Are all Mutual Guarantee Institutions the same?
Improving the economic allocation of public guarantees to favour SMEs

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Abstract

Our study focuses on the default risk of public guarantees. The analysis aims to identify policies to improve the allocation of Public Credit Guarantee Schemes (PCGS) in favour of SMEs based on verification of how the operating/structural characteristics of Mutual Guarantees Institutions (MGIs) effect default risk. We analyse the determinants of default for 33,229 loans guaranteed by MGIs and counter-guaranteed by the Italian Central Guarantee Fund, using a confidential dataset. We demonstrate that increases in the leverage and size of the counter-guaranteed portfolio increase the default risk, especially for larger MGIs. In contrast, this effect is reduced for local MGIs. Finally, we observe that an MGI may adopt opportunistic behaviour that makes Basel-compliant operations riskier than other operations. Appropriate PCGS design then becomes crucial to control the moral hazard of financial institutions and ensure the financial sustainability of public intervention.

Keywords: Public Credit Guarantees Schemes, Mutual Guarantees Institutions, Default risk, SME.

1. Introduction

Public Credit Guarantee Schemes (PCGSs) represent funds allocated by governments to reduce bank financial losses in case of borrower default. They are a prevalent form of public intervention in financial markets, in both developed and developing countries (AECM, 2010; KPMG, 2012; OECD, 2013; ABD-OECD, 2014).

In developed countries, these schemes are mainly aimed to facilitate access to credit for specific types of firms, often SMEs or start-ups, that are particularly disadvantaged in terms of interest rate spreads and requested collaterals (Beck and Demirguç-Kunt, 2006; Berger and Udell, 2006; European Commission, 2011). These constraints, exacerbated during recent years of economic and financial crisis, have prompted many governments to ramp up existing and structural guarantee instruments and support new anti-cyclical guarantee programs to indirectly stimulate growth and job creation (Beck et al., 2008; Holton et al., 2013; OECD, 2013).

However, in developing countries, PCGSs aim to improve financial inclusion and expand credit markets (ABD-OECD, 2014).

Empirical studies tend to demonstrate the effectiveness of public guarantees in supporting access to credit, especially in terms of maximizing financing and decreasing the pricing of loans and other collateral requests (Meyer and Nagarajan, 1996; Riding and Haines, 2001; European Commission, 2005; Lei and Xi, 2005; Benavente et al., 2006; Riding et al., 2007; Zecchini and Ventura, 2009; Arping et al., 2010; Gai et al., 2010; Leone and Vento, 2012).

Nevertheless, other authors emphasize the difficulty of assessing the additionality of these programs (Vogel and Adams, 1997; Camino and Cardone, 1999; De Meza, 2002; Mistrulli and Vacca, 2011). In this respect Holton et al. (2013) state: 'it is possible that such a scheme will exist merely to allow banks to reduce their exposure to default risk on loans that would have been made without the scheme, while charging borrowers an unnecessary premium'.

This study enters the broad debate on the effectiveness and sustainability of PCGSs, and contributes to public policy discussion of the economic allocation of public guarantee funds.

This research focuses on the Italian case, which is of particular interest in relation to the history and articulation of the credit guarantees system. The financing structure of the Italian SME population, which is among the most reliant on bank funding in Europe, has encouraged a deep-rooted and extensive network of external guarantee instruments, both private and public, capable of determining a well-established multi-layer guarantee structure (De Vincentiis, 2008; Columba et al., 2010; Bartoli et al., 2012; Busetta and Zazzaro, 2012). Particularly, groups of entrepreneurs, with well-defined territorial or sectorial identity, have founded private societies to provide mutual

guarantees to their associates (Confidi in Italy). These Mutual Guarantees Institutions (MGIs) are usually coordinated by regional federations, which provide co-guarantees or counter-guarantees to the first-level guarantor. Finally, the government acts as guarantor of last resort through a public central guarantee fund (CGF).

The CGF is the main tool in the Italian public guarantees system, and aims to facilitate access to credit for micro, small and medium-sized enterprises[1]. It can provide a direct guarantee to the banks granting loans or a counter-guarantee to an MGI acting as first level guarantor. In this case, the government assumes part of the risk from the principal guarantor, up to a pre-defined share of the guarantee. Like in several other countries, use of the CGF has increased significantly since 2008 in Italy, specifically to support SMEs especially during the most intense years of the financial crisis. Moreover, since 2010 the regulation of the CGF has changed significantly, expanding the opportunities for intervention.

Our empirical analysis focuses on every bank loan secured by an MGI and counter-guaranteed by the CGF during 2010-2011, the peak of the financial crisis, when applications to PCGSs expanded most.

The analysis is based on an original and confidential dataset, which is not available in public documents or statistics of the Supervisory Board, but is collected directly from the MGIs that participated in the research.

The work continues with a review of the literature (Section 2), analysis of the research hypotheses (Section 3), description of the sample, applied methodology (Section 4) and presentation of the empirical results (Section 5). Section 6 concludes by outlining potential policies for rationalization of public guarantee provision.

2. Literature review

Empirical studies show that PCGSs are more effective and economical than public directed lending as a means of expanding firm access to credit (Vogel and Adams, 1997; Arping et al., 2010; Gai et al., 2010). Several authors report that banks consider PCGSs the most common and effective government support program for SME lending, ahead of directed credit and interest rates or regulatory subsidies (Llisteri, 1997; Beck et al., 2006; Beck et al., 2008; Klapper and Mendoza, 2008).

[1] The CGF is a tool of the Ministry of Economic Development, established by Law 662/96.

An extensively used government instrument among PCGSs, especially in Europe and South America, is the counter-guarantee (ABD-OECD, 2014). This form of public intervention has advantages for both the main guarantor and counter-guarantor.

First, empirical studies have shown that the granting of public counter-guarantees has helped increase the volume of mutual guarantees offered to SMEs and improve the credibility and reputation of private guarantee schemes, even during the most intense periods of crisis (European Commission, 2005; AECM, 2010; OECD, 2013). Moreover, such interventions can generate a significant leverage effect on private guarantee schemes, contributing to their sustainability and permanence (Beck et al., 2008; KPMG 2012). With reference to the Italian case, the portion of Basel compliant loans and guarantees backed by the CGF receives a zero weighting in the calculation of capital requirements for banks and MGIs. In fact, following the approval of Decree Law no. 185/2008[2], financial institutions consider the activation of the public guarantee risk-free. In the event of default, losses are reimbursed by the CGF, or should its resources be inadequate, directly by the State, which acts as the guarantor of last resort[3].

From the perspective of the public counter-guarantor, the counter-guarantee does not imply immediate cash flow for the government, as the payment becomes effective only when the counter-guarantee is enforced by the main guarantor in the event of borrower default. The counter-guarantee, compared with direct public funding, should also foster more precise assessment of firm creditworthiness, as banks retain control over access to credit and lending decisions stay mostly with financial institutions (Beck et al., 2008; Honohan, 2008; Arping et al., 2010).

However, for this to occur, PCGSs must provide proper incentives so that the financial intermediary continues to appropriately assess credit risk. As guarantor of last resort, the government assumes risk for loans granted and guaranteed by other financial institutions, and it therefore must verify the capacity of these actors to adequately control credit risks and so avoid morally hazardous behaviours (Boot et al., 1994; Jemenez and Saurina, 2004; Caselli et al., 2013; Gai et al., 2013). Such behaviours can arise because government involvement in the management of credit guarantees, default risk assessment and loss recovery is not common (OECD, 2013). Moral hazard risk, common when loan granting and risk-taking are separated, can then arise. For example, this is the case in the securitization market (Boot et al., 1994; Bubb et al., 2009; Hartman-Glaser et al., 2012).

[2] Following amendments, specifically Law 2009 January 28, n. 2, covered the 'criteria, terms and conditions of operation of the State guarantee of last resort in relation to the actions of the Guarantee Fund'.

[3] However, repayments to MGIs sometimes prove incomplete or are made only after significant delay.

Consequently, one of the main risks of PCGSs is the possibility of their being mainly used to reduce the risk exposure of the bank and the MGI, without benefitting the economy as a whole. The mission of PCGSs should be to facilitate access to credit for firms that would otherwise be excluded from bank loans, while carefully controlling the risk of public guarantees to protect public resources and avoid unduly benefiting financial institutions (Levitsky, 1997; Holton et al., 2013). Restated, PCGSs must provide both additionality and sustainability (OECD, 2013). The condition of additionality captures the increase in the flow of funds towards viable enterprises that face credit constraints and the consequent increase in overall economic welfare, measured in terms of higher employment, investment and innovation performance of the companies supported. Simultaneously, such schemes must pursue financial sustainability, verifying the risk of losses before extending guarantees. Such attention is especially urgent and relevant today, given the strong growth internationally in the scale and scope of PCGSs (ABD-OECD, 2014).

Focusing our attention on MGIs as principal applicants for public counter-guarantees, the question arises of what conditions favour proper risk assessment by these main guarantors, and so reduce the risk assumed by the counter-guarantor.

First, the risk appetite of a financial institution is affected by its degree of capitalization. Shareholder capital in financial intermediaries is a cushion protecting creditors. Lower capital is associated with higher institutional risk appetite, and usually also with risk of financial system instability (BIS, 2011).

Given constant risk appetite, the ability to assess and monitor default risk can differ among individual MGIs.

Generally, these institutions can control the information asymmetries that characterize bank loans and solve some of the moral hazard problems that limit access to credit for SMEs (Lei and Xi, 2005; Zecchini and Ventura 2009; Columba et al., 2009; Busetta and Zazzaro, 2012). Nevertheless, this ability is stronger in companies operating in specific industries or geographical areas, because such narrow operations allow more in-depth knowledge of local businesses and the exertion of moral pressure between members of the MGIs (peer pressures) (Columba et al., 2010; Bartoli et al. 2012; Gai et al., 2013).

Moreover, the debate on the efficiency of MGIs and their ability to adequately assess credit risk is focused on dimensional variables, highlighting the opportunity for MGIs of adequate size, to strengthen controls for good risk management and optimize organizational structures and corporate governance (De Vincentiis, 2008; Leone and Vento, 2012).

In contrast, the decrease in the efficiency of firm screening and default risk monitoring activities, with a consequent increase in credit risk for MGIs, could be related to the use of government grants and public funds that can generate opportunistic behaviours in MGIs (Busetta and Zazzaro, 2012). Several authors show that intervention of a public guarantee/counter-guarantee, not removal of the cause of credit rationing, can generate market distortions and reduce screening and monitoring activities by banks and MGIs, with a consequent increase in credit risk (Vogel and Adams, 1997; Llisteri, 1997; De Meza,2002; Benavente et al., 2006).

This study focuses on the above operating and structural characteristics of MGIs, which are considered critical by the literature in terms of risk taking and risk assessment. Simultaneously, this study controls for other explanatory variables, to identify new elements that can be employed in the design of a PCGS to improve its allocative efficiency and financial sustainability.

3. Research hypotheses

Application selection by the Italian Central Guarantee Fund is exclusively on the basis of quantitative variables related to the borrower. Particularly, through the application of several scoring models, the CGF assesses the eligibility of borrowing firms via a set of financial ratios. The CGF does not assess the credit worthiness of the borrower using other factors, besides historical financial data, that can influence the risk of the public guarantees, such as the structural and operating characteristics of the involved financial intermediaries (Jiménez and Saurina, 2004), including banks and MGIs.

The study of the relationship between certain characteristics of the intermediaries and the probability of default of the guaranteed portfolio is interesting for several reasons:

1) the CGF has the opportunity to provide guarantees not only for specific positions, but also for whole portfolios of loans (tranched cover operations)[4]. In such cases, the CGF must evaluate the risk assessment process of the financial institution that requires the tranched cover intervention;

2) within the CGF the principle is increasingly that the financial institution applying to the Fund must assess the financed firms[5] and communicate the reliability of its assessments to the CGF[6];

3) the lack of consideration of the characteristics of the financial intermediaries can generate moral hazard risk, as well as inefficiencies in the use of soft MGI information about borrowers. CGF

[4] This possibility was introduced by the Joint Decree of the Ministry of Economic Development and the Ministry of Economics and Finance on April 24, 2013.

[5] The MGIs that have adequate capacity to assess creditworthiness may be authorized to certify that the final beneficiaries are economically and financially healthy. These MGIs may submit requests for admission relating exclusively to subjects classified in bands 1 or 2, provided that: a) the turnover in the latest approved financial statements has not decreased by 40% or more from the previous reporting period; b) the company has not reported a loss exceeding 5% of its turnover in the last two years.

[6] Baione G., speech at the conference 'Confidi 2.0: practical proposals for action in times of crisis', University of Florence, February 27, 2014.

operating mode can encourage MGIs to apply for a counter-guarantee for any company that meets the quantitative parameters defined in the scoring models of the CGF without verifying its effective viability. In fact, presently no incentive exists for an intermediary exposed to default risk totalling only 10-20% of the amount covered by the CGF to make an in-depth and up-to-date credit risk assessment.

In this study we aim to test the hypotheses that some structural and operating characteristics of MGIs, which can affect their ability to evaluate borrower creditworthiness, can influence the default risk of public guarantees.

Particularly, we want to test the following hypotheses, based on the previous literature review.

H1: the level of capitalization of MGI is negatively related to the default risk of public guarantees.

H2: the level of financial liability of MGI in granting guarantees is negatively related to the default risk of public guarantees.

The allocation of more shareholder capital implies lower risk appetite and greater control over the risks assumed. Consequently, it can affect the risk level for the portfolio backed by the CGF. We expect this to be verified with reference both to the total capital of the MGI and the amount of capital allocated to cover the risks of individual guarantees.

Regarding the different types of guarantees issued by the MGIs, they can be distinguished based on mode of payment enforcement by the bank and the financial liability of the MGI against the lender. Particularly, analysis of the first profile allows the distinguishing of the first demand guarantee from the subsidiary one. In the event of company default the bank can immediately enforce the MGI to meet its obligations under the first demand guarantee. However, the subsidiary guarantee is enforceable only after the unsuccessful execution of the principal debtor. With respect to the liability assumed by the MGI, we distinguish guarantees with limited liability from those with unlimited liability. In the first case, the MGI is liable for obligations arising from the guarantee only up to the value of funds it has allocated to the bank (through pledge money or pledge securities). In the second case, the MGI meets the obligations arising from the guarantee using shareholders' capital. Combining the different methods of payment enforcement and financial liabilities of the MGI results in four types of operations (Gai, 2011):

1) Basel-compliant operations (enforcement on first demand, unlimited financial liability);

2) tranched cover operations (enforcement on first demand, limited liability);

3) segregated operations (subsidiary enforcement, limited liability);

4) subsidiary operations (subsidiary enforcement, unlimited financial liability) .
We expect that the guarantees with lower risk are Basel compliant, given the unlimited financial liability of the MGI and the enforcement on first demand by the bank.

H3: the degree of geographical concentration of MGI is negatively related to the default risk of public guarantees.
H4: the degree of industrial specialization of MGI is negatively related to the default risk of public guarantees.

As shown in the literature, the MGI specialized and organized by geographical area and/or industry is characterized by more effective peer monitoring and peer selection among members, which impacts the risk of the guaranteed portfolio. We expect local and specialized MGIs to have less risky portfolios, all else being equal, and thus to be able to determine a lower risk of public guarantees.

H5: the size of MGI is negatively related to the default risk of public guarantees.
H6: the volume of the counter-guaranteed portfolio of the MGI is positively related to the default risk of public guarantees.

As shown in the literature, guarantor size can affect the availability of skills and advanced models for properly assessing default risk. We therefore expect, all else being equal, an association between larger MGI and less risky portfolios.
In contrast, increased use of public guarantees can contribute to less efficient assessment of default risk. With the increase in the counter-guaranteed portfolio, we thus expect an increase in the risk of the positions assumed, all else being equal.
The last hypothesis to be tested is closely connected to the previous one and concerns the presence of opportunistic behaviour by MGIs in response to increasing value of the counter-guaranteed portfolio. We demonstrate that some characteristics of MGIs may reduce or increase the opportunistic behaviour above.
H7: When the counter guaranteed portfolio increases, certain characteristics of MGIs (size, geographical concentration and capitalization) can influence the increase in the probability of default.

The confirmation of this hypothesis involves the opportunity of a rationalization of the operating procedures of PCGSs for adequate application screening. Particularly, the CGF can use the information related to MGIs to modulate the conditions of the counter-guarantees provided. The modulation of the maximum amounts of the counter-guarantee and the percentages of loans covered by the CGF are among the most significant conditions for discouraging opportunism by financial institutions and ensuring more favourable conditions to the most virtuous and deserving MGIs.

4. Sample and method

The study analyses all counter-guaranteed portfolios of 12 Italian MGIs[7]. The analysis includes the total number of issued guarantees covered by the CGF, including both those *in bonis* and in default, as of the end of the first semester of 2011. To verify the determinants of defaults, the analysis focuses exclusively on positions already existing at the end of the previous year.

The sample comprises 33,229 positions. The total value of analysed guarantees exceeds 2 billion Euros, of which about 55 million is in default.

For each position, we collected confidential information from the MGIs relating to:

1) the type of guaranteed loan;

2) the form of the issued guarantee;

3) the volume of exposure.

With regard to form of financing, we distinguish credit account overdrafts, advances on invoices, unsecured instalment loans, mortgage loans and other loans. The distinction between technical forms of financing can be important in this context, as loan type relates to loan size and the quality of required collateral, and hence to the risk of the position. Access to CGF is now permitted for any financial loan intended to finance a business need, whether short term or medium-long term. Therefore, a CGF cannot exclude specific forms of financing, but can take into account the financial risk of a position.

With regard to the type of guarantee issued by the MGI, we distinguish Basel-compliant operations, tranched cover operations, segregated operations and subsidiary operations. This classification is useful to verify whether the financial liability of the MGI and the mode of payment enforcement by the bank affect the risk of the guaranteed positions. With reference to counter-guaranteed operations, it must be emphasized that the MGI can benefit from the use of Basel compliant guarantees. In this way, it is also possible to transfer the effect of the lower capital requirements against the bank. This implies greater use of the CGF for Basel compliant guarantees: more than

[7] Cofidi Veneziano, Cofiter, Commerfidi, Confartigianato Fidi Piemonte, Confeserfidi, Confidi Imprese Toscane, Eurofidi, Fidindustria Emilia Romagna, InterconfidiMed, Italia Comfidi, Sardafidi, Società Regionale Garanzia Marche.

70% of the analysed sample possess this feature. Nevertheless, the use of the CGF even with other forms of guarantees is not marginal. Therefore, it is important for the CGF to consider whether the type of guarantee issued by the MGI impacts the default risk of the public guarantees.

With regard to exposure volume, the analysis refers to the value of the secured loan as of the survey date.

Information on structural and operating characteristics of MGIs is then collected. The sample analysed in this paper entirely comprises supervised MGIs, recorded in the special list pursuant to article 107 of the Italian Banking Law before the reference period of the survey.

To test our research hypotheses, MGIs are first segmented into local and national, as well as mono-industry and multi-industry.

Additionally, the size of the institutions is evaluated by considering the total guarantees provided. This is one of the indicators traditionally used to evaluate the dimensional structure of an MGI, along with number of associates and employees. However, the latter are not always available in the public documents issued by MGIs.

Then we collect data on the size of the counter-guaranteed portfolio. Because the information on counter-guarantees is unclear or absent in the IAS financial statements, which the supervised MGIs are called to draw up, proxies are used to assess this variable. First, total exposures as of the detection date were considered. This data is a proxy of the stock of counter-guarantees, because it is related to the total value of the counter guaranteed position, not only the portion of the loan actually covered by the CGF. Secondly, the 'multiplier' (guarantees/equity) is included among the variables analysed. This analysis assesses the degree of coverage of the guarantees by shareholders' capital, highlighting the degree of 'leverage' taken by the MGI, and thus its capitalization and risk appetite.

To obtain information on the variables described above, data are collected from the financial statements of the MGIs belonging to the sample:

1) percentage of guarantees granted to firms located in the same region as the MGI (stock of guarantees at December 31, 2011). The MGI is considered local when more than 50% of the stock of issued guarantees is related to companies from the region in which the headquarters of the MGI are located. Other MGIs are considered national, and have diversified portfolios according to the geographical area of their associates;

2) percentage of guarantees granted to firms operating in the primary sector in which the MGI is active (based on the stock of guarantees as of December 31, 2011). MGIs issued by a professional organization with more than 50% of its guarantees granted to companies operating in a single sector were considered mono-industry, while other MGIs were considered multi-industry. In terms of

sectoral divisions, we distinguish among industry, trade/tourism/services, handicrafts and agriculture/fishing;

3) total amount of guarantees provided by each MGI (stock of financial guarantees issued to banks, financial institutions and customers as of December 31, 2011);

4) shareholders' equity (total value at the end of 2011, as recorded in the statement of changes in shareholders' equity), including share capital, share premium, reserves (of earnings and others), valuation reserve, equity instruments, treasury shares (with negative sign) and annual profit/loss.

We did not collect information on borrower financial data because, as said previously, all the loans analysed are counter guaranteed by the CGF. This means the CGF has already assessed the eligibility of borrowing firms based on their financial historical data.

Tables 1 and 2 summarize the variables used in the empirical analysis.

Table 3 outlines some descriptive statistics of the sample.

Table 1_Description of dependent variable

Name of dependent variable	Abbreviation	Description
Default	D	Dummy variable: the value is 1 if the loan went in default by June 30, 2011, 0 otherwise

This table presents the names, abbreviations and descriptions of the dependent variables used in the analysis.

Table 2_Description of independent variables

Name of independent variable	Abbreviation	Description
Category 1: Type of guaranteed loan		
Current account overdrafts	CurAcc	Dummy variable: the value is 1 if the guarantee is granted on Current account overdrafts, 0 in the other cases
Advances on invoices	Adv	Dummy variable: the value is 1 if the guarantee is granted on Advances on invoices, 0 in the other cases
Mortgage loans	Mort	Dummy variable: the value is 1 if the guarantee is granted on Mortgage loans, 0 in the other cases
Unsecured instalment loans	Unsec	Dummy variable: the value is 1 if the

		guarantee is granted on Unsecured term loans, 0 in the other cases
Others	Other	Dummy variable: the value is 1 if the guarantee is granted on loans different from the previous ones, 0 in the other cases
Category 2: Type of guarantee		
Basel compliant	BasCom	Dummy variable with value 1 if the guarantee issued by the MGI belongs to the Basel compliant portfolio, 0 in the other cases
Subsidiary	Subs	Dummy variable with value 1 if the guarantee issued by the MGI belongs to the subsidiary portfolio, 0 in the other cases
Segregated	Segr	Dummy variable with value 1 if the guarantee issued by the MGI belongs to the segregated portfolio, 0 in the other cases
Tranched cover	Tranc	Dummy variable with value 1 if the guarantee issued by the MGI belongs to the tranched cover portfolio, 0 in the other cases
Category 3: Mutual guarantee institution		
Local	Loc	Dummy variable with value 1 if the MGI operates in a specific geographical area, 0 if the MGI's portfolio is not geographically concentrated
Multi-industry	MulInd	Dummy variable with value 1 if the MGI is multi-industrial, 0 if the MGI is specialized
Volume of guarantees	Guar	Logarithm of the value of the guarantees issued by the MGI, according to the data of 2011 financial statement
Volume of counter guarantees	CounGuar	Logarithm of the total value of the counter guarantees obtained by the MGIs on the basis of the data of our sample (the data correspond to the total amount of the loan at the end of the analyzed period, not only the counter

		guaranteed portion)
Guarantees/Equity	Guar/Equ	The ratio of total guarantees and the MGIs' equity, according to data from the 2011 financial statement

This table presents the names, abbreviations and descriptions of the independent variables used in the analysis.

Table 3_ Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
Default	33229	0.0264	0.1605	0	1
Type of guaranteed loan					
Current account overdrafts	33229	0.4504	0.4975	0	1
Advances on invoices	33229	0.0411	0.1984	0	1
Mortgage loans	33229	0.2714	0.4447	0	1
Unsecured instalment loans	33229	0.2369	0.4251	0	1
Others	33229	0.0002	0.0145	0	1
Type of guarantee					
Basel compliant	33229	0.7113	0.4531	0	1
Subsidiary	33229	0.0288	0.1672	0	1
Segregated	33229	0.2598	0.4385	0	1
Tranched cover	33229	0.0001	0.0123	0	1
Mutual Guarantee Institution					
Local	33229	0.4120	0.4922	0	1
Multi-industry	33229	0.8695	0.3368	0	1
Volume of guarantees	33215	20.7937	1.4917	18.1173	22.0408

Volume of counter guarantees	33229	20.0403	1.4751	13.6029	21.1706
Guarantees/Equity	33215	23.2048	12.2011	4.1525	33.4005

This table presents, for each variable analysed, the number of observations, mean value, standard deviation and minimum and maximum values.

To test our hypothesis (from H1 to H6) we use a Logit regression model (Eq.1). The dependent variable is a dichotomous variable that takes the value 1 for loans in default and zero for others. The probability of default is considered a function of different types of variables. We consider: type of guaranteed loan, type of guarantee and certain structural and operating characteristics of the MGIs that request the counter-guarantee (as listed in Table 2).

$$Log_e = \left[\frac{\pi}{1-\pi} \right] = \beta_0 + \beta_1 Loc + \beta_2 MultInd + \beta_3 \text{Guar} + \beta_4 CounGuar + \beta_5 Guar / Equ + \beta_6 CurrAcc + \beta_7 Adv + \beta_8 Un\,\text{sec} +$$

$$+\beta_9 Other + \beta_{10} Sub + \beta_{11} Segr + \beta_{12} Tranc$$

[Eq.1]

Where π represents the probability of default.

To test Hypothesis 7, and particularly to uncover potential opportunistic behaviour by MGIs, we add interaction effects between the variable relative to the size of the counter-guaranteed portfolio and other variables: local, volume of guarantee and Guarantee/Equity as a proxy of capitalization (Eq.2). We test these specific variables, because they represent particular characteristics of the MGI that can improve both its capacity for risk assessment (local and volume of guarantee) and its risk appetite (Guarantee/Equity).

$$Log_e = \left[\frac{\pi}{1-\pi} \right] = \beta_0 + \beta_1 Loc + \beta_2 MulInd + \beta_3 \text{Guar} + \beta_4 CounGuar + \beta_5 Guar / Equ + \beta_6 CurrAcc + \beta_7 Adv + \beta_8 Un\,\text{sec} +$$

$$+\beta_9 Other + \beta_{10} Subs + \beta_{11} Segr + \beta_{12} Tranc + \beta_{13} CounGuar * Loc + \beta_{14} CounGuar * Guar + \beta_{15} CounGuar * (Guar / Equ)$$

[Eq.2]

Where π represents the probability of default.

We perform a forward stepwise selection and verify the robustness of our results by also performing a backward selection. We run these analyses using the Wald and Likelihood-ratio tests. As we can achieve the same results with all these methods of analysis, the next section presents only the result of the Logit forward stepwise method with the Likelihood ratio test[8].

5. Main Results

The initial stage of the study focused on checking the extent to which the two samples are characterised in terms of mean values, as well as highlighting the differences between statistically significant means through a t-test. As outlined in the section on sample description, the study considered variables related to the type of guaranteed loan, the type of guarantee and information about the MGI. The main differences between positions in default and *in bonis* involve type of guaranteed loan and characteristics of MGI.

The operations in default are mainly unsecured term loans, whereas current account overdrafts are most common for operations *in bonis*.

In terms of guarantee type both groups concentrate mainly on Basel-compliant and segregated guarantees.

One of the most interesting aspects relates to the characteristics of MGI. Table 4 lists significant differences in terms of the default of guaranteed loans between local and national MGIs as well as between multi-industry and specialized MGIs. The variable size also seems important. To summarise, Table 4 shows that loans in default, as opposed to loans *in bonis,* are promoted by MGIs more geographically distant from the guaranteed firms, operating in specific sectors, smaller in terms of volume of guarantees and larger in terms of volume of counter-guarantees.

Table 4_ The test for equal means

	Non default	Default	T-test
Type of guaranteed loan			
Current account overdrafts	0.4568	0.2147	***
Advances on invoices	0.0351	0.2614	***

[8] The authors are available to show, in response to a specific request, the results of logistic regressions run using other estimation methods.

Mortgage loans	0.2781	0.0238	***
Unsecured term loans	0.2297	0.5000	***
Others	0.0002	0.0000	
Type of guarantee			
Basel compliant	0.7081	0.8284	***
Subsidiary	0.0286	0.0341	
Segregated	0.2631	0.1375	***
Tranched cover	0.0001	0.0000	
Mutual Guarantee Institution			
Local	0.4556	0.4108	***
Multi-industry	0.8741	0.7011	***
Volume of guarantees	20.7969	20.6731	***
Volume of counter guarantees	19.7721	20.0403	***
Guarantees/Equity	23.1968	23.4999	

Before using the t-test to check the equality of means, the equality of variances was checked. When the equality of variances is rejected at 5%, the t-test is used for different variances. In the event of acceptance of the hypothesis of equality, the t-test is performed with the same variance for both groups. The significance of the coefficients is expressed via one, two or three asterisks, indicating the rejection of the hypothesis of equality of the coefficients with probability levels of 10%, 5% or 1%, respectively.

The results of the Logit Regression (Table 5, column I) confirm the importance of the technical form of financing in influencing default probability: unsecured loans (current account overdrafts, advances on invoices and unsecured term loans) are much riskier than mortgage loans. Regarding guarantee type, Basel-compliant guarantees tend to be more risky. In fact, the values of odds ratios show that subsidiary and segregated guarantees, respectively, have default probabilities below 45% and 40% with respect to Basel-Compliant type obligations. In this regard, we can identify possible opportunistic behaviour by MGI. In fact, the main difficulties in terms of capital requirements often

limit the operation of a first request to situations where it is possible to obtain the counter guarantee of the CGF. Moreover, the presence of a second level guarantee appears to reduce the attention paid to the screening activity by the MGI (Gai and Ielasi, 2014). The second hypothesis is not confirmed: the financial liability assumed by MGI in granting guarantees is negatively related to the default risk of public guarantees.

The last aspect was to analyse concerns regarding the characteristics of the MGI. Firstly, it can be seen that territorial closeness between MGI and guaranteed firm (local MGI) is associated with an almost 80% reduction of the probability of default with respect to the case of a national MGI.

In contrast, the variable related to the MGI multi-sector activity does not seem to affect default risk. The third hypothesis is confirmed: the level of geographical concentration of MGI is negatively related to the default risk of public guarantees. The fourth hypothesis (the level of industrial specialization of MGI is negatively related to the default risk of public guarantees) is rejected.

The analysis allows us to assert that the geographical concentration of the MGI can affect the probability of default of the guaranteed company. This probably occurs because of greater efficiency and effectiveness of peer monitoring and peer selection. In fact, an MGI that is territorially close to its associates can acquire more knowledge of their businesses. Simultaneously, members from the same geographical area can monitor one another more easily. This confirms the ability of the MGI to provide 'implicit' guarantees. Besides traditional 'express' guarantees, the MGI can provide a further form of guarantee to the bank or the CGF based on its close knowledge of the borrower. Implicit guarantees are not only based on quantitative information (deduced for example from the firm's balance sheet or credit behaviour), but also on soft and reserved information.

In terms of size, we observe that an increase in the volume of granted guarantees helped reduce the risk of default, while an increase in the volume of the counter-guaranteed portfolio increased the default risk. This data should be read in conjunction with the ratio between the volume of guarantees and MGI equity. This ratio indicates that an increase in leverage increases the default risk.

The inverse relationship between the volume of the guarantees and the default risk may be justified based on economies of scope and improvement in the assessment methods, while the result regarding the counter-guarantees could highlight an opportunistic attitude by MGIs that requires a public guarantee for riskier positions of their portfolio.

Besides the size, capitalization is another important feature of the MGI that can influence default risk. An excessive increase in the volume of guarantees with respect to equity increases the default

probability of the guaranteed positions. In this sense we can assume that an excessive increase in leverage could once again engender an opportunistic attitude on the part of the MGI less exposed in terms of equity. Hypotheses one (MGI level of capitalization is negatively related to the default risk of public guarantees), five (MGI size is negatively related to the default risk of public guarantees) and six (the volume of MGI counter-guaranteed portfolio is positively related to the default risk of public guarantees) are all confirmed.

Columns II, III and IV of Table 5 are useful for testing hypothesis seven. The results demonstrate how the increase in the risk of default, given an increase in the counter-guaranteed portfolio, is lower for local MGIs, but higher for larger MGIs (with a high volume of guarantee). In contrast, capitalization does not seem significant.

We demonstrate that when the counter-guaranteed portfolio increases, so too does the probability of default. As illustrated before, this could hide opportunistic behaviour that seems to be emphasised with larger MGIs (an increase in the guarantee volume increases the default risk by 2%), whereas it can be reduced by the presence of a local MGI (the presence of a local MGI reduces the default risk by 7%).

Table 5 _ Logit regression

	I		II		III		IV	
Loc	-1.5174	***	n.s.		-1.3380	**	-1.5174	**
	(0.6190)				(0.6063)		(0.6190)	
Guar	-1.5947	***	-1.5350	***	-1.8819	***	-1.5947	***
	(0.3317)		(0.3006)		(0.3561)		(0.3317)	
CounGuar	0.4089	***	0.4383	***	n.s.		0.4089	***
	(0.0634)		(0.0688)				(0.0634)	
Guar/Equ	0.2641	***	0.2619	***	0.2620	***	0.2664	***
	(0.0241)		(0.0233)		(0.02370)		(0.0242)	
CounGuar*Loc			-0.0757	***				
			(0.0294)					
CounGuar*Guar					0.0197	***		
					(0.0030)			

CounGuar*(Guar/Equ)							n.s	
CurAcc	1.8901 (0.2306)	***	1.8901 (0.2304)	***	1.8901 (0.2305)	***	1.8901 (0.2305)	***
Adv	7.3418 (0.2618)	***	7.3518 (0.2622)	***	7.3498 (0.2621)	***	7.3418 (0.2618)	***
Unsec	7.2043 (0.2672)	***	7.2254 (0.2688)	***	7.2186 (0.2678)	***	7.2043 (0.2672)	***
Subs	-0.5804 (0.2182)	***	-0.5559 (0.2144)	***	-0.5558 (0.2174)	**	-0.5804 (0.2182)	***
Segr	-0.5085 (0.1700)	***	-0.4779 (0.1723)	***	-0.4920 (0.1698)	***	-0.5085 (0.1700)	***
Constant	11.6490 (6.0029)	*	9.8602 (5.1624)	*	17.5566 (6.3939)	***	11.6490 (6.0029)	*
LR Chi Squared	2592.80 (0.000)		2593.74 (0.0009		2593.41 (0.0000)		2593.18 (0.0000)	
Pseudo R2	0.3194		0.3195		0.3194		0.3194	
Correctly classified	98.35%		98.35%		98.35%		98.35%	

Table 5 illustrates the results of the Logit Regression model used to analyse the default risk of counter-guaranteed loans. The significance of the coefficients is expressed with one, two, or three asterisks, indicating the rejection of the null hypothesis of the coefficients with probability levels of 10%, 5%, and 1%, respectively. Standard errors are in brackets; n.s. means not significant. The table also shows values referring to the Likelihood Ratio test, McFadden's pseudo-R^2 and percentage of cases correctly classified. In the analysis of guarantee type we used the dummy variable 'Basel-compliant' as a reference. Meanwhile, in the analysis of the type of guaranteed loan we used the dummy variable 'Mortgage loan' as a reference.

6. Conclusions

Our results show that the probability of default of the counter-guaranteed operations depends, among other things, on the operational and structural characteristics of the MGI that relate to public funds. In this sense appropriate PCGS design is crucial to control moral hazard of financial institutions and ensure the financial sustainability of public intervention.

The study identifies three variables that may signal opportunistic behaviour by MGIs: guarantee type, volume of the counter-guarantee portfolio and ratio between guarantees and equity. With respect to the first variable, we observe that in counter-guaranteed operations the MGI may adopt opportunistic behaviour that makes Basel-compliant operations riskier than others. Such

opportunistic behaviour may also occur with the growth of the counter-guaranteed portfolio and the value of leverage used. Using the public guarantee and exposing themselves with limited shareholders' capital, the MGI may agree to guarantee riskier operations.

The second important result of this paper concerns the link between the default probability of the guaranteed loans and the structural characteristics of the MGI. Geographical concentration is key to the reduction of risk. The volume of guarantees issued allows the MGI to achieve significant economies of scope and refinement of risk management techniques. Both these factors can reduce information asymmetries between the firm and its intermediary, thus reducing risk. However, the industrial specialization of the MGI appears not to affect the risk of default of the guaranteed loans.

It is important to emphasize that the effect of these variables on the default risk may change with increasing size of the counter-guaranteed portfolio. Particularly, when the counter guaranteed portfolio increases, larger MGIs (in terms of volume of guarantees) appear riskier than smaller ones. This finding shows that larger MGIs generally have more sophisticated risk management techniques and can correctly assess firm riskiness. However, when the counter-guaranteed portfolio increases, they probably adopt opportunistic behaviour and evaluate risk using the simpler scoring model adopted by CGF.

In contrast, local MGIs can reduce the risk of default by means of soft and confidential information, the so-called implicit guarantee, even when the counter-guaranteed portfolio increases.

These results provide guidance to the CGF to fine tune allocation of public resources to benefit the most virtuous MGIs, i.e. through differentiation of percentage guarantees and the maximum amounts guaranteed. The CGF should rationalize resource allocation to both reduce opportunistic MGI behaviours, and also reward the most virtuous MGIs for managing their guarantee portfolio to limit default rates among PCGSs.

Particularly, the regulatory conditions of the PCGSs around the world must adjust the degree of risk left to the principal guarantor according to its ability to measure and manage the risk taken. In fact, all involved non-government parties (i.e. SMEs, banks and MGIs) should retain sufficient responsibility to ensure proper functioning of public intervention and avoid moral hazard.

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