

## PUBLIC CREDIT GUARANTEES AND SME FINANCE

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Difficulties in finding appropriate financing weigh heavily on the ability to grow of Italy's small enterprises, due to their narrow equity base and limited access to credit markets. The State Fund for guarantees to SMEs is one of the instruments used to overcome such difficulties. This essay provides the first evaluation of the impact of this Fund in terms of ability to increase the availability of credit, reduction of borrowing costs and financial sustainability. Extensive econometric tests confirm the presence of a causal relationship between the State guarantee and the higher debt of guaranteed firms, as well as their lower debt cost. The guarantee instrument has proved to be an effective instrument, although it has had a limited economic impact because of its narrow capital base and selective approach.

Key words: SME, State-fund guarantee, credit rationing, causal effect, difference-in-difference.  
JEL classification: G14; G21; G28

### Non-technical summary

Is State intervention or a State-funded guarantee scheme a necessary and effective instrument to promote lending to small firms?

In the economic literature there is no consensus on the answers to these questions. Theoretical and empirical studies lead to different views. On the one side, it is argued that credit guarantee schemes (CGSs) are costly instruments that pose problems of financial sustainability. At the same time, benefits have still to be proved, as there is no conclusive evidence about the contention that they allow additional lending to financially constrained SMEs. In any case, they should not be viewed as a substitute for correcting financial market or legal system failures that are at the source of credit rationing.

On the other side, CGSs are seen as capable of opening new access to credit, although they can be effective only under a well-specified set of conditions about their operations. Against this background, this essay investigates whether Italy's State-funded guarantee scheme for SMEs (SGS) is an effective means to overcome the main difficulties faced by small firms in accessing the bank credit market. This means assessing whether SGS is able to increase credit access for SMEs, to reduce credit cost and to achieve financial sustainability.

In spite of its modest budget, the Fund has a strong potential to direct credit to certain disadvantaged sectors and enterprises that deserve credit, since it is run according to tight criteria aimed at reducing the risk of resource misuse. In particular, eligibility criteria are such as to greatly limit the percentage of guarantee applications that are rejected on merit grounds. On average, 83% of all applications were accepted, and the acceptance rate was even higher in 2004 (93%).

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Extensive econometric tests have been carried out by comparing the performance of the SMEs that benefited from this guarantee with a control group made out of a sample of comparable firms. The findings confirm the presence of a causal relationship between the State guarantee and the higher debt of guaranteed firms, as well as their lower debt cost. This analysis lends support to the contention that such a scheme had a positive, albeit limited, impact.

### 1. The financing problem of SMEs

Among EU countries, Italy is the one with the largest share of small- and medium-sized enterprises (SME) in its economic system<sup>1</sup>. In 2003, firms with less than 20 employees accounted for 98% of the total of industry and services sectors, while contributing by 59.5% to Italy's employment and by 43.5% to its production in terms of value added, Istat (2005).

Fragmentation of the enterprise system is a long standing feature of the Italian economy, a feature that has not declined in recent decades, OECD (2004), Confindustria (2005). In spite of some upward mobility of firms along the size classes, there has been very little change in the share of firms with less than 50 employees between 1996 and 2003<sup>2</sup>, Istat (2001, 2005).

Many factors account for the tendency of Italian firms to remain small. According to surveys of entrepreneurs, Federconfidi (2004), Confapi (2001), shortage of bank financing is one of the stumbling blocks to growth, given small firms' narrow equity base. In fact, small firms show on average a ratio of financial debt to total financial debt plus equity (59% in 2003) that is higher than those of medium- and large-size enterprises. Likewise, with respect to financial debt, borrowing from banks represents the largest portion (74%), still higher than that of the other firm classes, Banca d'Italia (2005).

This evidence is consistent with a body of literature and empirical evidence showing that financial constraints are inversely related to firm size, and that the rate of growth of financially constrained SMEs is not independent from their initial size, Bagella-Becchetti-Caggese (2001), Becchetti-Trovato (2002). Start-up firms, young enterprises, smaller ones, innovative ones, in short all firms of small size, with fewer tangible assets and an uncertain track record are subject to much tighter financial constraints than other firms, especially, under the form of credit rationing by the banking system, Berger-Udell, 1998.

In contrast, evidence provided by the banking system seems to question the extent of credit rationing, although not its existence, Banca d'Italia (2006), Capitalia (2005).

Small business formation and growth actually bear heavily the impact of imperfections in bank credit markets. *Ex ante* asymmetric information between bank lenders and borrowers, together with agency problems related to the appropriate use of borrowed funds, lead to well known phenomena of credit rationing and higher interest charged to small business, as compared to larger firms.

Interest rate cannot often work as a screening device for selecting creditworthy small businesses, since information asymmetries leave enough room for adverse selection, i.e. selection of riskier borrowers, Stiglitz-Weiss, 1981. This is compounded by moral hazard, due to difficulties and costs involved in monitoring the behaviour of small borrowers, Vogel-Adams, 1997.

Apart from these market failures, access to credit may be denied just because the evaluation of small borrowers' creditworthiness does involve fixed costs that turn out to be generally high compared to the risk-adjusted return to the lender. Nor banks have a strong incentive to monitor a

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<sup>1</sup> The average number of employees per business in industry and services was less than 4 in Italy, vs. almost 8 in the EU15 in the year 2001 [Istat, 2004]. According to EU definition, that also applies to Italy, an enterprise is classified as small if it has less than 50 employees, annual sales not exceeding € 10 million, total balance sheet assets not higher than 10 million and is not controlled by a larger firm. The three quantitative ceilings for defining a medium sized enterprise are respectively 249 employees, € 50 million of annual sales and € 43 million of assets. Micro enterprises are those with less than 10 employees, and sales turnover and total assets not higher than € 2 million.

<sup>2</sup> In 2003, the share of small firms was 99.4%, the same percentage as in 1996. These firms provided 69.5% of total employment, against 71% in 1996.

small firm, when the latter splits its credit demand into small portions to tap several banks at the same time, Guelpa (2005). In other words, for smaller firms, there might actually be situations in which there is no market where to borrow.

Hence, in the presence of inefficient or incomplete credit markets, small firms have less chances to find the financial means to grow, and often to survive. On this ground, bank credit allocation ends up being far from an efficient one.

Under certain conditions the provision of collateral can lessen credit rationing and borrowing costs, allowing a better allocation of credit and investment in the economy, Coco 2000. This, however, depends on the working characteristics of the individual loan and deposit markets, Berger-Udell (1998), as well as on the effectiveness of legal procedures for loan recovery. Should a small firm be unable to post a collateral, or should the legal system be inadequate to protect creditor rights, SME's access to bank credit would be restricted.

The empirical evidence, *prima facie*, seems to confirm this conclusion. In Italy, 83% of bank loans to small enterprises are backed by guarantees, that mostly take the form of a real asset pledge (65% of bank loans). The relevance of guarantees is, instead, lower in lending to other enterprises (respectively, 72% and 56%), Banca d'Italia (2005).

Furthermore, the value of these guarantees is depressed by the length and cost of legal procedures, that make the amount of recovered credit value a small proportion of the original loan, Carmignani (2004). In these respects, Italy's position is far worse than the OECD average, World Bank (2005).

Can, however, the provision of outside guarantees, regardless whether real or personal<sup>3</sup>, be a means to overcome market imperfections and lack of inside collateral, thereby giving SMEs broader access to bank financing?

Given financial market imperfections and institutional weaknesses Governments in general resort to various industrial policy tools to improve credit allocation to the advantage of SMEs. One of them is credit guarantees.

Mutually-based guarantees can obviate some of the moral hazard problems that limit banks' credit to SMEs. Their emergence is, however, hindered by the same adverse selection problems that lead banks to ration their lending to risky firms. Less risky SMEs are actually reluctant to enter into mutual guarantee agreements with other firms, knowing that close monitoring of their peers' performance is difficult and that such guarantee schemes attract more risky firms.

Thus, is State intervention necessary to support the emergence of credit guarantee schemes (CGS)? Moreover, is a State-funded guarantee scheme an effective instrument to promote lending to small firms?

In the economic literature there is no consensus on the answers to these questions. Theoretical and empirical studies lead to different views. On the one side, it is argued that CGSs are costly instruments that pose problems of financial sustainability. At the same time, benefits have still to be proved, as there is no conclusive evidence about the contention that they allow additional lending to financially constrained SMEs, Vogel-Adams (1997), Llisterri (1997). In any case, they should not be viewed as a substitute for correcting financial market or legal system failures that are at the source of credit rationing.

On the other side, CGSs are seen as capable of opening new access to credit, although they can be effective only under a well-specified set of conditions about their operations Holden (1997), Levitsky (1997).

Against this background, this essay investigates whether Italy's State-funded guarantee scheme for SMEs (SGS) is an effective means to overcome the main difficulties faced by small firms in accessing the bank credit market. This means assessing whether SGS is able to increase credit access for SMEs, to reduce credit cost and to achieve financial sustainability.

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<sup>3</sup> An inside guarantee is termed real when a physical asset is pledged by a subject that is related to the borrower, while is termed personal when no specific material asset is involved. An outside guarantee is the one provided by a subject unrelated to the borrower.

Accordingly, in the following section an outline of the Italian guarantee system is presented, highlighting its operating features. Next comes an analysis of its activities, focusing on their magnitude and on the disadvantaged groups of firms that have benefited from the scheme. In the fourth section, the analysis is focused on the costs inherent to this scheme, while in the fifth, a first-ever econometric test is presented concerning the SGS' role in easing SMEs' financial constraints.

In the concluding section, it is shown that this analysis lends support to the thesis that such a scheme had a positive, albeit limited, impact.

## *2. The Italian guarantee system*

Italy's universe of credit guarantee institutions tends to form a multi-pillar and multi-layer system based on a mix of private and public funding. It is not an outright system because no specific network agreement or legal constraint exists in order to bring together all these entities within the framework of a system<sup>4</sup>.

Three pillars can be identified: a) the mutual guarantee institutions (MGI), that are associations of small entrepreneurs willing to mutually share their debt risk as a way to improve their access to credit market; b) the banks and other financial companies, that provide guarantee services to the enterprise sector<sup>5</sup>; and c) the public funds, set up at State and Regional government levels, for the purpose of offering guarantees, i.e., insurance and/or reinsurance services, to institutions that lend to SMEs or to MGIs.

As private, mutual guarantee schemes are expensive and risky, public money is the true engine of the entire system. The Government gives financial support through two channels: by contributing to fund the MGIs and by financing the public guarantee schemes, at both central and regional levels, with the primary objective of allowing a counter-guarantee (namely, a re-insurance) for the MGIs' guarantees.

The system actually works as a multi-layer structure. At the grassroots level, both MGIs and banks provide guarantees. But MGIs fulfil a special function. They act as a facilitator in the bank-SME relationship by providing potential borrowers with both, a guarantee and the benefit of an interest rate reduction. The latter is often agreed upon with the lending bank as part of a general agreement that applies to all MGI participating firms. This guarantee is usually backed by a money deposit that MGIs make with the lending bank as a general pledge against all guaranteed debt. This deposit can be considered as a general-purpose collateral to the guarantee itself.

At the same grassroots level, there are banks that sell credit insurance to firms on their own.

The particular value of a MGI guarantee derives from three features: the deep assessment that the guarantor can make on the firm's creditworthiness due to its access to inside information, the close monitoring of the firm's business conditions after the loan, and the mutual responsibility of all participating firms.

At present, more than 1000 MGIs are officially registered, but around 600 are actually operational. They are spread throughout the country and constitute a network that covers almost all economic sectors, Zecchini (2002).

The Italian MGIs represent the largest component of Europe's mutual guarantee sector, since they account for 37.3% of the total outstanding volume of guarantees to SMEs and 46.5% of all beneficiary firms, EU Commission (2005).

At the second level of the guarantee system, there are second-tier MGIs, that are set up by groups of the same institutions. Their function is to reinsure (i.e., to counter-guarantee) MGI guarantees in order to reach a broader sharing of the financial risk involved, as each MGI covers a narrow range of enterprises.

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<sup>4</sup> The fundamental law regulating this sector, that was issued rather recently, in December 2004, does not go far enough in making it possible for these institutions to work together as parts of a well-defined system.

<sup>5</sup> Banks also have an Interbank Guarantee Fund that provides deposit insurance to depositors in an insolvent bank.

At the same level, operate reinsurance entities that are funded by regional governments. Banks can, however, bypass second-tier MGIs and these regional entities, and apply for a direct guarantee from a State-supported guarantee fund.

Three such funds are in operation and constitute the system's third level: one is the central "Fund for Guarantee to SME" (SGS), that aims at the SMEs in general, another aims exclusively at the craft sector, still another at the agricultural sector. Each of them acts as a sort of guarantor of last resort for a specific enterprise category.

The focus of this analysis is just on the SGS, that is the largest one among the three and is funded only by the central government. This was established in 1996 with the generic mandate of providing guarantees to banks and financial institutions, against their loans to SMEs, as well as against their minority equity participations in small and medium-size companies, and to MGIs, against their guarantees for SMEs's borrowing. Hence, the SGS offers direct guarantees to lending banks, co-guarantees together with other guarantor institutions, and guarantees of last resort to MGIs. (See the Annex and tab.1 for details about its operations).

### 3. The economic performance of the Fund for Guarantees to SMEs

The Fund actually began its operations in 2000 with an initial endowment of € 66.5 million, replacing pre-existing fragmented funds aimed at similar objectives on a sectoral basis. As a result of further annual allocations from the State budget, its guarantee capacity has risen to 233.5 millions. By applying a gearing ratio over its capital base, the Fund has guaranteed loans amounting to 4.6 billions in its 6 years of operation. This corresponds to just around 3% of total lending small enterprises belonging to the sectors covered by the Fund were granted in 2005.

Given the relative modesty of these figures, it is apparent that this mechanism is in no position to have a significant impact either on the economy, or on promoting entrepreneurship. Even adding the guarantees given by the other guarantee Funds dedicated to the craft sector and agricultural sector, the overall size of these mechanisms greatly limits their significance as an industrial policy tool that can modify the market-driven credit allocation.

The Fund has, nevertheless, a strong potential to direct credit to certain disadvantaged sectors and enterprises that deserve credit, since it is run according to tight criteria aimed at reducing the risk of resource misuse. In particular, eligibility criteria (tab.1) are such as to greatly limit the percentage of guarantee applications that are rejected on merit grounds. On average, 83% of all applications were accepted, and the acceptance rate was even higher in 2004 (93%).

The guarantee coverage rate was also limited to such an extent as to reduce the risk of sizeable losses. For the period 2000-2004, the guarantee coverage was about 50% of the debt principal, with narrow yearly fluctuations around this average. In contrast, there was a large dispersion of coverage rates (from 25 to 88%) both, across firms of different size and across regions. This reflects a tendency to provide larger support to smaller borrowers.

The most credit-worthy enterprises received on average more than a quarter of all guarantees (28.7%), and their share has been rising since 2002. Micro enterprises obtained far less than their share in industry and services' national product (22.4 vs. 33%). Medium-size firms were, instead, the largest beneficiaries, with a 40.6% share exceeding their contribution to national product (16%). Small-size firms also obtained a share of guarantees (36.8%) that goes far beyond their 16% quota in Italy's value added (tab. 2).

Some preferences were given to some disadvantaged groups, such as women in business (5% in 2004 and 3.8% on average), while a larger support was accorded to start-up firms (12%) that are generally among the most credit-rationed firms because of their lack of a financial track record. Only 4.4% of guarantees went to firms in the highest admissible risk category.

This allocation pattern can be interpreted as evidence that the Fund showed a significant degree of risk aversion and paid more attention to banks' credit supply preferences than to the unmet demand of more financially constrained firms. Guarantee allocation actually approaches an

increasing function of firm size. Hence, the Fund's role in helping the most disadvantaged firms to overcome credit rationing appears rather limited.

Among economic sectors, industry (including the construction business) received the largest portion of guarantees (71%), although its relative share declined recently. Tourism and trade are instead acquiring more weight in the allocation pattern, even though they obtained respectively 11

**Table 1. Allocation of guarantees and default distribution 2000-2004 (percentages)**

<b>Distribution by</b>	<b>Guaranteed loans</b>	<b>Guaranteed loans in default</b>	<b>Fund's loan repayment</b>
<b><u>SIZE:</u></b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>
- Medium-size firm	40,59	50,39	49,00
- Small-size firm	36,84	29,39	27,00
- Micro firm	22,45	20,22	24,00
- Consortia of firms	0,12	-	-
<b><u>CATEGORIES OF FIRM:</u></b>	<b>-</b>	<b>-</b>	<b>-</b>
- Equity participation	0,19	4,51	35,56
- SMEs (with lower credit score)	25,43	36,86	24,44
- Women entrepreneurship	3,79	3,89	0
- Start-ups	11,76	12,75	24,44
- SMEs (with higher credit score)	28,82	19,13	4,44
- MGIs (top of the group)	29,49	22,86	11,11
- Micro credit	0,52	0	0
<b><u>MATURITY:</u></b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>
- Short-term loan	23,26	22,86	9,09
- Medium-term loan	48,18	49,92	40,91
- Long-term loan	28,37	22,55	13,64
- Equity participation	0,19	4,67	36,36
<b><u>TYPE OF GUARANTEE:</u></b>	<b>100.00</b>	<b>100.00</b>	<b>100.0</b>
- Direct guarantee	37,71	41,37	43,00
- Counter-guarantee	60,78	58,16	57,00
- Co-guarantee	1,52	0,47	0
<b><u>ECONOMIC SECTOR</u></b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>
- Industry & Construction	70,00	74,00	85,00
- Tourism	11,14	11,00	10,00
- Trade & other services	17,98	15,00	5,00
<b><u>BY AREAS:</u></b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>
- North-West	45,74	55,21	64,00
- North-East	14,31	13,53	2,00
- Centre	13,65	9,95	17,00
- South (Mezzogiorno)	26,30	21,31	17,00

Source: Elaborations based on Fund's data.

and 18% of total guarantees in the 2000-2004 period. The tiny fraction of resources that was directed to the new technology sectors is highly indicative of the Fund's failure in promoting a new growth pattern for the economy. This shortcoming was corrected only in part in 2005, by setting up a specialized section devoted to the ICT sector.

Overall, the Fund appears to have been used to support what already existed in industry and services, more than to open up new opportunities in investment and production, that involve higher risks and more innovative enterprises. This seems at odds with the often stated objective of the policy makers to support a diversification of the country's production base toward new and more dynamic sectors, with a higher value added intensity. It might, however, be the result of the lack of demand by these fledging sectors, or their inadequate representation in the Management Committee, or even insufficient consistency in public action across the full spectrum of policy instruments. Whatever the reason, these results point to the need to closely revise the Fund's economic strategy.

Another sign of the Fund's economic impact can be drawn by looking at the economic destination of the loans that had a guarantee. Slightly more than half (54%) went to support investment projects, but their relative importance has been declining during the entire period, as it could be expected due to the severe slowdown of investment and growth. At the same time, an increasing portion, reaching 59% in 2004, was directed to cover firms' working capital needs. This doesn't seem to reflect the presence of tight liquidity conditions in the economy, because the first half of the years 2000 was a period of historically low interest rates and relatively easy monetary conditions. Rather, it might signal the particularly tense liquidity position of the small enterprise sector, as a consequence of the prolonged economic downturn.

Such interpretation finds support in the maturity structure of guaranteed loans. The short-term component (i.e., up to 18 months) increased significantly since 2001, the year when the long economic slowdown started. Symmetrically, the medium- and long-term segments decreased from 87% to 77%. Over the entire period, however, 48% of the guarantees went to medium-term loans (i.e., maturing between 18 months and 5 years), with the short-maturity end (23%) approaching the long one at around 28%.

This maturity structure doesn't seem fully consistent with the rationale of focusing most State-sponsored guarantees on the riskiest as well as most meritorious loans. If financial risk is an increasing function of loan maturity and the public guarantee scheme has the mandate of mending a financial market failure in funding valuable but risky projects, one should expect an upward sloping maturity structure of guarantees, rather than a bell shaped one, as described in tab. 2. However, credit supply factors, rather than firms' preferences, might actually have shaped this distribution. Furthermore, short- and medium-term loans are often used by Italian firms to fund long-term investment projects.

An unbalanced distribution also characterizes the allocation of guarantees by regions. The North-West of the country obtained the biggest portion (46%), that is also above its share in total bank credit in 2005 (37.6%), Banca d'Italia (2006). As this is the most industrialized area of the country and given the difficult adjustment and downscaling industry underwent during the past five years, the predominance at the same time of this region and of the industrial sector in guarantee allocation lends support to the notion that the Fund assisted the industrial adjustment process more than anything else. This can be interpreted as a sign of the priority the Fund managers accorded to demand factors, notably, the needs of the enterprise system, over other goals.

Another assistance objective received much attention: the objective of backing the development of the Southern regions. These regions received about 26% of total guarantees, a percentage that is far ahead of their share in bank credit (11.2%). The guarantee coverage ratios were also a higher percentage of the loan principal than for the other regions, as envisaged in the Government guidelines to the Fund. Remarkably enough, in the Southern regions like in the North-

West, most of the guarantees went to the manufacturing sector, even though the latter contributes to the Southern regions' production much less than in the North.

An additional role was played by the Fund in promoting the emergence of a national guarantee system. In fact, it focused more on counter-guaranteeing MGIs' operations (61% on average) than on providing direct guarantees to the banks. This is the result of a significant shift of orientation that took place over five years. While at the beginning of its activity in 2000 the Fund allocated 71% of its guarantees to dealing directly with lending banks, in 2004 the allocation was reversed: 71% was with MGIs.

This development is not welcomed by the banking system, since banks are prodded to deal increasingly with MGIs and lose part of their autonomy in deciding what part of their loan portfolio to submit for the State guarantee. It should instead be seen as a positive development for the economy and for the banks themselves. As to the economy, the Fund creates an incentive for small firms to join institutions where they are subject to closer scrutiny and higher mutual responsibility in ensuring a good use of borrowing. For the banks themselves, it is a way to delegate MGIs part of their monitoring over borrowing firms and gaining more information about small firms' creditworthiness.

In a number of loans, the Fund's intervention had a complementary role, to the extent that it backed borrowing that was in part collateralized by real assets. In 2005 a quarter of the outstanding guarantees concerned such loans. This is a signal that the collateral offered by SMEs was not adequate to satisfy the lenders' risk aversion. The public guarantee, in particular, might have served to overcome not only small firms' lack of collateral, but the shortcomings stemming from Italy's particularly costly and lengthy procedures for contract enforcement, Generale-Gobbi (1996). Were not for these reasons, there would be no other plausible justification for such a high proportion of guarantees but the attempt by both, the lender and the guarantor to minimize room for moral hazard situations. The provision of collateral by the borrower, as an addition to the public guarantee, can actually strengthen the borrower's commitment to repay the loan.

By another token, the Fund did not succeed in promoting the build-up of the equity base among small firms. Only 12 equity participations were granted a guarantee, i.e., 0.2% of the total. Their outcome is even more negative: they recorded capital losses equal to 4.5% of all guarantee defaults. The Fund's caution towards equity investment, albeit warranted with hindsight, can be attributed to both, demand and supply sides at the same time. On the one hand, small entrepreneurs in Italy are not keen to open up their firms to outside investors. On the other hand, the Fund's management has been rather cautious in using public money for risky endeavours, such as supporting equity participation. This is, nevertheless, a valuable objective that merits to be pursued, but it requires a different institutional framework in order to better combine private investment bank skills and resources with public guarantees.

By bringing together all these elements, one is left with the picture of a public guarantee instrument that has served the purpose of giving assistance to an industrial sector under stress and to the development of backward regions. It has not, however, promoted entrepreneurship and risk taking in innovative sectors to a significant scale.

Specifically, the Fund has provided a response to the demand for assistance of the small scale industrial firms, helping them to cope with the general economic slowdown in the first part of the current decade. It has also targeted the less developed Southern regions, in spite of the limited availability of creditworthy investments and firms, and a certain resistance of small businesses to participate in mutual guarantee schemes.

In contrast, it has not managed to play an active role in pursuing an economic development strategy based on the growth of the small firm. This might have been prevented by the rather conservative attitude it adopted towards risk-taking, an attitude justified by the need to safeguard public resources. At any rate, its intervention has been constrained by the very limited amount of resources that the State budget assigned to this instrument. It represents just 5.5% of total State aid to enterprises in the period between 2001 and 2004.

Still, the Fund has proved to have a great potential in reaching a large number of enterprises (about 3.500) at a relatively small cost for the State budget. Between the years 2000 and 2005, 20,304 loans for a total of € 4.6 billion have been made possible for SMEs at the cost of just 233.5 millions for the State budget: a gearing ratio of almost 1 to 20. No other State aid instrument can boast a similar effectiveness.

In any event, effectiveness must also be measured in terms of financial sustainability of this instrument and its ability to add to the amount of loanable funds made available to small firms, as well as to lower their cost compared to other firms.

#### *4. Costs, subsidies and financial sustainability of the Guarantee Fund*

To be financially sustainable a guarantee scheme has to break even, by balancing costs with revenues. In the case of a public scheme, it is not necessary to generate a profit, since the scheme serves the general interest of promoting economic development. It is, however, important that it does not pile up such losses as to place a boundless burden on the public budget. This is the most likely outcome, Grudger (1997), in the absence of some constraints, because a public guarantee ends up shifting a significant portion of moral hazard and financial risk from the lender and the borrower to the taxpayer.

From this vantage point, the Fund's performance has been satisfactory, as it can be seen by analysing costs and revenues. On the cost side, there are three main components: loan losses, administration expenses and the cost of servicing public debt, that is incurred by the Government to endow the Fund with its capital and to cover any Fund's losses<sup>6</sup>. The debt service component is particularly appropriate in Italy's case, as the Italian Government has run a budget deficit for decades and has to cover them by borrowing in the financial markets.

The degree of Fund's financial sustainability over the 5 year period can basically be assessed by drawing on the following equation:

$$[1] \quad L + A + I = F + O + S$$

where

L = loan losses

A = administration expenses

I = public debt service cost (cost of use of borrowed capital)

F = guarantee fees

O = other income, such as the return from the investment of reserves

S = the amount of public subsidy to cover any losses.

The subsidy component is the balancing item that allows the Fund to avoid exhausting its capital base as a result of both, annual losses due to the firm's failure to repay the guaranteed loan, and the Fund's operating expenses that are not covered by the fees.

As to the losses deriving from non-repayment of loans, the Fund's performance is appreciable and much better than that of similar schemes of other European countries. Default losses as a ratio to Fund's guarantees<sup>7</sup> are 0.25% for the period 2000-2004 (tab.3), against percentages ranging from 2% in Germany to 10% in Spain, Oehring (1997). Although the loss ratio shows a sharp upward trend after the first two years of Fund's operations (tab.3), it remained at a relatively low level in 2005, hinting that at cruising speed it should not exceed 0.50% by far. After

<sup>6</sup> The debt service cost, being equal to the State's average borrowing cost, could be considered as a proxy for the opportunity cost of funding the Fund.

<sup>7</sup> The default loss ratio can be decomposed as the product of the default loan rate, the repayment rate and the reciprocal of the guarantee coverage rate. These ratios are presented in table 3.

all, the guarantee system passed unscathed a period of serious economic stagnation, such as the first half of the current decade.

The default ratio (i.e., defaulted loans as a ratio to guaranteed loans) is also much lower than that of Italy's banking system, being 1.83% against 5,89% for banks' loans to the private non-financial sector<sup>8</sup> (tab.3).

As expected, the most credit-worthy SMEs and MGIs proved to be a good risk for the Fund, since they gave rise to a minor portion of the Fund's losses respectively 4 and 11% of total losses). In contrast, heavy losses were recorded among start-ups and SMEs with a less good credit score.

The Fund's losses are heavily concentrated in loans to medium-sized enterprises (49%), while the lowest rate is among the micro firms (24%). This is consistent with data showing that loan default rates are an increasing function of the loan size, as well as of the guarantee size (fig.1). The only exception is found in the smallest loan category (up to € 10,000), where there is the highest default rate but a relatively low loss rate, because the guarantee coverage rate was rather low. This might reflect the high risk involved in micro credit and the consequent cautious attitude adopted by the Fund.

By comparing guarantee distribution with default distribution, small firms appear to be less risky than bigger ones within the same SME group. Correspondingly, medium-size firms experience a much higher share of defaults than their guaranteed loan share (tab. 2).

The distribution of losses is also positively correlated with loan and guarantee sizes. 49% of losses against short-term loans are in the loan category between € 150,001 and 200,000, while 61% of those related to medium and long-term loans are in the group amounting to more than € 250,000<sup>9</sup> (fig. 1). In brief, the larger the loan, the lower the percentage of the loan that is recovered after the default, although recovery rates are generally high.

Defaults and losses also appear to rise with the loan maturity, but with a concentration in the second year of the loan, for both short- and medium-long term loan groups. As expected, the largest percentage of defaults is among the guarantees with longer maturities: 59% occur after the first two years of the loan. But this cannot be attributed just to the risk content inherent to the financed investment projects, because 69% of the defaults are vis-à-vis loans for working capital needs.

**Table. 2 Fund for Guarantees to SMES**

	2000	2001	2002	2003	2004	Total
	<i>(Percentages)</i>					
Guarantee coverage ratio (1)	55.78	53.94	54.77	48.90	44.91	50.16
Loan default rate (2)	0	0,47	1,36	1,51	3,63	1,83
Repayment /Guarantees (3)	0	0	0.11	0.38	0.47	0.25
Loss/Loans (4)	0	0	0.06	0.19	0.21	0.12
Repayment rate (5)	0	0	4.30	12.29	5.80	6.81

Source: Elaborations based on Fund's data.

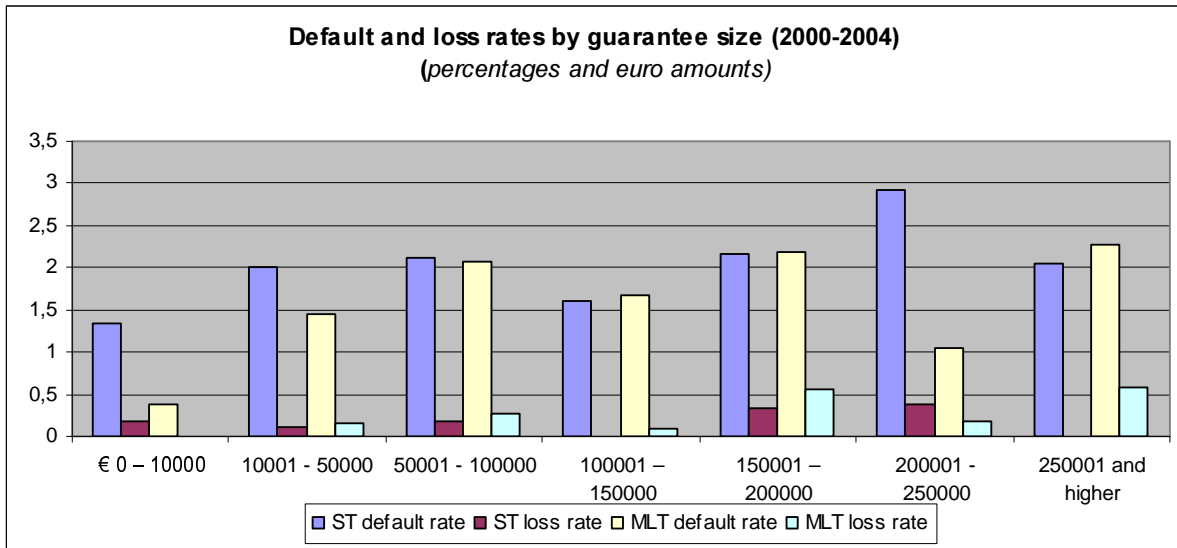
- (1) Guarantees/guaranteed loans
- (2) Guaranteed loans in default/guaranteed loans
- (3) Fund's loan repayments/guarantees
- (4) Fund's loan repayments/guaranteed loans
- (5) Fund's loan repayments/guaranteed loans in default

Source: elaborations on MCC data.

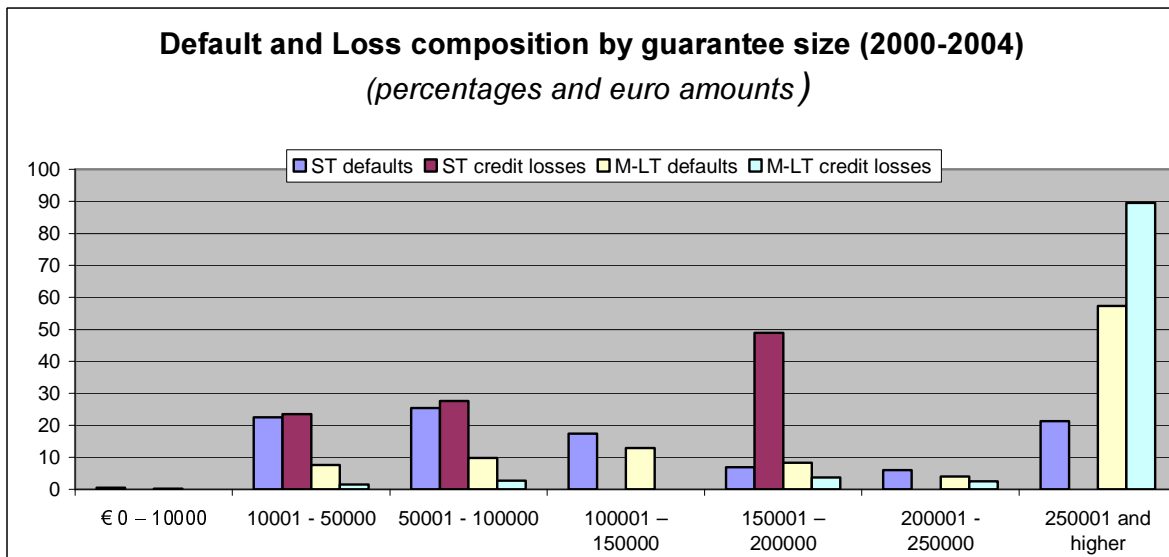
<sup>8</sup> The default rate for banks' loans to micro enterprises is 9.82%, Banca d'Italia (2005).

<sup>9</sup> Losses for equity participation are included in this category, where they account for 29%.

Fig. 1



(cont.)



Source: Elaborations based on Fund's data.

The largest portion of defaults pertains to industry, but in relative terms the default distribution by economic sectors is close to the corresponding guarantee distribution.

This sectoral concentration of defaults can explain their clustering in the Northern regions, as this area has a higher density of industrial firms. The South fares better in terms of default ratios (1.53% vs. 2.23 in the North), owing to its larger share of loans to trade and services sectors. It also performs better in terms of losses, since default losses as a ratio to guarantees are lower (0,26% vs. 0.38%). This might also be due to a particular caution in granting guarantees to firms located in Southern regions.

Overall, size and economic sector of the firm matter more than other factors in explaining both, guarantee allocations and default distribution. However, the assumption of smaller firms being riskier is not confirmed in the case of the Fund, since medium-sized firms have a worse record. Such a result might reflect the Fund's approach to loan selection.

Interestingly enough, the type of guarantee also seems to matter. Direct guarantees to banks present a higher delinquency rate than guarantees to MGIs. This appears in line with the assumption that MGIs have a better monitoring capacity over the participating firms and can therefore reduce lending risk. Such an effect has actually offset the impact of the high risk concentration that characterizes these guarantors, since each MGI operates in a limited territory and with firms belonging mostly to the same economic sector or to complimentary sectors. Once these sectors are in a downturn, the MGI has little room to compensate this guarantee risk with the good performance of other sectors.

The highest failures were, nevertheless, recorded by the Fund in guaranteeing equity participations: 43% of guaranteed capital ended up in a capital loss.

The Fund has, instead, performed well in its function of redistributing guarantee risks across regions and sectors, as its overall loss rate has been kept relatively low. This good performance is due to its capacity to offset risks on a nation-wide basis and to a careful scrutiny of firms, as described earlier. It can also be imputed to the subsidiary nature of the Fund's guarantee, that leaves to the lending bank the responsibility of carrying out the debt recovery process before claiming the loan reimbursement. With the abandonment of such subsidiarity in the current year because of the requirements of the Basel II Agreement, the Fund might experience a much higher loss rate, since it is required to reimburse the lender within a short period, regardless of debt recovery.

The Fund's relatively low loss rate of the past could be anyway a poor indicator of future performance. The latter is a function of how a number of crucial variables will evolve, namely, the average duration of the loan portfolio, the guarantee coverage ratio, the firm's probability of default, the actual loss rate and the country's general economic conditions. Nevertheless, the first six years of Fund's operation have not shown rising default trends, notwithstanding the prolonged economic stagnation and the lengthening of loan maturities.

A conclusion is anyway warranted: the Fund's guarantee risk profile can be lowered by making the guarantee rate a decreasing function of the loan size. This would also have the result of shifting the guarantee distribution towards small and micro enterprises, an objective that is valuable, given the Fund's mandate of supporting the most credit rationed firms.

Beside losses, another cost component is given by the operating expenses. They come very close to the loss rate, being 0.39% of guarantees in the period 2000-2004. They also show a clear rising trend, increasing from 0.29% in 2000 to 0.67% in 2004.

Funding costs are not included in the Fund's accounting, but are relevant, since they impinge on the willingness of the public sector to incur additional debt to fund this mechanism. They can be approximated by the weighted average of the yields on Government securities over the period 2000-2004, i.e., 3.65% , Ministero dell'Economia e delle Finanze (2005). By applying this rate to the funds provided by the Government, the funding cost amounts to 0.47% of guarantees given by the Fund. If we instead use as a proxy the ratio of interest payments to public debt for the same period, the funding cost would be 0.66%.

On the revenue side, the main source is derived from guarantee fees. These do not reflect any assessment of the risk involved in the specific guarantee, but are charged at a subsidized rate to about two thirds of the borrowers, with a degree of subsidy varying according to the firm's size and location. The other firms are exempted in order to maximize public support (see table 1A). On the whole, fees represent just 0.35% of guarantees for the period 2000-2004.

An additional income was drawn from the investment of any liquid funds that were maintained as part of ongoing operations. This source amounts to 0.012% of guarantees.

By normalizing equation 1 by the amount of guarantees (G) and applying the estimated ratios, we have that the subsidy rate in percentage terms is

$$S/G = ((L + A + I - F - O)/G) * 100$$

namely,

$$0.25 + 0.39 + 0.47 (\sim 0.66) - 0.35 - 0.012 = 0.75 (\sim 0.94)$$

On this basis, the average subsidy that the Government gave per unit of guarantee in the period 2000-2004, is estimated at less than 1% . This figure is higher than the gross subvention equivalent (GSE)<sup>10</sup>, that is calculated according to EU rules, and amounts on average to about 0.65%. The average subsidy rate, however, declines to 0.28% if the user cost of capital is left out.

Of course, the subsidy rate was much higher for those enterprises that were charged no fee: in our estimation, it goes on average up to 1.29% of the guarantee. But it should be even higher for those firms that are responsible for loss rates above the average. Correspondingly, it should be lower for those borrowers with lower default probability or higher debt recovery ratios, as well as for those charged higher fees, such as medium-size firms and SME consortia.

In principle, for such a guarantee mechanism to be financially sustainable, the fee revenues should cover both, losses and operating expenses. In the case of the Fund, fees did not cover either one. There was in fact a current-account deficit averaging 0.28% per guarantee, that prevented the scheme from breaking even.

Such a deficit (0.14% per euro of guarantee<sup>11</sup>) looks, however, very low compared to the other State-funded subsidy schemes for enterprises, that carry a much higher grant element and absorb 94.5% of total State resources devoted to aiding enterprises. Moreover, its magnitude should be assessed against the sizeable amount of loanable funds that the scheme succeeded in mobilizing to the advantage of credit constrained SMEs. On this ground, the scheme appears to be an outright success, even though it must still be proved that the Fund had an impact in easing credit rationing and lowering credit cost for SMEs. These two aspects will be explored in the following section.

##### 5. The approach to Credit additionality and interest cost reduction

To test whether the Fund's guarantee has widened SMEs' access to credit and lessened its cost, we can draw on different strands of the empirical literature concerning the degree of financial constraint for some groupings of firms and the factors that can ease their funding. A strand of analyses is aimed at showing that some firms, especially small ones, are more financially constrained than others. These analyses are centred around models of investment demand coupled with the notion of capital market imperfections and disparities in firms' access to capital markets, Hubbard (1998). They show that some firms have a higher sensitivity of investment demand to their cash-flow, since external financing proves to be more difficult and costly than internal one, Fazzari et al. (1988).

But a credit rationing situation would go beyond a mere financial constraint. Specifically, it would imply that for a given supply of credit, some of them cannot obtain loans even if they are willing to pay a higher interest, Stiglitz Weiss (1981).

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<sup>10</sup> This is calculated according to the following formula  $GSE = z \left[ \sum_{t=0}^n y_t K (1 - \frac{t}{n})(1 + i)^{-t} \right] - x(zK)$  where z= guarantee coverage rate, y= annual fee at market, K= loan amount n= loan maturity, i= discount rate, x= once only fee charged by the Fund.

<sup>11</sup> This is the ratio of the deficit to the amount of guaranteed loans, and is equal to the product of the deficit ratio by the guarantee coverage ratio (Table 2).

In empirical analyses, financing constraints and credit rationing are tested for different groupings of firms, with respect to size, age, economic sector, banking relationship, and other structural factors. In modelling these tests, the first issue to be addressed is how the two financial conditions can be measured. Various indicators have been used, such as the firm's debt ratio, its delay in settling trade credit, Petersen Rajan (1994), the outcome of *ad hoc* surveys, firms' credit scoring models. The common goal of these different approaches is to identify which firms are mostly constrained in their credit availability, what are the main factors behind and what works in easing such constraints.

In our analysis, we focus just on the impact of Government guarantees on firm's finance, in the context of a reduced form model that highlights firm size and financial structure factors. The main assumption behind is that all firms that apply for a public guarantee are financially constrained or credit rationed, otherwise they wouldn't do so.

Attempts to estimate the effects of Government credit programmes were carried out, among others, by Gale (1991), NERA (1990), Piedad (1992), KPMF (1999), Boocock and Shariff, (2005), Riding and Haines (2001), Riding et al (2006), Cowling (1998). Gale simulated an *ad hoc* model, generating numerical estimates of the changes induced by the US Government credit programme on credit allocations to the different sectors of the US economy. NERA (1990), Piedad (1992) and KPMG (1999) made use of a questionnaire.

A broadly similar method was adopted by Boocock and Shariff (2005). They measured the effectiveness of Malaysia's guarantee scheme through a combination of a postal questionnaire survey and a number of case studies based on semi-structured interviews with borrowers and lenders, as well as with key informants.

Riding and Haines (2001) also used a questionnaire approach in a telephone survey of a sample of Canada's SBLA loan guarantee recipients. They identified some incremental economic benefits due to the SBLA guarantee. But credit additionality was inferred just from the characteristics of the sampled borrowing firms, an approach that cannot lead to a generally-valid conclusion. Riding et al (2006), instead, make use of a credit scoring and logistic regression model to account for the additionality effect in the Canada Small Business Financing program. Finally, Cowling (1998) looks at the effect of the Fund from a macroeconomic point of view, analyzing the regional variation on the British CGS take-up and loan value.

## 6. The database

For the econometric tests we use financial data on a sample of SMEs repeated over eight years, 1999-2006, where the 1999 is one year before the Fund started operating. This sample has been constructed by merging data from two sources of information: Capitalia-MCC and AIDA databank. The former provides us with information on guaranteed firms, i.e. their identity and the guarantee duration; this data was matched with financial data and Ateco sector code extracted from AIDA databank. At the same time also non guaranteed SMEs have been included in the sample in order to have a control group. Descriptive statistics are presented in Table 3.

**Table 3. Descriptive statistics of used variables**

	Guaranteed firms (*)	Non-guaranteed firms (*)
Number of firms	1,385	9,876
Financial cost/bank debt	0.101 (0.09)	0.122 (0.12)
Bank debt/total assets	0.574 (0.26)	0.515 (4.42)
Employees per firm	50.18 (50.18)	45.26 (95.52)
Sales (thousands euro)	9,965 (9965)	8,773 (22266)
Fixed assets	2,737	2,408

(thousands euro)	(3,646)	(11,791)
Intangible assets (thousands euro)	333 (840)	234 (1,012)
Non banking debt/total asset	0.091 (0.262)	0.077 (1.27)
Net worth (thousands euro)	1,953 (2,595)	2,311 (16,870)
Earnings (thousands euro)	42 (1,030)	23 (2,740)

(\*) Mean value and sd in parenthesis, except for the number of sampled firms

### 7. The anticipation effect

To test the effectiveness of the Fund in widening credit access (the so called additionality effect) for the SMEs and reducing borrowing cost, we apply an econometric technique aimed at isolating the average effect of the treatment for the treated units, the DID technique. This estimator is based on a double comparison. Once defined an outcome variable to check the effectiveness of the cure, i.e. the guarantee, the average time difference of the outcome of the treated units is compared to the average time difference of the control units' outcome. It follows that the performance of the treated units is compared to that of non treated ones, after having computed the difference in outcome before and after the treatment. Going through the details of the estimator is beyond the scope of this paper. We refer the interested reader to Wooldridge 2002.

The DID estimator is based on the underlying assumption that treated and control groups would have followed parallel paths over time if the treatment had not occurred. This assumption can be considered quite realistic in the case of SMEs, since the same changes in macroeconomic conditions that affect temporal variation in the outcome of SMEs are likely to affect both groups of firms, guaranteed and non guaranteed ones.

Nevertheless, a possible violation of this assumption can arise if before the Fund started operating future guaranteed firms were better performers in terms of either financial costs or credit availability. This event is referred to as anticipation effect, Blundell et al, 2003.

To check for this possible violation of the basic hypothesis, it is possible to perform a test following the idea in De Galdeano and Vuri (2004) by estimating the following regression equation for the year 1999, i.e. before the Fund started operating.

$$(1) \mathbf{r}_t = \alpha + \beta_1 \mathbf{x}_{1t} + \beta_2 \mathbf{x}_{2t} + \beta_3 \mathbf{x}_{3t} + \delta \mathbf{d}_{t+n} + \mathbf{u}_t$$

where

$\mathbf{r}_t$  Nx1 vector of (log of) financial costs in 1999;

$\mathbf{x}_{1t}$  Nx1 vector of (log of) number of employees in 1999;

$\mathbf{x}_{2t}$  Nx1 vector of (log of) sales in 1999;

$\mathbf{x}_{3t}$  Nx1 vector of (log of) total debt in 1999;

$\mathbf{d}_{t+n}$  dummy variables, that takes on value of 1 if the firm is guaranteed at time t+n (where t= 1999) and to 0 otherwise;

$\mathbf{u}_t$  error term.

The same reasoning applies for the anticipation effect on credit supply, i.e. on additionality. In this case, the theoretical scheme of reference for these estimates is the disequilibrium approach proposed by Bowden (1978, 1978a). This allows a quantification of the credit rationing phenomenon. In the simplest version of this approach, the amount of borrowed funds is a function of both, its cost and a set of explanatory variables concerning the demand for funds. This model specification has had several empirical applications, Pittaluga (1987, 1989) and the bibliography herein cited. Among them, the disequilibrium approach by Pittaluga (1988) is noteworthy, since it was applied to estimate the credit rationing phenomenon across different regions in Italy.

The approach followed in this essay draws on the above-mentioned theoretical and empirical works. In Bowden and Pittaluga, credit rationing has been approached from a macroeconomic point of view, by using lending rates for various loan sizes and total bank loans as dependent variables in credit rationing tests. In contrast, this analysis is developed in a microeconomic context, by applying different debt measures, in order to show that well focused public guarantee schemes can indeed contribute to ease credit rationing for disadvantaged SMEs.

In line with Pittaluga (1987, eq.10), the quantity of loaned funds is seen as a function of two components: i) its cost; and ii) a set of explanatory variables of credit demand. The database for econometric tests is made out of repeated cross sections, containing mainly balance-sheet entries. The use of repeated cross sections does not allow to explicitly insert an interest rate, such as the prime rate, as it is done in the cited literature, because this variable does not vary across firms, thereby collapsing into a constant term. However, to take account of temporal variation in interest rates, period-fixed effects and cross section-fixed effects have been included in the regression equation.

As explanatory variables for the demand of funds, the following variables are used. The number of employees is taken as an indicator of creditor's ability to gain an insight into the firm's creditworthiness. This is a proxy of the demand quality, Pozzolo, (2004). Total sales is included as a proxy of the firm size. This has a bearing on the demand for credit. Total assets is included to assess to what extent the presence of a credit guarantee raises the firms' ability to borrow. For a given level of total assets, this equation specification allows to highlight the guarantee impact on guaranteed firms, as compared to non-guaranteed ones.<sup>12</sup> The inclusion of the dummy variable is the core of our analyses and is consistent with a lending additionality test, since a credit-rationed firm with no guarantee is expected to have a relatively lower financial debt level than a comparable guaranteed firm. Formally we are testing the following relationship

$$(2) \mathbf{y}_t = \alpha + \beta_1 \mathbf{x}_{1t} + \beta_2 \mathbf{x}_{2t} + \beta_3 \mathbf{x}_{3t} + \delta \mathbf{d}_{t+n} + \mathbf{u}_t$$

where

$\mathbf{y}_t$  Nx1 vector of (log of) bank debt in 1999;

$\mathbf{x}_{1t}$  Nx1 vector of (log of) number of employees in 1999;

$\mathbf{x}_{2t}$  Nx1 vector of (log of) sales in 1999;

$\mathbf{x}_{3t}$  Nx1 vector of (log of) total assets in 1999;

$\mathbf{d}_{t+n}$  dummy variables, that takes on value of 1 if the firm is guaranteed at time t+n (where t= 1999) and to 0 otherwise;

$\mathbf{u}_t$  error term.

The results of the test for the anticipation phenomenon are reported in Table 4 for the cost effect, and in Table 5 for the additionality effect.

**Table 4. Estimates of the  $\delta$  parameter using data prior to 1999 for firms receiving the guarantee in the following years (cost effect)**

Guarantee years	2000 OLS	2001 OLS	2002 IV	2003 OLS	2004 OLS	2005 OLS	2006 OLS
$\delta$	0.185** * (0.070)	0.167*** (0.039)	0.180*** (0.042)	0.149*** (0.004)	0.159*** (0.036)	0.163*** (0.034)	0.136** * (0.023)
R2	0.654	0.654	0.654	0.654	0.65	0.65	0.655
Prob (F-Stat)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Marginal R2			0.82				

<sup>12</sup> Estimates have also been carried out by replacing total assets with the share of physical over total assets. The results show no appreciable difference from the above estimates.

of excluded instruments in the First Stage <sup>13</sup>							
F of excluded instruments (P-val)			2100 (0.00)				
instruments			$d_{t+1} d_{t+2}$ $d_{t+4} d_{t+5}$				

Robust standard errors in parenthesis. “\*\*\*”, “\*\*” and “\*” indicate 1%, 5% and 10% significance levels, respectively. Standard errors are computed through the White correction to account for heteroskedasticity. All the regressions include a constant. The dependent variable is the (log of) bank debt in 1999. The regressors are the (log of) number of employees, sales, total asset. All the variables are at time  $t=1999$ . The full estimates are not reported for brevity. Different regressions are reported in each column by changing the dummy in order to account for the firms guaranteed in different years. For instance, in column 3 we report the estimated  $\delta$  coefficient related to the 1999 financing cost for firms that received a guarantee in 2001.

**Table 5. Estimates of the  $\delta$  parameter using data prior to 1999 for firms receiving the guarantee in the following years (additionality effect)**

Guarantee years	2000 IV	2001 IV	2002 IV	2003 IV	2004 IV	2005 IV	2006 IV
$\delta$	- 5.836*** (0.857)	- 6.049*** (1.399)	- 8.150*** (1.737)	- 14.211*** (2.823)	- 23.208*** (5.613)	2.922 (1.799)	7.811*** (2.123)
R2 (uncentered)	0.975	0.977	0.974	0.962	0.943	0.986	0.9823
Prob (F-Stat)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Marginal R2 of excluded instrument in the First Stage	0.007	0.006	0.005	0.004	0.001	0.007	0.02
F of excluded instruments (P-val)	82.25 (0.00)	61.56 (0.00)	48.48 (0.00)	19.38 (0.00)	19.11 (0.00)	9.41 (0.00)	4.48 (0.00)
instruments	$d_{t+2} d_{t+3}$	$d_{t+1} d_{t+3}$	$d_{t+1} d_{t+2}$	$d_{t+1} d_{t+2}$ $d_{t+3}$	$d_{t+3} d_{t+4}$	$d_{t+4} d_{t+5}$	$d_{t+1} d_{t+2}$ $d_{t+3} d_{t+4}$

Robust standard errors in parenthesis. “\*\*\*”, “\*\*” and “\*” indicate 1%, 5% and 10% significance levels, respectively. Standard errors are computed through the White correction to account for heteroskedasticity. All the regressions include a constant. The dependent variable is the (log of) bank debt in 1999. The regressors are the (log of) number of employees, sales, total assets. All the variables are at time  $t=1999$ . The full estimates are not reported for brevity. Different regressions are reported in each column by changing the dummy in order to account for the firms guaranteed in different years. For instance, in column 3 we report the estimated  $\delta$  coefficient related to the 1999 bank debt for firms that received a guarantee in 2001.

<sup>13</sup> According to Bound et al (1995), instrumental variables estimates may be biased in small samples. A correct practice is to report a statistic that measures this possible bias. Staiger and Stock (1997) prove that when the instrumented variables are no more than 1, the reciprocal of the F-test of the exclusion of the instruments in the first stage approximates the fraction of the OLS bias that is still present in the IV approach to LATE in a finite sample. The partial R2 allows to directly estimate the proportion of unexplained variation of  $y$  that becomes explained with the addition of variable  $x_j$ . For an example of the inclusion of the F of the first stage and of the use of partial R2 in a LATE estimate, see Ichino and Winter-Ebner (2004).

Diagnostic tests have been carried out in advance in order to rule out problems of endogeneity and/or simultaneity. The Durbin-Wu-Hausman signals the inconsistency of the OLS estimator only for the year 2002 in Table 4 and for every year in Table 5. In this case an instrumental variables estimate has been run, where the instruments are different lags and leads of the dummy variable. This set of instruments is validated by the Sargan and Basman tests<sup>14</sup>.

It is worth noting that the estimates in Table 4 and 5 are not aimed at detecting a causal relationship between the treatment and the outcome variable, since in 1999 the treatment had not occurred yet, therefore it is not necessary to check the conditions by Angrist-Imbens-Roubin (1996).

For our analysis, the estimate of the  $\delta$  coefficient is the most relevant element, since it signals the impact of the guarantee on the outcome variable, the cost of borrowing and the quantity of bank debt, as compared to other firms. As far as the anticipation effect on cost is concerned the estimates of delta is always positive and significant. This evidence can be interpreted as signalling that in 1999, those firms that received a Fund guarantee years later paid higher financial costs, other things being equal. The cost difference is estimated between 14.56% and 20.32% at the median point<sup>15</sup>. This result goes in the direction of ruling out the possibility of an anticipation effect for the cost.

For the additional effect the dummy coefficient is negative and significant, pointing out that guaranteed firms were given a lower quantity of bank debt in 1999 for those firms that received a guarantee from 2000 to 2004, while there were no difference between 2005 guaranteed and non guaranteed firms. Finally, the estimates show a positive and significant  $\delta$  for firms guaranteed in 2006, hence the anticipation effect occurred for firms guaranteed in 2006. As a consequence, one must rule out those firms from the sample.

8. The effectiveness of the Fund: DID estimates

On the basis of the tests on the anticipation effect, fixed-effect panel versions of eq. 1 and 2 for the years 1999-2005 are estimated. The coefficients in the pre-guarantee year are estimated separately from those for the other years, Abadie (2005), Blundell *et al.* (2003), De Galdeano-Vuri (2004). At the same time, two similar questions are addressed: does the guarantee is effective in providing guaranteed firms with a larger quantity of loans at lower cost? And, what does happen once the guarantee expires? Answers to these questions are given in Tables 6 and 7.

**Table 6 - DID estimate of the causal effect of the guarantee on the (log of) financial costs 1999-2005**

		Fixed Effects (DID)	Fixed Effects (DID)
	$\alpha$	0.125 (0.287)	4.652*** (0.646)
Year 1999	No. of employees	0.107*** (0.014)	0.048** (0.020)
	Sales	0.283*** (0.033)	0.362*** (0.033)
	Bank debt	0.425*** (0.040)	0.143*** (0.043)
po	No. of employees	0.068*** (0.013)	-0.027 (0.021)

<sup>14</sup> Proofs are available from the authors upon request.

<sup>15</sup> This figure is obtained as  $[\exp(\delta)-1]*100$ . Since the dependent variable is in log, once taken the antilog one must refer to the median value of the dependent variable. For more details see p. 321 of Gujarati (2004) and cited references.

	Sales	0.298*** (0.025)	0.514*** (0.036)
	Bank debt	0.468*** (0.028)	0.052 (0.056)
	Guarantee dummy	0.016 (0.013)	
	Expired guarantee		0.013 (0.027)
	Inverse Mills		1.884*** (0.241)
	R <sup>2</sup>	0.94	0.94
	# Obs	19804	3959
	Prob(F-stat)	0.00	0.00

Robust standard errors in parenthesis. “\*\*\*”, “\*\*” and “\*” indicate 1%, 5% and 10% significance levels, respectively. S.E. are computed through the SUR (PCSE) coefficient covariance matrix to account for both cross-section heteroskedasticity and correlation.

**Table 7- DID estimate of causal effect of the guarantee on the (log of) debt bank debt, 1999-2005**

		Fixed Effects (DID) Dep vbl: bank debt	Fixed Effects (DID) Dep vbl: bank debt
	$\alpha$	-2.302*** (0.383)	-2.647*** (0.500)
Year 1999	No. of employees	0.013 (0.032)	0.088* (0.047)
	Sales	-0.005 (0.060)	-0.092* (0.050)
	Total assets	1.120*** (0.042)	1.225*** (0.063)
post 1999	No. of employees	0.051* (0.026)	0.033 (0.054)
	Sales	-0.046 (0.038)	-0.107** (0.046)
	Total assets	1.111*** (0.038)	1.223*** (0.035)
	Guarantee dummy	0.129*** (0.029)	
	Expired guarantee		-0.241*** (0.076)
	R <sup>2</sup>	0.86	0.89
	# Obs	20800	4020
	Prob(F-stat)	0.00	0.00

Robust standard errors in parenthesis. “\*\*\*”, “\*\*” and “\*” indicate 1%, 5% and 10% significance levels, respectively. S.E. are computed through the SUR (PCSE) coefficient covariance matrix to account for both cross-section heteroskedasticity and correlation. Financial statement data are the result of elaborations on AIDA-MCC data, 1999-2005.

The first column of Tables 6 and 7 reports the test for the effectiveness of the guarantee. The non significance of the guarantee dummy in the estimate of the cost effect signals that guaranteed firms are charged lower borrowing costs, since after receiving the guarantee, they pay as much as non guaranteed firms, other things being. Although this result is not directly comparable to other evidence, it is not far from data gathered by some MGIs. Federconfidi (2004) reports an average

reduction in bank interest charges of about 1.5 points (-21% of reported average bank rates) for short-term loans and 1.1 points (-20%) for medium-term loans. By the same token, Fedart Fidi (2005) records average charges for their members that were lower than the average of reported market interest rates by 1.2 percentage points for medium-term loans.

The result has also been corroborated by other regressions, where bank debt has been replaced by non-bank debt and total debt. As expected, the guarantee turns out to be not effective for non-bank loans, while as far as total debt is involved the guarantee becomes effective again. Clearly this latter result is affected by the disproportion in the distribution of debt for SMEs, as confirmed by the descriptive statistics of the sample.

For the additionality test the guarantee dummy is positive and significant: thanks to the guarantee, guaranteed firms receive a greater quantity of bank loans than non guaranteed SMEs, by the amount of 13.77%. The result does not hold when the dependent variable is replaced by non-bank debt, as expected.

These quantitative findings also go in the same direction as those of other authors, although the latter findings lack the strength of a causality test, comparable to our test. A much higher additionality effect (+37% on average) is estimated by Boocock and Sharif (2005) for Malaysia on the basis of a variety of methods drawing on questionnaire answers, interviews and case studies. A higher impact also results from the simulations by Gale (1991): he calculates a 25-33% rise in credit allocation to small business as a result of loan guarantees provided under US federal credit programs. Riding *et al.* (2006), instead, estimate (through a credit scoring and logistic regression model) a  $74.8 \pm 9\%$  increase in the number of loans made possible by Canada Small Business Financing program. These loans would have otherwise been turned down by credit institutions.

Turning to the second question, what happens once the guarantee expires, we face a puzzling situation. On the one hand, formerly guaranteed firms are still charged with the same financial costs as guaranteed firms. On the other hand, the former go back to the previous situation, since they receive a lower quantity than with the guarantee.

We should point out that in testing for the effect of the expired guarantee, the control group of SMEs is represented by those firms whose guarantee is still alive. This might raise problems of sample selection. To check whether the regression results are robust enough in the face of this possible bias, we employed the Heckman two step method. In the additionality test, the obtained p-value shows that there is no evidence to assume selection bias is present, while for the cost effect the inverse Mills ratio is included to account for the bias, Heckman (1976) (see second estimates reported in Tables 6 and 7).

## 9. Conclusions

Most advanced economies have established publicly-funded guarantee schemes to help SMEs overcome their financing difficulties, that are due to imperfect or incomplete financial markets. Under such conditions, credit rationing for sub-prime borrowers, such as SMEs, is the usual outcome in Italy, as in other countries.

What differs from other countries is the way in which the SGS was run in Italy. The evidence described here indicates that a high degree of selectivity was used in choosing the targeted SME groups, the individual beneficiaries and the guarantee coverage ratios. All these factors pertain to SGS management and could be replicated in other countries. They also help explain the reason why, contrary to other SGS, the Italian one has managed to limit default rates and to contain the public subsidy element, that is required in order to maintain the Fund's financial sustainability.

Overall, the relevance of the Fund guarantee in widening SME access to bank credit is confirmed by our tests. Of course, these findings refer specifically to Italy's SGS in the context of a banking system that usually links lending decisions concerning SMEs to the presence of an

adequate collateral, Coco (2000). But this empirical evidence is also relevant for any other country, where the absence of a collateral leads to a stringent credit rationing towards SMEs.

The empirical evidence presented in this analysis shows that Italy's scheme has reached a measure of effectiveness in reducing SMEs' borrowing cost and easing their financing constraints. The cost reduction is evaluated as being in the range of 14.56-20.32%, while the additional supply of credit by banks is estimated at 13.77% at the median. These estimates are consistent with those resulting from alternative and less rigorous methodologies.

A puzzling result is found when the guarantee expires since formerly guaranteed firms are still charged financial costs in line with non guaranteed firms, but they are not granted greater quantities of bank loans. Further research should shed light on this point.

What this study adds to the existing empirical evidence is, first, the strength of a causality test and, second, its application to Italy's SGS, an analysis never carried out before. This econometric test, however, is not relevant just for the country under review, but can be replicated for other countries as well, since no explanatory variable in this analysis is highly specific to a single country.

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## ANNEX

### Fund’s operations

A number of strict conditions apply to SGS’ operations as to the beneficiaries and the nature of the guarantee. The main eligibility criteria for applying for a guarantee are that the enterprise has to be in good health and does not belong to a number of manufacturing and services sectors (tab.1) that are excluded because they benefit from other public aid regimes. A specific quota of this fund is devoted to ICT small firms.

As a result of these criteria, no assessment is made about the degree of financial need of the applying firm, so as to ascertain that the guarantee is necessary in order to improve the firm’s credit access. Banks, in particular, can choose what part of their SME loan portfolio to submit for a guarantee, provided that the loans meet the eligibility criteria and the parameters that SGS established for the SMEs, taking into account their economic sector and their size. These parameters form an enterprise scoring system that is used by the SGS to order applications according to their guarantee-merit. Hence, banks could, in principle, use the SGS guarantee just to improve the risk profile of a portion of their portfolio to free resources for lending to other sectors.

The scheme is governed by a Management Committee made out of public officials, a representative of the bank association and a representative for each of the major SME associations. Its operations are, instead, managed by a private bank, that is chosen on the basis of a public auction.

On the basis of a scoring system, other assessment criteria and some generic priority guidelines, the Management Committee decides how to allocate the fixed amount of guarantees that is possible annually, given the public funding endowment of the SGS and a predetermined limit to its gearing ratio. Specifically, it decides what firms will get a guarantee and the latter’s amount as a ratio to the loan principal, taking into account the ceilings that are fixed by the Government. These ceilings are differentiated according to the economic development of the region where the firm is located, and according to the type of guarantee (tab.1).

In fact, the Management Committee tried to achieve some balance among beneficiaries in terms of both their economic sectors, regions and sizes (i.e., micro, small, medium and consortia of SMEs).

The cost of the guarantee is a matter of different degrees of public aid, since the SGS is seen as a tool to promote SMEs development, particularly in some areas and sectors. In less developed areas, no fee is applied, while in areas in economic decline, the fees can range between 0.125 and 0.50%, and in the rest of the country, between 0.25 and 1% (tab.1).

The subsidized nature of the public guarantee scheme is tempered by the fact that the scheme is geared to cover just a fraction of the principal. This can limit moral hazard problems, since other entities, including the lender itself, share a significant portion of the financing risk.

**Table 1a. Characteristics of the Fund**

- Degree of discretion in	- The Fund decides on bank’s and MGIs’ proposals, according to a pre-specified scoring system, or set of indicators.
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lending	
- Eligibility conditions	<ul style="list-style-type: none"> <li>- Only small and medium size firms, as defined by EU regulations, and SME consortia.</li> <li>- Sound economic and financial conditions.</li> <li>- The following sectors are excluded: coal and steel, shipbuilding, synthetic fibres, automobile, transport. Guarantee ceilings are applied to the following sectors: car components, food industry and related trade.</li> </ul>
- Guarantee coverage rates	<ul style="list-style-type: none"> <li>- In less developed areas: up to 80% loan for direct guarantees; up to 90% for MGIs' guarantees, that cannot, however, go beyond 80% loan.</li> <li>- In rest of the country: up to 60% of loan for direct guarantees; up to 90% for MGIs' guarantees, that cannot, however, go beyond 60% loan.</li> </ul>
- Fees	<ul style="list-style-type: none"> <li>- No fee in the less developed areas.</li> <li>- In areas in economic decline, once only: 0.125% of loan for micro firms; 0.125% for equity and participatory debt, and 0.25% loans to small firms; 0.25% for equity and participatory debt, and 0.50% of loans to medium firms and consortia of firms.</li> <li>- In the rest of the country, once only: 0.25% of loan for micro firms; 0.25% for equity and participatory debt, and 0.50% loans to small firms; 0.50% for equity and participatory debt, and 1.00% of loans to medium firms and consortia of firms.</li> </ul>
Types of guarantee	<ul style="list-style-type: none"> <li>- Direct guarantee to banks</li> <li>- Counter-guarantee to mutual guarantee institutions</li> <li>- Co-guarantee with MGIs</li> <li>- On equity participation or participatory debt</li> </ul>
Priority sectors	<ul style="list-style-type: none"> <li>- MGIs</li> <li>- Southern regions</li> <li>- Women entrepreneurship</li> <li>- Micro firms</li> <li>- Start-up</li> <li>- Digital economy firms</li> </ul>
Nature of the guarantee	<ul style="list-style-type: none"> <li>- Subsidiary, after debt recovery procedure is completed.</li> <li>- Since 2006, direct</li> </ul>
Funding	<ul style="list-style-type: none"> <li>- Annual allocations from State budget, and levied fees.</li> </ul>

The effectiveness of the guarantee for the lender is also mitigated by its subsidiary nature. In case of debt insolvency, the lender has to pursue the debt recovery procedure by itself. Only at the end of this process, the Fund steps in to reimburse the portion of the debt that was not recouped by the lender. This approach was changed in 2006 to ensure full reimbursement within a short time from insolvency, as requested by the new Basel 2 criteria for bank capitalisation.

Overall, from the regulatory standpoint, it appears that the scheme tends to be rather stringent in selecting its beneficiary firms, but without going as far as to target the most disadvantaged among the SMEs. The priority status that the regulations grant to some categories of firms (those of industry, trade and services, those guaranteed by MGIs, those owned by women, micro firms, start-ups) are in fact so broad as to be tantamount to covering the vast majority of potential demand. There is no attempt to reach those small firms that are mostly constrained in financing their investment projects, because of the risk element involved. Only in 2005, a special section of SGS was dedicated to an innovative and risky sector, such as the ICTs.

Furthermore, the stringency of scoring parameters that are applied to the guarantee applications, leads to skimming the best credit risks among the eligible SMEs, making it particularly difficult to assess whether the most disadvantaged groups of firms, such as start ups and those operating in R&D fields, can actually rely on this scheme for gaining better access to credit.

By giving a clear preference to firms located in the less developed southern regions, it is also evident that this mechanism is not used merely to promote SMEs, but also to foster regional development.

No preference is, instead, granted by the regulation to particular economic sectors, with the exception of an ICT dedicated section, that is funded on a special basis.

Of particular significance is that the SGS regulation does not give any strong preference to Mutual guarantee institutions vis-à-vis banks and other financial institutions. Both groups are on the same level playing field. This is justified by the importance of banks in SME financing. However, it

deprives the Fund of a possible incentive effect, that could be achieved by giving priority to MGIs. Such a priority could induce more SMEs to resort, first, to MGIs for acquiring a guarantee. This would strengthen the sense of mutual responsibility among borrowing firms, since it would lead them to take part in institutions that aim at mutually sharing part of the financing risk, rather than shifting it directly to public funds.