2-tier vs 3-tier Loan Guarantee schemes: which is the most successful? Empirical findings from an in depth analysis of the Italian System

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Abstract

A large body of literature has shown that SMEs may find it difficult to gain access to the credit market. The reason relies on market imperfections, such as informational asymmetries, that can lead to small firms being credit rationed. Loan Guarantee Systems provide a guarantee for SMEs in order to encourage banks and other financial institutions to lend money when small firms are unable to raise conventional finance because of a lack of security or established track record. In the main European Countries two different models of Loan Guarantee Schemes prevail: the 2-ter model (banks and Mutual Guarantee Institutions) and the 3-tier model (banks, Mutual Guarantee Institutions and a Central Counter Guarantee Fund). The authors intended to test whether one of the two models is more successful than the other one. Italy has been chosen as a case study, since in the Italian Loan Guarantee System the two models coexist. A successful Loan Guarantee System is a system that minimizes the amount of capital requirement for banks and Mutual Guarantee Institutions while maximizing the amount of guarantees/lendings available for SMEs. The results of our analysis show that one of the two models seems to be more effective and more efficient than the other one, in other words one of the two models appears to be more successful.

INTRODUCTION

According to the latest available data, more than 99% of all European businesses are small and medium enterprises (SMEs). They provide two out of three jobs of the private sector and contribute to more than half of the total value-added created by businesses in the EU. Nine out of ten SMEs are actually micro enterprises with less than 10 employees (Wymenga, Spanikova, Derbyshire, & Barker, 2011). The EU currently defines SMEs as those companies with fewer than 250 employees, which are independent from larger companies, with an annual turnover of less than €50 million or an annual balance sheet total not exceeding €43 million (European Commission, 2003).

SMEs not only make up the vast majority of companies in the European Union, but they are also Europe's main job-creation engine. The European Commission published a study (De Kok et al., 2011) analyzing the important role small and medium sized enterprises play in creating more and better jobs. According to the analysis, 85% of net new jobs in the EU between 2002 and 2010 were created by small and medium sized enterprises (SMEs). This figure is considerably higher than the 67%-share of SMEs in total employment.

Notwithstanding their role as a key driver in the economic growth and employment, a large body of literature has shown that small firms may face difficulties with their access to the credit market.

The current financial and economic crisis has an adverse effect on SMEs' access to bank financing (Audretsch et al., 2009). In particular, non-price terms and conditions (i.e. charges, fees and commissions) and collateral requirements tightened since first half of 2009 for SMEs in the Euro area. For micro firms, increases in bank lending rates are also frequently reported as a source of deteriorating access to finance (Wymenga et al., 2011). The European Commission reports that in the current, still fragile environment, SMEs depend critically on

external sources of finance. In 2010, 24 percent of SMEs reported a worsening in their access to bank loans (De Kok et al., 2011).

Government-sponsored Loan Guarantee Systems provide a guarantee for SMEs in order to encourage banks and other financial institutions to lend money when firms are unable to raise conventional finance for viable projects because of a lack of security or established track record (UK Department for BIS, 2010). The term can be used to refer to a Government that assumes a private debt obligation if the borrower defaults. Most Government-sponsored Loan Guarantee Systems have been established to correct perceived market failures by which small borrowers, regardless of creditworthiness, lack access to the credit resources available to large borrowers (Riding, 1997). In fact, the economic justification for any Government-sponsored loan guarantee program must rest on a generally acknowledged failure of private markets to allocate loans efficiently (Armstrong, Craig, Jackson III, & Thomson, 2010).

In recent years there has been an upsurge of interest in Credit Guarantee Schemes as an instrument to expand access of small and mid-size enterprises to loans from financial institutions (Levitsky, 1997a).

With the economic crisis, guarantee players have returned to being the sole credit access tool for most SMEs (KPMG, 2011). Most of the guarantee players operating in the international scenario are State-and-publicly held, mainly through public capital. In Countries where the public model prevails, the guarantee scheme represents an economic policy tool through which the government distributes economic aids, especially during a period of economic downturn. The private model is based on the direct mutualism principle, whereby member companies benefit from the guarantee (KPMG, 2011). The players are supervised by the Central Bank when they qualify as (special) financial intermediaries, especially in Privately-held schemes, otherwise they are supervised by the Central Government or Ministries of Economy. They operate at a national level and in some cases at a regional/area

level (Germany, France, Portugal, Spain) mainly serving small and medium-sized enterprises, and in some cases micro enterprises (KPMG, 2011).

Loan guarantee systems provide a guarantee for SMEs in order to encourage banks and other financial institutions to lend money when firms are unable to raise conventional bank loans for viable projects because of a lack of adequate collateral and/or an insufficient track record (Cowling, 2010). In fact, the economic justification for any government-sponsored loan guarantee program must rest on a generally acknowledged failure of private markets to allocate loans efficiently (Armstrong et al., 2010).

Government-sponsored Loan Guarantee Schemes have proved to be an important tool for facilitating access to financing. In the current scenario of economic crisis and credit crunch, guarantee schemes have become even more important than in a situation of stability. In fact, in recent years credit terms and collateralization requirements have become more severe, due to banks' and other financial institutions credit crunch economic policy. Generally, banks are more likely than before the crisis to request an additional guarantee in order to grant the loan (AECM, 2010). The explicit objective of credit guarantee programs is usually additionality in bank lending to the target sector. On the other hand, the implicit objective could be thought as fostering the economic growth of the targeted population that could be achieved because of improved access to credit (Benavides, & Huidobro, 2008).

In fact, one of the main issues for any Government Scheme providing finance to firms is whether this finance would have been available from other commercial sources. Such finance, i.e. that which would not have been available through other sources, is defined as additional finance (UK Department for BIS, 2010). The provision of finance that is not additional from other sources may be seen as a waste of scarce resources available to the government since it would have occurred in the absence of the Program. Finance additionality is an important issue in the contest of the rationale for Government-sponsored Loan Guarantee Schemes as

businesses are required to have exhausted all other potential debt funding routes before considering applying for a Loan Guarantee. The term “additionality” refers to the additional loans made possible due to the guarantee against loss provided to the lender. If there are few additional loans and the same amount of lending to SME would have taken place without the provision of guarantees, then one of the main justifications for a guarantee fund would have been disproved (Levitsky, 1997b).

The European Commission has, since 1991, been promoting Mutual Guarantee Systems (Llorens, 1997). Llorens divides guarantee schemes in Europe into two types: Mutual Guarantee Systems (MGSs) and Public Guarantee Schemes (PGSs). In an MGS a private society gives a guarantee to the bank in favor of an SME member of the group. In PGSs, a public agency or administrative body grants a guarantee to the lender, usually through a guarantee fund. In Germany, Spain, France and Italy operate MGS. In Netherlands, the United Kingdom and Ireland operate PGSs (Llorens, 1997).

As we have seen, Loan Guarantee Systems provide a guarantee for SMEs in order to encourage banks and other financial institutions to lend money when small firms are unable to raise conventional finance for viable projects because of a lack of security or established track record. In these cases, other contractual schemes may emerge to mitigate severe asymmetric information problems. For example, joint responsibility among firms may be achieved. Mutual Guarantee Institutions (MGIs) is put under the same responsibility a group of small firms that need bank lending but individually have a limited collateral capacity (Columba, Gambacorta, & Mistrulli, 2008). Each member (i.e. a small firm) of a MGI contributes to the guarantee fund that is then posted as collateral to loans granted to MGI members. Since members are mostly part of the same local community, a peer-monitoring is in place and it can mitigate to a certain extent moral hazard effects. MGI intervene in the bank-firm relationship in different ways, mitigating problems of access to bank loans for SME that have

insufficient collateral or lack of a sufficient track record or credit history. They supply personal and real guarantees to the bank that allow a partial coverage of potential losses of SME lending (Columba, Gambacorta, & Mistrulli, 2009).

MGIs are quite widespread in Europe, particularly in Germany, France, Spain and Italy. Two different models of Loan Guarantee Schemes can be identified among the main European Countries.

Insert Figure 1 about here

The 2-tier model (France, UK, Poland) is a model where the main players of the credit market are the banks and the Mutual Guarantee Institutions. When a SME is not able to obtain loan trough traditional channels, it can ask for a guarantee from the MGI, that covers part of the loan. This means that in case of SME default, the MGI will repay the debt (principal and some agreed interest, for the part of the loan covered by the guarantee) to the bank. This is supposed to stimulate banks to increase their SME lending activity. In fact, with the guarantee, the bank lowers its cost for the lending, because the risk is lower and the consequent necessary capital requirement of the bank will be lower too. The capital requirement, or capital ratio, is the percentage of a bank's capital to its risk-weighted assets. Basel II requires that the total capital ratio must be no lower than 8%.

Insert Figure 2 about here

The 3-tier model (Germany, Italy, Spain) is a model where banks, Mutual Guarantee Institutions and a Central Counter Guarantee Institution are the main players on the market. The functioning of the system is the same as the one described for the 2-tier model, but in this case part of the guarantees issued by the MGI can be counter guaranteed by the public authorities. Usually, the part of the loan counter guaranteed by public funds has a zero-

wighting in terms of regulatory own funds requirement. This is an important incentive, since it significantly reduces the cost of funding for SME-loan operations (AECM, 2010).

Starting from the active role and the ever-growing importance of the Loan Guarantee Schemes as a necessary tool that enables banks to issue loans to SMEs in a moment of difficult economic juncture, it is very important to compare the different operating models on an international level in order to identify possible best practices that should be enhanced and spread worldwide.

The purpose of this study, in fact, is to bridge the gap we identified in literature concerning the comparison of different Loan Guarantee System models that exists at present. The authors compared the 2-tier model with the 3-tier model of Loan Guarantee Schemes, in order to test whether one of these models is more effective and/or more efficient than the other under some aspects we have taken in consideration.

All evaluations of credit guarantee Schemes until now have proved inadequate to reach conclusions on the effectiveness of credit guarantees (Meyer, & Nagarajan, 1996). The Oxford Dictionary defines “effectiveness” as “the degree to which something is successful in producing a desired result”. If the guarantee accomplishes its objectives, lenders will increase lending to the target client (Meyer, & Nagarajan, 1996). For the purpose of our analysis (the comparison of the two different models), we will consider as a measure of effectiveness (“the degree to which something is successful in producing a desired result”) the amount of lendings available to SMEs through each of the two models. In particular, we can consider that the most effective model is the one that allows more lendings starting from a same amount of funds available to the System.

The first step of our analysis, in fact, tests which one of the two models, starting from a given amount of public resources, is able to provide a bigger volume of guarantees to SMEs (which of the two models is more effective).

Levistky (1997b) has observed that one of the major arguments in favor of Guarantee Schemes is that such a fund can provide “leverage” for a much larger volume of SME lending by banks for a given level of resources. This leads us to consider efficiency, too, as a measure of success of the Loan Guarantee model. The Oxford Dictionary defines “efficiency” as “achieving maximum productivity with minimum wasted effort or expense”. In this sense, the authors have considered more successful the model that requires a lower amount of capital requirement for the players of the System, in order to provide the same amount of guarantees to SMEs.

The second step of our analysis tests which one of the two models needs a lower capital requirement to provide the same amount of lendings as the other one.

In particular, we have tested the efficiency of each model through the amount of capital requirement for banks (Capital Ratio) necessary to provide a certain level of lendings, and the effectiveness of each model through the comparison of the multiplier effect (amount of lendings that can be provided to SMEs in each model starting from the same amount of public funds). Our case study has been focused on the Italian Loan Guarantee System because it is a system where the two models (2-tier and 3-tier) coexist. We then have empirically tested the efficiency of the two different models in the context of a natural experiment: the current Italian Loan Guarantee System.

In fact, the Italian Loan Guarantee system has been a 2-tier model for decades: since the creation of Mutual Guarantee Institutions “confidi” in 1957 up to 1996 (when the third tier, the Central Guarantee Fund (CGF), has been introduced). Today, the two models coexist. If the small firm that needs the loan meets the necessary requirements to obtain e guarantee or a counter guarantee from the CGF then banks and confidi can choose whether to ask for a guarantee (or counter guarantee) from the CGF or not. In the first case we can say that the

transaction occurred in the context of a 3-tier model, while in the second one we are clearly in front of a simple, bank-confidi, 2-tier model.

In order to test which one of the two models is more successful in terms of effectiveness and of efficiency, the authors compared the 2-tier vs 3-tier Loan Guarantee models. Two research questions have been formulated:

a. Which model is more efficient?

b. Which model is more effective?

The first question relates to the ability of the model to lower bank and MGIs capital requirements in order to provide a certain amount of lending to SMEs. The second question relates to the ability of the model to provide a larger amount of lending, starting from a given level of public funds destined to the Loan Guarantee System.

In order to be able to answer to our research questions, the authors have empirically analyzed the impact of the two different models on banks' capital requirement (to test the efficiency) and on additional lendings to SMEs (to test the effectiveness). A case-based approach has been utilized, and the Country that constitutes our case study is Italy, since in its Loan Guarantee System the two models coexist. Using data consisting of matched information deriving from different sources of regulation, we estimated the total capital requirement necessary for banks to provide the same amount of loans in the context of a 2-tier model and in the context of the 3-tier model. This way we tested the efficiency of the two models. Then, we estimated the multiplier effect (amount of lendings that can be provided from banks to SMEs starting from a given amount of public funds). This way we tested the effectiveness of the two models.

LITERATURE REVIEW

A common concern raised in the literature on financing SMEs is that small firms may be exposed to a particular type of market imperfections that limit their availability of finance.

The existence of such kind of market failure has led to the widespread introduction of loan guarantee programs throughout the developed and developing world (Riding, 1997).

Loan guarantee systems provide a guarantee for SMEs in order to encourage banks and other financial institutions to lend money when firms are unable to raise conventional bank loans for viable projects because of a lack of adequate collateral and/or an insufficient track record (Cowling, 2010). In fact, the economic justification for any government-sponsored loan guarantee program must rest on a generally acknowledged failure of private markets to allocate loans efficiently (Armstrong et al., 2010).

Most small firms are relatively young and have little or no credit history. Furthermore, lenders may be reluctant to fund small firms with new and innovative products because it is not always easy to evaluate the risk of such products. The precision of the evaluation of small firms depends on the amount and on the quality of information the bank can obtain on the firm. Nevertheless, information is not costless. Market imperfections may allow a party of a transaction to have more information about facts relevant to the terms of the contract than others. In these circumstances, information asymmetry can lead to sub-optimal outcomes (Stiglitz, & Weiss, 1981). Information problems may prevent otherwise creditworthy firms from obtaining credit. If information asymmetries are substantial, they can lead to credit rationing (Armstrong et al., 2010).

Credit rationing can be defined as a situation where two borrowers with an equal probability of repayment have an unequal probability of obtaining credit (Stiglitz, & Weiss, 1981). To justify the need for a loan guarantee scheme, it must be the case that small firms cannot gain access to as much credit as larger firms of equal risk. In fact, the rationale for Loan Guarantees appears to be that credit market imperfections can result in small enterprises being credit rationed (Armstrong et al, 2010). The existence of credit rationing which is not

based on borrower quality is fundamental to the requirement for a corrective Government-sponsored Loan Guarantee scheme (Cowling, 2007).

The lack of information in the credit market may cause two other effects: adverse selection and moral hazard (Armstrong et al., 2010). The first effect is the consequence of different borrowers with similar risk profile having different probabilities of repaying their loan. The expected return to the bank depends on the probability of repayment, so the bank would like to be able to identify good borrowers (higher repayment probability) from bad ones (lower repayment probability). To avoid the phenomenon of bad borrowers dissembling to be good borrowers (in order to have a higher probability to get lower margins or larger loan amounts), the bank can rely on a powerful tool: the collateral. A number of papers (Stiglitz, & Weiss, 1981; Craig, Jackson III, & Thomson, 2004; Armstrong et al., 2010) on SMEs finance have argued that collateral can act as a sorting device. In fact, only good borrowers will be willing to offer collateral, since they think that their probability of default is very low. Bad borrowers, knowing that they are risky, are usually reluctant to offer collateral against borrowing as they have a higher probability of default. If the credit market was perfect, a good borrower that puts up collateral to the bank would be compensated with a lower interest rate. In the framework of an imperfect market as it is today, the collateral level required from the good borrower in order to eliminate the incentive for the bad one, may be too high and may then impose an unfair cost on them. Thus a proportion of good borrowers may be still unfairly credit rationed. Small firms, and in particular the young ones, have little collateral and short credit histories, and thus may not be able to gain access to as much credit, proportionally, as bigger firms of equal risk. In fact, if collateral on one side does help to reduce the information asymmetries between the firm and the bank, yet it can act as a borrowing constraint for "good" firms with few assets (Stiglitz, & Weiss, 1981).

The second effect, moral hazard, happens when the interest rate influences the ex-post actions of borrowers. As the interest rate and other terms of the contract change, the behavior of the borrower is likely to change too. For example, raising the interest rate may decrease bank's return on its loans. This is because higher interest rates may induce firms to undertake riskier projects (with lower probabilities of success) but higher payoffs when successful (Craig et al., 2004).

In the case of a small firm or of a start-up that has little credit history (which makes it difficult for that the bank to evaluate its creditworthiness), or that can offer little collateral (which makes the bank not able to lower the risk related to the loan), the bank has two options: not to lend the money to the small firm, or to lend money without having enough credit history or collateral from the firm. In the first case the choice not to lend the money represents a missed opportunity for the bank to make profits from the transaction. This can be considered a cautious but inefficient choice. In the second case the choice seems to be efficient but not cautious: the bank makes profits from the transaction, while minimizing costs related to the evaluation of the firm (little or no evaluation is made). However, in this case the risk related to the probability of firm's default can be very high (Artusio, Bolognese, & Quaglia, 2011).

Considering the structure of Loan Guarantee Systems all over Europe, we can distinguish two particular models of the system: a 2-tier and a 3-tier model. France, Poland and UK represent some examples of Countries where the Loan Guarantee Scheme is based on a 2-tier model. In this System the main players of the value chain are banks and one or more Mutual Guarantee Institutions, while there are no counter guarantors.

Insert Figure 3 about here

In France (Artusio et al., 2011), the Mutual Guarantee Institutions are "Oséo", "Socama" and "Siagi", which are State-and-privately-held players. Oséo is the main MGI of France and

its clients are mainly medium enterprises. Socama's target are small enterprises (less than 20 emolyees), and Siagi's target are mainly micro firms. In the French Loan Guarantee System there are no counter-guarantors. This means that the only way for French MGI to obtain counter guarantees on the guarantees they provide, is through specific agreements with the European Investment Fund (EIF).

Insert Figure 4 about here

In Poland (Artusio et al., 2011) the guarantee scheme is mainly based on public intervention. The main actor of the Polish guarantee scheme is the National Credit Guarantee Fund (NCGF), which is controlled by National Economy Bank (BGK) and is the backbone of the entire system. A second type of guarantors is Regional funds, owned by provincial self-Government and Local Funds, owned by County Municipal Authorities and the BGK. The only private company offering guarantees services is the Podlaski Loan Guarantee Fund Ltd. The Polish Loan Guarantee Scheme lacks of a counter guarantor as the French one.

Insert Figure 5 about here

In UK (Artusio et al., 2011) the only Guarantee Institution is the Government program: the Enterprise Finance Guarantee (EFG). The EFG is intended to facilitate additional commercial lending to viable SMEs unable to obtain a bank loan because of insufficient security. EFG is a fund issued by Bank of England. The fund is managed by Capital for Enterprise Limited ('CfEL'), a professional asset management company owned by UK Government through the Department for Business, Innovation and Skills.

Italy, Germany and Spain, on the contrary, have Loan Guarantee Scheme based on a 3-tier model.

Insert Figure 6 about here

In Italy (Artusio et al., 2011) the main players of the system are banks, Mutual Guarantee Institutions ("confidi") and the Central Guarantee Fund (CGF), which issues guarantees for banks and counter guarantees for confidi. Italian MGIs supply personal and real estate guarantees to banks, allowing a partial coverage of potential losses of SME lending. The CGF, a national public guarantee fund set up with aim of improving SME access to credit finance, issues guarantees directed to financial institutions as well as counter guarantees to the confidi (AECM, 2010).

Insert Figure 7 about here

In Germany (Artusio et al., 2011), the players are the banks, the Mutual Guarantors "Verband Deutscher Burgshaftbanken", while the Federal Republic Fund and the Federal State Fund act as counter guarantors. German MGIs, Burgshaftbanken, are credit institutions whose primary objective is to support small and medium-sized enterprises with credit and equity financing. The Counter Guarantee issuers are the German Federal Government Fund and the German Federal States Fund, which main role is to counter guarantee the guarantees that MGIs provide to firms.

Insert Figure 8 about here

In Spain (Artusio et al., 2011) the MGIs are non banking financial intermediaries subjected to prudential supervision by the Banco de España, called "Sociedades De Garantia Reciproca". Their mission is to grant guarantees for operations carried in the entrepreneurial field. The Compania Espanola de Reafianzamiento (CERSA) is the Spanish public counter guarantor. Apart from the Sociedades De Garantia Reciproca there are various guarantee funds held by public entities on a Regional level.

All evaluations of credit guarantee Schemes until now have proved inadequate to reach conclusions on the effectiveness of credit guarantees (Meyer, & Nagarajan, 1996). The

Oxford Dictionary defines “effectiveness” as “the degree to which something is successful in producing a desired result”. If the guarantee accomplishes its objectives, lenders will increase lending to the target client (Meyer, & Nagarajan, 1996). For the scope of our analysis (which is the comparison of the two different models), we will refer to “effectiveness” as the degree to which each model is successful in producing the desired result. This leads us to state that the most effective between the two models is the one that allows more lendings to SMEs starting from a same amount of funds available to the System.

The first step of our analysis, in fact, tests which one of the two models, starting from a given amount of public resources, is able to provide a bigger volume of guarantees to SMEs (which of the two models is more effective).

Levitsky (1997b) has observed that one of the major arguments in favor of Guarantee Schemes is that such a fund can provide “leverage” for a much larger volume of SME lending by banks for a given level of resources. This leads us to consider efficiency, too, as a measure of success of the Loan Guarantee model. The Oxford Dictionary defines “efficiency” as “achieving maximum productivity with minimum wasted effort or expense”. In this sense, the authors have considered more successful the model that requires a lower amount of capital requirement for the players of the System, in order to provide the same amount of guarantees to SMEs.

The second step of our analysis tests which one of the two models needs a lower capital requirement to provide the same amount of lendings as the other one to Smes (which of the two models is more efficient).

In particular, we have tested the efficiency of each model regarding the capital requirement for banks (Capital Ratio) and the effectiveness of each model regarding the direct multiplier effect (lendings that can be provided to SMEs thanks to the public funds) and the indirect

multiplier effect (additional lendings that can be provided to SMEs through the capital saved from market players thanks to the public funds injected in the System).

RESEARCH QUESTION

Given the ever-growing importance of the Loan Guarantee Schemes as a fundamental tool that enables banks to issue loans to SMEs in a moment of difficult economic juncture, the authors decided to try to fill the gap in literature related to the comparison of the existing different models, in order to identify possible best practices to be followed worldwide.

As explained in the previous sections, literature on SMEs insists on a common concern related to their difficulties in access to finance, especially in the recent context of credit crunch. A successful Loan Guarantee System is a system where the amount of lending available to SMEs is maximized. For this to happen, it must be the case that banks and Mutual Guarantee institutions have sufficient capital in order to provide the maximum amount of loans/guarantees. This leads us to observe that a successful Loan Guarantee System is the one that minimizes the amount of capital requirement for banks and Mutual Guarantee Institutions while maximizing the amount of loans/guarantees available for SMEs.

These remarks have led us to formulate the following research questions, in relation to the two different models of Loan Guarantee Schemes that prevail in the main European Countries:

¶ 2-tier vs 3-tier Loan Guarantee schemes:

a. Which model is more efficient?

b. Which model is more effective?

After having defined the concepts of “effectiveness” and of “efficiency”, in order to test which one of the two models is more successful in terms of effectiveness and of efficiency, the authors compared the 2-tier vs 3-tier Loan Guarantee models.

The first research question relates to the ability of the model to lower banks and MGIs capital requirements in order to provide a certain amount of lending to SMEs. The second research question relates to the ability of the model to provide a larger amount of lending, starting from a given level of public funds destined to the Loan Guarantee System.

METHODOLOGY

In this paper we have empirically analyzed the impact of the two different types of Loan Guarantee Schemes (the 2-tier and the 3-tier model) on banks' capital requirement and on additional lendings to SMEs. We referred to Italy as our case study, as it is a system where the two models coexist. It has been thus possible to conduct an empirical analysis in the context of a natural experiment represented by the Italian Loan Guarantee system.

The Italian Loan Guarantee system has been a 2-tier model since the creation of confidi in 1957 up to 1996 (when the third tier, the Central Guarantee Fund, has been introduced). Today, the two models coexist. If the small firm that needs the loan meets the necessary requirements to obtain e guarantee or a counter guarantee from the Central guarantee Fund, then banks and confidi can choose whether to ask for a guarantee (or counter guarantee) from the CGF or not. In the first case we can say that the transaction occurred in the context of a 3-tier model, while in the second one we are clearly in front of a simple, bank-confidi, 2-tier model.

Using data consisting of matched information deriving from different sources of regulation (Decrees of the Italian Ministries, Bank of Italy's regulation, Medio Credito Centrale's regulation) we estimated the total capital requirement necessary for banks to provide the same amount of loans in the context of a 2-tier model and in the context of the 3-tier model. This way we tested the efficiency of the two models. Then, we estimated the direct multiplier effect (lendings that can be provided from banks to SMEs starting from a given amount og public funds) and the indirect multiplier effect (additional lendings that can be provided to

SMEs thanks to the capital saved by confidi and banks through the public funds injected in the System). This way we tested the effectiveness of the two models. The objective of our work is to conduct a comparison that would allow the identification of a possible best practice between the two models.

¶ Total Capital Requirement analysis

¶ Multiplier effect analysis

In order to conduct the Total Capital Requirement analysis, we considered the hypothesis of a loan to SMEs of 100.000 euro.

In the 2-tier model we then have considered the hypothesis that part of that loan is guaranteed by the confidi. Considering:

¶ the amount of loan guaranteed by the confidi

¶ the amount of loan not guaranteed

¶ confidi's risk weight

¶ firm's risk weight

¶ banks' capital requirement defined by Basel II

we have calculated the amount of banks' capital requirement necessary to release that loan. This allowed us to understand what total amount of capital is necessary for banks to release a 100.000 euro loan to SMEs in the 2-tier model.

In the 3-tier model we have considered the further hypothesis that part of the confidi guarantee is counter-guaranteed by the Central Guarantee Fund (CGF). Considering:

¶ the amount of loan counter-guaranteed by the CGF

¶ the amount of loan guaranteed by the confidi

¶ the amount of loan not guaranteed

¶ CGF's risk weight

¶ confidi's risk weight

¶ firm's risk weight

¶ banks' capital requirement defined by Basel II

we have calculated the amount of banks' capital requirement necessary to release that loan. This allowed us to understand what total amount of capital is necessary for banks to release a 100.000 euro loan to SMEs in the 3-tier model.

Case Study: The Italian Loan Guarantee System

The Loan Guarantee systems came up to address a gap in the market for small firms' access to finance. In recent times, the quality of information on small firms has improved with credit rating systems that have been developed and improved in their scope to evaluate the risks presented by small firms. Nevertheless, there is a continued need for security backed lending. In fact, small firms which lack collateral or a track record continue to face problems in obtaining finance: the Italian National Institute for Statistics (Istat, 2011) reports that in 2010 only 78% of SMEs have succeeded in obtaining credit from banks (in 2009 they were 87%).

The Italian Loan guarantee system has some particular features when related to other Countries' systems. First of all, it doesn't came up as a government-sponsored institution, but as a common need of the 4,5 million of SMEs, which are the main component of the Italian economy. In fact, we can say then that the Italian Loan guarantee system is the concrete expression of an entrepreneurship that is widespread all over the country. SMEs in Italy are more than 99% of all firms and they account for 80% of total employment. Furthermore, Italy is more dependent on micro firms than other EU members (Istat, 2011).

The first "confidi", which are the Italian Mutual Guarantee Institutions, came up in 1957 as a spontaneous reaction of the small and micro firms in the handicraft industry. A common concern of these entrepreneurs was their limited credit power in the relationship with the bank, and the consequent difficulties to gain access to credit. In their dealing with the bank, in

fact, still today the small firms find limited or no scope for bargaining over margins, charges, collateral requirement, which are usually set by the bank. The confidi system developed rapidly all over the country, and the number of the Italian confidi today is 537 (Artusio et al., 2011), much bigger than the number of Loan guarantee institutions in France (36) or in Germany (22) (KPMG, 2011).

Confidi institutions are formed directly by the firms and are usually located in the headquarters of the business associations that promote them, or hosted by Chambers of Commerce. This helps the exchange of information between the firms within the business association and the confidi (Columba et al., 2009).

This kind of Loan Guarantee associations represent an institutional device that puts under the same responsibility a group of small firms that need bank lending but individually have a limited collateral capacity. Each member contributes to the guarantee fund that is then posted as collateral to loans granted to the confidi members. When a small firm is denied access to credit by the bank, the confidi can supply personal and real guarantees to the bank that allow a partial coverage of potential losses of SME lending (Columba et al., 2008). The confidi then assumes part of the risk of the transaction and evaluates the creditworthiness of the firm on behalf of the bank. The bank makes profits from the transaction minimizing its costs and its risk, and the small firm gains a loan which otherwise could not have gained.

We can identify two types of models of the Italian Loan Guarantee System. The first one is a 2-tier model, where the main players on the market are banks and confidi. The second one is a 3-tier model, where a third player is introduced: the Central Guarantee Fund (CGF). Today these two models coexist: this means that if the small firm that needs the loan meets the necessary requirements to obtain e guarantee or a counter guarantee from the Central guarantee Fund, then banks and confidi can choose whether to ask for a guarantee (or counter guarantee) from the CGF or not. In the first case we can say that the transaction occurred in

the context of a 3-tier model, while in the second one we are clearly in front of a simple, bank-confidi, 2-tier model.

The 2-tier model

The Italian Loan Guarantee system has been a 2-tier model for decades: since the creation of confidi in 1957 up to 1996 (when the third tier was introduced). Confidi are Mutual Guarantee Institutions that supply personal and real guarantees to the banks which allow a partial coverage of potential losses of SME lending.

We define "2-tier model" a model where the main players are the banks and the confidi. When the small firm is not able to obtain a loan from the bank because of lack of security or established track record, the confidi can provide a guarantee to the bank on the firm's loan. The guarantee allows to the bank a partial coverage of potential losses of the borrower. In the 2-tier model the risk related to the loan is shared between the bank and the confidi. If confidi reach a special threshold of activity, they must be entered in a special register (ex. art. 107 of the Italian Banking Law) and are subject to prudential regulation.

Features of the 2-tier model:

- Main players: Confidi, Bank
- Confidi's guarantee can cover up to 60% of the loan in North Italy and up to 80% in South Italy (Medio Credito Centrale, 2011)
- Confidi's risk weight is 20%, if it is entered in the special register ex. art 107 (Banca d'Italia, 2009)

The 3-tier model

In 1996 the Italian Government has established the Central Guarantee Fund (CGF) for SMEs, which became active in 2000. This can be seen as the introduction of a third level in the system: this is why we will call it a "3-tier model". In the 3-tier model, the confidi provides a guarantee to the small firm that covers part of the bank's loan. Then, the confidi asks for a counter guarantee from the CGF on the guarantee released to the firm. This way the confidi's risk on the firm's loan is partially covered by the CGF counter-guarantee. In the 3-tier model the risk related to the loan is shared among the bank, the confidi, and the Central Guarantee Fund (CGF). In December 2008, the State became the lender of last resort of the CGF this had and still today has implications of great importance in the Italian credit market. In fact, since March 2009 to the loans guaranteed or counter guaranteed by the CGF is applied a "zero weighted" risk related to the Italian State default risk. This implies that in case of a loan guaranteed or counter-guaranteed from the CGF, confidi and banks can lower their risk and the consequent capital requirement (the standardized percentage of capital to its risk weighted assets required by Basel II) and thus accordingly they are able to provide more guarantees/lendings to SMEs.

Features of the 3-tier model:

- Main players: CGF, Confidi, Bank
- Confidi's guarantee can cover up to 60% of the loan in North Italy and up to 80% in South Italy (Medio Credito Centrale, 2011)
- Confidi's risk weight is 20%, if it is entered in the special register ex. art 107 (Banca d'Italia, 2009)
- CGF's counter guarantee can cover up to 80% of the confidi guarantee both in the North and in the South of Italy (Medio Credito Centrale, 2011)
- CGF's risk weight is 0% (Ministero Economia e Finanze, 2009)

APPLYING THE METHODOLOGY

A successful Loan Guarantee System is one that minimizes the amount of capital requirement for banks and Mutual Guarantee Institutions while maximizing the amount of loans/guarantees available for SMEs. After having defined the concepts of "effectiveness" and of "efficiency", in order to test which one of the two models is more successful in terms of effectiveness and of efficiency, the authors compared the 2-tier vs 3-tier Loan Guarantee models.

Assumptions

1. 2-tier model: Confidi ex. art. 107 – Bank
2. 3-tier model: 3-tier model: CGF - Confidi ex. art. 107 - Bank (Hp)
3. In both models firms are located in Northern Italy (Hp)
4. Percentage of counter guarantee provided by CFG to confidi: 80% of the guarantee provided by the confidi (Medio Credito Centrale, 2011)
5. Percentage of guarantee provided by confidi to bank: 60% of the loan (Medio Credito Centrale, 2011)
6. CGF's capital ratio (Tier 2): 8% (Ministero Attività Produttive, 2005)
7. Confidi's capital ratio (Tier 2): 6% (Banca d'Italia, 2007)
8. Bank's capital ratio (Tier 2): 8% (Banca d'Italia, 2007)
9. CGF's weighting factor: 0% (Ministero Economia e Finanze, 2009)
10. Confidi's weighting factor: 20% (Banca d'Italia, 2009)
11. Firm's weighting factor: 100% (Hp)

Total Capital Requirement Analysis

In order to test which one of the two models requires a lower amount of capital ratio, an additional assumption has been considered:

1. Bank's loan: 100.000 euro

Insert Figure 9 about here

In the first case (2-tier model) the confidi issues a guarantee that covers 60% of the total loan. The RWA for the bank is lower because confidi's risk weight is 20%. The RWA for the bank corresponds to the amount of loan not guaranteed (40%). The capital ratio is 8% of that amount: €4.160.

Insert Figure 10 about here

In the second case (3-tier model) the confidi issues a guarantee that covers 60% of the loan. This guarantee is then partly counter guaranteed by the CGF (80% of the guarantee). For the counter guaranteed part (80% of the 60% of the loan) the risk weight is zero, so there is no capital requirement for the bank. The remaining part which is guaranteed by the confidi (20% of the 60% of the loan) has 20% risk weight, while the rest of the loan (40%) has a 100% of risk weight since it is not guaranteed. The RWA for the bank in this case is equal to 20% of risk weight related to 12% of the loan and 100% of risk weight related to 40% of the loan. The capital ratio is 8% of that amount: €3.392

The 3-tier model seems then to be the one that requires a lower amount of capital ratio related to the risk weighted assets (RWA) from the banks.

Multiplier Effect Analysis

In order to test which one of the two models permits a higher amount of loans provided to SMEs, starting from a same amount of funds injected in the System, two additional assumptions have been considered:

1. Public Funds: €1.000 (Hp)
2. Market players (confidi and banks) have sufficient assets to sustain the level of guarantees/loans that can be provided through the public funding tool. (Hp) This hypothesis is

confirmed by the 53 Italian confidi ex. art 107 having an average capital ratio (Tier 2) of 13,39% in 2010 (the minimum standardized requirement in place for confidi is 6%) and by an average capital ratio (Tier 2) of the Italian banks being 12,4% in 2010 (the minimum standardized requirement in place for banks is 8%).

In this part of the analysis we considered two different cases: 1.000 euro of public funds destined to the capital of the confidi (2-tier model) and 1.000 euro of public funds destined to the capital of the CGF (3-tier model). The aim of this test is to verify which of the two models allows to provide, through the same amount of public funds, a bigger volume of loans to SMEs. Two different types of multiplier effect have been identified:

- the direct multiplier effect consists in the volume of bank lendings that can be provided to SMEs starting from the public funds destined to the Loan Guarantee System
- the indirect multiplier effect consists on additional bank lendings that can be provided starting from the "free capital", i.e. the capital that has been saved by confidi and banks thanks to the public funds destined to the Loan Guarantee System.

Evidently, the cumulative multiplier effect is the sum of the effects of the two (direct and indirect) multipliers: it indicates the total possible lendings to SMEs available through the public funds destined to the Loan Guarantee System and through the consequent capital savings made possible for confidi and banks by the public funds destined to the System.

Insert Figure 11 about here

In the first case (2-tier model), 1.000 euro of public funds destined to confidi allow 16.667 euro of guarantees available for the banks. This is because the confidi's capital requirement is 6% of the RWA. Since the guarantees cover 60% of bank loans, with 16.667 euro of guarantees, 27.778 euro of loans can be provided to SMEs. This is the direct multiplier effect. Bank's RWA related to that amount of lending is in this case 14.444 euro. If we confront bank's capital requirement in the absence of public funds (2.222 euro) with the actual capital

requirement (1.156 euro) related to 14.444 euro of RWA, we get that bank's free capital (thanks to the public funds) is 1.067 euro. Since bank's capital requirement is 8%, this means that with the free capital at bank's disposal, 13.333 euro of additional lending can be provided to SMEs. This is the indirect multiplier effect. Starting from a public funding to confidi of 1.000 euro, the total lending available for SMEs in the 2-tier model with the direct and the indirect multiplier is 41.111 euro and the cumulative multiplier (total lendings/public funds) is 41.

Insert Figure 12 about here

In the second case (3-tier model), 1.000 euro of public funds destined to CGF allow 12.500 euro of counter guarantees available for the Mutual Guarantee Institutions (confidi). This is because CGF's capital requirement is 8% of its RWA. Since the counter guarantees cover 80% of the confidi guarantees, with 12.500 counter guarantees, 15.625 euro of guarantees can be provided to banks. Confidi guarantee covers 60% of bank's loan: this means that the bank can offer 26.042 euro of loans to SMEs. This is the direct multiplier effect. Confidi's RWA related to the guarantees provided is 3.125. If we confront confidi's capital requirement in the absence of public funds to the CGF (937 euro) with the actual capital requirement of 187 euro, we get that confidi's free capital (thanks to the public funds) is 750 euro. Following the same logic, bank's free capital (obtained as the difference between the capital requirement that would have been necessary in the absence of public funds and the actual capital requirement needed) is 1.200 euro. With the free capital available of 750 euro, confidi can offer 12.500 euro of guarantees to the banks. With that amount of guarantees, the bank can offer 20.833 euro of additional loans to SMEs. Bank's capital requirement for that amount of loans is 867 euro. This means that, after the additional loans provided, bank's free capital is 333 euro (1.200 - 867 euro). With the remaining free capital of the bank, further additional lending can be provided (up to 4.167 euro). This is the indirect multiplier effect. Starting from

a public funding to the CGF of 1.000 euro, the total lending available for SMEs in the -3-tier model with the direct and the indirect multiplier is 51.042 euro and the cumulative multiplier (total lending/public funds) is 51.

EMPRICIAL EVIDENCES

Insert Figure 13 about here

The comparison of the two dimensions "Total Capital Requirement" and "Multiplier Effect" in the 2-tier model and in the 3-tier model lead us to the following considerations.

Regarding the Total Capital Requirement comparison, our findings show that the 3-tier model seems to be the one that requires a lower amount of capital ratio related to the risk weighted assets (RWA) from the banks. This is strictly related to the "zero weighted" risk of the percentage of the loan counter guaranteed by the CGF. The "zero weighted" risk, related to the Italian State default risk, in fact lowers the risk and the consequent capital requirement of the bank.

Regarding the analysis of the multiplier effect, the comparison of the two multipliers (41 for the 2-tier model and 51 for the 3-tier model) leads us to state that:

¶ the direct multiplier effect is higher in the 2-tier model

¶ the indirect multiplier effect is higher in the 3-tier model

¶ the cumulative multiplier effect is higher in the 3-tier model.

In fact, starting from the same amount of public funds (1.000 euro in our hypothesis) destined to the Loan Guarantee system (in particular, to the confidi in the 2-tier model and to the CGF in the 3-tier model), the 2-tier model allows more lendings to SMEs (27.7778 euro vs 26.042 euro in the 3-tier model). But if we consider the indirect multiplier effect, which indicates the additional bank lendings that can be provided starting from the "free capital" of banks and confidi obtained thanks to the public funds injected in the System, we find that the

3-tier model results to be more effective. In fact, through the indirect multiplier effect the amount of lendings available for SMEs is 13.333 euro in the 2-tier model and 25.000 in the 3-tier model.

Considering the cumulative multiplier effect (total lendings available to SMEs) we can affirm that the 3-tier model seems to allow more lendings, starting from the same amount of public funding (cumulative lendings in the 3-tier model are 51.042 euro, while in the 2-tier model they are 41.111 euro).

CONCLUSION AND LIMITS

A large body of literature (Stiglitz & Weiss, 1981; Armstrong et. al, 2010; Cowling, 2010) has shown that SMEs may find it difficult to gain access to credit, due to market imperfections. Loan Guarantee Systems provide a guarantee for SMEs in order to encourage banks and other financial institutions to lend money for viable projects of small firms, that otherwise would not be able to obtain the loan.

The authors focused their analysis on the comparison of the two models (2-tier and 3-tier) prevailing among the main European Countries' Loan Guaranty Schemes. In the 2-tier model the main players on the credit market are banks and the Mutual Guarantee Institutions. In the 3-tier model there is a third player, which is the Central Guarantee-counter guarantee Fund.

The purpose of the study was to test whether one of the two models is more successful than the other one. To be successful, a Loan Guarantee System should minimize the amount of capital requirement for banks and Mutual Guarantee Institutions while maximizing the amount of loans/guarantees available for SMEs. A quantitative approach has been developed in order to conduct the analysis of the two models on an empirical basis since Italy has been chosen by the authors as a case study, because in the Italian Loan Guarantee System the two models coexist.

The results of the analysis make it possible to answer to our research question: 2-tier vs 3-tier Loan Guarantee schemes:

¶ *Which one is more efficient?*

¶ *Which one is more effective?*

The first part of the analysis was aimed at testing which one of the two models allowed a lower amount of capital requirement for the bank in order to provide the same amount of lendings to SMEs (in our hypothesis: 100.000 euro). Since the 2-tier model's capital requirement was 4.160 euro and the 3-tier model it was 3.392 euro, it is possible to affirm that the 3-tier model appears to be more efficient from the point of view of the lowest capital requirement for banks.

The second part of the analysis was aimed at verifying which one of the two models allowed more lendings to SMEs starting from a given amount of public funds injected in the System. In fact, starting from a same amount of public funds (1.000 euro) destined in the first case (2-tier model) to the total capital of the confidi and in the second case (3-tier model) to the total capital of the CGF, it has been possible to observe that the 2-tier model has a higher direct multiplier effect than the 3-tier model. On the contrary, the indirect multiplier effect is higher in the 3-tier model than in the 2-tier one. In order to be able to answer to our second question, we have considered the cumulative multiplier effect (the sum of the direct and of the indirect multiplier effects), which is higher in the 3-tier model. In fact, the 2-tier model permits final lendings to SMEs of about 41.000 euro, while the 3-tier model allows about 51.000 euro. Consequently, the 3-tier model seems to be more effective than the 2-tier one in the way that it allows more loans to SMEs, starting from the same amount of public funds destined to the Loan Guarantee System.

The results of the analysis made it possible to answer to our research questions. In fact, findings show that the 3-tier model of the Italian Loan Guarantee System appears to be more

successful than the 2-tier model in the way that it allows banks to have lower capital requirements. The 3-tier model appear also to be more effective than the 2-tier one, since starting from the same amount of money it is able to provide more lendings to SMEs than the 2-tier model.

These conclusions give a significant contribution to existing literature on Loan Guarantee Schemes, since it adds new elements that can widen the field of study from the point of view of the efficiency related to the model of each Country's Loan Guarantee System. The findings of the study can also give a contribution to the decision making process in Public Administration with regard to the economic policy measures (related to the problem of SMEs access to finance) that should be undertaken by Governments.

An interesting further development of this research could be an experiment made through the application of actual data (i.e. the medium total capital of the Mutual Guarantee Institutions, the medium total capital of the banks and the medium total capital of the Central Guarantee Fund) to our analysis model, in order to test whether the conclusions of this paper are still valid. The findings of our study also offer a stimulus for future research on 2-tier and 3-tier models existing at a European and at a worldwide level: more case studies on different Countries would undoubtedly offer an interesting perspective on the topic and would contribute to further narrow the existing gap on international Loan Guarantee Schemes comparison.

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Figure 1: The 2-tier Loan Guarantee model

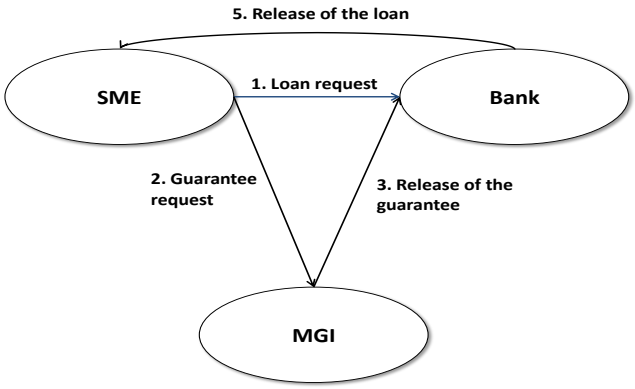

Figure 2: The 3-tier Loan Guarantee model

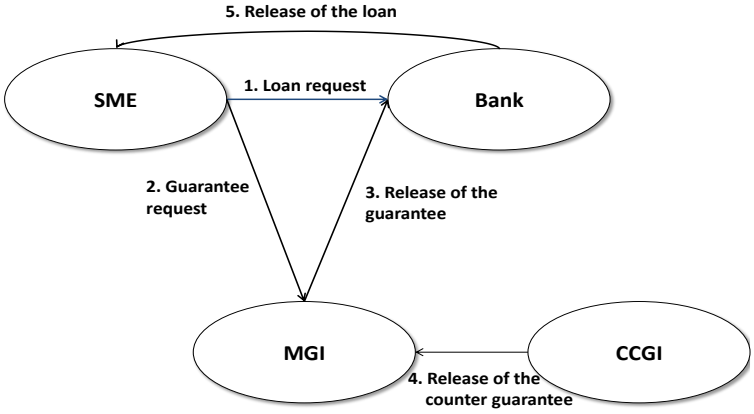

Figure 3: Loan Guarantee Scheme in France

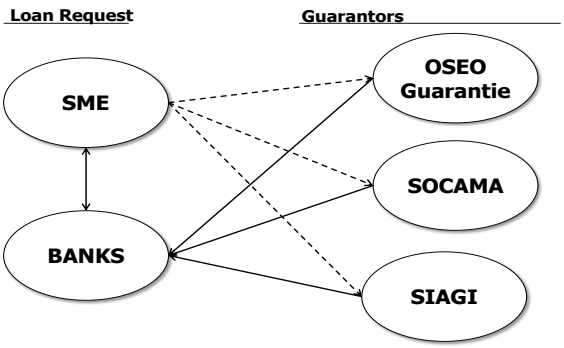

Figure 4: Loan Guarantee Scheme in Poland

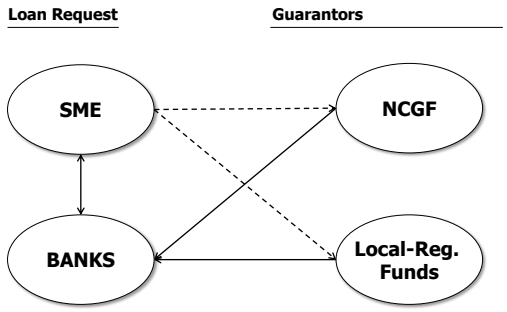

Figure 5: Loan Guarantee Scheme in UK

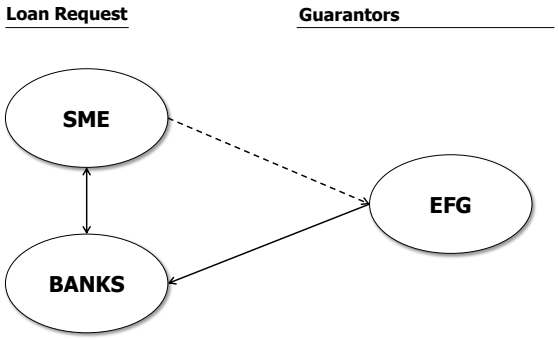

Figure 6: Loan Guarantee Scheme in Italy

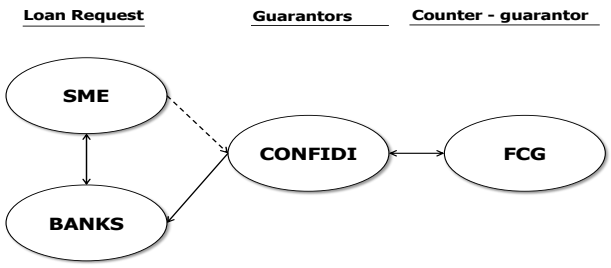

Figure 7: Loan Guarantee Scheme in Germany

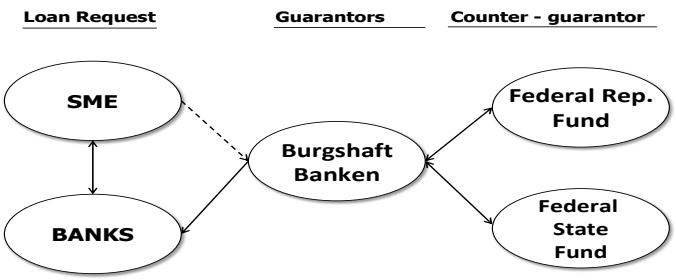

Figure 8: Loan Guarantee Scheme in Spain

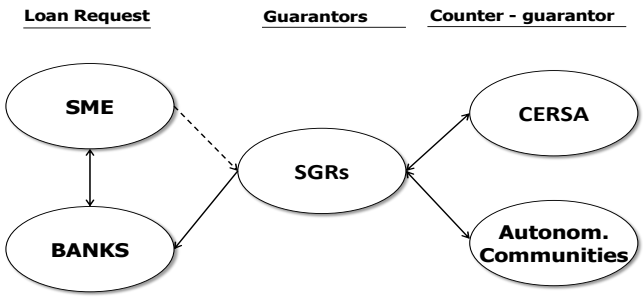

Figure 9: Total Capital Requirement in the 2-tier model

Loan: 100.000 €	Guarantee	Risk Weight	Bank's RWA
Bank's loan not guaranteed	40%	100%	€ 40.000
Confidi guarantee	12%	20%	€ 2.400
CGF counter guarantee	48%	0%	€ 0
Total Bank's RWA			€ 42.400
Capital Ratio (8% x RWA)			€ 3.392

Figure 10: Total Capital Requirement in the 3-tier model

Loan: 100.000 €	Guarantee	Risk Weight	Bank's RWA
Bank's loan not guaranteed	40%	100%	€ 40.000
Confidi guarantee	60%	20%	€ 12.000
Total Bank's RWA			€ 52.000
Capital Ratio (8% x RWA)			€ 4.160

Figure 11: Multiplier Effect in the 2-tier model

MULTIPLIER EFFECT OF 1.000 EURO OF PUBLIC FUNDS DESTINED TO THE TOTAL CAPITAL OF THE CONFIDI (2-tier model)	
Public funds	**1.000,00**
Guarantees that the confidi can provide (Public funds/6%)	**16.666,67**
Lendings that the bank can provide (Guarantees/60%)	**27.777,78**
DIRECT MULTIPLIER (Lendings/Public Funds)	**27,78**

Bank's RWA related to the lendings	**14.444,44**
Percentage of lendings guaranteed by confidi (60%) x confidi's risk weight (20%)	*3.333,33*
Percentage of lendings not guaranteed by the confidi (40%) x firm's risk weight (100%)	*11.111,11*
Bank's capital requirement (8%*RWA)	**1.155,56**
Bank's RWA in the absence of public funds for the confidi (no guarantee) (Percentage of lendings not guaranteed (100%) x firm's risk weight (100%))	**27.777,78**
Bank's capital requirement in the absence of public funds for the confidi (8%*RWA)	**2.222,22**
Bank's free capital (Capital req. without public funds - capital requirement with public funds)	**1.066,67**
Additional lendings that could be provided (Free capital/8%)	**13.333,33**
Total lendings with the indirect multiplier	**13.333,33**
INDIRECT MULTIPLIER (additional lendings/public funds)	**13,33**
Total lendings (Direct Multupl. + Ind. Multipl.)	**41.111,11**

CUMULATIVE MULTIPLIER (Total lendings/public funds)	**41,11**

Figure 12: Multiplier Effect in the 3-tier model

MULTIPLIER EFFECT OF 1.000 EURO OF PUBLIC FUNDS DESTINED TO THE TOTAL CAPITAL OF THE CGF (3-tier model)	
Public funds	**1.000,00**
Counter-guarantees that the CGF can provide (Public funds/8%)	**12.500,00**
Guarantees that the confidi can provide (Counter-guarantees/80%)	**15.625,00**
Lendings that the bank can provide (Guarantees/60%)	**26.041,67**
DIRECT MULTIPLIER (Lendings/Public Funds)	**26,04**
Confidi's RWA on the guarantees	**3.125,00**
Percentage of guarantees counter-guaranteed by CGF. (80%) x FCG's risk weight (0%)	**-**
Percentage of confidi guarantees (20%) x firm's risk weight (100%)	*3.125,00*

Confidi's capital requirement (6%*RWA)	**187,50**
Confidi's RWA in the absence of public funds for the CGF (no counter guarantee) (Guarantees not counter-guaranteed (100%) x firm's risk weight(100%))	**15.625,00**
Confidi's capital requirement in the absence of public funds for the CGF (no counter guarantee) (6%*Guarantees)	**937,50**
Confidi's free capital (Capital req. without public funds - capital req. with public funds)	**750,00**
Bank's RWA on lendings	**11.041,67**
Percentage of lendings guaranteed and counterguaranteed (48%) x FCG's risk weight (0%)	-
Percentage of lendings guaranteed by confidi and not counterguaranteed (12%) x confidi's risk weight (20%)	*625,00*
Percentage of lendings not guaranteed (40%9 x firm's risk weight (100%)	*10.416,67*
Bank's capital requirement (8%*RWA)	**883,33**
Bank's RWA in the absence of public funds for the CGF (no guarantee-no counterguarantee) (Percentage of lendings not guaranteed (100%) x firm's risk weight (100%)	**26.041,67**

Bank's capital requirement in the absence of public funda for the CGF (8%*RWA)	**2.083,33**
Bank's free capital (Cap. req. without public funds - capital req. with public funds)	**1.200,00**
Confidi's free capital (Capital req. without public funds - capital req. with public funds)	**750,00**
Additional guarantees that can be provided by the confidi (Capital/6%)	**12.500,00**
Additional lendings that can be provided by bank (Additional guarantees/60%)	**20.833,33**
Bank's RWA on additional lendings	**10.833,33**
Percentage of lendings guaranteed by confidi (60%) x confidi's risk weight (20%)	*2.500,00*
Percentage of lendings not guaranteed (40%) x firm's risk weight (100%)	*8.333,33*
Bank's capital requirement (8%*RWA)	**866,67**
Bank's additional free capital (free capital from direct multiplier - cap. req. for additional lendings)	**333,33**
Further dditional lendings that can be provided by bank	

(Free capital/8%)	**4.166,67**
Total lendings with the indirect multiplier	**25.000,00**
INDIRECT MULTIPLIER (Total additional Lendings/public funds)	**25,00**
Total lendings (Direct Multupl. + Indirect Multipl.)	**51.041,67**
CUMULATIVE MULTIPLIER (Total lendings/ public funds)	**51,04**

Figure 13: Total Capital Requirement and Multiplier Effect (2-tier vs 3-tier model)

	Loan of 100.000 €	**Public Funds of 1.000 €**		
	Capital Requirement	Direct Multiplier	Indirect Multiplier	Cumulative Multiplier
2-tier Model	€ 4.160,00	x 27,78	x 13,33	x 41,11
3-tier Model	€ 3.392,00	x 26,04	x 25.00	x 51,04