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**Article**

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Cogent Economics & Finance

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*Suggested Citation:* Phan Thi Kieu Hoa; Tran Nam Hoai (2019) : Dividend policy and stock price volatility in an emerging market: Does ownership structure matter?, Cogent Economics & Finance, ISSN 2332-2039, Taylor & Francis, Abingdon, Vol. 7, Iss. 1, pp. 1-29, <https://doi.org/10.1080/23322039.2019.1637051>

This Version is available at:

<https://hdl.handle.net/10419/245264>

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To cite this article: Thi Kieu Hoa Phan & Nam Hoai Tran | (2019) Dividend policy and stock price volatility in an emerging market: Does ownership structure matter?, Cogent Economics & Finance, 7:1, 1637051, DOI: [10.1080/23322039.2019.1637051](https://doi.org/10.1080/23322039.2019.1637051)

To link to this article: <https://doi.org/10.1080/23322039.2019.1637051>



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Received: 11 April 2019  
Accepted: 23 June 2019  
First Published: 28 June 2019

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Reviewing editor:  
Lanouar Charfeddine, Finance and Economics, Qatar University, Doha, Qatar

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## FINANCIAL ECONOMICS | RESEARCH ARTICLE

# Dividend policy and stock price volatility in an emerging market: Does ownership structure matter?

Thi Kieu Hoa Phan<sup>1\*</sup> and Nam Hoai Tran<sup>2</sup>

**Abstract:** This paper examines the impacts of dividend policy and ownership structure on stock price volatility in the Vietnamese market. The study also tests for the moderating effect of foreign/state ownership on the dividend policy–price volatility relation. The authors use a comprehensive panel dataset of non-financial firms listed publicly on the Ho Chi Minh Stock Exchange and Hanoi Stock Exchange over the period from 2008 to 2015. Employing a set of different econometric methods, the robust results indicate that dividend yield mitigates stock price volatility in the emerging market of Vietnam. The price-stabilising effect of foreign (and state) involvement has no longer been significant after the global financial crisis. Also, the study finds no moderating effect of ownership structure on the relation between dividend yield and price volatility during the sample period. The finding of the influence of dividend policy on stock market risk has critical implications for the investment landscape in emerging markets.

**Subjects:** Econometrics; Corporate Finance; Risk Management

**Keywords:** Dividend policy; Ownership structure; state ownership; foreign ownership; emerging markets



Thi Kieu Hoa Phan

### ABOUT THE AUTHOR

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### PUBLIC INTEREST STATEMENT

The Vietnamese stock market is a young market and has potential risks. Most investors have concerned about factors impacting share price volatility in this market to decide suitable investment strategies. Policy makers also pay attention to this topic to conduct monitoring policies efficiently and timely. The relationship between dividend policy and stock price fluctuation has been researched in developed markets but in Vietnam, this is a new subject. Especially, in the context of globalisation and financial liberalisation, the linkage between dividend policy related to ownership structure including state and foreign ownership and stock price volatility should be more concerned. This paper suggests that since more foreign ownership does not impact stock price volatility, the government should attract more foreign investors rather than setting the foreign ownership ceiling. As state ownership does not support the stability of share price, the government should keep divesting state capital from local companies.

## 1. Introduction

Stock price volatility means a change in stock prices over time. It is a consequence of instability, unpredictability, and risks. This affects investors' interests and leads to the differences between buying and selling prices, which implies that risk management (stock price fluctuations) plays an important role in investment (Beg & Anwar, 2012). The effects of dividend policy on share price fluctuation are a concerned topic, not only for business leaders but also for policymakers as well as for investors, who directly make decisions related to planning future portfolios. In addition, it is important for academics being interested in the topic of evaluating the performance of capital markets (Miller & Modigliani, 1961).

In the early stages of studying dividend policy, scholars only study at the level of a company choosing between paying dividends to shareholders in cash or retaining a part of earnings. Dividend payments are studied based on the frequency of payments such as annual, semi-annual or quarterly and how much the company will pay (Hussainey, Oscar MGgbame, & Chijoke-Mgbame, 2011). Recently, the dividend policy has been discovered in terms of not only ordinary aspects such as the company's options to pay dividends in cash or redeeming shares but also other issues such as how to balance the interests between high tax bracket investors and low tax bracket investors. One managerial concern is about how the company can maintain and enhance the value of stocks in the market via the dividend policy (Hussainey et al., 2011).

The measurement of ownership structure was used by Demsetz (1983), of which, the ownership structure is based on the fraction of shares owned by a company's most significant shareholders. In the political context of Vietnam, where there is a great involvement of the state in economic activities, ownership structure can be considered in two main aspects including state ownership and foreign ownership (Phung & Mishra, 2016). State ownership has played an integral role in the development of the Vietnamese economy. Obviously, the Vietnamese government determines the state sector as a major driver of the national economy.<sup>1</sup>

In addition, the processes of globalisation and financial liberalisation in developing nations like Vietnam has attracted a large amount of capital investment from developed nations such as the United States and Japan (Bank of Japan, 2001; Khan & Khan, 1998; Ministry of Finance, 2000). This means that the roles of foreign investors towards the development of financial markets in developing nations should be concerned. In Vietnam, the stock market was born in the 2000s, which has been considered as one of the most significant capital channels for domestic companies. Additionally, the Vietnamese government has taken many steps to reform the economy and open the market to attract more foreign investors since the 2000s. As a consequence, the number of foreign investors and their trade volumes in the Vietnamese stock market has gradually increased. The occurrence of foreign investors makes the Vietnamese financial market not only more active but also more liquid. Moreover, it can believe that the quality of corporate governance and profitability of the Vietnamese firms would be improved due to the managerial intervention of foreign ownership. Thus, the critical concern of Vietnamese researchers and policymakers is to investigate the effects of foreign investors on the Vietnamese stock market, especially under the aspect of stock price volatility. Based on these, they may have effective and timely adjustments in monitoring policies.

Although state ownership and foreign ownership are key components of ownership structure in the context of Vietnam, the effects of dividend policy and ownership structure on stock volatility in the Vietnamese stock market is under-researched so far. The main objective of this research, therefore, is to assess the impacts of dividend policy, ownership structure (focusing on foreign ownership and state ownership) on stock price fluctuation. In fact, it is particularly crucial to scrutinise the stabiliser roles of foreign and state ownership in an emerging market like Vietnam

which is currently experiencing an enormous, interesting challenge during its process of liberalisation and internationalisation, especially its opening of domestic financial market.

More specifically, this paper investigates the influence of dividend policy (quantitatively measured by dividend yield and dividend payout ratio) and ownership structure (i.e., foreign ownership and state ownership) on stock price volatility, controlling other potential determinants well-established in the literature. In addition, the paper examines the moderating effect of foreign/state ownership on the dividend policy-price volatility relation in order to clarify the roles of foreign/state ownership in driving stock price fluctuation conditional on dividend policy. Our data sample includes listed companies of the Vietnamese stock market in the recent eight-year period from 2008 to 2015. This research is different from previous studies as regards the measurement of price volatility. Instead of using the standard deviation of returns or cross-sectional or time series estimates, this paper calculates stock fluctuation at each point in time to avoid the collapsing of data or loss of information. Apart from employing traditional panel data approaches, we run the dynamic panel regressions via the system GMM approach in order to deal with potentially serious sources of endogeneity.

This research contributes to and consolidates the empirical evidence related to dividend policy, ownership structure and stock price volatility in transitional, emerging markets like Vietnam. Since then, scholarly researchers may continue to dig deeper other potential factors which may impact stock price fluctuations in the Vietnamese market and in other markets. More importantly, the study makes a novel contribution to the extant literature and empirical research in terms of the robust negative effect of dividend yield on stock price volatility, which is first detected using advanced econometric methods dealing with the endogeneity issues. Our research provides some implications for management and investment. Because of the evidence of the nexus between dividend policy, ownership structure, and stock price risk, for example, managers can choose adaptive dividend policy and structure of ownership to mitigate stock price volatility as well as to maximise the shareholders' value. Regarding market investors, they can select stocks with dividend policy and ownership structure in accordance with their risk preference or portfolio strategies. Some policy implications are also derived from our main findings.

The remainder of the paper is organised as follows. A literature review on the relationships between stock price volatility, dividend policy, and ownership structure are presented in section 2. Section 3 introduces the research data and methodology. The empirical results and discussion are reported and presented in section 4. Section 5 concludes.

## 2. Literature review

The theories of dividend policy have researched for more than 70 years, which has been continuing a controversial topic among scholars. In the *bird-in-hand theory*, Lintner (1956) and Gordon and Shapiro (1956) admit that receiving expected dividends are more valuable than waiting for capital gains. Al-Malkawi (2007) adds that due to the uncertainty of future cash flows and information asymmetry, investors would prefer dividends to retained earnings. This theory includes two ideas: the dividend payout ratio is positively related to share price, and it is inversely related to the cost of equity capital. Thus, firms must conduct a high dividend payout policy to boost firm value. However, Miller and Modigliani (1961) and Black and Scholes (1974) develop an influential argument that dividend policy does not influence the stock price and costs of capital. Thus, dividend policy is not relevant to the stock volatility.

Besides the two dividend theories above, the *signalling hypothesis* shows that an increase in dividend payments is a positive signal and bespeaks good prospects of firms' earnings and vice versa (Al-Malkawi, 2007; Miller & Modigliani, 1961; Pettit, 1972). In addition, the *clientele effect* theory explains that different investor groups will prefer different dividend policies (Al-Malkawi, 2007). Investors who pay higher taxes will expect businesses to pay little or no dividend, and they should be compensated in terms of their gains from the growth of stock price. In contrast, small

investors would prefer companies paying dividends because they may not pay transaction costs once they sell the stocks (Al-Malkawi, 2007).

Regarding the relationship between dividend policy and risk, Baskin (1989) rationalises the effects from the causality relations between dividend policy and stock price volatility including duration effect, rate of return effect, arbitrage realisation effect, and information effect which are derived from the bird-in-hand theory and the signalling hypothesis. The duration effect and rate of return effect consider dividend payment as a proxy for the effectiveness of firms' cash flow. The arbitrage realisation effect and information effect suggest that firm directors can actively impact share price volatility.

Specifically, the **duration effect** assumes that high dividend yields lead to more upcoming cash flows. In a manner parallel to short-term debt versus long-term debt, high-dividend stocks will have a smaller duration if dividend policy is constant. As short-term debt is approximately in par value, the price of such stocks can less be influenced by changes in discount rate. The **rate of return effect** means that a low-payout and low-dividend yield firm can be valued more regarding future investment opportunities than assets in place. Thus, its share price can be more sensitive to shifting expected rates of return throughout the distant time period (Gordon, 1963; & Baskin, 1989). The **arbitrage realization effect** states that a mispriced share that pays a liquidating dividend throughout the holding period will offer a complete arbitrage profit to investors, irrespective of the level of market efficiency. Finally, the **information effect** suggests that directors can mitigate stock price fluctuation by raising a target payout ratio. This is based on the awareness that dividend policy is informative (Miller & Rock, 1985) and investors tend to be more confident and have less irrational actions once earnings announcements contain generous dividend payments.

The empirical relations between dividend policy and stock volatility have been found by prior studies. Dividend yield and payout ratio are considered as the proxies of dividend policy. Gordon (1963) argues that paying more dividend could reduce risk, affect capital costs, and reduce stock price. Some empirical evidence has demonstrated a negative relation between dividend yield and/or dividend payout and share price volatility in advanced markets. Baskin (1989) demonstrates that the return on each share has an inverse relation with the price fluctuation. The managers, therefore, may employ stock policy to influence the risk of stocks (for example, to reduce stock volatility via increased dividend payments). The research by Allen and Rachim (1996) on the impact of dividend policy on stock price movement at the Australian Securities Exchange (ASX) suggest that stock price volatility is significantly, negatively related to dividend payout ratio. Hussainey et al. (2011) also add that dividend payout rate has a negative relationship with the stock price fluctuation. Profilet and Bacon (2013) conclude that both dividend payout and dividend yield are negatively linked to the fluctuation of securities price. Other evidence has empirically shown a positive linkage between dividend yield and/or payout ratio and stock price fluctuation in developed markets. Hussainey et al. (2011) study the relationship between dividend policy and stock price fluctuation of listed companies in the UK market and show that dividend yields have a positive connection with stock price changes.

The linkage between dividend policy and stock price volatility in emerging markets has been investigated. Rashid and Rahman (2008) employ the data in the Bangladesh stock market and find no significant connection between dividend yield and stock price fluctuation. Similarly, Ilaboya and Omoye (2012) investigate the influence of dividend policy on share price fluctuation in the Nigerian Stock Exchange market. By employing ordinary least squares (OLS) regression method, the research does not find the connection between dividend yield, payout ratio, and stock price volatility. In the Sri Lankan market, Jahfer and Mulafara (2016) discover that stock price fluctuation is significantly positively related to dividend yield. Nevertheless, Gunaratne, Priyadarshanie, and Samarakoon (2016) explain that, at this stock market, while share price volatility is negatively related to dividend yield in the present year, the payout ratio in both present and prior years is positively linked to stock price fluctuation.



In the Tehran stock market, the research by Irandoost, Hassanzadeh, and Salteh (2013) shows that stock price movement is significantly affected by dividend policy in the short term, not in the long term. More specifically, Lashgari and Ahmadi (2014) indicate that dividend payout ratio has a significantly negative relation with stock price movement. In the Jordanian market, Ramadan (2013) claims that both dividend yield and payout ratio are significantly negatively related to share price fluctuation. The author adds that Jordanian managers of such firms are able to impact their stock price by adaptive dividend policies. Thus, this study recommends that the signalling theory and duration effect can be used to explain the stock price movement in Jordan. Studying in the same market, Al-Shawawreh (2014) shows that while stock price fluctuation is significantly, negatively related to dividend payout ratio, dividend yield is weakly, positively related to the changes in stock price.

In Pakistan, Nazir, Nawaz, Anwar, and Ahmed (2010) argue that the stock price volatility is significantly impacted by dividend policy. Of which, dividend yield is positively related to stock price fluctuation, whereas payout ratio is negatively linked to share price movement. Shah and Noreen (2016) also study the Pakistan market and find that both dividend payout ratio and dividend yield are significantly, negatively associated with stock price volatility. Apparently, Nazir et al. (2010) and Shah and Noreen (2016) affirm the influences of dividend policy on stock price movements in Pakistan and confirm that the arbitrage realisation effect, duration effect and information effect are reinforced by their empirical evidence from this market. In the Malaysian market, Zakaria, Muhammad, and Zulkifli (2012) investigate the relationship between dividend policy and stock price movement of construction and material listed firms. The study's results show that payout ratio is significantly positively connected to fluctuations in share price. However, the researches by Hashemijoo, Mahdavi-Ardekani, and Younesi (2012), Hooi, Albaity, and Ibrahimy (2015), and Zainudin, Mahdzan, and Yet (2018) in Malaysia declare that both dividend yield and payout ratio are negatively associated with stock price volatility.

It is obvious that the empirical research results related to the influence of dividend policy on stock price volatility are conflicting, which may be caused by differences in selected samples and research methods. Suwanhirunkul and Masih (2018) use a dataset of Islamic shares listed in the Dow Jones Islamic US Index and other shares listed in the Dow Jones US Index from 2005 to 2017 to analyse the relation between dividend policy and stock price volatility through the quantile regression and GMM approach. They conclude that the price volatility of all shares and Islamic shares are not impacted by dividend policy when using the GMM approach. The results from quantile regressive models are similar to those of the GMM models. However, Islamic share price volatility is significantly and positively related to dividend yield via employing the quantile regression method. Camilleri, Grima, and Grima (2019) study the influence of dividend policy on stock price movements for Mediterranean banks from 2001 to 2016. When testing the whole sample, the research result shows that dividend yield is more important than dividend payout ratio in explaining their impacts on volatility. Nevertheless, payout ratio becomes a meaningful explanatory variable in comparison with dividend yield when testing the models by the cluster approach.

The relationship between state ownership and stock price volatility has not been well-researched so far. Most empirical studies concentrate on the linkage between state ownership and firm performance. Ang and Ding (2006) argue that in Singapore, state-connected firms have better corporate governance and greater profits than other firms. Borisova, Brockman, Salas, and Zagorchev (2012) claim that state ownership can improve firm performance because companies with state owners can find easier to have access to resources and more powerful than other kinds of owners. In China, Yu (2013) claims that firm performance is related to state ownership in the form of a U-shaped relationship. The research results demonstrate that the state stockholders supply both a "grabbing hand" and a "helping hand" to listed firms (Yu, 2013, p.85). Similarly, in Vietnam, the relationship between state ownership and firm performance is a convex curve (Phung & Mishra, 2016). More importantly, this paper's results imply that at first, state ownership used to align with social or political objectives does not contribute to the improvement of firm value.

However, if state ownership rises, the government rises its effects on executives and forces them to act for political or social aims. Thus, although the contribution of state ownership to firm performance in different markets are not totally similar, it infers that in emerging markets, state ownership in listed companies may be significant.

The process of liberalization and internationalisation of economies have led to concerns about the role of foreign investors in stabilizing stock price levels of domestic markets. Bae, Chan, and Ng (2004), firstly, find evidence of a positive relationship between the openness of foreign investment and stock dividend volatility. Obviously, they suggest that legal constraints (such as foreign ownership ceilings) and practical barriers (such as industry and liquidity) have impacts on transnational investment flows. Charfeddine and Elmarzougui (2010) suggest that the dividend payout ratio should be considered by institutions in making decision on holding a firm's shares. Accordingly, institutional investors that own significant equity stakes in the firm are those who are more likely to engage/intervene in management decisions influencing the firm's performance. Such an investment decision which is normally made based on expected risks and returns should be realised in the movement of the stock's market price. As far as foreign investment is regarded as the dominant presence of institutional investors in emerging markets, it is reasonable to argue that foreign involvement—as a performance-enhancing mechanism of corporate governance—and dividend policy can jointly exert an impact on stock price fluctuation.

Li, Nguyen, Pham, and Wei (2011) research into another aspect and find that the level of foreign investors' equity holding reduces the volatility of corporate dividends in emerging markets. This evidence relates to the strategic and long-term ownership of foreign investors. Chen, Du, Li, and Ouyang (2013) employ a dataset of 1458 companies from 1998 to 2008 to analyse the influence of foreign institutional ownership on stock return fluctuations. Their results indicate that while foreign institutional ownership leads to an increase in stock volatility, the ownership by foreign individuals mitigates stock fluctuation. Chiang and Chan (2019) also examine the relationship between foreign ownership and stock return fluctuation of Taiwanese companies over the period of 1994–2014. The authors conclude that between foreign ownership and stock price volatility have a negative relation during the research period, which is called the stabilising effect. Nevertheless, this effect does not occur in recent years after the 2008 global financial crisis.

Regarding the Vietnamese market, Vo (2015) discovers empirical evidence about the negative relationship between foreign ownership and stock price fluctuation. However, Vo's (2015) study focuses on only companies listed on the Ho Chi Minh Stock Exchange (HoSE) in the period of 2006–2012. Besides, the study investigates the standard deviation of returns rather than stock price volatility. Engle (2004) argues that the measurement of price fluctuations using the standard deviation of returns is inaccurate because of employing historical data. Thus, he suggests using the ARCH model to predict future price movements. Likewise, Parkinson (1980), Baskin (1989), Allen and Rachim (1996), and Hussainey et al. (2011) disagree with the use of standard deviations to represent price fluctuations because of the impacts of extreme values. These authors propose calculating price volatility by taking the annual range of the price divided by the average of the highest and lowest prices, obtaining the square, then taking the square root. Therefore, the empirical research on the role of ownership structure, including foreign and state ownership, on stock market risk in Vietnam essentially remains neglected.

Still, there has been no research for the Vietnamese context that delves into the joint relation between dividend policy, ownership structure, and stock price volatility. It is intriguing to realise that understanding this nexus in a typical emerging market like Vietnam should add value to the prevailing literature on corporate finance and management policies. Motivated by this, the current paper explores the influence of dividend policy (i.e., dividend yield and dividend payout) and ownership structure (i.e., foreign ownership and state ownership) on stock price movement, controlling well-established determinants as regarded in the literature. In addition, the paper looks into the mediating impact of foreign/state ownership on the dividend policy-price volatility



relation to clarify whether ownership structure drives stock price fluctuation conditional on dividend policy. In awareness of the potential problem of endogeneity, the main finding of this research is deduced from the empirical results from the dynamic panel data regressions using the system GMM estimator. One critical point of view from our approach of research is reassessing the stabiliser roles of foreign and state ownership after the 2008 global financial crisis. It is also crucial to recognise that the economic ambience in Vietnam during the recent period is characterised by its unique process of liberalisation and internationalisation, where there still exists unnecessary restrictions on foreign investment, weak legal enforcement, and partial privatisation. This research focusing on the post-crisis period and surveying the whole equity market of Vietnam is expected to shed light on the interesting phenomenon of transitional, emerging markets.

### 3. Data and methodology

#### 3.1. Empirical model and identification strategy

According to Baskin's (1989) modelling, there are several mechanisms of the impact between dividend policy and stock market risk, in terms of dividend yield and dividend payout as the two important components of a dividend policy that should be considered:

$$P - VOL = f(D - YIELD, PAYOUT)$$

where P-VOL denotes stock price volatility as a measure of the firm's market risk, D-YIELD and PAYOUT refer to dividend yield and dividend payout, respectively. Baskin (1989) systematises theoretical arguments on the inverse impacts of dividend yield and dividend payout on stock price movement through four main mechanisms including duration, rate of return, arbitrage realisation, and information effects. Empirical evidence in both mature and emerging markets has validated such a negative relation in terms of dividend yield and/or dividend payout (Baskin, 1989; Allen & Rachim, 1996; Hashemijoo et al., 2012; Hooi et al., 2015; Hussainey et al., 2011; Lashgari & Ahmadi, 2014; Nazir et al., 2010; Profilet & Bacon, 2013; Shah & Noreen, 2016; Zainudin et al., 2018). However, other evidence has empirically shown a positive relation (Zakaria et al., 2012; Gunaratne et al., 2016; Jahfer & Mulafara, 2016) or no statistically significant relation (Rashid & Rahman, 2008; Ilaboya & Omoye, 2012; Suwanhirunkul & Masih, 2018). The variety of empirical patterns may be due to different samples and time periods. Indeed, Camilleri et al. (2019) indicate that the relation (in terms of the coefficient and significance) is sensitive to sampled periods and other sampling procedures.

To detect the effect of dividend policy on stock price volatility, it is crucial to control for other variables that potentially drive price volatility. According to previous studies such as Baskin (1989), Allen and Rachim (1996), Hussainey et al. (2011), Shah and Noreen (2016), Zainudin et al. (2018), and Camilleri et al. (2019), control variables include earnings volatility (E-VOL), firm size (SIZE), financial leverage (DEBT), assets growth (GROWTH). Firstly, instability of the earnings stream implies underlying risk in the firm's product market that is associated with share price volatility. Stocks of smaller firms whose activities are less diversified are likely to be less scrutinised by market investors, having their prices less informed, more illiquid, and thus higher volatile. Greater price fluctuations may be observed for firms with higher financial leverage or higher risk of financial distress. Finally, the estimated price impact of dividend policy after controlling for the influence of growth should be indicative of the arbitrage or information effect. In sum, stock price volatility should be a function of dividend policy, earnings volatility, firm size, financial leverage, and assets growth. Traditionally, the empirical specification could be modelled as follows:

$$P - VOL_{it} = c + \beta_1 \times D - YIELD_{it} + \beta_2 \times PAYOUT_{it} + \beta_3 \times E - VOL_{it} + \beta_4 \times SIZE_{it} + \beta_5 \times DEBT_{it} + \beta_6 \times GROWTH_{it} + u_{it} \quad (1)$$

In the context of emerging markets, Li et al. (2011) argue that large ownership of foreign shareholders plays a prominent role in the price stabilisation, that is, reducing fluctuations in share price.

In the context of Vietnam's equity market, which is a small and young market still restricted by its partial privatisation process and currently in market-reforming attempts to upgrade it from a frontier emerging market to a secondary emerging market, it might be necessary to control for the potential effects of both foreign and state ownership. This study's motivation for exploring the joint effect of dividend policy and ownership structure (including foreign ownership, FOREIGN and state ownership, STATE) on stock price volatility leads to the second empirical specification as following:

$$P - VOL_{it} = c + \beta_1 \times D - YIELD_{it} + \beta_2 \times PAYOUT_{it} + \beta_3 \times FOREIGN_{it} + \beta_4 \times STATE_{it} + \beta_5 \times E - VOL_{it} + \beta_6 \times SIZE_{it} + \beta_7 \times DEBT_{it} + \beta_8 \times GROWTH_{it} + u_{it} \quad (2)$$

It is critical to note that many previous studies use cross-section or time-series estimations. Recent studies tend to estimate the dividend-volatility relation using panel data regression techniques such as fixed effects, random effects, and GMM (e.g., Lashgari & Ahmadi, 2014; Shah & Noreen, 2016; Gunaratne et al., 2016; Suwanhirunkul & Masih, 2018). In fact, the panel data approach, by blending the inter-firm differences and intra-firm dynamics, has several advantages over cross-section and time-series approaches (see Hsiao, 2007). Especially, we suggest that the panel approach should be necessary because it is plausible to examine the difference across firms in and the dynamics over time of the dividend policy in association with stock price volatility. However, the panel methodology has its econometric challenge. As shown by Hsiao (2007), the challenge is to control the influence of unobserved heterogeneity, that is, represented by the incidental parameters  $u_{it}$  in Equations (1) and (2). Accordingly, fixed effects and random effects models are designed to address this issue based on their different assumptions about the heterogeneity (i.e., the individual specific effect). Consequently, a Hausman-type test would be carried out to determine which of the two models should be more appropriate.

Although fixed effects and random effects models complement each other in terms of their advantages and disadvantages (Hsiao, 2007, p.9), their estimates are biased in the presence of other sources of endogeneity such as dynamic bias, simultaneity and causality problems (Wintoki, Linck, & Netter, 2012). Suwanhirunkul and Masih (2018) point out potential impacts of some endogeneity issues in examining the relation between dividend policy and price volatility. For our specifications (1) and (2), it further concerns the potential causality relation between ownership structure and price volatility. For example, while the participation of foreign investors could reduce stock price variation, foreign investors could strategically choose to invest in stocks with less volatile prices for their long-term investment horizons or portfolio diversification targets. Fortunately, these endogeneity concerns can be dealt with by using the (dynamic) GMM estimator<sup>2</sup> developed by Arellano and Bover (1995) and augmented by Blundell and Bond (1998) (Hsiao, 2007; Suwanhirunkul & Masih, 2018; Wintoki et al., 2012).

It should also be noted that industry and year fixed effects, as characterising the panel approach, should be controlled in specifications (1) and (2). Using the system GMM estimator could further control for time-invariance like industry effects, which fixed effects model could not. (The random effects model, albeit allowing time-invariant variables, is of course not suitable in the endogenous existence of unobserved individual specific effects that violates its basic assumptions.) Post-estimation tests such as Hansen *J*-test and Arellano-Bond test are conducted to check for the GMM-type specification validity. For all estimation approaches, including the pooled OLS for an initial inference, the firm-level clustering technique is used (where applicable) so that robust standard errors are arbitrary to heteroskedasticity and autocorrelation.

We also investigate the moderating effect of ownership structure (i.e., foreign and state ownership) on the potential impact of dividend policy on price volatility. However, it should be realised that adding interactive variables between ownership structure and dividend policy leads to an increase in the number of regressors that may bias estimated results due to the potential of serious multicollinearity.<sup>3</sup> To quantify the degree of multicollinearity in our empirical models, we

generally calculate variance inflation factors (VIFs) for all estimation approaches and report them in Appendix C. For the sake of making a deduction about the moderating effect, we report the results for the interactive approach in Appendix B, in awareness of the multicollinearity problem via VIFs reported in Appendix C.

Table 1 below describes how the variables are measured. In general, all variables are constructed following the methods used by the previous studies. The notice, as above-mentioned, is that the measurement is designated for the panel data. Our data are available to calculate the variables for each year. Following Shah and Noreen (2016), Suwanhirunkul and Masih (2018), and Camilleri et al. (2019), the longitudinal measurement of dependent variable P-VOL is derived from the original method by Baskin (1989). The use of the high-low range of stock prices and the square root transformation in estimating the volatility is a much more efficient approach than using opening/closing prices and standard deviation estimation (Allen & Rachim, 1996; Baskin, 1989; Hussainey et al., 2011; Parkinson, 1980). Furthermore, we suggest that measuring P-VOL at each point in time helps preserve the structure of data panel instead of collapsing the panel into a single cross-section as in most previous studies. This enables us to apply the panel approach with its aforementioned advantages.

### 3.2. Data

The sample includes companies listed on the two Vietnamese stock exchanges (Ho Chi Minh Stock Exchange—HOSE and Hanoi Stock Exchange—HNX) in the eight-year period from 2008 to 2015. There are 480 sampled firms (2,976 firm-year observations) that are classified into nine industries (see Appendix A). The research uses panel data to investigate the relationship between dividend policy, ownership structure and stock price fluctuation.

Table 2 below shows a description of the data sample employed in this research paper. Price volatility of Vietnamese stocks during the 2008–2015 period is observed at a mean of 0.72 with a standard deviation of 0.30. On average, the dividend yield of Vietnamese listed firm is 8% with the maximum value of 43%. The average value of payout ratio is 57 % with the minimum value of –51%.<sup>4</sup> The sample mean of foreign ownership stands at 3% with the highest value of 49% (legal limit), while the average of state ownership is 25% with the maximum value of 97%.

Table 3 indicates the correlation coefficients amongst the variables of this research. At first glance, it can see that the stock price volatility is adversely correlated to dividend yield and payout ratio, which means that payout ratio could be a managerial device to reduce the fluctuation of share price. Similarly, stock price volatility is negatively correlated to foreign and state ownership. These relationships suggest that the foreign block holders and state block holders may contribute to the stability of stock prices. The share price volatility is negatively correlated to firm size and positively correlated to earnings volatility, financial leverage (long-term debt ratio) and assets growth rate.

The block foreign ownership is positively correlated to firm size and growth rate. This implies that firms which have more sizeable assets and grow at a higher rate may attract more foreign investors. In contrast, the adverse relationship between block state ownership and growth rate means that the stronger state intervention may destroy firm growth.

### 4. Empirical results and discussion

Table 4 reports the results of OLS estimation variants. For the two dividend policy variables, only dividend yield (D-YIELD) has a statistically significant impact on price volatility (P-VOL). The significance of this effect of dividend yield keeps robust regardless of whether the industry and year dummies are controlled and ownership structure is included in the model. Especially, controlling year fixed effects (column (3)) increases remarkably the statistical confidence level and economic magnitude of the estimated effect of D-YIELD (the absolute value of *t*-statistic nearly doubles to 8.05 from 4.11, and the coefficient changes from –0.34 to –0.71). This affirms the

**Table 1. Definition of variables**

Variables	Description	Previous Studies	Measurement
Dependent variables			
P-VOL	Stock price volatility	Parkinson (1980); Baskin (1989); Allen and Rachim (1996); Hussainey et al. (2011); Shah and Noreen (2016); Suwanhirunkul and Masih (2018); Camilleri et al. (2019)	The annual range of extreme stock prices (i.e., the difference between yearly highest and lowest prices) is divided by their midpoint (i.e., the average of the highest and lowest prices), and then raised to the second power. A square root transformation is applied to provide a volatility measure comparable to a standard deviation.
Independent variables			
D-YIELD	Dividend yields	Baskin (1989); Allen and Rachim (1996); Hussainey et al. (2011); Shah and Noreen (2016); Suwanhirunkul and Masih (2018); Camilleri et al. (2019)	The ratio of dividend per share to share price
PAYOUT	Payout ratio	Baskin (1989); Allen and Rachim (1996); Hussainey et al. (2011); Shah and Noreen (2016); Suwanhirunkul and Masih (2018); Camilleri et al. (2019)	The ratio of dividend per share to earnings per share
E-VOL	Earnings volatility	Baskin (1989); Allen and Rachim (1996); Hussainey et al. (2011); Shah and Noreen (2016); Suwanhirunkul and Masih (2018); Camilleri et al. (2019)	The standard deviation of the earnings ratio (the ratio of the operating earnings before interest and taxes (EBIT) to total assets) over the previous three years.
SIZE	Market capitalization	Baskin (1989); Allen and Rachim (1996); Hussainey et al. (2011); Shah and Noreen (2016); Suwanhirunkul and Masih (2018); Camilleri et al. (2019)	The logarithm of market value
DEBT	Debt structure	Baskin (1989); Allen and Rachim (1996); Hussainey et al. (2011); Shah and Noreen (2016); Suwanhirunkul and Masih (2018); Camilleri et al. (2019)	The ratio of long-term debt to total assets
GROWTH	Growth in assets	Baskin (1989); Allen and Rachim (1996); Hussainey et al. (2011); Shah and Noreen (2016); Suwanhirunkul and Masih (2018); Camilleri et al. (2019)	The rate of the change in total assets between the beginning of the year and the end of the year
FOREIGN	Foreign block ownership	Li et al. (2011); Vo (2015)	Total combined ownership of foreign shareholders

(Continued)

Variables	Description	Previous Studies	Measurement
FOREIGN_dum	The presence of foreign ownership		A dummy variable that equals 1 if the firm has its shares owned by foreign investors, or 0 otherwise.
STATE	State block ownership	Vo (2016)	Total combined ownership of state shareholders
STATE_dum	The presence of state ownership		A dummy variable that equals 1 if the firm has its shares owned by the state, or 0 otherwise.

**Table 2. Descriptive statistics of variables**

	Obs.	Mean	Std. Dev.	Min	25%	Median	75%	Max
P-VOL	2976	0.72	0.30	0.10	0.50	0.67	0.90	2.00
D-YIELD	2976	0.08	0.09	0.00	0.00	0.06	0.12	0.43
PAYOUT	2975	0.57	1.12	-0.51	0.00	0.37	0.67	8.98
FOREIGN	2976	0.03	0.09	0.00	0.00	0.00	0.00	0.49
FOREIGN_dum	2976	0.20	0.40	0.00	0.00	0.00	0.00	1.00
STATE	2976	0.25	0.25	0.00	0.00	0.19	0.51	0.97
STATE_dum	2976	0.60	0.49	0.00	0.00	1.00	1.00	1.00
E-VOL	2016	0.03	0.03	0.00	0.01	0.02	0.04	0.15
SIZE	2976	5.02	1.59	0.24	3.94	4.88	5.96	11.80
DEBT	2976	0.08	0.13	0.00	0.00	0.02	0.11	0.76
GROWTH	2496	0.11	0.25	-0.35	-0.03	0.06	0.19	1.38

importance of including time dummies in the panel data approach. Another critical note is that controlling ownership structure effects (columns (4)–(6)) reduces the statistical and economic significance of the negative impact of dividend yield on price volatility. This is particularly explained by the statistically significant price-stabilising role of state ownership. The other variable of dividend policy, dividend payout (PAYOUT), shows no effect on price fluctuation at all. In fact, the estimated coefficient of PAYOUT is nearly zero in magnitude across all stylised models in Table 4. In general, our results are in line with previous findings by Baskin (1989) and Hussainey et al. (2011), who confirm the empirical dominance of dividend yield over dividend payout as a significant dividend-related determinant of price volatility. In the context of emerging markets, these results are complementary to Hashemijoo et al. (2012), Shah and Noreen (2016), and among others.

Estimated coefficients of control variables such as earnings volatility (E-VOL), firm size (SIZE) and financial leverage (DEBT) appear to be significant at 1% level throughout the variant models. Generally, the robustness of earnings volatility, firm size, and debt in explaining price variation remains unaffected significantly notwithstanding the controlling for industry/year and ownership effects. More specifically, more volatility of stock price is associated with more instability of income streams and more long-term indebtedness. Larger firms tend to have their stock prices less volatile or more stable. For firm growth (GROWTH), its significance is reduced through including industry and year dummies (columns (1)–(3)) and disappears when controlling for either foreign ownership (column (4)), state ownership (column (5)), or both ownership identities (column (6)). Indeed, GROWTH has the explanatory power for price volatility diminished in terms of its coefficient (from 0.06 to 0.05) and t-statistic (from 2.1 to 1.7). Remarkably, state ownership is found

**Table 3. Correlation matrix**

	P-VOL	D-YIELD	PAYOUT	FOREIGN	FRGN_dum	STATE	STATE_dum	E-VOL	SIZE	DEBT	GROWTH
P-VOL	1.00										
D-YIELD	-0.04**	1.00									
PAYOUT	-0.03*	0.34***	1.00								
FOREIGN	-0.08***	-0.04**	-0.04**	1.00							
FOREIGN_dum	-0.11***	-0.06***	-0.04**	0.78***	1.00						
STATE	-0.10***	0.14***	0.04**	-0.17***	-0.17***	1.00					
STATE_dum	-0.08***	0.17***	0.04**	-0.11***	-0.10***	0.81***	1.00				
E-VOL	0.09***	0.01	0.02	0.00	-0.01	-0.05**	-0.06***	1.00			
SIZE	-0.16***	-0.17***	-0.03*	0.21***	0.32***	0.04**	-0.05***	-0.03	1.00		
DEBT	0.10***	-0.09***	0.00	-0.04*	-0.01	0.12***	0.06***	-0.09***	0.22***	1.00	
GROWTH	0.10***	-0.07***	-0.1***	0.04*	0.04**	-0.09***	-0.09***	-0.03	0.19***	0.12***	1.00

\* indicates significance at 10%; \*\* significance at 5%; \*\*\* significance at 1%.



**Table 4. OLS estimates**

	Baseline models excluding ownership			Baseline models including ownership		
	w/o industry & time dummies (1)	w/industry dummies & w/o time dummies (2)	w/industry & time dummies (3)	w/foreign ownership (4)	w/state ownership (5)	w/foreign & state ownership (6)
D-YIELD	-0.384*** (-4.66)	-0.337*** (-4.11)	-0.706*** (-8.05)	-0.706*** (-8.04)	-0.644*** (-7.48)	-0.640*** (-7.43)
PAYOUT	-0.004 (-0.65)	-0.005 (-0.82)	0.000 (-0.01)	0.000 (-0.04)	-0.001 (-0.15)	-0.001 (-0.22)
FOREIGN				-0.071 (-1.08)		-0.136* (-2.11)
STATE					-0.125*** (-4.68)	-0.135*** (-4.95)
E-VOL	0.861*** (3.81)	0.883*** (3.97)	0.674** (3.08)	0.674** (3.08)	0.640** (2.96)	0.639** (2.95)
SIZE	-0.033*** (-8.21)	-0.029*** (-6.69)	-0.023*** (-5.08)	-0.022*** (-4.67)	-0.021*** (-4.77)	-0.019*** (-4.15)
DEBT	0.270*** (4.99)	0.261*** (4.63)	0.179*** (3.60)	0.176*** (3.53)	0.200*** (3.99)	0.196*** (3.90)
GROWTH	0.074*** (2.78)	0.065* (2.42)	0.059* (2.09)	0.059* (2.09)	0.047 (1.67)	0.046 (1.65)
Constant	0.788***	0.748***	0.826***	0.823***	0.869***	0.866***

(Continued)

**Table 4. (Continued)**

	Baseline models excluding ownership		Baseline models including ownership			
	w/o industry & time dummies <b>(1)</b>	w/industry dummies & w/o time dummies <b>(2)</b>	w/industry & time dummies <b>(3)</b>	w/foreign ownership <b>(4)</b>	w/state ownership <b>(5)</b>	w/foreign & state ownership <b>(6)</b>
Industry dummies	(33.44)	(20.06)	(19.68)	(19.39)	(20.21)	(19.96)
Year dummies	No	Yes	Yes	Yes	Yes	Yes
No. of observations	No	No	Yes	Yes	Yes	Yes
No. of firms	2016	2016	2016	2016	2016	2016
Prob. > F	480	480	480	480	480	480
Squared R	0.000	0.000	0.000	0.000	0.000	0.000
	0.073	0.091	0.182	0.182	0.195	0.197

Notes: Estimated coefficients are reported with t-statistics in parentheses; \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001; Standard errors are adjusted for firm-level clustering so that they are robust to arbitrary heteroskedasticity and autocorrelation.

negatively related to share price volatility at 1% significance while the price-stabilising role of foreign ownership is just significant, albeit at 10% level, when additionally considering the effect of state ownership (column (6)). In general, most signs of estimated variables are as expected theoretically. So far, the estimated patterns of basic control variables are consistent with to research results in developed markets (e.g., Allen & Rachim, 1996; Baskin, 1989; Hussainey et al., 2011) and emerging markets (e.g., Hooi et al., 2015; Jahfer & Mulafara, 2016; Zainudin et al., 2018).

Comparisons between obtained results from OLS, fixed effects, and random effects regressions are presented in Table 5. Columns (1), (2), and (3) report the results for estimating specification (1) without ownership variables, while the results in case of including ownership variables are reported in columns (4), (5), and (6). Testing for model selection leads to a favour of the fixed effects model through the two approaches with and without ownership identities. In particular, the Hausman test shows that the fixed effects model should be more appropriate than the random effects model regardless of whether ownership identities are included (columns (5) and (6)) or not (columns (2) and (3)). Meanwhile, the F test rejects the null hypothesis of the homogeneity of firm-specific characteristics, which means that the fixed effects models (columns (2) and (5)) should be more preferred to the OLS models (columns (1) and (4)). Taken together, the fixed effects models are the best among the three panel data approaches and more appropriate to be used for empirical analysis.

While random effects estimates share same patterns with OLS estimates, fixed effects estimates have statistical and economic significance reduced in case of dividend yield (D-YIELD) and earnings volatility (E-VOL). Specifically, the estimated coefficients of D-YIELD in the fixed effects models (columns (2) and (5)) are just significant at the 10% level while those in the OLS and random effects models are significant at the 1% level. The negative effect of dividend yield is much weaker in the fixed effects models. The signs of E-VOL in the fixed effects models are also at the 10% level of significance compared to the 5% level in the other models, whereas the degree of the price effect of earnings volatility is not noticeably reduced in the fixed effects models. Debt structure and firm growth have no significant effect on share price fluctuation in the fixed effects models. Meanwhile, the price influence of long-term debt in the OLS models (columns (1) and (4)) is significantly stronger than that in the random effects models (columns (3) and (6)). The weak significance of firm growth in the OLS and random effects models without ownership controls (columns (1) and (3)) disappears once the potential impact of ownership structure is considered (columns (4) and (6)). Firm size is the only control variable that shows a significant explanatory power for price volatility across all of the models. Interestingly, the signs of SIZE in the fixed effects models become positive significantly, in inverse direction to those in the OLS and random effects models. In particular, bigger firms have shares more volatile. This relation should be assessed from the fact that the fixed effect models cannot estimate time-invariant effects, which is one of its own disadvantages as discussed earlier in this paper. Also, it can be seen that the industry effects are not controlled in such a model.<sup>5</sup>

Ownership structure may be influential in explaining price fluctuations through most of the models. Both foreign and state ownership tends to be negatively related to stock price volatility. Surprisingly, the price-stabilising role of foreign investors is more profound (at 1% significance) in the fixed effects model (column (5)) while the state plays its price-stabilising role significantly only in the OLS and random effects models (columns (4) and (6)). It is critical to observe that the marginal reduction in the significance of estimates is trivial across the models following the inclusion of ownership variables. It should also be noted that the results remain unchanged when we include interaction terms of dividend policy with ownership structure in the fixed effects and random effects models.<sup>6</sup> This also affirms that ownership structure has not driven the relation between, at least, dividend yield and price volatility.

As discussed methodologically, there may be an endogeneity issue in our empirical approach. A potential source of endogeneity is related to the linkage between ownership structure and price

**Table 5. OLS, fixed effects, and random effects estimates**

	Models excluding ownership			Models including ownership		
	OLS (1)	fixed effects (2)	random effects (3)	OLS (4)	fixed effects (5)	random effects (6)
D-YIELD	-0.741*** (-8.37)	-0.224* (-2.31)	-0.603*** (-6.91)	-0.656*** (-7.55)	-0.215* (-2.25)	-0.543*** (-6.32)
PAYOUT	0.001 (0.15)	0.000 (-0.03)	0.003 (0.48)	-0.001 (-0.13)	0.000 (-0.00)	0.001 (0.24)
FOREIGN				-0.162* (-2.55)	-0.489*** (-3.92)	-0.231*** (-3.74)
STATE				-0.138*** (-5.10)	-0.100 (-1.18)	-0.155*** (-5.72)
E-VOL	0.633** (2.83)	0.521* (2.12)	0.614** (2.89)	0.578** (2.65)	0.521* (2.12)	0.564** (2.69)
SIZE	-0.028*** (-6.75)	0.087*** (6.03)	-0.019*** (-4.48)	-0.025*** (-5.65)	0.091*** (6.35)	-0.015*** (-3.33)
DEBT	0.200*** (4.12)	-0.026 (-0.25)	0.138** (2.83)	0.221*** (4.49)	-0.024 (-0.23)	0.158** (3.25)
GROWTH	0.068* (2.49)	0.006 (0.18)	0.059* (2.17)	0.053 (1.95)	0.003 (0.10)	0.048 (1.77)
Constant	0.858*** (26.93)	0.294*** (3.89)	0.816*** (26.83)	0.882*** (26.83)	0.309*** (3.74)	0.843*** (26.32)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	2016	2016	2016	2016	2016	2016

(Continued)

**Table 5. (Continued)**

	Models excluding ownership			Models including ownership		
	OLS (1)	fixed effects (2)	random effects (3)	OLS (4)	fixed effects (5)	random effects (6)
No. of firms	480	480	480	480	480	480
Prob. > F	0.000	0.000	0.000	0.000	0.000	0.000
Squared R	0.158	0.178	0.131	0.176	0.188	0.141
<b>Hausman test:</b> fixed vs. random (Indicated model)		<i>p</i> -value 0.000 (fixed)			<i>p</i> -value 0.000 (fixed)	
<b>F test</b> (all $u_i = 0$ ): OLS vs. fixed (Indicated model)		<i>p</i> -value 0.000 (fixed)			<i>p</i> -value 0.000 (fixed)	

Notes: Estimated coefficients are reported with *t*-statistics in parentheses; \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ ; Standard errors are adjusted for firm-level clustering so that they are robust to arbitrary heteroskedasticity and autocorrelation. Reported *p*-values of Hausman tests and F tests indicate that fixed effects model should be preferred over random effects model and OLS model, respectively.

volatility. As stock price should reflect the effectiveness of corporate governance mechanisms that address agency conflicts, the endogeneity problem here may derive from the potentially endogenous association of ownership structure (including ownership level/concentration and institutional holdings by foreign investors and the state) with firm performance/market valuation or riskiness of corporate performance (see Charfeddine & Elmarzougui, 2010; Tran & Le, 2017, *in press*). As explained earlier, for example, the relation between share volatility and foreign ownership may be in mutual causation. In other words, the significant effect of foreign ownership in column (5) of Table 5 observations may be biased due to the reverse causality source of endogeneity. We, thus, employ the dynamic panel regression via the system GMM estimator to address the endogeneity issue. The results are presented in Table 6. It is clear that estimated patterns are robust to whether ownership variables and industry dummies are included. GMM-type post-estimation tests suggest the validity of used instrument variables and the non-existence of second-order serial correlation in first-differenced errors. This implies that the results of the GMM estimator should be used for final inference.

Results in the last two columns of Table 6 show that foreign investors have not played a stabilising role in the Vietnamese stock market during 2008–2015. This is a complementary finding compared to Vo (2015) who finds a stabilising effect of foreign investors on the HOSE during 2006–2012. A critical note is that Vo (2015) does not consider the effect of the 2008 global financial crisis. Based on our finding, we argue that foreign investors have no longer played a significant stabilising role in Vietnam, an emerging market, after the crisis. For state ownership, its estimated coefficients have become insignificantly positive. In other words, the role of the government in stabilising the volatility of SOEs' stock prices is inconclusive.

Controlling the endogeneity problem inevitably depreciates the explanatory power of the control variables. The controls including earnings volatility (E-VOL), financial leverage (DEBT), and firm growth (GROWTH) now appear to be insignificant. The sign of earnings volatility is even reversed. The signs of long-term debt and firm growth remain positive, albeit insignificant statistically. The negative effect of firm size on price volatility becomes weaker, especially when controlling industry effects. The less significance of regressors when including industry dummies has been observed previously (e.g., Hussainey et al., 2011). In fact, the negative influence of firm size on price fluctuation has been found in many prior studies for both developed and developing countries (e.g., Rashid & Rahman, 2008; Hashemijoo et al., 2012; Hooi et al., 2015; Hussainey et al., 2011; Jahfer & Mulafara, 2016; Profilet & Bacon, 2013). It is plausible that price volatility is negatively associated with firm size. One reason is that larger firms whose activities are more diversified are more inspected by market investors, thus stock prices of these firms tend to be more informed and less volatile.

As a proxy for dividend policy, the effect of dividend payout on price volatility has not been found in our study for Vietnamese equities. Once again, the coefficients of D-PAYOUT in all columns of Table 6 are not significant. Especially, the sign of D-PAYOUT that is ambiguous in the previous estimation approaches tends to be negative in the GMM approach. This negative relation, albeit insignificant, should be consistent with the prediction by the dividend policies. For example, Baskin (1989) suggests that the adverse impact of payout ratio reflects the rate of return and information effects. That is, a higher dividend payout ratio in a firm can be realised as fewer growth opportunities available for the firm, and the firm's stock price should be less volatile because of its higher sensitivity to varying estimates of return rates or as a consequence of the firm's managers raising the target payout ratio to signal market investors for a positive prospect of the firm. Such an argument has been supported by some recent studies in both developed and emerging countries such as Allen and Rachim (1996), Rashid and Rahman (2008), Lashgari and Ahmadi (2014), and Hooi et al. (2015). However, our current research is in line with the negative insignificance detected by Baskin (1989), Hussainey et al. (2011), Hashemijoo et al. (2012), and Shah and Noreen (2016). Compared to the previous studies, the result is more intact because the correlation coefficient between D-YIELD and D-PAYOUT in our Vietnamese sample is just 0.34 (Table 3).



**Table 6. Dynamic system GMM estimates**

	excluding ownership		including ownership	
	w/o industry dummies (1)	w/industry dummies (2)	w/o industry dummies (3)	w/industry dummies (4)
P-VOL(t-1)	0.106* (2.24)	0.106* (2.26)	0.102* (2.13)	0.099* (2.08)
D-YIELD	-0.927** (-2.80)	-0.933** (-2.81)	-0.988** (-3.10)	-0.986** (-3.07)
PAYOUT	-0.049 (-1.05)	-0.055 (-1.16)	-0.04 (-0.84)	-0.048 (-0.97)
FOREIGN			-0.196 (-0.97)	-0.243 (-1.21)
STATE			0.103 (0.65)	0.059 (0.37)
E-VOL	-1.428 (-1.59)	-1.455 (-1.63)	-0.966 (-1.06)	-1.027 (-1.13)
SIZE	-0.060** (-3.11)	-0.055* (-2.48)	-0.058** (-2.92)	-0.050* (-2.25)
DEBT	0.37 (1.46)	0.29 (1.23)	0.347 (1.37)	0.255 (1.06)
GROWTH	0.107 (0.83)	0.104 (0.75)	0.163 (1.42)	0.143 (1.21)
Industry dummies	No	Yes	No	Yes
Year dummies	Yes	Yes	Yes	Yes

(Continued)

**Table 6. (Continued)**

	excluding ownership		including ownership	
	w/o industry dummies (1)	w/industry dummies (2)	w/o industry dummies (3)	w/industry dummies (4)
No. of observations	2016	2016	2016	2016
No. of instruments	49	57	63	71
No. of firms	480	480	480	480
Prob. > F	0.000	0.000	0.000	0.000
Sargan test (p-value)	0.094	0.078	0.126	0.108
Hansen J-test (p-value)	0.231	0.192	0.276	0.240
Arellano-Bond test: AR(2) (p-value)	0.501	0.548	0.546	0.634

Notes: Estimated coefficients are reported with t-statistics in parentheses; \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001; System-GMM estimates are Blundell and Bond (1998) system GMM estimates using a two-equation system of the regression in levels and in first differences. Estimated constants are not reported.

The most important result in Table 6 is that the estimate of dividend yield remains significant across all GMM models. The estimated coefficients of D-YIELD are significant at the 5% level. The adverse effect of dividend yield on price volatility is clear theoretically and empirically in the literature (e.g., Baskin, 1989; Hashemijoo et al., 2012; Hooi et al., 2015; Hussainey et al., 2011; Profilet & Bacon, 2013; Shah & Noreen, 2016; Zainudin et al., 2018). However, our research is the first that confirm this well-established relation using the advanced econometric approach (i.e., dynamic system GMM) to deal with potential problems of endogeneity. This is important because the sources of endogeneity that might exist in the research landscape of the dividend-risk relation could bias estimates from OLS, fixed effects and random effects models (Suwanhirunkul & Masih, 2018). Our methodological approach should be useful in consolidating the empirical evidence of the dividend policy-price volatility relation, especially in the context of emerging markets. In fact, the empirical evidence in emerging markets has been ambiguous so far (e.g., for a typical case of mixed results, see Malaysian findings by Hashemijoo et al., 2012; Hooi et al., 2015; Zainudin et al., 2018; Zakaria et al., 2012).

Our finding of the negative relation between dividend yield and price volatility is obviously in line with Baskin's (1989) theoretical framework. It supports the influential argument that dividend yield as a proxy for dividend policy is a dominant determinant of stock price risk via several mechanisms. In other words, our evidence from an emerging market is consistent with the predictions about duration, arbitrage, and information effects as suggested by some dividend theories. The return rate effect could also matter despite the fact that dividend payout has no significant influence on price volatility. It is possible to conclude that share price volatility in the emerging stock market of Vietnam is strongly associated with dividend yield. Managers may adopt dividend policy in terms of setting eyes on dividend yield behaviours as a useful device for stabilising stock price fluctuation. Specifically, firms with higher dividend yields tend to have their share prices more stable. Our further results also indicate that, while the price-stabilising effect of foreign (and state) involvement has no longer been significant after the crisis, ownership identities have also not mediated the relation between dividend yield and price volatility anymore after the crisis.<sup>7</sup>

## 5. Conclusion

Stock price volatility is a risk characteristic of emerging markets. Theoretical and empirical studies show that corporate managers can use dividend policy to tailor stock market fluctuation. Evidence in emerging markets emphasises the role of foreign investors as a stabiliser of the domestic stock markets. However, the impact of dividend policy and ownership structure on price variation has not been jointly examined in the context of emerging markets. Using an extensive sample of Vietnamese listed firms, we investigate the price-stabilising effects of dividend policy, foreign and state ownership.

We find that dividend yield is an attribute of Vietnamese share volatility in a manner that firms providing higher dividend yields tend to be less risky in terms of price oscillation. Different from empirical evidence in developed markets (Allen & Rachim, 1996; Hussainey et al., 2011), price volatility in an emerging market like Vietnam is not influenced by dividend payout but dividend yield. The evidenced negative relation between dividend yield and price variation is similar to the basic finding of Baskin (1989), which is consistent with all theoretical hypotheses. It should be understood that managers in emerging markets also use dividend policy to influence the firm's stock risk. This implies an adaptive dividend policy for corporate management and risk diversification strategies for market investors as well as provides practical implications for policymakers in emerging markets.

This research particularly has policy implications for the Vietnamese government. Our evidence shows that foreign and state involvements in emerging market companies after the global financial crisis have no longer helped stabilise the stock price volatility. Also, ownership identities have not moderated the relation between dividend policy and stock price risk. This means that, in the period of economic recovery, more foreign holding in local companies may not lead to more fluctuation in stock prices. Thus, the government should open the domestic financial market to

attract more foreign investors rather than setting the foreign ownership ceiling. Moreover, as the involvement of the state in local enterprises does not give rise to the instability of share prices, the government should continue its policy of divesting state capital from the local corporations in order to boost its process of privatisation.

#### Funding

The authors received no direct funding for this research.

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#### Citation information

Cite this article as: Dividend policy and stock price volatility in an emerging market: Does ownership structure matter?, Thi Kieu Hoa Phan & Nam Hoai Tran, *Cogent Economics & Finance* (2019), 7: 1637051.

#### Notes

1. Constitution of the Socialist Republic of Vietnam (1992, 2013)).
2. A dynamic approach to the empirical model means including the lagged dependent variable,  $P-VOL_{it-1}$ , as a regressor.
3. For the main analysis in this paper, as suggested by the editor, we use the specification with a maximum of eight variables (i.e., Equation (2)). We would like to thank the editor and an anonymous reviewer for raising this issue regarding the interactive approach. Our obtained results in Appendix B show that the interactive terms have little explanatory power for price volatility.
4. A negative value of *payout* implies a negative net profit (thus, negative EPS) in a given year.
5. Accordingly, the OLS and random effects models in Table 5 exclude industry dummies in order to ensure comparability.
6. These results are not tabulated and available upon request.
7. Untabulated results from the dynamic system GMM estimation using interaction terms of dividend policy and ownership structure show that the estimated coefficients of interaction terms are insignificant at all. Based on the period of 2008–2015, this finding may be partly complementary to the evidence of Vo (2016) for HOSE-listed firms during 2006–2012. In fact, Vo (2016) finds that dividend policy affects the stabilising effect of institutional investors. However, the effect of the 2008 global financial crisis is not considered in Vo (2016).

#### References

- Allen, D. E., & Rachim, V. S. (1996). Dividend policy and stock price volatility: Australian evidence. *Applied Financial Economics*, 6(2), 175–188. doi:10.1080/096031096334402
- Al-Malkawi, H. N. (2007). Determinants of corporate dividend policy in Jordan: An application of the Tobit model. *Journal of Economic and Administrative Sciences*, 23(2), 44–70. doi:10.1108/10264116200700007
- Al-Shawawreh, F. K. (2014). The impact of dividend policy on share price volatility: Empirical evidence from Jordanian stock market. *European Journal of Business and Management*, 6(38), 133–143.
- Ang, J. S., & Ding, D. K. (2006). Government ownership and the performance of government-linked companies: The case of Singapore. *Journal of Multinational Financial Management*, 16, 64–88. doi:10.1016/j.mulfin.2005.04.010
- Arellano, M., & Bover, O. (1995). Another look at the instrumental variable estimation of error-components models. *Journal of Econometrics*, 68(1), 29–51. doi:10.1016/0304-4076(94)01642-D
- Bae, K. H., Chan, K., & Ng, A. (2004). Investibility and return volatility. *Journal of Financial Economics*, 71(2), 239–263. doi:10.1016/S0304-405X(03)00166-1
- Bank of Japan. (2001). *Locational international banking statistics in Japan*. Tokyo: Author.
- Baskin, J. (1989). Dividend policy and the volatility of common stocks. *The Journal of Portfolio Management*, 15(3), 19–25. doi:10.3905/jpm.1989.409203
- Beg, A. R. M. B. A., & Anwar, S. (2012). Detecting volatility persistence in GARCH models in the presence of the leverage effect. *Quantitative Finance*, 14(12), 2205–2213. doi:10.1080/14697688.2012.716162
- Black, F., & Scholes, M. (1974). The effects of dividend yield and dividend policy on common stock prices and returns. *Journal of Financial Economics*, 1(1), 1–22. doi:10.1016/0304-405X(74)90006-3
- Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics*, 87(1), 115–143. doi:10.1016/S0304-4076(98)00009-8
- Borisova, G., Brockman, P., Salas, J. M., & Zagorchev, A. (2012). Government ownership and corporate governance: Evidence from the EU. *Journal of Banking and Finance*, 36, 2917–2934. doi:10.1016/j.jbankfin.2012.01.008
- Camilleri, S. J., Grima, L., & Grima, S. (2019). The effect of dividend policy on share price volatility: An analysis of Mediterranean banks' stocks. *Managerial Finance*, 45(2), 348–364. doi:10.1108/MF-11-2017-0451
- Charfeddine, L., & Elmarzougui, A. (2010). Institutional ownership and firm performance: Evidence from France. *IUP Journal of Behavioral Finance*, 7, 4.
- Chen, Z., Du, J., Li, D., & Ouyang, R. (2013). Does foreign institutional ownership increase return volatility? Evidence from China. *Journal of Banking & Finance*, 37(2), 660–669. doi:10.1016/j.jbankfin.2012.10.006
- Chiang, Y. C., & Chan, M. H. (2019). Foreign ownership and firm-level stock return volatility in Taiwan. *Innovations*, 14(3), 261–269.
- Constitution of the Socialist Republic of Vietnam. (1992). (Amended). Hanoi: Nha Xuat Ban Chinh Tri Quoc Gia.
- Constitution of the Socialist Republic of Vietnam. (2013). (Amended). Hanoi: Nha Xuat Ban Chinh Tri Quoc Gia.
- Demsetz, H. (1983). The structure of ownership and the theory of the firm. *Journal of Law and Economics*, 26, 375–390. doi:10.1086/467041
- Engle, R. (2004). Risk and volatility: Econometric models and financial practice. *American Economic Review*, 94(3), 405–420. doi:10.1257/0002828041464597
- Gordon, M. J. (1963). Optimal investment and financing policy. *The Journal of Finance*, 18(2), 264–272.

- Gordon, M. J., & Shapiro, E. (1956). Capital equipment analysis: The required rate of profit". *Management Science*, 3, 102–110. doi:10.1287/mnsc.3.1.102
- Gunaratne, D., Priyadarshanie, W. A. N., & Samarakoon, S. M. R. K. (2016). Impact of dividend policy on stock price volatility and market value of the firm: Evidence from Sri Lankan manufacturing companies. *Corporate Ownership and Control*, 13(3), 219–225.
- Hashemijoo, M., Mahdavi-Ardekani, A., & Younesi, N. (2012). The impact of dividend policy on share price volatility in the Malaysian stock market. *Journal of Business Studies Quarterly*, 4, 1.
- Hooi, S. E., Albaity, M., & Ibrahimy, A. I. (2015). Dividend policy and share price volatility. *Investment Management and Financial Innovations*, 12(1), 226–234.
- Hsiao, C. (2007). Panel data analysis—Advantages and challenges. *Test*, 16(1), 1–22. doi:10.1007/s11749-007-0046-x
- Hussainey, K., Oscar MGbame, C., & Chijoke-Mgbame, A. M. (2011). Dividend policy and share price volatility: UK evidence. *The Journal of Risk Finance*, 12(1), 57–68. doi:10.1108/15265941111100076
- Ilaboya, O. J., & Omoye, A. S. (2012). Earnings, dividend and share price volatility in Nigeria. *The Pakistan Journal of Social Issues*, 3, 149.
- Irandoost, R., Hassanzadeh, R. B., & Salteh, H. M. (2013). The effect of dividend policy on stock price volatility and investment decisions. *European Online Journal of Natural and Social Sciences: Proceedings*, 2(3(s)), 51.
- Jahfer, A., & Mulafara, A. H. (2016). Dividend policy and share price volatility: Evidence from Colombo stock market. *International Journal of Managerial and Financial Accounting*, 8(2), 97–108. doi:10.1504/IJMFA.2016.077947
- Khan, M. S., & Khan, A. H. (1998). Capital flows to developing countries: Blessing or curse? with comments. *The Pakistan Development Review*, 125–151. doi:10.30541/v37i4pp.125-151
- Lashgari, Z., & Ahmadi, M. (2014). The impact of dividend policy on stock price volatility in the Tehran stock exchange. *Kuwait Chapter of Arabian Journal of Business and Management Review*, 33(2541), 1–11.
- Li, D., Nguyen, Q. N., Pham, P. K., & Wei, S. X. (2011). Large foreign ownership and firm-level stock return volatility in emerging markets. *Journal of Financial and Quantitative Analysis*, 46(4), 1127–1155. doi:10.1017/S0022109011000202
- Lintner, J. (1956). Distribution of incomes of corporations among dividends, retained earnings, and taxes. *The American Economic Review*, 46(2), 97–113.
- Miller, M. H., & Modigliani, F. (1961). Dividend policy, growth and the valuation of shares. *The Journal of Business*, 34, 411–433. doi:10.1086/jb.1961.34.issue-4
- Miller, M. H., & Rock, K. (1985). Dividend policy under asymmetric information. *The Journal of Finance*, 40(4), 1031–1051. doi:10.1111/j.1540-6261.1985.tb02362.x
- Ministry of Finance. (2000). *Regional balance of payment*. Tokyo: Author.
- Nazir, M. S., Nawaz, M. M., Anwar, W., & Ahmed, F. (2010). Determinants of stock price volatility in Karachi stock exchange: The mediating role of corporate dividend policy. *International Research Journal of Finance and Economics*, 55(55), 100–107.
- Parkinson, M. (1980). The extreme value method for estimating the variance of the rate of return. *Journal of Business*, 61–65. doi:10.1086/296071
- Pettit, R. R. (1972). Dividend announcements, security performance, and capital market efficiency. *The Journal of Finance*, 27(5), 993–1007. doi:10.1111/j.1540-6261.1972.tb03018.x
- Phung, D. N., & Mishra, A. V. (2016). Ownership structure and firm performance: Evidence from Vietnamese listed firms. *Australian Economic Papers*, 55(1), 63–98. doi:10.1111/1467-8454.12056
- Profflet, K., & Bacon, F. (2013). Dividend policy and stock price volatility in the US equity capital market. *ASBBS Annual Conference: Las Vegas*, 20(1), 219–231.
- Ramadan, I. Z. (2013). Dividend policy and price volatility. Empirical evidence from Jordan. *International Journal of Academic Research in Accounting, Finance and Management Sciences*, 3(2), 15–22.
- Rashid, A., & Rahman, A. A. (2008). Dividend policy and stock price volatility: Evidence from Bangladesh. *The Journal of Applied Business and Economics*, 8(4), 71–81.
- Shah, S. A., & Noreen, U. (2016). Stock price volatility and role of dividend policy: Empirical evidence from Pakistan. *International Journal of Economics and Financial Issues*, 6(2), 461–472.
- Suwahirunkul, P., & Masih, M. (2018). Effect of dividend policy on stock price volatility in the Dow Jones US index and the Dow Jones Islamic US index: Evidences from GMM and quantile regression. MPRA Paper 93543, University Library of Munich, Germany.
- Tran, N. H., & Le, D. C. (2017). Ownership concentration, corporate risk-taking and performance: Evidence from Vietnamese listed firms. Retrieved from <https://ssrn.com/abstract=3030405>
- Tran, N. H., & Le, D. C. (in press). Ownership concentration and firm valuation in a typical frontier market. *Afro-Asian Journal of Finance and Accounting*.
- Vo, X. V. (2015). Foreign ownership and stock return volatility—Evidence from Vietnam. *Journal of Multinational Financial Management*, 30, 101–109. doi:10.1016/j.mulfin.2015.03.004
- Vo, X. V. (2016). Does institutional ownership increase stock return volatility? Evidence from Vietnam. *International Review of Financial Analysis*, 45, 54–61. doi:10.1016/j.irfa.2016.02.006
- Wintoki, M. B., Linck, J. S., & Netter, J. M. (2012). Endogeneity and the dynamics of internal corporate governance. *Journal of Financial Economics*, 105(3), 581–606. doi:10.1016/j.jfineco.2012.03.005
- Yu, M. (2013). State ownership and firm performance: Empirical evidence from Chinese listed companies. *China Journal of Accounting Research*, 6(2), 75–87. doi:10.1016/j.cjar.2013.03.003
- Zainudin, R., Mahdzan, N. S., & Yet, C. H. (2018). Dividend policy and stock price volatility of industrial products firms in Malaysia. *International Journal of Emerging Markets*, 13(1), 203–217. doi:10.1108/IJoEM-09-2016-0250
- Zakaria, Z., Muhammad, J., & Zulkifli, A. H. (2012). The impact of dividend policy on the share price volatility: Malaysian construction and material companies. *International Journal of Economics and Management Sciences*, 2(5), 1–8.

### Appendix A. Industry classification

Industries in the sample, based on the industry classification system by Thomson Reuters

Industry	Frequency (No. of firm-years)	Percentage in total sample	Accumulated Percentage
Energy	210	7.06	7.06
Basic materials	523	17.57	24.63
Industrials	841	28.26	52.89
Consumer cyclicals	455	15.29	68.18
Consumer non-cyclicals	334	11.22	79.4
Financials	314	10.55	89.95
Healthcare	88	2.96	92.91
Technology	100	3.36	96.27
Utilities	111	3.73	100
<b>Total sample</b>	<b>2,976</b>	<b>100</b>	

### Appendix B. Empirical specification with interaction terms

We further examine the moderating of ownership structure on the relation between dividend policy and stock price volatility by adding interaction terms between dividend yield/payout and foreign/state ownership to specification (2) so that we obtain:

$$\begin{aligned}
 P - VOL_{it} = & c + b_1 \times D - YIELD_{it} + b_2 \times PAYOUT_{it} + b_3 \times FOREIGN_{it} + b_4 \\
 & \times STATE_{it} + b_5 \times D - YIELD_{it} \times FOREIGN_{it} + b_6 \times D - YIELD_{it} \\
 & \times STATE_{it} + b_7 \times D - PAYOUT_{it} \times FOREIGN_{it} + b_8 \times D - PAYOUT_{it} \\
 & \times STATE_{it} + b_9 \times E - VOL_{it} + b_{10} \times SIZE_{it} + b_{11} \times DEBT_{it} + b_{12} \times GROWTH_{it} + u_{it}
 \end{aligned}
 \tag{3}$$

For the robustness's sake, we then replace the level ownership variables (FOREIGN and STATE) with the dummy ownership variables (FOREIGN\_dum and STATE\_dum). The obtained results should be the same.

Table B1 represents empirical results from the interaction approach, that is, using interaction terms of dividend policy (dividend yield and payout ratio) and ownership structure (foreign and state ownership). Generally, our results in column (2) of Table B1 show no moderating effect of ownership structure, in terms of both foreign and state ownership, on the relation between dividend policy and price volatility (in fact, the significant volatility-reducing effect of dividend yield rather than dividend payout ratio). A similar conclusion can reach when we use dummy variables of foreign/state ownership to replace its level variables in the specification (column (4)), or only replace ownership levels in the interaction terms with ownership dummies (column (5)). Simple OLS estimates in Table B1 have so far confirmed the directly significant price-stabilising effect of state ownership as well as the weak significance of the effect by foreign ownership. Estimated patterns for control variables remain unchanged, with systematically persistent insignificance of the coefficient of GROWTH.



**Table B1. OLS estimates with ownership structure and its interactions**

	Ownership levels		Ownership dummies		Ownership levels w/ interactions of dummies
	w/o interactions (1)	w/interactions (2)	w/o interactions (3)	w/interactions (4)	
D-YIELD	-0.640*** (-7.43)	-0.850*** (-6.51)	-0.628*** (-7.41)	-0.819*** (-5.58)	-0.683*** (-4.94)
PAYOUT	-0.001 (-0.22)	0.003 (0.41)	-0.002 (-0.30)	0.003 (0.35)	0.004 (0.48)
FOREIGN	-0.136* (-2.11)	-0.168 (-1.93)			-0.094 (-1.30)
STATE	-0.135*** (-4.95)	-0.182*** (-5.35)			-0.138*** (-4.51)
D-YIELD*FOREIGN		0.621 (1.14)			
D-YIELD*STATE		0.763* (2.19)			
PAYOUT*FOREIGN		-0.023 (-0.36)			
PAYOUT*STATE		-0.016 (-0.69)			
FOREIGN_dum			-0.038* (-2.58)	-0.041* (-2.21)	
STATE_dum			-0.074*** (-5.58)	-0.089*** (-5.52)	
D-YIELD*FOREIGN_dum				0.084 (0.5)	-0.1 (-0.58)

(Continued)

**Table B1. (Continued)**

	Ownership levels		Ownership dummies		Ownership levels w/ interactions of dummies	
	w/o interactions (1)	w/interactions (2)	w/o interactions (3)	w/interactions (4)	w/o interactions (5)	w/interactions (6)
D-YIELD*STATE_dum				0.282 (1.68)	0.096 (0.61)	
PAYOUT*FOREIGN_dum				-0.005 (-0.41)	-0.011 (-0.77)	
PAYOUT*STATE_dum				-0.006 (-0.53)	-0.008 (-0.69)	
E-VOL	0.639** (2.95)	0.615** (2.87)	0.603** (2.78)	0.583** (2.69)	0.632** (2.91)	
SIZE	-0.019*** (-4.15)	-0.019*** (-4.03)	-0.020*** (-3.93)	-0.019*** (-3.85)	-0.019*** (-4.00)	
DEBT	0.196*** (3.9)	0.195*** (3.85)	0.189*** (3.83)	0.186*** (3.76)	0.193*** (3.84)	
GROWTH	0.046 (1.65)	0.043 (1.55)	0.043 (1.57)	0.04 (1.46)	0.045 (1.61)	
Constant	0.866*** (19.96)	0.877*** (20.15)	0.881*** (19.81)	0.889*** (19.93)	0.864*** (19.54)	
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	2016	2016	2016	2016	2016	2016
No. of firms	480	480	480	480	480	480
Prob. > F	0.000	0.000	0.000	0.000	0.000	0.000
Squared R	0.197	0.2	0.202	0.204	0.198	0.198

Notes: Estimated coefficients are reported with t-statistics in parentheses; \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001; Standard errors are adjusted for firm-level clustering so that they are robust to arbitrary heteroskedasticity and autocorrelation.

### **Appendix C. Variance inflation factors (VIFs)**

We report VIFs which are obtained after running multiple regressions based on specifications (1) and (2) (section 3.1), and specification (3) (Appendix B) in Table C1. It is observable that there no case indicative of serious multicollinearity requiring correction (i.e., when a value of VIF exceeds 10). In other words, the variance of every estimated regression coefficient in each model is not inflated at all. Even in the models with interaction terms (columns (3) and (5)), the VIFs for the interaction between D-YIELD and STATE are the highest values, 4.06 and 4.68 respectively, but still in the undamaged range of multicollinearity.

**Table C1. Variance inflation factors (VIFs) for different specifications**

	Specification (1)	Specification (2)	Specification (3)	Specification (2) with dummy ownership	Specification (3) with dummy ownership
	(1)	(2)	(3)	(4)	(5)
D-YIELD	1.18	1.22	2.84	1.23	3.69
PAYOUT	1.15	1.16	2.07	1.16	2.31
FOREIGN		1.09	2.11		
STATE		1.10	2.06		
D-YIELD*FOREIGN			2.14		
D-YIELD*STATE			4.06		
PAYOUT*FOREIGN			1.63		
PAYOUT*STATE			2.28		
FOREIGN_dum				1.14	2.11
STATE_dum				1.08	1.90
D-YIELD*FOREIGN_dum					2.26
D-YIELD*STATE_dum					4.68
PAYOUT*FOREIGN_dum					1.62
PAYOUT*STATE_dum					2.5
E-VOL	1.01	1.01	1.02	1.01	1.02
SIZE	1.11	1.18	1.18	1.25	1.26
DEBT	1.07	1.09	1.09	1.08	1.09
GROWTH	1.05	1.06	1.07	1.06	1.07

Notes: VIFs are reported after running OLS analyses corresponding to specifications (1), (2), and (3).



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