The Journal of Economic Asymmetries 21 (2020) e00147

Contents lists available at ScienceDirect

The Journal of Economic Asymmetries

journal homepage: www.elsevier.com/locate/jeca

Information Asymmetry and firm value: Is Vietnam different?☆

Toan Luu Duc Huynh [a,*], Junjie Wu [b], An Trong Duong [c]

[a] School of Banking, University of Economics Ho Chi Minh City, Viet Nam
[b] Leeds Beckett University, United Kingdom
[c] Banking University of Ho Chi Minh City, Viet Nam

ARTICLE INFO

JEL classification:
H20
H50
H70
G38

Keywords:
Information asymmetry
Firm value
Leverage
GMM
Vietnam

ABSTRACT

Using firm-level data from 250 non-financial companies with 2,500 firm-year observations collecting from two stock exchange markets in Vietnam covering a 10-year period from 2008 to 2017, this paper examines the relationship between information asymmetry and firm value in Vietnamese firms. The findings reveal that fundamentally, information asymmetry in Vietnamese firms has a negative impact on firm value. Although this conclusion is consistent with that in the literature underlying by pecking order and agency cost theories, the value of information asymmetry related variables is higher than that in similar studies conducted in other developed countries. The results also find that the financial leverage in Vietnamese firms is higher than in other developed countries but can only play a limited role in mitigating the negative impact of information asymmetry on firm value. All in all, the findings relating to all variables used in the study highlight that Vietnam is a typical emerging country because there is a precise distance from other developed countries.

1. Introduction

Obtaining appropriate and accurate information is considered by investors as the most essential precondition to make an investment decision, and thus the power of knowledge is defined as the assumption for an efficient market. However, asymmetric information rather than information efficiency is often observed in many markets. Akerlof's pioneering work (1970) first defines the concept of information asymmetry and demonstrates in a market where sellers hold better information than buyers about the quality of products which can cause an adverse selection of low-quality products. Spence (1973) and Stiglitz (1974) late to further develop the concept, leading the three won the Nobel Prize jointly in 2001.

Information asymmetry is a kind of market failure. When it exists, it affects the market value and the value of the firms listed in the stock market. It is because information asymmetry could lead to individual investors and firms making wrong financial decisions with loss of their investment and the share value of firms. For example, firms with good wealth and large profits usually tend to use own recourse to finance business and avoid a large chunk of debts (Besbes & Boujelbene, 2014). However, if under the exposure of asymmetric information, the pecking order theory suggests that firms prefer an order of debt financing to the equities to reduce information risk (Myers & Majluf, 1984; Agarwal & O'Hara, 2007). Myers and Majluf (1984) point out that once a market cannot distinguish good or bad quality investment opportunities, firms in favourable positions often choose self-financing. These examples demonstrate

☆ This paper was accepted in International Conference on Business and Finance 2019 - Ho Chi Minh City (Vietnam) and this research is fully funded by University of Economics Ho Chi Minh City.

* Corresponding author.
E-mail addresses: toanhld@ueh.edu.vn (T.L.D. Huynh), J.Wu@leedsbeckett.ac.uk (J. Wu), anduongbuh@gmail.com (A.T. Duong).

https://doi.org/10.1016/j.jeca.2019.e00147
Received 18 September 2019; Received in revised form 10 November 2019; Accepted 13 November 2019

information symmetry/asymmetry is an important factor in determining firms' capital structure, investment decision and consequently firm value.

Scholars have examined the linkages of market information asymmetry level, firm asset level, leverage level and firm value/performance (see examples, Botosan, 1997; D'Mello & Ferris, 2000; D'Mello et al., 2008; Bharath, Pasquariello, & Wu, 2009; Drobetz, Grüninger, & Hirschvogl, 2010; Fosu, 2013; He, Lepone, & Leung, 2013; Gao & Zhu, 2015; Fosu, Danso, Ahmad, & Coffie, 2016; Aye, Balcilar, Demirer, & Gupta, 2018). From these studies, readers understand how information asymmetry impacts firms in developed countries such as the US (Botosan, 1997; D'Mello & Ferris, 2000; D'Mello et al., 2008; Bharath et al., 2009), Germany (Lechner & Gatzert, 2018), the UK (Fosu et al., 2016), Australia (He et al., 2013), other developing countries such as Australia (He et al., 2013), some emerging markets in Asian region, for instance, Thailand and India (Prommin, Jumreornvong, Jiraporn, & Tong, 2016; Farooq et al., 2017), and across different countries (Drobetz et al., 2010; Gao & Zhu, 2015). However, less evidence found in the literature relating to the relationship between information asymmetry, leverage level and firm value in Vietnam. Vietnam is an emerging country in South-East Asia with rapid development in recent decades and is also in the process of transforming from a traditional socialist economy to a market economy. Driven by the opening and reforming economy, Vietnam proactively participates in many international organizations and agreements such as World Trade Organization (WTO), Trans-Pacific Partnership (TPP) Agreement and ASEAN Economic Community (AEC). To meet the requirements of these international organizations and agreements, Vietnam positively commits towards financial integration with international standards and transparency in information disclosure. As a result of these commitments, after the Global Financial Crisis, the Vietnamese economy has continuingly experienced rapid increase. For example, the annual growth rate lasts between 5% and 7% since early 2000.[1] Vietnamese equity market also continuously attracts foreign investors with it reaching approximate 43% national GDP.[2] Moreover, Vietnam stock index doubled from 520.7 to 1130.1 points during two years (Nguyen & Huynh, 2019). Meanwhile, the private sector in Vietnam contributes to the half of the total national GDP (Huynh, 2019) which suggests the role of privatization and stock market in Vietnam economy is prominent. Compared to other countries in Southeast Asian, the development of Vietnamese stock market plays a leading role in the region. It thus can be reasonably predicted that there should have some different characteristics in terms of the relationship between information asymmetry, leverage level and firm value, compared to that in other developed countries or other developing countries in different geographical regions.

In order to develop an understanding of the difference of this topic in the Vietnamese context, this paper aims to examine the relationship between information asymmetry and firm value in Vietnamese listed firms. To carry out a reasonable comparison, this study purposely is designed to adopt similar methodology used by Fosu et al. (2016) in the UK to capture a rough distance/feature between a developing country and a developed nation. Our firm-level data include 250 non-financial companies with 2,500 firm-year observations collecting from two stock exchange markets in Vietnam covering a 10-year period from 2008 to 2017. Least squares based on Pooled OLS (Pooled Ordinary Least Square), Fixed-Effect Model (FEM) and Random-Effect Model (REM), one step GMM (one-step generalized method of moments) are employed to analyse data. The findings report that there are several differences regarding the research variables used and a precise distance that Vietnam is behind the UK, though a negative impact of information asymmetry on firm value is observed in both countries. Besides, there are two main reasons for us to replicate the work of Fosu et al. (2016) in the Vietnamese equity market. First, this study initiates the role of financial leverage to control the information asymmetry. Second, it also confirms the reliability of measuring scales from previous studies such as Drobetz et al. (2010); Krishnaswami and Subramaniam (1999). Therefore, a replication of this study in an emerging market (i.e. Vietnam) would bring new fresh insight into the relationship between information asymmetry and firm value in a less developed market.

The rest of the paper is structured as follows: Section 2 develops hypotheses based on theoretical reasoning, section 3 explains the methods used in the study, section 4 presents results, and section 5 makes a conclusion.

2. Theoretical reasoning and hypothesis formulation

The concept of information asymmetry was created from the study of The Market for Lemons' theory (Akerlof, 1970) which initially refers to product buyers have less information about product quality they bought than the sellers. Since then, some influential theories relating to information asymmetry have been developed, such as Signalling Theory by Spence (1973) and Stiglitz (1974) and Pecking Order Theory (POT) by Myers (1984) and Myers and Majluf (1984). POT specifically suggests that the management (agent) inside a company has better information about the firm's actual value than outside shareholders (principal). As such, the cost of adverse selection arising from information asymmetry leads to the priority of debt financing than equity financing (Myers & Majluf, 1984). Afterwards, many scholars have provided theoretical arguments and empirical evidence to support POT. For example, the research of Botosan et al. (1997) evaluates the cost of equity and find it has a strong connection with firm value. A study from Ryen, Vasconcellos, and Kish (1997) is considered as the further development of the information asymmetry and its relationship related to investment decisions as well as firm valuation. This research proves that insiders of a firm have more information than outside investors leading to newly issued shares undervalued. Also, Dierkens (1991) demonstrate that at the time of issuing equity, the extent of information asymmetry is relatively low; however, it increases alongside the distribution of predictions of the capital cost by analysts.

Furthermore, the relationships among information asymmetry and higher equity cost (Botosan, 1997; Dierkens, 1991), high levels of financial leverage (Bharath et al., 2009; Fosu et al., 2016; Gao & Zhu, 2015) and lower value of cash have been researched. Importantly, Drobetz et al. (2010); Mansour (2019); Artikis and Papanastasopoulos (2019) emphasize the role of free cash flow under the condition of

[1] Please refer to World Bank source for further information (https://data.worldbank.org/country/vietnam).
[2] Please refer to Federal Reserve Bank of St. Louis.

asymmetric information. Then based on the idea in Drobetz et al. (2010), Fosu et al. (2016, p.141) further develop the research argument by "conditioning the relationship between firm value and information asymmetry on firms' level of financial leverage". In a similar vein, Drobetz et al. (2010) remarkably indicate the calculation methods and employing quantitative techniques for measuring variables can convey asymmetric information. This study uses the dispersion of analysts' forecasts and error in analysts' estimates as the primary measurements of information asymmetry and Fosu et al. (2016) also follow these measures.

2.1. The impact of information asymmetry on firm value

As discussed above, how a firm makes its capital structure choice and investment decision is debated and studied by many scholars. A well-known theory to explain this is Pecking Order Theory established by Myers (1984), and Myers and Majluf (1984). POT not only highlights the decision-making process of whether a firm opts issuing equity capital or debt financing in the environment of information asymmetry, but also the consequence of costs of the firm's value because of the decision. As we know, for a principal-agent problem, managers of firms often hold more information about the firm's performance, asset value and prosperity than the investors (shareholders). In other words, information about the firm hold by insiders and outsiders are asymmetric. According to the POT, in a firm with a higher degree of information asymmetry, managers are more realistic and more likely to propose newly issued equity capital under-priced (Fosu et al., 2016), and they also tend to invest in projects having potentially positive NPV (Myers, 1984). However, shareholders in the firm do not have the same level of information and cannot agree with the decision of the managers. As such, they are more likely to reject these projects with potentially positive NPV because the under-pricing equities diluted their investment wealth. Consequently, the firm would lose excellent investment opportunities (i.e. resources are misallocated) and firm value would be reduced (Myers & Majluf, 1984). Therefore, information asymmetry is costly to firms because of adversely selecting cost, which prevents the firms from opting cheap financing and consequently reduces the firm value (Fosu et al., 2016).

Myers and Majluf's POT has been empirically proved by many studies in other countries, and examples include Dierkens (1991), Ryen et al. (1997), Botosan (1997), Bharath et al. (2009), Drobetz et al. (2010), Fauver and Naranjo (2010), Gao and Zhu (2015) and Fosu et al. (2016). The principle of information asymmetry in Vietnamese firms are the same, though Vietnam is still classified as an emerging market. We thus have our first hypothesis formulated as:

H1. Information asymmetry in Vietnamese firms is negatively correlated with firm value.

2.2. The role of financial leverage between information asymmetry and firm value

POT has another assumption that financial leverage (i.e. debt financing) can help firms mitigate the adversely selected costs caused by information asymmetry (Fosu et al., 2016). It is because, for a firm, external equity capital is the most information-sensitive security compared to debt financing. When managers in a firm have superior information about the firm than the firm owners (investors), they would prefer (if possible) issuing less information-sensitive security (i.e. opting debt financing) over equity capital, once the firm requires external funding (Myers & Majluf, 1984). The reason behind this is because issuing new stock/share will involve future dividend pay-out, whereas dividend payout ratios are quite sticky (Myers, 1984). In other words, the firm's leverage has played an important role in its information asymmetry and firm value.

A significant number of studies provide empirical evidence to support the assumption. Among them, earlier research includes, for example, Ryen et al. (1997), Grossman and Hart (1982) and Opler and Titman (1994), as well as recent articles of Bharath et al. (2009), Gao and Zhu (2015) and Fosu et al. (2016). The findings from these studies are generally consistent and confirm prioritising debt financing over issuing external equity and keeping healthy cash flow are effective ways of reducing information asymmetry and generating firm value (Fosu et al., 2016). Similarly, the principle should be applied in Vietnamese companies, and we thus expect our second hypothesis expressed as:

H2. Financial leverage in Vietnamese firms can reduce the negative impact of information asymmetry on firm value.

3. Sample and empirical methods

3.1. Sample

To test our hypotheses developed in the last section, we firstly collect listing companies in the two stock exchange markets in Vietnam (i.e. HOSE and HNX). As of December 26, 2016, there were 699 firms on the list.[3] Followed a standard practice proposed by other scholars (e.g. Fosu et al., 2016; Gao & Zhu, 2015), financial and utility companies are excluded because their businesses can be more likely influenced by government's policies and regulations. We then visit the relevant websites[4] to collect individual companies' financial data. Additional criteria are applied to maintain data quality. For example, we drop the firms from the sample if (1) their financial statements are not disclosed following accounting standard, (2) the companies with negative equity; and (3) the firms with

[3] https://vietstock.vn/2017/01/chuyen-niem-yet-2016-it-nhung-dinh-dam-741-512080.htm.

[4] Such as State Security Commission of Vietnam, https://www.ssc.gov.vn.

Table 1
Summary of variables.

Variable	Measurement	Expected sign	Reference
Asy-Disp	Dispersion of analysts' forecasts	-	Drobetz et al. (2010), Fosu et al. (2016)
Asy-Er	Error analysts' forecast	-	Drobetz et al. (2010), Fosu et al. (2016)
Asy-Dummy	1, if the dispersion of analysts' forecasts is greater than the industry average forecast; otherwise 0.	-	Drobetz et al. (2010), Fosu et al. (2016)
Value	The ratio of market value of assets to book value of assets		Maury and Pajuste (2005), Fosu et al. (2016)
Lev	The ratio of book value of debts to book value of assets	+/−	Danso and Adomako (2014), Fosu (2013), Opler and Titman (1994), Fosu et al. (2016)
Size	The natural logarithm of the book value of total assets	-	Maury and Pajuste (2005), Fosu et al. (2016)
Tang	The ratio of tangible assets to total assets	+/−	Maury and Pajuste (2005), Fosu et al. (2016)
Growth	The annual growth rate of a firm' sales	+	Maury and Pajuste (2005), Fosu et al. (2016)

missing values for three consecutive firm-year observations. In this case, our final firm-level data include 2,500 firm-year observations (i.e. yearly data for 250 firms)[5] and the investigation period is 10-year long from 2008 to 2017.

3.2. Information asymmetry measurement

By referring the work done by Krishnaswami and Subramaniam (1999), Drobetz et al. (2010) and Fosu et al. (2016), we use the dispersion of analysts' forecasts (*Asy-Disp*) and analysts' forecast error (*Asy-Er*) as the leading measures of information asymmetry in order to examine its relationship with firm value.

The dispersion of analysts' forecasts (*Asy-Disp*) is the standard deviation of analysts forecast about earning per share (EPS) of the fiscal year. It is expected a higher level of dispersion represents a higher level of information asymmetry (Krishnaswami.et al., 1999; Drobetz et al., 2010). According to Fosu et al. (2016), the dispersion of analysts' forecasts can be expressed as:

$$\text{Asy} - \text{Disp} = \ln\left(1 + \frac{St.d\ \ analysts\ \ forecast\ \ EPS}{|Median\ \ forecast\ \ EPS\ \ |}\right)$$

The error of analysts forecast (*Asy-Er*) is the difference between the forecast of analysts earnings per share and the actual earnings per share for the fiscal year (Drobetz et al., 2010; Krishnaswami, Spindt, & Subramaniam, 1999). A higher level of error forecast suggests a higher level of asymmetric information. For each fiscal year, the latest forecast has been used to make sure the representativeness of the forecast at the year-end. Besides, to ensure the comparability across sample companies relating to the asymmetric information measures, we have adjusted to the median forecast of analysts in the fiscal year (Drobetz et al., 2010; Fosu et al., 2016). The error of analysts forecast (*Asy-Er*) can be formulated as:

$$\text{Asy} - \text{Er} = \text{Ln}\left(1 + \frac{\left|EPS_{forecast} - EPS_{actual}\right|}{|median\ \ EPS|}\right)$$

EPS forecast is a principal value used by the authors to estimate the calculation of Asy variables for model testing in this paper. EPS forecast is calculated by using the previous year's EPS results and combined with EPS (g) growth through ROE and retained rate of return, parameters collected and processed from information asymmetry published. For example, to calculate the EPS forecast for year N, the actual EPS of year N-1 is used, the ROE value in year N-1 is b and the N-1 retained rate is C, then the calculated result is a * (1+ (b * c)).

The third measure of information asymmetry (*Asy-Dummy*) is used. It is a dummy variable: 1 representing if the dispersion of analysts is larger than the median forecast in the industry; 0 otherwise. Using this additional measure is because according to Fosu et al. (2016), it can effectively capture companies which have higher information asymmetry compared to their peers in the same sector. The sectors in our sample have also followed the classification of Industry Classification Benchmark (ICB) which include: Oil and Gas, necessary materials, industrials, consumer goods, consumer services, telecommunication, and technology.

Asy- Disp is considered as the deviation of the forecast and Asy – Dummy is a variable set to determine the dispersal deviation, therefore. If Asy – Disp is more significant than the estimated value of Asy – Disp's average during years of study, the value is "1"; if all the predictions have the deviation reversed, the value is "0". However, according to Drobetz (2010) and Fosu et al. (2016), the meaning of Asy – Dummy is considered as a forecasted result by at least two forecasters of the company. Because predicting is difficult, the authors use the accepting value of conclusion to give the numbers in a variable set of Asy – Dummy.

3.3. Firm value measurement and control variables

The firm value (*Value*) is measured as the ratio of the market value of assets to book value of assets as in Maury and Pajuste (2005). The market value of assets is measured by the number of outstanding shares. It is the critical value (the dependent variable) in our

[5] A list of sample firms is available upon request.

Table 2
Descriptive statistics.

Variable	Mean	Std. Dev	Min	Max
Value	0.9690	16.6948	0	6.1358
Lev	0.7146	11.48497	0	5.7447
Size	27.6470	1.2889	19.4431	32.8926
Growth	0.4117	3.1215	−0.9989	0.8825
Tang	0.4637	6.8277	0	2.6711
Asy-Disp	0.7824	0.8641	0	7.1621
Asy-Er	0.7418	0.8575	0	7.7140
Asy-Dummy	0.2272	0.4191	0	1

Note: Variable observations are 2500.

research model. The relationship between a firm's leverage to the firm's value is also crucial for the study. We thus consider firms' leverage as another key variable. Leverage (*LEV*) is the ratio of the book value of debts to book value of assets. The adoption of book value is to reduce the potential reverse causation from firm value to leverage (Fosu et al., 2016; Opler & Titman, 1994).

We further control for several variables not included in the hypotheses which consist of firm size, tangible assets and sales growth followed Maury and Pajuste (2005) and Fosu et al. (2016). Firm size (*Size*) is measured as the natural logarithm of the book value of total assets. According to Maury and Pajuste (2005), when firms tend to larger and mature, their valuation would be lower. It is, therefore that we can expect a negative relationship between firm size and firm value. Tangible assets (*Tang*) is measured as the ratio of tangible assets to total assets. Firms with a significant proportion of tangible assets have less value generated from intangible assets (for example human capital) (Maury & Pajuste, 2005). This argument indicates a negative relationship between tangible asset and firm value. However, on the other hand, firms with more tangible assets might be less asymmetric information and more values generated. As such the expected effect of tangible assets on firm value is still unclear. Sale Growth (*Growth*) is the annual growth rate of a firm' sales which is expressed by fractions. A positive relationship between sale growth and firm value is expected because firms with high growth are turned to having higher valuation (Maury & Pajuste, 2005).

In Table 1, the variables used in the study and their expected prediction are summarised.

3.4. Analytic model

In this sub-section, we introduce the research model used to test our hypotheses. To "take advantage of the variations in the variable of interest over time" (Fosu et al., 2016, p. 143), we also consider a panel data approach in the analysis. Following the advanced statistic techniques used in the studies such as Maury and Pajuste (2005), Gao and Zhu et al. (2015) and Fosu et al. (2016), we firstly use Pooled-OLS, FEM and REM to generate appropriate results based on cross-sectional and time-series data, which are statistically augmented into panel data; and secondly, one-step GMM is employed to exclude endogenous error in the model. In other words, GMM is used to test the sustainability of the model. Also, Roberts and Whited (2013) mention that the proper use of the methodology in econometrics could avoid the spurious results if the model suffers from endogeneity problem. One of their proposed solutions is the use of instrumental variables (the first lag of dependent variable) in one-step GMM (Generalized Method of Moments). Noticeably, Ullah & Zaefarian (2018) also emphasize that endogeneity problem can cause inconsistent estimates and incorrect inferences. Besides, several studies which empirically examine corporate governance issues in the Vietnamese context employ the GMM to solve endogeneity problems (e.g. Le, Tran, Nguyen, Ngo, & Huynh, 2018; Tran et al., 2019, p. 72). Thus, this paper uses GMM to overcome endogeneity issues in the panel data and presents the methodologic consistency to the existing literature. Moreover, we also employ a different set of estimations to identify the best-fitted regression results for interpretation.

To test H_1, the firm value is defined as a function of firm size (*Size*), tangible assets.

(*Tang*) and sales growth (*Growth*) (collectively termed as *Controls* in the equation). To test H_2, leverage (*Lev*) and other extensions are used for measuring the effects of asymmetric information (*Asy*) (Fosu et al., 2016). As such, the baseline model can be formulated to:

$$Value_{it} = \alpha_0 + \lambda_t + \beta_1\ Lev_{it} + \sum\nolimits_2^4 \beta_k\ Controls_{kit} + \gamma Asy_{it} + \varepsilon_{it} \quad \text{(Eq.1)}$$

Which can be further expressed into the three analytic models:

$$Value_{it} = \alpha_0 + \lambda_t + \beta_1\ Lev_{it} + \sum\nolimits_2^4 \beta_k\ \overrightarrow{Control}_{kit} + \beta_5 Asy\text{Disp}\ \ (\text{Model}\ 1) \quad \text{(Eq.2)}$$

$$Value_{it} = \alpha_0 + \lambda_t + \beta_1\ Lev_{it} + \sum\nolimits_2^4 \beta_k\ \overrightarrow{Control}_{kit} + \beta_5 AsyEr\ \ (\text{Model}\ 2) \quad \text{(Eq.3)}$$

$$Value_{it} = \alpha_0 + \lambda_t + \beta_1\ Lev_{it} + \sum\nolimits_2^4 \beta_k\ \overrightarrow{Control}_{kit} + \beta_5 AsyDummy\ \ (\text{Model}\ 3) \quad \text{(Eq.4)}$$

Where ε_{it} is the combination error term comprising of firm fixed effect μ_i and a component assumption being independent and identically distributed (V_{it}); α, β, γ are parameters, subscripts $_i$ and $_t$ are firm $_i$ and time $_t$, $_k$ indicates control variables.

Table 3
Correlation matrix.

	Value	Lev	Size	Growth	Tang	Asy-Disp	Asy-Dummy	Asy-Er
Value	1.0000							
Lev	−0.0004	1.0000						
Size	−0.1639	0.0163	1.0000					
Growth	−0.0027	−0.0020	0.0169	1.0000				
Tang	0.8904	−0.0016	−0.1392	−0.0090	1.0000			
Asy-Disp	−0.0118	−0.0057	0.0823	0.1002	−0.0052	1.0000		
Asy-Dummy	−0.0228	−0.0107	−0.0265	0.0708	−0.0180	0.6738	1.0000	
Asy-Er	−0.0047	0.0009	−0.0085	0.0969	−0.0130	0.6399	0.4797	1.0000

3.5. Descriptive statistics

Before going to regression and understanding the characteristics of our data, a summary of descriptive statistics is disclosed in Table 2.

In Table 2, the ratio of average firm value (*Value*) of our sample firm-year is 0.969 (in Fosu et al., 2016, UK is 1.438).[6] The average ratio of leverage (*Lev*) is 0.7146 (the UK is 0.174). Annual tangible assets (*Tang*) account for 46.37% (the UK is 30.1%) the total assets while the overall revenue growth reaches 41.17% (the UK is 12.2%) which implies the rapid growth of the firms (however, the minimum figure (−0.9989) suggests some companies are with negative sale growth). The average values of the two variables representing asymmetric information (*Asy-Disp* and *Asy-Er*) are 0.7824 and 0.7418, respectively (the UK are 0.193 and 0.262). The mean value of the third variable for the asymmetric information (*Asy-Dummy*) is 0.2272 (the UK is 0.503) which shows that for almost one-fifth of the observed firm-year data, the dispersion in analysts' forecast is higher than the average industry forecast.

By comparing our results with that in the Fosu et al. (2016) conducted in the UK, there are significant differences in terms of information asymmetry and development level between Vietnam and a developed country such as the UK. The leverage rate (0.7146) in Vietnams firms is much higher than that in UK firms (0.174). Putting this result in the tax environment of M&M theory (Modigliani and Miller, 1963), it indicates UK firms have sufficient equity to maintain business.

4. Results

4.1. Correlation check

Before conducting a regression analysis, multicollinearity among independent variables needs to examine. We carry out correlation analysis, and the correlation matrix is presented in Table 3.

Table 3 reveals that the correlation coefficients for all variables are low, which suggests the improbability of multicollinearity. We further prove it by testing the Variance Inflation Factor (VIF), and the result shows that all coefficients are less than ten indicating no multicollinearity in the data set (Kennedy, 1992). Table 3 also shows that all of three information asymmetry related variables (i.e. *Asy-Disp*, *Asy-Er* and *Asy-Dummy*) are negatively correlated with firm value (*Value*), *Asy-Disp* and *Asy-Dummy* are also negatively correlated with firm leverage (Lev), and the results preliminarily support our Hypothesis 1.

4.2. Regression

Firstly, we run Pooled OLS regression for the Model 1, Model 2 and Model 3 formulated in 3.4. The purpose of employing Pooled OLS regression is to evaluate the impact of independent variables on dependent ones. The results are shown in Table 4.

Reading the results in Table 4, all three variables measuring information asymmetry are not statistically significant. In this case, we decide to apply Fixed-Effect Model (FEM) and Random-Effect Model (REM) to further assess the impact of asymmetric information variables on dependent variables. The results are shown in Table 5.

The FEM is used to analyse the correlation between residuals and explanatory variables by controlling and separating the effect of individual characteristics from explanatory variables. Therefore, the real influence of explanatory variables on dependent ones can be estimated accurately.

According to the regression result in Table 5, most variables representing information asymmetry have a significantly negative impact on the firm value. It means the presence of information asymmetry will lower the firm's value. The regression coefficient of *Asy-Disp* in REM and FEM ranges is −0.0866 and −0.997 respectively. Additionally, the coefficient also has high statistical significance at 1% level in the FEM as well as economic importance at which an increase in the standard deviation of *Asy-Disp* will reduce firm value.

The regression result of *Asy-Er* using FEM and REM in model 2 suggests that the variable has a positive impact on firm value; however, it is not statistically significant. In model 3, the regression coefficient of *Asy-Dummy* corresponding to REM and FEM values from −0.3351 to −3.068 and has statistical significance in FEM. It implies that a transition of information asymmetry from low to a high level is associated with a significant reduction in firm value.

[6] We cite equivalent figures in brackets from a UK study conducted by Fosu et al. (2016) for the purpose of comparison.

Table 4
OLS regression.

Variable	Model (1)	Model (2)	Model (3)
Lev	0.0024 (0.0131)	0.0024 (0.0132)	0.0023 (0.0132)
Size	−0.5249*** (0.1191)	−0.5287*** (0.1187)	−0.5330*** (0.1187)
Growth	0.0342 (0.0487)	0.0288 (0.0487)	0.0351 (0.0486)
Tang	2.1634*** (0.0224)	2.1635*** (0.0224)	2.1629*** (0.0224)
Asy-Disp	−0.0866 (0.1768)		
Asy-Er		0.1157 (0.1775)	
Asy-Dummy			−0.3351 (0.3626)
Cons	14.5309*** (3.2902)	14.4851*** (3.2918)	14.7625*** (3.2922)

Note: ***, ** and * are the significance levels of 1%, 5% and 10% respectively.

Table 5
FEM and REM regression.

Variable	Model 1		Model 2		Model 3	
	FE	RE	FE	RE	FE	RE
Lev	0.0073 [0.0136]	0.0024 [0.0132]	0.0066 [0.0136]	0.00245 [0.0132]	0.0066 [0.0136]	0.0023 [0.0132]
Size	−2.8644*** [0.2851]	−0.5249*** [0.1191]	−2.7900*** [0.2857]	−0.5288*** [0.1187]	−2.8017*** [0.2838]	−0.5330*** [0.1188]
Growth	−0.1555*** [0.0503]	0.0342 [0.0488]	−0.1590*** [0.0505]	0.0288 [0.0488]	−0.1553*** [0.0503]	0.0351 [0.0487]
Tang	2.1135*** [0.0240]	2.1635*** [0.0224]	2.1144*** [0.0241]	2.1635*** [0.0224]	2.1141*** [0.0240]	2.163*** [0.0224]
Asy-Disp	−0.9970*** [0.3686]	−0.0866 [0.1768]				
Asy-Er			0.1351 [0.2354]	0.1157 [0.1776]		
Asy-Dummy					−3.0682*** [0.7991]	−0.3351 [0.3627]
Cons	80.0225*** [7.9167]	14.5309*** [3.2902]			78.2037*** [7.8534]	14.7625*** [3.2922]

Note: ***, **, * are the significance levels of 1%, 5% and 10% respectively. Standard errors of the corresponding coefficients are reflected in square brackets.

Regarding the impact of leverage on enterprise value, the regression result in Table 5 shows the leverage has a positive effect on the firm value, although the magnitude is quite small. However, the coefficient is not statically significant.

All other control variables are found statistically significant at less than 1% level. Specifically, both *Size* and *Growth* have negative coefficients at −2.8644 and −0.1555, respectively, suggesting they have a negative impact on dependent variables. The two variables are significant in both statistics and economy which means when *Size* of a company is large, and *Growth* of the company is robust to a certain extent, and an increase in size and growth will lead to a reduction in firm value. These findings are consistent with that in the research of Murray and Pajuste (2005). The coefficient of *Tang* is positive at 2.1135 representing a positive impact on dependent variables. It suggests that tangible assets compensate for the loss of intangible assets for firm value.

We further conduct the Hausman test to select the most suitable model. The result reveals that Hausman p-value in both models is less than 0.05. Therefore, the null hypothesis (H0) is rejected which means the coefficients estimated by the Random Effect model are not as efficient as the coefficients in the Fixed Effect model. Accordingly, applying the FEM method in all models will bring a more consistent result.

After verifying homoscedasticity, autocorrelation and endogeneity errors in the models, the one-step GMM method is applied to fix errors presented in the models (1), (2), (3). The main reason to choose one-step GMM rather than system-GMM is to ensure the parsimony theorem of statistics. The result of one-step GMM is reported in Table 6. The results of one-step GMM estimation in Table 6

Table 6
GMM regression.

Variable	Model (1)	Model (2)	Model (3)
Lev	0.00223 [0.0153]	0.0024 [0.0153]	0.0018 [0.0152]
Size	− 10.1439*** [0.4772]	− 10.1699*** [0.4773]	− 10.1654*** [0.4748]
Growth	− 1.8491*** [0.0932]	− 1.853*** [0.0933]	− 1.831771*** [0.0927]
Tang	1.9882*** [0.0288]	1.9863*** [0.0288]	1.9867*** [0.0287]
Asy-Disp	− 1.0247** [0.4269]		
Asy-Er		−0.3225 [0.3015]	
Asy-Dummy			− 3.1752*** [0.8869]
Cons	282.5588*** [13.2360]	282.731*** [13.2388]	283.0774*** [13.1660]

Note: ***, **, * are the significance levels of 1%, 5% and 10% respectively. Standard errors of the corresponding coefficients are reflected in square brackets.

are similar to what we reported in Tables 4 and 5

All three variables measuring information asymmetry (*Asy-Disp*, Asy-Er and *Asy-Dummy)* adversely influence on firm value (*Value*), indicating a negative relationship between information asymmetry and firm value. As such, the first hypothesis (*H1: Information asymmetry in Vietnamese firms is negatively correlated with firm value)* has been confirmed. The result broadly is consistent with the findings in other studies mentioned in 2.1.

With regards to firms' financial leverage (*Lev*), although the variable is positively correlated with the firm value (*Value*), it has no statistical significance in all the three models. Due to the insignificant effect of leverage on firm value in our estimation, we can say that in Vietnamese firms, financial leverage can help increase the firm value which in turn offsets or mitigates the negative impact of information asymmetry, however, its role perhaps is limited. The finding thus partially supports the second hypothesis (*H2: Financial leverage in Vietnamese firms can reduce the negative impact of information asymmetry on firm value)*.

In terms of firm size and growth, the findings suggest that *Size* and *Growth* have a negative impact of on firm value (*Value*) and the results are in line with the finding in Murray and Pajuste (2005).

Finally, our result also shows that firms' tangible assets (*Tang*) positively affect firm value indicating tangible assets can compensate the loss of intangible assets and the finding is also consistent with that in the studies of Maury and Pajuste (2005) and Fosu et al. (2016).

5. Conclusion

First, if taking a comparative view to compare our results with a similar study conducted in the UK by Fosu et al. (2016), we can summarize: (1) the firm value of our sample is lower than that in the UK; (2) the average leverage for Vietnamese firms is much higher than that in the UK firms; (3) the level of tangible assets for Vietnamese firms is also higher than that in the UK firms; (4) the total revenue growth for Vietnamese firms is much higher than that in the UK firms; and (5) the information asymmetry for Vietnamese firms is much higher than that in the UK firms. This comparison clearly shows a difference between Vietnam as an emerging and developing country and the UK as a developed country. Second, our paper proves, with strong evidence, that information asymmetry in Vietnam has a significant negative effect on firm value. This negative relationship is consistent with that in other studies mentioned earlier and supports POT and agent cost theories, but the extent of the negative impact on firm value in Vietnam is stronger. Third, our results also suggest that despite the financial leverage in Vietnamese firms is high, however, unlike in the UK, its role in mitigating the negative impact of information asymmetry on firm value is limited.

Our study contributes to the existing literature in two-fold: (1) it addresses a less explored area by examining the impact of information asymmetry on firm value in developing countries, particularly in Vietnam – an emerging but catching up the economy. The meaning for carrying out such research is to provide with an impression of how far these developing countries are behind developed countries in terms of the relationship between information asymmetry and firm value. Our finding confirms a negative correlation between asymmetric information and firm value in Vietnam, which shares the similarity with the results in other studies in the literature; (2) in Vietnamese context, firms cannot use the financial leverage to control the level of asymmetric information, whereas in Fosu et al. (2016), the result indicates that the UK firms can take financial leverage as a tool to mitigate the effect of asymmetric information. The reason behind this difference requires a separate study to find out.

Information asymmetry and firm values remain widespread attention in the academic world. There is growing body of literature in the filed (Chang & Hong, 2019; Drobetz et al., 2010; Fosu et al., 2016; Gao & Zhu, 2015; Lemmon & Zender, 2019). Scholars explore their relationship theoretically and empirically in different contexts. They have identified the impact of information asymmetry on firm value can be influenced by many factors, taking a few as examples, bank competition (Fosu, Danso, Agyei-Boapeah, Ntim, & Murinde, 2018), bank risk-taking behavior (Fosu, Ntim, Coffie, & Murinde, 2017), capital structure (Lemmon & Zender, 2019). In the shortage of this type of studies in emerging world, our paper sheds new light to the relationship between information asymmetry, leverage and firm value in Vietnam – a typical emerging equity market with high capital growth and intensified foreign investments. Our results provide useful evidence showing supporting but also converging conclusions to that in the literature, and also can be used as a mirror for other emerging markets to explore their different institutional settings.

Our findings have a policy and managerial implications. First, providing transparent information to minimize information asymmetry in the equity market can not only protect investors but also enhance firm values. Therefore, the Vietnamese Securities Commission should set up the timeliness and appropriate measurement in terms of information disclosure assurance. Second, from managerial perspective in the firm level, because the use of financial leverage is not adequate to mitigate the adverse influence of information asymmetries, therefore both shareholders and managers should be cautious in considering financing source through financial leverage.

Future research direction about asymmetric information could extend other areas, for instance, to negative interest rates (see what happens in Japan and some European countries) as a negative interest rate would affect managers' decision-making on debt financing; to the cryptocurrency market where investors are quite sensitive to 'bad news' (e.g. security breach) (Luu Duc Huynh, 2019). Besides, cross-country comparisons on the relationship between information asymmetry and firm value might be a prosperous avenue for deepening our understanding of this issue in more complex environments.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgement

The authors sincerely appreciate the two anonymous reviewers for the highly constructive comments and Professor A.G. Malliaris (the Editor-in-Chief) for the excellent guidance. All funding sources is well acknowledged. This research is fully funded by University of Economics Ho Chi Minh City (Vietnam). The authors thank Quan Thanh Nguyen, Ngoc Duc Nguyen, My Thi Tra Le and Phuong Thi Thu Ho for excellent research assistance. Any remaining errors are our own responsibility.

References

Agarwal, P., & O'Hara, M. (2007). *Information risk and capital structure* (Available at: SSRN 939663).
Akerlof, G. A. (1970). The market for 'Lemons': Quality uncertainty and the market mechanism. *Quarterly Journal of Economics, 84*, 488–500.
Artikis, P. G., & Papanastasopoulos, G. A. (2019). Asymmetries in the persistence and pricing of cash flows: Evidence from the United Kingdom. *The Journal of Economic Asymmetries, 19*, e00113.
Aye, G. C., Balcilar, M., Demirer, R., & Gupta, R. (2018). Firm-level political risk and asymmetric volatility. *The Journal of Economic Asymmetries, 18*, e00110.
Besbes, L., & Boujelbene, Y. (2014). Information asymmetry within financial markets and corporate financing decisions. *International Journal of Economics, Finance and Management, 3*(2), 50–58.
Bharath, S. T., Pasquariello, P., & Wu, G. (2009). Does asymmetric information drive capital structure decisions? *Review of Financial Studies, 22*(8), 3211–3243.
Botosan, C. A. (1997). Disclosure level and the cost of equity capital. *The Accounting Review*, 323–349.
D'Mello, R., & Ferris, S. P. (2000). The information effects of analyst activity at the announcement of new equity issues. *Financial Management, 29*(1), 78–95.
Chang, B., & Hong, H. (2019). Selection versus talent effects on firm value. *Journal of Financial Economics, 133*(3), 751–763. https://doi.org/10.1016/j.jfineco.2019.01.001.
Danso, A., & Adomako, S. (2014). The financing behaviour of firms and financial crisis. *Managerial Finance, 40*(12), 1159–1174.
Dierkens, N. (1991). Information asymmetry and equity issues. *Journal of Financial and Quantitative Analysis, 26*, 181–199.
Drobetz, W., Grüninger, M. C., & Hirschvogl, S. (2010). Information asymmetry and the value of cash. *Journal of Banking & Finance, 34*(9), 2168–2184.
D'Mello, R., Krishnaswami, S., & Larkin, P. J. (2008). Determinants of corporate cash holdings: Evidence from spin-offs. *Journal of Banking & Finance, 32*(7), 1209–1220.
Farooq, O., Asgarov, Z., Guliyev, A., Islam, T., Kalinina, Y., & Pashayev, Z. (2017). Capital structure and value of reported earnings: Evidence from an emerging market. *Applied Economics Letters, 24*(10), 690–694.
Fosu, S. (2013). Capital structure, product market competition and firm performance: Evidence from South Africa. *The Quarterly Review of Economics and Finance, 53*(2), 140–151.
Fosu, S., Danso, A., Agyei-Boapeah, H., Ntim, C. G., & Murinde, V. (2018). How does banking market power affect bank opacity? Evidence from analysts' forecasts. *International Review of Financial Analysis, 60*, 38–52.
Fosu, S., Danso, A., Ahmad, W., & Coffie, W. (2016). Information asymmetry, leverage and firm value: Do crisis and growth matter? *International Review of Financial Analysis, 46*, 140–150.
Fosu, S., Ntim, C. G., Coffie, W., & Murinde, V. (2017). Bank opacity and risk-taking: Evidence from analysts' forecasts. *Journal of Financial Stability, 33*, 81–95.
Gao, W., & Zhu, F. (2015). Information asymmetry and capital structure around the world. *Pacific-Basin Finance Journal, 32*, 131–159.
Grossman, S. J., & Hart, O. D. (1982). In J. J. McCall (Ed.), *Corporate financial structure and managerial incentives. The Economics of Information and Uncertainty*. University of Chicago Press.
He, W. P., Lepone, A., & Leung, H. (2013). Information asymmetry and the cost of equity capital. *International Review of Economics & Finance, 27*, 611–620.
Huynh, T. L. D. (2019). Which google keywords influence entrepreneurs? Empirical evidence from Vietnam. *Asia Pacific Journal of Innovation and Entrepreneurship, 13*(2), 214–230.
Kennedy, P. (1992). *A guide to econometrics* (3d ed.). Cambridge, MA: The MIT Press.
Krishnaswami, S., Spindt, P. A., & Subramaniam, V. (1999). Information asymmetry, monitoring, and the placement structure of corporate debt. *Journal of Financial Economics, 51*(3), 407–434.
Krishnaswami, S., & Subramaniam, V. (1999). Information asymmetry, valuation, and the corporate spin-off decision. *Journal of Financial Economics, 53*(1), 73–112.
Lechner, P., & Gatzert, N. (2018). Determinants and value of enterprise risk management: Empirical evidence from Germany. *The European Journal of Finance, 24*(10), 867–887.
Lemmon, M. L., & Zender, J. F. (2019). Asymmetric information, debt capacity, and capital structure. *Journal of Financial and Quantitative Analysis, 54*(1), 31–59.
Le, H. T. T., Tran, V. T., Nguyen, N. T. P., Ngo, N. S., & Huynh, T. L. D. (2018). The influence of peg and F_Score on stock return by valued investment portfolios: Empirical evidence from Vietnam. *Asian Economic and Financial Review, 8*(3), 366.
Luu Duc Huynh, T. (2019). Spillover risks on cryptocurrency markets: A look from VAR-SVAR granger causality and student'st copulas. *Journal of Risk and Financial Management, 12*(2), 52.
Mansour, W. (2019). Is the investment-cash flow sensitivity divergent when information is asymmetrically distributed? *The Journal of Economic Asymmetries, 19*, e00111.
Maury, B., & Pajuste, A. (2005). Multiple large shareholders and firm value. *Journal of Banking & Finance, 29*, 1813–1834.
Myers, S. C. (1984). Capital structure puzzle. *The Journal of Finance, 39*(3), 575–592.
Myers, S. C., & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics, 13*, 187–221.
Nguyen, S. P., & Huynh, T. L. D. (2019). Portfolio optimization from a Copulas-GJR-GARCH-EVT-CVAR model: Empirical evidence from. *ASEAN stock indexes, 3*(3), 562–585.
Opler, T. C., & Titman, S. (1994). Financial distress and corporate performance. *The Journal of Finance, 49*(3), 1015–1040.
Prommin, P., Jumreornvong, S., Jiraporn, P., & Tong, S. (2016). Liquidity, ownership concentration, corporate governance, and firm value: Evidence from Thailand. *Global Finance Journal, 31*, 73–87.
Roberts, M. R., & Whited, T. M. (2013). Endogeneity in empirical corporate finance1. In *Handbook of the economics of finance* (Vol. 2, pp. 493–572).
Ryen, T. G., Vasconcellos, M. G., & Kish, J. R. (1997). Capital structure decisions: What have we learned? *Business Horizons, 40*(5), 41–50.
Spence, A. (1973). Job market signalling. *Quarterly Journal of Economics, 87*, 355–374.
Stiglitz, J. E. (1974). Incentives and risk sharing in sharecropping. *The Review of Economic Studies, 41*, 219–255.
Tran, L. M., Mai, C. H., Le, P. H., Bui, C. L. V., Nguyen, L. V. P., & Huynh, T. L. D. (2019). *Monetary policy, cash flow and corporate investment: Empirical evidence from Vietnam*. Currency Crisis.
Ullah, S., Akhtar, P., & Zaefarian, G. (2018). Dealing with endogeneity bias: The generalized method of moments (GMM) for panel data. *Industrial Marketing Management, 71*, 69–78.