

Credit portfolio quality of Italian Mutual Guarantee Credit Institutions in the financial crisis: an empirical comparison with Cooperative Banks

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ABSTRACT

This paper aims at analyzing credit quality characteristics of supervised Italian Mutual Guarantee Credit Institutions (MGCI) supporting Small and Medium Enterprises (SMEs). The prevailing literature on this subject, mainly descriptive, highlights how informational asymmetries and geographical proximity are able to justify their double-intermediation effect. Our study instead focuses on supervised MGCI and provides evidence on the determinants of impaired guarantees in the current deteriorated economic environment. Moreover, we compare the performance experienced by both MGCI and Cooperative Banks (CBs) in order to assess whether there are differences in terms of product, risk and portfolio management variances. Furthermore, we analyze the geographical distribution within these intermediaries to control for territorial biases. We provide evidence that the impairments of MGCI are positively related with the intermediaries' size and negatively with the regulatory capital. On the other hand, the CBs' non-performing loans are highly dependent on net loan interest income. Our results show a difference in the credit portfolio quality between the two types of intermediaries operating in the same region but only for the year 2011. Finally, we show that portfolio quality is strongly influenced by the geographical area in which intermediaries are established only for CBs.

JEL classification: G01, G21, G23

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1. Introduction and literature review

Mutual guarantee credit institutions (MGCI) are financial intermediaries issuing mainly or exclusively credit guarantees as collateral to loans received from their members, which usually are Small and Medium Enterprises (SMEs). Their business model avails from mutuality, leverage of own funds and risk pooling mechanisms to enhance credit standing and capacity or reducing lending costs for associated firms.

This double intermediation can reduce information asymmetries in principal-agent transactions, extending to phenomena such as adverse selection and moral hazard (Arrow, 1963; Akerloff, 1970; Bester, 1985). In particular, collateral is a potential substitute for higher interest rates required from riskier projects (Stiglitz and Weiss, 1981), despite at the same time less risky firms achieving higher lending levels could experience greater collateral needs (Chan e Kanastas, 1985; Besanko and Takor, 1987a and 1987b; Bester, 1987).

The informational advantage of MGCI stems mainly from geographical and dimensional proximity to SMEs, leading to a higher competence in incorporating qualitative and 'soft' information than bigger banks. The related positive signalling (Leland and Pyle, 1977; Ross, 1977), peer monitoring (Varian, 1990; Stiglitz, 1991) and relationship lending effects (Berger, 1999; Boot, 2000; Elyasiani and Goldberg, 2004) are especially needed by small economic operators, usually expressing lower levels of informational transparency. Furthermore, despite adopting different business models around the world (Beck *et al.*, 2010), MGCI are able to intercept and leverage public funds to enhance SMEs lending, although criticism emerged when assessing their outcome (Arping *et al.*, 2010). Finally, mutual banking entities, directly comparable with MGCI, present strong efficiency and operating correlations with a number of variables describing their reference geographical area (Fiordelisi and Mare, 2011).

MGCI can play an even more important role nowadays for two reasons. Firstly, by increasing liquidity to higher quality firms, thus promoting economic development during recessions, despite mutual guarantees are less likely to reduce moral hazard than other sources of collateral (Honoah, 2010). Secondly, banking approach on credit scrutiny favours statutable information (as opposed, f.i. to quality of reference markets', managerial and human resources), whereas credit risks produce highly pro-cyclical and adverse effects on capital allocation and supervision. Consider, for instance, the combined effect of quantitative easing measures, increasing capital charges due to non-performing loans and favourable credit risk and liquidity risk weights placed on public debt. During crises, this could increase risk concentrations and enhance a credit crunch (Cornett *et al.*, 2011; Hyun and Rhee, 2011; Rosch and Kaserer, 2013).

Several empirical studies analyse collateral effects on credit features and rationing, arguing that MGCI are able to increase loan levels and reducing their costs (Zecchini and Ventura,

2007; Cowling, 2010), as well as acting as a sorting device (Busetta and Zazzaro, 2012; Columba *et al.*, 2010). Most studies analysed micro-data at the firm level or macro-economic variables, whereas few considered extensively information at the MGCI level. Therefore, we have identified a few areas that would require additional research and that inspired this paper.

Few studies examine differences between direct and unsecured loans in terms of funding costs and the effects of mutual guarantees on insolvency risks. Beck *et al.* (2010) found a strong correlation between public funding and default rates of MGCI members. Busetta and Zazzaro (2012) provide evidence that members of MGCI experience lower default rates than non-members, especially in developing and riskier geographical areas. Bartoli *et al.* (2013) debate on their higher financial equilibrium, especially for median ratings and newer transactions.

Another area worth researching involves differences emerging from MGCI business models or their legal/supervisory status, as well as from guarantees in influencing credit risk mitigation effects. Columba *et al.* (2010) base their analysis on bank overdrafts of micro firms, finding that larger MGCI have limited positive effects and that their members express better credit standing and recovery rates on recallable credit lines.

Furthermore, limited literature exposes the different effects that MGCI guarantees could produce on either losses given default (LGDs) and default probabilities (PD), depending on banking rating systems. Cowling and Mitchel (2003) analyzed guarantee schemes' effects on recovery rates for SMEs, finding that financing working capital and limited liability firms leads to higher default rates and smaller survival durations. Cardone-Riportella *et al.* (2013) find that, for Spanish firms, the effect of guarantees on SME's risk premium depends on the values taken by credit variables of MGCI, in particular the PD, also stressing the importance of MGCI's creditworthiness.

On the other hand, data collection from MGCI's own financial reporting is controversial, due to its poorer quality and lower homogeneity: in this area most part of existing literature mainly focuses on describing this specialized market (f.i. De Vicentiis, 2012). A further criticality in analyzing these intermediaries consists in the fact that non-performing loans are signaled more quickly by banks, whereas MGCI require guarantees' enforcement before recognizing its impact: this shifting effect could lead to under- or over-estimating MGCI's portfolio quality, depending on the timing of the assessment. In this regard, Mistrulli and Vacca (2011) provide evidence that lower loan costs required from MGCI members are associated with a higher probability of non-performing, arguing that riskier firms have more incentives to participate in a mutual scheme.

We are not aware, to our best knowledge, of studies providing empirical analysis and testing credits quality and its determinants for MGCI by using accounting data. However, MGCI's own data could increase understanding their role in promoting economic growth as well

as its constraints (capital requirements, size, cost-efficiency, etc.), thus with significant implications for operators, academics and policymakers.

We believe that the Italian market is an interesting testing ground for several reasons. Firstly, Italian MGCI have a significantly long history, dating back to 1960s, and are closely linked with an economic system strongly dependent on banking credit: Italian SMEs account for 99.9% of all firms, whereas 94.6% employ less than 10 people (EC, 2012). Their informational opacity adds to reasons for having smaller financial intermediaries, including MGCI. Moreover, major players in this market (f.i. with total guarantees issued exceeding 75 millions of Euros) are supervised as banks (Basel prudential supervision) and are subject to enhanced disclosure and accounting requirements (IAS/IFRS). Finally, the last national reform aiming at promoting their contribution to economic growth was enforced in 2010, but its incentives towards solidity and efficiency started producing results only recently (Baldinelli, 2011), suggesting more research on recent financial data.

Therefore, we decided to analyze Italian MGCI focusing on recent accounting information and to carry out a comparison with other financial intermediaries, in order to highlight any weaknesses and constraints that may limit their role in the promotion of economic growth. In particular, we focus on credit impairments of supervised MGCI and Cooperative Banks (CBs), to test whether there are differences in the comparison between these two intermediaries, similar in many respects. In fact, their client approach and segment serviced is quite similar (SMEs), their dimensional and geographical differentiation is comparable and they fall within the scope of the same supervisory and transparency frameworks.

We aim at testing differences deriving from technical and legal status of credit issued (loans instead of guarantees), including their management effects (e.g. cost of funding), as well as a different approach in evaluating the credit standing of clients (f.i. individual assessment instead of risk pooling mechanisms). We expect that the relative amount of impaired guarantees likely depends on the size of MGCI, the pricing practices, the regulatory capital strength and the operating expenses. Moreover, a similar analysis on CBs could test for significant differences stemming from product, risk and portfolio management variances. Finally, we expect that geographical effects have explanatory power over credit portfolio quality in both MGCI and CBs.

Our research aims at providing new evidence enriching the current debate on efficacy of this specific sector of financial intermediation in promoting economic growth, as well as contributing to controversial aspects involving the efficient use of public funds to enhance SMEs finance.

The rest of the paper is organized as follows. Section 2 describes the data and the research methodology. Section 3 presents our main empirical results. Section 4 provides our final remarks and concludes the paper.

2. Data and methodology

In order to test our hypothesis we constructed two datasets. The first is based on data collected from MGCI's annual reports and notes to the accounts of IAS/IFRS compliant statements for 2011 and 2012. This sample is composed of all MGCI's licensed and supervised by Bank of Italy as financial intermediaries at the end of both reporting years. In particular, 63 MGCI's are authorized to function as supervised intermediaries in June 2013 of which 5 were licensed in 2013, 7 in 2012; 8 in 2011; 35 in 2010 and 8 in 2009¹. Therefore, due to the current availability of annual reports up to 2012 and the aforementioned reform process started in 2010, we started building our sample focusing on 51 MGCI's for 2011 and 58 for 2012. We then excluded 4 MGCI's as second level guarantee institutions² and two other institutions due to lack of documentation for 2012. Thus, our final sample consists of 47 intermediaries for 2011 and 52 for 2012.

It is worth mentioning that in several MGCI's 2012 annual reports some figures related to the year 2011 have been restated. Therefore, we decided to update 2011's data according to the 2012's estimation in order to increase the uniformity and the quality of our dataset.

Table 1 and Table 2 show descriptive statistics for our sample of MGCI's broken down geographically for both the years 2011 and 2012. Our analysis does not include other sources of revenues, such as interest income and contributions from the public sector (although essential for the assessment of this industry) due to the heterogeneity in recording and disclosing information on public contributions in MGCI's annual reports.

<< Insert Table 1 and Table 2 about here >>

Focusing on the 2011 sub-sample, we register 13 MGCI's based in the North-West (NW) of Italy, 15 in the North-East (NE), 9 in the Centre (C) and 10 in the South (S). The average level of guarantees issued is over 316 million of which over 39 million are impaired. Comparing these values with the values of the median, quartiles and standard deviations, emerges the heterogeneity of size within the sample of MGCI's: there are many small entities that lower the

¹ It should be noted that this segmentation is slightly different from the list provided by Bank of Italy, currently listing 62 entities, since two MGCI merged with effective date 1/1/2013, hence still appearing in our analysis for 2012 as a separate entity.

² Entities whose members are other MGCI's. This intermediaries show important differences in their business model hence, to maintain a higher level of homogeneity, we excluded them from our dataset.

average level of the issued guarantees (e.g. 17% of MGCI's show an amount of guarantees greater than 300 million). This heterogeneity is confirmed also geographically, since smaller institutions are mostly based in Central and Southern Italy. On the other hand, North-Eastern institutions show significantly lower levels of guarantees but with relatively high levels of regulatory capital. Direct fees and commissions are slightly greater than operating expenses (around 3.4 million). The average level of total regulatory capital accounts for 23.3 million whereas average associated firms are nearly 14.000. Moreover, the average incidence of impaired guarantees on total guarantees is 8.76% with a minimum of 0.32% and a maximum of 30.89%. From a geographical perspective, North-Western and Southern institutions show impairments slightly higher than the overall average. Moreover, Southern MGCI's report both the highest commissions and operating expenses on a relative basis.

Moving to 2012's statistics, Table 2 shows limited differences in the characteristics of institutions compared to the previous year. The average level of guarantees issued is slightly over 275 million, showing a significant decline from 2011, of which over 47 million are impaired, increasing the 2011's statistics. The average relative level of impaired guarantees is therefore higher than in 2011 representing 11.20% of total guarantees. The average commission income (3.3 million) is slightly lower than in 2011, whereas both average regulatory capital and average associated firms are influenced by new entrants in the 2012 sample characterized by a small size (22.6 million and 13.000 respectively). In the light of these negligible differences, breaking down geographically our sample shows similar statistics to those related to 2011.

With the aim of investigating the difference and the determinants of the quality of the MGCI's loan portfolio, we construct a comparative sample consisting of Italian CBs for both years of observation. We use Bankscope as the source of data. The sample of the year 2011 is composed by all Italian CBs which were active in December 2011 (457 items). We exclude 25 CBs because of incomplete data. Therefore, our 2011 CBs dataset is composed of 432 units. Similarly, for the year 2012 we obtain a dataset of 279 units³. Table 3 and Table 4 present some descriptive statistics of this sample for 2011 and 2012, again divided geographically.

<< Insert Table 3 and Table 4 about here >>

The overall averages are higher than to those previously discussed concerning MGCI's due to the presence of some large credit institutions. However, looking at the median values, the two samples of intermediaries are more comparable. This regards both the median size of loan portfolios (nearly 231 and 324 million for 2011 and 2012 respectively) and the median level of

³ The difference in the sample size between 2011 and 2012 is due to the current unavailability of part of the 2012 data especially related to smaller entities. As data becomes available, this sample will be updated following the same process.

non-performing loans (21 million for 2011 and 34 million for 2012). Similar conclusions on dimensional and geographical heterogeneity can be achieved by looking at the quartiles and standard deviation.

Geographically, the average level of loans decreases considerably from north to south, whereas deterioration of credit quality increases, as shown by the average ratio between NPLs and total loans. At the same time, the incidence of net interest income and operating expenses on total loans increases significantly. Apparently, no clear geographical trend is associated to the ratio between regulatory capital and total loans. Limited differences emerge also by comparing our geographical clusters across 2011 and 2012, with the exception of an average increase in the share of NPLs.

Our work progresses focusing on credit quality, namely both the ratio of the MGCI's impaired guarantees on total guarantees and the ratio of CBs non-performing-loans on total loans. We investigate possible explanatory accounting variables by multiple regression analyses, in order to capture the potential impact on future economic performance, credit capacity and stability. In particular, in the case of MGCI's, the regression is run with the ratio of impaired and total guarantees as the dependent variable. As explanatory variables, firstly we control for the size of the intermediary using, as a proxy, the level of total guarantees in logarithmic terms. We also test the ratio between direct commissions and total guarantees in order to verify if the pricing of guarantees is risk-consistent for assisted members; in other words, we expect to find higher commissioning levels where higher amounts of impairments are experienced. Moreover, we test the weight of total regulatory capital on guarantees, in order to verify if greater impairments are associated with greater capacity to absorb their impact. Finally, we control for the weight of operating expenses on guarantees to test if MGCI's are characterized by structures and fixed costs that affect their ability to correctly identify and select credit risks of assisted members. The mentioned variables are listed in Table 5.

<< Insert Table 5 about here >>

The cross-sectional analysis described for MGCI's is done by the estimation of the following regression equation for both years of investigation:

$$\text{NPG_GUAR} = b_0 + b_1 \text{SIZE} + b_2 \text{COMM_GUAR} + b_3 \text{TRC_GUAR} + b_4 \text{OPEXP_GUAR} + \varepsilon, \quad (1)$$

where b_n are the regression coefficients of variable n .

Similar regression analyses are applied to CBs where the dependent variable is the level of impaired to total loans. We test the following four independent variables: (1) size, as the total

loans in logarithmic terms; (2) net loan interest income on total loans, as a measure of pricing for credit risks; (3) total regulatory capital on total loans, and (4) operating expenses on total loans. We set to check if significant differences emerge in the explanatory power of these variables between the two sets of financial intermediaries. This would imply that the different pricing, product and managing models produce positive or negative effects on impairments, with important implications for the role of MGCI in fostering economic development. The aforementioned variables are listed in Table 6.

<< Insert Table 6 about here >>

As before, we test the following regression equation for both our datasets related to 2011 and 2012:

$$\text{NPL_LOANS} = b_0 + b_1 \text{SIZE} + b_2 \text{INT_LOANS} + b_3 \text{TRC_LOANS} + b_4 \text{OPEXP_LOANS} + \varepsilon_i \quad (2)$$

where b_n are the regression coefficients of variable n .

Moreover, we investigate whether there is a statistically significant difference on credit quality of MGCI with respect to CBs. With this purpose, we homogeneously associate each MGCI to the group of CBs based in the same Italian region. In particular, for each MGCI we calculate the difference between NPG_GUAR and the average NPL_LOANS of the corresponding CBs. Then, we average this vector of differences and test its statistical significance.

Finally, we verify whether the differences in the mean values of the ratio of impaired on total guarantees/loans in different geographic areas are statistically significant. Therefore, we run the following dummy variable regression model:

$$Y_i = b_0 + b_1 D_{1i} + b_2 D_{2i} + b_3 D_{3i} + \varepsilon_i \quad (3)$$

where Y_i is the NPG_GUAR of the MGCI $_i$ or the NPL_LOANS of the CB $_i$, D_{1i} is coded 1 for Centre and 0 otherwise, D_{2i} is coded 1 for North-East and 0 otherwise and D_{3i} is coded 1 for North-West and 0 otherwise. b_0 is the mean for South. Parameters b_1 , b_2 and b_3 allow us to check whether the Centre, the North East and the North West Italy are significantly different from the South, respectively. This is a common issue of several studies involving MGCI and CBs in Italy (f.i. Baldinelli, 2011; Busetta and Zazzaro, 2012), that we wanted to verify with more recent data.

3. Empirical Results

Table 7 and Table 8 present the results of the regression analyses on the credit portfolio quality of MGCI and CBs respectively.

<< Insert Table 7 and 8 about here >>

Our findings show that the size of intermediaries is positively related to the portfolio credit quality: in the case of MGCI the variable is statistically significant in both years while for CBs only for 2012⁴. This means that both intermediaries experience scale diseconomies in terms of credit deterioration. We argue that, for MGCI, this finding could imply offsetting positive effects of scale economies with negative consequences of losing their “soft” informational advantage on assisted members due to geographical proximity (Honohan, 2010; Baldinelli, 2011; Bartoli *et al.*, 2013). For CBs, instead, this mechanism seems unclearly weighting positive and negative effects of increases in size, hence leading to lower levels of statistical significance of this variable.

On the other hand, a difference between the two types of intermediaries is found by looking at the results of the variables related to the pricing of loan portfolios: the ratio between commissions to guarantees is not statistically significant in the case of MGCI while the ratio between net interest income on loans is positively related and statistically significant (1% level) in the case of CBs in both the years. This finding is consistent with existing literature that attributes to MGCI a lower level of risk-based pricing, namely the ability of requiring higher commission levels to riskier members (Baldinelli, 2011; Mistrulli and Vacca, 2011). On the other hand, CBs require higher returns from riskier customers.

The variable regulatory capital is negatively related to impaired guarantees and statistically significant (10% level in 2011 and 5% in 2012) in the case of MGCI while is not significant in the case of CBs. These findings are not surprising: CBs demonstrate a greater ability of risk-based pricing than MGCI, which reduces the impact of impairments on profits and therefore, on their level of capital. However, in our opinion, this explanation is not exhaustive because a higher level of regulatory capital on guarantees is usually associated with a lower efficiency in allocating resources or with a competitive disadvantage that does not allow for a full depletion of the intermediary’s credit capacity. It is also plausible that, due to the current financial and

⁴ We underline that, as mentioned above, our sample of CBs is currently incomplete for 2012 due to the delay in updates to our data source. In particular, smaller entities are underrepresented, leading to a significance of size for 2012. We expect, as our sample of CBs is completed, to lose this significance also for 2012. Moreover, to avoid survivorship biases we included in our sample of CBs also inactive entities that present smaller dimension and greater impairment levels: excluding these entities, as we did for robustness checks, leads to significance of size for these intermediaries also for 2011.

economic conditions, difficulties in raising capital lead to a weaker relation between the increasing deterioration of credit quality of portfolios and the need for augmenting regulatory capital.

We also test several other reasonable accounting explanation variables (f.i. number of members, public funds and contributions) but without finding any significance. Our analysis does not consider MGCI's investments, mainly represented by government bonds. Due to financial turmoil, if liquidity constraints or significant unrealised losses impact these assets, the capacity of some MGCI's to increase the level of guarantees issued could be reduced, potentially explaining a greater level of regulatory capital compared to total outstanding guarantees.

Finally, the relation between impairments and operating expenses is positive and statistically significant only for MGCI's and in 2011. This is somehow in contrast with the expectation that, due to more thorough and costly credit valuation, lower levels of deterioration in credit quality should be expected. It may be argued that, due to a lower level of efficiency, risk selection and monitoring ability for MGCI's are not strongly related with costs due to human resources, which for these intermediaries should mostly involve these two activities. It is worth highlighting that the non-significance of the result related to CBs, must be interpreted considering that banking operating expenses are not related only to loan management, but extend to other lines of business and processes and, from an accounting perspective, are more difficult to disentangle.

Focusing on the analysis of the difference between the NPG_GUAR ratios and the matching regional average NPL_LOANS ratios, we find that, on average, it is negative in both years (-3.77% in 2011 and -1.24% in 2012) but statistically significant ($t=-3.54$) only in relation to 2011. This result could be interpreted as the economic conditions of a specific geographical area impact the local two types of intermediaries in a different way. However, for this difference, our data show a lower average value with a higher variance in 2012, leading to a loss of significance. In other words, in 2012 there is no statistically significant difference between credit quality of portfolios of the two intermediaries due to regional economic trends.

Finally, Table 9 shows the results of the geographical distribution of the difference between the impairment levels of the two intermediaries.

<< Insert Table 9 about here >>

We find that the geographical location of the intermediary influences the level of impairments especially in the case of CBs confirming the deterioration of credit quality associated with specific areas, especially towards Southern Italy. Despite a better performance in risk-based pricing, as mentioned above, CBs experience a stronger influence on impairment

levels due to local market conditions. In the case of MGCI, there is a statistical difference only considering the NE. In particular, as noted above, we attribute this significance to a limited number of entities that materially restated 2011's values in their 2012's annual reports that had a greater share in this geographical area. We argue that an efficient selection of conditions for issuing guarantees is relevant despite the average quality expressed by a specific geographical area; in other words, products' features and risk management procedures are able to strongly influence the impact of external economic conditions on MGCI, whereas for CBs credit risks are more dependent on local issues. More evidence is required, however, to attribute clearly these effects to product's or risk management variances between MGCI and CBs, in particular considering potential material lags in recording impairments in the former due to the different nature of their credit intermediation, rather than attribute them only to products' and risk management's features.

4. **Concluding remarks**

We examined the accounting data of the supervised Italian Mutual Guarantees Credit Institutions for a comparison with a sample of Italian Cooperative Banks. We mainly focused on the ratio of the impaired both on the total guarantees and on the total loans for the MGCI and the CBs respectively. We tested some reasonable explanatory variables of these ratios running two regression analyses.

The first shows, as dependent variable, the ratio of the impaired guarantees on total guarantees. Our results highlight a negative and significant relation with the total regulatory capital on the total loans. Moreover, the dependent variable is positively related to the MGCI size, operating expenses (personnel and other administrative expenses), yet with a partial statistical significance.

The second analysis is focused on the quality of the credit portfolio of the CBs. In this case, our results indicate, as explanatory variables, the size of the bank (in terms of total loans) and the interest income on loans related to the total loans amount. We argue that these results provide evidence of scale diseconomies in terms of credit deterioration that is stronger for CBs than MGCI, and at the same time that the two intermediaries differ materially in terms of pricing credit risks and operating cost-efficiently.

We calculated the difference between the quality of the credit portfolios of the two intermediaries, matched by geographical area, and verified its statistical significance only for 2011.

Finally, we investigated if the quality of the credit portfolio for both the MGCI and the CBs is influenced by their location. While the activity of the MGCI seems not to be influenced

by the economic environment, CBs experience higher NPL moving to the south of the country and this result is supported by a high level of statistical significance.

We believe that our results can be a driver for further research on this topic, which is extremely important when one considers the recent credit crunch and the role of MGCI's for economic growth. Unfortunately, despite their influence in promoting SME financing, the number of supervised MGCI's only recently achieved sufficiency for building a consistent IAS/IFRS dataset. On the other hand, unsupervised MGCI's are greater in numbers but still awaiting for regulatory innovations after 2010's reform: they present accounting data that is inadequate both in depth and quality. It follows that the limited size of our sample may have partially affected our empirical results.

Further investigation should focus on the constraints and determinants of MGCI's performance and capability to enhance a more efficient capital allocation, especially by considering the role of public funding and contributions. Furthermore, it would be also interesting to test if different and less pro-cyclical supervisory frameworks (f.i. testing similarities with the insurance sector) could, at the same time, preserve this sector's stability and foster a greater capacity in promoting bank lending during crises.

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Table 1 Descriptive statistics of Italian Mutual Guarantees Institutions (year 2011)

This table shows some descriptive statistics for our sample of MGCI. Guarantees measure the total nominal amount of outstanding commitments issued, of which a separate figure for the impaired amount is provided. Fees and commissions measure the gross income due to revenues directly charged on guarantees issued to MGCI members, expressed by economic competence. Operating expenses relate to administrative expenses and human resources costs. Total regulatory capital includes both Tier 1 and Tier 2 amounts as of Basel 2 requirements.

The geographical distribution is the typical statistical reference for national accounts provided by Istat. North-West (NW) includes Lombardia, Piemonte, Liguria, Valle d'Aosta. North-East (NE) includes Veneto, Friuli Venezia Giulia, Trentino Alto Adige, Emilia Romagna. Centre (C) includes Toscana, Lazio, Abruzzo, Marche, Umbria. South (S) includes Sicilia, Sardegna, Puglia, Basilicata, Campania, Molise, Calabria.

Sample of MGCI year 2011 (No. 47)	Mean	SD	Minimum	Maximum	Q1	Q2	Q3	Mean			
								NW (No.13)	NE (No. 14)	C (No.9)	S (No. 10)
Guarantees (mln €)	316.3	603.8	56.2	3734.3	105.9	142.4	216.5	498.0	209.6	439.5	129.1
Impaired Guarantees (mln €)	39.2	113.8	0.6	631.3	5.8	11.6	19.7	60.4	13.4	79.6	14.2
Fees and commissions (mln €)	3.4	5.6	0.6	35.5	1.4	2.1	3.5	5.5	2.0	4.2	2.3
Operating expenses (mln €)	3.3	4.2	0.7	28.6	1.3	2.2	3.4	4.9	2.6	3.3	2.1
Total Regulatory Capital (mln €)	23.3	20.4	4.7	101.2	12.0	18.9	25.6	20.1	26.6	33.9	12.9
Number of members	14017	17604	895	74223	3192	6662	16150	16038	14241	21536	5036
<i>Impaired Guarantees / Guarantees (%)</i>	8.76%	6.49%	0.32%	30.89%	4.18%	8.12%	11.08%	12.12%	6.40%	18.11%	10.98%
<i>Fees and commissions / Guarantees (%)</i>	1.36%	0.52%	0.24%	2.34%	1.07%	1.33%	1.82%	1.10%	0.95%	0.95%	1.75%
<i>Operating expenses / Guarantees (%)</i>	1.41%	0.54%	0.33%	2.56%	0.98%	1.37%	1.70%	0.99%	1.25%	0.76%	1.66%
<i>Total Regulatory Capital / Guarantees (%)</i>	11.90%	8.70%	1.52%	53.98%	7.15%	9.50%	13.08%	4.03%	12.68%	7.72%	10.01%

Table 2 Descriptive statistics of Italian Mutual Guarantees Institutions (year 2012)

This table shows some descriptive statistics for our sample of MGCI. Guarantees measure the total nominal amount of outstanding commitments issued, of which a separate figure for the impaired amount is provided. Fees and commissions measure the gross income due to revenues directly charged on guarantees issued to MGCI members, expressed by economic competence. Operating expenses relate to administrative expenses and human resources costs. Total regulatory capital includes both Tier 1 and Tier 2 amounts as of Basel 2 requirements.

The geographical distribution is the typical statistical reference for national accounts provided by Istat. North-West (NW) includes Lombardia, Piemonte, Liguria, Valle d'Aosta. North-East (NE) includes Veneto, Friuli Venezia Giulia, Trentino Alto Adige, Emilia Romagna. Centre (C) includes Toscana, Lazio, Abruzzo, Marche, Umbria. South (S) includes Sicilia, Sardegna, Puglia, Basilicata, Campania, Molise, Calabria.

Sample of MGCI year 2012 (No.52)	Mean	SD	Minimum	Maximum	Q1	Q2	Q3	Mean			
								NW (No.12)	NE (No. 16)	C (No.13)	S (No. 11)
Guarantees (mln €)	275.2	549.7	52.9	3602.2	93.1	127.2	191.8	486.9	191.6	312.7	121.4
Impaired Guarantees (mln €)	47.3	148.6	0.5	835.8	7.8	12.7	21.8	97.2	14.9	66.9	17.0
Fees and commissions (mln €)	3.3	5.5	0.5	37.7	1.3	2.0	3.0	5.8	2.0	3.5	2.1
Operating expenses (mln €)	3.2	4.4	0.7	31.7	1.4	2.2	3.4	5.5	2.7	2.8	2.2
Total Regulatory Capital (mln €)	22.6	19.8	5.0	95.5	10.4	16.3	26.2	20.0	27.6	27.0	13.2
Number of members	13191	16848	751	76385	3260	6828	14526	14320	14426	17223	5763
<i>Impaired Guarantees / Guarantees (%)</i>	11.20%	7.72%	0.40%	39.44%	6.00%	9.60%	13.37%	19.96%	7.77%	21.39%	13.97%
<i>Fees and commissions / Guarantees (%)</i>	1.55%	0.76%	0.24%	5.39%	1.11%	1.45%	1.92%	1.19%	1.05%	1.11%	1.77%
<i>Operating expenses / Guarantees (%)</i>	1.64%	0.59%	0.36%	2.83%	1.19%	1.60%	2.05%	1.12%	1.39%	0.90%	1.80%
<i>Total Regulatory Capital / Guarantees (%)</i>	13.32%	9.44%	1.39%	61.99%	8.40%	10.66%	15.64%	4.10%	14.38%	8.64%	10.91%

Table 3 Descriptive statistics of Italian Cooperative Banks (year 2011)

This table shows some descriptive statistics of our sample of CBs for the year 2011. Total assets measure the total amount of assets as of the entitie’s annual report. Loans express the total amount of direct credit issued, of which the separate figure for the impaired amount is provided. Operating expenses relate to administrative expenses and human resources costs. Total regulatory capital includes both Tier 1 and Tier 2 amounts as of Basel 2 requirements. The geographical background is the typical statistical reference for national accounts provided by Istat. North-West (NW) includes Lombardia, Piemonte, Liguria, Valle d’Aosta. North-East (NE) includes Veneto, Friuli Venezia Giulia, Trentino Alto Adige, Emilia Romagna. Centre (C) includes Toscana, Lazio, Abruzzo, Marche, Umbria. South (S) includes Sicilia, Sardegna, Puglia, Basilicata, Campania, Molise, Calabria.

Sample of Cooperative Banks (No. 432)	Mean	SD	Minimum	Maximum	Q1	Q2	Q3	Mean			
								NW (No.57)	NE (No.154)	C (No.113)	S (No.108)
Total Assets (mln €)	1,815	10,290	24.0	134,127	136	326	640	5,054	1,873	1,408	451
Loans (mln €)	1,349	7,829	11.1	102,834	98	231	471	3,936	1,387	972	324
Impaired Loans (mln €)	123	730	0.2	10,866	9	21	48	279	139	105	37
Operating expenses (mln €)	36	209	0.2	2,925	4	7	13	104	35	27	12
Total Regulatory Capital (mln €)	164	892	3.1	12,282	17	37	69	488	158	118	49
<i>Impaired loans / Loans (%)</i>	10.01	5.21	0.64	36.60	6.56	9.05	12.19	8.02	9.20	9.51	12.76
<i>Interest Income on Loans / Loans (%)</i>	4.36	0.95	0.48	7.71	3.68	4.16	4.89	3.85	3.74	4.52	5.35
<i>Operating expenses / Loans (%)</i>	3.36	1.31	0.55	13.14	2.54	2.54	2.54	2.75	2.81	3.27	4.58
<i>Total Regulatory Capital / Loans (%)</i>	16.97	8.74	6.88	135.14	12.30	12.30	12.30	15.34	16.99	14.24	20.65

Table 4 Descriptive statistics of Italian Cooperative Banks (year 2012)

This table shows some descriptive statistics of our sample of CBs for the year 2012. Total assets measure the total amount of assets as of the entitie's annual report. Loans express the total amount of direct credit issued, of which the separate figure for the impaired amount is provided. Operating expenses relate to administrative expenses and human resources costs. Total regulatory capital includes both Tier 1 and Tier 2 amounts as of Basel 2 requirements. The geographical background is the typical statistical reference for national accounts provided by Istat. North-West (NW) includes Lombardia, Piemonte, Liguria, Valle d'Aosta. North-East (NE) includes Veneto, Friuli Venezia Giulia, Trentino Alto Adige, Emilia Romagna. Centre (C) includes Toscana, Lazio, Abruzzo, Marche, Umbria. South (S) includes Sicilia, Sardegna, Puglia, Basilicata, Campania, Molise, Calabria.

Sample of Cooperative Banks (No.279)	Mean	SD	Minimum	Maximum	Q1	Q2	Q3	Mean			
								NW (No.54)	NE (No.71)	C (No.87)	S (No.67)
Total Assets (mln €)	2,833	13,007	28.7	132,434	241	478	930	5,575	3,939	1,995	540
Loans (mln €)	1,953	9,430	14.8	96,223	142	324	647	4,063	2,799	1,179	360
Impaired Loans (mln €)	226	1,109	0.7	12,729	16	34	74	394	344	160	49
Operating expenses (mln €)	50	234	0.8	2,432	5	9	17	102	67	33	13
Total Regulatory Capital (mln €)	223	1,012	3.7	12,204	24	46	91	512	269	138	54
<i>Impaired loans / Loans (%)</i>	12.29	5.34	1.98	35.35	8.71	11.56	15.01	10.79	11.86	12.03	14.30
<i>Interest Income on Loans / Loans (%)</i>	4.47	0.86	1.88	7.82	3.83	4.34	4.98	3.97	3.84	4.69	5.23
<i>Operating expenses / Loans (%)</i>	3.38	1.22	1.48	8.94	2.53	2.53	2.53	2.74	2.73	3.32	4.67
<i>Total Regulatory Capital / Loans (%)</i>	16.34	6.61	6.73	60.25	12.33	12.33	12.33	15.30	14.33	14.52	21.65

Table 5 Mutual Guarantee Credit Institutions: definition of variables

Variable	Definition
NPG_GUAR	Impaired Guarantees /Guarantees
SIZE	Total Guarantees (in logarithmic specification)
COMM_GUAR	Commissions/Guarantees
TRC_GUAR	Total Regulatory Capital / Guarantees
OPEXP_GUAR	Operating expenses/ Guarantees

Table 6 Cooperative Banks: definition of variables

Variable	Definition
NPL_LOANS	Impaired Loans / Loans
SIZE	Total loans (in logarithmic specification)
INT_LOANS	Interest Income on Loans / Loans
TRC_LOANS	Total Regulatory Capital / Loans
OPEXP_LOANS	Operating expenses / Loans

Table 7 Regression test on Impaired Guarantees / Guarantees

This table shows the results of the regression analysis related to the sample of MGCI. The dependent variable is the ratio between impaired and total guarantees (NPG_GUAR). The explanatory variables are the logarithm of Total Guarantees (SIZE), the commission income on total guarantees (COMM_GUAR), the ratio between regulatory capital and total guarantees (TRC_GUAR), and the incidence of operational expenses on total guarantees (OPEXP_GUAR).

* Significant at the 10% level; ** Significant at the 5% level.

	No. Obs.	b_0	SIZE	COMM_GUAR	TRC_GUAR	OPEXP_GUAR
NPG_GUAR 2011	47	-0.350 (0.173)	0.022 * (0.078)	-3.031 (0.202)	-0.214 * (0.069)	-5.798 ** (0.016)
NPG_GUAR 2012	52	-0.474 (0.125)	0.031 ** (0.043)	-0.620 (0.697)	-0.262 ** (0.027)	-3.236 (0.154)

Table 8 Regression test on Impaired Loans / Loans

This table shows the results of the regression analysis related to the sample of Cooperative banks. The dependent variable is the ratio between impaired and total loans (NPL_LOANS). The explanatory variables are the logarithm of Total Loans (SIZE), the net interest income on total loans (INT_LOANS), the ratio between regulatory capital and total loans (TRC_LOANS) and the incidence of operational expenses on total loans (OPEXP_LOANS).

** Significant at the 5% level; *** Significant at the 1% level.

	No. Obs.	b_0	SIZE	INT_LOANS	TRC_LOANS	OPEXP_LOANS
NPL_LOANS 2011	432	-0.490 (0.892)	0.247 (0.207)	1.630 *** (0.001)	-0.025 (0.528)	0.222 (0.475)
NPL_LOANS 2012	279	-3.855 (0.424)	0.556 ** (0.027)	1.993 *** (0.001)	0.032 (0.691)	-0.107 (0.837)

Table 9 Geographical distribution

This table shows the results of the dummy variable regression model related to the geographical distribution of the variables Impaired Guarantees / Total Guarantees and Impaired Loans / Total Loans. The intercept coefficient represents the mean value for the intermediaries based in the South (our reference group). The coefficients b_1 , b_2 and b_3 are the differences between of the Central, North Eastern, North Western and the Southern intermediaries the mean value, respectively.

** Significant at the 5% level ; *** Significant at the 1% level.

	No. Obs.	b_0	b_1	b_2	b_3
<i>Panel A: year 2011</i>					
NPG_GUAR 2011	47	0.112 *** (0.001)	-0.019 (0.518)	-0.058 ** (0.029)	-0.009 (0.718)
NPL_LOANS 2011	432	12.76 *** (0.001)	-3.26 *** (0.001)	-3.56 *** (0.001)	-4.74 *** (0.001)
<i>Panel B: year 2012</i>					
NPG_GUAR 2012	52	0.135 *** (0.001)	-0.023 (0.450)	-0.070 ** (0.0178)	0.003 (0.921)
NPL_LOANS 2012	279	14.30 *** (0.001)	-2.27 *** (0.008)	-2.44 *** (0.007)	-3.50 *** (0.001)