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

Lara Cathcart[1] Alfonso Dufour[2] Ludovico Rossi[2]

Simone Varotto[2]

[1] Imperial College Business School

[2] ICMA Centre, Henley Business School

First version: July 12, 2017

Current version: January 15, 2018

Abstract

In this paper we estimate a discrete time hazard model to predict corporate default with a large database of financial reports including more than 6 million firm-year observations for large corporations as well as small and medium enterprises (SMEs) spanning 6 European countries from 2005 to 2014. We document that corporate defaults drivers are highly heterogeneous across European countries. However we find that, on average, (1) financial leverage impacts more on the probability of default of SMEs than large corporations, (2) short maturity debt has a much bigger impact on corporate defaults than long maturity debt and (3) this impact is more pronounced for SMEs than large corporations. These results hold across a rich set of robustness tests. Moreover, we show that sources of finance have a significant impact on loan prices and capital requirements. Our findings have important implications for credit risk modelling of bank loans, bank regulators and policy makers.

I Introduction

In a frictionless Modigliani and Miller (1958) environment, where the capital structure does not affect firms' valuation, financial leverage increases financial risk and associated risk premium: stocks with higher debt-to-equity ratios would have a higher expected rate of return. Since the seminal work of Altman (1968), academic research has paid a great deal of attention to determinants of corporate defaults and financial leverage has been used as one of the main factors to predict financial distress (see also Loffler and Maurer, 2011). More recently, Traczynski (2017) has shown that, when Bayesian model-averaging techniques that take into account model uncertainty are used to predict corporate defaults, only financial leverage (measured as the ratio of total liabilities on total assets) and the inverse of the volatility of market returns are correlated with defaults across all industries sectors. Therefore, for unlisted firms, for which stock returns cannot be computed, financial leverage becomes an essential indicator to predict default. In this paper, we estimate a discrete time hazard model, in line with the strand of literature started by Shumway (2001), to better understand how leverage impacts on corporate default probabilities. In particular, we focus on the differential effect of leverage on default risk for SMEs and large corporations. Our prior is that leverage may be a more important distress factor for smaller firms. As recent crises have highlighted, bank-dependent SMEs are more likely to face restricted access to credit than large firm, as the latter may tap financial markets (see Beck et al., 2008). Moreover, we want to highlight how different sources of external finance, characterized by different counterparts and maturities (e.g. trade credit versus bank loans), may have a different impact on firms' defaults.

This paper relates to the vast literature that looks at the determinants of corporate defaults (Altman, 1968, Ohlson, 1980, Zmijewski, 1984, Shumway, 2001, Chava and Jarrow, 2004, Hillegeist et al., 2004, Duffie et al., 2007, Bharath and Shumway, 2008, Campbell et al., 2008 and Traczynski, 2017). However, all of the above contributions are

based on listed US corporations. Indeed, previous research mostly relies on CRSP and Compustat data[1]. In practice, it is critical to develop a clear understanding of the factors that influence default probabilities not only for big, listed, firms but also for unlisted corporations and for smaller firms both for bank risk management[2] and for loan pricing purposes. We use Bureau Van Dijk's Orbis database (Orbis, hereafter), which covers European listed and non-listed firms. This database has several advantages. Firstly, it covers not only large corporations but also SMEs, which represent the economic backbone of European countries. Earlier attempts to analyse SME failures date back to Edmister (1972)). However, very few studies focus on SMEs in recent years, most likely because of issues related to data coverage and reliability. For instance, Altman and Sabato (2007) show that standard corporate default models may lead to poor results when applied to small businesses. With our multi-country database we are able to improve the robustness of our findings and, at the same time, assess cross-country differences in the determinants of corporate defaults. We find substantial heterogeneities across countries which suggests that previous findings based on US data may only have limited applicability to other countries. Finally, Orbis extensive coverage, both cross-sectionally and over time, enables us to investigate a much larger sample of defaults than can normally be obtained from CRSP and Compustat which are typically used in the literature.

This paper also relates to the literature on SMEs financing. SMEs are more opaque than large corporations. In order to overcome agency problems, they need to have a different capital structure than larger firms, as documented by Berger and Udell (1998). Moreover, Berger and Udell (2006) explain how financial institutions may employ different lending technologies to overcome information asymmetries, when lending to SMEs. Although we find that external sources of finance increase default probabilities of firms

[1]with the only exception of Altman (1968) who collects data directly from annual reports and Moody's Industrial Manuals. Anyway, also Altman (1968) exclusively studies US-listed firms.

[2]The probability of defaults is one of the main drivers of Basel II and Basel III regulations.

of all sizes, the magnitude of our results vary markedly between SMEs and large corporations. In particular, we show that financial leverage affects more default probability of SMEs than the probability of default of large corporations. Financial leverage cannot be treated as an overall, aggregate, variable, especially for SMEs. For example, Casey and O'Toole (2014) show that financial 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 means that different components of financial leverage may not have the same impact on firms' probability of default. In addition, Carpenter and Petersen (2002) document that small firms, that are financially constrained, have to rely upon internal cash flows to finance investment projects. As a consequence their growth rates are suboptimal. This could lead to an increase of default probabilities in the long run. If a firm is not able to finance long-term projects but only working capital, and if its growth rates are suboptimal, then it will have a higher probability of default as time goes by. We, indeed, find that components of financial leverage with shorter maturities have a higher impact on firms' defaults.

The remainder of the paper is organized as follows: in section II we describe data and variables, in section III we outline the empirical methodology, in section IV we present our result, in section V we show the implications of our findings for loan interest rates and Basel III capital requirements, in section VI we describe our robustness tests; conclusions are in section VII.

II Data

We collect firm-level data from Orbis. We have access to the financial report of firms from the seventeen western European countries with the largest GDP. We exclude all firms that operate in industries which present huge heterogeneities among them-self[3]. We also exclude all firms for which the industry is missing. 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 for which the default history is not possible to construct, because of lack of information on the date in which the "*status*" is recorded or on the "*status*" itself [4]. Moreover, we drop all firm-year observations that do not report accounting variables and we exclude countries in which the total number of firm-year observations is less than 5,000[5]. We 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[6]. Finally, we winsorize all firm-level variables at their 1% and 99% levels in each country.

Therefore, our database consists in 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. To the best of our knowledge, this is the database on firms survival analysis that covers the highest number of firms. Table 1 reports the number of observations and firms for each country in the sample. The most represented country is Italy, with 34.96% of total observations and 32.11% of firms,

[3]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.*

[4]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.*

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

[6]This percentage is not plausible and reflects problems with how Orbis records "*status*" field or problems with data availability in that country. Including these counties in the analysis would substantially bias results.

whereas the least represented country is Portugal, with 3.85% of total observations and 4.76% of firms. However, also for Portugal we have a fairly big number (44,898) of firms.

II.I Variables

The dependent variable in all regressions (Y) is a categorical variable that captures if the firm is either *Active*, *Insolvent* or *Bankrupt*[7]. In the main analysis Y takes value 0 if the firm is *Active* and value 1 if the firm is either *Insolvent* or *Bankrupt*. Table 2 is a simple transition matrix. Most of the firm-year observations classified as *Active* (97.83%) do not migrate in another state: only 0.36% of them go through insolvency procedures and 1.81% directly to bankruptcy. For what regards *Insolvent* firm-year observations, few of them (1.01%) manage to recover to the *Active* state whereas a big share goes to *Bankrupt* (7.35%). Table 3 reports the number of *Insolvent* and *Bankrupt* firms each year. Percentages are consistently higher for SMEs than for large corporations. The outbreak of the financial crisis is particularly relevant for SMEs (the percentage of *Insolvent* and *Bankrupt* firms increases from 1.581% in 2006 to 2.105% in 2007). The peak of defaults is in 2012 for both SMEs and large corporations, reflecting the increased credit constraints experienced by firms due to the Euro debt crisis.

In the first set of regressions, the independent variable of interest is $LEVERAGE$, defined as the ratio of total liabilities on total assets. In the second set of regressions we substitute $LEVERAGE$ with four variables that capture the impact of different sources of finance: $TRADE$ is defined as the ratio between trade payables and total assets, $LONGFIN$ is debt from financial institutions and bonds with maturity higher than one year divided by total assets, $SHORTFIN$ is debt from financial institutions and bonds with maturity lower than one year divided by total assets, $OTHER$ is a residual cate-

[7]Additional details on the classification of firm-year observations in *Active*, *Insolvent* and *Bankrupt* are in appendix **??**

gory[8].

Other firm-level variables include the ratio between net income and total assets ($NITA$) to control for profitability, the ratio between current assets to total assets ($CATA$) to control for liquidity and a dummy variable that takes value one if the firm has less than 43 million EUR (SME) to control for firm dimension. Although Shumway (2001) shows that including market variables in hazard models increases forecasting power, we can rely exclusively on accounting-based measures because a large share of our database is composed of unlisted firms. We do not include firms' age as an explanatory variable for two reasons. The first one is that it is not always possible to back up real firms' age on Orbis[9]. The second motivation is that previous pieces of research (e.g. Shumway, 2001) find that age as is not a statistically significant predictor of firms' defaults. The economic environment influences probability of defaults (Duffie et al., 2007); for this reason we also use a set of macro variables to predict corporate distress. Specifically, we employ GDP growth (GDP) to capture the business cycle, the yield of three months government bonds ($GOVBOND$) because the risk-free rate is a key ingredient in Merton (1974) distance to default model and the level of government SOVCDS spreads ($SOVCDS$) to capture sovereign riskiness.

Tables 4 and A.1 report summary statistics of independent variables. $LEVERAGE$ is, on average higher for $Insolvent$ (1.017) and $Bankrupt$ firms (0.964) than for $Active$ ones (0.703); moreover, $LEVERAGE$ is lower for large corporations (0.664) than for SMEs (0.711). Looking at the distribution of $LEVERAGE$ across countries, the lowest value is in Belgium (0.626) whereas the highest is in Italy (0.769). The residual category $OTHER$ has the highest average value among sources of finance and it is equal to, in

[8] $OTHER$ is equal to $(TotalLiabilities - TradePayables - LongTermFinancialDebt - ShortTermFinancialDebt)/TotalAssets$.

[9] The field *"incorporation date"* on Orbis may refer either to the creation date of the firm or to an update of a company fundamental (such as legal form, address, etc...) and it is not available for all firms in our sample.

the overall sample, of 0.297, it comprises all liabilities that are not financial and trade payables (e.g. trade debts, group companies , pension loans, provisions, deferred taxes, personnel costs, intra-group debts, accounts received in advance, etc...) and it is significantly higher for *Insolvent* (0.416) and *Bankrupt* firms (0.424) than for *Active* ones (0.294). Trade payables are the single most used source of finance (0.202), followed by long-term financial debt (0.122) and short-term financial debt (0.082). Table 5 displays correlations between variables, The variable that is mostly negatively correlated with *Inactive* and *Bankrupt* is $NITA$ whereas the one that is most positively correlated with *Inactive* and *Bankrupt* is, indeed, $LEVERAGE$.

III Empirical Methodology

We estimate the probability of default with a discrete hazard model in the form of 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 respect to static, accounting based, models (e.g. Altman, 1968, Ohlson, 1980, Zmijewski, 1984) and contingent claim models (e.g. Hillegeist et al., 2004 and Bharath and Shumway, 2008). Hazard models have been employed not only to estimate default probabilities, but also to forecast other corporate events such as changes of top executive directors (Denis et al., 1997) and IPOs (Pagano et al., 1998). The probability of default in the following time period is given by equation 1.

$$P_t(Y_{i,c,j,t+1} = 1) = \frac{1}{1 + exp[-(\alpha + \boldsymbol{x_{i,t}}\boldsymbol{\beta} + \boldsymbol{z_{c,t}}\boldsymbol{\delta} + \gamma_c + \gamma_j)]} \tag{1}$$

subscripts i, c, j, and t indicate firms, countries, industries and years, respectively. Y is a dummy variable which indicates corporate default. In the baseline regression, it takes value 0 if the firm is *Active* and value 1 if the firm is *Insolvent* or *Bankrupt*. Therefore,

Y takes value 1 if firms are $Insolvent$, which means that they can eventually recover in future, and if firms are $Bankrupt$ and cannot recover; in section VI, as robustness tests, we regress active firms versus insolvent ones, $Active$ and $Insolvent$ versus $Bankrupt$ ones and we estimate an ordered logit in which we distinguish the three states. α is the coefficient common to all countries and industries, $\boldsymbol{\beta}$ and $\boldsymbol{\delta}$ are vectors of parameters to be estimated, $\boldsymbol{x_{i,t}}$ is a vector of firm-level, time varying, covariates recorded at the end of the previous accounting year, $\boldsymbol{z_{c,t}}$ is a vector of country-level, time varying, covariates recorded at the end of the previous accounting year, γ_c are country fixed effects to capture heterogeneities in the six different countries and γ_j are industry fixed effects (Chava and Jarrow, 2004 and Traczynski, 2017) to capture heterogeneities in the fifteen industries we have in our sample (NACE 2 classification consists of twenty-one industries, of which we have excluded seven as explained in section II).

Having estimated a logistic function, which is non-linear in nature, we want to calculate marginal effects of $LEVERAGE$, $TRADE$, $LONGFIN$, $SHORTFIN$ and $OTHER$ on probabilities of default, across different levels of the independent variables their-self. Another reason to calculate marginal effects is that we want to assess the importance of the interaction between sources of finance with 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).

IV Results

In Table 6 we present estimates of the baseline regressions. Better economic conditions decrease probabilities of defaults of firms, indeed higher GDP and $GOVBOND$ decrease probability of corporate defaults whereas a higher level of $SOVCDS$ increases firms' default probabilities. Higher profitability ($NITA$) and lower liquidity ($CATA$)

decrease the probability of defaults. Moreover, SMEs have, on average, a higher probability of default than large corporations: the size of firms have widely been recognized to decrease probabilities of default (e.g. Altman, 1968). The coefficient of $LEVERAGE$ is positive in both specifications; however, in order to better assess its impact on corporate defaults, we compute marginal effects. For large corporations the marginal effect of $LEVERAGE$ calculated at the mean (0.664) is 0.011, which means that a 1% increase of $LEVERAGE$ from its mean value translates in an increase of 0.011 basis points of the probability of defaults. Similarly, The marginal effect for SMEs calculated at the average value of $LEVERAGE$ (0.711) is 0.02, which means that an increase of 1% of $LEVERAGE$ from its mean value translates in an increase of 0.02 basis points of the probability of defaults. These numbers are economically significant if compared with average one-year default rates by Moody's Investor Service: an investment grade firm has an average one-year default probability that spans from 0% if Aaa rated to 0.259% if Baa3 rated (exhibit 29 from Moodys Investor Service, 2017). Figure 1 shows how the impact of $LEVERAGE$ on probabilities of default is increasing in the level of independent variable and it is always higher for SMEs than for large corporations. The latter result can be explained by the fact that, when financially constrained, large firms are more able to raise external finances than small firms Beck et al. (2008).

In order to capture cross countries heterogeneities, we run the same regression separately for each country. As reported in table 7, the effect of $LEVERAGE$ on defaults differs remarkably from one country to the other; when evaluated at the average, in Belgium $LEVERAGE$ decrease default probabilities for large firms but it has the opposite effect for SMEs, in Spain $LEVERAGE$ increases default probability for all firms, with no substantial differences between SMEs and large firms, in France and Portugal $LEVERAGE$ has the same behaviour as for the overall sample (i.e. it increases probability of default for large corporations and even more for SMEs), finally, in the United

Kingdom and Italy $LEVERAGE$ increases probability of default more for large firms than for SMEs. Marginal effects reported in figure 2 confirm this pattern. One of the main sources of heterogeneities is that capital structure of similar firms vary remarkably across countries (i.e. average value of $LEVERAGE$ is different across countries), as vertical lines in graph 2 indicate. Moreover, heterogeneities may be due to the fact that the relative importance of industries changes across countries[10]. Indeed, firms in different industries may have different speed of defaults and they may affect marginal effects of sources of finance. These results cast doubts on the possibility of generalising results that are established in the literature, but exclusively based on US data, to other countries.

One of the main points of this paper is to disentangle which source of external finance contributes most to default probabilities. In order to do that, we split $LEVERAGE$ into four different variables, which represent the main liabilities of firms. Logit estimates are reported in table 8. For the average SMEs, $TRADE$ is the major source of risk, whereas $LONGFIN$ is the one that brings the lowest risk, in particular a 1% increase of trade payables increases default probability by 0.041 basis points whereas if long-term financial debt increase by 1%, default probabilities would increase by 0.023 basis points only. For the average large corporation, the relative importance of sources of finance is reversed: $LONGFIN$ is the one that impacts most on default probabilities (a 1% increase translates in a higher default probability of 0.02 basis point) and trade payables are the least important (a 1% increase translates in a higher default probability of 0.01 basis point). In order to have a better picture of how sources of finance impact on SMEs and large firms we compute marginal effects for different levels of the independent variables (plotted in figure 3). For large corporations, $TRADE$ map is almost flat whereas for SMEs it is exploding, which means that for highest levels of $TRADE$, the impact on default probabilities is much higher than 0.08 basis points. The very same behaviour

[10]The number of firm-year observations for each industry is reported in table A.2

is true for $OTHER$; high levels may increase default probabilities of SMEs by almost 0.1 basis points. On the one hand, the impact of $LONGFIN$ is increasing but it is not statistically different between the two categories of firms. On the other hand, the effect of $SHORTFIN$ on probabilities of default is always higher for SMEs than for large firms. Looking at marginal effects plot of $LONGFIN$, the effect of long-term financial debt has no statistically significant different impact on large corporations and SMEs, because the 99% confidence bands of the two lines overlap. Finally, it is worth stressing that McFadden's R^2 increases when sources of finance are used instead of $LEVERAGE$: McFadden's R^2 goes from 0.083 in table 6 to 0.097 in table 8. Therefore, employing sources of finance as predictors of financial distress gives a better picture of true probabilities of defaults.

We also investigate the effect of different sources of finance across countries in our sample. Logit coefficients are reported in table 9 whereas figures C.1 to C.4 plot marginal effects across different levels of independent variables. There are large heterogeneities across countries; for example, Belgium is the only country in which average marginal effects of each source of finance on probabilities of default of large corporations are negative (although only trade payables and long-term financial debt are statistically significant at 1% confidence level). In all the other five countries, all sources of finance have positive marginal effects on corporate default probabilities, although magnitudes differ a lot across countries and for different sources of finance. For SMEs, all marginal effects are positive, however they go from 0.006, which is the marginal effect of $LONGFIN$ in Belgium to 0.08, which is the marginal effect of $SHORTFIN$ in Spain. Figures C.1 to C.4 confirm that the higher is the level of the source of finance, the higher will be its impact on default probabilities in almost all countries.

Looking at tables 7 and 9, also coefficients of macro variables have different signs among countries. Sign of GDP is negative in all countries with the only exception of

United Kingdom. This may be due to the fact that, among the countries in our sample, the United Kingdom is the one that managed to recover faster after the financial crisis. By the time that British banks recognised non performing loans, the British economy was already growing. $GOVBOND$ is positive in Spain, United Kingdom and Portugal. It is negative in Belgium (although it is not statistically significant), France and Italy. Interest rates impact on default probabilities through two channels. The first channel works through firms' financing costs: interest rate raises result in higher financing costs for enterprises. This causes an increase in number of defaults. The second channel, documented by Gonzalez-Aguado and Suarez (2015), works in the following way: an interest rate rise that increases financing costs, would diminish borrowing incentives of entrepreneurs. Therefore, firms' leverage would decrease below the long-run target, resulting in lower default rates. Depending on which of the two channels dominates the other, sign of $GOVBOND$ may be positive or negative. Finally, $SOVCDS$ is positive in all countries except Portugal. This odd sign may be due to the fact Portuguese government received a bailout package of 78 million Euro by the International Monetary Fund and European Union in 2011. Although sovereign default risk remained quite high, the package enhanced survival of Portuguese firms.

V Economic Implications

In this section, we want to show how different model could have a significant impact on loan rates and on Basel III capital requirements. Therefore, avoiding to take in consideration heterogeneities between SMEs and large corporations and heterogeneities of sources of finance leads to a significant loan rate mispricing and capital requirements miscalculation.

V.I Loan Pricing

In order to show how misestimating the probability of default could lead to a substantially different interest rate, we follow the simple approach of Resti and Sironi (2007)[11]. Firstly, in equation 2, we estimate the spread that compensate for expected losses (d_{el}). d_{el} equates the expected return on a risky loan to a risk-free investment. Secondly, once d_{el} is known, in equation 3 we estimate the spread that compensate for unexpected losses (d_{ul}), to take into account banks' risk aversion.

$$(1 + r_f + d_{el})[(1 - PD) + (1 - LGD)PD] = (1 + r_f) \tag{2}$$

$$(1 + r_f + d_{el} + d_{ul})[(1 - PD) + (1 - LGD)PD] = (1 + r_f) + EcCap(r_e - r_f) \tag{3}$$

We set the risk free rate (r_f) equal to the value of 12 months LIBOR denominated in Euro (0.294%). The average loss given default (LGD) on loans is taken from Moodys Investor Service (2017)[12] and it is equal to 19.4%. r_e is the bank cost of capital, which we set at a value of 12%. $EcCap$ is the economic capital that the bank should hold in order to cover its loan position in percentage terms, which we set equal to 8%. We estimate PD according to two different specifications resulting from the previous section: one in which we use only $LEVERAGE$ and the other where $TRADE$, $SHORTFIN$, $LONGFIN$, $OTHER$, together with their interactions with SME are employed. Results are summarized in table 10. We report the average of all countries and the specific case of Italy, because it is the country with the highest variability between the two models. In panel A of table 10, we keep all independent variables at their mean values, in panel B we take $LEVERAGE$ and the other sources of finance variables at the fist decile, in panel C we take $LEVERAGE$ and the other sources of finance variables at the ninth

[11] pages 451 to 457.
[12] exhibit 8.

decile.

In panel A, the average large corporation and SME are not particularly affected by the selection of independent variables. However, for firms that have lower than average values of financial leverage (panel B) the selection of which variable are used to represent financial leverage is relevant, in particular for SMEs. Indeed, for SMEs if $LEVERAGE$ only is taken into account, the total interest rate would be 1.379%, but if all different sources of finance and interactions with SME are employed, it would be 1.278%. For firms with higher than average financial leverage, the magnitude of the mispricing would be even higher: model (1) implies an interest rate of 1.357% for SME and one of 1.330% for large corporations whereas model (4) would imply an interest rate of 1.567% for SMEs and one of 2.063% for large firms. Moreover, there is a relevant variability across countries. For example, in Italy the mispricing would be even higher: for firms with high leverage model (1) implies a loan rate of 1.374% and 1.446% for SMEs and large firms whereas model (4) implies a loan rate of 4.342% and 4.575%.

V.II Basel III Capital Requirement

Probabilities of default, estimated using models which do not differentiate between SMEs and large corporations and that do not take in consideration different sources of finance, may be biased. This have consequences for banks' capital requirements that lend to SMEs and large firms. We show how banks' capital requirements corresponding to loan of one million vary, when probabilities estimated through the four different models described in the previous subsection are adopted. We apply the Basel III capital requirement calculation by the Basel Committee on Banking Supervision (2011). We assume a LGD of 45%[13], loan maturity of five years and firm's annual sales over 50 million dollars. Table 11 reports the Risk Weighted Assets (RWA) for this loan, as well as the minimum

[13]Which is the LGD adopted by Basel II foundation approach for senior claims on corporations.

Tier 1 capital (6% of RWA) and Total (Tier 1 + Tier 2) Capital (8% of RWA).

For both SMEs and large corporations, models (1) to (3) result in higher capital requirements (with the only exception of model (3) for SMEs). Overestimating capital requirements is damaging for the economic environment because banks might decide to decrease lending to meet more stringent capital requirements (Van den Heuvel, 2008). The magnitude of the difference is relevant: also a 1% difference results in several millions of additional equity that banks have to raise. On the other hand, underestimating the capital requirements may have significant impacts on systemic risk. Capital requirement are, anyway, always higher for the average SMEs than for the average large corporation, due to the fact capital structure of the former results in a higher estimated PD.

VI Robustness

In this section, we run a battery of robustness tests to validate our conclusions[14]. First of all, we want to make sure that results are not affected by dependent variable definition we have chosen. We repeat the main analysis with an alternative logit model, where Y in model 1 takes value 0 if the firm is either *Active* or $Insolvent$ and value 1 if the firm is *Bankrupt*, and with an ordered logit, where Y in model 1 takes value 1 if the firm is *Active*, value 2 if the firm is $Insolvent$ and value 3 if the firm is *Bankrupt*. In columns (1) and (3) of tables A.3 and A.4 we report coefficients of the alternative logit model and in column (2) and (4) of tables A.3 and A.4 we report coefficients of the ordered logit model.

In figures C.5 to C.9 we plot marginal effects of $LEVERAGE$, $TRADE$, $LONGFIN$, $SHORTFIN$ and $OTHER$ estimated with the alternative logit. Marginal effects confirm the pattern of the main model but are smaller in magnitude. In figures C.10 to C.14 we plot marginal effects of the same variables, estimated with the ordered logit.

[14]Tables and figures of this section are reported in the appendix.

In the bankruptcy literature it is not common to estimate ordered logit that distinguish between, because of scarcity of data availability of firms' insolvencies. Thanks to Orbis database we have access to this information. Marginal effects of the ordered logit explain what is the marginal impact of independent variables for each state of Y. Ordered logit marginal effects are in line with the ones of the main model: higher levels of financial leverage decrease probabilities of being in *Active* state and increase probabilities of being either in the $Insolvent$ or $Bankrupt$ state.

Moreover, we want to prevent our results to be driven by the definition of SMEs that we have selected. We run the analysis, defining SMEs accordingly to the definition given by the European Commission[15]; unfortunately, not all firms in our sample report number of employees, therefore we run this test only on the subsample of firms that do report this figure. Columns (5) of tables A.3 and A.4 report coefficient estimates and figures C.15 to C.19 plot marginal effects. Results are qualitatively similar to the ones in the main analysis.

Finally, we want to check if the classification of sources of finance we have done drives our conclusion regarding the impact of long and short-term liabilities on probabilities of default. To this extent, we classify liabilities as $CURRENT$ or $NONCURRENT$. The first category comprehends short-term financial debts, trade credits, pension, intragroup debts, accounts received in advance whereas the second category embeds long-term financial debts, trade debts, loans to group companies, pension loans, provisions and deferred taxes. Columns (6) and (7) of table A.4 report coefficient estimates and figures C.20 and C.21 plot marginal effects. Results confirm the behaviour of short and long-term financial debt identified in the main analysis.

[15]The European Commission defines as SMEs those firms which 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.

VII Conclusion

Since Altman (1968), financial literature has devoted a great deal of attention to corporate defaults. Traczynski (2017) shows that, after taking into account model uncertainty, financial leverage is one of the few robust predictors of firms' defaults. In this paper, using a large database of European SMEs and large corporations, we show the heterogeneous impact of different financial leverage components. Moreover, we highlight how those sources of external finance impact differently SMEs and large corporations and what is the variation across different European countries. Finally, we show that our results have relevant implication for loan pricing.

Leverage increase probabilities of default more for SMEs than for large corporations. In addition, its impact is increasing the higher in the level of financial leverage itself. However, in each country the link between sources of finance and default probabilities is different, this fact casts doubts on the possibility of generalizing well-established results in the literature outside the United States. Moreover, we show how not taking into account external sources of finance and heterogeneities between SMEs and large corporations leads to biased estimations of probabilities of default which have a significant impact on loans rates. Moreover, probabilities of defaults are inputs for Basel II and Basel III regulations, any bias will be reflected in the final capital requirement calculation of banks. Therefore, our results have implications both for regulators and for practitioners.

References

Ai, C. and Norton, E. C. (2003). Interaction terms in logit and probit models. *Economics Letters*, 80(1):123–129.

Altman, E. I. (1968). Financial ratios, discriminant analysis and the prediction of corporate bankruptcy. *The Journal of Finance*, 23(4):589–609.

Altman, E. I. and Sabato, G. (2007). Modelling Credit Risk for SMEs: Evidence from the U.S. Market. *Abacus*, 43(3):332–357.

Basel Committee on Banking Supervision (2011). Basel III: A global regulatory framework for more resilient banks and banking systems.

Bauer, J. and Agarwal, V. (2014). Are hazard models superior to traditional bankruptcy prediction approaches? A comprehensive test. *Journal of Banking & Finance*, 40:432–442.

Beck, T., Demirg-Kunt, A., and Maksimovic, V. (2008). Financing patterns around the world: Are small firms different? *Journal of Financial Economics*, 89(3):467–487.

Berger, A. N. and Udell, G. F. (1998). The economics of small business finance: The roles of private equity and debt markets in the financial growth cycle. *Journal of Banking & Finance*, 22(68):613–673.

Berger, A. N. and Udell, G. F. (2006). A more complete conceptual framework for SME finance. *Journal of Banking & Finance*, 30(11):2945–2966.

Bharath, S. T. and Shumway, T. (2008). Forecasting Default with the Merton Distance to Default Model. *The Review of Financial Studies*, 21(3):1339–1369.

Campbell, J. Y., Hilscher, J., and Szilagyi, J. (2008). In Search of Distress Risk. *The Journal of Finance*, 63(6):2899–2939.

Carbo-Valverde, S., Rodrguez-Fernndez, F., and Udell, G. F. (2016). Trade Credit, the Financial Crisis, and SME Access to Finance. *Journal of Money, Credit and Banking*, 48(1):113–143.

Carpenter, R. E. and Petersen, B. C. (2002). Is the Growth of Small Firms Constrained by Internal Finance? *The Review of Economics and Statistics*, 84(2):298–309.

Casey, E. and O'Toole, C. M. (2014). Bank lending constraints, trade credit and alternative financing during the financial crisis: Evidence from European SMEs. *Journal of Corporate Finance*, 27:173–193.

Chava, S. and Jarrow, R. A. (2004). Bankruptcy Prediction with Industry Effects. *Review of Finance*, 8(4):537–569.

Denis, D. J., Denis, D. K., and Sarin, A. (1997). Ownership structure and top executive turnover. *Journal of Financial Economics*, 45(2):193–221.

Duffie, D., Saita, L., and Wang, K. (2007). Multi-period corporate default prediction with stochastic covariates. *Journal of Financial Economics*, 83(3):635–665.

Edmister, R. O. (1972). An Empirical Test of Financial Ratio Analysis for Small Business Failure Prediction. *Journal of Financial and Quantitative Analysis*, 7(2):1477–1493.

Gonzalez-Aguado, C. and Suarez, J. (2015). Interest Rates and Credit Risk. *Journal of Money, Credit and Banking*, 47(2-3):445–480.

Hillegeist, S. A., Keating, E. K., Cram, D. P., and Lundstedt, K. G. (2004). Assessing the Probability of Bankruptcy. *Review of Accounting Studies*, 9(1):5–34.

Loffler, G. and Maurer, A. (2011). Incorporating the dynamics of leverage into default prediction. *Journal of Banking & Finance*, 35(12):3351–3361.

Merton, R. C. (1974). On the Pricing of Corporate Debt: The Risk Structure of Interest Rates. *The Journal of Finance*, 29(2):449–470.

Modigliani, F. and Miller, M. H. (1958). The Cost of Capital, Corporation Finance and the Theory of Investment. *The American Economic Review*, 48(3):261–297.

Moodys Investor Service (2017). Annual Default Study: Corporate Default and Recovery Rates, 1920 - 2016.

Ohlson, J. A. (1980). Financial Ratios and the Probabilistic Prediction of Bankruptcy. *Journal of Accounting Research*, 18(1):109–131.

Pagano, M., Panetta, F., and Zingales, L. (1998). Why Do Companies Go Public? An Empirical Analysis. *The Journal of Finance*, 53(1):27–64.

Resti, A. and Sironi, A. (2007). *Risk Management and Shareholders' Value in Banking: From Risk Measurement Models to Capital Allocation Policies*. John Wiley & Sons.

Shumway, T. (2001). Forecasting Bankruptcy More Accurately: A Simple Hazard Model. *The Journal of Business*, 74(1):101–124.

Traczynski, J. (2017). Firm Default Prediction: A Bayesian Model-Averaging Approach. *Journal of Financial and Quantitative Analysis*, 52(3):1211–1245.

Van den Heuvel, S. J. (2008). The welfare cost of bank capital requirements. *Journal of Monetary Economics*, 55(2):298–320.

Zmijewski, M. E. (1984). Methodological Issues Related to the Estimation of Financial Distress Prediction Models. *Journal of Accounting Research*, 22:59–82.

Tables

Table 1: Number of observations and firms

Table 1 summarizes number of firm-year observations in the sample, number of observations in *Active*, *Insolvent* and *Bankrupt* state and firms for each country. Percentages are reported in parenthesis.

	Firm-Year Observations	(%)	*Active*	(%)	*Insolvent*	(%)	*Bankrupt*	(%)	Firms	(%)
Belgium	432,403	(6.924)	426,283	(6.985)	889	(2.204)	5,231	(5.128)	55,887	(5.920)
Spain	1,150,059	(18.415)	1,120,937	(18.368)	11,711	(29.029)	17,411	(17.069)	194,102	(20.562)
France	1,867,438	(29.902)	1,822,620	(29.865)	17,429	(43.203)	27,389	(26.852)	264,236	(27.992)
United Kingdom	371,760	(5.953)	362,417	(5.939)	1,466	(3.634)	7,877	(7.722)	81,704	(8.655)
Italy	2,183,133	(34.957)	2,135,906	(34.999)	4,790	(11.873)	42,437	(41.604)	303,135	(32.113)
Portugal	240,315	(3.848)	234,602	(3.844)	4,057	(10.057)	1,656	(1.624)	44,898	(4.756)
Total	6,245,108		6,102,765		40,342		102,001		943,962	

Table 2: Transition Matrix

Table 2 is a transition matrix. Firm-year observations are classified in three states: *Active*, *Insolvent* and *Bankrupt*. They are *Active* if Orbis "*status*" is *Active*, *Insolvent* if Orbis "*status*" is either *Active default of payment*, *Active rescue plan* or *Active insolvency proceedings*,*Bankrupt* if Orbis "*status*" is either *Bankruptcy*, *In liquidation*, *Dissolved*, *Dissolved bankruptcy* or *Dissolved liquidation*. States in year $t-1$ are in the column and state in year t are on the rows. Inside the table there are probabilities of migrating from one state to another. Probabilities are computed by averaging probabilities from annual transition matrices.

$state_{t-1} \setminus state_t$	*Active*	*Insolvent*	*Bankrupt*
Active	97.833%	0.359%	1.808%
Insolvent	1.011%	91.643%	7.345%
Active & Insolvent	97.515%	0.648%	1.836%

Table 3: Number of Defaults

Table 3 reports the number of Insolvent and Bankrupt firms and from 2005 to 2014. In parenthesis there is the percentage of the total number of firms in that year. Table 3 also displays SMEs and for large corporations. The last column is the ratio between the percentage of defaulted SMEs over the percentage of defaulted large corporations.

Years	Overall Sample		SMEs		Large Corporations		$\frac{\%SMEs}{\%LargeCorporations}$
	N	(%)	N	(%)	N	(%)	
2005	7,609	(1.438)	7,350	(1.443)	259	(1.311)	1.100
2006	9,223	(1.572)	8,914	(1.581)	309	(1.344)	1.176
2007	12,886	(2.079)	12,533	(2.105)	353	(1.436)	1.466
2008	15,709	(2.464)	15,426	(2.519)	283	(1.128)	2.233
2009	14,826	(2.295)	14,486	(2.333)	340	(1.354)	1.722
2010	16,134	(2.442)	15,821	(2.491)	313	(1.225)	2.034
2011	18,734	(2.797)	18,422	(2.860)	312	(1.215)	2.354
2012	19,627	(2.928)	19,178	(2.975)	449	(1.760)	1.690
2013	17,201	(2.604)	16,802	(2.646)	399	(1.563)	1.693
2014	10,394	(1.842)	10,181	(1.876)	213	(0.978)	1.918

Table 4: Summary Statistics

Table 4 displays summary statistics of independent variables for the overall sample. GDP is the one year GDP growth rate, $GOVBOND$ is the three-months government bond interest rate, $SOVCDS$ is the SOVCDS on government bond rate, $NITA$ is the ratio of net income on total assets, $CATA$ is the ratio of current assets on current liabilities, SME is a dummy variable that take value 1 if firm's total assets are equal or below 43 million EUR, $LEVERAGE$ is the ratio between total liabilities and total assets, $TRADE$ is the ratio between trade payables and total assets, $LONGFIN$ is the ratio between debt from financial institutions and bonds with maturity higher than one year and total assets, $SHORTFIN$ is the ratio between debt from financial institutions and bonds with maturity equal or lower than one year and total assets, $OTHER$ is a residual variable defined as the ratio between all liabilities that are not captured by $TRADE$, $LONGFIN$, $SHORTFIN$ and total assets.

	Observations	Mean	Median	St. Dev.	Min	Max
GDP	6,245,108	0.310	0.652	2.497	-7.101	4.223
GOVBOND	6,245,108	1.760	1.244	1.571	-0.073	6.750
SOVCDS	6,245,108	1.153	0.698	1.354	0.013	11.507
NITA	6,245,108	0.026	0.017	0.116	-1.722	1.000
CATA	6,245,108	0.683	0.769	0.282	0.000	1.000
SME	6,245,108	0.961	1.000	0.193	0.000	1.000
LEVERAGE	6,245,108	0.709	0.737	0.315	0.000	5.013
TRADE	6,245,108	0.202	0.147	0.204	0.000	0.988
LONGFIN	6,245,108	0.122	0.027	0.197	0.000	1.492
SHORTFIN	6,245,108	0.082	0.013	0.144	0.000	2.222
OTHER	6,245,108	0.297	0.218	0.257	0.000	1.815

Table 5: Correlations

Table 5 is a correlation table. GDP is the one year GDP growth rate, $GOVBOND$ is the three-months government bond interest rate, $SOVCDS$ is the SOVCDS on government bond rate, $NITA$ is the ratio of net income on total assets, $CATA$ is the ratio of current assets on current liabilities, SME is a dummy variable that take value 1 if firm's total assets are equal or below 43 million EUR, $LEVERAGE$ is the ratio between total liabilities and total assets, $TRADE$ is the ratio between trade payables and total assets, $LONGFIN$ is the ratio between debt from financial institutions and bonds with maturity higher than one year and total assets, $SHORTFIN$ is the ratio between debt from financial institutions and bonds with maturity equal or lower than one year and total assets, $OTHER$ is a residual variable defined as the ratio between all liabilities that are not captured by $TRADE$, $LONGFIN$, $SHORTFIN$ and total assets. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Active	Insolvent	Bankrupt	GDP	GOVBOND	SOVCDS	NITA	CATA	SME	LEVERAGE	TRADE	LONGFIN	SHORTFIN	OTHER
Active	1													
Insolvent	-0.528***	1												
Bankrupt	-0.844***	-0.010***	1											
GDP	0.019***	-0.0064***	-0.018***	1										
GOVBOND	0.005***	-0.023***	0.009***	0.004***	1									
SOVCDS	-0.021***	0.026***	0.009***	-0.429***	-0.135***	1								
NITA	0.144***	-0.079***	-0.119***	0.062***	0.003***	-0.089***	1							
CATA	-0.025***	-0.003***	0.032***	0.004***	0.004***	-0.040***	0.089***	1						
SME	-0.013***	0.003***	0.013***	-0.019***	-0.003***	0.024***	0.007***	0.107***	1					
LEVERAGE	-0.131***	0.079***	0.104***	-0.016***	0.049***	0.006***	-0.419***	0.109***	0.029***	1				
TRADE	-0.048***	0.020***	0.044***	-0.049***	-0.002***	0.006***	-0.082***	0.353***	0.079***	0.300***	1			
LONGFIN	-0.024***	0.036***	0.005***	0.014***	0.041***	0.046***	-0.164***	-0.335***	-0.057***	0.309***	-0.238***	1		
SHORTFIN	-0.048***	0.027***	0.040***	-0.041***	0.039***	0.014***	-0.180***	0.019***	-0.051***	0.327***	0.031***	-0.036***	1	
OTHER	-0.074***	0.037***	0.064***	0.028***	0.009***	-0.035***	-0.158***	0.104***	0.045***	0.445***	-0.250***	-0.217***	-0.186***	1

Table 6: Corporate Defaults: Effects of Leverage

Panel A of Table 6 reports coefficients of logit regression and robust standard errors clustered at firm level, in parentheses. Panel B reports marginal effects evaluated at the mean value of $LEVERAGE$ for small an medium enterprises and large corporations; standard error of marginal effects are calculated with delta method. Panel C reports number of observations, number of clusters (i.e. firms) and McFadden's R squared. GDP is the one year GDP growth rate, $GOVBOND$ is the three-months government bond interest rate, $SOVCDS$ is the SOVCDS on government bond rate, $NITA$ is the ratio of net income on total assets, $CATA$ is the ratio of current assets on current liabilities, SME is a dummy variable that take value 1 if firm's total assets are equal or below 43 million EUR, $LEVERAGE$ is the ratio between total liabilities and total assets, $TRADE$ is the ratio between trade payables and total assets, $LONGFIN$ is the ratio between debt from financial institutions and bonds with maturity higher than one year and total assets, $SHORTFIN$ is the ratio between debt from financial institutions and bonds with maturity equal or lower than one year and total assets, $OTHER$ is a residual variable defined as the ratio between all liabilities that are not captured by $TRADE$, $LONGFIN$, $SHORTFIN$ and total assets. *** p<0.01, ** p<0.05, * p<0.1

Panel A		
GDP	-0.036***	-0.036***
	(0.001)	(0.001)
GOVBOND	-0.014***	-0.014***
	(0.002)	(0.002)
SOVCDS	0.092***	0.093***
	(0.002)	(0.002)
NITA	-3.011***	-3.009***
	(0.030)	(0.030)
CATA	0.429***	0.429***
	(0.015)	(0.015)
SME	0.359***	0.165***
	(0.026)	(0.049)
LEVERAGE	1.007***	0.781***
	(0.016)	(0.056)
LEVERAGE*SME		0.232***
		(0.058)
Constant	-6.242***	-6.055***
	(0.051)	(0.064)
Panel B		
Marginal Effect	SMEs	large corp.
LEVERAGE	0.020***	0.011***
	(0.001)	(0.001)
Panel C		
Observations	6,245,108	6,245,108
Clusters	943,962	943,962
Country FE	YES	YES
Industry FE	YES	YES
PseudoR^2	0.083	0.083

Table 7: Corporate Defaults: Effects of Leverage Across Countries

Panel A of Table 7 reports coefficients of logit regression and robust standard errors clustered at firm level, in parentheses. Panel B reports marginal effects evaluated at the mean value of $LEVERAGE$ for small an medium enterprises and large corporations; standard error of marginal effects are calculated with delta method. Panel C reports number of observations, number of clusters (i.e. firms) and McFadden's R squared. GDP is the one year GDP growth rate, $GOVBOND$ is the three-months government bond interest rate, $SOVCDS$ is the SOVCDS on government bond rate, $NITA$ is the ratio of net income on total assets, $CATA$ is the ratio of current assets on current liabilities, SME is a dummy variable that take value 1 if firm's total assets are equal or below 43 million EUR, $LEVERAGE$ is the ratio between total liabilities and total assets, $TRADE$ is the ratio between trade payables and total assets, $LONGFIN$ is the ratio between debt from financial institutions and bonds with maturity higher than one year and total assets, $SHORTFIN$ is the ratio between debt from financial institutions and bonds with maturity equal or lower than one year and total assets, $OTHER$ is a residual variable defined as the ratio between all liabilities that are not captured by $TRADE$, $LONGFIN$, $SHORTFIN$ and total assets. *** p<0.01, ** p<0.05, * p<0.1

Country	BE	ES	FR	GB	IT	PT	BE	ES	FR	GB	IT	PT
Panel A												
GDP	-0.010	-0.057***	-0.044***	0.016**	-0.052***	-0.048***	-0.010	-0.057***	-0.044***	0.016***	-0.052***	-0.048***
	(0.007)	(0.003)	(0.003)	(0.006)	(0.002)	(0.007)	(0.007)	(0.003)	(0.003)	(0.006)	(0.002)	(0.007)
GOVBOND	-0.003	0.140***	-0.084***	0.294***	-0.086***	0.053***	-0.003	0.140***	-0.084***	0.294***	-0.086***	0.053***
	(0.012)	(0.004)	(0.005)	(0.009)	(0.004)	(0.008)	(0.012)	(0.004)	(0.005)	(0.009)	(0.004)	(0.008)
SOVCDS	0.127***	0.026***	0.328***	0.593***	0.133***	-0.011**	0.127***	0.026***	0.328***	0.593***	0.133***	-0.011**
	(0.020)	(0.005)	(0.012)	(0.063)	(0.004)	(0.005)	(0.020)	(0.005)	(0.012)	(0.063)	(0.004)	(0.005)
NITA	-3.104***	-3.691***	-2.015***	-0.545***	-3.688***	-2.713***	-3.063***	-3.691***	-2.014***	-0.561***	-3.693***	-2.700***
	(0.118)	(0.059)	(0.048)	(0.048)	(0.058)	(0.111)	(0.118)	(0.059)	(0.048)	(0.048)	(0.058)	(0.111)
CATA	0.919***	0.147***	0.668***	0.398***	0.167***	0.175***	0.918***	0.147***	0.671***	0.400***	0.165***	0.168**
	(0.059)	(0.033)	(0.033)	(0.039)	(0.025)	(0.067)	(0.059)	(0.033)	(0.033)	(0.039)	(0.025)	(0.067)
SME	0.783***	-0.102**	1.247***	0.746***	0.243***	0.557***	-0.514*	-0.105	0.423**	1.072***	1.153***	-0.144
	(0.121)	(0.050)	(0.078)	(0.038)	(0.046)	(0.135)	(0.273)	(0.105)	(0.213)	(0.062)	(0.278)	(0.239)
LEVERAGE	0.751***	1.402***	2.097***	0.287***	3.581***	1.354***	-1.684***	1.399***	1.108***	0.659***	4.587***	0.557*
	(0.046)	(0.028)	(0.024)	(0.016)	(0.048)	(0.048)	(0.534)	(0.122)	(0.268)	(0.057)	(0.308)	(0.299)
LEVERAGE*SME							2.469***	0.003	0.994***	-0.388***	-1.022***	0.814***
							(0.536)	(0.122)	(0.268)	(0.058)	(0.306)	(0.299)
Constant	-6.646***	-5.858***	-7.638***	-6.731***	-8.433***	-7.223***	-5.377***	-5.855***	-6.820***	-7.043***	-9.325***	-6.536***
	(0.197)	(0.096)	(0.128)	(0.160)	(0.087)	(0.218)	(0.308)	(0.132)	(0.234)	(0.166)	(0.286)	(0.290)
Panel B												
Marginal Effect	SMEs	SMEs	SMEs	SMEs	SMEs	SMEs	large corp.	large corp.	large corp.	large corp.	large corp.	large corp.
LEVERAGE	0.010***	0.029***	0.038***	0.007***	0.048***	0.026***	-0.009***	0.032***	0.007***	0.008***	0.026***	0.007*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.075)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.070)
Panel C												
Observations	432,403	1,150,059	1,867,438	371,760	2,183,133	240,315	432,403	1,150,059	1,867,438	371,760	2,183,133	240,315
Clusters	55,887	194,102	264,236	81,704	303,135	44,898	55,887	194,102	264,236	81,704	303,135	44,898
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
PseudoR^2	0.060	0.101	0.131	0.064	0.171	0.112	0.061	0.101	0.131	0.064	0.171	0.112

Table 8: Corporate Defaults: Effects of Sources of Finance

Panel A of Table 8 reports coefficients of logit regression and robust standard errors clustered at firm level, in parentheses. Panel B reports marginal effects evaluated at the mean value of $TRADE$, $SHORTFIN$, $LONGFIN$ and $OTHER$ for small an medium enterprises and large corporations; standard error of marginal effects are calculated with delta method. Panel C reports number of observations, number of clusters (i.e. firms) and McFadden's R squared. GDP is the one year GDP growth rate, $GOVBOND$ is the three-months government bond interest rate, $SOVCDS$ is the SOVCDS on government bond rate, $NITA$ is the ratio of net income on total assets, $CATA$ is the ratio of current assets on current liabilities, SME is a dummy variable that take value 1 if firm's total assets are equal or below 43 million EUR, $LEVERAGE$ is the ratio between total liabilities and total assets, $TRADE$ is the ratio between trade payables and total assets, $LONGFIN$ is the ratio between debt from financial institutions and bonds with maturity higher than one year and total assets, $SHORTFIN$ is the ratio between debt from financial institutions and bonds with maturity equal or lower than one year and total assets, $OTHER$ is a residual variable defined as the ratio between all liabilities that are not captured by $TRADE$, $LONGFIN$, $SHORTFIN$ and total assets. *** p<0.01, ** p<0.05, * p<0.1

Panel A		
GDP	-0.038***	-0.038***
	(0.001)	(0.001)
GOVBOND	-0.017***	-0.017***
	(0.002)	(0.002)
SOVCDS	0.095***	0.095***
	(0.002)	(0.002)
NITA	-2.463***	-2.462***
	(0.030)	(0.030)
CATA	0.155***	0.162***
	(0.016)	(0.016)
SME	0.341***	-0.065
	(0.025)	(0.063)
TRADE	1.937***	0.793***
	(0.019)	(0.174)
SHORTFIN	1.390***	1.145***
	(0.031)	(0.092)
LONGFIN	1.038***	1.422***
	(0.023)	(0.081)
OTHER	1.788***	0.837***
	(0.016)	(0.097)
TRADE*SME		1.158***
		(0.174)
LONGFIN*SME		-0.414***
		(0.083)
SHORTFIN*SME		0.259***
		(0.096)
OTHER*SME		0.972***

		(0.098)
Constant	-6.550***	-6.154***
	(0.051)	(0.075)
Panel B		
Marginal Effect	SMEs	large corp.
TRADE	0.041***	0.010***
	(0.000)	(0.000)
LONGFIN	0.023***	0.020***
	(0.000)	(0.000)
SHORTFIN	0.030***	0.016***
	(0.000)	(0.000)
OTHER	0.037***	0.011***
	(0.000)	(0.000)
Panel C		
Observations	6,245,108	6,245,108
Clusters	943,962	943,962
Country FE	YES	YES
Industry FE	YES	YES
PseudoR^2	0.097	0.097

Table 9: Corporate Defaults: Effects of Sources of Finance Across Countries

Panel A of Table 9 reports coefficients of logit regression and robust standard errors clustered at firm level, in parentheses. Panel B reports marginal effects evaluated at the mean value of $TRADE$, $SHORTFIN$, $LONGFIN$ and $OTHER$ for small an medium enterprises and large corporations; standard error of marginal effects are calculated with delta method. Panel C reports number of observations, number of clusters (i.e. firms) and McFadden's R squared. GDP is the one year GDP growth rate, $GOVBOND$ is the three-months government bond interest rate, $SOVCDS$ is the SOVCDS on government bond rate, $NITA$ is the ratio of net income on total assets, $CATA$ is the ratio of current assets on current liabilities, SME is a dummy variable that take value 1 if firm's total assets are equal or below 43 million EUR, $LEVERAGE$ is the ratio between total liabilities and total assets, $TRADE$ is the ratio between trade payables and total assets, $LONGFIN$ is the ratio between debt from financial institutions and bonds with maturity higher than one year and total assets, $SHORTFIN$ is the ratio between debt from financial institutions and bonds with maturity equal or lower than one year and total assets, $OTHER$ is a residual variable defined as the ratio between all liabilities that are not captured by $TRADE$, $LONGFIN$, $SHORTFIN$ and total assets. *** p<0.01, ** p<0.05, * p<0.1

Part 1						
Country	BE	ES	FR	GB	IT	PT
Panel A						
GDP	-0.010	-0.032***	-0.048***	0.016**	-0.052***	-0.047***
	(0.007)	(0.003)	(0.003)	(0.006)	(0.002)	(0.007)
GOVBOND	-0.003	0.155***	-0.090***	0.291***	-0.083***	0.053***
	(0.012)	(0.004)	(0.006)	(0.009)	(0.004)	(0.008)
SOVCDS	0.127***	0.033***	0.336***	0.597***	0.132***	-0.010*
	(0.020)	(0.006)	(0.012)	(0.063)	(0.004)	(0.005)
NITA	-3.154***	-3.852***	-2.151***	-0.468***	-4.498***	-2.947***
	(0.114)	(0.057)	(0.046)	(0.046)	(0.045)	(0.108)
CATA	0.705***	0.110***	0.517***	0.187***	0.229***	0.172**
	(0.068)	(0.035)	(0.038)	(0.043)	(0.026)	(0.072)
SME	0.807***	-0.008	1.256***	0.689***	0.295***	0.568***
	(0.122)	(0.049)	(0.078)	(0.038)	(0.046)	(0.137)
TRADE	1.071***	1.210***	2.224***	1.435***	2.699***	1.397***
	(0.071)	(0.053)	(0.037)	(0.072)	(0.041)	(0.086)
LONGFIN	0.379***	1.408***	1.500***	0.365***	2.429***	1.278***
	(0.090)	(0.034)	(0.057)	(0.036)	(0.054)	(0.072)
SHORTFIN	1.506***	3.556***	3.102***	0.452***	3.107***	1.678***
	(0.103)	(0.064)	(0.054)	(0.030)	(0.047)	(0.117)
OTHER	0.647***	1.225***	2.312***	0.543***	2.902***	1.468***
	(0.059)	(0.036)	(0.031)	(0.039)	(0.038)	(0.081)
Constant	-6.546***	-6.039***	-7.645***	-6.769***	-7.767***	-7.210***
	(0.198)	(0.097)	(0.132)	(0.160)	(0.082)	(0.221)
Panel B						
Observations	432,403	1,150,059	1,867,438	371,760	2,183,133	240,315
Clusters	55,887	194,102	264,236	81,704	303,135	44,898
Industry FE	YES	YES	YES	YES	YES	YES
PseudoR^2	0.062	0.110	0.136	0.069	0.168	0.114
Part 2						
Country	BE	ES	FR	GB	IT	PT

Panel A						
GDP	-0.010	-0.032***	-0.048***	0.016**	-0.052***	-0.047***
	(0.007)	(0.003)	(0.003)	(0.006)	(0.002)	(0.007)
GOVBOND	-0.003	0.154***	-0.090***	0.291***	-0.083***	0.053***
	(0.012)	(0.004)	(0.006)	(0.009)	(0.004)	(0.008)
SOVCDS	0.127***	0.034***	0.336***	0.597***	0.132***	-0.010*
	(0.020)	(0.006)	(0.012)	(0.063)	(0.004)	(0.005)
NITA	-3.115***	-3.851***	-2.149***	-0.489***	-4.497***	-2.936***
	(0.114)	(0.057)	(0.046)	(0.046)	(0.045)	(0.108)
CATA	0.712***	0.111***	0.522***	0.189***	0.229***	0.166**
	(0.068)	(0.035)	(0.038)	(0.043)	(0.026)	(0.072)
SME	-0.609**	-0.043	0.389	1.119***	1.594***	-0.138
	(0.259)	(0.121)	(0.238)	(0.092)	(0.291)	(0.272)
TRADE	-3.909***	1.098***	1.089**	1.450***	3.083***	0.759
	(1.285)	(0.345)	(0.459)	(0.318)	(0.412)	(0.808)
LONGFIN	-1.982***	1.612***	1.581***	1.308***	4.919***	0.328
	(0.644)	(0.158)	(0.468)	(0.111)	(0.438)	(0.476)
SHORTFIN	-0.722	3.488***	1.196	0.691***	5.524***	0.261
	(0.718)	(0.277)	(0.838)	(0.112)	(0.376)	(0.749)
OTHER	-1.324**	0.852***	1.156***	0.812***	4.197***	1.076**
	(0.663)	(0.179)	(0.335)	(0.153)	(0.330)	(0.468)
TRADE*SME	5.019***	0.117	1.139**	-0.011	-0.391	0.644
	(1.286)	(0.348)	(0.459)	(0.322)	(0.412)	(0.810)
LONGFIN*SME	2.407***	-0.216	-0.088	-1.046***	-2.530***	0.978**
	(0.648)	(0.160)	(0.471)	(0.116)	(0.438)	(0.478)
SHORTFIN*SME	2.273***	0.071	1.920**	-0.240**	-2.449***	1.470*
	(0.726)	(0.281)	(0.840)	(0.115)	(0.376)	(0.755)
OTHER*SME	2.000***	0.386**	1.162***	-0.265*	-1.310***	0.409
	(0.666)	(0.180)	(0.336)	(0.157)	(0.329)	(0.472)
Constant	-5.166***	-6.005***	-6.785***	-7.174***	-9.050***	-6.524***
	(0.295)	(0.146)	(0.257)	(0.179)	(0.297)	(0.316)
Panel B						
Marginal Effect (at mean) of SMEs						
TRADE	0.015***	0.028***	0.047***	0.037***	0.055***	0.031***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
LONGFIN	0.006***	0.031***	0.033***	0.007***	0.046***	0.028***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
SHORTFIN	0.021***	0.080***	0.067***	0.011***	0.077***	0.038***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
OTHER	0.009***	0.030***	0.047***	0.014***	0.070***	0.032***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Marginal Effect (at mean) of large corporations						
TRADE	-0.019***	0.025***	0.007**	0.018***	0.042***	0.009
	(0.001)	(0.002)	(0.012)	(0.000)	(0.000)	(0.346)
LONGFIN	-0.008***	0.037***	0.011***	0.018***	0.077***	0.005
	(0.002)	(0.000)	(0.001)	(0.000)	(0.000)	(0.508)
SHORTFIN	-0.003	0.082***	0.008***	0.009***	0.058***	.004
	(0.313)	(0.000)	(0.161)	(0.000)	(0.000)	(0.729)

OTHER	-0.006*	0.019***	0.007***	0.010***	0.049***	0.014**
	(0.053)	(0.000)	(0.001)	(0.000)	(0.000)	(0.028)
			Panel C			
Observations	432,403	1,150,059	1,867,438	371,760	2,183,133	240,315
Clusters	55,887	194,102	264,236	81,704	303,135	44,898
Industry FE	YES	YES	YES	YES	YES	YES
PseudoR^2	0.063	0.110	0.137	0.071	0.169	0.114

Table 10: Loan Interest Rates

Table 10 reports probabilities of default estimated with two different logit models that employ different independent variables and interactions with SME. In panel A we evaluate probabilities of default when all independent variables are held at their mean values. In panel B we take the first decile of $LEVERAGE$, $TRADE$, $LONGFIN$, $SHORTFIN$ and $OTHER$. In panel C we take the ninth decile of $LEVERAGE$, $TRADE$, $LONGFIN$, $SHORTFIN$ and $OTHER$. PD is the probability of default, r_f is the risk free rate, d_{el} is the spread that compensates for expected losses and d_{ul} is the spread that compensates for unexpected losses.

	All Countries				Italy			
Model	Large (1)	SMEs (1)	Large (4)	SMEs (4)	Large (1)	SMEs (1)	Large (4)	SMEs (4)
				Panel A				
PD	0.467%	0.756%	0.446%	0.712%	0.257%	0.511%	0.220%	0.605%
d_{el}	0.091%	0.147%	0.087%	0.139%	0.050%	0.100%	0.043%	0.118%
d_{ul}	0.937%	0.938%	0.937%	0.938%	0.937%	0.937%	0.937%	0.938%
$r_f + d_{el} + d_{ul}$	1.322%	1.379%	1.318%	1.370%	1.281%	1.331%	1.273%	1.349%
difference from model (1)			-0.004%	-0.009%			-0.007%	0.018%
				Panel B				
PD	0.302%	0.510%	0.232%	0.244%	0.065%	0.143%	0.017%	0.083%
d_{el}	0.059%	0.099%	0.045%	0.047%	0.013%	0.028%	0.003%	0.016%
d_{ul}	0.937%	0.937%	0.937%	0.937%	0.937%	0.937%	0.937%	0.937%
$r_f + d_{el} + d_{ul}$	1.290%	1.330%	1.276%	1.278%	1.243%	1.258%	1.233%	1.246%
difference from model (1)			-0.014%	-0.052%			-0.010%	-0.012%
				Panel C				
PD	0.646%	0.510%	1.712%	4.206%	0.730%	1.099%	15.371%	16.489%
d_{el}	0.126%	0.099%	0.334%	0.825%	0.142%	0.214%	3.083%	3.314%
d_{ul}	0.938%	0.937%	0.940%	0.944%	0.938%	0.939%	0.965%	0.967%
$r_f + d_{el} + d_{ul}$	1.357%	1.330%	1.567%	2.063%	1.374%	1.446%	4.342%	4.575%
difference from model (1)			0.210%	0.733%			2.968%	3.129%

Table 11: Basel III Capital Requirements

Table 11 reports probabilities of default estimated with four different logit models that employ different independent variables and interactions with SME. Moreover, it shows Risk Weighted Assets (RWA), Tier 1 Capital requirement and Total Capital requirement of a loan with an exposure at default of one million, a loss given default of 45%, a maturity of 10 years of a firm with more than 50 million dollar annual sales. PD is the probability of default, RWA stands for Risk Weighted Assets, Tier 1 Capital is the required regulatory minimum Tier 1 capital, Total Capital is the required regulatory minimum total (Tier 1 + Tier 2) capital.

	Model			
	(1)	(2)	(3)	(4)
large corporations				
PD	0.467%	0.485%	0.431%	0.446%
RWA	1019389.0	1034175.3	988176.0	1001459.0
Total Capital	81551.1	82734.0	79054.1	80116.7
Tier 1	61163.3	62050.5	59290.6	60087.5
% difference from model (4)	1.790%	3.267%	-1.326%	
SMEs				
PD	0.756%	0.755%	0.729%	0.712%
RWA	1208315.1	1207801.1	1194168.1	1184964.5
Total Capital	96665.2	96624.1	95533.4	94797.2
Tier 1	72498.9	72468.1	71650.1	71097.9
% difference from model (4)	1.971%	1.927%	0.777%	
% difference between SMEs and large corporations	18.533%	16.789%	20.846%	18.324%
$LEVERAGE$	YES	YES	NO	NO
$TRADE$, $LONGFIN$, $SHORTFIN$, $OTHER$	NO	NO	YES	YES
SME interaction	NO	YES	NO	YES

Figures

Figure 1: Marginal Effects of Leverage

Figure 1 plots marginal effects of $LEVERAGE$ for large corporations and SMEs. Vertical lines highlight average values of $LEVERAGE$ for large corporations (dash-dotted line) and SMEs (solid line).

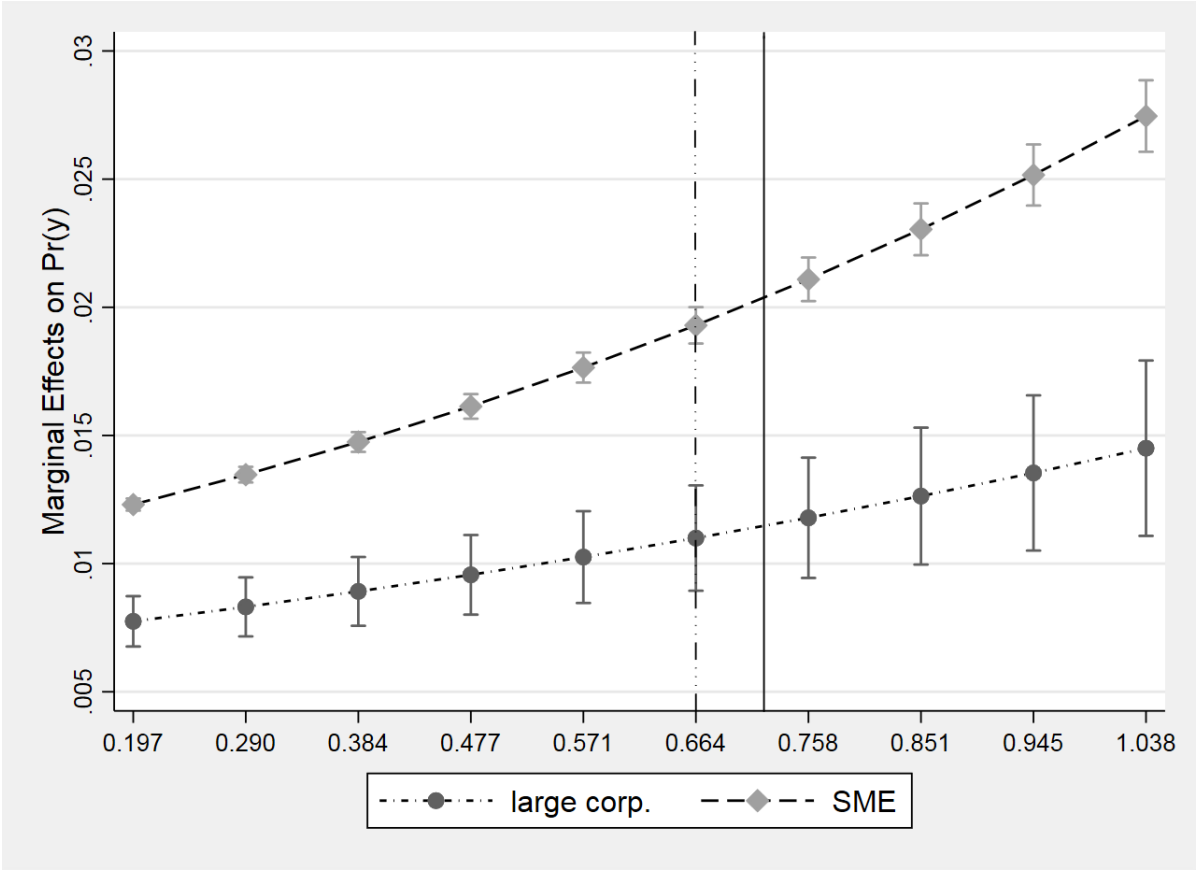
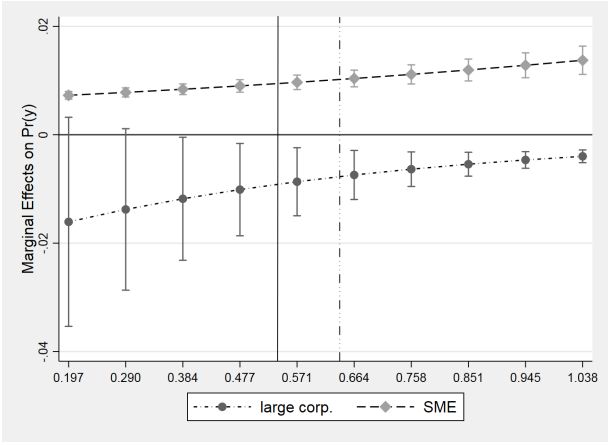


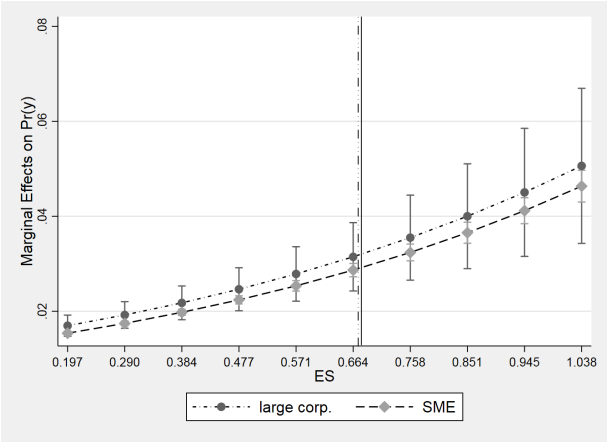
Figure 2: Marginal Effects of Leverage Across Countries

Figure 2 plots marginal effects of $LEVERAGE$ for large corporations and SMEs for different countries. Vertical lines highlight average values of $LEVERAGE$ for large corporations (dash-dotted lines) and SMEs (solid lines).

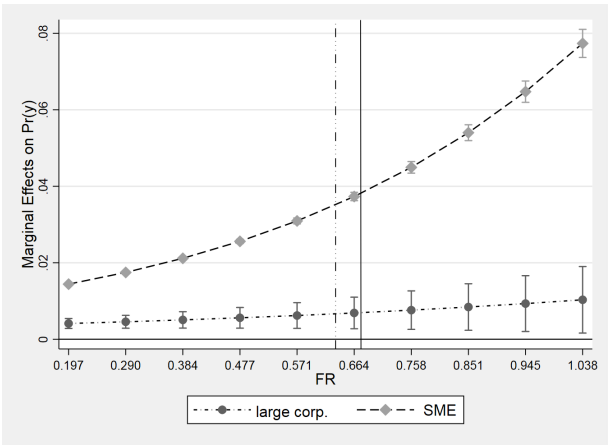
(a) Belgium



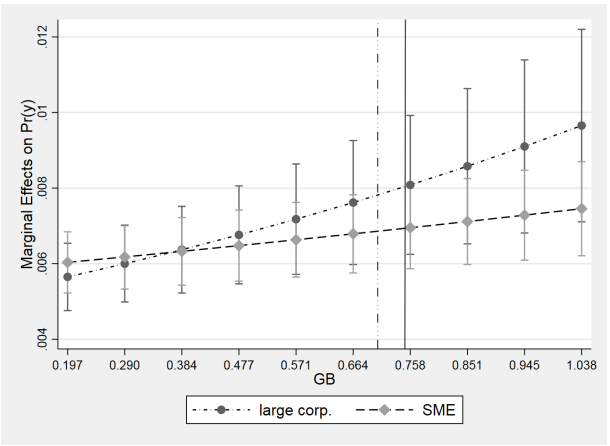
(b) Spain



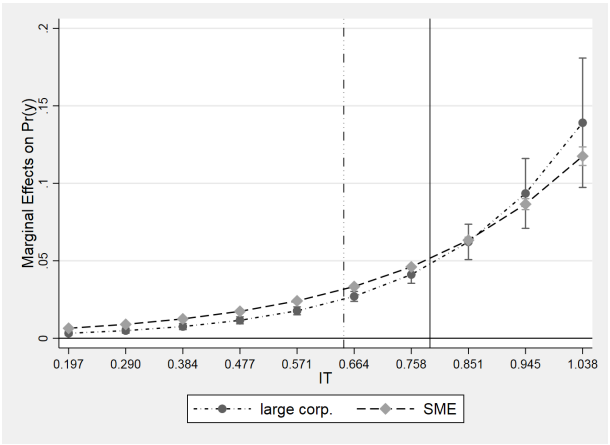
(c) France



(d) United Kingdom



(e) Italy



(f) Portugal

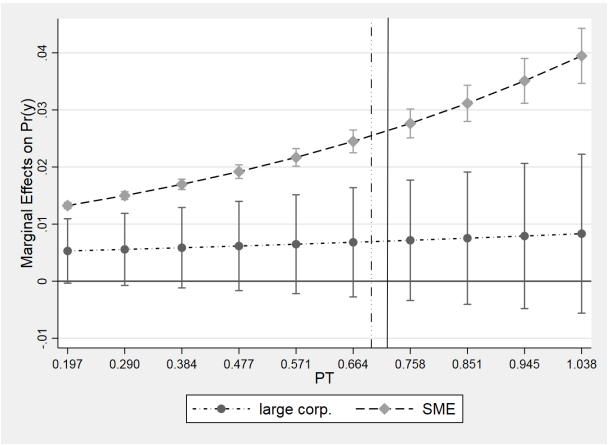
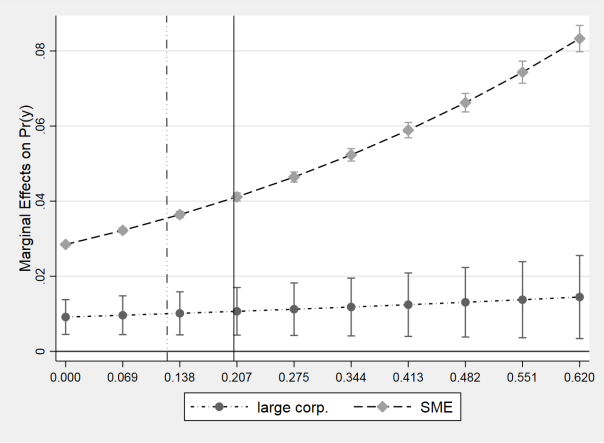


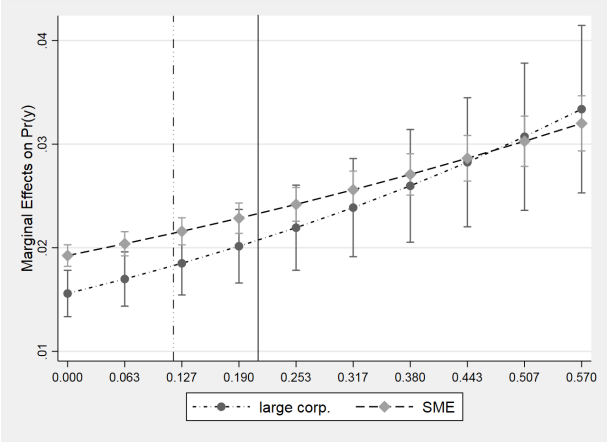
Figure 3: Marginal Effects of Sources of Finance

Figure 2 plots marginal effects of $TRADE$, $LONGFIN$, $SHORTFIN$ and $OTHER$ for large corporations and SMEs. Vertical lines highlight average values of $TRADE$, $LONGFIN$, $SHORTFIN$ and $OTHER$ for large corporations (dash-dotted lines) and SMEs (solid lines).

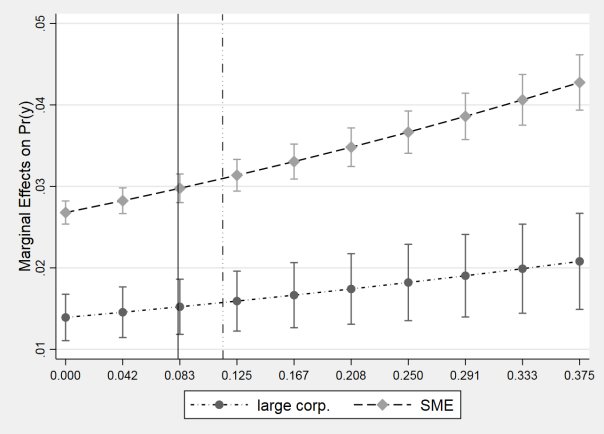
(a) Trade Payables



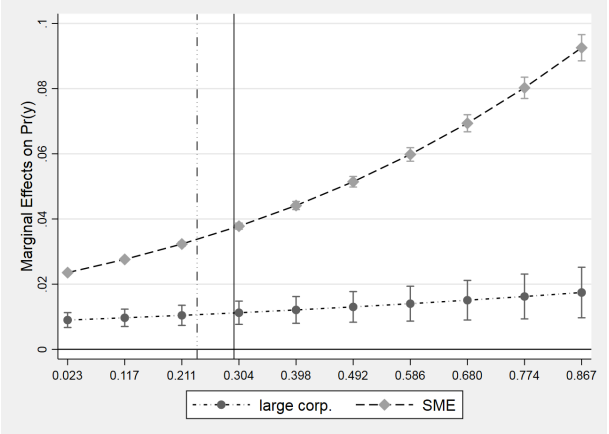
(b) Long-Term Financial Debt



(c) Short-Term Financial Debt



(d) Other Liabilities



Appendices

A Additional Tables

Table A.1: Summary Statistics - Break-Up Across Different Dimensions

	Observations	Mean	Median	St. Dev.	Min	Max
Overall Sample						
GDP	6,102,765	0.317	0.652	2.495	-7.101	4.223
GOVBOND	6,102,765	1.761	1.244	1.570	-0.073	6.750
SOVCDS	6,102,765	1.148	0.698	1.352	0.013	11.507
NITA	6,102,765	0.028	0.018	0.112	-1.722	1.000
CATA	6102765	0.682	0.768	0.283	0.000	1.000
SME	6,102,765	0.961	1.000	0.194	0.000	1.000
LEVERAGE	6,102,765	0.703	0.732	0.309	0.000	5.013
TRADE	6,102,765	0.200	0.146	0.202	0.000	0.988
LONGFIN	6,102,765	0.122	0.027	0.196	0.000	1.492
SHORTFIN	6,102,765	0.081	0.013	0.142	0.000	2.222
OTHER	6,102,765	0.294	0.216	0.254	0.000	1.815
Insolvent						
GDP	40,342	0.111	0.410	2.098	-7.067	4.223
GOVBOND	40,342	1.305	0.535	1.532	-0.055	6.370
SOVCDS	40,342	1.588	0.929	1.738	0.013	10.574
NITA	40,342	-0.089	-0.019	0.199	-1.722	1.000
CATA	40,342	0.674	0.754	0.275	0.000	1.000
SME	40,342	0.970	1.000	0.172	0.000	1.000
LEVERAGE	40,342	1.017	0.937	0.396	0.000	5.013
TRADE	40,342	0.251	0.197	0.229	0.000	0.988
LONGFIN	40,342	0.211	0.108	0.257	0.000	1.492
SHORTFIN	40,342	0.131	0.052	0.186	0.000	2.222
OTHER	40,342	0.416	0.326	0.332	0.000	1.815
Bankruptcy						
GDP	102,001	-0.047	0.497	2.701	-7.067	4.223
GOVBOND	102,001	1.867	1.244	1.640	-0.058	5.890
SOVCDS	102,001	1.245	0.818	1.273	0.013	10.482
NITA	102,001	-0.082	-0.007	0.223	-1.722	1.000
CATA	102,001	0.752	0.853	0.263	0.000	1.000
SME	102,001	0.980	1.000	0.139	0.000	1.000
LEVERAGE	102,001	0.964	0.944	0.429	0.000	5.013

TRADE	102,001	0.271	0.207	0.263	0.000	0.988
LONGFIN	102,001	0.130	0.008	0.231	0.000	1.492
SHORTFIN	102,001	0.126	0.029	0.203	0.000	2.222
OTHER	102,001	0.424	0.324	0.343	0.000	1.815
			SMEs			
GDP	6,003,535	0.301	0.652	2.494	-7.076	4.223
GOVBOND	6,003,535	1.759	1.244	1.566	-0.073	6.750
SOVCDS	6,003,535	1.159	0.698	1.357	0.013	11.507
NITA	6,003,535	0.026	0.017	0.116	-1.722	1.000
CATA	6,003,535	0.689	0.775	0.279	0.000	1.000
SME	6,003,535	1.000	1.000	0.000	1.000	1.000
LEVERAGE	6,003,535	0.711	0.739	0.314	0.000	5.013
TRADE	6,003,535	0.205	0.151	0.205	0.000	0.988
LONGFIN	6,003,535	0.120	0.026	0.194	0.000	1.492
SHORTFIN	6,003,535	0.081	0.013	0.141	0.000	2.222
OTHER	6,003,535	0.299	0.220	0.258	0.000	1.815
			Large Corporations			
GDP	241,573	0.544	1.194	2.549	-7.101	4.223
GOVBOND	241,573	1.781	0.849	1.682	-0.073	6.750
SOVCDS	241,573	0.989	0.589	1.253	0.013	11.507
NITA	241,573	0.021	0.015	0.109	-1.722	1.000
CATA	241,573	0.533	0.554	0.322	0.000	1.000
SME	241,573	0.000	0.000	0.000	0.000	0.000
LEVERAGE	241,573	0.664	0.691	0.325	0.000	5.013
TRADE	241,573	0.122	0.063	0.154	0.000	0.988
LONGFIN	241,573	0.178	0.042	0.264	0.000	1.492
SHORTFIN	241,573	0.119	0.031	0.196	0.000	2.222
OTHER	241,573	0.239	0.161	0.235	0.000	1.815
			Belgium			
GDP	432,403	1.187	1.607	1.913	-3.833	3.595
GOVBOND	432,403	1.346	0.750	1.411	-0.073	4.306
SOVCDS	432,403	0.759	0.640	0.734	0.023	2.621
NITA	432,403	0.036	0.026	0.116	-0.527	0.458
CATA	432,403	0.624	0.701	0.313	0.005	1.000
SME	432,403	0.957	1.000	0.202	0.000	1.000
LEVERAGE	432,403	0.626	0.655	0.339	0.002	2.056
TRADE	432,403	0.180	0.110	0.202	0.000	0.906
LONGFIN	432,403	0.135	0.035	0.196	0.000	0.860
SHORTFIN	432,403	0.052	0.000	0.116	0.000	0.631
OTHER	432,403	0.253	0.181	0.238	0.000	1.303

			Spain			
GDP	1,150,059	0.456	-0.165	2.737	-4.252	4.223
GOVBOND	1,150,059	2.163	2.184	1.411	0.043	4.501
SOVCDS	1,150,059	1.400	0.929	1.397	0.028	4.495
NITA	1,150,059	0.015	0.013	0.096	-0.539	0.375
CATA	1,150,059	0.604	0.650	0.288	0.011	1.000
SME	1,150,059	0.965	1.000	0.184	0.000	1.000
LEVERAGE	1,150,059	0.672	0.703	0.296	0.003	1.780
TRADE	1,150,059	0.118	0.035	0.168	0.000	0.800
LONGFIN	1,150,059	0.236	0.149	0.248	0.000	1.008
SHORTFIN	1,150,059	0.054	0.000	0.102	0.000	0.514
OTHER	1,150,059	0.260	0.169	0.248	0.001	1.067
			France			
GDP	1,867,438	0.865	1.165	1.701	-3.820	2.943
GOVBOND	1,867,438	1.344	0.482	1.494	-0.030	4.395
SOVCDS	1,867,438	0.561	0.457	0.515	0.017	1.857
NITA	1,867,438	0.050	0.047	0.120	-0.525	0.407
CATA	1,867,438	0.730	0.817	0.253	0.050	1.000
SME	1,867,438	0.975	1.000	0.155	0.000	1.000
LEVERAGE	1,867,438	0.671	0.669	0.288	0.063	1.948
TRADE	1,867,438	0.233	0.195	0.182	0.000	0.850
LONGFIN	1,867,438	0.078	0.016	0.132	0.000	0.697
SHORTFIN	1,867,438	0.056	0.016	0.093	0.000	0.530
OTHER	1,867,438	0.297	0.243	0.218	0.007	1.219
			United Kingdom			
GDP	371,760	1.252	1.950	2.492	-6.091	4.157
GOVBOND	371,760	1.892	0.550	2.054	0.274	5.902
SOVCDS	371,760	0.424	0.346	0.359	0.013	1.426
NITA	371,760	0.028	0.032	0.226	-1.722	1.000
CATA	371,760	0.602	0.674	0.328	0.000	1.000
SME	371,760	0.815	1.000	0.389	0.000	1.000
LEVERAGE	371,760	0.746	0.674	0.623	0.000	5.013
TRADE	371,760	0.119	0.059	0.148	0.000	0.676
LONGFIN	371,760	0.197	0.032	0.320	0.000	1.492
SHORTFIN	371,760	0.182	0.067	0.300	0.000	2.222
OTHER	371,760	0.216	0.136	0.255	0.000	1.815
			Italy			
GDP	2,183,133	-0.508	0.370	2.765	-7.101	2.582
GOVBOND	2,183,133	1.883	1.244	1.524	0.070	4.439
SOVCDS	2,183,133	1.511	1.154	1.281	0.077	4.640

NITA	2,183,133	0.009	0.005	0.089	-0.515	0.291
CATA	2,183,133	0.715	0.808	0.275	0.017	1.000
SME	2,183,133	0.973	1.000	0.163	0.000	1.000
LEVERAGE	2,183,133	0.769	0.837	0.246	0.037	1.526
TRADE	2,183,133	0.237	0.184	0.229	0.000	0.928
LONGFIN	2,183,133	0.073	0.000	0.141	0.000	0.696
SHORTFIN	2,183,133	0.108	0.026	0.151	0.000	0.684
OTHER	2,183,133	0.350	0.252	0.288	0.001	1.107
			Portugal			
GDP	240,315	-0.305	1.120	2.518	-4.477	2.809
GOVBOND	240,315	2.493	2.345	1.713	0.137	6.750
SOVCDS	240,315	3.154	1.830	3.298	0.051	11.507
NITA	240,315	0.009	0.011	0.108	-0.655	0.358
CATA	240,315	0.645	0.702	0.275	0.016	1.000
SME	240,315	0.965	1.000	0.184	0.000	1.000
LEVERAGE	240,315	0.724	0.729	0.297	0.012	2.236
TRADE	240,315	0.209	0.165	0.188	0.000	0.988
LONGFIN	240,315	0.234	0.166	0.237	0.000	1.045
SHORTFIN	240,315	0.084	0.027	0.124	0.000	0.740
OTHER	240,315	0.191	0.124	0.198	0.002	1.043

Table A.1 displays summary statistics of independent variables for *Active* firms, *Insolvent* firms, *Bankrupt* firms, large corporations, SMEs and for firms in each country individually. GDP is the one year GDP growth rate, $GOVBOND$ is the three-months government bond interest rate, $SOVCDS$ is the SOVCDS on government bond rate, $NITA$ is the ratio of net income on total assets, $CATA$ is the ratio of current assets on current liabilities, SME is a dummy variable that take value 1 if firm's total assets are equal or below 43 million EUR, $LEVERAGE$ is the ratio between total liabilities and total assets, $TRADE$ is the ratio between trade payables and total assets, $LONGFIN$ is the ratio between debt from financial institutions and bonds with maturity higher than one year and total assets, $SHORTFIN$ is the ratio between debt from financial institutions and bonds with maturity equal or lower than one year and total assets, $OTHER$ is a residual variable defined as the ratio between all liabilities that are not captured by $TRADE$, $LONGFIN$, $SHORTFIN$ and total assets.

Table A.2: Indsutries

Table A.2 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	130,235	(2.085)	7,246	(1.676)	39,223	(3.411)	21,950	(1.175)	5,125	(1.379)	49,069	(2.248)	7,622	(3.172)
Mining and quarrying	29,767	(0.477)	1,162	(0.269)	7,097	(0.617)	6,841	(0.366)	5,143	(1.383)	7,948	(0.364)	1,576	(0.656)
Manufacturing	1,309,258	(20.965)	56,541	(13.076)	223,183	(19.406)	289,294	(15.491)	72,876	(19.603)	604,538	(27.691)	62,826	(26.143)
Electricity, gas, steam and air conditioning supply	59,321	(0.950)	1,882	(0.435)	12,614	(1.097)	12,342	(0.661)	3,432	(0.923)	26,807	(1.228)	2,244	(0.934)
Water supply; sewerage, waste management and remediation activities	56,333	(0.902)	3,275	(0.757)	7,523	(0.654)	15,030	(0.805)	3,423	(0.921)	24,742	(1.133)	2,340	(0.974)
Construction	1,003,188	(16.064)	53,294	(12.325)	239,362	(20.813)	286,959	(15.366)	39,130	(10.526)	350,705	(16.064)	33,738	(14.039)
Wholesale and retail trade; repair of motor vehicles and motorcycles	1,749,605	(28.016)	119,193	(27.565)	316,024	(27.479)	635,726	(34.043)	57,396	(15.439)	547,254	(25.067)	74,012	(30.798)
Transportation and storage	322,960	(5.171)	24,780	(5.731)	63,106	(5.487)	95,734	(5.126)	15,865	(4.268)	113,010	(5.177)	10,465	(4.355)
Accommodation and food service activities	267,832	(4.289)	11,402	(2.637)	53,004	(4.609)	91,854	(4.919)	16,045	(4.316)	82,753	(3.791)	12,774	(5.316)
Information and communication	202,980	(3.250)	14,053	(3.250)	26,156	(2.274)	69,418	(3.717)	21,563	(5.800)	67,299	(3.083)	4,491	(1.869)
Professional, scientific and technical activities	462,307	(7.403)	67,019	(15.499)	62,328	(5.420)	164,207	(8.793)	38,210	(10.278)	120,905	(5.538)	9,638	(4.011)
Administrative and support service activities	301,851	(4.833)	26,028	(6.019)	43,049	(3.743)	94,288	(5.049)	42,152	(11.338)	88,206	(4.040)	8,128	(3.382)
Education	55,998	(0.897)	5,564	(1.287)	9,463	(0.823)	12,194	(0.653)	14,968	(4.026)	11,331	(0.519)	2,478	(1.031)
Human health and social work activities	163,281	(2.615)	25,603	(5.921)	22,676	(1.972)	44,251	(2.370)	15,270	(4.107)	50,106	(2.295)	5,375	(2.237)
Arts, entertainment and recreation	72,368	(1.159)	6,139	(1.420)	15,048	(1.308)	15,658	(0.838)	9,267	(2.493)	24,511	(1.123)	1,745	(0.726)
Other service activities	57,824	(0.926)	9,222	(2.133)	10,203	(0.887)	11,692	(0.626)	11,895	(3.200)	13,949	(0.639)	863	(0.359)
Total	6,245,108		432,403		1,150,059		1,867,438		371,760		2,183,133		240,315	

Table A.3: Corporate Defaults: Effects of Leverage - Robustness

Panel A of Table A.3 reports coefficients of logit regression and robust standard errors clustered at firm level, in parentheses. Panel B reports number of observations, number of clusters (i.e. firms) and McFadden's R squared. GDP is the one year GDP growth rate, $GOVBOND$ is the three-months government bond interest rate, $SOVCDS$ is the SOVCDS on government bond rate, $NITA$ is the ratio of net income on total assets, $CATA$ is the ratio of current assets on current liabilities, SME is a dummy variable that take value 1 if firm's total assets are equal or below 43 million EUR, $LEVERAGE$ is the ratio between total liabilities and total assets, $TRADE$ is the ratio between trade payables and total assets, $LONGFIN$ is the ratio between debt from financial institutions and bonds with maturity higher than one year and total assets, $SHORTFIN$ is the ratio between debt from financial institutions and bonds with maturity equal or lower than one year and total assets, $OTHER$ is a residual variable defined as the ratio between all liabilities that are not captured by $TRADE$, $LONGFIN$, $SHORTFIN$ and total assets. *** p<0.01, ** p<0.05, * p<0.1

	(1)	(2)	(3)	(4)	(5)
Panel A					
GDP	-0.037***	-0.036***	-0.037***	-0.036***	-0.039***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
GOVBOND	0.057***	-0.012***	0.057***	-0.012***	0.013***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
SOVCDS	0.067***	0.090***	0.067***	0.090***	0.066***
	(0.003)	(0.002)	(0.003)	(0.002)	(0.003)
NITA	-2.911***	-2.993***	-2.911***	-2.990***	-3.697***
	(0.034)	(0.030)	(0.034)	(0.030)	(0.037)
CATA	0.745***	0.439***	0.746***	0.439***	0.294***
	(0.015)	(0.015)	(0.015)	(0.015)	(0.020)
SME	0.510***	0.363***	0.255***	0.168***	-0.137**
	(0.024)	(0.025)	(0.052)	(0.049)	(0.064)
LEVERAGE	0.711***	0.994***	0.405***	0.767***	0.458***
	(0.014)	(0.015)	(0.061)	(0.056)	(0.074)
LEVERAGE*SME			0.313***	0.233***	0.653***
			(0.063)	(0.057)	(0.076)
/cut1		6.236***		6.049***	
		(0.050)		(0.063)	
/cut2		6.587***		6.399***	
		(0.050)		(0.063)	
Constant	-6.657***		-6.409***		-6.301***
	(0.046)		(0.063)		(0.086)
Panel B					
Observations	6,245,108	6,245,108	6,245,108	6,245,108	3,926,184
Clusters	943,962	943,962	943,962	943,962	758,377
Country FE	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES
PseudoR^2	0.071	0.073	0.071	0.073	0.103
European	NO	NO	NO	NO	YES

Table A.4: Corporate Defaults: Effects of Sources of Finance - Robustness

Panel A of Table A.3 reports coefficients of logit regression and robust standard errors clustered at firm level, in parentheses. Panel B reports number of observations, number of clusters (i.e. firms) and McFadden's R squared. GDP is the one year GDP growth rate, $GOVBOND$ is the three-months government bond interest rate, $SOVCDS$ is the SOVCDS on government bond rate, $NITA$ is the ratio of net income on total assets, $CATA$ is the ratio of current assets on current liabilities, SME is a dummy variable that take value 1 if firm's total assets are equal or below 43 million EUR, $LEVERAGE$ is the ratio between total liabilities and total assets, $TRADE$ is the ratio between trade payables and total assets, $LONGFIN$ is the ratio between debt from financial institutions and bonds with maturity higher than one year and total assets, $SHORTFIN$ is the ratio between debt from financial institutions and bonds with maturity equal or lower than one year and total assets, $OTHER$ is a residual variable defined as the ratio between all liabilities that are not captured by $TRADE$, $LONGFIN$, $SHORTFIN$ and total assets. *** p<0.01, ** p<0.05, * p<0.1

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A							
GDP	-0.039***	-0.038***	-0.039***	-0.038***	-0.041***	-0.037***	-0.037***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)
GOVBOND	0.054***	-0.013***	0.055***	-0.013***	0.012***	-0.018***	-0.018***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
SOVCDS	0.069***	0.092***	0.069***	0.092***	0.068***	0.096***	0.096***
	(0.003)	(0.002)	(0.003)	(0.002)	(0.003)	(0.002)	(0.002)
NITA	-2.429***	-2.455***	-2.431***	-2.454***	-3.093***	-2.633***	-2.628***
	(0.032)	(0.030)	(0.032)	(0.030)	(0.039)	(0.030)	(0.030)
CATA	0.413***	0.169***	0.422***	0.176***	0.032	0.237***	0.240***
	(0.016)	(0.016)	(0.016)	(0.016)	(0.022)	(0.016)	(0.016)
SME	0.482***	0.346***	-0.025	-0.048	-0.228***	0.350***	0.080
	(0.024)	(0.025)	(0.064)	(0.061)	(0.071)	(0.026)	(0.058)
TRADE	1.735***	1.899***	0.238	0.767***	1.041***		
	(0.018)	(0.018)	(0.186)	(0.169)	(0.164)		
LONGFIN	0.580***	1.007***	1.026***	1.404***	1.083***		
	(0.024)	(0.022)	(0.085)	(0.079)	(0.124)		
SHORTFIN	0.894***	1.351***	0.394***	1.119***	0.803***		
	(0.030)	(0.030)	(0.106)	(0.091)	(0.128)		
OTHER	1.532***	1.755***	0.514***	0.823***	0.846***		
	(0.015)	(0.016)	(0.101)	(0.095)	(0.101)		
TRADE*SME			1.510***	1.145***	0.870***		
			(0.186)	(0.169)	(0.164)		
LONGFIN*SME			-0.482***	-0.428***	0.010		
			(0.087)	(0.081)	(0.126)		
SHORTFIN*SME			0.520***	0.246***	0.822***		
			(0.109)	(0.094)	(0.132)		
OTHER*SME			1.037***	0.953***	1.041***		
			(0.102)	(0.096)	(0.102)		
CURRENT						1.559***	0.870***
						(0.017)	(0.079)
NONCURRENT						1.066***	1.386***
						(0.021)	(0.076)
CURRENT*SME							0.708***
							(0.079)
NONCURRENT*SME							-0.336***
							(0.078)
/cut1		6.529***		6.146***			
		(0.050)		(0.074)			
/cut2		6.883***		6.500***			
		(0.050)		(0.074)			
Constant	-6.920***		-6.426***		-6.508***	-6.443***	-6.183***
	(0.046)		(0.074)		(0.092)	(0.051)	(0.071)
Panel B							
Observations	6,245,108	6,245,108	6,245,108	6,245,108	3,926,184	6,244,962	6,244,962
Clusters	943,962	943,962	943,962	943,962	758,377	943,957	943,957
Country FE	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES	YES
PseudoR^2	0.083	0.085	0.084	0.086	0.116	0.092	0.092
European	NO	NO	NO	NO	YES	NO	NO

B Independent Variable Classification

Definitions of Orbis *"status"* are reported in table B.1. 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"*, *"Dissolved bankruptcy"*, *"Dissolved bankruptcy"*.

Table B.1: Orbis Status

Orbis Definition of Status	Description
Active	The company is active.
Active default of payment	The term default should be distinguished from the terms insolvency and bankruptcy. Default essentially means a debtor has not paid a debt. Insolvency is a legal term meaning that a debtor is unable to pay his debts. Bankruptcy is a legal finding that imposes court supervision over the financial affairs of those who are insolvent or in default.
Active rescue plan	The company remains active; it is not involved in insolvency proceedings, but is in a period of protection. One of the conditions is that the company hasn't been incurred into default of payment this means that there aren't credits unpaid. This proceeding starts on the initiative of the debtor to benefit from a suspension of creditor lawsuits. Here the terms of loans are reviewed through a negotiation with creditors. Normally there is an external supervisor. The target is to prevent financial difficulties which endanger survival of the company. A specific case for this status is for instance "Procdure de sauvegarde" in France.
Active insolvency proceedings	Here the company is declared insolvent. The company remains active, though is in administration or receivership or under a scheme of arrangement US - Chapter 11. During this period, the company is usually placed under the protection of a law and continues operating and repaying creditors and tries to reorganize and return to normal operating. At the end, the company will either return to normal operating the default of payment was thus temporary; or will be reorganized parts of its activity can be restructured or sold; or will be liquidated.
Active dormant	The company is still registered, but has no significant activity and no significant accounting transactions during the accounting

	period. Companies may be dormant for various reasons, for example, to protect a company name, in readiness for a future project, or to hold an asset or intellectual property. A company can remain dormant for as long as necessary - indefinitely if, for example, its purpose is just to prevent the name being used by another company. However, there are expenses associated with keeping a company on the register.
Active reorganization	We make a distinction between plain active and active but being reorganized, restructured, in process of merger a priori the reason for reorganization is not having financial problems.
Bankruptcy	Bankruptcy is a legally declared inability of a company to pays its creditors. The company is in the process of bankruptcy. The assets are being sold in order to repay the creditors. At the end the company will be dissolved and will no longer exist.
In liquidation	The company is in the process of liquidation; all assets of the company are being sold. The next step will be that the company will be dissolved and will no longer exist. We reserve the term "in liquidation" mainly to friendly or voluntary liquidation. The reason for the liquidation can be the termination of the company as per the company status, voluntary dissolution, or another reason that is not linked to payment/credit difficulties. In some cases however the need for liquidation proceedings can be viewed as self-addressing creditor problems when an insolvent debtors assets are insufficient to meet the claims of all creditors it will be in a creditors own best interest to take action to recover its claim before other creditors can take similar action.
Dissolved	The company no longer exists as a legal entity, but the reason for this is not specified. This means that the company is dead, has no more activity or is no longer included in the companies register. Synonyms: erased, deleted, removed from register, dead, defunct, struck off, signed out, ceased, wound up. When the cause of dissolution is known, we use one of the 4 more precise labels listed below.
Dissolved merger or take-over	The company no longer exists as a legal entity because the company has been included in a merger or was subject of a take-over.
Dissolved demerger	The company no longer exists as a legal entity; the reason for this is a demerger: the company has been "split".
Dissolved bankruptcy	The company has been dissolved at the end of a bankruptcy process or there was a bankruptcy declared into an insolvency or liquidation proceeding.
Dissolved liquidation	The company has been dissolved after friendly liquidation of its assets.

Inactive no precision	The company is no longer active and the precise reason for inactivity is unknown.
Unknown	No information regarding the status.

Table B.1 reports definitions of Orbis *"status"* field.

C Additional Figures

Figure C.1: Marginal Effects of Trade Payables Across Countries

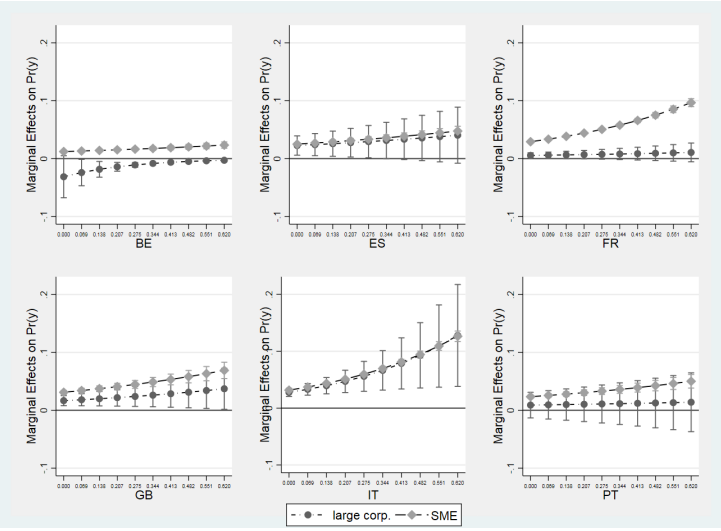


Figure C.2: Marginal Effects of Long-Term Financial Debt Across Countries

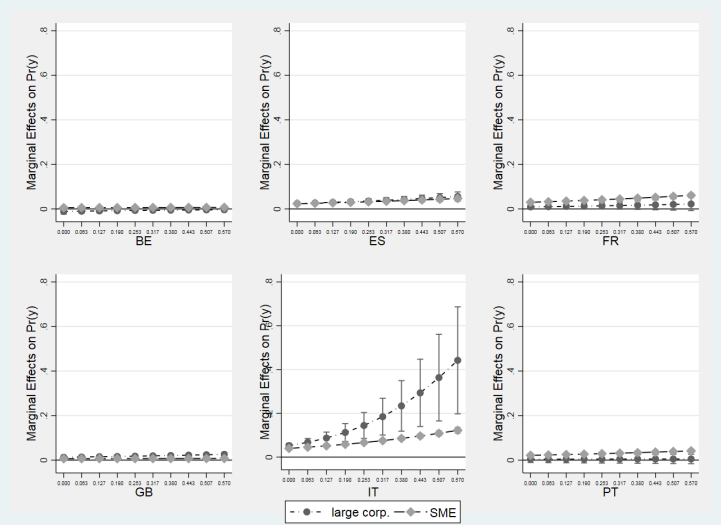


Figure C.3: Marginal Effects of Short-Term Financial Debt Across Countries

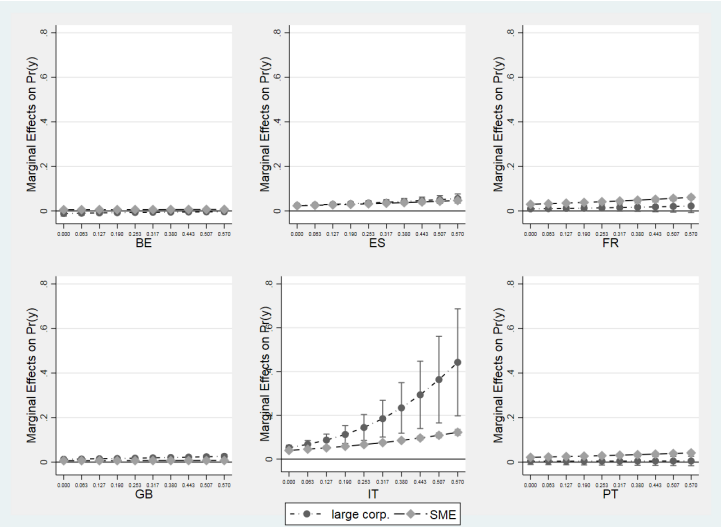


Figure C.4: Marginal Effects of Other Liabilities Across Countries

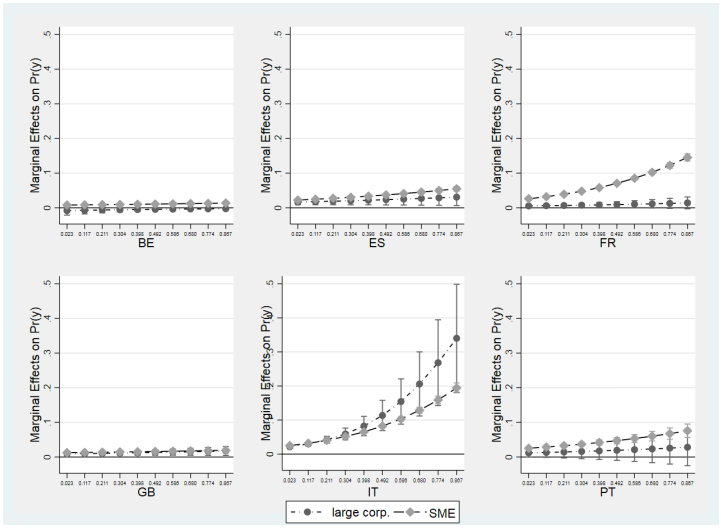


Figure C.5: Marginal Effects of Leverage with Alternative Logit

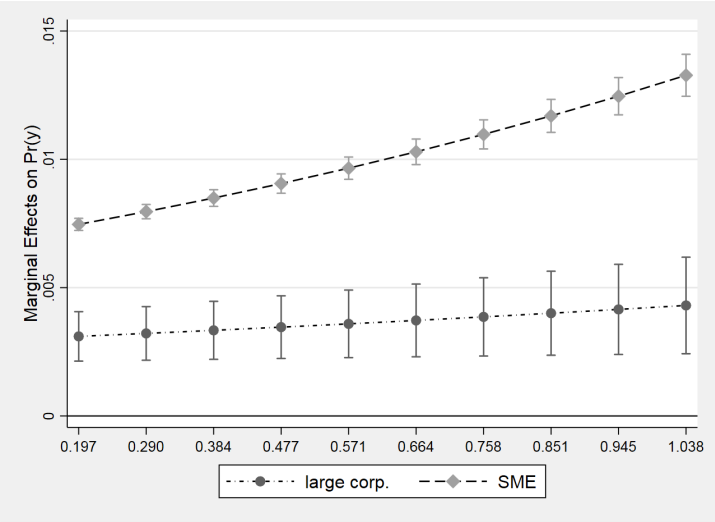


Figure C.6: Marginal Effects of Trade Payables with Alternative Logit

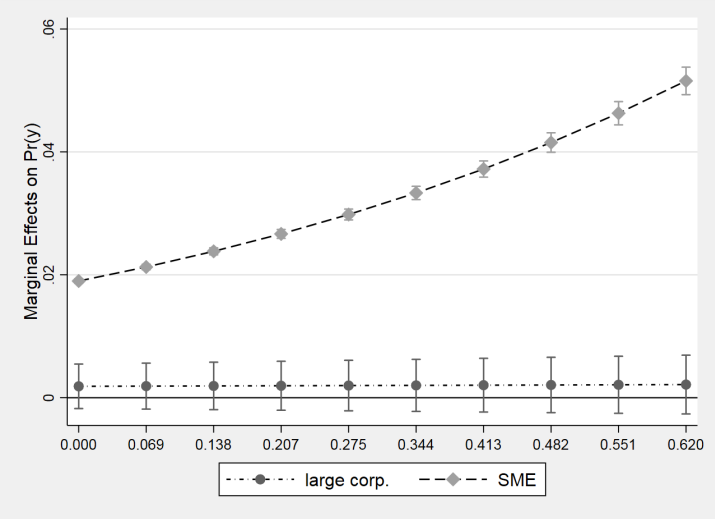


Figure C.7: Marginal Effects of Long-Term Financial Debt with Alternative Logit

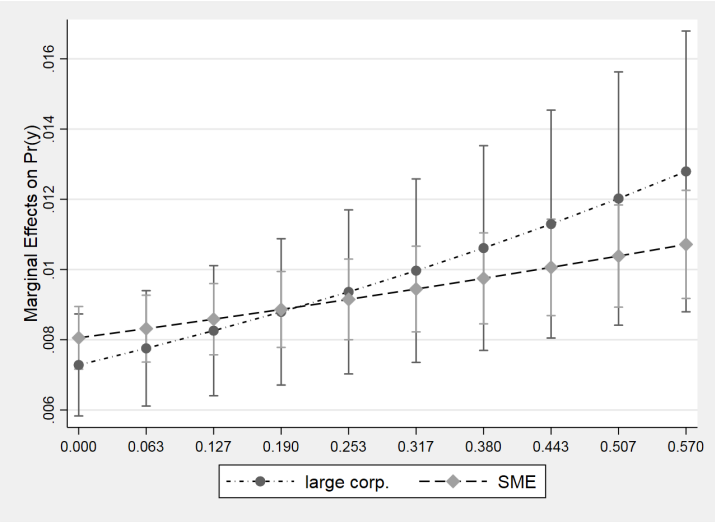


Figure C.8: Marginal Effects of Short-Term Financial Debt with Alternative Logit

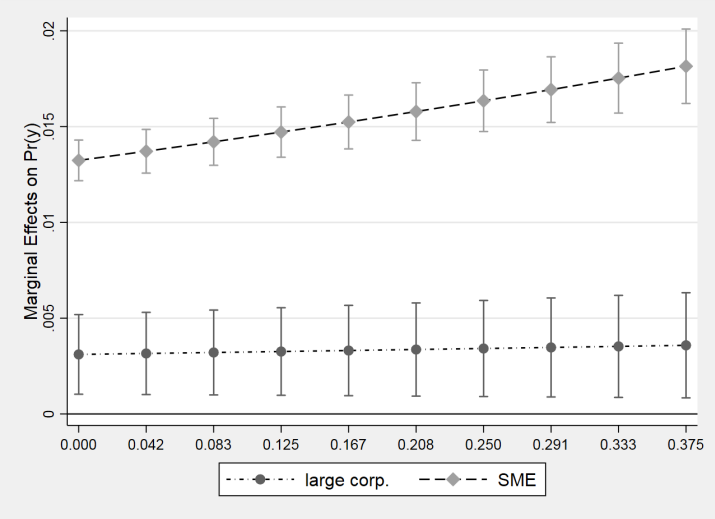


Figure C.9: Marginal Effects of Other Liabilities with Alternative Logit

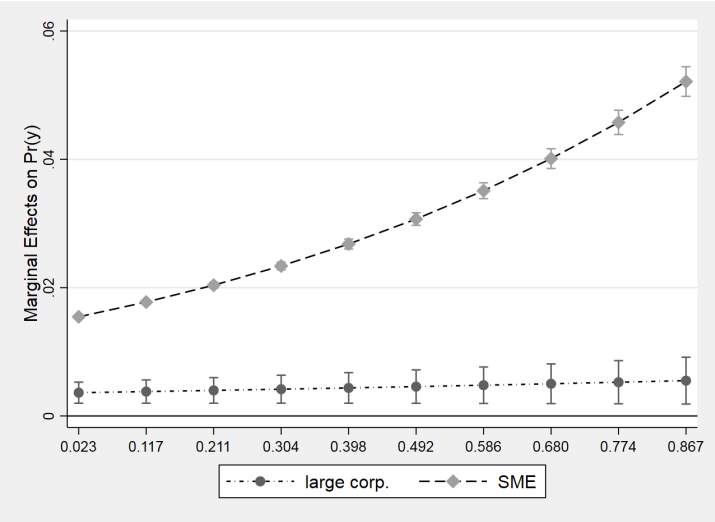


Figure C.10: Marginal Effects of Leverage with Ordered Logit

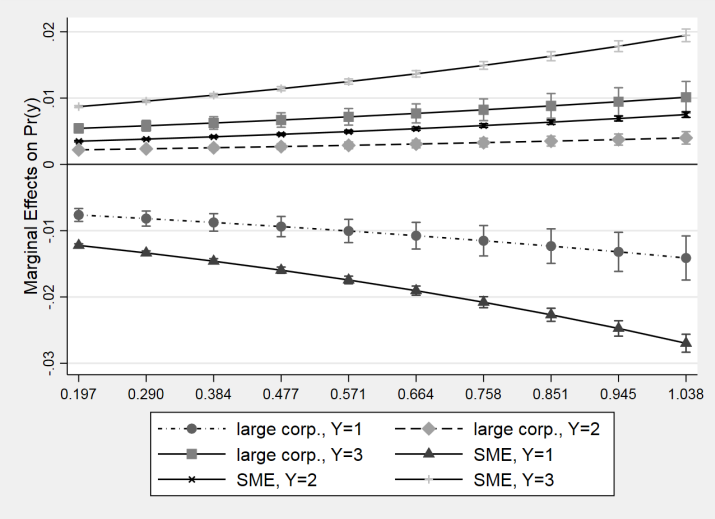


Figure C.11: Marginal Effects of Trade Payables with Ordered Logit

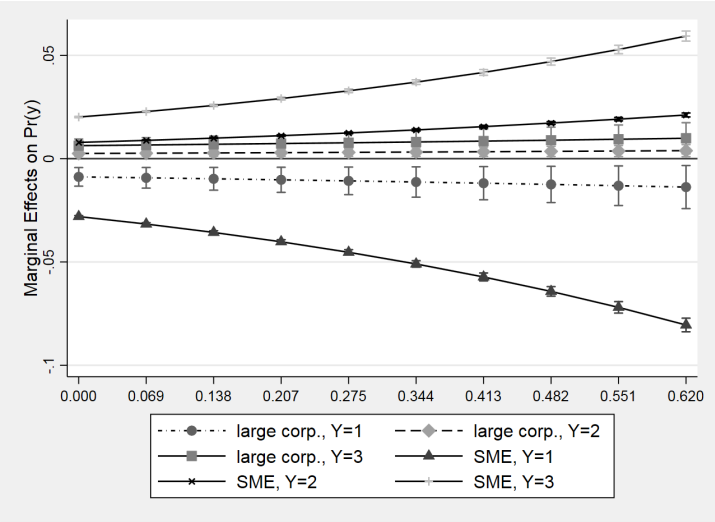


Figure C.12: Marginal Effects of Long-Term Financial Debt with Ordered Logit

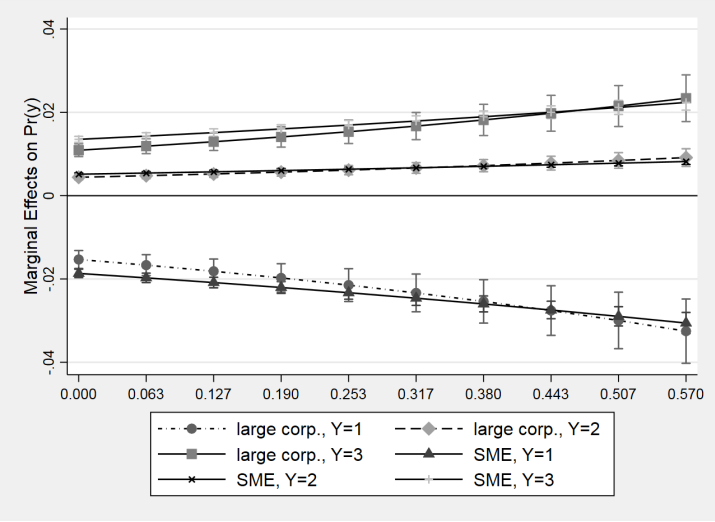


Figure C.13: Marginal Effects of Short-Term Financial Debt with Ordered Logit

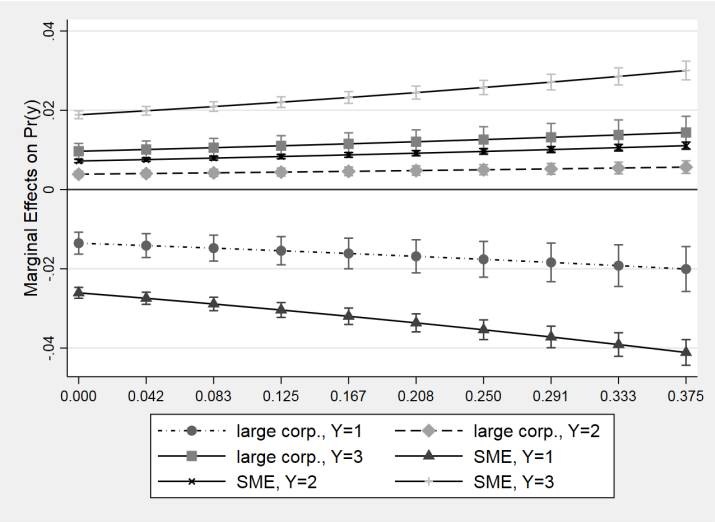


Figure C.14: Marginal Effects of Other Liabilities with Ordered Logit

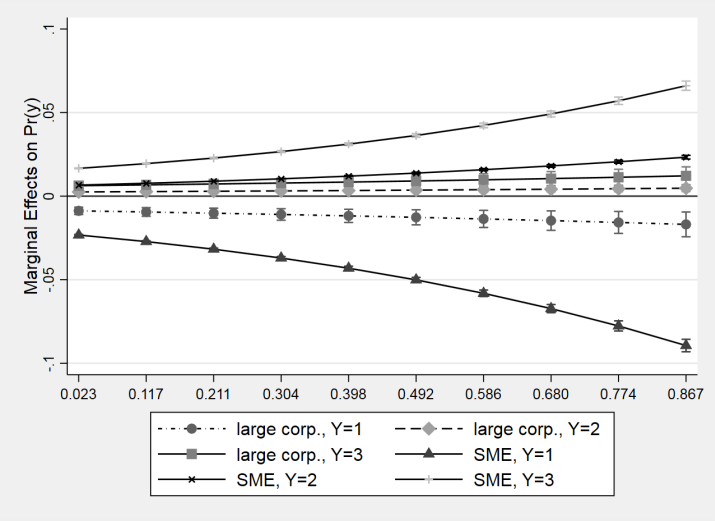


Figure C.15: Marginal Effects of Leverage with EU commission SME definition

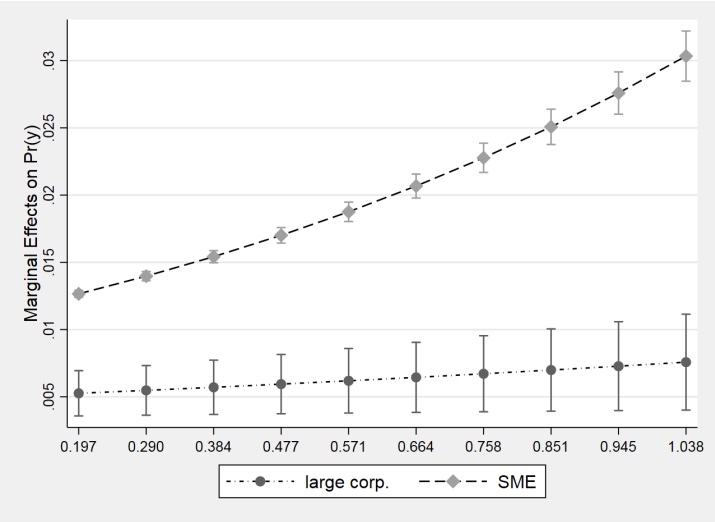


Figure C.16: Marginal Effects of Trade Payables with EU commission SME definition

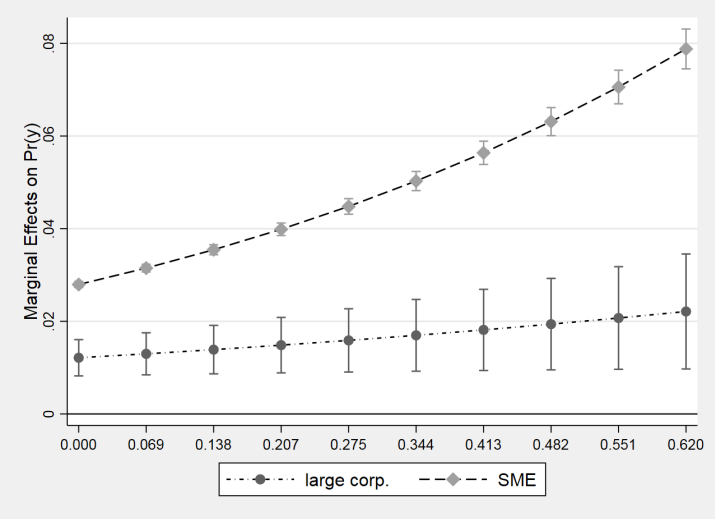


Figure C.17: Marginal Effects of Long-Term Financial Debt with EU commission SME definition

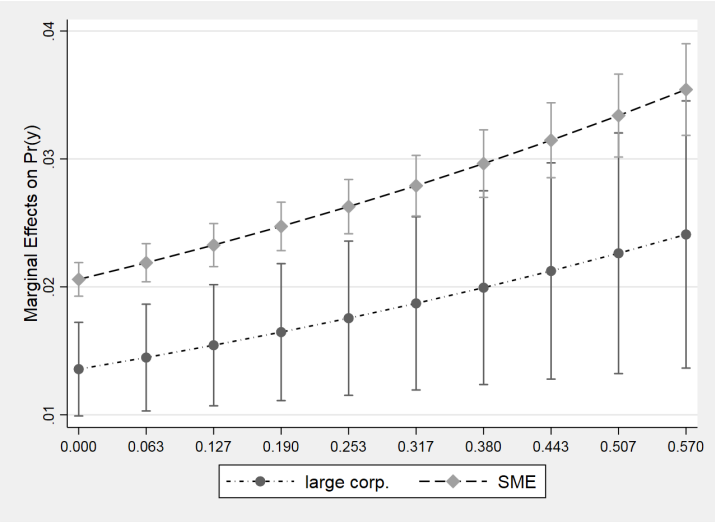


Figure C.18: Marginal Effects of Short-Term Financial Debt with EU commission SME definition

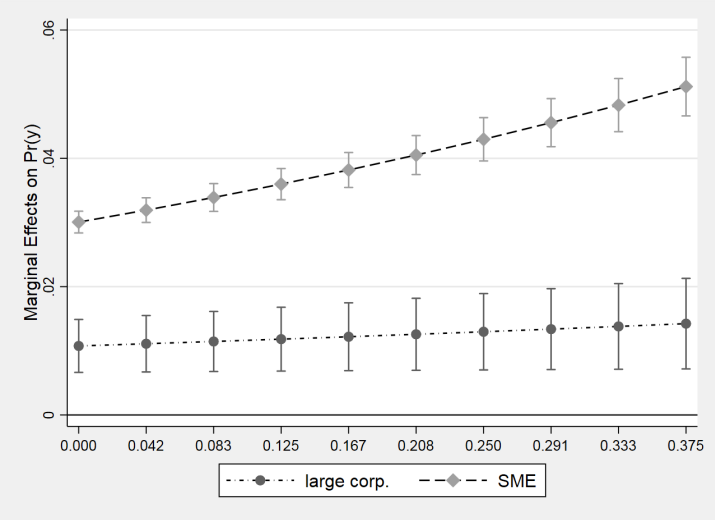


Figure C.19: Marginal Effects of Other Liabilities with EU commission SME definition

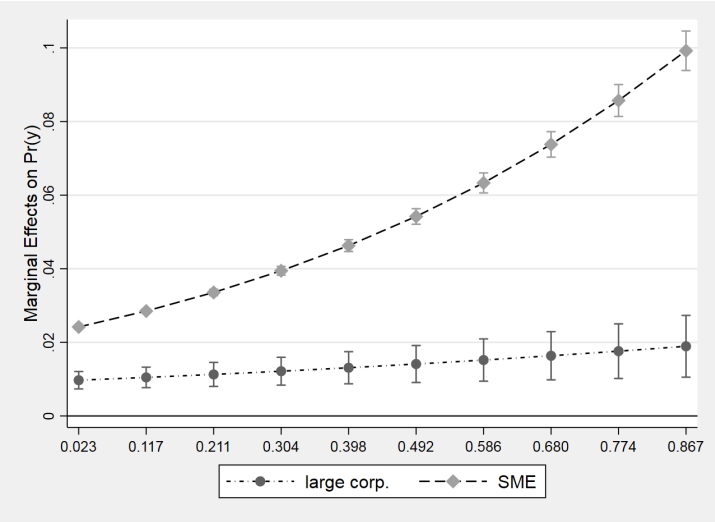


Figure C.20: Marginal Effects of Current Liabilities

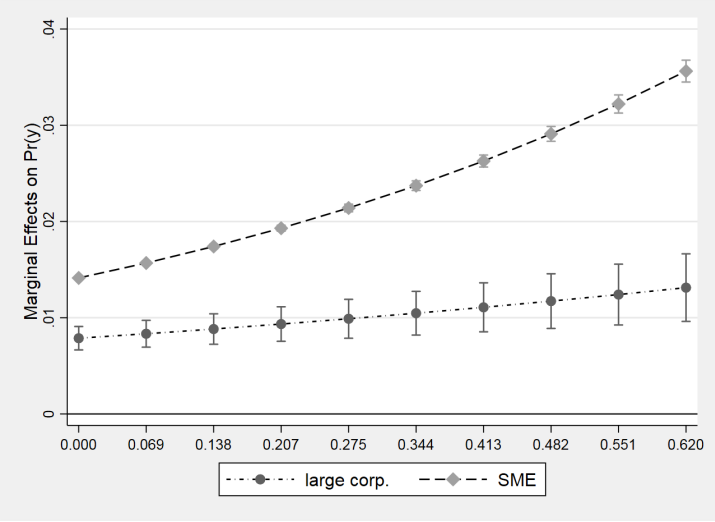


Figure C.21: Marginal Effects of Non-Current Liabilities