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AN ANALYSIS OF BANK NON-PERFORMING LOANS: MAIN CAUSES AND POSSIBLE SOLUTIONS

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INTRODUCTION

The aim of this thesis is to depict one consequence of the Financial Crisis of 2007-08: the fast increase of Non-Performing Loans (NPLs) ratios observed in several economies.

The last financial crisis originates mainly from a real estate market boom; this, itself, is not different from a lot of past crisis. The Great Depression, the Asian Crisis of the 1990s, the Dot-com bubble and the recent one were all preceded by a "boom period", with high economic growth and easy supply of credit, lasting until a trigger event bursts the bubble and initiate a phase of instability and recession.

The growth in the United States started to suffer with the increase of interest rates imposed by the FED in 2006 and when the housing market turned in 2007. In September 2008, with the failure of Lehman Brothers and subsequently failure or bailout of many other institutions, the crisis deepened radically and spread all over the world.

As a consequence a fast rise of NPLs has been observed both in the United States and in the Euro area. Persistently high levels of NPLs constitute a major problem since they reduce banks' profitability due to the higher provisions required and tie up relevant amount of capital, thus impairing lending and ultimately jeopardizing economic activity.
Although the trend reverted radically in USA since 2010, the same did not happen in Europe; where the NPL Ratio started to decrease only from 2014 and the level is still high in comparison with pre-crisis ratio.

The build-up of large volumes of bad loans depends on group-management decision, but it also affected by the general economic conditions. Moreover, also structural obstacles, i.e. underdeveloped distressed debt markets and shortages in supervisory and legal frameworks, cause at least a part of the persistency.

Most of the recent literature focused on the causes of NPLs and suggested or analysed a number of actions to speed up the resolution process. Our research instead, focuses on the substantial difference between the price offered by investors and the net book value of NPLs, i.e. the "Price GAP", as one of the main factors hindering the development of a distressed debt market. To overcome the shortage of publicly available data on NPLs' sale prices, the estimation provided by Ciavoliello *et al.* (2016) has been used.

The analysis is based on a sample of ten commercial Italian banks. For each of them we estimate the Price GAP under different hypothesis and the subsequent losses following a massive sale of Bad loans. Moreover, an assessment of this theoretical exercise on capital ratios is carried out, estimating both the effect on the Common Equity Tier 1 Capital and on Risk-weighted Assets.

The present work is therefore organized as follow.

Chapter 1 provides a general overview of the Financial Crisis of 2007-08; describing the main causes, effects and measures taken at global level. Then focuses on the new Regulatory Framework implemented in the European Union as a response and finally devotes some attention to two consequences, strictly correlated with each other, of the crisis: the credit crunch and the increase in NPLs.

In *Chapter 2*, after describing some general evidences about the creation of value through divestitures, we present a comprehensive strategy to the NPLs problem focusing mainly on the management and disposals of NPL stocks. Then a comparison between internal and external solutions is carried out. Lastly, the possibility to resort to a Bad Bank is analysed, also through some recently examples, and some considerations concerning the compatibility between Bad Banks and the actual EU regulatory framework are represented.

Chapter 3 focuses on the Price Gap, highlighting the rationale for a better understanding of it. Then explain the interesting features of Italy that, despite some reforms, remains one of the European countries with the highest level of NPLs. After reviewing the significant literature and explaining how the data were collected or estimated, we discuss the main results and conclusions.

CHAPTER 1. THE FINANCIAL CRISIS OF 2007-08: STRICTER REGULATIONS AND NPLs AS CONSEQUENCES

1.1 General Overview

In the past, economies have been afflicted by a long sequence of crises and recessions. If we take a look to financial crisis in the nineteenth century, some common characteristics exist. Episodes of increasing prosperity led to investment and credit expanding, simultaneously, the price of assets increase and stimulate speculative buying. At some point the bubble would burst, subsequently bank lending sharp decrease causing a recession (meant as major downturns in production, employment and income), triggering the bankruptcy of the weakest firms and arranging the basis for the next period of expansion (Evans, 2010).

The most serious crisis of the 20th century started in 1929 with the US stock market crash and takes the name of "Great Depression". As a consequence the US unemployment rate rose from 2.9% in 1929 to 22.9% in 1932, in the same period GDP fell by 26% (Crafts, 2010) and by 1932 one quarter of banks in the United States declared bankruptcy (Markham, 2000). Hence, a number of measures to regulate the financial sector have been promptly introduced by the Roosevelt government.

Among the others, it is worth mentioning the Glass-Steagall Act (introducing the separation between commercial and investment banks), the set-up of the Securities and Exchange Commission (SEC) and the creation of a Federal Insurance administrated by the Federal Deposit Insurance Corporation (FDIC) in order to prevent bank runs. Following the introduction of this tighter regulation the US did not experience any severe financial crisis since 1940s up to the early 1970s.

At the same time, from the late 1960s, three major changes have been observed in the US banking system: the introduction of new technologies in part to get round of regulations as well as to intentionally obscure the risks involved, a propensity toward internationalisation and a strong process of financial deregulation.

Following the process of deregulation and innovations there was an enormous growth of the financial sector. Both these factors, together with a poor supervision, contribute to the savings and loan crisis of the 1980s leading to a short recession in 1990 (Sherman, 2009). In the period between 1986 and 1995, more than one thousand thrifts failed and the total thrift industry shrunk from 3,234 to 1,645 institutions. Moreover, the crisis had produced losses for

approximately \$153 billion, of which \$124 billion payed by taxpayers (Curry and Shibut, 2000).

Since the second half of the 1990s until 2007 the US economy experienced two further expansions. The first was driven by a boom in information technology (Dot-com bubble) and finished in early 2000; triggering a recession in the subsequent year and a collapse in prices similar to the crash in 1929 (the Nasdaq Composite Index lost almost 78% of its value from the peak to the bottom[1]). The latter was mainly driven by a boom in house price, and greatly contributed to the last Financial Crisis.

1.2 The Financial Crisis of 2007-08

As emphasized by the former Chairman of the Federal Reserve, the main source of the Financial Crisis of 2007-08 was the real estate market boom (Bernanke, 2009). This, itself, is not divergent from a lot of past crises. The Great Depression, the Asian Crisis of the 1990s, the Dot-com bubble and the recent financial crisis were all preceded by a "boom period" with high economic growth and easy supply of credit, lasting until a trigger event, varying from crisis to crisis, bursts the bubble and initiate a phase of instability, depression or recession (Norgren, 2010).

A great change in comparison to previous crisis is the strong role of securitization, especially of subprime mortgages. The main advantage of securitization is the possibility to transform an illiquid asset into a liquid one and therefore, selling securitized loans, reduce capital requirements[2]. Thus, capital requirements themselves stimulated the securitization of loans. Securitization has a lot of pluses but also serious shortcomings, e.g. risks could be underestimate and the diversification effect might be miscalculate, as it happened with non-prime loans.

In the early 2000s the fraction of subprime and Alt-A[3] mortgages was relatively small and most of them were not securitized. After few years the situation changed deeply, the subprime market rapidly increased and the majority of these loans were securitized (by 2006 75% of subprime and 91% of Alt-A mortgages were securitized, in 2001 only 46% and 18%

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[1] It fell from 5,048.62 (March 10, 2000) to 1,114.11 (October 9, 2002).
[2] Central banks of the G10 countries established a Committee on Banking Regulations and Supervisory Practices which led in 1988 to the introduction of an international agreement, the Basel Accord, requiring minimum capital ratio for banks to provide a buffer to absorb losses (BIS, 2015).
[3] Alt-A mortgages are between prime and subprime in terms of credit quality.

respectively) (Udell, 2009). Unfortunately, much of this lending was poorly done; bankers who made the mortgages had small incentives to worry about credit quality as they sold the mortgages as soon as possible.

Such trend started to suffer with the growth of interest rates imposed by the FED (from 1.5% in 2004 to 5.25% in 2006) and when the housing market turned in 2007 (the variation in house prices was -9.7% in 2007 and -15.3% in 2008) (Iannuzzi and Berardi, 2010).
As a consequence a part of borrowers start to became insolvent. During the first half of 2007 counterparty risk between banks rose, since no one knew which institutions were solvent and which were not. In September 2008, with the failure of Lehman Brothers and subsequently failure or bailout of many other institutions, the crisis deepened radically and spread all over the world.

At this point liquidity in the interbank markets almost disappeared, pushing a lot of institutions highly dependent on such short-term loans close to the bankruptcy. Central banks in US and Europe immediately and repeatedly pushed big amounts of money into inter-bank markets and cuts interest rates. Furthermore governments, of major European countries and US, announced plans to directly invest capital in troubled banks.
Emergency measures reached the goal to stop the chain of failures but fail to prevent a collapse in bank lending, the commonly named "credit crunch", both in US and in Europe (Evans, 2010). As explained in Section 1.5, a credit crunch is one of the main channels through which a banking crisis may have an impact on the real economy.

At the same time precautionary savings increased and planned investments were postponed due to a general increase in uncertainty; hence aggregate demand fell down (Norgren, 2010). World trade dropped and by the second half of 2008 a recession hit most of the developed countries, originating the so-called "Great Recession".

In the US, the downturn started in December 2007 and ended in June 2009 (NBER[4]), in the same period the unemployment rate rose from 5% to almost 10%, then the trend steadily revert reaching pre-crisis level by late 2015. S&P500 lost almost 57% of its value from October 2007 to March 2009 (FRED[5]).

The crash was transmitted to Europe through the close linkage with the US financial sector, the strong dependency on exports and, in some cases, due to macroeconomic imbalances that started to correct. Asian countries were considered less exposed since their financial markets

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[4] National Bureau of Economic Research.
[5] Federal Reserve Bank of St. Louis Economic Research.

are less integrated with others; nevertheless the crisis spread through a collapse in the demand for exports.

As regard EU, there had been a considerable fall in the rate of increase of GDP already in 2008, followed by a contraction in real GDP of 4.4 % in 2009 and by an additional mild one in 2012. The unemployment rate rose from 6.8% in the second quarter of 2008, to 11% in the second quarter of 2013 (with a small drop between mid-2010 and first quarter of 2011); since then the ratio started to decrease, reaching 7.7% in July 2017. However, inside the EU, the figures varied considerably both over time and between Member States (Eurostat).

The financial and economic crisis had also significant effects on public balances all over the world. Especially in Europe, where in 2010 the subprime crisis was immediately followed by the European Sovereign Debt Crisis, and some governments had trouble to refund their own debt[6]. Ureche-Rangaua and Burietza (2013) show a linkage, statistically significant, between the volume of capital injections provided by the different European governments to banks and the level of long-term sovereign interest rate spreads. In addition, Ehrmann and Fratzscher (2017) explained how the euro area experienced significant fragmentation across national sovereign bond markets since the beginning of the European sovereign debt crisis, and also that negative shock to yield in stressed countries moved French and German yields in the opposite direction. This flight to quality phenomenon largely disappears after the ECB's announcement of its Outright Monetary Transactions (OMT) program in 2012, although no country has ever requested the OMT programme to be used.

How did it happen? Several theories have been developed; among the others Evans (2010) identified five main roots to explain the financial crisis.

The first one concerns the role of perverse incentives for several actors: the sale staffs, the banks that have originated the loans (focused on generating as many mortgages as possible and not on credit quality), the investment banks, and the rating agencies (involved in a severe conflict of interest).

The second argument involved the US interest rate policy, since in the period 2001-2004 according to some economists the US central bank kept the interest rate too low for too long time. On the other hand, this criticism fails to recognize that without such measures crises in 1990 and in 2001 would have been worse.

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[6] For some countries large public deficits reflect a not solid fiscal position also before the crisis started, indeed some governments used to borrow heavily to finance their budgets, accumulating impressive amount of debts.

Another approach identifies the source of the crisis into the large inflows of capital to US mostly from developing countries that had large current account surpluses. Savings inflows from abroad can be valuable if the receiving country invests them well, unfortunately US financial institutions reacted to this surplus by competing for borrowers through relatively cheap and easy to obtain credit (Bernanke, 2009).

The fourth focuses on the US financial sector's deregulation. The abolishment of legal limits on interest rates occurred in 1980 contributes to the development of subprime loans (allowing for much worse conditions than normal loans), while the effect of removing the separation between commercial and investment banks (completed in 1999 with the Gramm–Leach–Bliley Act) is more debated. According to Udell (2009) and Crafts and Fearon (2010) the combination of commercial and investment banks into an "universal bank" is likely to create a new entity less risky than the two stand-alone corporations, moreover empirical evidences suggest a low correlations between these two activities allowing for a risk reduction up to 40%. Moreover Iannuzzi and Berardi (2010, p. 285) argue that the Glass-Steagall Act "has allowed an uncontrolled development of investment banks … developing the same activities and offering similar services as commercial banks, but under no regulation and control of risk".

The last identifies the excess capital accumulated in US and Europe as a cause.

Other factors that contributed are the shift toward higher risk taking to obtain a predetermined return because of low interest rates during the last decade, the underestimation of systemic risk, the increasing dependency on wholesale funding markets which are less stable than deposits, the fragmentation and lack of coherence between supervisory bodies both in the US and the EU, a lack of international coordination and harmonization, and the presence of explicit or implicit governments guarantee originating long term undermining effects[7] (Norgren, 2010).

What has been done? As previously mentioned, several emergency measures together with more long-term actions, have been undertaken.

At a global level a set of non-binding proposals, aimed at providing a new regulatory framework to improve financial stability, has been arranged by the Group of 20 (G20) together with the Financial Stability Board (FSB). The two main pillars are a new set of banking standards, the Basel III framework, and a set of recommendations for the resolution

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[7] To some extent, the absence of proper winding up procedure for banks forced the governments to bail-out insolvent institutions to avoid "domino effect".

regimes of financial institutions. The former tool is aimed at preventing a new financial crisis, while the latter is intended to protect taxpayers and to solve the lack of proper resolution process to avoid, if a banking failure occurs, the triggering of a systemic crisis (Perrut 2012).

At the European level, ECB played a crucial role in containing the crisis with standard and non-standard policies, e.g. the Long-term Refinancing Operations (LTROs) followed in 2014 by the Targeted Longer-term Refinancing Operations (TLTROs), the Outright Monetary Transaction (OTM) programme[8] and the Expanded Asset Purchase Programme (APP) introduced in January 2015.

Moreover, to prevent a complete meltdown of the financial system, several governments used exceptional amount of State aid to rescue their banks. Hence, the important role of the Commission, about the evaluation of the Rescue Plans under the State aid rules, should be mentioned (see Section 1.3).

Similarly European countries as a whole reacted to the debt crisis with emergency measures, e.g. the set-up of two temporary financial backstops[9] to help countries experiencing financing problems, and with more long-term actions to ensure competitiveness, promote growth and guarantee sound public finances (European Commission, 2014).

Finally, the response of the EU institutions can also be captured in a set of 40 legislative proposals, several of them motivated by the G20 agenda, which radically changed the EU financial regulatory framework (The European Union Committee, 2015). This last aspect, with a focus on the Bank Recovery and Resolution Directive (BRRD), is analysed in the Section 1.4.

1.3   The State Aid rules and the role of the European Commission

Starting from 2008 the European Commission adopted a set of crisis rule, i.e. four different "Crisis Communications", to coordinate the support to the financial sector during the crisis. The Commission's assessment, under this set of temporary State aid rules, is aimed at restoring long-term viability of the rescued institutions[10], minimising the use of taxpayers' money and taking all the measures necessary to limit the potential distortion of competition.

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[8] This program refers to the outright transactions in secondary sovereign bond markets.
[9] These two temporary funds have been replaced in 2012 by a new and permanent one: the European Stability Mechanism (ESM).
[10] When the long-term viability condition is no more met, i.e. the institution is unable to cover all its costs and generate an appropriate return on equity, the distressed bank should be liquidated.

The preservation of financial stability was also crucial. For this reason the Commission initially allowed relatively generous conditions, nevertheless during the evolution of the crisis this set of rules has been repeatedly updated and tightened. With the last update, applicable from 1st august 2013, a new Banking Communication has been implemented. The main change, besides a more effective restructuring process, is a further strengthening of the burden sharing requirements in order to curtail the public intervention and the consequently moral hazard problem. No contribution is required from senior debt holders, on the other hand, before State aid is granted, subordinated debt and hybrid capital must be fully converted into equity or written down (European Commission, 2013).

The figures are quite impressive, since the beginning of the crisis almost 30% of the European banking system (by assets) received support subject to State aid rules. European countries have provided to distressed financial institutions €671 billion in capitals and repayable loans, i.e. 5.4% of EU's GDP in 2008, and €1,288 billion in guarantees, equivalent to 10.3% of GDP. The latter reflects the total of peak amounts issued by each government, afterword the volume of liquidity supports dropped as the crisis became progressively less strong.

The findings of Adamczyk and Windisch (2015) support the effectiveness of these restructuring plans. First, with the application of restructuring strategies a significant improvement in operational and risk indicators and in funding and solvency positions of rescued institutions has been observed. Secondly, approaching the end of the restructuring period (five years), the performances of the group of supported banks and of the peer cluster of non-aided institutions tend to converge. Finally, most of the banks subject to State aid control passed the Comprehensive Assessment conducted by the European Central Bank in 2014.

1.4   The new Regulatory Framework in the European Union

1.4.1   The Banking Union

As the crisis worsened it became clear how an economic and monetary union, without a centralised application of EU rules for banks, were not enough and more had to be done. According to the Commission "the financial crisis showed that no Member State alone can regulate the financial sector and supervise financial stability risks when financial markets are integrated" (The European Union Committee, 2015; p. 21), that is why, in June 2002 Governments agreed to create a Banking Union. The new regulatory framework applies to all

the financial institutions in the EU and it is set out in a Single Rulebook (European Commission, 2015).

The three main pillars are:

- The *Single Supervisory Mechanism* (SSM), that introduces the directly supervision by the ECB of the most significant banks while the national supervisors, within an integrated system, continue to monitor the remaining banks.

- The *Single Resolution Mechanism* (SRM), compulsory for banks subject to the SSM. It should allow the bank resolutions (if all else fails) to be managed efficiently by a Single Resolution Board (SRB), in cooperation with national resolution authorities (NRAs), and to be financed by the banking sector through a Single Resolution Fund (SRF).

- The third mainstay, originally, was the creation of a Single Deposit Guarantee Mechanism but it was quickly dropped in favour of a recast of the directive on *Deposit Guarantees Schemes* (DGS), reinforcing and improving the coordination of national deposit insurance systems. Nevertheless, in November 2015, the Commission made a proposal for a European Deposit Insurance Scheme (EDIS), which would offer a more uniform degree of insurance across the Eurozone in case of bank failures.

The banking union's objectives are to break the vicious circle between sovereign and bank crisis and make the banking system safer, i.e. reducing the probability that banks would fail and the impact that the eventually failure of an institution could have. These goals are reached through three subsequent phases. For all these phases, especially the second and the third, a crucial role is played by the Bank Recovery and Resolution Directive (BRRD) and by the SRM Regulation.

The first one is commonly referred as *crisis prevention*. It includes the implementation of the Basel III standards into the EU legal framework, other core improvements as the already mentioned SSM, the creation of a macro-prudential oversight body, the European Systemic Risk Board (ESRB), and the set-up of three sector oriented supervisory authorities (ESAs)[11]. The ESAs, with binding powers on financial institution, have been created to ensure a consistent application of EU-level rules, to resolve conflicts concerning individual cross-border institutions and to enhance consumer protection.

The second, named *early intervention* is aimed to ensure the adoption of timely corrective action when problems occur, but before the situation become critical.

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[11] The three new authorities are: the European Banking Authority (EBA), the European Securities and Markets Authority (ESMA) and the European Insurance and Occupational Pensions Authority (EIOPA).

The last phase, *crisis management*, is triggered when the situation deteriorates irreparably and is intended to protect taxpayers and depositors (European Commission, 2015).

Besides the Banking Union, several others reforms have been done, with the general aims of enhancing transparency (e.g. a regulation concerning credit rating agencies and the improvement of the Markets in Financial Instruments Directive), improving resilience and stability of the financial sector, and strengthening the protection of consumer (e.g. measures on short selling and credit default swaps).

1.4.2 The Bank Recovery and Resolution Directive

Due to the particular nature of banks, normal insolvency rules have been shown to be inadequate for the resolution.

The functioning of banks is based on trust, i.e. if customers and counterparties lose confidence in the bank's ability to meet their obligations the institution may become quickly unviable, furthermore, due to the degree of connections between institutions problem in one bank might spreads to the entire system. These destabilizing effects greatly contributes to the belief that "too big to fail" banks will always be rescued by national governments.

This main source of moral hazard could be reduced through a proper resolution system, i.e. by establishing the credible promise that consequences of careless management will be full burden by bank's shareholders and unsecured creditors through bail-in, and no more through massive bail-outs funded by taxpayers. At the same time an effective system must keep secured depositors safe and, contrary to ordinary bankruptcy procedures[12], guarantee the continuity of failing institutions' basic functions (Bruzzone *et al.*, 2015).

These recommendations are the foundation of the new Resolution Mechanism, established by 2014, and fully in force since the beginning of 2016[13]. The two main legal measures on which is based the new system are the BRRD together with the Single Resolution Mechanism (SRM) Regulation. Moreover the BRRD conferred the power to adopt delegated acts to the Commission. Likewise EBA is entrusted with the development of draft regulatory and implementing technical standards, and could also issue guidelines or recommendations under its own initiative.

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[12] Ordinary procedures managed in court typically require the suspension of all failing banks' claims for a too long period.
[13] Member States were required to adopt and publish by 31 December 2014 the laws, regulations and administrative provisions necessary to comply with the Directive. Moreover they shall apply these provisions from 1 January 2015, or at the latest from 1 January 2016 as regards Section 5 of Chapter IV of Title IV.

The new framework envisages the three different phases mentioned before: preparation and prevention, early intervention and crisis management.

Preparation and prevention

In the first stage banks and authorities need to make a suitable preparation for crisis. For this reason recovery plans, defining the measures institutions will take to remain viable if their financial situation were to deteriorate significantly, should be arranged by banks and updated at least annually or after a relevant change. Meanwhile resolution authorities are required to set down resolution plans, for each institution or group, explaining the actions are triggered when the conditions for resolution are met. Overall this first phase is complex and requires a close cooperation between all the subjects involved, i.e. banks, supervisory authorities and resolution authorities, in order to ensure that each one is fully informed.

Early Intervention

The second phase is triggered when there are specific signals of financial distress, for instance when the institution infringes or in the near future is likely to break prudential requirements, but before the situation worsens irreparably so that resolve the bank remains the only option. The BRRD requires member states to grant to the competent supervisory authorities (the ECB or national supervisors according to the SSM rules) a broad range of early intervention powers. An appropriate deadline for the achievement of each early intervention measure should be defined by them; moreover competent authorities are also in charge to monitor compliance and shall notify the development of the situation to the resolution authorities without delay.

Crisis Management

The last phase, i.e. the administrative procedure called resolution, starts if the situation deteriorates beyond repair, reached this point shareholders no longer retain responsibility and control. The procedure could begin only when all these three conditions are met: the institution (or group) is failing or likely to fail; there is no reasonable prospect that any alternative private sector measures would prevent the failure within a reasonable timeframe; and a resolution action is necessary in the public interest.

What does "*failing or likely to fail*" means? As stated by the BRRD an institution is deemed to be failing or likely to fail in one or more of the following four circumstances: when it infringes or is close to infringe the requirements for continuing authorisation; when the assets of the institution are, or are likely to be in the near future, less than its liabilities; when it is, or

is close to be, unable to pay its debts as they fall due; and when extraordinary public financial support is required (except in the specific circumstances write down in the Directive).

When all the three previous conditions are met, the resolution authorities are allowed to use the following four tools, either individually or in any combination (with the exception of the asset separation tool, which must be always applied in combination with another one):

a) The sale of business;
b) The bridge institution;
c) The asset separation;
d) The bail-in.

With the *sale of business tool*, authorities can sell parts of the institution under resolution to a purchaser (different from a bridge institution), also without the approval of shareholders. The transfer shall be made on commercial term, in accordance with the State aid framework and with the aim of maximize the sale price.

The *bridge institution tool* is intended to facilitate the continuous access to deposits and to preserve essential banking functions. According to the BRRD is possible to transfer instruments of ownership, assets, right or liabilities of institutions under resolution to a new entity, at least partially owned by public authority and controlled by the resolution authority. When conditions are appropriate, the bridge institution should be put back on the market on commercial terms and in accordance with the State aid framework, e.g. merging it with another entity or selling it to a third party; if it is not possible the institution must be wound up.

The *asset separation tool* involves the transfer of assets, rights or liabilities of a bridge institutions or an institution under resolution to one or more asset management vehicles, at least partially owned by public authority and controlled by the resolution authority. With asset management vehicles (also called "bad banks") is possible to separate good and bad assets, and therefore maximizes the value of the second category through sale or orderly liquidation.

The *bail-in tool* consists in the possibility of write down the institution's liabilities or converts debt into equity. It is of decisive importance in the new framework since it makes sound the promise that shareholders and creditors have to accept losses in case of bankruptcy of the institution, "putting an end to the era of massive bail-outs paid by taxpayers" (Bruzzone *et al.*, 2015; p. 3).

Resolution authorities may apply this tool either when the objective is to recapitalize the institution or to reduce the principal amount of debt instruments that are transferred to other institutions (or equivalently to convert debts into equity before transfer them).

In the first case the bail-in tool should be used only when, together with the application of other relevant measures, there is a realistic prospect to restore the financial soundness and long term viability of the entity under resolution.

The BRRD establishes some general principles governing the resolution. The main rules are the following: shareholders bear the first losses; creditors bear losses after them according to the priority defined under national insolvency law (therefore starting from subordinated debt and then, down the line, up to uninsured deposits); and finally no creditor shall incur greater losses than would have been incurred if the institution had been wound up under normal insolvency proceedings ("no creditor worse-off principle"). In any case covered deposits (up to € 100.000 under the Deposit Insurance directive) and some others liabilities are explicitly excluded from the resolution procedures[14].

The write down and conversion powers of capital instruments only (i.e. Common Equity Tier 1, Additional Tier 1 and Tier 2) may be exercised either independently or in combination with a resolution action. Instead the bail-in tool, so within a resolution process, applies to a larger set of liabilities.

Thus, the new bail-in tool goes much further than burden-sharing under State aid Control (see Figure 1). Anyway, all measures entailing public financial support, also during a resolution, has to comply with the relevant State aid rules and the Commission will continue to exercise its exclusive competence to control if the proposals made by the Resolution authorities satisfy the requirement of a sufficient burden sharing (European Commission, 2013). Additionally, when the SRF is involved in the resolution of a bank, the SRB has to notify its use to the Commission, and the Commission has to assess its compatibility with the rules on State aid. Finally it is important to remember that the granting of "extraordinary public financial support", i.e. State aid, is itself one of the conditions that trigger the start of a resolution procedure (with some exceptions).

In exceptional circumstances, the resolution authority may exclude (or partially exclude) certain liabilities from the application of the write-down or conversion powers. In this case, when the losses that would have been borne by those liabilities have not been passed on fully

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[14] On the other hand DGSs are liable "for the amount by which covered deposits would have been written down ..., had covered deposits been included within the scope of bail-in" (Art 109 of BRRD, 2014).

to other creditors, "resolution financing arrangements" may contribute under specific conditions provided by the Article 45 of the BRRD. The most important establishes that, the use of these funds is permitted only after a contribution to loss absorption and recapitalisation, equal to an amount not less than 8% of the total liabilities (including own funds), has been made by the shareholders and eligible creditors. These specific national financial arrangements are designed for support the effective working of resolution tools without involving taxpayers, since contributions to these arrangements are made by the banking sector (either ex-ante or ex-post).

Figure 1
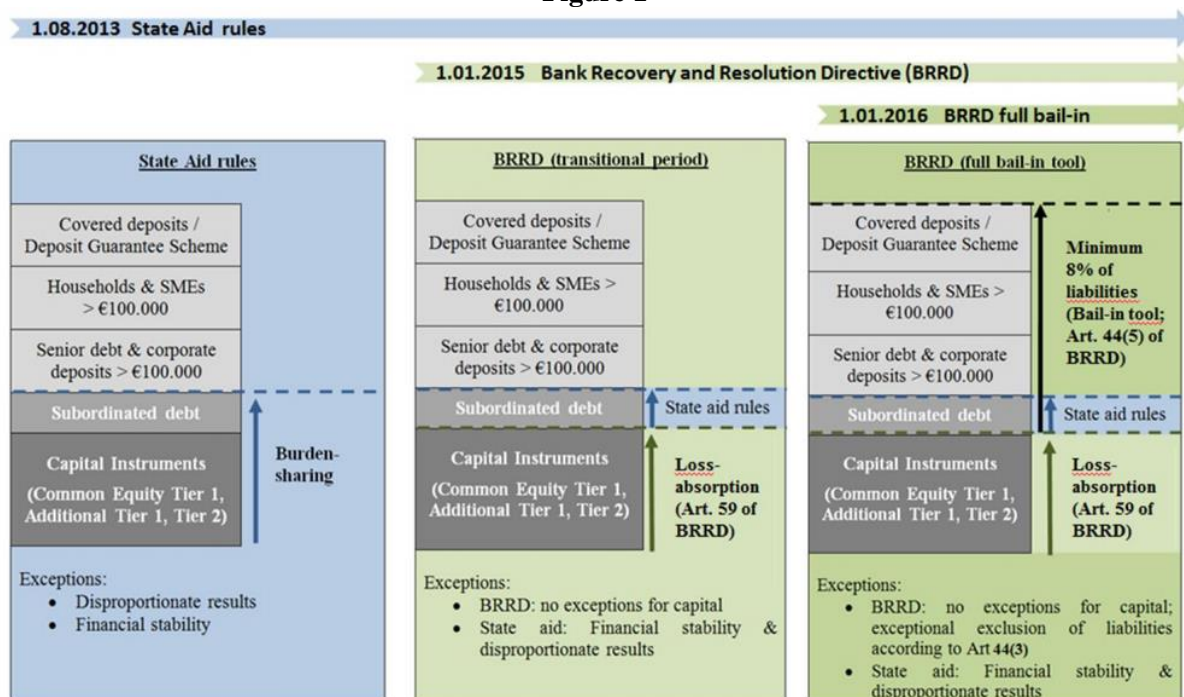
The BRRD establishes a minimum set of harmonised rules but leaves to the Member States discretion in the application of the tools and in the use of national financial arrangements. To eliminate the risk of inconsistent decisions between states, the SRM Regulation establishes a more centralized architecture for all the decisions concerning the resolution.

In particular, this Regulation creates a "resolution network" composed by the Single Resolution Board (acting as a resolution authority for banks directly supervised by the ECB and cross border groups) and by National Resolution Authorities (for the other banks); in addition it establishes the allocation of competences between the SRB and NRAs.

Moreover it creates an integrated system of financial arrangements aimed to support resolution, that relies on the Single Resolution Fund since "if the funding of resolution were

to remain national in the longer term, the link between sovereigns and the banking sector would not be fully broken, and investors would continue to establish borrowing conditions according to the place of establishment of the banks rather than to their creditworthiness" (Recital 19 of SRM Regulation, 2014). The SRF is financed by all the banks of participating Member States by means of contributions raised at national level on an annual basis[15]. Initially resources will be collected in national compartments, and then they will be gradually mutualized.

1.5   Credit crunch and Non-Performing Loans

1.5.1   Credit crunch

The impaired ability of the private sector to obtain the credit needed to fund investment and consumption is one of the main channels through which a banking crisis may have an impact on the real economy. Therefore is important to understand to what extent the dry up in bank liquidity, after the failure of Lehman Brothers, reduced the availability of credit.
As already mentioned the measures implemented by Central Banks and Governments, in the early stages, fail to prevent a credit crunch in the developed economies. Indeed after the failure of Lehman Brothers credit growth plummeted both in US and in Europe.

Iyer *et al.* (2014), using Portugal's lending data, provide three main evidences of this phenomenon. The first result shows how problems in the interbank market induced a contraction of credit supply primarily for entrepreneurial (younger and smaller) firms, moreover for these companies is particularly difficult to compensate the reduction with other sources of credit therefore the credit crunch was binding. Besides this, evidences show a stronger decline of credit supply for banks with higher interbank borrowing ratio and greater level of non-performing loans prior to the crisis. Finally, the injection of money from central banks had limited overall positive effects on credit supply even if banks with higher liquidity problems used the central bank help mostly to hoard liquidity.

Albertazzi and Marchetti (2010) reached similar conclusions studying the Italian banking system: a generalized and excessive tightening of credit policies have been observed. Moreover their evidences show that only larger undercapitalized banks have reallocated their credit away from riskier firms, while this "flight to quality" has not occurred for smaller less-capitalized institutions.

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[15] Funds will be collected gradually to reach a target level of 1% of covered deposits by 1st January 2024.

1.5.2   The increase in Non-performing Loans

Another consequence of the Financial Crisis and Great Depression, strictly connected with the previous one, is the Non-Performing Loans (NPLs) surge. First of all, it should be noted that the relevance of NPLs in the recent crisis is not surprising; on the contrary, deteriorated loans are a regular feature of several economic and banking crisis (Bholat *et al.*, 2016).

A fast increase of NPL ratio, both in United States and in the euro area, has been observed during the Financial Crisis, nevertheless the trend changed radically from 2010, with an efficient resolution of the problem in the USA while Euro area banks continued to hoard bad debts (see Figure 2). Since 2015 also in the EU the situation is slowly improving as the average NPL ratio decreased from 6.4% in December 2014 to 5.7% in March 2016; however this level remains up to three times higher than other global jurisdictions (EBA, 2016).

Figure 2: The evolution of NPL ratios in Europe and in the US
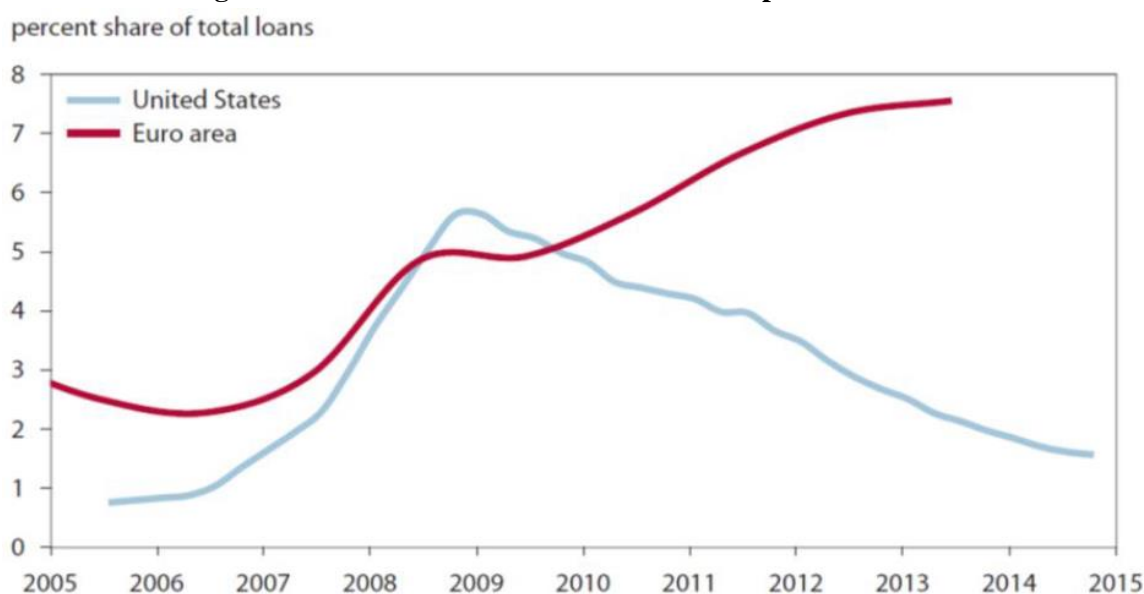
Source: Mesnard *et al.*, 2016.

It is important to emphasize that, since the start of the crisis, the deterioration of assets' quality was very irregular across Member States. Significant differences can be observed in term of:

- *NPL ratio*, that fluctuates both according to countries and to size of the institution. Across countries it varies from 1% for Luxembourg, Norway and Sweden to value above 40% in financial distressed states (Cyprus and Greece)[16]; simultaneously small and medium banks account higher NPL ratio than large banks and GSIBs.

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[16] All point-in time data are reported as of March 2016.

- *Coverage ratio*, that differs significantly across states ranging from only 30% to 67%; in addition the group of small banks reports lower coverage ratios in comparison with the others.
- Finally also in terms of *sectors* the NPL ratio differs across countries, although there is a common trend towards higher NPL ratios for SMEs in comparison with large corporates and households.

On the other hand a comparison of NPLs' levels between countries is challenging (if not impossible) since, until recently, there was no common definition across states. This gap, at least at the EU level, has been recently closed with the adoption of a harmonised definition[17] of NPLs by the EBA, compulsory since September 2014. Only in 4 out of the 28 European Union countries there are still national definitions of NPL that differ from the one envisaged by EBA.

Impact of NPLs on credit and economic growth

Persistently high levels of NPLs constitute a major problem that must be addressed since they slow down credit growth and, as a consequence, they endanger economic activity.

According to Aiyar *et al.* (2015) high levels of bad loans reduce bank profitability due to the higher provisions required and they boost risk perception on part of investors. Additionally NPLs, even net of provisions, tie up significant amount of capital as a result of the higher risk. In other words banks filled of bad debts set up higher lending rates, reduce lending volumes and cope with higher funding costs. They also estimate a robust relationship between higher NPLs and weaker credit supply and GDP growth.

Furthermore their analysis suggest that a reduction of NPLs could make available for European banks a sizable amount of capital (€54 billion), enough to support new lending up to €553 billion[18].

To conclude a more energetic credit growth is vital for SMEs (that are more dependent on bank financing), it should reduce the private sector debt overhang problem and it may enhance monetary policy transmission (Mesnard *et al.*, 2016).

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[17] A briefly explanation is provided later in the second Chapter (Box 1).

[18] Assuming NPL are reduced to their historical average of 3-4% (as percent share of total loans) and sold at their net book value (that is with no haircut). Instead with haircuts larger than 5% (on net book values) the freed-up capital could be negative for some countries.

<u>Determinants of NPLs</u>

Trends in NPLs, and more generally in credit quality, clearly depend on group-management decision (e.g. poor lending), but they are also affected by the general economic conditions in the markets where institutions operate. In fact, there is a vast empirical literature than confirms the interaction between the macroeconomic conditions and asset quality.

The research of Beck, Jakubik and Piloiu (2013) investigates the determinants of NPLs using data from a sample of 75 countries in the decade before the financial crisis. Their empirical evidences confirm the hypothesis that the drop in real GDP growth during the crisis was the largest driver for the increase of NPLs.

Moreover they found additional factors that tend to increase NPLs. According to their results an exchange rate depreciation have a great impact on countries with specific vulnerabilities, and also a decline of stock prices and a rise in lending interest rates tend to increase NPLs. The last two factors appear to be statistically significant although relative moderate in size.

CHAPTER 2. DIFFERENT APPROACHES TO THE NPLs PROBLEM

2.1 A Comprehensive Strategy

As stated in the last part of the first chapter the level of NPLs in some economies is still high with respect to pre-crisis ratios. The problem is of high relevance especially in some part of Europe, i.e. in the southern part of the euro area as well as in some south-eastern European countries (sees Figure 3). To tackle this problem several strategies has been developed, both for the Europe as a whole as well as for the single countries experiencing highest difficulties.

Figure 3: Gross NPLs ratio in Europe after the Global Financial Crisis
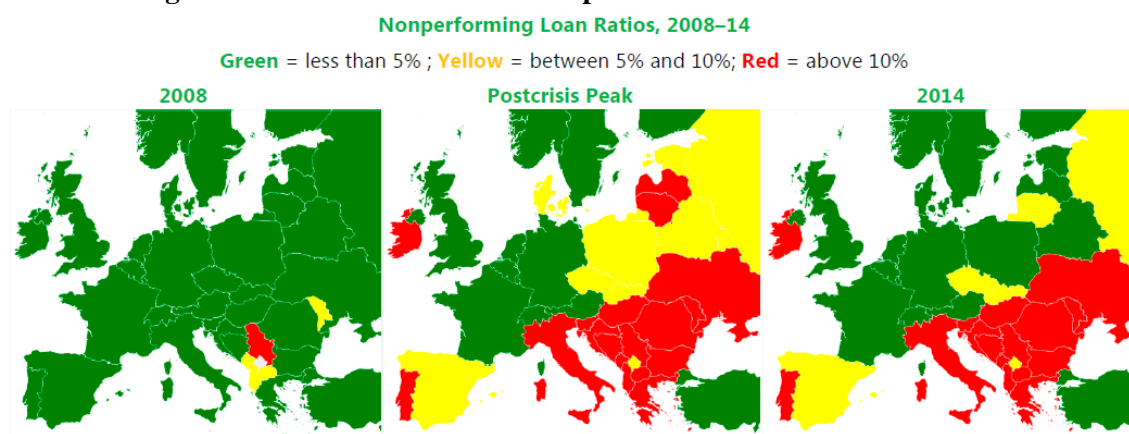
Sources: FSIs and country authorities.
Note: The FSIs are computed using consolidated bank data and therefore do not reflect only domestic NPLs. For example, in Spain the postcrisis peak and 2014 figures based on domestic data only are above 10 percent (13.5 percent and 12.5 percent, respectively).

Source: Aiyar *et al.*, 2015.

The build-up of large volumes of bad loans is in part due to the sluggish economic recovery but structural obstacles, e.g. underdeveloped distressed debt markets and shortages in supervisory and legal frameworks, cause at least a part of the persistency.
Additionally there is not only a main problem (e.g. an underdeveloped market for distressed debt) but on the contrary there are several structural obstacles interrelated between them, for this reason a comprehensive approach is crucial.

A recent Staff discussion Note of the International Monetary Fund (IMF) has investigated the main obstacles to the NPL resolution in Europe and, based on these, has developed a "Comprehensive NPL Resolution Strategy" (Aiyar *et al.*, 2015). The survey focused on European countries with high NPLs levels and clustered difficulties into five general areas: supervisory framework, legal system, distressed debt markets, informational shortcomings and the tax regime.

Problem in the legal framework and underdeveloped distressed debt markets are deemed as the most severe obstacles, furthermore the different obstacles are interlinked (there is a sort of compounding effect) and the scores of the other three difficulties are not significantly lower. As expected higher score, i.e. greater severity, of obstacles is associated with worse NPL outcomes.

Aiyar *et al.* (2015), looking at the lessons from past international experiences, suggest that an efficient strategy for the European context have to be implemented as soon as possible and should be a comprehensive one, i.e. combine three key elements: a more robust supervision, institutional reforms to the insolvency regimes and the development of a distressed debt market (Figure 4).

To enhance effectiveness these three core measures should be backed by some support actions, e.g. reforming the tax regime in areas where creditors are discouraged from provisioning or writing off loans; enhancing access to debtor's information; revisiting the privileged role of public creditors[19]; and through advisory services to made debtors more aware of their options and comfortable to discuss them with creditors.

Figure 4: NPLs, Causes and Solutions
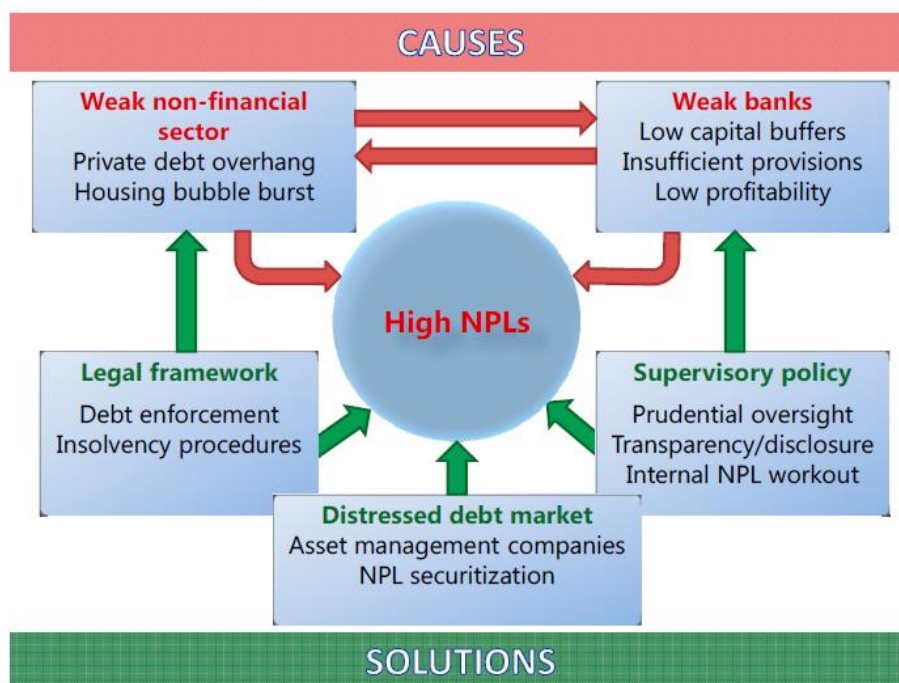
Source: Aiyar *et al.*, 2015.

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[19] The priority of public creditor's claims can pose collective actions problems, e.g. discourage banks from restructuring distressed debtors. This is compounded by lack of coordination between private and public creditors.

Supervisory policies

An effective supervisory policy should first pursue a conservative application of accounting standards in such a way a more vigorous provisioning, fast write-offs and income recognition is encouraged. Second, it should ensure that banks apply a firm approach to collateral valuation, i.e. reflecting variations in market conditions, the cost of sale, and the time necessary to realize the proceeds. Third, assets disposal should be pushed through a reinforcement of capital requirements, for example with time-bounds targets and increasing risk weights for "aged" impaired assets.

Another measure, to address asset quality problems proactively, for banks with NPLs exceeding a set threshold, could be an enhanced oversight regime through detailed reporting requirements and the development of internal NPL management unit defining rules and work practices for NPL resolution[20]. Finally supervisory authorities should encourage full disclosure to increase market transparency and discipline, and must review their sanctioning power, often underdeveloped for NPL oversight.

Legal framework

The European authorities' reform process should aims at the creation of an effective insolvency regime. Fundamentally it should arrange an adequate number of resolution toolkit ranging from rehabilitation (for viable but distressed firms) to effective liquidation (for no more viable firms), also through out-of-court agreements.

As a complement, an effective institutional setting is necessary, as slow and inefficient court proceedings can jeopardize even a good insolvency regime. For example in some cases countries do not set strict time limits for the insolvency process (or if existing are regularly not respected), incentive for insolvency practitioners to speed up liquidation are often not developed enough and there are no specialized judges to deal with commercial or insolvency issues. All this aspects lead to a considerably variation across countries for debt enforcement and foreclosures both in term of speed and rate of recovery.

Recently, many European countries have improved their insolvency regimes in line with these suggestions and international best practices; on the other hand reforms have been irregular across states.

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[20] Despite most banks tend to have dedicated NPL divisions they lack the expertise, capacity and tools to deal with large amounts of bad loans.

<u>Distressed debt markets</u>

The market in Europe for distressed debt is relative small both compared with the outstanding stock of NPLs and with peer countries. Therefore the last part of the strategy suggested by the IMF to facilitate the removal of NPLs is to foster the development of such markets[21]. These markets suffer from various structural shortcomings greatly contributing to the large price gaps between potential buyers and sellers. Some deficiencies are related to incomplete and not timely updated credit information on borrowers, overvalued and not liquid collaterals, low recovery values and inadequate provisioning of NPLs.

Distressed asset disposals in the past had mixed results and usually took place via portfolio sales, securitization or with transfer to private or public Bad Bank. The various alternatives are discussed later on this chapter, devoting also some attention at the compatibility between (public) Asset Management Companies, State Aid Rules and the recent BRRD.

2.2 Creating value through divestitures

Before investigate different possibilities to cope with NPLs, it is worthwhile to review first some general evidences about divestitures and then focus on the banking sector.

From a wider perspective a portfolio of businesses is value-creating if the company is currently the "best owner" for each business of the portfolio. An owner could qualifies as the best for a specific industry if he could add value through unique links with other businesses or through better governance, influencing critical stakeholders, if he has distinctive skills (both functional or managerial) or insight and foresight from which the new business can benefit.

The definition of best owner is not static; on the contrary it varies over time as circumstances change. Unsurprisingly the skills needed to create value in any single business unit renovate as the unit evolves and, since company's core competencies are relative fixed, only few corporation can efficiently manage a business unit across all the life cycle. Hence, applying the best owner principle, corporations should "continually look for and acquire companies where they could be the best owner, and must divest businesses where they used to be the best owner but that another company could now own better" (Koller, Goedhart and Wessels, 2015; pp. 418-419).

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[21] A liquid distress debt market could be a more cost-effective alternative to internal NPL management, especially for smaller banks that often lack the necessary competences and resources to manage NPLs.

The steps to exploit the entire potential value of a portfolio of businesses can be summarized as in the Figure 5 and they include improvement of operations internally, divestitures, acquisition and possible changes in the capital structure.

Figure 5: Steps in Constructing a Portfolio of Businesses
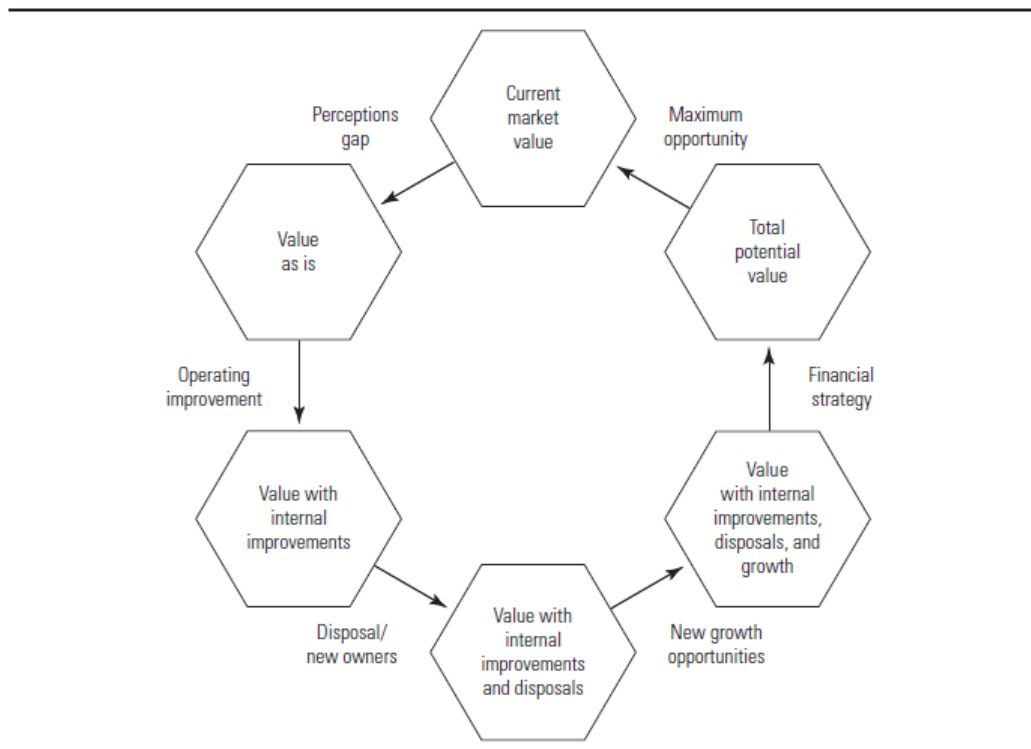
Source: Koller, Goedhart and Wessels, 2015.

Therefore any value creating strategy should focus not only on acquisitions or internal improvements but also on a periodically portfolio's cleaning out strategy.

The right mix also varies across the business lifecycle, Brandimarte, Fallon and McNish (2001) analysis suggests that the strategy should be more weighted toward acquisitions in the first phases (build and expand) while for business in the last segments of the lifecycle (operate and reshape) the best plan is a more balanced program of acquisitions and divestitures.

Focusing on divestitures only, they are commonly classified in two main categories: private (trade sale and joint venture) and public transactions (initial public offering, carve-out and spin/split-off). The first category is particularly suitable when the candidates (better owners) can be clearly identified.

In general the choice depends on several aspects. Among the others an important role is played by the availability of strategic or financial buyers, by the need to collect cash and as a result of the need of holding some level of control during the first steps of the procedure.

From a pure seller perspective a divestiture creates value when someone else is willing to pay a price that exceeds the seller's estimated value of the business or asset. In other words a comparison between costs and benefits of holding a business is necessary. The main costs could be classified into costs to the parent, costs to the unit and depressed exit prices. The first one concerns incompatibilities between the parent and the unit "culture", the absorption of a sizable share of scarce management time in an inefficient way and cross-subsidization between branches that could leads to not optimal decisions. The second is mainly related to the parent's lack of core capabilities needed to manage the business efficiently, at different moment in the lifecycle. Finally hold on seriously underperforming businesses too long could bring down the value of the entire organization (Koller, Goedhart and Wessels, 2015).

Academic researches provide numerous evidences for divestitures' potential to create value, both in the short term when announced and either in the long term. Among the others Mulherin and Boone (2000) studied the announcement effect of acquisitions and divestitures during the 1990s providing evidences that both acquisitions and divestitures increase wealth and that those effects are correlated to the size of the restructuring proposal.

Meanwhile a McKinsey study of some of the largest US companies[22] provided some interesting evidences about the impact of divestitures over a longer period. The least active one third of the sample, i.e. companies implementing a passive portfolio approach with no divestitures or that sold business only under pressure, significantly underperformed companies with an active portfolio approach. Indeed, over the ten-year period analysed, active companies achieved a thirty percent higher total return to shareholders in comparison with corporations implementing passive M&A strategies. Finally, focusing only on active companies, those that pursued a balanced strategy obtained higher return than those that primarily divested or acquired only (Brandimarte, Fallon and McNish, 2001).

Furthermore Mauboussin and Callahan (2014) show that most of the value of a typical company is created by a relative small percentage of their assets, this means that corporations have businesses or assets not earning the cost of capital and that may be more valuable for someone else. Therefore owners could increase their company values even if the scale of their operations has been reduced through the so called "addition by subtraction". Also, on average, be a seller is better than be a buyer since evidences shows that M&A overall create value but the acquirers fight to capture much, if any, of that value.

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[22] They used a sample of 200 companies and examined all their acquisitions and divestitures in one decade (from 1990 to 2000).

Nevertheless managers often mistakenly consider divestitures as a synonym of failure. Most of the sales are reactive rather than be proactive and systematic, this means that executives tend to divest only in reaction to pressures from outside and often postpone the trades for too much time, i.e. divest only after the business has been underperforming for many years.

The underdeveloped role actually played by divestitures is in part caused by the belief that a dilution of corporate earnings occurs. Indeed it is true but, as long as another part is willing to pay more than the value estimated by the parent company, the divestiture is value creating and should be executed.

Additionally some practical challenges may complicate the decision to divest (how and when). Some difficulties could arise in the presence of synergy benefits since part of them could be lost; shared assets, services or systems carriage similar issues. Moreover legal, contractual and regulatory barriers should be taken into account as well, since they can significantly slow down the process.

A final remark looks at market conditions. Market value is generally consistent with the fundamental value in the long term but deviations could occur in the short term so possible value gaps have to be considered; for example many companies cancelled their divestments plans completely during the financial crisis. Obviously the more liquid a market is the better the sale price is expected to be (Koller, Goedhart and Wessels, 2015).

Additionally both acquisitions and divestitures tend to occur in waves, i.e. a lot of divestitures occur during recession while a lot of M&A are made during moments of euphoria, but they should be ultimately driven by the core factors explained before and not by external forces. In other words the timing is a key factor for maximize the value of the operation.

2.3 Divestitures in the banking sector

The bulk of the evidences reported before could be well applied to the banking sector, taking into account its special characteristics. Banks are a particular category of financial intermediaries with the power to exercise the banking activity, reserved to banks only.

But what does banking activity mean? Banking activity could be defined as the simultaneous action of collecting savings from the public (depositors) and that of granting loans to

borrowers. In addition to this, banks can exercise any other financial activity, following the proper discipline, and other related and instrumental activities (Art. 10, TUB[23]).

The first step is to define what banks should divest. At a first glance, since one of the main activities of financial institutions is to grant loans to borrowers then, divesting should mainly imply to off-load NPLs and only residually other categories of assets.
However this definition is broad and rely on a specific type of bank, indeed it works smoothly for a commercial bank with an "originate-to-hold" model, i.e. financial institutions where loans account for an high percentage of overall assets and that kept mortgages on their balance sheets until maturity (hereafter also called "classical banking business").

Different financial institutions may have different objectives. Investment and universal banks, having a lower percentage of loans over total assets, have clearly complete different divestitures strategies, less focused on bad loans and more dedicated to the divestitures of non-core activities or units were they used to be the best owner.

Likewise over time, and with the introduction of new technologies, a lot of commercial banks evolve toward a more "originate-to-distribute" model, i.e. selling securitized loans before the maturity. In this way banks greatly reduced credit risk and curbed the rise of NPLs, on the other hand this behaviour spread the credit risk among numerous subjects and, as already mentioned, it was one of the roots of the financial crisis.

In the remaining part of our analysis the focus will be mainly on the disposal of NPLs and not on the divestitures of other non-core assets or business. This choice is motivated by the great attention devoted to NPLs since the start of the financial crisis. Indeed they are still perceived as one of the major problem for the banking system (especially in the southern part of the euro area as well as in some other south-eastern countries) and they are considered as one of the key priorities for ECB banking supervision (ECB, 2016).

NPLs do not generate interest income, nonetheless due to write-downs and legal and administrative costs they have a strong impact on earnings ratios, i.e. banks have to cope with a significant profitability problem. Moreover, as already mentioned in the first chapter, high levels of NPLs are negative related with lending and GDP growth. Finally, due to additional capital requirements for high-risk weighted asset, NPLs tie-up relevant amount of capital.

To tackle the NPLs problem several measures have been undertaken at the European Union level.

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[23] Testo unico delle leggi in materia bancaria e creditizia (Consolidated Law on Banking).

The first relevant regulatory change is the introduction of a new set of banking standards (Basel III)[24] aimed at gradually strengthens financial institutions.

The main improvements are the introduction of higher capital requirements and capital buffers, the set-up of a leverage ratio with the intention of limit the build-up of leverage in the banking sector, and the arrangement of liquidity ratios to improve the funding position both in the short term[25] and in the medium/long term.

The second is the response of the International Accounting Standard Board (IASB) to the financial crisis, completed in July 2014, with the introduction of a new accounting standard the "IFRS 9 Financial Instruments" (replacing the previous IAS 39) that will come into effect on January 2018. The new accounting principle is expected to enhance investor confidence in bank's balance sheets through the improvements introduced, e.g. with the introduction of a new definition of impaired assets and of a new expected-loss impairment model that will require a more timely recognition of estimated credit losses (IFRS, 2014).

One more important step forward is represented by the ECB's Draft guidance to banks on non-performing loans, currently non-binding, identifying a number of best practices useful to cope the problem throughout the all the life cycle of NPL (ECB, 2016). The ECB's focus on this issue is not new, indeed it began in 2014 with the Comprehensive Assessment, a financial health check to ensure that banks can survive possible financial shocks and are sufficiently capitalised.

Furthermore, as already mentioned, the EBA has released a new forbearance and non-performing exposures definition which applies to all loans and debt securities that are on-balance-sheet. Both these definitions are compulsory[26] for all the European banks since September 2014 and a briefly explanation of them is reported inside the box in the next page (Box 1).

In that period the EBA was concerned by a general trend of deteriorating asset quality across Europe and by the extensive use of forbearance, potentially aiming at delaying loss recognition and hiding asset quality deterioration. To assess and solve these criticalities a comparable and harmonised definition was a necessary prerequisite, however at that time

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[24] Since standards proposed by the Basel Committee have not legal power, the implementation in the European Framework has been made through the Capital Requirements Directive IV (Directive 2013/36/EU) and the Capital Requirements Regulation (Regulation EU 575/2013), the so called "CRD IV package".

[25] It is worth recalling that during the crisis a number of banks suffered liquidity problems due to the excessive reliance on short term inter-banking fund.

[26] The implementation has been made with the Commission implementing regulation (EU) No 680/2014, later revised by the Commission Implementing Regulation (EU) 2015/227 of 9 January 2015.

national practices differ and there were no coherent definitions. This lack of homogeneity has pushed the EBA toward the implementation of a harmonised definition (EBA, 2014).

For the same reasons also the Basel Committee on Banking Supervision in July 2016 published a guideline with their definition of NPEs and forbearance (BIS, 2016).

Box 1

EBA's newly harmonised definitions of NPEs and Forbearance
According to the EBA, <u>Forborne Exposures</u> are defined as debt contracts in respect of which forbearance measures have been applied, i.e. concessions towards a debtor that is experiencing or close to experience difficulties in meeting its financial commitments. A concession may entail a loss for the lender and refers to a modification of the previous terms and conditions of a contract or to a total or partial refinancing of a troubled debt contract that would not have been granted had the debtor not been experiencing financial difficulties. Forbearance does not necessarily mean non performing, indeed forborne exposures can be recognized both in the non-performing and in the performing portfolios. The definition of <u>Non-Performing Exposure</u> is based on the four following criteria: a) *Entry criteria*: a non-performing exposure is every exposure that is 90 days past-due or unlikely to pay without collateral realisation, even if it is not recognised as defaulted or impaired. In any case exposures in respect of which a default is considered to have occurred and exposures that have been found impaired in accordance with the applicable accounting framework shall always be considered as NPEs. b) *Pull effect*: all exposures to a debtor have to be considered non-performing when its on-balance sheet 90 days past-due reaches 20% of the outstanding amount of total on-balance sheet exposure to that debtor. c) Exposures cease to be non-performing if all the following conditions are satisfied: the exposures meet the exit criteria for the discontinuation of the impairment and default classification, the situation of the debtor has improved to the extent that full repayment is likely to be made, and the debtor does not have any amount past-due by more than 90 days. d) Additionally NPE that are forborne cannot exit the NPE classification before one year over which the debtor has to prove its ability to meet the restructured conditions, even if forbearance has led to the exit from default or impairment classes (Commission Implementing Regulation (EU) 2015/227).

Thus, from a wider perspective, we have four different definitions of exposures that are no more performing. The first two, almost identical, are the already mentioned supervisory definition of "NPEs" developed by the EBA and the one developed by the Basel Committee on Banking Supervision, the third is the prudential definition of "default" set up in the Capital Requirement Regulation (Art 178), and the last one is the accounting definition of "impaired" provided by the IAS 39 (now IFRS 9).

Although the last two categorizations are slightly different in comparison with the first pair, in most cases the concepts are aligned. Every impaired and every defaulted exposure by definition is necessarily a NPE, but the converse could not be true since NPE is a relative broader concept and could potentially incorporate other exposures.

The main drivers of the potential differences are the extent in which automatic factors used in NPE are not envisaged by the other two definitions, i.e. NPE classification due to the 20% pulling effect and one year period to exit NPE category (ECB, 2016).

Some other actions mainly aimed at improving national insolvency systems have been introduced by single member states, consistently with the recommendations of the "Comprehensive Strategy" developed by the IMF.

Indeed recently European banks have put significant effort and resources to reduce the pile of NPLs in line with the suggestions and provisions of regulators and of many other institutions (mainly IMF, ECB and EBA). In this regard is useful to remember that since the starting of the financial crisis European banks are facing a drive on the road to the reduction of the size of their balance sheet, primarily through sales of non-core assets. The main reason is the already mentioned strong pressure toward the increase of capital ratios. This behaviour is consistent with the common belief that divestitures are a synonym of failure and that they happen mainly in reaction to outside pressures.

Nevertheless in some countries NPL stocks are still much higher than pre-crisis level and a lot more needs to be done in the next future both for reduce stocks and new flows of NPLs.

In the first part of the chapter the focus was more general and centred on the actions that regulators should undertake. Now the emphasis is more on the improvement required at the bank level. At this level NPL management require a proactive and rigorous approach.

A well-structured plan to manage NPL stocks begins with an assessment of the operating environment. After that through a number of steps a NPL plan, establishing strategic targets both in terms of development of operational capabilities and projected NPL reductions over a defined time horizon, can be formed. The plan must then be implemented and results should

be evaluated and matched with initial targets with the aim to refine the strategies and, if necessary, take corrective actions (Alvarez & Marsal, 2016; ECB, 2016).

A complete assessment of the operating environment includes three main valuations. The first one concern an analysis of the internal capabilities to effectively manage and reduce NPLs, at the end the bank should determine strengths, significant gaps and area of improvements. Subsequently an analysis of the external conditions and operating environment is fundamental: the external factors that should be taken into account are macroeconomic conditions, market expectations, NPL investor demand, and the regulatory, legal and judicial framework. Finally also the capital implication of the plan, ideally under different economic scenarios, should be considered.

The next stage looks at the development and implementation of the strategy. It should not include only a single option, but rather a combination of different strategies to best achieves the targets over the different time horizons and over different portfolios or segments. From a continuum of solutions we can outline two main approaches: internal recovery and external routes, where the first one also acts as a reserve plan if the exit option is not feasible or fail.

The development of *internal work-out strategies* involves the definition of a certain number of realistic and regularly updated targets for each relevant class of exposure; e.g. expected long term NPL level, expected recovery rate, potential losses and expected timelines for recovery. The various steps can be handled completely internally, through non-core NPL unit, or can be outsourced (even partially). In the first case actions on NPLs can be taken in the court (legal recovery) or out of the court (consensual recovery).

External recovery means sale of loan portfolios to external specialized companies, use of hybrid strategies (work-out of loans with enhancement potential internally for a specified time followed by sale or outsourcing) and resort to more structured solutions like Special Purpose Vehicles (SPVs, also called Bad Banks). In each case the ultimate exit scheme will depends not only on the bank's optimal strategy but also on constrains and external factors.

Table 1 briefly summarizes the advantages and considerations of the various possibilities. Starting from the lowest level of externalization NPLs can be retained and managed by banks. This approach could be proficient if the bank has a sufficient level of knowledge and expertise to effectively tackle the issues. Moreover it requires suitable incentive schemes and the availability of sufficient funds to support restructuring when necessary. If all these conditions are fulfilled, i.e. an efficient recovery system has been implemented; there is the potential for high recovery.

Internal actions on NPLs can then be taken in or out the court. The first is based on insolvency and liquidation processes, in-court restructuring schemes and legal recovery through enforcement of underlying collateral, also without the cooperation of the debtor.

The second one is centered on consensual recovery and mainly consists on forbearance measures like loans' restructuring with new terms or new lending, cash settlement with the borrower's consent and on out of the court restructurings.

The strengths of legal recovery are the set-up of a binding framework and the higher degree of certainty in developed markets. At the same time legal costs, potential uncertainty outcome in less developed markets and long time to execution should be considered since they can greatly reduce the recoverable amount.

The main advantages of consensual recovery are the avoidance of costly legal process and the shorter time required for the implementation that leads to more cost-efficient process and with the potential for high recovery. Anyway funding requirements in form of new lending, in case of restructuring, and time to execution should be taken into account.

For both approaches the bank needs an adequate extent of skilled staff and appropriate incentive schemes (Alvarez & Marsal, 2016).

The recourse to external solutions is unavoidable when the bank believes to be not able to manage all the NPEs internally or lacks some core skills.

The first alternative is to outsource part of the management to external specialized companies or to form a joint venture with third parties, although retaining the majority and therefore the governance of the work out unit. These strategies are suitable if the institution lacks core skills. At the same time they allow free-up management time but are time consuming to be implementing.

A more incisive option, i.e. with a higher degree of externalization, is to relocate or sold bad loans to specialized loan companies. Besides free-up management time, with this choice banks can also improves liquidity position and potentially pick-up capital ratios. Nonetheless the sales of NPLs imply an immediate crystallisation of losses that could be particularly relevant if the price gap between market value and book value is high.

Moreover, managing the stock of NPL is only half of the story. Addressing the flow of new NPEs is as important as managing the stock: eradicate the past consistencies without addressing the underlying problems is not really helpful, as the stock will rise again and again due to the new flows of bad loans.

Though NPL flow highly depends on general economic conditions, an important role is also played by management decisions. Therefore the development of strong underwriting policies and guidelines, continuously reviewed and updated on the basis of "best practice" is crucial.

Table 1: Internal VS External Solutions

		Advantages	**Considerations**
INTERNAL SOLUTIONS	Consensual	✓ Potential for high recovery ✓ Costly legal process are avoided	✓ Skilled staff ✓ Suitable incentive schemes ✓ Funding requirements in case of restructuring ✓ Time to execution
	Legal	✓ Framework for binding restructuring and recovery ✓ More certainty in developed markets	✓ Legal costs ✓ Uncertainty outcome in less developed markets ✓ Time to execution
EXTERNAL SOLUTIONS	Hybrid Strategy / Outsourcing	✓ Exploit enhancement potential ✓ Frees up management time ✓ Suitable if bank lacks core skills	✓ Time to execution ✓ Time consuming to implement
	Sale	✓ Frees up management time ✓ Improves liquidity position ✓ Potentially improves of capital ratios	✓ High Price Gap ✓ Quality of portfolio ✓ Inadequate provisioning and lack of information
	SPV (Bad Bank)	✓ Diversification effect ✓ Potential increases of capital ratios and liquidity position ✓ Possibility of state intervention	✓ Immediate crystallisation of losses through asset transfer ✓ Time to execution due to complexity ✓ State Aid rules / BRRD

Source: own elaboration from Alvarez & Marsal (2016).

2.4   Internal management or Externalization?

Clearly the credit work-out activity should not be treated as stand alone, but as the last phase of the entire credit value chain. In other words the whole credit lifecycle should be designed in such a way to minimize the probability of deterioration and, if things go wrong with the debtor, to ensure an optimal collection of the residual value. The three central phases of loan lifecycle are the credit origination, the credit management, and the credit collection and recovery.

During the origination phase the bank collects all the relevant information on the counterpart asking for a loan. The creation of a reliable database is essential; therefore a correct management of this phase involves getting information efficiently and effectively about the debtor and about the contractual arrangement of the mortgage. After that the financial institution must determine the specific risk of the loan, the estimated losses and the associate provisions. According to the Basel III Accord, the bank can choose among three different approaches (standardized, foundation, and advanced internal rating based) each one with a different grade of complexity.

With the standardized approach no internal discretionary actions are needed, while the other two requires the estimation of some parameters in order to assess the counterparty risk.

Under the foundation approach the financial institution has to estimate the probability of default (PD) of any single loan while the "formula" and other relevant parameters are provided by the banking supervisor.

The advanced IRB approach instead is the most complex since the bank must estimate not only the PD but also the exposure at the moment of default (EAD) and the loss given default (LGD), on the other hand its application usually results in lower capital requirements.

Once the credit has been originated the next phase is to manage it. Information about the status of a credit should be regularly collected and updated since the credit can take a multitude of possible patterns and the bank must be ready to react. For this reason each bank should institute a limited number of early warning signals (EWS) allowing for a timely determination of any possible deterioration.

Depending on the development of the loans itself the final phase of the credit lifecycle can either be its full collection or its partial recovery if the counterpart defaulted. Anyhow the declaration of default is not immediate, indeed if an obligor fails to repay its debt within the contractual terms the loan is considered past-due (or sub-performing) and a number of actions take place before the relocation into the NPLs category (Scardovi, 2016).

In any case a clear separation between the units originating the loans and the unit managing the NPLs is recommended in order to avoid potential conflict of interest. Moreover the division should be set-up in such a way to take into account the full NPL life cycle from the beginning to the end.

The first relevant phase in an hypothetic life cycle of NPLs is the management of early arrears (up to 90 days past due) but not yet classified as non-performing, at this stage the focus should be on collecting the information necessary for a comprehensive valuation of the

borrower's status to determine the most appropriate work-out strategy. Financial actions can be taken to minimize the exposure at the time of the potential future default and on the other side to reduce the borrower's probability of default, e.g. the bank should seek options to strengthen its position and could grant short-term forbearance agreements.

The following stage consists on the formalization and implementation of restructuring and forbearance arrangements with the borrowers. These concessions should be carried out only when the previous assessment concluded that viable restructuring options exists and in each case should be subject to an enhanced monitoring for a defined period.

Another phase, which takes place in parallel with the previous one, focuses on borrowers for which no viable forbearance solutions are available. In these cases, banks should perform a cost-benefit analysis of the different liquidation options, choose the best one and speedily proceed with it as soon as the loan reaches the non performing status (ECB, 2016).

Once the loan reaches the non-performing status the focus moves from the minimization of the PD and of the EAD to the minimization of the LGD. At this point, since the possibility of recovery to a performing status is low (especially for the worst NPLs categories), the bank must plan and execute its work out activities in order to try to recovery as much value as possible from the loan.

In doing this a financial institution can decide to manage the non performing exposure through an internal division, or as an alternative, can consider the externalization of this task to third party servicers.

The choice between internal and external strategy is not trivial, it is based on a strategic assessment of the bank's internal capabilities but also on the economic conditions as during recessions financial institutions may end up owing too big amount of bad loans that cannot be all efficiently managed.

A homogeneous and unfocussed management of NPLs would have a negative effect on the workout process because it would lack both of efficiency and of effectiveness. Indeed effective NPL strategies always require a segmentation of portfolios to obtain group of borrowers with similar characteristics and requiring analogous treatments.

Clearly the more granular the segmentation, the more accurate the other steps will be. The first distinction is between "common" lending and leasing. In fact the bank is already the direct owner of the underlying asset being financed in the case of leasing, but this is not true for all the remaining assets. After this first segmentation has been done, additional separation could be introduced to further clusters NPL portfolios.

There are numerous ways to segment loans: the main drivers could be the kind of counterpart, the size of the exposure, the age, the presence of guarantee or collateral and the location.

For the leasing book the clusters are similar, e.g. the size, the vintage and the type and nature of "collateral". The kind of asset associated to a leasing contract is very important.

Indeed the big variability among collateral is critical for the bank. It could be an asset that has no dynamic secondary market or even in the case of a more standard good it could lose value quickly over time. The Figure 6 provides an example of clusterization of banking and leasing positions.

Figure 6: Segmentation of a NPLs portfolio
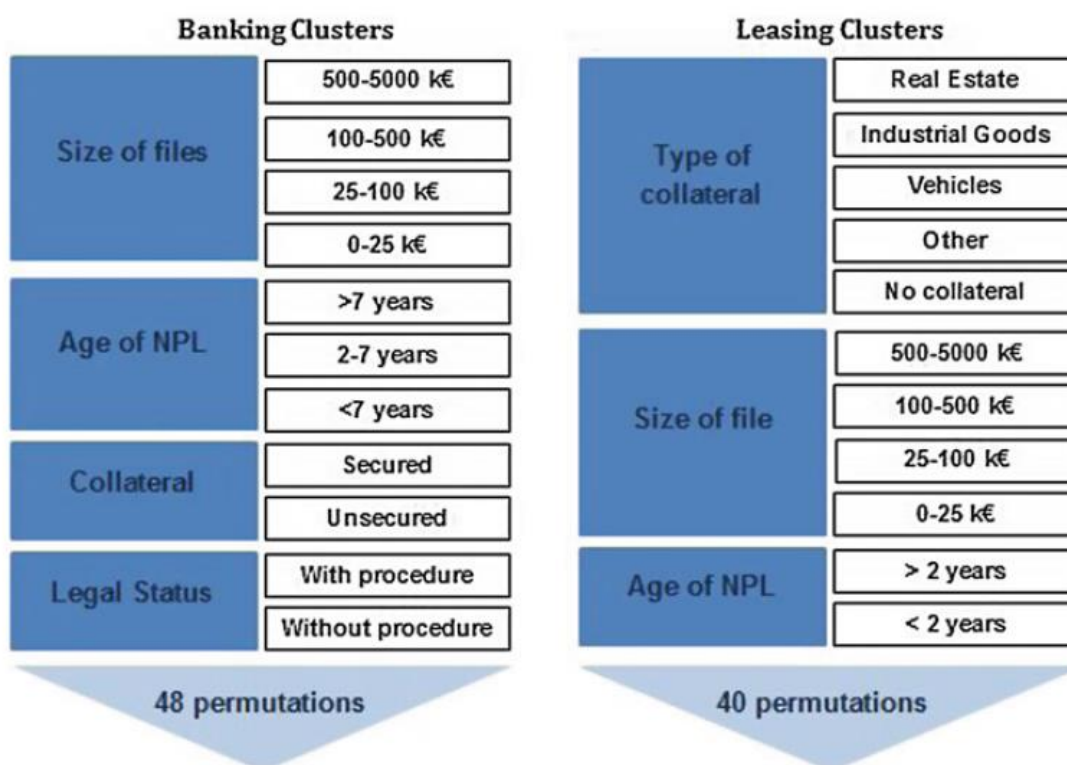
For each combination or permutation a detailed analysis, aimed at defining the best recovery strategy, should be carried out.

First of all a feasible overall target recovery rate should be assigned to each cluster. Usually it is expressed as a percentage of the gross book value, but a more useful one should also take into account the time value of the money recovered. Indeed the net present value is what really matters, as it focuses on net cash flows and gives the right weight to the timing.

The most important decisions, as already explained, concern the choice of the process that could be judicial, extrajudicial or both, and the level of outsourcing wanted. Therefore, after

having defined the recovery targets, an appropriate management strategy for each category of NPLs should be recognized. For this purpose is important to deal both with a cost-to-income maximization and with a maximization of recovery rate.

Costs can be both fixed and variable. In case of internal management fixed costs are usually higher since they include the dedicated bank's employees, the costs related to the operations and the technology owned by the bank for the purpose. Conversely externalization would require the bank to pay a variable fee relatively high but usually depending on the performance reached by the third party, therefore highly incentivizing the counterparts. At a first glance externalization could be desirable since lead to a more flexible cost structure.

Through a sort of screening process each bank should define the portion of NPLs portfolios to manage internally versus the ones to be outsourced. A bank prefers to keep managing internally the positions with the highest recovery potential, whilst outsourcing the remaining: when the expected recovery rate is not higher enough to cover associated internal costs the bank decides to sell the portfolio to a third parties. In turn this second player can manage all the leftover position internally or pass over some to a third player, and so on (Scardovi 2016).

When executing a sale transaction selecting the right portfolios is only half of the story, also the preparation plays a critical role both to attract investors and to help to squeeze the "bid-ask spread" by removing some uncertainties and unknowns in a potential transaction.
For this purpose is important to understand and take into account investors' requirements, and price is not the only one. For example a high data quality and accuracy is of paramount importance, therefore investments in information technologies that allows a higher data precision have higher returns on investments. The same considerations apply to collaterals valuation (Alvarez & Marsal, 2016).

Another possible answer to the NPLs problem is the securitization. In the first chapter we have already mentioned the unrestrained use of loans' securitization in the USA starting from the last decades.

The essence of securitization is the process of pooling together a large number of assets and the subsequent issuance of prioritized claims against these collateralized pools. As a result is possible to transform an illiquid asset into a liquid one, moreover many of the created "artificial" tranches are far safer (i.e. have a higher rating) than the average assets in the underlying pool (Coval, Jurek and Stafford, 2009).

This practice began to be commonly used by banks in the early 2000s when they start to pooling thousands of mortgages together, and selling these pools to special purpose vehicles (SPVs). SPVs finance the purchases by issuing securities with different seniority, called Asset Backed Securities or ABS.

Even if the securitization of performing loans is more common and much cheaper, the process is applied also to group of NPLs. Through securitization the originator bank, as in the case of a normal sale, can transfer a part of the credit risk outside, increase the financial resources and reduce the management cost.

Sometimes, in order to reduce the risks for the investors and therefore the required rate of return, the originator retains or buy-backs the subordinated tranches; but in this way the bank is still burdened by part of the credit risk.

2.5   Transfer to a Bad Bank

When the size of NPLs reaches too big proportion and all the other strategies seems to be not sufficient, the creation of an Asset Management Company (AMC) should be taken into account.

The process usually starts with a perception by management that non-performing loans are imposing a no more sustainable burden on the bank. Moreover also external pressures from regulators could push toward this solution (Neuberger, 1992).

Through an AMC or Bad Bank the troubled assets in a bank's balance sheet can be detached from the good ones. The first result is a reduction in the information asymmetries since investors can distinguish the healthy part of the institution (the good quality assets' remaining in the good bank) from the troubled one.

The greater transparency is not the only reason to set up a SPV. Worries about a bank's financial situation hinder its capacity to lend, issue debt and raise additional capital. The burden of carrying NPLs encloses also the cost of workout efforts within the bank, which can distract loan officers from servicing good loans or developing new business. Moreover a high proportion of impaired loans likely encourage stricter scrutiny from regulators, thereby imposing additional regulatory costs on the bank (Neuberger, 1992). Other value drivers created are the properly aligned incentive systems, the focalization of the skills and the managerial talents of the management, the possibility to reduce the overall financial risk by sharing the risks with other subjects (diversification effect) and, over a longer period of time,

the possible improving of capital ratios and liquidity position for the "good" bank (Scardovi, 2016).

The basic idea looks simple; nevertheless in practice there are many organizational and structural aspects to be taken into considerations. Indeed the creation of a bad bank is highly complex and different features must be considered and detailed since they can affect the bank's liquidity, solvency and overall profitability.

At first glance bad banks can be classified according to the structure and the ownership. Focusing on both the characteristics we can identify, on one side, decentralised AMCs, and on the other side centralised AMCs. In the first case the asset management is undertaken by the bank itself and this vehicle also tend to be private, even if entities set up by the government to deal with the assets from a single bank are possible. Conversely a centralised AMC involves only one workout entity with some level of public ownership.

In general a decentralised solution should be in a better position to resolve NPL problems than a centralised tool since it has a relevant informational advantage: banks already have all the loan files and institutional knowledge of the borrowers. Moreover banks can provide additional financing when needed in the restructuring process and, leaving loans in banks, may provide an incentive for recovery and for avoiding future losses by improving approval and monitoring procedures.

Conversely a centralized approach allows exploiting economies of scale (i.e. aggregation of scarce work-out skills and resources within one agency), due to larger pool of assets can ease their securitization, since breaks links between banks and corporates could potentially improve the collectability of loans and allows banks to focus on core business. Moreover the entity may be entrusted with special powers to accelerate the loan recovery and bank restructuring (Klingebiel, 2000).

In a 2009 paper, McKinsey & Company recognised different basic models for decentralised bad banks and some core design topics that banks need always to take into account in setting up a SPV (Figure 7).

First of all, as in every asset disposal strategy, the asset scope should be well-defined; selecting which assets should be transferred to the bad bank and which should be retained by the core one. Bad banks are usually set up to manage non-performing loans and sometimes non-strategic assets, i.e. whatever banks want to dispose in order to deleverage or resize its business model.

Another crucial step is the selection of the most suitable structure. Individual bad banks solutions can be clustered into four basic structures, determined by the combination between the legal structure (which can be a structured solution or the creation of a separate banking entity) and the level of deconsolidation from the balance sheet (on-balance sheet vs off-balance sheet solutions).

On-balance sheet operations involve a low level of deconsolidation, are faster and simpler to implement but they result in only limited risk transfer.

Structured solutions usually involves the use of guarantee, typically from the government, to protect a fraction of the portfolio against losses, still the attractiveness of this solution is limited by the lack of a clear asset separation. This disadvantage can be overcome with the creation of an internal and separate restructuring unit. While this solution still lacks efficient risk transfer, it increases transparency on the core bank's performance.

Off-balance sheet actions involves a higher complexity level but at the same time an efficient risk transfer and a certain degree of protection. Structured solutions implicate the transfer of some portfolios into a special purpose entity, which is then ideally removed from the core bank balance sheet. A more effective solution is to dispose the assets into a legally separated entity, i.e. perform a bad bank spin-off.

Figure 7: Core design topics for establishing a bad bank
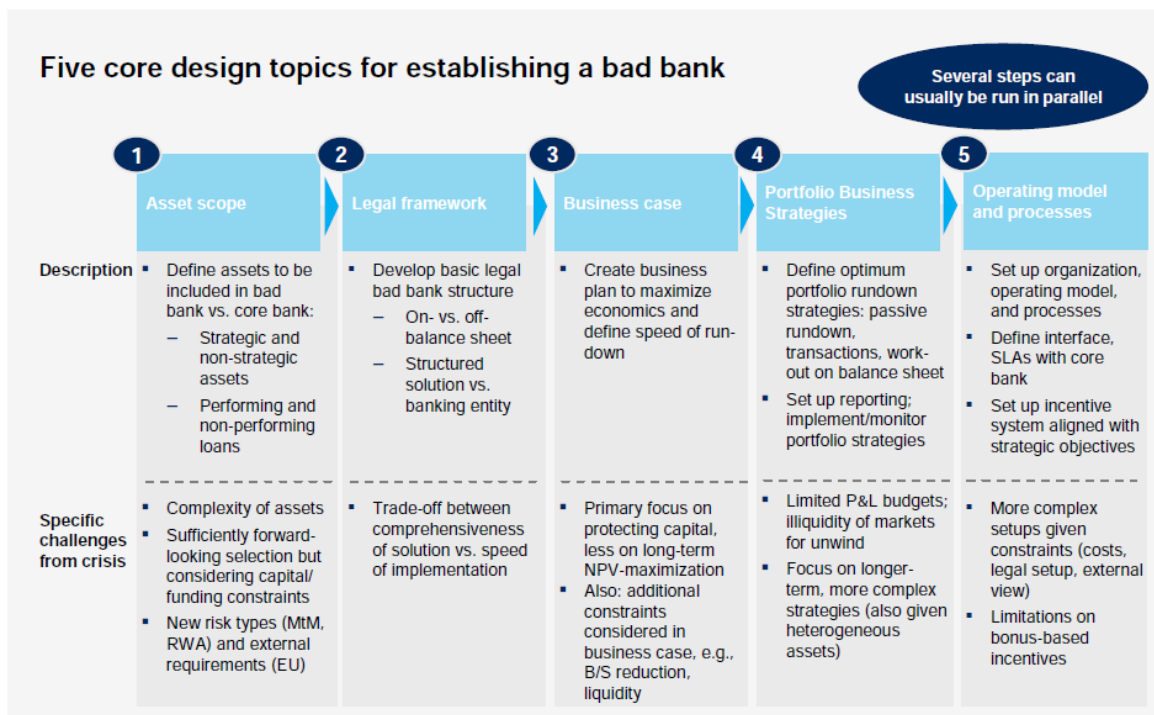
Source: McKinsey & Company, 2009.

After that, to maximize the value's extraction, is important to define and pursue an optimal portfolio run-down strategy. There are basically three main techniques for extracting value from the assets: a mere passive rundown; implement sale or securitization of selected assets, and set up a work-out on balance sheet trying to accelerate the recovery by actively managing the assets.

Large centralized AMCs, privately held, are rare. When the amount of bad loans and assets transferred to the bad bank became significant, it is usually difficult to find an investor willing to assume the ownership of such vehicle without asking for a public participation or requiring state guarantees to cover the risk for future losses (Klingebiel, 2000).

During the last financial and economic crisis some euro-area countries set up AMCs to address the growing level of NPLs, threatening the financial stability of the entire Eurozone. In 2009 the Irish government established the National Asset Management Agency (NAMA) to address the serious crisis in the Irish banking sector. Similarly, in 2010, the German ones set up the FMS Wertmanagement and in November 2012 the "Management Company for Assets Arising from the Banking Sector Reorganisation" (Sareb) was created in Spain.

These three AMCs have some common features but at the same time some dissimilarity. Indeed Sareb and NAMA are more similar to each other than between either of them with FMS.

The German AMC was designed as an entirely public AMC and focused on a single nationalised banking group, the Hypo Real Estate group, acquiring most of its assets (€ 176.5 billion, just below 7% of German GDP in 2010). Conversely both Nama and Sareb are centralised and were established as majority privately-owned; they both took over assets from several domestic banks[27].

The funding strategy of Nama and Sareb was similar: liabilities are made up of a small percentage of equity, few subordinated bonds and of a large amount of state-guaranteed senior bonds. FMS has a different strategy, by 2011 the original government bonds were replaced by FMS's own funding; bonds can be issued at favourable rates due to a sovereign guarantee.

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[27] More precisely, according to their respective websites, NAMA acquired assets from 5 participating institutions for a gross amount of €74.3 billion (44% of 2009 GDP) while Sareb took over assets from 5 nationalised banks and from 4 banks that received state funding for an overall gross amount of €107.4 billion (10% of 2012 GDP).

Moreover all the three AMCs have hired a lot of expert skilled staff with private sector experience; but while FMS does its own servicing, NAMA and Sareb commonly outsource asset servicing activities (Medina Cas and Peresa, 2016).

Today the three AMC are at different stages of portfolio disposals and the results are mixed. Nama has been very effective, by the end of 2015 it has sold 75% of its assets, redeemed 70% of its senior obligations and it is also likely to realize a profit for the Irish state by the time it wind down.

Sareb, having been established only at the end of 2012, is in the early stages of reducing its portfolio and repaying senior debt. Moreover Sareb has been loss-making in 2013 and 2014, in part due to the slower recovery of market property value in Spain in comparison with Ireland and UK.

FMS has been reasonably successful with the sale of its assets however asset disposal in the future will likely be more challenging given the illiquidity and long maturity profile of its remaining portfolio (Muehlbronner and Lemay, 2015).

Some final considerations concern the EU regulatory framework as it strongly influenced the extent of some of the Bad Banks established in Europe, especially in countries with high debt levels. Moreover, due to recent reforms, the regulatory framework will likely reduce the possibility and the convenience to set up state-sponsored bad banks in the future.

First of all in 2009 Eurostat provided some conditions for SPVs to be classified outside the general government sector[28] even if they benefit from government guarantees. Even if all the conditions are fulfilled such entities would still increase sovereigns' contingent liabilities. Moreover Eurostat also decided to classify capital injections into banks as government expenditure (i.e. deficit increasing transfers). Major changes were implemented also in the "Eurostat's European System of National and Regional Accounts" (ESA, 2010), published in 2013, where a stronger emphasis was put on who is effectively bearing most of the risks associated to the bad bank regardless of the AMCs' ownership structure (Gandrud and Hallerberg, 2014).

Ireland and Spain's SPV were created to comply with the rules to be classified as a financial corporation and the likelihood of building significant losses for the government was mitigated mainly by the larger haircut applied to the asset purchased (the average haircut was 57% for NAMA and 53% for Sareb). On the other hand, due to the pronounced haircut, the necessary

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[28] Such entities need to be: majority privately owned, temporary, autonomous in decision-making, acquire assets with a substantial haircut and established with the only objective to address financial crisis.

recapitalisation of banks led to a consequent increase in general government debts in both countries.

By contrast, the German FMS Wertmanagement was entirely publicly-owned and raised the public debt by about 8% of GDP in 2010, but there was no need for recapitalisation of the HRE group since FMS acquired assets with no haircut.

In addition the three AMCs had to comply with EU State-aid regulations when they acquired impaired assets from participating banks.

The transfer price of NPLs is critical in determining the presence and the amount of State aid, in general the operation would be State Aid compatible if the transfer price is not higher than the real economic value[29] as this ensures a level of burden sharing by the banks, since the price is set below the book value.

In the Irish and Spanish case this criteria were respected. Contrariwise, as already mentioned, the asset transfer from HRE to FMS exceeded the real economic value as the transfer price was equal to the book value. The commission considered also this measure compatible given the partial claw back and the in-depth restructuring (Medina Cas and Peresa, 2016).

As already described in the first chapter, from 2013 the burden sharing requirement was further strengthened and a new Resolution Mechanism was established. Moreover due to the Bank Recovery and Resolution Directive, fully in force since 2016, new measures involving State Aid would almost[30] automatically trigger the resolution and bail-in of the beneficiary banks and the creation of a bad bank is recognised only as one of the resolution tool.

Bad banks like those created in Spain Ireland and Germany are no more possible under the new rules, unless the affected banks are in resolution. However, if an AMC is built with no State Aid, then neither bank resolution nor bail-in is required.

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[29] The real economic value corresponds to the net present value of the sum of expected cash flow, discounted at an appropriate rate (i.e. the risk-free rate plus a risk premium). It is somewhere between the book value and the market value.

[30] The main exception is the *Precautionary recapitalisation* under Article 32(4)(d) of the BRRD. It is an exceptional measure that does not trigger the resolution, on the other hand it is available only for solvent bank and when this is necessary to remedy a serious disturbance in the economy of a Member State. These recapitalisation measures are conditional on final approval under the European Union State aid framework.

CHAPTER 3. AN ANALYSIS OF THE "PRICE GAP" AND OF THE EFFECTS ON CAPITAL REQUIREMENTS

3.1 The rationale for a better understanding of NPLs' Price GAP

In the first Chapter the steep rise in some areas of NPLs, as a consequence of the Financial Crisis of 2007-08, has been analysed. Then, in Chapter two a Comprehensive Strategy to handle the problem was described and a great level of attention has been devoted to the divestitures of Non-Performing Exposures.

To this end some possible solutions, both internal as well as external, have been presented. The choice between internal and external strategies is not trivial; indeed it's based on a thorough evaluation. Likewise the recourse to external solutions could be the only possible choice when the amount of NPLs exceeds the bank's management capacity or when the financial institution lacks some core skills.

During the last financial crisis to overcome these difficulties a number of European banks resorted to State Aids and some Asset Management Companies have been set-up. As already explained, today measures involving State Aid would almost automatically trigger the resolution of the troubled bank, consistently with the BRRD.

For this reason the transfer of NPLs need to take place at market conditions. At the same time, one prerequisite is the existence of a well-developed secondary market. Such markets are often underdeveloped and one of the reasons of this failure is the substantial difference between the prices offered by investors and the book value of NPLs. This difference is often named as "Price GAP" or haircut on the net book value.

A better understanding of the Price Gap's determinants and of its effects on Capital Ratios could provide some advices for additional measures to reduce the haircut and to improve the size of the NPLs' market. Indeed the bulk of this Chapter focuses on the estimation of the Price Gap under different assumptions and on the resulting effects on capital ratios.

The analysis is based on a sample of Italian banks. Italy is an interesting case study because, despite some improvements, remains one of the European countries with the highest level of NPLs.

According to the last 2016 Risk Dashboard[31] published by the European Banking Authority the Ratio of NPLs in Italy despite a marginally downward trend is still 15.3%, compared with a European average of 5.1%. Only three countries have a higher ratio (see Figure 8).

Figure 8: Ratio of non-performing loans and advances (NPL ratio)
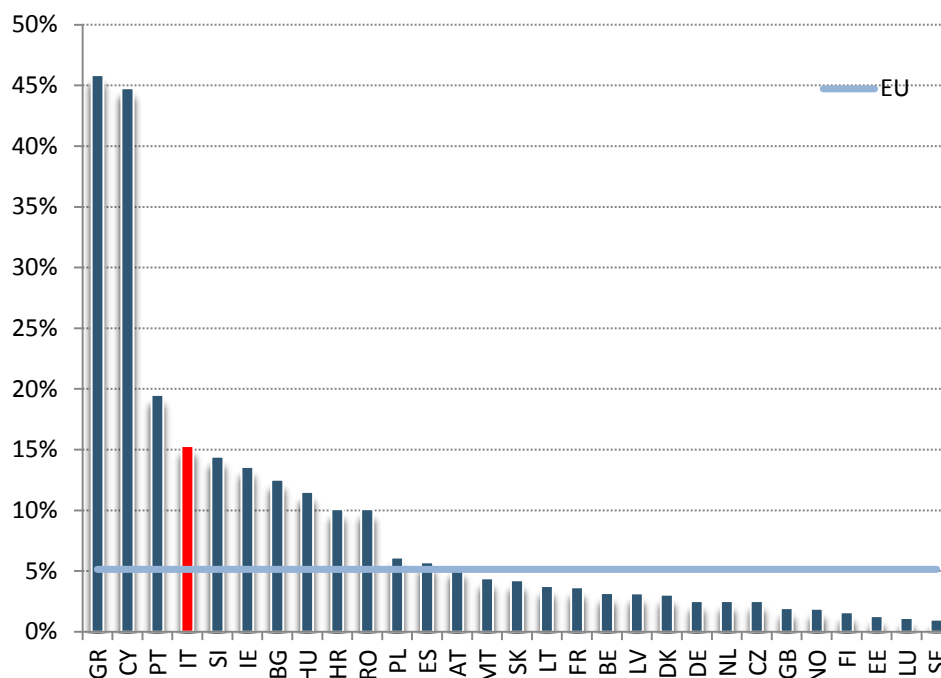
Source: EBA Risk Dashboard (data as of Q4 2016), 2017.

Table 2: Credit quality of Italian banks

Credit quality: amounts and shares of non-performing loans and coverage ratios (1)
(billions of euros and per cent; December 2016)

	Significant banks (2)					Less significant banks (2)					Total (2)				
	Gross exposures	Net exposures	Gross percentage share	Net percentage share	Coverage ratio	Gross exposures	Net exposures	Gross percentage share	Net percentage share	Coverage ratio	Gross exposures	Net exposures	Gross percentage share	Net percentage share	Coverage ratio
Customer loans (3)	1,519	1,373	100.0	100.0	9.6	312	283	100.0	100.0	9.3	2,017	1,830	100.0	100.0	9.3
Performing	1,251	1,244	82.4	90.6	0.6	252	250	80.6	88.2	0.7	1,667	1,657	82.7	90.6	0.6
Non-performing	267	129	17.6	9.4	51.7	61	33	19.4	11.8	44.8	349	173	17.3	9.4	50.6
Bad debts (4)	165	61	10.9	4.4	63.1	36	15	11.5	5.4	57.8	215	81	10.7	4.4	62.3
Unlikely to pay	98	65	6.4	4.7	33.7	22	16	7.0	5.6	27.9	126	85	6.3	4.7	32.6
Past-due	5	4	0.3	0.3	24.7	3	3	0.9	0.9	9.4	8	7	0.4	0.4	19.4

Source: Supervisory reports, on a consolidated basis for banking groups and individually for the rest of the system.
(1) The coverage ratio is the amount of loan loss provisions in relation to the corresponding gross exposure. In the case of performing loans, it is calculated as the ratio of generic provisions to performing loans. Rounding may cause discrepancies in the totals. The percentage composition is calculated on the basis of the amounts expressed in millions of euros. Provisional data. – (2) Significant banks are those supervised directly by the ECB; less significant banks are those supervised by the Bank of Italy in close cooperation with the ECB. The total includes subsidiaries of foreign banks that are not classified as either significant or less significant Italian banks and account for about 9 per cent of total gross customer loans. Excludes branches of foreign banks. – (3) Unlike previous editions, it also includes 'non-current assets and groups of assets held for sale'. – (4) This non-harmonized Italian subcategory distinguishes the exposures with the worst credit quality from other non-performing exposures.

Source 1: Bank of Italy, 2017. Financial Stability Report, Number 1/2017.

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[31] The risk dashboard is based on a sample of Risk Indicators from 189 European banks, so ratio may slightly differ from data published by other Authorities, e.g. Bank of Italy.

The data reported in the last Financial Stability Report (Table 2) outline a similar situation. The gross exposure of NPLs at the end of 2016 was €349 billion (17.3% of customer loans) while the net exposure was equal to €173 billion (9.4%).

Another particular feature of the Italian system is the deep reform process started in the 2015 with the goal of strengthening the whole banking system. Some of the most important initiatives are briefly summarized below.

In March 2015 the Italian Parliament has approved a decree to reform the governance of cooperative banks and few months later a protocol of intent, to foster the self-reform of the foundations, was signed between the Association of banking foundations and the Ministry of Economy and Finance (Garrido *et al.*, 2016).
The Decree-law 18/2016 (converted into Law 49/2016) moves in the same direction, pushing small mutual banks to consolidate under joint-stock holding companies with at list €1 billion in equity, in an effort to strengthen the fragmented local banking sector.

Even more significant are the couple of decree laws[32] enacted by the Italian government in August 2015 and in May 2016.

The first one contains a number of measures amending the procedures for firms' restructuring and for the foreclosure of assets. The main adjustments seek to improve the efficiency of the existing restructuring tools with the aim of shortening the duration of bankruptcy procedures and increase both the survival of debtors and the creditors' recovery. Other measures include a new scheme of restructuring agreement to discourage potential problems generated by opportunistic behaviour of creditors' minorities, as in the previous framework the objection of a single creditor might perhaps delay restructuring agreements and end up blocking the rescue of still viable corporations. Moreover the reform increases transparency and enhances the administrators' incentives to foster the efficiency and speed of sale proceedings, also through the use of electronic processes and staff enhancements (Marcucci *et al.*, 2015).

The second one, in continuity with the measures adopted in 2015, overall promotes a more effective management of NPLs by banks.
First, it broadened the variety of guarantee tools by adding two new mechanisms: a) a non-possessory security interest which can be enforced out-of-court in several ways and b) the transfer of real property as guarantee for firms, i.e. the so-called "Marcian Pact".

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[32] Law Decree No. 83/2015 turned into Law No. 132/2015 and Decree Law 59/2016 converted as amended into Law 119/2016.

The change that is expected to have the greatest impact in the short term is the second one; under certain conditions it gives to the creditor, should the debtor commit a material breach, the right to obtain the ownership of real properties serving as guarantee through an out-of-court proceeding. Instead through the ordinary enforcement procedure the creditor usually obtains the cash amount resulting from the sale of the pledged assets.

Furthermore it announces the creation of digital register containing information on judicial property foreclosures and insolvency proceedings, thus increasing the availability of information that can make the valuation of NPLs easier and ultimately contribute to the development of a NPLs market.

Finally additional measures, with respect to those introduced in 2015, to accelerate judicial property foreclose procedures, streamline the processes, and improve the probability of selling pledged assets have been established (Brodi *et al.*, 2016).

Together these legal reforms, when fully implemented, are expected to have important effects. More efficient and faster foreclosure procedures should reduce the discount required by the buyers of NPLs and in the long term should bring down the equilibrium value of the NPL/total loans ratio of Italian banks. According to Marcucci *et al.* (2015) once the new rules are fully into force the average length of the bankruptcy process should drop from more than six years to around 3 years (or around 4-5 years in a less optimistic scenario) and the overall average duration of judicial foreclosures should fall by more than one year, from the 4 years before the reforms. Moreover, assuming the complete incorporation of the Marcian Pact in the loan agreements, it is realistic to assume that the time needed to transfer real properties will be reduced to six months (Brodi *et al.*, 2016).

Likewise better chances of success for restructuring operations will reduce the inflow of loans into the worst quality categories. The system would also benefit from more widespread use of digital tools to conduct proceedings and from greater transparency ensured by the single sales portal and by the proceedings register.

At the same time it should be noted that these changes are more effective in curbing the flow of NPLs originated from new loans than in dealing with existing stocks. The reason is that part of the actions does not affect the already existing contracts, unless they are renegotiated.

The mentioned reforms are supported by a tool called GACS[33], introduced by the Italian authorities in the first months of 2016.

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[33] GACS stands for "Garanzia sulla cartolarizzazione delle sofferenze" and has been introduced by the Law Decree No. 18/2016, turned into Law No. 49/2016.

Under this mechanism banks can buy a government guarantees for senior tranches of securities issued against bad loans, if rated at least as investment grade. Since the insurance is priced at market terms and it is based on expected losses, in agreement with the European Commission, it does not imply any public support subject to the EU State aid regulations.

The full impact of the mechanism is not yet completely clear, despite that market participants expect it to have a positive but modest impact in closing the "Pricing GAP" by around 2-3 percentage points (Jobst and Weber, 2016).

So far, the use of this tool has been also quite limited, only Banca Popolare di Bari, Banca Carige and Creval have resorted to it. Furthermore it expired on 16 August 2017 (18 months after its entry into force) but it could be extended up to further 18 months, subject to approval by the European Commission.

Finally, in April 2016, Italy's largest banks together with nonbank financial institutions and banking foundations created a fund called Atlante. The aim was to backstop capital increase of banks and purchase non-investment grade tranches of NPL securitizations.

In the second quarter of 2016 Atlante subscribed the entire capital increase of Banca Popolare di Vicenza (for €1.5 billion) and purchased most of the new shares of Veneto Banca after the listing to the Italian Stock Exchange was rejected or failed for both banks.

As a result, the available resources in the Atlante fund significantly dropped and a new fund, called "Atlante II" has been created at the end of July 2016. The new fund, differently from Atlante, can only invest in NPLs or instruments associated to them.

One interesting characteristic of the Atlante Fund is its financial objective, achieve a return of approximately 6% per annum (i.e. coherent with the IRR of a bond with an average rating of approximately single B), significantly lower than the IRR usually planned by specialized investors (Quaestio Capital Management SGR S.p.A., 2016).

On the other hand, to date, the fund activity in the acquisition of junior and mezzanine tranches, issued by vehicles set up to acquire portfolios of NPLs, has been rather scarce. Moreover the value of the first Atlante fund has recently been reduced of about 80% of nominal value due to the zeroing of the value of the owned Veneto banks and, this considered, Quaestio Capital Management is evaluating the possibility of liquidating the Fund[34].

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[34] For more information, see the press release of 20 July 2017 available at
http://www.quaestiocapital.com/sites/default/files/17081%20Red%20391%20ING%20Comunicato%20Stampa%20Quaestio%20Atlante%20I-II%2020%2007%2017%20%28002%29.pdf

3.2 Literature review

To the best of my knowledge most of the recent literature focused on the causes of NPLs and suggested or analysed a number of actions to speed up the resolution. Moreover some other studies investigates quantitatively the prospective earnings capacity of Italian banks but not so much attention has been paid to the development of a model to estimate the value of NPLs and the subsequently effects on Capital Requirements.

For example Jobst and Weber (2016) estimated the profitability of the 15 largest Italian banks under different assumptions. Moreover they also proposed a possible approximation of the Price gap to briefly analyse the capital relief and new lending capacity that could arise from a decisive NPL disposal, with the purpose of emphasize that higher credit growth is essential to improve bank profitability in an environment of declining interest rates. In their research they argue that an immediate reduction of NPLs to a level consistent with historical averages would not be expected to result in capital relief, since losses would outweigh any potential reduction in capital requirements.

A number of recent studies suggested different measures to resolve the problem of Bad Loans. Aiyar *et al.* (2015) suggested the already mentioned comprehensive strategy to resolve Europe's problem loans. In addition some other researches provided a more tailored country-specific strategy for Italy.

Jassaud and Kang (2015) described the situation of NPLs in Italy, then analysed the reasons behind the slow pace of NPL Resolution (both on the demand and supply side) and lastly advised a number of actions for developing a market for Bad Loans in Italy.

Factors hindering supply relate to the inadequate incentives for banks to write-off and sell NPLs. Indeed the low level of provisioning for bad loans has led to large pricing gaps, representing a significant barrier to sales and write-offs. Likewise banks are encouraged to hold on highly or fully provisioned loans to boost their overall provisioning coverage ratios. Intuitively writing off highly provisioned NPEs reduces the amount of gross loans (i.e. the denominator of the coverage ratio) more than the level of provisioning (that is the numerator). Conversely if write-offs were not considered the indicator would be possibly underestimated since for some written-off loans recovery procedures could still be under way and there is the possibility to recover some amounts.

Other obstacles include the limited capital buffer to absorb additional losses, the unclear accounting treatment of the write-offs under IFRS and a tax regime that, until recently, was inclined to penalize aggressive provisions and write offs.

On the demand side the slow speed of NPLs resolution is mainly due to a lengthy and inefficient judicial system that increases the cost of foreclosure and drops the return on NPL, and by the lack of a well-developed secondary market.

Garrido *et al.* (2016) provided a similar but more exhaustive analysis, including an analysis of NPLs by the type of bank, a detailed investigation of the insolvency system and of reform options that could further support NPL resolution in Italy. Moreover the paper briefly describes the already mentioned set of reforms took by Italian authorities in the last years.

Shifting for a moment the emphasis on the availability of data, it is worth nothing that pricing NPLs is not easy at all. Indeed there is a wide shortage of public, reliable and detailed data on NPLs' sale prices. Furthermore the value largely depends on the characteristics of the single portfolio of loans sold, which are not public.

A reference point for the Italian market might be the transfer price of the bad debts of the four resolved banks[35]. In the provisional assessment the Bank of Italy indicated a weighted "real economic value" for bad debts equal to 17.6% of the nominal value (25% for the portion backed by mortgages and 8.4% for the unsecured part). Later, in the final assessment made by independent experts, the average transfer value was determined to be slightly higher and equal to 22.3% (31% for the secured portion and 7.3% for the unsecured one) (Visco, 2016).

A recent research performed by Ciocchetta *et al.* (2017), estimated recovery rates using data from the Central Credit Register for the period 2006-15. They find that the average recovery rates for closed positions sale on the market was 23%, significantly inferior to those closed following the internal work-out procedures (47%).

One recent and significant attempt to better assess the market value of NPLs and therefore the Price GAP has been provided by Ciavoliello *et al.* (2016). They try to investigate the main drivers of the substantial difference between the book value and the market value of NPLs. According to their proposal the difference is mainly the result of two features or, in other words, these two factors alone generate the entire price gap between book and market value.

The first driver is related to the different discount rate of NPLs' cash flow. Banks adopting the IAS/IFRS accounting principles use the original effective interest rate[36] while investors demand a much higher rate of return, due to their risk aversion, because they generally have a

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[35] The resolution procedure has been applied in November 2015 to four small or medium-sized banks all under BoI's special administration (Banca Marche, Banca Popolare dell'Etruria e del Lazio, Cassa di Risparmio di Ferrara, and Cassa di Risparmio di Chieti).

[36] The effective interest rate is the rate that exactly discounts estimated future cash payments of the loan (both principal and interest) to the amount disbursed inclusive of the costs/revenues attributable to the loan.

lower financial leverage than banks and due to the presence of information asymmetries in the credit market. Obviously adopting a higher return to discount expected cash flows will results in a lower NPL price.

While the second factor is related to the indirect costs of managing NPLs: banks account for them in the financial statement of the year in which they are incurred; contrariwise potential buyers deduct them immediately from value, further reducing the purchasing price.

Moreover Ciavoliello *et al.* (2016) point out that the price gap is proportionate to the length of recovery procedure showing that a two-year reduction in recovery times would involve an increase of market price of approximately 10 percentage points and, ceteris paribus, a significant contraction in long-term stocks of NPLs.

3.3   Model specification

As frequently emphasised by ECB and Bank of Italy the disposal of NPLs will take place gradually without pushing all banks, disregarding the peculiarities of each institution, to sell those assets on the market at the earliest opportunity (Ciavoliello *et al.*, 2016). Nevertheless a better understanding of the width of the Pricing Gap and of the effects of a potential sale on Capital Ratios may provide important insights both for banks as well as for regulators.

NPLs still represent one of the greatest weaknesses of the Italian banking system; they tied up relevant amounts of capital reducing the possibility of issuing new loans and therefore reducing bank profitability.

I therefore decided to evaluate, for a sample of Italian banks, first the price gap under different hypothesis and afterwards the effects of a bad loans' sale on Capital Adequacy and Risk-Weighted Assets (RWA).

The analysis has some similarities with the research of Jobst and Weber (2016) and uses the estimates of Ciavoliello *et al.* (2016) as a proxy for market prices. Complementary to the others studies mentioned, the analysis is not limited to estimating the losses following a massive sale of NPLs, but also tries to assess the effects on capital ratios under different hypothesis and scenarios.

The analysis' steps can be summarised as follows:

1. Estimate of different possible market value offered by investors;
2. Calculation of the difference between market value and book value;
3. Recalculation of the Capital Ratios (in particular of the Common Equity Tier 1 Capital Ratio) assuming the sale is established; this stages could be splitted in two parts:
   a. Effect on the Common Equity Tier 1 (numerator),
   b. Effects on the Risk-weighted Assets (denumerator);
4. A comparison with the starting point and with minimum capital requirements is performed.

Before starting the exposition of the various stages is important to identify a homogeneous class of exposures investigated for each bank of the sample.

This is not insignificant since, according to the rules issued by the Bank of Italy, consistent with EU supervisory regulations, there are three different sub-categories of NPLs based on their different level of severity: "bad loans", "unlikely-to-pay exposures" and "past due loans" (Bank of Italy, 2016a). More precisely:

- Bad Loans ("*Sofferenze*") are on and off-balance sheet exposures to a debtor in state of insolvency (even if not recognized by a court) or in substantially similar circumstances, irrespective of the bank's own opinion on a potential loss;
- Unlikely to pay ("*Inadempienze Probabili*") exposures are those in respect of which, according to the bank's own judgement, the debtor is assessed as unlikely to pay its obligation in full, without recourse actions or collateral realisation, regardless of any past due amount;
- Past due and/or overdrawn exposures ("*Esposizioni scadute e/o sconfinanti deteriorate*") are those that, excluding those classified as 'bad loans' and 'unlikely to pay', are past due or overdrawn continuously for more than 90 days and for above a predefined amount.

From here on the analysis will focus only in the sale of the worst category, bad loans, amounting on average to more than half of all NPLs of the banks in the sample (63.1% of gross NPLs and 48.5% of net value). This hypothesis is motivated by the almost irreversible situation for loans classified as "*sofferenze*", while assets in the other two categories have more chances to be reclassified as performing, e.g. through restructuring, and could be successfully worked-out internally.

3.3.1 Market Values' and Pricing Gap's estimation

Unless loans are classified at fair value in the accounting portfolios, banks calculate the book value with the amortized cost method according to the international accounting principles IAS 39 and soon IFRS 9.

The amortized cost method requires discounting all the future expected cash flow (*f*) over the life of the loan using the original effective interest rate (*i*). The same method is certainly appropriate also to determine the net value of NPLs.

Using the same technique, if a debtor is experiencing some difficulties in repaying the loan, the bank must assess the recoverable amount and the recovery time (*t'*) which is usually longer than the one originally stated in the loan contract. This assessment also encompasses the valuation of new cash flows (*f'*), taking into account the direct costs of managing NPLs but not the indirect ones[37].

Therefore the overall value adjustment of a bad loan could be expressed as the sum of value adjustments recorded over time, and it is equal to the difference between the original Gross Book Value (GBV) and the actual Net Book Value (NBV):

$$Value\ Adjustment = GBV - NBV = \sum_{t=1}^{T} \left(\frac{f_t}{(1+i)^t} \right) - \sum_{t'=1}^{T'} \left(\frac{f'_{t'}}{(1+i)^{t'}} \right).$$

A precise estimate of the net value of a portfolio of NPLs needs a detailed assessment of each position and cannot be performed only with publicly available data. Indeed, few market prices are available and the estimations vary greatly according to the characteristics of the loan sold (e.g.: type, guarantees, amount of the write-down). Therefore it is not possible to quote an average price representative for all exposures' classes.

To overcome this difficulty the estimation performed by Ciavoliello *et al.* (2016) has been used. Bearing in mind the amortized cost method they consider a hypothetical exposure classified as bad loan with an original value of 100 and an estimated cash flow equal to 47, collected at the end of the recovery procedure[38] (supposed to last 4 years).

Moreover, they assumed an original effective interest rate equal to 4% (consistent with the average interest rate documented during the Asset Quality Review conducted in the 2014).

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[37] Indirect costs, e.g. staff costs or fees paid to a servicer, must be recorder in the P&L statement of the relevant year.
[38] For the sake of simplicity only one inflow collected at the end of the recovery procedure has been considered, but partial reimbursement over time can be easily taken into account.

Therefore, using the formula above, from a bank's point of view the net book value of this position would be 40.2% of the GBV and the value adjustment or coverage ratio is almost equal to 60%.

As already sketched, from an investor's point of view, the estimated value will be different since they immediately deduct from the price all the indirect management costs and because they search for a much higher internal rate of return (IRR) than the original effective interest rate used by banks. Ciavoliello *et al.* (2016), relying on their evidences, assumed an indirect management costs effect equal to 6% of nominal expected cash flow, while the IRR is supposed to be between 15 and 25 percent. According to these assumptions the purchase price for investors would be between 24.1 and 16.4 per cent of GBV, significantly lower with respect to the bank's estimated value.

For the purpose of our analysis the same assumptions have been used. Only the original hypothesis about recovery times and Investors' IRR have been relaxed assuming a recovery times ranging from 1 to 6 years and investors' IRR from 6% to 25%, as illustrated in the table below (Table 3). In this way we obtained a matrix with thirty different estimated market values, ranging from 41.52% to only 9.5% of the original GBV. The estimated value will be higher for shorter recovery times and lower IRR.

Table 3: Estimation of Bad Loans' market value

		Recovery times					
		1 Year	2 Years	3 Years	4 Years	5 Years	6 Years
Investors' IRR	6%	41.52%	39.01%	36.64%	34.41%	32.30%	30.31%
	10%	39.91%	36.02%	32.49%	29.28%	26.36%	23.71%
	15%	38.05%	32.72%	28.08%	24.05%	20.55%	17.50%
	20%	36.35%	29.82%	24.38%	19.85%	16.07%	12.92%
	25%	34.78%	27.26%	21.24%	16.43%	12.58%	9.50%

Source: own calculation from Ciavoliello *et al.* (2016) data.

Assumptions: 1) GBV equal to 100, expected value collected at maturity equal to 47, indirect costs amount to 6% of expected value collected at maturity.

At this point the Pricing Gap is given by the difference between the estimated market value and the net book value, and can be expressed in euro as well as a percentage of the original gross book value. With this formulation negative values indicate a loss (i.e. the selling price is lower than the NBV); on the contrary the difference is positive if the selling price is higher than the NBV (i.e. the sale originates a gain):

$$Pricing\ GAP = Estimated\ Market\ Value - NBV.$$

3.3.2   Recalculation of Capital Ratios

In accordance with the Basel III frameworks banks are subjects to a number of capital requirements. The three main elements making up own funds are the Common Equity Tier 1 (CET1), Additional Tier 1 (AT1) and the Tier 2 (T2). Summing up CET1 and AT1 we obtain the Tier 1 Capital, which added to Tier 2 Capital leads to the determination of the overall Own Funds.

The Regulatory Framework (Bank of Italy, 2016b) accurately establishes the eligible components and the deductions or prudential filters for each category. Moreover it requires that institutions comply with the following minimum ratios, expressed as a percentage of the total risk exposure amount:

- ✓ Common Equity Tier 1 capital ratio of at least 4.5%;
- ✓ Tier 1 capital ratio at least equal to 6%;
- ✓ Total Capital Ratio of 8%.

In addition to the mandatory requirements prescribed, to date, the following capital buffers must be maintained by the Italian banks:

- ✓ A Capital Conservation Buffer (CCB) of CET1 equal to 1.25% of their total risk exposure amount for the 2017 (1.875% from 2018 and 2.50% from 2019);
- ✓ A Countercyclical Capital Buffer (CCyB) to reduce the procyclicality of the financial system, currently set at zero per cent by the Bank of Italy;
- ✓ A Capital reserve for global systemically important institutions (G-SIIs) and a Capital reserve for other systemically important institutions (O-SIIs) to increase their ability to absorb losses[39];
- ✓ And a Systemic Risk Buffer (SRB) to prevent or mitigate long-term structural systemic risks; this buffer is envisaged under EU law but not compulsory and it has not been introduced in Italy (Bank of Italy, 2017).

In addition, every year the ECB performs the Supervisory Review and Evaluation Process (SREP). Based on the information reviewed and evaluated, an overall valuation of the capital and liquidity acceptability of the supervised banks is made and a "SREP decision" for each supervised bank is prepared.

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[39] The Bank of Italy has identified one Italian banking group, Unicredit Group, as a G-SII and three banking group as O-SII (Unicredit, Intesa Sanpaolo and Banca Monte dei Paschi di Siena). In accordance with European legislation, the Unicredit Group must apply only the higher between the G-SII and the O-SII requirements.

With the SREP decision the authority not only defines banks' capital requirements, but it may also decide to impose additional measures on banks, including liquidity and qualitative measures. For what concerns capital requirements the ECB based on the individual bank risk profile, risk management and capital planning, may well impose additional capital requirements usually referred as "Pillar 2" (while Pillar 1 refers to the minimum capital a bank is required to hold by law).

Moreover, for the first time with the 2016 SREP process, supervisors differentiate between Pillar 2 requirements and Pillar 2 guidance. The first one is binding and breaches can have direct legal consequences for banks, while non-compliance with the Pillar 2 guidance does not automatically trigger legal action (European Central Bank, 2016).

For the purposes of our analysis the focus will be on the CET1 Ratio only and comparisons will be performed with respect to the minimum CET 1 requirements defined as the sum of 4.5%, introduced Capital Buffers and of the Pillar 2 requirement.

In general, as a consequence of a NPLs sale, there will be two different effects on Capital ratios. The first channel is the impact on the own funds, via income statement due to the losses (or gains) generate by the sale. The second channel is the increase/decrease of Risk Weighted Assets.

Therefore the new Common Equity Tier 1 Ratio, after the hypothetical bad loans' transfer, can be expressed as follows:

$$CET1\ Ratio^{NEW} = \frac{\text{CET1 Capital} - \text{Losses} (+\text{Gains})}{\text{RWA}_{NEW}}$$

CET1 Capital (Common Equity Tier 1 Capital)

According to the Article 36 of the Capital Requirements Regulation, institutions shall deduct losses for the current financial year from Common Equity Tier. Conversely, interim or year-end profits can only be included in CET1 capital with the prior permission of the competent authority and if the following conditions are met: these profits have been verified by an external auditor and any foreseeable charge or dividend has been deducted (CRR, Article 26).

In our estimation the CET1 Capital as at December 31, 2016 is the starting point. The new one (CET1 *Ratio*^*NEW*) is obtained subtracting the losses or eventually adding the gains

stemming from the sale of Bad Loans. Moreover, for simplicity, all other costs and revenues potentially achieved by the company in the same period were disregarded.

RWA (Risk-Weighted Assets)

The impact on the denominator, i.e. Risk-Weighted Assets, arising from the sale of bad loans is not straightforward.

For an institution adopting only the Standardized Method to evaluate the Credit Risk, defaulted exposures should be weighted either at 150% when specific credit risk adjustments are less than 20% or at 100% if specific credit risk adjustments are no less than 20%. More precisely, in Accordance to Article 127 of the CRR, these weights apply to the unsecured party only of the defaulted exposures.

Therefore, following a sale, there will be a reduction of RWAs equal to the (net) amount of exposure sold times the assigned risk weight[40], as stated in the equation below:

$$RWA_{Stand\ App\ (ps)} = \text{RWA}_{Stand\ App} - (\text{Bad Loans net value}) \times (\text{Risk weight}).$$

The same reasoning cannot be applied to banks adopting the internal ratings-based (IRB) approaches, especially the advanced one, indeed for those institutions estimating the effect on RWA in this way is not appropriate and can lead to a very misleading result.

This aspect cannot be neglected since a significant fraction of the whole share of Loans to Customer and NPEs in the EU is subject to the A-IRB model. The same occurs in the sample considered, where seven banks out of ten got the permission to use the A-IRB model to evaluate some categories of Loans to customers.

For banks using the advanced internal ratings-based method (A-IRB), as clearly explained by Gangeri *et al.* (2017) in a recent note, there is a negative impact on capital ratios, via RWA, from the higher estimated Loss Given Default (LGD) induced by the NPLs sale[41].

Their reasoning, also applied here, is based on the following considerations.

First of all they assume that the average LGD on bad loans is close to the coverage ratio actually observed among Italian banks (in our elaboration the coverage ratio reported by each

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[40] Given the available data we assumed a uniform risk weight equal to 100%.

[41] More precisely there is an additional negative effect. The increase in LGD lead to an increase of the expected loss amounts for not sold exposures, which must be deducted from CET1 ratio or covered by further provisions.

bank, instead of the average one, has been used). Then the LGD after the sale is calculated as the mean between the initial LGD and the losses arising from the bad loans' sale.

Once defined the LGD variation post-sale it is worth nothing that the LGD for performing exposures can be written as a fraction (β) of the LGD for bad loans.

$$LGD_{perf} = \beta * LGD_{soff(ps)}$$

In other words, there is a linear relationship between LGD_{perf} and $LGD_{soff(ps)}$, so the proportional increase of LGD_{perf} is, by definition, equal to the proportional increase of $LGD_{soff(ps)}$ post-sale.

Finally, according to the A-IRB formula for performing exposures, there is a linear dependence between LGD and RWA ($\%\Delta RWA_{A\text{-}IRB} = \%\Delta LGD_{perf}$) therefore the impact on RWA following a bad loans' sale can be computed as follows:

$$RWA_{A-IRB\ (ps)} = RWA_{A-IRB} \times (1 + \%\Delta LGD_{perf})$$

Since banks in our sample do not evaluate all credit and counterparty risk with only one approach (except the three using only the Standardized approach) and since RWA comes also from market, operational and other specific risks, hereafter, the new value of Risk-Weighted Assets (i.e. post the hypothetical sale) is computed taking into account all the previous components as stated in the formula below:

$$RWA_{NEW} = \alpha \times RWA_{Stand\ App\ (ps)} + \beta \times RWA_{A-IRB\ (ps)} + \gamma \times RWA_{Others}.$$

The first component is weighted according to the percentage of the Credit risk (w.r.t. the overall RWA) coming from the Standardised approach (α) and the second according to the fraction of Credit risk (w.r.t. the overall RWA) calculated through the Internal rating based approach (β).

The last components (RWA_{Others}), contains the other fractions of RWA (market and settlement risk, operational risk and other specific risks) and it is assumed not to change as a result of bad loans' sale.

Moreover, to compute the $RWA_{Stand\ App\ (ps)}$ we should know the net amount of Bad loans assessed through the Standardized Method. Since this data is not available we used as proxy the percentage of RWA coming from the Standardized approach[42].

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[42] For example if net bad loans amount is €120 million and 70% of the Credit and Counterparty Risk comes from the Standardized method we assumed that €80 millions of Bad loans are assessed with the Stand. Approach.

3.4 Data Set and summary of data statistics

To obtain a homogeneous sample, among the banks subject to the SSM, the largest commercial banks have been selected. Moreover, to ensure a wider availability of data, unlisted institutions have not been taken into consideration.

As a result, our sample is formed by the following ten banks, ordered from largest to smallest[43]: Unicredit S.p.A., Intesa Sanpaolo S.p.A., Banca Monte dei Paschi di Siena S.p.A., Banco Popolare, Unione di Banche Italiane S.p.A. (UBI), Bper Banca S.p.A., Banco Popolare di Milano (BPM), Credito Emiliano S.p.A., Banca Popolare di Sondrio ScpA, Banca Carige S.p.A. (Cassa di Risparmio di Genova e Imperia).

For each of the 10 banks we collected a number of data for the last year either from the Thomson Reuters Eikon Database and from the last consolidated Annual Report (2016) published by each institute.

The data collect from the Eikon Database mainly refer to granular Balance Sheet and Income Statement items, e.g. Loans to customers, Intangible assets, Total Assets, Shareholders' Equity and Net income.

Instead, from each Annual Report were collected more meticulous data related to the composition of Own Funds, Risk-weighted assets (also regarding the composition of the Credit and counterparty risk category) and Loans to customers. For this last item data were collected for both the gross and the net exposure and for each class exposures (Performing and non-performing).

Moreover through a brief reading of the financial statements it was possible to collet, for each bank, data about minimum capital requirements (also including the minimum "Pillar 2 requirements") and about other relevant facts (e.g. recent or planned loan disposals and Capital increases).

Based on these variables some ratios have been calculated, e.g. capital ratios, coverage ratios, Texas ratio and incidence of each class of NPLs w.r.t. total loans to customers.

The main statistics are summarised in the Table 4 below, while a more detailed exposition of data and ratios is presented, for convenience, in Annex A.

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[43] The sample of bank is sorted on the basis of total assets, ranging from 859,533 million of Euro (Unicredit S.p.A.) to 26,111 million of Euro (Banca Carige S.p.A.).

Table 4: Main Statistics

	UCG	ISP	BMPS	BP	UBI	BPER	BPM	CE	BPSO	CRG	TOTAL
Loans to customer (net)	446.816	364.713	106.693	75.840	81.854	45.494	34.771	23.687	25.313	18.246	**1.223.429**
as a % of total assets	*51,98%*	*50,30%*	*69,65%*	*64,59%*	*72,83%*	*70,04%*	*68,00%*	*59,86%*	*68,05%*	*69,88%*	***55,95%***
Total assets	859.533	725.100	153.179	117.411	112.384	64.957	51.131	39.569	37.196	26.111	**2.186.571**
Equity (net of minorities interest)	39.336	48.911	6.426	7.575	8.990	4.881	4.364	2.474	2.588	2.109	**127.654**
Company's net income (loss)	- 11.790	3.111	- 3.241	- 1.682	- 830	14	73	132	99	- 292	**- 14.406**
Non-performing loans											
- gross exposure	73.387	58.137	45.785	19.654	12.521	11.174	6.260	1.403	4.426	7.333	**240.080**
- net exposure	27.204	29.767	20.320	12.568	8.056	6.197	3.636	807	2.382	4.002	**114.941**
Bad loans											
- gross exposure	48.844	37.834	29.424	10.916	7.261	7.039	3.497	856	2.100	3.726	**151.496**
- net exposure	13.154	14.895	10.365	6.239	3.988	3.009	1.583	346	768	1.377	**55.725**
NPLs Coverage ratio	62,93%	48,80%	55,62%	36,05%	35,66%	44,54%	41,92%	42,48%	46,17%	45,42%	**52,12%**
Bad loans Coverage ratio	73,07%	60,63%	64,77%	42,85%	45,08%	57,25%	54,72%	59,58%	63,43%	63,04%	**63,22%**
Risk-weighted assets	387.137	283.918	65.522	39.137	59.484	32.593	35.363	13.426	23.208	17.029	**956.816**
CET 1 capital ratio	8,15%	12,65%	8,17%	12,97%	11,48%	13,80%	11,48%	13,15%	11,09%	11,41%	**10,41%**

Source: own elaboration.

The entire sample is characterized by a high incidence of loans to customers over total assets, which range from 50.30% to 72.83% with an average value of almost 56%. Overall the (net) loans to customers amount to 1,223 billion of euro, representing the 66.85% of all the Italian banking system[44].

All together the examined banks are burdened by € 240,080 million of NPLs, or equivalently €114,941 million net of value adjustments; representing respectively the 68.79% and 66.40% of the entire amount of Italian NPLs.

The average coverage ratio is about 52%, in line with the banking system as a whole, but it varies significantly across banks from a minimum of 35.66% to an extreme of 62.93%.

The incidence of NPLs over the total loans to customers amounts to 17.72% gross of adjustments or equivalently to 9.39% (net values). A great dispersion is observed within the sample, with percentages ranging from 5.76% to 34.46% (gross of adjustments) and from 3.41% to 21.93% taking into account net values. For more details see Table 5 inside the Annex A.

The sample also represents a large percentage of the Italian banking system's Bad loans: 70.46% gross of adjustments (€ 151,496 million) and 68.80% net of adjustments (€ 55,725 million).

The average Bad loans coverage ratio is about 63%, ranging from a minimum of 42.85% to a maximum of 73.07%.

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[44] This and the next comparisons are based on the data reported in the last available Financial Stability Report published by the Bank of Italy (2017).

The same is detected for the incidence of Bad Loans over the total loans costumers, on average equal to 11.18% gross of adjustments (ranging from 3.51% to 22.15%), falling to 4.55% net of adjustments (varying from 1.46% to 9.72%).

Within the Table 6 (see Annex A) are reported the main capital ratios and the decomposition of Risk Weight Assets (RWA).

As already mentioned three banks rely only on the Standardized approach to assess the Credit and counterparty risks, while others seven use both Standardised as well as Internal rating based approach. Five banks out of seven rely more on Internal rating based approaches while for other two credit risks comes mostly from the standardised approach. Moreover, for all the considered banks the majority of the RWA comes from Credit and Counterparty risks, accounting on average for 85.23% of the entire Risk Weighted Assets (and ranging from 81.67% to 93.45%).

The CET 1 Capital ratio is on average equal to 10.41%, oscillating from a minimum of 8.15% to a maximum of 13.80%. Excluding Unicredit S.p.A. and Banca Monte dei Paschi di Siena S.p.A., it would be equal to 12.43%.

The two institutes just mentioned at the end of 2016 were the only temporarily not compliant with the Minimum capital Requirements as defined before.

Unicredit has restored compliance with SREP 2016 requirements in March 2017 through a capital increase of €13 billion, pushing the CET 1 Ratio to 11.5%. While Banca Monte dei Paschi di Siena recently receives €5.4 billion of State Aid through a Precautionary recapitalizations. Including this capital increase the CET 1 Ratio amount to 15.4%, well above minimum requirements.

For the additional capital ratios similar observations can be made, the Tier Capital Ratio is on average equal to 11.17% (ranging from 8.17% to 13.9%) while the Total Capital Ratio amount to 13.81% (varying from 10.4% to 17%).

Finally, for each bank the CET 1 Ratio is above the minimum capital requirements provided by the Basel III framework (4.5%). Also considering the capital buffer and the additional requirements provided by the ECB through the SREP[45] (also called "Pillar 2 requirement") the majority of the banks are well above the minimum level, and the two non-conforming banks have already adjusted their position.

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[45] The Pillar 2 guidance has been excluded since it does not automatically trigger legal action and especially because it is not made public by the majority of the analysed banks.

3.5 Analysis of results

For each bank of the described sample we simulated the sale of the whole bulk of Bad Loans. This is merely a theoretical exercise, since such a large offer would hardly be absorbed by a not well developed market and in any case would further depress market prices.

The purpose of this analysis is exactly the opposite: show how recent reforms to reduce recovery times should translate in higher market prices, thus lower Price GAP and ultimately should encourage transfer of NPLs. At the same time private initiatives, like the Atlante Fund, can further reduce the distance between book value and market value.

The Table 7 illustrates the new NPLs amounts after the sale. With this exercise the overall Net NPLs' amount drops to €59,216 million (-48.48%). The fall is more accentuated for big banks (close to 50%), but also for small ones is significant (included in the range between -34% and -44%).

The NPLs ratio oscillates in a similar way: from 17.72% to 7.36% gross of adjustments (-59%), and from 9.39% to 5.07% in net terms (-46%).

Assuming such a massive balance sheet cleaning operation is performed the NPLs ratio would be halved and only slightly above the European average as reported in the EBA Risk Dashboard (see Figure 8). Furthermore the NPLs ratio, net of the adjustment, would approach their historical average of 3-4% (Aiyar *et al.*, 2017).

Simultaneously the Coverage ratio would also decrease from 52% to 33%, this sharp decline is to be found in the lower risk density of the remaining NPLs, composed only by Unlikely to pay and Past due loans.

Table 7: New NPLs and Ratios after the sale of bad loans

(millions of euro)

	Net NPLs' amount			% of NPLs (gross)		% of NPLs (net)		Coverage Ratio	
	Pre-sale	Post-sale	% change	Pre-sale	Post-sale	Pre-sale	Post-sale	Pre-sale	Post-sale
UCG	27.204	14.050	-48,35%	14,82%	5,50%	6,09%	3,24%	62,93%	42,75%
ISP	29.767	14.872	-50,04%	14,72%	5,69%	8,16%	4,25%	48,80%	26,75%
BMPS	20.320	9.955	-51,01%	34,46%	15,82%	19,05%	10,33%	55,62%	39,15%
BP	12.568	6.330	-49,64%	23,63%	12,09%	16,57%	9,09%	36,05%	27,56%
UBI	8.056	4.068	-49,50%	14,44%	6,62%	9,84%	5,22%	35,66%	22,66%
BPER	6.197	3.188	-48,56%	22,06%	9,48%	13,62%	7,50%	44,54%	22,89%
BPM	3.636	2.053	-43,55%	16,67%	8,12%	10,46%	6,18%	41,92%	25,73%
CE	807	461	-42,87%	5,76%	2,33%	3,41%	1,98%	42,48%	15,72%
BPSO	2.382	1.614	-32,23%	16,10%	9,16%	9,41%	6,58%	46,17%	30,59%
CRG	4.002	2.625	-34,41%	33,77%	20,05%	21,93%	15,56%	45,42%	27,23%
TOTAL	114.941	59.216	-48,48%	17,72%	7,36%	9,39%	5,07%	52,12%	33,15%

Source: own elaboration.

Such a large decrease of NPLs' ratios has also some drawbacks. Indeed it is of great interest to understand if such plan can be sustained by the analysed banks. This can be perceived observing the Price GAPs and even more recalculating the new CET1 Ratio post-sale.

The price gap is computed subtracting the estimated Bad loans' market value from their Net Book Value. The results, for each bank and for each combination of time and interest rate, are reported in percentage term in the next figure (Figure 9).

Figure 9: Estimated percentage Price GAPs between market value and book value

Unicredit SpA

Investors' IRR	Recovery times (years)					
	1	2	3	4	5	6
6%	14,59%	12,08%	9,71%	7,48%	5,37%	3,38%
10%	12,98%	9,09%	5,56%	2,35%	-0,57%	-3,22%
15%	11,12%	5,79%	1,15%	-2,88%	-6,38%	-9,43%
20%	9,42%	2,89%	-2,55%	-7,08%	-10,86%	-14,01%
25%	7,85%	0,33%	-5,69%	-10,50%	-14,35%	-17,43%

Intesa Sanpaolo SpA

Investors' IRR	Recovery times (years)					
	1	2	3	4	5	6
6%	2,15%	-0,36%	-2,73%	-4,96%	-7,07%	-9,06%
10%	0,54%	-3,35%	-6,88%	-10,09%	-13,01%	-15,66%
15%	-1,32%	-6,65%	-11,29%	-15,32%	-18,82%	-21,87%
20%	-3,02%	-9,55%	-14,99%	-19,52%	-23,30%	-26,45%
25%	-4,59%	-12,11%	-18,13%	-22,94%	-26,79%	-29,87%

Banca Monte dei Paschi di Siena SpA

Investors' IRR	Recovery times (years)					
	1	2	3	4	5	6
6%	6,29%	3,78%	1,41%	-0,82%	-2,93%	-4,91%
10%	4,68%	0,80%	-2,74%	-5,95%	-8,86%	-11,52%
15%	2,82%	-2,51%	-7,14%	-11,17%	-14,68%	-17,73%
20%	1,12%	-5,41%	-10,85%	-15,38%	-19,16%	-22,31%
25%	-0,45%	-7,97%	-13,98%	-18,80%	-22,65%	-25,73%

Banco Popolare

Investors' IRR	Recovery times (years)					
	1	2	3	4	5	6
6%	-15,63%	-18,14%	-20,51%	-22,75%	-24,85%	-26,84%
10%	-17,25%	-21,13%	-24,66%	-27,87%	-30,79%	-33,44%
15%	-19,10%	-24,43%	-29,07%	-33,10%	-36,61%	-39,65%
20%	-20,81%	-27,33%	-32,77%	-37,31%	-41,09%	-44,23%
25%	-22,37%	-29,89%	-35,91%	-40,72%	-44,57%	-47,65%

Unione di Banche Italiane SpA   (UBI)

Investors' IRR	Recovery times (years)					
	1	2	3	4	5	6
6%	-13,40%	-15,91%	-18,28%	-20,52%	-22,62%	-24,61%
10%	-15,02%	-18,90%	-22,43%	-25,64%	-28,56%	-31,21%
15%	-16,87%	-22,20%	-26,84%	-30,87%	-34,38%	-37,42%
20%	-18,58%	-25,10%	-30,54%	-35,08%	-38,86%	-42,00%
25%	-20,14%	-27,66%	-33,68%	-38,49%	-42,34%	-45,42%

Bper Banca SpA

Investors' IRR	Recovery times (years)					
	1	2	3	4	5	6
6%	-1,23%	-3,74%	-6,11%	-8,34%	-10,45%	-12,44%
10%	-2,84%	-6,73%	-10,26%	-13,47%	-16,39%	-19,04%
15%	-4,70%	-10,03%	-14,67%	-18,70%	-22,20%	-25,25%
20%	-6,40%	-12,93%	-18,37%	-22,90%	-26,68%	-29,83%
25%	-7,97%	-15,49%	-21,51%	-26,32%	-30,17%	-33,25%

Banco Popolare di Milano (BPM)

Investors' IRR	Recovery times (years)					
	1	2	3	4	5	6
6%	-3,76%	-6,27%	-8,64%	-10,87%	-12,98%	-14,97%
10%	-5,38%	-9,26%	-12,79%	-16,00%	-18,92%	-21,57%
15%	-7,23%	-12,56%	-17,20%	-21,23%	-24,74%	-27,78%
20%	-8,94%	-15,46%	-20,90%	-25,44%	-29,21%	-32,36%
25%	-10,50%	-18,02%	-24,04%	-28,85%	-32,70%	-35,78%

Credito Emiliano SpA

Investors' IRR	Recovery times (years)					
	1	2	3	4	5	6
6%	1,10%	-1,41%	-3,78%	-6,01%	-8,12%	-10,11%
10%	-0,51%	-4,40%	-7,93%	-11,14%	-14,06%	-16,71%
15%	-2,37%	-7,70%	-12,34%	-16,37%	-19,87%	-22,92%
20%	-4,07%	-10,60%	-16,04%	-20,57%	-24,35%	-27,50%
25%	-5,64%	-13,16%	-19,18%	-23,99%	-27,84%	-30,92%

Banca Popolare di Sondrio ScpA

Investors' IRR	Recovery times (years)					
	1	2	3	4	5	6
6%	4,95%	2,44%	0,07%	-2,16%	-4,27%	-6,26%
10%	3,34%	-0,55%	-4,08%	-7,29%	-10,21%	-12,86%
15%	1,48%	-3,85%	-8,49%	-12,52%	-16,02%	-19,07%
20%	-0,22%	-6,75%	-12,19%	-16,73%	-20,50%	-23,65%
25%	-1,79%	-9,31%	-15,33%	-20,14%	-23,99%	-27,07%

Banca Carige SpA (Cassa di Risp. di Genova e Imperia)

Investors' IRR	Recovery times (years)					
	1	2	3	4	5	6
6%	4,56%	2,05%	-0,32%	-2,56%	-4,66%	-6,65%
10%	2,94%	-0,94%	-4,47%	-7,68%	-10,60%	-13,25%
15%	1,09%	-4,25%	-8,88%	-12,91%	-16,42%	-19,46%
20%	-0,62%	-7,15%	-12,58%	-17,12%	-20,90%	-24,04%
25%	-2,18%	-9,70%	-15,72%	-20,53%	-24,38%	-27,46%

Source: own elaboration.

Note: A negative percentage means that the estimated market value is lower than the net book value (e.g. suppose that the gross value of a loan is 1,000, the net book value is 270 and the estimated market price only 200; therefore the difference between market and book value is -70 or equivalently -7% of the Gross Book Value), while a positive percentage means the estimated market value is higher than the net book value (i.e. the sale originates a gain).

As expected, the percentage price gap would be larger for higher Investors' IRR and for sluggish recovery procedures. In most cases a sale of Bad Loans would generate a loss since the value given by potential investors is typically lower than the book value.

Hence, according to our estimations, a capital gain is theoretically possible for banks with a high Coverage Ratio, with a drastic decline of recovery procedures' duration and for Investors' IRR not too high (e.g. Unicredit and Banca Monte dei Paschi di Siena); a situation far from the current one.

Furthermore the variance of Coverage ratios within the sample explains the different haircuts on the net book values[46].

The evolution of Capital Ratios is of more interest. Although a NPLs sale usually generates a loss, it can still be bearable it the effect on Capital Ratios is not too heavy, i.e. if the Capital Ratios remain higher than the minimum requirements.

Hence for each bank and combination the $CET1\,Ratio^{NEW}$, as defined in the model specification, has been computed. The results are reported in the Figure 10 below.

Red boxes indicate a new CET1 Ratio lower than 4.5%, i.e. the minimum level required by the Basel III framework.

As a matter of fact the minimum Capital Requirement in terms of CET1 is well above 4,5%. For the banks in our sample, including also the different Capital Buffers and the Pillar 2 requirements, the minimum requirement would varies from 6.7% to 10.75%. Then yellow bokes represents all the new CET1 Ratio which, despite being higher than 4.5%, are lower than the overall minimum required CET 1 Ratio[47].

Light green and dark green boxes denote, respectively, the cases where the new CET1 Ratio would be higher than the overall minimum requirement and situations where it would be also higher than the initial CET 1 Ratio as of 31.12.2016.

Overall four banks out of ten would be able to meet the minimum capital requirements for each assessed combination, even the most restrictive. Additionally they could even improve the CET1 Ratio in particularly favourable scenarios.

Other four institutes would be able to meet the requested CET1 Ratio only in some states. While only for two banks out of ten there would be a violation of the minimum requirements almost in every situation, with values even below than 4.5%.

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[46] It is worth remembering that the estimated market value depends only on the recovery time and on the expected Investors' IRR, so it does not take into account the specificities of each bank.

[47] Since the Pillar 2 requirement depends also on the bank risk profile, it is logical to foresee a reduction following the sale of the riskiest category of customer loans.

Figure 10: Recalculated CET1 Ratio for each bank of the sample

Unicredit SpA

		Recovery times (years)					
		1	**2**	**3**	**4**	**5**	**6**
Investors' IRR	**6%**	10,57%	10,17%	9,80%	9,45%	9,12%	8,82%
	10%	10,31%	9,70%	9,15%	8,67%	8,23%	7,84%
	15%	10,02%	9,19%	8,48%	7,89%	7,37%	6,94%
	20%	9,75%	8,75%	7,93%	7,27%	6,73%	6,29%
	25%	9,51%	8,36%	7,48%	6,79%	6,24%	5,82%

Intesa Sanpaolo SpA

		Recovery times (years)					
		1	**2**	**3**	**4**	**5**	**6**
Investors' IRR	**6%**	13,40%	12,94%	12,51%	12,12%	11,75%	11,41%
	10%	13,10%	12,40%	11,78%	11,23%	10,74%	10,30%
	15%	12,77%	11,82%	11,03%	10,35%	9,78%	9,30%
	20%	12,46%	11,32%	10,41%	9,67%	9,08%	8,59%
	25%	12,18%	10,89%	9,90%	9,13%	8,54%	8,07%

Banca Monte dei Paschi di Siena SpA

		Recovery times (years)					
		1	**2**	**3**	**4**	**5**	**6**
Investors' IRR	**6%**	12,10%	10,75%	9,51%	8,35%	7,28%	6,28%
	10%	11,23%	9,18%	7,38%	5,77%	4,35%	3,08%
	15%	10,24%	7,49%	5,19%	3,25%	1,60%	0,21%
	20%	9,35%	6,04%	3,40%	1,28%	-0,43%	-1,83%
	25%	8,54%	4,78%	1,93%	-0,27%	-1,98%	-3,31%

Banco Popolare

		Recovery times (years)					
		1	**2**	**3**	**4**	**5**	**6**
Investors' IRR	**6%**	8,80%	7,99%	7,25%	6,56%	5,92%	5,33%
	10%	8,28%	7,06%	5,98%	5,03%	4,19%	3,44%
	15%	7,69%	6,05%	4,68%	3,54%	2,58%	1,76%
	20%	7,16%	5,19%	3,63%	2,39%	1,38%	0,57%
	25%	6,67%	4,45%	2,77%	1,48%	0,49%	-0,29%

Unione di Banche Italiane SpA (UBI)

		Recovery times (years)					
		1	**2**	**3**	**4**	**5**	**6**
Investors' IRR	**6%**	9,42%	9,01%	8,63%	8,28%	7,96%	7,66%
	10%	9,16%	8,53%	7,98%	7,50%	7,08%	6,71%
	15%	8,85%	8,02%	7,33%	6,75%	6,27%	5,86%
	20%	8,58%	7,58%	6,80%	6,18%	5,68%	5,28%
	25%	8,34%	7,21%	6,37%	5,73%	5,23%	4,85%

Bper Banca SpA

		Recovery times (years)					
		1	**2**	**3**	**4**	**5**	**6**
Investors' IRR	**6%**	14,10%	13,40%	12,75%	12,15%	11,60%	11,08%
	10%	13,65%	12,59%	11,65%	10,82%	10,08%	9,43%
	15%	13,13%	11,71%	10,52%	9,51%	8,66%	7,94%
	20%	12,67%	10,96%	9,59%	8,49%	7,61%	6,89%
	25%	12,25%	10,31%	8,83%	7,69%	6,81%	6,12%

Banco Popolare di Milano (BPM)

		Recovery times (years)					
		1	**2**	**3**	**4**	**5**	**6**
Investors' IRR	**6%**	11,62%	11,36%	11,12%	10,89%	10,67%	10,46%
	10%	11,46%	11,05%	10,69%	10,36%	10,05%	9,78%
	15%	11,26%	10,71%	10,23%	9,82%	9,45%	9,14%
	20%	11,09%	10,41%	9,85%	9,38%	8,99%	8,66%
	25%	10,93%	10,15%	9,52%	9,03%	8,63%	8,31%

Credito Emiliano SpA

		Recovery times (years)					
		1	**2**	**3**	**4**	**5**	**6**
Investors' IRR	**6%**	13,40%	13,06%	12,76%	12,47%	12,21%	11,97%
	10%	13,18%	12,68%	12,24%	11,85%	11,51%	11,20%
	15%	12,94%	12,26%	11,71%	11,24%	10,85%	10,52%
	20%	12,72%	11,91%	11,28%	10,78%	10,37%	10,05%
	25%	12,52%	11,61%	10,93%	10,41%	10,01%	9,70%

Banca Popolare di Sondrio ScpA

		Recovery times (years)					
		1	**2**	**3**	**4**	**5**	**6**
Investors' IRR	**6%**	11,93%	11,70%	11,48%	11,27%	11,07%	10,89%
	10%	11,78%	11,42%	11,09%	10,79%	10,52%	10,27%
	15%	11,61%	11,11%	10,68%	10,30%	9,97%	9,69%
	20%	11,45%	10,84%	10,33%	9,91%	9,55%	9,26%
	25%	11,30%	10,60%	10,04%	9,59%	9,23%	8,94%

Banca Carige SpA (Cassa di Risp. di Genova e Imperia)

		Recovery times (years)					
		1	**2**	**3**	**4**	**5**	**6**
Investors' IRR	**6%**	13,49%	12,90%	12,33%	11,80%	11,30%	10,83%
	10%	13,11%	12,19%	11,35%	10,58%	9,89%	9,26%
	15%	12,67%	11,40%	10,30%	9,34%	8,50%	7,78%
	20%	12,26%	10,71%	9,41%	8,34%	7,44%	6,69%
	25%	11,89%	10,10%	8,67%	7,52%	6,61%	5,87%

Legend

🟥	**Rec. CET1 Ratio** < 4.5%
🟨	**Rec. CET1 Ratio** < Capital Requirements (Buffers and Pillar 2 included)
🟩 (light)	Capital Requirements < **Rec. CET1 Ratio** < CET1 Ratio as of 31.12.16 (if applicable*)
🟩 (dark)	**Rec. CET1 Ratio** > CET1 Ratio as of 31.12.16 (and greather than Capital Requirements)

Source: own elaboration.

* For Unicredit and Banca Monte dei Paschi di Siena, since the CET1 Ratio as of 31.12.2016 is lower than the Minimum Capital Requirements (capital buffer and Pillar 2 Requirement included) this condition is not applicable.

The two banks achieving the worst outcomes are Banca Monte dei Paschi di Siena and Banco Popolare. The first one, considering data as of 31 December 2016, is characterized either by a percentage of bad loans that is more than twice the average and by one of the lowest CET1 Ratios. Though Banco Popolare result's is similar it depends more on the fairly low Bad loans' coverage ratio (43% versus an average of 63%) rather than by a lack of capital.

Moreover it is worth to remember that all the analysis rest on data as of 31 December 2016. Taking into account the recapitalizations carried out or planned by some banks in the course of the current year, the results would be even better.

Before we argued that recent reforms are likely to reduce the severity of the price haircut. To provide some support to this statement a comparison between different scenarios was also made (see Table 8).

Consistently with the results of a survey of recovery times for credit to firms carried out by the Bank of Italy in 2015 (Carpinelli *et al.*, 2016) the expected recovery times in 2015 was close to 4 years while the Investors' IRR can be as high as 18-20 per cent of net profits (Ciavoliello *et al.*, 2016; Quaestio Capital Management SGR S.p.A., 2016).

The Baseline scenario depicted in the first two columns is based on these two findings and may be a good proxy of the Italian situation before the recent reforms.
In this situation the new CET 1 Ratio of five banks out of ten would be below the minimum Capital Requirements.

The "Scenario A" is built to take into account the effects of recent reforms to reduce the recovery time, in fact it is based on a recovery time of 3 years (-1 year) while the IRR does not vary. Though four banks would breach the minimum capital requirements there are some improvements: the average CET1 Ratio post-sale would increase from 7.33% to 8.19% and the percentage price gap would drop from 16.98% to 12.45%.

The third scenario (Scenario B) takes into account the existence of private initiatives to acquire tranches of NPL securitizations, like the Atlante Fund, with financial objectives significantly lower than the IRR usually achieve by specialized investors. Therefore the Investors' IRR is assumed to be halved (from 20% to 10%) while the recovery time does not vary. The figures shown in the table show a noticeable improvement: the average CET1 Ratio after the sale would be 9.19%, the percentage price gap reduces to 7.55% and only three banks would be below the minimum capital requirements.

The last scenario (Scenario C) combines the two previous, assuming both a decrease of the recovery times (from 4 to 3 years) and a halving of investors' IRR (from 20% to 10%). In this

case only Banca Monte dei Paschi di Siena and Banco Popolare would not meet the minimum requirements. Additionally the average percentage Gap would drop to just 4.34%, even if it remains rather wide for banks with low coverage ratios.

Table 8: Sensitive of CET1 Ratios and Price GAPs

	Baseline		Scenario A		Scenario B		Scenario C		Min CET1 Ratio
	New CET1 Ratio	Price GAP	New CET1 Ratio	Price GAP	New CET1 Ratio	Price GAP	New CET1 Ratio	Price GAP	
UCG	7,27%	-7,08%	7,93%	-2,55%	8,67%	2,35%	9,15%	5,56%	8,78%
ISP	9,67%	-19,52%	10,41%	-14,99%	11,23%	-10,09%	11,78%	-6,88%	7,25%
BMPS	1,28%	-15,38%	3,40%	-10,85%	5,77%	-5,95%	7,38%	-2,74%	10,75%
BP	2,39%	-37,31%	3,63%	-32,77%	5,03%	-27,87%	5,98%	-24,66%	8,15%
UBI	6,18%	-35,08%	6,80%	-30,54%	7,50%	-25,64%	7,98%	-22,43%	7,50%
BPER	8,49%	-22,90%	9,59%	-18,37%	10,82%	-13,47%	11,65%	-10,26%	7,25%
BPM	9,38%	-25,44%	9,85%	-20,90%	10,36%	-16,00%	10,69%	-12,79%	8,15%
CE	10,78%	-20,57%	11,28%	-16,04%	11,85%	-11,14%	12,24%	-7,93%	6,75%
BPSO	9,91%	-16,73%	10,33%	-12,19%	10,79%	-7,29%	11,09%	-4,08%	7,25%
CRG	8,34%	-17,12%	9,41%	-12,58%	10,58%	-7,68%	11,35%	-4,47%	9,00%
TOTAL	7,33%	-16,98%	8,19%	-12,45%	9,14%	-7,55%	9,78%	-4,34%	8,23%

Source: own elaboration.

Notes. Baseline Scenario: recovery times of 4 years and investors' IRR equal to 20%. Scenario A: recovery times of 3 years and investors' IRR equal to 20%. Scenario B: recovery times of 4 years and investors' IRR equal to 10%. Scenario C: recovery times of 3 years and investors' IRR equal to 10%.

Last of all, we devoted some attention on the various factors affecting the CET 1 Ratio and that determines the change w.r.t. the CET 1 Ratio as of 31.12.2016.

We have already explained that the CET1 Ratio usually shrinks after a bad loans' sale. In our estimation this reduction is the consequence of the three following factors:

- ✓ a reduction of the CET 1 Capital attributable to the losses generated by the sale (negative effect);
- ✓ a reduction of RWA for the banks adopting the Standardized Method to evaluate the credit risk (positive effect);
- ✓ an increase of RWA (negative effect) for the banks adopting A-IRB methods to evaluate the credit risk.

The next figure (Figure 11) assess the effect of each different factor, starting from the CET 1 Ratio as of 31.12.2016 and adding first the losses generate by the bad loans' sale, then the reduction of RWA due to the fraction of loans valuated through the standardized method and finally the increase in RWA due to the application of the A-IRB method.

All the ratios are expressed in basis points and the calculation is made using the Scenario C reported in the previous Table (Investors' IRR of 10% and a recovery time of 3 years).

Figure 11: Breakdown of the effects on the new CET 1 Ratio

Source: own elaboration.

Note. The estimation is based on the "Scenario C": recovery times of 3 years and investors' IRR equal to 10%.

The overall effect, according to our expectations, is negative for nine banks out of 10, only Unicredit would increase its CET 1 Ratio by 100 basis points.

Decomposing the factors is possible to notice that biggest effect comes from the Price GAP, even if the average Price GAP in the "Scenario C" is only 4.34%, leading alone to a reduction of the CET 1 Ratio between 37 and 688 basis points.

The increase of RWAs, via the higher Loss Given Default, for banks adopting the A-IRB Method results in a modest decrease of CET 1 Ratio between 8 and 103 basis points.

While the positive effect on RWA due to the lower risk density of assets evaluated with the Standardized approach is really modest and it translates into an increase of CET 1 Ratio between 10 and 92 points.

Replicating the same analysis for the Baseline Scenario the results would be similar; the last two effects are modest and tend to offset each other, while the main cause of the reduction of CET 1 Ratio remains the Price GAP.

Due to the higher IRR and recovery times assumed in the Baseline scenario the average price gap is estimated to be almost 17% of the gross book value and accordingly the impact on CET 1 Ratio is much broader, ranging from -89 to -1.041 basis points.

CONCLUSIONS

In the first part of the thesis the focus was on the Financial Crisis of 2007-08 and on the actions undertaken at global level. Then the attention shifted on the improvements required to manage and dispose NPLs stocks, investigating the main internal and external solutions.
The last part of the analysis is focalized on Italy; an interesting case study because, despite some improvements, remains one of the European countries with the highest level of NPLs. After briefly discussing the reform process started in the 2015 and other two initiatives (the tool called GACS and the private fund Atlante), a study of the "Price GAP" and of its effects on Capital Requirements has been performed.

The analysis has some similarities with the research of Jobst and Weber (2016) and uses the estimates of Ciavoliello *et al.* (2016) as a proxy for market prices. Complementary to the others studies mentioned, our research is not limited to estimating the losses following a massive sale of NPLs, but also tries to assess the effects on capital ratios under different hypothesis and scenarios.

As regard the model specification the different steps can be summarised as follows. First using the research performed by Ciavoliello *et al.* (2016) we estimated a matrix with thirty possible Bad Loans' market value, according to recovery times and investors' IRR. Then, the Price Gap is computed as the difference between each estimated market value and net book value.
The recalculation of CET 1 Capital Ratio could be splitted into two parts; first we figured the effect on the CET 1, by subtracting the losses stemming from this hypothetical sale and then we recomputed the new amount of Risk-weighted assets. This last evaluation is carried out in a different way subject to the model used to evaluate Credit Risk: Standardized Method or Internal ratings-based Method (IRB).
In the first case, there will be a reduction of RWA (positive effect) assumed equal to the (net) amount of exposures sold times the assigned risk weight. Differently for banks adopting the Advanced-IRB, due to the higher estimated Loss Given Default (LGD) induced by the NPL sale, there will be an increase of RWA (negative effect).

The results we obtained are based on a sample of ten Italian commercial banks. Overall, the sample represents a large fraction of the Italian banking system's NPLs (66% net of value adjustments) and Bad Loans (69% net of value adjustments).

Assuming the sale of the entire stock of Bad Loans, the overall Net NPLs' amount would reduce by more than 48%; simultaneously the Coverage ratio would also decrease due to the lower risk density of outstanding loans.

The Price GAP, as expected, would be larger for higher Investors' IRR and for sluggish recovery procedures. In most cases, a sale of Bad Loans would generate a loss since the value given by potential investors is typically lower than the book value; hence, according to our estimations, a capital gain is theoretically possible for banks with a high Coverage Ratio, with a drastic decline of recovery procedures' duration and for Investors' IRR not too high.

Shifting the focus on CET 1 Capital Ratio, according to our estimations, four banks out of ten would be able to meet the minimum Capital Requirements (including also Capital Buffers and the Pillar 2 Requirements) for each assessed combination, even the most restrictive; other four only in some states; and only for two banks there would be a violation of the minimum requirements almost in every situation.

Subsequently four different scenarios were analyses, assuming either a reduction of recovery times or of investor' IRR. Assuming, both a decrease of the recovery times of one year (from 4 to 3 years) and a halving of investors' IRR (from 20% to 10%), only two banks would not meet the minimum requirements. Additionally the average percentage Gap would drop to just 4.3% (from 17% in the Baseline scenario), even if it remains rather wide for banks with low coverage ratios.

Last of all, we estimated each factor affecting the CET 1 Ratio separately. According to our estimations, the biggest effect comes from the Price GAP (leading alone to a reduction of the CET 1 Ratio between 37 and 688 basis points); the increase of RWAs, via the higher LGD, results in a modest decrease of CET 1 Ratio and the positive effect on RWA, due to the lower risk density of assets evaluated with the Standardized approach, turns out to be really modest.

In conclusion, even if assuming the sale of the whole bulk of Bad Loans is merely a theoretical exercise, since such a large offer would further depress market prices, our results provide some evidence of the resilience of the Italian banking system. Indeed a large fraction of the sample would be able to meet Minimum Capital Requirement in most scenarios.

Moreover our research highlights how reforms aimed at reducing recovery times, when fully into force, should translate into higher market prices, thus lowering Price GAP and ultimately encouraging transfer of NPLs. At the same time the presence of funds, like Atlante Fund, with lower expected yields than specialized operators could further reduce the distance between book and market value.

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ANNEX A: SUMMARY STATISTICS

Table 5

(millions of euro)

	UCG	ISP	BMPS	BP	UBI	BPER	BPM	CE	BPSO	CRG	TOTAL
Gross exposure											
Non-performing loans, of which	73.387	58.137	45.785	19.654	12.521	11.174	6.260	1.403	4.426	7.333	**240.080**
Bad loans	48.844	37.834	29.424	10.916	7.261	7.039	3.497	856	2.100	3.726	**151.496**
Unlikely to pay	23.165	19.745	15.247	8.619	5.119	3.977	2.730	504	1.988	3.487	**84.580**
Past due loans	1.378	558	1.114	119	141	158	34	43	339	120	**4.004**
Performing loans	421.804	336.781	87.061	63.528	74.178	39.481	31.287	22.950	23.071	14.380	**1.114.521**
Total	495.191	394.918	132.846	83.182	86.699	50.654	37.548	24.353	27.497	21.713	**1.354.601**
Net exposure											
Non-performing loans, of which	27.204	29.767	20.320	12.568	8.056	6.197	3.636	807	2.382	4.002	**114.941**
Bad loans	13.154	14.895	10.365	6.239	3.988	3.009	1.583	346	768	1.377	**55.725**
Unlikely to pay	13.144	14.435	9.101	6.234	3.935	3.043	2.023	425	1.323	2.524	**56.187**
Past due loans	906	437	854	95	133	145	30	36	292	101	**3.029**
Performing loans	419.612	334.946	86.373	63.272	73.799	39.297	31.135	22.881	22.931	14.244	**1.108.489**
Total	446.816	364.713	106.693	75.840	81.855	45.494	34.771	23.688	25.313	18.246	**1.223.430**
Ratios											
NPLs Coverage ratio	62,93%	48,80%	55,62%	36,05%	35,66%	44,54%	41,92%	42,48%	46,17%	45,42%	**52,12%**
Bad loans Coverage ratio	73,07%	60,63%	64,77%	42,85%	45,08%	57,25%	54,72%	59,58%	63,43%	63,04%	**63,22%**
% of NPLs (gross amount)	14,82%	14,72%	34,46%	23,63%	14,44%	22,06%	16,67%	5,76%	16,10%	33,77%	**17,72%**
% of NPLs (net amount)	6,09%	8,16%	19,05%	16,57%	9,84%	13,62%	10,46%	3,41%	9,41%	21,93%	**9,39%**
% of Bad loans (gross amount)	9,86%	9,58%	22,15%	13,12%	8,37%	13,90%	9,31%	3,51%	7,64%	17,16%	**11,18%**
% of Bad loans (net amount)	2,94%	4,08%	9,72%	8,23%	4,87%	6,61%	4,55%	1,46%	3,03%	7,55%	**4,55%**
Texas Ratio	68,01%	71,00%	332,30%	213,28%	109,37%	123,01%	84,88%	38,97%	89,95%	192,26%	**107,99%**

Source: own elaboration.

Note: The Texas Ratio is computed as [Net NPLs amount] / [Equity inclusive of minorities interests – Intangible assets].

Table 6

(millions of euro)

	UCG	ISP	BMPS	BP	UBI	BPER	BPM	CE	BPSO	CRG	TOTAL
Risk-weighted assets											
1. Credit and counterparty risks	331.182	242.312	53.521	34.665	54.388	27.226	32.105	11.695	20.565	15.916	**823.575**
of which Standardised approach	180.076	114.333	23.196	19.687	24.479	12.722	32.074	3.414	20.250	15.914	**446.146**
of which Internal rating based approach	148.203	123.656	30.318	14.913	29.909	14.130	-	8.253	-	-	**369.382**
- Basic	11.906	6.622	-	-	-	-	-	-	-	-	**18.528**
- Advanced	136.297	117.034	30.318	14.913	29.909	14.130	-	8.253	-	-	**350.854**
of which Securitisations	2.903	4.323	7	65	-	374	31	28	315	2	**8.048**
2. Other	55.955	41.606	12.001	4.472	5.096	5.367	3.258	1.730	2.642	1.113	**133.241**
Total	387.137	283.918	65.522	39.137	59.484	32.593	35.363	13.426	23.208	17.029	**956.816**
% Credit risk, of which	84,80%	83,82%	81,67%	88,41%	91,43%	82,39%	90,70%	86,90%	87,26%	93,45%	**85,23%**
- Standardised approach	46,51%	40,27%	35,40%	50,30%	41,15%	39,03%	90,70%	25,43%	87,26%	93,45%	**46,63%**
- Int. Rating based approach	38,28%	43,55%	46,27%	38,10%	50,28%	43,35%	n.a.	61,47%	n.a.	n.a.	**38,61%**
% Other	15,20%	16,18%	18,33%	11,59%	8,57%	17,61%	9,30%	13,10%	12,74%	6,55%	**14,77%**
Own funds											
CET 1 capital net of regulatory adjustments	31.537	35.926	5.353	5.077	6.829	4.498	4.058	1.765	2.574	1.942	**99.560**
CET 1 capital ratio	8,15%	12,65%	8,17%	12,97%	11,48%	13,80%	11,48%	13,15%	11,09%	11,41%	**10,41%**
TIER 1 capital net of regulatory adjustments	35.005	39.459	5.353	5.119	6.829	4.527	4.189	1.765	2.580	2.040	**106.867**
TIER 1 capital ratio	9,04%	13,90%	8,17%	13,08%	11,48%	13,89%	11,84%	13,15%	11,12%	11,98%	**11,17%**
Total own funds	45.150	48.274	6.817	6.330	8.389	4.959	4.730	1.939	3.151	2.358	**132.096**
Total capital ratio	11,66%	17,00%	10,40%	16,17%	14,10%	15,21%	13,38%	14,44%	13,58%	13,85%	**13,81%**
Minimum CET 1 Ratio (SREP 2016)	8,78%	7,25%	10,75%	8,15%	7,50%	7,25%	8,15%	6,75%	7,25%	9,00%	
of which minimum Pillar 2 requirements	2,50%	1,50%	5,00%	2,40%	1,75%	1,50%	2,40%	1,00%	1,50%	3,25%	

Source: own elaboration.

Note: The minimum CET 1 Ratio is computed as the sum of 4,5%, Capital Buffers and of Pillar 2 requirements required by SREP 2016 from 01.01.2017 (Pillar 2 Guidance is not included).