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Article

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The determinants of leverage decisions: Evidence from Asian emerging markets

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Abstract: This study provides a stage-level analysis of firm-scale pooled data of 16 Asian countries to classified income economy-based data for various firm- and country-specific predictors of leverage. Our analysis captures the selection impact of both micro- and macro-level determinants on capital structure with and without income economy-based models. The regression model evaluated the significance of predictor variables based on random effect model of panel data setting. The study further explores the issue of interest by looking at key individual regression models by income economy to avoid any potential loss of information. We argue that this approach provides a comprehensive and insightful set of determinants because of the newer dimension of income economy classification based on per-capita Gross National Product (GNP) defined by the World Bank. The estimating equations for financing determinants identify the additional variables of non-debt tax shield, liquidity, tax and GDP growth rate in case of Asian countries. Our study establishes that the core variables of tangibility, growth, size, and profitability retain their significance for leverage choice in both options during 2008–2014 in Asian economies. Furthermore, the findings show that the financing choices of firms in Asian

Quratulain Zafar

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Ms. Quratulain is Assistant professor at BUITEMS, Pakistan. She is currently pursuing her PhD in FinancialEconomics, from Asian Institute of Technology, Thailand with scholarship from HEC under Faculty Development program. Her research encompasses financial development system and relationship with financing choices in 16 Asian Countries during 2008-2014.

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PUBLIC INTEREST STATEMENT

We primarily contribute by classifying the micro-panel data and macrovariables being effective determinants for three Income economies composed of 16 Asian countries as classified by the World Bank from 2008–2014, in contrast to previous studies in which countries are analyzed as pooled only. The research findings provide a significant contribution for: (1) Shareholders and market investors by developing a better understanding of the capital structure determinants for Asian firms. (2) Academicians will understand the role of financing decisions in maximizing the firm value. (3) The corporate managers can use the discussion on determinants as guidelines for their financing strategies to facilitate investment decisions. Our study is first of its kind to elaborate the impact of Income-economy wise basis where the expertise and policy application for financial development sector of upper middle income-economies can be replicated in lower middle-income economies as role models.

regional markets are complemented by financial system development stages using the equity market, the bond market and the banking industry as proies.

Subjects: Development Economics; Finance; Industry & Industrial Studies

Keywords: leverage; firm-specific determinants; country-specific determinants; income economies; Asian countries

JEL classification: G30; G20; F61; F62; C33

1. Introduction

Research on capital structure and its relation to firm value was initiated by Modigliani and Miller (MM) (1958). They further revised the first theory in 1963 by incorporating tax shelters, bankruptcy costs, and asymmetric information in the capital structure. The trade-off theory for capital structure by Baxter (1967) and Kraus and Litzenberger (1973) indicates that the target capital structure choices of firms are determined by balancing the bankruptcy cost and tax-saving debt benefits against the cost of borrowing. Trade-off theory is strictly criticized by Myers and Majluf (1984) because tax-paying firms ruled out the theory of a conservative capital structure. Although tax benefits seem to be considerable according to Graham (2000), while Frank and Goyal (2003) explored the practical significance of trade-off theory. Consistent with Fama and French (2002), trade-off theory most convincingly explains a firm's departure from an optimal capital structure due to its dynamic characteristics. The precise interpretation of pecking order theory (Lemmon, Roberts, & Zender, 2008) led to the concept of debt capacity, which suggests that firms should consider the equity issue only. This rigorous explanation has led researchers to focus on the concept of modified pecking order theory. Less than 20% of the firms follow pecking order theory prediction for debt and equity choices (Leary & Roberts, 2010). Frank and Goyal (2003) believe that pecking order theory is more relevant for large firms' choice of capital structure because of asymmetric information, whereas Byoun and Rhim (2005) prove that the pecking order is more relevant for small firms. By re-examining determinants, the authors continuously evaluate the validity of the competing capital structure theories to bridge the gap between theoretical explanations and financial practices concerning capital structure, particularly for Asia, because the empirical studies have provided inconclusive results (Brounen, de Jong, & Koedijk, 2006). We re-examine the validity of firm-specific and macroeconomic variables being portable determinants of capital structure in the Asian region in the pooled model form as well as in income economy groups. We will also test the explanatory power of the firm-specific factors representative of three major theories for their significant impact on capital structure. Considering the background of dynamic changes and the associated problems arising from inconsistent studies (Haron, 2014; Lemmon & Zender, 2010), the authors of following study strongly call for identification of the most relevant and current developments in optimal capital structure studies specializing in Asia (Leary & Roberts, 2010; Sibindi & Makina, 2018).

We primarily contribute to the literature by classifying the effective determinants for three income economies composed of 16 Asian countries as classified by the World Bank in contrast to previous studies in which countries are analyzed in pooled form only. Using the World Bank's definition of income economies (IEs), we classify 16 Asian countries into three IEs based on the per-capita gross national product (GNP). In this study, the dataset is divided into lower middle-IEs (LMIEs), upper middle-IEs (UMIEs) and high-income economies IEs (HIEs), which are described in Table 3. We proceed to explore the differences in leverage choice when 16 sample countries are pooled as one group as compared to when the 16 countries are segregated on an income economy basis. Debt and equity are raised through institutions that include stock markets, banking institutions, bond issuing agencies, and investment banks. Thus, the selected firm variables are representative of all three capital structure theories and country-specific factors. The impacts of institutional differences are captured through country-specific determinants, including both stock market orientation, the development of the banking sector and bond markets. The institutional

environment remains distinctive around the continent, which may influence firms' operational and financing decisions (Desai, Foley, & Hines, 2004)

In addition to contributing to existing knowledge, the authors seek to extend a major field study by De Jong, Kabir, and Nguyen (2008) with our sample of 16 Asian countries and to verify the stylized facts presented by Frank and Goyal (2009) that are applicable to Asian firms in recent times. We also find appropriate dimensions for inconclusive results by concentrating on the selected Asian economies (Haron, 2014). Re-examination of the variables in these countries will yield the latest empirical evidence on the determinants of capital structure. We will also discuss the applicability of the capital structure study of Rajan and Zingales (1995) for G7 economies, where tangibility, growth, firm size and profitability remain the major determinants. The objective of this paper is to examine the relevant determinants of capital structure in 16 Asian countries and three income economies, thus adding literature to the body of knowledge on the importance of firm-specific factors, such as profitability, net tangible assets, firm size and depreciation to total assets, and macroeconomic variables, such as stock market development, the banking industry and the bond market in addition to the GDP growth rate (GRT) and inflation (INF).

Our study suggests that leverage choices of firms in Asian regional markets are complemented by financial system development stages. We count upon the assessment of Demirgüc¸ Kunt and Maksimovic (1994) regarding developing countries in which the differences in capital structure choices are attributed to the differences in the levels of economic and financial developments and institutional differences. We use the equity market, bond market and banking industry factors as proxies for the financial system in pooled and income economy systems and discover that lower middle-income economies have the highest mean leverage of 1.323, while high-income economies have the lowest mean leverage of 1.181 for the sample period 2008–2014. Our study extends the major fieldwork of Booth, Aivazian, Demirgüc¸ Kunt, and Maksimovic (2001) in terms of countries' firm-specific and country-level determinants during the most recent period of 2008–2014 in 16 Asian economies. To identify the most significant determinants in the Asian context, we investigate micropanel data with country-level variables from 2008–2014 for the sample countries. China and India are the two fastest-growing major economies; our initial results show that India has the highest mean leverage of 1.567 for non-financial firms, followed by China's leverage of 1.562 and Japan's leverage of 1.549. In the bottom tier, Jordan has the third lowest leverage at 0.944, followed by Saudi Arabia as the second lowest at 0.887 and Malaysia as the lowest at 0.730. Furthermore, Asia has experienced some of the longest modern economic booms in the world, particularly in Japan (1950–1990), South Korea (1961–1996), and China (1978–2013), followed by current rapid economic growth in Philippines and India. Considering the synergistic outlook of Asia's developing economies and their importance to the world economic outlook, the Asian region is selected to examine the macro and microfinancing determinants of Asian economies.

Our empirical study aims to address the following questions:

(1) What are the determinants of capital structure choice for three Asian income economy groups and 16 sample countries in Asia?
(2) Do corporate financial leverage decisions differ significantly between the country-based model and income economy-based models for Asian firms?
(3) Are the conventional capital structure models still applicable to both cases during the 2008–2014 period?

The paper is structured as follows: Background information is provided in Section 1, while Section 2 presents a literature review and discusses various capital structure theories and variable selection. The proposed capital structure model is presented in Section 3. The panel data regression analysis and the results are reported in Sections 4 and 5. Section 6 summarizes the main findings and concludes the article.

2. Literature review

The puzzle of capital structure (Myers, 2001) remained unresolved for more than five decades. In a perfect capital market, when we interpret debt and equity as substitutable, firm value is assumed to be independent of capital structure choice as established by Modigliani and Miller (1958). Following studies since 1963, MM discarded the perfect capital proposition due to friction factors such as bankruptcy costs, transaction costs and agency costs and taxes, which has encouraged researchers to develop alternative theories of capital structure considering that capital structure is crucial for maximizing firm value across the globe. These theories include trade-off theory (Kraus & Litzenberger, 1973), pecking order theory (Myers, 1984), agency theory (Jensen & Meckling, 1976) and market timing theory (Baker & Wurgler, 2002; Demirgüç-Kunt & Maksimovic, 2002). These theories outline the impacts of determinants in either direction for various justifications (Bayrakdaroglu, Ege, & Yazici, 2013; Frank & Goyal, 2009; Haron, 2014; Mahajan & Tartaroglu, 2008;). Huang and Ritter (2009) and Leary and Roberts (2010) precisely explain that capital structure theories are not mutually exclusive because none of them can explain all relevant factors independently. We follow the description by Kayhan and Titman (2007) to reconcile explanations between trade-off theory and pecking order theory by introducing modified pecking order theory. These authors reported that long-term capital structure is guided by Trade-off theory, while short-term decisions are influenced by pecking order theory. An extensive range of studies on capital structure provide a wide array of factors from three well-recognized theories: trade-off theory, pecking order theory and free cash flow theory (Myers, 2001; Sánchez-Vidal & Martín-Ugedo, 2005). Trade-off theory refers to capital structure as a trade-off between the costs of financial distress and the tax shield. The literature on trade-off theory discusses concerns about tax-shield benefits, financial distress costs including cash flow volatility, and possible bankruptcy costs. These issues have been extensively discussed in DeAngelo and Masulis (1980) and Myers (2001). According to pecking order theory, firms prefer retained earnings as an internal funding source over external funding. When funds from internal sources are insufficient to finance capital expenditures, firms consider borrowing from external sources easier rather than issuing equity (Myers & Majluf, 1984). According to agency cost-based theory, agency costs arise because of the use of debt in capital structures Hart and Moore (1995) and Jensen and Meckling (1976). Jensen and Meckling (1976) introduced two major types of conflicts that emerge from agency costs. One type of conflict is between managers and shareholders, and the other is a conflict between shareholders and bondholders (Myers, 2001). Debt-mitigated agency conflicts between shareholders and managers can be found in many important studies, including Jensen and Meckling (1976) and Hart and Moore (1994).

Research has shifted toward emerging countries to highlight the probable deviation in factors that may have emerged from the 1997 Asian financial crisis. From an early examination of seven leading industrial economies (Rajan and Zingales, 1995), we learn about the prevailing firm-specific determinants that considerably affect firms' capital structures across countries in parallel with the country-specific factors that influence leverage choices across those same countries. Early empirical studies on leverage decisions examined the determinants of capital structure for U.S. firms (Titman & Wessels, 1988), while studies by Rajan and And Zingales (1995) and Beck, Demirgüç-Kunt, and Maksimovic (2004) and La Porta, Lopez-de-Silanes, Shleifer, & Vishny (2000) focused on cross-country comparative studies. By analyzing global patterns, it was established that capital structure varies with different institutional settings and macroeconomic variables. Booth et al. (2001) pioneered a study of emerging markets and indicated that the determinants of capital structure vary across developing countries. They also stated that capital structures in developing countries are affected by the same firm-specific factors that had previously been discussed in the context of developed countries. Some major studies by Huang and Ritter (2009) and Korajczyk and Levy (2003) highlighted the impact of macroeconomic variables on capital structure according to country-level differences. However, Deesomsak, Paudyal, and Pescetto (2004) argued that despite the importance of economic structure and cross-countries diversity, few studies have been conducted in ASEAN countries. Based on an analysis of 10 developing countries, Chen and Strange (2005) found that economic growth rates, inflation, and unemployment rates significantly and positively influenced capital structures and operational risks. Inflation increases the level of debt (Wu & Kim, 1988) while Chadegani, Nadem, Noroozi, and Madine (2011) showed that interest rates, inflation, and the GDP

negatively influence the debt-to-equity ratio, whereas exchange rates have a positive relation with leverage. However, differences exist in how some country-specific factors are related to GRTs and how capital markets impact leverage. Therefore, De Jong et al. (2008) examined both firm- and country-specific factors in an equally divided sample of 42 developed and developing countries. Their analysis shows that in addition to the direct effects of country-specific factors on firms' leverage, indirect effects also exist when country-specific factors signify firm-specific factors. Core factors (Frank & Goyal, 2009) that show consistent signs and statistical significance across alternative data treatments are considered as control variables. The remaining factors, which are less consistent over a wide range of studies, are considered as test variables in this study. Bokpin (2009) showed that control variables have significant impacts on capital structures in 34 emerging markets from 1990–2006 and discussed the significant impact of stock market development, bank credit, inflation, and the GDP on leverage structure. Demirgüç-Kunt and Maksimovic (2002), in their study of 10 developing countries, conclude that the capital structure variables that are significant in the case of developing countries (including Jordan, Pakistan, Korea, Malaysia, Turkey, and Thailand) are like those that impact capital structure choices in the U.S., such as tangibility, liquidity, firm size and growth. Remarkable studies conducted on international capital structures with firm- and country-specific variables across countries include Booth et al. (2001), Deesomsak et al. (2004), Song and Philippatos (2004), Fan, Titman, and Twite (2012), and Hall, Hutchinson, and Michaelas (2004).

The literature above identifies the determinants of capital structure for maximizing firm value and providing theoretical foundations for leverage decisions are subject to the empirical testing by field researchers. Scholars continue searching for and integrating theoretical explanations to determine debt and equity issues. Empirical studies demonstrate that basic firm-specific variables, including tangibility, size, ownership, tax, non-debt tax shield (NDTS), liquidity, dividends, profitability, risk, cash flow, expected growth rates, and inflation are important country-specific variables affecting leverage (Frank & Goyal, 2009). However, Kayo and Kimura (2011) prove that only firm-specific factors are important variables rather than macroeconomic variables across 40 sample countries. However, recent studies on capital structure in emerging markets by Delcoure (2007), Fauzi, Basyith, and Idris (2013), and M'ng, Rahman, and Sannacy (2017) provide contradictory results about both types of factors across Asian countries. For instance, the research on the economic effects of inflation (Barry, Mann, Mihov, & Rodriguez, 2008) and growth rates on capital structure are still lacking despite these factors' influences on firms' operating income and cash flow. From the literature review, we find that although empirical studies are increasing in individual developing countries, few studies have been conducted in the Asian region (Deesomsak et al., 2004; Driffield & Pal, 2010). The present study adds valuable knowledge to the existing literature by empirically testing the determinants of capital structure in 16 Asian countries in pooled status as well as in segregated status of income economies as per the World Bank classification. The variables determining leverage across Asian firms in our 16 sample countries from Asia are shown in Table 1, which are identified in the present review of previous studies.

2.1. Variable selection

The variables determining leverage across Asian firms are described in Table 1. All the variables are representative of each of the three core theories and will be regressed in addition to stylized variables as independent variables for panel regression to study the empirical relations identified in the literature review section. Our research discusses the influence of institutional differences captured through stock market orientation, size of the banking industry (SBI) and the size of the bond market (SBM) as country-specific factors. Our results support the empirical findings of Booth et al. (2001), Antoniou, Guney, and Paudyal (2008) and De Jong et al. (2008) indicating that the stock market has a significantly negative influence in the pooled model and income economy models. Our study supports the proposition that the institutional environment remains distinctive across Asian countries, with major influences on firms' financing decisions. Desai et al. (2004) and Chen and Strange (2005) found that economic growth rates, inflation, and

Table 1. Study variables

Vector	Variables	Related theories
1- Vector of firm-specific control variables	Tangibility	Trade-off theory
	Profitability	Trade-off theory
	Growth	Pecking order theory
	Size	Pecking order theory
	Tax	Trade-off theory
2-Vector of country-specific control variables	GDP growth rate	Macroeconomic factors
	Inflation	Macroeconomic factors
3-Vector of firm-specific test variables	Non-debt tax shield (NDTS)	Trade-off theory
	Liquidity	Pecking order theory
	Dividend payout ratio	Pecking order theory
	Business risk	Agency cost theory
	Cash flow	Agency cost theory
	Ownership structure	Agency cost theory
4-Vector of country-specific test variables	Size of the equity market	Macroeconomic factors
	Size of the bond market	Macroeconomic factors
	Size of the banking industry	Macroeconomic factors

Adapted from: Deesomsak et al. (2004) ***and Tarek I. Eldomiaty (2008)***

unemployment rates have significantly positive impacts on leverage. The variables are defined with corresponding measurements, and the data sources are summarized in detail in Table 2.

3. Data and empirical model

3.1. Data

Our study sample covers 16 countries[1] across Asia, including China, Jordan, Malaysia, Thailand, Turkey, India, Indonesia, Pakistan, Philippines, Sri Lanka, Hong Kong, Japan, South Korea, Kuwait, Saudi Arabia, and Singapore, from the World Bank classification of 2008–2014. The unit of analysis in our study is a single firm, and 100 firms are selected from each country (except for Kuwait (66 companies)), Jordan (78 companies) and Saudi Arabia (98 companies). Data for firm-specific variables, country-specific variables and leverage are collected from Capital IQ by Standard & Poor's. The firms in each country are selected using the criteria of the highest market capitalization and the availability of respective firm data over the sample period of 7 years. A few Asian countries are excluded because their data availability is fewer than 100 firms or less than 7 years. We primarily contribute by classifying the effective determinants for three Income economies composed of 16 Asian countries as classified by the World Bank in contrast to previous studies in which countries are analyzed in pooled form only. The World Bank divides the Asian income economies into four income groups: low-income economies, lower middle income economies, upper middle-middle income economies, and high-income economies. Income is measured using the gross national income (GNI) per capita in U.S. dollars converted from local currency using the World Bank Atlas method. We use the classification provided by the World Bank's definition of income economies (IEs) for 16 Asian countries and grouped into 3 IEs. We proceed to explore the differences in leverage choice when the 16 sample countries are pooled as one group compared to when the countries are segregated on an income economy basis. The World Bank segregation of income economies[2] for 16 Asian countries is presented in Table 3.

3.2. Empirical model for the impacts of firm- and country-specific determinants on leverage

Both firm- and country-specific variables are regressed to examine the determinants of leverage choices for firms. To ensure the robustness of both firm- and country-specific variables, four regression models are considered.

Table 2. The study variables with definitions, measurements, and data sources

Variables	Definition	Data source	Measurement
1- Leverage (LEV)	Leverage (LEV ratio is calculated by dividing a company's total liability by its stockholders' equity to assess how much debt is being used by a company to finance its assets relative to the shareholder value). Graham, Leary, and Roberts (2015), Gaud, Hoesli, and André Bender (2007), Drobetz and Fix (2005) and Demirgüc¸ Kunt and Maksimovic (1994)	*Calculated*	Debt-to- Equity ratio = Total liability/ shareholders' equity
Firm-specific variables			
2- Tangibility (TANG)	Tangibility is defined as fixed assets over the book value of total assets. Booth et al. (2001) and Rajan and And Zingales (1995)	*Capital IQ by standard & poor's*	Tangibility = Gross amount of fixed assets/ total assets
3- Size (SZE)	Firm size is defined as the natural logarithm of total sales. De Jong et al. (2008), Gaud et al. (2007) and Booth et al. (2001)	*Capital IQ by standard & poor's*	Size = (Natural log) Ln of sales
4- Profitability (PRT)	Profitability is measured by normalizing a firm's earnings before interest and taxes (EBIT) with total assets. De Jong et al. (2008), Deesomsak et al. (2004) and Booth et al. (2001)	*Capital IQ by standard & poor's*	Profitability = EBIT/total assets
5- Tax (TAX)	Effective average tax rate for the year is directly extracted from Compustat Global. De Jong et al. (2008)	*Capital IQ by standard & poor's*	Tax = Total income tax/EBIT
6- Growth opportunity (GRW)	Growth opportunity is defined as the market value of total equity over the book value of total equity. Gaud et al. (2007), Booth et al. (2001), and Bevan and Danbolt (2004)	*Capital IQ by standard & poor's*	Growth = Market-to-book ratio = Market value of equity/book value of equity
7- Non-debt tax shield (NDTS)	The NDTS is measured by depreciation over the book value of total assets. Deesomsak et al. (2004), Song and Philippatos (2004) and Huang and Song (2006)	*Capital IQ by Standard & Poor's*	NDTS = Depreciation/total assets

(*Continued*)

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Table 2. (*Continued*)

Variables	Definition	Data source	Measurement
8- Liquidity (LIQ)	Liquidity is defined as the current assets divided by current liabilities. De Jong et al. (2008) and Deesomsak et al. (2004)	*Capital IQ by Standard & Poor's*	Liquidity = Current assets/current liabilities
9- Payout ratio (PAYR)	This study defines the payout ratio as dividends divided by after-tax profits. Mazur (2007), Frank and Goyal (2009), and Beattie, Goodacre, and Thomson (2006)	*Capital IQ by Standard & Poor's*	Payout ratio = Dividends/profit after tax
10- Business risk (BRSK)	Defined as the standard deviation of the first difference in EBIT divided by assets during the sample period. Huang and Song (2006) and Booth et al. (2001)	*Capital IQ by Standard & Poor's*	Risk = Standard deviation of return on assets
11- Levered free cash flow (LFCF)	LFCF is calculated according to the widely accepted technique. Gul and Tsui (1997)	*Capital IQ by Standard & Poor's*	Free cash flow = EBITD—income tax—interest expense—total dividends
12- Ownership structure (OWS)	We used a dummy variable of 1 to indicate private ownership and 0 to indicate public ownership. Claessens, Djankov, and Lang (2000)	*Capital IQ by Standard & Poor's*	The dummy variable takes the value 1 if the firm is government-owned and 2 if it is privately-owned
Country-specific variables			
13- GDP growth rate (GRT)	Country-wise on a yearly basis. De Jong et al. (2008) and Mazur (2007)	*World development indicators*	Same as in the country statistics for 12 countries for each year
14- Inflation (INF)	Country-wise on a yearly basis. Cheng and Shiu (2007) and Mazur (2007)	*World development indicators*	Same as in the country statistics for 12 countries for each year
15- Size of the equity market (SEM)	We define stock market development as the ratio of stock market capitalization to the GDP. Kayo and Kimura (2011), De Jong et al. (2008) and Cheng and Shiu (2007)	*World development indicators*	Stock market capitalization (%) to the GDP (SMCAP_GDP)
16- Size of the bond market (SBM)	SBM is measured as the total bond market capitalization to the GDP. Kayo and Kimura (2011), De Jong et al. (2008)	*World development indicators*	Total bond market capitalization (%) to the GDP (TBMC_GDP)
17- Size of the banking industry (SBI)	The value of credit given by the banking sector to the private sector divided by the GDP. Cheng and Shiu (2007)	*World development indicators*	Private credit by deposit money banks and other financial institutions to the GDP (PCDBFIs_GDP)

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Table 3. *Sample Selection*: Top 100 companies from each of the 16 countries for 7 years (2008–2014) segregated according to the World Bank criterion of the GNP

Country name	Income Economy (IE) status	No. of countries in each IE
Hong Kong	High-income economies ($12,476 or more)	6 countries in High-income economies.
Japan		
Korea (South Korea)		
Kuwait		
Saudi Arabia		
Singapore		
China	Upper middle Income ($4,036 to $12,475)	5 countries in Upper middle-income economies
Jordan		
Malaysia		
Thailand		
Turkey		
India	Lower middle Income ($1,026 to $4,035)	5 countries in Lower middle-income economies
Indonesia		
Pakistan		
Philippines		
Sri Lanka		

Model 1 considers only firm-specific variables as follows:

$$LEV_{ijt} = \beta_{0j} + \beta_1 TANG_{ijt} + \beta_2 SIZE_{ijt} + \beta_3 PRT_{ijt} + \beta_4 TAX_{ijt} + \beta_5 GRW_{ijt} + \beta_6 NDTS_{ijt} + \beta_7 LIQ_{ijt} + \beta_8 PAYR_{ijt} + \beta_9 BRSK_{ijt} + \beta_{10} LFCF_{ijt} + \beta_{11} OWNERSHIP_{ijt} + \varepsilon it, \quad (1)$$

where *i = firm, j = country, t = time, and Ɛit is the error term with an average of zero, not autocorrelated with each other, (uncorrelated with the regressors, and homoscedastic) and it varies between individual firm and time.*

Core factors that show consistent signs and statistical significance across alternative data treatments are considered control variables, as identified in Table 2. Frank and Goyal (2009) rationally identified tangibility, growth, profitability, size, and inflation as core factors. In addition to core variables, we have extended the representative variables of the three theories for the firm-specific case.

Model 2 is expressed with Country-specific variables in addition to firm-specific determinants as follows:

$$LEV_{ijt} = \beta_{0j} + \beta_1 TANG_{ijt} + \beta_2 SIZE_{ijt} + \beta_3 PRT_{ijt} + \beta_4 TAX_{ijt} + \beta_5 GRW_{ijt} + \beta_6 NDTS_{ijt} + \beta_7 LIQ_{ijt} + \beta_8 PAYR_{ijt} + \beta_9 BRSK_{ijt} + \beta_{10} LFCF_{ijt} + \beta_{11} OWNERSHIP_{ijt} + \beta_{12} STOCKMKT_{ijt} + \beta_{13} BOND\ MKT_{ijt} + \beta_{14} BANK\ MKT_{ijt} + \varepsilon it, \quad (2)$$

where *i = firm, j = country, t = time, and Ɛit is the error term with the statistical properties depicted in Equation (1).*

To observe the effects of firm- and country-specific variables in each income economy, we segregate our sample into the three levels of income (high income, upper middle income, and lower middle income).

In Model 3, we estimate the effect of firm-specific variables on leverage by income economy:

$$LEV_{ijkt} = \beta 0 + \beta 1(Vector\ of\ firm\ control\ variables)_{ijkt} + \beta 2(Vector\ of\ firm - specificte\ stvariables)_{ijkt} + \varepsilon_{ijkt}, \quad (3)$$

where *i = firm, j = country, t = time, and k* =subscript for income-economy k = 1,2,3.

Subscripts *i, j, t*, and *k* are the same as in Model 3. Εijkt is the error term with an average of zero, not autocorrelated, (uncorrelated with the regressors, and homoscedastic)) and it varies between individual firm, time, and Income economy.

Vector of firm-specific control variables = Tangibility, Size, Profitability, Tax and Growth.

Vector of firm-specific test variables = Non-debt tax shield, Liquidity, Payout ratio, Business risk, Free cash flow, and Ownership structure.

Model 4 estimates the effects of both firm- and country-specific variables for each income economy.

$$LEV_{ijkt} = \beta 0 + \beta 1(Vector\ of\ firm - specific\ control\ variables)_{ijkt} + \beta 2(Vector\ of\ firm - specific\ test\ variables)_{ijkt} + \beta 3 + (Vector\ of\ firm - specific\ test\ variables)_{ijkt} + \beta 4\,(Vector\ of\ country - specific\ test\ variables)_{ijkt} + \varepsilon_{ijkt}, \quad (4)$$

where *i = firm, j = country, t = time, and k* =subscript for income-economy k = 1,2,3. ε_{ijkt} *is the error term with the statistical properties depicted in Equation* (3) already.

Vector of country-specific control variables = GDP growth rate and Inflation.

Vector of country-specific test variables = Size of the Equity market, Size of Bond market, and Size of Banking industry.

In contrast to pooled sample studies by Rajan and And Zingales (1995), Booth et al. (2001) and De Jong et al. (2008), for the 16 Asian countries, we consider three income economy groups to examine financing choices in addition to pooled analyses. In the panel regression, we have the benefit of combining maximum cross-sectional observations with time-series data to obtain better efficiency. The decision regarding which effect model (fixed-effects or random-effects model) should be selected requires a significant amount of attention. If we opt for the fixed-effects model, we can take all sample data, while we allow the intercept to change across firms over the time range. However, Hsiao (2010) notes that because of the presence of measurement errors, the fixed-effects model can produce more biased estimators than simple pooling. In contrast, the random-effects model assumes that the company-specific intercept is a random variable and uses a generalized least squares estimation procedure. Keeping this assumption in view, we employ the random-effects model for the analysis. We use a panel data model to estimate models (1)–(4). The panel is specified in terms of both countries and firms. Random effect model is applied here since some of our variables of interest are time-invariant. One limitation of the random-effects estimator (compared to the fixed-effects estimator) is that it can yield inconsistent and biased estimates if the unobserved fixed effects correlate with the remaining component of the error term. However, this is unlikely to be a serious problem in this case since the number of explanatory variables (*N*) is larger than the number of "within" observations (*T*) (Wooldridge, 2002: Chapter 10).

4. Summary statistics

Our focus is on examining the capital structure decisions of listed firms in emerging Asia with a view to understanding the extent to which recent increases in debt have outpaced those of equity

and historical norms. In the process, we also provide a more granular understanding of the determinants of debt levels and debt changes of firms in Asia. The summary statistics of the firm-specific determinants and leverage for the 16 Asian countries and three income-economies (IEs) during 2008–2014 are presented in Table 4. In this study, we observe a wide-ranging pattern of leverage around Asia. With respect to emerging economies, we find that there are different trends from low leverage in some economies, such as Malaysia and Saudia Arabia with long-term debt ratio with 0.730 and 0.887. Our results of the lowest long-term debt ratio are supported by the summary results of De Jong et al. (2008) and Booth et al. (2001). However, we observe from Table 4 that the highest long-term leverage ratio is found for India and China with 1.567 and 1.562, respectively. Similarly, we find the highest tangibility (TANG) in Japan with 0.799, followed by Saudi Arabia with 0.782. For firm size (SZE), we find that Korea is the highest with 15.175, whereas Kuwait has the lowest average with 3.118. The highest average profitability (PRT) is for India with 0.141, followed by Turkey (0.139). The highest average tax rate for Japan is 0.327, and Kuwait has the lowest rate with 0.037. For growth (GRW), Indonesia leads with 4.828, followed by India with 4.810. Both countries are already considered in the five fastest economies of Asia. Regarding the non-debt tax shield (NDTS), Turkey leads with 0.081, whereas Malaysia is the lowest at 0.024. For liquidity (LIQ), Malaysia leads with 2.927, followed by the Philippines with 2.534. For the payout ratio (PAYR), Thailand leads with 0.591 being one of the top eight Asian, whereas China has the lowest ratio of 0.010. Despite leading for business risk (BRSK) with 0.075, India remains in the top five largest economies in Asia followed by Turkey with 0.064.

The income economy-based segregation from the World Bank convinced the authors to identify the group-based variation impact in the selection of variables to study leverage choice. The effective capital selection strategies in terms of effective determinants can be studied to reduce the variation among countries. Leverage in lower middle income economies is 1.3, whereas the mean leverage is 1.1 by firms in both upper middle income and high-income economies. This implies that the firms in lower middle income economies prefer more debt in their capital structure as compared to the other two income economies. The study by Goyal and Packer (2017) for Hong Kong, Indonesia, Korea, Malaysia, the Philippines, Singapore, and Thailand from 1991 to 2015 also supports our results for the increase in debt ratio for low-income economies including Indonesia and Philippines. For tangibility, authors do not find considerable variation among the three income economy groups, lying within a range of 0.607 to 0.639 across three income economies. From Table 5 authors also find that the average firm size is highest in the lower middle-income countries with mean 9.92 followed by 9.41 in the high-income countries. Since the variation is reduced in income economy-based groupings, it is very much logical to consider the countries in their respective income economy groups. The profitability ratio is highest in the lower middle-income economy with 0.106. Large multinational corporations (LMCs) in such income economies have adopted various industrial policy approaches during the last 15 years. This classification result supports the import-substitution industrialization (ISI), which includes instruments of domestic market protection (for example, tariffs and quantitative restrictions) from the subsidies to domestic production. Profitability and tax have a highest mean ratio in case of lower middle income economies with 0.106 and 0.264, respectively, supports the fact that highly profitable firms pay taxes in addition to exploring the growth opportunities with highest mean 3.485 followed by upper middle income mean of 2.461. For dividend payout ratio we do not find conservable variation across all three income economies. Firms in high- and middle-income economies enjoy higher liquidity as compared to the firms in low-income economies. All other things being equal, high current ratio is considered better than lower by creditors because a higher ratio shows that such companies are more likely to meet its obligations due in short term. Thus, firms in high- and middle-income economies have better financial health and efficiency to pay off debt which is of great importance to creditors.

Our findings complement the study of Booth et al. (2001) which suggest that the development of equity markets renders it the most viable option for corporate financing, leading the firms to reduce the use of debt financing. In addition to the stock market, highly developed debt markets

Table 4. Cross-country summary statistics of leverage and firm-specific variables

Country	LEV	TANG	SZE	PRT	TAX	GRW	NDTS	LIQ	PAYR	BRSK	LFCF	Own (%)
China	1.562	0.521	9.830	0.077	0.185	3.596	0.027	1.597	0.010	0.033	−0.019	23
	(1.508)	(0.359)	(1.635)	(0.072)	(0.108)	(2.596)	(0.022)	(1.291)	(0.037)	(0.077)	(0.216)	
Hong Kong	0.948	0.466	8.843	0.077	0.161	2.766	0.025	2.080	0.419	0.016	0.002	93
	(1.060)	(0.346)	(1.637)	(0.090)	(0.137)	(2.645)	(0.023)	(1.505)	(0.382)	(0.025)	(0.222)	
India	1.567	0.521	11.131	0.141	0.262	4.810	0.028	1.854	0.266	0.075	−0.021	80
	(1.380)	(0.270)	(1.529)	(0.095)	(0.211)	(3.610)	(0.025)	(1.374)	(0.289)	(0.113)	(0.171)	
Indonesia	1.541	0.517	13.462	0.113	0.316	4.828	0.038	2.006	0.340	0.055	−0.017	97
	(1.685)	(0.403)	(3.381)	(0.148)	(0.275)	(5.175)	(0.063)	(1.771)	(0.429)	(0.119)	(0.416)	
Japan	1.549	0.799	14.168	0.074	0.327	1.614	0.041	1.992	0.385	0.020	0.036	96
	(1.485)	(0.526)	(1.142)	(0.059)	(0.308)	(1.047)	(0.023)	(1.471)	(0.358)	(0.018)	(.108)	
Jorden	0.944	0.767	2.569	0.029	0.127	1.491	0.042	2.232	0.538	0.040	−0.075	100
	(1.608)	(0.434)	(1.884)	(0.141)	(0.184)	(1.546)	(0.092)	(2.062	(0.830)	(0.035)	(1.000)	
Korea	1.425	0.596	15.175	0.078	0.288	2.011	0.037	1.498	.296)	0.026	−0.028	98
	(1.233)	(0.344)	(1.417)	(0.070)	(0.223)	(2.005)	(0.036)	(.793)	(0.409)	(0.027)	(0.289)	
Kuwait	1.094	0.461	3.118	0.027	0.037	1.475	0.033	2.111	0.350)	0.035	0.004	94
	(1.310)	(0.400)	(1.556)	(0.075)	(0.091)	(1.383)	(0.078)	(2.089)	(0.445)	(0.050)	(0.727)	
Malaysia	0.730	0.578	6.558	0.121	0.236	2.327	0.024	2.927	0.412	0.030	0.026	66
	(0.743)	(0.275)	(1.505)	(0.115)	(0.130)	(2.590)	(0.017)	(2.611)	(0.361)	(0.035)	(0.271)	
Pakistan	1.474	0.683	9.443	0.130	0.294	1.859	0.038	1.155	0.369	0.050	−0.152	66
	(1.624)	(0.339)	(1.369)	(0.127)	(0.203)	(2.198)	(0.064)	(1.057)	(0.452)	(0.101)	(0.834)	
Philippines	1.016	0.626	7.523	0.052	0.210	4.230	0.037	2.534	0.333	0.044	−0.036	80
	(1.448)	(0.480)	(2.978)	(0.138)	(0.221)	(7.146)	(0.053)	(2.629)	(0.507)	(0.087)	(0.322)	
Saudi Arabia	0.887	0.782	6.633	0.086	0.123	2.762	0.036	2.471	0.117	0.025	−0.074	99
	(0.932)	(0.393)	(1.769)	(0.101)	(0.210)	(2.453)	(0.036)	(2.066)	(0.224)	(0.032)	(0.482)	

(*Continued*)

Table 4. (*Continued*)

Country	LEV	TANG	SZE	PRT	TAX	GRW	NDTS	LIQ	PAYR	BRSK	LFCF	Own (%)
Singapore	1.149	0.496	6.300	0.075	0.195	2.511	0.025	1.997	0.498	0.027	−0.031	98
	(1.335)	(0.397)	(1.809)	(0.093)	(0.171)	(4.268)	(0.083)	(1.567)	(0.573)	(0.043)	(0.573)	
Sri Lanka	1.015	0.687	8.054	0.095	0.240	1.699	0.029	1.653	0.360	0.041	−0.046	92
	(1.179)	(0.351)	(1.710)	(0.106)	(0.229)	(2.044)	(0.025)	(1.421)	(0.500)	(0.042)	(0.276)	
Thailand	1.282	0.732	9.567	0.101	0.206	2.629	0.039	1.754	0.591	0.032	0.033	92
	(1.383)	(0.387)	(1.601)	(0.101)	(0.161)	(2.654)	(0.032)	(1.484)	(0.545)	(0.045)	(0.610)	
Turkey	1.281	0.625	5.418	0.139	0.189	2.049	0.081	1.930	0.354	0.064	−0.040	80
	(1.618)	(0.509)	(2.612)	(0.232)	(0.197)	(2.894)	(0.188)	(1.857)	(0.593)	(0.140)	(0.704)	
F-ratio	28.56	55.41	2327.53	55.07	88.44	77.84	51.30	43.30	65.89	34.60	5.99	-
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	
Income Economies												
Lower middle	1.323	0.607	9.922	0.106	0.264	3.485	0.034	1.840	0.334	0.053	−0.054	87
	(1.495)	(0.382)	(3.190)	(0.128)	(0.232)	(4.684)	(0.049)	(1.793)	(0.444)	(0.097)	(0.467)	
Upper middle	1.170	0.639	6.983	0.096	0.191	2.461	0.043	2.081	0.374	0.040	−0.012	75
	(1.430)	(0.409)	(3.224)	(0.148)	(0.162)	(2.625)	(0.098)	(1.969)	(0.564)	(0.080)	(0.609)	
High-income	1.181	0.608	9.405	0.072	0.198	2.231	0.033	2.018	0.345	0.024	−0.016	96
	(1.259)	(0.430)	(4.486)	(0.085)	(0.227)	(2.625)	(0.051)	(1.633)	(0.428)	(0.034)	(0.433)	
F-ratio	13.16	7.94	554.50	80.34	122.12	136.64	46.37	28.39	6.39	145.41	7.52	-
	(.000)	(.001)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.002)	(.000)	(.001)	

Figures in parenthesis are standard deviations. The figures under the ownership column represent the percentage of firms owned privately. F-ratios are reported for comparisons of the means of variables by ANOVA under study for both between countries and between Income Economies. The numbers in parenthesis associated with F-ratios are their p-values.
Source: Author's calculation

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Table 5. ***Cross-country summary statistics of country-specific variables*** **This table presents the cross-country summary statistics for all 16 countries from the World Bank data sources during 2008–2014**

Country	GRT	INF	SEM	SBM	SBI
China	8.88	0.033	83.815	46.785	114.285
	(1.238)	(0.017)	(23.270)	(2.204)	(9.551)
Hong Kong	2.69	0.034	456.221	42.084	165.582
	(2.861)	(0.013)	(65.030)	(12.958)	(26.264)
India	6.93	0.095	80.022	35.679	45.705
	(2.062)	(0.029)	(15.422)	(1.899)	(2.676)
Indonesia	5.66	0.067	38.869	14.673	26.481
	(0.625)	(0.030)	(7.688)	(2.047)	(2.689)
Japan	0.21	0.000	76.749	237.387	176.985
	(3.006)	(0.009)	(12.736)	(21.553)	(2.453)
Jorden	3.74	0.052	135.782	0.000	74.019
	(1.871)	(0.021)	(40.201)	(0.000)	(5.862)
Korea	3.18	0.029	91.207	104.589	63.850
	(1.750)	(0.011)	(9.029)	(5.332)	(11.417)
Kuwait	1.56	0.047	87.026	0.000	103.555
	(5.521)	(0.022)	(25.882)	(0.000)	(5.322)
Malaysia	4.60	0.025	135.327	108.759	23.863
	(2.847)	(0.011)	(15.482)	(4.813)	(12.051)
Pakistan	3.07	0.112	22.557	28.228	22.236
	(1.204)	(0.041)	(8.379)	(2.259)	(3.896)
Philippines	5.21	0.044	61.241	31.458	55.066
	(2.323)	(0.015)	(13.310)	(1.469)	(9.364)
Saudi Arabia	4.43	0.052	74.951	0.000	99.645
	(3.682)	(0.019)	(15.491)	(0.000)	(10.829)
Singapore	5.12	0.035	153.741	57.064	100.391
	(5.007)	(0.021)	(17.233)	(2.556)	(7.987)
Sri Lanka	6.20	0.099	26.370	0.000	123.331
	(2.358)	(0.063)	(8.189)	(0.000)	(15.732)
Thailand	2.90	0.027	70.605	57.149	123.331
	(3.224)	(0.011)	(14.081)	(5.842)	(15.732)
Turkey	4.88	0.081	152.774	47.455	38.391
	(5.372)	(0.501	(42.589)	(8.549)	(8.219)
F-ratio	3.159	143.94	105.51	377.72	131.45
	(.000)	(.000)	(.000)	(.000)	(.000)
Income Economies					
Lower middle	5.41	0.08	45.81	22.01	54.36
	(2.183)	(0.05)	(24.44)	(13.18)	(37.44)
Upper middle	5.00	0.08	92.94	52.02	74.81
	(3.689)	(0.25)	(45.34)	(35.40)	(41.96)
High-income	2.87	0.03	161.14	78.21	121.60
	(3.986)	(0.02)	(143.11)	(82.61)	(41.03)
F-ratio	6.287	15.90	14.30	8.29	24.78
	(.003)	(.000)	(.000)	(.000)	(.000)

Figures in parentheses are standard deviations. F-ratios are reported for comparisons of the means of the variables under study by ANOVA between countries and between income economies. The numbers in parenthesis associated with F-ratios are their p-values.

Source: Author's calculation

are associated with higher private sector debt ratios. In Table 5, we also find that bond markets with 78.21 and the banking industry with 121.60 are highly developed in case of high-income economies, followed by middle-income economies. A distinctive number of studies by Booth et al. (2001), Deesomsak et al. (2004), Song and Philippatos (2004), Bokpin (2009) and Fan, Titman, and Twite (2012) discuss international capital structures with firm- and country-specific variables across countries, supporting our research findings. We use equity market, bond market and banking industry factors as proxies for the financial system in pooled and income economy systems and discover that lower middle-income economies have the highest mean leverage of 1.323 and high-income economies have the lowest mean leverage of 1.181 for the sample period 2008–2014. This result contrasts with the findings of Booth et al. (2001) who report that developing countries have considerably lower amounts of long-term debt. Research has proven that the impact of institutional differences is captured through country-specific determinants such as stock market orientation and developments in the banking industry and bond markets.

Having documented the trends for the equity market role from the cross-country summary statistics in Table 5, we observe that the mean for stock market orientation is highest for high-income economies. From the cross-country summary statistics of macroeconomic variables in Table 5, we find a high degree of variation across all countries. Such as the highest mean GDP growth rate (GRT) is found for China at 0.097, while the lowest mean GRT is found for Japan at 0.004, we observe that the GRT is highest for the middle-income economy group with 0.72, and the lowest mean value is found for high-income economy with 0.01. The mean inflation value is highest for the lower middle-income economy is highest with 0.08, and the lowest value is found for the high-income economy group with mean 0.03. Our study supports the evidence reported by the International Financial Institution (IFI) showing that developments in the stock market represent a natural progression in a country's development, indicating that economic institutions' development is accelerated when a country achieves a higher level of economic development. We also observe that the variation impact is also reduced when we consider the cross-income economy group summary; for example, the GDP growth rate (GRT) is highest for the middle-income economy group. Meanwhile, inflation is highest for the lower middle-income economy group and lowest for the high-income economy group. Stock market orientation, bank market orientation and bond market orientation are all lowest in the lower middle-income economies and highest in the high-income economies.

5. Empirical results and discussion

In this study, the dataset of 16 Asian countries is considered in pooled data form. For further analysis 16 Asian countries are is divided into lower middle, upper middle and high-income economies to understand the cross-country differences and cross- income-economy group similarities (Table 1). To investigate our research questions, we advance to explore differences in leverage choices when 16 sample countries are pooled as one group compared to when the countries are segregated on an income economy basis. Our results add value to the existing literature when we will contribute by classifying effective determinants for three Income economies composed of 16 Asian countries as classified by the World Bank in contrast to previous studies in which countries' data are analyzed in pooled form only. Using the World Bank's definitions of income economies (IEs), we classify 16 Asian countries into 3 income economies based on the GNP.

We run firm-level random-effect regressions where leverage is the dependent variable, and firm-specific factors and country-specific factors are explanatory variables for each of the 16 countries in our dataset. The determining factors for leverage choice in Asian economies and countries from 2008–2014 are presented in Table 8. But initially, an examination of the collinearity diagnosis test (Table 6) and the correlation matrix of the sample data (Table 7) provides some insights about the robustness of our results. We check for multicollinearity by observing the Variance Inflation Factor (VIF) associated with explanatory variables and find that there is no serious issue of multicollinearity since the VIF values for all explanatory variables are not higher than 1.46 (Table 6). The

Table 6. Multicollinearity diagnostic test for the independent variables included in the models

Model		Unstandardized coefficients		Standardized coefficients	t	Sig.	Collinearity statistics	
		B	Std. error	Beta			Tolerance	VIF
	(Constant)	1.190	.060		19.792	.000		
	TANG	−.218	.031	−.064	−6.995	.000	.899	1.112
	SZE	.065	.003	.179	19.107	.000	.855	1.169
	PRT	−1.454	.106	−.128	−13.673	.000	.863	1.159
	TAX	.334	.059	.051	5.665	.000	.922	1.085
	GRW	.068	.004	.170	18.923	.000	.927	1.078
	NDTS	−.270	.195	−.015	−1.387	.165	.686	1.458
	LIQ	−.230	.007	−.298	−32.710	.000	.902	1.109
	PAYR	.023	.026	.008	.877	.380	.961	1.041
	BRSK1	−.574	.166	−.031	−3.462	.001	.949	1.053
	LFCFMCAP	−.082	.024	−.030	−3.427	.001	.991	1.009
	Ownership	.135	.037	.033	3.683	.000	.955	1.047
	GRT	−.003	.004	−.007	−.837	.403	.943	1.061
	INF	.268	.102	.027	2.627	.009	.691	1.446

Dependent variable: Leverage

Table 7. Correlation matrix of leverage, which also proves the absence of multicollinearity

	LEV	TANG	SZE	PRT	TAX	GRW	NDTS	LIQ	PAYR	BRSK	LFCF	Ownership
Leverage	1											
Tangibility	−.109**	1										
Size	.226**	.053**	1									
Profitability	−.101**	−.031**	.125**	1								
Taxation	.132**	.026**	.253**	−.027**	1							
Growth	.144**	−.044**	.019*	.215**	.018	1						
NDTS	−.045**	.220**	−.057**	.008	−.021*	−.027**	1					
Liquidity	−.347**	−.153**	−.178**	.114**	−.088**	.019*	−.086**	1				
Payout ratio	.014	.050**	−.025**	.063**	.094**	.020*	−.025**	.036**	1			
Business risk	−.110**	−.048**	−.082**	.137**	.000	.081**	.050**	.007	−.006	1		
LFCF	−.010	−.010	.018	.082**	−.008	.024*	.001	.040**	.015	−.006	1	
Ownership	.042**	−.013	.068**	.034	.030**	−.005	−.034**	−.002	−.091**	−.015	.012	1

Superscripts ** and * indicate that the correlation is significant at 1% and 5% levels, respectively.

Table 8. Effects of Firm- and Country-specific variables on Leverage for 16 countries using average annual data from 2008–2014

Variables	Model 1	Model 2	Model 3			Model 4		
			LMIEs	UMIEs	HIEs	LMIEs	UMIEs	HIEs
Intercept	0.721***	1.157***	0.779***	0.586***	0.526***	0.922*	1.432***	0.048*
	(0.069)	(0.178)	(0.139)	(0.141)	(0.100)	(0.507)	(0.392)	(0.493)
TANG	−0.227***	−0.249***	−0.169***	−0.444***	−0.234***	−0.165**	−0.492***	−0.292***
	(0.043)	(0.044)	(0.086)	(0.076)	(0.065)	(0.086)	(0.075)	(0.066)
SZE	0.071***	0.069***	0.062***	0.120***	0.083***	0.064***	0.145***	0.115***
	(0.006)	(0.007)	(0.011)	(0.015)	(0.008)	(0.012)	(0.019)	(0.012)
PRT	−0.726***	−0.752***	−0.645***	−0.536***	−1.605***	−0.695***	−0.582***	−1.680***
	(0.105)	(0.106)	(0.202)	(0.148)	(0.220)	(0.202)	(0.150)	(0.219)
TAX	0.365***	0.353***	0.349***	0.512***	0.304***	0.290***	0.506***	0.319***
	(0.051)	(0.051)	(0.096)	(0.112)	(0.067)	(0.096)	(0.114)	(0.067)
GRW	0.086***	0.088***	0.077***	0.096***	0.107***	0.082***	0.100***	0.109***
	(0.004)	(0.004)	(0.006)	(0.008)	(0.007)	(0.006)	(0.009)	(0.007)
NDTS	−0.229**	−0.149**	−0.121**	−0.308**	−1.607***	−0.115**	−0.643***	−1.560***
	(0.109)	(0.065)	(0.059)	(0.130)	(0.289)	(0.045)	(0.235)	(0.289)
LIQ	−0.141***	−0.144***	−0.187***	−0.104***	−0.125***	−0.177***	−0.117***	−0.125***
	(0.008)	(0.008)	(0.016)	(0.012)	(0.012)	(0.016)	(0.013)	(0.012)
PAYR	0.027	0.028	0.012	−0.016	0.104***	0.018	−0.029	0.125***
	(0.024)	(0.023)	(0.049)	(0.035)	(0.037)	(0.049)	(0.035)	(0.038)
BRSK	−0.362**	−0.332**	−0.227**	−0.547***	−0.210**	−0.268**	−0.525***	−0.205**
	(0.138)	(0.138)	(0.108)	(0.210)	(0.107)	(0.122)	(0.201)	(0.093)
LFCF	−0.007	−0.007	−0.041	0.013	−0.039	−0.027	0.011	−0.036
	(0.019)	(0.019)	(0.043)	(0.026)	(0.030)	(0.043)	(0.026)	(0.030)
Ownership	0.120	0.131*	0.353***	−0.219*	−0.228	0.252*	−0.131	−0.225
	(0.075)	(0.076)	(0.129)	(0.120)	(0.204)	(0.132)	(0.119)	(0.204)

(*Continued*)

Table 8. (*Continued*)

Variables	Model 1	Model 2	Model 3			Model 4		
			LMIEs	UMIEs	HIEs	LMIEs	UMIEs	HIEs
GRT	-	−0.605***	-	-	-	−0.464***	−0.112***	−0.267**
		(0.208)				(0.116)	(0.055)	(0.122)
INF	-	0.153	-	-	-	1.819***	−0.039	1.787**
		(0.119)				(0.430)	(0.124)	(0.707)
SEM	-	−0.334***	-	-	-	−0.541***	−0.158	−0.249**
		(0.063)				(0.166)	(0.126)	(0.113)
SBM	-	−0.032	-	-	-	0.250*	−0.412***	−0.231***
		(0.038)				(0.131)	(0.091)	(0.061)
SBI	-	0.145*	-	-	-	0.201	−0.026	0.482**
		(0.079)				(0.259)	(0.147)	(0.192)
Observations	10,794	10,794	3500	3346	3948	3500	3346	3948
R-Square	0.17	0.17	0.17	0.18	0.18	0.17	0.21	0.19
Wald Chi-square	1128.35	1163.96	388.58	395.88	577.28	403.19	428.63	611.10
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
Breusch and Pagan LM test	10,244.38	10,221.45	2073.29	4126.54	3909.24	2074.80	3866.66	3817.23
	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)

The table presents the regression results of the effects of firm- and country-specific variables on leverage using annual average data from 2008–2014 estimated from Eq 3.1–3.2. The data represent 16 Asian countries and 3 Asian income economies using average annual data from 2008–2014. The independent variable is leverage, and the regression coefficients are reported for the independent variables previously defined in Table 2. The *Robust Standard errors* are reported in parentheses. Superscripts ***, **, and * indicate statistical significance at the 1%, 5% and 10% levels, respectively. Observations are the number of panel observations in the regressions. The Wald chi-square and Breusch and Pagan (1980) test results for random effects are reported for each model. The numbers in parenthesis associated with Wald chi-square and Breusch and Pagan test are their p-values.

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results are presented in the following correlation matrix (Table 7), which shows that the pair-wise correlations of the variables generally do not appear to indicate any concern over the multi-collinearity problem in estimating the regression. In this study, we study 11 firm-specific variables and estimates the relationships among all of them. Pearson correlation analysis provides an early sign that SZE, TAX GRW, and Ownership are positively significantly related to leverage and are significantly different from zero at the 1% level. On the other hand, the variables of TANG, PRT, NDTS, LIQ, and BRSK are negatively significantly related to leverage at a 1% level. Among the explanatory variables, highest (and significant) correlation is between firm size and taxation such that their correlation coefficient is 0.253 (p-value 0.000). And to a lesser extent, NDTS is correlated with TANG (0.220; p-value = 0.000). We believe that this level of correlation between independent variables may not pose any possible threat of multicollinearity for our further regression analysis.

5.1. Country-wise and income-economy based impacts of firm-specific determinants on leverage

The results reveal that tangibility, profitability, non-debt tax shield, liquidity, business risk, and GDP growth rate have significant negative effects on firms' leverage across all four models. However, firm size, taxation, and business growth have significant positive impacts on leverage. Nevertheless, certain factors showed partial effects over leverage, indicating that these are not significant in pooled models (Models 1 and 2), whereas their effects are significant in certain individual models based on income economies. For example, the effects of payout ratio and ownership are shadowed in the pooled models, whereas in the Income economy-based segregated models (3 and 4), these factors showed their differentiated impacts. From pooled model 2, the stock market and bond market have significant negative effects on leverage. However, the effects of stock market development are not apparent in the case of upper middle-income economy in segregated models. The size of the banking industry (SBI) showed a significant positive relationship with leverage in pooled model 2. Interestingly, the role of bank market is quite apparent in the high-income economy only. Ownership is positively related to leverage in model 2 (combined micro and macro factors). A positive relationship with leverage implies that firms in countries with concentrated private ownership show more leverage usage compared to those in countries with more publicly owned firms.

The positive correlation between leverage with tangibility is supported by Rajan and And Zingales (1995) and De Jong et al. (2008) in their studies across countries. Nevertheless, our research finds that tangibility is negatively associated with leverage across four models because firms' asset tangibility is mainly associated with agency costs of debt according to agency theory (Jensen & Meckling, 1976). Risky firms prefer to use fewer fixed assets, thus restraining managers from using more debt than the optimal level. Our results advocate the findings of Booth et al. (2001) regarding the negative relation of tangibility in their study of 10 countries. Research over time indicates that the value and risk of a firm's assets are not the only determinants of the level of borrowing and that certain types of assets also have a significant impact. Therefore, the companies holding more tangible assets with extensive secondhand markets are expected to borrow less than those holding more valuable or intangible assets. Furthermore, the use of collateral plays an important role in countries with relatively weaker creditor protection (Vinh.Vo, 2017); thus, emerging countries can be rationally accepted as part of the group of countries with weak credit protection. Since the need for collateral is more pronounced in traditional bank lending, the role of asset tangibility is expected to be more prominent in bank-oriented economies.

Larger firms tend to have higher leverage, coherent to our study which is also proving the positive impact of firm size on leverage, thus supporting the notion of Rajan and And Zingales (1995) and M'ng et al. (2017) in their research on Thailand, Malaysia and Singapore implying that larger firms in terms of assets tend to have higher leverage, and that larger and more diversified firms face a lower default risk. Our finding regarding firm size is consistent with those of Deesomsak et al. (2004), Huang and Song (2006) and Shahjahanpour, Ghalambor, and Aflatooni (2010) according to trade-off theory. Pursuant to pecking order theory, profitable firms choose to

use internally generated funds and lower leverage (Myers & Majluf, 1984). We find negative and significant results in all of the models, which are supported by key studies such as Al-Sakran (2001), Chen (2004), Gaud et al. (2007) and Alves and Ferreira (2011). We also find a positive and significant impact of taxation on leverage across all four models for Asian countries and three economies, confirming the hypothesis proposed by Fan et al. (2012) in which they suggested that negative significant values arise because of dividend relief tax systems, whereas positive values arise because of classical tax systems; for such countries, the value of the tax gain from leverage is positive (De Jong et al., 2008). In our case, only Thailand and Turkey are found to be following dividend tax relief systems, and their negative relation has been overshadowed by those countries with positive gains. Contrary to the results of Booth et al. (2001), we find a significant relation between debt ratios and tax policy for developing Asian countries.

Our study finds that firm growth positively and significantly impacts leverage because high-growth firms use more external borrowing, which is well supported by the pecking order theory. Investment in high-risk projects is backed by the fact that large firms have higher growth opportunities, which eventually increase their likelihood of bankruptcy. Additionally, creditors may be unwilling to lend the funds at lower rates because the expected growth may decrease to 0%. Eventually, creditors will be unwilling to lend funds at low rates. Myers and Majluf (1984), Deesomsak et al. (2004) and Gaud et al. (2007) have empirically shown the positive relationship between leverage and firm growth. For developed countries and high-income economies, we find a stable and linear relationship between firm leverage and the NDTS because with more securable assets when leverage is increased, the NDTS is a contributive variable for securing a firm's assets. Our study, in conjunction with Huang and Song (2006), indicates that the NDTS has a negative influence because firms with a high NDTS enjoy a tax benefit, thus negatively influencing leverage. Deesomsak et al. (2004) estimated the negative coefficients for the non-debt tax shield (NDTS) statistically significant for Thailand, Malaysia, Singapore, and Australia, thus supporting tax-based capital structure theories. In the context of a highly perceived bankruptcy risk and the rising cost of borrowing, the NDTS shows greater relevance to the leverage decision. Companies in Switzerland also support the trade-off theory in demonstrating the negative relationship between leverage and NDTS (Drobetz & Fix, 2005).

Likewise, the coefficient associated with liquidity is negative and significant. According to the Pecking order theory, when Asian firms use their internal funds with decreasing levels of external financing, liquidity will shrink (Vo, 2017). Our regression verifies the results of Deesomsak et al. (2004), Mazur (2007), Viviani (2008) and Shahjahanpour et al. (2010). Thus, firms with less liquid equity employ more debt in their capital structures. The modified turnover exhibits negative and significant coefficients. Lower turnover implies less liquidity because firms with low liquidity carry more debt. Finally, when we measure liquidity using the modified liquidity ratio, we find that the coefficient of the modified liquidity ratio shows a significant negative impact on a company's leverage (De Jong et al., 2008; Udomsirikul, Jumreornvong, & Jiraporn, 2011). The probability of financial distress is defined as business risk, which is assumed to be negatively related to leverage according to trade-off theory. Business risk is negatively related to debt because earnings are volatile when the environment is uncertain (Maria, Petr, & Anna, 2010). Our study shows that business risk is negatively and significantly correlated with leverage, supporting the study of 45 countries by Cheng and Shiu (2007) indicating that a firm with a lower business risk will use higher debt. Regarding the negative effect of business risk on leverage, our results are consistent with the findings of Huang and Song (2006) and De Jong et al. (2008). Trade-off theory indicates that firms with a relatively higher business risk prefer to reduce debt in their capital structures. The likelihood of defaulting on debt increases with a high business risk, causing an increase in financial distress costs. The coefficient for business risk is negative for six countries in Booth et al. (2001), a study which includes four countries contained in our dataset: South Korea, Pakistan, Thailand, and Turkey. Although dividends as a significant variable are not included in our final model, the payout ratio has a significant positive impact on the debt–equity ratio only for HIEs. We suggest that the companies in such economies have strong financial health and therefore can afford to pay

dividends. Empirical research by Chang and Rhee (1990) supports that firms with high payout ratios are likely to borrow more than firms with low payout ratios. Moreover, Beattie, Goodacre, and Smith (2004) and Frank and Goyal (2009) argue that companies will pursue debt-raising options to support their dividend payouts. In the expansion stage of economy development, companies prefer to finance ventures with debt while assuming the risk.

Ownership is among the factors that have partial and prominent effects on leverage in the income economy-based models (3 and 4), as shown in Table 8. Ownership shows a significant positive impact on leverage in the case of lower middle-income economies (LMIEs) and upper middle-income economies (UMIEs), implying that privately owned firms in LMIEs prefer to use debt. Authors observe that there are more privately owned firms in LMIEs that prefer to use debt rather than equity. This finding is complemented by the fact that bonds (as a private source of funding) also have a positive and significant effect on leverage. We find a negative and significant impact of ownership on leverage in UMIEs. As discussed, the negative sign signifies the concentration of publicly owned firms in those countries that belong to the UMIEs group. China has the highest proportion (77%) of the publicly owned firms concentrated in the telecommunication, transportation, chemical, energy, utilities, and construction sectors. The high proportion of publicly owned Chinese companies in this UMIEs group overshadows other countries in the same group that have zero percentage of public ownership, notably Jordan and Turkey. State-owned enterprises (SOEs) are favored by Government policies despite reductions in their formal privileges. Such policies provide SOEs with unlimited access to loans from state-administered banks (Attaoui & Poncet, 2011; Guariglia & Yang, 2016). In key strategic industries, some SOEs also hold important monopolistic positions (Allen, Qianb, & Qian, 2005; Ding, Guariglia, & Knight, 2013).

5.2. Country-wise and income-economy-based impacts of country-specific determinants on leverage

Thus far, we have discussed the effect of leverage on firm-specific determinants in both pooled models and income economy-based models. Next, we investigate the impact of country-specific factors with respect to income economy groups and pooled models. The variables of GDP growth rate (GRT), inflation (INF), size of the equity market (SEM), size of the bond market (SBM), and size of the banking industry (SBI) are regressed over corporate leverage for the 2008–2014 period. Cheng and Shiu (2007), in their study of 45 countries, show that Ln GDP (a proxy for the GRT) has a significant negative coefficient, indicating that firms in wealthier countries have less leverage than those in poorer countries. Our findings in Table 5 also indicate that high-income economies have lower leverage with a mean of 1.181, whereas lower middle-income economies have the highest mean of 1.323. At all the stages of economic development, financial development improves capital allocation, boosts aggregate growth, and helps the poor through this channel. However, the distributional effect of financial development and thus the net impact on the poor depends on the level of economic development.

Our regression results confirm the direct impacts of several country-specific factors on corporate leverage across pooled models and income-economies models unlike the indirect impacts of country-specific determinants on leverage by De Jong et al. (2008). Bokpin (2009) proposed that the effects of country-specific determinants on capital structures are subject to the choice of measuring the capital structure in the case of most countries. The GDP growth rate (GRT) among other factors such as creditor rights protection and bond market development, the GRT consistently shows a statistically significant impact on capital structure (De Jong et al., 2008). Following De Jong et al. (2008), we use the GRT to analyze the effects of countries' economic conditions. Our results for the GDP growth rate (GRT) show a negative relation with debt because debt financing becomes more attractive as the inflation rate increases, since corporations' real tax shelters attributable to interest deductions increase as inflation increases. The GRT is an aggregate of the magnanimity of a given country, thus propounding healthy investment opportunities for investors in that country and supporting investors with good growth opportunities. Our findings are consistent with those of Bokpin (2009) and Kayo and Kimura (2011) indicating that the GRT has a

negative and statistically significant relationship with corporate leverage. We find that inflation (INF) is positively and significantly related to leverage in the cases of lower middle and high-income economies.

The size of the equity market (SEM) indicates the size of the stock market relative to the size of the economy. Cheng and Shiu (2007), De Jong et al. (2008) and Kayo and Kimura (2011) find that stock market orientation is an important variable used to evaluate the impacts of macroeconomic variables on capital structure. The SEM influences the tendency to issue equity rather than debt. Firms in countries with strong capital markets have comparatively easy access to equity funds; therefore, a negative relation is expected between the SEM and leverage. We find a significant negative impact on leverage in cases of lower middle and high-income economies, implying that leverage decreases when capital markets are improved. Investors begin to use observable return capital production technology under weak conditions, which is correlated with equity issues. Therefore, a voluminous equity market increases the economic growth, that allows a lower debt–equity ratio over time, thus showing a typical pattern of development. Our study supports the fact that high levels of equity market activities are supported by a lower aggregate ratio of debt to equity that is associated with an increase in per-capita output. The stock market is a vehicle for diversifying risk when firms are also using banks or other financial intermediaries as sources to meet their financial requirements (Antoniou et al., 2008; De Jong et al., 2008). For investors, two types of complementary financial services exist: risk diversification and information processing. Therefore, we can say that the leverage of firms may increase with a better-developed stock market because developed stock markets help individuals to price and diversify risks more easily. It is well known that with developed stock market owners have more diversified investment opportunities, and they can also take projects that otherwise would not have been practicable.

The study of 42 countries by De Jong et al. (2008) mentions that trading bonds are easier when the bond market in a country is well developed, causing firms to have high leverage. In our study, we use the size of the bond market (SBM) to capture the financial depth of the financial sector relative to the economy. In addition to the bond market, creditor rights protection and GDP growth rates (Antoniou et al., 2008; Booth et al., 2001; Kayo & Kimura, 2011) show significantly positive relation with corporate leverage. Based on cross-country macro statistics, we find an overall increasing trend in the Bond market. In pooled model 2, we find that the SBM is not significantly showing the impact on leverage because those countries are in the majority in the pooled model where bond markets are not well developed. However, when we consider the segregated models based on Income economies, we find that the bond market is positively and significantly related to leverage in lower middle and upper middle-income economies. This indicates that firms in this group of countries prefer to use bond market credit rather than bank market credit for long-term financing to remain unaffected by yearly economic fluctuations (Tomschik, 2015). The development of bond markets arguably improves legal systems, thus mitigating agency problems and protecting debt holders. Highly developed bond market in a country allows firms to achieve a high leverage ratio; however, contrary to this proposition, we find that bond markets in the upper middle and high-income economies of Asia have an inverse effect on leverage. Similarly, we know that Beck et al. (2004) suggest that bond market development is positively related to the development and bank finance for large firms because lower expected return projects are conditioned to less frequent verification and are usually aimed at firms in mature economies.

The size of the banking industry (SBI) represents the financial depth of sector relative to the economy. Private credit issued by deposit money banks and other financial institutions to the GDP is a standard indicator in the finance and growth literature. Cheng and Shiu (2007) confirm that countries with powerful banking sectors can issue more loans, indicating a positive correlation between bank loans and the debt ratio. Countries with higher levels of private credit relative to the GDP have shown faster growth, with positive effects on poverty reduction (Beck, Demirgüç-Kunt, & Levine, 2000). The banking industry is positively and significantly affecting leverage in pooled model 2. We can say that better availability of private credit through banks is associated with

lower interest rates and better creditor rights. Private credit to the GDP differs widely across countries and is strongly correlated with income level. The SBI ratio for high-income economies is 126% and 62% higher than in lower middle and upper middle income economies, respectively. However, Beck et al. (2004) investigate the relation between the size of firms and the development of financial institutions in a country and confirm that firms are larger in size in those countries that have with highly developed banking sectors provided with efficient legal systems. This evidence supports our findings of a significant and positive impact of SBI on leverage in high-income economies in Asia in model 4. In high-income emerging markets, corporations tend to rely heavily on the banking sector for financing. We know that banks have the traditional ability and willingness to provide relatively low-cost capital, which originates from their broader business relationships in developed economies (Tomschik, 2015). Banks can accept less expensive capital as either deposit (particularly in deposit-rich countries) or as loans from capital markets, where most of them are recognized as creditworthy corporations in the market. In the pooled model, the coefficients of high-income economies showing significant relations with leverage overshadow the coefficients for UMIEs and LMIEs. Creditor rights and capital market depth have defining effects on internal and external corporate borrowing (Tomschik, 2015). From the same model, we find that leverage has a significant and positive relationship with banks and the highest coefficient in the case of payout ratio compared to LMIEs and UMIEs.

6. Conclusion

The purpose of the study is to examine the significance of the determinants proposed by three major theories in the Asian context during 2008–2014. Sixteen Asian countries are taken as a pooled sample of data in models 1 and 2, the regression model evaluated the significance of predictor variables (micro- and macro-economic factors, respectively) based on random effect model of panel data setting. The study further explores the issue of interest by looking at key individual regression windows by income economy in models 3 and 4 to avoid any potential loss of information. The same analysis was performed as well to establish whether macroeconomic variables have different impacts on leverage. This research finally attempts to identify and discuss significant predictor variables and their implications for future studies. The pattern for the impacts of determinants is pervasive over the 2008–2014 period for Asian economies. From the results, we observe that tangibility, profitability, the NDTS, liquidity, and business risk have shown negative and significant impacts on leverage across all four models. However, the firm size, tax rates, and growth opportunity have considerable positive effects on leverage in all models. Therefore, we confirm the portability of conventional capital structure theories in the case of Asian income economies by distinctively extending the work of Rajan and And Zingales (1995). We have identified the NDTS, tax, liquidity, business risk and the GDP growth rate as additional determinants impacting financing decisions of Asian firms. Our analysis suggests that effective determinants for capital structure choice for the dataset of developed countries are also valid for our dataset of 16 emerging countries. Our study supplements the work of Demirgüc¸ Kunt and Maksimovic (1994) by demonstrating that profitability, the NDTS, business risk, and tax, in addition to GDP growth rate, are effective determinants for Asian firms. We also confirm the applicability of stylized facts proposed by Frank and Goyal (2009) for firm-level determinants, which remain considerably similar in both the pooled and income economy-based models, with a few exceptions. In addition to newly identified firm variables, we find mixed results for certain variables; for example, the payout ratio is significant only in the case of high-income economies (HIEs). Similarly, ownership shows a significant impact in the upper middle and high-income economy models, whereas no effect is observed for model 2. Thus, financial leverage decisions by the Asian firms are determined in both pooled and income economy-based models by the same firm-specific variables.

Our comprehensive analysis provides evidence that country-specific determinants have profound impacts on leverage in income economy-based models compared to pooled models. GDP growth rate remains negative across all models, whereas inflation shows a contrasting impact, with a positive effect for lower middle and high-income economies. As supported by the literature, stock market orientation also has a negative and significant impact on leverage across all models.

This result implies that leverage choice is negatively affected by highly developed stock markets. In contrast, the bond market (SBM) shows a negative impact on leverage for upper middle and high-income economies and a positive impact on leverage for lower middle-income economies. In general, the relationship is positive in common-law countries (concentrated in the case of low-income economies) and negative in civil-law countries (concentrated in upper middle and high-income economies). However, the banking industry shows a positive impact on leverage in the pooled model and in high-income economies but remains non-significant for the other two economies. This financial flexibility is costly since banks face costs of capital themselves (which they attempt to minimize through securitization). For capital structure selection, it is more viable to consider both factors with respect to income economies. Importantly, when the total number of countries and their respective income economies categories can be controlled, which reflects data limitation in our study, researchers may find more convincing research results for both firm- and country-specific determinants for other countries and continents. Our findings suggest that although some insights from modern finance theory are portable across countries, more work is required to understand the impacts of different institutional features on capital structure choices subject to the changing economic scenario of Asia.

Our study provides the evidence supporting the proposition that capital structure theories are not mutually exclusive as stated by Huang and Ritter (2009) and Leary and Roberts (2010) because none of the three theories can independently explain certain crucial facts about capital structure. Moreover, the new set of firm-specific determinants reflects the amalgamation of the determinants of all three theories. Our results for tangibility and ownership support the proponents of agency theory, while the size, taxation and NDTS results support trade-off theory. In addition, our profitability and liquidity results are found to follow the pecking order theory. In the current global context, our study provides strong evidence of the direct impacts of country-specific determinants on capital structure, hence we strongly support that country-specific determinants should be treated as important as firm-specific determinants while considering the policy implications for capital structure selection for firms.

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Notes
1. http://data.worldbank.org/about/country-classifications/country-and-lending-groups.
2. http://databank.worldbank.org/data/download/site-content/OGHIST.xls.

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