# Which Determinants Matter for Capital Structure? Evidence from Polish and Portuguese Nonfinancial Firms*

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**ABSTRACT**

This paper uses ANOVA and static and dynamic panel regression analyses, to investigate the capital structure behavior of strongly balanced and matched samples of Polish (PL) and Portuguese (PT) nonfinancial firms, over the 2011-2019 period. We test for capital structure determinants at the firm, industry, and country level, whether firms revert to leverage target ratios, and whether euro area affiliation matter in terms of the cost of capital. We found that capital structure is significantly and positively associated with financial slack, debt tax shields and growth opportunities, and negatively related to the asset tangibility, internal funding, non-debt tax shields, exposure to bankruptcy risk and the cost of capital. The magnitude of those relationships is stronger for PT firms on the exposure to bankruptcy risk and growth opportunities, but weaker for those firms on the cost of capital, sovereign risk, and business cycle. On the relationships with financial slack, debt and non-debt tax shields, PL firms exhibit stronger effects. We also found that sample firms significantly revert their financial leverage to target leverage ratios. Last, results suggest that controlling for sovereign debt risk and business cycles, firm leverage is positively influenced by the affiliation with the euro zone. Our findings are robust to the endogenous nature of empirical corporate finance, and to alternative model and variable specifications.

OVER THE PAST DECADES, the balance sheets of the nonfinancial corporate sectors around the world, particularly in European Union (EU, hereafter), have experienced unprecedented episodes of debt buildup. This long-term trend intensified with the 2008 financial and the sovereign debt crises, and more recently, peaked driven by the ongoing governmental policy responses to the COVID 19 pandemic (e.g., DeAngelo et al., 2018; European Central Bank, 2017, 2012;

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Bornhorst and Ruiz-Arranz, 2015; Graham *et al*., 2015; European Commission, 2013b; Blundell-Wignall, 2012; Kalemli-Ozcan *et al*., 2012; Roxburgh *et al*., 2010; Kayhan and Titman, 2007).[1]

The macroeconomic shocks associated with the recent crises in the EU, were transmitted to the real economy, imposing non-negligible disruptive impacts on the investing and financing activities of the EU's corporate sectors. Among those impacts, the indebtedness wave in some EU countries, became a major source of concern, mainly for policymakers, and central bankers, and created the need for designing and implementing deleveraging public policies, aiming at mitigating, and ultimately smoothing down debt overhang risks (e.g., Kalemli-Özcan *et al*., 2019; Crouzet, 2018; Cuerpo *et al*., 2015; Dobbs *et al*., 2015; Buttiglione *et al*., 2014; Ruscher and Wolff, 2013; Bouis *et al*., 2013; Roxburgh *et al*., 2012).

Findings from recent research suggest that macroeconomic risks, such as the business cycle state, monetary policymaking, and the spillovers of governmental fiscal and financial policies, were influencing factors of nonfinancial corporate sectors' financing behavior.

Specifically, in the presence of bank-based financial systems, as it is the case of most EU countries, the short-term interest rate channel and the sovereign debt – banking channel, may have linked financial institutions' balance sheets to sovereign credit risk, affecting the availability, the cost and the timing of raising capital externally (e.g., Begenau and Salomao, 2019; Antoniou et al., 2008; Augustin et al., 2018; Almeida et al., 2017; Foley-Fisher et al., 2016; Bedendo and Colla, 2015; Gennaioli et al., 2014; Graham et al., 2014; European Commission, 2013a; Dell'Ariccia et al., 2008).

In this context, it is of utmost importance to acquire a thorough understanding of the financial disruptions, including debt overhang conditions and credit rationing episodes, associated with the recent macroeconomic shocks in EU, and their implications in terms of constraining the investment and financing of corporate sectors.

Given the depth, duration, and the magnitude of effects of most recent economic and financial crises in the EU area, that knowledge is instrumental for the adequate design and effective implementation of recovery responses, able to limit the adverse effects of the financial disruptive events, to design and implement deleveraging public policies, and to create prospects for the recovery.

To that end, it is critical examining how nonfinancial firms behaved historically in meeting their financings needs, controlling for the different factors that, at the firm, industry, and country specific level, may have impacted their financial behavior during the crises (e.g., Bernanke, 2018; Gross and Siklos, 2018; Erel et al., 2012; Covas and Den Haan, 2011, 2012; Hackbarth et al., 2006).

[1] Recent governmental responses to COVID 19 pandemic, propelled debt-to-GDP ratios, on average, 20 percent above their levels in the beginning of the current century, and to post-World War II levels, creating a debt overhang problem in a number of countries (e.g., Bulow et al., 2020; Kose *et al*., 2020; Rajan, 2020). Kalemli-Ozcan *et al*. (2019, p. 4) indicate that the «indebtedness of euro area nonfinancial corporations, measured as debt liabilities to GDP, increased 30 percentage points since 1999 on average, and 90 percentage points for the countries in the periphery".

Current knowledge about the interactions between macroeconomics and finance and their effects on corporate sectors is relatively limited, to a large extent, because most studies investigate a single country.

This paper aims at broadening our empirical knowledge on those issues, by exploring the case of Poland (PL) and Portugal (PT), which were dissimilarly affected by the most recent financial crises (Blundell-Wignall, 2012).

PL and PT share some institutional characteristics. Both are countries affiliated with EU, and both have adopted democracy during the last quarter of the past century. Economy-wise, they exhibit similar levels of the GDP per head, and comparable budgetary conditions (see Table 1 below). Albeit the financial systems of the two countries are both similarly developed and bank-oriented, the Portuguese financial system may be a little bit more integrated.[2] According to the interlinkages and composite measures of systemic risk of the European Systemic Risk Board, European Central Bank, banking systems of PT and PL, have common cross-border consolidated banking claims (European Systemic Risk Board, 2020).[3]

However, some dissimilarities between PL and PT, may arguably impact the financing behavior of their nonfinancial corporate sectors. Among those dissimilarities, is worth noting that PT is a euro area country and PL is not. Additionally, on average, PT exhibits, during the 2011-2019 period, a public debt-to-Gross Domestic Product (GDP) ratio almost 2.5 times larger than PL, albeit the relative difference in their budget deficit-to-GDP ratios is not so expressive (almost 1.5 times).

**Table 1**
**Economic Indicators**

| | **Sovereign debt to GDP** | | **Fiscal deficit to GDP** | |
|---|---|---|---|---|
| | **PL** | **PT** | **PL** | **PT** |
| 2011 | 54.6% | 114.4% | 4.96% | 7.66% |
| 2012 | 54.3% | 129.0% | 3.79% | 6.18% |
| 2013 | 56.4% | 131.4% | 4.23% | 5.11% |
| 2014 | 51.1% | 132.9% | 3.65% | 7.36% |
| 2015 | 51.3% | 131.2% | 2.60% | 4.45% |
| 2016 | 54.2% | 131.5% | 2.39% | 1.94% |
| 2017 | 50.6% | 126.1% | 1.49% | 2.96% |
| 2018 | 48.8% | 121.5% | 0.24% | 0.35% |
| 2019 | 45.7% | 117.2% | 0.69% | -0.08% |
| 2011-19 | 51.9% | 126.1% | 2.7% | 4.0% |

Source: https://sdw.ecb.europa.eu/browse.do?node=bbn3314

[2] PL and PT economies have both bank-oriented financial systems, in which banking loans are typically a major source of external financing for the nonfinancial corporate sectors (e.g., Wiesiołek and Tymoczko, 2015; Demirgüç-Kunt and Levine, 1999).

[3] The size of the interlinkage «corresponds to the ratio of domestic to total claims of a country's consolidated banking sector. The thickness of the arrows depends on the share of bilateral foreign claims in the total claims of the banking sector extending the loans» (European Systemic Risk Board, 2020, p. 4).

The PL and PT status vis-à-vis the affiliation with the European monetary area, represents a quasi-natural experiment to study the influence of country's budgetary and sovereign debt relative performance, and their spillover effects on the nonfinancial firms' costs of capital.

To our knowledge, there are no recent comparative research about the structure and dynamics of both countries' corporate sectors, specifically, controlling financing behavior and its determinants at the firm, industry, country, and macroeconomic level.[4]

In this paper we examine comparatively, the financing behavior of the Polish and Portuguese nonfinancial firms during the period between 2011-2019. Namely, we characterize capital structure patterns and determinants, focusing on those linked to macroeconomic conditions, which have been somewhat under researched.

For empirical testing purposes, we conducted an analysis of variance (ANOVA), and estimated a static panel data model, random and fixed effects, and a partial adjustment model, using two strongly balanced and matched samples – PL and PT – drawn from the Orbis database, covering the 2011-2019 sample period, with 2,878 firms each, and a total of 51,804 testable firm-years.

For that purpose, the investigation is organized around following generic research questions. The first, the descriptive characterization of the dynamics of corporate capital structures over the past decade. Second, the identification of the determinants that, at the firm, industry, and country level, significantly account for the financing behavior of Polish and Portuguese sample firms. Third, the investigation whether PL and PT firms revert their financial leverage to specific target leverage ratios. And fourth, exploring whether euro area membership matter in terms of the cost of capital of PL and PT comparable nonfinancial firms.

We find that PT firms are, on average, significantly more leveraged, and exhibit a significantly higher cost of capital and a larger financial slack than PL firms. However, PL firms, on average, are significantly more exposed to bankruptcy risk, exhibit higher debt tax shields, higher asset tangibility, and lower cost of capital, than PT firms.

Additionally, we also found that sample firms significantly revert their financial leverage to target leverage ratios. Further, firm leverage is significantly and positively associated with financial slack, debt tax shields and market-to-book ratio, and negatively related to asset tangibility surrogating for collateralization potential, internal funding, non-debt tax shields, exposure to bankruptcy risk and cost of capital. The relationships between firm leverage and exposure to bankruptcy risk and growth opportunities is stronger for PT firms, while for the relationships with financial slack, debt and non-debt tax shields, PL firms

[4] Recent literature on the Polish and Portuguese's corporate sectors financing behavior is scanty. To our knowledge, most recent studies include Augusto and Mateus (2021), Hartwell and Malinowska (2018), Barbosa and Pinho (2016), Cwynar *et al.* (2016), Antão and Bonfim (2012, 2008), Serrasqueiro and Rogão (2009), and Campbell and Jerzemowska (2001).

exhibit stronger effects. The effect on the relationships with the cost of capital, sovereign risk and business cycle is weaker for PT firms suggesting that are positively influenced by the affiliation with the euro zone.

Results hold across a set of robustness checks including, alternative variable specifications and proxies.

The remaining of the paper is structured as follows: The next section discusses relevant theoretical and empirical literature review. Section three describes the data and the empirical methodological design. Section four presents and discusses the results. A summary of conclusions and final remarks closes the paper.

## I. Literature Review and Research Questions

The influential irrelevance theorem articulated by Franco Modigliani and Merton Miller in their American Economic Review 1958 paper, proved that under the perfect capital market setting they specified, the mix of securities a firm could optimally issue, is irrelevant to firm value, and to its claimholder's wealth, because both individuals and firms, could engage in 'homemade leverage'. By implication, it was also shown that financing and investment decisions were independent, and internal and external financing were perfect substitutes. The theory, however, is in flagrant contrast with the observation of real-world firms' financing behavior.

Albeit its unquestionable analytical elegance, the irrelevance theorem is not useful either to explain or predict capital structure behavior of real-world firms, which should, according to the theory, exhibit random leverage ratios.

The observation of capital structures of real-world firms suggests that, in the presence of imperfect and frictional financial markets, and incomplete contracting, *ceteris paribus*, capital structure do matter for firm's valuation and for claimholders' wealth. Accumulated theoretical and empirical research, provide theoretical predictions and empirically based propositions, consistent with the conventional wisdom that capital structure matters. Empirical regularities documented in that literature, foster our understanding on various dimensions of the observed patterns of cross-sectional and time-series of debt-equity choice, and their determinants at the firm, industry, and country level.[5]

According to the trade-off capital structure theory, firms balance the expected marginal financial distress costs and debt tax-shield benefits associated debt and equity issuance, making firms' cost of capital an increasing function on leverage. The theory implies that firms adjust leverage to target leverage ratios, instantaneously and costlessly.[6]

[5] For relatively recent reviews of this literature see, e.g., Graham and Leary (2011) and Parsons and Titman (2008).

[6] Graham and Harvey (2001) report that 81 percent of firms have a preferred target leverage ratio when deciding on capital structure.

Prior research documents that firm's leverage tend to be mean reverting to industry's leverage ratios, which, over time, are relatively stable, suggesting that industry affiliation may be a relevant factor for capital structure policy.

The dynamic version of the trade-off theory predicts that firms adjust their leverage ratios over time towards their long-run leverage targets ratios, whenever they temporarily deviate from (e.g., Zhou *et al.*, 2016; Frank and Goyal 2009; Leary and Roberts, 2005; Kayhan and Titman, 2007).[7]

In the presence of costly leverage readjustment, a stream of this literature suggests that in the presence of leverage adjustment costs, firms seem to follow pecking order of financing in reverting to target leverage ratios (e.g., Danis *et al.*, 2014; Byoun, 2008; Fama and French, 2005).[8]

Findings of mainstream literature on capital structure, document cross-sectional and time-series empirical regularities on several determinants of leverage ratios at the firm level. Among others, are included, bankruptcy risk, debt and non-debt tax shields, position in the life cycle, financial flexibility, asset tangibility, internal funding, target leverage ratio, and growth opportunities (e.g., Graham *et al.*, 2015; DeAngelo and Roll, 2015; Graham and Leary, 2011; Frank and Goyal, 2009; Kayhan and Titman, 2007). Additionally, macroeconomic considerations, such as the business cycle state, are also shown to influence firms' behavior in raising external capital (e.g., Begenau and Salomao, 2019; Cook and Tang, 2010).

Leveraging up, all else constant, elevates costly default risk. Therefore, rational capital providers require commensurate premia for increased risk exposure, making the cost of capital a positive function on leverage (e.g., Bris *et al.*, 2006; Claessens and Klapper, 2005; François and Morellec, 2004; Kahl, 2002).[9]

Under the corporate income tax codes prevailing in most market economies, debt financing commands a tax advantage over cash flow distributions to residual claimants, because of the borrowing costs deductibility. This makes the expected corporate tax advantage of borrowing, a monotonic declining function of leverage, creating a bias towards debt financing (e.g., Graham 2008, 2000).

Fixed assets depreciations are a perfect substitute of debt tax-shields for income tax purposes, creating a link between leverage and asset tangibility. However, that relationship is ambivalent. On the one side, the positive linkage between asset tangibility and depreciations, and therefore the lower the effect

[7] Findings of Faulkender *et al.* (2012), Ovtchinnikov (2010), Huang and Ritter (2009), Lemmon *et al.* (2008), and Flannery and Rangan (2006), provide mixed results on the speed of adjustment towards target leverage ranges.

[8] The pecking order theory (POT) predicts that firms' incremental financing, tend to follow a hierarchical pecking order in using and exhausting the available funding sources. Firstly, firms use internal funding, subsequently, issue debt until debt capacity, followed by hybrid instruments, and lastly external equity. Leverage ratios are function of the levels of profitability, dividend payout policy, and the size of the growth opportunity set (Myers, 1984; Myers and Majluf, 1984).

[9] See Senbet and Seward (1995) and references cited therein, for a comprehensive survey of this literature.

on leverage (e.g., Leary and Roberts 2005; DeAngelo and Masulis 1980). On the other side, the positive relation between asset tangibility and assets collateralization potential, suggest the prediction that, ceteris paribus, the higher the asset tangibility, the higher the leverage.[10] Furthermore, the collateralization of firm's assets provides lenders with an option to liquidate those pledged assets in default states, strengthening, ex ante, the firm's debt capacity (e.g., Campello and Giambona, 2013; Rampini and Viswanathan, 2013; Chaney et al., 2012; Hall, 2012).

Mainstream capital structure theory under imperfect markets is deeply interlinked with the argument of atomistic corporate ownership.[11] Hence, in the presence of specialization in the residual risk-bearing and managerial decision-making functions, property rights assigned to firm's residual claimants get separated from the control rights delegated to their agents, creating potential for costly conflicts of interest. In this framework, conflicts and incentives arising within principal-agent relationships, arguably influence capital structure decision-making, notably in terms of security design, debt maturity and security placement choices (e.g., Morellec *et al*., 2018; Leland, 1998; Jensen and Meckling, 1976).

Under asymmetric information, the superiorly informed party in a binding contract has an incentive to using the informational advantage in her own benefit, at the expense of the inferiorly informed party. The most ubiquitous informational problems in firm's financing contracting are associated with risk shifting behavior, either in the form of claim dilution or asset substitution, and suboptimal capital allocative behavior (e.g., Lemmon and Zender 2019; Halov and Heider 2011; Bharath *et al*. 2009).

It is well-acknowledged that under widely dispersed ownership, atomistic shareholders lack the incentive and the resources, to engage in monitoring managerial behavior, and in producing information privately. Contrariwise, under concentrated ownership structure with block shareholder(s) in control, have the incentive to engage in the production of costly private information.

Ross (1977) signaling model predicts that diffusely held firms when deciding on new securities issuance, may convey insiders' private information about the firm's prospects, to mitigate the deadweight costs of adverse selection (see also Heinkel, 1982). The model of Leland and Pyle (1977) predicts that under concentrated ownership structures, block residual claimants in control, may signal the quality of the firm when issuing debt / equity securities, by abiding or increasing her ownership. Under this framework, debt / equity decisions, may become a trade-off between raising capital externally, and the allocation of control rights

[10] As the tangibility of asset bases vary cross sectionally, and depreciations reduce the marginal debt tax shield advantage, leverage inversely related with the magnitude of other tax shields, resulting in firms having different capital structures (e.g., DeAngelo and Masulis, 1980).

[11] A stream of the corporate ownership literature has documented patterns of concentrated ownership in most countries around the world (e.g., Holderness, 2003; La Porta *et al.*, 1999; Franks and Mayer, 1997; Holderness and Sheehan, 1988).

associated with debt / equity choices (e.g., Boot and Thakor 2011; Ellul, 2009; Cronqvist and Nilsson 2005).

Theoretical arguments and empirical regularities provide support for the proposition that firms' financing behavior exhibits a dynamic pattern of funding choices as they evolve along their life cycles (e.g., Teixeira and Coutinho dos Santos, 2014; Fluck, 2000).

Prior research documents that leverage of specific industries, appear to be mean reverting to leverage ranges which, over time, seem relatively stable.[12] Therefore, leverage cross-sectional distribution is consistent with the proposition that industry affiliation may be a relevant factor in capital structure choice (e.g., Dang *et al*., 2014; Elsas and Florysiak, 2011; D'Mello and Farhat, 2008; MacKay and Phillips, 2005; Mehrotra *et al*., 2005).

Country-specific institutional factors may affect cross-sectional firms' financing behavior. Among them, legal system origin and tradition, level of financial system development, and investors' protection laws, are the more relevant for capital structure (e.g., Belenzon *et al*., 2013; Öztekin and Flannery 2012; Alves and Ferreira, 2011; Antoniou *et al*., 2008; La Porta *et. al*., 2008; Braun and Larrain, 2005). However, we did not include country-specific institutional factors in our empirical testing, since a parametric test for the equality of means between the Polish and Portuguese index of investors protection from the World Economic Forum Global Competitiveness of the World Bank, indicated that the means were not statistically different.

Recent research provides theoretical and empirical arguments on nonfinancial firms' financing behavior, and their propensity to adjust dynamically their capital structures to the prevailing macroeconomic conditions, such as, business cycle fluctuations, monetary policies, government's fiscal and sovereign debt policies. Further, the transmission of government fiscal and sovereign debt policies through the banking and the capital markets channels, may affect the availability and the cost of funding for the nonfinancial corporate sector (e.g., Begenau and Salomao, 2019; Augustin *et al*., 2018; Ippolito *et al*., 2018; Caselli *et al*., 2016; Gilchrist *et al.* 2015; Graham *et al*., 2014; Erel *et al*., 2012; Gilchrist and Zakrajšek, 2012; Bhamra *et al*., 2010; Dell'Ariccia *et al*., 2008; Hackbarth *et al*., 2006; Korajczyk and Levy, 2003; Bernanke and Gertler, 1995).

Findings from prior research suggests that: (*i*) the transmission of government fiscal and sovereign debt policies through the interest rate and sovereign debt-banking channels, may affect the availability and the cost of funding for the nonfinancial corporate sector; (*ii*) the presence of a link between macroeconomic risk and the timing of nonfinancial firms funding decisions, with financially unconstrained firms to time favorable macroeconomic states; (*iii*) that leverage at the economy aggregated level, seems to be counter-cyclical. Contrariwise, firm-level leverage tends to be pro-cyclical; and (*iv*) firms revert towards

[12] According to, e.g., DeMarzo (2019), DeAngelo and Roll (2015) and Dudley (2012), both firm leverage and target leverage ratios may vary over time, and consequently the null hypothesis of stationarity cannot be excluded.

their leverage targets faster in good macroeconomic states relative to bad states. Adjustment to leverage preferences tend to be pro-cyclical for more financial constrained firms (e.g., Bhamra *et al*., 2010; Cook and Tang, 2010; Hackbarth *et al*., 2006; Korajczyk and Levy, 2003); and (*v*) the transmission of unconventional monetary policies, may affect the financial structure of, namely, nonfinancial corporate sectors (e.g., Foley-Fisher et al., 2016; Cour-Thimann and Winkler, 2012).

## II. Data Description and Empirical Implementation

For this empirical investigation we draw data from Bureau van Dijk's Orbis database, to develop two samples of PL and PT firms, for the sampling period 2011 to 2019. To be included in the samples, firms had to comply the following criteria: (*i*) to be established either in Poland, or Portugal; (*ii*) to be active for the full sampling period; and (*iii*) all financial service firms, education and regulated utilities were excluded from the sample, for the usual motives. Using the above-described criteria, we end up with a sample of 22,775 PL firms, and a sample of 36,625 PT firms.

To ensure comparability in terms of industry and size, we developed and run a tailor-made procedure, to match on a one-to-one basis, the PL and PT firms, with strongly balanced panels, in the same 2-digit NACE industry classification group, with total assets distanced at a maximum distance of 8 percentage points. After applying the matching procedure, we end up with two samples of 2,878 firms each, and a total of 51,804 testable firm-years.[13] In addition to the self-selection problems, the dynamic nature of the firm's financing behavior is prone to potential endogeneity of explanatory variables. To help mitigating endogeneity concerns, we used the system Generalized Method of Moments (GMM) estimation method, that provides adequate estimates in the likely presence of the equation's disturbance term being correlated with the lagged dependent variable, autocorrelation, fractional and highly persistent debt ratios as dependent variables (see, e.g., Flannery and Hankins, 2013; and Roberts and Whited, 2013).

This empirical investigation is organized around two generic research objectives. The first, aiming at characterizing and describing firms' capital structures. The second, the identification of the determinants that, at the firm, industry, and macroeconomic level, account for the variance in capital structures.

To comparatively describe and characterize the patterns and regularities of the capital structure behavior of samples of PL and PT nonfinancial firms, we conducted, after validating the homogeneity of variance using the Levene's test, an analysis of variance (ANOVA) and Brown and Forsythe's test.[14]

[13] See Appendix 1 for the matching procedure description.

[14] Conducted to equally sized and matched samples, and valid in relation to the homogeneity of variances assumption.

To address the second research objective, we regressed, under a static panel data model, random and fixed effects, leverage on a vector of capital structure determinants, at the firm, industry, and macroeconomic levels.[15] In addition, we also tested for the hypothesis that firms have target leverage ratios.

To conduct this testing, we specified our regression model in line with prior research (e.g., Flannery and Rangan, 2006; De Miguel and Pindado, 2001), as:

$$\left[D/A\right]_{it} = \sum_{j=1}^{n} \beta_j X_{jit} + \sum_{j=1}^{n} \eta_j Y_{jit} + \sum_{j=1}^{n} \omega_j Z_{jit} + \varepsilon_{it} \quad (1)$$

where $D_{it}$ denotes the total net debt; $A_{it}$ the total net assets; $\left(D/A\right)_{it}$ the dependent variable, firm $i$ leverage ratio at time $t$; $X_{jit}$, $Yjit$, and $Z_{jit}$ are vectors of $j$ firm, industry, and macroeconomic level characteristics, respectively; $\varepsilon_{it}$ is the error term with zero mean and constant variance.

The independent variables included in the vector $X$ were specified as: (*i*) asset tangibility (*Tang*), measured by tangible fixed assets divided by the net total assets; (*ii*) internal funding (*InterFund*), proxied by the retained earnings scaled by the net total assets; (*iii*) market-to-book ratio (*MtoB*) as surrogate for growth opportunities; (*iv*) financial slack (*FinSlk*), proxied by the debt capacity specified as the difference between the ratio of interest expenses in period $t$+1 to the cost of debt and the total net debt at time $t$, scaled by the net total assets; (*v*) non-debt tax shields (*NDTS*), measured by the ratio of annual depreciation to total operating costs; (*vi*) debt tax shields (*DTS*), proxied by the product between interest expenses and income tax rate, scaled by the net total assets; (*vii*) position in the life cycle (*Age*), proxied by firm age measured from the date of its incorporation; (*viii*) bankruptcy risk (*Z score*) proxied by a modified version of the Altman Original Z-Score for international comparisons, using the book value of equity instead of its market value; (*ix*) cost of capital (*CostCap*) (see, e.g., Altman *et al.*, 2019, 2017; Graham *et al.*, 2015; DeAngelo and Roll, 2015; Öztekin, 2015; Frank and Goyal, 2009).[16]

To control for capital structure determinants at the industry level, the vector $Y$ included the following independent variables: (*i*) *MedLev*, the industry total debt-to-total net assets ratio median; and (*ii*) *Industry* dummies, specified as the 2 digits NACE code surrogating for industry affiliation.

The vector $Z$ of macroeconomic characteristics includes: (*i*), expansion and contraction macroeconomic states (*BusiCycle*), proxied by a business cycle indicator published by the OECD, the Composite Leading Indicator (CLI) for European

[15] The Hausman test was conducted to ascertain which, the fixed or random estimators, was more efficient. We also conducted the Modified Wald test for heteroscedasticity, and the Wooldridge test for autocorrelation. Under the presence of heteroscedasticity and autocorrelation which may bias estimates of coefficients and standard errors, we performed panel-corrected standard errors (PCSE) estimators to mitigate potential bias.

[16] See Appendix 2 for more details on the determinant's specification for the variables used in the second research question empirical testing.

economies (e.g., Zhu and Zhu, 2014; Cook and Tang, 2010);[17] (*ii*) country's sovereign risk (*SovRisk*), surrogated by the ratio of outstanding sovereign debt to GDP, drawn from the Global Debt Database of the International Monetary Fund.[18] We also included *Year_Dummies*.

Regression model includes interaction effects between a dummy variable for euro area affiliation and the cost of capital, the business cycle state, and sovereign risk.

To control for growth opportunities, we used the market-to-book ratio, *MtoB*, specified as firm's equity market value to its book value, both referred to time *t*. Firm's equity fair value was estimated using the standard steady-state Gordon model. Equity cash flows, were estimated as the algebraic sum of the EBIT of period *t*, depreciation of period *t*, net interest expense of period *t*, change in net capital expenditures between time *t* and *t*-1, change in outstanding net debt between time *t* and *t*-1, change in working capital between time *t* and *t*-1, and taxes of period *t*.

We estimated the expected constant growth rates of cash flow for equityholders, as the product of the industry median reinvestment rate over the sampling period by the return on assets for period *t* and firm *i* (see, Damodaran, 2011). Reinvestment rates at the firm level can be negative, reflecting temporary phenomena of lumpy capital expenditures, or volatile working capital allocations. Under the presumption of stable industry's technological conditions, industry medians of the components of industry reinvestment rates should be stationary. Therefore, equity cash flow growth rates were estimated using the historical medians of industry reinvestment rates. It was also assumed that the book value of debt is an unbiased estimator of its market value.

To estimate the cost of equity, we used the standard Capital Asset Pricing Model (CAPM) (Brotherson *et al.*, 2013; Graham and Harvey, 2001). Since the firm's equity betas cannot be estimated either by textbook statistical or econometric methods because our two samples include a limited number of listed firms, we followed the 'bottom-up' approach to estimate those betas.

The asset beta was estimated as the coefficient of variation of the operating cash flow (e.g., Kale *et al.*, 1991). For that purpose, we grouped firms according to the two-digit NACE code, and estimated industry asset betas as the total net assets weighted average of individual asset betas. Equity betas were estimated using Hamada's (1972) procedure.

The market risk premium for Portugal was drawn from Dimson *et al.* (2017, p. 39). For Poland, we used the market return on a portfolio of European equities provided in Dimson *et al.* (2017, p. 49). The market risk premium for Poland was

[17] We specified macroeconomic expansion states (*ExpansionState*), as a dummy variable with the value 1 when the change in CLI between *t* and *t*-1 is higher than 0.25; the macroeconomic contraction states (*ContractionState*), specified as a dummy variable with the value 1 when the change in CLI is lower than 0.25; the macroeconomic stagnation states (*StagnationState*), specified as a dummy variable with the value 1 when the change in CLI is between -0.25 and 0.25.

[18] https://www.imf.org/external/datamapper/GG_DEBT_GDP@GDD/PRT/POL, accessed on the June 1st, 2020.

estimated deducting the annual average yield of Polish 10-years maturity sovereign bonds, for the 2011-2019 period.

Firms' average annual cost of outstanding debt was estimated using their year-on-year debt book values and interest expenses.

To answer the research question whether firms have target leverage ratios, under the assumption that transaction costs may prevent immediate adjustment to a firm's target leverage, we estimated a partial adjustment model of the firms' actual financial leverage ratio towards its target within each time period (e.g., Huang and Ritter, 2009; D'Mello and Farhat 2008; Flannery and Rangan, 2006).

Based on the assumption of a constant partial adjustment, the regression model was specified as (see Byoun, 2008):

$$\left[D/A\right]_{it} = \sum_{j=1}^{n} \beta_j X_{jit} + \sum_{j=1}^{n} \eta_j Y_{jit} + \sum_{j=1}^{n} \omega_j Z_{jit} + (1-\gamma)\left[D/A\right]_{it-1} + d_t + v_i + \varepsilon_{it} \quad (2)$$

where $\gamma$ denotes the target adjustment coefficient, measuring the relevance of the transaction costs and is assumed to be sample-wide constant and inversely related to adjustment costs; $d_t$ denotes the time specific effects; $v_i$ the firm specific effects that are not directly observable; and $\varepsilon_{it}$ the error term.

## III. Results

Table 2 displays reasonably similar cross-sectional profiles of industry distribution, with the exceptions of the accommodation and food service activities, and the coal, gas, and electricity production. It is also noteworthy the concentration on the wholesale and retail trade and manufacturing industries, which represent 49.74 percent of the firms in the PL sample and 42.11 percent in the PT sample. These distributional patterns are robust to the matching procedure.

Results for a one-way ANOVA and for the Brown-Forsythe test reported in Table 3, document that pair-wise comparisons exhibit statistically significant differences at the 1 percent level, between leverage and capital structure determinants for both PL and PT firms.

**Table 2**
## Industry distribution

The industry classification was based on the NACE Rev. 2's main section.

| Industry | Number of firms in PL sample | % | Number of firms in PT sample | % | Number of firms in the matched sample of PL and PT firms | % |
|---|---|---|---|---|---|---|
| Wholesale and Retail Trade | 6,298 | 27.65% | 10,303 | 28.13% | 1,802 | 31.31% |
| Manufacturing | 5,032 | 22.09% | 5,122 | 13.98% | 1,368 | 23.77% |
| Professional, Scientific and Technical Activities | 3,313 | 14.55% | 4,819 | 13.16% | 972 | 16.89% |
| Construction | 1,681 | 7.38% | 3,543 | 9.67% | 254 | 4.41% |
| Agriculture, Forestry and Fishing | 1,160 | 5.09% | 1,722 | 4.70% | 484 | 8.41% |
| Transportation and Storage | 1,129 | 4.96% | 1,986 | 5.42% | 224 | 3.89% |
| Water Supply; Sewerage, Waste Management and Remediation Activities | 970 | 4.26% | 388 | 1.06% | 140 | 2.43% |
| Human Health and Social Work Activities | 912 | 4.00% | 2,597 | 7.09% | 208 | 3.61% |
| Accommodation and Food Service Activities | 618 | 2.71% | 2,608 | 7.12% | 160 | 2.78% |
| Administrative and Support Service Activities | 542 | 2.38% | 1,937 | 5.29% | 12 | 0.21% |
| Information and Communications | 402 | 1.77% | 583 | 1.59% | 22 | 0.38% |
| Electricity, Gas, Steam and Air Conditioning Supply | 354 | 1.55% | 115 | 0.31% | 82 | 1.42% |
| Other Service Activities | 129 | 0.57% | 499 | 1.36% | 6 | 0.10% |
| Mining and Quarrying | 128 | 0.56% | 113 | 0.31% | 20 | 0.35% |
| Sports, Amusement and Recreation Activities | 107 | 0.47% | 290 | 0.79% | 2 | 0.03% |
| | 22,775 | | 36,625 | | 5,756 | |

**Table 3**
## Summary statistics, ANOVA and Brown-Forsythe test for differences between PL firms' and PT firms' samples

Table 3 presents summary statistics for two samples: one for PL firms and another of comparable PT firms. In Panel A, each sample contains 25,902 firm-year observations from the 2011 to 2019 Orbis files, in a total of 51,804 firm-year observations. Panel B presents information for the sampling period 2011-2013, and Panel C for the sampling period 2014-2016. This table reports: the number of observations (N), mean, median, standard deviation (StdDev); and analysis of variance (ANOVA) and Brown-Forsythe test to compare euro area (PT) and non-euro area (PL) firms' statistical difference on the variables considered in the empirical design. Brown and Forsythe's test for equality of variance uses more robust estimators of central tendency. The variables are: *Debt_Ratio* (book leverage) measured by the ratio of total bet debt, including debt of both long-term and short-term maturities net of cash holdings, to total net assets; industry median leverage (*MedLev*); asset tangibility (*Tang*); internally generated funding (*InterFund*); growth opportunities (*MtoB*); financial slack (*FinSlk*); non-debt tax shields (*NDTS*); positioning in life cycle (*Age*); bankruptcy

risk (*Z score*); debt tax shields (*DTS*); cost of capital (*CostCap*); macroeconomic risk (*BusiCycle*); and sovereign risk (*SovRisk*). *** indicates that the population mean, and median ranks differ significantly between euro area and non-euro area firms at 1 percent level.

| **Panel A: Period 2011-2019** | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Panel A: PL Firms Sample** | | | | | **Panel B: PT Firms Sample** | | | | | |
| **Variable** | **N** | **Mean** | **Median** | **StdDev** | **N** | **Mean** | **Median** | **StdDev** | **ANOVA** | **Brown-Forsythe** |
| Debt_Ratio (%) | 25,564 | 52.76 | 54.67 | 20.62 | 25,679 | 58.43 | 61.12 | 21.17 | 5.67*** | 11.98*** |
| MedLev (%) | 25,902 | 52.38 | 55.89 | 11.85 | 25,902 | 60.39 | 61.21 | 6.78 | 8.01*** | 6073.55*** |
| Tang (%) | 25,564 | 58.28 | 59.39 | 23.53 | 25,679 | 42.93 | 39.77 | 27.13 | -15.35*** | 605.28*** |
| InterFund (%) | 22,686 | 3.37 | 2.00 | 3.92 | 22,801 | 3.41 | 1.72 | 4.14 | 0.04 | 1.44 |
| MtoB | 22,671 | 3.24 | 1.45 | 4.35 | 22,790 | 2.26 | 0.92 | 3.20 | -0.98*** | 877.61*** |
| FinSlk (%) | 5,210 | 22.44 | 10.71 | 0.30 | 6,272 | 68.63 | 22.23 | 1.20 | 46..19*** | 672.64*** |
| NDTS (%) | 25,238 | 5.70 | 2.73 | 7.02 | 25,338 | 13.29 | 4.39 | 22.15 | 7.59*** | 2545.51*** |
| Age | 25,902 | 21.59 | 19.00 | 11.39 | 25,902 | 25.18 | 22.00 | 13.64 | 3.59*** | 907.29*** |
| Z score | 22,482 | 2.71 | 2.39 | 1.53 | 22,779 | 1.95 | 1.65 | 1.29 | -0.76*** | 519.26*** |
| DTS (%) | 17,791 | 0.34 | 0.22 | 0.38 | 23,323 | 0.26 | 0.12 | 0.33 | -0.08*** | 217.42*** |
| CostCap (%) | 17,703 | 4.19 | 4.09 | 1.05 | 23,322 | 4.63 | 4.27 | 1.74 | 0.44*** | 3196.68*** |
| BusiCycle | 25,902 | 100.08 | 100.10 | 0.79 | 25,902 | 100.07 | 100.49 | 1.66 | -0.01*** | 3208.35*** |
| SovRisk | 25,902 | 51.87 | 51.27 | 3.14 | 25,902 | 126.15 | 129.04 | 6.47 | 74.28*** | 7612.44*** |

| **Panel B: Period 2011-2013** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **Panel A: PL Firms Sample** | | | | **Panel B: PT Firms Sample** | | | | **ANOVA** |
| **Variable** | **N** | **Mean** | **Median** | **StdDev** | **N** | **Mean** | **Median** | **StdDev** | |
| Debt_Ratio (%) | 8,634 | 55.50 | 58.03 | 20.24 | 8,634 | 61.93 | 65.02 | 20.47 | 6.43*** |
| MedLev (%) | 8,634 | 55.54 | 60.71 | 11.31 | 8,634 | 64.44 | 66.21 | 5.15 | 8.90*** |
| Tang (%) | 8,634 | 58.66 | 59.24 | 23.55 | 8,634 | 42.70 | 39.59 | 27.18 | -15.96*** |
| InterFund (%) | 5,756 | 4.17 | 3.13 | 4.15 | 5,756 | 2.86 | 1.14 | 3.92 | -1.31*** |
| MtoB | 5,756 | 3.15 | 0.59 | 4.71 | 5,756 | 1.68 | 0.56 | 2.80 | -1.47*** |
| FinSlk (%) | 1,807 | 26.17 | 12.89 | 31.72 | 2,167 | 66.65 | 23.52 | 116.14 | 40.48*** |
| NDTS (%) | 8,472 | 5.72 | 2.66 | 7.19 | 8,469 | 13.55 | 4.60 | 22.39 | 7.83*** |
| Age | 8,634 | 18.88 | 16.00 | 11.46 | 8,634 | 22.49 | 19.00 | 13.67 | 3.61*** |
| Z score | 5,723 | 2.73 | 2.37 | 1.60 | 5,742 | 1.83 | 1.50 | 1.29 | -0.90*** |
| DTS (%) | 5,309 | 0.49 | 0.39 | 0.42 | 7,694 | 0.35 | 0.22 | 0.38 | -0.15*** |
| CostCap (%) | 7,927 | 4.24 | 4.21 | 1.69 | 7,990 | 6.14 | 5.96 | 2.13 | 1.90*** |
| BusiCycle | 8,634 | 99.65 | 99.65 | 0.22 | 8,634 | 98.44 | 98.49 | 1.86 | -1.21*** |
| SovRisk | 8,634 | 55.06 | 54.56 | 0.93 | 8,634 | 124.96 | 129.04 | 7.53 | 69.89*** |

**Table 3**
**Summary statistics, ANOVA and Brown-Forsythe test for differences between PL firms' and PT firms' samples (cont.)**

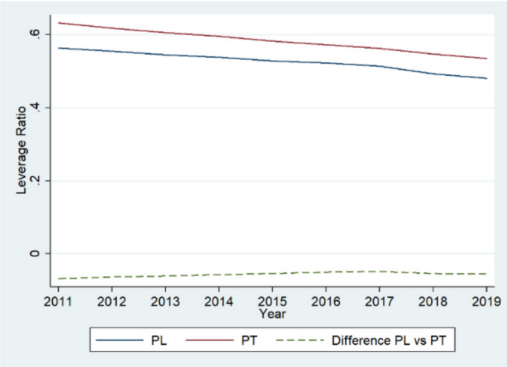
| Panel C: Period 2014-2016 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Panel A: PL Firms Sample | | | | Panel B: PT Firms Sample | | | | ANOVA |
| **Variable** | **N** | **Mean** | **Median** | **StdDev** | **N** | **Mean** | **Median** | **StdDev** | |
| *Debt_Ratio (%)* | 8,634 | 53.00 | 54.82 | 20.15 | 8,634 | 58.38 | 61.18 | 20.80 | 5.38*** |
| *MedLev (%)* | 8,634 | 52.94 | 57.98 | 11.08 | 8,634 | 60.60 | 61.56 | 6.05 | 7.66*** |
| *Tang (%)* | 8,634 | 59.11 | 60.70 | 23.26 | 8,634 | 42.90 | 39.46 | 27.08 | -16.21*** |
| *InterFund (%)* | 8,634 | 2.69 | 1.04 | 3.62 | 8,634 | 3.51 | 1.89 | 4.16 | 0.82*** |
| *MtoB* | 8,634 | 3.53 | 1.71 | 4.49 | 8,634 | 2.45 | 1.08 | 3.34 | -1.09*** |
| *FinSlk (%)* | 1,480 | 23.41 | 10.89 | 31.03 | 1,925 | 72.32 | 23.92 | 123.33 | 48.91*** |
| *NDTS (%)* | 8,521 | 5.82 | 2.82 | 7.09 | 8,494 | 12.99 | 4.37 | 21.74 | 7.17*** |
| *Age* | 8,634 | 21.54 | 19.00 | 11.24 | 8,634 | 25.13 | 22.00 | 13.52 | 3.59*** |
| *Z score* | 8,593 | 2.65 | 2.33 | 1.50 | 8,630 | 1.92 | 1.63 | 1.27 | -0.72*** |
| *DTS (%)* | 5,347 | 0.36 | 0.26 | 0.35 | 7,559 | 0.27 | 0.14 | 0.33 | -0.09*** |
| *CostCap (%)* | 7,959 | 3.99 | 3.94 | 0.97 | 6,192 | 3.84 | 3.77 | 1.06 | -0.15*** |
| *BusiCycle* | 8,634 | 100.81 | 100.99 | 0.38 | 8,634 | 100.67 | 100.49 | 0.34 | -0.14*** |
| *SovRisk* | 8,634 | 52.18 | 51.27 | 1.43 | 8,634 | 131.88 | 131.51 | 0.77 | 79.70*** |

We found that, on average, PT firms are 5.67 percent (median, 6.45 percent) significantly more leveraged than PL firms. Similar patterns in leverage are also found at the industry level, including when splitting the sampling period for the 2011-2013 (sovereign debt crisis) and 2014-2016 (post crisis) sub-periods.

Figure 1 depicts the leverage average profiles of PL and PT nonfinancial corporate sectors over the sample period, documenting a significant deleveraging trend, which may have been induced, among other factors, by the unconventional monetary policies adopted in the aftermath of the sovereign debt crisis. Because of PL non affiliation with the euro area, and therefore not benefitting from the transmission effects of those policies to their corporate sectors, we would expect the deleveraging process to be more pronounced for PT, not only because it was more leveraged than the PL in the beginning of the sample period, but also because of its affiliation with the euro area.

**Figure 1**
**Leverage by Country and Year**

Average leverage ratios are reported on the y-axis. Time is reported on the x-axis.




However, the average decreasing rates for both countries' corporate sector leverage ratios (PL, 1.98 percent; PT, 2.06 percent) over the 2011-2019 period, were not significantly different. As depicted in Figure 1, the difference on both countries leverage ratios is relatively stable during the sampling period.

This finding, we argue, may be due to the combined effect of the PL's lower sovereign debt-to-GDP ratio in 2013 (usually associated with the end of the European sovereign debt crisis) than PT's, which may have 'compensated' the absence for PL, of the stimuli provided by the European Central Bank's (ECB) unconventional monetary policies.

Empirical findings show that the mean (median) firm's age, proxy for the positioning on life cycle, is significantly higher for PT than for PL firms. The later European integration of PL (EU in 2004) in relation to PT (EEC in 1986), may have catalyzed major structural transformations for both economies, namely on their real sectors. However, we conjecture that the 3.59 years difference between PT and PL average firm ages, may have played a role in explaining, at least partially, on an asymmetrical renewal of both nonfinancial corporate sectors.

We also found that the significantly higher mean of PL firms' market-to-book ratio (3.24) than of PT firms (2.26) in Panel A of Table 3, suggests the former may be endowed with relatively larger growth opportunity sets. This result is consistent with our prior finding that PL firms are, on average, younger that PT firms, which we conjecture that may indicate that, on average, PL firms may be positioned at less mature stages on their life cycles, therefore exhibiting, all else constant, more growth opportunities compared with PL firms.

Further, results document that PT firms seem to be, on average, less financially constrained that PL comparable firms, as a result of a significantly higher financial slack. However, as previously reported, PT firms exhibited, on average, lower bankruptcy risk and lower cost of debt, but were more leveraged than PL firms. Taken together, these findings may seem at odds with the intuition that,

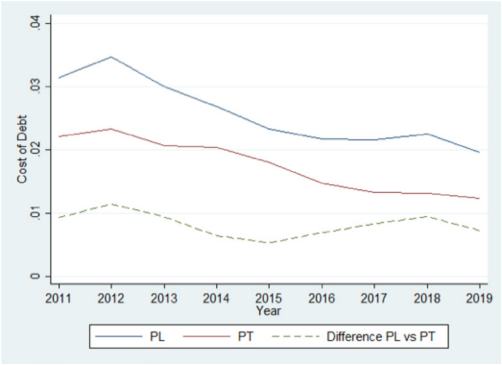
the higher the leverage, the bankruptcy risk, the cost of debt, and ultimately the lower the financial slack.

However, the annual differences between PT and PL's financial slack indicators, may reflect the effect of the unconventional monetary policies on lowering costs of debt that may explain, at least partially, the higher financial slack for those firms when compared with PL firms. This result provides empirical support for the effect of unconventional monetary policies on the financial structure of nonfinancial firms.

Figure 2 documents a downward pattern on the cost of debt over the 2011-2019 period, for both PL and PT, somewhat like the deleveraging profile depicted in Figure 1.

**Figure 2**
**Cost of Debt by Country and Year**

Average cost of debt is reported on the y-axis. Time is reported on the x-axis.



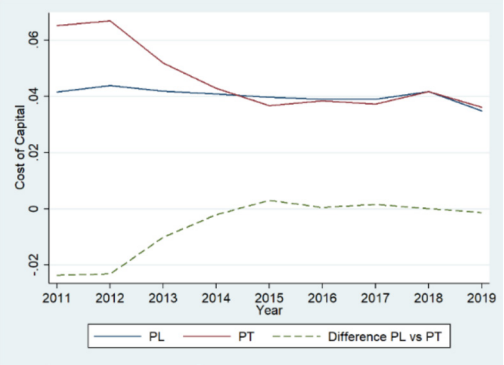

Results indicate that, over the sampling period, PL experienced an average cost of debt 0.834 percent higher than PT's. However, the annual differences were larger coinciding with the financial assistance programs provided conjointly by the International Monetary Fund (IMF) / European Central Bank (ECB) / European Union Commission (EUC) to PT, and peaked at the European sovereign debt crisis outbreak. In responding to those crises, ECB adopted unconventional monetary policies (asset purchase and pandemic emergency purchase programs), designed to mitigate the post-crises overhang conditions in euro area debt markets, and their impacts on the corporate sectors' cost of borrowing.

PT firms exhibited significantly higher non-debt tax shields than PL firms (means of 13.29 percent and of 5.70 percent, respectively), and documented asset tangibility means of 42.93 percent and 58.28 percent**,** respectively. Additionally, PL firms documented, on average, significantly higher debt tax shields than PT firms (0.34 and 0.26, respectively).

Figure 3 shows the cost of capital average profiles for PL and PT firms, which exhibit, during the 2011-2013 period, a downward trend, which stabilized in the remaining sampling period.

**Figure 3**
**Cost of Capital by Country and Year**

Average cost of capital is reported on the y-axis. Time is reported on the x-axis.




On average, PT firms exhibit a 0.66 percent (median, 0.31 percent) significantly higher cost of capital, than PL firms over the 2011-2019 period (see Table 3 – Panel A).

However, during PT's financial assistance program and the European sovereign debt crisis (2011-2013), PT firms continue to exhibit significantly higher cost of capital, although at decreasing pace, than PL firms. During the post crisis period (2014-2016), coincident with unconventional policies undertaken by the euro area monetary authorities, PT firms experienced a significantly lower cost of capital than PL firms (see Table 3 – Panel C).

We also found that PL firms were significantly more exposed to macroeconomic risk, proxied by OECD's business cycle indicator, than PT's. Relatedly, PT exhibited, over the sample period and of the 2011-2013 and 2014-2016 subperiods, significantly higher sovereign debt-to-GDP ratio than PL. Those findings suggest that PT's higher financial leverage condition, relatively to PL, may have had non-negligible implications for both, the availability and the cost of capital at the corporate level.

Results also document not statistically significant differences on internal funding for the two samples of firms during the overall sampling period.

Regression results on the determinants of capital structure at the firm, industry, and macroeconomic levels, for joint and independent samples of PL and PT

firms, are reported in table 4. Columns 1 to 4, include the fixed and random effects baseline results, excluding macroeconomic regressors.[19]

**Table 4**

## Parameter estimates from panel regression on the determinants of leverage ratio for joint and independent samples of PL and PT firms

This table reports the results obtained from estimating Eq. (1). OLS coefficients are presented. The data are drawn from the 2011 to 2019 Orbis files. Columns 1 to 5, report estimators using fixed effects (FE), random effects (RE), and panel-corrected standard errors (PCSE). Values enclosed in parentheses are the *t* (for the fixed effects model) or *z* (for both the random effects and PCSE models) statistics for coefficients. *, ** and *** indicate significance of the coefficients at the 10, 5 and 1 percent levels, respectively. Wald test indicates the *p*-values for the test of the null that regression coefficients, including the one on the interaction effects, are zero. Modified Wald test for heteroscedasticity. Wooldridge test for autocorrelation. The Hausman test to compare the efficiency of the fixed and random estimators.

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| | **(FE)** | **(RE)** | **PL (FE)** | **PT (FE)** | **(PCSE)** |
| MedLev | 0.2609*** | 0.4302*** | 0.2603*** | 0.2559*** | 0.5425*** |
| | (19.28) | (45.19) | (13.59) | (14.03) | (16.49) |
| Tang | 0.0152*** | -0.0262*** | 0.0317*** | 0.0019 | -0.0801*** |
| | (3.13) | (-6.27) | (4.20) | (0.31) | (-9.74) |
| InterFund | -0.3075*** | -0.3216*** | -0.2575*** | -0.2721*** | -0.3761*** |
| | (-25.87) | (-26.77) | (-15.21) | (-16.82) | (-10.61) |
| MtoB | 0.0022*** | 0.0026*** | 0.0018*** | 0.0027*** | 0.0043*** |
| | (18.53) | (21.07) | (12.50) | (14.16) | (13.27) |
| FinSlk | 0.0048*** | 0.0055*** | 0.0384*** | 0.0033*** | 0.0050*** |
| | (6.32) | (7.10) | (11.79) | (4.14) | (3.72) |
| NDTS | -0.0315*** | -0.0619*** | -0.2291*** | -0.0152** | -0.1107*** |
| | (-5.07) | (-10.93) | (-12.20) | (-2.28) | (-8.95) |
| Age | -0.0062*** | -0.0032*** | -0.0064*** | -0.0080*** | -0.0024*** |
| | (-24.14) | (-25.28) | (-18.61) | (-20.60) | (-17.81) |
| Z score | -0.0616*** | -0.0321*** | -0.0494*** | -0.0789*** | -0.0600*** |
| | (-97.09) | (-14.34) | (-62.90) | (-79.36) | (-38.80) |
| DTS | 0.0192*** | 0.0275*** | 0.0208*** | 0.0111*** | 0.0602*** |
| | (12.24) | (17.69) | (10.43) | (4.73) | (14.42) |
| CostCap | -0.0017*** | -0.0019*** | -0.0070*** | -0.0089*** | -0.0164*** |
| | (-13.15) | (-14.29) | (-5.48) | (-22.45) | (-7.01) |
| CostCap x EuroArea | | | | | -0.0116*** |
| | | | | | (-4.41) |

[19] To test whether the regression coefficients on the leverage determinants are significantly equal or different between PL and PT firms, we performed the Chow test with the null hypothesis of equal parameters for the regressors of both samples (Chow, 1960). For each test, the interaction terms of each regressor with a country dummy variable were added, and the model fitted with the interactions and the dummy.

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| | **(FE)** | **(RE)** | **PL (FE)** | **PT (FE)** | **(PCSE)** |
| EuroArea | | | | | -0.3249*** |
| | | | | | (-3.00) |
| BusiCycle | | | | | -0.0187** |
| | | | | | (-2.48) |
| BusiCycle x EuroArea | | | | | 0.0248*** |
| | | | | | (2.97) |
| SovRisk | | | | | -0.0080*** |
| | | | | | (-5.20) |
| SovRisk x EuroArea | | | | | 0.0074*** |
| | | | | | (7.04) |
| Constant | 0.7040*** | 0.5584*** | 0.6605*** | 0.8312*** | |
| | (53.09) | (68.37) | (38.27) | (41.78) | |
| Hausman | 1805.65*** | | | | |
| Observations | 33,571 | 33,571 | 15,405 | 18,166 | 9,625 |
| R-squared | 0.4261 | 0.4201 | 0.4124 | 0.4794 | 0.6547 |
| Industry_dummies | No | No | No | No | Yes |
| Year_dummies | No | No | No | No | Yes |
| Wald test | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Heteroskedasticity test | 1.9e+36*** | | 5.0e+36*** | 5.8e+34*** | |
| Wooldridge test | 2533.13*** | | 1182.88*** | 1259.23*** | |

Using panel-corrected standard errors, the estimated coefficient signs for asset tangibility (*Tangt*) (-), internal funding (*InterFund*) (-), market-to-book ratio (*MtoB*) (+), financial slack (*FinSlk*) (+), non-debt tax shields (*NDTS*) (-), debt tax shields (*DTS*) (+), position in the life cycle (*Age*) (-), bankruptcy risk (*Z score*) (-), and cost of capital (*CostCap*) (-), are consistent with the expected signs.

Results, reported in Table 4, columns 3 [PL (FE)] and 4 [PT (FE)], indicate that both PL and PT firms revert leverage towards target ratios (*MedLev*) documented by positive and statistically significant coefficients of 0.2603 and 0.2559, respectively. However, the effect of reverting to target ratios is not significantly different between the two firm samples (Chow test: 0.03, *p*-value 0.8693).

As expected, we found that asset tangibility, proxying for collateralization potential, is positively related with leverage for PL firms, albeit non-significantly for PT firms. Coefficients are significantly different at the 1 percent level (Chow test of 8.90, *p*-value 0.0029).

Internal funding exhibits a negative and statistically significant relation with leverage. According to a Chow test (0.38, *p*-value 0.5371) the relationship is not significantly different for PL and PT samples.

Growth opportunities, proxied by the market-to-book ratio, at PL and PT firm conjoint level are, as expected, positively and significantly associated with leverage. Results also document that the relationship is stronger for PT firms than for PL firms. A Chow test (13.30, *p*-value 0.0003) documents that those differences are significantly different at the 1 percent level.

Regression results document that the variables financial slack and leverage are significantly and positively related. The result of a Chow test (97.92, *p*-value 0.0000) shows that that effect on leverage is significantly different for PL and PT firms at the 1 percent level. PL firms exhibit a significantly larger effect of financial slack on firm leverage than PT firms, 3.84 and 0.33 percentage point increase, respectively. This finding suggests that everything else constant, PL firms may be primarily dependent, for deleveraging and incremental investment, from internal funding.

Non-debt-tax shields and leverage exhibit a negative and significant relationship for both PL and PT samples. A Chow test (104.00, *p*-value 0.0000) reveals that those differences are significant at the 1 percent level.

Results for the conjoint sample support the conjecture that firms' capital structure is negatively and significantly influenced by their positioning on the life cycle, proxied by firms' age. However, the magnitude of the effect is significantly different for PT and PL firms at the 1 percent level (Chow test of 8.65, p-value 0.0033). Since the estimated coefficient for PT firms (0.80) is larger than PL's (0.64), and the average age of PT firms' sample is the highest, this suggests that a positioning at a more advanced stage of the life cycle may, ceteris paribus, be associated to deleveraging.

Evidence on the joint sample of PL and PT firms, document that, on average, a 1 percent increment on bankruptcy risk, proxied by Altman's Z score, is associated with a 6.00 percent statistically significant reduction on leverage. A Chow test (545.80, *p*-value 0.0000) shows that the effect of the bankruptcy risk on leverage, is significantly different for PL and PT firms, at the 1 percent level.

Results document a positive relationship between debt tax shields and leverage. However, this effect is significantly different for PL and PT firms at the 1 percent level (Chow test of 9.96, *p*-value 0.0016).

Results on the cost of capital document the presence of a negative and statistically significant relationship with leverage for the overall sample. A Chow test (415.01, *p*-value 0.0000) indicates that the effect of the cost of capital on the leverage ratio is significantly different for PL and PT firms, at the 1 percent level.

Results reported in table 4, column 5, include additional regressors on macroeconomic level determinants of capital structure, and interaction effects between a euro area affiliation dummy variable and explanatory variables. Specifically, the sensitivity of firm leverage to the cost of capital at the firm affiliation with the euro area exhibits a significant negative coefficient. Our findings document that the effect of a change in the cost of capital on a firm leverage ratio is stronger for PT firms than for PL firms. A 1 percentage point increase in the cost of capital is associated with a 1.64 percent decrease in the leverage ratio of PL firms, and an even higher decrease of 1.16 percentage point for PT firms.

Findings document that the effect of a change in the sovereign risk on a firm leverage ratio is smaller for PT firms than for PL firms. A 1 percentage point increase in the sovereign risk is associated with a 0.80 percentage point decrease in the leverage ratio of PL firms, and a lower decrease of 0.06 percentage point for PT firms.

On the effect of the business cycle on firm leverage, a change to a macroeconomic contraction stage of the business cycle is associated with a 1.87 percent decrease in the leverage ratio of PL firms, and with an increase of 0.61 percent for PT firms. Therefore, the relationship between a contraction business cycle and firm leverage is positively influenced by euro area membership.

Additionally, using dynamic panel data estimators to mitigate methodological problems to which capital structure research is prone, such as endogeneity, we provide additional evidence on the determinants of leverage ratio, namely that both PL and PL firms revert their financial leverage towards their preferred targets. These results are documented on table 5, namely by the positive and statistically significant coefficients exhibited on the variables lagged leverage ratio and industry median/ target leverage ratio.

Overall, regression results indicate that 'standard' determinants on the financing behavior at the firm and industry levels are similarly relevant factors for capital structure choice of both PL and PT firms. Namely, in line with recent findings, results document that PL and PT firms both revert their leverage towards industry's median ratios targets (e.g., Nehrebecka and Dzik-Walczak, 2018; Antão and Bonfim, 2012; Serrasqueiro and Rogão, 2009; Antão and Bonfim, 2008).

Results also indicate that PL firm leverage ratios are significantly more influenced by financial slack, debt, and non-debt tax shields than PT firms, whereas the financial leverage of the latter is significantly more impacted by growth opportunities and exposure to bankruptcy risk.

Further, to check for robustness on the equality between sets of coefficients in PL and PT regressions, we tested whether the 95 percent confidence interval reported for each regressors overlap. Results show that the confidence intervals only overlap for: *(i)* the industry median/ target leverage ratio: PL (0.2227; 0.2978), and PT (0.2201; 0.2916); and (*ii*) for the internal funding variable: PL (-0.2906; -0.2243), and PT (-0.3038; -0.2404).

**Table 5**

**Parameter estimates from panel regression on the determinants of target leverage ratio [Eq. (2)]**

This table reports the results obtained from estimating Eq. (2). Blundell and Bond (1998) system GMM coefficients are presented. The data are drawn from the 2011 to 2019 Orbis files. Values enclosed in parentheses are the *t* statistics. *, ** and *** indicate significance of the coefficients at the 10, 5 and 1 percent levels, respectively.

| | PL Firms Sample | PT Firms Sample |
|---|---|---|
| $Leverage_{(t-1)}$ | 0.6018*** | 0.6741*** |
| | (5.29) | (13.86) |
| *MedLev* | 0.1377** | 0.1177*** |
| | (2.49) | (2.59) |
| *Tang* | -0.0758*** | -0.0297*** |

| | PL Firms Sample | PT Firms Sample |
|---|---|---|
| | (-4.14) | (-4.51) |
| *InterFund* | -0.3069*** | 0.0046 |
| | (-2.68) | (0.13) |
| *MtoB* | 0.0046*** | 0.0055*** |
| | (8.58) | (15.88) |
| *FinSlk* | -0.0027 | 0.0011 |
| | (-0.40) | (1.26) |
| *NDTS* | -0.1017*** | -0.0579*** |
| | (-3.03) | (-6.23) |
| *Age* | -0.0009** | -0.0004*** |
| | (-2.20) | (-3.08) |
| *Z score* | -0.0288*** | -0.0450*** |
| | (-6.80) | (-13.05) |
| *DTS* | 0.0230*** | 0.0108*** |
| | (2.23) | (2.89) |
| *CostCap* | -0.0068* | -0.0084*** |
| | (-1.87) | (-3.51) |
| *Business_Cycle_Expansion* | 0.0169** | 0.0073* |
| | (2.02) | (1.83) |
| *Business_Cycle_Contraction* | 0.0122* | 0.0231*** |
| | (1.72) | (4.67) |
| *SovRisk* | 0.0055*** | 0.0019*** |
| | (2.73) | (4.24) |
| Observations | 3,003 | 5,229 |
| Industry_dummies | Yes | Yes |
| Year_dummies | Yes | Yes |

Results on the capital structure macroeconomic determinants, and interaction effects suggest that that euro area membership, with its post-crisis monetary policies with potential effects in, e.g., unlocking bank lending, may smooth both the effects of the macroeconomic conditions and the cost of capital on firms' leveraging behavior. These results are consistent regarding the use of static or dynamic panel data estimators. Furthermore, our findings also document that the explanatory power of a regression model including additional determinants of capital structure at industry and macroeconomic levels, and interaction effects of euro area membership, is almost 2 times larger than that including only the 'standard' determinants on the financing behavior. Therefore, our results also contribute to mitigate misspecification problems due to potential omitted variables.

### *A. Robustness Checks*

To check for robustness of the regression results, we specified the target leverage ratio using the fitted values obtained through a panel data regression were

firm and industry characteristics were regressed on the observed debt ratio (e.g., Dang *et al.*, 2014; Elsas and Florysiak, 2011; Antoniou *et al.*, 2008; Byoun, 2008):

$$\left[D/A\right]_{it}^{*} = \sum_{j=1}^{n} \beta_j X_{jit} + \sum_{j=1}^{n} \eta_j Y_{jit} + \sum_{j=1}^{n} \omega_j Z_{jit} + \varepsilon_{it} \quad (3)$$

where $\left(D/A\right)_{it}^{*}$ denote target leverage. We specified the cost of debt as the ratio of the interest expenses to the average of non-current outstanding debt between time *t* and *t*-1. All variable distributions were winsorized at the top and bottom 5 percentile. We applied PCSE estimators for both sampling periods 2011-2013 and 2014-2016, and both PL and PT firms.

**Table 6**

**Parameter estimates from panel regression on the determinants of leverage ratio– using an alternative measure of target leverage ratio for Eq. (1) and winsorizing all variable distributions**

This table reports the results obtained from estimating Eq. (3). OLS coefficients are presented. The data are drawn from the 2011 to 2019 Orbis files. *, ** and *** indicate significance of the coefficients at the 10, 5 and 1 percent levels, respectively. Values enclosed in parentheses are the *z* (PCSE models) statistics for coefficients.

| | PL Firms Sample | PT Firms Sample | Period 2011-2013 | | Period 2014-2016 | |
|---|---|---|---|---|---|---|
| | | | PL Firms Sample | PT Firms Sample | PL Firms Sample | PT Firms Sample |
| *MedLev* | 0.1130* | 0.4390*** | 0.3105** | 0.5202*** | -0.0760 | 0.3067** |
| | (1.65) | (7.26) | (2.37) | (6.03) | (-0.51) | (2.21) |
| *Tang* | -0.1182*** | -0.0358*** | -0.0279 | 0.0231 | -0.2017*** | -0.0408** |
| | (-7.95) | (-3.46) | (-1.07) | (1.56) | (-7.29) | (-2.04) |
| *InterFund* | -0.6725*** | -0.0905** | -0.7819*** | 0.0461 | -0.5924*** | 0.0343 |
| | (-9.36) | (-2.13) | (-5.46) | (0.64) | (-4.17) | (0.38) |
| *MtoB* | 0.0037*** | 0.0015*** | 0.0043*** | 0.0017** | 0.0021 | 0.0040*** |
| | (5.93) | (2.90) | (4.02) | (1.98) | (1.61) | (3.66) |
| *FinSlk* | 0.0443*** | 0.0002 | 0.0419*** | -0.0058** | 0.0269* | 0.0018 |
| | (5.76) | (0.18) | (3.30) | (-2.54) | (1.76) | (0.71) |

**Table 6**

**Parameter estimates from panel regression on the determinants of leverage ratio– using an alternative measure of target leverage ratio for Eq. (1) and winsorizing all variable distributions (cont.)**

| | PL Firms Sample | PT Firms Sample | Period 2011-2013 | | Period 2014-2016 | |
|---|---|---|---|---|---|---|
| | | | PL Firms Sample | PL Firms Sample | PL Firms Sample | PL Firms Sample |
| *NDTS* | -0.0215 | -0.0839*** | 0.0977 | -0.0168 | 0.0506 | -0.1162*** |
| | (-0.45) | (-5.48) | (1.21) | (-0.77) | (0.50) | (-3.60) |
| Age | -0.0028*** | -0.0012*** | -0.0036*** | -0.0025 | -0.0029*** | -0.0015*** |
| | (-10.20) | (-6.12) | (-7.49) | (-0.89) | (-5.06) | (-3.63) |
| *Z score* | -0.0383*** | -0.0464*** | -0.0071 | -0.0061 | -0.0510*** | -0.0492*** |
| | (-8.18) | (-10.39) | (-0.76) | (-0.97) | (-5.21) | (-4.69) |
| *DTS* | 0.0578*** | 0.0103 | 0.0527*** | -0.289*** | 0.0844*** | 0.0756*** |
| | (7.00) | (1.51) | (3.66) | (-3.24) | (4.81) | (5.02) |
| *CostCap* | -0.0162*** | -0.0191*** | -0.0169*** | -0.0426*** | -0.0312*** | -0.0315*** |
| | (-5.70) | (-8.88) | (-3.23) | (-15.95) | (-4.31) | (-5.83) |
| BusiCycle_ Expansion | | 0.0263*** | | | | |
| | | (5.41) | | | | |
| *BusiCycle_ Contraction* | 0.1484*** | 0.0836*** | 0.0428*** | 0.0812*** | | -0.0189*** |
| | (9.56) | (9.89) | (4.29) | (12.69) | | (-2.64) |
| SovRisk | 0.0149*** | 0.0044*** | 0.0084*** | 0.0054*** | 0.0180*** | 0.0053*** |
| | (12.17) | (10.11) | (4.62) | (7.85) | (6.82) | (5.54) |
| Observations | 3,615 | 6,010 | 1,098 | 2,046 | 915 | 1,812 |
| Wald-Statistic | 3,634.26*** | 25,824.02*** | 13,091.52*** | 38,899.15*** | 4,982.09*** | 10,486.40*** |
| R-squared | 0.5992 | 0.7111 | 0.5820 | 0.7289 | 0.5639 | 0.6601 |
| Industry_ dummies | Yes | Yes | Yes | Yes | Yes | Yes |
| Year_dummies | Yes | Yes | Yes | Yes | Yes | Yes |

Overall, results of robustness checks, reported in table 6, are consistent with those previously presented and discussed, in terms of coefficient signs, magnitude, and statistical significance level. Withal, a few additional comments are in order. Both PT and PL firms continue reverting to target leverage ratios, with the exception of PL firms for the 2014-2016 sub-period.

Financial slack of PL firms remains exhibiting higher impact on financial leverage than PT firms, whereas PT firms' exposure to bankruptcy risk continues showing higher influence on leverage. However, the relationship between the leverage ratio and internal funding exhibits a higher effect for PL than for PT firms, and the inverse is documented for the effect of non-debt tax shields on the leverage ratio. The cost of capital effect on leverage exhibit now a higher effect for PT than for PL firms, and the inverse result is exhibited for the relationships between growth opportunities and leveraging and between debt tax shields and firm leverage.

## IV. Summary and Concluding Remarks

The paper explores different dimensions of the capital structure behavior of PL and PT's nonfinancial firms over the 2011-2019 period. Namely, we investigate capital structure determinants at the firm, industry, and macroeconomic level, including the cost of capital and the presence of leverage target ratios.

Univariate statistics and ANOVA results document that capital structure of PT firms, on average, is significant more leveraged, exhibit higher costs of capital, larger financial slacks and higher non-debt tax shields. Capital structures of PL firms, otherwise, on average, are more exposed to bankruptcy risk, exhibit higher debt tax shields, asset tangibility, and larger growth opportunities.

A dynamic-panel data analysis suggests that both PL and PT firms revert their financial leverage to industry-specific target leverage ratios, suggesting that industry affiliation is a relevant factor for the capital structure.

Results of panel data, fixed and random effects, regressions document that leverage for both PL and PT firms, is significantly and positively associated with financial slack, debt tax-shields, and growth opportunities, and is negatively related to asset tangibility, internal funding, non-debt tax-shields, bankruptcy risk and cost of capital.

Empirical results document that the capital structure of both PL and PT firms: (*i*) is, as expected, positively and significantly determined, ranked by the magnitude of the regression coefficient estimators, by debt tax shields, financial slack, and growth opportunities; (*ii*) that the relationship between leverage and asset tangibility, although positive for both PL and PT firms, it is not statistically significant for the latter; and (*iii*) it is negatively and significantly determined, ranked by the magnitude of the regression coefficient estimators, by non-debt tax shields, bankruptcy risk and cost of capital, and the internal funding and firm positioning in life cycle. Overall, firms' characteristics determine capital structure similarly for both PT and PL firms, despite the magnitude of those effects on leverage may differ between the two countries.

Table 7 summarizes the impact on leverage of a percentage point change on capital structure determinants.

**Table 7**
**Effect of Capital Structure Determinants on Leverage**

The table reports the impact of a percentage point change in capital structure determinants on leverage. [a] denotes a coefficient not statistically significant.

| | Panel A: PL Firms | Panel B: PT Firms |
|---|---|---|
| **Firm Level Capital structure Determinants** | | |
| Tang | 3.17 | 0.19 [a] |
| InterFund | -0.25 | -0.27 |
| MtoB | 0.18 | 0.27 |
| FinSlk | 3.84 | 0.33 |
| NDTS | -22.91 | -1.52 |
| Age | -0.64 | -0.80 |
| Z score | -4.94 | -7.89 |
| DTS | 2.08 | 1.11 |
| CostCap | -0.70 | -0.89 |

Dynamic-panel data analysis documents that both PL and PT firms revert their financial leverage towards industry-specific target leverage ratios, suggesting that industry affiliation is a relevant factor for the capital structure.

The impact of the cost of capital, the sovereign risk and the business cycle state on leverage, is weaker for PT *vis-à-vis* PL firms, suggesting the presence of a linkage between euro zone affiliation and leverage, operating through the cost of capital channel. This finding suggests that euro area affiliation may lessen macroeconomic risk to firms through the transmission of the impulses of non-conventional monetary policies to the cost of capital, and ultimately to leverage.

## Appendix I – Matching Procedure

Most corporate finance decisions are taken self-selecting from preferred choices of decision-makers. Under self-selection, OLS/GLS estimators may no longer be consistent (e.g., Li and Prabhala, 2007).

Two main approaches to address self-selection problems, can be used: (*i*) the Heckman baseline model for self-selection, and models generalizing the Heckman selection procedure (e.g., switching regressions and structural self-selection models); and (*ii*) matching models.

Matching models hold the assumption that unobserved private information is irrelevant to outcomes, contrasting with self-selection models. If a corporate finance decision is made through an exogenous process, the impact of the unobserved private information on the outcome may be irrelevant and the dimension-by-dimension matching models may be more accurate for the estimates. However, matching on several firm characteristics poses difficulties, such as: the exactly matching of firm characteristics; and dimensionality of the matches when raise the dimensions to be matched.

Therefore, we developed and applied a tailor-made matching procedure aiming at mitigating the self-selection problem. The matching process comprises of building a control group as an 'image' of the main group, which reports similar characteristics (variables), given the idea that unobserved characteristics do not justify significant differences between the two samples.

The matching procedure was conducted using Power BI MS-Excel add-in, through the following steps: (i) the first step, to ensure that for each Polish firm in sample 1, a comparable Portuguese firm, belonging to the same industry, based on a 2-digit NACE classification code, exists in sample 2; (ii) to ensure the best match in terms of size, a maximum distance of 8 percent between the total assets of the Polish firms and of the Portuguese firms, belonging to the same 2-digit NACE classification group, was considered.

## Appendix II – Determinants' specification

| **Determinants** | **Variables** | **Specification** |
|---|---|---|
| Bankruptcy risk | *Z score* | 1.2*(Working_Capital/Total_Assets)+1.4*(Retained_ Earnings/Total_Assets)+3.3*(EBIT/Total_ Assets)+0.6*(Book_Value_Equity/Book_Value_Total_ Liabilities)+1*(Sales/Total_Assets) |
| Debt tax shields | *DTS* | (Interest expense*income tax rate)-to-Total_Assets |
| Non-debt tax shields | *NDTS* | Depreciation-to-operating_costs |
| Asset tangibility | *Tang* | Fixed_assets-to-Total_assets |
| Internal funding | *InterFund* | Retained_earnings-to-Total_assets |
| Financial slack | FinSlk | Debt_capacity=((Interest_Expenses_t+1/$k_D$)-(Leverage_t))-to-Total_Assets |
| Position in life cycle | *Age* | Age since date of incorporation |
| Growth opportunities | *MtoB* | Market-to-Book |
| Cost of capital | *CostCap* | Rf: annual average yield of Portuguese and Polish maturity 10-year sovereign_bonds;<br>Market_Risk_Premium: for Portugal was drawn from Dimson et al. (2017); for Poland, the market return on a portfolio of European equities provided in Dimson et al. (2017) deducting the annual average yield of Polish maturity 10-year sovereign bonds;<br>Equity betas: estimated using Hamada's (1972) to lever industry asset betas;<br>Cost of Debt: Interest_Expenses/Financial_Debt<br>Tax rate: Taxation/Earnings_Before-Taxes |
| Industry affiliation | *Industry* | NACE code at 2 digits |
| Target leverage ratio | *MedLev* | Industry Total_Debt-to-Total_net_Assets median |
| Macroeconomic risk | *BusiCycle* | Expansion, contraction and stagnation states, based on a business cycle indicator published by the OECD, the Composite Leading Indicator (CLI) for European economies |
| Euro area affiliation | *EuroArea* | Dummy: 1 for Portuguese firms; 0 otherwise |
| Sovereign risk | *SovRisk* | Country Sovereign_Debt-to-GDP |

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