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Abstract

Purpose – The purpose of this paper is to examine how corporate governance moderates the relationship between macroeconomic uncertainty and corporate capital structure.

Design/methodology/approach – This paper employs the two-step system generalized method of moments regression, considering a sample of 907 listed non-financial firms from seven Asia Pacific countries during the period 2004-2014.

Findings – This study finds that macroeconomic uncertainty has a significant negative impact on the capital structure decisions of firms. The results also reveal that the overall effect of macroeconomic uncertainty on capital structure among firms with better governance quality is significantly negative. The evidence suggests that corporate governance acts as an effective mechanism to curb the usage of leverage during times of high volatility. Further analysis shows that board independence, the separation between the roles of CEO and chairman of the board and blockholders' ownership are effective governance mechanisms, whereas similar observations do not hold for board size and institutional ownership.

Research limitations/implications – The findings of this study may be useful to policy makers to formulate appropriate policies to mitigate the adverse effects caused by macroeconomic uncertainty. This is important because macroeconomic uncertainty may have potential destabilizing effects on a country's or region's development by jeopardizing the firms' ability to formulate sound investment, production and financing decisions. Additionally, the results suggest that good governance quality can act as a check and balance to ensure that firms use less leverage when they are facing volatility in the macroeconomic environment. These findings could help to reinforce the importance of good governance among policy makers of a country as well as managers of firms.

Originality/value – The authors make the first attempt to examine the moderating effect of corporate governance on the relationship between macroeconomic uncertainty and corporate capital structure.

Keywords Corporate governance, Capital structure, Leverage, System GMM, Macroeconomic uncertainty, Asia Pacific region

Paper type Research paper

1. Introduction

Capital structure is an area in corporate finance that has attracted much attention among researchers since the landmark paper by Modigliani and Miller (1958). These studies are mainly focused on identifying firm-specific determinants of capital structure such as profitability, asset tangibility and firm size (Martín and Saona, 2017; Vo, 2017; Antonczyk and Salzmann, 2014). More recently, some studies have found that macroeconomic factors such as exchange rate, inflation rate and interest rate are also significant influencers of capital structure decisions (Zeitun *et al.*, 2017; Muthama *et al.*, 2013; Öztekin and Flannery, 2012). However, only a handful of studies have focused on macroeconomic uncertainty and how it affects the firms' financing decisions.

Some theoretical papers have extended the studies on the effect of macroeconomic uncertainty to firms' financing decisions. For instance, Bhamra *et al.* (2010) study how time-varying macroeconomic conditions influence the optimal capital structure of firms at both the aggregate and individual levels. The authors demonstrate using a structural-equilibrium

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framework that although capital structure is pro-cyclical at refinancing points, it is counter-cyclical in aggregate dynamics. The authors contend that firms employ less debt during times of heightened macroeconomic uncertainty to preserve their financial flexibility. Meanwhile, Chen (2010) argues that macroeconomic uncertainty, in particular business cycle uncertainty, is important to corporate decisions. Using a dynamic capital structure model, the author predicts that during times of volatile macroeconomic conditions, firms encounter higher risk premia or discount rates, and declining expected cash flow growth rates. Consequently, firms will experience lower discounted value of expected tax benefits of debts, which in turn reduces the attractiveness of leverage.

Empirical studies on the influence of macroeconomic uncertainty on corporate capital structure report similar findings. For example, Baum *et al.* (2009) investigate the influence of macroeconomic and firm-specific uncertainty on the capital structure choices of non-financial firms in the USA. They report a negative association between uncertainty and leverage. This finding implies that firms are more cautious and borrow less when there is greater uncertainty in the macroeconomic environment. Firms behave in such a way because they expect declining revenues and potential shortage of cash flows. Caglayan and Rashid (2014) examine the influence of firm-specific and macroeconomic uncertainty on the capital structure of UK firms. They also report that firms use less leverage during times of high volatility.

Taken together, macroeconomic uncertainty may pose as a huge challenge for firms to make sound corporate decisions. For instance, not only does macroeconomic uncertainty affect the firms' decisions on production and investment but at the same time, the firms' ability to formulate sound financing decisions may be affected as well. Given the potential adverse effect of macroeconomic uncertainty on firms in various countries or regions, the economic growth of these countries or regions may also be adversely affected.

Due to the importance of the potential destabilizing effect of macroeconomic uncertainty, this study is motivated to find out whether there are any specific mechanisms that can be devised to effectively curb the usage of debt during times of high volatility. Financial crises such as the Asian financial crisis (AFC) of 1997 and the Global Financial Crisis (GFC) of 2008 had clearly demonstrated the devastating effects of having excessive leverage. This study conjectures that corporate governance can act as a potential mechanism to control and monitor firms' financing behavior during such times.

Corporate governance can be broadly defined as a system of laws, policies and processes that direct and control a firm. The idea of corporate governance originated from the agency theory, and is based on the premise of maximization of shareholder value (Jensen and Meckling, 1976). According to this theory, managers as agents operate the firms on the shareholders' behalf, and the separation of ownership and control has created significant agency costs to today's organizations. To a large extent, corporate governance involves mechanisms through which the interests of investors are protected from being expropriated by the managers of the firm.

However, this research differs from previous studies that have largely being confined to examining the influence of corporate governance on capital structure decisions of firms during times of crises or different stages of the business cycle only. For example, Bunkanwanicha *et al.* (2008) study the relationship between corporate governance and leverage in Indonesia and Thailand. The authors claim that firms with poor corporate governance employ more leverage, and this relationship is particularly strong during the AFC. The authors interpret these findings as debt can be used to facilitate expropriation when there is poor governance quality. Moreover, firms with better governance quality are reluctant to use more leverage to prevent default risk during times of crises.

Erkens *et al.* (2012) conduct a study on the effect of corporate governance on the performance of firms from 30 countries during the GFC. The authors contend that managers

are encouraged by both independent directors and institutional shareholders to take more risk to enhance the returns to shareholders prior to the crisis. However, managers are pressured to raise equity capital during the crisis to mitigate the risk of bankruptcy and maintain capital adequacy. The authors suggest that although issuing equity capital at low stock prices may have caused dismal performance during the crisis, this may have enabled firms to survive the crisis and chart better performance after the crisis.

Chung and Wang (2014) investigate the dynamic association between institutional ownership and corporate capital structure throughout the business cycle. The authors find an inverse association between institutional ownership and leverage, especially during economic contractions.

In contrast to these studies, we propose a novel approach by investigating the effect of the interaction between corporate governance and macroeconomic uncertainty on corporate capital structure. We contend that although macroeconomic uncertainty largely arises during times of crises or economic contractions, uncertainty may also occur in other occasions, particularly during "bad news" events. For instance, during times of volatile global commodity and energy prices, fiscal uncertainties and exchange rate volatility. However, these sources of macroeconomic uncertainty have not been considered in past literature. To the best of our knowledge, this is the first paper that examines the linkage between macroeconomic uncertainty, corporate governance and capital structure.

Hence, this study aims to fill this important gap by examining the association between macroeconomic uncertainty, corporate governance and corporate capital structure. We aim to address three important issues: First, does macroeconomic uncertainty negatively affect firm leverage[1]? Second, does corporate governance negatively affect firm leverage? And third, does corporate governance strengthen the negative effect of macroeconomic uncertainty on firm leverage?

This paper offers several contributions to the literature. First, this study extends the empirical literature on the influence of macroeconomic uncertainty on capital structure decisions of firms. Surveying the literature, we find that there are rather limited empirical studies that have been conducted in this area, and these studies are confined to single-country analyses, particularly on the US and UK firms (Caglayan and Rashid, 2014; Rashid, 2013; Baum *et al.*, 2009). We provide further evidence using a multi-country study based on a selected number of Asia Pacific countries. This study shows that similar to prior findings, macroeconomic uncertainty also has a significant negative impact on leverage among Asia Pacific countries.

Second, this study makes a novel attempt to investigate the moderating effect of corporate governance on the association between macroeconomic uncertainty and corporate capital structure. We show that good governance quality can act as a check and balance to ensure that firms use less leverage when they are facing volatility in the macroeconomic environment. As past experience had taught us, weak corporate governance practices could expose firms and countries to be more vulnerable to volatility in the macroeconomic environment such as during times of crises[2]. Hence, the results of this paper could reinforce the importance of good governance among policy makers of a country and managers of firms. Further analysis shows that board independence, the separation between the roles of CEO and chairman of the board and blockholders' ownership are effective governance mechanisms, which implies that specific corporate governance mechanisms can be devised to effectively curb the excessive use of leverage during such times.

Furthermore, this study considers two proxies for macroeconomic uncertainty which have not been widely explored in past literature on the effect of macroeconomic uncertainty on corporate capital structure, namely volatility of growth rate of exports and volatility of growth rate of imports. Past researchers (Olaberria and Rigolini, 2009; Helliar *et al.*, 2002)

have emphasized on the importance of the identification of the sources of uncertainty before any attempt is made to evaluate their impact on various corporate decisions and economic policies. Nonetheless, thus far, only Chow *et al.* (2017) have examined the effect of volatility in exports on the financing choices of Australian firms, whereas no studies have considered the impact of import volatility on capital structure decisions. This paper finds that both proxies for macroeconomic uncertainty provide robust evidence of the impact of macroeconomic uncertainty on the capital structure decisions of firms. This also suggests the important influence of both volatility in exports and imports on the firms' financing policies.

Lastly, this paper constructs a corporate governance index to deal with the multidimensional aspect of this concept. As highlighted by Harford *et al.* (2008), it is not easy to assess the board's effectiveness in executing its monitoring function because a board comprises various aspects which contribute differently to the corporate governance of a firm. Thus, it is challenging to merely rely on any single measure to capture the entire governance status of a firm (Liao *et al.*, 2015) and as such, the adoption of a composite measure of corporate governance enables us to assess the impact of the overall level of corporate governance of the firm on the relationship between macroeconomic uncertainty and corporate capital structure.

The paper is organized as follows. Section 2 develops the research hypotheses. Section 3 describes the data and methodology. Section 4 presents the empirical results. Section 5 provides the robustness tests, and Section 6 concludes.

2. Hypotheses development

2.1 Macroeconomic uncertainty and corporate capital structure

Uncertainty has long been studied in the literature as a potential factor contributing to the depth and duration of some of the greatest episodes of economic or financial crisis around the world (Bloom *et al.*, 2013; Stock and Watson, 2012). Macroeconomic studies have also documented the effects of fluctuations or swings in economic conditions on economic variables such as aggregate output growth, productivity, profitability of businesses, stock returns and labor income (Bloom *et al.*, 2013; Arellano *et al.*, 2012). Studies have also been done on the effect of macroeconomic uncertainty on firms' behavior such as capital investment spending (Beaudry *et al.*, 2001) and demand for liquidity (Baum *et al.*, 2006; Sterken *et al.*, 2001).

More recently, some theoretical papers have extended the studies on the effect of macroeconomic uncertainty to firms' financing decisions (Bhamra *et al.*, 2010; Chen, 2010; Levy and Hennessy, 2007). These studies report that firms use less debt during times of heightened macroeconomic uncertainty. Empirical studies on the effect of macroeconomic uncertainty on capital structure report similar findings (Caglayan and Rashid, 2014; Rashid, 2013; Baum *et al.*, 2009).

However, all these studies are conducted on a single-country basis, and are mainly confined to developed countries, particularly the USA and the UK. Less known, however, is whether such observation also holds true among firms in other countries, such as Asia Pacific countries. Hence, this study extends the present literature by investigating the association between macroeconomic uncertainty and corporate capital structure in a multi-country study. In particular, we cover seven Asia Pacific countries from both developed and developing economies. This study hypothesizes that:

H1. There is a significant negative association between macroeconomic uncertainty and firm leverage among these Asia Pacific countries.

2.2 Corporate governance and corporate capital structure

The literature suggests that corporate governance can have a significant influence on capital structure decisions. However, the existing empirical studies have provided inconclusive results.

On one hand, some studies find a negative relationship between corporate governance and leverage. For example, Arping and Sautner (2010) examine the impact of corporate governance reform on leverage of firms in the Netherlands. The authors report that there is a significant reduction in leverage due to the change in corporate governance standards. They conclude that improvement in governance quality results in lower level of leverage. Jiraporn *et al.* (2012) find that when managers are more entrenched with poor governance mechanisms, firms tend to have significantly more leverage. The authors interpret this finding as firms are using leverage as a substitute for corporate governance in their attempt to mitigate agency problems.

On the other hand, some studies find a positive relationship between corporate governance and leverage. For instance, Ghosh *et al.* (2011) find that entrenched managers prefer to employ less leverage. The authors also report about the tendency among such firms to issue debt with shorter maturity. They contend that self-serving managers employ lower leverage to mitigate liquidity risk, and use more short-term debt to maintain their ability to further boost their reputations and compensation via empire building. On the flip side, Harford *et al.* (2008) find that greater director power will force firms to take on more leverage, particularly short-term debts. In their study on a sample of UK firms, Sun *et al.* (2015) find supporting evidence of a positive association between institutional ownership and leverage.

In summary, studies on corporate governance find that the firms' board of directors plays a crucial role in monitoring and advising the firm's top management, and the board is responsible to represent the shareholders' interests to the decision makers of the firm. Moreover, governance quality is found to have a significant impact on the firms' capital structure choices. However, the empirical findings on this association remain inconclusive. The inconsistencies in previous findings suggest that further research needs to be conducted in this area. Based on the preceding discussion, this study hypothesizes that:

H2. There is a significant negative association between corporate governance and firm leverage among these Asia Pacific countries.

2.3 Macroeconomic uncertainty, corporate governance and corporate capital structure

Although numerous studies have been carried out on the influence of corporate governance on capital structure decisions, very few studies have examined this association during times of high volatility. This study conjectures that corporate governance can act as a potential mechanism to monitor and control firms' financing behavior during times of heightened macroeconomic uncertainty. However, unlike previous studies which are largely confined to times of financial crises (Erkens *et al.*, 2012; Bunkanwanicha *et al.*, 2008) or economic contractions (Chung and Wang, 2014), we propose a novel approach to investigate the effect of the interaction between corporate governance and macroeconomic uncertainty on corporate capital structure. We contend that although macroeconomic uncertainty largely arises during times of crises or economic contractions, uncertainty may also occur during other adverse occasions. This study hypothesizes that while macroeconomic uncertainty has a direct negative effect on leverage, corporate governance may have a moderating effect on this relationship since firms with good governance quality tend to use less leverage. In other words, the following hypothesis is posited:

H3. Corporate governance strengthens the negative effect of macroeconomic uncertainty on firm leverage among these Asia Pacific countries.

3. Data and methodology

3.1 Data

This study covers seven Asia Pacific countries, namely Malaysia, Indonesia, Thailand, Philippines, Singapore, Australia and Japan. These countries are selected based on data

availability, and they have diverse institutional backgrounds such as level of economic development, financial markets and legal origins. For instance, Malaysia, Thailand, Indonesia and Philippines are regarded as developing countries, while Singapore, Japan and Australia are developed countries. Moreover, Singapore, Australia, Thailand and Malaysia are countries based on common law, Philippines and Indonesia are based on French civil law, and Japan is based on German civil law (Öztekin and Flannery, 2012; La Porta *et al.*, 1998). The diverse institutional backgrounds of these countries provide the platform to examine the applicability of previous findings based on UK and US firms to Asia Pacific firms.

The target population is public firms listed on the main board listing or equivalent of the primary stock exchange of each country[3]. The data are collected from multiple sources. Macroeconomic data are sourced from the International Financial Statistics by the International Monetary Fund and the Federal Reserve Economic Data by the Federal Reserve Bank of St Louis, while firm-specific accounting data are gathered from Datastream. All data related to macroeconomic and firm-specific variables are winsorized at the 1st and 99th percentiles to overcome issues with outliers. Data related to corporate governance measures are manually collected from company annual reports. We also resort to other sources of data such as the firm's home page or related websites to gather any missing data. Data obtained from these various sources are merged to form the data set.

This paper aims to collect a net sample of at least 10 percent of the listed firms from each country. Firms from all major industries or sectors are randomly selected. We exclude financial firms due to differing reporting requirements. The study period spans from 2004 to 2014, and we require firms in the sample to have at least five consecutive annual observations. After taking into account all these restrictions, the final sample consists of 907 listed non-financial firms. Altogether, 221 Australian firms, 186 Japanese firms, and 100 firms are sampled from each of the remaining countries. This represents 10 to 37 percent of the target population of each country. Due to missing data, this study ends up with an unbalanced panel of 9,607 firm-year observations.

3.2 Methodology

This paper examines three main issues, i.e. macroeconomic uncertainty, corporate governance and corporate capital structure. First, we run the following panel regression (Equation (1)) to investigate the association between macroeconomic uncertainty and leverage (*H1*):

$$LEV_{it} = \beta_0 + \beta_1 LEV_{it-1} + \beta_2 \sigma_t^{macro} + \beta_3 CRISISDUM_t + \sum \delta_i X_{it} + \sum \vartheta_i Y_t + \mu_t + \varepsilon_{it} \quad (1)$$

where subscripts i and t denote the firm and year, respectively. LEV_{it} is leverage, σ_t^{macro} denotes macroeconomic uncertainty, $CRISISDUM_t$ represents the crisis dummy, the firm-specific control variables are represented by X_{it}, macroeconomic control variables are represented by Y_t, μ_t denotes country-specific effects, and ε_{it} is the error term.

Next, this study employs the following panel data model (Equation (2)) to examine the association between corporate governance and leverage (*H2*):

$$LEV_{it} = \beta_0 + \beta_1 LEV_{it-1} + \beta_2 \sigma_t^{macro} + \beta_3 GOV_{it} + \beta_4 CRISISDUM_t + \sum \delta_i X_{it} + \sum \vartheta_i Y_t + \mu_t + \varepsilon_{it} \quad (2)$$

where the corporate governance index is represented by GOV_{it}.

Finally, to test the moderating effect of corporate governance on the association between macroeconomic uncertainty and leverage, we estimate the following panel data model (Equation (3)) (*H3*):

$$LEV_{it} = \beta_0 + \beta_1 LEV_{it-1} + \beta_2 \sigma_t^{macro} + \beta_3 GOV_{it} + \beta_4 \sigma_t^{macro} \times GOV_{it} + \beta_5 CRISISDUM_t + \sum \delta_i X_{it} + \sum \vartheta_i Y_t + \mu_t + \varepsilon_{it} \quad (3)$$

where $\sigma_t^{macro} \times GOV_{it}$ is the interaction term between macroeconomic uncertainty and corporate governance.

The dependent variable (*LEV*) is measured as total debt over total assets (Huang and Wang, 2015; Öztekin and Flannery, 2012).

The first explanatory variable of interest is macroeconomic uncertainty. This study considers volatility of growth rate of exports (*EX_RISK*) as a proxy for macroeconomic uncertainty. As a robustness check, we also adopt a second proxy for macroeconomic uncertainty, namely volatility of growth rate of imports (*IM_RISK*). We use a time-varying macroeconomic volatility measure by computing the five-quarter moving-average standard deviations of the residuals from an AR(1) process using quarterly data for both growth rate of exports and imports for the period 2004-2014[4]. The arithmetic average of the relevant quarterly data is subsequently computed to obtain the annual macroeconomic volatility measure (Li and Rajan, 2015; Aizenman and Marion, 1999). In the section on robustness tests, we use the lagged macroeconomic uncertainty, and find consistent results.

The second explanatory variable of interest is corporate governance. This study adopts the following as proxies for corporate governance:

- Board independence (*BIND*), which is defined as the percentage of independent directors on the board (Alves *et al.*, 2015; Huang and Wang, 2015).
- CEO duality (*DUALITY*), where the dummy variable equals to one if there is a separation between the roles of CEO and chairman of the board, and otherwise zero (Alves *et al.*, 2015; Huang and Zhu, 2015).
- Board size (*BSIZE*), where the dummy variable equals to one if the board size is less than the median size of the board of the sample, and otherwise zero (Liao, 2012).
- Blockholders' ownership (*BHOWN*), which is defined as the percentage of shares owned by blockholders whose ownership is over 5 percent of a firm's equity (Lu and Wang, 2015; Eling and Marek, 2014).
- Institutional ownership (*INOWN*), which is measured as the percentage of shares owned by the largest institutional owners (Brown *et al.*, 2006).

In order to measure corporate governance quality, we use the principal component analysis methodology to deal with the multidimensional aspect of the governance mechanism (Liao *et al.*, 2015; Lu and Wang, 2015). It is used to aggregate individual governance characteristics to construct a single governance index. The corporate governance index (*GOV*) is computed based on the linear combination of the following individual governance measures:

$$GOV_{it} = \sum_{m=1}^{n} Loading_{im} Governance_{m,it} \quad (4)$$

where $Governance_{m,it}$ represents individual governance measure m of firm i in year t, and $Loading_{im}$ is the loading for individual governance measure m of firm i.

This study incorporates a number of firm-specific and macroeconomic control variables that are found to have significant effect on capital structure decisions in prior studies. The firm-specific control variables are sales (*SALES*) (measured as the ratio of sales to total assets) (Caglayan and Rashid, 2014; Baum *et al.*, 2009), tangibility (*TANGI*) (ratio of net values of property, plant and equipment to total assets) (Sun *et al.*, 2015; Harford *et al.*, 2008) and firm size (*FIRM_SIZE*) (natural logarithm of total assets) (Liao *et al.*, 2015). The macroeconomic control variables are inflation rate (*INFLATION*) (yearly percentage change in Consumer Price Index (CPI) (Muthama *et al.*, 2013; Öztekin and Flannery, 2012) and exchange rate (*EXG_RATE*) (real broad effective exchange rate) (Tehrani and Najafzadehkhoee, 2015). We also account for the GFC by incorporating a crisis dummy (*CRISISDUM*), where the dummy variable equals to one if the year is between 2008 and 2009, and zero otherwise. Finally, country dummies are also included to account for country-specific effects. Detailed variable definitions and their symbols are provided in Table AI. In the robustness tests, this study incorporates additional firm-specific and macroeconomic control variables into the regression models, and finds that the results are consistent.

This study employs a dynamic panel data methodology, namely the system generalized method of moments (GMM) estimator proposed by Blundell and Bond (1998). All coefficients are adjusted for heteroscedasticity. This estimation method has several advantages, which include dealing with any potential problem associated with endogeneity, controlling for heterogeneity across individual firms, and removing unobserved firm-specific fixed effects. In order to test for the robustness of the instrumental variables in the system GMM estimations, we employ two specification tests. The first is the Hansen (1982) *J*-statistic, a test of overidentifying restrictions of the null hypothesis that the instrumental variables are valid. The second is the Arellano and Bond (1991) AR(2) test of the null hypothesis of no second-order serial correlation in the residuals of the model. Furthermore, this paper adopts the two-step estimator which is more efficient compared to the one-step estimator.

4. Empirical results and discussion

4.1 Descriptive statistics

A summary of descriptive statistics is presented in Table I. The average book leverage for the sample of seven countries is 21.8 percent, while the standard deviation is 22.7 percent. Indonesia has the highest average ratio of 24.9 percent, while Philippines records the lowest average ratio of 17.5 percent. In terms of macroeconomic uncertainty, the average volatility of growth rate of exports for the full sample is 7.6 percent, with Philippines having the highest volatility of 9.3 percent and Singapore experiencing the lowest volatility of 5.5 percent. Meanwhile, the average volatility of growth rate of imports for all seven countries is 7.5 percent, with Indonesia recording the highest volatility of 8.5 percent and Japan having the lowest volatility of 5.8 percent.

The average value of the corporate governance index for the full sample is 1.306. Malaysia, Thailand, Indonesia, Singapore and Australia have higher than average level of corporate governance, while the remaining two countries exhibit below average values. Further examination into the individual components of the corporate governance index shows that on average, firms in all seven countries have 39.4 percent of independent directors on the board. Malaysia, Indonesia, Singapore and Australia record higher than average percentage of independent directors on the board, while the remaining three countries exhibit below average values. In terms of CEO duality, it can be observed that on average, there is separation between the roles of CEO and chairman in 71.5 percent of firm-year observations for the full sample. Malaysia, Thailand, Indonesia and Australia have higher than average percentage of firms that practice this separation of roles, while the remaining three countries exhibit below average values. On average, relatively smaller board size is observed in 35.8 percent of firm-year observations for the full sample.

Table I. Descriptive statistics

	All countries		Malaysia		Thailand		Philippines		Indonesia		Singapore		Australia		Japan	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Dependent variable																
LEV	0.218	0.227	0.217	0.220	0.229	0.189	0.175	0.171	0.249	0.195	0.213	0.162	0.211	0.330	0.228	0.158
Control variables																
SALES	0.884	0.681	0.786	0.628	0.956	0.679	0.474	0.496	0.987	0.713	0.914	0.697	0.902	0.828	1.014	0.450
TANGI	0.313	0.227	0.354	0.216	0.348	0.226	0.344	0.265	0.392	0.237	0.277	0.204	0.257	0.254	0.303	0.148
FIRM_SIZE	22.681	4.046	19.819	1.305	22.492	1.369	22.525	1.953	28.754	1.475	19.959	1.711	19.010	2.615	26.971	1.315
INFLATION	0.028	0.024	0.025	0.013	0.029	0.017	0.046	0.016	0.070	0.026	0.026	0.019	0.027	0.007	0.002	0.010
EXG_RATE	95.596	8.269	97.409	2.552	96.991	5.571	97.23	10.174	91.877	5.787	99.837	8.567	95.566	7.932	92.814	9.813
Independent variables																
EX_RISK	0.076	0.045	0.068	0.049	0.074	0.043	0.093	0.045	0.073	0.040	0.055	0.043	0.092	0.043	0.067	0.043
IM_RISK	0.075	0.046	0.078	0.048	0.084	0.058	0.080	0.045	0.085	0.054	0.060	0.040	0.083	0.035	0.058	0.043
GOV	1.306	0.527	1.407	0.462	1.480	0.452	1.186	0.525	1.690	0.418	1.429	0.473	1.410	0.388	0.839	0.490
GOV index components																
BIND	0.394	0.234	0.436	0.112	0.387	0.103	0.256	0.085	0.415	0.124	0.516	0.161	0.604	0.218	0.123	0.157
DUALITY	0.715	0.452	0.781	0.414	0.822	0.383	0.572	0.495	0.990	0.102	0.630	0.483	0.851	0.357	0.442	0.497
BSIZE	0.358	0.479	0.316	0.465	0.375	0.484	0.303	0.460	0.426	0.495	0.389	0.488	0.302	0.459	0.412	0.492
BHOWN	0.444	0.253	0.530	0.166	0.593	0.182	0.610	0.227	0.647	0.196	0.554	0.189	0.336	0.217	0.203	0.156
INOWN	0.061	0.113	0.090	0.153	0.040	0.087	0.020	0.046	0.068	0.160	0.077	0.184	0.062	0.076	0.063	0.056
Observations	9,607		1,100		998		1,004		1,049		1,081		2,350		2,025	

Note: Refer to Table AI for symbol and definitions of variables

Thailand, Indonesia, Singapore and Japan register higher than average percentage of firms with relatively small board size, while the opposite is observed for Malaysia, Philippines and Australia. In terms of blockholders' ownership, there are on average 44.4 percent of shares owned by blockholders whose ownership is over 5 percent of a firm's equity across all countries. All countries, except Australia and Japan, register higher than average percentage of shares owned by blockholders. There is relatively low percentage of shares (6.1 percent) held by the largest institutional investors across these seven countries. Malaysia, Indonesia, Singapore, Australia and Japan record higher than average percentage of shareholdings, while the remaining two countries exhibit below average values.

Table II reports the correlations between the main variables. Given the relatively low correlations observed among the regressors, multicollinearity should not be a concern in this study. In addition, we also examine the variance inflation factors (VIF), and find that the VIF for each variable is less than 3. Hence, we conclude that multicollinearity should not pose as a problem to the regressions.

4.2 Main regression results

Table III presents the main results from the empirical analyses. This study uses two proxies for macroeconomic uncertainty, namely volatility of growth rate of exports (Models 1 to 3) and volatility of growth rate of imports (Models 4 to 6) to enhance the credibility of the estimation results. The analysis begins by estimating the effect of macroeconomic uncertainty on leverage, and then we introduce corporate governance and finally the interaction term. For all regression models, asymptotic standard errors are robust to heteroscedasticity. The Hansen *J*-statistics indicate that the instrumental variables are valid, and the estimated statistics for AR(2) test confirm that the residuals of the models are free from second-order correlations.

We start by estimating the influence of macroeconomic uncertainty on leverage in the presence of other control variables. In both Models 1 and 4, the association between macroeconomic uncertainty and leverage is significantly negative at the 1 percent level. The results support *H1*. This implies that Asia Pacific firms tend to use less leverage when they face increasing volatility in the macroeconomic environment. These findings are consistent with prior empirical studies from the UK and the USA (Caglayan and Rashid, 2014; Rashid, 2013; Baum *et al.*, 2009). Furthermore, the results also indicate the important influence of both volatility in exports and imports on the firms' financing policies. Past literature offers several possible explanations for this observation. For instance, Bhamra *et al.* (2010) contend that firms employ less debt during times of heightened macroeconomic uncertainty to preserve their financial flexibility. Meanwhile, Chen (2010) demonstrates that during times of volatile macroeconomic conditions, firms experience

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
LEV (1)	1.000								
SALES (2)	−0.039*	1.000							
TANGI (3)	0.178*	−0.163*	1.000						
FIRM_SIZE (4)	0.113*	0.053*	0.190*	1.000					
INFLATION (5)	0.012	−0.057*	0.085*	0.057*	1.000				
EXG_RATE (6)	−0.016	−0.046*	−0.059*	−0.176*	−0.129*	1.000			
EX_RISK (7)	0.005	−0.030*	−0.025*	−0.081*	−0.128*	0.128*	1.000		
IM_RISK (8)	0.003	−0.012	0.017	−0.074*	0.018	−0.032*	0.773*	1.000	
GOV (9)	−0.010	0.033*	−0.020	−0.214*	0.320*	0.042*	0.035*	0.112*	1.000

Table II.
Correlation matrix

Notes: Refer to Table AI for symbol and definitions of variables. *Statistical significant at 5 percent level or less

Table III.
Regression results

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Lagged *LEV*	0.681*** (0.039)	0.681*** (0.039)	0.681*** (0.040)	0.681*** (0.040)	0.681*** (0.040)	0.681*** (0.040)
SALES	−0.011*** (0.003)	−0.011*** (0.003)	−0.012*** (0.003)	−0.011*** (0.003)	−0.011*** (0.003)	−0.012*** (0.003)
TANGI	0.042*** (0.011)	0.042*** (0.011)	0.041*** (0.011)	0.043*** (0.011)	0.043*** (0.011)	0.043*** (0.011)
FIRM_SIZE	0.009*** (0.002)	0.009*** (0.002)	0.009*** (0.002)	0.009*** (0.002)	0.009*** (0.002)	0.009*** (0.002)
INFLATION	0.168** (0.075)	0.168** (0.075)	0.145* (0.074)	0.112 (0.079)	0.112 (0.080)	0.104 (0.079)
EXG_RATE	0.001*** (0.000)	0.001*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)
EX_RISK	−0.081*** (0.030)	−0.081*** (0.030)	0.162** (0.071)			
IM_RISK				−0.123*** (0.030)	−0.123*** (0.030)	0.038 (0.076)
GOV		0.000 (0.004)	0.015*** (0.005)		0.001 (0.004)	0.009* (0.005)
EX_RISK×GOV			−0.186*** (0.056)			
IM_RISK×GOV						−0.119** (0.059)
CRISISDUM	0.019*** (0.003)	0.019*** (0.003)	0.019*** (0.003)	0.022*** (0.003)	0.022*** (0.003)	0.022*** (0.003)
Constant	−0.176*** (0.029)	−0.176*** (0.030)	−0.181*** (0.030)	−0.163*** (0.030)	−0.164*** (0.031)	−0.167*** (0.031)
Country effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	8,700	8,700	8,700	8,700	8,700	8,700
AR(2): *p*-value	0.835	0.835	0.828	0.840	0.840	0.838
J-statistic: *p*-value	0.711	0.713	0.704	0.658	0.660	0.666

Notes: Asymptotic standard errors (in parentheses) are robust to heteroscedasticity. Refer to Table AI for symbol and definitions of variables. *,**,***Statistical significant at 10, 5 and 1 percent levels, respectively

lower discounted value of expected tax benefits of debts, which reduces the attractiveness of leverage. Likewise, Baum *et al.* (2009) report that firms are more cautious and borrow less when there is greater uncertainty in the macroeconomic environment since they expect revenues and cash flows to decline.

Next, a measure of corporate governance, *GOV* is introduced. The coefficient of corporate governance in Models 2 and 5 is positive but insignificant. In other words, we find no evidence to support *H2*. At the meantime, the coefficient of macroeconomic uncertainty remains significantly negative at the 1 percent level after controlling for corporate governance and other variables.

Finally, we interact macroeconomic uncertainty and corporate governance. The coefficient of the interaction term for Model 3, *EX_RISK*×*GOV*, and Model 6, *IM_RISK*×*GOV*, is significantly negative at the 1 and 5 percent level, respectively, which supports *H3*. Moreover, the overall effect of macroeconomic uncertainty on leverage among firms with better governance quality (as measured by the sum of the coefficients on macroeconomic uncertainty and on the interaction term) is significantly negative when macroeconomic uncertainty is proxied by volatility of growth rate of exports (−0.024) and volatility of growth rate of imports (−0.081), respectively. The evidence suggests that corporate governance acts as an effective mechanism to curb the usage of leverage during times of high volatility, which lends support to the agency theory. The finding also complements the results of Chung and Wang (2014), Erkens *et al.* (2012) and Bunkanwanicha *et al.* (2008) who find that firms with better governance quality are reluctant to use more leverage to prevent default risk during times of financial crises or economic contractions. This further suggests that firms in the Asia Pacific region have learned their lessons about the dangers of having excessive leverage during times of macroeconomic uncertainty following the AFC. Additionally, the AFC had also demonstrated how weak corporate governance could exacerbate the vulnerability of these firms to the volatility in the macroeconomic environment. Consequently, countries affected by the AFC have revamped their standards, guidelines and rules related to corporate governance and financial reporting practices to enhance the quality of governance and disclosure (Gul and Leung, 2004). Moreover, Turner (2012) concurs that since the crisis, Asian economies follow more conservative financial policies.

Meanwhile, the coefficient for the lagged dependent variable is significantly positive at the 1 percent level. This shows the persistence effects of leverage, where firms with high leverage ratio tend to employ higher leverage in the next period. This complements prior results by Caglayan and Rashid (2014) and Rashid (2013).

The coefficient of sales is significantly negative at the 1 percent level. Similar results are reported by Caglayan and Rashid (2014) and Baum *et al.* (2009), which imply that when there is an improvement in sales, firms can afford to borrow less money.

The association between tangibility and leverage is significantly positive at the 1 percent level, which supports the trade-off theory. According to this theory, firms with higher tangibility possess more fixed assets that can be offered as collateral for loans. This also mitigates the risk of the banks when lending to such firms. Consequently, firms with high asset tangibility often find it easier to obtain debt financing. This is also in agreement with Dang *et al.* (2014) and Frank and Goyal (2009).

The coefficient of firm size is significantly positive at the 1 percent level. This agrees with the trade-off theory, which posits that large firms are more reputable and diversified, and have less probability of bankruptcy. These factors enable large firms to use more leverage. This is also in line with Chakraborty (2013) and Frank and Goyal (2009).

The relationship between exchange rate and leverage is significantly positive at the 1 percent level. Capital structure of firms may be affected by movements in exchange rates via several channels such as stock prices (Tehrani and Najafzadehkhoee, 2015) and firm

value (Akay and Cifter, 2014). As a result, firms may resort to debt financing due to unfavorable developments in the equity markets.

In Models 1 to 3, the coefficient of inflation rate is significantly positive. This agrees with the trade-off theory, which posits that firms tend to develop greater reliance on debt financing when expected inflation increases in order to benefit from the higher tax deductibility of interest payments. This is also consistent with Tomak (2013) and Frank and Goyal (2009). However, the effect of inflation rate is positive but insignificant in Models 4 to 6.

In all regression models, the coefficient of the crisis dummy is significantly positive at the 1 percent level. This indicates the important influence of the GFC on leverage. Similar findings are reported by Tomak (2013).

With regards to the components of the corporate governance index, the factor loadings for the five individual governance measures are, respectively, 0.628 (*BIND*), 0.653 (*DUALITY*), 0.788 (*BSIZE*), 0.671 (*BHOWN*) and 0.198 (*INOWN*). The factor loadings represent the magnitude of each component's contribution to the index, and the positive signs indicate the positive contribution of each component to the index. The positive loading for *BIND* is in line with Eling and Marek (2014) and Erkens *et al.* (2012). The positive loading for *DUALITY* is consistent with Gul and Leung (2004) and Klein (2002). *BSIZE* contributes positively to the index, which is in line with Brown *et al.* (2006). *BHOWN* also contributes positively to the index, which is consistent with McConnell and Servaes (1990) and Morck *et al.* (1988). Lastly, the positive loading for *INOWN* is consistent with Huang and Zhu (2015). Overall, a higher aggregate measure signifies greater level of corporate governance.

Taken together, the results suggest that firms in the Asia Pacific region do take into account volatility in the macroeconomic environment when formulating their financing policies. Furthermore, the findings of this paper could reinforce the important role of corporate governance as an effective mechanism to curb the usage of leverage during times of high volatility.

4.3 Further analysis: Individual measures of governance quality

Table IV presents the regression results using individual measures of governance quality for macroeconomic uncertainty as proxied by volatility of growth rate of exports. To conserve space, only the results for regression models which include the interaction terms between macroeconomic uncertainty and the individual measures of governance quality are reported.

The results show that the coefficients of the interaction terms between macroeconomic uncertainty and board independence, the separation between the CEO and chairman roles and blockholders' ownership are significantly negative, while insignificant for board size and institutional ownership. These findings suggest that board independence, the separation between the roles of CEO and chairman of the board and blockholders' ownership serve as effective governance mechanisms to curb the usage of leverage during times of high volatility, which lend further support to *H3*.

The results for board independence are in agreement with the prior findings of Erkens *et al.* (2012) that firms issue more equity financing (and less debts) during the GFC to mitigate the risk of bankruptcy and to maintain capital adequacy. This is also in accord with Eling and Marek (2014) who report that when good governance exists such as when the boards are more independent, firms tend to take lower risk.

The findings for the separation between the CEO and chairman roles complement the results by Klein (2002) who claims that such separation of roles improves the effectiveness of the board monitoring function. Similar results are reported by Gul and Leung (2004) who find that firms tend to have lower voluntary disclosures when their CEOs also hold the position as chairman of the board.

	BIND	*DUALITY*	*BSIZE*	*BHOWN*	*INOWN*
Lagged *LEV*	0.682*** (0.040)	0.681*** (0.039)	0.682*** (0.039)	0.679*** (0.039)	0.680*** (0.040)
SALES	−0.012*** (0.003)	−0.011*** (0.003)	−0.011*** (0.003)	−0.011*** (0.003)	−0.011*** (0.003)
TANGI	0.041*** (0.011)	0.042*** (0.011)	0.042*** (0.011)	0.042*** (0.011)	0.042*** (0.011)
FIRM_SIZE	0.009*** (0.002)	0.009*** (0.002)	0.009*** (0.002)	0.009*** (0.002)	0.009*** (0.002)
INFLATION	0.165** (0.075)	0.162** (0.075)	0.167** (0.075)	0.137* (0.074)	0.161** (0.074)
EXG_RATE	0.000*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.000*** (0.000)	0.001*** (0.000)
EX_RISK	0.100** (0.045)	−0.008 (0.042)	−0.069** (0.034)	0.098** (0.046)	−0.049 (0.038)
BIND	0.019 (0.015)				
DUALITY		0.003 (0.006)			
BSIZE			0.011** (0.005)		
BHOWN				0.013 (0.011)	
INOWN					−0.023 (0.031)
EX_RISK×BIND	−0.465*** (0.099)				
EX_RISK×DUALITY		−0.103** (0.049)			
EX_RISK×BSIZE			−0.034 (0.055)		
EX_RISK×BHOWN				−0.391*** (0.094)	
EX_RISK×INOWN					−0.551 (0.536)
CRISISDUM	0.019*** (0.003)	0.019*** (0.003)	0.019*** (0.003)	0.019*** (0.003)	0.019*** (0.003)
Constant	−0.175*** (0.028)	−0.178*** (0.029)	−0.196*** (0.031)	−0.165*** (0.030)	−0.188*** (0.029)
Country effects	Yes	Yes	Yes	Yes	Yes
Observations	8,700	8,700	8,700	8,700	8,700
AR(2): *p*-value	0.837	0.832	0.834	0.825	0.822
J-statistic: *p*-value	0.685	0.714	0.705	0.688	0.725

Table IV.
Analysis using individual measures of governance quality

Notes: Asymptotic standard errors (in parentheses) are robust to heteroscedasticity. Refer to Table AI for symbol and definitions of variables. *,**,***Statistical significant at 10, 5 and 1 percent levels, respectively

The results for blockholders' ownership are in accord with Morck *et al.* (1988) who report a positive association between the extent to which outside directors are willing to discipline managers of the firm, and their shareholdings in the firm. This is also supported by McConnell and Servaes (1990) who find that increases in managerial ownership lead to better alignment between the interests of managers and shareholders, which contribute to improved firm performance.

We have also repeated the regression models using volatility of growth rate of imports as an alternative proxy for macroeconomic uncertainty, and the results remain qualitatively the same. For brevity, the results are not reported here but are available on requests to the authors. Overall, the results are qualitatively similar with the earlier findings presented in Section 4.2. Accordingly, we can conclude that specific corporate governance mechanisms can be devised to effectively curb the excessive use of leverage during such times.

5. Robustness tests

To evaluate the sensitivity of the empirical results, we conduct additional tests involving lagged macroeconomic uncertainty and additional firm-specific and macroeconomic control variables.

5.1 Regression results with lagged macroeconomic uncertainty

As robustness checks, we use the lagged macroeconomic uncertainty to repeat the main regressions. Prior studies which have incorporated risk measures with a lag include Caglayan and Rashid (2014) and Baum *et al.* (2009). The results shown in Models 1, 2, 4 and 5 in Table V are fairly consistent with those previously reported. However, the coefficient of the interaction term for Model 3, *Lagged EX_RISK×GOV*, and Model 6, *Lagged IM_RISK×GOV*, is positive and weakly significant at the 10 percent level, which is not consistent with the previously reported results. Nevertheless, the overall effect of

Table V.
Robustness: Regression results with lagged macroeconomic uncertainty

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Lagged *LEV*	0.680*** (0.041)	0.679*** (0.041)	0.680*** (0.041)	0.681*** (0.041)	0.681*** (0.041)	0.682*** (0.040)
SALES	−0.012*** (0.003)	−0.012*** (0.003)	−0.012*** (0.003)	−0.012*** (0.003)	−0.012*** (0.003)	−0.012*** (0.003)
TANGI	0.039*** (0.011)	0.039*** (0.011)	0.038*** (0.011)	0.040*** (0.011)	0.040*** (0.011)	0.039*** (0.011)
FIRM_SIZE	0.009*** (0.002)	0.009*** (0.002)	0.009*** (0.002)	0.009*** (0.002)	0.009*** (0.002)	0.009*** (0.002)
INFLATION	0.278*** (0.075)	0.278*** (0.075)	0.276*** (0.075)	0.286*** (0.074)	0.286*** (0.074)	0.286*** (0.074)
EXG_RATE	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)
Lagged EX_RISK	−0.044** (0.021)	−0.044** (0.021)	−0.117** (0.049)			
Lagged IM_RISK				−0.035* (0.019)	−0.035* (0.019)	−0.103** (0.044)
GOV		−0.001 (0.004)	−0.005 (0.004)		−0.000 (0.004)	−0.004 (0.004)
Lagged EX_RISK×GOV			0.056* (0.034)			
Lagged IM_RISK×GOV						0.051* (0.031)
CRISISDUM	0.012*** (0.002)	0.012*** (0.002)	0.012*** (0.002)	0.012*** (0.002)	0.012*** (0.002)	0.012*** (0.002)
Constant	−0.188*** (0.029)	−0.186*** (0.030)	−0.181*** (0.030)	−0.185*** (0.029)	−0.184*** (0.030)	−0.181*** (0.030)
Country effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	8,700	8,700	8,700	8,700	8,700	8,700
AR(2): *p*-value	0.835	0.835	0.833	0.836	0.836	0.835
J-statistic: *p*-value	0.535	0.537	0.521	0.623	0.624	0.624

Notes: Asymptotic standard errors (in parentheses) are robust to heteroscedasticity. Refer to Table AI for symbol and definitions of variables. *,**,***Statistical significant at 10, 5 and 1 percent levels, respectively

macroeconomic uncertainty on leverage among firms with better governance quality remains significantly negative. Again, the results are consistent with the earlier discussions in Section 4.2. This also confirms the robustness of the main findings.

5.2 Regression results controlling for additional firm-specific and macroeconomic variables

In this subsection, we re-estimate the main regressions while controlling for several additional variables, and the results are presented in Table VI. Specifically, the additional firm-specific control variables included are investment (*INVESTMENT*) (measured as the ratio of investment to total assets), growth opportunities (*GROWTH*) (ratio of the sum of book value of debt and market value of equity to total assets), profitability (*PROFIT*) (ratio of earnings before interest and taxes to total assets), non-debt tax shields (*NDTS*) (ratio of depreciation and amortization to total assets), liquidity (*LIQUIDITY*) (ratio of current assets to current liabilities) and firm-specific uncertainty (*FIRM_RISK*) (volatility of corporate profits)[5]. Meanwhile, the additional macroeconomic control variables included are Gross Domestic Product (GDP) growth (*GDP*) (yearly percentage growth in real GDP) and interest rate (*INTEREST*) (nominal lending rate). Apparently, the coefficients of these additional control variables are not significant, and the results are qualitatively similar with those reported in Table III.

6. Conclusion

This paper examines how corporate governance moderates the relationship between macroeconomic uncertainty and corporate capital structure using an unbalanced panel data of 907 listed non-financial firms from seven Asia Pacific countries during the period 2004-2014. We employ the robust two-step system GMM model in the analyses. Macroeconomic uncertainty is proxied by the volatility of growth rate of exports. As a robustness check, we also adopt the volatility of growth rate of imports as a second proxy for macroeconomic uncertainty. The results for both proxies are generally similar, which indicate the robustness of the results. The results reveal that macroeconomic uncertainty has a significant negative influence on the capital structure choices of Asia Pacific firms. Additionally, this study finds that the overall effect of macroeconomic uncertainty on leverage among firms with better governance quality is negative. The evidence suggests that corporate governance acts as an effective mechanism to curb the usage of leverage during times of high volatility. Further analysis shows that board independence, the separation between the CEO and chairman roles and blockholders' ownership are effective governance mechanisms, whereas similar observations do not hold for board size and institutional ownership.

With respect to policy implications, the findings of this study contribute to the capital structure and corporate governance literature by providing further evidence on how macroeconomic uncertainty influences the capital structure choices of firms, as well as how corporate governance moderates this relationship. These results may be useful to policy makers to formulate appropriate policies to mitigate the adverse effects caused by macroeconomic uncertainty. This is important because macroeconomic uncertainty may have potential destabilizing effects on a country's or region's development by jeopardizing the firms' ability to formulate sound investment, production and financing decisions. Additionally, the results suggest that good governance quality can act as a check and balance to ensure that firms use less leverage when they are facing volatility in the macroeconomic environment. These findings could help to reinforce the importance of good governance among policy makers of a country and managers of firms. Lastly, these findings may serve as an important guide to managers of firms and investors to enable them to formulate appropriate financing and investment decisions, respectively.

Table VI.
Robustness: regression results with additional control variables

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Lagged *LEV*	0.676*** (0.042)	0.675*** (0.042)	0.675*** (0.042)	0.676*** (0.043)	0.676*** (0.043)	0.676*** (0.043)
SALES	−0.012*** (0.003)	−0.012*** (0.003)	−0.012*** (0.003)	−0.012*** (0.003)	−0.012*** (0.003)	−0.012*** (0.003)
TANGI	0.035*** (0.013)	0.035*** (0.013)	0.035*** (0.013)	0.036*** (0.013)	0.036*** (0.013)	0.036*** (0.013)
FIRM_SIZE	0.009*** (0.002)	0.009*** (0.002)	0.009*** (0.002)	0.009*** (0.002)	0.009*** (0.002)	0.009*** (0.002)
INVESTMENT	0.069 (0.056)	0.069 (0.056)	0.066 (0.056)	0.062 (0.056)	0.062 (0.056)	0.064 (0.056)
PROFIT	−0.013 (0.011)	−0.013 (0.011)	−0.013 (0.011)	−0.013 (0.011)	−0.013 (0.011)	−0.013 (0.011)
GROWTH	0.000 (0.003)	0.000 (0.003)	0.000 (0.003)	0.000 (0.003)	0.000 (0.003)	0.000 (0.003)
NDTS	−0.032 (0.066)	−0.032 (0.066)	−0.033 (0.066)	−0.035 (0.068)	−0.035 (0.068)	−0.035 (0.068)
LIQUIDITY	−0.000 (0.000)	−0.000 (0.000)	−0.000 (0.000)	−0.000 (0.000)	−0.000 (0.000)	−0.000 (0.000)
FIRM_RISK	−0.001 (0.026)	−0.001 (0.026)	−0.001 (0.026)	−0.001 (0.026)	−0.001 (0.026)	−0.001 (0.026)
INFLATION	0.166* (0.088)	0.166* (0.088)	0.143 (0.089)	0.110 (0.089)	0.110 (0.089)	0.100 (0.089)
EXG_RATE	0.001*** (0.000)	0.001*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)
GDP	0.002 (0.002)	0.002 (0.002)	0.002 (0.002)	0.003 (0.002)	0.003 (0.002)	0.002 (0.002)
INTEREST	−0.000 (0.002)	−0.000 (0.002)	0.000 (0.002)	−0.000 (0.001)	−0.000 (0.001)	−0.000 (0.001)
EX_RISK	−0.077** (0.031)	−0.077** (0.031)	0.154** (0.071)			
IM_RISK				−0.123*** (0.030)	−0.123*** (0.030)	0.031 (0.077)
GOV		0.001 (0.004)	0.015*** (0.005)		0.001 (0.004)	0.010* (0.005)
EX_RISK×GOV			−0.177*** (0.057)			
IM_RISK×GOV						−0.113* (0.059)
CRISISDUM	0.018*** (0.003)	0.018*** (0.003)	0.018*** (0.003)	0.022*** (0.003)	0.022*** (0.003)	0.022*** (0.003)
Constant	−0.186*** (0.038)	−0.188*** (0.039)	−0.193*** (0.039)	−0.172*** (0.040)	−0.174*** (0.040)	−0.178*** (0.040)
Country effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	8,700	8,700	8,700	8,700	8,700	8,700
AR(2): *p*-value	0.902	0.902	0.895	0.907	0.907	0.904
J-statistic: *p*-value	0.737	0.737	0.721	0.703	0.703	0.700

Notes: Asymptotic standard errors (in parentheses) are robust to heteroscedasticity. Refer to Table AI for symbol and definitions of variables. *,**,***Statistical significant at 10, 5 and 1 percent levels, respectively

Notes

1. In this study, the terms "capital structure" and "leverage" are used interchangeably.
2. For instance, weak corporate governance was identified as one of the causes of the AFC, where there were poor bank supervision and unhealthy relationships between lenders and borrowers (Gill and Kharas, 2007) and poor level of corporate disclosures (Gul and Leung, 2004).
3. The primary stock exchanges covered in this study are Bursa Malaysia, Indonesia Stock Exchange, Stock Exchange of Thailand, Philippine Stock Exchange, Singapore Exchange, Australian Securities Exchange and Tokyo Stock Exchange.
4. Following Aizenman and Marion (1999), we did not adopt more complicated autoregressive schemes given the relatively short sample period.
5. Volatility of corporate profits is measured as the recursive standard deviation of the operating return on asset (ROA) of the firm, where ROA is defined as the ratio of earnings before interest, taxes, depreciation and amortization to total assets.

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Appendix

Symbol	Variable	Definition
LEV	Leverage	Ratio of total debt to total assets
SALES	Sales	Ratio of sales to total assets
TANGI	Tangibility	Ratio of net values of property, plant and equipment to total assets
FIRM_SIZE	Firm size	Natural logarithm of total assets
INFLATION	Inflation rate	Yearly percentage change in CPI
EXG_RATE	Exchange rate	Real broad effective exchange rate
EX_RISK	Macroeconomic	Volatility of growth rate of exports
IM_RISK	uncertainty	Volatility of growth rate of imports
GOV	Corporate governance	Corporate governance index
BIND	Board independence	The percentage of independent directors on the board
DUALITY	CEO duality	Dummy variable equals to one if there is a separation between the roles of CEO and chairman of the board, and otherwise zero
BSIZE	Board size	Dummy variable equals to one if the board size is less than the median size of the board of the sample, and otherwise zero
BHOWN	Blockholders' ownership	The percentage of shares owned by blockholders whose ownership is over 5 percent of a firm's equity
INOWN	Institutional ownership	The percentage of shares owned by the largest institutional owners
CRISISDUM	Crisis dummy	Dummy variable equals to one if the year is between 2008 and 2009, and otherwise zero

Table AI.
Variable definitions

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