

Determinants of leverage of public firms in developing countries

Master thesis

**Name: Pengyuan Cui
ANR: 301640**

Supervisor: Dr Maria Penas

Abstract

In this thesis we examine the determinants of capital structure using a relative recent data sample of 10636 firms in 23 developing countries from 1995 to 2011, with different bankruptcy code, culture, level of corruption and level of law enforcement. Using a two-step regression, we confirm that the same firm-level factors that are related to capital structure choice in developed countries affect debt issuing in the same way in developing countries. Moreover, the distinct country-level factors such as culture, corruption, and law enforcement determine the difference of leverage across developing countries.

Key word: capital structure, firm-level factors, country-level factors, culture, bankruptcy law, corruption, law enforcement.

Contents

1. Introduction	4
2. Determinants of capital structure and hypothesis development	7
2.1 Firm-level factors	7
2.1.1. <i>Size</i>	7
2.1.2 Tangibility	7
2.1.3 Profitability.....	8
2.1.4. Growth Opportunity	8
2.1.5. Initial Leverage.....	8
2.2 Country-level Factors and Hypothesis	9
2.2.1. Individualism.....	9
2.2.2. Uncertainty Avoidance.....	10
2.2.3. No Unilateral Reorganization.....	10
2.2.4. Automatic Liquidation.....	11
2.2.5. Secured First.....	11
2.2.6. Manager Replacement.....	12
2.2.7. Corruption	12
2.2.8. Law Enforcement	12
3. Data and methodology.....	13
3.1 Data resource	13
3.1.1. Firm-level Data Resource.....	13
3.1.2. Country-level Data Resource.....	14
3.2 Summary Statistics	15
3.2.1. Firm-level Statistics Summary	15
3.2.2. Country-level Statistics Summary	16
3.3 Methodology	17
4. Empirical Results	18
4.1 Firm-level Regression Results.....	18
4.2 Country-level Regression	22
5. Conclusion.....	25

1. Introduction

Since 1958, Miller and Modigliani proposed their financial policy irrelevant theory that in a perfectly efficient market (i.e. without tax, information asymmetry, government and other unnecessary fees), the leverage level of a company cannot influence its market value and thus managers can choose leverage level by their own preference, capital structure has been perennial subject of growing literatures.

In 1960s and 1970s scholars focused on analyzing the benefits and costs of leverage. with assumptions that the market is efficiency and the information is symmetric, Kraus and Litzenberger (1973) developed static trade-off theory which stated that leverage ratio of firms moved towards an optimal level to balance the benefits due to tax shield with bankruptcy costs. Jensen and Meckling (1976) turned attention to agency costs, costs due to the conflicts between management and shareholders and the conflicts between bondholders and stockholders. The first conflicts due to managers' perquisites that may destroy firms' value can be solved by debt issuing (Jensen (1986)). Issuing debt can reduce free cash flow and thus the possibility of value destroying expropriation. The second conflict can generate two problems, the underinvestment and the asset substitution problem. The underinvestment problem proposed by Myers (1977) argues that stockholders may reject low-risk project with $NPV > 0$ to prevent shifting wealth to debtholders. The asset substitution problem issued by Jensen and Meckling (1976) arises that firms transfer value from bondholders to shareholders through substituting low-risk asset with high-risk asset. In 1980s, scholars placed more emphasis on problem how information asymmetries among investors and firms can affect corporate finance choice. Myers and Majluf (1984) suggested Pecking-order theory to solve this problem. The theory argues that firms would prefer to use internally generated funds to finance their new project rather than external funds. If firms have not enough internal funds, they will prefer debt to equity, because potential equity investors require much more incentive to invest as they know less about the firm than management. In opposition to static trade-off theory, Pecking-order theory suggests that firms do not have an optimal leverage ratio to achieve.

Basing on these three theories, determinants of capital structure choice are firstly examined in terms of firm-level factors. Harris and Raviv (1991) identified the firm specific determinants of leverage for U.S. firms. This article reported that leverage is positively related to firm size, asset tangibility, and investment opportunities, while is negatively related to research and development expenditure, bankruptcy risk, advertising expenditure, and firm's uniqueness. Rajan and Zingales (1995) extended Harris and Raviv's study from U.S. to G7 countries and documented that firm specific determinants of leverage for developed countries had basically the same effect on leverage. Although their research firstly taking into account some country-level factors, such as the size of capital markets, the bankruptcy law and the relation between ownership and control of firms, they did not found enough evidence to prove that country-level factors played important role in capital structure decision. Antoniou et al. (2008) confirmed this finding controlling institutional factors with data of G5 countries. Booth et al. (2001) analyzed these factors with data from 10 developing countries and found that leverage in these developing countries seem to be affected in the same way and by the same types of variables that significantly influence leverage choice in developed countries, although their sample only included 727 firms which may not well represented all firms in developing countries. Their research also include some country-level factors and find that country level factors play a role as important as firm level factors in shaping corporate financing decision. Lemmon et al. (2008) found the evidence that the capital structure variation of an individual firm can be explained by its initial leverage choice and concluded that the majority of variation in capital structure was determined by a time-invariant firm-level factor.

Forerunners have well examined firm-specific determinants of capital structure and their effect on financing choice. However country-specific determinants and their effects remain ambiguous. Why capital structure decisions are so different across countries? Much more recent researches on capital structure have focused on the country-specific determinants of leverage. As leverage increases probability of bankruptcy (Warner (1977)), the difference of bankruptcy laws may influence bankruptcy cost and further

affect leverage choice. La Porta et al. (1998) examined the effect of creditor rights which is affected by different bankruptcy law across different countries and found that creditor rights affected leverage ratio positively with sample containing 49 countries. Their study argues that firms in countries with better creditor protection adopt higher leverage because better legal protection enable debtors to offer firms fund at better term. Using creditor rights index from Djankov et al. (2007) and data from 51 countries, Ghoual et al. (2011) found evidence that legal protection on debtor may reduce leverage ratio of firms because self-interested managers and existing owners want to avoid losing control in financial distress case. Chui, Lloyd and Kwok (2002) uncovered the difference in culture also determine distinct leverage across countries.

Past literatures analyzing determinants of leverage with data from both developed countries and developing countries may generate biased estimation because we always have much more data on firms in developed countries than in developing countries. For example, the sample of Ghoual et al. (2011) contains 82389 observations for firms in developed countries while 30936 observations for firms in developing countries. Because of limitation on data resource, the results of literatures focusing on leverage choice in developing countries, Such as Booth et al. (2001) which only collected observations for 727 firms, may not well explained the reason why capital structure change in and across these countries. The purpose of this thesis is to complement these studies by examining the country specific determinants of capital structure choice with relatively adequate and recent data collected from main developing countries. In this thesis, we examine eight country-level factors, Individualism, uncertainty avoidance, four components of creditor rights index, corruption, and law enforcement. To control the influence of firm-level factors on finance choice, we use five firm-level factors: size, tangibility, profitability, growth opportunity, and initial leverage. Our sample includes 96361 observations for 10636 firms from 23 developing countries with different features: Brazil, Chile, China, Czech Republic, Egypt, Hong Kong, Hungary, Indonesia, India, Jordan, South Korea, Morocco, Mexico, Malaysia, Nigeria, Pakistan, Peru, Philippines, Poland, Russia Federal, Singapore, Thailand and South Africa.

The rest of this thesis is organized as follows. Section 2 discusses the determinants of capital structure and develop hypothesis. Section 3 describes the data and explains estimation method. Section 4 presents empirical results. Section 5 concludes the thesis.

2. Determinants of capital structure and hypothesis development

This section discusses the factors that determine a firm's leverage ratio and present our hypothesis on the effect of country-level factors on capital structure. The whole section is divided into two subsections. We present firm-level factors in the first subsection and describe country-level factors and hypothesis on them in the second subsection.

2.1 *Firm-level factors*

In this subsection, we discuss the five firm-level factors we examined in this thesis. Because firm specific determinants of leverage of firms are well examined in past literature and we mainly focus on country-level factors, we won't develop hypothesis on firm-level factors again and only elaborate the reason why we adopt these factors.

2.1.1. *Size*

Most past researches, such as Rajan and Zingales (1995) and Lemmon et al. (2008), show a positive relationship between size and leverage. The reason behind this relationship is: first, general bankruptcy cost is fixed to both large and small firms, but large firms have more ability to bear this type cost than small firms do; second, as potential investors have more information about large firm and thus need fewer resource concerning the firm's monitoring, large firms can issue debt at a lower cost.

2.1.2 *Tangibility*

Jensen et al. (1992), Rajan and Zingales (1995) and Booth et al. (2001) argue that tangibility is positively related to leverage. Considering potential asset substitution

problem, creditors will require more tangible asset as collateral in order to finance a new project, especially for banks. Because firms in developing countries heavily rely on loans from banks to finance their new project, more tangibility enable firms to borrow more fund at lower cost.

2.1.3 Profitability

According the argument of Jensen (1986), profitable firms would issue debt when corporate control of firms is ineffective to reduce free cash flow. The Pecking-order theory developed by Myers and Majluf (1984) provides opposite view. Because firms use internal funds to finance their new project in order to avoid asymmetric information cost; with more internal fund, profitable firms will issue less debt. Most empirical results, such as Harris and Raviv (1991), Rajan and Zingales (1995), Booth et al. (2001) and De Jong et al. (2006) provide evidence to support the latter view.

2.1.4. Growth Opportunity

The valuation of firms with high growth opportunity depends on their intangible assets which have no value in bankrupt case, hence they are less likely to finance their new project with debt since they face much higher financial distress costs. According the asset substitution problem suggested by Jensen and Meckling (1976), creditors are unwilling to finance firms with high growth opportunity because this type of firms is more likely in the presence of risky projects. Rajan and Zingales (1995) and Lemmon et al. (2008) support this argument.

2.1.5. Initial Leverage

Static trade-off theory states that firms change their leverage towards and optimal level to balance the benefits and costs both due to financial leverage. Hence, firms' historical leverage level will affect firms' future capital structure. Lemmon et al. (2008) discovers that in long term, firms with higher leverage are more likely to maintain their relatively

higher leverage and firms with lower leverage are more likely to maintain their lower leverage level and argue that firms' initial leverage choice determine their future leverage choice.

2.2 Country-level Factors and Hypothesis

In this subsection, we discuss eight country-level factors we examine in our analysis and develop the hypothesis on these factors.

2.2.1. Individualism

Hypothesis 1: degree of individualism in a culture can determine the leverage ratio of firms in the culture, but the sign of the influence is mixed.

Hofstede (1980, 2001) defined the individualism dimension as “the degree of interdependence a society maintains among its members.” Chui, Titman, and Wei (2008) argue that individualism is positively associated with overconfidence and self-attribution and thus facilitates risk-taking, so firms in more individualism culture will adopt higher leverage. Griffin et al. (2008) suggests that high individualism culture promotes independent action of individual and personal challenge and finds empirical evidence that individualism is positively related with leverage ratio. However, in his own website, Hofstede himself gives individualism the explanation that people only care about themselves and their direct family members in individualist society. Hence, we doubt that in high individualism culture, managers may also worry about losing control and avoid potential human capital loss if their firms bankrupt. As most debt contract include convent and bankruptcy damages the reputation of managers, we cannot reject the possibility that managers may adopt less leverage to solve above problem.

2.2.2. Uncertainty Avoidance

Hypothesis 2: degree of uncertainty avoidance in a culture negatively affects the leverage ratio of firms in that culture.

Hofstede (1980, 2001) defined the uncertainty avoidance dimension as that uncertainty avoidance score reflects “the extent to which the members of a culture feel threatened by ambiguous or unknown situations and have created beliefs and institutions that try to avoid these.” We can conclude that people in high uncertainty avoidance culture are more risk-averse. Since issuing debt increase bankruptcy risk, uncertainty avoidance culture will lead managers in it to reduce leverage use. Griffin et al. (2008) provide conclusive evidence for this argument. So we expected uncertainty avoidance is negatively related with leverage ratio across developing countries.

2.2.3. No Unilateral Reorganization

Hypothesis 3: firms in the developing country whose bankruptcy law prevents managers to file reorganization without creditor’s agreements will use less leverage.

This factor is one of four components of creditor rights index from Djankov, McLiesh, and Shleifer (2007). No unilateral reorganization means the bankruptcy law of an individual country prevents managers to file reorganization without creditor’s agreements. The reason why we adopt four components of creditor rights index instead of the index itself is to solve the conflict about the effect of creditor rights on capital structure choice long standing in academia. The same work has been done by Ghoul et al. (2001). There are two views about the effect of creditor rights on capital structure choice, supply side view and demand side view. The supply side view assumes that stronger creditor rights will facilitate leverage using because better creditor protection promote the development of creditor market and thus decrease the borrowing cost of firms. Many previous literatures, such as LLSV (1997) and Demirguc-Kunt and Maksimovic (1999) provide evidence for this view. The demand side view proposes that strong creditor rights affect capital structure negatively through increasing the possibility of self-interested managers and existing owners to lose control in financial distress. The result of Acharya, Sundaram

and John (2004) supports this view. Using the components of creditor rights index, Ghoul et al. (2001) found that bankruptcy law codes which protect creditor rights and does not damage the interests of managers would facilitate using leverage while codes that protect creditor rights through limiting the rights of managers reduce the leverage ratio. As no unilateral reorganization forbid managers to reorganize firms unilaterally, it is expected affect capital structure choice negatively.

2.2.4. Automatic Liquidation

Hypothesis 4: firms in the developing country whose bankruptcy law gives creditor rights to automatic liquidate an insolvent firm will use less leverage.

This factor is one of the four components of creditor rights index from Djankov, McLiesh, and Shleifer (2007) and defined as whether creditors have rights to automatic liquidate an insolvent firm according bankruptcy law. The right to allocate asset of a firm is the most important one in all rights of managers and shareholders. If bankruptcy law of a country give creditors right to automatic liquidate assets of firms in financial distress, managers and shareholders will lose their key power. Hence, this factor place strict limitation on managers, it is expected negatively related to leverage ratio as Ghoul et al. (2001) found.

2.2.5. Secured First

Hypothesis 5: firms in the developing country in which secured creditors have absolute priority to claims in bankruptcy case will use more leverage.

The factor is one of four components of creditor rights index and represents that secured creditors have absolute priority to claims in bankruptcy case. Managers are less likely to be direct lenders of their firms and thus secured first place little limitation on managers. The result of Ghoul et al. (2001) supports this view. Hence, Secured first is expected to be positively related with leverage ratio since it puts not limitation on management.

2.2.6. Manager Replacement

Hypothesis 6: firms in developing country whose bankruptcy law gives creditors right to replace the incumbent managers during bankruptcy will use less leverage.

The factor is also component of creditor rights index and defined as that bankruptcy law gives creditors right to replace the incumbent managers during bankruptcy. According Ghoul et al. (2001), replacing incumbent managers lead managers to lose their reputation. Since reputation is most important personal capital to managers, manager replacement damages the interest of managers. We expect manager replacement is negatively related with leverage issue.

2.2.7. Corruption

Hypothesis 7: firms in developing country with serious corruption problem will adopt higher leverage.

If corruption is common in an economy, firms are more likely to finance themselves with more debt. Smith and Warner (1979) gave explanation to this phenomenon that debt provided investors with a higher degree of monitoring ability and thus more protection from expropriation by managers and bureaucrats. La Porta et al. (2002) suggests that self-interested bureaucrats can raise funds in the form of loans through banks to which they have connections more easily if corruption is common. Hence, we expect that firms in developing country with serious corruption problem will adopt higher leverage.

2.2.8. Law Enforcement

Hypothesis 8: firms in developing country with better law enforcement system will favor higher leverage.

Given that debt contract is protected by law, the effectiveness of implementation of debt contract depend on the degree of law enforcement, or say the extent to which parties of contract abide the law. La Porta et al. (1998) suggests that active and well-functioning law enforcement system van step in and rescue creditors abused by management. Better law enforcement system gives creditors more confidence and thus promotes the development of debt market. Hence, we expect law enforcement affects leverage issuing positively.

3. Data and methodology

In this section, we introduce our data resource, present summary statistic and discuss our methodology in three subsections, respectively.

3.1 *Data resource*

In this subsection, we introduce our data resource. The subsection is organized as two parts, firm-level data resource and country-level resource.

3.1.1. *Firm-level Data Resource*

The first part of my sample is firm level sample which comprises of all non-financial firms, including inactive firm, in twenty three developing countries collected by “COMPUSTA” database of Wharton research data service. The selection of sample is motivated by three reasons. First, these countries well represent emerging market, so the sample may better represent firms in developing countries. Second, there are distinct financial, institutional and culture traditions existing in these countries. This phenomenon will allow us to examine the effect of these distinctions on the capital structure choice. Third, we excluded financial firms since they are subject to specific regulations that may affect their financing choice. Our sample includes data on total asset, current asset, long term debt, short term debt, earning before interest and tax, ISO currency code (currency that the data is collected in), nationality of individual firm and the industry classification.

The research period of sample covers from 1995 to 2011 aiming to maintain firms as many as possible in the sample. We drop observations that have missed value in all data items we mentioned above from our sample. “COMPUSTA” reports all financial data in millions and if the total asset of a certain firm is less than one million, it reports zero instead. So the firm whose total asset is reported as zero is also excluded from our sample. Finally, we translate all financial data into U.S dollars to maintain the consistency of monetary. We employ book leverage which is total debt divided by total asset for any individual firm with original data. I adopt logarithmic of total asset to measure the size of company. Tangibility and profitability are captured by the difference between total asset and current asset divided by total asset and earning before interest and tax divided by total asset, respectively. Because of the potential mispricing existing in the stock market in developing countries, we measure the growth opportunity with the asset turnover rate. Above four variables are generated by one year lagged to avoid reverse causality. Lemmon et al (2008) find that capital structure decision is explained by history leverage choice and capture it with first not missing value of leverage in the sample period. We also adopt this variable in the same way as they did and thus drop the first observation for each firm from my sample to avoid identity. Our final firm-level sample contains 10636 individual firms and 96361 observations with period from 1996 to 2011.

3.1.2. *Country-level Data Resource*

The second part is the country level sample. This sample contains country level data on culture difference provided by Hofstede personal website, [www.http://geert-hofstede.com](http://geert-hofstede.com), four components of creditor rights index derived from Djankov et al (2007), corruption perception index published by Transparency International, and rule of law, inflation rate and GDP collected by “databank world bank” database of World Bank for twenty three developing countries in the firm level sample. Hofstede has established five culture dimensions to measure the difference of culture in different countries or regions. We adopt two of these five dimensions, uncertainty avoidance and individualism, to measure the degree of conservatism and the degree of selfish in a certain culture environment. The scores of either dimension range from 0 to 100, with higher score indicating that the

degree of uncertainty avoidance or selfish is more serious. Both of these two variables are divided by 100. The components of Djankov's creditor rights index are four dummies, no unilateral reorganization, automatic liquidation, secured first, and manager replacement. Each of these four dummies equals 1 if the bankruptcy law of a certain country provides creditors with the specific protection and 0 otherwise. Because Djankov et al (2007) only provides year 2003 data of the four dummy variables, we have to use these data as Ghoul et al (2012) did. Corruption perceptions index range from 10 to 0, lower score means the degree of corruption is higher and thus we adopt reciprocal of the index for easy interception. The proxy of law enforcement, rule of law, ranges from 0 to 100, higher scores mean the country has a more effective law enforcement system. Uncertainty avoidance, individualism, and law enforcement are all divided with 100. As the corruption perception index and law enforcement do not change much through time, we just include average of these two variables from 1995 to 2010 in my model. We also employ average of inflation rate and GDP from 1995 to 2011 to control the effect of different economic developing level on the capital structure decision for each country.

3.2 Summary Statistics

3.2.1. Firm-level Statistics Summary

We report firm level summary statistics in table 1. The table provides us the summary statistics for book leverage along with the five firm level factors, size, tangibility, profitability, growth opportunity, and initial leverage for different regions in my sample. With a quick comparison, we can observe that firms in Latin America and Asia issue most debt among all firms in the 23 developing countries. The mean of leverage ratios of firms in these two regions are both 26%. Firms in Latin America, Asia, and Africa adopt much higher initial leverage than firms in East Europe and Middle East. The profit of firms located in Latin America is most unstable with a standard deviation of 132.39. Size, tangibility, and growth opportunity do not change much across different regions.

3.2.2. Country-level Statistics Summary

Summary statistics of continuous country-level factors is reported in table 2. We can observe that independent variables vary a lot across developing countries. Among all four continuous factors, uncertainty avoidance and law enforcement change most, with standard deviations 0.1783754 and 0.2363357, respectively. The standard deviation of corruption is the smallest one but still above 10%. Hence, we suspect that country-level factors may also affect leverage choice.

Table 1

Means and standard deviations of firm-level variables. Leverage is defined as total debt divided by total asset. Size is defined by the logarithmic of total asset. Tangibility is defined by the difference between total asset and current asset divided by total asset. Profitability is defined by earning before interest and tax (EBIT) divided by total asset. Growth opportunity is defined by sales divided by total asset. Initial leverage is defined by the first observation of leverage for each firm in my sample. Standard deviations are in parenthesis. N is the number of observations. Sample period is from 1995 to 2011.

Region	Leverage	Size	Tangibility	Profitability	Growth opportunity	Initial leverage	N
Latin America	0.26	5.88	0.63	-1.49	0.79	0.36	7592
	0.18	1.89	0.21	132.39	0.59	4.58	
Asia	0.26	4.54	0.49	0.04	0.87	0.3	79452
	0.2	1.73	0.22	2.54	0.75	3.54	
Africa	0.18	4.86	0.47	0.1	1.32	0.36	4049
	0.17	2.02	0.24	0.22	1.76	4.52	
East Europe	0.18	4.86	0.53	0.07	1.26	0.14	4727
	0.17	2.27	0.23	0.2	1.28	0.17	
Middle East	0.16	3.46	0.58	0.05	0.57	0.16	541
	0.14	1.42	0.23	0.09	0.49	0.16	
overall	0.25	4.66	0.5	-0.07	0.9	0.3	96361
	0.19	1.83	0.22	37.23	0.85	3.58	

Table 2

Statistic summary of country-level variables. Uncertainty avoidance is measured with Hofstede's uncertainty avoidance score which reflects "the extent to which the members of a culture feel threatened by ambiguous or unknown situation and have created beliefs that try to avoid these." The individualism is measured with Hofstede's individualism score which reflects "the degree of interdependence a society maintains among members. Corruption is defined as the average of corruption perception index published by the transparency international from 1995 to 2010. Law enforcement is measured with the rule of law index provided by World Bank.

Country level variables	Individualism	Uncertainty avoidance	Law enforcement	Corruption
mean	0.3321739	0.63	0.5386105	0.2786203
median	0.26	0.68	0.56122	0.2849003
standard deviation	0.1783754	0.2363357	0.2287316	0.107437

3.3 Methodology

We employ a two-stage regression to test my hypothesis. In the first stage, we employ panel data technique using original least squared method to analyze the effects of five firm-level factors on the variation of capital structure choice and identify variation of leverage that cannot be explained by firm- or industry-level characteristics but are related to country level factors. Because our dependent variable is censored, ordinary least squares (OLS) may produce biased estimates of coefficients and standard errors. We also use Tobit model to analyze my firm-level data sample. The function is below:

$$y_{it} = \alpha + \sum_{k=1}^4 \beta_k X_{k,it-1} + \varphi y_{i0} + \theta_{it} + \eta_t + \sum_{j=1}^{22} \gamma_j \mu_j + \varepsilon_{it}$$

Where, i indexes firms and t indexes years. y is total book leverage. The vector of one year lagged explanatory variables, X , includes four factors. They are proxies of: (1) size, (2) tangibility, (3) profitability, (4) growth opportunity. y_{i0} is firm i 's initial leverage. θ represents industry dummy. η is time fix effect which is common to all companies and changes over time. The vector, μ , includes twenty three country dummies representing all countries, Brazil, Chile, China, Czech, Egypt, Hungary, Hong Kong, Indonesia, India, Jordan, Korea, Malaysia, Mexico, Morocco, Nigeria, Pakistan, Peru, Philippines, Poland, Russia, Singapore, Thailand, and South Africa. The dummy variable for a given country takes value of one if the firm operates in that particular country at given year and zero otherwise except for Brazil which is used as bench mark. The letter α is the constant; β , φ ,

and γ are unknown parameters to be estimated. The item, ε , is standard error which is assumed to be serially uncorrelated.

In the second stage, we examine how variation of capital structure choice across developing countries can be explained by institution and culture difference across these countries with original least squares estimation. The function is below:

$$z_j = \alpha + \sum_{m=1}^4 \delta_m H_{m,j} + \sum_{k=1}^4 \tau_k W_{K,j} + \sum_l^2 \vartheta_l C_{l,j} + \varepsilon_j$$

Where, j indexes countries, Z represents the coefficients of country dummies in first step regression. H is a vector which contains individualism, uncertainty avoidance, corruption, and law enforcement. W is a vector which contains four dummy variables, no unilateral reorganization, automatic liquidation, secured first and manager replacement. C is a vector which contains two control variables, average of inflation rate and GDP for each country from 1995 to 2011. α is constant, δ , τ , and π are parameters to be estimated. ε is standard error.

4. Empirical Results

As we adopt a two-stage regression estimation method, our empirical results are divided into two parts, firm-level empirical results and country-level results.

4.1 *Firm-level Regression Results*

To gain an overall idea of effect of firm characteristics on leverage, we firstly run regression with firm-level data sample including industry and country dummy variables using original least squared method with robust standard errors to account for potential heteroscedasticity in my data. The estimation result is reported in table 3. In column (1), we only included five explanatory variables in my regression. We can observe that firms with bigger size and more tangible asset use more leverage in developing countries while

firms with more profit and growth opportunity will prefer less leverage. One standard deviation increase in size and tangibility will increase leverage by nearly 1.8% and 4%, respectively. However, one standard deviation increase in profitability and growth opportunity will decrease leverage by about 0.2% and 0.3%, respectively. These findings are consistent with Rajan and Zingales (1995) and Harris and Raviv (1991) and still hold after I control industry dummies in column (2). Taking into account the impact of the 1997 Asia crisis and 2008 subprime crisis, I add year dummies in column (3). We can observe that our findings do not change significantly after I control year fixed effect. I conclude that most firm-level factors shape the capital structure choice in the same way in developing countries as they do in the developed countries. In column (4), we add 23 country dummy variables to the specification, while omitting Brazil from our dummy variable list to avoid collinearity and also control industry and year dummies (the coefficients of country dummies are reported in appendix 1). Our findings on relationship between leverage and firm-level factors still hold in any individual country included by our sample. We observe that country dummies capture variation left unexplained by firm-level factors. Nineteen of twenty two coefficients are large and statistically significant at 5% or higher confidence level even we control the effect of industry and time on capital structure choice. In the last row of column (4), we report the p-value of F test on coefficients of country dummies. We can easily reject the hypothesis that the country dummy coefficients jointly equal to zero. In table 3, we also can observe that: for model 1, the adjusted R squared is only 0.065. After adding industry dummies, the adjusted R squared of model 2 only increase to 0.077, which is very small. For model 3, the number is 0.084 after we take into account for time fixed effect. However, when we include country dummies in model 4, the adjust R squared increase from 0.084 to 0.147. Compared with industry and time effect, knowing nationality of a firm appears to be more useful for estimating its leverage ratio. Hence, we can confirm that there are some country-level factors that also determine the financial leverage of firms in different developing countries. In appendix 1, the coefficients of country dummies gives us average leverage per country different from Brazil cleaned of variation due to firm-level factors, industry and time fixed effect. For example, average debt ratio of firms in India is still 9.06% higher than firms located in Brazil after accounting for the influence of firm-

level characteristics. In following analysis, we will refer the coefficients of country dummies as “country level leverage”.

Opposite to Lemmon et al. (2008), we didn’t find any evidence that proves firms’ initial leverage choice can shape their future leverage choice in developing countries. In all four models, the coefficients of initial leverage are insignificantly.

Table 3

Firm level panel regression of leverage. The dependent variable is total book leverage, which is defined as total debt divided by total asset. Size is defined by the logarithmic of total asset. Tangibility is defined by the difference between total asset and current asset divided by total asset. Profitability is defined by earning before interest and tax (EBIT) divided by total asset. Growth opportunity is defined by sales divided by total asset. These four independent variables are generated by one year lagged to avoid reserve causality. Initial leverage is defined by the first observation of leverage for each firm in my sample. The panel data regressions control industry, year and country dummies. The regression is estimated using original least squared method with robust standard error to potential heteroscedasticity .

Model	(1)	(2)	(3)	(4)
	Leverage	Leverage	Leverage	Leverage
Size	0.00967*** (27.65)	0.00969*** (27.25)	0.0111*** (30.89)	0.0170*** (42.78)
Tangibility	0.182*** (58.48)	0.168*** (51.72)	0.162*** (49.74)	0.153*** (45.91)
Profitability	-0.0000798*** (-22.36)	-0.0000821*** (-22.24)	-0.0000845*** (-20.98)	-0.0000924*** (-17.38)
Growth opportunity	-0.00340*** (-4.58)	-0.00407*** (-5.25)	-0.00359*** (-4.81)	-0.00490*** (-5.23)
Initial leverage	0.000894 (1.50)	0.000862 (1.48)	0.000852 (1.45)	0.000814 (1.57)
Constant	0.115*** (52.04)	0.0903*** (19.95)	0.113*** (18.43)	0.0824*** (11.73)
Observations	96361	96361	96361	96361
R ²	0.065	0.078	0.085	0.147
Adjusted R ²	0.065	0.077	0.084	0.147
Industry dummies	No	Yes	Yes	Yes
Time dummies	No	No	Yes	Yes
Country dummies	No	No	No	Yes
Pro>F				0

t statistics in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.001$

As we mentioned in subsection 3.3, leverage ratio cannot be smaller than zero or above one, so the dependent variable of our models is censored and thus traditional original

least squares estimation may produce bias on coefficients and standard error. To eliminate the potential bias, we run Tobit regression and report the results in table 4. Table 4 is reported in the same way as table 3. The coefficients of country dummies are reported in appendix 2. Eighteen of twenty two coefficients of country dummy are significant at 95% confident level or above. We can observe that the estimation result of independent variables isn't obviously different from table 3.

Table 4

Firm level panel regression of leverage. The dependent variable is total book leverage, which is defined as total debt divided by total asset. Size is defined by the logarithmic of total asset. Tangibility is defined by the difference between total asset and current asset divided by total asset. Profitability is defined by earning before interest and tax (EBIT) divided by total asset. Growth opportunity is defined by sales divided by total asset. These four independent variables are generated by one year lagged to avoid reverse causality. Initial leverage is defined by the first observation of leverage for each firm in my sample. The panel data regressions control industry, year and country dummies. The regression is estimated using a censored Tobit model (left censored at 0).

Model	(1) Leverage	(2) Leverage	(3) Leverage	(4) Leverage
Size	0.0119*** (31.98)	0.0120*** (31.57)	0.0137*** (35.37)	0.0200*** (48.26)
Tangibility	0.198*** (61.64)	0.185*** (55.59)	0.178*** (53.40)	0.169*** (50.86)
Profitability	-0.0000830*** (-4.77)	-0.0000858*** (-4.96)	-0.0000886*** (-5.14)	-0.0000968*** (-5.83)
Growth opportunity	-0.00226** (-2.67)	-0.00290*** (-3.39)	-0.00228** (-2.69)	-0.00392*** (-4.50)
Initial leverage	0.000943*** (5.08)	0.000910*** (4.94)	0.000900*** (4.90)	0.000867*** (4.87)
Constant	0.0866*** (34.82)	0.0560*** (11.62)	0.0819*** (12.24)	0.0493*** (6.61)
Observations	96361	96361	96361	96361
industry dummies	No	Yes	Yes	Yes
time dummies	No	No	Yes	Yes
Country dummies	No	No	No	Yes
chi2	6793.8	8187.5	9015.0	15681.2
Degree of freedom	5	14	29	51
p-value of chi squared	0	0	0	0
Multiple squared correlation	0.0645	0.0775	0.08456	0.1467
Pro>F				0

t statistics in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.001$

In table 4, we use chi test to check whether our models fit significantly better than empty ones. We can observe the p-values of chi square are zero for all four models meaning that each of these four models fits significantly better than the model with no predictors. Since R squared of Tobit model may be above one or below zero, we cannot use R-squared to measure the good of fitness as we usually do with original least squared estimation. To compare good of fitness of these four regressions, we adopt multiple-squared correlations to measure how well the models fit. The multiple-squared correlation indicates how much the variance of expected value of dependent variable is shared with observed value. In table 4, we find that adding industry dummy only increase multiple-squared correlation by about 1% however multiple-squared correlation increase by about 7% after controlling country dummy. This finding confirm what we find in table 3, there are some country-level factors determine the difference of leverage ratio across developing countries.

According to above findings, we conclude that traditional capital structure theory also holds in developing countries but there are some country level factors-such as law and culture-that may explain different capital structure across these countries effectively.

4.2 Country-level Regression

In this subsection, we examine whether variation of country level leverage can be explained by country-level differences across countries. To observe the effect of these country-level factors more directly, we adopt coefficients of country dummies derived from firm-level original least squared regression as dependent variable and use original least squares estimation method with robust standard errors to account for potential heteroscedasticity in my data. The estimation results are reported in table 5. In table 5, the independent variables are individualism, uncertainty avoidance, corruption, law enforcement, and the four components of creditor rights index calculated by Djankov et al. (2007), no unilateral reorganization, automatic liquidation, secured first, and manager replacement. No unilateral reorganization equals one if managers cannot file reorganization without creditor's agreements and zero otherwise. Automatic liquidation equals one if bankruptcy law gives secured creditors rights to automatic liquidate an insolvent firm and zero otherwise. Secured first equals one if secured creditors have absolute priority to claims in bankruptcy case and zero otherwise. Manager replacement

equals one if creditors can replace the incumbent managers during bankruptcy and zero otherwise. In column (1), we only include eight explanatory variables in my model and find that the individualism affects corporate finance choice negatively and significantly. This result supports our argument that managers in an individualist developing country or regions may prefer lower leverage as they worry about losing their human capital due to the possible bankruptcy. One standard deviation increasing in individualism will decrease country level leverage by 4%. Or more directly, keeping other things constant, leverage ratio of firms located in Czech Republic is generally 1.18% lower than firms located in China, since the degree of individualism for Czech Republic is 5% higher than China. We also find that firms will adopt less leverage if bankruptcy code of their country allows creditors to automatically liquidate an insolvent firm. Law enforcement is positively and significantly related with leverage. Better law enforcement system increases the supply of debt fund, reduces the costs of firms to issue debt and thus facilitates leverage using. Corruption also affects capital structure choice positively and significantly as expected. Providing fund in debt, investors can gain more monitoring ability through covenants and thus more protection from expropriation of managers in corrupt business environment. The economic effects of law enforcement and corruption are 7% and 0.5%, respectively.

The development of creditor market requires fixed institutional costs. This requirement is only satisfied when total economy is large enough. High Inflation rate can devalue the outstanding debt and thus damage the interest of creditors. Hence, we add average of GDP and inflation rate from 1995 to 2011 of each country into our model as control variable in column (2). The coefficient of automatic liquidation turns to be insignificant, after controlling GDP and inflation rate. The sign and the magnitude of coefficients of individualism, law enforcement, and corruption don't change obviously. The R-squared of regression changes little, from 0.747 in column (1) to 0.757 in column (2). Hence, the difference of economic development and inflation level may not explain the different capital structure choice across developing countries sufficiently.

We don't find any evidence that secured first and manager replacement shape capital structure across developing countries. No unilateral reorganization is slightly significant

(at 10% level) in column (1) but it turns to be insignificant in column (2) after controlling inflation rate and GDP. Automatic liquidation also turns to be insignificant in column (2).

Table 5

Country level cross-section regression. The dependent variable is country level leverage which is defined as coefficients of country dummies in first step regression (table 3, column 4). Uncertainty avoidance is measured with Hofstede's uncertainty avoidance score which reflects "the extent to which the members of a culture feel threatened by ambiguous or unknown situation and have created beliefs that try to avoid these." The individualism is measured with Hofstede's individualism score which reflects "the degree of interdependence a society maintains among members. No unilateral reorganization, automatic liquidation, Secured first and manager replacement are four components of creditors rights index calculated by Djankov, McLiesh and Shleifer (2007). No unilateral reorganization equals to one if managers cannot file reorganization without creditor's agreements. Automatic liquidation equals one if bankruptcy law gives secured creditors rights to automatic liquidate an insolvent firm. Secured first equals one if secured creditors have absolute priority to claims in bankruptcy case. Manager replacement equals one if creditors can replace the incumbent managers during bankruptcy. Corruption is defined as the average of corruption perception index published by the transparency international from 1995 to 2011. Law enforcement is measured with the rule of law index provided by World Bank. Inflation and GDP are the average of inflation rate and GDP from 1995 to 2011, respectively. The model is estimated using original least squares method with robust errors to account for potential heteroscedasticity

	(1) Country level leverage	(2) Country leverage
Uncertainty avoidance	0.0168 (0.30)	-0.00648 (-0.13)
Individualism	-0.236*** (-3.30)	-0.204** (-2.43)
No unilateral reorganization	0.0430* (1.77)	0.0284 (1.20)
Automatic liquidation	-0.0660** (-2.24)	-0.0462 (-1.24)
Secured first	0.0285 (0.92)	-0.00182 (-0.05)
Manager replacment	0.0158 (0.71)	0.0201 (0.92)
Law enforcement	0.303** (2.54)	0.319** (2.38)
Corruption	0.492** (2.17)	0.604** (2.44)
Inflation		-0.128 (-0.51)
GDP		0.0209 (1.58)
Constant	-0.281** (-2.38)	-0.544** (-2.51)
<i>N</i>	22	22
<i>R</i> ²	0.520	0.615

t statistics in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

5. Conclusion

Using relatively recent data on firm-level and country-level determinants of leverage from 1995 to 2011, we revisit some established results on capital structure choice across developing countries and confirm that in developing countries firm specific characteristics affect the firms' financial leverage in the same way as they do in developed countries. Consistent with the results of past researches such as Chui, Lloyd, and Kwok (2001) and Booth et al (2001), we also find that knowing nationality of a certain firm can help to predict its debt ratio. After controlling GDP and inflation rate, we find that: difference of culture across countries can explain different capital structure decision of firms in these countries. Managers in an individualist developing country are more likely to use less leverage. The reason may be that they worry about losing their human capital due to bankruptcy. The firm in a more corrupt country will be financed with more debt, because debt provides more monitoring ability to investors than equity. Better law enforcement promotes debt issuing since effective law enforcement system strengthens confidence of creditors and thus promotes the developing market. Hence, firms can raise fund easier and cheaper in term of debt.

The previous studies on the relationship between culture value and capital structure insist that individualism lead to overconfident and thus more debt issuing but ignores the possibility that individualism may affect capital structure negatively since managers in individualist society will reduce leverage to avoid loss of reputation and personal capital due to bankruptcy. Providing evidence for existence of this possibility, this thesis complements the growing literature on country specific determinants of capital structure with relatively recent and adequate data, especially for developing countries.

Reference

- Acharya, V., Amihud, Y., and Litov, L., 2009. Creditor rights and corporate risk-taking. Working paper, National Bureau of Economic Research.
- Acharya, V., Sundaram, R., JOHN, k., 2004. Cross-country variation in capital structures: The role of bankruptcy codes. Working paper, New York University.
- Antoniou, A., Yilmaz Guney, and Krishna paudyal, 2008. The determinants of capital structure: capital market oriented versus bank oriented institutions. *Journal of Financial and Quantitative Analysis*, 43, 59-92.
- Barclay, M. and C. Smith, 1995. The maturity structure of corporate debt. *Journal of Finance* 50, 609-631.
- Booth L., V. Aivazian, A. Demirguc-Kunt, and V. Maksimovic, 2001. Capital structure in developing countries. *Journal of Finance*, 56, 87-130.
- Bradley, M., Jarrell, G.A., and Kim, H., 1984. On the existence of an optimal capital structure. *Journal of Finance*, 39, 857-878.
- Bancel, F., and Mittoo, U., 2004. Cross-country determinants of capital structure choice: a survey of European firms. *Financial Management* 33: 4, Winter, 103-132.
- Claessens, S., Djankov, S., and Nenova, T., 2001. Corporate risk around the world. Working paper, world bank, CEPR, and Harvard University.
- Claessens, S., Djankov, S., and Lang, L., 2000. The separation of ownership and control in East Asian corporations. *Journal of Financial Economics* 58, 81-112.
- Chui A., A. Lloyd, and C. Chuck, 2002. The determination of capital structure: is national culture a missing piece to puzzle? *Journal of International Business Studies*, 33, 99-127.
- Djankov, S., C. McLish and A. Shleifer, 2007. Private credit in 129 countries. *Journal of Financial Economics*, 84, 299-329.
- Frank, M. and Goyal, V.K. 2009. Capital structure decisions: Which factors are reliably important? *Financial Management*, 38(1): 1-37.
- Ghoul S., O. Guedhamin, S. Cho, and J. Suh, 2011. Creditor rights and capital structure: evidence from international data. Working paper, University of Alberta
- Griffin d., K., Li, H. Yue, and L. Zhao, 2008. Cultural values and corporate risk-taking. Working paper, University of British Columbia.
- Harris M. and A. Raviv, 1991. The theory of capital structure. *Journal of Finance*, 46, 297-355
- Hofstede, Geert H., 1980. *Culture's consequences: international differences in work-related values*. Beverly Hills, CA: Stage.
- Hofstede, Geert H., 1985. The interaction between national and organizational value systems. *Journal of Management Studies*, 22(4): 347-357.
- Hofstede, Geert H., 2001, *Culture's Consequences: Comparing Values, Behaviors, Institutions, and Organizations Across Nations*, 2nd edition, Sage, Thousand Oaks, CA.
- Jong A. de and C. Veld, 1998. An empirical analysis of incremental capital structure decisions under

managerial entrenchment. 1998.

Jensen M., 1986. Agency costs of free cash flow, corporate finance and takeovers. *American Economic Review*, 76, 323-339.

Jensen M. and W. Meckling, 1976. Theory of the firm: managerial behavior, agency costs, and ownership structure. *Journal of Financial Economics*, 3, 305-360.

Jayant R.Kate, Thomas H.Noë and Gabriel G.R., 1991. The effect of business risk on corporate capital structure: theory and evidence. *Journal of Finance*, 46,717-737

Kraus, A., and R. H. Litzenberger, 1973. A State-preference Model of Optimal Financial Leverage. *Journal of Finance*, 28 (1973), 911-922.

Lemmon M., M.R. Roberts and J.F. Zende, 2008. Back to the beginning: persistence and the cross-section of corporate capital structure. *Journal of Finance*.

La Porta, R., F. Lopez-de-Silanes, A. Shleifer, and R. W. Vishny, 1997. Legal Determinants of External Finance. *Journal of Finance*, 52, 1131-1150.

La Porta, R., F. Lopez-de-Silanes, A. Shleifer, and R. Vishny, 1998, Law and finance. *Journal of Political Economy* 106, 1113-1155.

Myers, S. C., 1977. Determinants of Corporate Borrowing. *Journal of Financial Economics*, 5, 147-175

Mayers and C. Stewart, 1984. The capital structure puzzle. *Journal of Finance*, 39, 575-592.

Myers S. and N. Majluf, 1984. Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, 13, 187-221.

Mao, C. X., 2003. Interaction of Debt Agency Problems and Optimal Capital Structure: Theory and Evidence. *Journal of Financial and Quantitative Analysis*, 38, 399-423.

Rajan, R. G., and L. Zingales, 1995. What do We Know about Capital Structure? Some Evidence from International Data. *Journal of Finance*, 50, 1421-1460.

Shyam-Sunder, L., and Myers, S., 1999. Testing static tradeoff against pecking order models of capital structure. *Journal of Financial Economics* 51, 219-244.

Song, J. and Philippatos, G., 2004. Have we resolved some critical issues related to international capital structure? Empirical evidence from the 30 OECD countries. Working Paper, University of Tennessee.

Warner, J. B., 1977. Bankruptcy Costs: Some Evidence. *Journal of Finance*, 32, 337-347.

Wald, J., 1999. How firm characteristics affect capital structure: an international comparison. *Journal of Financial Research* 22, 161-187.

Appendix:

Appendix 1

Coefficient estimates on country dummy variables from table 3, model (4).

Chile	-0.0304***	Jordan	-0.0703***	Philippines	-0.0297***
	(-6.34)		(-9.89)		(-5.26)
China	-0.00463	South Korea	0.0579***	Poland	-0.0375***
	(-1.41)		(15.35)		(-8.60)
Czech	-0.141***	Morocco	-0.0338***	Russia	-0.0496***
	(-13.79)		(-3.57)		(-8.11)
Egypt	0.0313**	Mexico	-0.0579***	Singapore	-0.0101**
	(2.64)		(-10.23)		(-2.67)
Hong Kong	-0.0452***	Malaysia	-0.000912	Thailand	0.0505***
	(-10.28)		(-0.25)		(11.25)
Hungary	-0.0976***	Nigeria	-0.00636	South Africa	-0.0659***
	(-12.16)		(-0.54)		(-15.24)
Indonesia	0.0913***	Pakistan	0.0924***		
	(17.73)		(15.51)		
India	0.0906***	Peru	-0.0496***		
	(17.73)		(-7.71)		

t statistics in parentheses

* p < 0.1, ** p < 0.05, *** p < 0.001

Appendix 2

Coefficient estimates on country dummy variables from table 4, model (4).

Chile	-0.0295***	Jordan	-0.0804***	Philippines	-0.0428***
	(-5.32)		(-8.82)		(-7.40)
China	-0.00414	South Korea	0.0619***	Poland	-0.0407***
	(-1.18)		(15.45)		(-8.21)
Czech	-0.153***	Morocco	-0.0325***	Russia	-0.0541***
	(-11.62)		(-3.31)		(-8.68)
Egypt	0.0324**	Mexico	-0.0669***	Singapore	-0.00771*
	(2.30)		(-10.70)		(-1.88)
Hong Kong	-0.0495***	Malaysia	-0.000556	Thailand	0.0509***
	(-10.23)		(-0.15)		(11.77)
Hungary	-0.100***	Nigeria	-0.0149	South Africa	-0.0701***
	(-8.05)		(-1.32)		(-14.57)
Indonesia	0.0928***	Pakistan	0.0972***		
	(19.35)		(17.32)		
India	0.0979***	Peru	-0.0531***		
	(26.69)		(-7.03)		

t statistics in parentheses

* p < 0.1, ** p < 0.05, *** p < 0.001