Collateral, mutual guarantees and the entrepreneurial orientation of SMEs

Federico Beltrame, Josanco Floreani, Luca Grassetti,
Michela Cesarina Mason and Stefano Miani
*Department of Economics and Statistics, Università degli Studi di Udine,
Udine, Italy*

Abstract

Purpose – The purpose of this paper is to investigate whether guarantees characterised by different degrees of relationship lending (particularly referring to collateral and guarantees provided by Mutual Loan Guarantee Institutions) are able to convey some entrepreneurial orientation (EO) dimensions from firms to banks.

Design/methodology/approach – Exploiting data from a survey of Austrian and Italian SMEs, the empirical analysis is based on a sample of 328 small business firms. To test the signalling hypothesis, the authors used logistic regressions to assess the explanatory power of EO dimensions on the presence of several types of guarantees.

Findings – The analyses suggest that collateral cannot signal any EO dimension, even when controlling for the strength of the bank – firm relationship. Furthermore, SMEs are able to mitigate their financial risk through collateral only in a multiple bank – firm relationship. Lastly, innovativeness, competitive energy and aggressiveness allow SMEs to obtain external guarantees (mutual guarantees, bank guarantees and public guarantees, respectively), helpful in order to promote credit access.

Research limitations/implications – The mediation role of collateral and external guarantees on EO – credit access relation should be analysed in future research. Since the role of guarantees can change among different bank lending technologies, further studies should carefully consider lender's characteristics. Lastly, the use of loan data in respect of the firm data can help to better separate the effect of loan and firm attributes on the collateral.

Practical implications – The study suggests how managers and entrepreneurs should manage the financial risk through collateral in different situations (one–to–one and multiple bank – firm relationship). Furthermore, depending on the level of innovativeness, competitive energy and aggressiveness, a firm should request a specific type of external guarantees in order to increment the credit availability, to maximise the possibility of success and to improve its performance.

Originality/value – To the authors' knowledge, this paper is the first attempt to analyse whether EO affects the request for guarantees instead of credit access. This can be helpful especially when the banks involved in the relation apply a transaction lending technology.

Keywords Performance, SME, Entrepreneurial orientation, Collateral, Mutual guarantees

Paper type Research paper

1. Introduction

This paper aims at investigating whether guarantees characterised by different degrees of relationship lending (particularly referring to collateral and guarantees provided by Mutual Loan Guarantee Institutions, hereafter MLGIs) are able to convey some entrepreneurial orientation (EO) dimensions from firms to banks.

The financial turmoil and the resulting macroeconomic slacks have implications for both firms and the financial system. In particular, the recent financial crisis left important consequences in the bank – firm relationship. From the banks' side, the ability to select good firms and projects became nowadays even more important to reduce losses. On the other side, firms experienced tightening of credit access conditions, leading to a massive credit crunch.

Among the prominent factors contributing to the tightening of credit access conditions in Europe are the lack of investments and collateral availability, according to the European

Central Bank's periodic "Euro Area Bank Lending Survey". In the years when the world fell into the harsher stages of the crisis (2008–2009), roughly 40 per cent of banks reported the collateral availability as an important factor contributing to tightening their credit standards.

Literature analysing credit crunch effects focusses attempts on sorting out demand (among others, see Ongena *et al.*, 2011; Presbitero and Zazzaro, 2011) and supply effects (Iyer *et al.*, 2013; Jiménez *et al.*, 2012). Investigation of the supply effects confirms that SMEs now suffer more than before the crises, particularly referring to smaller, younger and riskier firms (Kremp and Sevestre, 2013). Beyond firm characteristics, managers' and entrepreneurs' qualities and competencies can play an important role (Moro *et al.*, 2014). Regarding the point, empirical studies investigated the relationship between EO and credit access in order to improve firm performance, finding that EO presents a positive relationship with credit availability (Wiklund and Shepherd, 2005; Zampetakis *et al.*, 2011; Fatoki, 2012).

However, the effect of firm and entrepreneur characteristics on credit availability might change depending on the bank lending technology type. To simplify and following Berger and Udell (2006) rationales, lending technologies can be categorised in two types: transaction lending that is based on quantitative data (the so-called "hard" information) and relationship lending which is strongly based on personal knowledge and relations with the firm (the so-called "soft" information).

Unlike firm performance, which can be assessed through financial statements, EO dimensions are usually transmitted and perceived as "soft information". We can conclude, at least conceptually, that the EO dimensions could not have a direct influence on credit access in the case of transaction lending. In this case, it can be important to elaborate an alternative paradigm helpful to analyse EO relevance for the bank – firm relation from a different standpoint.

An alternative point of view is to see the collateral as a "collector" of SMEs information. Referring to the traditional adverse selection paradigm, pledging collateral may help attenuate both adverse selection (Stiglitz and Weiss, 1981; Besanko and Thakor, 1987; Chan and Thakor, 1987) and moral hazard problems (Aghion and Bolton, 1992) acting as a signal. The prediction, therefore, is that collateral works as a sorting device by which low–risk borrowers pledge collateral whereas high–risk borrowers tend to be less collateralised, especially when the firm characteristics are not observable.

Regarding other kinds of guarantees, Jiménez and Saurina (2004) find that loans guaranteed by credit institutions or by the public sector are less risky (in terms of lower firm's probability of default). Bartoli *et al.* (2013) confirm those results on MLGIs highlighting that mutually guaranteed firms are less likely to experience financial tension.

The signalling theory proved to be fruitful for addressing a number of research questions in management (see Connelly *et al.*, 2011), ranging from corporate governance, entrepreneurship literature (Certo, 2003; Lester *et al.*, 2006; Busenitz *et al.*, 2005), capital market decisions and human resource management. What remains in the shadow is the management of collateral under the perspective of the borrower, i.e. decisions regarding the choice of collateral type and the entrepreneurs' factors affecting it.

The firm choice of how to signal to the lender its intrinsic characteristics requires further research attention. Connelly *et al.* (2011) identified the incentives of signallers as an interesting topic for further investigation, in particular regarding the extent to which signals of the firm quality may help in predicting its performance. To the best of our knowledge, there is a lack of investigation on the signalling power of collateral on EO, despite its relevant managerial implications. We try to answer this first research question:

RQ1. Does collateral pledge signal good firm performance and EO dimensions?

Furthermore, we focus on the signaller (the firm) – signal (the collateral) relation in order to gauge the knowledge on how performance, entrepreneurial dimensions and competitive energy can affect the access to mutual guarantees due to their level of relationship lending, comparing the results with the signalling effect of other kinds of external guarantees – namely public and bank guarantees. Bringing together entrepreneurial literature and the borrower–lender literature we provide new insights on how firm's characteristics affect firm's behaviour when selecting the most appropriate form of guarantee with the purpose of signalling soft information. A second research question we try to answer in this paper is:

RQ2. How do EO and firm performance affect the availability of mutual guarantees?

To address the investigation in a wider perspective, a sample of 328 Austrian and Italian SMEs was analysed. Logistic regressions are used to answer the research questions.

We found that the simple provision of collateral does not provide a signal of either positive or negative performance and EO, while financial leverage affects positively collateral, with a different magnitude if the bank – firm relationship is not exclusive. Interestingly, each type of third-party guarantee is associated with different dimension: innovative and low autonomy firms are affiliated to MLGIs, bank guarantees are associated with competitive energy, and public–sector guarantees are positively affected by aggressiveness. Furthermore, both mutual and bank guarantees are characterised by low levels of subjective performance.

Our contribution is relevant for entrepreneurs and firm managers. The study suggests how managers and entrepreneurs should manage the financial risk through collateral in the different situations (one–to–one and multiple bank – firm not relationship). Furthermore, depending on the level of innovativeness, competitive energy and aggressiveness, firms should request of a specific type of external guarantees in order to maximise the possibility of success, to increment the credit availability and to improve the performance.

The paper is organised as follows. The next section introduces the concept of EO and the link with the credit access. Sections 3 and 4 develop the hypotheses for the collateral and the guarantees provided by MLGIs, respectively. Section 5 describes the methodology and Section 6 presents the results. Section 7 discusses the results and concludes the paper.

2. EO and credit access

EO is among the most investigated management constructs of the last thirty years (Gupta and Gupta, 2015), over which the literature has developed sound and rigorous theoretical background (Basso *et al.*, 2009).

In a wider perspective, we characterize EO as being an effective combination of five dimensions (Hughes and Morgan, 2007; Kollmann *et al.*, 2007; Lumpkin and Dess, 1996, 2001; Felício *et al.*, 2012): risk–taking, innovativeness, proactiveness, competitive aggressiveness and autonomy. Each dimension can be defined as follows.

Risk–taking behaviour can be identified as the propensity to commit large amounts of resources to the appropriation of market opportunities, with the aim to secure high and uncertain future returns (Huang *et al.*, 2011); entrepreneurs denoted by risk–taking behaviour tend to show a willingness to take on risky resources (like external financial capital). Innovativeness measures the firm's predisposition to introduce new products/services or new processes and sustain experimentation requiring the commitment of financial resources (Li *et al.*, 2008). Proactiveness is the ability of management to act anticipating the future demand for a product or service (Miller, 1983). Competitive aggressiveness defines the intensity of firm's efforts to outperform industry competitors (Lumpkin and Dess, 1996). Autonomy reflects the "independent spirit" (Lumpkin and Dess, 1996), including the concept of free and independent action and decision–making (Callaghan and Venter, 2011). Finally, while competitive energy is not seen as a dimension of

EO in the strict sense, it complements other factors describing the firm's efforts to respond to the actions of competitors (Felício *et al.*, 2012).

With the purpose to explain the link between EO and performance, some studies tried to test the moderator effect of credit availability, since entrepreneurial strategies require considerable financial sources to be successful (Wiklund and Shepherd, 2005). Zampetakis *et al.* (2011) find a positive effect of EO on financial resources: the orientation towards action, the active implementation of new ideas, the ability to anticipate opportunities to instigate changes in current strategies and tactics and the ability to detect the future trend in the markets increment the probability of obtaining additional financing resources. Fatoki (2012) extends those results, considering SMEs from different sectors in South Africa.

On the supply side, when one participant of a financial transaction is not fully aware either of characteristics of the other participant or of its behavioural intentions, rhetoric related to EO should send positive signals to lenders (Moss *et al.*, 2015). However, EO transmission is difficult to predict, depending on a combination of different factors such as the structure of the banking industry, the prevailing lending technology (in terms of transaction lending vs relationship lending) and the availability of collateral. From the banks' side, the EO dimensions could not be captured and determinate an increment of credit availability when the relationship with the firm is conducted in a transaction lending framework. Since the transaction lending is mainly based on the firm's hard information, all the information related to the personal knowledge of the entrepreneur and its business (soft information), including the EO dimensions, tend to have a marginal role in the credit assessment.

In those terms, previous literature analysing the link EO–credit access (Wiklung and Shepherd, 2005; Zampetakis *et al.*, 2011; Fatoki, 2012), lacks in terms of splitting the bank – firm relationship based on lending technologies. However, like Berger and Udell (2006) highlighted, even using proxies to define the bank – firm relationship (like the type of bank, i.e. cooperatives banks – in which the creditworthiness assessment is mainly based on relationship lending – in comparison with the larger and globally significant banks – in which the transaction lending is predominant), to separate the lending technologies perfectly is a very challenging task.

Since EO can be transmitted like soft information from firms to banks, the collateral pledging and the request of external guarantees can represent an alternative channel for a bank to capture those entrepreneurs' dimensions, in the light of the signalling theory. In the next paragraph we describe the role of collateral in the signalling theory framework and we develop the hypotheses about the effect of EO and performance on collateral; in the fourth section we do the same in the case of the MLGIs' guarantees, financial intermediaries devoted to providing guarantees to SMEs.

3. Collateral, EO and firm performance

In frictionless markets, lenders possess all the relevant information for assessing borrowers. Otherwise, in the presence of market imperfections, lenders tend to have a smaller set of information on borrowers, especially when the borrowers are opaque as SMEs are (Vander Bauwhede *et al.*, 2015).

Any relation where two parties have different information (presence of asymmetric information) depicts a good framework for the signalling theory (Spence, 2002), which is helpful to explain the behaviour of the parties involved in the relation. In such a setting one party has an information advantage (the sender) over the other party (the receiver). The sender faces the choice of whether (and how) signal the relevant information – including his risk level – to the receiver. The receiver has the problem of decoding such information in order to take some management decisions. For a signal to be efficient, it should be both observable and costly (Bird and Smith, 2005), where costs of producing signals have the function to prevent

incentives to disseminate false signals. Spence (1973) first applied the signalling construct to the labour market showing how high quality employees might distinguish themselves from low quality ones through costly signalling of high quality education.

In the case of bank – firm relationship, the signalling theory is particularly suitable for at least two reasons. First, firms' decisions and actions deliver signals that the banks observe in order to infer its status or the quality of its investment projects (i.e. financing decisions and the timing when taping capital markets provides useful information). Second, since financial contracts are dominated by uncertainty about future states of the world (i.e. the quality of the borrower and evolution thereon along with the behaviour of borrowers), the practice has developed incentive–compatible contracts for driving borrower behaviour or facilitating monitoring activities, which are characterised by different costs. In order to define such incentive–compatible contracts, the literature usually combines the theory on collateral pledge with lender–borrower bargaining (i.e. the loan interest rate – see Bester, 1985; Comeig et al., 2014). In this framework collateral is able to signal significant information on borrowers' quality, especially in terms of risk.

However, the detection of the signal in terms of risk depends on the ability of the credit institutions to observe firm characteristics (Berger et al., 2011; Meles et al., 2017).

When firm characteristics are not observable by banks, the presence of collateral is negatively related to the firm's risk, signalling good quality borrowers: lower the borrowers' probability of default, higher the incentive to pledge collateral, because the chance to incur asset losses and to enforce collateral is remote; otherwise, bad borrowers, due to the higher chance to face asset losses, tend to post a lower amount of collateral (Bester, 1985; Chan and Kanatas, 1985; Besanko and Thakor, 1987). Bester (1985) argued that, when collateral is offered to borrowers with different probabilities of default, riskier firms choose banks that demand less collateral, given the higher probability of the guarantee being enforced.

On the contrary, when firm information is observable, the relation between collateral and borrower's risk is positive since banks request collateral to cope with the moral hazard problem of riskier borrowers (Boot et al., 1991; Chen, 2006). The more observable the risk of borrowers is, the higher the collateral requested will be since a collateral induces more borrower effort and reduces the incentives for strategic default (Bester, 1994). The empirical evidence mainly supports those predictions (among others Jiménez and Saurina, 2004; Brick and Palia, 2007; Jiménez et al., 2009).

In the case of bank – firm relationship, the ability to observe borrowers' information might depend on the type of information (soft vs hard) and the strength of the bank – firm relationship.

Regarding the type of information, we can state that the soft one is constituted by all the information non-transmissible in a numerical way like opinions, ideas, rumours, economic projection, statement of managers plans and market commentary (Petersen, 2004). Since the perception of EO dimensions by financial intermediaries is usually not collectable in a numerical way, it has to be treated like soft information. For this reason EO cannot be easily observed like, for example, the performance analysable through firm's financial reports. Soft information becomes more observable when the bank – firm relationship is strong. The strength of the bank – firm relationship can be proxied by using the length of the relation (Berger and Udell, 1995; Machauer and Weber, 1998; Harhoff and Körting, 1998; Chakraborty and Hu, 2006; Brick and Palia, 2007; Jiménez et al., 2009; Berger et al., 2011), the number of lenders (Ono and Uesugi, 2009), the presence of a main bank (Machauer and Weber, 1998; Degryse and van Cayseele, 2000; Elsas and Krahnen, 2002), the physical and organisational distance between the firm and the lender (Berger et al., 2011; Inderst and Mueller, 2007; Jiménez et al., 2009) and trust (Moro et al., 2012). The selection of the appropriate measures of the bank – firm relationship strength mainly depends on the level of analysis – loan data or firm data. In this paper, we take the number of lenders to define

the strength of bank – firm relationship, since it is the unique measure applicable when only firm data are available.

When the strength of the bank – firm relationship is weak (as in multiple relationship case), information, including EO, tends to be not observable. In this framework, following Berger *et al.* (2011) and Meles *et al.* (2017), less risky borrowers are driven to offer collateral in order to signal their quality. On those bases we can formulate our first hypothesis:

> *H1.* In the absence of an exclusive bank – firm relationship, EO dimensions (innovativeness, autonomy, risk–taking, proactiveness and competitive aggressiveness) positively influence the provision of collateral.

In the presence of borrowers with observable characteristics, banks are likely to request collateral to low quality firms, in order to compensate the (known) high – risk occurred (Meles *et al.*, 2017). On the contrary, for the (known) riskless firms, banks do not feel the need to demand a higher level of collateral. Thus, our second hypothesis is as follows:

> *H2.* In the presence of an exclusive bank – firm relationship, EO dimensions (innovativeness, autonomy, risk–taking, proactiveness, competitive aggressiveness) negatively influence the provision of collateral.

Regarding hard information, empirical evidence demonstrates that the large part of "hard" risk measures is positively related to the collateral. For example, age is negatively related with the presence of collateral (Leeth and Scott, 1989), while doubtful loans (Jiménez and Saurina, 2004), overdrafts (Yaldiz Hanedar *et al.*, 2014), financial leverage (Brick and Palia, 2007) and default events (Brick and Palia, 2007; Jiménez *et al.*, 2009; Berger *et al.*, 2011) positively affect the presence of collateral. Inderst and Mueller (2007) predict that observable higher–risk borrowers pledge more collateral, implying that highly collateralised loans have higher ex–post default likelihood.

Corporates default are often preceded by deterioration in firm's economic and financial ratios, such as turnover, liquidity ratios, leverage, coverage ratios and profitability, although with a different magnitude in their predictive power (Muscettola and Pietrovito, 2012).

At least, when borrowers' characteristics are observable, high default likelihood is associated with deteriorating financial performance and implies high collateral requirements:

> *H3.* Performance negatively influences the presence of collateral.

4. Mutual guarantees, EO and firm performance

While there is a vast body of research on collateral and its implications for the bank – firm relationship, relatively less investigation has spurred on the ground of guarantee schemes. Nevertheless, such schemes deserve attention given their unique features and the promising insights that they can bring into the debate on lending relations, especially for small business lending.

In general, credit guarantee schemes can emerge for the purpose of overcoming information asymmetries between the borrower and the lender, diversifying risk and exploiting regulatory arbitrages (Honohan, 2010). Specifically, partial credit guarantee schemes are particularly valuable for banks supporting SMEs, more than other contractual characteristics like interest rates or other regulatory subsidies (Beck *et al.*, 2008).

Among them, MLGIs are associations of independent firms (normally, small businesses), with or without government support, whose specific function is providing guarantees to loans issued to their members, who are involved in the management of the association. Guaranteed SMEs must take part in this mutual scheme by signing equity and paying a fee for each loan operation.

Despite some concerns on this kind of external guarantees, in particular relating to the public intervention (Camino and Cardone, 1999; Honohan, 2010; Columba *et al.*, 2010), it is highlighted that MLGIs guarantees are helpful for SMEs.

From an economic point of view, MLGIs intervention not only limits credit rationing (Columba *et al.*, 2010), but also implies lower credit costs (Zecchini and Ventura, 2009; Cowling, 2010).

Regarding the MLGIs' portfolio quality, Bartoli *et al.* (2013) found that MLGI guaranteed firms are less likely to experience financial tension and Columba *et al.* (2010) showed that small firms affiliated with MLGIs signal good creditworthiness since they present lower interest rates with respect to other firms.

Even though those findings could suggest a positive relation between firms guaranteed by MLGI's and their performance, this relation deserves further investigation.

First, in practice firm performance could not affect the provision of mutual guarantees, since MLGIs are not able to measure it (especially financial performance) on a significant part of their portfolio. In fact, micro and small firms that are not obliged to draw up financial reporting or subject to a limited external disclosure reppresent a large part of their portfolio. For this reason, MLGIs usually based the SMES credit assessment on soft information, exploiting their territorial proximity with firms.

Second, it was empirically demonstrated that mutually guaranteed firms are riskier borrowers with poor performance, when public-sector contribution result in MLGIs. According to Columba *et al.* (2010), when the public sector gives a partial contribution to MLGIs (like in Italy), the screening activity from MLGIs became less strict and SMEs affiliated show lower firm performance as compared with non-affiliated ones.

Lastly, and most important, SMEs requesting mutual guarantees are usually firms that were previously rejected or discouraged by banks due to their poor performance (Gama and Duarte, 2017). In practice, SMEs request mutual guarantees when their financial performance is not sufficient for being financed by banking firms. MLGIs find themselves having to select the companies to be guaranteed among those with a lower performance. Those evidences lead us to formulate our fourth hypothesis:

H4. Performance negatively influences the presence of mutual guarantees.

What actually differentiates MLGIs from the other kinds of financial intermediaries is that they base their assessment of the affiliated firms on the peculiar knowledge of business features and specific traits of the entrepreneur, rather than exploiting a pure performance assessment.

As associations between small businesses, MLGs can be regarded as the locus where associated firms meet and interact, spurring a network of relations. A unique network of relations possessed by individuals or social units allows them to access valuable resources and knowledge (Adler and Kwon, 2002; Davidsson and Honig, 2003). Such a form of proximity develops social capital, defined by Nahapiet and Ghoshal (1998) as the overall resources embedded in the wide network of relations that individuals and economic actors possess. From a firm's perspective, two strictly related dimensions are connected to the social capital. The first is its role as a conduit for acquiring external knowledge and resources through social connections (Manev *et al.*, 2005). The second is related to the managerial function of directing social capital to acquire valuable resources and their orchestration for the purpose of supporting firm's actions (Sirmon *et al.*, 2011).

On a wider perspective, networks of relations might allow an inter-unit exchange of resources, an inter-firm learning and lead to product innovation (Adler and Kwon, 2002). The inter-firm exchange of knowledge and information allows for an inter-firm learning about peer's business activities, strengths, weaknesses and the unique resources they are endowed with. In that, MLGIs represent an interesting case for investigating how associations between SMEs can foster the exchange of knowledge through the connection

between the firms involved in the relation. Arguably, network relations within local communities and within sectors should facilitate such exchange of knowledge, especially in the case of MLGIs that are established on a sector or industry level.

Since Miao *et al.* (2017) accounted for a positive association between EO and social capital, and in the light of the evidence described above, we can postulate that mutually guaranteed firms are entrepreneurially oriented. At the same time, social connections allow MLGIs to possess unique information on the associates and find themselves in a better position to certify and signal to lenders the quality of the firms they support, more than a bank or public guarantee can do.

Therefore, we can predict a significant relation between EO and access to mutual guarantees. Positive EO attributes of a firm suggest entrepreneur proactivity also on the availability of external guarantees, due to their importance in the obtainment of banks loans. The following hypothesis can be formulated:

H5. EO dimensions (innovativeness, autonomy, risk-taking, proactiveness and competitive aggressiveness) positively influence the presence of mutual guarantees.

5. Methodology

5.1 Data and sample

The data derive from the European Interreg Italia–Austria research project for a sample of Italian and Austrian firms. Out of the 3,950 questionnaires submitted within a one-year period (2013), we received 328 answers (response rate around 8 per cent), minimising the lack of technical comprehension, errors, and missing data. SMEs are defined according to European Recommendation 2003/361/EC and include firms of less than 250 employees, with a turnover of at most €50 m or total assets of at most €43 m. Firms in the sample were selected within North-East Italy and South Austria considering both activity (using ATECO codes) and province population. The sample gives a general representation of the Italian and Austrian economies, thanks to the heterogeneity of firms in terms of legal status and sectors.

5.2 The measurement model

For each firm, EO dimensions are considered and measured by means of the following items based on a Likert scale: risk taking (RISK, six items taken from Hornsby *et al.*, 2002; Morgan and Strong, 2003; Acedo and Jones, 2007), Innovativeness (INNOV, four items taken from Calantone *et al.*, 2002), Proactiveness (PROAC, ten items taken from Acedo and Jones, 2007; Hult and Ketchen, 2001; Morgan and Strong, 2003), Competitive aggressiveness (AGRESS, six items taken from Lumpkin and Dess, 2001), Autonomy (AUTON, nine items taken from Engel, 1970; Hornsby *et al.*, 2002; and Spreitzer, 1995).

First of all, by means of factorial analysis, we reduced the items of each construct to a unique reference. In addition, we performed a scale reliability analysis to validate our EO variables. Table I reports the results for Cronbach's α and the Kaiser–Meyer–Olkin statistic. The results confirm the validity of our scales and suggest that some items should be dropped in order to obtain more reliable scales. In particular, items 5 and 6 can be dropped from the risk scale, items 1 and 5 can be removed from the aggressiveness scale and items 1 and 6 can be excluded from the autonomy scale. Some other items were dropped from the scales after carrying out the exploratory factor analysis.

The results of the factor analysis are given in Table II. Finally, 26 items were considered in the analysis of constructs. The global Cronbach's α is acceptable (0.84). The results of the estimation of the five latent dimensions show that the cumulative proportion of variance included in the factors is 47.5 per cent. A similar result can be obtained using the principal components analysis. In this case, the cumulative proportion of variance for five

Construct	Total	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10
INNOV											
α	0.873	0.837	0.854	0.817	0.841	–	–	–	–	–	–
KMO	0.780	0.815	0.805	0.753	0.758	–	–	–	–	–	–
RISK											
α	0.457	0.318	0.339	0.343	0.405	*0.534*	*0.495*	–	–	–	–
KMO	0.573	0.559	0.571	0.606	0.539	0.593	0.659	–	–	–	–
PROAC											
α	0.877	0.868	0.865	0.862	0.869	0.860	0.871	0.862	0.865	0.862	0.865
KMO	0.896	0.898	0.941	0.900	0.896	0.903	0.882	0.881	0.868	0.922	0.876
AGGRESS											
α	0.701	*0.711*	0.581	0.590	0.622	*0.747*	0.654	–	–	–	–
KMO	0.661	0.618	0.622	0.619	0.741	0.479	0.804	–	–	–	–
AUTON											
α	0.738	*0.752*	0.699	0.690	0.711	0.681	*0.777*	0.700	0.714	0.703	–
KMO	0.805	0.868	0.869	0.742	0.670	0.865	0.746	0.778	0.911	0.826	–

Note: In italic the values of the Cronbach's a are larger than the general scale index (suggesting the possibility to drop the items)

Table I.
EO dimensions: scale reliability measures

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components is 57.7 per cent. The factor loadings were obtained considering the varimax rotation and the relative scores were used in the following analyses. The threshold for the factor loadings was fixed at 0.4 (with the exception of the coefficient for the first item of risk scale). In general, the estimation results are coherent with the theoretical scale specification. The reliability of the factor analysis can be evaluated considering the standard measures. The RMSR value is 0.040 and its corrected value is 0.050. The Tucker-Lewis Index (TLI) of factor reliability is 0.832 and the RMSEA value is 0.073. The RMSR and TLI values are acceptable, while the RMSEA value is slightly larger than the suggested limit.

We also performed a scale reliability analysis to validate the performance multiple items scale. The analysis of Cronbach's α (0.897) and of the Kaiser–Meyer–Olkin (0.882) show that the scale can be considered reliable. However, reliability can be improved by dropping the third item on the scale, but the gain is irrelevant ($α = 0.903$). The results of the factor analysis confirmed the unidimensionality of the scale and the results of the data reduction method can be considered reliable. The RMSR value is 0.07 and its corrected value is 0.09. The TLI of factor reliability is 0.845. The RMSEA value is 0.164, which is somewhat larger than the suggested limit (0.05). Nevertheless, the proportion of "explained" total variance is 0.54.

5.3 Research model
The research model is as follows:

$$P(G = 1) = f \ (firm \ generic \ variables, \ financial \ variables \ and \ performance,$$

$$loan \ variables, \ relationship \ variables, Entrepreneurial \ orientation \ variables)$$

(1)

In accordance with Ono and Uesugi (2009), the dichotomous variable (G) is equal to one when the line granted by the main bank is guaranteed, zero otherwise. The research model is run using four different types of guarantees: collateral ($G = $ GUA), mutual guarantee ($G = $ MG), bank guarantee ($G = $ BG) and public-sector guarantee ($G = $ PG). GUA is used on full sample (MODEL 1) to test the third hypothesis, on a sub-sample of: exclusive bank – firm relationships

	Proactiveness	Autonomy	Innovativeness	Aggressiveness	Risk
INNOV1			0.773		
INNOV2			0.737		
INNOV3			0.813		
INNOV4			0.748		
PROAC1	0.569				
PROAC2	0.579				
PROAC4	0.522				
PROAC5	0.622				
PROAC7	0.684				
PROAC8	0.649				
PROAC9	0.682				
PROAC10	0.674				
AGGRESS2				0.874	
AGGRESS3				0.807	
AGGRESS4[b]			0.412	0.443	
AGGRESS6				0.432	
AUTON2		0.598			
AUTON3		0.630			
AUTON4		0.497			
AUTON5		0.753			
AUTON8		0.648			
AUTON9		0.481			
AUTON10		0.610			
RISK1[a]					0.294
RISK2					0.569
RISK3					0.681
SS loadings	3.503	3.008	2.754	2.042	1.052
Variance proportion	0.135	0.116	0.106	0.079	0.041
Cumulative variance proportion	0.135	0.250	0.356	0.435	0.475

Notes: The RMSR value is 0.040 and its corrected value is 0.050. The Tucker Lewis Index of factor reliability is 0.832 and the RMSEA values is 0.073. [a]The loadings values are reported if larger than 0.400. For the risk construct the first loading is lower than the threshold, but it is reported because it represents the larger value; [b]the only item giving an ambiguous result if the fourth of the aggressiveness scale, notwithstanding the larger loading is the one in the aggressiveness regression

(MODEL 2); and multiple bank – firm relationships (MODEL 3), in order to test the first and second hypothesis, respectively. MG is used on the full samples (MODEL 4) in order to test the fourth and fifth hypotheses. Finally BG and PG are used on the full samples (MODEL 5 and 6, respectively) in order to compare the results with the case of mutual guarantees.

5.4 Explanatory variables
The explanatory variables can be classified into five groups: *firm generic variables*, financial variables and performance, loan variables, relationship variables and managerial variables. Except for performance and managerial variables, the other variables are taken by the consolidated literature on collateral. Regarding the performance, since the presence of collateral is affected by the default events (Brick and Palia, 2007; Jiménez *et al.*, 2009; Berger *et al.*, 2011), we use some performance indicators, which can impact on the probability of default (Altman, 1968). Regarding managerial variables, assuming that those aspects can affect credit and guarantees access, we test their significance through the models.

Firm generic variables (all variables are taken from Yaldiz Hanedar *et al.*, 2014). The firm's generic information refers to its geographical location (GEO, Italy or Austria), sector (SEC, services, commercial or industrial sectors), size (SIZE, the number of

full-time employees), age (FIRM_AGE) and the presence of a sole owner (SOLOWNER, a dummy variable that equals one if the firm has a sole owner and zero otherwise).

Financial variables and performance. The first financial variable is the ratio between the amount of equity and to the total funding sources (CAP, taken from Brick and Palia, 2007), the presence of outstanding receivables (OUT, a dummy variable that equals one if the firm has outstanding receivables and zero otherwise, used to measure the firm's default attitude, see Inderst and Mueller, 2007). Following Koe (2013) approach, we examined performance (PERF, eight items) by means of the results of a factor analysis in terms of sales growth, employee growth, market share growth, economic margins growth, return on equity (or the ratio of net income against equity capital), return on investment (or the ratio of operating profits against capital invested), return on sales (or the ratio of operating profits against sales) and earnings retention.

Loan variables. Loan variables comprise the characteristics of bank debt. Following prior research, we used the loan cost (LOAN_COST, taken from Yaldiz Hanedar *et al.*, 2014) and loan duration. To overcome the unavailability of the loan credit files for the firms, instead of the time variable of loan duration (Yaldiz Hanedar *et al.*, 2014), we used two dummy variables expressing the presence of short-term debt (SHORT_DEBT) and long-term debt (LONG_DEBT).

Relationship variables. We measured the relationship variable as the number of financial intermediaries that provide cash loans (LEND, taken form Ono and Uesugi, 2009).

Managerial variables. Risk taking (RISK), Innovativeness (INNOV), Proactiveness (PROAC), Competitive aggressiveness (AGRESS), Autonomy (AUTON). Following Felício *et al.* (2012), we introduced a variable measuring Competitive energy (COMP_EN, seven items). Lastly, the following variables are taken accordingly to Herath (2007): the entrepreneurial strategies (STRAT, seven items), the presence of economic and financial control on financial sources (FIN, dummy variable that equals one if the firm control systematically the correct use of financial sources and zero otherwise), the use of forecasting techniques (BDG, scored from one to seven) and the use of cost control techniques (COST_CONTROL, scored from one to seven).

More information regarding the variables is reported in Table III.

5.5 Statistical tool

Using a stepwise methodology for each model, we selected the best explanatory variables among the set of variables described above. In order to check the validity of the estimated models, we also adopted a bootstrap approach. The number of replication is fixed at 1,000. The results of the generalised linear model estimation and the bootstrap results are reported in the next section. In order to generate the bootstrap replicates of the logit model parameters' estimates, we used the boot command in R boot library. In particular, the results were obtained adopting the non–parametric ordinary resampling approach with equal probabilities of inclusion. The parameters' medians are reported in Tables V and VI along with the limits of the 95% confidence interval. The median is used instead of the mean in order to avoid the presence of some very large outliers. In general, the results of the bootstrap estimation were very similar to those of the standard logit models.

6. Results

Excluding data with missing variables and outliers, the final sample is composed of 181 Italian firms and 91 Austrian firms. The summary statistics are given in Table IV, and Table V provides the correlation matrix.

We ran the logit model to test our hypotheses. To explore the issue of collinearity in the estimated generalised linear models, we considered generalised variance inflation factors (VIFs);

Variable	Definition
Dependent variables	
GUA	Dummy variable indicating whether collateral has been used ($=1$) or not ($=0$)
MG	Dummy variable indicating whether a mutual guarantee has been used ($=1$) or not ($=0$)
BG	Dummy variable indicating whether a bank guarantee has been used ($=1$) or not ($=0$)
PG	Dummy variable indicating whether a public guarantee has been used ($=1$) or not ($=0$)
Firm generic variables	
GEO	Dummy variable indicating whether the firm is Italian ($=1$) or Austrian ($=0$)
SEC	Three sector dummies.
SIZE	Total number of full–time employees
FIRM_AGE	Age of the firm (in years)
SOLOWNER	Dummy variable indicating whether the firm is owned by a sole owner ($=1$) or not ($=0$)
Financial variables and performance	
CAP	Equity per source of the firm ($=$ equity/(equity + financial debt))
OUT	Dummy variable indicating whether the firm has outstanding receivables ($=1$) or not ($=0$)
PERF	Factorial measure of subjective performance
Loan variables	
LOAN_COST	Cost of financial sources [$=$ interest expenses/bank debt]
SHORT_DEBT	Dummy variable indicating whether short–term debt bank has been used ($=1$) or not ($=0$)
LONG_DEBT	Dummy variable indicating whether long–term debt bank has been used ($=1$) or not ($=0$)
Relationship variables	
LEND	Number of bank or other financial intermediaries that finance the firm
Entrepreneurial Orientation variables	
RISK	Factorial measure of risk taking
IINNOV	Factorial measure of innovativeness
PROAC	Factorial measure of proactiveness
AGRESS	Factorial measure of competitive aggressiveness
AUTON	Factorial measure of autonomy
COMP_EN	Factorial measure of competitive energy
FIN	Dummy variable indicating whether the firm systematically controls its financial sources ($=1$) or not ($=0$)
BDG	Score (1 to 7) to measure the firm's attitude to using forecasting techniques
STRAT	Score (1 to 7) to measure the firm's attitude to formulating strategies
COST_CONTROL	Score (1 to 7) to measure the firm's attitude to using cost control techniques

Table III.
Variables

(Fox and Monette, 1992). These measures identify inflation as the size of the confidence intervals for the coefficients due to correlation in the data.

For the selected models (best Akaike information criterion values), the analysis of the VIF measures suggests that in MODEL 4 two variables (competitive energy and strategy) are strictly related. We ultimately excluded the competitive energy variable from the model specification. The VIF values for the final models' specification are shown in Table VI.

The empirical results are reported in Tables VII and VIII. Table VII presents the estimated coefficients for the explanatory variables for the logit model that are used to test *H1–H3*, while Table VIII presents the explanatory variables for the logit model specification which can be used to test *H4* and *H5*. In order to evaluate the model goodness of fit we adopted the predictive capability index. For all the considered models, this measure resulted in acceptable values.

Looking at the determinants of collateral, our results show different patterns throughout the various models we tested (MODEL 1, MODEL 2 and MODEL 3). In all the three models a negative association between age (FIRM_AGE) and collateral emerges, implying that young

Variable	Unit	Obs.	Mean	Std
GUA	0, 1	272	0.619	0.486
MG	0, 1	272	0.210	0.408
BG	0, 1	272	0.186	0.413
PG	0, 1	272	0.217	0.413
GEO	0, 1	272	0.689	0.464
SIZE	Quantity	272	25.250	68.168
FIRM_AGE	Years	272	25.740	26.093
SOLOWNER	0, 1	272	0.494	0.501
CAP	Ratio	272	0.521	0.363
OUT	0, 1	272	0.442	0.497
PERF	Quantity	272	34.720	8.202
LOAN_COST	Ratio	272	0.043	0.034
SHORT_DEBT	0, 1	272	0.613	0.488
LONG_DEBT	0, 1	272	0.546	0.499
LEND	Quantity	272	2.866	2.779
RISK	Quantity	272	8.484	2.938
INNOV	Quantity	272	9.4720	5.012
PROAC	Quantity	272	29.500	7.102
AGGRESS	Quantity	272	9.778	5.070
AUTON	Quantity	272	18.84	4.946
COMP_EN	Quantity	272	4.485	1.676
STRAT	Quantity	272	4.572	1.553
FIN	0, 1	272	0.606	0.491
BDG	Scaled (1, 7)	272	4.444	2.222
COST_CONTROL	Scaled (1, 7)	272	4.284	2.330

Table IV.
Summary statistics

firms are more probable to pledge collateral. In MODEL 1 and 3, the leverage ratio (CAP) is significantly and negatively related with collateral, although with different magnitude ($\beta = -0.978$ in the first model and $\beta = -1.476$ in the third model). Under an exclusive bank – firm relation, it is the loan pricing (LOAN_COST) to emerge as a significant variable, entering the relation with a positive sign ($\beta = 23.541$) and showing that firms characterised by higher interest rates are more probable to pledge collateral. The other loan variables (namely, LONG_DEBT and SHORT_DEBT) are significant only in the first model ($\beta = 0.602$ and 0.908, respectively). Finally, in a multiple bank – firm relationship framework, the cost control (COST_CONTROL) is significant and enters the relation with collateral with a negative sign ($\beta = -0.174$).

Turning to external guarantees (MODEL 4, MODEL 5, MODEL 6), we observe that young and small firms are more likely to affiliate to MLGIs: size (SIZE) and age (FIRM_AGE) are both weakly significant and negatively related with MLGIs (MODEL 4) with a β that equals -0.010 and -0.017, respectively. Bank guarantees (MODEL 5) are significantly and negatively associated with the presence of a unique firm owner (SOLOWN), with a coefficient equal to -0.861: the more concentrated the ownership, the less likely is the firm to resort to bank guarantees. Both MLGIs and bank guarantees are negatively associated with performance ($\beta = -0.074$ and -0.041, respectively). The presence of long debt (LONG_DEBT) and the number of bank relationships (LEND) are positively and significantly associated with all external guarantees (MLGIs, bank and public guarantees). Loan pricing (LOAN_COST) has an opposite behaviour in MLGIs and bank guarantees: it is positively associated with MLGIs ($\beta = 14.156$) while it is negatively associated with bank guarantees ($\beta = -12.186$).

Finally, it is interesting to note the impact of EO dimensions which affects, to some extent, only MLGIs and public guarantees (MODEL 6). More precisely, MLGIs are positively

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(1) FIRM_AGE	1.0000														
(2) SIZE	0.2174	1.0000													
(3) BDG	0.0300	0.1698	1.0000												
(4) COST_CONTROL	0.0052	0.1577	0.6233	1.0000											
(5) PERF	-0.1360	0.1001	0.2716	*0.3283*	1.0000										
(6) CAP	-0.0866	-0.0695	-0.1294	-0.1069	0.2378	1.0000									
(7) LOAN_COST	-0.0351	-0.0830	-0.0978	0.0333	-0.1746	-0.2365	1.0000								
(8) LEND	0.1027	0.2879	0.1461	0.1357	-0.0844	-0.3020	0.1290	1.0000							
(9) STRAT	-0.0403	-0.0898	0.1575	0.1692	0.1247	0.0050	-0.0143	0.0129	1.0000						
(10) INNOV	-0.1345	0.0716	0.2186	0.2173	0.2124	0.0797	0.1028	0.0701	-0.1482	1.0000					
(11) RISK	-0.0736	-0.0916	-0.0263	-0.0836	-0.0126	0.0051	0.1487	0.1270	0.0215	0.1319	1.0000				
(12) PROAC	-0.0340	-0.0429	0.2524	0.2598	0.2954	-0.0208	0.0122	0.0419	0.1956	0.2199	0.1527	1.0000			
(13) AGGRESS	-0.0705	0.1342	0.2718	0.2147	0.1187	-0.0675	0.1403	0.1438	-0.0684	*0.4106*	0.1261	0.2094	1.0000		
(14) AUTON	-0.0284	0.0195	*0.3184*	*0.3386*	0.1950	-0.0010	-0.0011	0.0471	0.0760	0.2148	-0.0623	0.2963	0.1051	1.0000	
(15) COMP_EN	-0.0404	-0.0893	0.1575	0.1694	0.1261	0.0055	-0.0150	0.0126	1.0000	-0.1481	0.0208	0.1959	-0.0681	0.0765	1.0000

Notes: In italic we report variables with at least a moderate correlation (> 0.3 or < -0.3). No strong correlations are present among variables (> 0.7 or < -0.7)

Table V.
Correlation matrix

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
GEO	1.176	1.033	1.106		1.231	
SOLOWN					1.070	
FIRM_AGE				1.183		
SIZE				1.798		1.292
CAP	1.269		1.020			
PERF				1.299	1.240	
LOAN_COST		1.033		1.064	1.260	
LONG_DEBT	1.245			1.220	1.144	1.032
SHORT_DEBT	1.235					
LEND				1.692	1.069	1.276
INNOV				1.512		
AUTON				1.290		
AGGRESS				1.336		1.025
FIN				1.193		
COST_CONTROL	1.177		1.116		1.234	
Sector (factor)	1.160					
OUT				1.064		
COM_EN					1.071	

Table VI.
VIF measures

associated with innovativeness (INNOV) ($\beta = 0.099$) and negatively associated with autonomy (AUTON) ($\beta = -0.123$). Public guarantees, in turn, are positively associated with aggressiveness (AGGRESS) ($\beta = 0.120$). By contrast there is no significant impact of any of the EO dimensions on bank guarantees, which are only positively related to competitive energy (COMP_EN) ($\beta = 0.311$).

7. Discussion and conclusions

7.1 Collateral and financial risk management

Results show that any good or bad performance does not characterize firms pledging collateral; neither EO dimensions manifest any correlation with the presence of collateralised firm. Thus, *H1–H3* regarding the effect of EO and performance on collateral are not confirmed. At a first glance, these results suggest that information asymmetries persist as a challenging issue and collateral proves to be inefficient as a sorting device of firm's quality.

However, the firm characteristic effects on collateral can provide important implication regarding the management of financial risk. In fact, the only firm specific variable affecting collateral is the ratio of shareholder equity issued by the firm to the total financing sources (capitalisation ratio – CAP), according to Brick and Palia (2007). Rather than acting as a signalling mechanism, collateral serves as a substitute of firm capitalisation level in order to mitigate the financial risk suffered by third parties lenders (i.e. banks). Introducing the strength of the bank – firm relationship in the analysis, we are able to complete the picture adding significant evidence. Splitting our sample into multiple–lender firms and firms holding an exclusive bank – firm relationship, we observe that in the first case the information asymmetry issue becomes more severe, reinforcing the "substitution effect" between collateral and leverage. In fact the capitalisation ratio is significant at 1 per cent level with a coefficient of −1.476 (MODEL 3) against a significance level of 5 per cent with a coefficient of −0.978 for the base case (MODEL 1). By contrast, when it comes to firms with exclusive bank relations (MODEL 2), firms' characteristics become observable. In this framework, finding a positive relationship between loan pricing (LOAN_COST) and collateral, banks are able to discern low-risk and high-risk firms so that the latter are charged higher interest rates. In fact, according to Hainz *et al.* (2013) and

Dep. Variable: GUA

	Model 1 Estimated values (272 obs.)	Model 1 Bootstrap (percentile 95% CI)	Model 2 Estimated values (53 obs.)	Model 2 Bootstrap (percentile 95% CI)	Model 3 Estimated values (188 obs.)	Model 3 Bootstrap (percentile 95% CI)
GEO	−1.140***	−1.195 (−1.999; −0.534)	−2.496***	−4.805 (−20.040; −1.145)	−0.911**	−0.956 (−1.859; −0.206)
CAP	−0.978**	−1.021 (−1.906; −0.208)			−1.476***	−1.477 (−2.542; −0.471)
LOAN_COST			23.541**	27.224 (0.756; 64.683)		
LONG_DEBT	0.602*	0.619 (0.030; 1.235)				
SHORT_DEBT	0.908***	0.941 (0.316; 1.590)				
COST_CONTROL	−0.096	−0.099 (−0.241; 0.041)			−0.174**	−0.175 (−0.337; −0.006)
Services	−1.433**	−1.581 (−3.199; −0.292)				
Industry	−1.336***	−1.467 (−3.048; −0.249)				
Constant	2.698***	2.885 (1.209; 4.748)	1.681**	3.918 (0.160; 19.216)	3.039***	3.100 (1.963; 4.358)
Predictive capability	71.69%		77.36%		73.40%	
Pseudo R^2	0.149		0.220		0.077	

Notes: *$p < 0.1$; **$p < 0.05$; ***$p < 0.01$

Table VII.
Models 1 to 3

	Model 4		Model 5		Model 6	
	Estimated values (272 obs.)	Bootstrap (percentile 95% CI)	Estimated values (272 obs.)	Bootstrap (percentile 95% CI)	Estimated values (272 obs.)	Bootstrap (percentile 95% CI)
GEO			1.573***	1.714 (0.694; 2.941)		
SOLOWN			−0.861**	−0.923 (−1.795; −0.165)		
FIRM_AGE	−0.017*	−0.017 (−0.039; −0.002)				
SIZE	−0.010*	−0.010 (−0.048; 0.005)			−0.006	−0.006 (−0.019; 0.001)
COST_CONTROL			0.154*	0.158 (−0.044; 0.365)		
PERF	−0.074***	−0.078 (−0.153; −0.030)	−0.041*	−0.044 (−0.100; 0.006)		
OUT	0.902**	0.946 (0.200; 1.787)				
LOG_DEBT	1.045**	1.115 (0.242; 2.181)	1.473***	1.600 (0.687; 2.696)	1.069***	1.081 (0.315; 1.956)
LOAN_COST	14.156**	15.389 (4.013; 26.850)	−12.186*	−13.831 (−32.066; 0.326)		
LEND	0.227***	0.263 (0.094; 0.611)	0.141**	0.157 (0.009; 0.363)	0.152***	0.184 (0.045; 0.409)
INNOV	0.099**	0.108 (0.019; 0.214)				
AUTON	−0.123**	−0.133 (−0.233; −0.045)				
AGGRESS	0.066	0.066 (−0.039; 0.198)			0.120***	0.123 (0.039; 0.193)
COMP_EN			0.311**	0.333 (0.099; 0.636)		
FIN	0.576	0.605 (−0.352; 1.470)				
Constant	−0.619	−0.713 (−3.186; 1.803)	−4.053***	−4.337 (−7.107; −1.848)	−3.610***	−3.768 (−4.746; −2.884)
Predictive capability	83.82%		82.72%		77.94%	
Pseudo R^2	0.302		0.218		0.129	

Notes: $*p < 0.1$; $**p < 0.05$; $***p < 0.01$

Table VIII.
Models 4 to 6

Yaldiz Hanedar *et al.* (2014), positive relation between loan's spread and collateralised loans support the observed risk hypotheses investigated in the literature.

The association between collateral and capitalisation ratio elicit few implications on the relations between capital structure, firm's assets and investment policies. Corporate finance literature counts collateral among the determinants of the capital structure. In line with Myers and Majluf (1984), firms holding collateralizable assets would optimally choose higher debt ratios, especially when outside investors suffer from information gaps. In fact, differently from the case of multiple bank – firm relationships (higher level of information asymmetry), in which firms compensate financial fragility by pledging collateral, in an exclusive bank – firm relationship the financial risk perceived by credit institutions cannot be mitigated using collateral. In this case, entrepreneurs should operate with an adequate equity dotation. As a consequence, a more versatile management of financial risk should lead managers to operate with a high number of banks.

7.2 EO, credit access and performance: the contribution of MLGIs and other external guarantees

In this sub-section, we move to discuss the evidence on external guarantees, which represent the novel part of the present work.

First, with respect to the short-term debt, the long-term debt is more difficult to monitor (Rajan and Winton, 1995), justifying the positive relation between LONG_DEBT and collateral. Furthermore, the positive correlation between the number of lenders and the presence of external guarantees complete the evidence of Ono and Uesugi (2009) and find support in the work of Moro *et al.* (2012): a closer relationship between a borrower and a lender reduces the use of external guarantees and does not affect the presence of collateral. On the contrary, a weak bank – firm relationship is reinforced by turning to mutual, bank, and public–sector guarantees, rather than a collateral pledge.

Regarding the hypotheses formulation, results demonstrate an inverse relation between subjective performance (PERF) and the access to guarantees, particularly referring to bank guarantees (MODEL 5) and mutual guarantees (MODEL 4), confirming the *HP4*. In the case of mutual guarantees, the inverse relationship between the quality of the firm and the presence of guarantee is confirmed by looking at the sign and the significance of outstanding receivables (OUT) and loan pricing (LOAN_COST), with a coefficient of 0.902 (5 per cent significance level) and 14.156 (5 per cent significance level), respectively. But this evidence does not mean an absence of screening filter from MLGIs and banks that imply an adverse selection made by those financial intermediaries. In fact, both MLGIs and banks imply credit-scoring system to access their potential firm guaranteed. This is rather because third party guaranteed loans may attract firms in which the financing requests were previously rejected or discouraged by lenders (Gama and Duarte, 2017).

Comparing mutual guarantees with other external guarantees, we observe important results: mutual guarantee is positively associated with innovativeness (INNOV), bank guarantees with competitive energy (EN_COM) and public guarantees with aggressiveness (AGGRESS). Referring to mutual guarantees, *H5* is partially confirmed (MODEL 4): the mutual guarantees are negatively related to autonomy (AUTON) and positively related to innovativeness (INNOV). The negative relationship between autonomy and the presence of mutual guarantees appears counterintuitive. However, a firm with scarce autonomy tends to suffer financially (Covin *et al.*, 2006). The poor availability of finance is the most significant obstacle to the launching of new businesses (Van Auken, 1999) and to the start-up process (Holtz–Eakin *et al.*, 1994). Firms characterised by a lack of financing sources are more likely to request mutual guarantees. Thus, mutual guarantee affiliated firms tend to manifest low autonomy and are more likely to experience credit rationing. This is coherent with the significance level of age and size in MODEL 4. Both are significant, at least at 10 per cent

level and negatively related with MLGIs. Therefore, young and small firms are the ones that are most prone to make recourse to MLGIs, highlighting MLGIs as a viable mechanism for sorting out firms with specific characteristics. Those results do not support the adverse selection hypothesis that some authors advocates as a potential drawback of MLGIs intervention. Rather, since assessing young, small and innovative firms requires information that is not easily available from financial reports or credit filings by banks, MLGIs have an important role in supporting those firms, exploiting their proximity to them.

Past literature shows a positive relation between credit access and performance in a sense that financing sources availability influences the future performance positively (Wiklund and Shepherd, 2005; Zampetakis *et al.*, 2011). However, whether the historical (subjective and financial) performance is negative, firm tends to front high difficulties to maintain or reach an additional amount of credit availability, especially in the current macroeconomic scenario. And this is true in particular in scenarios characterised by less ability to monitor borrowers by banks and a higher level of information asymmetries (high level of uncertainty). External guarantees became an important way to overcome this impasse and establish a virtuous cycle: firm characterised by scarce performance and a good level of innovativeness, aggressiveness and competitive energy in a scenario with a high level of uncertainty, can refer to external guarantees to maintain or increment the availability of financing sources and improve their performance.

Entrepreneurs and managers could increment the credit availability and firm performance as a whole, acting on their EO specificities and asking for a specific kind of external guarantee. The higher is the EO and competitive attitudes, the greater is the chance to rely on a large set of external guarantees. This is particularly true for innovative firms due to the lack of track records, the difficulties in reaching break even in the early stage of their lives, the high level of risk, the difficulty in accessing their creditworthiness and the lack of guarantees (see, for instance, Gualandri and Venturelli, 2008). Mutual guarantees can be the way to favour the availability of additional sources to develop the business for those firms.

7.3 Implications and future research

The present paper highlighted that MLGIs and bank guarantees act as viable signalling mechanisms. Signals that they produce are observable and costly and, hence, not easily replicable. The screenings that MLGIs do as guarantors add to the creditworthiness valuation performed by the lending bank: given that they are based on the knowledge of the firm receiving the loan, they are credible. Supposedly, it is however costly for the low-quality firms to build up the endowment of social capital that MLGIs allow to develop or to gain a bank commitment to secure a loan. Special relations that are developed among associated firms allow MLGIS to gain peculiar knowledge of business features and specific traits of entrepreneurs. Inter-firm exchange of knowledge and information allow learning about peer's business activities, strengths, weaknesses and the unique resources they are endowed with.

Overall, our results suggest that bank – firm relationship is not just an exogenous attribute of the firm's approach to credit markets. Rather, firms, at least to some extent, can manage their relations with credit institutions depending on a combination of a variety of factors which can be related to the attitudes of the entrepreneur (i.e. in terms of EO), growth prospects and opportunities, asset composition and investment policies. In such framework, different types of guarantees can be seen as tools for efficiently managing the bank – firm relationship. Therefore, for firms operating in industries characterised by low levels of innovation or exhibiting at most short–term financial needs, multiple bank – firm relationships are the means of financial risk management and collateral serves the purpose of retaining financial flexibility. A strong commitment to innovation, the propensity to

operate in highly risky and uncertain environments or a strong competitive energy lead to support multiple bank relations with the certification effect of external guarantors.

Future research should analyse the mediation role of collateral and external guarantees on EO – credit access relation. Since the role of guarantees can change based on different bank lending technologies, further studies should carefully consider lender's characteristics. Lastly, the use of loan data in respect of firm data can be helpful to better separate the effect of the loan and the firm attributes on collateral and other guarantees.

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Corresponding author
Federico Beltrame can be contacted at: federico.beltrame@uniud.it