

The Effect of Firm-Specific and Macroeconomic Uncertainty on Firm Leverage, Short-Term and Long-Term Debt in the Philippines

(Kesan Ketidaktentuan Tertentu Firma dan Makroekonomi ke Atas Leveraj Firma, Hutang Jangka Pendek dan Jangka Panjang di Filipina)

Yee Peng Chow

(Faculty of Accountancy, Finance and Business, Tunku Abdul Rahman University College)

Junaina Muhammad

A. N. Bany-Arifin

Fan Fah Cheng

(Faculty of Economics and Management, Universiti Putra Malaysia)

ABSTRACT

Firms often face uncertainties which may affect corporate financing decisions. As uncertainty has potential adverse and destabilizing effects on firms, this study is carried out to examine the influence of firm-specific and macroeconomic uncertainty on firm leverage, short-term and long-term debt. Based on a panel of Philippine listed firms from 2004-2014, we adopt a dynamic panel data estimation technique, namely the Generalized Method of Moments to conduct our analyses. The results provide strong evidence of the adverse influence of firm-specific and macroeconomic uncertainty on leverage. Furthermore, the results indicate that while short-term debt is adversely impacted by firm-specific and macroeconomic uncertainty, long-term debt is merely influenced by macroeconomic uncertainty. This implies that although Philippine firms consider firm-specific and macroeconomic uncertainty in their short-run financing decisions, they are primarily concerned about macroeconomic uncertainty in the long-run. This paper addresses the paucity of research that has been conducted in this area, particularly in the context of developing countries. The findings provide important insights into the way firms derive their short- and long-run corporate financing decisions when encountering uncertainties. The insights can guide policymakers to formulate suitable policies to ensure stability in the business and macroeconomic environment.

Keywords: Firm-specific uncertainty; leverage; long-term debt; macroeconomic uncertainty; short-term debt

ABSTRAK

Firma sering berhadapan dengan ketidaktentuan yang boleh menjejaskan keputusan pembiayaan korporat. Memandangkan ketidaktentuan berpotensi mendatangkan kesan buruk dan ketidakstabilan terhadap firma, kajian ini dijalankan untuk menyelidik kesan ketidaktentuan tertentu firma dan makroekonomi terhadap leveraj firma, hutang jangka pendek dan jangka panjang. Berdasarkan panel firma yang disenaraikan di Filipina bagi tempoh 2004-2014, analisis kajian dijalankan menggunakan teknik penganggaran data panel dinamik, iaitu Kaedah Momen Teritlak. Hasil kajian membuktikan bahawa ketidaktentuan tertentu firma dan makroekonomi mempunyai kesan negatif terhadap leveraj. Kajian ini juga mendapati bahawa walaupun hutang jangka pendek dipengaruhi secara negatif oleh ketidaktentuan tertentu firma dan makroekonomi, hutang jangka panjang hanya dipengaruhi oleh ketidaktentuan makroekonomi. Ini menunjukkan bahawa walaupun firma di Filipina mengambil kira ketidaktentuan tertentu firma dan makroekonomi dalam keputusan pembiayaan jangka pendek mereka, mereka hanya mengutamakan ketidaktentuan makroekonomi dalam jangka panjang. Kajian ini mengatasi masalah kekurangan kajian yang pernah dilaksanakan dalam bidang ini, terutamanya dalam konteks negara membangun. Hasil kajian mendedahkan cara firma membuat keputusan pembiayaan jangka pendek dan jangka panjang mereka apabila berhadapan dengan ketidaktentuan. Ini boleh dijadikan panduan kepada pembentuk dasar untuk menggubal dasar yang bersesuaian bagi memastikan kestabilan dalam persekitaran perniagaan dan makroekonomi.

Kata kunci: Ketidaktentuan tertentu firma; leveraj; hutang jangka panjang; ketidaktentuan makroekonomi; hutang jangka pendek

INTRODUCTION

Firms are constantly being subject to uncertainties, which may affect their ability to formulate corporate decisions, including corporate financing decisions. For instance, firm-specific uncertainty may affect the cost of capital (Mueller 2008), credit availability from lenders (Heyman,

Deloof & Ooghe 2008) and adverse selection problems (Ebrahim et al. 2014). Meanwhile, macroeconomic uncertainty contributes to economic or financial crises, fluctuations in investment, hiring and productivity growth (Bloom et al. 2013) and inefficiency in the allocation of capital funds (Beaudry, Caglayan & Schiantarelli 2001). Due to the potential adverse and destabilizing impact of

uncertainty on firms, we are motivated to investigate the influence of firm-specific and macroeconomic uncertainty on corporate financing decisions.

This research extends the literature on corporate financing determinants by investigating the impact of firm-specific and macroeconomic uncertainty on the leverage of firms. Although many research has been done to identify the factors influencing firms' financing choices since the seminal paper by Modigliani and Miller (1958) on the irrelevance theorem, surprisingly very few research has examined the combined impact of firm-specific and macroeconomic uncertainty on leverage. Several researchers have included firm-specific uncertainty in their analyses but very few have considered the influence of macroeconomic uncertainty. This could be due to the initial interest and focus among researchers to identify firm-specific determinants of corporate financing decisions (e.g. Chakraborty 2013; Thippayana 2014). Yet, there has been recent interest on the influence of macroeconomic variables as well (e.g. Memon, Md Rus & Ghazali 2015; Muthama, Mbaluka & Kalunda 2013).

The major theories of capital structure offer alternative explanations on the relation between risk and financing decisions. The trade-off theory (TOT) posits an inverse effect of firm-specific risk on leverage (Bradley, Jarrell & Kim 1984). However, the agency theory offers an alternative view that a positive relation exists between risk and leverage (Myers 1977). Nonetheless, both theories are referring to firm-specific risk only. More recently, some studies (e.g. Bhamra, Khuen & Strebulaev 2010; Chen 2010) have proposed theoretical frameworks to explain the firms' financing decisions when managing volatility in the macroeconomic environment. The literature reveals that macroeconomic uncertainty has an adverse effect on leverage. Similar empirical evidence is provided by research such as Chow et al. (2017) and Rashid (2013). These studies are, however, mainly conducted on developed countries such as Australia, U.K. and U.S. The question here is whether these findings are applicable to developing countries such as countries in Southeast Asia.

There are marked differences between developed and developing countries in terms of institutional and environmental settings such as financial markets and the degree of economic development (La Porta et al. 1998). For instance, firms may be subject to costlier external financing when financial markets are less developed (Stephan, Talavera & Tsapin 2011). Furthermore, developing countries are more vulnerable to external shocks than developed countries since the former has less developed financial markets and higher openness to trade (Cucculelli & Bettinelli 2016). This exacerbates the possibility of being imposed with a higher default premium or being denied with a loan (Stephan et al. 2011). Based on prior findings from developed countries, the leverage of firms in developing countries is expected to be adversely affected by these uncertainties as well. Nevertheless, this remains an empirical question since there are wide disparities between developed and developing countries.

Another shortcoming of previous research is these studies have primarily neglected the combined effects of firm-specific and macroeconomic uncertainty on short-term debt (STD) and long-term debt (LTD). Therefore, it is unclear whether macroeconomic and firm-specific uncertainty have similar effects on different debt maturities. The choice between STD and LTD has been shown to have an important influence on the agency costs of debt (Myers 1977), firm value (Stephan et al. 2011) and risk (Orman & Köksal 2017). For instance, firms that have made the wrong debt maturity choices may encounter difficulties in rolling over their loans. Moreover, firms may be subject to fluctuations in interest rates, which pose as an obstacle to undertake profitable investments (Orman & Köksal 2017).

It is the aim of this research to fill these research gaps by furnishing new evidence on how firm-specific and macroeconomic uncertainty influence firm leverage, STD and LTD using a developing country dataset. Specifically, we investigate 100 non-financial Philippine listed firms from 2004-2014. Being a relatively small and highly open economy, the Philippines is susceptible to the volatile international environment, which has affected its ability to sustain steady growth rates. The Philippine economy has also undergone multiple episodes of macroeconomic imbalances. This renders the Philippines an interesting case of a developing country to conduct our analysis.

The contributions of this research are twofold. Firstly, this paper adds to the scarce empirical research on the way firm-specific and macroeconomic uncertainty influence corporate financing decisions which is largely confined to developed countries such as the U.S. (Baum, Stephan & Talavera 2009) and the U.K. (Caglayan & Rashid 2014; Rashid 2013). This study aims to provide further evidence based on a developing country, namely the Philippines. The results demonstrate that firm-specific and macroeconomic uncertainty exert negative effect on the leverage of Philippine firms, which are consistent with findings based on developed countries. The results also corroborate the capital structure theories on how uncertainty influences leverage.

Secondly, this study addresses the paucity of studies that have been conducted on the combined impact of firm-specific and macroeconomic uncertainty on STD and LTD. Thus far, these studies are only confined to either STD (Baum et al. 2009; Caglayan & Rashid 2014) or LTD (Kirch & Terra 2012; Orman & Köksal 2017), without considering both STD and LTD. Meanwhile, other papers have investigated the determinants of STD and LTD without accounting for the combined effects of both uncertainties (Mac an Bhaird & Lucey 2014; Michaelas, Chittenden & Poutziouris 1999; Öhman & Yazdanfar 2017). We find that macroeconomic and firm-specific uncertainty do not exert similar effects on STD and LTD. Specifically, STD is impacted by both macroeconomic and firm-specific uncertainties but LTD is merely influenced by macroeconomic uncertainty. The results, therefore, provide valuable insights into the way firms derive their

short- and long-run corporate financing decisions when managing uncertainties. It is also noteworthy that although the empirical results on the influence of firm-specific and macroeconomic uncertainties on leverage are well-grounded in theories, there is still lack of theoretical explanation and empirical support for the association between uncertainty with STD and LTD. Hence, this study helps to fill these important gaps by furnishing empirical evidence in a developing country's context.

The subsequent section outlines the macroeconomic uncertainty background of the Philippines, followed by the review of literature and hypotheses development. Data and methodology, empirical results and conclusion are discussed in the next sections.

OVERVIEW OF MACROECONOMIC UNCERTAINTY BACKGROUND OF THE PHILIPPINES

The Philippines is experiencing a relatively slow-paced economic growth. Being a fairly small and highly open economy, the Philippines is susceptible to the volatile international environment and cannot sustain steady growth rates for long periods of time. For example, the country's Gross Domestic Product (GDP) deteriorated from 7.2% in 2007, to 4.6% in 2008 and 0.9% in 2009 due to a series of major external shocks in 2008 including the global financial crisis (GFC), escalating prices in food and oil and the global recession (Bangko Sentral ng Pilipinas (BSP) 2008, 2009).

Overall, the Philippine economy has undergone multiple episodes of macroeconomic imbalances due to both domestic and external factors. For instance, due to world oil prices hitting record high levels, inflation stood at 7.6% in 2005. This led to a rise in policy rates for the first time since 2000 and there was a total of three interest rate hikes in 2005 (BSP 2005). Subsequently, as a result of the food and oil price shocks, inflation reached a decade high of 9.3% in 2008. During this period, the policy rates were also raised three times. However, the interest rates were lowered in December 2008, demonstrating a better inflation outlook. This was followed by the GFC, which caused a substantial decline in domestic asset prices and a disruption of credit markets (BSP 2008).

The country's macroeconomic instability was further exacerbated by the global recession, which had contributed to the volatility of the country's domestic financial market. For example, due to massive sell-off of foreign equity holdings amounting to about USD 1 billion, equity prices plunged by 49% in 2008 and declined by another 2% in 2009 (World Bank 2009). As part of its crisis intervention measures, BSP, the country's central bank, continued to slash its policy rates. Additionally, liquidity support measures were also implemented such as reducing the reserve requirement, increasing the rediscounting budget and opening a U.S. dollar repo facility (BSP 2009).

In the recent years, the Philippine economy continued to face challenges stemming from both domestic and external factors including the global

economic slowdown, intensification of the euro-area crisis, uncertainties over the U.S. Federal Reserve tapering plans, disruptions in the supply chain following Japan's natural disasters, poor weather conditions and tensions in the Middle East. Such uncertainties made it increasingly challenging for Philippine firms to formulate corporate financing decisions. Hence, the Philippines serves as an interesting case of a developing country to conduct our analysis.

REVIEW OF LITERATURE AND HYPOTHESES DEVELOPMENT

Bollerslev, Chou and Kroner (1992: 6) once wrote that "uncertainty is central to much of modern finance theory." In the context of firm-specific uncertainty, several theoretical papers predict that uncertainty negatively influences leverage. Using a single-period model, Bradley et al. (1984) produce results which support the bankruptcy hypothesis of the TOT, where an inverse relation exists between firm-specific risk and leverage. However, Myers (1977) arrives at the opposite conclusion where the author postulates a positive association between the variables since higher uncertainty may lead to lower agency cost of debt. Consequently, firms may prefer to use more debt when uncertainty increases. Meanwhile, empirical papers such as Ebrahim et al. (2014) and Memon et al. (2015) claim that firm-specific uncertainty has a positive influence on leverage, while opposite results are reported by Rashid (2013). To sum, although both theoretical and empirical research acknowledged the important influence of firm-specific uncertainty on leverage, thus far no consensual conclusions have been reached concerning the direction of this association. This brings us to the development of our first hypothesis:

H₁ There is a significant association between firm-specific uncertainty and total debt among Philippine firms.

Turning to macroeconomic uncertainty, some recent studies have proposed theoretical frameworks to explain the firms' financing decisions when encountering macroeconomic uncertainty. Majority of these studies report that macroeconomic uncertainty has an adverse effect on leverage. Bhamra et al. (2010) claim that during such times, firms opt for lower debt to maintain their financial flexibility. Chen (2010) predicts that firms will use less leverage due to lower expected interest tax shields. Empirical research also finds similar results. For example, Rashid (2013) analyzes the influence of uncertainty on U.K. firms' leverage and finds that macroeconomic uncertainty negatively affects leverage. Nonetheless, all these studies are performed on developed countries, in particular the U.K. and the U.S. There is scarce evidence on the existence of this relationship in developing countries such as the Philippines. Following the preceding discussions, the following second hypothesis is developed:

H₂ There is a significant association between macroeconomic uncertainty and total debt among Philippine firms.

Next, we further segregate debt into STD and LTD to determine the impact of uncertainty on both debt maturities. The major theories of capital structure offer some insights into how firms select between STD and LTD. Firstly, the TOT postulates that firms weigh between the benefits and costs of debt before choosing their optimal capital structure. The major imperfections being considered are taxes and bankruptcy costs. This implies that firms with higher profits can use more interest tax shields and have lower bankruptcy costs, which enable them to have more debts including STD and LTD (Jensen 1986). Secondly, the pecking order theory (POT) posits that the firms' capital structure decisions follow a strict hierarchy where internal funding is the most preferred choice to fund their investments, followed by STD, LTD and lastly equity financing when there is insufficient internal funding (Myers 1984; Myers & Majluf 1984). Thirdly, the agency model of the firm espoused by Jensen and Meckling (1976) posits that conflict of interest happens among managers of the firm, outside shareholders and bondholders due to separation of the decision-making responsibility of the firm from its risk bearing responsibility. Myers (1977) proposes that agency problems such as those arising between the shareholders and bondholders which lead to wealth appropriation from bondholders to shareholders can be reduced if firms choose STD instead of LTD. Nonetheless, these theories are somewhat silent about how uncertainty affects STD and LTD.

The current empirical literature offers rather mixed conclusions. Baum et al. (2009) study the link between firm-specific and macroeconomic uncertainty with STD of U.S. firms and report that a rise in either form of uncertainty results in lower STD. Orman and Köksal (2017) report that macroeconomic uncertainty adversely impacts the LTD of Turkish firms. They contend that during periods of heightened macroeconomic uncertainty, firms avoid issuing LTD. Meanwhile, Michaelas et al. (1999) analyze the influence of the business cycle and find that firms use less STD during economic booms but adopt more STD during economic recessions. However, the authors report that LTD increases monotonously with economic growth, implying that firms prefer issuing LTD when the economy improves and vice versa during economic downturns. Considering all the arguments, the theoretical predictions and empirical support of the effect of uncertainty on STD and LTD remain inconclusive. Nevertheless, there appears to be more empirical support for the negative influence of firm-specific and macroeconomic uncertainty on STD and LTD. This, however, remains an empirical question, which necessitates further investigation. Our remaining hypotheses are as follows:

H₃ There is a significant association between firm-specific uncertainty and STD among Philippine firms.

H₄ There is a significant association between firm-specific uncertainty and LTD among Philippine firms.

H₅ There is a significant association between macroeconomic uncertainty and STD among Philippine firms.

H₆ There is a significant association between macroeconomic uncertainty and LTD among Philippine firms.

DATA AND METHODOLOGY

This research covers 100 firms listed on the Philippine Stock Exchange from 2004-2014.¹ The study period is chosen based on data availability and is intended to capture the differences in macroeconomic and capital market conditions over time. Such a changing environment allows us to observe the firms' financial behavior better and develop a comprehensive understanding of their financing decisions (Stephan et al. 2011). Representative firms are selected from all important sectors using a random sampling method, except the financial sector due to differences in reporting requirements. Table 1 shows the sector distributions of these firms. Besides, only firms with five or more continuous years of data are selected to ensure the robustness of diagnostics using the Generalized Method of Moments (GMM) estimation technique (Arellano & Bond 1991). We collect macroeconomic data from the International Financial Statistics of the International Monetary Fund and firm-level data from Datastream. To overcome outliers, we winsorize the upper and lower 1% observations of each variable. This leaves us with an unbalanced panel of 1,004 firm-year observations.²

TABLE 1. Sample firms by sectors

Sector	Frequency
Industrial	31
Holding firms	6
Mining and oil	12
Services	29
Property	22
Total	100

We adopt six leverage measures as the dependent variable. Three are book leverage ratios, while the remaining three are market leverage ratios. The book leverage ratios are book value of total debt ratio (BVDRTD), long-term debt ratio (BVDRLTD) and short-term debt ratio (BVDRSTD). The market leverage ratios are market value of total debt ratio (MVDRTD), long-term debt ratio (MVDRLTD) and short-term debt ratio (MVDRSTD). Book leverage is determined based on accounting-based historic values, while market leverage is computed using future cash flows expectations. Both leverage measures at the book and market values are intended to ascertain the robustness of the research results.

The extant literature has extensively debated the choice between market and book leverage ratios. On one hand, book leverage ratios are preferred over market leverage ratios since they are the relevant measure of debtholders' liabilities in the event of bankruptcy (Lewis & Jais 2014). Book leverage ratios are also preferred because changes in market leverage ratios may not reflect any underlying changes in the firm (Prasad, Green & Murinde 2001). On the other hand, supporters of market leverage ratios assert that these ratios better reflect the relative firm ownership by equityholders and creditors. The market leverage ratios are also widely applied in the firms' cost of capital computation (Welch 2004).

TABLE 2. GARCH (1,1) model of macroeconomic uncertainty

Panel I: Estimates for GARCH (1,1)	
AR(1)	-0.553*** (0.17)
AR(2)	-0.242 (0.15)
AR(3)	-0.190* (0.11)
MA(1)	0.548** (0.22)
ARCH(1)	0.772*** (0.20)
GARCH(1)	0.448*** (0.07)
Constant	0.000 (0.00)
Panel II: Diagnostic tests	
Log-likelihood	279.252
Obs.	100
LM-test (6)	-0.448
p-value	0.655
Q (8)	7.354
p-value	0.118
Q (15)	9.175
p-value	0.606

Notes: The brackets indicate standard errors.

***p < 0.01, **p < 0.05 and *p < 0.10.

The independent variables are macroeconomic and firm-specific uncertainty. Macroeconomic uncertainty is measured by the conditional variance of real interest rate, which is estimated using a generalized autoregressive conditional heteroscedasticity (GARCH) model. The GARCH (1,1) model for real interest rate is estimated commencing from 1990Q1 till 2014Q4. Following Caglayan and Rashid (2014), the estimation of the GARCH model covers an extended time to enhance the model's performance. The arithmetic mean of each four-quarter conditional variance series is subsequently calculated to derive macroeconomic uncertainty in annual terms. Details of the model are provided in Table 2. Following Paligorova (2010), firm-specific uncertainty is computed as the recursive standard deviation of the operating return on asset. Operating return on asset is computed as income before interest, taxes, depreciation and amortization over total assets.

Guided by previous capital structure research, we include four control variables in the analysis, namely profitability, non-debt tax shield (NDTS), firm size and investment. However, capital structure theories have

conflicting predictions about the direction of their relationship. Firstly, according to the TOT, profitability positively influences leverage because firms with higher profits are less prone to bankruptcy and adopt leverage to shield taxable income. In contrary, the POT predicts a negative association since profitable firms prefer to fund investments with internal funds than external financing due to adverse selection and information asymmetry problems. Along with this line of argument, profitability is expected to have a positive relation with both STD and LTD if TOT holds true and vice versa if POT applies.

Secondly, the TOT predicts an inverse association between NDTS and leverage because firms with more NDTS (e.g. tax deductions for depreciation) have a higher probability of earning no taxable income and having lower expected corporation tax rate and return from interest tax shields. This, in turn, discourages firms from issuing more debts. However, the POT predicts a positive association, which implies that NDTS does not substitute interest tax shield. In line with these arguments, if the TOT holds true, NDTS is expected to negatively affect both STD and LTD since NDTS serves as an alternative to interest tax shield. Conversely, if NDTS does not substitute interest tax shield, positive relationships between NDTS and both STD and LTD are expected, which is consistent with the POT.

Thirdly, the TOT predicts that firm size has a positive impact on leverage. Firms that are larger in size can issue more debts because they bear lower bankruptcy risk, borrowing cost and information asymmetry problems, and enjoy better reputation and creditworthiness. In contrary, according to the POT, since large firms have a better reputation and lower adverse selection problems, they can issue equity more easily than small firms. Consequently, large firms rely on less debt. Turning to the effect of firm size on STD and LTD, past literature finds that larger firms possess better ability to borrow long-term because they are better diversified, have more collateralizable assets and lower information asymmetry problems and risk of bankruptcy than smaller firms. Conversely, creditors are more reluctant to provide LTD to smaller firms since they suffer from more information asymmetry problems and are considered to be riskier (Myers 1984; Öhman & Yazdanfar 2017).

Lastly, past literature reports a positive association between investment and leverage because firms need to seek for additional funds including debt financing when they want to undertake investment projects (Caglayan & Rashid 2014; de Miguel & Pindado 2001). Turning to the effect of investment on STD and LTD, the maturity-matching hypothesis posits that the maturity of the firms' assets should match with the maturity of their liabilities. If the liabilities have shorter maturity than the assets, there may be inadequate time for these assets to generate the required cash flows to repay the liabilities. When the opposite situation occurs, firms may also face the risk of non-repayment of debt after the assets mature. Hence, firms may mitigate this risk by matching maturities (Morris 1976). Hence, we would expect firms to use

more LTD than STD to fund their investments due to the long-term nature of investments. Table A1 in the appendix summarizes the research variables.

The following is the regression model adopted in this research:

$$\begin{aligned} \text{LEV}_{it} = & \beta_0 + \beta_1 \text{LEV}_{it-1} + \beta_2 \text{UNCER_FIRM}_{it} \\ & + \beta_3 \text{UNCER_MACRO}_{it} + \beta_4 \text{INVESTMENT}_{it} \\ & + \beta_5 \text{PROFITABILITY}_{it} + \beta_6 \text{FIRM_SIZE}_{it} \\ & + \beta_7 \text{NDTS}_{it} + \varepsilon_{it} \end{aligned} \quad (1)$$

where LEV denotes leverage ratio, UNCER_FIRM represents firm-specific uncertainty, UNCER_MACRO represents macroeconomic uncertainty, INVESTMENT is investment, PROFITABILITY is profitability, FIRM_SIZE is firm size, NDTS denotes non-debt tax shield while ε represents the disturbance term.

A dynamic panel data method is adopted to estimate the regression models. Specifically, we adopt Blundell and Bond (1998)'s system GMM estimation technique. The main advantage of this method lies in its ability to deal with any potential endogeneity problem. Moreover, it controls firm-level heterogeneity and removes unobserved firm-specific fixed effects. A two-step estimator is also adopted which has higher efficiency compared to the one-step estimator.

Two specification tests are applied. Firstly, the J -statistic is adopted to determine whether the instruments are valid and to prevent model misspecification.³ Secondly, the autocorrelation test is conducted to ascertain whether second-order serial correlation exist. For both tests, failure to reject the null hypotheses indicates the validity of the instruments and second-order serial correlation is not present, respectively.

TABLE 3. Descriptive statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
BVDRTD	1,004	0.175	0.171	0.000	0.773
BVDRSTD	1,004	0.071	0.095	0.000	0.610
BVDRLTD	1,004	0.104	0.138	0.000	0.680
MVDRTD	1,004	0.159	0.162	0.000	0.780
MVDRSTD	1,004	0.067	0.092	0.000	0.595
MVDRLTD	1,004	0.092	0.127	0.000	0.695
INVESTMENT	1,004	0.046	0.059	0.000	0.517
PROFITABILITY	1,004	0.060	0.213	-5.298	0.736
FIRM_SIZE	1,004	22.525	1.953	17.287	27.816
NDTS	1,004	0.032	0.035	-0.003	0.252
UNCER_FIRM	1,004	0.057	0.082	0.000	1.703
UNCER_MACRO	1,004	0.000	0.000	0.000	0.000

Notes: Refer to the appendix for variable definitions. All variables are expressed as ratios, except for FIRM_SIZE which is in Philippine peso.

RESULTS AND DISCUSSION

DESCRIPTIVE STATISTICS

Table 3 depicts the descriptive statistics. The average *BVDRTD* and *MVDRTD* are 0.175 and 0.159, respectively. Meanwhile, the average *BVDRSTD*, *MVDRSTD*, *BVDRLTD* and *MVDRLTD* are 0.071, 0.067, 0.104 and 0.092, respectively. This shows that, on average, Philippine firms adopt more LTD than STD. Moreover, a wide variation is observed among the sampled firms where some firms have no debts while others have up to 78% debts in their capital structures. Moving on to the explanatory variables, the average *UNCER_FIRM* is 0.057, with a range between zero (minimum) and 1.703 (maximum), and the average *UNCER_MACRO* is 0.00002, with a range between zero and 0.0001. Turning to the control variables, the average *INVESTMENT* is 0.046, with some sampled firms registering no investments while others investing up to 51.7% of total assets. On average, *PROFITABILITY* is low (0.06) but the large variation (0.213) understates the profitability

level where some firms suffer losses (-5.298) while others record profits as high as 0.736. The average *FIRM_SIZE* is 22.525 and the sampled firms have quite diverse firm sizes, ranging from 17.287 to 27.816. The average *NDTS* is 0.032, with a range between -0.003 and 0.252. Collectively, the statistics indicate that some variations are observed among the sampled firms for each variable.

Table 4 illustrates the Pearson correlations between the explanatory variables. It can be observed that the explanatory variables do not register high correlations. Hence, multicollinearity is not an issue. The variance inflation factor (VIF) further confirms this observation, where the highest VIF recorded is 1.32 (below ten) (Gujarati & Porter 2009).

REGRESSION RESULTS

Table 5 reports the findings for the book value of total debt ratio (Model 1) and the market value of total debt ratio (Model 2). Asymptotic standard errors are corrected for heteroscedasticity. In both Models 1 and 2, the J -statistics

TABLE 4. Correlation matrix

	(1)	(2)	(3)	(4)	(5)	(6)
INVESTMENT (1)	1.000					
PROFITABILITY (2)	0.098*	1.000				
FIRM_SIZE (3)	0.170*	0.218*	1.000			
NDTS (4)	0.505*	0.148*	0.115*	1.000		
UNCER_FIRM (5)	-0.020	-0.549*	-0.139*	0.030	1.000	
UNCER_MACRO (6)	0.015	0.023	-0.068*	0.052	-0.148*	1.000

Notes: Refer to the appendix for variable definitions.

*p < 0.05.

TABLE 5. Two-step system GMM estimation of book and market leverage models

	Model 1 BVDRTD	Model 2 MVDRTD
Lagged leverage	0.860*** (0.07)	0.750*** (0.08)
INVESTMENT	0.293*** (0.09)	0.230** (0.11)
PROFITABILITY	-0.059** (0.03)	-0.062** (0.03)
FIRM_SIZE	0.010*** (0.00)	0.013*** (0.00)
NDTS	-0.346*** (0.12)	-0.275* (0.16)
UNCER_FIRM	-0.131*** (0.05)	-0.150*** (0.06)
UNCER_MACRO	-363.372*** (84.07)	-374.850*** (95.76)
Constant	-0.190*** (0.06)	-0.235*** (0.07)
Observations	904	904
AR(2): p-value	0.868	0.759
J-statistic: p-value	0.669	0.103

Notes: Refer to the appendix for variable definitions. Asymptotic standard errors (in brackets) are adjusted for heteroscedasticity.

***p < 0.01, **p < 0.05 and *p < 0.10.

portray that the instruments are valid and the AR(2) test statistics suggest that the models' residuals do not suffer from second-order correlations.

Both models show relatively similar findings, indicating that the results are robust. Both the coefficients for firm-specific and macroeconomic uncertainty are significantly negative for both models. These findings imply that when firms encounter increasing firm-specific and macroeconomic uncertainty, lower debt is employed. Thus, H_1 and H_2 are supported. The results for firm-specific uncertainty corroborate the bankruptcy hypothesis of the TOT, where firms facing more business risk utilize lower debt to mitigate bankruptcy risk. Meanwhile, among the theoretical explanations for the findings for macroeconomic uncertainty are during times of heightened volatility, firms opt for a lower debt due to lower expected interest tax shields (Chen 2010) and to preserve financial flexibility (Bhamra et al. 2010). These results also complement empirical findings by Rashid (2013) and Caglayan and Rashid (2014).

The lagged leverage coefficient is significantly positive for both models. This indicates that leverage has persistence effects, where firms recording high leverage ratios continue to do so in the following period. The results agree with Rashid (2013) and Caglayan and Rashid (2014). The investment coefficient is significantly positive for both

models. The results suggest that when firms must fund investment projects, they will seek more funds including debt financing. This is consistent with de Miguel and Pindado (2001) and Caglayan and Rashid (2014). The profitability coefficient is significantly negative for both models. The results corroborate the POT, where profitable firms prefer to fund investments with internal funds than external financing due to adverse selection and information asymmetry problems. The findings also complement Rashid (2013) and Ebrahim et al. (2014).

The firm size coefficient is significantly positive for both models, which supports the TOT. Large firms can issue more debts since they have less bankruptcy risk, borrowing cost and information asymmetry problems, and have a higher reputation and creditworthiness. This is also in accord with Rashid (2013) and Chakraborty (2013). The NDTS coefficient is significantly negative for both models, which corroborates the TOT. Firms having more NDTS tend to adopt lower debts because they have a higher probability of earning no taxable income and having lower expected corporation tax rate and return from interest tax shields. This also complements DeAngelo and Masulis (1980).

Next, this paper estimates the impact of firm-specific and macroeconomic uncertainty on STD and LTD and Table 6 reports the results. Models 3 and 5 are short-term models, while Models 4 and 6 are long-term models.

TABLE 6. Two-step system GMM estimation of short- and long-term leverage models

	Model 3 BVDRSTD	Model 4 BVDRLTD	Model 5 MVDRSTD	Model 6 MVDRLTD
Lagged dependent variable	0.504*** (0.07)	0.765*** (0.06)	0.537*** (0.10)	0.669*** (0.08)
INVESTMENT	0.072* (0.04)	0.240*** (0.09)	0.060* (0.04)	0.211* (0.12)
PROFITABILITY	-0.032* (0.02)	-0.020 (0.01)	-0.032* (0.02)	-0.023* (0.01)
FIRM_SIZE	0.003* (0.00)	0.011*** (0.00)	0.003 (0.00)	0.010*** (0.00)
NDTS	0.107 (0.10)	-0.177 (0.11)	0.040 (0.09)	-0.213 (0.14)
UNCER_FIRM	-0.086* (0.05)	-0.030 (0.03)	-0.095** (0.05)	-0.048 (0.03)
UNCER_MACRO	-93.766 (61.44)	-279.820*** (68.25)	-207.685** (81.33)	-267.479*** (65.96)
Constant	-0.038 (0.04)	-0.227*** (0.06)	-0.028 (0.04)	-0.207*** (0.06)
Observations	904	904	904	904
AR(2): p-value	0.690	0.291	0.540	0.236
J-statistic: p-value	0.426	0.326	0.175	0.265

Notes: Refer to the appendix for variable definitions. Asymptotic standard errors (in brackets) are adjusted for heteroscedasticity.

***p < 0.01, **p < 0.05 and *p < 0.10.

The firm-specific uncertainty coefficient is significantly negative for Models 3 and 5, but insignificant for Models 4 and 6. The results imply that although firm-specific uncertainty exerts a significantly adverse influence on STD, its impact on LTD is insignificant. Hence, H_3 is supported but not H_4 . The findings are consistent with Baum et al. (2009), suggesting that when firms encounter higher firm-specific uncertainty, they rely more on internal funds when external financing becomes either costlier or less accessible. Firms may also reduce their reliance on STD to alleviate liquidation risk. Debts with shorter maturity make it easier for creditors to place firms into liquidation such as by disposing the firms' assets or taking over the control of the firm when firms fail to service their debts (Diamond 1991).

The macroeconomic uncertainty coefficient is significantly negative for all models, except for Model 3 which is insignificant. This shows that macroeconomic uncertainty adversely affects LTD, which supports H_6 . The results are in accord with Orman and Köksal (2017), indicating that firms try not to engage in long-term debt agreements because of the instability and unpredictability of the macroeconomic environment. Furthermore, macroeconomic uncertainty negatively affects the market value of short-term debt ratio, but no support is found for the book value of short-term debt ratio. Therefore, H_5 is partially supported. This is in line with Baum et al. (2009), implying that during such times, firms exercise caution and try not to incur more debts in anticipation of declining revenues and cash flows. A closer examination into the economic significance of these models (as

shown by the size of the coefficients) reveals that LTD (Models 4 and 6) decreases by a larger magnitude than STD (Model 5) as macroeconomic uncertainty increases. Put differently, although macroeconomic uncertainty adversely affects both STD and LTD, the size or magnitude of changes observed between both debt maturities differs.

The findings for the control variables are generally preserved except for NDTS which becomes insignificant. The lagged dependent variable coefficient is significantly positive for all four models, indicating the persistence effects of both STD and LTD. The investment coefficient is significantly positive for all four models. In terms of economic significance, STD increases by a relatively smaller magnitude than LTD when there is a 1% increase in investment. This is due to the long-term nature of investments which are primarily funded by LTD. This corroborates the maturity-matching hypothesis which posits that the maturity of the firms' assets and liabilities should match to mitigate potential financial distress risk. This is also in accord with Michaelas et al. (1999).

The profitability coefficient is significantly negative for all models, except for Model 4 which is insignificant. The size of the coefficients indicates that both STD and LTD decline by almost the same magnitude when there is a 1% increase in profitability, which corroborate the POT. Profitable firms depend heavily on their internal funding to finance investments, leading to a decline in both STD and LTD. Similar evidence is reported by Michaelas et al. (1999) and Öhman and Yazdanfar (2017). The firm size coefficient is significantly positive for all models, except

TABLE 7. Two-step system GMM estimation incorporating crisis dummy

	Model 1 BVDRTD	Model 2 MVDRTD	Model 3 BVDRSTD	Model 4 BVDRLTD	Model 5 MVDRSTD	Model 6 MVDRLTD
Lagged dependent variable	0.859*** (0.07)	0.715*** (0.08)	0.504*** (0.07)	0.773*** (0.06)	0.529*** (0.10)	0.669*** (0.08)
INVESTMENT	0.297*** (0.09)	0.213* (0.11)	0.071* (0.04)	0.240*** (0.09)	0.053 (0.03)	0.212* (0.12)
PROFITABILITY	-0.055** (0.02)	-0.062** (0.03)	-0.032* (0.02)	-0.020 (0.01)	-0.032* (0.02)	-0.022 (0.01)
FIRM_SIZE	0.010*** (0.00)	0.014*** (0.00)	0.003* (0.00)	0.011*** (0.00)	0.003 (0.00)	0.011*** (0.00)
NDTS	-0.355*** (0.12)	-0.289* (0.16)	0.107 (0.10)	-0.188 (0.12)	0.041 (0.09)	-0.229 (0.15)
UNCER_FIRM	-0.118** (0.05)	-0.148** (0.06)	-0.085* (0.05)	-0.028 (0.03)	-0.094** (0.05)	-0.044 (0.03)
UNCER_MACRO	-324.776*** (83.26)	-283.230*** (93.19)	-92.644 (63.95)	-262.543*** (71.18)	-185.366** (82.98)	-216.150*** (68.18)
DUMCRISIS	0.011* (0.01)	0.023*** (0.01)	-0.000 (0.00)	0.004 (0.01)	0.006* (0.00)	0.014** (0.01)
Constant	-0.193*** (0.06)	-0.265*** (0.08)	-0.039 (0.04)	-0.225*** (0.06)	-0.032 (0.04)	-0.211** (0.06)
Observations	904	904	904	904	904	904
AR(2): p-value	0.772	0.926	0.689	0.295	0.520	0.266
J-statistic: p-value	0.607	0.130	0.419	0.317	0.198	0.331

Notes: Refer to the appendix for variable definitions. Asymptotic standard errors (in brackets) are adjusted for heteroscedasticity. ***p < 0.01, **p < 0.05 and *p < 0.10.

for Model 5 which is insignificant. In terms of economic significance, larger firms adopt more LTD than STD since they are more diversified, have more collaterals and less information asymmetry problems and bankruptcy risk. This complements Michaelas et al. (1999) and Mac an Bhaird and Lucey (2014).

FURTHER ANALYSIS: CRISIS DUMMY

This section re-estimates the regression models by incorporating a crisis dummy (DUMCRISIS) to capture the influence of the GFC. The inclusion of the dummy variable is expected to provide a clearer pattern of the regression results. DUMCRISIS is equal to one if the year is between 2008 and 2009, and zero otherwise. The findings for Model 1 through 6 with the inclusion of the crisis dummy are shown in Table 7.

The overall findings are qualitatively similar to those found in Tables 5 and 6, which indicate the robustness of the results. For example, the firm-specific uncertainty coefficient remains significantly negative for Models 3 and 5, but insignificant for Models 4 and 6, which reaffirms the adverse effect of firm-specific uncertainty on STD, but not LTD. The macroeconomic uncertainty coefficient remains significantly negative for all models, except for Model 3 which is insignificant. This reaffirms the adverse impact of macroeconomic uncertainty on both STD and LTD. Similar to the findings in Table 6, it can be observed that in terms of economic significance, LTD (Models 4 and 6) declines by a relatively larger magnitude than STD (Model 5) as macroeconomic uncertainty increases.

The crisis dummy coefficient is significantly positive for all models, except for Models 3 and 4. This agrees with Iqbal and Kume (2014) who analyze the effect of the GFC in Germany, U.K. and France and report that a rise in leverage ratios was observed during the crisis. However, these ratios reverted to their pre-crisis level after the GFC. This is also in accord with Campello, Graham and Harvey (2010) who assert that firms, which are financially restricted, borrowed heavily during the GFC in anticipation of credit restrictions in the future.

CONCLUSION

Drawing on a sample of Philippine listed firms from 2004-2014, we empirically analyze how firm-specific and macroeconomic uncertainty influence leverage, STD and LTD. This study reports that firm-specific and macroeconomic uncertainty negatively affect leverage. Furthermore, the findings indicate that while STD is adversely impacted by both macroeconomic and firm-specific uncertainty, LTD is influenced by macroeconomic uncertainty only. These effects are robust to the inclusion of a crisis dummy in the model specifications. This implies that although Philippine firms account for both firm-specific and macroeconomic uncertainty in their short-run corporate financing decisions, they are only focused on macroeconomic uncertainty in the long-run.

In terms of policy implications, policymakers should take pro-active steps in formulating suitable policies to ensure stability in the business and macroeconomic

environment such as by ensuring that there is less volatility in its monetary policies. A stable or less volatile environment will facilitate firms to make sound short-run financing decisions (e.g. working capital financing) and long-run financing decisions (e.g. financing for the acquisition of non-current assets and business expansions). Moreover, the results may provide an improved understanding among firms on the sources of uncertainty and their effects on leverage, STD and LTD.

Theoretically, the results lend further support to the theories on capital structure related to the impact of uncertainty on leverage. Since our evidence based on a developing country dataset is consistent with the results based on developed countries, this indicates that the theoretical prediction of the negative influence of both uncertainties on leverage holds true across different institutional and environmental settings. Furthermore, the findings also provide richer insights into the effects of uncertainty on STD and LTD, which to date are still lacking in terms of both theoretical explanations and empirical support.

As recommendations for further research, there are a host of other potential variables that could be included in the analysis. For example, further studies could explore other macroeconomic uncertainty's proxies such as volatility of exchange rates, terms of trade and fiscal policy. Future research is suggested to cover private firms to improve generalizability.

ENDNOTES

- ¹ Initially, we consider all firms listed on the Philippine Stock Exchange as the population of study. However, after excluding firms from the financial sector, we are left with 220 firms. According to Hair et al. (2007), a sample of 100 cases is considered adequate for conducting multiple regression. Moreover, Callahan, Millar and Schulman (2003) opine that a 10% sample of the target population is sufficient for statistical inference purpose. Therefore, we have decided to select 100 non-financial firms as the sample of study which represent 45% of the target population.
- ² We employ the STATA software to run the regression models. This software package is able to handle unbalanced panel data. In fact, it is more efficient to utilize the entire unbalanced dataset than eliminating excess observations to make the dataset balanced (Baltagi & Chang 1994).
- ³ The *J*-statistic or Hansen (1982) test is the most common diagnostic applied in GMM estimation to ascertain the appropriateness of the model. The Hansen test is more advantageous and robust compared to other tests (e.g. Sargan test) since it adopts an optimal weighting matrix which does not depend on the strict assumptions of homoscedasticity and no serial correlation in the error term (Baum, Schaffer & Stillman, 2003).

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- Yee Peng Chow
Faculty of Accountancy, Finance and Business
Tunku Abdul Rahman University College
Jalan Genting Kelang, Setapak
53300 Kuala Lumpur, MALAYSIA
E-Mail: chowyeepeng@gmail.com
- Junaina Muhammad (corresponding author)
Faculty of Economics and Management
Universiti Putra Malaysia
43400 Serdang, Selangor, MALAYSIA
E-Mail: junaina@upm.edu.my
- A.N. Bany-Arifin
Faculty of Economics and Management
Universiti Putra Malaysia
43400 Serdang, Selangor, MALAYSIA
E-Mail: bany@upm.edu.my
- Fan Fah Cheng
Faculty of Economics and Management
Universiti Putra Malaysia
43400 Serdang, Selangor, MALAYSIA
E-Mail: chengfanfah@upm.edu.my

APPENDIX

TABLE A1. Summary of research variables

Variables	Items	Proxies	Definition
Independent variables	Firm-specific uncertainty	UNCER_FIRM	Recursive standard deviation of operating return on asset
	Macroeconomic uncertainty	UNCER_MACRO	Conditional variance of real interest rate
Dependent variables	Leverage	Book value of total debt ratio (BVDRTD)	Book value of total debt over book value of total assets
		Book value of short-term debt ratio (BVDRSTD)	Book value of short-term debt over book value of total assets
		Book value of long-term debt ratio (BVDRLTD)	Book value of long-term debt over book value of total assets
		Market value of total debt ratio (MVDRTD)	Book value of total debt over the sum of market value of equity and book value of total debt, where market value of equity is derived from the multiplication of the company's stock price and total shares outstanding
		Market value of short-term debt ratio (MVDRSTD)	Book value of short-term debt over the sum of market value of equity and book value of total debt
		Market value of long-term debt ratio (MVDRLTD)	Book value of long-term debt over the sum of market value of equity and book value of total debt
Control variables	Investment	INVESTMENT	Investment over total assets
	Profitability	PROFITABILITY	Income before interest and taxes over total assets
	Firm size	FIRM_SIZE	Natural logarithm of total assets
	Non-debt tax shield	NDTS	Amortization and depreciation over total assets