# The Differential Impact of Leverage on the Default Risk of Small and Large Firms*

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**Abstract**

We use a sample of 6 million firm-year observations of large corporations and small and medium enterprises (SMEs) spanning 6 European countries from 2005 to 2014 to study the impact of leverage and different sources of funding on default risk. We find that financial leverage has a greater impact on the probability of default of SMEs than for large corporations. The difference in default probability between top and bottom leverage quartiles is 1.61% for large firms and 3.34% for SMEs. This may be explained by the larger exposure of SMEs to short-term debt and their consequently higher refinancing risk. When looking at the probability of recovery from the state of insolvency, we find that SMEs appear to address the high refinancing risk that brought them into distress by shifting liabilities towards longer-term debt. Our findings have important implications for bank regulators, policy-makers and credit risk modelling.

JEL Codes: G01, G32, G33

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# I Introduction

Since the seminal works of Beaver (1966) and Altman (1968), academic research has paid great attention to the determinants of corporate defaults. More recently, Traczynski (2017) has shown that the only two risk factors that can explain default risk across all industry sectors are financial leverage and market return volatility. This suggests that, for unlisted firms, for which stock returns cannot be computed, financial leverage may be the most important predictor of corporate distress. Indeed, leverage plays a central role in standard credit risk models used in academia and in the industry (Merton, 1974, Collin-Dufresne and Goldstein, 2001, Vassalou and Xing, 2004, Bharath and Shumway, 2008).

Although several papers have looked at the role of leverage separately for large firms (Altman, 1968, Ohlson, 1980, Shumway, 2001, Chava and Jarrow, 2004, Campbell et al., 2008, Giordani et al., 2014 and Traczynski, 2017) and small firms (Edmister, 1972, Altman and Sabato, 2005, Altman and Sabato, 2007) none, to our knowledge, has investigated the differential default risk impact of leverage and its components for these two types of firms. Yet, the factors influencing capital structure decisions as well as resilience to adverse economic conditions and financing constraints may vary with firm size. For example, Beck et al. (2008), by employing firm level survey data that include both small and large firms across 48 countries, find that small firms use less external finance, especially bank loans. They also show that, credit constrained, large firms can more easily increase external sources of finance than small firms. The implication is that similar capital structures may result in rather different credit risk profiles in small and large firms. A better understanding of these issues can lead to more accurate default prediction models, improve lending decisions and inform government policies aiming at promoting a healthy SME sector.

Our paper contributes to the literature in the following ways. First, we show that

leverage has a greater impact on the default probability of SMEs than large firms. To reach this conclusion we employ a sample of 6 million firm-year observations of large corporations and small and medium enterprises (SMEs) spanning 6 European countries from 2005 to 2014. We estimate default probabilities with a discrete hazard model to control for common firm-specific and systematic factors. Our data source is Bureau van Dijk's Orbis for both types of firms, which ensures a degree a consistency across the balance sheet information used in the analysis. We find that the differential impact of leverage on default probabilities (PD) across companies of different size is economically important. The difference in PD between first and fourth leverage quantiles for large firms is 1.61% while it is more than double, 3.34%, for SMEs. Although higher leverage always causes higher default risk, the influence of leverage components on such risk varies between firm groups. Distressed SME firms exhibit higher leverage across all its components but particularly current liabilities with a median increase of 15.4% of total assets. This is likely because current liabilities are the source of financing which may be more easily accessible to SMEs. The marked increase in short-term (current) liabilities substantially increases rollover risk and, with it, default risk. In contrast, large firms in distress tend to increase leverage mainly through non-current liabilities (+13.3% of total assets). Hence, it appears that the maturity structure of liabilities could explain the differential impact of leverage on the PD of SMEs and large firms. Restricted access to longer-term financing for SMEs may be due to their perceived riskiness. But such perception could act as a self-fulfilling prophecy. A clear policy implication of our findings, to avoid the vicious circle of excessive short-term borrowing leading to higher default rates, would be to give SMEs easier access to longer-term financing.

Our second contribution is an analysis of the influence of leverage on the probability of recovery from the state of insolvency. Here, as in the Orbis database, "insolvency" is used to indicate an intermediate state between the "active" state and the "bankrupt" or "in

liquidation" states. Insolvent firms have the opportunity to restructure and become active again thus avoiding liquidation. This transition out of insolvency is little investigated in corporate default studies. Indeed, corporate default is normally modelled as an absorbing state. Yet, understanding the factors that may help a firm's recovery has important economic implications. We find that both large and small firms considerably alter the maturity structure of their liabilities in order to exit from insolvency. But they do so in different ways. SMEs, appear to address the high rollover risk that brought them into insolvency by shifting liabilities away from short-term debt to long-term debt. As a result, the median non-current debt increases by 15.8% of total assets while current debt and trade credit decline by 7.4% and 8.5% of total assets, respectively, relative to the SMEs that remain in the insolvency state. Instead, large firms appear to decrease non-current liabilities and increase current ones, which is exactly the opposite, though these changes are not statistically significant. This is more likely due to the small sample of large recovered firms. The findings suggest that SMEs and large firms are subject to very different restructuring strategies, which may be the result of separate bankruptcy procedures and/or differences in creditors' bargaining power (Berkowitz and White, 2004, Berger and Udell, 2006).

Until recently, the literature on predicting financial distress has mainly focused on large corporations. Our paper, contributes to the expanding research that investigates default risk in SMEs with a specific focus on the European market (Filipe et al., 2016, McGuinness et al., 2018). Our findings do not support the conclusions in McGuinness et al. (2018) who suggest that trade finance may decrease SMEs' default risk. Instead we show that trade finance has a positive and highly statistically significant impact on the probability of default of small and medium firms. This may be due to the fact that our larger sample enables us to test the impact of trade finance and other leverage components directly on defaulted firms, rather than indirectly, via the medium of the Z-

score, as in McGuinness et al. (2018). Our findings are also related to recent studies that aim to explain capital structure decisions in European SMEs (Casey and O'Toole, 2014, Daskalakis et al., 2017, Mc Namara et al., 2017, Carbo-Valverde et al., 2016) and earlier ones that focus on agency problems and information asymmetries in SME financing. For instance, Berger and Udell (1998) document that in order to overcome agency problems, SMEs need to have a different capital structure than larger firms. Berger and Udell (2006) explain how financial institutions may employ different lending technologies to overcome information asymmetries when lending to SMEs. Similarly, Beck and Demirg-Kunt (2006) explain how different financing tools are needed to fund SMEs and show that SMEs financing opportunities depend on the development of financial institutions. Casey and O'Toole (2014) show that financially constrained SMEs use distinct sources of external finance to replace bank credit. Trade credit is mainly used for working capital purposes whereas informal loans, company loans, market financing and grants are used principally for investment projects. Carbo-Valverde et al. (2016) show how trade creditors may function as lender of last resort when SMEs are financially constrained and cannot access bank lending. This suggests that different components of financial leverage may not have the same impact on firms' probability of default.

The remainder of the paper is organized as follows, in section II we describe the data, in Section III we outline the empirical methodology and the variables used in our regressions, in Section IV we present our result. Section V discusses the implications of our findings and Section VI concludes.

# II Data

We collect firm-level data from Orbis. We have access to the financial report of firms from the sixteen western European countries with the largest GDP. We exclude finan-

cials, public sector firms and industries with poor representation across the countries in the sample.[1] We also exclude all firms for which the industry sector is not provided. We construct the credit history of each firm using Orbis fields "*status*" and "*status date*", which report default information. We exclude all firm-year observations when information on the date in which the "*status*" is recorded or on the "*status*" itself are not available.[2] Moreover, we drop all firm-year observations when accounting variables are not recorded and we exclude countries in which the total number of firm-year observations is less than 5,000.[3] We also exclude countries in which the percentage of active firm-year observations is higher than 99.99% of the total number of firm-year observations in that country.[4] Finally, we winsorize all firm-level variables at 1% and 99% in each country. Our cleaned database consists of around 6.2 million observations, from almost one million firms based in six countries (Belgium, Spain, France, United Kingdom, Italy and Portugal) over the time period 2005-2014.

Table 1 reports the number of observations and firms in each country in the sample. We also differentiate between large corporations and SMEs. The most represented country is Italy, with 34.95% of total observations and 32.21% of firms, whereas the least represented is Portugal, with 3.84% of total observations and 4.76% of firms. The United Kingdom is the country with the largest number of large firms, whereas Italy is the country with the largest number of SMEs. Table 1 also shows the percentages of firms that are *Active*, *Insolvent* or *Bankrupt*. Firms are *Active* if the "*status*" field on Orbis is *Active*. They are *Insolvent* if the "*status*" field in Orbis is either *Active*

[1]Specifically, we drop all firm that, according to the NACE Rev. 2 classification, operate in one of the following industries: *financial and insurance activities*; *real estate activities*; *public administration and defence*; *compulsory social security*; *activities of households as employers; undifferentiated goods service producing activities of households for own use* and *activities of extraterritorial organisations and bodies.*

[2]We also exclude all firm-year observations that have a "*status*" which is *active branch*, *active dormant*, *active reorganization*, *dissolved demerger*, *dissolved merger*, *dissolved take-over*, *inactive branch*, *inactive no precision*, *non-profit organisations* or *unknown situation.*

[3]The low number of firms would not be representative of the overall country.

[4]The high percentage is not plausible and most likely reflects issues with how Orbis records a firm's "*status*" or problems with the availability of defaulted firm data in that country.

*default of payment*, *Active rescue plan* or *Active insolvency proceedings*. Finally, firms are *Bankrupt* if the "*status*" field in Orbis is either *Bankruptcy*, *In liquidation*, *Dissolved*, *Dissolved bankruptcy* or *Dissolved liquidation*. Additional details on the classification of firm-year observations in *Active*, *Insolvent* and *Bankrupt* are in Table A.1. Percentages of firms in *Insolvent* and *Bankrupt* vary across countries. The heterogeneity is mainly due to the different percentages of large firms and SMEs in each countries and firm sizes. For instance, Italy has the largest SME cumulative bankruptcy rate over the whole sample period at 13.99%. But it also has a below average bankruptcy rate for large firms (3.65%). On the contrary, the bankruptcy rate of small and large Spanish firms is remarkably similar, 8.81% and 8.24% respectively. We discuss the possible causes of these country heterogeneities later in the paper.

Table 2 shows transition rates from the *Active* and *Insolvent* states to the other states. Over one-year, most of the firm-year observations classified as *Active* (97.88%) do not migrate to another state, only 0.36% go through insolvency procedures and 1.8% directly to bankruptcy. With regards to *Insolvent* firm-year observations, only 1.02% manage to recover to the *Active* state whereas a big share goes to the *Bankrupt* state (7.34%). We also look at 5 and 10 year transition matrices to have an idea of status changes at different intervals over the sample period. Multi-period transitions are derived from the 1 year matrix under the homogeneous Markov chain assumption. Table 3 reports the number of default firms, which include those with *Insolvent* and *Bankrupt* status, for each year of our sample period. Percentages are consistently higher for SMEs than for large corporations. The effect of the global financial crisis is particularly visible for SMEs. The percentage of defaulted firms increases from 1.49% in 2006 to 2.48% in 2008. The peak of default for both SMEs (2.97%) and large corporations (1.76%) is in 2012 and is associated with the European sovereign debt crisis. From the global financial crisis onwards, the proportion of defaulted SMEs increases markedly relative to large

corporations (last column of Table 3).

# III Empirical Methodology

## III.a Model Specification

We estimate the probability of default with a discrete hazard model in the form of a multi-period logit, as in Shumway (2001) and Campbell et al. (2008). Bauer and Agarwal (2014) show that hazard models, which have time-varying covariates, have superior performances with respect to static, accounting based, models (e.g. Altman, 1968, Ohlson, 1980, Zmijewski, 1984) and contingent claim models (e.g. Vassalou and Xing, 2004, Hillegeist et al., 2004 and Bharath and Shumway, 2008). Our logit model is given by,

$$\begin{aligned} P_t(y_{i,c,j,t+1} = 1) &= \Phi(\alpha + \boldsymbol{X_{i,t}\beta} + \boldsymbol{Z_{i,c,t}\delta} + \gamma_c + \gamma_j) \\ &= \frac{1}{1 + exp[-(\alpha + \boldsymbol{X_{i,t}\beta} + \boldsymbol{Z_{i,c,t}\delta} + \gamma_c + \gamma_j)]} \end{aligned} \tag{1}$$

Subscripts $i$, $c$, $j$, and $t$ indicate firms, countries, industries and years, respectively, $y$ is a dummy variable which indicates corporate default, it takes value 0 if the firm is *Active* and value 1 if the firm is *Insolvent* or *Bankrupt*. If firms are *Insolvent*, this means that they can eventually recover in the future. If firms are *Bankrupt*, they cannot recover, $\alpha$ is the constant, $\gamma_c$ and $\gamma_j$ are country and industry fixed effects respectively. $\boldsymbol{X}$ is a vector of firm-level, time-varying, leverage variables and $\boldsymbol{Z}$ is a vector of time-varying control variables. Covariates are lagged and refer to the previous accounting year relative to the dependent variable.

## III.b Variables

Leverage variables include LEVERAGE or its components, that is, TRADE, CURRENT and NONCURRENT. LEVERAGE is the ratio of total liabilities and total assets, TRADE is the ratio of trade payables and total assets, CURRENT is the ratio of current liabilities and total assets and NONCURRENT is the ratio of non-current liabilities and total assets. In our analysis, we use four different specifications that combine these variables with a dummy that identifies SMEs. SME takes value one if the firm has total assets below 43 million EUR and zero otherwise.[5]

Controls that vary at the country level include a set of macroeconomic variables.[6]. We employ the natural logarithm of GDP growth (GDP) to capture the business cycle, the yield of three months government bonds (GOVBOND)[7] and sovereign CDS spreads (SOVCDS) to capture interest rate effects and sovereign riskiness. Information on GDP is from the Eurostat Database, interest rates are collected form the IMF-World Economic Outlook Database and CDS spreads are obtained from Markit. Firm-level control variables include the ratio between net income and total assets (NITA), the ratio between current assets and total assets (CATA), the number of years since a firm's incorporation (AGE) and the SME dummy.

Table 4 reports the summary statistics of the independent variables. The median LEVERAGE is higher for SMEs (0.74) than for large corporations (0.69). Looking at the individual components of financial leverage, the median short-term sources of finance (TRADE and CURRENT) are higher for SMEs (0.15 and 0.27) than large firms (0.07 and 0.23). On the other hand, NONCURRENT is higher for large corporations. Table 5 describes the distribution of LEVERAGE, TRADE, CURRENT and NONCURRENT

[5]This threshold is based on the SMEs European Commission definition.

[6]Duffie et al. (2007) and Filipe et al. (2016) find that the economic environment influences the probability of default. The transmission channels of risk from sovereign to corporates are government guarantees, domestic demand and credit markets (Bedendo and Colla, 2015).

[7]The risk-free rate is a key ingredient in Merton (1974) distance to default model.

across countries. It displays a heterogeneous financing pattern, which, apart for few exceptions, confirms at the country level the cross-country findings of Table 4.

To understand the typical capital structure of active and defaulted firms we check the levels of leverage and its components in the active and default states. Results are reported in Table 6. We can see that defaulted firms are always more levered than active ones and this is true regardless of size. The median increase in leverage for large firms is +21.4% and for SMEs is +21.0% of total assets. But, the changes in leverage components do appear to be size dependent. Defaulted SMEs exhibit the largest median inflation in current liabilities (+15.4%) followed by trade finance (+5.7%) relative to active SMEs. In contrast, large defaulted firms have the largest variation in non-current liabilities, relative to large active companies (+13.3%), followed by current liabilities (+8.0%). This suggests that SMEs in distress are not only subject to higher debt levels but also to higher rollover risk. Indeed, SMEs in default have both higher trade finance and higher current liabilities than large defaulted firms (+15.4% and +11.4%) while they have a lower non-current debt (-14.5%) as a proportion of total assets. This difference in the maturity structure of liabilities and the resulting greater difficulties in re-financing for SMEs, could help explain why the default rates for SMEs are much higher than for large firms even when controlling for total leverage.

# IV Results

## IV.a Baseline Specification

We estimate default probabilities using equation 1. Table 7 displays correlations between regression variables. The variable that is mostly negatively correlated with Insolvent and Bankrupt is net income over total assets NITA whereas the one that is most positively correlated is LEVERAGE. In Table 8 we present logit regression estimates for

four different specifications. Specification (1) is our benchmark model. In specification (2) add an interaction term between leverage and the SME dummy to measure the differential impact of leverage on the PDs of SMEs. In specifications (3) and (4) leverage is broken down into three separate components: trade payables, (other) current liabilities and non-current liabilities.

As expected, the coefficient of LEVERAGE is positive and strongly significant. When we look at the leverage components (specification 3) they are also positive and strongly significant. Since the coefficient of interaction terms with dummy variables, such as the SME dummy, cannot be directly interpreted in a logit model (Ai and Norton, 2003), for the sign and significance of leverage and its components interacted with SME we look at their marginal effects. Details of the calculation of marginal effects are explained in Appendix B. Results are reported in Table 9. For large corporations, the marginal effect of LEVERAGE is 0.012. This means that a 10% increase in LEVERAGE leads to a 12 basis points increase in the default probability. On the other hand, the marginal effect for SMEs is much higher at 20 basis points for the same change in LEVERAGE. These numbers and their differences are economically significant. According to Moody's, an increase in the average default rate from zero to 9 (27) basis points would cause a substantial downgrade from Aaa to A (Baa) (exhibit 30, Moodys Investor Service, 2017). In Figure 1 we show the marginal effects of different levels of LEVERAGE on default probabilities. Figure 1 reveals that changes in leverage always have a greater impact on the probability of default of SMEs than large corporates. This is consistent with the evidence that, financially constrained, large firms are able to raise external finances more than small firms, especially during crises periods (Gertler and Gilchrist, 1994 and Beck et al., 2008).

The default risk literature indicates that short-term liabilities can have a greater influence on default risk than long-term financing. In the popular Merton-based KMV model

(Vassalou and Xing, 2004) the default trigger is composed of 100% short-term debt and only 50% long-term debt which highlights the relative importance of debt maturity. Our results in Table 9 confirm this idea, but for SMEs alone. Specifically, a 10% increase of trade payables and current liabilities increases the default probability by 36 basis points in both cases. Instead, if long-term financial debt goes up by 10%, the default probability would rise by 16 basis points only (approximately half the sensitivity observed for short-term financing). However, for the average large corporation, all sources of finance have similar importance, with marginal effects ranging from 10 to 15 basis points. The difference between large corporations and SMEs may be due to the fact that smaller firms start with higher levels of short-term funding. Also, the ability of large firms to obtain long-term financing would decrease the impact of financial leverage on default probabilities. For robustness, we check marginal effects at different quantiles of the leverage components, TRADE, CURRENT and NONCURRENT to see if their relative impact on the probability of default for SMEs and large firms is sensitive to the capital structure of the corporation. Results are reported in Table D.1. Our main findings are confirmed in that the marginal effects of TRADE and CURRENT for SMEs are always larger than those for large firms across different levels of leverage. We also run OLS regressions (reported in Table D.2) to be able to interpret directly the coefficients of the interaction terms between leverage and its components with the SME dummy and results are in line with expectations.

To illustrate more clearly the effect of leverage on the PD we calculate predicted PDs with our estimated logit model for different leverage quartiles. Results are shown on Table 10. We can see that an increase of leverage from the first to the last quartile generates a much larger rise in the PD of SMEs (+3.34%) than for large corporations (+1.61). For SMEs the largest increase in the probability of default from bottom to top quartile is caused by current liabilities (+2.43%) and trade finance (+1.35%). This result is con-

sistent with Cunat (2007) who shows that firms use trade credit as a marginal source of finance and that firms which rely on trade credit have to pay higher interest rates. On the other hand, in line with previous findings in Table 6, trade credit does not influence much the PD of large firms when moving from bottom to top trade credit quartiles.

Regarding the other control variables used in Table 8 to estimate the PD of large and small firms, following expectations, better macroeconomic conditions, as indicated by a higher GDP growth rate, lower interest rates and lower sovereign default risk, decrease corporate default rates. Regarding the impact of firm-specific control variables, higher profitability measured by net income over total assets NITA, as one would expect, decreases the incidence of default. Firm age also causes a contraction of default probabilities since younger, less established firms, are well known to be more prone to distress. Finally, the proportion of current assets to total assets CATA affects positively default risk. Indeed, there are items in current assets that can reasonably be associated with distress risk. For instance, difficulties to obtain payments from customer sales will increase trade receivables. Rising inventory stocks may indicate a slowing demand for the companys products. Both occurrences, would cause current assets and default risk to increase. However, higher cash holdings, also included in current assets, should indicate a healthier financial position and hence a lower probability of default. To disentangle these effects we re-run our benchmark model (specification 1 in Table 8) on all the above components of current assets. Results are shown in Table A.3 and they confirm our expectations with cash exhibiting a negative and statistically significant coefficient while all the other components have a positive and significant impact on PD.

#### IV.a.1 Robustness

We perform a battery of robustness tests on our main results by using specification (2) in Table 8 as a benchmark. First, we want to check that our findings are not driven

by zero-or low-leverage firms. These firms have different capital structure, profitability, dividend payout policy (Strebulaev and Yang, 2013) and corporate culture (El Ghoul et al., 2018) from the rest of the sample. We run our benchmark model excluding all observations in the bottom 10% of the LEVERAGE distribution. Results are reported in Figure D.1 which is very similar to Figure 1 confirming that our conclusions are robust to the exclusion of low-leverage firms.

Further, it is conceivable that the impact of LEVERAGE on default probabilities is non-linear (Giordani et al., 2014). For this reason, we run our model including a quadratic term for LEVERAGE and its interaction with the SME dummy. Figure D.2 shows the resulting marginal effects and again the differentiation between large firms and SMEs is fairly obvious.

Next we separately consider *Insolvent* and *Bankrupt* firms, which in the main analysis are bunched together as defaulted companies. We expect firms that will face bankruptcy, that it those that will be liquidated and cannot recover from default, to be the group most sensitive to leverage. Indeed, when we use an ordered logit model we find bankrupt firms to have the largest marginal effects, which are also statistically significantly different from insolvent firms. Results are shown in Figure D.3. The lines in the Figure relate to changes in the probability to retain or migrate to a certain state (*Active*, *Insolvent*, *Bankrupt*). Hence, the marginal effects of the active state are declining as the probability of remaining active falls when leverage increases.

We also check that our results are not driven by our definition of SMEs. The European Commission defines SMEs as those firms that have less than 250 employees and either no more than 50 million Euro of turnover or no more than 43 million Euro of total assets. To maximise the sample size, in our analysis we have considered as SMEs all firms with total assets below 43 million Euro. This is because the number of employees is not always reported in the Orbis database. As a robustness test, we restrict the analysis to

the subsample of firms for which the number of employees is available. Figure D.4 shows marginal effects computed with specification (2) on the restricted sample. Results are qualitatively similar to those reported in Figure 1 where the full sample is used.

To check that our analysis is not driven by a dominant country or sector we re-run our regressions by excluding Italy and the retail sector which have the largest number of observations. Figure D.5 shows marginal effects when Italy is excluded, Figure D.6 shows marginal effects when the retail sector is excluded. Results are unaffected.

Finally, we want to understand if our findings are driven by a specific size sub-sample within the SME grouping. Therefore, we run our benchmark regression interacting LEVERAGE with dummies that capture small and medium firms separately.[8] Figure D.7 confirms that the sensitivity of the default probability to leverage increases monotonically with size.

## IV.b Sector Variation

In this section, we investigate how financial leverage affects probabilities of default in different industries. We group our observations in five different sectors: production, retail, services, construction and transportation.[9] We run our benchmark model separately for each sector. Figure 2 shows that marginal effects[10] vary across sectors, although the effect for SMEs is always higher than the one of large corporations. In the production,

[8]Small dummy takes value 1 if the firms has less than 10 million EUR in total assets, medium dummy takes value 1 if total assets are between 10 and 43 million EUR, based on the European commission definition.

[9]We assign firms to the production sector if the NACE Rev. 2 code is either *agriculture, forestry and fishing*; *mining and quarrying*; *manufacturing* or *electricity, gas, steam and air conditioning supply*, to the retail sector if the NACE Rev. 2 code is *wholesale and retail trade; repair of motor vehicles and motorcycles*, to the services sector if the NACE Rev. 2 code is either *water supply; sewerage, waste management and remediation activities*; *accommodation and food service activities*; *information and communication*; *professional, scientific and technical activities*; *administrative and support service activities*; *education*; *human health and social work activities*; *arts, entertainment and recreation* or *other service activities*, to the construction sector if the NACE Rev. 2 code is *construction* and to the transportation sector if the NACE Rev. 2 code is *transportation and storage*.

[10]Estimated coefficients of logit regressions for each sector are available upon request.

retail and transportation sectors, marginal effects for large corporations do not seem to be much sensitive to the level of LEVERAGE, whereas for SMEs marginal effects exhibit a clear positive slope. In contrast, in the construction sector, marginal effects present a steep increase as LEVERAGE goes up, for both types of firm. At the opposite side of the spectrum lies the services industry, in which marginal effects are low and do not change across levels of LEVERAGE.

## IV.c Country Heterogeneity

In Figure 3, we show marginal effects computed when our benchmark model is run separately on the countries represented in our sample.[11] Results are highly heterogeneous across countries. In Belgium and Portugal, LEVERAGE increases the probability of default of SMEs but not so strongly for large corporations. In France, LEVERAGE has a statistically significant positive effect on the default probabilities of both SMEs and large corporations. However, the effect for SMEs is much stronger. In Italy and Spain LEVERAGE increases the probability of defaults for both SMEs and large firms in a similar way, though the effect for both firms is more pronounced in Italy for high levels of leverage. Oddly, in the United Kingdom, LEVERAGE appears to have a small impact on probabilities of default regardless of firm size. Interestingly, Dutch large firms appear to have a negative relationship between leverage and PD, with leverage causing a fall in PD (though the fall is lower as leverage increases). Bruggeman and Van Nieuwenhuyze (2013) and the Financial Times[12] in their discussion of the peculiar resilience of Belgium during the Great Recession and the European sovereign debt crisis offer clues to this puzzling result. Specifically, they illustrate that a substantial increase of corporate leverage was not the result of funding needs but rather financial flows from Dutch multinational com-

[11] Estimated coefficients of logit regressions for each country are available upon request.

[12] See "What's the deal with Belgium?" by: Matthew C Klein published in August 20, 2015, FT.com

panies towards local firms for tax purposes.[13] This explains why an increase of leverage did not affect default risk and, in fact, rather the opposite because debt accumulation took place when Dutch companies were performing well.

One of the possible sources of heterogeneity is the capital structure of SMEs and large corporations which varies remarkably across countries (see Table 5). Moreover, heterogeneities may be due to the fact that the relative importance of industry sectors changes across countries. Indeed, as shown in Section IV.b, firms in different industries show rather different default patterns (Nickell et al., 2000). For instance, the flat plot for the United Kingdom can be explained by the prominence of firms belonging to the services sector, in which default probabilities react less to changes in LEVERAGE.

Another explanation for the heterogeneous link between default probabilities and financial leverage may be traced back to different bankruptcy codes, degrees of creditors' protection (Davydenko and Franks, 2008) and different degrees of investors' legal protection (La Porta et al., 1998). The same holds true for SMEs (Mc Namara et al., 2017). Fernndez et al. (2018) show that firms are partially able to substitute bank credit with non-bank credit when they lose access to the former. However, this ability is weaker in countries where there are strong creditor protection laws. These results cast doubts on the possibility of generalising results of default studies that are established in the literature, but exclusively based on US data, to other countries.

[13]Bruggeman and Van Nieuwenhuyze (2013) state that "The debt accumulation of Belgian firms is also determined partly by various specific factors attributable to the tax environment. For instance, in Belgium there are considerable funding flows between non-financial corporations, on account of the activities of non-financial holding companies and finance companies of multinationals based in Belgium. These companies were previously attracted by the tax concessions available to coordination centres and, since 2006, by the notional interest allowance. Since 2005, the loans granted by related foreign firms to firms based in Belgium have risen by 17 percentage points of GDP to 37% of GDP at the end of 2012, accounting for much of the rise in the consolidated debt ratio, up by 26 percentage points of GDP during that period."

## IV.d Financial Crisis

The 2007-2008 financial crisis affected the availability of credit in European countries.[14] Financially constrained firms increased trade credit (Garcia-Appendini and Montoriol-Garriga, 2013, Carbo-Valverde et al., 2016). Trade credit is a short-term source of finance and, therefore, tends to be riskier (Vassalou and Xing, 2004, He and Xiong, 2012). Moreover, Campello et al. (2010) show that firms that experienced financial constrains because of the 2007-2008 crisis reduced investments and were forced to cut planned projects. For this reasons, we are interested in investigating if there have been any major changes in the sensitivity of default probabilities to financial leverage after the crisis. Finally, Daskalakis et al. (2017) show that SMEs adjust their long-term debt ratios more slowly during crisis periods. Therefore, financial crises may impact on firms' debt management.

So, we run our benchmark model for three sub-periods: pre-crisis (2005-2006), Great Recession (2007-2009) and European sovereign debt crisis and recovery periods (2010-2014). The marginal effects shown in Figure 4 suggest that even though the sensitivity of PDs to leverage is similar for large firms and SMEs in the pre-crisis period, the difference between the two becomes more pronounced during the Great Recession. This is mainly due to SMEs' PDs becoming more sensitive to leverage, while the marginal effects of large firms remain rather flat. In contrast, in the sovereign debt crisis both marginal effects are upward sloping and noticeably higher than in previous periods.

## IV.e Recovery Probabilities

In this Section, we investigate the capital structure of the firms that are able to recover relative to those that remain insolvent. Hence, we are able to explore the determinants of recovery probabilities from the state of insolvency. From Table 11 a clear pattern emerges, while defaulted and recovered SMEs have similar levels of leverage, those that

[14]Estimated coefficients of logit regressions for each time period are available upon request.

recover exhibit markedly lower short-term debt and substantially higher long-term debt. Specifically, from insolvent to recovered firms, trade credit falls by 8.5% and current liabilities by 7.4% while non-current liabilities go up by 15.8% (Panel B). All results are highly statistically significant. This suggests that a recipe for recovery is to seek more stable sources of funding and not necessarily decrease leverage, which may not always be possible. Put it another way, decreasing rollover risk may be key for restoring viable operating conditions.

Results for large firms have no or low statistical significance due to the small sample of large recovered firms (only 17). For this reason, the subsequent analysis of the determinants of recovery probabilities is restricted to SMEs only. Results are reported in Table 12. Specification (1) indicates that leverage contributes positively to the chances of recovery. Specification (2) qualifies this finding and confirms that recovery is more likely when non-current liabilities increase. So, again, the stability and maturity structure of liabilities appear to make a difference between remaining or exiting the default state. An alternative explanation is that a small firm which is able to raise long-term finance will have a higher probability of surviving an insolvency procedure. This may be because SMEs with longer-term financing went through stricter screening procedures.

Looking at the other determinants, a better economic and financial environment as indicated by higher GDP and lower interest rates, improve recovery probabilities. Interestingly, higher sovereign risk (SOVCDS) also appears to help recoveries. This may simply indicate that following the height of a crisis, when the economy has bottomed out but sovereign spreads may still be higher than normal, SMEs may find better conditions to emerge from distress. This would also be reinforced by typical post-crisis governments' and regulators' policies that aim at supporting the SME sector (OECD, 2009, Bergthaler et al., 2015, Mayordomo and Rodrguez-Moreno, 2018).

Finally, with the estimated recovery probability models we derive predicted recovery

probabilities for different quartiles of leverage and its components. Results in Table 13 confirm the above conclusions and show that an increase in long-term debt NONCURRENT from bottom to top quartile, improves the probability of recovery of SMEs by 3.18%. In contrast, higher short-term debt TRADE and CURRENT causes the recovery probability to contract.

# V Applications in Banking

In this section, we explore possible applications of our estimated default probability models. Specifically, we look at the differential impact of leverage on bank capital requirements and loan pricing for large versus SME borrowers.

## V.a Basel III Capital Requirement

We derive capital requirements with the internal rating based approach in Basel III (see Appendix C) for a 1-year pure discount loan worth \$1 at maturity. Besides maturity and loan exposure, the capital requirement depends on the loan PD, its expected loss given default (LGD), and borrower size. The PDs are produced by our logit model, specification (4), as reported in Table 8. We consider average PDs for the first and tenth decile of our sample of firms ranked according to leverage. The LGD is taken from Moodys Investor Service (2017) which provides bank loan recoveries. We compute the LGD as 1 minus the average corporate loan ultimate recovery over the period 1987-2016 (80.6%), which gives a LGD of 19.4% (see Exhibit 8 in Moodys Investor Service, 2017).

Firm size is measured in terms of annual sales and impacts of the correlation of the loan with the other loans in the portfolio. The Basel III assumption is that the smaller the firm the lower its correlation with the rest of the bank portfolio. The maximum correlation difference between large and small firms is 4%, which is achieved for SMEs

with annual sales below 5 million Euros. Minimum capital requirements with the above assumptions are reported in Panel A of Table 15. As reported in earlier sections the PD of SMEs is greater than for large firms and the difference is increasing with leverage. For low leverage (first decile) the SME default probability (0.78%) is 1.26 times that of large firms (0.62%). When leverage is high (tenth decile) the factor goes to 2.13 times, from 3.14% to 6.68%. When we hold correlation constant, regulatory capital would also rise, as one would expect, but with lower multiples (1.12 and 1.33 for low and high leverage respectively). However, when we consider the correlation discount given to small SMEs as defined by Basel (on average, the SMEs in our sample belong to this category) the capital requirement of SMEs becomes smaller than or similar to large firms (multiples are now 0.88 and 1 respectively). This is clearly at odds with the evidence we have presented in Table 3 where we show that default rates for SMEs are bigger than for large firms in each year of the sample. Those rates represent the combined effect of default risk (PD) and correlation as they indicate the aggregate default risk of the portfolio of firms in our sample.

Our results are intuitive and highlight a potentially serious drawback of current regulation. Although it might be defensible to assume that portfolio correlation declines with firm size in normal market conditions, such assumption clearly does not hold in crisis periods when SMEs are more likely to experience distress due, for example, to restricted access to credit (see, for instance, Ferrando et al., 2017). Indeed, the results in Table 3 show that from 2008 the ratio of SME defaults to large firm defaults has increased and remained higher (1.87) than in the pre-crisis period (1.35).

## V.b Loan Pricing

To illustrate the effect of leverage on the pricing of loans to SMEs and large firms, we adopt a similar approach to Resti and Sironi (2007).[15] The loan spread is decomposed into an expected loss component ($d_{el}$) and an "unexpected loss" component ($d_{ul}$). The former, for a 1-year pure discount loan worth \$1 at maturity, is obtained from the following equation,

$$\frac{1 - LGD \cdot PD}{1 + r_f} = \frac{1}{1 + r_f + d_{el}} \tag{2}$$

We assume that the unexpected loss component of the spread is driven by the risk premium ($r_e - r_f$) paid by the bank for the regulatory capital allocated to the loan, as a percentage of the loan exposure ($RegCap$). The term "unexpected loss" is derived from Basel III regulation where equity capital requirements for credit exposures are meant as buffers to absorb the value-at-risk of the loan not already covered by loan loss provisions (Basel Committee on Banking Supervision, 2017). Details of the capital requirement calculations are shown in Appendix C, $d_{ul}$ can be derived from the following equation,

$$\frac{1 - LGD \cdot PD}{(1 + r_f) + RegCap(r_e - r_f)} = \frac{1}{1 + r_f + d_{el} + d_{ul}} \tag{3}$$

We normalise the risk-free rate ($r_f$) to zero. $r_e$ is the bank's cost of capital and is set to 13.66%. This is computed as the average cost of equity capital of the four main banks in each country in our sample as of December 31, 2014. Bank-specific costs of equity are sourced from Bloomberg.

We divide our sample in deciles based on leverage and compute loan spreads and their components for the first and tenth deciles. Results are reported in Table 12. We can see that, at low leverage, the spread differential between large firms and SMEs is nil. But, the spread difference increases to 70 basis points at high leverage, with the SME spread

[15] See Chapter 15 pp. 451-457.

(1.88%) being 1.61 times that of large firms (1.17%). Another way to look at this is to check the leverage effect for the two types of firms separately, as reported in the last two columns of the table. We can observe that, in large firms, loan spreads at high leverage are 2.85 times those at low leverage, a difference of 0.76%. However, the jump for SMEs is much more pronounced with a multiple of 4.59 multiple and a difference of 1.47%. This evidence reinforces the key role that the interaction between firm size and leverage can have on lending rates.

In Table D.3 we perform sensitivity analysis on the cost of capital to test if our findings on loan spreads are robust. Instead of adopting the original assumption of a cost of capital of 13.66% we consider the alternative values of 10% and 15%. The results are broadly in line with our previous findings.

# VI Conclusion

We focus on the role of financial leverage and its differential effect on the probabilities of default and recovery after default of SMEs and large corporations. We find that leverage and each of its components, including trade finance, current and non-current liabilities have a positive impact on default probabilities. But such impact is stronger for SMEs especially in relation to short-term financing. The implication is that the rollover risk associated with short-term financing makes SMEs more prone to default. In addition, we observe that in order to recover from default, SMEs need to rely less on short-term debt and more on longer-term liabilities. The upshot is that the maturity structure of liabilities appears to be a key ingredient to the health and stability of the SME sector. A clear direction from our research for future government policies aiming at increasing the resilience of SMEs particularly during crisis periods, would be to create incentives for banks to extend longer-term credit. Indeed, SMEs' perceived higher default risk may

partly be the result of short-term lending policies that create the pre-conditions for that very risk to materialise.

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Table 1: Active, Insolvent and Bankrupt Firms by Country

This table shows the sample countries, the number and percentage of firms per country and the number and the percentage of firm-year observations. Firm-year observations are classified into 3 alternative states: *Active*, *Insolvent* and *Bankrupt*. Firms are *Active* if their Orbis "*status*" is *Active*, *Insolvent* if their Orbis "*status*" is either *Active default of payment*, *Active rescue plan* or *Active insolvency proceedings* and *Bankrupt* if their Orbis "*status*" is either *Bankruptcy*, *In liquidation*, *Dissolved*, *Dissolved bankruptcy* or *Dissolved liquidation*. The last six columns present the number of firm-year observations (and percentages) for each state.
$a = \frac{Firms\,in\,Country\,n}{Total\,Firms}$ ; $b = \frac{Observations\,in\,Country\,n}{Total\,Observations}$ ; $c = \frac{Active\,Firms\,in\,Country\,n}{Firms\,in\,Country\,n}$ ; $d = \frac{Insolvent\,Firms\,in\,Country\,n}{Firms\,in\,Country\,n}$ ; $e = \frac{Bankrupt\,Firms\,in\,Country\,n}{Firms\,in\,Country\,n}$

| | Firms | | Firm-Year Obs. | | *Active* State | | *Insolvent* State | | *Bankrupt* State | |
|---|---|---|---|---|---|---|---|---|---|---|
| | N. | $a$ (%) | N. | $b$ (%) | N. | $c$ (%) | N. | $d$ (%) | N. | $e$ (%) |
| Overall Sample | | | | | | | | | | |
| Belgium | 55,795 | 5.94% | 430,250 | 6.93% | 55,031 | 98.63% | 455 | 0.82% | 5,155 | 9.24% |
| Spain | 193,791 | 20.64% | 1,147,757 | 18.48% | 190,243 | 98.17% | 6,594 | 3.40% | 17,350 | 8.95% |
| France | 261,963 | 27.90% | 1,859,931 | 29.94% | 258,182 | 98.56% | 9,139 | 3.49% | 25,755 | 9.83% |
| United Kingdom | 80,339 | 8.56% | 364,610 | 5.87% | 77,375 | 96.31% | 1,339 | 1.67% | 7,586 | 9.44% |
| Italy | 302,464 | 32.21% | 2,170,906 | 34.95% | 299,520 | 99.03% | 2,649 | 0.88% | 42,024 | 13.89% |
| Portugal | 44,723 | 4.76% | 238,710 | 3.84% | 43,807 | 97.95% | 3,662 | 8.19% | 1,640 | 3.67% |
| Total | 939,075 | 100% | 6,212,164 | 100% | 924,158 | 98.41% | 23,838 | 2.54% | 99,510 | 10.60% |
| Large Firms | | | | | | | | | | |
| Belgium | 3,000 | 6.98% | 18,343 | 7.73% | 2,984 | 99.47% | 6 | 0.20% | 92 | 3.07% |
| Spain | 7,684 | 17.89% | 40,261 | 16.96% | 7,476 | 97.29% | 283 | 3.68% | 633 | 8.24% |
| France | 7,434 | 17.30% | 45,677 | 19.24% | 7,403 | 99.58% | 54 | 0.73% | 197 | 2.65% |
| United Kingdom | 13,484 | 31.39% | 65,113 | 27.43% | 13,268 | 98.40% | 169 | 1.25% | 585 | 4.34% |
| Italy | 9,872 | 22.98% | 59,618 | 25.11% | 9,827 | 99.54% | 199 | 2.02% | 360 | 3.65% |
| Portugal | 1,486 | 3.46% | 8,409 | 3.54% | 1,473 | 99.13% | 51 | 3.43% | 30 | 2.02% |
| Total | 42,960 | 100.00% | 237,421 | 100% | 42,431 | 98.77% | 762 | 1.77% | 1,897 | 4.42% |
| SMEs | | | | | | | | | | |
| Belgium | 54,233 | 5.93% | 411,907 | 6.89% | 53,468 | 98.59% | 450 | 0.83% | 5,063 | 9.34% |
| Spain | 189,853 | 20.75% | 1,107,496 | 18.54% | 186,334 | 98.15% | 6,358 | 3.35% | 16,717 | 8.81% |
| France | 258,141 | 28.21% | 1,814,254 | 30.37% | 254,338 | 98.53% | 9,102 | 3.53% | 25,558 | 9.90% |
| United Kingdom | 70,934 | 7.75% | 299,497 | 5.01% | 68,088 | 95.99% | 1,171 | 1.65% | 7,001 | 9.87% |
| Italy | 297,902 | 32.56% | 2,111,288 | 35.34% | 294,862 | 98.98% | 2,477 | 0.83% | 41,664 | 13.99% |
| Portugal | 43,927 | 4.80% | 230,301 | 3.85% | 43,014 | 97.92% | 3,614 | 8.23% | 1,607 | 3.66% |
| Total | 914,990 | 100.00% | 5,974,743 | 100% | 900,104 | 98.37% | 23,172 | 2.53% | 97,610 | 10.67% |

Table 2: Transition Matrix

Firm-year observations are classified into 3 alternative states: *Active*, *Insolvent* and *Bankrupt*. Firms are *Active* if their Orbis "*status*" is *Active*, *Insolvent* if their Orbis "*status*" is either *Active default of payment*, *Active rescue plan* or *Active insolvency proceedings* and *Bankrupt* if their Orbis "*status*" is either *Bankruptcy*, *In liquidation*, *Dissolved*, *Dissolved bankruptcy* or *Dissolved liquidation*. This table presents the probabilities (%) of firms changing from $\text{state}_{t-n}$ (in the first column) to $\text{state}_t$ (in the top row). Figures in the table are computed by averaging probabilities from annual transition matrices and they are reported in percentage terms. Annual transition probabilities are reported in panel A. 5 years transition probabilities are reported in panel B. 10 years transition probabilities are reported in panel C.

| $state_{t-n} \setminus state_t$ | *Active* | *Insolvent* | *Bankrupt* |
|---|---|---|---|
| Panel A: n=1 | | | |
| *Active* | 97.884 | 0.358 | 1.758 |
| *Insolvent* | 1.015 | 91.646 | 7.339 |
| Panel B: n=5 | | | |
| *Active* | 89.888 | 1.448 | 8.664 |
| *Insolvent* | 4.103 | 64.680 | 31.217 |
| Panel C: n=10 | | | |
| *Active* | 80.858 | 2.239 | 16.903 |
| *Insolvent* | 6.342 | 41.895 | 51.763 |

Table 3: Number of Defaults

This table reports the number (and percentage) of Insolvent and Bankrupt firms for each year of the sample. The percentages (in parenthesis) are computed with respect to the total number of firms for each year. Sample firms are then split into two sub-samples: SMEs and large corporations. If the value of a firm's total assets is no greater than EUR 43 million the firm is classified as SME, otherwise it is classified as large corporation. The table displays the number (and percentage with respect to each sub-sample) of Insolvent and Bankrupt firms for SMEs and for large corporations. The last column is the ratio between the percentage of defaulted SMEs over the percentage of defaulted large corporations. $a = \frac{\%SMEs}{\%LargeCorporations}$

| Years | Overall Sample | | SMEs | | Large Firms | | $a$ |
|---|---|---|---|---|---|---|---|
| | N. | (%) | N. | (%) | N. | (%) | |
| 2005 | 7,035 | 1.34 | 6,804 | 1.35 | 231 | 1.19 | 1.13 |
| 2006 | 8,644 | 1.48 | 8,354 | 1.49 | 290 | 1.29 | 1.16 |
| 2007 | 12,270 | 1.20 | 11,935 | 2.02 | 335 | 1.31 | 1.45 |
| 2008 | 15,386 | 2.43 | 15,111 | 2.48 | 275 | 1.12 | 2.22 |
| 2009 | 14,682 | 2.29 | 14,353 | 2.32 | 329 | 1.34 | 1.74 |
| 2010 | 16,008 | 2.44 | 15,701 | 2.48 | 307 | 1.22 | 2.03 |
| 2011 | 18,684 | 2.80 | 18,374 | 2.86 | 310 | 1.23 | 2.34 |
| 2012 | 19,558 | 2.93 | 19,115 | 2.97 | 443 | 1.76 | 1.69 |
| 2013 | 17,111 | 2.60 | 16,721 | 2.64 | 390 | 1.55 | 1.70 |
| 2014 | 10,348 | 1.84 | 10,135 | 1.87 | 213 | 0.99 | 1.89 |
| Total | 139,726 | 14.88 | 136,603 | 14.93 | 3,123 | 7.27 | 2.05 |

Table 4: Summary Statistics of Regression Variables

This table displays the summary statistics for the independent variables used in the empirical analysis. The first three are country-specific variables: GDP is the one year GDP growth rate, GOVBOND is the three-month government bond interest rate, SOVCDS is the logarithm of the CDS price of government bonds, NITA is the ratio of net income to total assets, CATA is the ratio of current assets to total assets, AGE is the number of days since incorporation divided by 365, LEVERAGE is the ratio of total liabilities to total assets, TRADE is the ratio of trade payables to total assets, CURRENT is the ratio of current liabilities (minus trade payables) to total assets, NONCURRENT is the ratio of non-current liabilities to total assets. GDP, GOVBOND and SOVCDS are reported for the whole sample of firm-year observations. NITA, CATA, AGE, LEVERAGE, TRADE, CURRENT and NONCURRENT are reported for large corporations and SMEs. A Firm-year observation is classified as SME if firm's total assets are worth no more than EUR43 million. The total number of firm-year observations is 6,212,164. The number of large corporations firm-year observations is 237,421. The number of SMEs firm-year observations is 5,974,743.

| | Mean | Median | St. Dev. | Min | Max |
|---|---|---|---|---|---|
| GDP (%) | 0.310 | 0.652 | 2.495 | -7.101 | 4.223 |
| GOVBOND (%) | 1.758 | 1.244 | 1.571 | -0.073 | 6.750 |
| SOVCDS (%) | -0.775 | -0.359 | 1.647 | -4.375 | 2.443 |
| Large Firms | | | | | |
| NITA | 0.022 | 0.016 | 0.101 | -0.976 | 0.621 |
| CATA | 0.535 | 0.556 | 0.320 | 0.002 | 1.000 |
| AGE | 25.820 | 20.263 | 20.698 | 0.449 | 104.825 |
| LEVERAGE | 0.663 | 0.690 | 0.318 | 0.004 | 4.427 |
| TRADE | 0.124 | 0.066 | 0.154 | 0.000 | 0.918 |
| CURRENT | 0.291 | 0.225 | 0.250 | 0.000 | 1.922 |
| NONCURRENT | 0.244 | 0.133 | 0.283 | 0.000 | 2.584 |
| SMEs | | | | | |
| NITA | 0.027 | 0.017 | 0.108 | -0.976 | 0.621 |
| CATA | 0.689 | 0.775 | 0.279 | 0.002 | 1.000 |
| AGE | 17.377 | 14.263 | 13.611 | 0.449 | 104.825 |
| LEVERAGE | 0.710 | 0.739 | 0.304 | 0.004 | 4.427 |
| TRADE | 0.205 | 0.152 | 0.204 | 0.000 | 0.918 |
| CURRENT | 0.321 | 0.267 | 0.244 | 0.000 | 1.922 |
| NONCURRENT | 0.181 | 0.097 | 0.228 | 0.000 | 2.584 |

Table 5: Sources of Finance Across Countries

This table displays the summary statistics for the variables representing the alternative sources of finance across the sample countries. LEVERAGE is the ratio of total liabilities to total assets, TRADE is the ratio of trade payables to total assets, CURRENT is the ratio of current liabilities (minus trade payables) to total assets, NONCURRENT is the ratio of non-current liabilities to total assets. Bold numbers are the maximum mean values across countries of LEVERAGE, TRADE, CURRENT and NONCURRENT on the overall sample, for large corporations and for SMEs.

| | | LEVERAGE | TRADE | CURRENT | NONCURRENT | N observations: |
|---|---|---|---|---|---|---|
| Belgium | Mean (Large Firms) | 0.547 | 0.127 | 0.234 | 0.184 | 18,343 |
| | Median (Large Firms) | 0.593 | 0.058 | 0.155 | 0.063 | |
| | Mean (SMEs) | 0.631 | 0.183 | 0.275 | 0.168 | 411,907 |
| | Median (SMEs) | 0.658 | 0.114 | 0.212 | 0.080 | |
| Spain | Mean (Large Firms) | 0.670 | 0.097 | 0.277 | 0.292 | 40,261 |
| | Median (Large Firms) | 0.710 | 0.040 | 0.214 | 0.198 | |
| | Mean (SMEs) | 0.671 | 0.118 | 0.308 | 0.241 | 1,107,496 |
| | Median (SMEs) | 0.703 | 0.035 | 0.247 | 0.157 | |
| France | Mean (Large Firms) | 0.640 | **0.175** | 0.289 | 0.171 | 45,677 |
| | Median (Large Firms) | 0.657 | 0.130 | 0.229 | 0.082 | |
| | Mean (SMEs) | 0.671 | 0.235 | 0.320 | 0.112 | 1,814,254 |
| | Median (SMEs) | 0.669 | 0.196 | 0.274 | 0.040 | |
| United Kingdom | Mean (Large Firms) | **0.707** | 0.067 | **0.312** | **0.324** | 65,113 |
| | Median (Large Firms) | 0.706 | 0.018 | 0.222 | 0.182 | |
| | Mean (SMEs) | 0.745 | 0.133 | 0.335 | 0.258 | 299,497 |
| | Median (SMEs) | 0.665 | 0.076 | 0.250 | 0.095 | |
| Italy | Mean (Large Firms) | 0.658 | 0.163 | 0.303 | 0.191 | 59,618 |
| | Median (Large Firms) | 0.709 | 0.123 | 0.260 | 0.127 | |
| | Mean (SMEs) | **0.773** | **0.240** | **0.343** | 0.191 | 2,111,288 |
| | Median (SMEs) | 0.841 | 0.188 | 0.292 | 0.123 | |
| Portugal | Mean (Large Firms) | 0.693 | 0.127 | 0.247 | 0.313 | 8,409 |
| | Median (Large Firms) | 0.710 | 0.066 | 0.188 | 0.226 | |
| | Mean (SMEs) | 0.723 | 0.210 | 0.248 | **0.262** | 230,301 |
| | Median (SMEs) | 0.730 | 0.168 | 0.200 | 0.194 | |

Table 6: Sources of Finance for Active and Defaulted SMEs and Large Firms

This table displays the summary statistics for the variables representing the alternative sources of finance for active and defaulted SMEs and large firms. LEVERAGE is the ratio of total liabilities to total assets, TRADE is the ratio of trade payables to total assets, CURRENT is the ratio of current liabilities (minus trade payables) to total assets, NONCURRENT is the ratio of non-current liabilities to total assets. Panel B reports the difference between median values of active and defaulted SMEs and large firms, statistical significance is calculated with the Wilcoxon test. The number of *Active* large corporations firm-year observations is 234,298. The number of *Insolvent* and *Bankrupt* large corporations firm-year observations is 3,123. The number of *Active* SMEs firm-year observations is 5,838,140. The number of *Insolvent* and *Bankrupt* SMEs firm-year observations is 136,603. *** p<0.01, ** p<0.05, * p<0.1

| Panel A | | | | | |
|---|---|---|---|---|---|
| | Mean | Median | St. Dev. | Min | Max |
| | | Active Large | | | |
| LEVERAGE | 0.660 | 0.688 | 0.316 | 0.004 | 4.427 |
| TRADE | 0.124 | 0.066 | 0.154 | 0.000 | 0.918 |
| CURRENT | 0.290 | 0.224 | 0.249 | 0.000 | 1.922 |
| NONCURRENT | 0.243 | 0.132 | 0.281 | 0.000 | 2.584 |
| | | Defaulted Large | | | |
| LEVERAGE | 0.874 | 0.902 | 0.414 | 0.004 | 4.427 |
| TRADE | 0.124 | 0.054 | 0.173 | 0.000 | 0.918 |
| CURRENT | 0.375 | 0.304 | 0.316 | 0.000 | 1.922 |
| NONCURRENT | 0.369 | 0.264 | 0.370 | 0.000 | 2.584 |
| | | Active SMEs | | | |
| LEVERAGE | 0.704 | 0.734 | 0.299 | 0.004 | 4.427 |
| TRADE | 0.204 | 0.151 | 0.202 | 0.000 | 0.918 |
| CURRENT | 0.317 | 0.264 | 0.241 | 0.000 | 1.922 |
| NONCURRENT | 0.180 | 0.096 | 0.226 | 0.000 | 2.584 |
| | | Defaulted SMEs | | | |
| LEVERAGE | 0.966 | 0.944 | 0.386 | 0.004 | 4.427 |
| TRADE | 0.268 | 0.208 | 0.252 | 0.000 | 0.918 |
| CURRENT | 0.471 | 0.418 | 0.316 | 0.000 | 1.922 |
| NONCURRENT | 0.234 | 0.120 | 0.291 | 0.000 | 2.584 |

| Panel B: Median Differences | | | | |
|---|---|---|---|---|
| | Large Firms | SMEs | SMEs - Large | |
| | Defaulted - Active | Defaulted - Active | Active | Defaulted |
| LEVERAGE | 0.214*** | 0.210*** | 0.046*** | 0.042*** |
| TRADE | -0.012*** | 0.057*** | 0.085*** | 0.154*** |
| CURRENT | 0.080*** | 0.154*** | 0.039*** | 0.114*** |
| NONCURRENT | 0.133*** | 0.024*** | -0.036*** | -0.145*** |

## Table 7: Correlations

This table shows the correlations for all independent variables and three dummy variables representing the three firm states (*Active*, *Insolvent* and *Bankrupt*). GDP is the one year GDP growth rate, GOVBOND is the three-month government bond interest rate, SOVCDS is the logarithm of the CDS price of government bonds, NITA is the ratio of net income to total assets, CATA is the ratio of current assets to total assets, AGE is the number of days since incorporation divided by 365, SME is a dummy variable that takes value 1 if a firm's total assets are worth no more than EUR43 million, LEVERAGE is the ratio of total liabilities to total assets, TRADE is the ratio of trade payables to total assets, CURRENT is the ratio of current liabilities (minus trade payables) to total assets, NONCURRENT is the ratio of non-current liabilities to total assets. *** p<0.01, ** p<0.05, * p<0.1

| | Active | Insolvent | Bankrupt | GDP | GOVBOND | SOVCDS | NITA | CATA | AGE | SME | LEVERAGE | TRADE | CURRENT | NONCURRENT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Active | 1 | | | | | | | | | | | | | |
| Insolvent | -0.532*** | 1 | | | | | | | | | | | | |
| Bankrupt | -0.841*** | -0.0103*** | 1 | | | | | | | | | | | |
| GDP | 0.0201*** | -0.00648*** | -0.0196*** | 1 | | | | | | | | | | |
| GOVBOND | 0.00696*** | -0.0234*** | 0.00671*** | 0.00328*** | 1 | | | | | | | | | |
| SOVCDS | -0.0269*** | 0.0297*** | 0.0128*** | -0.486*** | -0.533*** | 1 | | | | | | | | |
| NITA | 0.145*** | -0.0813*** | -0.119*** | 0.0653*** | 0.00389*** | -0.0991*** | 1 | | | | | | | |
| CATA | -0.0249*** | -0.00250*** | 0.0310*** | 0.00442*** | 0.00379*** | -0.0360*** | 0.0973*** | 1 | | | | | | |
| AGE | 0.0256*** | 0.00904*** | -0.0360*** | 0.0117*** | -0.0632*** | 0.0337*** | 0.00209*** | -0.0327*** | 1 | | | | | |
| SME | -0.0126*** | 0.00329*** | 0.0127*** | -0.0180*** | -0.00256*** | 0.0191*** | 0.00897*** | 0.105*** | -0.115*** | 1 | | | | |
| LEVERAGE | -0.128*** | 0.0779*** | 0.101*** | -0.0181*** | 0.0510*** | -0.00647*** | -0.409*** | 0.113*** | -0.226*** | 0.0300*** | 1 | | | |
| TRADE | -0.0467*** | 0.0192*** | 0.0428*** | -0.0499*** | -0.00201*** | 0.0173*** | -0.0842*** | 0.355*** | -0.0839*** | 0.0772*** | 0.304*** | 1 | | |
| CURRENT | -0.0926*** | 0.0446*** | 0.0808*** | 0.0451*** | 0.0419*** | -0.0789*** | -0.201*** | 0.161*** | -0.129*** | 0.0234*** | 0.529*** | -0.193*** | 1 | |
| NONCURRENT | -0.0354*** | 0.0418*** | 0.0151*** | -0.0313*** | 0.0259*** | 0.0635*** | -0.227*** | -0.331*** | -0.0825*** | -0.0528*** | 0.426*** | -0.266*** | -0.204*** | 1 |

Table 8: Default Probability: Regression Results

This table reports the estimated coefficients of logit regressions and their robust standard errors clustered at firm level (in parenthesis). The bottom of the table reports the number of observations, number of clusters (i.e. firms), McFadden's R squared and percentages of observations correctly classified. The dependent variable takes value 0 if the firm is *Active* and value 1 if it is either *Insolvent* or *Bankrupt*. GDP is the one year GDP growth rate, GOVBOND is the three-month government bond interest rate, SOVCDS is the logarithm of the CDS price of government bonds, NITA is the ratio of net income to total assets, CATA is the ratio of current assets to total assets, AGE is the number of days since incorporation divided by 365, SME is a dummy variable that takes value 1 if a firm's total assets are worth no more than EUR43 million, LEVERAGE is the ratio of total liabilities to total assets, TRADE is the ratio of trade payables to total assets, CURRENT is the ratio of current liabilities (minus trade payables) to total assets, NONCURRENT is the ratio of non-current liabilities to total assets. Independent variables are lagged. *** p<0.01, ** p<0.05, * p<0.1

| Specification | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| LEVERAGE | 0.942*** | 0.735*** | | |
| | (0.017) | (0.056) | | |
| LEVERAGE*SME | | 0.213*** | | |
| | | (0.057) | | |
| TRADE | | | 1.728*** | 0.695*** |
| | | | (0.020) | (0.170) |
| TRADE*SME | | | | 1.047*** |
| | | | | (0.170) |
| CURRENT | | | 1.701*** | 1.027*** |
| | | | (0.017) | (0.079) |
| CURRENT*SME | | | | 0.695*** |
| | | | | (0.080) |
| NONCURRENT | | | 0.776*** | 1.055*** |
| | | | (0.022) | (0.068) |
| NONCURRENT*SME | | | | -0.294*** |
| | | | | (0.070) |
| SME | 0.324*** | 0.145*** | 0.316*** | -0.017 |
| | (0.026) | (0.050) | (0.026) | (0.059) |
| GDP | -0.014*** | -0.014*** | -0.015*** | -0.015*** |
| | (0.001) | (0.001) | (0.001) | (0.001) |
| GOVBOND | 0.046*** | 0.046*** | 0.046*** | 0.046*** |
| | (0.002) | (0.002) | (0.002) | (0.002) |
| SOVCDS | 0.157*** | 0.157*** | 0.164*** | 0.164*** |
| | (0.003) | (0.003) | (0.003) | (0.003) |
| NITA | -3.886*** | -3.884*** | -3.313*** | -3.309*** |
| | (0.027) | (0.027) | (0.028) | (0.028) |
| CATA | 0.446*** | 0.447*** | 0.125*** | 0.132*** |
| | (0.015) | (0.015) | (0.017) | (0.017) |
| AGE | -0.007*** | -0.007*** | -0.005*** | -0.005*** |
| | (0.000) | (0.000) | (0.000) | (0.000) |
| Constant | -5.908*** | -5.735*** | -6.153*** | -5.836*** |
| | (0.053) | (0.065) | (0.053) | (0.073) |
| Observations | 6,212,164 | 6,212,164 | 6,212,164 | 6,212,164 |
| Country FE | YES | YES | YES | YES |
| Industry FE | YES | YES | YES | YES |
| Clusters | 939,075 | 939,075 | 939,075 | 939,075 |
| Pseudo-$R^2$ | 0.0932 | 0.0932 | 0.105 | 0.105 |
| % *Insolvent* and *Bankrupt* correctly classified | 68.757% | 68.745% | 69.323% | 69.273% |
| % *Active* correctly classified | 69.550% | 69.585% | 69.959% | 70.027% |

Table 9: Default Probability: Average Marginal Effects

Panel A of this table reports average marginal effects of LEVERAGE, TRADE, CURRENT and NONCURRENT for both SMEs as well as large corporations. Standard errors are reported in parenthesis. Standard errors of marginal effects are calculated with the delta method. LEVERAGE is the ratio of total liabilities to total assets, TRADE is the ratio of trade payables to total assets, CURRENT is the ratio of current liabilities (minus trade payables) to total assets, NONCURRENT is the ratio of non-current liabilities to total assets. Average marginal effects of LEVERAGE are computed using specification (2) of Table 8. Average marginal effects of TRADE, CURRENT and NONCURRENT are computed using specification (4) of Table 8. Panel B reports differences of average marginal effects between SMEs and large firms, statistical significance is calculated with the Wald test.

| | LEVERAGE | TRADE | CURRENT | NONCURRENT | N observations |
|---|---|---|---|---|---|
| | | | Panel A | | |
| Large Firms | 0.012*** | 0.010*** | 0.014*** | 0.015*** | 237,421 |
| | (0.001) | (0.003) | (0.001) | (0.001) | |
| SMEs | 0.020*** | 0.036*** | 0.036*** | 0.016*** | 5,974,743 |
| | (0.000) | (0.000) | (0.000) | (0.000) | |
| | | | Panel B: SMEs - Large Firms | | |
| | 0.008*** | 0.026*** | 0.022*** | 0.001 | |

Table 10: Predicted Default Probabilities

This table reports average predicted probabilities of default in percentages computed using specification (4) of Table 8. Predicted probabilities are sorted for different quartiles of LEVERAGE, TRADE, CURRENT and NONCURRENT. LEVERAGE is the ratio of total liabilities to total assets, TRADE is the ratio of trade payables to total assets, CURRENT is the ratio of current liabilities (minus trade payables) to total assets, NONCURRENT is the ratio of non-current liabilities to total assets. The last column reports a Wald test on the difference between means of the fourth and the first quartile. The number of Recovered large corporations firm-year observations is 17. The number of *Insolvent* and *Bankrupt* large corporations firm-year observations is 494. The number of Recovered SMEs firm-year observations is 313. The number of *Insolvent* and *Bankrupt* SMEs firm-year observations is 167,794. *** p<0.01, ** p<0.05, * p<0.1

| | First Quartile | Second Quartile | Third Quartile | Fourth Quartile | ΔFourth - First |
|---|---|---|---|---|---|
| | | | LEVERAGE | | |
| All Sample | 0.98*** | 1.58*** | 2.18*** | 4.26*** | 3.28*** |
| Large Firms | 0.68*** | 0.98*** | 1.31*** | 2.29*** | 1.61*** |
| SMEs | 0.99*** | 1.61*** | 2.22*** | 4.33*** | 3.34*** |
| | | | TRADE | | |
| All Sample | 1.86*** | 1.79*** | 2.15*** | 3.19*** | 1.32*** |
| Large Firms | 1.38*** | 1.28*** | 1.28*** | 1.32*** | -0.06*** |
| SMEs | 1.89*** | 1.82*** | 2.19*** | 3.24*** | 1.35*** |
| | | | CURRENT | | |
| All Sample | 1.43*** | 1.68*** | 2.09*** | 3.80*** | 2.38*** |
| Large Firms | 1.09*** | 1.11*** | 1.25*** | 1.81*** | 0.72*** |
| SMEs | 1.44*** | 1.70*** | 2.12*** | 3.88*** | 2.43*** |
| | | | NONCURRENT | | |
| All Sample | 2.25*** | 2.13*** | 2.10*** | 2.51*** | 0.26*** |
| Large Firms | 1.01*** | 1.10*** | 1.22*** | 1.93*** | 0.91*** |
| SMEs | 2.29*** | 2.17*** | 2.14*** | 2.55*** | 0.25*** |

Table 11: Sources of Finance for Recovered and Defaulted SMEs and Large Firms

This table displays the summary statistics for the variables representing the alternative sources of finance for firms that were *Insolvent* at $t-1$. Panel A reports summary statistics for recovered and defaulted SMEs and large firms. LEVERAGE is the ratio of total liabilities to total assets, TRADE is the ratio of trade payables to total assets, CURRENT is the ratio of current liabilities (minus trade payables) to total assets, NONCURRENT is the ratio of non-current liabilities to total assets. Panel B reports the difference between median values of active and defaulted SMEs and large firms, statistical significance is calculated with the Wilcoxon test. The number of Recovered large corporations firm-year observations is 17. The number of *Insolvent* and *Bankrupt* large corporations firm-year observations is 494. The number of Recovered SMEs firm-year observations is 313. The number of *Insolvent* and *Bankrupt* SMEs firm-year observations is 16,794.*** p<0.01, ** p<0.05, * p<0.1

| Panel A | | | | | |
|---|---|---|---|---|---|
| | Mean | Median | St. Dev. | Min | Max |
| | | Recovered Large | | | |
| LEVERAGE | 1.092 | 1.055 | 0.328 | 0.584 | 1.578 |
| TRADE | 0.049 | 0.016 | 0.076 | 0.000 | 0.280 |
| CURRENT | 0.513 | 0.495 | 0.384 | 0.009 | 1.022 |
| NONCURRENT | 0.435 | 0.300 | 0.370 | 0.003 | 1.003 |
| | | Defaulted Large | | | |
| LEVERAGE | 0.946 | 0.917 | 0.317 | 0.004 | 2.169 |
| TRADE | 0.109 | 0.041 | 0.166 | 0.000 | 0.918 |
| CURRENT | 0.409 | 0.354 | 0.313 | 0.000 | 1.164 |
| NONCURRENT | 0.429 | 0.402 | 0.320 | 0.000 | 1.847 |
| | | Recovered SMEs | | | |
| LEVERAGE | 1.061 | 0.986 | 0.338 | 0.158 | 1.883 |
| TRADE | 0.175 | 0.096 | 0.209 | 0.000 | 0.893 |
| CURRENT | 0.395 | 0.321 | 0.316 | 0.002 | 1.216 |
| NONCURRENT | 0.469 | 0.430 | 0.336 | 0.000 | 1.003 |
| | | Defaulted SMEs | | | |
| LEVERAGE | 1.055 | 0.971 | 0.385 | 0.031 | 4.427 |
| TRADE | 0.249 | 0.181 | 0.236 | 0.000 | 0.918 |
| CURRENT | 0.471 | 0.396 | 0.336 | 0.000 | 1.922 |
| NONCURRENT | 0.344 | 0.273 | 0.304 | 0.000 | 2.584 |

| Panel B: Comparisons | | | | |
|---|---|---|---|---|
| | Large Firms | SMEs | SMEs - Large | |
| | Defaulted - Recovered | Defaulted - Recovered | Recovered | Defaulted |
| LEVERAGE | -0.138* | -0.015 | -0.069 | 0.054*** |
| TRADE | 0.025* | 0.085*** | 0.080*** | 0.140*** |
| CURRENT | -0.141 | 0.074*** | -0.174 | 0.042*** |
| NONCURRENT | 0.103 | -0.158*** | 0.131 | -0.130*** |

Table 12: Recovery Probability for SMEs: Regression Results

This table reports the estimated coefficients of logit regressions and their robust standard errors clustered at firm level (in parenthesis). The bottom of the table reports the number of observations, number of clusters (i.e. firms), McFadden's R squared and percentages of observations correctly classified. The dependent variable takes value 0 if the firm is either *Insolvent* or *Bankrupt* and value 1 if it is *Active*. The regression is estimated on the sub-sample of SMEs that were *Insolvent* at $t-1$. GDP is the one year GDP growth rate, GOVBOND is the three-month government bond interest rate, SOVCDS is the logarithm of the CDS price of government bonds, NITA is the ratio of net income to total assets, CATA is the ratio of current assets to total assets, AGE is the number of days since incorporation divided by 365, SME is a dummy variable that takes value 1 if a firm's total assets are worth no more than EUR43 million, LEVERAGE is the ratio of total liabilities to total assets, TRADE is the ratio of trade payables to total assets, CURRENT is the ratio of current liabilities (minus trade payables) to total assets, NONCURRENT is the ratio of non-current liabilities to total assets. Independent variables are lagged. *** p<0.01, ** p<0.05, * p<0.1

| Specification | (1) | (2) |
|---|---|---|
| LEVERAGE | 0.786*** | |
| | (0.215) | |
| TRADE | | 0.579 |
| | | (0.395) |
| CURRENT | | 0.157 |
| | | (0.254) |
| NONCURRENT | | 0.877*** |
| | | (0.242) |
| GDP | 0.304*** | 0.303*** |
| | (0.049) | (0.049) |
| GOVBOND | -1.004*** | -1.024*** |
| | (0.166) | (0.169) |
| SOVCDS | 1.419*** | 1.402*** |
| | (0.154) | (0.154) |
| NITA | -0.208 | -0.635 |
| | (0.460) | (0.483) |
| CATA | -1.098*** | -0.914*** |
| | (0.225) | (0.238) |
| AGE | 0.018*** | 0.018*** |
| | (0.005) | (0.005) |
| Constant | -2.106*** | -1.841*** |
| | (0.499) | (0.459) |
| Observations | 14,395 | 14,395 |
| Country FE | YES | YES |
| Industry FE | YES | YES |
| Clusters | 5,027 | 5,027 |
| Pseudo-$R^2$ | 0.359 | 0.359 |
| % *Insolvent* and *Bankrupt* correctly classified | 80.349% | 80.356% |
| % *Active* correctly classified | 92.121% | 92.121% |

Table 13: Predicted Recovery Probabilities for SMEs

This table reports average predicted probabilities of recovery in percentages for SMEs computed using specification (2) of Table 12. Predicted probabilities of recovery are sorted for different quartiles of LEVERAGE, TRADE, CURRENT and NONCURRENT. LEVERAGE is the ratio of total liabilities to total assets, TRADE is the ratio of trade payables to total assets, CURRENT is the ratio of current liabilities (minus trade payables) to total assets, NONCURRENT is the ratio of non-current liabilities to total assets. The last column reports a Wald test on the difference between means of the fourth and the first quartile. *** p<0.01, ** p<0.05, * p<0.1

| First Quartile | Second Quartile | Third Quartile | Fourth Quartile | ΔFourth - First |
|---|---|---|---|---|
| | | LEVERAGE | | |
| 2.02*** | 2.01*** | 2.34*** | 2.33*** | 0.31** |
| | | TRADE | | |
| 3.52*** | 1.98*** | 1.67*** | 1.52*** | -1.99*** |
| | | CURRENT | | |
| 2.90*** | 2.11*** | 1.97*** | 1.71*** | -1.19*** |
| | | NONCURRENT | | |
| 0.94*** | 1.93*** | 2.65*** | 2.55*** | 3.18*** |

Table 14: Basel III Capital Requirements

This table reports Basel III capital requirements when default probabilities are estimated with specification (4) in Table 8. "Low leverage" firms belong to the first decile of our sample ranked according to leverage, while "High leverage" firms belong to the tenth decile. SME regulatory capital is estimated while keeping correlation the same as per large firms. SME (5M) denotes SME capital levels estimated by assuming annual sales below 5 million Euros. Details of the regulatory capital calculations are shown in Appendix C. We report capital levels in Panel A and differences in Panel B. All figures are in percent.

| Panel A | | | | | | |
|---|---|---|---|---|---|---|
| | Low Leverage | | | High Leverage | | |
| | Large | SME | SME(5M) | Large | SMEs | SME(5M) |
| PD | 0.62 | 0.78 | 0.78 | 3.14 | 6.68 | 6.68 |
| Total Capital | 2.13 | 2.39 | 1.88 | 4.08 | 5.42 | 4.06 |

| Panel B: Differences | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Low Leverage | | High leverage | | High - Low | | |
| | SME - Large | SME(5M) - Large | SME - Large | SME(5M) - Large | Large | SME | SME(5M) |
| PD | 0.16 | 0.16 | 3.54 | 3.54 | 2.53 | 5.90 | 5.90 |
| Total Capital | 0.26 | -0.25 | 1.34 | -0.02 | 1.95 | 3.03 | 2.18 |

Table 15: Loan Spreads

This table reports loan spreads when default probabilities are estimated with specification (4) in Table 8. "Low leverage" firms belong to the first decile of our sample ranked according to leverage, while "High leverage" firms belong to the tenth decile. SME (5M) denotes SMEs with annual sales below 5 million Euros. PD is the probability of default, $d_{el}$ is the expected loss component of the spread, $d_{ul}$ is the unexpected loss component of the spread, $d_{el} + d_{ul}$ is the total loan spread. All figures are in percent.

| | Low Leverage | | | High Leverage | | | Δ High - Low | |
|---|---|---|---|---|---|---|---|---|
| | Large | SME(5M) | Δ | Large | SME(5M) | Δ | Large | SME(5M) |
| PD | 0.62 | 0.78 | 0.16 | 3.14 | 6.68 | 3.54 | 2.53 | 5.90 |
| $d_{el}$ | 0.12 | 0.15 | 0.03 | 0.61 | 1.31 | 0.70 | 0.49 | 1.16 |
| $d_{ul}$ | 0.29 | 0.26 | -0.03 | 0.56 | 0.56 | 0.00 | 0.27 | 0.30 |
| $d_{el} + d_{ul}$ | 0.41 | 0.41 | 0.00 | 1.17 | 1.88 | 0.70 | 0.76 | 1.47 |

Figure 1: Marginal Effects of Leverage

This figure presents plots of marginal effects of LEVERAGE for both large corporations and SMEs computed with specification (2) in Table 8. Vertical lines highlight average values of LEVERAGE for large corporations (dash-dotted line) and SMEs (solid line). LEVERAGE is the ratio of total liabilities to total assets. Confidence intervals are at 99%.

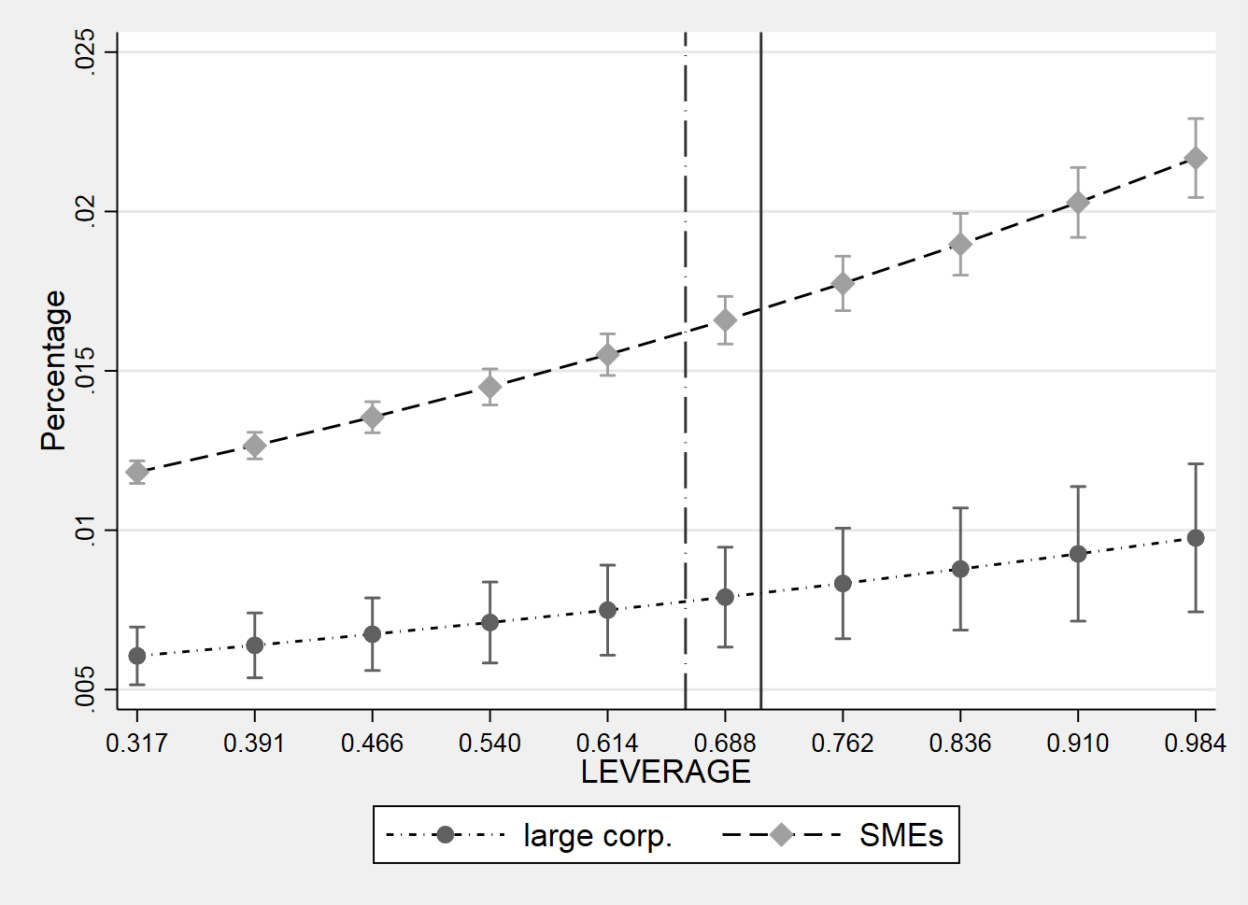
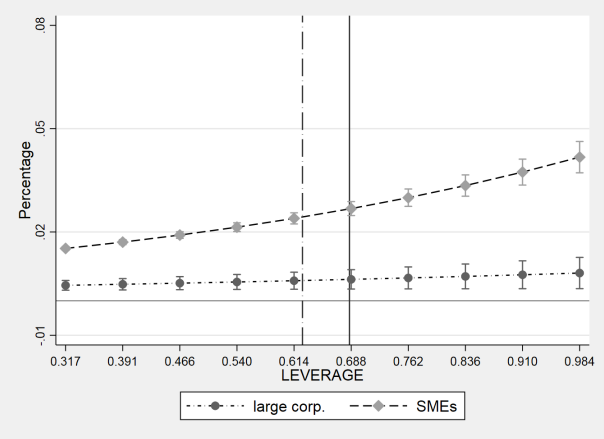


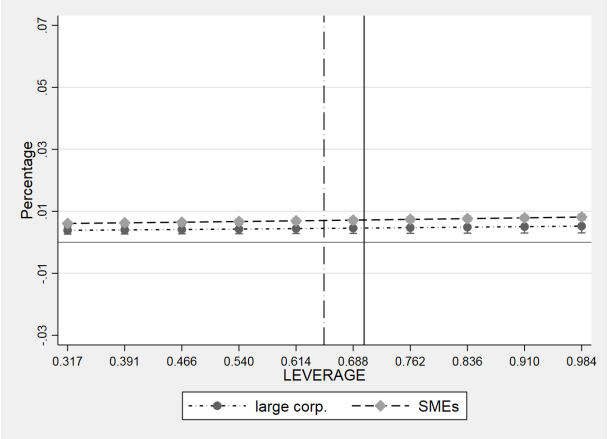
Figure 2: Marginal Effects of Leverage Across Sectors

This figure presents the marginal effects of LEVERAGE for both large corporations and SMEs for different sectors computed with specification (2) in Table 8. Vertical lines highlight average values of LEVERAGE for large corporations (dash-dotted line) and SMEs (solid line). LEVERAGE is the ratio of total liabilities to total assets. Confidence intervals are at 99%.

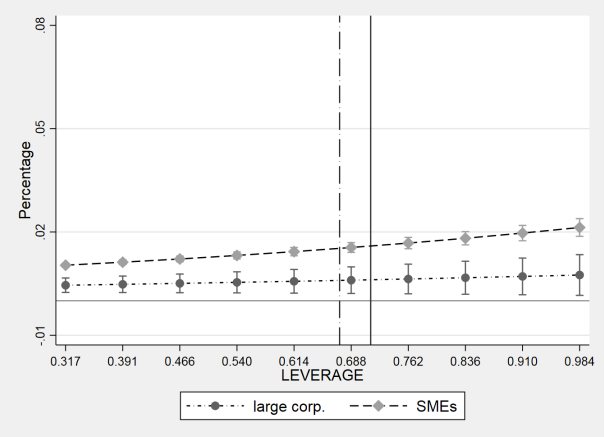
(a) Production



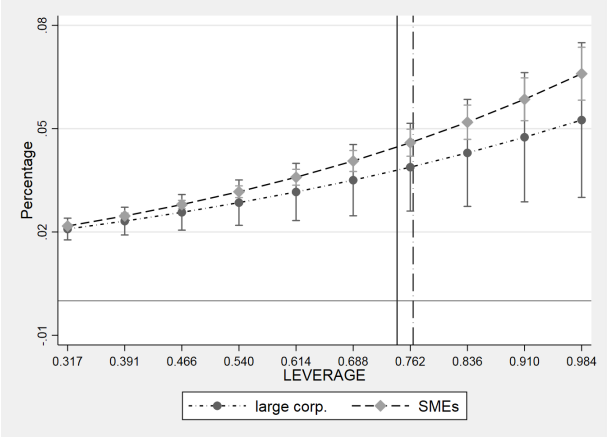

(b) Services




(c) Retail




(d) Construction




(e) Transportation

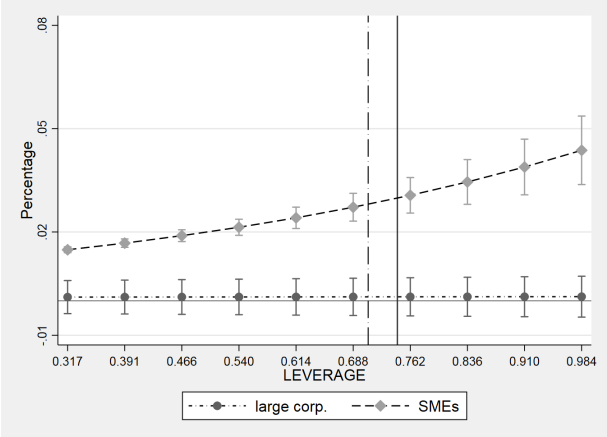
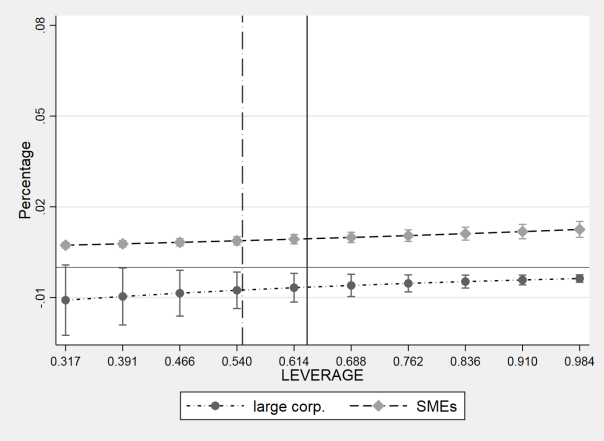


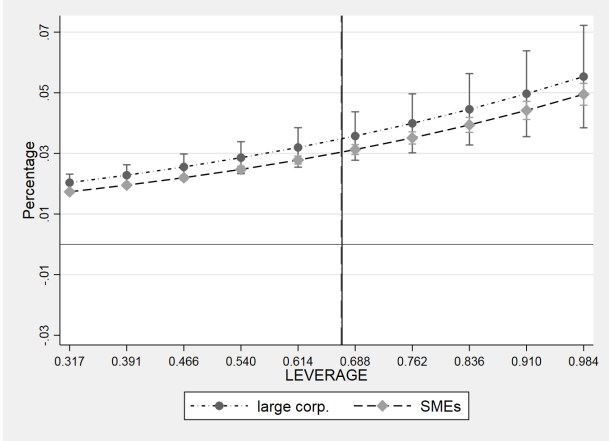
Figure 3: Marginal Effects of Leverage Across Countries

This figure presents the marginal effects of LEVERAGE for both large corporations and SMEs for different countries computed with specification (2) in Table 8. Vertical lines highlight average values of LEVERAGE for large corporations (dash-dotted line) and SMEs (solid line). LEVERAGE is the ratio of total liabilities to total assets. Confidence intervals are at 99%.

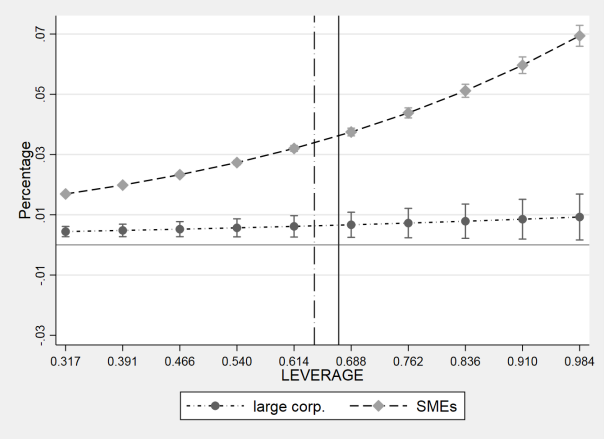
(a) Belgium



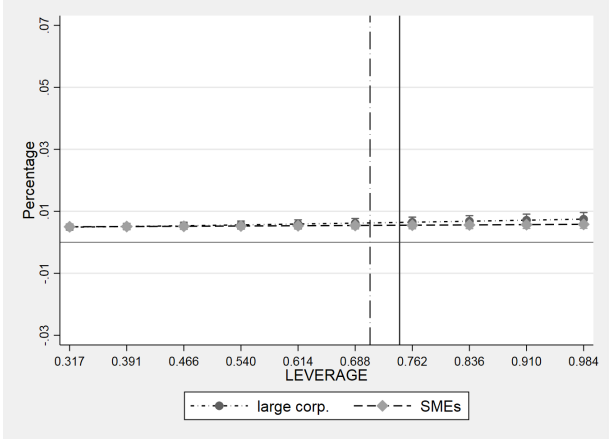

(b) Spain



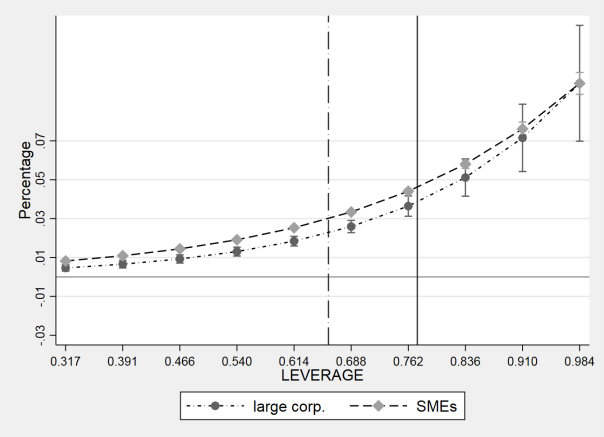

(c) France




(d) United Kingdom




(e) Italy




(f) Portugal

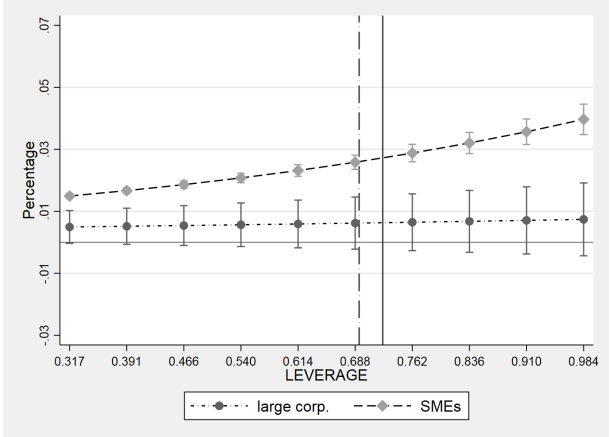
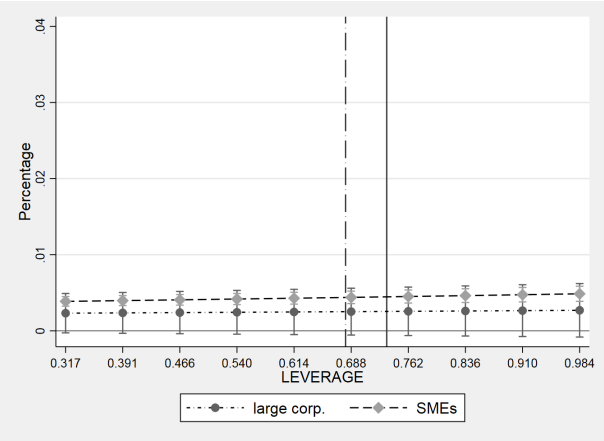


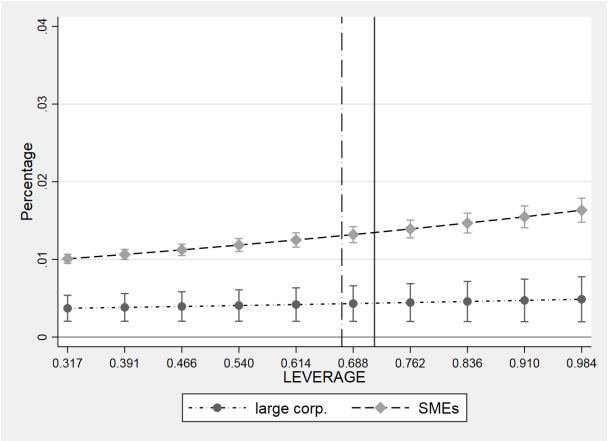
Figure 4: Marginal Effects of Leverage Over Time

This figure presents the marginal effects of LEVERAGE for both large corporations and SMEs for two different time periods computed with specification (2) in Table 8. Vertical lines highlight average values of LEVERAGE for large corporations (dash-dotted line) and SMEs (solid line). LEVERAGE is the ratio of total liabilities to total assets. Confidence intervals are at 99%.

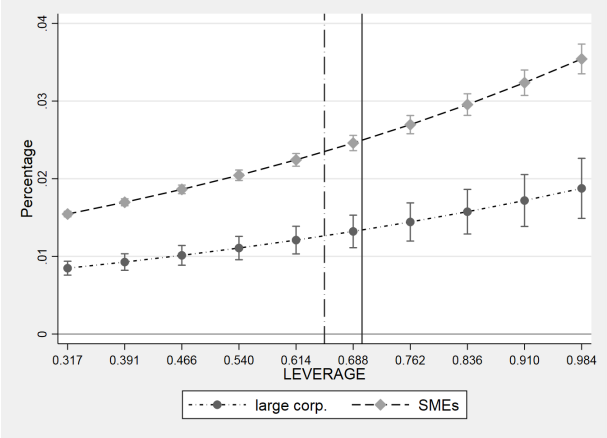
(a) 2005-2006




(b) 2007-2009




(c) 2010-2014



# Appendices

## A Additional Tables

Table A.1: Definition of Status Field

This table reports definitions of Orbis *"status"* field. We define firm-year observations as *Active* if *"status"* is *"Active"*, as *Insolvent* if *"status"* is *"Active default of payment"*, *"Active rescue plan"*, *"Active insolvency proceedings"*, as *Bankrupt* if *"status"* is *"Bankruptcy"*, *"In liquidation"*, *"Dissolved"*.

| Orbis Definition of Status | Description |
|---|---|
| Active | The company has not defaulted. |
| Active default of payment | The company has defaulted but it is still a going concern. |
| Active rescue plan | The company is active, has not defaulted but sought protection from its creditors to have time to reorganise. There are no formal insolvency proceedings. Typical in France (Procedure de sauvegarde"). |
| Active insolvency proceedings | The company is insolvent but is still active. Similar to Chapter 11 in the US. |
| Bankruptcy | The company is declared bankrupt. |
| In liquidation | The company is under liquidation, not necessarily because of bankruptcy. A company may be liquidated due to voluntary dissolution for instance. |
| Dissolved | The company has been liquidated and no longer exists as a legal entity. |

## Table A.2: Industries

This table reports the number of firm-year observations in each industry for each country in the sample. Percentages are reported in parenthesis.

| | Overall Sample | | Belgium | | Spain | | France | | United Kingdom | | Italy | | Portugal | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | (%) | N | (%) | N | (%) | N | (%) | N | (%) | N | (%) | N | (%) |
| Agriculture, forestry and fishing | 129,664 | 2.09 | 7,228 | 1.68 | 39,126 | 3.41 | 21,905 | 1.18 | 5,083 | 1.39 | 48,727 | 2.24 | 7,595 | 3.18 |
| Mining and quarrying | 29,584 | 0.48 | 1,160 | 0.27 | 7,089 | 0.62 | 6,825 | 0.37 | 5,019 | 1.38 | 7,925 | 0.37 | 1,566 | 0.66 |
| Manufacturing | 1,304,813 | 21 | 56,354 | 13.1 | 223,076 | 19.44 | 287,981 | 15.48 | 72,326 | 19.84 | 602,680 | 27.76 | 62,396 | 26.14 |
| Electricity, gas, steam and air conditioning supply | 58,579 | 0.94 | 1,860 | 0.43 | 12,550 | 1.09 | 12,190 | 0.66 | 3,326 | 0.91 | 26,414 | 1.22 | 2,239 | 0.94 |
| Water supply; sewerage, waste management and remediation activities | 56,072 | 0.9 | 3,263 | 0.76 | 7,505 | 0.65 | 14,971 | 0.8 | 3,386 | 0.93 | 24,620 | 1.13 | 2,327 | 0.97 |
| Construction | 997,327 | 16.05 | 53,062 | 12.33 | 238,143 | 20.75 | 285,889 | 15.37 | 38,760 | 10.63 | 348,072 | 16.03 | 33,401 | 13.99 |
| Wholesale and retail trade; repair of motor vehicles and motorcycles | 1,743,338 | 28.06 | 118,849 | 27.62 | 315,867 | 27.52 | 633,649 | 34.07 | 57,180 | 15.68 | 544,230 | 25.07 | 73,563 | 30.82 |
| Transportation and storage | 321,435 | 5.17 | 24,711 | 5.74 | 63,080 | 5.5 | 95,269 | 5.12 | 15,768 | 4.32 | 112,199 | 5.17 | 10,408 | 4.36 |
| Accommodation and food service activities | 266,622 | 4.29 | 11,349 | 2.64 | 52,927 | 4.61 | 91,573 | 4.92 | 15,894 | 4.36 | 82,173 | 3.79 | 12,706 | 5.32 |
| Information and communication | 201,955 | 3.25 | 13,985 | 3.25 | 26,127 | 2.28 | 69,090 | 3.71 | 21,260 | 5.83 | 67,018 | 3.09 | 4,475 | 1.87 |
| Professional, scientific and technical activities | 456,590 | 7.35 | 66,520 | 15.46 | 62,129 | 5.41 | 163,448 | 8.79 | 34,925 | 9.58 | 120,009 | 5.53 | 9,559 | 4 |
| Administrative and support service activities | 298,963 | 4.81 | 25,884 | 6.02 | 42,960 | 3.74 | 93,714 | 5.04 | 40,818 | 11.19 | 87,519 | 4.03 | 8,068 | 3.38 |
| Education | 55,663 | 0.9 | 5,513 | 1.28 | 9,437 | 0.82 | 12,104 | 0.65 | 14,908 | 4.09 | 11,229 | 0.52 | 2,472 | 1.04 |
| Human health and social work activities | 162,541 | 2.62 | 25,487 | 5.92 | 22,628 | 1.97 | 44,066 | 2.37 | 15,154 | 4.16 | 49,867 | 2.3 | 5,339 | 2.24 |
| Arts, entertainment and recreation | 71,919 | 1.16 | 6,006 | 1.4 | 15,015 | 1.31 | 15,601 | 0.84 | 9,181 | 2.52 | 24,376 | 1.12 | 1,740 | 0.73 |
| Other service activities | 57,099 | 0.92 | 9,019 | 2.1 | 10,098 | 0.88 | 11,656 | 0.63 | 11,622 | 3.19 | 13,848 | 0.64 | 856 | 0.36 |
| Total | 6,212,164 | 100 | 430,250 | 100 | 1,147,757 | 100 | 1,859,931 | 100 | 364,610 | 100 | 2,170,906 | 100 | 238,710 | 100 |

Table A.3: Default Probability: Effect of Current Assets

This table reports the estimated coefficients of logit regressions and their robust standard errors clustered at firm level (in parenthesis). The bottom of the table reports the number of observations, number of clusters (i.e. firms), McFadden's R squared and percentages of observations correctly classified. The dependent variable takes value 0 if the firm is *Active* and value 1 if it is either *Insolvent* or *Bankrupt*. GDP is the one year GDP growth rate, GOVBOND is the three-month government bond interest rate, SOVCDS is the logarithm of the CDS price of government bonds, NITA is the ratio of net income to total assets, STOCKTA is the ratio of inventories to total assets, DEBTORSTA is the ratio of trade receivable to total assets, CASHTA is the ratio of cash and cash equivalent to total assets, OTHERCATA is the ratio of all current assets not included in STOCKTA, DEBTORSTA and CASHTA to total assets, AGE is the number of days since incorporation divided by 365, SME is a dummy variable that takes value 1 if a firm's total assets are worth no more than EUR43 million, LEVERAGE is the ratio of total liabilities to total assets. Independent variables are lagged. *** p<0.01, ** p<0.05, * p<0.1

| Specification | (1) |
|---|---|
| LEVERAGE | 0.943*** |
| | (0.018) |
| SME | 0.404*** |
| | (0.027) |
| GDP | -0.011*** |
| | (0.001) |
| GOVBOND | 0.041*** |
| | (0.002) |
| SOVCDS | 0.153*** |
| | (0.003) |
| NITA | -3.942*** |
| | (0.029) |
| STOCKTA | 0.418*** |
| | (0.020) |
| DEBTORSTA | 1.097*** |
| | (0.021) |
| CASHTA | -1.911*** |
| | (0.042) |
| OTHERCATA | 0.735*** |
| | (0.018) |
| AGE | -0.007*** |
| | (0.000) |
| Constant | -5.939*** |
| | (0.054) |
| Observations | 6,041,207 |
| Country FE | YES |
| Industry FE | YES |
| Clusters | 928,766 |
| Pseudo-$R^2$ | 0.103 |

# B Marginal Effects

We calculate the marginal effects of LEVERAGE, TRADE, CURRENT and NON-CURRENT on the probabilities of default, across different levels of the independent variables, as our estimated logistic function, is non-linear in nature. Another reason to calculate marginal effects is that we want to assess the importance of the interaction between sources of finance and SME; but, because of the logistic function, we cannot interpret directly the sign, magnitude and statistical significance of the interaction term (Ai and Norton, 2003).

Marginal effects in specifications (1) and (3), where there is no interaction term with the SME dummy are:

$$\frac{\partial P_t(y_{i,c,j,t+1}=1)}{\partial x} = \beta_x \Phi'(\alpha + \boldsymbol{X_{i,t}}\boldsymbol{\beta} + \boldsymbol{Z_{i,c,t}}\boldsymbol{\delta} + \gamma_c + \gamma_j) \tag{B.1}$$

Marginal effects in specifications (3) and (4), where variables of interest interact with the SME dummy are:

$$\frac{\partial P_t(y_{i,c,j,t+1}=1)}{\partial x} = (\beta_x + \beta_{x\cdot SME} SME)\Phi'(\alpha + \boldsymbol{X_{i,t}}\boldsymbol{\beta} + \boldsymbol{Z_{i,c,t}}\boldsymbol{\delta} + \gamma_c + \gamma_j) \tag{B.2}$$

Where $x$ is the variable of interest under investigation (LEVERAGE, TRADE, CURRENT or NONCURRENT). In non-linear models, independent variables affect marginal effects of the variable of interest. We choose to evaluate marginal effects at the mean values of the two subgroups (SMEs and large corporations).

# C Basel III Formula

In this appendix we report Basel III capital requirements calculations that we employ in sections V.a and V.b.

$$R = 0.12\frac{(1-e^{-50PD})}{(1-e^{-50})} + 0.24\frac{[1-(1-e^{-50PD})]}{(1-e^{-50})} \tag{C.1}$$

$$b = (0.11852 - 0.05478ln(PD))^2 \tag{C.2}$$

$$MA = \frac{1+(M-2.5)b}{1-1.5b} \tag{C.3}$$

$$K = \left[LGD\cdot N\left[\left(\frac{1}{1-R}\right)^{0.5} G(PD) + \left(\frac{R}{1-R}\right)^{0.5} G(0.999)\right] - PD\cdot LGD\right] MA \tag{C.4}$$

$$K = 12.5\cdot K\cdot 1.06\cdot EAD \tag{C.5}$$

Where $R$ stands for correlation, $PD$ is the probability of default, $b$ is a calibrated parameter, $MA$ is the Maturity Adjustment, $M$ is the "effective" maturity of the loan estimated as its Macaulay duration with the discount rate set to zero, $K$ is the capital requirement, $LGD$ is the loss given default, $EAD$ is the exposure at default. $N$ is the normal cumulative function and $G$ is its inverse.

# D Robustness Tests

Figure D.1: Marginal Effects of Leverage Excluding Low Leverage Firms

This figure presents plots of marginal effects of LEVERAGE for both large corporations and SMEs computed with specification (2) in Table 8. We include a LEVERAGE quadratic term and a LEVERAGE quadratic term interacted with SMEs dummy. Vertical lines highlight average values of LEVERAGE for large corporations (dash-dotted line) and SMEs (solid line). LEVERAGE is the ratio of total liabilities to total assets. Confidence intervals are at 99%.

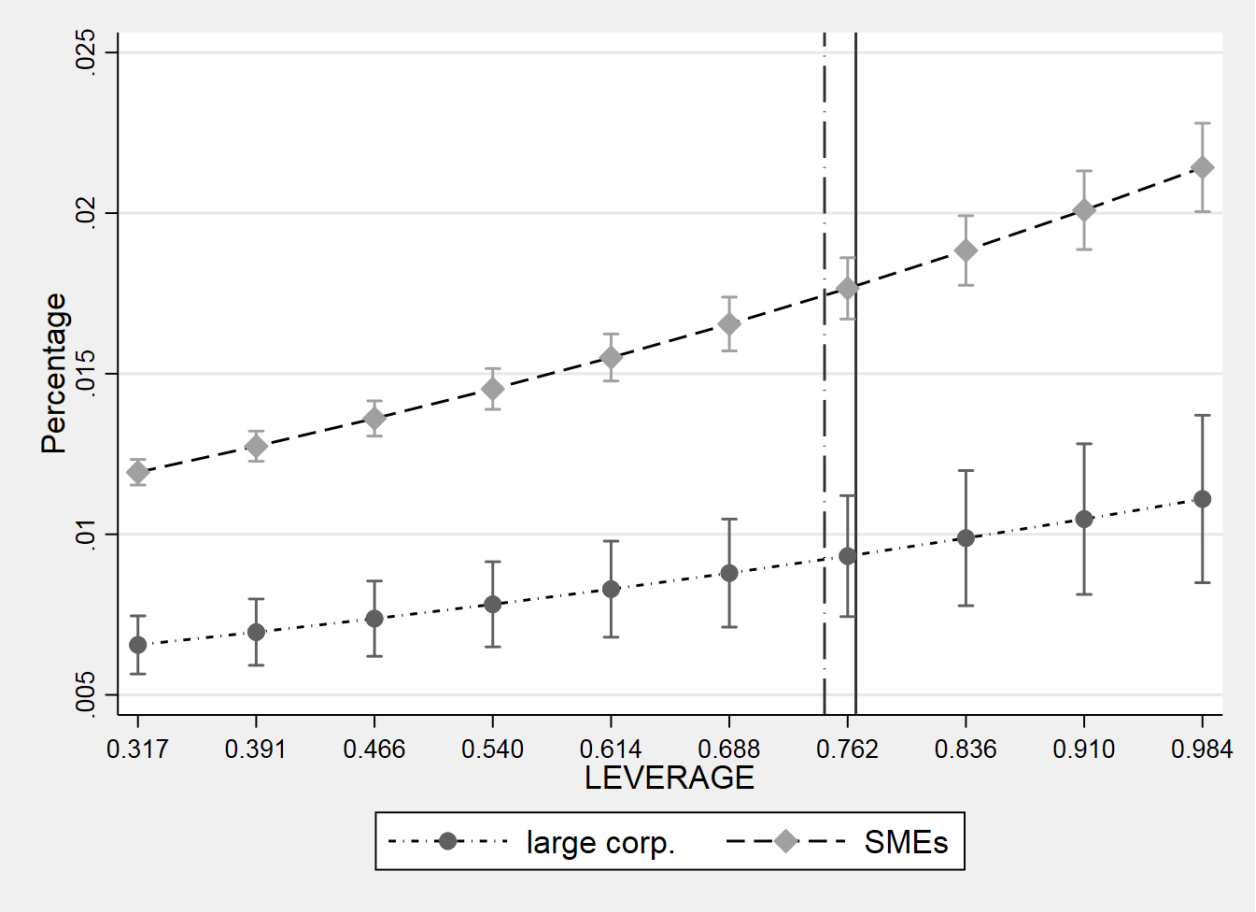


Figure D.2: Marginal Effects of Leverage with Quadratic Term

This figure presents plots of marginal effects of LEVERAGE for both large corporations and SMEs computed with specification (2) in Table 8. We exclude observations in the bottom 10% of the LEVERAGE distribution. Vertical lines highlight average values of LEVERAGE for large corporations (dash-dotted line) and SMEs (solid line). LEVERAGE is the ratio of total liabilities to total assets. Confidence intervals are at 99%.

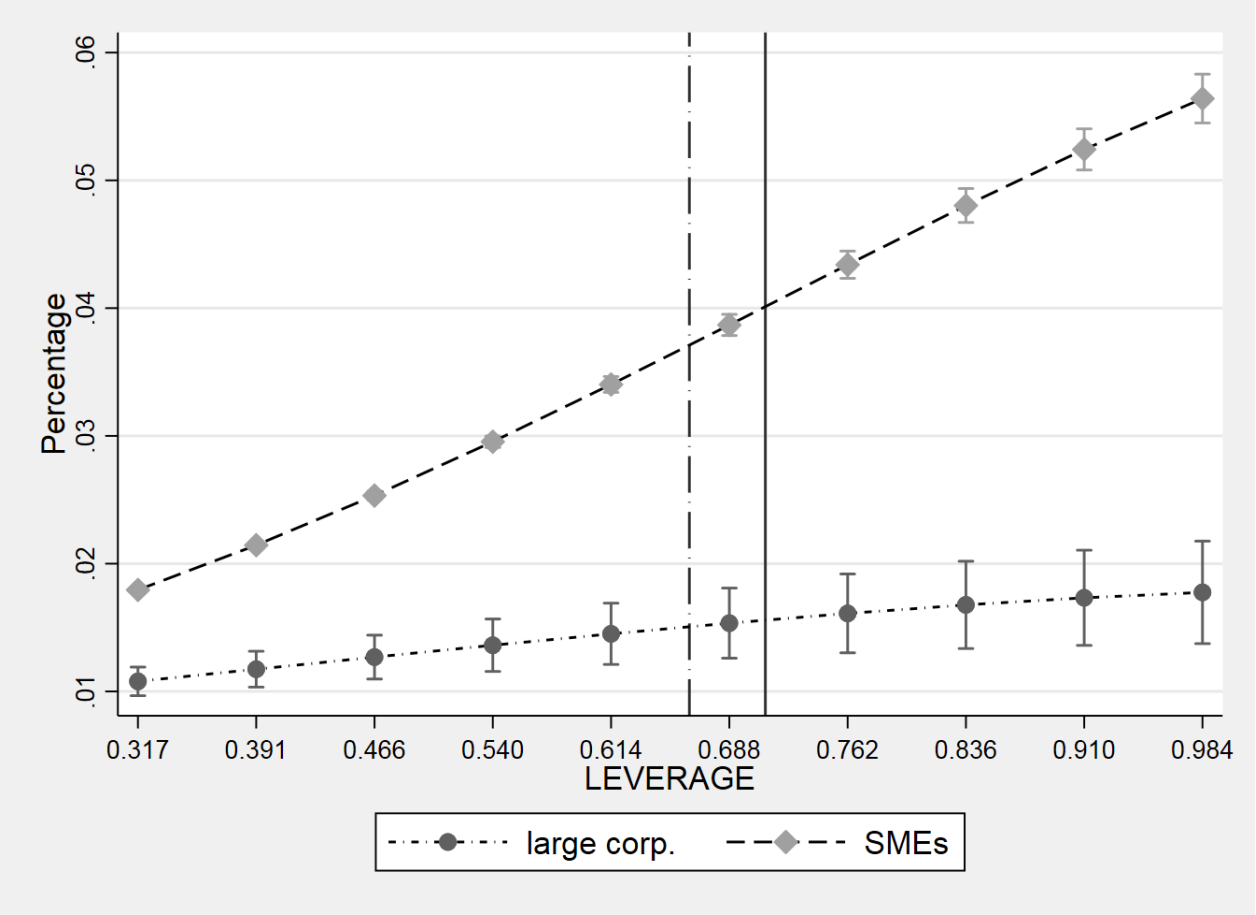
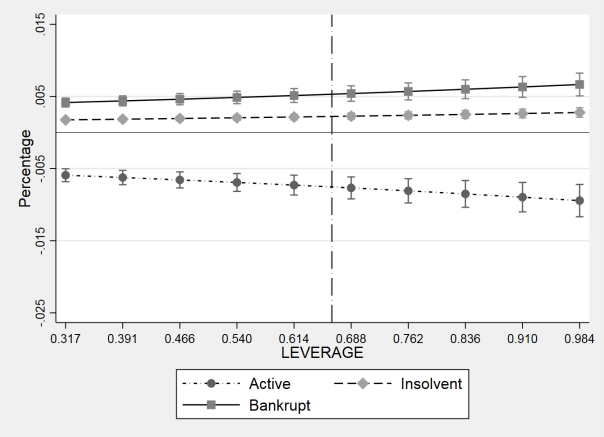


Figure D.3: Marginal Effects of Leverage with Ordered Logit

This figure presents the marginal effects of LEVERAGE for large corporations and SMEs computed with specification (2) in Table 8. The model is an ordered logit which distinguishes *Active*, *Insolvent* and *Bankrupt* observations. Vertical lines highlight average values of LEVERAGE for large corporations (dash-dotted line) and SMEs (solid line). LEVERAGE is the ratio of total liabilities to total assets. Confidence intervals are at 99%.

(a) Large Corporations




(b) SMEs

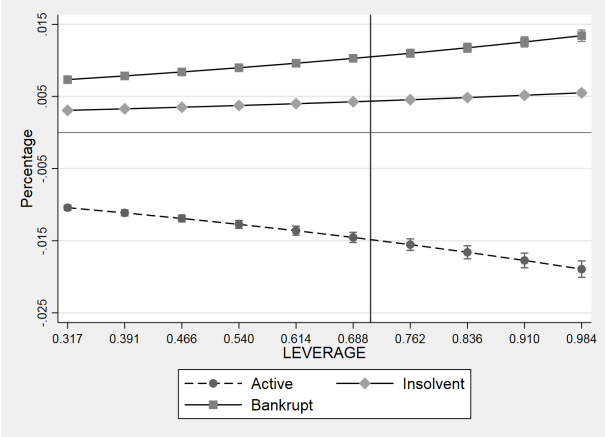


Figure D.4: Marginal Effects of Leverage with EU commission SME definition

This figure presents the marginal effects of LEVERAGE for large corporations and SMEs computed with specification (2) in Table 8. SMEs are defined accordingly with the European Commission definition. LEVERAGE is the ratio of total liabilities to total assets. Vertical lines highlight average values of LEVERAGE for large corporations (dash-dotted lines) and SMEs (solid lines). Confidence intervals are at 99%. Confidence intervals are at 99%.

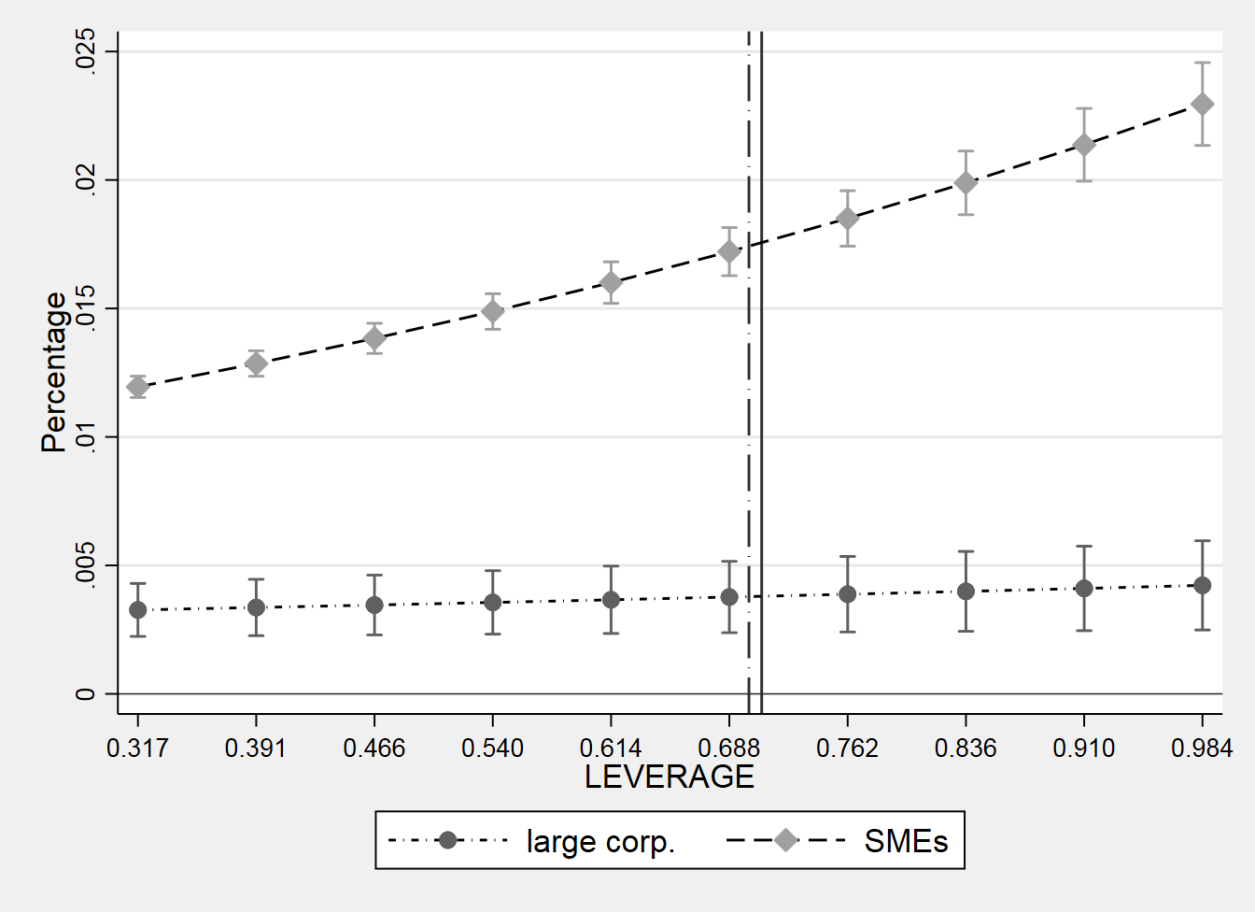


Figure D.5: Marginal Effects of Leverage Excluding Italy

This figure presents the marginal effects of LEVERAGE for large corporations and SMEs computed with specification (2) in Table 8. Observations from Italy are excluded. LEVERAGE is the ratio of total liabilities to total assets. Vertical lines highlight average values of LEVERAGE for large corporations (dash-dotted lines) and SMEs (solid lines). Confidence intervals are at 99%. Confidence intervals are at 99%.

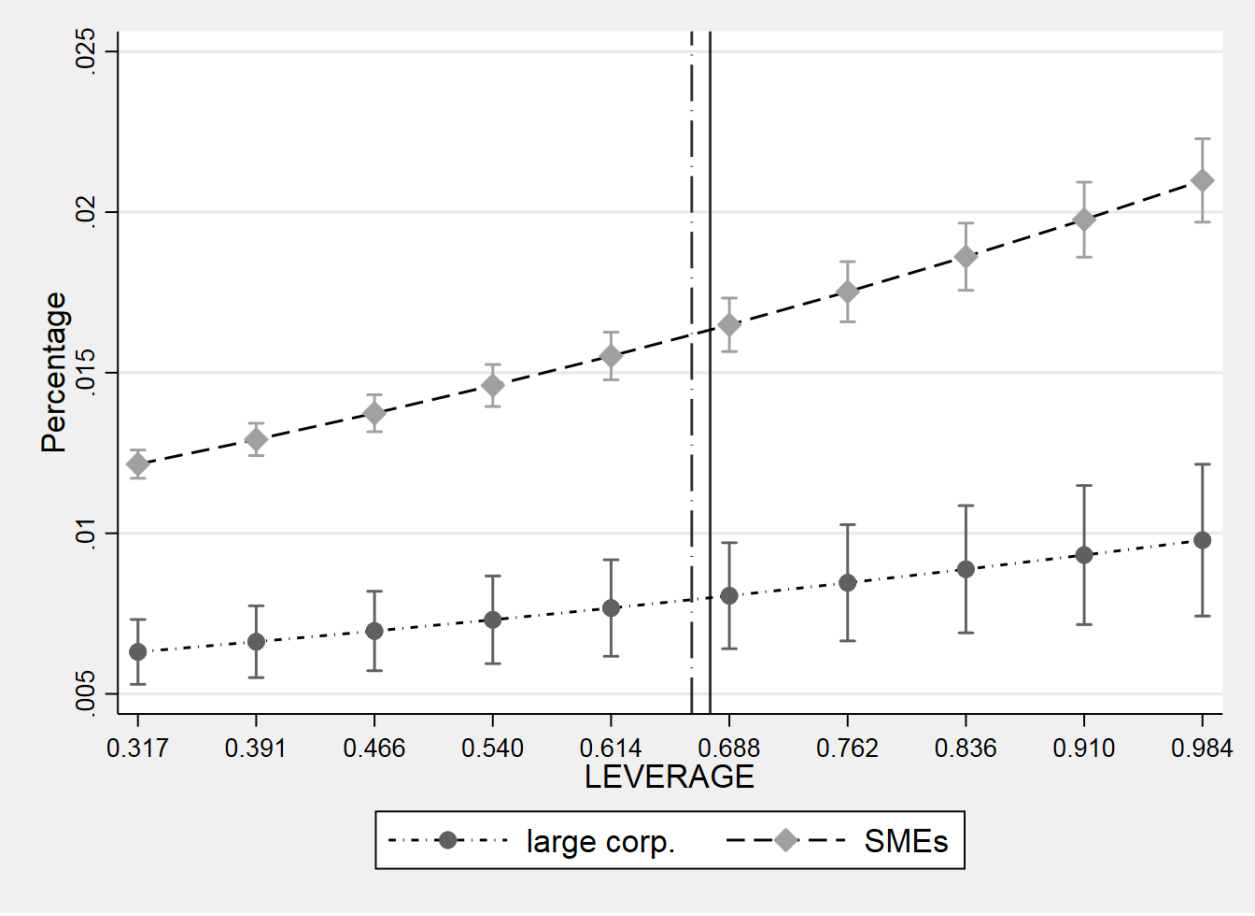


Figure D.6: Marginal Effects of Leverage Excluding Retail

This figure presents the marginal effects of LEVERAGE for large corporations and SMEs computed with specification (2) in Table 8. Observations from retail sector are excluded. SMEs are defined accordingly with the European Commission definition. LEVERAGE is the ratio of total liabilities to total assets. Vertical lines highlight average values of LEVERAGE for large corporations (dash-dotted lines) and SMEs (solid lines). Confidence intervals are at 99%. Confidence intervals are at 99%.

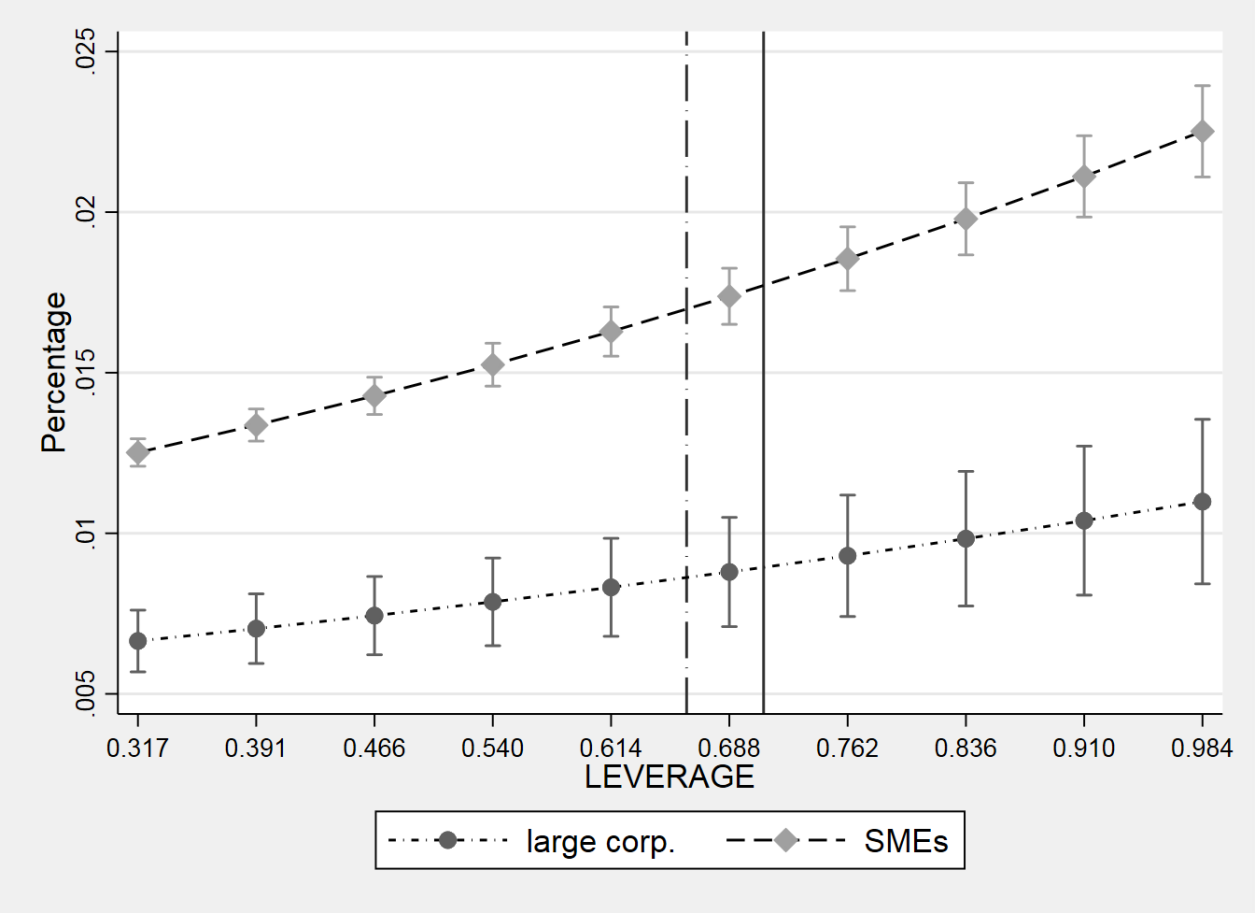


Figure D.7: Marginal Effects of Leverage and Firm Dimension

This figure presents the marginal effects of LEVERAGE for large corporations, medium and small firms computed with specification (2) in Table 8. SMEs are defined accordingly with the European Commission definition. LEVERAGE is the ratio of total liabilities to total assets. Vertical lines highlight average values of LEVERAGE for large corporations (dash-dotted lines) and SMEs (solid lines). Confidence intervals are at 99%. Confidence intervals are at 99%.

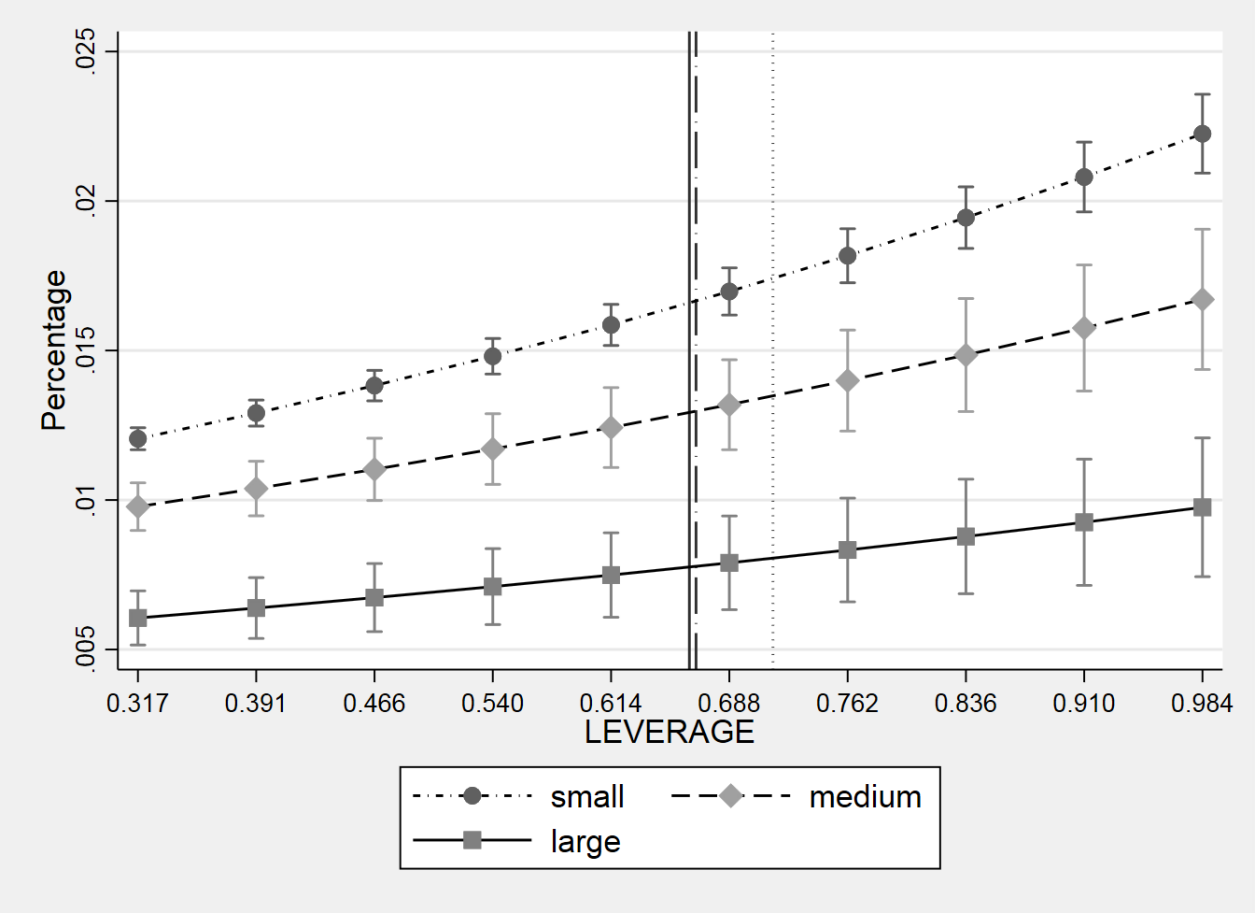


Table D.1: Default Probability: Marginal Effects at $10^{th}$ Percentile, Median and $90^{th}$ Percentile

This table reports marginal effects evaluated at the $10^{th}$ percentile, at the median and at the $90^{th}$ percentile of TRADE, CURRENT and NONCURRENT. Standard errors are reported in parenthesis. Standard errors of marginal effects are calculated with the delta method. Independent variables are held at the mean and the variable of interest is held at the $10^{th}$ percentile, mean and $90^{th}$ percentile. TRADE is the ratio of trade payables to total assets, CURRENT is the ratio of current liabilities (minus trade payables) to total assets, NONCURRENT is the ratio of non-current liabilities to total assets.

| | TRADE | | | CURRENT | | | NONCURRENT | | |
|---|---|---|---|---|---|---|---|---|---|
| Marginal Effect at | $10^{th}$ percentile | Mean | $90^{th}$ percentile | $10^{th}$ percentile | Mean | $90^{th}$ percentile | $10^{th}$ percentile | Mean | $90^{th}$ percentile |
| | | | | Panel A | | | | | |
| Large Firms | 0.009*** | 0.010*** | 0.012*** | 0.011*** | 0.014*** | 0.020*** | 0.012*** | 0.015*** | 0.020*** |
| | (0.002) | (0.002) | (0.004) | (0.001) | (0.001) | (0.002) | (0.001) | (0.001) | (0.002) |
| SME | 0.026*** | 0.036*** | 0.056*** | 0.022*** | 0.034*** | 0.058*** | 0.014*** | 0.016*** | 0.020*** |
| | (0.000) | (0.000) | (0.001) | (0.000) | (0.000) | (0.001) | (0.000) | (0.000) | (0.001) |
| | | | | Panel B: SMEs - Large Firms | | | | | |
| | 0.017*** | 0.026*** | 0.044*** | 0.011*** | 0.020*** | 0.039*** | 0.002** | 0.001 | 0.000 |

Table D.2: Default Probability: OLS Regressions

This table reports the estimated coefficients of OLS regressions and their robust standard errors clustered at firm level (in parenthesis). The bottom of the table reports the number of observations, number of clusters (i.e. firms) and Adjusted R squared. The dependent variable takes value 0 if the firm is *Active* and value 1 if it is either *Insolvent* or *Bankrupt*. GDP is the one year GDP growth rate, GOVBOND is the three-month government bond interest rate, SOVCDS is the logarithm of the CDS price of government bonds, NITA is the ratio of net income to total assets, CATA is the ratio of current assets to total assets, AGE is the number of days since incorporation divided by 365, SME is a dummy variable that takes value 1 if a firm's total assets are worth no more than EUR43 million, LEVERAGE is the ratio of total liabilities to total assets, TRADE is the ratio of trade payables to total assets, CURRENT is the ratio of current liabilities (minus trade payables) to total assets, NONCURRENT is the ratio of non-current liabilities to total assets. Independent variables are lagged. *** p<0.01, ** p<0.05, * p<0.1

| Specification | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| LEVERAGE | 0.039*** | 0.007*** | | |
| | (0.000) | (0.001) | | |
| LEVERAGE*SME | | 0.034*** | | |
| | | (0.001) | | |
| TRADE | | | 0.052*** | 0.010*** |
| | | | (0.001) | (0.002) |
| TRADE*SME | | | | 0.043*** |
| | | | | (0.002) |
| CURRENT | | | 0.058*** | 0.011*** |
| | | | (0.001) | (0.002) |
| CURRENT*SME | | | | 0.049*** |
| | | | | (0.002) |
| NONCURRENT | | | 0.033*** | 0.010*** |
| | | | (0.001) | (0.002) |
| NONCURRENT*SME | | | | 0.024*** |
| | | | | (0.002) |
| SME | 0.008*** | -0.015*** | 0.007*** | -0.018*** |
| | (0.000) | (0.001) | (0.000) | (0.001) |
| GDP | -0.000*** | -0.000*** | -0.000*** | -0.000*** |
| | (0.000) | (0.000) | (0.000) | (0.000) |
| GOVBOND | 0.001*** | 0.001*** | 0.001*** | 0.001*** |
| | (0.000) | (0.000) | (0.000) | (0.000) |
| SOVCDS | 0.003*** | 0.003*** | 0.004*** | 0.004*** |
| | (0.000) | (0.000) | (0.000) | (0.000) |
| NITA | -0.161*** | -0.161*** | -0.154*** | -0.153*** |
| | (0.001) | (0.001) | (0.001) | (0.001) |
| CATA | 0.012*** | 0.012*** | 0.004*** | 0.005*** |
| | (0.000) | (0.000) | (0.000) | (0.000) |
| AGE | -0.000*** | -0.000*** | -0.000*** | -0.000*** |
| | (0.000) | (0.000) | (0.000) | (0.000) |
| Constant | -0.024*** | -0.003*** | -0.026*** | -0.002** |
| | (0.001) | (0.001) | (0.001) | (0.001) |
| Observations | 6,212,164 | 6,212,164 | 6,212,164 | 6,212,164 |
| R-squared | 0.031 | 0.031 | 0.033 | 0.034 |
| Country FE | YES | YES | YES | YES |
| Industry FE | YES | YES | YES | YES |
| Clusters | 939,075 | 939,075 | 939,075 | 939,075 |
| Adjusted-$R^2$ | 0.0308 | 0.0310 | 0.0334 | 0.0337 |

Table D.3: Loan Spreads - Equity Sensitivity Analysis

This table reports loan spreads when default probabilities are estimated with specification (4) in Table 8. "Low leverage" firms belong to the first decile of our sample ranked according to leverage, while "High leverage" firms belong to the tenth decile. SME (5M) denotes SMEs with annual sales below 5 million Euros. PD is the probability of default, $d_{el}$ is the expected loss component of the spread, $d_{ul}$ is the unexpected loss component of the spread, $d_{el} + d_{ul}$ is the total loan spread. In Panel A cost of equity ($r_e$) is 10%. In Panel B cost of equity ($r_e$) is 15%. All figures are in percentages.

| | Low Leverage | | | High Leverage | | | ΔHigh - Low | |
|---|---|---|---|---|---|---|---|---|
| | Large | SMEs | Δ | Large | SMEs | Δ | Large | SMEs |
| Panel A: $r_e = 10\%$ | | | | | | | | |
| PD | 0.62 | 0.78 | 0.16 | 3.14 | 6.68 | 3.54 | 2.53 | 5.90 |
| $d_{el}$ | 0.12 | 0.15 | 0.03 | 0.61 | 1.31 | 0.70 | 0.49 | 1.16 |
| $d_{ul}$ | 0.21 | 0.19 | -0.02 | 0.41 | 0.41 | 0.00 | 0.20 | 0.22 |
| $d_{el} + d_{ul}$ | 0.33 | 0.34 | 0.01 | 1.02 | 1.73 | 0.70 | 0.69 | 1.38 |
| Panel B: $r_e = 15\%$ | | | | | | | | |
| PD | 0.62 | 0.78 | 0.16 | 3.14 | 6.68 | 3.54 | 2.53 | 5.90 |
| $d_{el}$ | 0.12 | 0.15 | 0.03 | 0.61 | 1.31 | 0.70 | 0.49 | 1.16 |
| $d_{ul}$ | 0.32 | 0.28 | -0.04 | 0.62 | 0.62 | 0.00 | 0.30 | 0.33 |
| $d_{el} + d_{ul}$ | 0.44 | 0.43 | -0.01 | 1.23 | 1.93 | 0.70 | 0.79 | 1.50 |