; the larger and better capitalized banks

seem to more profitable both in terms of ROE and ROA. In line with Capuano (2013), this variable is positively correlated to the presence and complexity of a risk management system: the largest banks, in fact, are also those in which the presence of the CRO is more widespread and in which this figure assumes a role of greater importance, but also those where the degree of independence of the board is higher and the Committee risks more active.

# ***CHAPTER 4***

## **CASE STUDY: UNICREDIT GROUP S.P.A.**

### **4.1 UNICREDIT: A BRIEF HISTORY**

After presenting the empirical results of the analysis, a presentation of a business case will be provided, for which the Italian banking group UniCredit S.p.A. was chosen.

UniCredit S.p.A. (until May 2008 Unicredito Italiano S.p.A.) is among the leading Italian and European credit groups and is based in Milan. The bank has over 25 million customers and operates in 18 countries. The main markets in which it operates are Italy, Austria, Germany and Central and Eastern Europe. The group, with a 15% market share, is the second largest Italian banking group after Intesa Sanpaolo. The company is listed on the FTSE MIB index of the Milan Stock Exchange.

In 1998, Unicredito Italiano was born from the merger of the Credito Italiano and Unicredito groups.

In 1999 they joined the Cassa di Risparmio group of Trento and Rovereto (Caritro) and Cassa di Risparmio of Trieste, which just twenty years earlier, in 1979, had incorporated the Cassa di Risparmio dell'Istria di Pola, with provisional seat in Trieste.

On 1<sup>st</sup> January 2003 Unicredito Italiano at the end of the "S3 project" (from Credito Italiano, three new banks are created, divided by the category they are addressed to: a bank for retail customers, individuals, families and small businesses, Unicredit Banca; a bank for highly profitable customers, Unicredit Private Banking; a bank for companies, Unicredit Banca d'Impresa) adopts the UniCredit brand.

Also, in 2003 the members of the group Banca dell'Umbria and Cassa di Risparmio di Carpi were merged into Unicredit.

In the following years there were a series of international mergers. In 2005 UniCredit announced the Public Purchase Offer on the German bank HypoVereinsbank AG (HVB-Group), which led to the takeover bids on Bank Austria Creditanstalt and Bank BPH



(controlled by HVB). On November 17<sup>th</sup> 2005, UniCredit announced that it had reached 93.93% of subscriptions to the HVB Public Offer.

The public offer had important consequences in Poland. In that country Unicredit (Unicredito Group) already controlled Bank Polska Kasa Opieki Spółka Akcyjna (Bank Pekao S.A.), purchased on June 23<sup>th</sup> 1999, while Austria Creditanstalt AG controlled Bank BPH with 71.03% of the shares. Pekao and BPH were two of the largest banking institutions in Poland and their merger would have given birth to the first credit operator in the country, surpassing the state-controlled Pko bank. At the time of the acquisition of Banca Pekao, the Unicredito Group had undertaken a commitment with the Polish state not to purchase other banks and the Kazimierz Marcinkiewicz government demanded compliance with this agreement. The European Commission intervened and through the Commissioners of the Competition, Neelie Kroes, and the Internal Market, Charlie McCreevy activated on 8<sup>th</sup> March 2006 a double infringement procedure against the Warsaw government, considering the agreement between Unicredit and the opposite Poland European directives and the full approval of the merger by the European Union.

The merger with HVB also took effect in Croatia: in this way, Unicredit was in possession of Zagrebačka banka (acquired in 2002 together with Allianz) and indirectly of Splitska banka (already acquired by Unicredit in the late 90s and then resold right to Bank Austria Creditanstalt, later taken over by HVB, to avoid antitrust problems due to the possession of the largest Croatian bank), first and third among the banking institutions of the country. Incorporation into Zagrebačka Banka of the CRTrieste Banka of Zagreb (already a subsidiary of the Cassa di Risparmio di Trieste) completes the Croatian scenario.

On May 20<sup>th</sup> 2007, the Boards of Directors of UniCredit and Capitalia, meeting respectively in Milan and Rome, Profumo and its lower managing directors Fiorentino and Milanta and the general manager Schiattarella and his deputy Donisi, approved the merger by incorporation of Capitalia SpA in Unicredito Italiano S.p.A. The merger became operational as from 1<sup>st</sup> October 2007, which brought a further 9% of Mediobanca's capital into UniCredit's bank, in addition to the 9% it already owned.

The 2007-2008 financial crisis also hits UniCredit, with the value of its shares collapsing in a short time (in September 2008 UniCredit lost 29%). The bank responds with a 3-billion-euro capital increase, which allows the Institute to strengthen its liquidity.

In September 2009 a capital increase of € 4 billion was decided, which definitively aligns UniCredit's capital ratios with the best world standards and allows the bank not to resort to state aid.

Since September 30<sup>th</sup> Federico Ghizzoni, already present in UniCredit as responsible for the Central-Eastern European area, is the new CEO of the group replacing the outgoing Alessandro Profumo.

2011 should have been a year of transition for UniCredit, but the summer crisis of European sovereign debt leads to the collapse of UniCredit shares that lose 63% of their value from 16<sup>th</sup> February to 16<sup>th</sup> September, which makes a new capital increase almost indispensable.

On November 14<sup>th</sup> 2011 the 2012-2015 business plan was presented: a new capital increase (third in 3 years) of 7.5 billion euros is decided and no dividends for 2012. At the same time, a surplus of 5200 employees was declared for Italy. The recapitalization of UniCredit follows the worst quarter of its history, with write-downs of 9,6 billion and a deficit of 10,6.

On January 4<sup>th</sup> 2012, UniCredit announced the details of the 7.5 billion euro capital increase; the strong discount (43%) offered to the new shares (2 new shares each old existing share) causes a stock fall of 37% in 3 days.

In December 2016 UniCredit, led by Jean Pierre Mustier from June 30<sup>th</sup>, leaves Bank Pekao and collects 3 billion and decides for a 13-billion-euro capital increase Also in December, UniCredit sold its subsidiary Pioneer Investments, a company operating in asset management in 19 countries, to the French company Amundi of the Crédit Agricole Group for € 3.54 billion.

On January 23<sup>th</sup> 2017, UniCredit shares are grouped 10 to 1, then, on February 6<sup>th</sup>, a maxi-capital increase of 13 billion euros starts.

On January 29<sup>th</sup> 2018 a new digital bank called buddy bank was launched on the Italian market.

### 4.2 UNICREDIT TODAY

Today UniCredit is one of the largest European banks by turnover and by number of customers. Of all the Italian banks (72% of the capital belongs to foreign funds) it is the one with the greatest international vocation. It is active in 17 countries with 7800 branches. In fact, since several years Unicredit has pursued a strategy that has led it to operate several acquisitions in Europe, particularly in Germany and Eastern Europe, where it is one of the most important banks.

UniCredit’s activities range across all banking sectors, from private banking to retail banking, from online banking to investment banking. UniCredit offers local expertise as well as an international network capable of supporting its broad customer base globally, providing unprecedented access to leading banks in its 14 strategic markets and 18 other countries worldwide. At the end of 2017, the bank presented the following results:

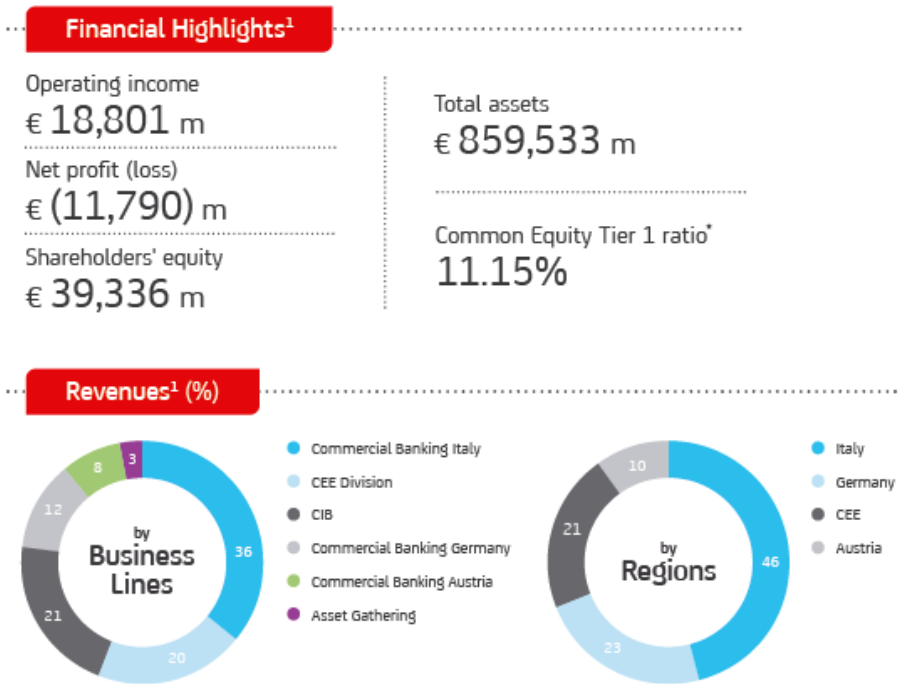


Figure 31: UniCredit's 2017 financial results

(Source: UniCredit 2017 annual report)

The Group's network includes Italy, Germany, Austria, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Romania, Russia, Serbia, Slovakia, Slovenia, Hungary and Turkey, with the following market shares (UniCredit, 2017):

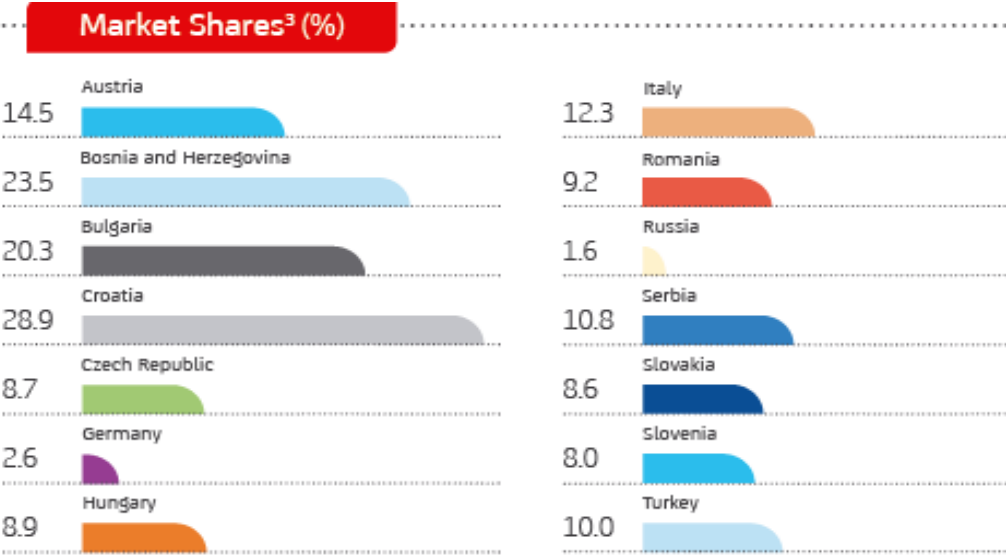


Figure 32: UniCredit's 2017 market shares

(Source: UniCredit 2017 annual report)

The challenging context, determined both by the evolution of the regulatory framework and by the ongoing low interest rates and growth, has imposed a profound strategic review of all the main areas of the Bank, to strengthen and optimize the Group's capital, reduce its risk profile, improve its profitability, as well as guarantee a continuous evolution of operating activities, which allows to devote more attention to customers, to further reduce costs and to increase cross-selling at Group level. These objectives have to be achieved while maintaining the flexibility necessary to capture all the opportunities for generating value and an even more disciplined approach to risk.

Therefore, UniCredit has set pragmatic, concrete and achievable objectives deriving from the implementation of the “*Transform plan 2019*”, a two-year strategic plan started in 2017, which is based on prudent assumptions based on five strategic pillars:

- strengthen and optimize capital, to align with the capital ratios of the best G-SIFIs;
- improve the quality of assets, with incisive measures to address the problems inherited from the past through a proactive risk reduction;

- transforming the business model, increasing customer focus, simplifying and streamlining products and services;
- maximize the value of commercial banking, capitalizing on the potential deriving from the retail customer base, from the status of reference bank for corporate customers in Western Europe, with a consolidated leadership in Central and Eastern Europe and cross-selling opportunities between business lines and several countries;
- adopt a lean Group Corporate Center, but with strong driving and control power through specific KPIs (UniCredit, 2016).

This transformation will enable the Bank to seize all future opportunities and achieve long-term profitability, becoming a simple pan-European commercial bank fully integrated with the CIB and a Western, Central and Eastern European network. This plan, which will allow the Bank to seize all future opportunities and achieve long-term profitability, can be represented as follows:

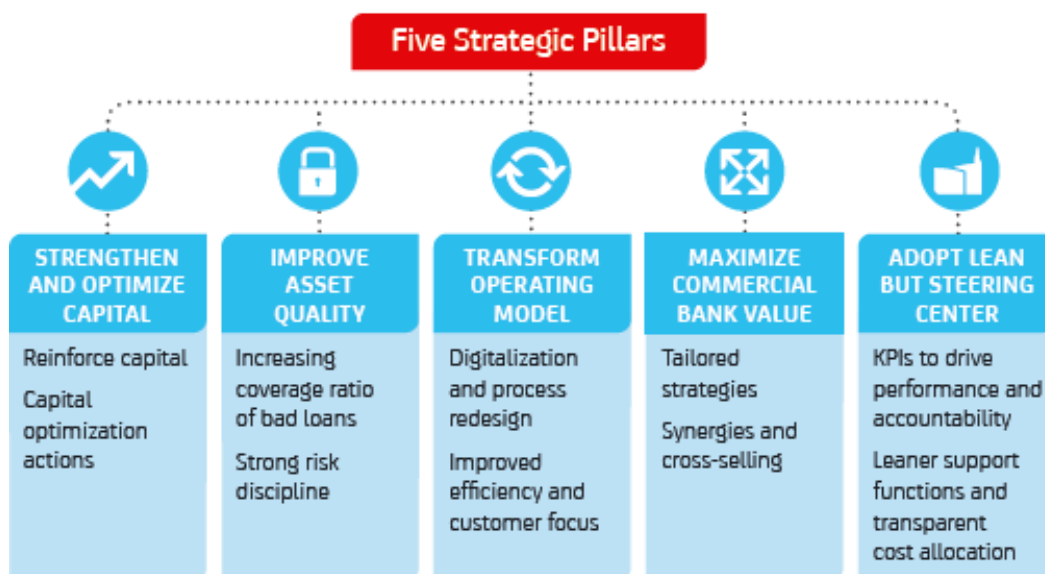


Figure 33: Five strategic pillars

(Source: UniCredit 2017 annual report)

Among the pillars of the 2017-2019 strategic plan, the transformation of the operating model is one of the most important objectives. It aims to increase customer focus and improve the quality of products and service by simplifying and increasing the Group's

efficiency, in order to achieve a lower and sustainable cost base thanks to digitization as a tool to support this transformation. The main initiatives are aimed at:

- reschedule end-to-end processes and reduce operational costs by leveraging global operations and developing economies of scale;
- focus more on the customer, focusing increasingly on customer experience, product standardization and more "one-to-one" activities;
- investing in IT to support the transformation process through digitalization, the technological development of core systems and the continuous updating of the entire IT infrastructure (UniCredit, 2016).

The graph shown in the figure below (Figure 34) represents the final objectives of this two-year strategy:

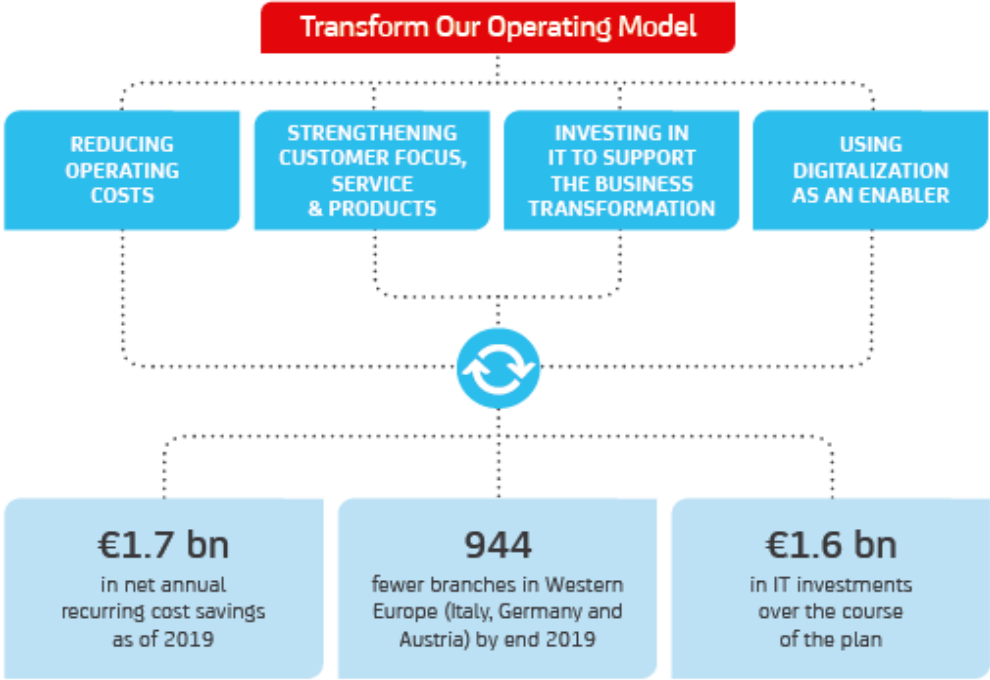


Figure 34: The strategic model transformation

(Source: UniCredit 2017 annual report)

Unicredit is the only Italian bank that has been included in the 2017 list of systemically important banks, where the most important global banks reside, whose bankruptcy would entail a financially linked disaster. Within this list occupies the thirtieth and last place, so it resides in the lower bucket.

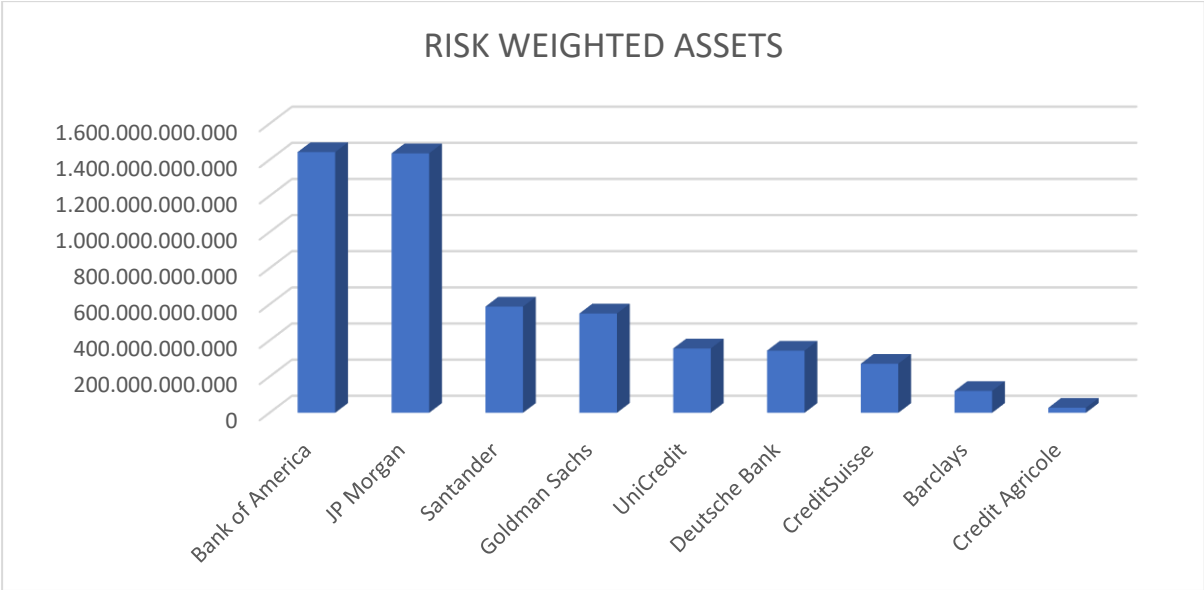


Figure 35: Risk weighted assets value

(Source: Author Elaboration)

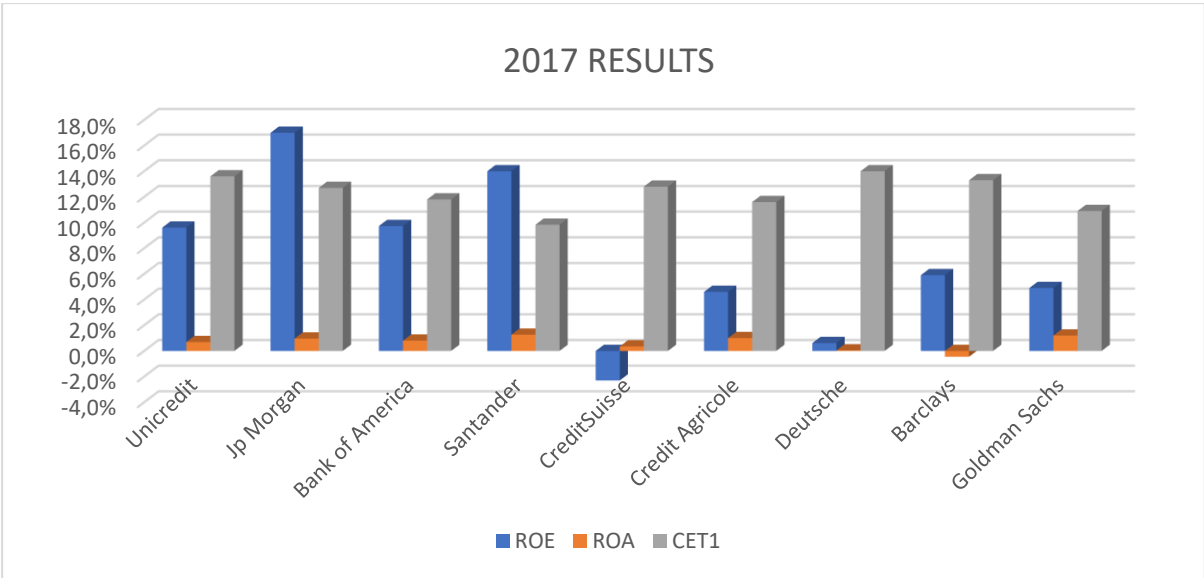


Figure 36: ROE, ROA and CET1 ratio

(Source: Author elaboration)

The two graphs presented here show a comparison between UniCredit and some of the financial institutions included in the 2017 SIFIs list.

They highlight the values assumed by some of the main performance indicators of banks at the end of last year.

Figure 29 shows the values of RWA, a very important indicator for calculating the capital adequacy ratios of the banks themselves and indicating the extent of the capital that banks must hold to meet the capital adequacy requirements required by the Basel Committee.

UniCredit shows a RWA of € 356,000 million compared with total assets of € 836,790 million, a value that places it in fifth place in this particular ranking, behind the big American giants but ahead of some of the major European banks such as Deutsche Bank and Barclays, which respectively reside in the third and second bucket of the SIFIs list.

Considering that the banks called to prepare an adequate level of capital coverage of their activities have equipped themselves with accurate internal detection and control systems of the RWA, in order to strive continuously and decisively to reduce and optimize the riskiness of the loans and consequently to minimizing the opportunity cost determined by the need to set aside increasing capital in the face of high risk loans, UniCredit shows a good degree of risk in its activities and at the same time a good availability of capital.

Figure 30 shows an aggregate graph of some percentage performance values of the reference group: Return on Equity (ROE), Return on Assets (ROA) and Common Equity Tier 1 (CET).

The first indicator can be considered as a summary of the overall economy, evaluating how management has managed to manage its own resources to increase company profits. UniCredit shows a value of 9.6% for 2017, ranking in fourth place behind the two American giants and Banco Santander but beyond the majority of European financial institutions.

Although it would provide better indications when combined with other balance sheet indices, this data shows the good health of UniCredit as well as its profitability and ability to generate profit based on the money invested in capital, so as to make it attractive to the stakeholders searching for profitable investments.

The ROA is part of that category of indicators that gives an idea to the potential investor if it is appropriate to enter or not the chosen title. It is typically used as a benchmark against other indicators, such as Return on Equity (ROE) or as an alternative to Return on Investment (ROI).



The ROA indicates how much value created all the assets held by the company, so the capacity of the company to create value through the assets held. Together with the ROE, the ROA confirms the company's ability to create wealth for the investor.

UniCredit shows a value of 0.7% for 2017, which is not particularly high but still higher than the interest rate set by the ECB for the same year, which indicates that the money borrowed from the company has cost less than how much they made.

With this value UniCredit stands in the middle of the examined financial institutions ranking, positioning itself beyond the main European groups such as Credit Suisse, Deutsche Bank and Barclays.

The third indicator of this chart, the Common Equity Tier ratio (CET1) is the main parameter for assessing the bank's solidity<sup>2</sup>.

The ECB sets CET1 threshold values for each bank and for each country, although in general the minimum value indicated is 8% (European Central Bank, 2016).

The Common Tier Equity 1 ratio is the major index of a bank's solidity, even if alone it is not sufficient to give an exhaustive representation of this characteristic and therefore other indicators must be considered as well. This index, expressed as a percentage, is calculated as the ratio between ordinary paid-in capital (Tier 1) and risk-weighted assets. It indicates with which resources the institution under evaluation is able to guarantee loans granted to customers and the risks represented by impaired loans or non-performing loans.

The ECB and the European authorities have decided that this index cannot be less than 8% in all States, under penalty of the bank commissioner, as happened for example with the Italian Banca Etruria.

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<sup>2</sup> The definition of CET 1 capital is given by the Financial Stability Board in *Basel III: A global regulatory framework for more resilient banks and banking system* and is:

Common Equity Tier 1 capital consists of the sum of the following elements:

- Common shares issued by the bank that meet the criteria for classification as common shares for regulatory framework (or the equivalent for non-joint stock companies);
- Stock surplus (share premium) resulting from the issue of instruments including CET 1;
- Retained earnings;
- Accumulated other comprehensive income and other disclosed reserves;
- Common shares issued by consolidated subsidiaries of the bank and held by third parties that meet the criteria for inclusion of CET 1;
- Regulatory adjustments applied in the calculation of CET 1;

Each EU member country has been granted a minimum CET1 ratio for its own institutes and to Italy has been designated 10.5% in general. In addition to a minimum value for each state, the ECB, through the single supervisory mechanism, decides each time the CET1 target for each credit institution. For UniCredit, for 2017, it is 8.75%.

The chart shows a value of 13.60% for 2017, therefore above the thresholds indicated by the ECB, both for its country of origin and the one exclusively designed for it.

Furthermore, with reference to the group of banking institutions examined, UniCredit is in second place, behind only the German Deutsche Bank, thus demonstrating an excellent state of overall solidity and therefore excellent risk management and its activities.

This brief analysis shows how the results achieved by UniCredit in 2017 are in line with the transformation plan 2019, which aims at reducing costs and therefore more careful management and a greater propensity of its activities risk management.

Moreover, a brief application of the model implemented in the previous chapter shows the UniCredit future trend and position in its reference market. A positive ROE, a cost/income ratio above the average historical value and an appropriate bank size are a good proof that the bank is implementing a good corporate and risk management system, laying the foundations for an improvement of its position in the world market.

This management capacity will allow UniCredit a better capital allocation within its activities, placing more attention and therefore investments in the IT sector, a business component that is becoming increasingly important with the management technological evolution and value enhancement systems.

This strategy will also allow UniCredit to act proactively in the technological risk management, indicated by experts as one of the main risks of the near future for banks.

## CONCLUSION

Following the financial crisis, regulators and international standard setters have given increasing importance to the risk management function, reflecting on the shortcomings of intermediaries in the risk management process and on the strategic importance of this function for financial institutions.

This growing attention has meant that the risk management function became more and more a topic of discussion, both from academics and practitioners.

Given the magnitude of the shock caused by the crisis, it was concluded that the ability of banks to identify, assess and manage risks from an integrated perspective has assumed a business-level strategic importance.

With the increasing complexity of the banks and their activities, some of the main control bodies, such as the Senior Supervisory Group, the Basel Committee and the European Banking Authority, have provided important indications for better risk management, encouraging financial institutions to abandon the silos approach to adopt a holistic approach that focus more on the interaction between the various business activities.

The new and recommended Enterprise Risk Management system for banks is mainly defined by supervisory and prudential regulations, which define the guidelines for risk measurement methodologies, information systems and reporting, governance and organizational articulation.

Reference is made to the Basel 3 regulations and, at national level, to the Bank of Italy's contribution, which, with the update of circular 263/2006, has given a strong push towards the effective adoption of enterprise risk management policies.

It is important, in this sense, as highlighted both by the Financial Stability Board (2013) and Parmenter (2017) that banks are able to determine their Key Performance Indicators and to model them according to their business ideas in order to better achieve their performance objectives.

To work properly, in fact, key performance indicators not only have to be identified, but they should also be clearly communicated to employees, so all levels of the organization understand which business metrics matter the most and what constitutes successful

performance against them. In this way a corporate culture will be built, evolving towards best practices that overcome regulatory simplifications and the past trend of approaching risk management only and exclusively on a compliance perspective.

However, although the focus on ERM has grown considerably in recent years, there is still a strong disparity between the theoretical arguments in favour of it and the concrete evidence to support these claims. In particular, although most of the major global financial institutions take the risk of their activities into consideration in some way, the trend in adopting the ERM is not clearly defined, since it is a fairly recent approach.

Furthermore, the topic concerning the increase in value through the ERM is still a debated topic, both in the theoretical field and in some empirical evidence, as also showed by the presented empirical analysis and literature.

It is always good to keep in mind, in fact, how the analyzed dataset is composed and what are the starting point, the process and the aimed results of the analysis.

In particular, also the reference literature has tried to analyze the phenomenon under examination, reaching different conclusions given the difference of the analysis sample, of the data considered and the models implemented in the attempt to give a concrete answer to the truthfulness of the relationship between ERM and the increase in value and company performance.

The heterogeneity of the results presented in this work is mainly due to the fact that financial institutions have relative freedom in determining performance and therefore it is difficult to precisely correlate the data presented through the proposed financial reports.

However, the empirical evidence presented in this thesis has partially demonstrated a general correlation between active risk management and implementation of the ERM system, with reference to the selected and analyzed variables; careful management of risk, in fact, leads to a controlled increase of the same, offering the possibility for banks' activities to be more valuable, with positive effects on ROE and consequently to an increase in the performance of the financial institution.

In the same way, in line with the results provided by Capuano (2013), an inefficient management of the risk itself may lead the bank to an increase in the costs of reviewing

its activities as well as a greater use of company capital to develop its processes, so as to erode the between costs/income ratio, with a consequent decrease in the final performance value.

Finally, the bank size also positively affects the performance of financial institutions, if it is correlated with important and effective managerial skills and when the risk is incorporated into the strategic management processes.

With reference to the work presented, in fact, there is a stronger positive correlation between the variables for the considered basket leader and a negative correlation for the smaller bank. The results of this work need to be integrated in the light of some limitations, both from a data and proposed results point of view. The extension of the time horizon, as well as a larger reference sample and the analysis of a larger number of data would provide more complete and exhaustive indications in order to better understand the actual relationship between the implementation of an ERM system and the increase in business performance.

In conclusion, this work can however be useful for comparison with the existing literature and contribution for the development of further studies and analyses on the risk management function of banks, hoping that this line of research will be further developed. The results empirical studies carried out in different contexts and identifying the most relevant management factors in increasing the effectiveness of the risk management function of intermediaries to increase their performance.

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