



ISTITUTO DI STUDI E ANALISI ECONOMICA

Public Credit Guarantees and SME Finance

by

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Working paper n. 73

October 2006

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ABSTRACT

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 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 leverage 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.

Keywords: 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%).

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 leverage 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. The limited effect is, however, attributable to the particular features that govern the guarantee scheme.

GARANZIE PUBBLICHE E FINANZA DELLE PMI

SINTESI

Le difficoltà di finanziamento condizionano ampiamente la capacità di crescita delle PMI italiane, a causa della loro ristretta base di capitale di rischio e del limitato accesso al mercato del credito. Il Fondo Pubblico di garanzia per le PMI è uno degli strumenti attualmente disponibili per superare queste difficoltà. In questo saggio si presenta per la prima volta una valutazione dell'impatto del Fondo in termini di capacità di incremento della disponibilità di credito, riduzione del costo dell'indebitamento e sostenibilità finanziaria delle PMI.

Sono stati effettuati numerosi test econometrici confrontando le performance delle PMI ammesse a beneficiare della garanzia con un appropriato gruppo di controllo. I risultati attestano l'esistenza di un nesso di causalità tra la garanzia pubblica e l'ampliamento dell'indebitamento delle imprese garantite, come pure tra la stessa e il minor costo del debito. Il Fondo mostra pertanto di essere uno strumento efficace, benché abbia avuto un impatto contenuto a causa della sua limitata capitalizzazione e della selettività dell'approccio adottato per ammettere le imprese alla garanzia.

Parole chiave: PMI, garanzie di credito pubbliche, razionamento del credito, effetti causali, difference-in-difference.

Classificazione JEL: G14; G21; G28.

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1 THE FINANCING PROBLEM OF SMEs¹

Among EU countries, Italy is the one with the largest share of small- and medium-sized enterprises (SME) in its economic system². 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 2003³, 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,

¹ The authors wish to gratefully acknowledge the valuable assistance of P. Brunozzi, of Mediocredito Centrale, in providing data on SGS guarantees, and of Istituto per la Promozione Industriale, Rome, in supplying balance-sheet data concerning SMEs, as well as in processing them according to the requested format. Of course, the results and opinions expressed in this analysis are the sole responsibility of the authors and in no way can be attributed to the above-mentioned institutions.

² 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.

³ 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.

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 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 personal⁴, 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.

⁴ 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. The limited effect is, however, attributable to the particular features that govern the guarantee scheme, and to the high level of aggregation of the SME's financial data that are available and were used in this econometric analysis.

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 system⁵.

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 sector⁶; 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

⁵ 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.

⁶ Banks also have an Interbank Guarantee Fund that provides deposit insurance to depositors in an insolvent bank.

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.

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 (Tab.1).

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).

Tab. 1 Characteristics of the Fund

– Degree of discretion in lending	– The Fund decides on bank’s and MGIs’ proposals, according to a pre-specified scoring system, or set of indicators.
– Eligibility conditions	<ul style="list-style-type: none"> – Only small and medium size firms, as defined by EU regulations, and SME consortia. – Sound economic and financial conditions. – 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.
– Guarantee coverage rates	<ul style="list-style-type: none"> – In less developed areas: up to 80% loan for direct guarantees; up to 90% for MGIs’ guarantees, that cannot, however, go beyond 80% loan. – 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.
– Fees	<ul style="list-style-type: none"> – No fee in the less developed areas. – 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. – 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.
– Types of guarantee	<ul style="list-style-type: none"> – Direct guarantee to banks – Counter-guarantee to mutual guarantee institutions – Co-guarantee with MGIs – On equity participation or participatory debt
– Priority sectors	<ul style="list-style-type: none"> – MGIs – Southern regions – Women entrepreneurship – Micro firms – Start-up – Digital economy firms
– Nature of the guarantee	<ul style="list-style-type: none"> – Subsidiary, after debt recovery procedure is completed. – Since 2006, direct
– Funding	– Annual allocations from State budget, and levied fees.

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. In the following analysis observations for independent variables at time t are used to predict the state of the dependent variable (crisis/non-crisis) at time $t+1$, so that the forecast is a one-step-ahead forecast. Hence the covariates in the final database range from 1980 to 2003, while the dependent variable ranges from 1981 to 2004.

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.

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 to a significant scale. 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 credit allocations determined by the marketplace.

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 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.

**Tab. 2. Allocation of guarantees and default distribution 2000-2004
(percentages)**

Distribution by	Guaranteed loans	Guaranteed loans in default	Fund's loan repayment
<u>SIZE:</u>	<i>100.00</i>	<i>100.00</i>	<i>100.00</i>
- 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	-	-
<u>CATEGORIES OF FIRM:</u>	-	-	-
- 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
<u>MATURITY:</u>	<i>100.00</i>	<i>100.00</i>	<i>100.00</i>
- 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
<u>TYPE OF GUARANTEE:</u>	<i>100.00</i>	<i>100.00</i>	<i>100.00</i>
- Direct guarantee	37.71	41.37	43.00
- Counter-guarantee	60.78	58.16	57.00
- Co-guarantee	1.52	0.47	0
<u>ECONOMIC SECTOR</u>	<i>100.00</i>	<i>100.00</i>	<i>100.00</i>
- Industry & Construction	70.00	74.00	85.00
- Tourism	11.14	11.00	10.00
- Trade & other services	17.98	15.00	5.00
<u>BY AREAS:</u>	<i>100.00</i>	<i>100.00</i>	<i>100.00</i>
- 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.

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 table 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 losses⁷. 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:

$$L + A + I = F + O + S$$

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.

⁷ 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.

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 guarantees⁸ 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 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 sector⁹ (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 € 250,000¹⁰ (Fig. 1). In brief, the larger the loan, the lower the percentage of the

⁸ 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.

⁹ The default rate for banks' loans to micro enterprises is 9.82%, Banca d'Italia (2005).

¹⁰ Losses for equity participation are included in this category, where they account for 29%.

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.

Tab. 3 Fund for Guarantees to SMEs (percentages)

	2000	2001	2002	2003	2004	Total
Guarantee coverage ratio (1)	55.78	53.94	54.77	48.90	44.91	50.16
Loan default rate (2)	0.00	0.47	1.36	1.51	3.63	1.83
Repayment /Guarantees (3)	0.00	0.00	0.11	0.38	0.47	0.25
Loss/Loans (4)	0.00	0.00	0.06	0.19	0.21	0.12
Repayment rate (5)	0.00	0.00	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.

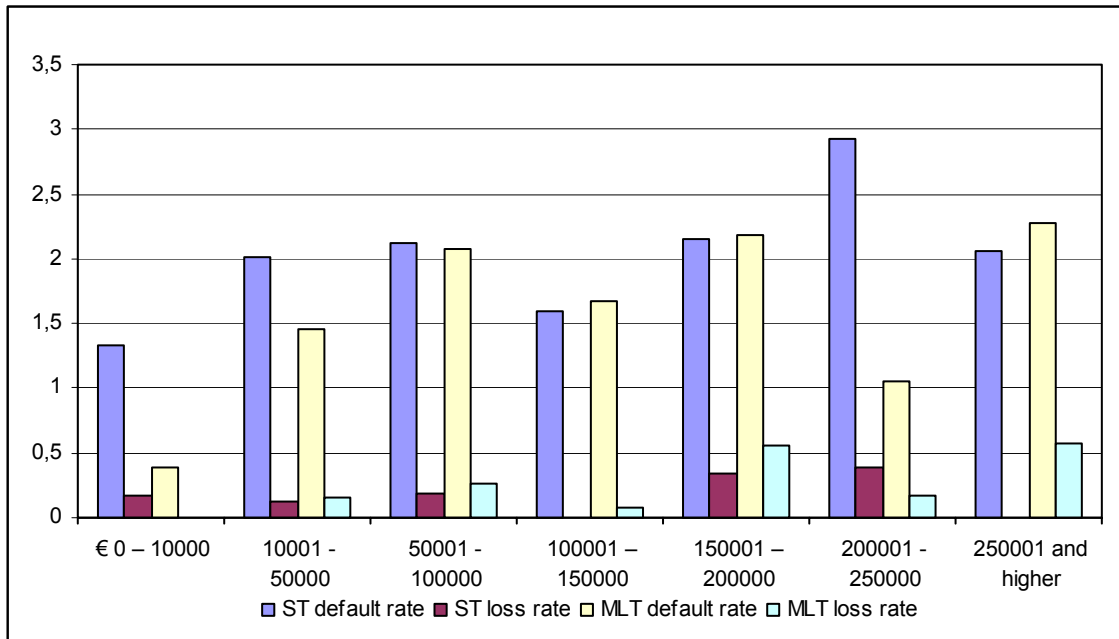
(5) Fund's loan repayments/guaranteed loans in default.

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.

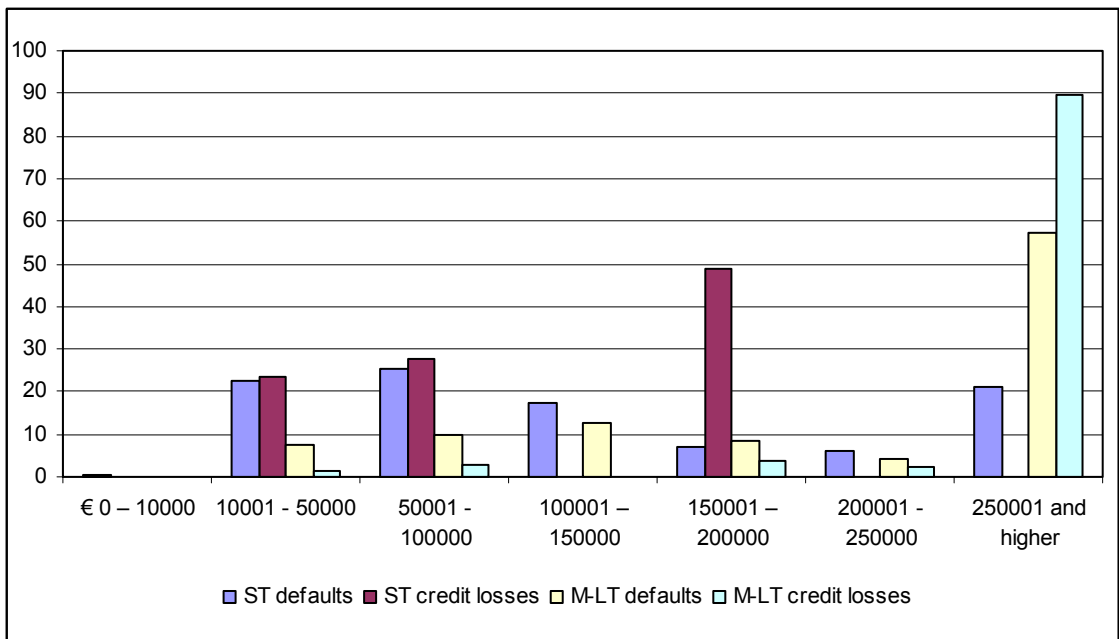
This sectoral concentration of defaults can explain their clustering in the Northern regions, as this area has a higher density of industrial firms. The South fares better in terms of default ratios (1.53% vs. 2.23 in the North), owing to its larger share of loans to trade and services sectors. It also 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.

Fig. 1 Default and loss rates by guarantee size (2000-2004)
(percentages and euro amounts)



Source: elaborations on MCC data.



Source: elaborations based on Fund's data.

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 1). 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)¹¹, 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.

¹¹ This is calculated according to the following formula $GSE = z \left[\sum_{t=0}^n y_t K \left(1 - \frac{t}{n}\right) (1+i)^{-t} \right] - x(zK)$

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.

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 guarantee¹²) 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 CREDIT ADDITIONALITY AND INTEREST COST REDUCTION

A To test for the Fund's role in widening credit access for SMEs and lessening their cost, we apply two econometric techniques, using financial data concerning a sample of SMEs. This sample is composed of firms that received the guarantee, and firms that didn't. The latter have successively split into two large groups: potential appliers (eligible) and non potential appliers (non eligible), according to their ATECO (sectoral) codes. Our aim is to find econometric evidence about the possible effect of the Fund's guarantee on credit additionality and financial cost reduction for SMEs. Attempts to estimate the effects of Government credit programmes are not new in economic literature. They were carried out, among others, by Gale (1991), NERA (1990), Piedad (1992), KPMF (1999), Boocock and Shariff, (2005), Riding and Haines (2001). Gale simulated an *ad hoc* model, generating numerical estimates of the changes induced by the US 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.

¹² 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 (Tab. 3).

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.

Our estimation is based neither on surveys, nor on an *ad hoc* model. We, instead, follow the consolidated econometric literature of causal effects estimation. For a technical discussion of this approach, we refer to the Technical Appendix and to Wooldridge (2002), that clearly surveys the main features of the causal effect econometric literature.

For our econometric tests we used data concerning SMEs that received the Fund's guarantee for the full period of the Fund's existence¹³. Information on their financial statements was drawn from AIDA data bank, as specified below. From the latter, we also drew a random sample of SMEs that were eligible for the Fund's guarantee but did not apply for it, and firms that were not eligible, because of the EU exclusion of some economic sectors from the guarantee.

Total number of SMEs	11261
Guaranteed firms	1243
Eligible firms	3952
Non eligible firms	6066
Sample years	1999-2004
Balance-sheet entries	financial costs, earnings, net worth, fixed and intangible assets, long/short term bank-related debt, long/short term bonds, long/short term non bank-related financial debt, sales, number of employees, depreciation allowance, total assets.

As a simple OLS estimation does not allow to detect the presence of a causal relationship, we follow the approach by Angrist (1990) and Angrist-Imbens-Rubin (1996). They prove that by resorting to a suitable

¹³ These data originate from the Fund's books.

instrumental variable (IV), under certain conditions, it is possible to “locally” insulate causal effects (see the Technical Appendix). Specifically, an instrumental variable that is correlated with the independent variable (instrumented variable), but at the same time is uncorrelated with the dependent, has to be found.

The IV approach can single out the Average Treatment Effect (ATE) for treated units¹⁴, but not for the whole economy. This local effect, called Local Average Treatment Effect (LATE), is useful for our purpose, since we are aiming at testing the average effect only for some units, i.e. for the guaranteed firms.

- B.** To this end, we measure the dependent variable in terms of the (log of) the ratio of the firm’s financial costs to its bank debt, since these are the most clearly identifiable cost figures in the AIDA data bank. Of course, a better choice would be the ratio of bank-related financing costs to bank debt, but this requires a level of detail that is not available in our data set. Our indicator is, however, a good proxy because the bulk of SMEs’ financing is provided by banks.

The following equation is estimated on the basis of a cross-section of the sampled SMEs for each year under consideration (below indicated as time t).

$$\mathbf{r}_t = \alpha + \beta_1 \mathbf{x}_{1t} + \beta_2 \mathbf{x}_{2t} + \beta_3 \mathbf{x}_{3t} + \beta_4 \mathbf{x}_{4t} + \dots + \beta_7 \mathbf{x}_{7t} + \delta \mathbf{d}_t + \mathbf{u}_t \quad (1)$$

where:

\mathbf{r}_t Nx1 vector of (log of) the ratio financial costs/bank-related debt in year t

\mathbf{x}_{1t} Nx1 vector of (log of) number of employees at time t

\mathbf{x}_{2t} Nx1 vector of (log of) sales at time t

\mathbf{x}_{3t} Nx1 vector of (log of) fixed assets at time t

\mathbf{x}_{4t} Nx1 vector of (log of) intangible assets at time t

\mathbf{x}_{5t} Nx1 vector of (log of) non bank-related financial debt at time t

\mathbf{x}_{6t} Nx1 vector of (log of) net worth at time t

\mathbf{x}_{7t} Nx1 vector of (log of) earnings at time t

\mathbf{d}_t dummy variables, equal to 1 in the case of guaranteed firms at time t, and to 0 otherwise

\mathbf{u}_t error term.

¹⁴ Any subject that is submitted to any “treatment”, such as a credit guarantee, re-educational program, income subsidy, etc.

Among the regressors, the firm's size (measured by the number of employees) is a proxy of the degree of information available to allow an adequate appraisal of credit-worthiness. Likewise, the fixed asset variable is introduced as an element that can influence banks' expectations of loan recovery in case of default, Pozzolo (2004). The earnings variable and the guarantee dummy are instrumented, by using for the earnings the data lagged 1 period in order to overcome simultaneity, and for the dummy, a new dummy that takes on the value of 1 for the firms that are eligible for the Fund's guarantee, regardless whether they received it or not, and zero otherwise.

The cross-section estimates for each year are presented in the following table.

Tab. 4 Dependent Variable: (log of) financial costs/bank debt

Year	2000	2001	2002	2003	2004
α	0.58 (1.075)	-0.44 (0.916)	-1.38** (0.692)	-1.16 (0.897)	-0.10 (1.062)
No. of employed	0.21* (0.074)	-0.01 (0.077)	0.01 (0.054)	0.00 (0.073)	0.13*** (0.070)
Sales	-0.15 (0.099)	-0.18* (0.070)	-0.14** (0.072)	-0.24* (0.077)	-0.28* (0.083)
Fixed assets	-0.32* (0.070)	-0.22* (0.062)	-0.09** (0.044)	-0.18* (0.052)	-0.18** (0.072)
Intangible assets	0.02 (0.029)	0.06** (0.032)	0.02 (0.028)	0.08** (0.032)	0.08* (0.028)
Non bank debt	0.09** (0.037)	0.13* (0.034)	0.08* (0.025)	0.15* (0.027)	0.12* (0.030)
Net worth	0.15** (0.072)	0.03 (0.058)	0.06 (0.066)	0.14*** (0.078)	0.07 (0.105)
Earnings	0.01 (0.059)	0.16* (0.054)	0.07 (0.059)	0.08 (0.057)	0.10 (0.086)
d_t	-1.22 (1.258)	-0.11 (0.502)	-1.11** (0.541)	-1.22* (0.476)	-1.49* (0.580)
# Obs	725	796	860	748	622

Heteroskedasticity robust standard errors in parenthesis. "****" indicates a significance level at 10%, "***" significance level at 5% and "*" significance at 1%. All variables are in log, except the dummy. The instrumented variables are "earnings" and "treated" respectively with earnings at time t-1, for sake of simultaneity, and a dummy variable which takes on value 1 when the firm is eligible, namely, potentially admissible to the treatment on the basis of its ATECO code, and 0 otherwise.

For our purpose, the estimate of δ coefficient is the most relevant element, since it signals the impact of the guarantee on the guaranteed firm's borrowing cost, as compared to the other firms. According to this estimate, it took two years, since the beginning of the Fund's operations, for the cost

reduction effect to become apparent and significant. After 2001, the point estimate of the δ coefficient shows significant values, that rise over time.

In the year 2004, the guarantee is estimated to have lowered bank debt cost for the guaranteed SMEs by 1.49%. This finding seems consistent with evidence gathered by some MGIs for the same year. In its annual survey of its guaranteed firms, Federconfidi (2005) reports an average reduction of bank interest charges by about 1.7% for short-term loans and by 1.1% for medium-term loans. Another MGI, Fedart Fidi (2005) reports average charges for their members, that are lower than average market interest rates by 1.2% for medium-term loans.

Nevertheless, the estimated coefficients might overstate the guarantee impact, if they were also to capture the effect of other variables related to the firm. In order to rule out this possibility, following De Galdeano-Vuri (2004), the same equation is estimated for the year 1999, that is prior to the first guarantee operation. In this case, the dummy takes on the value of 1 for all firms that received a Fund's guarantee in the following years, and zero otherwise, as specified in table 5.

Tab. 5. Instrumental variable estimates of the δ parameter using data prior to 1999 for firms receiving the Fund's guarantee in the following years

Guarantee years	2000	2001	2002	2003	2004
δ	-0.67 (0.682)	-0.38 (0.381)	-0.31 (0.317)	-0.29 (0.293)	-0.29 (0.290)
# Obs	11111	11111	11111	11111	11111

Robust standard errors in parenthesis. "****" indicates a significance level at 10%, "***" significance level at 5% and "**" significance at 1%. Standard errors are computed through the white correction to account for heteroskedasticity. All regressions include a constant. The dependent variable is the (log of) financial costs over bank debt in 1999. The regressors are the (log of) number of employees, sales, fixed assets, intangible assets, non bank debt, net worth, all for the year 1999. Their estimates are not reported for brevity and because uninteresting. Different regressions in each column have been run by changing the dummy accounting for the guaranteed firms in different years. For instance, in column 3 we report the estimated δ coefficient related to the 1999 financing cost for firms that received a guarantee only in year 2001.

The lack of significance of the δ coefficient in all the estimates in Table 5, can be interpreted in the sense that in the year 1999, those firms that received a Fund's guarantee years later, did not perform any better than those firms that never received the guarantee, although they were eligible. This result goes in the direction of ruling out the possibility that the

estimated effects may overstate the guarantee's impact, catching both the effect of the guarantee and the effect of unobservable firms' characteristics.

Still, another distortion might be possible in the estimates of Table 1. Since the estimated coefficient linearly increases (in absolute terms) over time (from 0 statistic in 2000 to -1.49 in 2004), one might suspect that it could be affected by temporal variation. The latter might pertain to changing macroeconomic conditions, such as a decrease in official interest rates, or to factors that allow firms to systematically save on financial costs over time, for instance, because of improvements in financial management due to technological advances.

To account for this possibility, all data related to the cross-sections of sampled firms for the period 1999-2004 are pooled together in order to take advantage of the properties of a Panel Data approach within the context of a Difference-in-Difference (DID) estimation procedure.

- C. This section examines the Fund's guarantee impact on financial cost through a DID estimate. This approach is based on the notion that treated units and non treated ones are not directly comparable when there are reasons to believe that they differ in unobservable characteristics that are associated with the potential outcome. This is so even after controlling for differences in observed characteristics.

To deal with such a shortcoming, an impact analysis of outcomes could be made for the same treated units by comparing their performance in the two periods, before and after treatment. In other words, the treated units' outcome before treatment, is used as a control variable for the treated units' outcome after treatment.

Such a comparison could, however, be contaminated by time trends in the outcome variables, or by the effect of events, other than the treatment, that occurred over the two periods. When only a fraction of the population is exposed to the treatment, an untreated comparison group can be used to identify temporal variations in the outcome that are not due to the treatment. In other words, the DID estimator relies on the assumption that the average outcomes for treated units and control ones would have followed parallel paths over time in the absence of the treatment.

In our case, this assumption can be considered quite realistic, since the temporal variation in the outcome variable, i.e., the financial cost, is basically affected by changing macroeconomic conditions. But such assumption could be violated if firms eligible for the Fund's guarantee

would react to it in anticipation of the guarantee (see in the same sense: Blundell *et al.* (2003)).

The test we carried out on 1999 data and reported in table 5 allows us to rule out an anticipation effect. The lack of significance of the δ estimate in all of the estimates of table 5 can mean that, in the period before the guarantee, guaranteed firms did not perform better than non guaranteed firms.

Tab. 6 DID estimate of the causal effect of the guarantee on financial cost

		Fixed Effects (DID)	Fixed Effects (DID)
	α	-3.14* (0.571)	-2.52* (0.503)
Year 1999	No. of employed	0.02 (0.059)	0.03 (0.044)
	Sales	0.11 (0.116)	0.08 (0.061)
	Fixed assets	-0.13** (0.058)	-0.12* (0.042)
	Intangible assets	-0.07* (0.025)	-0.07* (0.024)
	Non banking debts	0.07* (0.021)	0.04 (0.025)
	Net worth	0.05 (0.078)	0.06 (0.040)
	Earnings	0.05** (0.020)	
post 1999	No. of employed	0.02 (0.048)	0.02 (0.047)
	Sales	0.15** (0.070)	0.11** (0.051)
	Fixed assets	-0.20* (0.036)	-0.16* (0.027)
	Intangible assets	-0.04** (0.020)	-0.06* (0.016)
	Non banking debts	0.09* (0.014)	0.08* (0.013)
	Net worth	0.03 (0.063)	0.05 (0.040)
	Earnings	0.03*** (0.013)	
	Guarantee dummy	-0.11** (0.053)	-0.07*** (0.042)
	R ²	0.75	0.71
	# Obs	5835	8130
	Prob(F-stat)	0.00	0.00

Robust standard errors in parenthesis. “****” indicates a significance level at 10%, “***” significance level at 5% and “*” significance at 1%. Standard errors are computed through the SUR (PCSE) coefficient covariance matrix to account for both cross-section heteroskedasticity and correlation.

Having clarified our approach and assumptions, we present an estimate of a fixed-effect panel version of eq. 1 for the years from 1999 to 2004 in table 6¹⁵. Following Abadie (2005), Blundell *et al.* (2003), De Galdeano-Vuri (2004), the coefficients in the pre-guarantee year (1999) are estimated separately from those for the other years, by applying a time dummy variable to all regressors.

To account for problems of simultaneity (see the appendix), table 3 reports two different estimates incorporating time and cross-sectional fixed effects. The first estimate includes earnings among the regressors, while the second doesn't. This exclusion does not greatly alter the results, as the resulting estimate of the δ coefficient slightly decreases from -0.11 to -0.07, and the significance moves from 5 to 10%.

Our estimate shows a negative and significant coefficient for δ , as expected. This supports our contention that the Fund's guarantee indeed plays a significant, albeit small role in reducing debt cost for the borrowing firm. The small magnitude of the estimated effect should be considered in the light of the slight overestimation of financial costs, due to the inclusion of a small cost component that is not related to bank debt. Should we have more detailed data to correct such an overestimation, the resulting coefficient estimate could most likely be higher.

- D.** This section is devoted to testing the causal effect of the guarantee on credit access. Has the Fund's guarantee allowed the firm to receive a bank credit amount larger than what would otherwise be the case? To answer this question, we apply the same DID approach, using the (log of) ratio of bank debt to total assets as the dependent variable. This seems a proxy of a financial leverage ratio, but is consistent with a loan additionality test, since a credit rationed firm should have a relatively lower debt leverage ratio. The results are in Tab. 7.

The above estimates are not exempt from simultaneity problems with respect to earnings and sales and to the dependent variable and non-bank debt, that is included in the denominator of the dependent variable. This is the reason why we present in Tab. 7 different sets of regressors, by removing in turn: earnings, non-bank debt and both.

In all the estimates, the effect of the guarantee is found to have the expected (positive) sign and to be significant, but it is very small. According to these estimates guaranteed firms receive on average between 0.10 and

¹⁵ On the basis of a Hausman test, we can reject the null hypothesis of consistency of both fixed and random effects.

0.13% more bank loans than non guaranteed firms. The Fund's relevance for widening credit access is, however, consistently found.

Tab. 7 DID estimate of the causal effect of the guarantee on bank credit availability

		Fixed Effects (DID)	Fixed Effects (DID)	Fixed Effects (DID)	Fixed Effects (DID)
	α	-0.83 (0.646)	-1.04** (0.439)	0.16 (0.402)	-0.92** (0.439)
Year 1999	No. of employees	0.03 (0.049)	0.00 (0.043)	0.04 (0.035)	0.00 (0.036)
	Sales	0.13 (0.114)	0.12** (0.056)	0.00 (0.000)	0.10*** (0.057)
	Fixed assets	0.12** (0.055)	0.13* (0.034)	0.16* (0.047)	0.14* (0.034)
	Intangible assets	0.07* (0.022)	0.07* (0.021)	0.05* (0.014)	0.04* (0.010)
	Non bank debt	-0.14* (0.025)	-0.10* (0.022)		
	Net worth	-0.25* (0.071)	-0.23* (0.037)	-0.32* (0.042)	-0.29* (0.028)
	Earnings	-0.04** (0.016)		0.00 (0.013)	
post 1999	No. of employees	-0.01 (0.044)	0.00 (0.049)	0.02 (0.029)	-0.03 (0.029)
	Sales	0.16*** (0.087)	0.12** (0.050)	0.00 (0.000)	0.09** (0.037)
	Fixed assets	0.20* (0.039)	0.19* (0.022)	0.22* (0.024)	0.18* (0.023)
	Intangible assets	0.05* (0.016)	0.05* (0.015)	0.04* (0.010)	0.04* (0.007)
	Non bank debt	-0.12* (0.013)	-0.12* (0.014)		
	Net worth	-0.30* (0.054)	-0.29* (0.034)	-0.31* (0.031)	-0.33* (0.022)
	Earnings	-0.05* (0.012)		-0.05* (0.012)	
	Guarantee dummy	0.12** (0.058)	0.10** (0.047)	0.13* (0.038)	0.11* (0.037)
	R ²	0.82	0.80	0.79	0.76
	# Obs	5852	8154	11704	16158
	Prob (F-stat)	0.00	0.00	0.00	0.00

Robust standard errors in parenthesis. “***” indicates a significance level at 10%, “**” significance level at 5% and “*” significance at 1%. Standard errors are computed through the SUR (PCSE) coefficient covariance matrix to account for both cross-section heteroskedasticity and correlation.

6 CONCLUSIONS

In imperfect or incomplete financial markets, Government intervention is often advocated by the most disadvantaged borrowers, such as SMEs, in order to overcome their financing difficulties. Government intervention is, however, the subject of much controversy in the economic literature, even when it takes the form of a limited guarantee of a bank loan.

All advanced economies have established publicly-funded guarantee schemes for SMEs. Doubts have, however, been expressed by some about the justification and effectiveness of this instrument on grounds of financial sustainability and ability to meet targets, such as credit additionality and borrowing cost reduction. Others argue that this is an effective tool to modify a market-based credit allocation in favour of disadvantaged firms. Both sides, nevertheless, agree on the presence of agency problems between both, lender and guarantor and lender and borrowing firm in the working of a public guarantee mechanism.

Conflicting results come out of the empirical evidence that has been gathered so far through various analytical tools. But, to our knowledge, there has never been any econometric evidence based on standard econometric techniques. This study attempts to fill this gap by examining the case of Italy's State-funded guarantee scheme for SMEs.

After a thorough analysis of the performance of this scheme, econometric tests are carried out to verify whether or not the State guarantee had any ascertainable impact on widening credit access and reducing its cost for SMEs. These tests are based on detailed information on all guarantee recipients and on their financial statements, as reported in the AIDA data bank. Econometric tools are applied to check whether or not a causal relationship can be established.

Our findings show that the scheme has reached a measure of effectiveness in easing the SMEs' financing difficulties, but also highlight some critical areas that require more attention.

On the positive side, our econometric tests provide evidence that the Fund's guarantee raised the amount of credit SMEs received from the banking system. This effect is, however, rather limited, not least because of the relatively small amount of resources the Government has committed to this purpose.

Another finding of our analysis is that the public guarantee lowered the SMEs' borrowing cost to a substantial extent, confirming anecdotal evidence drawn from some surveys of SMEs.

Furthermore, Italy's scheme has achieved some positive results on several grounds. It limited defaults covered by the guarantee to a very low percentage, performing much better than other European countries. It directed a relatively high share of guarantees towards the less developed regions of the South and some disadvantaged groups of firms. It mostly supported small-size enterprises, and fostered the development of a system of private mutual guarantee institutions. This systemic aspect is of particular relevance, since it helps spread among guaranteed firms the principle of mutual responsibility, that is essential to limit moral hazard problems in financing.

Above all, it mobilized a significant amount of bank loans to the advantage of SMEs by leveraging a relatively tiny amount of public financial resources. Its financial gearing ratio is also much higher than that of any other State aid tool. This has been made possible at an operating cost that is lower than in similar schemes in other countries.

Against such achievements stand some less positive aspects. The scheme did not necessarily manage to target the most financially-disadvantaged firms within the SME group. There was no such a mechanism as to make a comparative assessment of firms' financing needs among loan applicants. Nor was there any screening to see whether a loan proposed by a bank for the Fund's guarantee would have been granted even in the absence of the Fund's guarantee. As a consequence, the pattern of guarantees seems to reflect credit supply factors, notably banks' lending decisions, more than SMEs' potential credit demand.

This is also evident in the apparent absence of mechanisms aimed at outreaching for the most meritorious investment projects. Specifically, innovative enterprises had not received any preference, until a specific section of the Fund was established in 2005. Short-term lending received as much attention as medium-term financing needs, suggesting that fixed capital accumulation was not a priority target. Rather than focusing on the growth and strengthening of small-size firm through valuable investment projects, the Fund provided sizeable support to the survival of small firms by helping them fill their gap in working capital.

Overall, the Fund showed a high degree of caution in risk taking. This is confirmed by the fact that boosting firm's equity financing through guarantees remained marginal. With hindsight, such a decision nevertheless seems to have been appropriate, given the extremely high default rate experienced in these guarantees.

Caution against risk helped to contain default rates to a very low percentage, thereby maintaining the Fund's operations close to financial sustainability. But since guarantees were granted with a significant subsidy

element, financial sustainability was not intended to be achieved and was never achieved. Although loan defaults and operating costs were kept at a low level, they could not be covered through the fees that were levied just on a subset of guaranteed firms. The Fund could, however, reach financial sustainability through a higher differentiation of the subsidy component according to each firms' financing need and by containing the rise of operating costs. In any case, even if these changes are not enacted, the cost of such subsidy is extremely low compared to financing impact that it had for SMEs, an impact far above that of other State aid instruments.

In the light of this evidence, a number of lessons could be drawn. First, among the various tools a Government can use to promote SME financing, a guarantee scheme can be one of the most effective ones, because of its relatively small cost for public finances and its high capacity to mobilize private capital. But to be also effective from the point of view of economic development, several conditions must be met.

First of all, any risk taking due to a guarantee must be shared with other financial institutions and with the SMEs themselves, in order to lessen moral hazard and adverse selection problems. This should lead Governments to use this tool to foster the emergence of a spirit of mutual risk-sharing among firms, by inducing them to take part in mutual credit guarantee schemes. The publicly-funded guarantee scheme should specifically serve the purpose of providing only a counterguarantee to a portion of the guarantee that consortia of firms grant to their participants.

The public guarantee should target the neediest firms on the basis of the quality of their investment projects and their relevance for the overall economy . These are necessary prerequisites to foster the expansion at the same time of the firm's size and the economy's growth potential. Increasing the dimensions of a firm is a necessary condition to strengthen its ability to invest in new projects, to innovate, to afford significant research and development programs, and to be able to better withstand the most difficult phases of a business cycle.

In a global economy with global markets, such as ours, that is driven by continuous technological innovation and an ever increasing number of competitors, innovation, investment and internationalization are of outmost importance for all the firms and cannot be just the preserve of medium and large enterprises, as we have broadly seen so far. Small firms have to be in a position to take a full part in these crucial activities. This is not possible without a determined effort by Governments to channel an increasing flow of private savings toward SMEs, since they represent a large portion of any country's production capacity and employment.

Guarantees can prove to be a highly effective policy instrument to achieve these goals, provided that they are more focused on those enterprises that are more financially constrained in pursuing these objectives. Innovation, research, internationalization are all risky areas that financial markets and institutions are generally reluctant to finance. They are even more reluctant in the case of SMEs because of the more unfavourable trade-off between risk and return. Guarantees can help Governments in overcoming this hurdle, as they can help in pursuing other valuable economic objectives, such as the development of some regions or sectors.

In any case, as there is a need to sharpen the focus of a public guarantee system, so there is a need to better tailor their conditions in terms of coverage ratio and costs for the borrowing firm. According to the Fund's experience, coverage ratios that are far below 80 per cent of the loan can narrow the room for moral hazard. Nevertheless, coverage ratios can also be instrumental in discriminating among firms with different financial needs and across different business projects. Accordingly, they should be an increasing function of the project priority and a decreasing one of the size of the loan.

The cost of the guarantee to the firm can also be used as an element to be more selective in granting a public subsidy. In the Fund's experience both, flat exemptions and flat fees can give rise to unwarranted and undesirable degrees of subsidization, inasmuch as firms with different risk profiles and different positions in the Government sectoral priority list are treated equally. A wider differentiation of fees is, instead, a means to make the guarantee instrument more selective and less inconsistent with its financial sustainability.

At any rate, it is essential to maintain fees at such a level as to avoid both, discouraging small firms from resorting to the guarantee and creating a mechanism that is so financially unsustainable to lead to its demise. In this perspective, there is no doubt that a country-wide publicly supported guarantee scheme is necessary, since it can compensate guarantee risks across the full spectrum of risk categories, regardless whether they are linked to specific regions, or economic sectors, or types of firms. This is precisely what the Fund has accomplished: its default rates and operating costs kept guarantee risk low by exploiting the risk balancing effect and economies of scale. It is through such a system that the fee level required to achieve financial sustainability can be kept below a market-based fee level.

Given the full array of relative advantages inherent to a well-run country-wide guarantee scheme, the latter should be considered, in Italy as in other advanced economies, as an instrument to be expanded and used to replace other costly aid instruments. This is not, however, the case in reality.

Hence, the question to be raised is why neither Italy, nor other countries have resorted more heavily to this tool, particularly in a period of severe budget stringency, as the current decade? But answering this question is the subject for a different type of analysis.

TECHNICAL APPENDIX

Cross-section analysis

The set of instruments used to estimate the equations reported in table 4 is composed of: earnings at time t-1 in order to instrument earnings at time t, and a dichotomic variable, that takes on value 1 when the firm is eligible on the basis of ATECO economic sectors, and zero otherwise, in order to instrument the dummy \mathbf{d}_t .

The earnings variable must be instrumented because it has a problem of simultaneity with the numerator of the dependent variable. As in Pozzolo (2004), its lagged value allows to have an instrument uncorrelated with the dependent variable and at the same time correlated with the regressor at time t.

The chosen instrument for the \mathbf{d}_t variable must fulfil the following requirements by Angrist-Imbens-Rubin (1996) in order to estimate the causal effect.

Exclusion restriction hypothesis: this requirement is met since EU rules aimed at excluding some sectors from the Fund's guarantee do not lead over time to a systematic difference in financing cost between eligible firms and non eligible ones. In other words, EU rules affect other domains of firm's performance.

Such a hypothesis was tested through the following equation ¹⁶:

$$\mathbf{r}_t = \alpha + \beta_1 \mathbf{x}_{1t} + \beta_2 \mathbf{x}_{2t} + \beta_3 \mathbf{x}_{3t} + \beta_4 \mathbf{x}_{4t} + \beta_5 \mathbf{x}_{5t} + \beta_6 \mathbf{x}_{6t} + \beta_7 \mathbf{z} + \beta_8 (1 - \mathbf{z}) + \mathbf{u}_t \quad (2)$$

where \mathbf{z} refers to a dummy that takes on the value 1 in the case of an eligible firm and 0 otherwise. Hence, it should be tested whether $\beta_7 = \beta_8$. This hypothesis is accepted as a result of $F_{(1,1247)} = 0.97$. Moreover, as expected, the two coefficients are significantly different from zero.

Stable Unit Treatment Value Assumption (SUTVA): this requirement is met since there is no reason to assume that non guaranteed firms could generally benefit of lower borrowing costs and larger credit access, as it is the case for guaranteed firms.

Monotonicity assumption: this requirement for the LATE effect is met since no firm can be assumed to be charged higher rates by lending banks

¹⁶ Equation 2 must be estimated on the basis of 1999 data, since the Fund was not yet operational in that year. The earnings variable is omitted from equation 2 because no lagged data are available.

because of the guarantee. This assumption is also supported by the negative sign of the estimated coefficients in all OLS and IV estimates.

OLS and IV estimates are reported in the following table for each year of the period 2000-2004.

Dependent Variable: (log of) financial costs/bank debt¹⁷

method	OLS	IV	OLS	IV	OLS	IV	OLS	IV	OLS	IV
year	2000	2000	2001	2001	2002	2002	2003	2003	2004	2004
α	0.25 (0.926)	0.58 (1.075)	-0.75 (0.739)	-0.44 (0.916)	-1.91* (0.608)	-1.38** (0.692)	-0.83 (0.713)	-1.16 (0.897)	-0.64 (1.032)	-0.10 (1.062)
No. of employed	0.16* (0.056)	0.21* (0.074)	0.02 (0.060)	-0.01 (0.077)	0.00 (0.061)	0.01 (0.054)	0.01 (0.059)	0.00 (0.073)	0.05 (0.072)	0.13*** (0.070)
Sales	-0.14*** (0.082)	-0.15 (0.099)	-0.12** (0.056)	-0.18* (0.070)	-0.04 (0.058)	-0.14** (0.072)	-0.19* (0.063)	-0.24* (0.077)	-0.15*** (0.076)	-0.28* (0.083)
Fixed assets	-0.25* (0.047)	-0.32* (0.070)	-0.16* (0.046)	-0.22* (0.062)	-0.14* (0.042)	-0.09** (0.044)	-0.16* (0.045)	-0.18* (0.052)	-0.23* (0.062)	-0.18** (0.072)
Intangible assets	-0.01 (0.023)	0.02 (0.029)	0.02 (0.023)	0.06** (0.032)	0.01 (0.023)	0.02 (0.028)	0.04 (0.026)	0.08** (0.032)	0.06** (0.026)	0.08* (0.028)
Non banking debts	0.10* (0.030)	0.09** (0.037)	0.10* (0.027)	0.13* (0.034)	0.11* (0.022)	0.08* (0.025)	0.14* (0.026)	0.15* (0.027)	0.13* (0.027)	0.12* (0.030)
Net worth	0.07 (0.049)	0.15** (0.072)	0.04 (0.042)	0.03 (0.058)	0.01 (0.046)	0.06 (0.066)	0.08 (0.057)	0.14*** (0.078)	0.08 (0.065)	0.07 (0.105)
Earnings	0.07** (0.028)	0.01 (0.059)	0.06* (0.022)	0.16* (0.054)	0.09* (0.023)	0.07 (0.059)	0.06** (0.024)	0.08 (0.057)	0.04 (0.036)	0.10 (0.086)
d_t	-0.23** (0.117)	-1.22 (1.258)	-0.24* (0.082)	-0.11 (0.502)	-0.35* (0.081)	-1.11** (0.541)	-0.28* (0.105)	-1.22* (0.476)	-0.34* (0.089)	-1.49* (0.580)
# Obs	944	725	1080	796	1140	860	916	748	832	622

Source: elaborations on AIDA-MCC data.

Heteroskedasticity robust standard errors in parenthesis. “***” indicates a significance level at 10%, “**” significance level at 5% and “*” significance at 1%. All variables but dummies are in log.

The instrumented variables are “earnings” and “treated” respectively with earnings at time t-1, for sake of simultaneity, and a dummy variable which takes on value 1 if the firm is admissible to the guarantee on the basis of its sectoral ATECO code, and 0 otherwise.

¹⁷ 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. Following Staiger and Stock (1997), when the instrumented variables are no more than 1, the reciprocal of the F-test of the first stage¹⁷ approximates the fraction of the OLS bias with respect to the LATE of which IV still suffers in a finite sample. Unfortunately, when instrumented variables are more than 1 a measure of the IV bias becomes a rather complicated expression. For this reason we omit the F of the first stage in the tables. For an example of the inclusion of the F of the first stage in a LATE estimate see Ichino and Winter-Ebner (2004).

DID estimates

Estimates reported in tables 6 and 7 are based on the following equation:

$$y_i = c_i \mathbf{i}_T + \mathbf{I}_T \boldsymbol{\gamma} + \mathbf{S} \mathbf{X}_i \boldsymbol{\beta} + (\mathbf{I}_T - \mathbf{S}) \mathbf{X}_i \boldsymbol{\beta} + \delta (\mathbf{I}_T - \mathbf{S}) \mathbf{d}_i + \mathbf{u}_i \quad \text{for } i=1 \dots N$$

Broadly speaking, this equation is a standard DID regression equation, where all regressors are treated with a dummy variable to distinguish the two periods. For its algebraic derivation, we refer the reader to Abadie (2005), Blundell et al (2003), De Galdeano-Vuri (2004).

Given that our data set is made out of a number of cross-section data related to different years, we may rewrite the panel equation regression as a pool of cross-sectional equations. Each equation's observations are actually stacked on top of the others. In the above equation, \mathbf{i}_T is a T-element unit vector, \mathbf{I}_T is the T-element identity matrix, c_i is a cross section fixed effect, $\boldsymbol{\gamma}$ is a vector containing all of the period effects, $\boldsymbol{\gamma}' = (\gamma_t, \gamma_{t+1}, \dots, \gamma_T)$, $\boldsymbol{\beta}$ is a $k \times 1$ coefficient vector, \mathbf{X}_i is a $N \times k$ matrix of explanatory variables, \mathbf{S} is the corresponding matrix (T \times T) form of the usual temporal dummy variable, that takes on value 1 for all t belonging to the first period, and 0 otherwise. In matrix form \mathbf{S} takes on value 1 in the t^{th} element of the principal diagonal for all t belonging to the first period. In our case, we are interested in distinguishing between data prior and next to the treatment, i.e. 1999 is the first period and 2000-2004 belong to the second, thus \mathbf{S} takes on value 1 only in the first element of the principal diagonal.

δ is our parameter of interest, since it captures the effect of the guarantee on the dependent variable. The dummy \mathbf{d}_i captures the guaranteed firms, taking on value 1 in the year(s) of guarantee for the guaranteed firm, or 0 otherwise. From another standpoint, it can be regarded as the stacked interleaved form of the \mathbf{d}_t vectors of equation (1). Obviously, it takes on value 0 for all firms in 1999.

The table below reports the full set OLS and IV estimates.

**DID estimate of the causal effect of the guarantee
on the (log of) financial cost/bank debt**

		OLS	Fixed Effects (DID)	OLS	Fixed Effects (DID)
	α	-0.78* (0.302)	-3.14* (0.571)	-0.79* (0.266)	-2.52* (0.503)
Year 1999	No. of employed	0.03 (0.043)	0.02 (0.059)	0.05 (0.042)	0.03 (0.044)
	Sales	-0.10** (0.047)	0.11 (0.116)	-0.06 (0.037)	0.08 (0.061)
	Fixed assets	-0.19* (0.036)	-0.13** (0.058)	-0.18* (0.040)	-0.12* (0.042)
	Intangible assets	0.00 (0.025)	-0.07* (0.025)	-0.02 (0.020)	-0.07* (0.024)
	Non bank debt	0.07* (0.021)	0.07* (0.021)	0.07* (0.025)	0.04 (0.025)
	Net worth	0.09* (0.030)	0.05 (0.078)	0.11* (0.036)	0.06 (0.040)
	Earnings	0.07* (0.016)	0.05** (0.020)		
post 1999	No. of employed	0.05* (0.021)	0.02 (0.048)	0.05** (0.022)	0.02 (0.047)
	Sales	-0.13* (0.034)	0.15** (0.070)	-0.11* (0.024)	0.11** (0.051)
	Fixed assets	-0.18* (0.021)	-0.20* (0.036)	-0.21* (0.018)	-0.16* (0.027)
	Intangible assets	0.02*** (0.011)	-0.04** (0.020)	0.02** (0.009)	-0.06* (0.016)
	Non bank debt	0.12* (0.008)	0.09* (0.014)	0.12* (0.010)	0.08* (0.013)
	Net worth	0.05* (0.016)	0.03 (0.063)	0.11* (0.016)	0.05 (0.040)
	Earnings	0.07* (0.011)	0.03*** (0.013)		
	Guarantee dummy	-0.31* (0.040)	-0.11** (0.053)	-0.33* (0.033)	-0.07*** (0.042)
	R ²	0.05	0.75	0.05	0.71
	# Obs	5835	5835	8130	8130
	Prob(F-stat)	0.00	0.00	0.00	0.00

Source: elaborations on AIDA-MCC data.

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

The table above reports two different estimates, carried out both with OLS and fixed effects. The first estimate reports the earnings variable among the regressors. Given the strong presumption of a simultaneity bias for this variable with the dependent one, the second estimate removes this variable from the set

**DID estimate of causal effect of the guarantee
on the (log of) bank debt/total asset**

		OLS	Fixed Effects (DID)	OLS	Fixed Effects (DID)	OLS	Fixed Effects (DID)	OLS	Fixed Effects (DID)
	α	-2.96* (0.346)	-0.83 (0.646)	-2.76* (0.319)	-1.04** (0.439)	0.99* (0.218)	0.16 (0.402)	-2.74* (0.240)	-0.92** (0.439)
Year 1999	No. of employed	-0.04 (0.043)	0.03 (0.049)	-0.05 (0.033)	0.00 (0.043)	0.05 (0.032)	0.04 (0.035)	-0.05** (0.025)	0.00 (0.036)
	Sales	0.34* (0.045)	0.13 (0.114)	0.28* (0.034)	0.12** (0.056)	0.00 (0.000)	0.00 (0.000)	0.27* (0.031)	0.10*** (0.057)
	Fixed assets	0.23* (0.049)	0.12** (0.055)	0.22* (0.043)	0.13* (0.034)	0.25* (0.032)	0.16* (0.047)	0.23* (0.033)	0.14* (0.034)
	Intangible assets	0.05** (0.024)	0.07* (0.022)	0.07* (0.019)	0.07* (0.021)	0.07* (0.018)	0.05* (0.014)	0.07* (0.014)	0.04* (0.010)
	Non bank debt	-0.10* (0.028)	-0.14* (0.025)	-0.10* (0.015)	-0.10* (0.022)				
	Net worth	-0.32* (0.053)	-0.25* (0.071)	-0.38* (0.041)	-0.23* (0.037)	-0.40* (0.043)	-0.32* (0.042)	-0.47* (0.040)	-0.29* (0.028)
	Earnings	-0.14* (0.021)	-0.04** (0.016)			-0.11* (0.032)	0.00 (0.013)		
post 1999	No. of employed	-0.04 (0.031)	-0.01 (0.044)	-0.05*** (0.026)	0.00 (0.049)	0.11* (0.021)	0.02 (0.029)	-0.06* (0.017)	-0.03 (0.029)
	Sales	0.42* (0.033)	0.16*** (0.087)	0.36* (0.026)	0.12** (0.050)	0.00* (0.000)	0.00 (0.000)	0.32* (0.022)	0.09** (0.037)
	Fixed assets	0.24* (0.029)	0.20* (0.039)	0.26* (0.026)	0.19* (0.022)	0.25* (0.016)	0.22* (0.024)	0.24* (0.014)	0.18* (0.023)
	Intangible assets	0.02** (0.010)	0.05* (0.016)	0.03* (0.007)	0.05* (0.015)	0.07* (0.006)	0.04* (0.010)	0.04* (0.005)	0.04* (0.007)
	Non bank debt	-0.12* (0.008)	-0.12* (0.013)	-0.14* (0.008)	-0.12* (0.014)				
	Net worth	-0.40* (0.026)	-0.30* (0.054)	-0.45* (0.023)	-0.29* (0.034)	-0.43* (0.024)	-0.31* (0.031)	-0.51* (0.017)	-0.33* (0.022)
	Earnings	-0.13* (0.013)	-0.05* (0.012)			-0.09* (0.010)	-0.05* (0.012)		
	Guarantee dummy	0.53* (0.067)	0.12** (0.058)	0.57* (0.071)	0.10** (0.047)	0.47* (0.052)	0.13* (0.038)	0.49* (0.059)	0.11* (0.037)
	R ²	0.16	0.82	0.14	0.80	0.14	0.79	0.16	0.76
	# Obs	5852	5852	8154	8154	11704	11704	16158	16158
	Prob (F-stat)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Source: elaborations on AIDA-MCC data.

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

of regressors. The underlying rationale is that to instrument the earnings variable through earnings at time $t-1$ would imply dropping the first time observation, thereby missing the pre-guarantee period and making it impossible to carry out a DID estimate. By restricting the set of covariates, the δ coefficient estimate slightly decreases from -0.11 to -0.07, and its significance goes from 5 to 10%.

The same estimation procedure was applied to estimate the credit additionality effect.

Simultaneity problems might affect both earnings and sales, and the dependent variable and non-bank debt, that is included in the denominator of the dependent variable. For this reason, different combinations of regressors are used, by removing in turn, earnings, non-bank debt, and both.

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