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Expected cost of financial distress in small and medium-sized enterprises (SMEs): A German-Italian comparison

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This study aims to identify a number of qualitative and quantitative elements that affect financial distress costs between Italian and German small and medium-sized enterprises (SMEs). We propose a model that interprets “expected costs” as the product between “expected financial distress likelihood” and “total amount of financial distress costs due to insolvency”. The model is estimated using panel data methodology on samples from two European countries (Italy and Germany). The results indicate that expected costs depend on the use of derivative financial instruments, use of intangible assets and the relation with local banks (small local banks rather than large banking groups); in particular, the results obtained from cross-country comparison shows that German SMEs (or Mittelstand companies) have characteristics that limit financial distress costs. It should be emphasized that the present work limits its field of investigation to a few variables without fully addressing other elements of uncertainty which may adversely affect the expected cost of financial distress in SMEs. This work will be useful to stimulate debate on policies to support SMEs. The originality of this study is to focus on determinants of financial distress in SMEs using panel data methodology.

Key words: Cross-country comparison, derivative instrument, expected cost, financial distress, small and medium-sized enterprises (SME).

INTRODUCTION

This study is finalized to identify a number of qualitative and quantitative elements that affect financial distress costs of small and medium-sized enterprises (SMEs). The survey model analyzes SME samples from two European countries, Italy and Germany, whose financial and entrepreneurial systems show significant differences. Data were extracted from BvD databases, and panel data methodology was used to control potential endogeneity and unobservable heterogeneity.

The results obtained applying survey model revealed that parameters are significant and with the expected signs. More specifically, the expected financial distress...
costs decrease in relation SME’s ability to provide themselves with intangible assets, derivative financial instruments and small partner banks (local banks rather than international banking groups).

Financial distress means severe liquidity problems that cannot be resolved without a sizable rescaling of the entity’s operations or structure (Foster, 2005). Financial distress refers to the inability of the firm to pay current obligations on the dates they are due (Baldwin and Mason, 1983). Any enterprise is susceptible to financial distress if it has frequent cash shortages and few revenue streams. Therefore, small enterprises are more likely to experience financial distress. Companies facing insolvency often liquidate assets to settle debts. However, small enterprises have few assets to sell and tend to fall victim to secured creditors who focus on debt collection to the detriment of the firm (Gopinath, 1995). Several streams of research have explored financial distress. The literature on organizational decline describes this phenomenon in terms of a loss of slack or the surplus resources that cushion the firm against environmental jolts.

In line with studies by Keasey et al. (2015), we develop a definition of financial distress based on financial criteria. Thus, using an approximation of Keasey et al. (2015) concept of business failure, we consider financial distress companies as those that meet some of the following conditions:

1. Its earnings before interest, taxes depreciation and amortization (Ebitda) are lower than its financial expenses for two consecutive years; and/or
2. Increase in the debt-to-net worth formula for two consecutive periods with concomitant decrease of the denominator. Other previous studies on business failure have used those proxies (Manzaneque et al., 2016).

Post-crisis financial costs are heavily influenced by a number of variables that characterize firm activity: intangible capital, financial partner type (local or not) and provision of financial derivative instruments; while the first two variables are useful to reduce informational asymmetries and thus to facilitate access to (re)financing, the third variable reduces the likelihood of financial crisis.

THEORETICAL BACKGROUND

The common causes of financial distress and business failure are often a complicated mix of problems and symptoms but the common causes of SMEs’ failure and financial distress can be examined from different perspectives:

1. The capital structure
2. The degree of bank localism
3. The size of the bank, the rating models adopted and, the degree of customer relationship;
4. The endowment of invisible intangible assets;
5. The endowment of derivative financial instruments;
6. The country’s system.

Much of the literature agrees that SMEs are characterized by the high probability of financial distress; this phenomenon is justified by their typical capital structure (Keasey and Watson, 1993; Andrade and Kaplan, 1998; Frank and Goyal, 2009; Mac an Bhoirid, 2010).

Capital structure theory begins with the Modigliani and Miller (1958) paradox of “capital structure irrelevance”, where firm value is not affected by its financing mix. Since then, corporate finance literature has grown enormously and basically distinguishes between two main theoretical approaches (Balios et al., 2015):

1. The trade-off theory
2. The pecking order theory.

The core of the trade-off theory refers to the balancing process of benefits of debt (tax shield, reduction of agency costs of equity, lower issuance costs) and costs of debt (direct and indirect financial distress costs, rising agency costs of debt) which leads to the concept of an optimal capital structure. The pecking order theory emerges from the pioneering studies of Myers (1984) and Myers and Majluf (1984); these studies focus particularly on the concept of information asymmetries. Studies on information asymmetries have seen many authors focus on SMEs. Within this line of studies, there are several prospects of investigation: agency costs of equity and agency costs of debt. In this respect, precious are the studies of Scott (1977), Ang et al. (1982), Pettit and Singer (1985), van der Wijst (1989), Harris and Raviv (1990), Ang (1991, 1992), Holmes and Kent (1991), Psillaki (1995), Michaelas et al. (1999), Boot and Thakor (2000), Watson and Wilson (2002), Hall et al. (2004), Sogorb-Mira (2005), Daskalakis and Psillaki (2008), Frank and Goyal (2009), Psillaki and Daskalakis (2009), and Balios et al. (2015).

The theoretical debate about financial distress is rooted in the studies that explore the causes of credit rationing. In short, studies suggest a series of variables in computing bankruptcy likelihood. For instance, Diamond (1984), Fama (1985), Diamond (1991), Berger and Mester (1997), Cesarini and Ferri (1997), Uzzi and Gillespie (1999), Goddard et al. (2001), De Laurentis (2001), DeYoung et al. (2004), De Bruyn and Ferri (2005), De Laurentis (2011), and Chen and Yao (2017) suggest to investigate the degree of bank localism (bank proximity). Other authors suggest to investigate the size of the bank, the rating models adopted and, the degree of customer relationship (Jayaratne and Wolken, 1999; Berger and Udell, 2002; Stein, 2002; Takats, 2004; Berger et al., 2005; Berger and Udell, 2006; Formisano,
The endowment of intangible assets not visible on the financial statements can affect the financial distress of the enterprise. In this regard, there are two different schools of thought. The first current of thought states (Harris and Raviv, 1991; Degryse and Ongena, 2002; Frank and Goyal, 2003; Berry, 2004; Cohen, 2005; Heiens et al., 2007; Hulten and Hao, 2008; Parsons and Titman, 2009; Fukao et al., 2009; Degryse et al., 2010; Roulstone, 2011; Campello and Giambona, 2011; Marrocu et al., 2012; Koksal et al., 2013; Lim et al., 2014; Bulot et al., 2015; Cucculelli and Bettinelli, 2015):

«Firm specific skills, invisible in the budget and that escapes from the traditional analysis, are strategic factors to get out of the business crisis or to alleviate bankruptcy/financial distress costs».

More specifically, part of this school of thought states that firm specific skills allows the (re)financing under economic conditions to restructure their business. The second school of thought, on the other hand, points out that intangibles not visible at the accounting level are a source of problems which ultimately reflect negatively on the company’s ability to contain financial distress costs.

In this regard, some authors point out that the high intangible capital endowment it’s not easily perceivable and quantifiable by stakeholders outside the firm, it determines significant information asymmetries between shareholders/management and third lenders (Warner, 1977; Haugen and Senbet, 1988; Cutler and Summers, 1988; Giammarino, 1989; Altinkilic and Hansen, 2000; Thorburn, 2000; Jostarndt and Sautner, 2010; Gennaioli and Rossi, 2010; Ashraf and Zheng, 2015). These information asymmetries increase when the lender adopts transaction-based banking model rather than relationship-based model, which favors the collection of quantitative and standardized information (hard information). Other authors point out that distressed firms with plenty of intangible assets sustain high indirect costs of bankruptcy (Gilson et al., 1990; Asquith et al., 1994; Alves and Martins, 2014).

The theoretical debate about financial distress lights up further with the analysis of the role of derivatives. Empirical studies show that bankruptcy costs is a further source of incentive for the use of derivatives. Many empirical studies indicate that the use of derivatives is positively reflected on the creation of firm value. Hedging financial risks (currency, interest rate and commodity risk) reduces the volatility of cash flows and therefore allows the attracting funding to get out of the financial crisis or to mitigate exit costs from the market. Such evidence emerges from numerous studies (Stulz, 1984; Hoshi et al., 1991; Bessembinder, 1991; Dobson and Soenen, 1993; Froot et al., 1993; Gecey et al., 1997; Gay and Nam, 1998; Minton and Schrand, 1999; Haushalter, 2000; Mello and Parsons, 2000; Allayannis and Ofek, 2001; Haushalter et al., 2002; Iqbal; 2015; Shaowen (2015).

The study analysis of literature ends with a further aspect: the country’s system. The aspects analyzed so far in the literature have to be interpreted in relation to the political, financial and entrepreneurial system of the country. German SMEs (so-called Mittelstand) have their own peculiarities to Italian SMEs. Their business policies tend to be especially long-term. The “German Mittelstand” companies are some of the most innovative in Europe: 54% of them launched an innovation onto the market in the 1999 to 2006 period. The “German Mittelstand” relies on sound financing models - chiefly equity and bank loans. The high equity ratio and a cautious approach to expansion enable the companies to undertake medium-term and long-term investments, even in times of crisis. Government supports the “German Mittelstand” on key issues like investment in R&D, the skills shortage, foreign trade and investment, financing needs, company start-ups and company hand-overs. The empirical evidence indicates that Germany’s Mittelstand is exploiting its full potential to raise funds via alternative financing instruments (Casey and O’Toole, 2014).

It should be noted, in particular, German government’s policy to achieve a tax and accounting system capable of encouraging the use of derivatives. The same is true for the use of public support programmes given. Unlike bank-firm relationships in Italy, the ones from Germany have their own features (Audretsch and Elston, 1997; Hainz and Wiegang, 2013):

1. Mittelstand companies have close, confidential and long-term-oriented relationship with one main bank, their “house bank”.
2. Companies are willing to disclose sensitive economic data.
3. Relatively easy access to long-term bank loans, even under difficult economic circumstances.
4. Broad supply of public (financial) support programmes on national and land-level, delivered mainly via house banks.
5. The German “house bank” system valorize soft information in rating systems (through-the-cycle ratings).

Research hypothesis, data and empirical model

Most of the data used in the paper are taken from databases maintained by Bureau Van Dijk: Amadeus (a high quality European database), Aida and Mint Italy. From these databases, we gather information on the firm specific data, ownership data, and accounting data for every German and Italian company that satisfies a maximum size threshold. For Germany and Italy, the databases includes all companies that meet the following criteria:

1. Revenues not exceeding €20 m
2. Less than 250 employees
3. Organized in the form of Ltd.

The study sample period started in 1999 (the first year for which we
can gather ownership data from the DVDs) and ends in 2006 (the last year before the outbreak of the crisis). Statistics are based on a sample of approximately 37,787 SMEs, and covers the 38% of the universe of small and medium sized enterprises active in Italy and in Germany at the end of 2006. The investigation has required 385,671 statistic observations. We consider two measures of risk of bankruptcy. The first measure, Ebitda, is a measure of the degree of financial stress. The intuition is simple: the lower the Ebitda, the greater the company’s inability to cover financial expenses. The second, debt-to-net worth is a measure of the degree of fragility of the entire financial structure; this was classified as deteriorated in the financial structure that introduces an increase in the debt-to-net worth formula for two consecutive periods with concomitant decrease of the denominator. A firm is also considered as financially distressed in the year that immediately follows these events.

From this classification, we can build a variable that captures the probability, ranging from 0 to 1, of a firm becoming financially distressed. We expect this financial distress likelihood to have a positive impact on the cost of financial distress. In the light of this study consideration we formulate four research hypotheses. Therefore, the first hypothesis is [H1]:

Regardless of the country of origin of the firm, financial distress likelihood and (ex-ante) financial distress costs are positively correlated

The analysis continues with the formulation of further three research hypotheses that show, regardless of the country of origin of the enterprise, the negative correlation with the expected financial distress costs (ExpFDC): Intangible assets (hypothesis 2), Banking localism (hypothesis 3) and Derivative financial instruments (hypothesis 4).

With respect to the second hypothesis, we believe that the weight of intangible assets (not recognised in the financial statements and its disclosure notes) on total assets (INTAN) is a useful indicator to understand the company’s ability to create value. Moreover, it is important to emphasize the fact that, in the restructuring phase, intangibles create the premises to begin refinancing processes on advantageous terms. For the enterprises subject to restructuring, there are some focal points (Lenz, 1981; McNair et al., 1990; Neely, 1999; Bontis et al., 1999; Buckmaster, 2000; Unger, 2000; Joia, 2000; Ching and Yang, 2000; Harris and Ogbonna, 2001; Dubrovski, 2001; Hoque et al., 2001; Schwarz et al., 2002; Catasus and Gröjer, 2003; Katcher, 2003; Kumar, 2017): clientèle’s quality, contractual power with the suppliers, reliability of the plans and sustainability of the investments, R&D investment, process control systems, management skills, credibility of management, brand development, investment in training, after sales, entrepreneurship and management experience, business continuity, and governance. Such data have been picked after an access to BvD databases.

The data have opportunely been quantified through a scoring and normalization process, and in order to get homogeneous values among 0 and 1 (Min. 0 - Max 1). Table 1 highlights the main results of the normalization process. Accordingly, the second research hypothesis affirms as follows [H2]:

Regardless of the country of origin of the firm, invisible intangible assets and expected financial distress costs (ExpFDC) are negatively correlated

Without prejudice to the previous considerations, the study research is enriched with the formulation of the following hypothesis [H3]:

The negative correlation between invisible intangible assets and expected financial distress costs (ExpFDC) is more significant if firm has local bank as partner. This correlation is considered valid regardless of the country of origin of the enterprise

The third hypothesis of the research is verified using a dummy variable “LOCALB”. In particular, we would use a 0. 1 dummy variable where a firm is given a value of 1 if it is a client of a local bank or a 0 in case of the presence of a national and/or international banking group. The typology of partner bank of the enterprise has been individualized by accessing BvD databases. This variable influences the study model in the part that considers the weight of the invisible intangible assets on total assets (INTAN); the dummy LOCALB variable assumes a critical role in estimating the effects of the intangibles on the expected financial distress costs (Table 1).

With reference to the fourth and last hypothesis, Smith and Stulz (1985) show that bankruptcy costs is a further source of incentive for the use of derivatives. The same conclusions are received from these studies Tuckman (2016), Xiao (2017), Bae et al. (2017) and Carroll et al. (2017). In fact, by reducing the fluctuations in corporate flows, hedging through derivatives makes it possible to reduce the likelihood of a financial crisis, which can lead to extremely critical situations such as bankruptcy, liquidation or, at the very least, corporate restructuring and the need to bear direct costs (legal costs, administrative costs and the lesser value attributed to assets at the time of liquidation) and indirect (loss of image and consequent reduction in contractual power) of a very high amount.

Based on this model, the likelihood of using derivatives is greater for companies with high financial loss costs. If these costs, as Nance et al. (1993) point out, are a fixed component, then smaller companies will be the ones that will most effectively use hedging derivatives because they have a stronger impact on the fixed component of costs. These statements were shared by Tuckman (2016).

In addition, given the ability of derivatives to reduce the company’s default probability, they also make it possible to increase the level of indebtedness, and thus the value of the enterprise. In particular, this theory was developed by Stulz (1984) and Xiao (2017), where they suggest that by reducing the volatility of company profits and hence the likelihood of financial stress, the company is able to increase its potential debt capability. If companies increase leverage in response to this higher debt capability, the associated increase in financial burdens will lead to a reduction in taxation and, consequently, an increase in the value of the company. Starting from the foregoing considerations, the following search hypothesis is examined [H4]:

There is a negative correlation between SMEs’ derivative financial instruments and expected financial distress costs (ExpFDC). The greatest endowment of derivatives determines the reduction of the expected financial distress costs. This correlation is considered valid regardless of the country of origin of the enterprise.

With reference to the hypothesis 4, it is believed that the endowment of derivative financial instruments on the total assets of a firm (DER) - shows the amount of derivative financial instruments as a percentage of total assets - is a measure of its ability to reduce the likelihood of financial distress. The study model was designed to provide a representation of the value loss of SMEs in financial crisis. This section clarifies how “probability of financial suffering” and “ex-post financial aid costs” can be useful drivers in building a model for estimating ex-ante financial distress costs.

In literature we see a rich literary production engaged in the formulation of ex-ante models to estimate the financial distress likelihood (FDL). Particularly, Grice and Ingram (2001), Pindado et al. (2008), Keasey et al. (2015) and Gupta et al. (2015) underline that the seminal models by Beaver (1966), Altman (1968, 1984) and Ohlson (1980) are revealed suitable in the classification of the sector (better for the manufacturing enterprises) but poorly sensitive
Table 1. Normalization process.

<table>
<thead>
<tr>
<th>Focal aspects</th>
<th>Scoring</th>
<th>N. observations of total sample</th>
<th>N. observations Italian sample</th>
<th>N. observations German sample</th>
<th>Average score total sample</th>
<th>Norm (0-1) total sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clientele’s quality</td>
<td>Min 28; Max 44</td>
<td>37787</td>
<td>25715</td>
<td>12072</td>
<td>29</td>
<td>0.20161</td>
</tr>
<tr>
<td>Contractual power with the suppliers</td>
<td>Min 28; Max 44</td>
<td>37787</td>
<td>25715</td>
<td>12072</td>
<td>33</td>
<td>0.45641</td>
</tr>
<tr>
<td>Reliability of the plans</td>
<td>Min 28; Max 44</td>
<td>37787</td>
<td>25715</td>
<td>12072</td>
<td>30</td>
<td>0.43323</td>
</tr>
<tr>
<td>R&amp;D investment</td>
<td>Min 28; Max 44</td>
<td>37787</td>
<td>25715</td>
<td>12072</td>
<td>35</td>
<td>0.59692</td>
</tr>
<tr>
<td>Process Control Systems</td>
<td>Min 28; Max 44</td>
<td>37787</td>
<td>25715</td>
<td>12072</td>
<td>32</td>
<td>0.40006</td>
</tr>
<tr>
<td>Investment in training</td>
<td>Min 28; Max 44</td>
<td>37787</td>
<td>25715</td>
<td>12072</td>
<td>34</td>
<td>0.56014</td>
</tr>
<tr>
<td>Sustainability of the investments</td>
<td>Min 28; Max 44</td>
<td>37787</td>
<td>25715</td>
<td>12072</td>
<td>31</td>
<td>0.48897</td>
</tr>
<tr>
<td>Brand development</td>
<td>Min 28; Max 45</td>
<td>37787</td>
<td>25715</td>
<td>12072</td>
<td>37</td>
<td>0.78691</td>
</tr>
<tr>
<td>Credibility of management</td>
<td>Min 28; Max 45</td>
<td>37787</td>
<td>25715</td>
<td>12072</td>
<td>40</td>
<td>0.80010</td>
</tr>
<tr>
<td>After Sales</td>
<td>Min 28; Max 45</td>
<td>37787</td>
<td>25715</td>
<td>12072</td>
<td>43</td>
<td>0.89988</td>
</tr>
<tr>
<td>Entrepreneurship and management</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>experience</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business continuity</td>
<td>Min 28; Max 45</td>
<td>37787</td>
<td>25715</td>
<td>12072</td>
<td>39</td>
<td>0.78013</td>
</tr>
<tr>
<td>Governance</td>
<td>Min 28; Max 45</td>
<td>37787</td>
<td>25715</td>
<td>12072</td>
<td>38</td>
<td>0.72215</td>
</tr>
</tbody>
</table>

Source: the study elaboration on BvD data.

to the typology of financial distress of the enterprise. To analogous conclusions, the studies of Zmijewski (1984) are reached. The aim of this section is to outline the empirical approach that we use to analyse the FDL. In this regard, we fellow Pindado et al. (2008) and Keasey et al. (2015), where FDL is specified as a function of three ratios (1):

\[
\log \left( \frac{\text{Prob(Insolvency)}}{\text{Prob(NoInsolvency)}} \right) = \beta_0 + \beta_1 \left( \frac{\text{EBITDA}_{it}}{\text{TA}_{i-1}} \right) + \beta_2 \left( \frac{\text{FE}_{it}}{\text{TA}_{i-1}} \right) + \beta_3 \left( \frac{\text{RE}_{it-1}}{\text{TA}_{i-1}} \right) + \epsilon_{it}
\]

(1)

The first ratio (EBITDA ÷ Total Assets) measures operating efficiency apart from depreciation, amortization, tax and leveraging factors. It is also an indicator useful to understand the firm’s ability to attract financial resources or renegotiate debts. The second ratio (Financial Expenses ÷ Total Assets) measures cumulative profitability over time as a proportion of total assets. The last ratio (Retained Earnings ÷ Total Assets) measures the impact of financial expenses on FDL; as with other model variables, it is scaled by total assets. The last ratio (Retained Earnings ÷ Total Assets) indicates the impact of financial expenses on FDL; as with other model variables, it is scaled by total assets. FDL variable originates from proposed regression model; its value ranges between “0” and “1”. It appears evident as the FDL variable has a positive impact on the (ex-ante) financial distress costs (ExaFDC). Following financial distress, the company’s loss of value is identifiable in terms of ex-post financial distress cost (ExpFDC). Consistent with the study ExaFDC definition, this can be represented in formula as follows (3):

\[
\text{ExaFDC} \equiv \text{ExpFDC} \times \text{FDL}
\]

(2)

Consistent with the study ExaFDC definition, this can be represented in formula as follows (3):

\[
\text{ExaFDC} = \text{FDL} \times e^{\beta_0 X_1 + \beta_1 X_2 + \beta_2 X_3 + \ldots + \beta_n X_n}
\]

(3)

Given that estimating a linear model has undoubted advantages in econometric analysis, the sides of the previous equation have been restated by taking natural
logarithms (4):
\[ \varphi = \frac{1}{\tau} \ln(\text{FDL}) + \beta_1 \frac{1}{\tau} X_1 + \beta_2 \frac{1}{\tau} X_2 + \beta_3 \frac{1}{\tau} X_3 + \ldots + \beta_n \frac{1}{\tau} X_n \]

In line with Keasey et al. (2005) directions:

\[ \text{LnFDL is the natural logarithm of financial distress likelihood and } \tau \text{ is the horizon of time over which firms formulate expectations for the resolution of financial distress. Consequently, the estimated coefficients } \alpha_1, \alpha_2 \text{ and } \alpha_3 \text{ represent the adjustment rate of the value of the firm due financial distress, devised by the number of periods till the resolution of financial distress.} \]

\[ \varphi_i = \alpha_1 \ln(\text{FDL}_n) + \alpha_2 \text{INTAN}_i + (\alpha_3 + \lambda \text{LOCALB}_i) \text{INTAN}_i + \alpha_4 \text{DER}_n + \epsilon_i \]

Equation 7 highlights the variables (X) influencing our model:

1. The ability to equip itself by invisible intangible assets (INTAN)
2. The privileged relationship with local banks (LOCALB), and

All the variables in formula 7 are scaled by total assets in order to reduce frequently heteroskedasticity problems presents in regression models. In this model, the disturbance term, \( \epsilon_i \), is composed by the following investigation elements: \( \eta_i = \epsilon_i + d_i + v_i \), where \( v_i \) is a statistical fluctuations (error), and \( d_i \) is a yearly dummy variable reflecting macroeconomic factors. Finally, \( \eta_i \) is the SME individual effect; in this study, this variable captures those individual-specific effects that are time constant and impact on financial distress costs. Table 2 shows the number of firms from each country.

**RESULTS**

Summary statistics of the total sample are reported in Table 3. As a general rule data were trimmed at 99th percentile. Table 3 shows the standard deviation, mean, minimum and maximum values of the main variable, and Table 4 shows the results of the basic and local banks adjusted model. As shown in Table 3, the average stake of intangibles is around 45% of total assets. The average ratio of derivatives to total assets is 9.8%.

As can be in Table 4, all the coefficients are statistically significant and of the expected sign. The m_{21} test detects that there is no second-order serial correlation and Wald test confirms that macroeconomic events can affect all firms. We ran a regression analysis using panel previously described (Normal: 68.2%; Financial distressed: 31.8%).

In future studies, we shall include further means such as Conic Multivariate Adaptive Regression Splines (CMARS), Robust Conic Multivariate Adaptive Regression Splines (RCMARS) and Conic Generalized Partial Linear Models (CGPLM). These methods can help to give new perspectives and developments in financial mathematics to make more accurate predictions about financial distress likelihood.

Several studies have been carried out to apply the aforementioned methods to various fields of study including finance, industry, business and environment. These includes; Özmen et al. (2010), Özmen et al. (2012), and Weber et al. (2012).

The empirical evidence corroborates this study initial hypothesis. As shown in column 1 of Table 4, the positive coefficient of the FDL variables confirms hypothesis 1 (H1: Regardless of the country of origin of the firm, financial distress likelihood and (ex-ante) financial distress costs are positively correlated) and supports the evidences emerged by Keasey et al. (2005) studies that the FDL is one of the main explanatory variables of financial distress costs.

Additionally, to confirm the second hypothesis (H2: Regardless of the country of origin of the firm, invisible intangible assets and expected financial distress costs (ExpFDC) are negatively correlated), we find empirical evidence supporting the negative correlation between SMEs’ invisible intangible assets and expected financial distress costs, since the coefficient (β_{21-Total sample} + τ = -0.2258) obtained for INTAN_{i} is negative and significant.

The third hypothesis (H3: The negative correlation between invisible intangible assets and expected financial distress costs (ExpFDC) is more significant if firm has local bank as partner. This correlation is considered valid regardless of the country of origin of the enterprise) is tested using the dummy LOCALB_{i}. The negative correlation between SMEs’ invisible intangible assets and expected financial distress costs (ExpFDC) is more evident for the SMEs that relate to local banks: β_{21-Total sample} + τ + \lambda + τ = -0.2258 - 1.5678 - 1.7936. This finding confirms the results that emerge from the doctrine: the ability of local banks to attenuate information asymmetries that, especially in the phases of restructuring for financial distress, are critical in the bank-firm relationship.

The fourth hypothesis (H4: There is a negative correlation between SMEs’ derivative financial instruments and expected financial distress costs (ExpFDC) in the SMEs with local banks in the sample, but it is not significant for the SMEs with national banks) is confirmed by the empirical evidence that the coefficient (β_{31-Total sample} + τ = -0.2258) obtained for DER_{n} is negative and significant for local banks and it is not significant for national banks.

The above mentioned directions lead to the following Equation 5:

\[ \alpha_1 = \frac{1}{\tau}; \quad \alpha_2 = \frac{\beta_1}{\tau}; \quad \alpha_3 = \frac{\beta_2}{\tau}; \quad \alpha_4 = \frac{\beta_3}{\tau} \]

We can see the following Equation 6 holds:

\[ \varphi_i = \alpha_1 \ln(\text{FDL}_n) + \alpha_2 \text{INTAN}_i + \alpha_3 \text{INTAN}_i + \alpha_4 \text{DER}_n + \epsilon_i \]
Table 2. Structure of the samples by country.

<table>
<thead>
<tr>
<th>Country</th>
<th>Firms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Italy</td>
<td>25000</td>
</tr>
<tr>
<td>Germany</td>
<td>12072</td>
</tr>
<tr>
<td>Total</td>
<td>37072</td>
</tr>
</tbody>
</table>

Table 3. Summary statistics of the total sample.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>SD</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>ExaFDC</td>
<td>-0.077</td>
<td>0.687</td>
<td>-2.798</td>
<td>0.579</td>
</tr>
<tr>
<td>LnFDL</td>
<td>-1.896</td>
<td>1.723</td>
<td>-6.988</td>
<td>-0.098</td>
</tr>
<tr>
<td>INTAN</td>
<td>0.457</td>
<td>0.158</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>DER</td>
<td>0.098</td>
<td>0.355</td>
<td>-2.987</td>
<td>0.689</td>
</tr>
</tbody>
</table>

Source: The study elaboration on BvD data.

Table 4. Results of the basic and localb adjusted model.

<table>
<thead>
<tr>
<th>Model</th>
<th>Basic (total sample)</th>
<th>LOCALB adj. model</th>
<th>Italian sample</th>
<th>German sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>N. of SMEs</td>
<td>37787</td>
<td>37787</td>
<td>25715</td>
<td>12072</td>
</tr>
<tr>
<td>τ</td>
<td>11.09</td>
<td>10.7</td>
<td>12.01</td>
<td>8.4</td>
</tr>
<tr>
<td>LnFDL&lt;sub&gt;it&lt;/sub&gt;</td>
<td>0.0999 (0.0000)</td>
<td>0.0883 (0.0000)</td>
<td>0.0823 (0.0000)</td>
<td>0.0900 (0.0000)</td>
</tr>
<tr>
<td>INTAN&lt;sub&gt;it&lt;/sub&gt;</td>
<td>-0.2258 (0.0000)</td>
<td>-1.7867 (0.0000)</td>
<td>-0.1832 (0.0000)</td>
<td>-0.7811 (0.0000)</td>
</tr>
<tr>
<td>LOCALBINTAN&lt;sub&gt;it&lt;/sub&gt;</td>
<td>-</td>
<td>-1.5678 (0.0001)</td>
<td>-1.4001 (0.6333)</td>
<td>-1.6956 (0.3410)</td>
</tr>
<tr>
<td>DER&lt;sub&gt;it&lt;/sub&gt;</td>
<td>-1.0006</td>
<td>-1.1445</td>
<td>-1.5367</td>
<td>-1.8874</td>
</tr>
<tr>
<td>z&lt;sub&gt;1&lt;/sub&gt;</td>
<td>758.2323</td>
<td>326.0089</td>
<td>500.6897</td>
<td>482.3666</td>
</tr>
<tr>
<td>z&lt;sub&gt;2&lt;/sub&gt;</td>
<td>206.2199</td>
<td>212.3456</td>
<td>199.2624</td>
<td>202.5589</td>
</tr>
<tr>
<td>τ</td>
<td>9.0000</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>m&lt;sub&gt;1&lt;/sub&gt;</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>m&lt;sub&gt;2&lt;/sub&gt;</td>
<td>0.0456</td>
<td>0.1022</td>
<td>0.0689</td>
<td>0.0489</td>
</tr>
<tr>
<td>m&lt;sub&gt;3&lt;/sub&gt;</td>
<td>0.5598</td>
<td>0.6589</td>
<td>0.5001</td>
<td>0.4589</td>
</tr>
<tr>
<td>Hansen</td>
<td>1658 (33)</td>
<td>1879 (105)</td>
<td>1101 (52)</td>
<td>1178 (78)</td>
</tr>
</tbody>
</table>

Source: The study elaboration on BvD data.

(ExpFDC). The greatest endowment of derivatives determines the reduction of the expected financial distress costs. This correlation is considered valid regardless of the country of origin of the enterprise) is tested using DER<sub>it</sub>. As shown in column 1 of Table 4, the negative term (β<sub>3</sub>-Total sample + τ = -1.0006) confirms the study hypothesis 4. In line with the evidence emerged by literature review, the greatest endowment of derivatives determines the reduction of the expected financial distress costs.

Moreover, the results obtained from the study cross-country comparison, provide additional evidence. Without prejudice to previous assumptions, Germany, compared to Italy, recorded more significant coefficients. Considering the first hypothesis (H1) as universally valid, the most significant differences can be found in the other three hypotheses of research. In summary, German SMEs have their own peculiarities to Italian SMEs (Abel-Koch et al., 2015).

With regard to the second hypothesis (H2), the largest coefficient (β<sub>1</sub>-German sample + τ = -0.7811) is justified by Germany’s highest R&D investments: 33% of German companies invest 1% in R&D (24% invest 2%, 18% invest 4%, and 25% invest more than 4%). A key to the success of the “Made in Germany” strategy is, moreover, the After Sales, organized efficiently, precisely and in a very short time. Another important factor contributing to the success of the German Industry is the Common Labor Market - synergies through industry training - which shows that there is less competition in Germany than
Italian reality.

Certainly, greater financial solidity has been a key driver of the creation of world-leading industry leaders. While the suffering in Italy is 3 times higher than in Germany. Another interesting fact is that 61% of Mittelstand has an Advisory Board or Supervisory Board and 67% of the Advisory Board is made up of owners of other companies. Business continuity, entrepreneurship and management experience are also important drivers in generational steps.

With reference to the third hypothesis (H3), the coefficient recorded by the German sample (β2-German sample \( \tau + \lambda_1 + \tau = -2.4767 \)) is more significant than the Italian one and in line with the study hypotheses. As mentioned earlier, there are several factors that justify these differences. Mittelstand companies show strong relationships with local banks and, in particular, the German “house bank” system valorize soft information in rating systems. This is for the benefit of firms that have skills that are not visible at the accounting level.

In addition, the German banking system is characterized by maximum transparency. For example, in Germany, under the Initiative Finanzstandort Deutschland (IFD), banks tell enterprises their rating. In the context of the implementation of the Basel III Accord and to improve financial dialogue between the financial community and the public, IFD, working with the German banking associations, developed a brochure that explains in layman’s language the nature of internal and external ratings and the advantages of ratings for SMEs. Although the IFD has been superseded, this brochure is still often referred to as a standard of quality and has contributed to the development of a “rating culture” in Germany.

With regard to the fourth hypothesis (H4)), German financial system shows peculiarities respect Italian system (β3-German sample \( \tau + \tau = -1.8874 \)). These peculiarities concern the use of derivatives. Compared with Italian companies, German companies are more likely to use derivatives: 78% of German SMEs than 24% of Italian SMEs. As previously mentioned, German government’s policy has been active to ensure a tax and accounting system capable of encouraging the use of derivatives. German firms are more likely to use derivatives than Italian firms. This is consistent with Germany being an open economy, leading to greater exposure of its firms to financial price risk, especially foreign exchange rates and commodity prices. Italian companies use less derivatives than German companies.

The use of derivatives is more significant among large companies for each category of risk suggesting the presence of economies of scale in the use of such tools. The most heavily hedged type of risk is the exchange rate risk followed by interest rate risk and ultimately credit risk. A recent Bank of Italy’s annual report highlights that category of financial risk hedging services presents the most modest use grade. It also emerges that the SME has a low ex-ante perception of exchange rate risk and, above all, the risk of interest. In addition, entrepreneurs are experiencing strong commercial pressure from banks on this product category, which is not balanced by proper coordination with financing operations.

**DISCUSSION**

The estimate of the variables LnFDL, INTAN, LOCALBINTAN and DER is useful in building a “matrix” capable of suggesting, at country level, policies for Italian SMEs for tackling the crisis as well as to mitigate the costs of exit from the market (Figure 1). SMEs have financial constraints that, compared with large companies, diminish the benefits of their expertise.

As evidenced by the results of this study research, expected financial distress costs are intimately linked to a number of variables considered influential in this analysis: the intangible assets, the close relationship with local banks and, the use of derivative instruments commonly used for risk management. German firms compared with Italian ones are more immune to financial distress phenomena and have been able to develop antidotes useful to face the crisis painlessly; the motives are different and must be sought in entrepreneurial culture and in the decisive role of Germany's government and local banks to support SME development policies (Figure 1).

German SMEs developed market leadership in global niches thanks to the high capacity of innovation and traditional skills that have kept pace with the technological innovation at a global level. Germany’s government acknowledges their importance, and in 2012 launched an initiative to make “German Mittelstand” logo a quality brand that helps businesses both in expanding on global markets and skilled workers recruitment. The critical role of SMEs in Germany justifies the existence of governmental programmes that support their development.

In general, the policy of the financial support for the SMEs in Germany is concentrated on the promotion of the investment process, leaving the short-term financing to the private and cooperative bank sector. As a result, a strong relationship between cooperative banks and credit boxes is registered in the SMEs’s financing.

In the financial field, the hybrid instruments are what is considered to be the center floor in architecture. In Germany, the instrument named “Mezzanine Kapital” has been developed with the aim of covering the intermediate spectrum (hybrid) between the own capital and the debt during the last years (Ulrich and Hilmar, 2003).

The emergency of this type of hybrid instruments originated as collateral tools of the business of the banks (operations of high performance but of high risks) in The United States and The United Kingdom in the seventies. In the eighties, the hybrid instruments were transformed into the ideal vehicle for the concision of the MBO
operations and, at the same time, they were turned into an alternative for investors who look for high performances.

In Germany, the hybrid instrument had an important development that helped it being transformed into the third market with a world-importance at present. Mezzanine Kapital constitutes the German version of the financial hybrid instruments whose institutionalization is given through the equity issues of participation in order to attract investors and the divisibility of the application of the fund constituted in the SMEs.

Another mechanism present in Germany is the financing through the VC. Taking into account the “Own Capital” financing matter, an intensive field of VC activities through the specific legal figure over societies of participation in capital (KapitalBeteiligungsGesellschaft) has been developed in Germany since the nineties.

In order for the banks to achieve a better ratio performance-risk, they may enter a business to finance the process of creation of the Mittelstand companies replacing the traditional loan scheme with the use of the financial hybrid instruments via. For instance, the equity kickers constitute a vehicle that was proved in order to step up the performance with the receipt of the interests of both parts, agent and principal.

Local banks play an important role in Mittelstand financing. The savings and cooperative bank sector in Germany accounts for a distinctly higher share in credit financing of SMEs than in the Italy; compared to Italian SMEs, German SMEs have longer and closer relationships to their banks. In Germany, intensive competition among banks favours the establishment of long and close bank relations of SMEs, which improves the availability of loans. As shown by recent Bundesbank’s annual report, banks, in particular small banks, adopt internal rating methodologies aim a through-the-cycle rather than at point-in-time rating; as already mentioned, such rating systems favor SMEs.

Financial instrument are be designed for the Mittelstand companies with due regard to the investors’s interests and the capital needs that the Mittelstand companies must face; in this regard, the Kreditanstalt fuer Wiederaufbau K (fW) public bank plays an important role as the country’s industrial policy instrument. KfW’s supports COSME’s promotional activities for start-ups within the “Start-Up Loan – StartGeld”. KfW’s supports InnovFin’s promotional activities for innovative companies. With the help of a guarantee from the European Investment Fund KfW assume 80% of the credit risk normally incurred by the banks.

In many cases, this makes the loan financing possible for start-ups. The “Start-Up Loan - Universal” also enables companies to finance succession and takeover projects, an aspect that is becoming increasingly important in light of demographic changes. KfW offers a broad range of promotional programmes for SMEs financing needs, such as the “ERP Innovation Programme” or the “ERP Regional Promotion Programme”.

The “ERP innovation program” supports SMEs by providing long-term loans at favourable conditions for close-to-market research and development of new products, processes or services; the aim of “ERP Regional Promotion Programme” is to promote investments in structurally weak regions at particularly attractive conditions. Considering the results of the study

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**Figure 1.** Policy matrix.

Source: The study elaboration.
and taking into consideration the German experience, the following remarks are suggested for tackling the crisis as well as to mitigate the costs of exit from the market:

(1) “New financing instruments”. Even though Italy shows poor financial culture than Germany, current government policies are moving in the right direction. As evidenced by a recent study (Quintiliani, 2017a,b), at the end of 2012, the legislator intervened to facilitate the debt instruments’ issuance for SMEs (mini-bonds, commercial papers, project bonds, equity crowdfunding). In fact, with the “Decreto Sviluppo” (legislative decree n. 83/2012) and “Decreto Destinazione Italia” (legislative decree n. 145/2013), they have eliminated fiscal constraints that hindered the debt capital issuance by companies not listed on a stock exchange. The lawmaker’s goal was to diversify the sources of financing for SMEs in order to reduce the credit crunch and their financial dependence from the banking system. Thanks to the new legislation SMEs, but not “micro-companies”, are allowed to issue debt instruments with short term (commercial paper), medium and long-term (mini-bond, project bond, equity crowdfunding);

(2) “Valorising soft information in rating systems”. Italian banking system is strongly oriented to using cyclical internal rating systems that value hard information. Small local banks (for example, cooperative credit banks), unlike large banks, are more willing to evaluate soft information but have some structural limits: small size, poorly qualified staff, and a supply limited at traditional bank lending activities. A new “rating philosophy” is suggested that does not neglect the relationship with the clientele and that encourages “through-the-cycle” evaluation processes capable to capture and mix the positive elements of the statistical model with the positive elements of the judgemental model;

(3) “Valorising skills and know-how”. Italian SMEs are characterized by innovation, proactivity and risk appetite, but their small size is a limit in a globalized context that lives a Fourth Industrial Revolution. In this sense, the “National Industry 4.0 Plan” is undoubtedly an important signal, and on this road it will be necessary to continue;

(4) “A tax and accounting system capable of encouraging the use of derivatives”. The current system sees increased taxation on derivatives and their recording on-balance-sheet according to Italian Accounting Standards (OIC 32). This system discourages the use of derivatives and impacts negatively on the company’s ability to mitigate financial distress. It is therefore suggested a low taxation and the recording on-balance-sheet as “memorandum item”;

(5) All the findings in this research can be used for supporting or even completing other studies with similar or same concept, after necessary adjustments have been made.

In conclusion, the results of this study are in line with those emerging from the literature that consider the value loss of the enterprise in financial distress strongly correlated to the following aspects:

(1) The endowment of invisible intangible assets (Harris and Raviv, 1991; Degryse and Ongena, 2002; Frank and Goyal, 2003; Berry, 2004; Cohen, 2005; Heiens et al., 2007; Hulten and Hao, 2008; Parsons and Titman, 2009; Fukao et al., 2009; Degryse et al., 2010; Roulstone, 2011; Campello and Giambona, 2011; Marrocchi et al., 2012; Koksal et al., 2013; Lim et al., 2014; Bulot et al., 2015; Cuculelli and Bettinelli, 2015), (2) Bank proximity (DeYoung et al., 2004; Berger et al., 2005; Carter and McNulty, 2005; Udell, 2008; DeYoung et al., 2008; Modina, 2015; Formisano, 2016).

(3) Derivative financial instruments (Stulz, 1984; Smith and Stulz, 1985; Nance et al., 1993; Mello and Parsons, 2000; Allayannis and Ofek, 2001; Tuckman, 2016; Xiao, 2017; Carroll et al., 2017).

It should be emphasized that the present work limits its field of investigation to a few variables without fully addressing other elements of uncertainty which may adversely affect the financial distress likelihood and the value creation of the SME. An interesting starting point for future research is indeed represented by application of additional methods (RCMARS and CGPLM) useful to mitigate the uncertainty of the forecast and capable to analyzing further variables nonlinearly (environmental, political, social and labor).

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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