Managerial Finance

National culture and capital structure dynamics

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Abstract

Purpose – We expand the recent literature on the dynamics of capital structure decisions by investigating the impact of national culture on firms' optimal debt ratios and their dynamic re-adjustment process. To this end, we aim at estimating firm-specific speeds of leverage adjustment, allowing for heterogeneous dynamics in firms' capital structure.

Design/methodology/approach – We use dynamic panel data estimators to analyze the impact of cultural factors on the dynamics of debt ratios.

Findings – We show that national culture affects the optimal level of leverage and the dynamic rebalancing of debt ratios, both directly and indirectly, by altering the effect of firm characteristics and macroeconomic factors on firms' financing behavior. Firms converge faster towards the optimal leverage in countries with a stronger attitude to conform with the norm, while they are slower where there is a higher propensity to intellectual autonomy. A higher risk aversion and long-run propensity induce over-levered firms to reduce leverage faster, making the adjustment process strongly asymmetric. Moreover, national culture also produces indirect effects by mitigating the impact of asymmetric information on capital structure decisions. Indeed, firms in more individualistic countries display a lower speed of adjustment and a stronger effect of firm characteristics associated with higher agency costs. On the contrary, firms in countries with a higher tendency to conform to social norms, less individualistic and more long-term oriented have a higher adjustment speed and appear to suffer less from agency issues. Our results therefore highlight how national culture affects agency problems within firms, thus suggesting the adoption of country-specific corporate governance provisions accounting for the effects of local cultural traits on managers' behavior.

Originality/value – We expand the capital structure and governance literature by showing how cultural traits impact on the dynamics of debt ratios. In particular, we show how cultural traits may mitigate or exacerbate the role of agency issues on firms' behavior, hence suggesting that cultural factors may interact with governance rules in shaping firms' decisions. Therefore, our work highlights how policy-makers should include cultural aspects when defining regulation concerning corporate governance.

Keywords Capital structure, Debt dynamics, Firm financing, Financing decisions, National culture

Paper type Research paper

1. Introduction

This study investigates the impact of national culture on the dynamics of leverage ratios. An empirical regularity when testing the static determinants of observed debt ratios is the fact

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that knowing the nationality of a company partially helps at predicting its capital structure. Chui *et al.* (2002), Antonczyk and Salzmann (2014) and Mogha and Williams (2021) show that national culture may be a relevant factor in explaining the role of nationality in determining cross-sectional differences in observed debt ratios. Its role adds to the importance of other national characteristics such as macroeconomic conditions (Korajczyk and Levy, 2003), the type of legal system (López-Iturriaga and Rodríguez-Sanz, 2008), transparency measures (Aggarwal and Kyaw, 2009), institutional arrangements (Gungoraydinoglu and Öztekin, 2011), the type of financial system (Acedo-Ramírez and Ruiz-Cabestre, 2014), the quality of public governance and the degree of enforcement of the rule of law (Turk Ariss, 2016), financial market conditions (Zavertiaeva and Nechaeva, 2017) or societal trust (Meng and Yin, 2019).

Recent developments in capital structure research have seen a shift from static analyses to more dynamic models that examine the behavior of leverage ratios over time. This shift acknowledges the presence of market frictions, which may cause firms to delay convergence to their optimal capital structure, as defined by Kraus and Litzenberger (1973), until the benefits outweigh the rebalancing costs. Consequently, temporary deviations from the target leverage level can occur.

Researchers have addressed this by adopting the partial adjustment model, which assumes that firms gradually converge towards their target debt ratio. These more recent studies aim to identify the factors that affect the speed of this convergence. If the estimated speed is sufficiently high, then one can conclude that firms effectively pursue an optimal capital structure. While the original works in this line of research (see, for example, Fama and French (2002) and Flannery and Rangan (2006)) focused on a pooling model of convergence, in which a common speed of adjustment was estimated for all firms, subsequent papers have started to investigate what factors affect a firm-specific speed of adjustment: firm growth (Drobetz and Wanzenried, 2006), being over-levered or under-levered (Byoun, 2008), economic growth (Cook and Tang, 2010), economic and political uncertainty (Çolak *et al.*, 2018) or national institutions and macroeconomic conditions, as well as their interaction with firm characteristics (Botta and Colombo, 2022).

This study complements this newer stream of literature, as well as that concerning the role of national culture as a determinant of capital structure, by examining the potential role of cultural traits as significant factors affecting the heterogeneous speed at which firms converge toward their optimal capital structure. We therefore focus on the role of national culture in affecting both the optimal level of leverage and the dynamic process through which firms converge (if at all) towards the estimated target.

To test these hypotheses, we focus on Eastern European countries that transitioned from centrally planned economies, offering a unique setting. Their relatively recent shift to market economies allows us to observe the effects of national culture without the potential confounding factors of long-established financial systems and regulations. Additionally, despite geographical proximity and a shared Soviet Union influence, these countries exhibit significant cultural variations, providing an ideal testing ground. In addition, by only considering Eastern European countries that have already accessed the European Union, the role of national regulation should be modest because the harmonization process required for accessing the European Union suggests that these new market economies should have similar regulatory frameworks and have access to the European financial markets. Turk Ariss (2016) shows the importance of strengthening public governance and laws as well as deepening capital markets in developing countries to improve financing conditions: by examining firms operating within the regulatory framework of the European Union which produces a significant harmonization between member countries, we are better able to separate the role of national culture from that of national institutions and regulations.

Our research reveals a significant influence of national culture on both the target leverage level and the speed at which firms converge towards it. When examining the optimal

leverage level, we find that national culture plays a crucial role in mitigating or exacerbating the effects of asymmetric information on debt usage. Indeed, our findings indicate that firms in countries with higher individualism tend to have lower leverage levels. This is likely due to the higher reputational costs associated with violating social norms in such cultures. As a result, lenders in these countries have greater confidence in debt repayment, allowing managers to borrow more. Conversely, in more individualistic societies, lenders might be wary of excessive borrowing due to concerns about over-optimism or lower reputational consequences of bankruptcy, leading them to restrict loan supply. We also show that leverage is lower in countries with higher risk aversion and long-term orientation. This aligns with expectations, as cultures with these traits tend to adopt a more conservative financial approach. Interestingly, our analysis provides even stronger insights when we allow for interactions between cultural traits and firm or institutional characteristics. This suggests that the impact of national culture on leverage can be further nuanced by specific firm-level factors or the institutional environment.

We then study how firms reach that target to shed new light on capital structure dynamics. Our findings reveal a significant influence of national culture on the speed of adjustment, which is far from uniform across firms. This influence manifests in both direct and indirect effects, the latter arising through interaction with firm-specific characteristics. We report how in rule-abiding and conformist cultures firms exhibit faster convergence, suggesting a prioritization of achieving target leverage levels, potentially to adhere to perceived societal expectations. Conversely, in the presence of higher intellectual autonomy and individualism firms display a slower speed, indicating a preference for thorough individual evaluation and adjustment over rapid conformity. Cultural traits also display interesting indirect effects, mediating the impact of individual firm characteristics on the speed of adjustment. When interacting with risk aversion and long-term orientation, we observe a significant asymmetry in the adjustment process: over-levered firms display a faster speed, driven by a desire to mitigate risk by reaching the target level sooner. Conversely, under-levered firms exhibit slower convergence, likely due to a cautious approach and satisfaction with their current debt position. These findings highlight the critical role of national culture in shaping the dynamic journey of firms towards their optimal leverage positions. Not only does culture influence the target destination, but also the path taken to reach it.

Thus, the agency costs connected with financing decisions may be mitigated or exacerbated by cultural traits. Therefore, countries may decide to set governance rules in order to prevent agency conflicts from producing inefficient outcomes, and, through this, mitigate the negative impact of specific cultural traits. Indeed, our results indicate that one should carefully consider the effects that the local cultural traits produce on managers' behavior when defining corporate governance rules for a specific national context, and consequently construct a country-specific regulatory framework that adapts to local requirements.

2. Literature review

The key argument of our work is that cultural factors affect the financing behavior of firms. Scholars have developed various measures to quantify different aspects of national culture and make them comparable across countries. Triandis (1995) stresses the importance of relying on different sets of indicators when studying cultural differences, due to the uncertainty surrounding them; therefore, our study relies on two different sets of cultural indicators. The first one is the set of cultural traits indicators proposed by Hofstede (2001), which is commonly used to investigate the role of a cultural framework on the behavior of people or companies. It characterizes the different cultural traits of a nation through six

dimensions: power distance, uncertainty avoidance, individualism, masculinity, long-term orientation and indulgence. For robustness purposes (see Online appendix), we repeat our analysis with an alternative set of measures and consider the indicators proposed by Schwartz (1994), who identifies seven different dimensions: Embeddedness, Intellectual and Affective Autonomy, Hierarchy, Mastery, Egalitarian Commitment and Harmony. These seven value types are further grouped into three bipolar cultural dimensions, reflecting how societies solve three fundamental problems: Autonomy versus Embeddedness, Mastery versus Harmony and Hierarchy versus Egalitarianism.

A growing body of literature suggests that the social and cultural environment in which firms operate contributes at determining how they make their decisions, ultimately affecting their operating and financial performance. Karolyi (2016) provides a thorough review of these various lines of research.

Gleason *et al.* (2000) analyze the relationship between national culture and capital structure decisions for retail firms. They provide evidence in favor of the effect of national culture on debt ratios. They also show how retailers' performance is instead independent of any cultural influence, while being affected by capital structure. Their results suggest that agency conflicts may be primarily responsible for the excess leverage of retailers, resulting in a negative relationship between capital structure and performance.

Building on the observation that knowing the country of origin of a company helps predict its leverage ratio, Chui *et al.* (2002) study the determinants of leverage focusing in particular on the role of national culture as a potential factor in a static analysis of capital structures. They find that countries with high scores on the cultural dimensions of conservatism and mastery tend to have lower corporate debt ratios, consistently with the hypothesis that high levels of conservatism induce managers to place greater importance on a harmonious working and social environment, on preserving the public image and on security and tradition, hence limiting the use of debt. Similarly, firms in countries with high scores on mastery use less debt because they put more weight on control and individual success. Arosa *et al.* (2015) investigate the impact of national culture on the role of market timing in capital structure decisions using a traditional static model of the determinants of debt ratios. They find that firms engage in market timing by reducing their leverage ratios when their share prices increase. They also document that in countries with high uncertainty avoidance and high power distance market leverage ratios are lower, and market timing has a weaker impact, especially in developed markets. They conclude that cultural dimensions affect the degree to which a firm can modify its capital structure to take advantage of perceived market mispricings. Antonczyk and Salzmann (2014) analyze whether variations in the observed debt ratios across companies from different countries can be explained by different cultural traits. Using again a classic static model of debt determinants, they find evidence that capital structure is indeed affected by the degree of individualism, likely because managers in those countries exhibit strong optimism and overconfidence, which in turn causes an upward bias in the perception of supportable debt ratios. Pan *et al.* (2017) investigate the role of managers' cultural traits in shaping firm culture. They report that risk preferences are significantly correlated both across members of a firm's leadership team and across generations of leadership. Moreover, their preferences towards risk and uncertainty play a key role in determining a firm's risk culture, preserving the firm's founders' preferences in the firm's culture and producing a long-term persistence of corporate culture. In turn, this affects firms' attitudes towards acquisitions and research investments, and initial differences in risk culture contribute to determining persistent differences in firms' innovation intensity. Haq *et al.* (2018) examine the impact of national culture on banks' leverage ratios, and report that banks in countries with a highly individualistic culture, masculinity and indulgence have a higher leverage, while those in countries with high uncertainty-avoidance, power distance and long-term orientation have less leverage. They

also show how bank size substantially moderates these cultural effects, possibly because by growing bigger the bank develops its own corporate culture, either because of more diverse management, stronger effects of bank regulation or the need to attract a larger investors' base. Finally, Mogha and Williams (2021) report how cultural traits may influence corporate risk-taking hence affecting their capital structure decisions. In particular, they report how national culture influences financing choices both when looking at the short-term and long-term debt-to-equity ratio. They also report how the impact is more pronounced for short-term rather than long-term debt ratios. Finally, they show how national culture affects not only the overall debt ratio, but also the decisions about the relative maturity of debt. Nadarajah *et al.* (2023) report that firms based in countries with higher levels of individualism have greater default risk, due to higher risk-taking behavior. They also find that this impact of individualistic culture on firms' risk of default is mitigated by more stringent bankruptcy laws, showing the importance of adapting regulation to national culture traits.

3. Research questions and hypotheses

Building on the extant literature, we formulate the following hypotheses on the role of cultural traits – measured with Hofstede's indicators – as potential determinants of capital structure. We expect a negative relationship between power distance and leverage, and between individualism and leverage. High levels of individualism and power distance are likely associated with greater asymmetric information (Davis *et al.*, 1997) and a lower moral obligation to fulfill the promise to repay debt. As a result, in these countries firms end up being able to borrow less, due to self-interested managers who increase agency costs (Leland, 1998), and higher indirect bankruptcy costs. We expect a negative relationship also with uncertainty avoidance and long-term orientation. Higher levels of debt increase the risk of default, therefore firms in countries with higher uncertainty avoidance will want to limit the risk of bankruptcy, hence using less debt. Similarly, more long-term oriented cultures will likely induce companies to use less aggressive financial strategies, limiting the use of debt to avoid being constrained in their future actions due to the promised debt repayments. We instead expect a positive effect of masculinity because this trait is typically associated with a higher propensity to undertake risk, including the higher financial risk associated with increases in leverage. Finally, we expect an insignificant effect of indulgence because, on the one hand, higher leverage may be used to restrain indulgent managers from making an inefficient use of resources to obtain private perks (Jensen, 1986); on the other hand, indulgent managers may take advantage of asymmetric information to make decisions that redistribute wealth from debtholders to shareholders (Jensen and Meckling, 1976), hence reducing firms' ability to raise debt. If the two effects compensate each other, we should observe an insignificant relationship between indulgence and leverage. We also expect culture to produce an indirect (or moderating) effect on capital structure, by influencing ("moderating") the effects of firm or country-level determinants, a possibility not yet explored in the literature. In particular, in line with the hypotheses made for direct effects, we expect significant indirect effects with those variables connected with agency costs, like growth opportunities, profitability and the degree of protection of property rights. We then expect these interactions to reinforce the direct effects described above, given that cultural traits may exacerbate or mitigate the risk of incurring in situations that may generate opportunistic behavior and, consequently, agency costs. Therefore, we expect a negative indirect effect of power distance, individualism, masculinity and indulgence when interacting with growth opportunities, because these traits increase agency costs (Davis *et al.*, 1997), thus increasing the negative impact of higher growth opportunities on the use of debt. On the contrary, long term propensity and uncertainty avoidance reduce the impact of agency costs (Gleason *et al.*, 2000), thus mitigating the effect of growth opportunities on the

optimal leverage. For similar reasons, since power distance, indulgence, individualism and masculinity tend to increase agency costs within firms, we expect that firms will rely more on debt as a governance instrument, thus displaying a positive indirect effect with profitability, to prevent managers from abusing of their position, in line with Jensen (1986). On the contrary, we expect a negative indirect effect for long term orientation and uncertainty avoidance when interacting with profitability, because these traits moderate manager's behavior thus requiring a lower use of debt as a governance tool. Finally, we expect cultural traits and national rules to compensate each other in protecting investors' rights: therefore, we expect a negative interaction between the index of protection of property rights and long term orientation as well as uncertainty avoidance, as these two traits are associated with lower agency costs and propensity to take risks. On the contrary, we expect a positive interaction between the protection of property rights and traits like masculinity, individualism, power distance and indulgence. All these traits, as discussed before, are associated with higher agency costs, and therefore may require a higher protection of property rights in order to convince creditors to lend more. In other words, we assume that national rules and national culture may act as substitutes, and integrate each other in protecting property rights.

When looking at the speed of adjustment, we formulate the following hypotheses. In countries associated with higher power distance, individualism and masculinity managers will likely take capital structure decisions based on personal opinion rather than more objective factors, such as optimal debt ratio. They will also feel a lower pressure to conform with the norm, represented by the target leverage. Therefore, we would expect to observe larger deviations from an optimal debt ratio and a lower speed of adjustment when those traits are higher. Thus, we expect a negative impact of those traits on the speed of adjustment. Li *et al.* (2013) and Mogha and Williams (2021) show that high uncertainty avoidance decreases risk-taking. Chang and Noorbakhsh (2009) show that it is also associated with higher cash holdings. These findings lead us to hypothesize that firms in countries with higher levels of uncertainty avoidance will have lower deviations from target and a higher speed of adjustment when over-levered, to reduce the uncertainty connected with the risk of excessive debt. On the contrary, they will have a lower speed of adjustment when under-levered, preferring to maintain financial flexibility for the future and limiting financial risk rather than immediately optimizing leverage by increasing debt. Similarly, long-term-oriented cultures, by putting higher emphasis on savings and reducing risk to chase long-terms rewards rather than short-term gains, will tend to have a high speed of adjustment when over-levered, to reduce risk and maximize value, while when under-levered they will put more emphasis on flexibility rather than on constant and immediate capital structure optimization. Therefore, we hypothesize that in long-term oriented cultures firms will prefer to converge faster to target leverage when over-levered, and more slowly when under-levered. Finally, indulgence indicates that people in the country have a tendency to enjoy life. This may increase agency costs in a firm, as managers may indulge in pursuing private perks rather than shareholder value. As a consequence, we hypothesize a negative effect of indulgence on the speed of adjustment, because managers sacrifice optimizing capital structure to pursue more personal goals. In terms of indirect effects, we expect power distance, individualism, masculinity and indulgence to interact negatively with GDP growth: these traits indicate higher independence in taking decisions, and therefore we expect that firms in countries characterized by higher scores of these traits to be less affected by business cycles in their capital structure decisions. For similar reasons, we hypothesize a negative interaction with the Ohlson's O-Score. On the contrary, we expect that uncertainty avoidance and long-term orientation will display a positive interaction with GDP when debt is below target, because the more favorable business cycle conditions reduce the risk of increasing leverage to

converge towards the target. On the contrary, we expect a negative sign for the interaction effect when over-levered, because managers will prefer reducing risk by converging towards the target even if macroeconomic conditions are not favorable for a reduction of debt and an increase in equity, rather than postponing the readjustment, hence facing a higher risk, until more favorable conditions arrive. For similar reasons, we expect the same asymmetric impact for the interaction with the Ohlson's O-score.

4. Research method

The modern literature on capital structure dynamics relies on various forms of the classic partial adjustment model of Jalilvand and Harris (1984). This model estimates the speed at which a firm moves towards its optimal debt ratio over time. In its basic form, the model relies on the following equation:

$$Debt_{ij,t} - Debt_{ij,t-1} = \lambda\left(Debt^{*}_{ij,t} - Debt_{ij,t-1}\right) + \delta_{ij,t}, \tag{1}$$

where $Debt^{*}$ is the firm's target debt ratio, λ is the speed of adjustment towards the target, i indicates firm, j indicates country, t indicates time and δ is the error term. We measure the debt ratio as total financial debt divided by the sum between total market capitalization and total financial debt. In turn, the target level of the debt ratio is given by:

$$Debt^{*}_{ij,t} = \beta X_{ij,t-1} + \gamma Z_{j,t} + \delta X_{ij,t-1} Z_{j,t} \tag{2}$$

where X is a vector of firm or country (other than national culture) characteristics, Z is a vector of national culture measures, β, γ and δ are vectors of parameters, and all other symbols have the same meaning as before. By substituting Equation (2) into (1) and re-arranging, we obtain:

$$Debt_{i,t} = \lambda\beta X_{ij,t-1} + (1-\lambda) Debt_{ij,t-1} + \epsilon_{i,t} \tag{3}$$

The adjustment speed λ indicates the portion of the deviation from target leverage that firms are willing to reduce in a year. If firms believe that there is an optimal debt ratio, then we should observe that they adjust leverage in order to converge towards it, so that λ should result significantly greater than zero. We define the distance between the target and the actual debt ratio (also *deviation* or *Dev* hereinafter) that firms (may) want to reduce simply as:

$$Dev_{ij,t} = Debt^{*}_{ij,t} - Debt_{ij,t-1}. \tag{4}$$

The speed of adjustment obtained by estimating the model in Equation (1) would be constant, and this corresponds to obtaining a common speed of adjustment for all firms, irrespective of individual or country-level characteristics. To test our hypothesis that the speed of adjustment is instead heterogeneous due to changes in firm characteristics or cultural factors, we construct a more sophisticated model where a firm's rate of adjustment toward its target leverage varies as a function of different variables. More specifically, we adopt the following model allowing for heterogeneity in the speed of adjustment:

$$Debt_{ij,t} - Debt_{ij,t-1} = \Lambda_{ij,t} Dev_{ij,t}, \tag{5}$$

The speed of adjustment Λ can now vary across firms, countries and time, as a function of firm or country characteristics, and interactions between the two:

$$\Lambda_{ij,t} = \lambda_0 + \lambda_1 X_{ij,t} + \lambda_2 Z_{j,t} + \lambda_3 X_{i,t} Z_{j,t} \tag{6}$$

where λ_i are parameters, X is a vector of firm or country (other than national culture) characteristics, and Z is a vector of national culture measures. This model, therefore, allows for both a direct and an indirect effect of national culture on the debt re-adjustment process: cultural traits can either directly affect the speed of adjustment, or produce an indirect effect by affecting the relationship between firm characteristics (or macroeconomic and institutional factors) and the speed of adjustment.

The estimation process hence proceeds as follows. Equation (5) fully describes the dynamic model of debt ratios that we want to investigate, and represents the object of our analysis. However, due to its complex nature, it cannot be estimated directly. Rather, in order to estimate Equation (5), consistently with the pertinent literature we adopt a two-step approach, with which we first define the optimal level of leverage and then analyze the dynamic adjustment process towards it.

Therefore, we first estimate Equation (3) to define the firm-specific target level of leverage. From a methodological perspective, we do so by means of system GMM (Blundell and Bond, 1998), which is preferable in the presence of a relatively short panel (Flannery and Hankins, 2013). We then obtain an estimate of target debt ratios as:

$$\widehat{Debt}^{*}_{i,t} = \widehat{\beta} X_{i,t} = \frac{\widehat{Debt}_{i,t} - (\widehat{1-\lambda}) Debt_{i,t-1}}{1 - (\widehat{1-\lambda})} \tag{7}$$

In the second step, we analyze how firms converge, if at all, towards the estimated target debt ratio from the previous step. To do so, we first calculate the distance from target by means of Equation (4). Next, we analyze the firm-specific speed of adjustment by replacing Equation (6) into (5), to obtain the following regression model:

$$Debt_{ij,t} - Debt_{ij,t-1} = (\lambda_0 + \lambda_1 X_{ij,t} + \lambda_2 Z_{j,t} + \lambda_3 X_{i,t} Z_{j,t}) Dev_{ij,t} + \delta_{ij,t}, \tag{8}$$

where λ_i are parameters, i indicates firm, j indicates country, t indicates time, X is a vector of firm or country (other than national culture) characteristics, Z is a vector of national culture measures, and δ is an error term. We estimate Equation (8) by means of a pooled OLS regression, with bootstrapped standard errors to account for the generated regressor problem.

As firm-level determinants of the *firm-specific* optimal debt ratio, we consider the variables most commonly used in the capital structure literature, that have proven to result significant also in samples based on Eastern European companies (see, among others, Delcoure (2007) and Botta (2020)). Therefore, our set of firm-level determinants includes: profitability (*profit*), given by the ratio between earnings before interest and taxes and total assets; growth opportunities (*growth*), obtained as the ratio between the market value of assets (proxied by the sum of the market value of equity and total financial debt) and the book value of total assets; the ratio of tangible assets to total assets (*tangible*) and firm size (*size*), measured as the natural logarithm of net sales. We then include the annual mean debt ratio in the industry, to account for potential industry effects (Bradley *et al.*, 1984). We also consider the potential effects of macroeconomic conditions, in terms of GDP growth (*GDP*) and the inflation rate (*inflation*). Then, we include measures of institutional quality, by relying on the Heritage Index of Economic Freedom and its components, that measure (on a scale from 0 to 100) the market friendliness of various aspects of national institutions.

Finally, as firm level determinants of the heterogeneous speeds of adjustment we consider a dummy variable labeled *Above* which takes the value one if the deviation from target, as defined in Equation (4) is negative (that is, the firm is over-levered), and zero otherwise. Then,

we consider the free cash flow generated by the company in the year (*fcf*), defined as the difference between funds generated from operation minus the funds consumed by capital expenditure, all scaled by total assets. A key prediction of the pecking order theory is that firms should first use internal funds to cover their investment needs, so that the debt ratio would naturally fluctuate depending on the sign of the free cash flow. We, therefore, include it directly in the adjustment equation in order to account for this effect; we also include it in the dynamic adjustment equation as a factor that could potentially affect the speed of adjustment. Finally, in light of the importance of rating as a determinant of the speed of adjustment (Samaniego-Medina and di Pietro, 2019), we include a credit risk measure. Since the official score from credit rating agencies is available only for a very limited sub-sample of firms, we calculate for each company the Ohlson's O-score (*Ohlson*), and include it to measure the overall risk of default given the financial and operating assets and liabilities of the firm [1].

5. Dataset

We construct our dataset by collecting yearly observations for listed firms incorporated in one of the following Eastern European countries: Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia. We only consider countries that are members of the European Union to ensure that the companies under investigation operate in a homogeneous regulatory framework, as a result of the harmonization process that the European Union imposes to its members. Data are collected for the period that goes from 2004 until 2019. We then require firms to have at least four consecutive years of data in order to be included in our sample, because we need to estimate dynamic models. The resulting sample comprises a total of 19.842 firm-year observations. We retrieve all accounting data from Worldscope, while market data are from Datastream. In line with most of capital structure literature, the sample excludes financial and utility companies, because their financing decisions are severely affected by industry-specific regulations, making them hardly comparable with companies in other sectors. Firms are sorted within industries based on the four-digit code assigned by Worldscope.

We obtain the Hofstede's national culture indicators from his personal website [2], and we use Schwartz cultural dimensions indicators from the latest release of the dataset. Table 1 reports the main descriptive statistics for all the variables used in our analysis over the entire sample period.

In particular, it is important to observe that the indicators of cultural traits display significant variation between countries, as one can see by looking both at the gap between the minimum and the maximum value, as well as by focusing on the standard deviation [3]. This implies that we have sufficient variation in the cultural factors to run a meaningful analysis on the impact of culture on firms' financing behavior.

6. Results and discussion

6.1 Estimates of the target leverage ratio

In a first step of our analysis, we estimate the firm-specific target level of leverage with a simplified version of Equation (2) in which we remove the last term. This implies that we only allow for a direct effect of culture on leverage, that would correspond to a constant, country-wide effect of culture on financing decisions. We provide this as an initial benchmark, making our model comparable with the extant literature, before introducing our improvements in the following paragraphs. Table 2 reports our results.

The coefficients for the firm-level characteristics are consistent with those typically found in the literature: profitability and growth opportunities have a negative effect on leverage,

	Mean	Median	SD	Min	Max
Debt ratio	0.214	0.148	0.241	0.000	0.947
Profit	0.037	0.035	0.092	−0.159	0.218
Growth	1.440	0.920	1.450	0.153	5.718
Tangible	0.386	0.377	0.256	0.008	0.875
Size	10.950	11.167	2.376	6.045	14.990
Ohlson	−3.776	−4.092	2.861	−8.875	2.624
FCF	−0.010	0.002	0.103	−0.259	0.170
GDP growth	3.347	3.607	3.158	−14.814	11.889
Inflation	2.811	2.459	2.756	−1.545	15.402
Heritage	63.688	64.200	4.594	50.000	79.100
Prop. Rights	48.845	50.000	13.591	30.000	90.000
Gov. Integrity	44.567	42.000	9.274	26.000	69.900
Fin. Freedom	63.392	60.000	9.046	50.000	90.000
pdi	70.739	68.000	11.460	40.000	104.000
idv	47.849	60.000	15.664	27.000	80.000
mas	53.593	64.000	18.525	9.000	110.000
uai	86.684	90.000	9.398	51.000	93.000
ltowvs	51.362	51.889	13.988	37.783	82.116
ivr	26.273	29.241	7.587	12.946	47.545
Harmony	4.040	4.020	0.195	3.860	4.470
Embedded	3.839	3.860	0.085	3.590	4.000
Hierarchy	2.388	2.510	0.294	1.620	2.680
Mastery	3.902	3.840	0.114	3.710	4.060
Aff. Auton.	3.436	3.450	0.190	2.990	3.920
Intel. auton.	4.381	4.310	0.155	4.220	4.880
Egalitar	4.428	4.480	0.151	4.130	4.600

Note(s): Summary statistics for all the variables included in the dataset. SD indicates the standard deviation. Statistics are calculated over the entire sample period
Source(s): Created by the author

Table 1.
Summary statistics

while the incidence of tangible assets on total assets and firm size have a positive effect. Focusing the variables measuring cultural traits, we find that they are indeed significant determinants of the observed debt ratios, and the results are in line with our hypotheses. The findings are not affected when we also include measures of national institutions as an additional control (see Columns (2) and (3) in the Table), to avoid that the cultural variables may proxy for some different type of country effect [4].

More specifically, in contrast with the findings in Antonczyk and Salzmann (2014), we find that firms in countries with higher power distance (*pdi*) and individualism (*idv*) have a lower leverage, likely because the reputational costs of bankruptcy are higher in societies where inequalities or offences to social rules (like the moral obligation to pay one's debt) are less tolerated. As a result, firms in those countries may be able to borrow more, because lenders are more confident about the efficient use of borrowed money. In other words, the sign of these two coefficients may reflect supply-side effects, and the use of debt by shareholders as a governance instrument to provide a managerial incentive to an efficient use of internal funds (Jensen, 1986), rather than preferences of firms' managers. As one would expect, higher uncertainty avoidance is associated with lower leverage; given that a higher level of debt increases the risk of default, and therefore the uncertainty about a company's future, this result should not be surprising. Similarly, a higher long-term orientation also produces a negative effect on the debt ratio: again, leverage increases the risk of a company, hence potentially reducing its future flexibility to undertake new projects. Adopting a conservative capital structure would therefore be a more long-term oriented strategy. Firms

	(1)	(2)	(3)
Debt ratio$_{t-1}$	0.406***	0.402***	0.404***
Profit	−0.203**	−0.206**	−0.194*
	(0.09)	(0.09)	(0.10)
Growth	−0.008***	−0.008***	−0.006**
	(0.00)	(0.00)	(0.00)
Tangible	0.092***	0.092***	0.091**
	(0.03)	(0.03)	(0.04)
Size	0.013**	0.012***	0.013**
	(0.01)	(0.00)	(0.01)
Industry	0.329***	0.295***	0.282***
	(0.07)	(0.07)	(0.08)
Heritage		0.001	
		(0.00)	
Property Rights			−0.000
			(0.00)
Government Integrity			0.001***
			(0.00)
Financial Freedom			−0.001***
			(0.00)
pdi	−0.017*	−0.019**	−0.019**
	(0.01)	(0.01)	(0.01)
idv	−0.026**	−0.029***	−0.028***
	(0.01)	(0.01)	(0.01)
mas	0.010*	0.011**	0.011**
	(0.00)	(0.00)	(0.00)
uai	−0.035**	−0.036***	−0.036***
	(0.01)	(0.01)	(0.01)
ltowvs	−0.031**	−0.032***	−0.032***
	(0.01)	(0.01)	(0.01)
ivr	−0.005	−0.006	−0.006
	(0.01)	(0.01)	(0.01)
Constant	6.547**	6.950**	6.862***
	(2.82)	(2.78)	(2.42)

Note(s): The Table reports estimates of Equation (2) without interaction effects between national culture characteristics and firm or macroeconomic factors. Estimates are obtained by means of a system-GMM estimator (Blundell and Bond, 1998), using Hofstede measures of national culture. Coefficient estimates significantly different from zero at the 1%, 5% and 10% level are marked with ***, **, and* respectively. Standard errors are reported in parenthesis
Source(s): Created by the author

Table 2. Determinants of target leverage and Hofstede measures of national culture

in more masculine countries (*mas*) display higher leverage: this is also consistent with expectations, as masculinity is typically associated with an higher propensity to undertake risk. Finally, the degree of indulgence (*ivr*) is not a significant determinant of leverage ratios, either because it has no effect on firms' decisions or, as we highlighted in Section 3, the two opposing effects connected with this variable offset each other.

Having provided preliminary results with a model consistent with previous literature, we then proceed with the estimate of our full model from Equation (2) that allows for potential indirect effects of cultural traits through their interactions with firm-level characteristics and national institutions. This way, we introduce the possibility of a firm-specific impact of cultural traits on the target leverage, rather than a simple country-wide effect as is done in previous works. Table 3 reports the results.

Table 3.
Determinants of target leverage with two-way interactions

		Profit	Growth	Tangible	Size	Industry	Prop. Rights	Gov. Integrity	Fin. Freedom
		−2.550***	−0.719***	1.573**	0.217*	0.836	0.044***	−0.011	−0.090***
pdi	−0.010	0.011*	−0.002***	−0.003	−0.001**	0.002	0.001**	0.000	0.001***
idv	−0.015	0.010	−0.003***	−0.002	−0.001*	−0.007	0.001*	0.000	0.001***
mas	0.002	−0.003	−0.001***	0.001	0.000	0.002	0.000	−0.000	−0.000
uai	−0.022*	0.012	0.003***	−0.008*	−0.001	−0.004	−0.001***	0.000	0.001***
ltowvs	−0.022*	0.005	0.003***	−0.008*	−0.001	0.001	−0.001***	0.000	0.001***
ivr	−0.003	−0.004	−0.002***	−0.003	−0.001***	−0.007	−0.001**	0.000***	0.000
$Debtratio_{t-1}$	0.433***								
Constant	4.293								

Note(s): The Table reports estimates of the full model in Equation (2), including interaction effects between national culture characteristics and firm or macroeconomic factors. The first row reports the coefficient for the direct effect of the corresponding firm characteristic or institutional variable, the first column displays the coefficient for the direct effect of cultural traits, and all other rows and columns report the coefficients for the interactions amongst the two sets of variables. Estimates are obtained by means of a system-GMM estimator (Blundell and Bond, 1998). Coefficient estimates significantly different from zero at the 1%, 5% and 10% level are marked with ***, **, and* respectively. Standard errors are not reported to save on space and for an easier readability of the table, but are available upon request

Source(s): Created by the author

We find that most of the effect of national culture is not direct, but through the interaction with the other regressors. In particular, cultural traits produce significant indirect effects when interacting with growth opportunities, the degree of protection of property rights and with financial freedom.

The interaction with growth opportunities is consistent with the direct effects in the restricted model of Table 2: firms in countries with higher risk avoidance and long-term orientation have a less negative effect of growth opportunities, while those in more masculine countries, higher power distance or individualism a more negative one. The negative effect of power distance and individualism is consistent with our hypothesis that cultural traits may affect agency costs within firms: higher growth opportunities generate greater indirect bankruptcy costs (in the form of lost opportunities) and higher agency costs (like those due to risk shifting), so in countries with higher power distance or individualism managers may display a higher propensity to take advantage of their position, and exacerbate the resulting agency costs. Knowing this, lenders become even more cautious and reduce their willingness to finance high-growth firms with debt, due to the negative moderating effect that cultural traits have on managers' incentives. The positive interaction with the degree of protection of property rights and with financial freedom suggest that culture and institutions may act as substitutes in protecting shareholders' ability to keep the results of their investments. An higher protection of property rights is typically associated with a decrease in leverage and an increase in retained earnings (Johnson *et al.*, 2002). Our results indicate that this effect is stronger in countries where inequalities and the violation of social norms are less tolerated. This is reinforced by the finding that the interaction with risk avoidance and long-term orientation is instead negative. These results are consistent with our view that the role of national culture is crucial in determining the outcome of situations where agency conflicts (and the connected costs) may arise: when cultural traits suggest a lower propensity to avoid risk and respect rules, a higher protection of property rights is needed to protect investors' rights.

6.2 Measuring the speed of adjustment towards the target leverage

The next step of the analysis consist in the estimation of the dynamic adjustment towards the target leverage, by means of Equation (8). In order to provide an initial benchmark, we first estimate a partial adjustment model with a constant speed of adjustment (*SOA*) for all firms, and then one allowing the speed to change between under-levered and over-levered firms and as a function of the free cash flow generated by the firm. In the remainder of the analysis, we define as *under-levered* those companies with a debt ratio below the estimated firm-specific optimal target, and as *over-levered* those which instead have a debt ratio higher than the estimated target. Table 4 reports our results.

We find that the average speed of adjustment in the entire sample is around 30% (see Column (1)), corresponding to an half-life of deviations from target of 1.9 years [5]. This model assumes that the change in leverage is only a function of the distance from its target, a typical trade-off argument. A key prescription of the pecking order theory is instead that firms should use internal funds as a first source of financing, so that we should observe a decrease in leverage if internally generated funds (measured by the free cash flow to the firm) are positive, and vice versa. In Column (2) we therefore add to the adjustment equation the free cash flow of the company (*FCF*) in the corresponding year, in order to simultaneously allow for both trade-off and pecking order types of behavior. Our results suggest that both the distance from the target and the free cash flow significantly contribute at explaining the change in leverage.

In Columns (3)–(4) we further augment the model, and allow for different speeds of adjustment and different impact of the free cash flow between under-levered and over-levered firms. To this end, we include the dummy variable $Above_t$, which is equal to one if the

	(1)	(2)	(3)	(4)
Dev_t	0.306***	0.302***	0.168***	0.128***
	(0.02)	(0.02)	(0.02)	(0.02)
FCF_t		−0.221***		−0.300***
		(0.02)		(0.02)
$Above_t$			0.042***	0.042***
			(0.00)	(0.00)
$Above_t$*Dev_t			0.337***	0.384***
			(0.04)	(0.04)
$Above_t$*FCF_t				0.136***
				(0.03)
Intercept	0.000	−0.002*	0.005**	0.005**
	(0.00)	(0.00)	(0.00)	(0.00)

Note(s): The Table reports ordinary least squares estimates of alternative restricted versions of Equation (8). *Dev* indicates the distance from the optimal debt ratio at the beginning of the year. *FCF* is the free cash flow of the firm in the year. *Above* is a dummy equal to one if the debt ratio at the beginning of the year is greater than the optimal debt ratio estimated for the year. Coefficient estimates significantly different from zero at the 1%, 5% and 10% level are marked with ***, **, and* respectively. Bootstrapped standard errors are reported in parenthesis

Source(s): Created by the author

Table 4.
Symmetric and asymmetric speeds of adjustment

debt ratio at the end of the previous year (i.e. at the beginning of the current year) is greater than the target estimated for the current year, and zero otherwise. The speed of adjustment is significantly different between the two groups of firms, as well as the effect of the free cash flow, indicating that the adjustment process is strongly asymmetric. In particular, the speed of adjustment is significantly greater for over-levered firms (about four times as large), while the use of internal funds to reduce leverage is greater for under-levered ones.

In light of these findings, we estimate a model with heterogeneous speeds of adjustment both on the entire sample and, separately, on the under-levered and over-levered sub-samples. We begin with a restricted version of Equation (8) only allowing for direct effects of national culture on the adjustment process. Table 5 reports our results.

We find that the role of cultural traits in directly affecting the speed of adjustment is limited to the sub-sample of under-levered firms. In particular, higher power distance, individualism, long-term orientation, uncertainty avoidance and indulgence have a negative effect on the speed of adjustment, while masculinity has a positive effect. In other words, all the traits that we found having a negative effect on the optimal level of leverage, hence determining a lower target leverage, also induce a lower speed of adjustment for under-levered firms (i.e. a lower propensity to increase leverage when it is below the target). On the other hand, masculinity, which we found having a positive effect on target leverage, also induces a higher speed of adjustment for below-target firms. For over-levered firms, instead, we do not find any direct effect of national culture on the speed of adjustment.

In Table 6 we report a set of descriptive statistics for the speeds of adjustment obtained by applying to the model in Equation (8) the coefficients reported in Table 5.

Looking at the distribution of the speeds of adjustment, three main findings emerge. First, there is a wide heterogeneity in the adjustment process, with speeds ranging between a minimum of around −0.4 and a maximum of more than 1. Second, the mean and median speeds of adjustments are nearly identical in all cases, suggesting that the distribution is symmetric around the mean. Third, the adjustment process for over-levered firms is more heterogeneous compared to under-levered ones, with both a more negative minimum and a much larger maximum. Overall, this suggests that for under-levered firms converging to the

	(1) Full sample	(2) Under-levered	(3) Over-levered
Dev_t	2.614	4.123***	2.186
	(1.78)	(1.15)	(2.55)
FCF	−0.237***	−0.230***	−0.367***
	(0.01)	(0.03)	(0.04)
Dev_t*FCF	−0.310**	−0.400	−0.607**
	(0.14)	(0.29)	(0.24)
Dev_t*Ohlson	0.056***	0.011*	0.058***
	(0.01)	(0.01)	(0.01)
Dev_t*GDP	0.011***	−0.001	0.016***
	(0.00)	(0.00)	(0.01)
Dev_t*Inflation	0.008	0.003	0.016**
	(0.01)	(0.00)	(0.01)
Dev_t*Heritage	−0.010**	−0.004	−0.011*
	(0.00)	(0.00)	(0.01)
Dev_t*pdi	−0.003	−0.010***	−0.001
	(0.01)	(0.00)	(0.01)
Dev_t*idv	−0.002	−0.013***	0.001
	(0.01)	(0.00)	(0.01)
Dev_t*mas	0.003	0.006***	0.003
	(0.00)	(0.00)	(0.00)
Dev_t*uai	−0.010	−0.020***	−0.008
	(0.01)	(0.01)	(0.01)
Dev_t*ltowvs	−0.009	−0.016***	−0.009
	(0.01)	(0.01)	(0.01)
Dev_t*ivr	−0.002	−0.006**	−0.002
	(0.00)	(0.00)	(0.01)
Constant	0.007***	0.004*	0.025***
	(0.00)	(0.00)	(0.00)

Note(s): The Table reports ordinary least squares estimates of a restricted version of Equation (8), allowing for heterogeneous speeds of adjustment as a direct function of Hofstede's national culture traits. *Dev* indicates the distance from the optimal debt ratio at the beginning of the year. *FCF* is the free cash flow of the firm in the year. Coefficient estimates significantly different from zero at the 1%, 5% and 10% level are marked with ***, **, and* respectively. Bootstrapped standard errors are reported in parenthesis

Source(s): Created by the author

Table 5. Hofstede cultural traits and non-linear speeds of adjustment

optimal leverage is likely not their main concern, as indicated by their low speed of adjustment: the 90th percentile has a speed of around 0.22, corresponding to a half-life of deviations close to 2.8 years, a relatively low adjustment process. Over-levered firms, instead, have a wide variety of adjustment speeds. On the one hand, this again indicates that the deviation from the target is not the only relevant factor in determining the dynamics of capital structure. On the other hand, noting that the 75th percentile has a speed of around 40%, there is an important number of firms displaying a high speed of adjustment.

Finally, we estimate the full model in Equation (8), allowing for indirect effects of national culture on the firm-specific speed of adjustment, reporting our findings in Table 7.

When using Hofstede factors, the first thing to note is that their direct effect on the speed of adjustment becomes almost completely insignificant once we allow for indirect effects, while some of the interactions are statistically significant. Again, we find that the adjustment is strongly asymmetric, with significant differences in the coefficients between under and over-levered firms. Two variables in particular, the GDP growth rate and the Ohlson's o-score, have relevant interactions with cultural factors. Although the overall effect is quite complex to interpret, these interactions suggest that a higher risk aversion and a stronger

	(1) Full sample	(2) Under-levered	(3) Over-levered
Mean	0.200	0.129	0.264
St. Dev.	0.180	0.070	0.218
Min.	−0.320	−0.075	−0.398
p5	−0.085	0.025	−0.086
p10	−0.026	0.046	−0.015
p25	0.078	0.081	0.111
p50	0.200	0.120	0.263
p75	0.314	0.170	0.406
p90	0.422	0.224	0.535
p95	0.504	0.256	0.629
Max.	0.853	0.483	1.052

Note(s): The Table reports the descriptive statistics for the estimated speeds of adjustment obtained by using the regression results reported in Table 5. *St. Dev.* indicates the standard deviation; *p5, p10, . . ., p95* indicate the 5th, 10th, and 95th percentile, respectively. Statistics are reported both for the entire sample of firms (*Full sample*), as well as for firms with leverage below (*Under-levered*) or above (*Over-levered*) the optimal level of leverage

Source(s): Created by the author

Table 6.
Estimated speeds of adjustments from non-linear models

		GDP	Heritage	Inflation	FCF	Ohlson
Dev_t	6.303	−0.840**	0.083	−0.688	−27.612*	1.161**
Dev_t*pdi	0.025	0.002	−0.001	0.001	0.146***	−0.003*
Dev_t*idv	0.006	0.003**	−0.001	0.002	0.137**	−0.005**
Dev_t*mas	−0.029	−0.001***	0.001*	−0.001*	−0.029	0.002**
Dev_t*uai	−0.078	0.005***	0.000	0.005	0.066	−0.006**
Dev_t*ltowvs	−0.037	0.004*	−0.000	0.003	0.103	−0.005*
Dev_t*ivr	0.063	0.001	−0.001	0.001	0.039	−0.002**
FCF	−0.244***					
Above*Dev_t	60.587	1.104**	−0.998	0.415	−1.303	−0.666
Above*Dev_t*pdi	−0.115	−0.003*	0.002	−0.001	−0.039	0.004
Above*Dev_t*idv	−0.242	−0.004**	0.004*	−0.002	−0.039	0.003
Above*Dev_t*mas	0.137***	0.002**	−0.002***	0.001	0.033	−0.001
Above*Dev_t*uai	−0.333*	−0.005**	0.005**	−0.001	0.043	0.003
Above*Dev_t*ltowvs	−0.289	−0.006**	0.005	−0.001	0.016	0.003
Above*Dev_t*ivr	−0.133	−0.003**	0.002	−0.002	−0.043	−0.000
Above*FCF	−0.394***					

Note(s): The Table reports ordinary least squares estimates of Equation (8), allowing for heterogeneous speeds of adjustment as a direct and indirect function of national culture dimensions. *Dev* indicates the distance from the optimal debt ratio at the beginning of the year. *FCF* is the free cash flow of the firm in the year. The first row reports the constant term of Equation (6), and the coefficients for the direct effects of firm-level and macroeconomic variables. The first column reports the coefficients for the direct effects of cultural dimensions. The remaining rows and columns report the coefficients for the interactions between firm (or macroeconomic) variables and cultural dimensions. Coefficient estimates significantly different from zero at the 1%, 5% and 10% level are marked with ***, **, and* respectively. Bootstrapped standard errors are not reported for an easier readability of the Table, but are available upon request

Source(s): Created by the author

Table 7.
Non-linear speeds of adjustment with two-way interactions

long-run propensity increase the asymmetry of the adjustment process, by increasing the speed of adjustment for over-levered firms and reducing it for under-levered ones. Similar results are obtained when using Schwartz indicators, although in this latter case cultural traits also produce a significant direct effect (although for over-levered firms only). Table 8

	(1) Full sample	(2) Under-levered	(3) Over-levered
Mean	0.144	0.068	0.250
St. Dev.	0.434	0.391	0.467
Min.	−1.048	−1.048	−0.731
p5	−0.725	−0.725	−0.707
p10	−0.364	−0.384	−0.338
p25	−0.082	−0.110	−0.018
p50	0.096	0.041	0.233
p75	0.347	0.217	0.509
p90	0.738	0.534	0.955
p95	1.161	0.874	1.161
Max.	1.601	1.601	1.478

Note(s): The Table reports the descriptive statistics for the estimated speeds of adjustment obtained by using the regression results reported in Table 7. *St. Dev.* indicates the standard deviation; *p5, p10, . . ., p95* indicate the 5th, 10th and 95th percentile, respectively. Statistics are reported both for the entire sample of firms (*Full sample*), as well as for firms with leverage below (*Under-levered*) or above (*Over-levered*) the optimal level of leverage

Source(s): Created by the author

Table 8. Estimated speeds of adjustments from non-linear models with two-way interactions

reports summary statistics for the corresponding estimates of the firm-specific speeds of adjustment obtained from the various specifications of the full regression model. Again, as already discussed before we obtain an extremely high level of heterogeneity in the firm-specific speeds of adjustment, with important differences between under-levered and over-levered firms. As before, we observe that the speed of adjustment for over-levered firms is higher than for under-levered ones, both in terms of average and median speed.

Overall, our findings show that the adjustment process is far from homogeneous among firms. First, there is a strong asymmetry between under-levered and over-levered firms. Second, within the two subgroups different firms adjust differently towards a firm-specific target, as indicated by the direct effect of firm characteristics on both the target leverage and the speed of adjustment. Finally, cultural traits play an important role, both because they directly contribute at determining the target level of leverage and the speed of adjustment, and, more importantly, because they produce an indirect effect through their interaction with firm-specific factors.

7. Conclusions

This paper investigates whether and how national culture affects the dynamics of firms' leverage. We therefore expand the literature on the effects of national culture on capital structure, that until now has only focused on static analyses of debt ratios (see, for example, Gleason *et al.* (2000), Chui *et al.* (2002), Antonczyk and Salzmann (2014) and Mogha and Williams (2021)), by introducing measures of cultural traits in more sophisticated dynamic models of leverage.

Our research explores the influence of national culture on two key aspects of capital structure: the optimal debt ratio, and the speed of adjustment towards it. Focusing on the first element, national cultural traits can profoundly impact how firms manage information asymmetries through debt use. Then, beyond the optimal level, how quickly firms adjust towards it also has a crucial role. Our analysis reveals significant support for the importance of national culture in defining capital structure policies, shaping both the optimal level of leverage and the speed of adjustment. We observe lower leverage levels and slower convergence in countries with higher individualism and intellectual autonomy traits, further

validating our theoretical framework. Furthermore, cultures with higher risk aversion and long-term orientation exhibit the predicted patterns of lower overall leverage and an asymmetrical adjustment process. These findings not only contribute to the understanding of capital structure dynamics but also hold important policy implications. Recognizing the influence of national culture necessitates a nuanced approach to corporate governance frameworks. Policymakers might consider tailoring regulations to address potential negative impacts of specific cultural traits. For example, cultures with higher individualism might benefit from stricter regulations regarding financial reporting and transparency to mitigate information asymmetry concerns. We posit that cultures emphasizing individualism tend to exhibit lower leverage due to higher reputational costs associated with breaching social norms. Conversely, in more collectivistic cultures, lenders might have greater trust in repayment, leading to higher leverage levels. Additionally, cultures with higher risk aversion and long-term orientation exhibit lower leverage due to a more conservative financial approach.

Beyond the optimal level, how quickly firms adjust towards it also presents a crucial aspect. We find that cultures fostering rule adherence and conformity lead to faster convergence likely due to a stronger emphasis on adhering to norms and expectations. Conversely, cultures with a higher propensity for intellectual autonomy result in slower convergence as firms take more time to evaluate and adjust their strategies. Furthermore, cultures with higher risk aversion and long-term orientation exhibit an asymmetrical adjustment process, with faster convergence for over-leveraged firms seeking to reduce risk and slower convergence for under-leveraged firms already within their comfort zone.

Our findings therefore hold significant value across academic, regulatory and practical domains. For academics, our research advance the capital structure debate by demonstrating how national culture influences firm debt ratios, both directly and through interactions with factors like GDP growth, institutional quality and firm characteristics. We reveal the complexity of debt dynamics, highlighting how cultural traits impact not only financing decisions but also the debt rebalancing process, both directly and indirectly through interactions with business cycle indicators, institutions and firm characteristics. We also shed light on how national culture, financing choices, institutions and governance rules intertwine to incentivize managers, revealing a statistically and economically significant interplay between cultural traits and firm-level agency costs, indirectly influencing financing decisions. For regulators, these findings underscore the crucial role of national culture in shaping firm behavior. Our results suggest that institutions and governance requirements might not translate consistently across countries due to cultural nuances. This emphasizes the importance of understanding cultural impact on managerial incentives to mitigate potential conflicts and economic inefficiencies. For practitioners, we highlight how financial management should explicitly consider national cultural context. Our analysis shows that replicating successful financial strategies or governance structures from one cultural environment to another may not guarantee optimal outcomes. Investors and managers should be aware that different cultural settings may require alternative governance rules to prevent opportunistic or inefficient decisions.

To conclude, this study reveals a crucial role for national culture in shaping agency costs associated with financing decisions. Our findings suggest that culturally-sensitive corporate governance frameworks can be instrumental in mitigating the negative impacts of specific cultural traits on firm behavior. For example, in cultures with high individualism, stricter regulations regarding financial transparency and reporting could help address information asymmetry concerns and reduce excessive borrowing. Conversely, in cultures with strong rule-abiding tendencies, less stringent regulations might be feasible due to inherent norms encouraging adherence to financial rules. Implementing such culturally-specific approaches presents challenges. Balancing the benefits of tailoring frameworks to local contexts with the need for consistency across markets requires careful consideration. Nonetheless, our

research suggests that policy-makers should consider the cultural landscape when designing regulations to effectively address agency costs and promote efficient outcomes.

Notes

1. For a thorough description of the index, see Ohlson (1980), who selected nine independent variables to generate the O-score index to predict bankruptcy, given by the following estimated equation: $O-score = -1.32 - 0.407ln(TA_t) + 6.03\frac{TL_t}{TA_t} - 1.43\frac{WC_t}{TA_t} + 0.0757\frac{CL_t}{CA_t} - 1.72X - 2.37\frac{NI_t}{TA_t} - 1.83\frac{FFO_t}{TL_t} + 0.285Y - 0.521\frac{NI_t - NI_{t-1}}{|NI_t| + |NI_{t-1}|}$, where TA is total assets, TL is total liabilities, WC is working capital, CL is current liabilities, CA is current assets, X is a dummy equal to 1 if TL > TA and 0 otherwise, NI is net income, FFO is funds from operations, Y is a dummy equal to 1 if the company had a net loss for the last two years, and 0 otherwise.
2. We use "version 2015 12 08" of the dataset. Data are freely available at https://geerthofstede.com/research-and-vsm/dimension-data-matrix/ (*retrieved on April 16th, 2024*).
3. Note that the original Hofstede indicators were defined on a 0–100 scale, but in replication studies that were run to update the original dataset some of the dimension scores fall outside the 0–100 continuum. We use the unmodified updated 2015 dataset, so that some of the values may indeed fall outside the original 0–100 scale. Schwartz indicators are instead comprised in the $[-1, +7]$ interval.
4. In unreported analyses, we also check for the significance of macroeconomic variables – such as inflation, GDP growth, or sentiment indicators – but they are not statistically significant. The full results are available upon request.
5. The half-life of deviations is calculated as $\ln(0.5)/\ln(1 - SOA)$.

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Online Appendix

The supplementary material for this article can be found online.

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