Institutional and geopolitical aspects of bond spreads impacts on corporate capital structure in emerging markets

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Abstract: This paper investigates the impacts of institutional, geographical, and political determinants of corporate capital structure in emerging economies, whilst controlling for macro-economic and firm-level factors, particularly corporate bond spreads. The development finance literature has established that a country's financial and legal systems have significant impacts on the capacity of its private sector to raise external investment funding. Our results show that, when macroeconomic and firm-level factors are controlled for, most institutional variables have no significant impact on capital structure, with the exception of regulatory quality. The type of financial system and the legal framework have hardly any impact on capital structure. Our results also address the endogeneity issue between corporate bond spreads and capital structure, and show that both variables interact significantly with each other. Firm-specific variables such as profitability, tangibility and macroeconomic performance were found to be the common determinants of both leverage and bond spread.

Keywords: capital structure; corporate bond spread; emerging markets; bank-based vs. market-based economies; governance indicators; financial systems; economic and political institutions; simultaneous equations models.

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1 Introduction

There is a strong body of research showing that corporate capital structure in emerging economies is influenced by firm-specific and country-specific factors (Demirgüç-Kunt and Maksimovic, 1999, 2002; Claessens and Perotti, 2007; Bancel and Mittoo, 2004). This literature extends previous research built on Rajan and Zingales's (1995) seminal article on the determinants of capital structure in G-7 economies. A direct comparison of emerging and mature economies by Demirgüç-Kunt and Maksimovic (1999) concluded that institutional differences between developed and developing countries explain a large portion of the variation in the use of long-term debt. Country-specific factors are also relevant to the capital structure decisions in mature economies, as evidenced by Graham and Harvey (2001), Bancel and Mittoo (2004) and Brounen et al. (2004).

More recently, the literature has highlighted the importance of corporate risk, as measured by spreads, on capital structure (Flannery et al., 2012; Cavallo and Valenzuela, 2010; Liu et al., 2017). In a seminal article, Collin-Dufresne and Goldstein (2001) have shown that spreads reflect both the issuing company's current risk and investors' expectations about how that risk might change over time, whilst Flannery et al. (2012) found that investors' expectations about future leverage significantly affect bond yields, above and beyond the effect of contemporaneous leverage. This literature thus suggests the existence of endogeneity between of capital structure and corporate risk. In particular, leverage can be seen as a determinant of the perceived riskiness of the bonds a firm issues, viz., its spread, which is often used a proxy for the riskiness of the firm itself. On the other hand, since corporate riskiness affects the amount of debt the firm may raise in capital markets, it is clear that spreads will affect leverage.

This paper investigates the impacts of institutional, geographical, and political factors of corporate capital structure of non-financial companies, whilst controlling for firm-specific and macroeconomic variables, and addressing the potential endogeneity between corporate risk and capital structure. It has been established in the development finance literature that a country's financial and legal systems have a significant impact on the capacity of its private sector to raise investment funding (Demirgüç-Kunt and Maksimovic, 2002, 1999; Demirgüç-Kunt and Levine, 2009; La Porta et al., 1997a; Alves and Ferreira, 2011). We extend this literature by considering the direct and indirect effects of leverage on spread, jointly with institutional, geographical, and political factors. We include dummies for financial system (market and bank-based economies), legal framework (common law or French), as well as measures of regulatory quality, political stability, corruption, rule of law, government effectiveness, freedom of expression and electoral participation created by the World Bank.

Our results show that financial and legal systems can be viewed as a signal for sound institutional governance, rather than its determinants. The type of financial system, namely, 'market-based' or 'bank-based', has no implication on capital structure in any of the samples considered in the empirical analysis of the determinants of leverage. However, institutional variables such as regulatory quality and political stability are both significant determinants of leverage worldwide, and in Europe, Middle East and Africa (EMEA) and in Latin America. Political stability and absence of violence/terrorism is only significant at conventional levels in a panel of all countries and in EMEA. Macroeconomic variables, such as GDP growth, are significant at conventional levels. An increase in economic growth has positive impact on capital structure. Firm-specific variables remain the most important factors affecting leverage decisions and corporate

riskiness, since they are consistently significant around the world and in regional groupings. Profitability, tangibility, performance and corporate tax are good indicators of whether the firms can afford to have further credit from funds providers. Finally, the simultaneous equation framework suggests that bond spread negatively affects leverage in Latin America (LATAM) and worldwide, but positively in EMEA and Asia. Leverage decreases bond spread in LATAM, but increases bond spread in EMEA and Asia.

This paper extends a strand of literature that examines the interaction of firm-and country-specific factors in determining capital structure decisions. Titman and Wessels (1988) show that latent and unobservable variables, such as the uniqueness of a firm's line of business, have a significant impact on debt levels. Although the unobservable determinants tend to be firm-specific, Titman and Wessels's (1988) research strongly suggests that capital structure can be indirectly determined by different factors. Lucas and McDonald (1990), Welch (2004) and Baker and Wurgler (2002) further develop the concept of endogeneity of capital structure determinants, by showing that a firm's leverage determines its stock returns, and vice-versa. More recently, Yang et al. (2010) extended this literature by including other endogenous firm-specific factors, such as expected growth, uniqueness, asset structure, profitability, industry classification, whilst De Jong et al. (2008) show that macroeconomic factors can also affect corporate leverage directly and indirectly. Direct effects have been extensively examined in the literature. For instance, the existence of a developed bond market may lead to higher corporate leverage. However, De Jong et al. (2008) also find evidence that country-specific factors can equally influence corporate leverage indirectly through their impact on the effect of firm-specific factors.

The rest of the article is organised as follows: Section 2 surveys the empirical literature on the determinants of financing decisions. Section 3 presents the econometric model, whilst Section 4 discusses the empirical results, and precedes the conclusion.

2 Determinants of capital structure and bond spreads

Literature on the interaction of capital structure and bond spread followed Merton's (1974) seminal research, and which is commonly referred to as the structural approach to credit risk (see Lando, 2009). This literature focused originally on the determinants of credit risk and default probability by mean of stochastic models of corporate capital structure, from which optimal credit spreads, i.e., spreads of corporate bonds over treasury yields – could be derived. The subsequent empirical literature assumed a causal relationship going from capital structure to credit spread. For instance, two seminal articles by Collin-Dufresne and Goldstein (2001) and Collin-Dufresne et al. (2001) investigate the determinants of credit spread of US corporates between 1988 and 1997, where one of these determinants is firm leverage. Interestingly, their results do not show a clear-cut, uni-directional relationship between credit spread and leverage, but rather that the impact of leverage on spreads varies according to the leverage level. Below 15%, and above 55%, increases in leverage result in decreases in credit spread. Between 15% and 55% increases in leverage imply higher credit spreads. Subsequent research upheld the existence of a nonlinear relationship between capital structure and credit spread (Duffie and Lando, 2001; Koresh et al., 2014; Parsons and Titman, 2008; Graham and Leary, 2011).

However, another theoretical strand of literature established that credit spreads could be considered one of the determinants of capital structure, insofar as credit spreads are a measure of the corporate riskiness widely used in capital and debt markets. This approach is found mostly in the literature on dynamic capital structure (Titman and Tsyplakov, 2007; Graham and Leary, 2011). To avoid endogeneity issues, this literature usually uses alternative measures of riskiness such as the z-score, or credit rating.

2.1 Macroeconomic and firm-specific variables

Macroeconomic determinants of firms' capital structure have been considered in single-equation models as extensions to the traditional firm-specific factors (see for instance, Korajczyk and Levy, 2003; King, 2015; Bastos et al., 2009). Growth opportunity and GDP, for instance, have been shown to be positively influence firms' debt level, whereas tax, inflation and interest rate negatively affect leverage decisions (Cook and Tang, 2010; Gajurel, 2005). Although most of the literature studies the US, De Jong et al. (2008) obtains analogous results in emerging markets. M'ng et al. (2017) for instance, investigate the determinants of capital structure of publicly listed companies in Malaysia, Singapore and Thailand Stock Exchange from 2004 to 2013, and how firm-specific factors such as profitability, firm size, tangibility of assets and depreciation to total assets along with the macroeconomic factor such as inflation influence the capital structure decisions of those companies. Profitability and depreciation are found to have a significant negative influence on capital structure for Malaysia and Singapore but insignificant for Thailand. Firm size and tangibility, and the other hand have a significant positive influence on capital structure in the three countries.

2.2 Legal tradition and financial structure

Institutional factors such as legal tradition and financial system are particularly relevant for emerging economies. Access to external funding and international capital markets are often linked to the sovereign's credit rating and the perceived country risk (the 'sovereign ceiling') (Borensztein et al., 2013). Consequently, a country's legal framework was shown to have a strong influence on its companies' capital structure and funding capacity, and is associated with specific financial and capital markets structures. La Porta et al. (1997b, 1997a, 2008) in a pioneering work, have shown that common (English) law countries generally offer the strongest protections to shareholders and creditors, whilst French civil law countries offer the weakest. As a result, companies in countries with better legal protections have more external finance in the form of debt and equity, and capital markets in those countries tend to represent a larger proportion of GDP than in countries governed by French civil law. However, more recent research, e.g., Cho et al. (2014) has cast some doubt on these findings, since these authors show from a sample of 48 countries that strong creditor rights are associated with low long-term leverage and low long-term debt issuance. Bastos et al. (2009) also found that macroeconomic and institutional factors had no robust significance on capital structure in seven Latin American countries (Mexico, Brazil, Argentina, Chile and Peru) between 2001 and 2006.

Nonetheless, as far as the issue of capital structure is concerned, it is clear from this literature that companies in common law countries will have easier and safer access to bond and debt markets, and will be more likely to finance their capital structure with debt. Moreover, Demirgüç-Kunt and Maksimovic (2002, 1999) and Demirgüç-Kunt and Levine (2009) have corroborated that the institutional structure of the financial and capital markets further compounds the impact of legal structure. This research focuses more on the differences in financial structures across the globe and indicate the existence of an overlap between countries with a common law legal system and highly capitalised financial and capital markets. In such countries, corporates thus tend to favour issuing bonds and stocks over borrowing from banks. Demirgüç-Kunt and Maksimovic (2002, 1999) and Demirgüç-Kunt and Levine (2009) classify countries where the main source of funding is financial markets as 'market-based' economies. In contrast, French and German law countries tend to be bank-based economies, i.e., countries where firms obtain most of their investment funding from banks. Examples of the former include the UK and the US, whereas France, Germany, Italy, Spain are examples of bank-based economies.

Emerging economies have tended to maintain the legal framework of their former colonisers, with the notable exception of China, which, according to La Porta et al. (2008), follows a German legal tradition. However, the implications of these links for the development of capital markets do not immediately ensue. In effect, irrespective of the country's legal tradition, most emerging economies can be classified as bank-based (Demirgüç-Kunt and Maksimovic, 2002, 1999; Demirgüç-Kunt and Levine, 2009). La Porta et al. (1997a) observe that law enforcement in poorer countries is less stringent, and that the enforcement of investors' right in common law countries depends crucially on a strong judiciary. It is thus not surprising that in emerging markets companies would rather develop strong and long-term relationships with their banks and ensure constant funding from the banking system, instead of issuing bonds or equity and having to enforce their rights in the courts.

2.3 Political factors

More recent research has expanded the scope of the investigation of the institutional aspects of company financing to include political risk. Nesset et al. (2019), for instance, develop an index of political risk that takes into account not only the legal and policy dimensions of political risk, but also its ethnic and religious dimensions. The main findings of their econometric investigation of excess stock market returns in 28 countries between 2001 and 2015 suggest that political tensions and conflict affect excess stock returns negatively in emerging markets, whereas conflict has a positive impact on risk-return in developed countries. Obviously, these results are obtained after controlling for macroeconomic variables, such as inflation rate, interest rates, industrial production and country risk. Balding (2011) focuses on the role of credit risk pricing during elections from 2004 to 2007 in 13 emerging market economies. The author examines daily sovereign credit default swap (CDS) pricing, with standard macroeconomic controls, to study the role of elections in prompting financial market instability and contagion. Balding's (2011) main results show that investors price in additional risk for elections regardless of party, incumbency or size of win. Long- and short-term investors price risk very differently, with one-year CDS investors reacting much more strongly to election risk, causing the overall spread between 10- and 1-year

swaps to narrow. Eichler and Plaga (2017) analyse the link between political factors and sovereign bond holdings of US investors in 60 countries over the 2003–2013 period. Eichler and Plaga (2017) find that US investors prefer to hold more bonds in countries with few political constraints on the government, and respond to increased uncertainty around major elections by reducing government bond holdings. Moreover, political instability reduces US investment in government bonds. This effect is more pronounced in countries with low sovereign solvency.

2.4 A broader perspective

A distinctive feature of the current literature on capital structure in emerging markets is the exclusive focus on specific aspects of a complex issue. Beck et al. (2004, 2000), Beck and Demirgüç-Kunt (2009), BIS (2013), Booth et al. (2001), amongst others, only investigate the impact of macroeconomic determinants, whilst Demirgüç-Kunt and Maksimovic (2002, 1999) and Demirgüç-Kunt and Levine (2009) solely analyse institutional factors. Although this approach allows for a detailed representation of the business environment in which corporate firms operate, it overlooks the interaction between macroeconomic factors and firm-level determinants that are usually more critical to corporate operations than institutions. Institutional factors may have differentiated impacts depending on the type of corporate firm. Giannetti (2003) found that institutions, and in particular good creditor protection, play an important role in determining the capital structure of unlisted companies. Moreover, unlisted firms appear more indebted than listed companies even after controlling for firm characteristics. Since our investigation is restricted to listed companies in emerging markets, our hypothesis is that firm-specific variables are much more significant to businesses because they directly affect capital structure decisions, whereas institutions and legal frameworks constitute an environment that is beyond the control of corporates. We anticipate that only firm-level variables will be consistently statistically significant. The empirical analysis in Section 3 evaluates the importance of each category of determinants, viz., institutional, macroeconomic, and firm-level, in the capital structure, whilst addressing potential endogeneity issues in firm-level variables.

3 Data and econometric model specification

3.1 Variables

The data were collected from Bloomberg, Thomson Reuters Datastream, and from the World Bank Indicators (WBI) databases for the period 1998-2016. Observations for macroeconomic variables, such as GDP growth and inflation rates, were obtained from the WBI, as well as institutional variables such as the corruption index and income level classification. Firm balance sheet variables were obtained from Thomson Reuters Datastream, while risk premia and bond spreads were downloaded from Bloomberg.

Table 1 Variables definition

	Dependent variables	
$mLev$	Market leverage	$(LTD_t + STD_t)/(\text{Market value of total assets})_t$.
$bLev$	Book leverage	$(LTD_t + STD_t)/(\text{Book value of total assets})_t$.
$sprd$	Spread	Corporate bond yield minus risk-free yield.
	Independent variables	
Institutional variables		
gov	Government effectiveness	Perceptions of the quality of public services, of the civil service and of policy formulations. Degree independence from political pressures.
pol	Political stability	Perceptions of the likelihood government instability or overthrow by unconstitutional or violent means, including politically-motivated violence and terrorism.
reg	Regulatory quality	Perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.
RoL	Rule of law	Perceptions of agents' confidence in the rules of society, viz., the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.
voice	Voice and accountability	perceptions of the extent of citizens' participation in selecting their government, freedom of expression, freedom of association, free media.
finsys	Financial system	Dummy: market-based = 1; bank-based = 0.
legal	Legal origin	Dummy: common law = 1, non-common law = 0.
corindx	Corruption index	Categorical variable, from 0 = very corrupt to 10 = very clean.
Firm-specific variables		
prof	Profitability	EBITDA/total assets, where EBITDA = net income + interest + taxes + depreciation + amortisation.
tang	Tangibility	Fixed assets/total assets.
roa	Return on assets	$(\text{Net income})_t/(\text{average total assets})_t$.
size	Size	Natural log of total assets.
ebit	EBIT	EBIT = net income + interest + taxes; earnings before interest and taxes.
Macroeconomic variables		
gdp	GDP growth rate	$(GDP_t - GDP_{t-1})/GDP_{t-1}$.
riskprm	Risk premium	Equity market return minus risk-free rate; in basis point.
inf	Inflation	$(CPI_t - CPI_{t-1})/CPI_{t-1}$, where CPI_t = consumer price index at time t.
corptax	Corporate tax	Rate in decimals.

Notes: LTD_t and STD_t are the long-term and short-term debt at time t, respectively.

Source: Bloomberg, World Bank Indicators (WBI), World Governance Indicators (WGI), Thomson Reuters Datastream, La Porta et al. (1998, 2008) and Demirgüç-Kunt and Maksimovic (1999)

Table 1 summarises all the variables used and their definition. Firm's specific factors include ROA, profitability, and tangibility. Some country-specific institutional factors, namely, origin of the country's legal system, and its financial structure, are taken from the seminal papers La Porta et al. (1998, 2008), Demirgüç-Kunt and Maksimovic (2002, 1999) and Demirgüç-Kunt and Levine (2009), respectively. La Porta et al. (1997a, 2008) identify five main legal frameworks, French (Napoleonic) law, English common law, German law, Scandinavian law, and socialist. The two main systems in terms of global reach are the French law and the English common law frameworks. For this reason, our dummy capturing the country's legal framework will group all non-common law countries.

Corruption has negative impacts on corporate finance decisions, as evidenced by Mauro (1995) and Ortiz-Ospina and Roser (2019). If access to external funding is dependent on bribing bank officials, for instance, then fewer corporates may be able to do so. In this case, companies may rely on internal funding to finance investments, with consequent limitations on company growth. The World Bank's corruption index ranges between 0 (highly corrupt) and 10 (highly clean).[1] Subsequent literature has upheld most of his findings [see for instance Acemoglu and Robinson (2010) and literature therein].

Regulatory quality and political stability are self-explanatory, although political stability includes here the absence of violence and or terrorism. Government effectiveness captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. Rule of law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts. Voice and accountability captures perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media. All these variables are estimates, with a score in units of a standard normal distribution, i.e., ranging from approximately –2.5 to 2.5.

The spread is the difference between corporate bond yield and the yield on treasury bonds. It is possible for the spread to be negative, which would imply a holder is willing to take a fixed spread below the current risk free spot yield curve. This could be interpreted as being that the bond is perceived to be safer than 'risk free' treasuries. The risk premium is the return on a country's stock market minus the risk free rate (typically government bonds) for the country.

Owing to severe limitations of bond data availability over several decades, our sample comprises 16 countries, and 3,598 corporate bonds spread transactions between 1998 and 2016. The number of bonds by country are: Argentina, 26; Brazil, 21; Chile, 69; Mexico, 184; Peru, 60; China, 821; India, 1297; Indonesia, 156; Malaysia, 604; Philippines, 11; Thailand, 18; Czech Republic, 22; Poland, 55; Russia, 119; South Africa, 93; and Turkey, 42. The regional break-up of the bonds spreads are 360 in Latin America and 331 in EMEA. Both regions lag behind Asia, where we found 2907 bond spreads during the same period.

For the sake of simplicity, and in order to reduce the dimensions of the analysis, it is assumed in the econometric model that each country has only one firm, rather than keeping C countries containing N firms, each issuing M bonds over T years. In order to do so, bond spreads were averaged over time and country. As a result, the sample to be estimated will be an unbalanced panel containing N countries and T

years. We also do not differentiate between French and German law, choosing instead to amalgamate all these countries in the category of non-common law legal systems. In our sample only China, Czech Republic, and Poland are considered as a German law country in La Porta et al. (2008). All remaining countries are either French or English law-based. We have included Poland, Czech Republic and Russia as emerging markets because they are former socialist countries transitioning to market-based economy over the sample period, even though Poland for instance is classified by the World bank as a high income country. The Czech Republic and Russia are classified as upper middle income countries, along with China, India, and all the Latin American countries bar Chile (high income).

3.2 Econometric model

The main econometric model is the estimation of the determinants of leverage (book and market) for T years and N firms.

$$\begin{aligned} lev_{i,t} = {} & \alpha_i + \gamma_{11} sprd_{i,t} \\ & + \underbrace{\beta_{11} GDP_{i,t} + ... + \beta_{14} INF_{i,t}}_{\text{macroeconomic variables}} \\ & + \underbrace{\beta_{15} ROA_{i,t} + ... + \beta_{19} prof_{i,t}}_{\text{firm-specific variables}} \\ & + \underbrace{\beta_{110} gov_{i,t} + ... + \beta_{117,i,j} corindx_{i,t}}_{\text{institutional dummies}} + \epsilon_{1,i,t} \end{aligned} \tag{1}$$

The distributional assumption for the random error vectors $\epsilon_{1,i,t}$ and $\epsilon_{2,i,t}$ is that they follow a multivariate process with zero mean and constant variance,

$$E[\epsilon_{\mathbf{i}}] = 0 \text{ and } E[\epsilon_{\mathbf{i}} \epsilon_{\mathbf{j}}] = \sigma_{ij} \text{ for } i, j = 1, ..., N$$

However, it is clear from the literature that there is a strong endogeneity between leverage and spread, which may lead to biased estimators. Endogeneity can be corrected by instrumenting the endogenous variable, bond spread, with the country risk premium (*riskprm*).

An alternative approach consists of estimating the determinants of leverage and spread simultaneously as a system of equations. In accordance to Table 1, for the two dependent variables, leverage and spread, the following system of equations is estimated:

$$\underset{2NT \times 1}{\mathbf{Y}} = \underset{2NT \times K}{\mathbf{X}} \times \underset{K \times 2NT}{\boldsymbol{\beta}} + \underset{2NT \times 1}{\boldsymbol{\epsilon}} \tag{2}$$

for K explanatory variables, and where, for each firm $i = 1, ..., N$ and time $t = 1, ..., T$, equation (2) implies the following system of two equations

$$\begin{cases} lev_{i,t} = \alpha_i + \gamma_{11} sprd_{i,t} \\ \quad + \underbrace{\beta_{11} GDP_{i,t} + ... + \beta_{14} INF_{i,t}}_{\text{macroeconomic variables}} \\ \quad + \underbrace{\beta_{15} ROA_{i,t} + ... + \beta_{19} prof_{i,t}}_{\text{firm-specific variables}} \\ \quad + \underbrace{\beta_{110} gov_{i,t} + ... + \beta_{117,i,j} corindx_{i,t}}_{\text{institutional variables}} + \epsilon_{1,i,t} \\ sprd_{i,t} = \alpha_j + \beta_{21} GDP_{i,t} \\ \quad + \underbrace{\beta_{22} lev_{i,t} + ... + \beta_{25} prof_{i,t}}_{\text{firm-specific variables}} + \epsilon_{2,i,t} \end{cases} \tag{3}$$

for $t = 1, ..., T$. $i = 1, ..., N$ represent the firms, γ and β_{1k} and β_{2k}, $k = 1, ..., 20$, are the parameters of the system to be estimated from the data. More specifically, for the first equation, where the dependent variable is the firm leverage of firm i, β_{11} to β_{14}, are the coefficients of the macroeconomic variables, β_{15} to β_{19}, those of the firm-specific variables, and β_{110} to β_{117}, those of the institutional variables. For equation (2), the coefficients are self-explanatory.

The assumptions regarding each random error of each equation $n = 1, 2$, $\epsilon_{1,i,t}$ and $\epsilon_{2,i,t}$, are the standard SUR assumptions, namely, that all errors have zero mean, that their variance is constant over time, but that each error can have a different variance

$$E[\epsilon_{n,i,t}] = 0 \text{ and } E[\epsilon_{n,i,t}\epsilon_{n,i,t}] = \sigma^2_{n,i} \text{ for } n = 1, 2; t = 1, ..., T; i = 1, ..., N$$

Errors of different equations corresponding to the same time are correlated (contemporenous correlation), and errors of different times, even in the same equation are not correlated (no autocorrelation)

$$E[\epsilon_{n,i,t}\epsilon_{m,i,t}] = \sigma_{n,m,i} \text{ and } E[\epsilon_{n,i,t}\epsilon_{n,i,s}] = 0 \text{ and } E[\epsilon_{n,i,t}\epsilon_{n,j,s}] = 0$$

for $i \neq j = 1, ..., N$ firms, $t \neq s = 1, ..., T$ years, and $n \neq m = 1, 2$ equations.[2]

4 Empirical results

4.1 Descriptive statistics

Table 2 provides a summary statistic of variables used in the empirical analysis, and is followed by the correlation matrix between market/book leverage and the main independent and control variables. We observe a wide range of values for the main risk indicators, e.g., the spread varies between –5.6 and 32 basis points, whilst the risk premium has a much narrower range, varying between 6.12 and 14 basis points. Corporate taxes have very low dispersion and in all countries in the sample vary between 19 and 35%.

Macroeconomic variables such as inflation and GDP growth rates also present a high dispersion in the sample. The lowest inflation rate is an annual deflation of 5% and the highest an annual rate of 40%. The GDP growth rate varies between a fall of 6% to a positive rate of 14%. This wide variation illustrates the diversity of economic

performance of the countries in our sample, which includes high income and lower middle income countries. The remaining variables, and particularly, the firm-specific variables are less varied.

Table 2 Descriptive statistics

Variable	*Obs*	*Mean*	*Std. dev.*	*Min*	*Max*
blev	133	0.53393	0.10818	0.20816	0.94846
mlev	133	0.81991	2.34578	–3.14529	22.17691
gov	133	0.30045	0.50302	–0.52126	1.27549
pol	133	–0.37985	0.69116	–2.00906	1.08478
reg	133	0.25792	0.61985	–1.07426	1.53851
voice	133	0.10150	0.73484	–1.70117	1.29252
RoL	133	0.01544	0.65359	–0.88603	1.43314
corindx	133	4.16942	1.30275	2.1	7.5
finsys	133	0.20301	0.40376	0	1
legal	133	0.36842	0.48420	0	1
corptax	133	0.26211	0.04586	0.19	0.35
prof	133	0.10536	0.03750	–0.012	0.208
tang	133	0.3770542	0.1051439	–0.0574354	0.7104947
ebit	133	48.33859	519	–0.0575724	5,980
roa	133	3.45167	3.72501	–6.586	29.325
size	133	5.157506	0.9886707	2.861863	7.991344
gdp	133	3.29274	3.20675	–6.221	13.636
riskprm	133	8.02505	1.86869	6.124	14.940
sprd	133	2.34011	5.16449	–5.591	32.227
inf	133	5.68471	6.49194	–5.016	40.852

Notes: blev = business leverage, mlev = market leverage, gov = government effectiveness, RoL = rule of law, pol = political stability and absence of violence/terrorism, reg = regulatory quality, voice = voice and accountability, inf = inflation, finsys = financial system, legal = legalSprd = spread, prof = profitability, gdp = GDP growth rate, riskprm = risk premium, inf = inflation, corptax = corporate tax, corindx = corruption index, and roa = return on assets.

The correlation matrices evidence the presence of high correlation between a few control variables, notably, government effectiveness (*gov*) and political stability and absence of violence (*pol*), which have an 88% correlation. *gov* and *reg* are correlated at 83%, *gov* and *RoL* at 88%, and *gov* and *corindex* at 82%. In addition, *reg* is also highly correlated with *pol* (70%) and with *corindex* (83%). Consequently, for robustness checks, equations (1) and (2) are re-estimated without the variables *gov* and *reg*. Results can be found in Tables 8 to 11.

4.2 Econometric results

Tables 5, 6 and 7 present the results of the estimation of model (1) and (2) for all countries, and for regional sub-samples, namely, Asia, Europe Middle East Africa (EMEA), and Latin America (LATAM). Table 5 presents the results of the panel instrumental variable (IV) estimation, whilst Tables 6 and 7 show SUR regressions for two types of leverage, book and market, and spread.

Table 3 Correlation matrix of book leverage and independent variables

	blev	*gov*	*pol*	*reg*	*RoL*	*voice*	*corindx*	*finsys*	*legal*	*corptax*	*prof*	*tang*	*ebit*	*roa*	*size*	*gdp*	*sprd*	*riskprm*	*inf*
blev	1																		
gov	–0.24	1																	
pol	–0.18	0.70	1																
reg	–0.31	0.83	0.65	1															
RoL	–0.15	0.88	0.70	0.83	1														
voice	0.03	0.37	0.50	0.52	0.61	1													
corindx	–0.16	0.82	0.69	0.83	0.87	0.51	1												
finsys	0.32	–0.40	–0.27	–0.57	–0.22	0.16	–0.34	1											
legal	0.02	0.06	–0.25	–0.10	–0.04	–0.01	–0.20	0.16	1										
corptax	0.35	–0.44	–0.21	–0.45	–0.39	0.18	–0.35	0.40	0.21	1									
prof	–0.24	–0.13	–0.09	0.11	–0.13	0.11	–0.06	–0.14	0.05	–0.11	1								
tang	–0.86	0.22	0.03	0.29	0.14	–0.12	0.14	–0.27	0.02	–0.46	0.21	1							
ebit	–0.03	–0.09	–0.06	–0.10	–0.09	–0.02	–0.10	0.17	–0.07	–0.02	0.24	0.06	1						
roa	–0.21	0.02	0.01	0.03	–0.01	0.02	0.00	0.05	0.01	–0.12	0.38	0.28	0.11	1					
size	–0.02	–0.11	–0.20	–0.14	0.00	0.10	–0.10	0.43	0.07	0.04	0.16	0.08	0.25	–0.04	1				
gdp	0.06	–0.15	–0.26	–0.21	–0.10	–0.25	–0.13	0.25	–0.14	–0.01	–0.27	0.06	0.04	0.06	0.03	1			
sprd	0.30	–0.41	–0.17	–0.54	–0.35	0.07	–0.37	0.42	–0.01	0.51	–0.15	–0.52	–0.07	–0.04	–0.12	–0.15	1		
riskprm	0.18	–0.19	–0.15	–0.26	–0.28	–0.33	–0.22	–0.06	–0.05	–0.03	0.07	–0.23	–0.02	–0.08	–0.10	–0.14	0.16	1	
inf	0.24	–0.34	–0.06	–0.48	–0.34	–0.01	–0.33	0.42	–0.13	0.39	–0.02	–0.40	0.13	0.01	0.01	–0.05	0.77	0.17	1

Table 4 Correlation matrix of market leverage and independent variables

	mlev	*gov*	*pol*	*reg*	*RoL*	*voice*	*corindx*	*finsys*	*legal*	*corptax*	*prof*	*tang*	*ebit*	*roa*	*size*	*gdp*	*sprd*	*riskprm*	*inf*
mlev	1																		
gov	0.33	1																	
pol	0.26	0.70	1																
reg	0.35	0.83	0.65	1															
RoL	0.38	0.88	0.70	0.83	1														
voice	0.26	0.37	0.50	0.52	0.61	1													
corindx	0.36	0.82	0.69	0.83	0.87	0.51	1												
finsys	–0.09	–0.40	–0.27	–0.57	–0.22	0.16	–0.34	1											
legal	–0.14	0.06	–0.25	–0.10	–0.04	–0.01	–0.20	0.16	1										
corptax	–0.09	–0.44	–0.21	–0.45	–0.39	0.18	–0.35	0.40	0.21	1									
prof	–0.19	–0.13	–0.09	0.11	–0.13	0.11	–0.06	–0.14	0.05	–0.11	1								
tang	0.08	0.22	0.03	0.29	0.14	–0.12	0.14	–0.27	0.02	–0.46	0.21	1							
ebit	–0.02	–0.09	–0.06	–0.10	–0.09	–0.02	–0.10	0.17	–0.07	–0.02	0.24	0.06	1						
roa	–0.08	0.02	0.01	0.03	–0.01	0.02	0.00	0.05	0.01	–0.12	0.38	0.28	0.11	1					
size	0.01	–0.11	–0.20	–0.14	0.00	0.10	–0.10	0.43	0.07	0.04	0.16	0.08	0.25	–0.04	1				
gdp	0.04	–0.15	–0.26	–0.21	–0.10	–0.25	–0.13	0.25	–0.14	–0.01	–0.27	0.06	0.04	0.06	0.03	1			
sprd	–0.15	–0.41	–0.17	–0.54	–0.35	0.07	–0.37	0.42	–0.01	0.51	–0.15	–0.52	–0.07	–0.04	–0.12	–0.15	1		
riskprm	–0.13	–0.19	–0.15	–0.26	–0.28	–0.33	–0.22	–0.06	–0.05	–0.03	0.07	–0.23	–0.02	–0.08	–0.10	–0.14	0.16	1	
inf	–0.09	–0.34	–0.06	–0.48	–0.34	–0.01	–0.33	0.42	–0.13	0.39	–0.02	–0.40	0.13	0.01	0.01	–0.05	0.77	0.17	1

Table 5 IV panel estimation of leverage by region

	All countries		*Asia*		*EMEA*		LATAM	
	blev	*mlev*	*blev*	*mlev*	*blev*	*mlev*	*blev*	*mlev*
sprd	–0.0266***	–0.1684	0.018	–0.042	–0.011	–0.172*	–0.085***	–2.908**
	(0.0000)	(0.4740)	(0.449)	(0.309)	(0.822)	(0.109)	(0.001)	(0.033)
gov	0.0124	0.1422	–0.044	–0.121	–0.035	0.090	0.137	–0.184
	(0.6460)	(0.9110)	(0.388)	(0.194)	(0.778)	(0.744)	(0.145)	(0.972)
reg	–0.0676***	0.5909	–0.082	–0.003	0.136	–0.663**	–0.219**	–7.517
	(0.0070)	(0.6200)	(0.129)	(0.970)	(0.290)	(0.019)	(0.030)	(0.176)
RoL	0.0268	0.3601	0.084	0.215	–0.138	–0.489	–0.016	0.314
	(0.2100)	(0.7210)	(0.277)	(0.122)	(0.473)	(0.249)	(0.846)	(0.946)
voice	0.0199	0.7173	–0.015	0.048	–0.001	0.971***	–0.075	11.206*
	(0.1070)	(0.2200)	(0.588)	(0.333)	(0.995)	(0.001)	(0.507)	(0.072)
pol	–0.0444***	–0.5453	–0.003	–0.071	–0.014	–0.288***	0.028	–1.751
	(0.000)	0.2720	(0.944)	(0.318)	(0.735)	(0.001)	(0.583)	(0.528)
corptax	–0.00548	0.03681	0.01373	0.0781	–0.3570	–1.0566	–2.22	0.0001***
	(0.235)	(0.856)	(0.660)	(0.879)	(0.428)	(0.397)	(0.773)	(0.002)
inf	0.0015	0.0700	0.002	–0.001	0.0011	–0.010*	0.004	0.194
	(0.1980)	(0.2080)	(0.435)	(0.856)	(0.868)	(0.061)	(0.125)	(0.196)
finsys	–0.0067	–0.4866	–0.018	–0.023			0.052	4.057
	(0.7640)	(0.6430)	(0.707)	(0.793)			(0.620)	(0.478)
legal	–0.0109	–0.4568	–0.056	–0.125	–0.013	–0.586***	–0.126**	1.080
	(0.3500)	(0.4090)	(0.252)	(0.138)	(0.869)	(0.001)	(0.034)	(0.743)
prof	–0.3262	–16.5036	–0.147	1.073*	0.033	0.233	–0.737**	–57.191***
	(0.0400)	(0.0280)	(0.671)	(0.088)	(0.910)	(0.721)	(0.034)	(0.003)
tang	–1.0066***	2.0500	–0.942***	–0.616***	–0.858***	–0.211	–1.104***	5.509
	(0.0000)	(0.3840)	(0.000)	(0.000)	(0.000)	(0.567)	(0.000)	(0.289)
roa	0.0033***	–0.0154	–0.006	–0.031***	0.0002	–0.024***	0.005***	0.094
	(0.0100)	(0.8010)	(0.266)	(0.001)	(0.967)	(0.007)	(0.007)	(0.369)
corindx	0.0052	0.1061	0.004	0.034	0.019	–0.167*	–0.003	0.697
	(0.4830)	(0.7620)	(0.750)	(0.117)	(0.639)	(0.057)	(0.817)	(0.372)
ebit	0.00124	–0.0081	–0.0031	–0.0174	0.0650	0.1604	0.2423	1.0625***
	(0.232)	(0.859)	(0.718)	(0.879)	(0.416)	(0.468)	(0.158)	(0.002)
gdp	–0.0024	0.0181	–0.002	–0.008	–0.002	0.007	0.006*	0.100
	(0.1490)	(0.8160)	(0.403)	(0.129)	(0.691)	(0.435)	(0.074)	(0.560)
size	–0.00578	0.1848	0.0382	0.2631	–0.0453***	–0.0151	–0.006*	0.100
	(0.364)	(0.481)	(0.699)	(0.843)	(0.000)	(0.576)	(0.074)	(0.560)
constant	1.1278***	2.0500	0.850***	1.011***	0.854*	2.953***	1.828***	23.692
	(0.0000)	(0.4770)	(0.000)	(0.006)	(0.106)	(0.011)	(0.000)	(0.120)

Notes: Estimation of equation (1). p-values in brackets; ***P-value < 0.01, **P-value < 0.05, *P-value < 0.1. Number of obs.: all: 133; Asia: 53; EMEA: 30; LATAM: 50. *finsys* = 0 for all countries in EMEA group, and was dropped from equation. Instrumented: sprd; instruments: gov; reg; RoL; voice; pol; inctax; infla; finsys; legal; prof; tang; roa; corindx; ebit; gdp; riskprm. *All countries*: for blev: R-sq: within = 0.7763; between = 0.9238; overall = 0.8364; σ_u = 0.000048; σ_e = 0.0439; rho = 0.00000012; Wald chi^2(16) = 592.86; p-value = 0.000; for mlev: R-sq: within = 0.0535; between = 0.4295; overall = 0.2220; σ_u = 0.00127443; σ_e = 2.1036993; rho = 0.00000067; Wald chi^2(16) = 33.09; p-value = 0.000. *Asia*: for blev: R-sq: within = 0.8426; between = 0.9990; overall = 0.9201; σ_u = 0.01734101; σ_e = 0.0388; rho = 0.1666; Wald chi^2(16) = 271.36; p-value = 0.000; for mlev: R-sq: within = 0.6378; between = 0.9877; overall = 0.7033; σ_u = 0.0181; σ_e = 0.0692; rho = 0.0643; Wald chi^2(16) = 77.63; p-value = 0.000. *EMEA*: for blev: R-sq: within = 0.9163; between = 0.9975; overall = 0.9475; σ_u = 2.066e-08; σ_e = 0.0209; rho = 9.756e-13; Wald chi^2(15) = 252.67; p-value = 0.000; for mlev: R-sq: within = 0.7977; between = 0.9999; overall = 0.8923; σ_u = 1.021e-08; σ_e = 0.0656; rho = 2.429e-14; Wald chi^2(15) = 115.98; p-value = 0.000. *LATAM*: for blev: R-sq: within = 0.8462; between = 0.9998; overall = 0.8853; σ_u = 0; σ_e = 0.0539; rho = 0; Wald chi^2(16) = 254.76; p-value = 0.000; for mlev: R-sq: within = 0.4856; between = 0.9999; overall = 0.6094; σ_u = 0; σ_e = 3.0385; rho = 0; Wald chi^2(16) = 51.49; p-value = 0.000.

Table 6 SUR estimation of leverage and spread – all countries and Asia

	All countries		*Asia*	
	blev	*mlev*	*blev*	*mlev*
gov	0.00454	0.3073	–0.1284**	0.1996
	(0.849)	(0.800)	(0.016)	(0.177)
reg	–0.0608***	0.5959	–0.2071***	–0.3799**
	(0.007)	(0.600)	(0.000)	(0.019)
RoL	0.0323*	0.2597	0.1592	–0.6483*
	(0.087)	(0.786)	(0.187)	(0.054)
voice	0.0158	0.6802	0.0787*	0.3672***
	(0.151)	(0.224)	(0.056)	(0.001)
pol	–0.0430***	–0.4914	0.04724	0.0193
	(0.000)	(0.311)	(0.216)	(0.856)
finsys	0.0086	–0.3286	–0.017	–0.4385
	(0.651)	(0.734)	(0.653)	(0.766)
inf	0.0018*	0.0629	–0.00274	–0.0099***
	(0.087)	(0.234)	(0.280)	(0.001)
corptax	–0.0060	0.0338	0.00656*	–0.0199*
	(0.100)	(0.856)	(0.093)	(0.068)
legal	–0.0088	–0.5411	0.0183	–0.1194*
	(0.391)	(0.298)	(0.782)	(0.119)
prof	–15.7213**	–17.7447**	–0.44512**	–0.1194*
	(0.020)	(0.022)	(0.013)	(0.038)
tang	–1.060***	1.5170	–1.1093***	–0.5853***
	(0.000)	(0.483)	(0.000)	(0.000)
roa	0.00334***	–0.0126	0.00182	–0.0311***
	(0.005)	(0.828)	(0.632)	(0.078)
corindx	0.00578	0.0877	–0.0243*	0.03232*
	(0.385)	(0.795)	(0.063)	(0.065)
ebit	0.00135	–0.0075	–0.0015*	0.2423***
	(0.101)	(0.857)	(0.094)	(0.000)
gdp	–0.00322***	0.01447	0.0014	–0.007*
	(0.031)	(0.845)	(0.632)	(0.084)
sprd	–0.03414***	–0.1831	–0.0318	–0.03485
	(0.000)	(0.417)	(0.181)	(0.295)
size	–0.0112***	0.0917	0.01821	0.0045
	(0.021)	(0.711)	(0.142)	(0.682)
constant	1.2606***	1.9342	1.4321***	0.9372***
	(0.000)	(0.541)	(0.000)	(0.002)

Notes: Estimation of equation (2). p-values in brackets; ***P-value < 0.01, **P-value < 0.05, *P-value < 0.1. Number of obs.: all: 133; Asia: 53. *blev/mlev* means that the variable is blev in column 'blev' and 'mlev' in column 'mlev'. *All countries*: *for blev*: R-sq = 0.8358; chi(2) = 758; p-value = 0.00; correlation (blev, sprd) = 0.2777; Breusch-Pagan test of independence: $chi^2(1)$ = 10.258, p-value = 0.0014; *for sprd*: R-sq = 0.3704; $chi^2(1)$ = 115; p-value = 0; *for mlev*: R-sq = 0.2192; $chi^2(1)$ = 37.76; p-value = 0.00; correlation (blev, sprd) = 0.0084; Breusch-Pagan test of independence: $chi^2(1)$ = 0.009, p-value = 0.9228; *for sprd*: R-sq = 0.3962; chi(1) = 87.28; p-value = 0.00. *Asia*: *for blev*: R-sq: 0.9580; chi(1) = 890; p-value = 0.00; correlation (blev, sprd) = –0.0086; Breusch-Pagan test of independence: $chi^2(1)$ = 0.003; p-value = 0.957; *for sprd*: R-sq = 0.1580; $chi^2(1)$ = 11.69; p-value = 0.0393. *For mlev*: R-sq = 0.7043; $chi^2(1)$ = 92.91; p-value = 0.00; correlation (blev, sprd) = –0.0020; Breusch-Pagan test of independence: $chi^2(1)$ = 0.000, p-value = 0.9898; *for sprd*: R-sq = 0.1605; chi(1) = 12.96; p-value = 0.0237.

Table 6 SUR estimation of leverage and spread – all countries and Asia (continued)

	All countries		*Asia*	
	blev	*mlev*	*blev*	*mlev*
		sprd		
blev/mlev	–15.0217***	–0.1757***	0.5326	3.5655*
	(0.000)	(0.002)	(0.900)	(0.056)
prof	–9.3216***	–9.8398***	–1.4297	–0.92498
	(0.016)	(0.017)	(0.822)	(0.872)
tang	–22.846***	–8.9131***	–1.3919	–2.0886
	(0.000)	(0.000)	(0.789)	(0.295)
roa	0.1097 ***	0.0845***	0.1217	0.1269
	(0.004)	(0.034)	(0.378)	(0.274)
gdp	–0.04804	–0.1018***	–0.0933	–0.0883*
	(0.256)	(0.02)	(0.358)	(0.077)
constant	25.4214***	12.6102***	7.9376	7.0363***
	(0.000)	(0.000)	(0.054)	(0.000)

Notes: Estimation of equation (2). p-values in brackets; ***P-value < 0.01, **P-value < 0.05, *P-value < 0.1. Number of obs.: all: 133; Asia: 53. *blev/mlev* means that the variable is blev in column 'blev' and 'mlev' in column 'mlev'. *All countries*: *for blev*: R-sq = 0.8358; chi(2) = 758; p-value = 0.00; correlation (blev, sprd) = 0.2777; Breusch-Pagan test of independence: $chi^2(1)$ = 10.258, p-value = 0.0014; *for sprd*: R-sq = 0.3704; $chi^2(1)$ = 115; p-value = 0; *for mlev*: R-sq = 0.2192; $chi^2(1)$ = 37.76; p-value = 0.00; correlation (blev, sprd) = 0.0084; Breusch-Pagan test of independence: $chi^2(1)$ = 0.009, p-value = 0.9228; *for sprd*: R-sq = 0.3962; chi(1) = 87.28; p-value = 0.00. *Asia*: *for blev*: R-sq: 0.9580; chi(1) = 890; p-value = 0.00; correlation (blev, sprd) = –0.0086; Breusch-Pagan test of independence: $chi^2(1)$ = 0.003; p-value = 0.957; *for sprd*: R-sq = 0.1580; $chi^2(1)$ = 11.69; p-value = 0.0393. *For mlev*: R-sq = 0.7043; $chi^2(1)$ = 92.91; p-value = 0.00; correlation (blev, sprd) = –0.0020; Breusch-Pagan test of independence: $chi^2(1)$ = 0.000, p-value = 0.9898; *for sprd*: R-sq = 0.1605; chi(1) = 12.96; p-value = 0.0237.

Table 5 shows that only three institutional governance variables are significant at conventional levels, namely, regulatory quality (*reg*) voice and accountability (*voice*), and political stability (*pol*). Specifically, regulatory quality and political stability are both significant at 1% for book leverage in the panel of all countries. Regulatory quality is significant at 5% in EMEA for market leverage only, and in Latin America for book leverage only. Regarding *voice* and *pol*, the former is significant for market leverage in Latin America and EMEA, at 10 and 1%, respectively. The latter is only significant at 1% in all countries and EMEA. The corruption index, *corindx*, is significant at 1% in EMEA (market leverage) in Tables 5 and 7. The positive sign of the coefficient indicates that an increase in the corruption index increases leverage, since higher values for *corindx* imply less corruption. Analogous results can be found in Tables 6 and 7, which present the results of the estimation of the system of simultaneous equations (2). Regulatory quality is significant at 1% in the all countries panel and in Asia, at 5% in Latin America and in EMEA. Political stability is significant at 1% only in the all countries panel. *finsys* is never significant, confirming the results of the IV estimation in Table 5. Finally, of all the remaining institutional variables, voice and accountability is only significant at 1% in Latin America.

Table 7 SUR estimation of leverage and spread – EMEA and LATAM

	EMEA		*LATAM*	
	blev	*mlev*	*blev*	*mlev*
gov	–0.04467	–0.11931	0.09196	–0.171
	(0.282)	(0.116)	(0.173)	(0.967)
reg	–0.0758**	0.00371	–0.1467**	–7.0007
	(0.057)	(0.959)	(0.044)	(0.113)
RoL	0.07813	0.203182	–0.01105	0.292786
	(0.205)	(0.071)	(0.855)	(0.937)
voice	–0.0151	0.0468	–0.0504	10.4357***
	(0.501)	(0.252)	(0.533)	(0.035)
pol	–0.00432	–0.0712	0.01857	–1.6308
	(0.891)	(0.218)	(0.606)	(0.459)
finsys	–0.017	–0.0205	0.03460	3.7783
	(0.653)	(0.766)	(0.641)	(0.406)
inf	0.0011	–0.0088**	0.00233	–0.0001***
	(0.476)	0.033)	(0.787)	(0.000)
corptax	0.00161	–0.00073	0.002811	0.1809
	(0.355)	(0.82)	(0.151)	(0.13)
legal	–0.05317	–0.1194*	–0.0849**	1.0061
	(0.145)	(0.073)	(0.049)	(0.7)
prof	–0.1313	1.0692**	–0.6929***	–60.8983***
	(0.641)	(0.038)	(0.009)	(0.000)
tang	–0.9309***	–0.5853***	–1.1655***	3.0636
	(0.000)	(0.000)	(0.000)	(0.464)
roa	–0.006	–0.0311***	0.00557***	0.110577
	(0.159)	(0.000)	(0.000)	(0.19)
corindx	0.00343	0.0323*	–0.00221	0.648742
	(0.72)	(0.065)	(0.827)	(0.295)
ebit	0.0729	0.0788	0.4506	0.8484***
	(0.114)	(0.000)	(0.370)	(0.000)
gdp	–0.00209	–0.00695*	–0.0061***	0.0892
	(0.341)	(0.084)	(0.014)	(0.52)
sprd	0.0202	–0.0349	–0.0693***	–2.9672***
	(0.267)	(0.295)	(0.000)	(0.006)
size	–0.04467***	–0.0125	–0.1905***	–0.0149
	(0.00)	(0.461)	(0.03)	(0.88)
constant	0.8234***	0.9372***	1.6734***	25.8381***
	(0.000)	(0.002)	(0.000)	(0.033)

Notes: Estimation of equation (2). p-values in brackets; ***P-value < 0.01, **P-value < 0.05, *P-value < 0.1. Number of obs.: EMEA: 30; LATAM: 50. *blev/mlev* means that the variable is blev in column 'blev' and 'mlev' in column 'mlev'. *EMEA*: *for blev*: R-sq = 0.9471; chi(2) = 542; p-value = 0.00; correlation (blev, sprd) = –0.0824; Breusch-Pagan test of independence: $chi^2(1)$ = 1.647; p-value = 0.1993; *for sprd*: R-sq = 0.2218; chi(1) = 9.08; p-value = 0.1057; *for mlev*: R-sq = 0.8868; $chi^2(1)$ = 252.19; p-value = 0.00; correlation (blev, sprd) = 0.1318; Breusch-Pagan test of independence: $chi^2(1)$ = 2.311; p-value = 0.1285; *for sprd*: R-sq = 0.4011; chi(1) = 24.18; p-value = 0.00; *LATAM*: *for blev*: R-sq: 0.8693; chi(1) = 417.17; p-value = 0.00; correlation (blev, sprd) = –0.2343; Breusch-Pagan test of independence: $chi^2(1)$ = 0.552; p-value = 0.4575; *for sprd*: R-sq = 0.5795; chi(1) = 110.55; p-value = 0.00. *for mlev*: R-sq = 0.5934; $chi^2(1)$ = 83.79; p-value = 0.00; correlation (blev, sprd) = –0.1271; Breusch-Pagan test of independence: $chi^2(1)$ = 1.647; p-value = 0.1993; *for sprd*: R-sq = 0.4719; chi(1) = 52.67; p-value = 0.00.

Table 7 SUR estimation of leverage and spread – EMEA and LATAM (continued)

	EMEA		*LATAM*	
	blev	*mlev*	*blev*	*mlev*
		sprd		
blev/mlev	5.0238	3.5655**	–26.831***	–0.2655***
	(0.118)	(0.056)	(0.000)	(0.002)
prof	–0.4551	–0.9250	–16.1704***	–29.508***
	(0.937)	(0.872)	(0.024)	(0.001)
tang	1.0393	–2.0886	–34.6257***	–7.9847***
	(0.781)	(0.295)	(0.000)	(0.003)
roa	0.0719	0.1269	0.1761***	0.08995
	(0.506)	(0.274)	(0.001)	(0.126)
gdp	–0.1188***	–0.0883***	–0.1905***	–0.0149
	(0.02)	(0.077)	(0.03)	(0.88)
constant	4.8429	7.0363***	36.4455***	14.5808***
	(0.132)	(0.000)	(0.000)	(0.000)

Notes: Estimation of equation (2). p-values in brackets; ***P-value < 0.01, **P-value < 0.05, *P-value < 0.1. Number of obs.: EMEA: 30; LATAM: 50. *blev/mlev* means that the variable is blev in column 'blev' and 'mlev' in column 'mlev'. *EMEA*: *for blev*: R-sq = 0.9471; chi(2) = 542; p-value = 0.00; correlation (blev, sprd) = –0.0824; Breusch-Pagan test of independence: $chi^2(1)$ = 1.647; p-value = 0.1993; *for sprd*: R-sq = 0.2218; chi(1) = 9.08; p-value = 0.1057; *for mlev*: R-sq = 0.8868; $chi^2(1)$ = 252.19; p-value = 0.00; correlation (blev, sprd) = 0.1318; Breusch-Pagan test of independence: $chi^2(1)$ = 2.311; p-value = 0.1285; *for sprd*: R-sq = 0.4011; chi(1) = 24.18; p-value = 0.00; *LATAM*: *for blev*: R-sq: 0.8693; chi(1) = 417.17; p-value = 0.00; correlation (blev, sprd) = –0.2343; Breusch-Pagan test of independence: $chi^2(1)$ = 0.552; p-value = 0.4575; *for sprd*: R-sq = 0.5795; chi(1) = 110.55; p-value = 0.00. *for mlev*: R-sq = 0.5934; $chi^2(1)$ = 83.79; p-value = 0.00; correlation (blev, sprd) = –0.1271; Breusch-Pagan test of independence: $chi^2(1)$ = 1.647; p-value = 0.1993; *for sprd*: R-sq = 0.4719; chi(1) = 52.67; p-value = 0.00.

The type of financial system, namely, 'market-based' or 'bank-based', has no implication on capital structure in any of the samples considered in the empirical analysis of the determinants of leverage (1).[3] We interpret this result as an indication that the type of financial system only signals institutional governance quality, but that it has in itself little economic implication. La Porta et al. (2008) also found that higher income countries, irrespective of the origin of their legal systems, tend to provide better investor protection than low income countries, suggesting that the coefficient of *legal* would not be significant in the capital structure regression. However, the coefficient is negative and significant at 1% in EMEA and at 5% in Latin America (Table 5). This result implies that being in a common law country reduces leverage, and that companies in common law countries would tend to avoid incurring in debt. Although this finding is unexpected in the light of La Porta et al. (2008), it is congruent with Cho et al. (2014), who show that strong creditors rights are associated with low long-term debt issuance. Moreover, De Jong et al. (2008) also found that creditor right protection has a significantly negative impact on the leverage level of corporate sector. common law countries tend to provide stronger creditor protection, according to La Porta et al. (2008).

Table 8 Robustness check: IV panel estimation of book leverage by region

blev	*All countries*		*Asia*		*EMEA*		*LATAM*	
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
sprd	0.059***	0.008	0.042	–0.005	–0.001	–0.001	–0.020*	–0.089
	(0.003)	(0.969)	(0.695)	(0.763)	(0.575)	(0.709)	(0.1)	(0.728)
reg	0.270		–0.372		–0.062		0.184*	
	(0.453)		(0.567)		(0.62)		(0.092)	
RoL	0.144	0.052	0.642	–0.073	–0.019	–0.047	–0.114	0.031
	(0.704)	(0.959)	(0.702)	(0.78)	(0.828)	(0.495)	(0.438)	(0.941)
voice	0.095	–0.003	0.073	–0.002	0.119	0.098	–0.176	–0.531
	(0.568)	(0.994)	(0.669)	(0.959)	(0.242)	(0.296)	(0.411)	(0.726)
pol	–0.040	0.011	–0.030	–0.017	–0.058**	–0.0494**	0.113	0.237
	(0.799)	(0.948)	(0.924)	(0.838)	(0.04)	(0.033)	(0.269)	(0.732)
inctax	0.011	0.002	0.027	–0.003	–0.167	–0.026	–1.750	–2.008
	(0.69)	(0.965)	(0.667)	(0.676)	(0.737)	(0.949)	(0.251)	(0.711)
inf	–0.008	0.001	–0.026	0.002	–0.0005	–0.0003	0.003	–0.002
	(0.312)	(0.984)	(0.692)	(0.868)	(0.843)	(0.899)	(0.493)	(0.922)
finsys	0.352942	0.029561	–0.19024	0.003148			–0.08845	–0.16494
	(0.999)	(0.986)	(0.616)	(0.956)			(0.537)	(0.767)
legal	–0.02143	0.009442	–0.17532	–0.00112	–0.09556	–0.07761	–0.04455	–0.02614
	(0.999)	(0.994)	(0.744)	(0.992)	(0.142)	(0.155)	(0.531)	(0.916)
prof	–0.605	–0.362	–0.235	–0.432	0.374	0.313	0.122	1.761
	(0.544)	(0.753)	(0.855)	(0.196)	(0.174)	(0.215)	(0.849)	(0.76)
tang		–0.856	–0.726	–1.187***	–0.714***	–0.730***	–1.379***	–2.273
		(0.815)	(0.529)	(0.000)	(0.000)	(0.000)	(0.000)	(0.566)
roa	0.0026	0.0022	–0.0162	0.0049	–0.0027	–0.0017	–0.0011	–0.0150
	(0.751)	(0.293)	(0.76)	(0.597)	(0.432)	(0.549)	(0.796)	(0.766)
corindx	–0.049	–0.009	–0.112	0.009	–0.025	–0.028	0.000	0.015
	(0.379)	(0.951)	(0.671)	(0.806)	(0.355)	(0.306)	(0.996)	(0.877)
ebit	–0.002	0.000	–0.006	0.001	0.034	0.009	0.464	0.540
	(0.693)	(0.965)	(0.667)	(0.674)	(0.695)	(0.901)	(0.294)	(0.726)
gdp	0.0049	–0.0030	–0.0056	0.0043	–0.0072	–0.007**	–0.0036	0.0082
	(0.694)	(0.949)	(0.832)	(0.413)	(0.046)	(0.051)	(0.527)	(0.839)
size	0.0225	–0.0104	0.0689	0.0001	–0.046***	–0.045	–0.029	–0.130
	(0.677)	(0.943)	(0.632)	(0.995)	(0.000)	(0.000)	(0.346)	(0.714)
_cons	0.417998	0.952922	1.25433	0.962279	1.13211	1.12274	1.213232	2.248463
	(0.999)	(0.663)	(0.101)	(0.000)	(0.000)	(0.000)	(0.000)	(0.56)

Notes: Estimation of equation (1). p-values in brackets; ***P-value < 0.01, **P-value < 0.05, *P-value < 0.1. Number of obs.: all: 133; Asia: 53; EMEA: 30; LATAM: 50. *finsys* = 0 for all countries in EMEA group, and was dropped from equation. Instrumented: sprd; instruments for cols 1, 3, 5, 7: reg; RoL; voice; pol; inctax; inf; finsys; legal; prof; tang; roa; corindx; ebit; gdp; riskprm. Instruments for cols 2, 4, 6, 8: RoL; voice; pol; inctax; inf; finsys; legal; prof; tang; roa; corindx; ebit; gdp; riskprm. *All countries*: *col 1*: R-sq: within = 0.06; between = 0.02; overall = 0.02; σ_u = 14,702; σ_e = 0.287; rho = 1; Wald chi^2(16) = 11.13; p-value = 0.74; *col 2*: R-sq: within = 0.66; between = 0.50; overall = 0.57; σ_u = 12.71; σ_e = 0.28; rho = 0.99; Wald chi^2(16) = 33.09; p-value = 0.000. *Asia*: *col 3*: R-sq: within = 0.29; between = 1; overall = 0.47; σ_u = 0; σ_e = 0.033; rho = 0; Wald chi^2(16) = 19; p-value = 0.26; *col 4*: R-sq: within = 0.83; between = 0.999; overall = 0.92; σ_u = 0; σ_e = 0.04; rho = 0; Wald chi^2(15) = 254; p-value = 0.000; *EMEA*: *col 5*: R-sq: within = 0.93; between = 1; overall = 0.95; σ_u = 2.297e-09; σ_e = 0.029; rho = 6.131e-15; Wald chi^2(15) = 293; p-value = 0.000. *col 6*: R-sq: within = 0.92; between = 1; overall = 0.7033; σ_u = 2.297e-09; σ_e = 0.028; rho = 0; Wald chi^2(16) = 289; p-value = 0.000. *LATAM*: *col 7*: R-sq: within = 0.57; between = 0.9998; overall = 0.67; σ_u = 0; σ_e = 0.1; rho = 0; Wald chi^2(16) = 77; p-value = 0.000; *col 8*: R-sq: within = 0.0608; between = 0.991;overall = 0.10; σ_u = 0; σ_e = 0.11; rho = 0; Wald chi^2(16) = 6.17; p-value = 0.98.

Table 9 Robustness check: IV panel estimation of market leverage by region

mlev	*All countries*		*Asia*		*EMEA*		*LATAM*	
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
sprd	0.241*	0.345	0.125	0.032	–0.006	0.002	–0.450	1.188
	(0.097)	(0.98)	(0.685)	(0.501)	(0.212)	(0.679)	(0.297)	(0.779)
reg	1.742		–0.765		–1.029***		0.514	
	(0.134)		(0.683)		(0.001)		(0.894)	
RoL	–0.076	–0.392	1.726	0.301	–0.119	–0.587***	–1.020	–0.645
	(0.939)	(0.995)	(0.72)	(0.708)	(0.599)	(0.015)	(0.844)	(0.925)
voice	0.968	2.490	0.183	0.029	1.006***	0.675**	5.913	14.467
	(0.125)	(0.931)	(0.711)	(0.762)	(0.000)	(0.038)	(0.436)	(0.562)
pol	–0.328	1.403	–0.155	–0.143	–0.214***	–0.076	2.022	–2.010
	(0.534)	(0.891)	(0.862)	(0.584)	(0.003)	(0.343)	(0.578)	(0.86)
inctax	0.037	0.150	0.057	–0.003	–1.303	1.079	3.080	11.140
	(0.864)	(0.952)	(0.75)	(0.881)	(0.299)	(0.438)	(0.955)	(0.901)
infla	0.014	–0.077	–0.070	–0.014	–0.008	–0.006	0.010	0.053
	(0.764)	(0.974)	(0.716)	(0.662)	(0.148)	(0.474)	(0.952)	(0.858)
finsys	–0.215	0.897	–0.390	0.014			–0.090	1.530
	(0.85)	(0.994)	(0.721)	(0.937)			(0.986)	(0.868)
legal	–0.218	0.326	–0.501	–0.160	–0.737***	–0.438**	5.081**	5.937
	(0.693)	(0.997)	(0.746)	(0.638)	(0.000)	(0.02)	(0.044)	(0.146)
prof	–20.647**	–16.297	–0.045	–0.439	0.604	–0.377	–19.207	–52.999
	(0.018)	(0.822)	(0.99)	(0.67)	(0.386)	(0.665)	(0.4)	(0.577)
tang		8.825	0.560	–0.356	–0.006	–0.252	2.146	27.655
		(0.97)	(0.866)	(0.562)	(0.986)	(0.582)	(0.835)	(0.672)
roa	0.037	–0.055	–0.069	–0.026	–0.033***	–0.016*	–0.224	0.083
	(0.598)	(0.599)	(0.654)	(0.354)	(0.000)	(0.104)	(0.149)	(0.92)
corindx	0.066	–0.574	–0.223	0.019	–0.102	–0.142	0.411	0.194
	(0.867)	(0.95)	(0.769)	(0.86)	(0.139)	(0.126)	(0.656)	(0.903)
ebit	–0.008	–0.033	–0.013	0.001	0.215	–0.218	0.935	–0.103
	(0.869)	(0.953)	(0.75)	(0.877)	(0.332)	(0.365)	(0.952)	(0.997)
gdp	0.121	0.080	–0.028	–0.008	–0.009	0.002	0.194	–0.028
	(0.216)	(0.978)	(0.709)	(0.612)	(0.318)	(0.879)	(0.336)	(0.967)
size	0.329	–1.044	0.180	0.040	–0.018	0.004	–3.109***	–0.943
	(0.263)	(0.91)	(0.663)	(0.502)	(0.486)	(0.916)	(0.005)	(0.872)
constant	–0.701	6.204	1.033	0.444	1.445***	1.278**	13.687	–10.340
	(0.777)	(0.964)	(0.639)	(0.325)	(0.001)	(0.035)	(0.179)	(0.871)

Notes: Estimation of equation (1). p-values in brackets; ***P-value < 0.01, **P-value < 0.05, *P-value < 0.1. Number of obs.: all: 133; Asia: 53; EMEA: 30; LATAM: 50. Instrumented: sprd; instruments for cols 1, 3, 5, 7: reg; RoL; voice; pol; inctax; inf; finsys; legal; prof; tang; roa; corindx; ebit; gdp; riskprm. Instruments for cols 2, 4, 6, 8: RoL; voice; pol; inctax; inf; finsys; legal; prof; tang; roa; corindx; ebit; gdp; riskprm. *All countries*: *col 1*: R-sq: within = 0.14; between = 0.15; overall = 0.06; σ_u = 111,882; σ_e = 2.188; rho = 1; Wald chi^2(16) = 28.45; p-value = 0.02; *col 2*: R-sq: within = 0.01; between = 0.50; overall = 0.11; σ_u = 0.026; σ_e = 7.83; rho = 0.00; Wald chi^2(16) = 27.65; p-value = 0.024. *Asia*: *col 3*: R-sq: within = 0.12; between = 1; overall = 0.14; σ_u = 0; σ_e = 0.095; rho = 0; Wald chi^2(16) = 1.86; p-value = 1; *col 4*: R-sq: within = 0.39; between = 0.995; overall = 0.46; σ_u = 0; σ_e = 0.14; rho = 0; Wald chi^2(15) = 20.31; p-value = 0.16; *EMEA*: *col 5*: R-sq: within = 0.77; between = 1; overall = 0.88; σ_u = 2.297e-09; σ_e = 0.029; rho = 6.131e-15; Wald chi^2(15) = 293; p-value = 0.000. *col 6*: R-sq: within = 0.55; between = 0.99; overall = 0.75; σ_u = 2.030e-09; σ_e = 0.07; rho = 0; Wald chi^2(16) = 47; p-value = 0.000. *LATAM*: *col 7*: R-sq: within = 0.33; between = 0.999; overall = 0.48; σ_u = 0; σ_e = 5.05; rho = 0; Wald chi^2(16) = 35; p-value = 0.000; *col 8*: R-sq: within = 0.07; between = 0.98; overall = 0.17; σ_u = 0; σ_e = 6.35; rho = 0; Wald chi^2(16) = 13; p-value = 0.60.

Table 10 Robustness check: SUR estimation of book leverage and spread

	All countries		*Asia*		*EMEA*		*LATAM*	
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
				blev				
reg	–0.059***		–0.233		–0.013		–0.091	
	(0.004)		(0.000)		(0.873)		(0.175)	
RoL	0.034**	0.013	–0.049	–0.027	–0.047	–0.053	0.013	–0.027
	(0.035)	(0.398)	(0.586)	(0.798)	(0.463)	(0.311)	(0.817)	(0.591)
voice	0.015	–0.0006	0.119***	0.014	0.108	0.103	–0.043	–0.044
	(0.123)	(0.938)	(0.003)	(0.697)	(0.153)	(0.131)	(0.588)	(0.591)
pol	–0.042***	–0.040***	0.035	–0.047	–0.065**	–0.063***	0.029	0.036
	(0.000)	(0.000)	(0.388)	(0.243)	(0.011)	(0.007)	(0.43)	(0.341)
finsys	0.009	0.043***	–0.210	0.0021			0.057	0.018
	(0.65)	(0.005)	(0.001)	(0.956)			(0.388)	(0.773)
inctax	–0.0062*	–0.007*	0.0028	–0.003	–0.009	0.012	–0.856	–0.922
	(0.083)	(0.067)	(0.466)	(0.528)	(0.977)	(0.967)	(0.156)	(0.133)
infla	0.0019*	0.0013	–0.0007	–0.0010	–0.0006	–0.0006	0.004***	0.003*
	(0.074)	(0.208)	(0.794)	(0.731)	(0.75)	(0.754)	(0.06)	(0.1)
legal	–0.008	–0.0078	0.109	–0.008	–0.074	–0.069*	–0.052*	–0.042
	(0.374)	(0.387)	(0.064)	(0.892)	(0.143)	(0.102)	(0.093)	(0.172)
prof	–0.326**	–0.349***	–0.423**	–0.423*	0.356*	0.335**	–0.638***	–0.555**
	(0.017)	(0.013)	(0.028)	(0.06)	(0.083)	(0.039)	(0.02)	(0.044)
tang	–1.060***	–1.073***	–1.213***	–1.158***	–0.714***	–0.721***	–1.139***	–1.148***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
roa	0.003***	0.0032***	–0.0006	0.0023	–0.0018	–0.0015	0.0048***	0.0046***
	(0.004)	(0.009)	(0.878)	(0.617)	(0.497)	(0.463)	(0.004)	(0.007)
ebit	0.0014*	0.002*	–0.0006	0.0006	0.006	0.0026	0.240	0.253
	(0.083)	(0.067)	(0.467)	(0.524)	(0.908)	(0.957)	(0.172)	(0.158)
sprd	–0.034***	–0.029***	–0.057***	–0.013	–0.014	–0.014	–0.065***	–0.044***
	(0.000)	(0.000)	(0.012)	(0.58)	(0.603)	(0.57)	(0.000)	(0.000)
size	–0.011**	–0.0096*	0.0119	–0.002	–0.045***	–0.045***	0.0017	0.0008
	(0.022)	(0.055)	(0.359)	(0.883)	(0.000)	(0.000)	(0.876)	(0.945)
constant	1.260***	1.217***	1.552***	1.089***	1.233***	1.242***	1.582***	1.380***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Notes: Estimation of equation (2). p-values in brackets; ***P-value < 0.01, **P-value < 0.05, *P-value < 0.1. Number of obs.: all: 133; Asia: 39; EMEA: 30; LATAM: 50. *All*: *blev col 1*: R-sq = 0.84; chi(2) = 757; p-value = 0.00; correlation (blev, sprd) = 0.28; Breusch-Pagan test: $chi^2(1)$ = 10.26; p-value = 0.00; *sprd col 1*: R-sq = 0.37; chi(2) = 115; p-value = 0.00; *blev col 2*: R-sq = 0.82; chi(2) = 701; p-value = 0.00; correlation (blev, sprd) = 0.29; Breusch-Pagan test: $chi^2(1)$ = 11.01; p-value = 0.00; *sprd col 2*: R-sq = 0.37; chi(2) = 117; p-value = 0.00; *Asia*: *blev col 3*: R-sq = 0.95; $chi^2(1)$ = 769; p-value = 0.00; correlation (blev, sprd) = 0.00; Breusch-Pagan test: $chi^2(1)$ = 0.00; p-value = 0.95; *sprd col 3*: R-sq = 0.09; chi(2) = 3.96; p-value = 0.55; *blev col 4*: R-sq = 0.93; chi(2) = 550; p-value = 0.00; correlation (blev, sprd) = –0.01; Breusch-Pagan test: $chi^2(1)$ = 0.0; p-value = 0.95; *sprd col 4*: R-sq = 0.09; chi(2) = 3.96; p-value = 0.55; *EMEA*: *blev col 5*: R-sq = 0.95; chi(2) = 527; p-value = 0.00; correlation (blev, sprd) = –0.0834; Breusch-Pagan: $chi^2(1)$ = 0.21; p-value = 0.65; *for sprd col 5*: R-sq = 0.22; chi(1) = 9.10; p-value = 0.105; *for blev col 6*: R-sq = 0.95; chi(2) = 527; p-value = 0.00; correlation (blev, sprd) = –0.08; Breusch-Pagan test: $chi^2(1)$ = 0.21; p-value = 0.65; *sprd col 6*: R-sq = 0.22; chi(2) = 9.10; p-value = 0.11; *LATAM*: *blev col 7*: R-sq: 0.87; chi(1) = 418; p-value = 0.00; correlation (blev, sprd) = 0.48; Breusch-Pagan: $chi^2(1)$ = 11.33; p-value = 0.00; *sprd col 7*: R-sq = 0.56; chi(1) = 110; p-value = 0.00. *blev col 8*: R-sq = 0.86; $chi^2(1)$ = 395; p-value = 0.00; correlation (blev, sprd) = 0.49; Breusch-Pagan: $chi^2(1)$ = 12.04; p-value = 0.00; *sprd col 8*: R-sq = 0.58; chi(1) = 113; p-value = 0.00.

Table 10 Robustness check: SUR estimation of book leverage and spread (continued)

	All countries		*Asia*		*EMEA*		*LATAM*	
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
				sprd				
blev	–15.023***	–15.381***	0.552	0.606	5.634	5.635	–26.806***	–27.158***
	(0.000)	(0.000)	(0.896)	(0.886)	(0.267)	(0.266)	(0.000)	(0.000)
prof	–9.322***	–9.363***	–1.428	–1.423	11.097*	11.097*	–16.17**	–16.17**
	(0.016)	(0.016)	(0.822)	(0.823)	(0.083)	(0.083)	(0.024)	(0.024)
tang	–22.847***	–23.166***	–1.370	–1.309	0.890	0.891	–34.60***	–34.90***
	(0.000)	(0.000)	(0.792)	(0.802)	(0.883)	(0.883)	(0.000)	(0.000)
roa	0.10968	0.110161	0.122	0.121	–0.0824	–0.0824	0.176***	0.176***
	(0.004)	(0.004)	(0.378)	(0.379)	(0.233)	(0.233)	(0.001)	(0.001)
corindex	0.006	0.002	–0.011	0.002	–0.030	–0.031	0.000	–0.001
	(0.355)	(0.773)	(0.381)	(0.885)	(0.158)	(0.137)	(0.964)	(0.904)
gdp	–0.048	–0.047	–0.094	–0.094	0.030	0.030	–0.190**	–0.192**
	(0.256)	(0.269)	(0.357)	(0.354)	(0.682)	(0.682)	(0.03)	(0.029)
constant	25.422***	25.732***	7.92*	7.89*	3.884	3.883	36.424***	36.720***
	(0.000)	(0.000)	(0.056)	(0.054)	(0.407)	(0.407)	(0.000)	(0.000)

Notes: Estimation of equation (2). p-values in brackets; ***P-value < 0.01, **P-value < 0.05, *P-value < 0.1. Number of obs.: all: 133; Asia: 39; EMEA: 30; LATAM: 50. *All*: *blev col 1*: R-sq = 0.84; chi(2) = 757; p-value = 0.00; correlation (blev, sprd) = 0.28; Breusch-Pagan test: $chi^2(1)$ = 10.26; p-value = 0.00; *sprd col 1*: R-sq = 0.37; chi(2) = 115; p-value = 0.00; *blev col 2*: R-sq = 0.82; chi(2) = 701; p-value = 0.00; correlation (blev, sprd) = 0.29; Breusch-Pagan test: $chi^2(1)$ = 11.01; p-value = 0.00; *sprd col 2*: R-sq = 0.37; chi(2) = 117; p-value = 0.00; *Asia*: *blev col 3*: R-sq = 0.95; $chi^2(1)$ = 769; p-value = 0.00; correlation (blev, sprd) = 0.00; Breusch-Pagan test: $chi^2(1)$ = 0.00; p-value = 0.95; *sprd col 3*: R-sq = 0.09; chi(2) = 3.96; p-value = 0.55; *blev col 4*: R-sq = 0.93; chi(2) = 550; p-value = 0.00; correlation (blev, sprd) = –0.01; Breusch-Pagan test: $chi^2(1)$ = 0.0; p-value = 0.95; *sprd col 4*: R-sq = 0.09; chi(2) = 3.96; p-value = 0.55; *EMEA*: *blev col 5*: R-sq = 0.95; chi(2) = 527; p-value = 0.00; correlation (blev, sprd) = –0.0834; Breusch-Pagan: $chi^2(1)$ = 0.21; p-value = 0.65; *for sprd col 5*: R-sq = 0.22; chi(1) = 9.10; p-value = 0.105; *for blev col 6*: R-sq = 0.95; chi(2) = 527; p-value = 0.00; correlation (blev, sprd) = –0.08; Breusch-Pagan test: $chi^2(1)$ = 0.21; p-value = 0.65; *sprd col 6*: R-sq = 0.22; chi(2) = 9.10; p-value = 0.11; *LATAM*: *blev col 7*: R-sq: 0.87; chi(1) = 418; p-value = 0.00; correlation (blev, sprd) = 0.48; Breusch-Pagan: $chi^2(1)$ = 11.33; p-value = 0.00; *sprd col 7*: R-sq = 0.56; chi(1) = 110; p-value = 0.00. *blev col 8*: R-sq = 0.86; $chi^2(1)$ = 395; p-value = 0.00; correlation (blev, sprd) = 0.49; Breusch-Pagan: $chi^2(1)$ = 12.04; p-value = 0.00; *sprd col 8*: R-sq = 0.58; chi(1) = 113; p-value = 0.00.

Tables 5, 6 and 7 thus suggest that the link between legal system, creditor protection and debt issuance is more tenuous than established in the development finance literature. However, recent research has cast doubts on the importance of institutional factors on capital structure decisions of listed companies when firm-level variables are taken into account (Alves and Ferreira, 2011; Gungoraydinoglu and Öztekin, 2011).

Macroeconomic variables, particularly GDP growth, are significant at conventional levels and have the expected sign. An increase in economic growth has positive impact on capital structure, as firms decide to raise funding for investment due to the economic boom (Table 5). The SUR estimations in Tables 6 and 7 show that GDP growth has a negative impact on spread, as expected, since firms become less risky during economic booms than during economic recessions. Inflation is only significant at conventional

levels for market leverage in EMEA (Table 5), in Asia (Table 6) and LATAM (Table 7). Inflation has a negative impact on leverage, i.e., an increase in inflation rate tends to reduce leverage in most emerging countries. This result is in line with the literature. Hatzinikolaou et al. (2002) found that inflation uncertainty reduces leverage in mature economies. And Frank and Goyal (2009) show that inflation uncertainty reduces the number of investment projects financed by issuing debt, and the number of capital investment projects that the firm undertakes. These results are also consistent with those of De Jong et al. (2008), who found both direct and indirect impacts of firm- and country-specific factors on the capital structure of firms.

Table 11 Robustness check: SUR estimation of market leverage and spread

mlev	*All*		*Asia*		*EMEA*		*LATAM*	
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
reg	0.671637		–0.333**		–0.675***		–7.845*	
	(0.522)		(0.04)		(0.000)		(0.062)	
RoL	0.376214	0.619122	–0.31844	–0.28592	–0.298**	–0.594***	2.34	–1.226
	(0.645)	(0.393)	(0.183)	(0.255)	(0.041)	(0.000)	0.521	0.703
voice	0.593	0.768*	0.300***	0.149*	0.883***	0.578***	7.742	7.476
	(0.219)	(0.054)	(0.005)	(0.07)	(0.000)	(0.002)	(0.125)	(0.153)
pol	–0.441	–0.462	0.038	–0.079	–0.277***	–0.182***	0.381	1.042
	(0.329)	(0.306)	(0.726)	(0.408)	(0.000)	(0.005)	(0.87)	(0.662)
finsys	–0.315	–0.706	–0.425***	–0.122			4.657	1.263
	(0.742)	(0.34)	(0.012)	(0.171)			(0.267)	(0.747)
inctax	0.022	0.029	–0.014	–0.022**	–0.365	0.706	15.236	6.386
	(0.904)	(0.873)	(0.175)	(0.031)	(0.607)	(0.368)	(0.688)	(0.87)
inf	0.064	0.069	0.007	0.006	–0.01**	–0.009	0.081	0.054
	(0.215)	(0.171)	(0.333)	(0.398)	(0.017)	(0.068)	(0.529)	(0.682)
legal	–0.459	–0.457	0.325**	0.158	–0.542***	–0.300	3.529*	4.185**
	(0.297)	(0.3)	(0.036)	(0.255)	(0.000)	(0.011)	(0.067)	(0.033)
prof	–17.154***	–16.925***	–0.594	–0.592	0.469	–0.614	–46.376***	–39.797**
	(0.011)	(0.012)	(0.244)	(0.27)	(0.323)	(0.181)	(0.005)	(0.017)

Notes: Estimation of equation (2). p-values in brackets; ***P-value < 0.01, **P-value < 0.05, *P-value < 0.1. Number of obs.: all: 133; Asia: 39; EMEA: 30; LATAM: 50. *All*: *mlev col 1*: R-sq = 0.21; chi(2) = 44; p-value = 0.00; correlation (blev, sprd) = 0.13; Breusch-Pagan test: $chi^2(1)$ = 2.29; p-value = 0.13; *sprd col 1*: R-sq = 0.33; chi(2) = 73; p-value = 0.00; *mlev col 2*: R-sq = 0.20; chi(2) = 43; p-value = 0.00; correlation (blev, sprd) = 0.13; Breusch-Pagan test: $chi^2(1)$ = 2.29; p-value = 0.13; *sprd col 2*: R-sq = 0.33; chi(2) = 74; p-value = 0.00 *Asia*: *mlev col 3*: R-sq = 0.69; $chi^2(1)$ = 88; p-value = 0.00; correlation (blev, sprd) = –0.11; Breusch-Pagan test: $chi^2(1)$ = 0.46; p-value = 0.50; *sprd col 3*: R-sq = 0.11; chi(2) = 6.17; p-value = 0.40; *mlev col 4*: R-sq = 0.65; chi(2) = 76; p-value = 0.00; correlation (blev, sprd) = –0.11; Breusch-Pagan test: $chi^2(1)$ = 0.51; p-value = 0.47; *sprd col 4*: R-sq = 0.11; chi(2) = 6.33; p-value = 0.39; *EMEA*: *mlev col 5*: R-sq = 0.87; chi(2) = 215; p-value = 0.00; correlation (blev, sprd) = –0.20; Breusch-Pagan: $chi^2(1)$ = 1.22; p-value = 0.26; *sprd col 5*: R-sq = 0.44; chi(1) = 27; p-value = 0.00; *mlev col 6*: R-sq = 0.80; chi(2) = 136; p-value = 0.00; correlation (blev, sprd) = –0.25; Breusch-Pagan test: $chi^2(1)$ = 1.84; p-value = 0.18; *sprd col 6*: R-sq = 0.43; chi(2) = 29; p-value = 0.00 *LATAM*: *mlev col 7*: R-sq: 0.56; chi(1) = 77; p-value = 0.00; correlation (blev, sprd) = 0.23; Breusch-Pagan: $chi^2(1)$ = 2.71; p-value = 0.10; *sprd col 7*: R-sq = 0.53; chi(1) = 66; p-value = 0.00. *mlev col 8*: R-sq = 0.53; $chi^2(1)$ = 69; p-value = 0.00; correlation (blev, sprd) = 0.24; Breusch-Pagan: $chi^2(1)$ = 2.92; p-value = 0.09; *sprd col 8*: R-sq = 0.52; chi(1) = 67; p-value = 0.00.

Table 11 Robustness check: SUR estimation of market leverage and spread (continued)

mlev	*All*		*Asia*		*EMEA*		*LATAM*	
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
tang	–0.0009	0.099	–0.865***	–0.785	–0.047	–0.373	6.057	4.734
	(1.000)	(0.963)	(0.000)	(0.000)	(0.842)	(0.157)	(0.179)	(0.308)
roa	0.003	0.006	–0.022**	–0.0182*	–0.0259***	–0.0124**	–0.067	–0.091
	(0.956)	(0.922)	(0.033)	(0.091)	(0.000)	(0.031)	(0.503)	(0.376)
corindx	0.102	0.149	0.076**	0.094***	–0.142***	–0.177***	0.364	0.288
	(0.755)	(0.642)	(0.025)	(0.006)	(0.004)	(0.002)	(0.571)	(0.664)
ebit	–0.005	–0.006	0.003	0.005**	0.054	–0.131	–2.156	–0.186
	(0.906)	(0.874)	(0.177)	(0.031)	(0.66)	(0.33)	(0.845)	(0.987)
gdp	–0.004	–0.008	–0.011	–0.005	0.005	0.009	0.141	0.098
	(0.954)	(0.914)	(0.175)	(0.513)	(0.461)	(0.219)	(0.316)	(0.497)
sprd	–0.346	–0.410**	–0.154***	–0.090*	–0.131**	–0.168**	–2.502**	–0.786
	(0.122)	(0.041)	(0.011)	(0.102)	(0.028)	(0.018)	(0.027)	(0.241)
size	0.080	0.064	0.012	–0.008	–0.016	0.001	–2.39***	–2.434***
	(0.745)	(0.795)	(0.72)	(0.825)	(0.36)	(0.972)	(0.001)	(0.001)
constant	4.028	4.566	1.772***	1.104**	2.506***	2.861***	33.704***	16.891**
	(0.2)	(0.132)	(0.003)	(0.033)	(0.000)	(0.000)	(0.007)	(0.051)
				sprd				
mlev	–0.174***	–0.175***	2.741	2.847	4.761***	5.188***	–0.272***	–0.280***
	(0.002)	(0.002)	(0.156)	(0.156)	(0.005)	(0.002)	(0.001)	(0.000)
prof	–9.475**	–9.479**	0.489	0.511	3.929	3.779	–30.567***	–30.932***
	(0.024)	(0.024)	(0.948)	(0.948)	(0.498)	(0.514)	(0.000)	(0.000)
tang	–8.880***	–8.879***	–0.087	–0.0179	–5.422**	–5.283**	–6.975***	–6.879***
	(0.000)	(0.000)	(0.972)	(0.972)	(0.043)	(0.049)	(0.007)	(0.008)
roa	0.082**	0.082**	0.179	0.182	0.071	0.077	0.066	0.066
	(0.041)	(0.041)	(0.218)	(0.218)	(0.257)	(0.223)	(0.237)	(0.24)
size	–0.057	–0.057	–0.117	–0.119	0.261	0.237	–0.756***	–0.756***
	(0.679)	(0.679)	(0.532)	(0.532)	(0.219)	(0.264)	(0.013)	(0.013)
gdp	–0.100**	–0.100**	–0.061	–0.060	0.076	0.071	–0.039	–0.039
	(0.023)	(0.023)	(0.507)	(0.507)	(0.26)	(0.291)	(0.675)	(0.68)
constant	12.853***	12.853***	6.683***	6.608***	6.304***	6.200***	18.327***	18.346***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Notes: Estimation of equation (2). p-values in brackets; ***P-value < 0.01, **P-value < 0.05, *P-value < 0.1. Number of obs.: all: 133; Asia: 39; EMEA: 30; LATAM: 50. *All*: *mlev col 1*: R-sq = 0.21; chi(2) = 44; p-value = 0.00; correlation (blev, sprd) = 0.13; Breusch-Pagan test: $chi^2(1)$ = 2.29; p-value = 0.13; *sprd col 1*: R-sq = 0.33; chi(2) = 73; p-value = 0.00; *mlev col 2*: R-sq = 0.20; chi(2) = 43; p-value = 0.00; correlation (blev, sprd) = 0.13; Breusch-Pagan test: $chi^2(1)$ = 2.29; p-value = 0.13; *sprd col 2*: R-sq = 0.33; chi(2) = 74; p-value = 0.00 *Asia*: *mlev col 3*: R-sq = 0.69; $chi^2(1)$ = 88; p-value = 0.00; correlation (blev, sprd) = –0.11; Breusch-Pagan test: $chi^2(1)$ = 0.46; p-value = 0.50; *sprd col 3*: R-sq = 0.11; chi(2) = 6.17; p-value = 0.40; *mlev col 4*: R-sq = 0.65; chi(2) = 76; p-value = 0.00; correlation (blev, sprd) = –0.11; Breusch-Pagan test: $chi^2(1)$ = 0.51; p-value = 0.47; *sprd col 4*: R-sq = 0.11; chi(2) = 6.33; p-value = 0.39; *EMEA*: *mlev col 5*: R-sq = 0.87; chi(2) = 215; p-value = 0.00; correlation (blev, sprd) = –0.20; Breusch-Pagan: $chi^2(1)$ = 1.22; p-value = 0.26; *sprd col 5*: R-sq = 0.44; chi(1) = 27; p-value = 0.00; *mlev col 6*: R-sq = 0.80; chi(2) = 136; p-value = 0.00; correlation (blev, sprd) = –0.25; Breusch-Pagan test: $chi^2(1)$ = 1.84; p-value = 0.18; *sprd col 6*: R-sq = 0.43; chi(2) = 29; p-value = 0.00 *LATAM*: *mlev col 7*: R-sq: 0.56; chi(1) = 77; p-value = 0.00; correlation (blev, sprd) = 0.23; Breusch-Pagan: $chi^2(1)$ = 2.71; p-value = 0.10; *sprd col 7*: R-sq = 0.53; chi(1) = 66; p-value = 0.00. *mlev col 8*: R-sq = 0.53; $chi^2(1)$ = 69; p-value = 0.00; correlation (blev, sprd) = 0.24; Breusch-Pagan: $chi^2(1)$ = 2.92; p-value = 0.09; *sprd col 8*: R-sq = 0.52; chi(1) = 67; p-value = 0.00.

The firm-specific variables *tang*, *prof* and *ROA* are significant at conventional levels for leverage in all regional groupings. The sign of *prof* is consistent with the pecking order theory, according to which profitable firms rely primarily on retained earnings when they face financing needs. ROA as a proxy for performance is significantly negatively related to leverage in Asia (Tables 5 and 6), and EMEA (Tables 5 and 7). For LATAM, and the all countries panel, the coefficient of ROA is positive and significant at 1% (Tables 5 and 7). This result implies that firms with higher performance borrow less in Asia and EMEA, but more in Latin America. These findings provides evidence for the pecking order theory of capital structure in EMEA, and are in line with existing literature (Titman and Wessels, 1988; Rajan and Zingales, 1995; Hovakimian et al., 2001; Giannetti, 2003; De Jong et al., 2008; Bastos et al., 2009; Mukherjee and Mahakud, 2012; Yang et al., 2010). In Asia, these results support the trade-off theory of capital structure, where profitability and leverage have a positive correlation, since profitability increases the benefits of debt tax shields. The sign of the coefficient of tangibility is negative in Table 5 for the all country panel, EMEA and LATAM (blev), and Asia (mlev). It is also negative in Tables 6 and 7 for all countries and LATAM (blev), and for both dependent variables for Asia and EMEA. This result is unexpected, since it suggests that an increase in tangible assets reduces leverage. The established relationship in the literature states that tangible assets are indicators of the quality of collaterals and provide confidence to creditors regarding the solvability of borrowers (De Jong et al., 2008; Parsons and Titman, 2008). However, a negative sign was found in empirical analyses that include institutional factors as dependent variables, e.g., Giannetti (2003) and Alves and Ferreira (2011).

Bond spreads impact negatively on leverage in the all countries panel, and in the regional groups EMEA and LATAM. Their coefficients are significant at 1% (all, LATAM for *blev*), 5% (LATAM for *mlev*) and at 10% (EMEA for *mlev*). No significant relationship between spread and leverage either in the IV panel estimation or in the SUR regression was found in Asia. This result is not unexpected, since it can be accounted for by the fact that bond markets are under-developed in Asia, particularly relative to this region's fast economic growth and long term capital needs (Bhattacharyay, 2013; Smaoui et al., 2017).

Tables 6 and 7 show that *roa* is negatively correlated to leverage decisions in Asia and EMEA, suggesting that a decrease in the return on the assets will lead companies to reduce leverage. The negative coefficient would indicate that firms in Asia and EMEA tend to adopt a pecking-order perspective on investment financing. Specifically, the pecking order view posits that firms prefer internal funding, such as retained earnings, to external funding such as debt or equity issuance. The opposite conclusion could be drawn for Latin American firms, where returns on assets have a positive impact on leverage. Analogously, corporate tax, *corptax*, is only significant in Asian and LATAM (Table 5), but with a positive coefficient. This finding is consistent with the 'tax shield' aspect of corporate debt, viz., that the tax deductibility of corporate debt positively influences the debt issuance (Titman and Wessels, 1988; Graham, 2003; Parsons and Titman, 2008; Chang et al., 2009; Moradi and Paulet, 2019).

Tables 6 and 7 also present the estimation of the determinants of bond spreads. All determinants bar GDP growth are firm-specific, are significant at the conventional levels, and the signs of the coefficients are as expected. Higher profitability reduces bond spreads, since it allows firms to rely on retained earnings rather than debt to finance investments, other things equal. Analogously, increased performance measured

by *ROA* tends to decrease spreads. The sign of *GDP* is negative in all cases. GDP growth is particularly relevant for emerging markets, since the solvency of private corporates is associated to that of their government (Borensztein et al., 2007; Cavallo and Valenzuela, 2010; Borensztein et al., 2013). In international capital markets, GDP growth is an indicator of a government creditworthiness. Firms in countries where GDP growth is high can raise more debt than those in countries with lower economic performance.

The simultaneous equation framework suggests that bond spread negatively affects leverage in Latin America and in the panel of all countries, that leverage decreases bond spread in all countries and in LATAM, but that leverage increases bond spread in EMEA and Asia. The rationale is bi-directional. If leverage is perceived as an increase in the risk of the company, it should lead to a higher spread. Since spread is a measure of company risk, it is unsurprising that the higher it is, the lower the firm's capacity to raise debt, resulting in a negative coefficient for the variable *sprd* in the leverage regression.

Tables 6 and 7 present mixed results. In EMEA and Asia the coefficient of *mlev* is positive and significant at 10% in the spread regression. Consequently, an increase in leverage would result in an increase in the spread of companies in these regions. Looking at the market leverage regression for Asia, this rise in spread would imply a decrease in leverage. The impact of leverage on spread in EMEA/Asia is in line with Flannery et al. (2012) and Cavallo and Valenzuela (2010). Tables 6 and 7 also show that there is a significant and negative statistical relationship between spreads and leverage decisions in the all countries panel and in LATAM. This suggests that an increase in leverage would reduce bond spreads. The rationale for this result is that for Latin American companies, and for companies in the countries considered in the main sample, leverage is not viewed by investors as a contributor to the risk of the companies, but rather as an indicator that these companies are making use of leverage as a tax planning instrument, in line with (Titman and Wessels, 1988; Graham, 2003; Parsons and Titman, 2008; Moradi and Paulet, 2019).

4.3 Robustness checks

The correlation matrices presented in Subsection 4.1 have evidenced that some institutional variables are highly correlated, and should thus be removed from the model. Equations (1) and (2) were re-estimated without the variable *gov* (government effectiveness) and *reg* (regulatory quality). The results of these estimations are presented in Tables 8 and 9, for the IV panel regressions, and Tables 10 and 11 for the SUR model. *finsys* = 0 for all countries in EMEA group, and was dropped from all regressions.

Columns (1), (3), (5) and (7) of Tables 8 and 9 show the estimation of equation (1) without *gov*, whilst the even-numbered columns show the estimation without *gov* and *reg*. It is clear that most coefficients are not significant, which suggests that most of the remaining control variables in model (1) have no impact on book or market leverage. Nonetheless, we note that spread (*sprd*) is significant at 1% in the all countries panel, and at 10% in LATAM for book leverage, whilst political stability and absence of violence (*pol*) is significant at 5% in EMEA. Analogous results can be found for market leverage in Table 9, where odd (even) numbered columns represent the estimation without *gov* (*reg*). *spread* is only significant at 10% in All countries, but in no other regional grouping. Profitability is also significant at 5% in all countries. The model

in equation (1) appears to fit the determinants of market leverage only in EMEA, where most significant variables are to be found. In Asia, none of the coefficients are significant, and in LATAM coefficients are significant at the conventional levels only for *legal* (5%), and *size* (1%).

The results of the SUR regressions in Tables 10 and 11 are much more significant, and corroborate the findings of Tables 6 and 7. First of all, all the firm-specific are significant at the conventional levels in the leverage and in the spread equations for the global group (all countries) and all regions. Most institutional variables are not significant in any regional group in Table 10, with a few exceptions. Table 10 shows that *finsys* and *voice* are significant in Asia at 1%, *RoL* and *pol* are significant at 5 and 10%, respectively, in all countries. *legal* is significant at 10% in EMEA, but in no other region. Inflation is significant in LATAM, reflecting the impact of high inflation episodes in several countries in the region in the 1990s. In Table 11, which shows the SUR panel estimation for market leverage, it is clear that model (2) does not fit market leverage adequately, but it represents a good model for regional groupings. In effect, all but one coefficients are not significant at conventional levels in the leverage equation. Four institutional variables, *reg*, *voice*, *RoL* and *pol*, are significant at 1% in EMEA, along with *corindex*, and *legal*. Spread is significant at conventional levels in all market leverage equations, and market leverage is significant at conventional levels in all spread equations.

A comparison of the results of the IV panel regressions and those of the SUR panel regressions suggests that the simultaneous estimation of leverage and spread is the appropriate modelling approach, since both have been shown to be endogenous (Lucas and McDonald, 1990; Welch, 2004; Baker and Wurgler, 2002; Yang et al., 2010). It also corroborates the findings of Tables 6 and 7, namely, that the impact of institutional factors on leverage become less important, once firm-level and macroeconomic factors are controlled for.

5 Conclusions and discussion

5.1 Conclusions

This paper investigates the institutional, geographical, and political determinants of corporate capital structure of non-financial companies in a large panel of emerging economies, whilst controlling for macroeconomic and firm-level factors, particularly corporate bond spreads. An IV panel analysis and a simultaneous equation system are estimated in order to account for the endogeneity of capital structure and corporate risk, proxied by bond spread. The results confirm that there is a direct and endogenous connection between leverage decisions and corporate spreads levels in emerging economies. An increase in spread leads to a decrease in leverage in all countries, whilst an increase in leverage is negatively related to corporate spread.

Regarding political and institutional factors, we found that a country's financial and legal systems are only indicators of its governance quality rather than a determinant of it in itself. The literature on development finance has established that common law and market-based countries are more conducive to companies raising external investment funding. However, once government effectiveness, regulatory quality, accountability, and the rule of law are explicitly controlled for, the significance of the type of financial

system, namely, 'market-based' or 'bank-based', and of the legal framework, are reduced. Regulatory quality and political stability are the only consistently significant institutional variable around the world and in the regions considered, viz., Asia, EMEA and Latin America.

Although country-level factors are the focus of this study, we found that firm-specific variables remain the most important determinants of leverage decisions and corporate riskiness, since they are consistently significant around the world and in regional groupings. Profitability, tangibility, performance and corporate tax are good indicators of whether the firms can afford to have further credit from funds providers. However, we found an asymmetry between the factors that impact capital structure decisions and corporate spread. The latter is affected by firm-specific variables and GDP growth, whereas the former is affected by macroeconomic, firm-specific, and institutional factors.

5.2 Discussion

The findings of this research are congruent with the few papers investigating the simultaneous interaction of capital structure and stock returns (Yang et al., 2010; Chang et al., 2009), and the literature on latent determinants of debt ratios (Titman and Wessels, 1988; Titman and Tsyplakov, 2007). We found evidence of simultaneity between capital structure and bond spreads, a measure of credit risk, implying that the level of bond spreads impacts on debt ratios, which in turn also impact on the credit risk of private firms. In addition, and also in accordance with this literature and with the empirical research on capital structure in general, we found that firm-level variables are significant determinants of capital structure. Our results depart from the current literature on the impacts of political and institutional factors on firm capital structure. We find no evidence that firms' access to external financing is predicted by a country's financial structure. Recent empirical research also points to the same direction. For instance, La Porta et al. (2008) found that higher income countries, irrespective of the origin of their legal systems, tend to provide better investor protection than low income countries. Nonetheless, in common with the literature, we found that the quality of regulation is a significant determinant of capital structure. Finally, political factors appear marginal when they are significant, and their impact is dependent on regional location. The current literature on political factors tends to investigate their impact on stock returns, rather than on capital structure, and focuses on macroeconomic determinants rather than firm-level variables. Consequently, our findings are not completely in line with those, since we investigate the impact of political factors on capital structure after controlling for macro-economic and firm-specific variables.

5.3 Limitations of the study

The main limitation of this study is the loss of information on bond spreads that resulted from their aggregation for each single firm, in order to reduce the dimensions of the original sample. In effect, many firms in the sample issued more than one bond simultaneously, and the original sample included several distinct bonds spreads per firm per country per year. The original panel thus had an extra dimension, viz., bond spreads, in addition to firms, countries and time. Considering that one of the major

focus of the paper is the role of institutional and geopolitical factors on capital structure, bond spreads and firm-level information were averaged for each firm in order to allow the estimation of a panel and a panel system of seemingly unrelated regressions. An extension of this study could be conducted by aggregating along the country dimension, whilst maintaining the bond spread dimension. A comparison of both types of analysis would also be of interest, given that it is would allow to evaluate the potential impact of institutional and geopolitical factors on the spreads of the distinct bonds issued by the same firm, in contrast to the present study where the focus is on the impacts of those factors on firms' capital structure, and on average corporate bond spread.

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Notes

1 Another World Bank database, the Corruption Perceptions Index scores countries on a scale from 0 (highly corrupt) to 100 (very clean). We did not use this database.

2 Models (1) and (2) are estimated in Stata, the former using the EC2SLS estimator (Baltagi and Li, 1992; Baltagi and Chang, 1994). References can be found in Baltagi (2021), and Stata [XT] Longitudinal/Panel data manual.

3 This dummy was removed from the regression for EMEA since all the constituent countries are bank-based economies, and *finsys* = 0 for the whole sample.