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Cost of capital and public loan guarantees to small firms

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Abstract In this paper, we study the determinants of the spread charged by banks under a UK policy intervention scheme, aimed at supporting access to the credit market for small firms through guarantee backed loans. We exploit a unique dataset containing data on 29,266 guarantee backed loans under the UK SFLG scheme over the period 2000 to 2005. Results suggest that lower spreads are offered for loans of larger amounts and higher durations, for service firms, for larger firms, and for those located in the most advanced regions. Higher spreads are applied to high-tech manufacturing firms and to loans issued for working capital purposes. We also find that the presence of other extant debt is associated with a relatively higher spread and that this effect is especially significant for the subset of firms that have reached a maximum debt capacity based on collateralized assets. Further, we also find that the higher the incidence of the publicly guaranteed debt over the total amount of outstanding loans, the lower, on average, the spread. However, an increase in the guaranteed coverage leads to a contraction in the spread only for loans aimed at covering working capital needs rather than investments.

Keywords Cost of debt · Small businesses · Public loan guarantee scheme · Credit market

JEL Code G21 · G28 · L26

1 Introduction

Numerous scholars have highlighted how capital market imperfections largely affect small businesses, which face significant difficulties in accessing external forms of finance and cannot rely on internal finance to sustain their growth (Beck and Demirguc-Kunt, 2006; Berger and Udell, 1990; Carpenter and Petersen, 2002). Financing obstacles significantly hamper small businesses' growth and competitiveness (Beck and Demirguc-Kunt, 2006; Headd and Kirchhoff, 2007). Small firms are very likely to face credit constraints because of their limited availability of collateral assets to secure firms' borrowing and their "informational opacity" due to the limited financial track records, which prevents banks from evaluating their creditworthiness (Berger and Udell, 1990). Concerns have been raised that the recent financial crisis and the relevant institutional changes that have been affecting the European credit market (e.g., the introduction of the Basel II and III Accords) might worsen lending conditions for small

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businesses, thus further exacerbating their financing constraints (Scellato and Ughetto, 2010).

The difficulties faced by small firms in accessing credit have called for a deeper reflection by policy makers, who have introduced different types of government programs to help small firms gain access to credit lines and loans that would otherwise be unavailable to them (Cowling and Clay, 1995; Cowling, 2010; Cowling and Siepel, 2013; Martí and Quas, 2016; Meuleman and De Maeseneire, 2012; Riding, 1998). While direct governmental credit subsidization programs have rarely achieved the expected success (Zia, 2008), numerous loan guarantee programs that supply government guarantees to banks have been successfully introduced in many developed and developing countries (Beck, Klapper, and Mendoza, 2010; Boschi, Girardi, and Ventura, 2014; Cowling and Mitchell, 2003; Honaghan, 2008; Klapper, Laeven, and Rajan, 2006; Riding, 1998). Such schemes allow for partial coverage of potential losses, so that the government shares with the bank the risk that the guaranteed loans may default, by covering a predetermined percentage of the outstanding loan (Beck, Klapper, and Mendoza, 2010; Honohan, 2010). Moreover, they are typically based upon the "additionality" concept, namely, the requirement that guaranteed loans are only issued to borrowers that have exhausted all other sources of funding (Cowling and Siepel, 2013).[1] However, there is much agreement in the literature that conventional screening lending criteria are still implemented by banks in the case of loans issued under public guaranteed schemes (Fraser, 2009; Riding, 1998). These public intervention programs differ worldwide in their pricing; risk assessment and risk management practices; in the role played by government; in the lending criteria (e.g. eligible borrowers and lending terms); in the proportion of the total loan which is guaranteed; in the distribution of losses between the lender and the guarantor in case of default; and in the restrictions which typically concern the sector, type of business, or geographic area of reference (Beck, Klapper, and Mendoza, 2010; Honohan, 2010; Ughetto and Vezzulli, 2011).

In this paper, we study the determinants of the spread charged by banks under a UK policy intervention scheme, aimed at supporting access to the credit market for small firms through guarantee backed loans. We exploit a unique dataset on 29,266 guaranteed loans under the UK SFLG scheme over the period 2000 to 2005. The strength of the dataset is the specific information it provides on the amount, duration, and purpose of guarantee backed loans, together with data on the spread applied by banks on such loans and on the borrowers' main characteristics. The database on loans guaranteed by the UK SFLG scheme has been matched with data at the regional level on the regions' economic competitiveness and structure of the banking system.

Our empirical analysis is twofold. First, we examine the determinants of the spread, using a set of covariates that account for (i) the firms' characteristics (i.e., age, size, sector), (ii) the loans' features (amount, duration, fixed or variable interest rate, loan purpose), and (iii) the regional conditions (i.e., development of the banking sector and regional competitiveness). The data allows us to control also for bank-specific factors and for the condition of the economy. Second, we move to the analysis of those firms that have accessed the credit market before the request of the guaranteed loan, in order to assess to what extent the public guarantee can help them in relaxing their credit constraints and in accessing lower-cost finance. Indeed, we have cases of firms in the dataset that have previously raised money through the normal credit channels (secured or unsecured debt) and cases of previously unlevered firms.

On the one hand, one might expect that, all else being equal, the fact that a young firm has previously raised debt (either secured or unsecured) should be associated with a lower spread charged by banks for a guaranteed loan. This would be consistent with the idea that previously unlevered firms should be, ceteris paribus, those facing higher credit constraints because of their inherent higher risk perceived by lending institutions. On the other hand, one might also expect a positive correlation between the spread charged for the guaranteed loan and the extent of previous debt, if the bank adopts a pricing approach that gives weight to the firm's previous debt exposure, despite the presence of a significant coverage by the public body.

We analyze the interplay between the extent of previous non-guaranteed debt and the cost of capital on guaranteed loans in two ways. We initially add to the model explaining the determinants of the spread a set of dummy variables that account for the presence of previous secured or unsecured debt. Then, we analyze to

[1] Interestingly, Boschi, Girardi, and Ventura (2014) find that a partial guarantee does not exert the same effect as a total guarantee on credit additionality. The authors suggest the existence of non-linear effects, so that coverage ratios below a certain threshold (25%) turn out to be ineffective to lessen credit constraints.

what extent the ratio between the amount of the loan covered by the guarantee and the total amount of outstanding loans, including the funds raised by the firm through the standard credit channels ("Guaranteed loan/debt"), correlates with the spread charged on guarantee backed loans.[2]

We then pose the question for which type of borrowers and loans does the public guarantee generate a more favorable effect (in terms of reduction in the cost of capital) for prospective borrowers. Hence, we examine how much the sensitivity of the spread with respect to the "guaranteed loan/debt" varies according to different factors, which are related to the usage of the loan and to the type of firms. In principle, if the public policy tool is targeted to reduce the financing gaps for small and undercapitalized firms, an increase of the incidence of the guaranteed debt should generate a reduction of the spread that is greater for certain types of loans and firms (e.g., loans to finance working capital needs, high-tech firms). The presence of a significant difference in the elasticity of the spread to the ratio between the amount of guaranteed loans and firms' total debt for different subgroups can provide insights on the relative effectiveness of this type of policy intervention in mitigating firms' credit constraints.[3]

Results suggest that higher spreads are applied to high-tech manufacturing firms and to loans issued for working capital purposes. Lower spreads are offered for loans of larger amounts and higher durations (more than 5 years), for service firms, and for firms with higher turnover and located in the most advanced regions (in terms of both competitiveness and development of the financial markets). Interestingly, we also find that the presence of existing debt is not associated with a lower spread charged on the guaranteed loans. More specifically, the subset of firms whose extant debt was fully secured with collateral are charged a significantly higher spread than both unlevered firms and firms with existing unsecured debt. Further, we find that the higher the incidence of the publicly guaranteed debt over the total amount of outstanding loans, the lower, on average, the spread.

Finally, we find that an increase of the incidence of the debt guaranteed by government with respect to the total outstanding debt leads to a contraction in the spread only for loans covering working capital needs rather than investments. This result seems to suggest that the policy instrument generates a larger reduction in the cost of debt for firms that mostly use borrowed money to finance operations rather than investments in physical assets. Interestingly, we do not find any differential impact when we split the sample according to whether borrowers belong to high-tech or low-tech manufacturing sectors and to knowledge-intensive (KIS) or less knowledge-intensive (LKIS) service sectors. The two latter pieces of evidence cast some doubts on the efficacy of interventions, at least in respect of cost of capital, which should be targeted to firms suffering more severe credit rationing.

The remainder of the paper is organized as follows. Section 2 illustrates the background literature. Section 3 describes the main features of the UK SFLG scheme. Section 4 introduces the data, describes the explanatory variables used in the empirical analysis, and provides some relevant descriptive statistics. Section 5 presents the results of the econometric analysis. Section 6 concludes and summarizes the paper.

2 Background literature

The context for our paper directly links to the theoretical body of work on credit rationing in markets with imperfect information (see the seminal works by Bester, 1985; Jaffee and Russell, 1976; Stiglitz and Weiss, 1981). The general case is that in equilibrium, loan markets may be characterized by credit rationing as banks making loans consider not only the interest rate and the riskiness of a loan but also how the interest rate offer might subsequently affect the riskiness of a loan due to adverse selection and/or moral hazard. And, central to these theories is the presence of imperfect information in the market. A key element of the credit market established by Bester (1985), particularly given the focus of our paper is on loan guarantees, is that the interest rate and collateral offer made by the bank to the firm seeking a loan occurs simultaneously. In this sense, loan interest

[2] Such variable is meant to capture the interplay between the loan pricing under the policy and the previous capability of the firms to access the credit market. Note that this variable might reflect unobservable firm-level factors that are correlated with the type and level of extant debt.

[3] It has to be noted that due to the unavailability of information on the spreads applied by banks on loans which are not publicly guaranteed, we cannot build a control sample. This is why we explore the variation in the sensitivity of the spread to the level of the guarantee provided by the government in order to observe the dynamics of the loan pricing related to the ability of sample firms to access the credit market under different conditions. We provide a discussion on this issue in the concluding section.

rates and collateral are viewed as a pair and are assumed to be negatively correlated as a higher collateral requirement should reduce the interest rate and vice-versa. This is a central a priori prediction of our empirical investigation as a third party, here the UK government, is intervening in the credit market to offer collateral to the lending bank.

Besanko and Thakor (1987) offer some further insights by examining how market structure might affect credit allocation in the presence of imperfect information. Their starting point is that low-risk borrowers will choose contracts with low interest rate and high collateral offers, and high-risk borrowers will choose contracts with high interest rate and low collateral offers. But, they argue that this leaves the potential for "good" borrowers with insufficient wealth to face rationing in the credit market. And, this is often used to justify government intervention in credit markets relevant to smaller firms, via loan guarantee schemes. The presence of a government guarantee reduces the potential for rationing but also strictly increases borrower welfare.

The empirical context for this paper is the UK small firm loan guarantee (SFLG) scheme, which has been previously analyzed in some empirical papers by Cowling and Mitchell (2003), Cowling (2010), and Cowling and Siepel (2013). Cowling and Mitchell (2003) consider 42,316 loans issued under the scheme in the period 1984 to 1998 and estimate the determinants and timing of default in the context of the theoretical credit rationing model by Stiglitz and Weiss (1981). They find that default increases with the banks' cost of capital and in periods of macroeconomic growth. In a further paper, Cowling (2010) questions if the SFLG scheme has alleviated credit constraints to small firms, by performing both "stickiness" tests (to verify movements in bank margins following fluctuations in base rates and differences in margins associated with different types of loans) and "proportions" tests (to test credit rationing on different types of loans following base rates changes). His results broadly support the view that credit rationing occurred, particularly for firms without collateral, and that the SFLG scheme has fulfilled its primary objective. Finally, Cowling and Siepel (2013), exploiting a survey conducted as part of a formal evaluation of the SFLG between 2006 and 2010 and a matched sample of firms not receiving guaranteed backed loans, evaluate the effectiveness of the scheme in terms of costs and benefits to the economy and to the government itself. Overall, they find that the SFLG scheme has a positive impact on the economy and on firms' performance. Even if the cost of loan defaults covered by the government guarantee have been substantial (£35 million over the first 2 years of the program), the authors estimate that for every £1 spent on SFLG, the additional sales attributable directly to SFLG would have been around £3.13 (for a total of £112 million), of which £1.05 would have been gross value added (for a total of £37 million).

These UK findings can be set in a wider context of empirical evidence on loan guarantee schemes spanning several countries. In relation to the Canadian scheme, which is the longest running in the world, Riding and Haines (2001) find that it is an extremely efficient means of job creation even though newer firms have significantly higher default rates. This job creation effect was also identified by Craig, Jackson, and Thompson (2008) in their US-based spatial analysis of the effects of the US SBA scheme, but only in economically poorer areas. At a broader level, several researchers have concluded that the government needs to exercise caution when setting the guarantee level. For example, Arping, Loranth, and Morrison (2010) argue that the optimal scheme is diminishing in the costs of incentivizing bank monitoring as setting the guarantee level too high reduces the banks incentive to efficiently screen loan applications. This was the case for the Canadian scheme where an increase in the guarantee induced higher default rates. Columba, Gambacorta, and Mistrulli (2010) identified a key role here for Mutual Guarantee Institutions in screening borrowers and pooling collateral for commercial bank loans. Further, in their review of loan guarantee schemes across 46 countries, Beck, Klapper, and Mendoza (2010) found that the most common role of governments in the process was one which was limited to providing funding for guarantees and in general scheme management. In this sense, while loan guarantee schemes are explicitly designed to alleviate binding credit constraints in the private market, most governments still viewed commercial banks as the most efficient institutions for screening loan applications and delivering loans to smaller businesses. And, this view prevails even when banks were found to take more collateral than needed (Voordecks and Steijvers, 2006) and traded off access to funds and lower cost of funds for more collateral, even in lengthy bank-firm relationships (Hernandez-Canoras and Martinez-Solano, 2010). Finally, Riding and Haines (2001) concluded that any attempts to broaden access to loan guarantee schemes

would be inconsistent with policy goals. This was also the conclusion of the UK Graham Review in 2004, which led to the scheme being restricted to firms 5 years old or less, although this policy was reversed after the Global Financial Crisis in late 2008.

3 The UK small firm loan guarantee scheme

The UK small firm loan guarantee (SFLG) scheme was established in 1981 by the UK government (Department for Trade and Industry (DTI), subsequently named Department for Business, Enterprise and Regulatory Reform (BERR), and now the Department for Business Innovation and Skills (DBIS)), to support small firms lacking collateral assets and/or lacking a track record in accessing debt finance. Over the last decade, around 4500 loans per year have been issued under the scheme, although there have been fluctuations across the years. In 2009, the scheme was replaced by the Enterprise Finance Guarantee (EFG), which was targeted to a wider set of businesses in response to the credit crunch that followed the 2008 financial crisis.

Under the scheme, the government provides a guarantee to banks for issuing debt to small firms that lack track records or collateral to secure loans. However, the scheme does not apply unselectively to all small businesses facing a financing gap but only to those applicants with a viable business plan and that satisfy the lenders' normal eligibility criteria. Individual decisions on the use of the SFLG program involve both the Ministry and banking officials up to Graham Review (December 2005), and the loan approval process is fully delegated to the lenders. Eligible firms are UK firms which are up to 5 years old and with an annual turnover of up to £5.6 million. The maximum amount of money that can be lent by participating banks is £250,000. Restrictions apply to transport, agriculture, and coal and steel sectors and to requests for funds to finance exports and to replace existing debt.

The SFLG scheme has been conceived in several phases: phase I (from June 1981 to May 1984), phase II (from June 1984 to December 1984), phase III (from January 1985 to March 1986), phase IV (from April 1986 to March 1989), phase V (from April 1989 to June 1993), phase VI (from July 1993 to March 2003), phase VII (from March 2003 to November 2005), and phase VIII (from December 2005 to present). The dataset at our disposal covers the years from phase VI (starting from the year 2000) to phase VII. The proportion of the total loan which is guaranteed by the government and the percentage of the government insurance premium vary across the single phases. In phase VI, the government covers 70% of the loan value for firms with less than 2 years and 85% for borrowers which had been trading more than 2 years before the application, plus up to 6 months' interest in the event of the borrower defaulting. In return for providing the guarantee, firms pay the government an insurance premium, which is 1.5% over the commercial bank rate for firms borrowing with a variable rate of interest and 0.5% for firms borrowing with a fixed rate of interest. In phase VII, the government coverage shifts to 75% of the outstanding loan amount, and the annual government insurance premium is 2% over the commercial bank rate.

4 Dataset and descriptive statistics

We exploit a comprehensive dataset of loans issued under the UK SFLG scheme over the period 2000 to 2005. Data are provided by the UK Department for Business Innovation and Skills (DBIS).[4] The initial dataset includes the full population of 31,434 SFLG backed loans issued between 2000 and 2005 by 25 banks and financial institutions throughout the UK, although the largest majority (nearly 80%) are issued by the four major UK banks.[5]

After computing the main variables used in the empirical analysis, we excluded observations with missing values. In order to check the potential influence of outliers, the main variables used in the model were winsorized, with a 2% cutoff for each tail (Dixon, 1960).[6] The final sample consists of 29,266 SFLG backed loans. For each firm receiving a guarantee backed loan, we associated the four-digit SIC codes in order to be able to distinguish among firms operating in

[4] The same dataset has been exploited in previous works by Cowling and Siepel (2013) and Cowling, Ughetto, and Lee (2016) and information on prior years 1984–1998 have been used in Cowling (2010) and Cowling and Mitchell (2003).

[5] The four banks are Barclays Bank Plc, National Westminster Bank plc, Lloyds Bank plc, HSBC Bank Plc.

[6] For each variable, we assigned the values corresponding to the 2nd and 98th percentiles of its distribution to all observations falling beyond them. This approach is useful to reduce the impact of outliers, and it allows a larger number of observations to be used than would otherwise be possible if outliers were deleted. The results are robust to the adoption of 5% in the cutoff.

the knowledge-intensive (KIS) and less knowledge-intensive (LKIS) service industries and in the high-tech and low-tech manufacturing industries.

We also collected data on the regions' number of bank branches for the year 2003 from Eurostat-Regio. We constructed a measure of bank branch density (number of branches divided by population) that has been widely used to measure the level of development of the local credit markets and the geographical closeness between borrowers and lenders (see, for instance, Benfratello, Schiantarelli, and Sembenelli, 2008; Degryse and Ongena, 2005; Jayaratne and Strahan, 1996). We matched this information with the region in which sample firms are located.

In order to distinguish between advanced and lagging regions, we used the UK competitiveness Index, derived from the Centre for International Competitiveness and relative to the year 2005. The composite index is based on a three-factor model based on: (1) input factors (i.e., R&D expenditure, economic activity rates, business start-up rates per 1000 inhabitants, number of businesses per 1000 inhabitants, proportion of working age population with NVQ level 4 or higher, proportion of knowledge based businesses), (2) output factors (i.e., value added per head at current basic prices, exports per head of population, imports per head of population, productivity-output per hour worked, employment rates), and (3) outcome factors (gross weekly pay, unemployment rates).

The dependent variable in our empirical analysis is the spread, defined as the bank margin over base. Spreads are on average of the order of 3%, although they can peak at much larger values. The other main variable of interest is "guarantee loan/debt," which is measured as the ratio between the amount of the loan covered by the government guarantee and the total amount of outstanding loans (in £). It is worth noting that this variable captures the effect of the financial debt that a firm holds in addition to the guaranteed debt and that can be provided by any eligible financial intermediary in the UK. The mean value for guaranteed backed loans is £63,937, but they can reach a maximum amount of £250,000. Guarantee backed loans are issued mainly to cover working capital needs (56.5%). The average duration of loans is 6.4 years, and the interest rate on the loan is fixed at the point of loan issue in the 11.4% of the cases. We also have additional information on whether borrowing firms have previously raised debt (either secured or unsecured) on the credit market at the moment of the issue of the guaranteed loan. On average, 41.2% of the firms are already indebted (by means of either unsecured or secured debt). Sample firms (20.9%) have extant debt that is fully secured with collateral, 11.6% have existing unsecured debt, while only 8.6% have existing unsecured and secured debt.

As expected, most of the firms that received a guarantee backed loan in our sample are micro- and small-sized enterprises. Respectively, 47.3 and 29.5% are firms less than 2 years old and newborn firms. Respectively, 57.8 and 15.5% of firms belong to the less-knowledge (LKIS) and knowledge (KIS)-intensive service sector according to the 2003 SIC industry classification. High-tech manufacturing firms represent the 10.4% of the sample.[7] The 40.8% of the firms are located in highly competitive regions according to the competitiveness index and the 59.8% in financially developed regions.

In order to investigate how much the sensitivity of the spread varies with respect to the ratio between the amount of the loan covered by the guarantee scheme and the total amount of outstanding loans under different conditions, we employed a set of split variables. Split variables were constructed so that they are equal to the variable guarantee loan/debt according to the different firm and loan classifications.[8] In particular, we split the variable guarantee loan/debt based on the sector of the company (high-tech manufacturing, low-tech manufacturing, KIS, LKIS) and on the purpose of the loan (if a loan is issued to cover working capital needs or not).

A listing of the variables used in the empirical analysis along with their definitions and their descriptive statistics (mean, median, standard deviation, minimum and maximum) is provided in Table 1. In the Appendix (Table 6), we report the correlation matrix.

5 Empirical analysis

The aim of the empirical analysis is twofold. First, we want to investigate what the determinants of the spread

[7] A firm is defined as high-tech if it belongs to the following industrial sectors: chemicals and drugs, mechanical machinery, computer equipment, electronic components machinery, communication equipment, medical, optical and precision equipment, and transportation equipment. A similar set of industries are identified as high-tech by Benfratello, Schiantarelli, and Sembenelli (2008), Himmelberg and Petersen (1994), and Ughetto (2008).

[8] For example, the split variable "Guarantee_hightech_manuf" is equal to the variable guarantee loan/debt if the firm belongs to the high-tech manufacturing sector and 0 otherwise.

Table 1 Descriptive statistics (mean, median, standard deviation, min and max) and definitions of the variables used in the empirical analysis

	Definition	Mean	Median	SD	Min	Max
Spread	Bank margin over base	3.099	2.6	1.996	0.2	7.85
Guaranteed loan/debt	Ratio between the amount of the loan covered by the guarantee scheme and the total amount of outstanding loans (in £)	0.580	0.7	0.229	0.001	0.850
Unsec_debt	A dummy variable equal to 1 if the firm has previous unsecured debt (and no previous secured debt) and 0 otherwise	0.116	0	0.320	0	1
Unsec&sec_debt	A dummy variable equal to 1 if the firm has previous unsecured and secured debt and 0 otherwise	0.086	0	0.281	0	1
Unsec_or_sec_debt	A dummy variable equal to 1 if the firm has previous unsecured or secured debt and 0 otherwise	0.412	0	0.492	0	1
Sec_debt	A dummy variable equal to 1 if the firm has previous secured debt (and no previous unsecured debt) and 0 otherwise	0.209	0	0.407	0	1
Loan amount	Loan amount (in million £)	0.063	0.05	0.052	0.009	0.25
Loan duration	Full term of the loan (in years)	6.450	5	2.616	0.25	11
Fixed rate	A dummy variable equal to 1 if the interest rate on the loan is fixed at the point of loan issue and 0 otherwise	0.114	0	0.318	0	1
WC Loan	A dummy variable equal to 1 if the loan is issued to cover working capital needs and 0 otherwise	0.565	1	0.495	0	1
New born	A dummy variable equal to 1 if the firm is a new born firm and 0 otherwise	0.295	0	0.456	0	1
Young firm	A dummy variable equal to 1 if the firm is a young firm (less than 2 years old) and 0 otherwise	0.473	0	0.499	0	1
KIS	A dummy variable equal to 1 if the firm belongs to the knowledge-intensive service sectors (SIC classification, based on Eurostat indicators on knowledge-intensive services) and 0 otherwise	0.155	0	0.361	0	1
LKIS	A dummy variable equal to 1 if the firm belongs to the less knowledge-intensive service sectors (SIC classification, based on Eurostat indicators on Knowledge- intensive services) and 0 otherwise	0.578	1	0.493	0	1
Hightech_manuf	A dummy variable equal to 1 if the firm belongs to the high-tech manufacturing sector (SIC classification) and 0 otherwise	0.104	0	0.305	0	1
Turnover	Firm's turnover (in million £)	0.345	0.14	0.505	0.1	2.3
Big4	A dummy variable equal to 1 if the firm's main loan is issued by one of the four major UK clearing banks and 0 otherwise	0.801	1	0.399	0	1
Bank branch density	Number of bank branches divided by population by region (year 2003)	0.240	0.217	0.082	0.059	0.358
Financially developed region		0.598	1	0.490	0	1

Table 1 (continued)

	Definition	Mean	Median	SD	Min	Max
	A dummy variable equal to 1 if the firm is located in a financially developed region (with a bank branch density higher than the median) and 0 otherwise					
Developed region	A dummy variable equal to 1 if the firm is located in a developed region (with a UK competitiveness Index higher than the median) and 0 otherwise	0.408	0	0.491	0	1
GDP growth	Quarterly GDP growth	0.597	0.54	0.269	0.26	1.41
CPI	Consumer price inflation	2.569	2.8	0.938	0.8	3.6
SME stock index	Normalized MSCI average stock market index for SMEs in UK at the point of loan issue	6.976	7.044	0.127	6.673	7.094

for guarantee-backed loans in terms of firm (i.e., age, size, sector), loan (amount, duration, fixed or variable interest rate, loan purpose), and regional development characteristics are (i.e., development of banking sector and regional competitiveness), controlling for bank-specific factors and for the condition of the economy. Accordingly, we have run a set of OLS regressions. This initial analysis is performed to assess whether the pricing of guaranteed loans is coherent with extant evidence on the determinants of the cost of debt in the absence of any public intervention.

Second, we move to the analysis of those firms that have accessed the credit market before the request of the guaranteed loan, in order to assess to what extent the public guarantee can help them in relaxing their credit constraints and in accessing lower cost finance. We initially add to the model on the determinants of the spread a set of dummy variables that account for the presence of existing secured or unsecured debt. In order to further analyze this point, we also examine to what extent the variable guaranteed loan/debt correlates with the spread charged on guarantee-backed loans. It has to be noted that the share of publicly guaranteed debt is fixed and determined by the scheme, so that the variation of the guaranteed loan/debt is driven by the relative incidence of the guaranteed loan with respect to the amount of the other financial debt.

We then examine how much the sensitivity of the spread with respect to the guaranteed loan/debt varies under different conditions related to the type of loan and firm, by employing a set of split variables. The presence of a significant difference in the elasticity of the spread to the ratio between the amount of guaranteed loans and firms' total debt for different subgroups can provide insights on the relative effectiveness of this type of policy intervention in mitigating firms' credit constraints. This in turn has clear policy implications for the design of public interventions that are expected to target specific populations of firms characterized by higher financial constraints.

Table 2 reports the econometric analysis of the determinants of the spread charged by banks. Model 1 illustrates the baseline specification that includes a set of basic loan (amount, type of interest rate) and firm (i.e., age, size, sector) level variables, a dummy variable that equals one if the loan was issued by one of the four main UK banks, region, and year dummies. We then

Table 2 Determinants of the spread (OLS regressions)

	Model 1	Model 2	Model 3	Model 4
Loan amount	−2.205***	−1.551***	−1.714***	−1.670***
	(0.205)	(0.211)	(0.208)	(0.209)
Fixed rate	3.115***	3.103***	3.103***	3.104***
	(0.033)	(0.033)	(0.033)	(0.033)
New born	0.217***	0.171***	0.181***	0.176***
	(0.025)	(0.025)	(0.025)	(0.025)
Young firm	0.484***	0.472***	0.484***	0.481***
	(0.025)	(0.025)	(0.025)	(0.025)
Turnover	−0.104***	−0.154***	−0.153***	−0.157***
	(0.023)	(0.023)	(0.023)	(0.023)
LKIS	−0.432***	−0.403***	−0.411***	−0.405***
	(0.023)	(0.023)	(0.023)	(0.023)
KIS	−0.208***	−0.216***	−0.223***	−0.217***
	(0.032)	(0.032)	(0.032)	(0.032)
Hightech_manuf	0.243***	0.201***	0.204***	0.205***
	(0.037)	(0.037)	(0.037)	(0.037)
WC Loan		0.126***	0.133***	0.131***
		(0.019)	(0.019)	(0.019)
Loan duration		−0.043***	−0.041***	−0.042***
		(0.004)	(0.004)	(0.004)
Bank branch density			−0.307***	
			(0.111)	
Financially developed region				−0.041**
				(0.019)
Developed region				−0.070***
				(0.019)
Big4	0.054*	0.076***		
	(0.029)	(0.029)		
Year dummies	Yes	Yes	Yes	Yes
Region dummies	Yes	Yes	No	No
Constant	3.105***	3.262***	3.319***	3.301***
	(0.111)	(0.113)	(0.051)	(0.045)
Observations	29,266	29,266	29,266	29,266
R−squared	0.377	0.382	0.380	0.380

Dependent variable: spread. The table reports the OLS regressions to test the determinants of the spread. The definitions of the independent variables are provided in Table 1. For the sake of synthesis, we omit estimated coefficients for region and year dummies. Robust standard errors are in parenthesis

***$p < 0.01$; **$p < 0.05$; *$p < 0.10$

augmented this specification by including dummy variables on loan purpose and duration (model 2), bank branch density (model 3), and whether firms are located in regions with high bank branch density and in regions scoring highly in the economic competitiveness index (model 4). As robustness checks, in the Appendix (Table 7), we report additional estimates in which we include bank dummies (model 1), sector dummies (model 2), the GDP growth (model 3), the normalized MSCI

average stock market index for SMEs in UK to proxy for the state of the stock markets at the time of the loan issue ("SME stock index")[9] (model 4), and consumer price inflation ("CPI") (model 5). The results of Table 7 confirm the evidence reported in Table 2.

The results in Table 2 suggest that lower spreads are applied to loans of larger amounts and higher durations (more than 5 years), to larger firms, to service sectors, and to firms located in the most advanced regions (in terms of both competitiveness and development of financial markets). It is plausible that more creditworthy firms populate such regions, because of the greater opportunities they receive in terms of access to credit, infrastructures, and business networks, leading banks to apply lower margins on their loans. The spread is between 40.3 and 43.2 basis points lower for LKIS firms than for firms in low-tech manufacturing sectors, according the model specification.[10] Model 4 shows that an increase in the loan amount of £100,000 is associated with a reduction of 16.7 basis points in the spread.

Results also indicate that the higher the number of bank branches in a region, the lower the spread. This evidence can be interpreted in light of the literature on relationship lending, which predicts that the closeness between lenders and borrowers (approximated by the number of branches in a territory) allows firms to get better access to and terms of debt (Berger and Udell, 2002). There is wide evidence that branch density facilitates credit flows to small firms, limiting the incidence of bad loans (Bonaccorsi di Patti and Gobbi, 2001) and alleviating credit constraints (Alessandrini, Presbitero, and Zazzaro, 2009). Indeed, in a financially developed region (with a number of bank branches higher than the median), banks operate more closely with their borrowers, and this allows them to complement their objectively-based risk assessment practices, with the collection of "soft" information over times through contacts with the firms (see Benfratello, Schiantarelli, and Sembenelli, 2008; Berger and Udell 2002). Alternatively, it might be argued that this evidence is driven by higher competition in the banking industry in those geographical areas that are characterized by a greater density of bank branches.

As expected, higher spreads are applied for high-tech manufacturing firms, because of the inherent risk generated by uncertain returns and lack of collateral assets and for loans issued for working capital purposes. Model 4 shows that, at sample mean, the spread is 310 basis points higher when the interest rate on the loan is fixed, 20.5 basis points higher for high-tech manufacturing firms, and 48.1 basis points higher for young firms relative to older firms. Higher spreads are also typically applied by the biggest four UK banks. Such evidence seems to suggest that banks operate with the standard credit assessment approaches even under this public policy scheme.

Table 3 reports the results of the effect of previous debt (secured/unsecured) on the spread. Results indicate that having previously raised debt (either secured or unsecured) is not associated with a lower spread charged on the guaranteed loans. The variable Unsec_or_sec_debt is in fact positively and significantly correlated with the spread (at 1% level of significance). More specifically, the subset of firms whose extant debt was fully secured with collateral are charged a significantly higher spread compared to unlevered firms and to firms with existing unsecured debt. This evidence suggests that small firms that have reached their maximum debt capacity based on collateralized assets are charged a relatively higher interest rate even in the presence of a significant public coverage. Obviously, this finding highlights the fact that banks tend to adopt a pricing approach that gives weight to the previous debt exposure and this raises some concerns about the impact of the policy for those firms with a lower availability of collateral assets (e.g., high-tech firms).

In Table 4, we show the results related to the second step of our analysis. Specifically, we analyze the correlation of the variable guaranteed loan/debt, namely, the incidence of the publicly guaranteed debt over the total amount of outstanding loans, with the spread charged by banks. The results in Table 4 suggest that the guaranteed coverage is negatively and significantly (at 5% level) associated with the spread, meaning that the higher the incidence of the publicly guaranteed

[9] The index is extracted from the Morgan Stanley Capital International (MSCI) website (www.msci.com).

[10] Note that less-knowledge-intensive (LKIS) service firms have at the margin a lower spread than do knowledge-intensive service (KIS) firms.

Table 3 Effect of previous debt (secured/unsecured) on the spread (OLS regressions)

	Model 1	Model 2	Model 3	Model 4
Unsec_debt		0.023		0.024
		(0.030)		(0.030)
Unsec&sec_debt		0.012		0.011
		(0.033)		(0.033)
Sec_debt		0.098***		0.095***
		(0.023)		(0.023)
Unsec_or_sec_debt	0.058***		0.057***	
	(0.019)		(0.019)	
Loan amount	−2.197***	−2.202***	−1.707***	−1.712***
	(0.205)	(0.205)	(0.208)	(0.208)
Fixed rate	3.113***	3.113***	3.100***	3.101***
	(0.033)	(0.033)	(0.033)	(0.033)
New born	0.217***	0.216***	0.181***	0.180***
	(0.025)	(0.025)	(0.025)	(0.025)
Young firm	0.482***	0.481***	0.482***	0.482***
	(0.025)	(0.025)	(0.025)	(0.025)
Turnover	−0.104***	−0.104***	−0.153***	−0.153***
	(0.023)	(0.023)	(0.023)	(0.023)
LKIS	−0.431***	−0.430***	−0.410***	−0.410***
	(0.023)	(0.023)	(0.023)	(0.023)
KIS	−0.207***	−0.206***	−0.223***	−0.222***
	(0.032)	(0.032)	(0.032)	(0.032)
Hightech_manuf	0.242***	0.241***	0.203***	0.202***
	(0.037)	(0.037)	(0.037)	(0.037)
WC Loan			0.133***	0.133***
			(0.019)	(0.019)
Loan duration			−0.041***	−0.041***
			(0.004)	(0.004)
Bank branch density			−0.306***	−0.308***
			(0.111)	(0.111)
Big4	0.054*	0.054*		
	(0.029)	(0.029)		
Year dummies	Yes	Yes	Yes	Yes
Region dummies	Yes	Yes	No	No
Constant	3.088***	3.091***	3.298***	3.301***
	(0.111)	(0.111)	(0.051)	(0.051)
Observations	29,266	29,266	29,266	29,266
R−squared	0.378	0.378	0.380	0.380

Dependent variable: spread. The table reports the OLS regressions to test the effect of previous debt (secured/unsecured) on the spread. The definitions of the independent variables are provided in Table 1. For the sake of synthesis, we omit estimated coefficients for region and year dummies. Robust standard errors are in parenthesis

***$p < 0.01$; **$p < 0.05$; *$p < 0.10$

Table 4 Effect of the incidence of the guaranteed debt over the total outstanding debt on the spread (OLS regressions)

	Model 1	Model 2	Model 3	Model 4
Guaranteed loan/debt	−0.104**	−0.095**	−0.102**	−0.100**
	(0.042)	(0.042)	(0.042)	(0.042)
Loan amount	−2.211***	−1.560***	−1.710***	−1.666***
	(0.211)	(0.216)	(0.213)	(0.214)
Fixed rate	3.116***	3.105***	3.103***	3.104***
	(0.033)	(0.033)	(0.033)	(0.033)
New born	0.217***	0.170***	0.180***	0.175***
	(0.025)	(0.026)	(0.026)	(0.026)
Young firm	0.483***	0.472***	0.483***	0.480***
	(0.025)	(0.025)	(0.025)	(0.025)
Turnover	−0.100***	−0.151***	−0.150***	−0.154***
	(0.023)	(0.023)	(0.023)	(0.023)
LKIS	−0.437***	−0.408***	−0.416***	−0.410***
	(0.024)	(0.024)	(0.024)	(0.024)
KIS	−0.219***	−0.227***	−0.234***	−0.229***
	(0.033)	(0.033)	(0.033)	(0.033)
Hightech_manuf	0.249***	0.207***	0.209***	0.210***
	(0.038)	(0.038)	(0.038)	(0.038)
WC Loan		0.131***	0.138***	0.136***
		(0.019)	(0.019)	(0.019)
Loan duration		−0.043***	−0.042***	−0.042***
		(0.004)	(0.004)	(0.004)
Bank branch density			−0.286**	
			(0.113)	
Financially developed region				−0.038**
				(0.019)
Developed region				−0.072***
				(0.019)
Big4	0.051*	0.073**		
	(0.029)	(0.030)		
Year dummies	Yes	Yes	Yes	Yes
Region dummies	Yes	Yes	No	No
Constant	3.124***	3.292***	3.382***	3.366***
	(0.081)	(0.084)	(0.056)	(0.052)
Observations	29,266	29,266	29,266	29,266
R−squared	0.379	0.384	0.381	0.382

Dependent variable: spread. The table reports the OLS regressions to test the effect of the incidence of the guaranteed debt over the total outstanding debt on the spread. The definitions of the independent variables are provided in Table 1. For the sake of synthesis, we omit estimated coefficients for region and year dummies. Robust standard errors are in parenthesis

***$p < 0.01$; **$p < 0.05$; *$p < 0.10$

debt over the total amount of outstanding loans, the lower, on average, the spread. This effect would offer support for the effectiveness of the public policy instrument, implying that an increase in the amount of the guaranteed debt generates a contraction of the spread, thus reducing the cost of debt for borrowing firms.

From a public policy perspective, it is interesting to examine the relevance of the reduction in the spread associated with an increase in the variable "guarantee loan over debt" under different conditions. Indeed, the presence of a significant difference in the elasticity of the spread to the ratio between the amount of guaranteed loans and firms' total debt for different subgroups of firms or loan typologies can provide insights into the relative effectiveness of the public policy instrument in alleviating firms' credit constraints. Table 5 reports the OLS estimates, together with the Wald test, on the difference between the coefficients of the split variables. Models 1 and 4 refer to the full sample. In models 2 and 3, we restrict the sample to, respectively, manufacturing and service firms only.

Results indicate that an increase of the incidence of the guaranteed coverage leads to a contraction of the spread for loans aimed at working capital purposes than for loans used for investment reasons. The difference between the coefficients of the split variables Guarantee_WC and Guarantee_noWC is significant at 1% level (model 4). The coefficients of the split variables Guarantee_hightech_manuf and KIS and Guarantee_lowtech_manuf and LKIS (model 1), as well as the coefficients of Guarantee_hightech_manuf and Guarantee_lowtech_manuf (model 2) or Guarantee_KIS and Guarantee_LKIS (model 3), are not significantly different. This result means that the degree of guarantee provided by the policy with respect to the total outstanding debt does not have a differential impact on the reduction in loan pricing for firms operating in those service or manufacturing sectors that are expected to be affected by higher or lower concerns of asymmetric information and credit rationing. Overall, the loan guarantee program seems to exert a role for small businesses seeking to finance working capital needs on a short-term basis, while it has not exerted a specific premium for certain types of firms (high-tech manufacturing and knowledge-intensive service firms) which might be ex-ante exposed to higher financial constraints.

6 Conclusion

In this paper, we have studied the determinants of the spread charged by banks under the UK SFLG policy intervention scheme, aimed at supporting the access to the credit market of small firms through guarantee backed loans. We have exploited a unique dataset of 29,266 guarantee backed loans in the period 2000 to 2005. Whether the guarantee provided by the government on issued loans facilitates small businesses in getting a lower cost of capital is a matter of considerable interest for policy makers questioning the effectiveness of the scheme. The current policy relevance of this theme is well represented by large-scale initiatives at European level, such as the COSME Loan Guarantee Facility (LGF) launched by the European Commission and managed by the European Investment Fund to support the growth and research and innovation of European enterprises.

Can the public guarantee lessen the informational wedge that exists between banks and borrowers when dealing with small businesses? Does the public program allow small firms to benefit from better terms for loans? Is there any difference on the impact that the guaranteed coverage exerts on spreads under different situations? Does the government's objective function through the SFGL scheme totally match the lenders' objective function? These are all relevant questions that deserve policy attention. We have been able to address a subset of them given the nature of our available data.

Our evidence suggests that lower spreads are found for loans of larger amounts and higher durations, for service firms, for larger firms, and for firms located in the most advanced regions. Higher spreads are applied to high-tech manufacturing firms and to loans issued for working capital

Table 5 Sensitivity of the spread with respect to the incidence of the guaranteed debt over the total outstanding debt in different conditions (OLS regressions)

	Model 1 (full sample)	Model 2 (sample restricted to manufacturing firms)	Model 3 (sample restricted to service firms)	Model 4 (full sample)
Loan amount	−2.112***	−1.811***	−2.130***	−1.919***
	(0.212)	(0.373)	(0.255)	(0.210)
Fixed rate	3.141***	2.628***	3.320***	3.100***
	(0.033)	(0.056)	(0.040)	(0.033)
New born	0.232***	0.193***	0.200***	0.152***
	(0.026)	(0.060)	(0.028)	(0.026)
Young firm	0.514***	0.419***	0.472***	0.436***
	(0.026)	(0.056)	(0.029)	(0.025)
Turnover	−0.054**	−0.109***	−0.092***	−0.121***
	(0.023)	(0.037)	(0.029)	(0.023)
Big4	0.043	−0.026	0.086**	0.045
	(0.030)	(0.058)	(0.034)	(0.030)
Hightech_manuf & KIS	0.181***			
	(0.067)			
Guarantee_hightech_manuf & KIS	−0.095			
	(0.099)			
Guarantee_lowtech_manuf & LKIS	−0.126***			
	(0.046)			
Hightech_manuf		−0.000		
		(0.140)		
Guarantee_hightech_manuf		−0.247		
		(0.223)		
Guarantee_lowtech_manuf		−0.107		
		(0.085)		
KIS			0.300***	
			(0.077)	
Guarantee_KIS			−0.075	
			(0.111)	
Guarantee_LKIS			−0.088*	
			(0.053)	
WC Loan				0.215***
				(0.051)

Table 5 (continued)

	Model 1 (full sample)	Model 2 (sample restricted to manufacturing firms)	Model 3 (sample restricted to service firms)	Model 4 (full sample)
Guarantee_WC				−0.157***
				(0.056)
Guarantee_noWC				−0.019
				(0.060)
Year dummies	Yes	Yes	Yes	Yes
Region dummies	Yes	Yes	Yes	Yes
Sector dummies	No	No	No	Yes
Constant	2.800***	3.831***	2.451***	2.810***
	(0.080)	(0.212)	(0.092)	(0.102)
Observations	29,266	7784	21,482	29,266
R-squared	0.370	0.366	0.383	0.385
Differences between coefficients: F (Prob > F)	guar_ lowtech_manuf & LKIS - guar_ hightech_manuf & KIS = 0 0.08	guar_hightech_manuf- guar_lowtech_manuf = 0 0.35	guar_KIS- guar_LKIS =0 0.01	guar_wc- guar_no_wc = 0 2.95**

Dependent variable: spread. The table reports the OLS regressions to test the sensitivity of the spread with respect to the incidence of the guaranteed debt over the total outstanding debt in different conditions. The definitions of the independent variables are provided in Table 1. For the sake of synthesis, we omit estimated coefficients for sector, region, and year dummies. The table reports the F test on the difference between the coefficients of the split variables

***$p < 0.01$; **$p < 0.05$; *$p < 0.10$

purposes. We find that the presence of existing debt is associated with a relatively higher spread and that this effect is especially significant for the subset of firms that have reached their maximum debt capacity based on collateralized assets. This confirms that banks tend to adopt a pricing approach that gives weight to the previous debt exposure, independently of the guarantee coverage. On the same line, we find that the higher the incidence of the publicly guaranteed debt over the total amount of outstanding loans, the lower the spread.

However, the sensitivity analysis shows that an increase of the incidence of the guaranteed coverage does not lead to an equal contraction in the spread for all types of borrowers and loans. An increase of the incidence of the guaranteed coverage leads to a contraction of the spread only for loans aimed at covering working capital needs rather than investments. Interestingly, we do not find any differential impact when we split the sample according to whether borrowers belong to high-tech or low-tech manufacturing sectors and to knowledge-intensive service (KIS) or less-knowledge-intensive service sectors (LKIS). In this respect, the SFLG scheme seems to be more supportive of the general population of firms in the UK rather than of those at the extremes of the distribution, which are often the focus of government policy interventions pursuing wider economic growth and redistributive policy agendas.

The study has some clear limitations. The most relevant limitation involves the study's typology of data. Unfortunately, we cannot build a control sample of similar firms receiving loans without public loan guarantees because of two main reasons. First, our sample firms receiving guarantee-backed loans are to a large extent small, and young firms that in the UK do not publish balance sheet data due to more relaxed reporting requirements. This prevents us from building a control sample using a standard approach such as propensity score matching. Second, even if we had a control sample of similar indebted firms receiving loans without a public loan guarantee, we could not have access to the spread applied by banks, which is a sensitive and typically not disclosed information. Despite this limitation, we are still able to exploit the internal variance of the sample to assess the conditions, both internal and external to the firm, which affect the spread and the relative effectiveness of the policy instrument. Another limitation related to the structure of the data pertains the lack of information on the seniority of the credit lines, which would have allowed further refinements of the analysis.

Our work makes an empirical contribution to our understanding of credit rationing at both a theoretical and practical level. From a theoretical point of view, the fundamental theories of credit rationing assume that in equilibrium, loan markets may be characterized by credit rationing as banks making loans consider not only the interest rate and the riskiness of a loan but also how the interest rate offer might subsequently affect the riskiness of a loan due to adverse selection and/or moral hazard. This is related to the concept of a backward bending loan supply curve where banks become less willing to supply loans that would attract higher interest rates. Here, riskier loans are choked off. But, collateral and loan interest rates are often viewed as a pair which are negatively correlated. In this sense, the theoretical prediction would be that the provision of a government-backed guarantee should lower the cost of finance, as well as increasing loan supply. But our results, while showing that this generally holds true, suggest that one unit of collateral (or guarantee) does not have equal or proportional effects across all firms. The effect is more nuanced. For a policy-maker, who often has explicit views and targets relating to particular 'types' of smaller firms that might add more economic value as they become unconstrained in the debt market via the guarantee, our results also add insight. Indeed, our results suggest that further work might be usefully conducted with a view to considering whether or not a different guarantee rate might be appropriate for different types of smaller firm. Further, it might not be the case that $1 of government collateral has the same value to the lending institution as $1 of personal collateral. And, this returns to the theoretical models of credit rationing, particularly in respect of whether a $1 of government guarantee has the same effort inducing effect assumed from personal (or firm) collateral.

Appendix

Table 6 Correlation matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19v	(20)
Spread (1)	1																			
Guaranteed loan/debt (2)	−0.08	1																		
Unsec_debt (3)	0.01	−0.19	1																	
Unsec&sec_debt (4)	0.02	−0.44	−0.11	1																
Unsec_or_sec_debt (5)	0.06	−0.84	0.43	0.37	1															
Sec_debt (6)	0.05	−0.57	−0.19	−0.16	0.61	1														
Loan amount (7)	−0.06	0.16	−0.01	−0.01	−0.01	0	1													
Fixed_rate (8)	0.53	−0.05	0.01	0.02	0.04	0.03	−0.04	1												
New born (9)	−0.01	−0.06	−0.01	0.01	0	0	−0.2	0	1											
Young firm (10)	0.11	−0.03	0.01	0	0.03	0.03	0.33	0.04	−0.61	1										
Turnover (11)	0	0.05	0.01	0	0.01	0.01	0.42	0	−0.42	0.5	1									
LKIS (12)	−0.17	0.04	0.01	−0.02	−0.04	−0.04	−0.09	−0.07	0.07	−0.15	−0.12	1								
KIS (13)	0.06	0	0	0.01	0.01	0.01	0.05	0.03	−0.01	0.03	−0.05	−0.5	1							
High-tech_manuf (14)	0.1	−0.02	−0.01	0.01	0.03	0.03	0.08	0.05	−0.03	0.06	0.01	−0.4	0.52	1						
WC Loan (15)	0.1	−0.03	−0.01	0.01	0.02	0.02	−0.01	0.05	0.1	−0.01	0.01	−0.13	0.1	0.13	1					
Loan_duration (16)	−0.13	0.08	0.01	−0.01	−0.03	−0.03	0.19	−0.06	−0.05	0	−0.06	0.14	−0.08	−0.11	−0.21	1				
Bank branch density (17)	−0.03	0.01	0	−0.01	0	0	0.03	−0.02	0.01	−0.02	−0.01	0.04	0.01	0.01	0.01	−0.01	1			
Financially developed region (18)	−0.02	0.01	0.01	−0.01	0	0	0.03	−0.01	−0.01	0	−0.01	0.03	0.02	0.02	−0.01	0.01	0.8	1		
Developed region (19)	−0.04	0.03	0	0	−0.01	−0.01	0.04	−0.01	−0.01	−0.04	−0.04	0.06	0.03	0.01	−0.02	0	−0.11	−0.03	1	
Big4 (20)	−0.01	0	0.01	−0.01	−0.01	−0.01	−0.12	0.03	−0.02	−0.04	−0.05	0.04	−0.03	−0.04	−0.01	0.06	−0.25	−0.18	0.24	1

Table 7 Determinants of the spread (OLS regressions)

	Model 1	Model 2	Model 3	Model 4	Model 5
Loan amount	−2.224***	−1.960***	−2.148***	−2.672***	−2.664***
	(0.207)	(0.206)	(0.204)	(0.213)	(0.214)
Fixed rate	3.109***	3.093***	3.136***	3.165***	3.170***
	(0.033)	(0.033)	(0.030)	(0.031)	(0.031)
New born	0.209***	0.166***	0.224***	0.235***	0.248***
	(0.025)	(0.025)	(0.025)	(0.026)	(0.026)
Young firm	0.470***	0.428***	0.491***	0.541***	0.554***
	(0.025)	(0.025)	(0.024)	(0.026)	(0.026)
Turnover	−0.117***	−0.133***	−0.116***	−0.115***	−0.115***
	(0.023)	(0.023)	(0.022)	(0.023)	(0.024)
KIS	−0.209***		−0.240***	−0.246***	−0.247***
	(0.032)		(0.032)	(0.034)	(0.034)
LKIS	−0.425***		−0.455***	−0.471***	−0.488***
	(0.023)		(0.023)	(0.024)	(0.024)
Hightech_manuf	0.236***		0.328***	0.296***	0.304***
	(0.037)		(0.037)	(0.039)	(0.039)
Big4			0.120***	0.071**	0.051*
			(0.029)	(0.030)	(0.030)
GDP growth			1.860***		
			(0.031)		
MSCI				−1.062***	
				(0.088)	
CPI					−0.100***
					(0.010)
Year dummies	Yes	Yes	No	No	No
Region dummies	Yes	Yes	Yes	Yes	Yes
Bank dummies	Yes	Yes	No	No	No
Sector dummies	No	Yes	No	No	No
Constant	3.053***	2.621**	1.866***	10.370***	3.241***
	(0.690)	(0.206)	(0.109)	(0.620)	(0.115)
Observations	29,266	29,266	29,266	29,266	29,266
R-squared	0.380	0.384	0.382	0.324	0.322

Robustness check with the inclusion of bank dummies, industry dummies, GDP growth, SME stock index and CPI. Dependent variable: spread. The table reports the OLS regressions to test the determinants of the spread, controlling for bank dummies (model 1), industry dummies (model 2), GDP growth (model 3), SME stock index (model 4), and CPI (model 5). The definitions of the independent variables are provided in Table 1. For the sake of synthesis, we omit estimated coefficients for bank, year, sector, and region dummies. Robust standard errors are in parenthesis

***$p < 0.01$; **$p < 0.05$; *$p < 0.10$

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