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INTERNATIONAL CORPORATE CAPITAL STRUCTURE: DYNAMICS AND DETERMINANTS

ABSTRACT

This paper uses the GMM estimator with target adjustment to examine the dynamics of capital structure in 28 countries. Firms are found to adjust their capital structures slowly to the target level indicating the existence of adjustment costs in the process of adjusting the debt level toward its target. Our results provide evidence that firms in common law countries, and in countries with better stock market development or liquidity, carry lower debt ratios indicating that the lower information asymmetry in these countries enhances the firm's ability to issue equity. We find a positive relationship between the firms' debt ratios and both a country's economic growth and corruption perception index. These results are found to vary among industry sectors in terms of the effect of these factors on the use of total and long-term debt ratios.

Key Words: international capital structure, target adjustment, capital structure dynamics

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INTRODUCTION

Since the time of Modigliani and Miller's (1958) irrelevance theory of capital structure, there have been numerous theoretical and empirical studies on how firms choose their capital structures. Theories of capital structure are mostly based on the variants of the theories of corporate finance such as trade-off theory, agency cost theory (Jensen and Meckling 1976, Jensen 1986), pecking order theory (Myers and Majluf 1984), and asymmetric information (Ross 1977). According to these theories, corporate capital structure depends on information asymmetry, agency costs of over- and under-investments, financing costs, bankruptcy costs, and debt tax shields.

In addition, as countries in different parts of the world have different legal recourse, levels of investor protections, and financial institutions, the forces influencing corporate capital structure should be different across countries. Country-specific economic factors such as growth, inflation, and interest rate regimes also differ across countries. Taking these international differences into account, it is fairly obvious that the financial contracting choice and therefore the capital structure for firms in countries with different institutional structures should differ.[1]

Thus, researchers recently have explored the reasons for international differences in the determinants of a firm's capital structure. The findings in Rajan and Zingales (1995), Wald (1999), Booth et al. (2001) provide evidence that international variations in institutional factors can explain capital structure differences.

Further, the influential role of determinants of leverage changes over time. Thus, analyzing the leverage ratio and its determinants by taking the year-average of the variables means that all available information is not used and it does not necessarily capture the time varying nature of leverage and its determinants. In order to capture the time variation, it is more appropriate to use a model that considers the changing nature of leverage and its determinants, and how leverage adjusts itself to the target level over time. In addition, a number of prior empirical studies use observed leverage as a proxy for optimal leverage. With the existence of adjustment costs, the actual leverage and optimal target leverage are not necessarily equal at any point in time. Therefore, examining the determinants of dynamic target leverage, instead of actual, and the speed of adjustment

[1] Indeed, the importance of legal and institutional factors on firm financing is explored in Shleifer and Wolfenzon (2002), Demirguc-Kunt and Maksimovic (1998) and in LaPorta, Lopez-de-Silanes, Shleifer, and Vishny (1997).

toward the target leverage in various countries should shed new light on capital structure dynamics and relative adjustment costs faced by firms in different countries.[2]

Little is known in the prior literature about the simultaneous impact of a country's institutional structures and the underlying dynamic nature of capital structure on determination of international capital structure. While studies by Demirguc-Kunt and Maksimovic (1999), Chui et al. (2002), Giannetti (2003), Fan, Titman, and Twite (2006), and Song and Philippatos (2004) address the effect of country-level institutional factors on cross-sectional variations in international capital structure, they are somewhat incomplete as they neither include a complete set of necessary institutional variables nor do they take into account the dynamic adjustments to target capital structure.

Thus, the contributions of this paper are as follows: first, taking into account the time-varying nature of determinants of optimal capital structure and the international institutional differences, we examine country- and firm-level capital structure determinants for 28 countries in four major industry sectors. Second, we use an improved statistical methodology – Generalized Method of Moments (GMM) estimation with target adjustment – that enables us to effectively choose more efficient instruments to control possible endogeneity between regressors and the unobservable firm-specific effects. Third, we use more recent data and a more complete set of independent variables (eighteen country- and eight firm-level variables).

We find that firms in different countries adjust their capital structures slowly to the target level showing the existence of adjustment cost in the process of adjusting the debt level toward its target. Unlike prior findings on US firms, this study finds a positive relationship between growth and debt ratios suggesting the role of national institutional factors in financing firm's growth opportunities. Debt ratios are also found to be positively related to firm size, tangibility, and taxes while firm profitability and z-score are negatively related to debt ratios.

Our results provide the evidence that lower information asymmetry in countries with better stock market development and liquidity, especially in common law countries, enhances the firm's ability to issue equity, which leads to lower debt ratios. We also find a positive relationship between firms' debt ratios and both a country's economic growth and corruption perception index. Our results also indicate that there are some significant

[2] More recently, Miguel and Pindado (2001), Ozkan (2001), and Antoniou et al (2002) apply Generalized Methods of Moments (GMM) methodology to study the dynamic nature of capital structure and its determinants.

differences among industry sectors in terms of the effect of these factors on the use of total and long-term debt ratios especially for firms in the primary sector.

The following section covers the literature regarding the influence of various legal, cultural, financial and economic factors on financing choices of firms across countries and the importance of dynamic nature of capital structure. Section III discusses our data and methodology, which is followed by the empirical results in section IV. The conclusions are in the final section of the paper.

INTERNATIONAL CAPITAL STRUCTURE AND ITS DYNAMICS

International differences in capital structure

As countries in different parts of the world have different legal recourse, level of investor protections, and financial institutions, the level of agency costs faced by the investors differ across countries. As such, the forces influencing corporate capital structure should be different across countries. Not only do legal and financial institutions differ, country-specific economic factors such as growth, inflation, and interest rate regimes also differ across countries. Thus, more recently, researchers attempt to apply theories of capital structure to international data (Rajan and Zingales 1995, Demirguc-Kunt and Maksimovic 1999, Wald 1999, Booth et al. 2001).

There are other studies that directly address the effect of country-level institutional factors on cross-sectional variations in international capital structure. Song and Philippatos (2004) analyze the capital structure choice of firms in 16 OECD countries. Fan, Titman, and Twite (2006) study the capital structure and debt maturity choices of firms in a cross-section of 39 developed and developing countries. Demirguc-Kunt and Maksimovic (1999) examine the effect of legal and institutional factors on debt and its maturity in 30 countries during the period 1980-1991. Chui et al. (2002) investigate the effect of national culture on corporate capital structures across 22 countries for the year 1996. They all find that the country's institutional factors – such as country's national culture, legal system, the tax system, the information environment, the capital market development, and the banking sector development clearly affect capital structure choices of firms in different countries.[3]

[3] A few other studies explore the role of culture and institutional factors on the capital structure decision of firms in different countries, mostly in a single-country context. Hirota (1999) studies the effect of Japanese institutional and regulatory characteristics, Miguel and Pindado (2001) looks at Spanish institutional effect, Gonenc (2003) reviews a sample

Country and institutional factors on capital structure choice

Legal system and its enforcement

Legal origin: A number of important differences in financial systems among countries are shaped by the extent of legal protection to outside investors from expropriation by the controlling shareholders or managers (Shleifer and Wolfenzon 2002). Differences in levels of investors' protection can translate into differences in optimal contracts between firms and investors and into differences in choice of debt or equity for firms across countries. La Porta et al. (1998) posit that common law countries provide better investor protection than civil law countries. They further contend that common law countries are found to have a significantly higher fraction of widely held firms than civil law countries. In addition, with higher shareholders' confidence in the firms, the stock market development is higher in those countries (La Porta et al. 1997). *Hence, common law countries with better investor protection and lower agency costs could be expected to have lower debt ratios compared to civil law countries.* We use common and civil law origin dummies constructed in La Porta et al (1998) and used in Song and Philippatos (2004) and Demirguc-Kunt and Maksimovic (1999) to test the relationship between capital structure choice and legal origin. We further differentiate legal origins to four as defined by La Porta et al. (1998): English, French, German, and Scandinavian origins.

Investor protection: Desai et al. (2004) document that firms in countries with poor *creditors' rights* would hold lower a level of debt since the creditor's willingness to lend money is expected to be lower. However, the expected relationship will be weak if the creditors play a strong role in monitoring the firm, for example in bank-oriented countries. Similarly, in some countries, financial intermediaries hold both the equity and debt of the same corporations. Therefore, intermediaries with equity ownership in a firm would be willing to provide loans even when creditor protection is relatively weak. On the other hand, with stronger creditors' rights, there are more incentives for financial institutions to monitor the firms, thereby making stock investment in those firms more attractive and decrease the debt level. Hence, as in Demirguc-Kunt and Maksimovic (1999), the investigation of *the influence of creditors' rights on the firm's financing choice is exploratory in nature.*

The effect of *shareholders' rights* on capital structure also is subject to the same arguments as those of creditors' rights as suggested in Demirguc-Kunt and Maksimovic

of Turkish firms, Antoniou et al (2002) pursues the effect of institutional differences on leverage of firms in France, Germany and the U.K., and Calomiris (1993) studies differences in banking systems in the U.S. and Germany and their effects on firm's financing.

(1999). As presented earlier, common law countries with better shareholders' rights have more developed stock markets and thereby firms in those countries are expected to hold less debt. However, the financial intermediaries, for example banks, may also hold both debt and equity stakes in the firm; as such, debt levels can be high even with strong shareholders' rights. In terms of spillover effects, countries with better shareholders protection provide better monitoring incentives for minority shareholders; thus, creditors' willingness to invest also increases, increasing the debt level. Hence, *the influence of shareholders' rights on the firm's financing choice is exploratory* and depends on the relative importance of financial intermediaries and the impact of spillover effects. The creditors' and shareholders' rights indices are used in Demirguc-Kunt and Maksimovic (1999) as measures of investors protection.

Legal enforcement: One important characteristic of the legal system is the quality of its enforcement. Thus, we measure the legal efficiency and its integrity using *Corruption Perception Index*. This index is prepared by Transparency International and it is related to the perceptions of the degree of corruption as seen by business people and risk analysts, and ranges between 10 (highly clean) and 0 (highly corrupt), where corruption is defined as the abuse of the public office or private gain. As in Fan, Titman, and Twite (2006), we reverse the index, with larger value indicating high corruption. We expect a positive relationship between the corruption index and the debt ratio as the contractual nature of debt – as compared to that of equity – better limits the expropriation of investors.

Cultural dimensions

Measures of cultural dimensions such as those of Hofstede (1980) – power distance, individualism, uncertainty avoidance, and masculinity[4] – are used to create cultural indexes to investigate the effect of cultural dimensions on capital structure choice of firms across countries.[5]

In societies with high **power distance**, people tend not to emphasize harmonious working relationships. *Absence of harmonious relationships, which is more prevalent in high power distance countries, would suggest more aggressiveness and a higher debt ratio* (Titman 1984). **Uncertainty avoidance** is the degree to which the members of a society feel

[4] See Hoefstede (1980) for detail discussion of these indexes.
[5] Instead of using two broad dimensions of cultural values defined by Schwartz (1994) – which are used in Chui et al (2002), we use Hofstede's (1980) because Schwartz's two broad dimensions may not be enough to look at better and more detailed dimensions of cultural values as defined in Hofstede (1980).

uncomfortable with uncertainty and ambiguity, which leads them to support beliefs promising certainty and to maintain institutions protecting conformity. According to Hofstede's criteria, *countries with high degree of uncertainty avoidance tend to be more conservative, and thus we expect these countries to hold a lower debt level.* **Individualism** stands for a preference for a loosely knit social framework in society in which individuals are supposed to take care of themselves and their families only. **Masculinity** stands for a preference for achievement, heroism, assertiveness, and material success. *As with the power distance, we would expect less harmonious working relationships in countries with high scores on "Individualism" and "Masculinity", and thus we expect a higher debt ratio in these countries.*

Financial structure and economic factors

Equity market development: We expect that the more developed and the more liquid the stock market in a nation, the less information asymmetry there is between management and the shareholders, and the higher the propensity for managers to issue equity to finance the investments. However, if better monitoring due to higher stock market turnover enhances creditor's willingness to lend, we can also expect an increasing debt level with stock market development. We use *stock market development* and *stock market turnover ratio* as measures of equity market development.

Bond market development: As better *development of a bond market* would provide more flexibility for firm's borrowing (La Porta et al. 1997), we expect a positive relationship between *bond market development* and the level of leverage.

Banking sector development: A country's emphasis on *banks as a source of finance* is an important factor in a firm's capital structure choice (Demirguc-Kunt and Maksimovic 1999). In addition to just providing loans, in some countries like Japan and Germany, banks play a significant role in both gathering information and monitoring the management (Bae et al. 2002). Therefore, in bank-oriented countries with a highly developed banking sector, we expect better access to external borrowing and, thus, a higher debt level.

Inflationary risk: Investors will be less willing to lend if they are not sure about the real returns from their investments. Investors will be taking higher *inflationary risk* by investing in high inflation countries. In addition, inflation uncertainty increases the firm's business risk through volatility in the firm's selling price, costs and volume of sales. Therefore, in a highly inflationary country with high inflation uncertainty, firms will

experience high business risk and will carry less debt in the capital structure. Since inflation uncertainty raises the business risk, the tax shield benefits from debt become more uncertain. In such an environment, where the tax shield benefit from debt is low, firms' propensity to use less debt is higher. Therefore, we expect a negative relationship between inflation and the level of a firm's leverage, especially long-term leverage (Hatzinikolaou et al. 2002).

Economic development: The strength or the development of the economy is measured by the growth rate of real per capita GDP. As stated in Demirguc-Kunt and Maksimovic (1999), annual growth rate in GDP over the sample period is an indicator of the financing needs of firms at the country level. Therefore, we include annual GDP *growth* rate as a control variable for overall financing needs of firms in our sample of countries.

Prior literature such as Demirguc-Kunt and Maksimovic (1999) and Chui et al. (2002), among others, have used the above national economic factors as determinants of corporate capital structure.

Capital structure dynamics

Most of the empirical literature on international capital structure is based on a static framework. It is not uncommon to believe that firms restructure their capital structure over time responding to the fluctuations of the determining variables. As mentioned, since actual and optimal target leverage may not be the same at any point in time, examining the determinants of dynamic target leverage (instead of actual or observed leverage) and the speed of adjustment toward the target leverage across countries should explain capital structure dynamics and relative adjustment costs faced by the firms in different countries.[6]

Recently, a Generalized Method of Moments (GMM) estimation method has been applied fairly often in empirical studies of dynamic capital structure models with target adjustments. A GMM framework improves efficiency of econometric estimates. Using GMM estimation, we can not only examine the speed of adjustment but also take into

[6] Indeed, the dynamic nature of capital structure has been explored in Ferri and Jones (1979), Jalilvand and Harris (1984), Fisher et al (1989), Gatward and Sharpe (1996), Frank and Goyal (2003), Banerjee et al (2004), Bevan and Danbolt (2001, 2002), Frydenberg (2003), Miguel and Pindado (2001), Heshmati (2001), Ozkan (2001), Wanzenried (2002), Antoniou et al (2002), De Hass and Peeters (2004), Nivorozhkin (2005), and Song and Philippatos (2004). However, these studies do not cover a large number of nations; as such, this study involves a larger number of countries to better understand the effect of institutional differences.

account the endogeneity between unobservable firm-specific effect and the regressors in the model. The GMM framework is discussed in detail in the next section.

DATA SOURCES AND METHODOLOGY

Data

The primary data source for firm-level data is from Standard and Poor's Global Vantage database. Global Vantage contains financial statement data of companies in many different countries, and provides the firms' accounting data and stock prices from many countries in a comparable form. Therefore, it helps us partially address the problem of the lack of consistent accounting and market information outside the United States (Rajan and Zingales 1995). First, we exclude financial and utility firms and firms in highly regulated industries. We further exclude observations with missing financial data required for the firm level analysis.

Complying with the data requirement by GMM, we choose the firms that have had at least six consecutive years of financial data between 1990 and 2001 necessary for firm level analysis. Taking into account the data requirement by GMM and the number of firms available in Global Vantage database, our sample consists of firms in 28 countries in which there are at least 25 firms available. The countries in our sample are: Australia, Austria, Belgium, Bermuda, Brazil, Canada, Denmark, Finland, France, Germany, Hong Kong, India, Indonesia, Ireland, Italy, Japan, Malaysia, Mexico, Netherlands, Norway, Singapore, South Africa, Spain, Sweden, Switzerland, Thailand, the UK and the US. This leads us to a final sample of 6,932 firms and 61,826 firm-year observations in 28 countries. For analysis of industry sectors, our sample of firms is grouped into four categories according to the grouping by Chui et al (2002). The four sectors are (i) primary (SIC 0000-1999), (ii) manufacturing (SIC 2000-2999), (iii) advanced manufacturing (SIC 3000-3999), and (iv) services (SIC 4000-9999). The total sample coverage in each country and in each sector is presented in Table 1.

For country level variables, we use data from different sources. Data definition, variable measurements and data sources used in this study are detailed in Table 2.

Table 1: Sample description

Country	Total		Primary		Manufacturing		Advanced Manufacturing		Services	
	N-Firms	N-Obs	N-Firms	N-Obs	N-Firms	N-Obs	N-Firms	N-Obs	N-Firms	N-Obs
Australia	142	1173	37	299	36	298	27	235	42	341
Austria	32	283	5	48	13	117	10	80	4	38
Belgium	31	259	4	31	13	98	9	84	5	46
Bermuda	56	452	2	15	10	85	16	124	28	228
Brazil	28	209	1	6	8	70	14	98	5	35
Canada	297	2565	76	615	71	649	73	633	77	668
Denmark	51	443	3	23	16	144	16	140	16	136
Finland	34	296	1	7	11	93	12	104	10	92
France	191	1610	9	74	54	460	61	518	67	558
Germany	180	1644	11	106	53	481	88	793	28	264
Hong Kong	50	435	3	21	10	90	11	87	26	237
India	69	616	1	10	32	287	34	300	2	19
Indonesia	41	313	4	28	20	154	9	68	8	63
Ireland	28	266	1	11	10	95	7	73	10	87
Italy	47	401	4	26	14	117	20	179	11	79
Japan	2227	19709	214	1908	480	4429	831	7506	702	5866
Malaysia	154	1330	32	283	41	346	43	377	38	324
Mexico	25	213	2	17	6	51	8	59	9	86
Netherlands	76	709	8	67	22	216	17	159	29	267
Norway	40	354	8	67	6	58	13	106	13	123
South Africa	37	296	14	109	9	80	10	77	4	30
Singapore	113	955	11	94	21	176	29	224	53	461
Spain	60	519	12	110	12	103	24	204	12	102
Sweden	52	467	4	39	10	87	23	204	15	137
Switzerland	74	654	4	34	8	74	34	312	28	234
Thailand	104	916	7	66	37	335	27	220	33	295
UK	559	4984	56	503	123	1076	161	1423	219	1982
US	2134	19755	129	1241	447	4214	808	7492	760	6808

Table 2: Data definitions, measurements and sources

Variables	Proxy for	Measurement	Source
L	Leverage	(Long-term debt + Debt in current liabilities + Accounts Payables)/total assets	Global Vantage
Tan	Asset Tangibility	Ratio of net fixed assets to total assets	Global Vantage
Profit	Profitability	Operating income on total assets	Global Vantage
Size	Size	Natural logarithm of total sales	Global Vantage
Tax	Tax Rate	Income taxes paid/Earnings Before Interest and Tax	Global Vantage
Zscore	Altman's Z-score	(3.3*Pretax Income+sales + 1.4*Retained Earnings + 1.2*(total current assets –total current liabilities))/total assets	Global Vantage
Growth	Growth opportunities	Market to book ratio	Global Vantage
PDI	Power Distance	The extent to wich the members of a society accept that power in institutions and organizations is distributed unequally	Hofsede (1980)
UAI	Uncertainty Avoidance	The degree to which the members of a society feel uncomfortable with uncertainty and ambiguity, which leads them to support beliefs promising certainty and to maintain institutions protecting conformity	Hofsede (1980)
IDV	Individualism	Stands for a preference for a loosely knit social framework in society in which individuals are supposed to take care of themselves and their families only; as opposed to collectivism, which stands for a preference for a tightly knit social framework in which individuals can expect their relatives, clan, or other in-group to look after them, in exchange for unquestioning loyalty	Hofsede (1980)
MAS	Masculinity	Stands for a preference for achievement, heroism, assertiveness, and material success; as opposed to Femininity, which stands for a preference for relationships, modesty, caring for the weak, and the quality of life	Hofsede (1980)
Stock	Stock mkt dev	Stock market capitalization of listed companies/GDP	WDI, World Bank
TOR	Stock mkt liquidity	Ratio of total value traded to total market capitalization	WDI, World Bank
Bond	Bond mkt dev	Bond market capitalization/GDP	World Federation Exchanges
Bank	Bank orientation	Domestic money bank domestic assets/GDP	IFS, IMF
GDPPCGR	GDP growth	Growth rate of real per capita GDP	WDI, World Bank
Inflation	Inflation	Rate of increase in GDP deflator	WDI, World Bank
Common	Legal Origin	Legal origin of the company law or commercial code of each country	La Porta et al (1998)
English	English Origin	Dummy variable equals one if the country is English origin country and zero otherwise	La Porta et al (1998)
French	French Origin	Dummy variable equals one if the country is French origin country and zero otherwise	La Porta et al (1998)
German	German Origin	Dummy variable equals one if the country is German origin country and zero otherwise	La Porta et al (1998)
Scandinavian	Scandinavian Origin	Dummy variable equals one if the country is Scandinavian origin country and zero otherwise	La Porta et al (1998)

Table 2: Data definitions, measurements and sources (continued)

Variables	Proxy for	Measurement	Source
CR	Creditor Rights Index	Add 1 when (1) the country imposes restrictions, such as creditor's consent or minimum dividends to file for reorganization; (2) secured creditors are able to gain possession of their security once the reorganization petition has been approved (no automatic stay); (3) secured creditors are ranked first in the distribution of the proceeds that result from the disposition of the assets of a bankrupt firm; and (4) the debtor does not retain the administration of its property pending the resolution of the reorganization. This index ranges from zero to four.	La Porta et al (1998)
SR	Shareholder Rights Index	Add 1 when (1) the country allows shareholders to mail their proxy vote to the firm; (2) shareholders are not required to deposit their shares prior to the general shareholders' meeting; (3) cumulative voting or proportional representation of minorities in the place; (4) an oppressed minorities mechanism is in place; (5) the minimum percentage of share capital that entitles a shareholder to call for an extraordinary shareholders' meeting is less than or equal to 10 percent; or (6) shareholders have preemptive rights that can be waived only by a shareholders' vote. This index ranges from zero to six.	La Porta et al (1998)
CPIscore	Corruption Perception Index	This index prepared by Transparency International relates to the perceptions of the degree of corruption as seen by business people and risk analysts, and ranges between 10 (highly clean) and 0 (highly corrupt), where corruption is defined as the abuse of the public office or private gain. We reverse the index, with larger value indicating high corruption.	Transparency International

A dynamic model for capital structure

We investigate the role of adjustment costs by adopting a partial adjustment model. By distinguishing between the observed debt ratio and optimal debt levels, we will first examine the determinants of optimal debt ratio. Let the optimal debt ratio for firm *i*, at time *t*, be L_{it}^{*}. As explained in the prior sections, L_{it}^{*} depends on legal, cultural financial, economic, and firm-specific factors, and it can be expressed as:

$$L_{it}^{*} = \alpha_0 + \sum_j \alpha_j F_{jit} + \sum_k \alpha_k C_{kn} + \sum_l \alpha_l I_{\ln t} + \alpha_q Ind_{qnt} + \nu_i + \nu_t + \varepsilon_{it} \qquad (1)$$

where the dependent and independent variables are defined as:

(i) $\boldsymbol{L_{it}^{*}}$, target leverage ratio of a given firm *i* at time *t* measured as either (1) the ratio of book value of total debt to total assets or (2) the ratio of long-term debt to total assets. To partially address the accounting differences between countries, total debt is defined as long-term debt plus debt in current liabilities plus accounts payable. We use book leverage instead of market leverage because market leverage

is subject to market volatility. In addition, book leverage is more appropriate and stable compared to market leverage for use with the target adjustment model.[7]

(ii) $\boldsymbol{F}_{jit}$, vector of firm-specific factors *j* for firm *i* at time *t*. We control for differences in firm characteristics by including firm level variables suggested by the trade-off, the agency cost, the pecking order and the asymmetric information models. Based on these theories and on prior empirical evidence, we focus on variables which have had consistent significant correlation with corporate leverage. These firm-specific determinants include: tangibility (*TAN*), profitability (*Profitibility*), size (*Size*), tax rate (Tax), bankruptcy risk measure (*Zscore*), investment opportunities (*Growth*), and dividend paying dummy (*DivD*).

(iii) $\boldsymbol{C}_{kn}$, vector of cultural indexes *k* for country *n*. We use the cultural indexes as defined by Hofesde (1980) – Power Distance (*PDI*), Uncertainty Avoidance (*UAI*), Individualism (*IDV*), and Masculinity (*MAS*).

(iv) $\boldsymbol{I}_{lnt}$, vector of legal and institutional factor *l* for country *n* at time *t*. Variables include stock market development (*Stock*), stock market turnover (*TOR*), bond market development (*Bond*), and bank emphasis (*Bank*). The economic variables include annual per capita GDP growth (*GDPPCGR*) and level of inflation (*Inflation*). The legal institutions factors are Common law dummy (*Common*), English origin dummy (*English*), French origin dummy (*French*), German origin dummy (*German*), Scandinavian origin dummy (*Scandinavian*), creditors' right index (*CR*), shareholders' right index (*SR*), and corruption perception index (*CPIscore*).

(v) $\boldsymbol{Ind}_{qnt}$, average industry sector leverage for sector *q* for country *n* at time *t* to control for the industry sector effects. As suggested in Roberts (2002), firms may revert primarily to an industry average with only minor deviations that are firm-specific. If that is the case, there should be a positive relationship between this variable and target leverage.

In the presence of transaction costs (Jalilvand and Harris 1984, Shyam-Sunders and Myers 1999, Hovakimian et al 2001, Titman and Tsyplakov 2004) and the fact that the optimal debt level is time-varying, firms do not adjust their leverage to the optimal level

[7] De Haas and Peetersargue that using book values rather than market values has some advances. From a theoretical perspective, the book value of debt is a better measure of debtholders' liability in case of bankruptcy. In addition, it should be noted that market values of traded equity often turn out to be excessively volatile, leading to severe measurement problems. Hovakimian et al (2001, 5) find that the choice between book and market value does not influence results significantly.

fully and automatically, or they would only adjust partially with a target adjustment model, which can be expressed as:

$$L_{it} - L_{it-1} = \lambda_i (L_{it}^* - L_{it-1}) \tag{2}$$

where λ_i is the adjustment speed. If λ_i =1, then $\boldsymbol{L_{it} = L_{it}^*}$, implying zero adjustment costs and firms' automatic adjustment to their target. λ_i =0 implies the presence of prohibitive adjustment costs such that firms do not adjust to their target at all. If λ_i <1, firms adjust slowly to the target and if λ_i >1, firms over-adjust the debt level above the target leverage.

Equation (2) can be rearranged so that:

$$L_{it} = (1-\lambda_i) L_{it-1} + \lambda_i L_{it}^* \tag{3}$$

Substituting equation (1) into equation (3), we have:

$$L_{it} = (1-\lambda_i) L_{it-1} + \lambda_i \alpha_0 + \sum_j \lambda_i \alpha_j F_{jit} + \sum_k \lambda_i \alpha_k C_{kn} + \sum_l \lambda_i \alpha_l I_{\ln t} + \lambda_i \alpha_q Ind_{qnt} + \nu_i + \nu_t + \varepsilon_{it} \tag{4}$$

$$L_{it} = \phi_0 L_{it-1} + \gamma_0 + \sum_j \gamma_j F_{jit} + \sum_k \gamma_k C_{knt} + \sum_l \gamma_l I_{\ln t} + \gamma_q Ind_{qnt} + \nu_i + \nu_t + \varepsilon_{it} \tag{5}$$

Where $\phi_0 = (1 - \lambda_i), \gamma = \lambda_i \alpha, \upsilon_i$ is an unobservable firm-specific, time-invariant effect, υ_t is time-specific, firm-invariant effect, and ε_{it} is a white noise disturbance.

Hsiao (1985) documents that the OLS estimation of equation (5) would result in biased coefficients assuming that the firm-specific effect, υ_i is unobservable and is correlated with other regressors in the model. In addition, OLS will produce inconsistent estimators since the lagged dependent variable would be correlated with υ_i which is constant. An estimation technique which takes account of the unobserved firm-specific effects is the *within-group* estimator, for which equation (5) is transformed by substracting out the time series means of each variable for each country. However, within group estimation requires strict exogeneity between time-varying observed regressors and time-varying errors in each time period (Wooldrige 2001). An alternative way of dealing with this endogeneity problem is to take first differences to eliminate the firm-specific effect, υ_i.

Even after the first differencing, the differenced lagged dependent variable ($L_{it-1} = L_{it-2}$) and the differenced error term, ($\varepsilon_{it} = \varepsilon_{it-1}$) are correlated through L_{it-1} and ε_{it-1}); thus, the OLS estimation of equation (5) will not produce consistent parameter estimates. Thus, valid instruments have to be found for ($\Delta L_{it-1} = L_{it-1} - L_{it-2}$).

For this purpose, Arellano and Bond (1991) use the Generalized Method of Moments (GMM), which requires additional instruments obtained by utilizing the orthogonality conditions that exist between the lagged values of the dependent variable and the disturbances. Assuming that errors are independent across firms and serially uncorrelated, Arellano and Bond (1991) suggest that the values of L_i lagged two periods or more are valid instruments in the first differenced leverage equation since L_{it-2} and earlier values are correlated with ΔL_{it-1} but not with $\Delta\varepsilon_{it}$ in the absence of serial correlation in the ε_{it} process. In addition, when the other regressors are not strictly exogeneous to the error term, we can then use the values of predetermined regressors lagged one or more periods as valid instruments in the first differenced leverage equation (Arellano and Bond 1991).

To check for potential misspecification of the models, we use m_2 statistics for the absence of second-order serial correlation. It is argued that first order serial correlation (m_1) is not necessarily zero. However, it is assumed that second order serial correlation (m_2) is zero, since the consistency of the GMM procedure is based on the absence of second-order serial correlation in differences and that of first-order correlation in levels. In our paper, the hypothesis of second-order serial correlation (m_2) is always rejected. However, because of transformation, there is no lack of first-order serial correlation (m_1) in the differenced residuals. We use the Wald test for joint significance of the regressors and the Sargan test for over-identification.

One problem of using the first-differenced GMM approach with our model in equation (5) is the fact that some of the legal and institutional factors are observable but time-invariant. As we take the first difference of equation (5) to eliminate the unobservable firm-specific time-invariant effect (v_i), the country-specific institutions factors will also disappear. To deal with this problem, we will use the procedure suggested in Hoeffler (2002). Since the measured institutional factors may be correlated with the unobserved country specific effects and/or the error term and/or the lagged dependent variable, we estimate the model in the following two-step procedure. First, we estimate (5) without including the measured country-specific institutional factors.

$$L_{it} = \phi_0 L_{it-1} + \gamma_0 + \sum_j \gamma_j F_{jit} \lambda_i + \alpha_q Ind_{qnt} + v_i^* + v_t + \varepsilon_{it}^{\ 8} \quad (6)$$

where $v_i^* = \sum_k \lambda_i \alpha_k C_{kn} + \sum_l \lambda_i \alpha_l I_{lnt} + v_i$. We then use the consistent GMM coefficient estimates $\hat{\phi}$ and $\hat{\gamma}$'s to estimate the residuals of equation (6). In the second step, we regress these residuals on the measured country characteristics:

$$L_{it} - \hat{\phi}_0 L_{it-1} - \hat{\gamma}_0 - \sum_j \hat{\gamma}_j F_{jit} - \lambda_i \alpha_q Ind_{qnt} = \sum_k \lambda_i \alpha_k C_{kn} + \sum_l \lambda_i \alpha_l I_{\ln t} + v_i + v_t + \varepsilon_{it} \quad (7)$$

Alternatively, one could estimate equation (5) by GMM. However, these coefficient estimates are only consistent if the measured country characteristics are all uncorrelated with the unobserved effects. Next, the speed of adjustment is determined by re-estimating equation (6) for each country. The adjustment speed is 1 minus the estimated coefficient of L_{it-1}.

EMPIRICAL RESULTS

Descriptives

Table 3 presents the mean values of firm level variables in our study, and Figures 1 and 2 illustrate the mean total and long-term debt ratios of sample firms in 28 countries. The highest mean total debt ratio is found in India (48%) and the lowest is in South Africa (28%). The highest and lowest range of the total debt ratio is represented by a mix of developed and developing countries.[9] However, most of the developed countries hold moderate levels of the total debt ratio. The highest mean long-term debt ratio is found in Norway (26%) and the lowest in South Africa (8%). The distribution of mean long-term debt ratio is not conclusive with regard to the economic development of the countries.[10]

[8] As discussed by Devereux and Schiantarelli (1990), to construct a complete dynamic specification that allows for possible AR-process, we add lagged firm-specific factors in our regressions.

[9] Developing countries are Brazil, India, Indonesia, Malaysia, Mexico, Singapore, Thailand according to Emerging Market Fact Book, IMF.

[10] To understand the importance of country and industry factors in a firm's capital structure choice, we also perform separate leverage regressions with only country dummies and with only industry sector dummies. The results of these regressions are not reported due to space limitation. However, the results indicate that the country factors may be more important than industry sector factors in explaining the corporate debt ratios, though industry sector shows some importance, indicating the important role of legal, cultural, financial, and economic institutions across countries in corporate capital structure choice.

Table 3: Mean values of firm level variables

Country	Total Debt Ratio	Long-Term Debt Ratio	Tan	Profit	Size	Tax	Zscore	Growth
Australia	0.3104	0.1620	0.4031	0.0350	5.6159	0.2807	1.5043	1.9032
Austria	0.3362	0.1338	0.3764	0.0249	5.7829	0.2923	1.3798	1.5800
Belgium	0.3935	0.1498	0.3169	0.0365	6.2677	0.2659	1.6023	2.0491
Bermuda	0.3467	0.1197	0.3633	0.0381	5.7468	0.1786	1.3702	1.6590
Brazil	0.3016	0.1424	0.5178	0.0283	6.9405	0.2611	1.1595	0.8038
Canada	0.3875	0.2042	0.4932	0.0264	5.5884	0.3135	1.4765	1.9604
Denmark	0.3546	0.1658	0.3621	0.0427	5.9273	0.2889	1.9744	1.5689
Finland	0.3847	0.2168	0.3687	0.0419	6.7926	0.2829	1.7480	1.7065
France	0.4024	0.1358	0.2210	0.0337	6.6421	0.3637	1.5903	2.2267
Germany	0.2970	0.0981	0.3176	0.0281	6.3360	0.4258	2.1102	2.4668
Hong Kong	0.3055	0.1091	0.3785	0.0435	5.3883	0.1894	1.1841	1.2242
India	0.4838	0.2558	0.4022	0.0557	5.6536	0.1675	1.5270	2.6459
Indonesia	0.4778	0.2244	0.4450	0.0405	4.7791	0.1972	1.1902	1.8509
Ireland	0.3750	0.1759	0.3989	0.0586	5.5051	0.1894	1.7915	2.1888
Italy	0.3879	0.1344	0.3012	0.0270	6.6769	0.4213	1.2144	1.9278
Japan	0.4312	0.1177	0.3074	0.0096	6.0650	0.4147	1.6066	1.6287
Malaysia	0.2900	0.0949	0.3863	0.0439	4.8140	0.2661	1.2075	2.1235
Mexico	0.3138	0.1691	0.5850	0.0679	7.2667	0.2646	1.7761	1.5762
Netherlands	0.3582	0.1326	0.3531	0.0579	6.4714	0.2809	2.0956	2.4655
Norway	0.4032	0.2611	0.4072	0.0294	5.5826	0.2581	1.4318	2.1803
South Africa	0.2825	0.0773	0.4884	0.0814	6.7050	0.2836	1.9659	1.8876
Singapore	0.3180	0.1034	0.3475	0.0331	4.9258	0.2666	1.3538	1.6941
Spain	0.3565	0.1051	0.4064	0.0400	5.9553	0.2503	1.2514	1.9051
Sweden	0.3369	0.1683	0.3437	0.0561	7.0752	0.2691	1.7453	1.9635
Switzerland	0.3401	0.1764	0.3846	0.0413	6.5193	0.2641	1.6663	2.0194
Thailand	0.4151	0.1365	0.4459	0.0422	4.0434	0.2013	1.2269	1.5367
UK	0.3180	0.1112	0.3877	0.0512	5.7075	0.2776	2.1136	2.4374
US	0.3105	0.1843	0.3250	0.0334	5.8414	0.3004	1.9562	2.7093

Figure 1: Mean total debt ratios of sample firms (1990-2001)

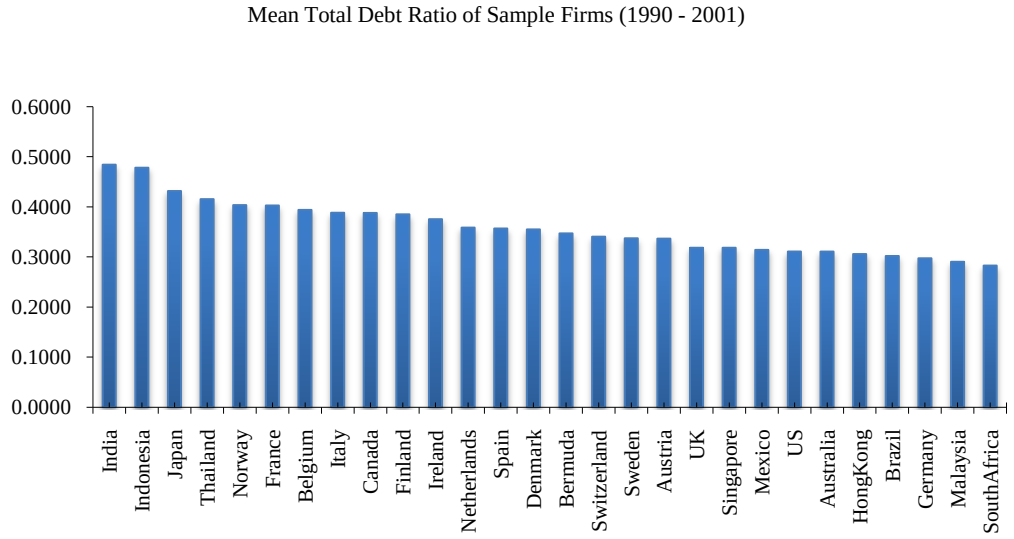
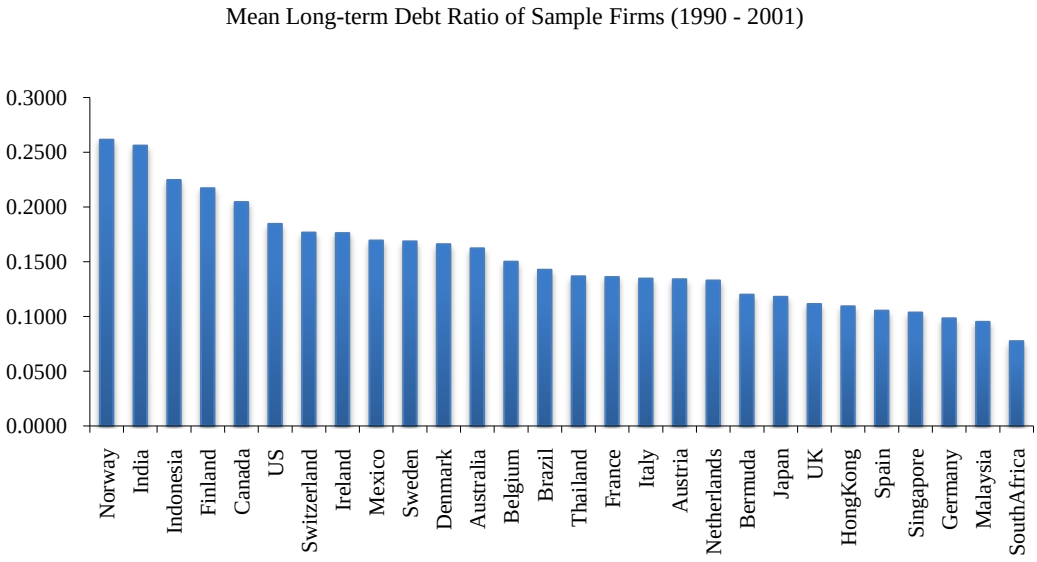


Figure 2: Mean long-term debt ratios of sample firms (1990-2001)



Firm level determinants of capital structure

The mean values of firm-level variables are also reported in Table 3. We do not find much variation in profitability, tangibility and tax levels across countries. However, somewhat higher variation is found in size, growth and Z-score across countries. The highest variation is found in firm size (with a standard deviation of 0.76), while the lowest variation is found in firm profitability (with a standard deviation of 0.01).

The GMM regression estimated is the target adjustment model of equation (6):

$$L_{it} = \phi_0 L_{it-1} + \gamma_0 + \sum_j \gamma_j F_{jit} \lambda_i + \alpha_q Ind_{qnt} + v_i^* + v_t + \varepsilon_{it} .$$

To allow for possible AR-process, we add lagged firm-specific factors in our regressions. L_{it} and L_{it-1} are leverage and lagged leverage ratios of a given firm i at time t and $t-1$. F_{jit} is a vector of firm-specific factors j for firm i at time t , which includes Tangibility (TAN), profitability (Profit), size (Size), tax rate (Tax), bankruptcy risk measure (Zscore), investment opportunities (GR), and dividend paying dummy (DivD). Ind_{qnt} is the average industry leverage for industry q for country n at time t to control for the industry effects.

Table 4: Firm level determinants of total and long-term debt ratios for pooled countries

	Total Debt Ratio			Long-Term Debt Ratio		
	Estimated coefficients		P-value	Estimated coefficients		P-value
L (t-1)	0.6207	***	0.00	0.5766	***	0.00
Tan	0.0212		0.31	0.1582	***	0.00
Profit	-0.1322	***	0.00	-0.1262	***	0.00
Size	0.0537	***	0.00	0.0082	**	0.02
Tax	0.0140	***	0.00	0.0260	***	0.00
Zscore	-0.0267	***	0.00	-0.0177	***	0.00
Growth	0.0018	***	0.01	0.0030	***	0.00
DivD	-0.0055	***	0.00	0.0026		0.14
Ind	0.0367	***	0.00	0.2197	***	0.00
Intercept	-0.0008	***	0.00	0.0003	*	0.09
N-obs/N-Firms	46208/6879			46535/6924		
Wald (15)	17011.00	***		11317.56	***	
Sargan	957.13 (642)	***		887.81 (642)	***	
m1	-28.8600	***	0.00	-25.91	***	0.00
m2	-1.0000		0.32	1.39		0.16

***significant at 1% level, **significant at 5% level, *significant at 10% level

Our first stage regression includes the GMM estimation of firm level determinants that are known to affect corporate debt ratios. The GMM regression estimates based on the model specified in equation (6) are presented in Table 4. Our target adjustment model allows for lags in both dependent and explanatory regressors and all firm level determinants are treated as endogenous.[11] Table 7 also reports the results for the Sargan test for over-identification and Wald test for joint significance of the regressors. The test for serial correlation in residuals provides evidence of negative first order serial correlation (m_1). However, the hypothesis of second-order serial correlation (m_2) is always rejected.

Turning to the GMM estimates of the total debt ratio, the majority of the estimated coefficients have the expected signs and are significant. The coefficient of the lagged total debt (ϕ_0) is positive and significant at the 1 percent level. The adjustment coefficient (λ) given by (1 - ϕ_0) is 0.3793, which is between zero and one indicating that firms adjust their debt ratios slowly in an attempt to achieve their target debt ratio. The adjustment speed toward the long-term debt ratio given by (1 - ϕ_0) is 0.4234 and is significant at the 1 percent level showing the existence of adjustment costs associated with the process of adjusting the debt level toward its long-term target. Further, significant results are obtained for the coefficient ϕ_0 which indicates that firms bear transaction costs when adjusting the debt level to its target.

In addition to the evidence obtained for the speed of adjustment and the adjustment costs, we also report the effect of firm-specific variables on total and long-term debt ratios of the firms for pooled countries. The positive and significant coefficient (for long-term debt ratio) of tangibility is consistent with the evidence reported in the literature that high levels of firm's tangible assets can be used as collateral for loans. The coefficient for profitability is negative and significant at the 1 percent level for both total and long-term debt ratios. This is consistent with the pecking order theory that firms with higher profitability would prefer internal resources to finance their investment opportunities before using external financing such as external debt and equity.

Firm's size is positive and significantly related to both total and long-term debt ratios. The result of this positive relationship indicates that larger firms tend to be more diversified and thus, size may be an inverse proxy for probability of bankruptcy (Rajan

[11] The same specification is used in Ozkan (2001) and Antoniou et al (2002).

and Zingales 1995). According to the trade-off theory, debt has the advantage of interest tax shield, while equity does not. The higher the tax rate, the greater will be the tax shield from the interest expense. Hence, we expect higher debt level for firms with high tax rate. Consistent with the prediction of the trade-off theory, we find a positive association between total and long-term debt ratios and the firm's tax rate.

Trade-off theory is also supported in terms of the bankruptcy measure (Z-score). Not surprisingly, firms with higher probability of financial distress, measured by lower Z-scores, are those with high debt levels (there is a negative association between the Z-score at time *t* with the debt ratios). This negative relationship between Z-score and firm's debt ratios is significant at 1 percent level. Firms with higher growth opportunities are found to hold higher level of debt. This is an important finding because the positive relationship between the growth and debt ratios conflicts with the usual understanding or findings from developed countries that high growth firms hold lower levels of leverage. However, high investment or growth opportunities are not necessarily financed with equity as the debt market or bank financing (rather than financing from equity markets) might be a major source of financing for countries in our sample.

Consistent with the Agency Theory of Jensen (1986), firms that pay dividends – proxied by the dividend paying dummy – tend to use less debt in their capital structure. We find the evidence supporting Roberts (2002) that firms may revert primarily to an industry average as the coefficient of industry average leverage is positive and significant.

To examine whether our results are sensitive to the nature of the industry sector within which the firms operate, we estimate these GMM regressions on sub-samples of four different industry sectors defined by Chui et al (2002). The results of sector-wise regressions are reported in Table 5. The Wald test, Sargan test, and tests for serial correlations satisfy the validity of GMM specification.

The results are roughly similar to those reported in Table 4. The coefficients of lagged leverage terms are positive and significant across all sectors. The adjustment speeds measured by (1 - ϕ_0) differ across sectors with the highest speed of adjustment in the primary sector (0.5457 for total debt ratio and 0.5587 for long-term debt ratio) and lowest in advanced manufacturing sector (0.3722) for total debt ratio and in services sector (0.4220) for long-term debt ratio.

The GMM regression for each industry is estimated using the target adjustment model of equation (6):

$$L_{it} = \phi_0 L_{it-1} + \gamma_0 + \sum_j \gamma_j F_{jit} \lambda_i + \alpha_q Ind_{qnt} + \nu_i^* + \nu_t + \varepsilon_{it} .$$

To allow for possible AR-process, we add lagged firm-specific factors in our regressions. L_{it} and L_{it-1} are leverage and lagged leverage ratios of a given firm i at time t and $t-1$. F_{jit} is a vector of firm-specific factors j for firm i at time t , which includes Tangibility (TAN), profitability (Profit), size (Size), tax rate (Tax), bankruptcy risk measure (Zscore), investment opportunities (GR), and dividend paying dummy (DivD). Ind_{qnt} is the average industry leverage for industry q for country n at time t to control for the industry effects.

Table 5: Firm level determinants of total and long-term debt ratios by industry sector

	Total Debt Ratio							
	Primary		Manufacturing		Advanced Manufacturing		Services	
L (t-1)	0.4543	***	0.5147	***	0.6278	***	0.6088	***
	0.00		0.00		0.00		0.00	
Tan	0.1248	***	0.1589	***	0.0783	***	0.0148	***
	0.00		0.00		0.00		0.15	
Profit	-0.2485	***	0.0055		-0.0505	***	-0.0842	***
	0.00		0.67		0.00		0.00	
Size	0.0156	***	0.0489	***	0.0656	***	0.0457	***
	0.00		0.00		0.00		0.00	
Tax	-0.0103	***	-0.0037		0.0098	***	0.0266	***
	0.00		0.14		0.00		0.00	
Zscore	-0.0363	***	-0.0382	***	-0.0416	***	-0.0324	***
	0.00		0.00		0.00		0.00	
Growth	0.0020	***	0.0060	***	0.0043	***	0.0030	***
	0.00		0.00		0.00		0.00	
DivD	0.0004		-0.0004		-0.0067	***	-0.0075	***
	0.14		0.82		0.00		0.00	
Intercept	-0.0002	***	-0.0013	***	-0.0013	***	-0.0009	***
	0.00		0.00		0.00		0.00	
N-obs	4413		11022		16336		14427	
N-firms	660		1584		2403		2232	
Wald (15)	4690000	***	15541.15	***	13518.89	***	125028.34	***
Sargan	621.46 (642)		718.71 (642)	**	769.68 (642)	***	744.7 (642)	***
m1	-10.36	***	-13.18	***	-19.47	***	-16.62	***
	0.00		0.00		0.00		0.00	
m2	0.53		-0.63		-0.58		-1.18	
	0.60		0.53		0.56		0.24	

***significant at 1% level, **significant at 5% level, *significant at 10% level. P-values are in the second row, below the coefficients.

Table 5: Firm level determinants of total and long-term debt ratios by industry sector (continued)

	Long-Term Debt Ratio			
	Primary	Manufacturing	Advanced Manufacturing	Services
L (t-1)	0.4413 ***	0.5612 ***	0.5522 ***	0.5780 ***
	0.00	0.00	0.00	0.00
Tan	0.2418 ***	0.2854 ***	0.1983 ***	-0.0646 ***
	0.00	0.00	0.00	0.00
Profit	-0.3871 ***	0.0142	-0.0761 ***	0.0085
	0.00	0.26	0.00	0.60
Size	-0.0067 ***	0.0198 ***	0.0147 ***	0.0059 *
	0.00	0.00	0.00	0.09
Tax	-0.0021 ***	0.0078 ***	0.0164 ***	0.0336 ***
	0.00	0.00	0.00	0.00
Zscore	0.0053 ***	-0.0074 ***	-0.0136 ***	-0.0118 ***
	0.00	0.00	0.00	0.00
Growth	0.0010 ***	0.0051 ***	0.0009 **	0.0022 ***
	0.00	0.00	0.03	0.00
DivD	0.0184 ***	0.0011	-0.0015	-0.0004
	0.00	0.51	0.37	0.87
Intercept	-0.0002 ***	-0.0003	-0.0006 ***	-0.0004 *
	0.00	0.13	0.00	0.07
N-obs	4462	11090	16418	14565
N-firms	665	1594	2413	2252
Wald (15)	9390000 ***	11178.83 ***	18422.6 ***	71169.1 ***
Sargan	618.14 (642)	728.37 (642) ***	805.13 (642)***	648.73 (642)
m1	-8.42 ***	-13.09 ***	-15.64 ***	-14.96 ***
	0.00	0.00	0.00	0.00
m2	1.03	0.78	-0.48	1.34
	0.30	0.43	0.63	0.18

***significant at 1% level, **significant at 5% level, *significant at 10% level. P-values are in the second row, below the coefficients.

As expected, tangibility, size, and growth are positively related to the total debt ratio, while the Z-score is negatively related to debt ratios across all sectors. These relationships are significant at the 1 percent level. Again, consistent with the pecking order theory, profitability is negatively related to total debt ratios with the exception of the manufacturing sector.

Table 6: Mean values and correlations between debt ratios and country level variables for a sample of 28 countries for the period of 1990-2001

Country	PDI	UAI	IDV	MAS	Stock	TOR	Bank	Bond	GDPPCGR	Inflation	Common	CR	SR	CPIscore
Australia	36	51	90	61	0.7192	0.4785	1.2189	0.1903	2.0871	1.9326	1	1	4	1.2951
Austria	11	70	55	79	0.1344	0.5728	1.2911	0.5216	1.8531	2.0967	0	3	2	2.6161
Belgium	65	94	75	54	0.1245	0.233	1.4005	0.9039	1.8902	2.122	0	2	0	3.6193
Bermuda					0.6264	0.0732				3.8945				
Brazil	69	76	38	49	0.2517	0.4843	0.5241	0.0051	0.5952	688.096	0	1	3	6.7733
Canada	39	48	80	52	0.7608	0.5868	0.7093	0.0025	1.453	1.7731	1	1	5	1.0181
Denmark	18	23	74	16	0.4361	0.5749	0.5706	1.7716	1.7443	2.3926	0	3	2	0.4555
Finland	33	59	63	26	0.8764	0.5383	0.721	0.2816	1.5763	2.1738	0	1	3	0.6175
France	68	86	71	43	0.5374	0.7861	1.0719	0.5223	1.5202	1.6427	0	0	3	3.142
Germany	35	65	67	66	0.3721	1.3328	1.3871	0.8898	1.3397	2.1004	0	3	1	1.9824
HongKong	68	29	25	57	2.5152	0.5512	1.6484	0.3976	2.5483	3.6512	1	4	5	2.6559
India	77	40	48	56	0.2947	0.6097	0.3684		3.6069	7.8753	1	4	5	7.22
Indonesia	78	48	14	46	0.2147	0.5144	0.5263	0.0013	3.1702	15.2455	0	4	2	7.9741
Ireland	28	35	70	68	0.6519	0.5514	0.9339	0.2757	6.4812	3.3456	1	1	4	1.7722
Italy	50	75	76	70	0.309	0.71	0.8525	0.7724	1.4324	4.0763	0	2	1	6.172
Japan	54	92	46	95	0.7163	0.4887	1.3275	0.8252	1.2317	0.1202	0	2	4	3.3994
Malaysia	104	36	26	50	1.8489	0.4434	0.9889	0.0287	4.1398	3.2984	1	4	4	4.8157
Mexico	81	82	30	69	0.3016	0.3722	0.3133	0.0374	1.6536	18.1407	0	0	1	6.7715
Netherlands	38	53	80	14	0.9944	0.9748	1.295	0.7338	2.184	2.3904	0	2	2	1.2007
Norway	31	50	69	8	0.3124	0.7365	0.7793	0.3424	2.55	3.6299	0	2	4	1.2439
Singapore	74	8	20	48	1.5395	0.4817	1.1277	2.2191	4.1443	1.2424	1	4	4	0.8748
SouthAfrica	49	49	65	63	1.4296	0.2202	0.6386	0.453	-0.265	10.2203	1	3	5	4.6378
Spain	57	86	51	42	0.4654	1.5499	1.1459	0.1164	2.2462	4.3708	0	2	4	4.7407
Sweden	31	29	71	5	0.8739	0.7405	0.7083	0.6412	1.3203	2.6801	0	2	3	0.917
Switzerland	34	58	68	70	1.6939	0.8396	1.7927	0.8828	0.418	1.8172	0	1	2	1.2728
Thailand	64	64	20	34	0.5018	0.8034	0.9956	0.0078	3.9333	3.8861	1	3	2	7.0225
UK	35	35	89	66	1.3587	0.5538	1.2157	0.8243	1.9723	3.3656	1	4	5	1.4685
US	40	46	91	62	1.0924	1.2096	0.4933	0.3102	1.6598	2.313	1	1	5	2.2992
Pearson Correlation Coefficients														
Total Debt Ratio	**0.1133**	**0.2382**	**-0.202**	**0.1645**	**-0.141**	**-0.133**	**0.1554**	**0.0999**	**-0.0718**	**-0.0166**	**-0.2197**	**0.0229**	**2**	**0.1431**
Long-Term Debt Ratio	**-0.101**	**-0.122**	**0.1558**	**-0.127**	**0.021**	**0.1309**	**-0.185**	**-0.166**	**0.0183**	**0.0039**	**0.1351**	**-0.157**	**8**	**-0.0591**

The overall results of sector-wise regressions indicate that, even though the influence of firm level variables is similar across industry sectors, we still find some differences in terms of direction and magnitude across different sectors. Therefore, we can conclude that there is a weak industry effect regarding the influence of firm-specific factors on country level, industry-wise leverage.

We also run the GMM estimation of firm-specific determinants of total debt and long-term debt ratios in each country together with the Wald test for joint significance of independent variables, Sargan test of overidentification, first- and second order serial correlations.[12] We find that, though variations can be found with regard to the firm-specific factors on corporate capital structures in different countries, we can roughly conclude that the impact of firm-specific factors on capital structure is similar to the results reported in Table 4 using the overall sample. The results also show that, with the target adjustment model, firms across countries adjust their leverage to the target level. But, because of the differences in adjustment costs, we find variations in speed of adjustment across countries.

In addition to the evidence of the existence of target adjustment in all countries and of variation in adjustment costs across countries, we find that the factors affecting leverage are common across countries; while the signs, magnitude and significance of these factors vary across countries. Since we find persistent differences across countries, it is worthwhile to look into the specific country factors which might have important influence on corporate capital structure choice. We discuss the importance of country factors in the next section with our second stage regression of equation (7).

Country level determinants of capital structure

To gain a general idea about the distribution of country level variables across countries, we report the mean value of country level variables for a sample of 28 countries in Table 6.

Developing countries have a relatively higher level of power distance compared to developed countries, while the exact opposite is found for individualism. The highest power distance is found in Malaysia and lowest is in Austria. The United States has the highest level of individualism while Indonesia has the lowest. The developing countries are in the middle range of uncertainty avoidance and masculinity. Japan has the highest

[12] The results are not reported here due to space limitation.

masculinity and Sweden has the lowest; whereas, Belgium has highest uncertainty avoidance score and Singapore has the lowest. Developing countries are also represented by higher stock market turnover, lower bond market development, and higher corruption. As expected, the economic growth rate is also highest among developing countries. In terms of the legal origin, civil law countries have lower average stock market capitalization, higher average stock market turnover, higher bank emphasis, higher bond market capitalization, lower economic growth, higher inflation rate and higher corruption compared to common law countries.

Table 6 also presents the Pearson correlation coefficients between country level variables and total and long-term debt ratios to see how these variables alone could influence the firm's leverage. Surprisingly, the sign of correlations become exact opposite depending on debt ratio (total or long-term). Interestingly, countries with higher scores on power distance, uncertainty avoidance, and masculinity have lower long-term debt ratios and greater use of total debt suggesting that these countries use more short-term debt in their capital structure. Countries with higher scores on individualism are associated with more long-term debt and with less use of short-term debt.

We find a positive correlation between stock market development, stock market liquidity and long-term debt, while we find a negative correlation of these variables with the total debt ratio. Consistent with the conjecture that banks provide shorter-term loans, we find that high-bank-emphasis countries and countries with better-bond-market-development are associated with lower long-term debt, while their use of total debt is higher. Economic development is negatively associated with the total debt ratio while it is positively associated with the long-term debt ratio. As expected, inflation is negatively correlated with the total debt ratio.

In terms of legal influence, common or English law origin countries are associated with higher long-term debt and at the same time, lower total debt, while civil law origin countries are associated with lower long-term debt ratio. Higher creditors-rights countries are associated with lower long-term debt ratios and higher shareholders-rights countries are associated with higher long-term debt ratios. As expected, countries with a higher corruption index tend to hold lower long-term debt while their total debt ratio is high.

The regression estimated is the equation (7):

$$L_{it} - \hat{\phi}_0 L_{it-1} - \hat{\gamma}_0 - \sum_j \hat{\gamma}_j F_{jit} - \lambda_i \alpha_q Ind_{qnt} = \sum_k \lambda_i \alpha_k C_{kn} + \sum_l \lambda_i \alpha_l I_{\ln t} + \nu_i + \nu_t + \varepsilon_{it}$$

Table 7: Country level determinants of total debt and long-term debt ratios for pooled countries

	Total Debt Ratio							
	(1)		(2)		(3)		(4)	
PDI	0.0001	**	0.0001	**	0.0001	*	0.0001	
	0.02		0.02		0.09		0.11	
UAI	-0.0003	***	-0.0003	***	-0.0003	***	-0.0004	***
	0.00		0.00		0.00		0.00	
IDV	0.0001	***	0.0001	***	0.0001	**	0.0001	**
	0.01		0.01		0.03		0.02	
MAS	0.0001		0.0001		0.0000		-0.0001	
	0.16		0.18		0.96		0.39	
Stock	-0.0061	***	-0.0062	***	-0.0062	***	-0.0068	***
	0.00		0.00		0.00		0.00	
TOR	-0.0026	**	-0.0026	**	-0.0032	***	-0.0033	***
	0.04		0.04		0.01		0.01	
Bank	0.0026	*	0.0029	*	0.0018		0.0025	
	0.06		0.10		0.22		0.17	
Bond	-0.0024		-0.0023		-0.0024		-0.0023	
	0.16		0.18		0.18		0.22	
GDPPCGR	0.0017	***	0.0017	***	0.0017	***	0.0018	***
	0.00		0.00		0.00		0.00	
Inflation	-0.0005	*	-0.0005	*	-0.0005	*	-0.0005	*
	0.06		0.06		0.08		0.08	
CPIscore	0.0018	***	0.0019	***	0.0018	***	0.0023	***
	0.01		0.01		0.01		0.00	
Common	-0.0104	***	-0.0110	***				
	0.00		0.00					
French					0.0112	***	0.0137	***
					0.01		0.00	
German					0.0142	***	0.0190	***
					0.00		0.00	
Scandinavian					0.0031		0.0027	
					0.49		0.56	
Cr			-0.0002				-0.0002	
			0.80				0.77	
Sr			0.0002				0.0013	*
			0.75				0.10	
Intercept	0.0064		0.0069		0.0018		0.0004	
	0.36		0.34		0.83		0.96	
N-obs	36430		36430		36430		36430	
F	7.47	***	6.59	***	5.88	***	6.65	***

Note: Estimation with Newey-West standard errors considering heteroscedasticity and autocorrelation.
***significant at 1% level, **significant at 5% level, *significant at 10% level. P-values are in the second row, below the coefficients.

Table 7: Country level determinants of total debt and long-term debt ratios for pooled countries (continued)

	Long-term Debt Ratio							
	(5)		(6)		(7)		(8)	
PDI	0.0000		0.0000		0.0000		0.0000	
	0.91		0.97		0.77		0.83	
UAI	-0.0002	**	-0.0002	**	-0.0003	**	-0.0003	**
	0.03		0.04		0.03		0.03	
IDV	0.0001		0.0001		0.0001		0.0001	*
	0.18		0.17		0.12		0.08	
MAS	0.0000		0.0000		0.0000		-0.0001	
	0.66		0.91		0.53		0.13	
Stock	-0.0049	***	-0.0051	***	-0.0050	***	-0.0057	***
	0.00		0.00		0.00		0.00	
TOR	-0.0031	**	-0.0029	**	-0.0035	***	-0.0036	***
	0.02		0.03		0.01		0.01	
Bank	-0.0009		-0.0006		-0.0014		-0.0009	
	0.51		0.71		0.35		0.60	
Bond	-0.0012		-0.0013		-0.0010		-0.0009	
	0.55		0.54		0.65		0.68	
GDPPCGR	0.0010	***	0.0011	***	0.0011	***	0.0011	***
	0.00		0.00		0.00		0.00	
Inflation	-0.0007	*	-0.0007	*	-0.0007		-0.0007	
	0.09		0.09		0.12		0.13	
CPIscore	0.0019	**	0.0020	**	0.0020	**	0.0025	***
	0.03		0.03		0.02		0.01	
Common	-0.0075	***	-0.0086	**				
	0.06		0.05					
French					0.0067		0.0095	
					0.23		0.11	
German					0.0111	***	0.0167	***
					0.00		0.00	
Scandinavian					0.0025		0.0016	
					0.61		0.74	
Cr			0.0001				0.0001	
			0.86				0.89	
Sr			0.0006				0.0016	*
			0.37				0.06	
Intercept	0.0157	*	0.0146	*	0.0102		0.0074	
	0.06		0.08		0.27		0.43	
N-obs	36687		36687		36687		36687	
F	3.59	***	3.13	***	3.0200	***	3.4000	***

Note: Estimation with Newey-West standard errors considering heteroscedasticity and autocorrelation.
***significant at 1% level, **significant at 5% level, *significant at 10% level. P-values are in the second row, below the coefficients.

where we regress the residuals of the equation (6) on country level variables. C_{kn} is a vector of cultural indexes k for country n, which include Power Distance (PDI), Uncertainty Avoidance (UAI), Individualism (IDV), Masculinity (MAS). I_{lnt} is a vector of legal and institutional factors for country n at time t, *which include* Stock market capitalization of listed companies (Stock), Stock turnover ratio (TOR), Country's bank emphasis (Bank), Bond market capitalization (Bond), Country's GDP growth rate (GDPPCGR), Inflation rate (Inflation), Common law dummy, French origin dummy, German origin dummy, Scandinavian origin dummy, the creditor rights index (CR), shareholder rights index (SR), and Corruption Perception Index (CPIscore).

The second stage regressions are performed with the model specified in equation (7), where we regress the residuals or first stage regression in equation (6) on the country level variables. The results of regression estimations with Newey-West standard errors (considering heteroscedasticity and autocorrelation) for pooled-countries-all-industries are reported in Table 7. Regressions in columns 1 through 4 are for the total debt ratio and regressions in columns 5 through 8 are for the long-term debt ratio.

The results reveal that cultural, financial, economic, and legal factors are related to corporate total debt ratios. We find a positive relationship between two cultural indexes (power distance, individualism) and the use of debt. This result is consistent with our conjecture that in those cultures represented by more aggressiveness and less harmonious working environments, firms use higher leverage. Interestingly, countries with higher uncertainty avoidance tend to hold lower debt levels, suggesting that firms in these countries are not willing to bear the bankruptcy risk associated with high leverage. High stock-market-development and high stock-market-turnover are associated with lower total debt ratios. The results reveal that, in more developed and more liquid equity markets, there is less information asymmetry between managers and shareholders. Therefore, there is high propensity for managers to issue equity to finance investments leading to a lower debt ratio. We do not find any significant relationship between a country's bond market development and the corporate use of debt.[13]

[13] World Federation Exchanges (FIBV) – where the bond market data is collected – reports the total market value of bonds outstanding, which includes the value of government bonds. We can expect that there are countries where the government is a major borrower and where the corporate bond market is still relatively undeveloped. This variable might overestimate the actual bond market development of countries in the sample. Because the variable is a rough proxy of a country's bond market development, it might obscure the influence of bond market development on the corporate capital structures.

There is a weak positive relation between a country's bank emphasis and use of total debt. Countries with better economic growth are found to hold higher levels of total debt, indicating that the firms in those countries have better access to the debt market. As expected, a higher level of inflation in the country is associated with a lower debt ratio. This result suggests that inflation uncertainty increases the firm's business risk through volatility in the firm's selling price, costs and sales volume. Therefore, in a highly inflationary country with high inflation uncertainty, firms will experience high business risk and will carry less debt in the capital structure. As expected, the corruption perception index is found to be positively associated with firm's total debt ratio suggesting that the contractual nature of debt – as compared to that of equity – better limits the expropriation of investors and investors are not willing to hold much equity in the presence of high corruption level in the country (Fan, Titman, and Twite 2006).

The findings above do not change significantly (except for *Bank*) with the inclusion/exclusion of legal origin dummies and creditors and shareholders rights in columns 1 through 4. Common law countries are found to hold lower total debt ratios. As common law countries have better stock market development and less information asymmetry, firms in these countries have better access to equity when they need external financing. When we include origin dummies in place of the common law dummy in columns 3 and 4, we find a positive and significant relationship between French and German law origin dummies and the firm's total debt ratio. Civil law countries, especially French and German origin countries, have higher average bank emphasis and higher average bond market capitalization. Thus, these countries tend to emphasize bank financing; we find a positive relationship between French and German origin countries and the use of total debt. Interestingly, the influence of bank emphasis on the total debt ratio disappears. It might be interpreted that the inclusion of French, German and Scandinavian origin countries captures the effect of a country's bank emphasis, since these countries, on average, have higher bank emphasis. We only find a weak positive relationship between the shareholders right index and the total debt ratio.

Table 8: Country level determinants of total debt and long-term debt by industry sector

	Total Debt Ratio							
	Primary		Manufacturing		Advanced Manufacturing		Services	
PDI	0.0001		0.0001	*	0.0002	**	0.0001	**
	0.25		0.07		0.03		0.05	
UAI	-0.0004	***	-0.0004	***	-0.0004	***	-0.0004	***
	0.00		0.00		0.00		0.00	
IDV	0.0002	***	0.0001	**	0.0001	**	0.0002	***
	0.00		0.05		0.02		0.01	
MAS	-0.0003	***	-0.0001		0.0000		-0.0001	
	0.00		0.38		0.75		0.41	
Stock	-0.0042	***	-0.0070	***	-0.0086	***	-0.0078	***
	0.00		0.00		0.00		0.00	
TOR	-0.0054	***	-0.0025	**	-0.0027	**	-0.0031	**
	0.00		0.05		0.04		0.02	
Bank	0.0013		0.0032	*	0.0030	*	0.0027	
	0.42		0.06		0.08		0.12	
Bond	0.0020		-0.0028		-0.0038	**	-0.0031	*
	0.25		0.12		0.04		0.09	
GDPPCGR	0.0029	***	0.0019	***	0.0022	***	0.0021	***
	0.00		0.00		0.00		0.00	
Inflation	-0.0002		-0.0003		-0.0005	*	-0.0005	*
	0.49		0.23		0.07		0.07	
CPIscore	0.0043	***	0.0025	***	0.0020	***	0.0025	***
	0.00		0.00		0.01		0.00	
French	0.0110	***	0.0134	***	0.0161	***	0.0149	***
	0.01		0.00		0.00		0.00	
Germany	0.0250	***	0.0190	***	0.0204	***	0.0207	***
	0.00		0.00		0.00		0.00	
Scandinavian	-0.0065		0.0015		0.0043		0.0029	
	0.13		0.74		0.35		0.52	
Cr	-0.0006		0.0003		0.0002		0.0000	
	0.30		0.63		0.72		0.97	
Sr	0.0016	**	0.0011		0.0011		0.0014	*
	0.03		0.18		0.18		0.08	
Intercept	-0.0057		0.0000		0.0001		-0.0001	
	0.47		1.00		1.00		0.99	
N-obs	4413		11022		16336		14427	
F	15.77	***	8.23	***	9.01	***	7.66	***

Note: Estimation with Newey-West standard errors considering heteroscedasticity and autocorrelation.
***significant at 1% level, **significant at 5% level, *significant at 10% level. P-values are in the second row, below the coefficients.

Table 8: Country level determinants of total debt and long-term debt by industry sector (continued)

	Long-Term Debt Ratio							
	Primary		Manufacturing		Advanced Manufacturing		Services	
PDI	-0.0001		0.0000		0.0000		0.0000	
	0.33		0.59		0.69		0.98	
UAI	-0.0002	**	-0.0004	***	-0.0004	***	-0.0004	***
	0.05		0.00		0.00		0.00	
IDV	0.0001	**	0.0001		0.0001	*	0.0001	
	0.03		0.27		0.08		0.15	
MAS	-0.0003	***	0.0000		-0.0001		0.0000	
	0.00		0.57		0.37		0.65	
Stock	-0.0016		-0.0070	***	-0.0060	***	-0.0081	***
	0.25		0.00		0.00		0.00	
TOR	-0.0080	***	-0.0034	**	-0.0049	***	-0.0039	***
	0.00		0.02		0.00		0.01	
Bank	-0.0018		-0.0001		-0.0005		-0.0001	
	0.29		0.96		0.78		0.94	
Bond	0.0015		-0.0043	**	-0.0039	*	-0.0050	**
	0.51		0.05		0.08		0.03	
GDPPCGR	0.0004		0.0006	**	0.0008	***	0.0005	
	0.14		0.05		0.01		0.11	
Inflation	-0.0004		-0.0008	*	-0.0008	**	-0.0010	**
	0.35		0.06		0.05		0.02	
CPIscore	0.0041	***	0.0029	***	0.0028	***	0.0027	***
	0.00		0.00		0.00		0.00	
French	0.0065		0.0145	**	0.0150	***	0.0150	***
	0.27		0.02		0.01		0.01	
Germany	0.0172	***	0.0160	***	0.0179	***	0.0173	***
	0.00		0.00		0.00		0.00	
Scandinavian	-0.0070		0.0025		0.0027		0.0039	
	0.15		0.61		0.58		0.42	
Cr	-0.0001		0.0005		0.0004		0.0005	
	0.87		0.41		0.54		0.43	
Sr	0.0019	**	0.0017	**	0.0015	*	0.0020	**
	0.03		0.05		0.07		0.02	
Intercept	0.0115		0.0173	*	0.0149		0.0159	*
	0.21		0.07		0.11		0.09	
N-obs	4462		11090		16418		14565	
F	5.05	***	3.40	***	3.82	***	3.39	***

Note: Estimation with Newey-West standard errors considering heteroscedasticity and autocorrelation.
***significant at 1% level, **significant at 5% level, *significant at 10% level. P-values are in the second row, below the coefficients.

All four regression models for long-term debt ratio from column 5 to column 8 are similar to the results we find for total debt ratios. What is more striking is that, though it is weak, the positive relationship between a country's bank emphasis and a firm's total debt ratio disappears with the long-term debt ratio. This evidence is consistent with the fact that banks provide shorter-term loans. Regarding the cultural influence, only the uncertainty avoidance index remains significant. This suggests that countries with a high score on uncertainty avoidance would hold less debt regardless of whether the debt is short-term or long-term.

$$L_{it} - \hat{\phi}_0 L_{it-1} - \hat{\gamma}_0 - \sum_j \hat{\gamma}_j F_{jit} - \lambda_i \alpha_q Ind_{qnt} = \sum_k \lambda_i \alpha_k C_{kn} + \sum_l \lambda_i \alpha_l I_{\ln t} + \nu_i + \nu_t + \varepsilon_{it},$$

where we regress the residuals of the equation (6) on country level variables. C_{kn} is a vector of cultural indexes k for country n, which include Power Distance (PDI), Uncertainty Avoidance (UAI), Individualism (IDV), Masculinity (MAS). I_{lnt} is a vector of legal and institutional factors for country n at time t, *which include* Stock market capitalization of listed companies (Stock), Stock turnover ratio (TOR), Country's bank emphasis (Bank), Bond market capitalization (Bond), Country's GDP growth rate (GDPPCGR), Inflation rate (Inflation), Common law dummy, French origin dummy, German origin dummy, Scandinavian origin dummy, the creditor rights index (CR), shareholder rights index (SR), and Corruption Perception Index (CPIscore).

To examine whether our results are sensitive to the nature of industry sector in which firms operate, we estimate these regressions on sub-samples of four different industries defined by Chui et al. (2001). The results of sector-wise Newey-West regressions are reported in Table 8. The sign or the direction of the influence of country variables for these sector-wise regressions are similar to those reported in Table 7 and are consistent with our expectations. Thus, we only bring up the interesting differences in this section.

As revealed in the first four columns, we find significant influence of cultural, financial, and economic factors on the total debt ratio across all sectors – with few exceptions. For example, the total debt ratio for firms in primary sector is not affected by the country's debt market (bank and bond markets) development, while the capital structure of firms in the other three sectors are affected either by banking sector development (+) or bond market development (–). This occurs because higher bond market development might lead to more capital market liquidity and thus less information asymmetry which in turn leads to issuance of more equity for external financing. Thus,

insignificant coefficients of *Bank* and *Bond* in Table 7 (columns 4 and 8) is mostly driven by the primary sector.

Another significant difference is that there is significant negative relationship between masculinity and total debt ratios of firms in the primary sector, while masculinity is insignificant in the other three sectors. This can be interpreted to indicate that firms in primary sectors are less aggressive, more feminine. and thus prefer less debt in their capital structure. The insignificance in the other three sectors also explains the insignificance of masculinity in Table 7. The opposite is true regarding the power distance.

The results of the last four columns regarding the long-term debt ratio are also similar to earlier results with some exceptions. The weak positive relationship between a country's bank emphasis and a firm's total debt ratio disappears with the long-term debt ratio. Once again, the evidence is consistent with the fact that banks provide shorter-term loans. Also, the primary sector behaves a little different from other three sectors in terms of masculinity, stock and bond market development, and inflation. We find a significant negative relation between long-term debt ratio and masculinity only in the primary sector. The long-term debt ratio for firms in the primary sector is not significantly affected by capital market (stock and bond markets) development, while firms in the other three sectors use less long-term debt (and more equity) with better capital market development. We may interpret this as less information asymmetry leading to issuance of more equity for external financing. The level of inflation also does not seem to affect firms in the primary sector, while firms in the other three sectors seem to be less tolerant to inflationary risk.

Overall, it is safe to conclude that a country's cultural, financial, economic and legal factors are responsible for the variations in capital structure of firms located in different countries, even after controlling for firm-level and industry sector-level variables. We also find some significant differences among the industry sectors regarding the effect of these factors on the use of total and long-term debt ratios especially for firms in primary sector.

CONCLUSIONS

Unlike prior studies and considering the time-varying nature of capital structure, this paper uses a GMM estimator with a target adjustment to examine the dynamics and determinants of capital structure for firms located in 28 countries with different national institutional structures. With GMM estimation, firms are found to adjust their capital

structures slowly to the target level as all adjustment factors are less than one. The adjustment speeds are 0.3793 toward total debt ratio and 0.4234 toward long-term debt ratio indicating that firms adjust their debt ratios slowly in an attempt to have their target debt ratio. It also shows the existence of adjustment cost in the process of adjusting the debt level toward its target.

Consistent with prior empirical findings, debt ratios are positively related to firm size, tangibility, and taxes while firm profitability and Altman's z-score are negatively related to debt ratios. However, unlike prior studies and contrary to our usual understanding of the negative relationship for US firms, we find a positive relationship between growth and debt ratios for our 28-country sample suggesting the role of national institutional factors in financing firm's growth opportunities.

Our results provide the evidence that lower information asymmetry in countries with a better stock market development, especially in common law countries, enhances the firm's ability to issue equity, which leads to lower debt ratios. Firms in countries with higher inflation are found to carry lower debt ratios. National culture is also found to influence how firms finance their investments, especially the uncertainty avoidance index which has negative relationship with the debt ratios. A positive relationship is found between firms' debt ratios and a country's corruption perception index supporting the argument that the contractual nature of debt – as compared to that of equity – better limits the expropriation of investors.

The results from the sector-wise regressions indicate that there are some significant differences in the effect of these factors regarding the use of total and long-term debt ratios especially for firms in primary sector. For example, capital structures of firms in primary sector are not affected by country's debt market development. In terms of cultural indices, debt ratios in only primary sector are highly negatively related to masculinity. Results from long-term debt ratios also indicate that firms in primary sectors are not affected by capital market development. This finding is also unique in a sense that no prior literature that we know of has studied how firms in different industry sectors react to these institutional factors on their use of total and long-term debt ratios.

The results reported in this paper have important public policy and managerial implications. For example, being aware of how a national institutional environment – such as financial market and economic development and the efficiency of legal system – impacts firm's financing choice, managers can make more efficient corporate financing

and investment decisions that create more value to the shareholders. For the policy makers, knowing the importance of national institutional development, they could appreciate the policies that would help improve the country's financial, legal and economic developments. With such improvements, firms could have better access to the financing sources and they, in turn, will be able to help enhance the financial and economic development of the country.

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