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Dividend Policy and Corporate Investment under Information Shocks

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ABSTRACT: This study exploits the mandatory adoption of International Financial Reporting Standards (IFRS) as an exogenous shock to the corporate information environment to examine how the constraining effect of dividend policy on corporate investment changes under lower levels of information asymmetry. To identify the treatment effect of the information shock, I employ a difference-in-differences research design using an international sample of 25 countries that spans the period 2000-2010. I first show that the information shock mitigates information asymmetry. Then, I find that the constraining effect of dividends on investments declines following the information shock, especially among firms with higher levels of information asymmetry *ex-ante*. Finally, I show that less constrained investments contribute to maximizing firm value. Overall, I show how reducing information asymmetry mitigates agency conflicts over dividend policy and thereby decreases the probability of forgoing valuable investments to pay dividends, which is found to maximize shareholders' wealth.

Keywords: Information Shocks; Information Asymmetry; Dividend Policy; Corporate Investment, Firm Value.

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1. Introduction

This study examines how an exogenous change in the level of information asymmetry affects the constraining effect of dividend policy on corporate investment. Miller & Modigliani (1961) theorize that, in a perfect capital market with complete information, the firm value is a function of investments that generate earnings and cash flows, while dividend policy being irrelevant. However, prior literature documents that the dividend policy has a constraining effect on corporate investment in an imperfect market that suffers information asymmetry (see the surveys of Allen & Michaely [2003] and DeAngelo, DeAngelo, & Skinner [2008]). Jensen & Meckling (1976) and Myers & Majluf (1984) show that, under information asymmetry, moral hazard and adverse selection problems constrain firm's access to external funds. This constraint may lead financial managers to forgo profitable investments for the sake of maintaining dividend payments (Brav, Graham, Harvey, & Michaely, 2005), especially when firms are reluctant to cut dividends (Ramalingegowda, Wang, & Yu, 2013). I examine whether this constraining effect of dividend policy on corporate investment is alleviated due to an exogenous change in the level of information asymmetry, caused by the mandatory adoption of International Financial Reporting Standards (IFRS).

As of the beginning of January 2005, all public companies listed in countries that fall under the authority of the European Union have been required to report their consolidated financial statements in compliance with IFRS (European Union, 2002). Several other countries outside Europe have also mandated the adoption of IFRS in their capital markets, such as Australia, Hong Kong, and South Africa (Hong, Hung, & Lobo, 2014). As such, IFRS are the most widely adopted accounting standards worldwide (De George, Li, & Shivakumar, 2016), mandatorily and voluntarily. The mandatory adoption of IFRS has been viewed as an exogenous shock to the corporate information environment (Brüggemann, Hitz, & Sellhorn, 2013; Hail, Tahoun, & Wang, 2014; Harakeh, Lee, & Walker, 2019b; Hung, Li, & Wang, 2015; Mazboudi & Hasan, 2018; Shroff, Verdi, & Yu, 2014) with positive economic consequences, such as lower levels of information asymmetry and increased market liquidity (Daske, Hail, Leuz, & Verdi, 2008; Muller, Riedl, & Sellhorn, 2011). Accordingly, this study examines the impact of IFRS adoption on the constraining effect of dividend policy on corporate investment through the channel of information asymmetry. First, I test the change in the level of information asymmetry following mandatory IFRS adoption (hereafter, information shock). Then, I confirm the negative effect of dividends on investments in order to examine the change in this negative impact following the information shock. Finally, to the extent that investing and financing policies are meant to maximize shareholders' wealth (Myers & Majluf, 1984), I investigate a potential effect on firm value following the change in the interplay between investments and dividends.

I run the aforementioned tests using a difference-in-differences research design. The sample employed is an international sample that comprises 25 countries and spans the period 2000-2010. Of the 25 countries, 18 countries serve as the treatment group and the rest are countries that did not adopt IFRS (i.e., the control group). My sample construction mainly follows Hong, Hung, & Lobo (2014) and Hung et al. (2015), in which all countries assigned to the treatment group have mandatorily adopted IFRS in 2005. Using an international sample allows exploiting a larger variation in information asymmetry problems across countries, which reflects the institutional setup and adds power to the empirical testing (Hail et al., 2014). To ensure that the treatment and control firms fall on a common support, I replicate the main analysis using a matched sample. I construct the matched sample using the Coarsened Exact Matching (CEM) technique (Duygan-Bump, Parkinson, Rosengren, Suarez, & Willen, 2013; Iacus, King, & Porro, 2012; Iacus, King,

& Porro, 2011), in which I match each treatment firm to one or more control firm(s) based on year, size, and industry (Barth, Landsman, & Lang, 2008; Barth, Landsman, Lang, & Williams, 2012; Florou & Kosi, 2015).

My findings show that the level of information asymmetry, measured as the bid-ask spread, decreases within the treatment group following the information shock. The results also indicate that this reduction in information asymmetry is accompanied with a reduction in the constraining effect of dividends on investments among treatment firms compared to control firms. Moreover, I find evidence suggesting that treatment firms that suffer higher levels of asymmetric information *ex-ante* witness a bigger decline in information asymmetry following the information shock, and accordingly a greater reduction in the constraining effect of dividends on investments. This joint evidence enriches the study and provides triangulation of results by showing that the reduction in information asymmetry is a main channel for the observed alleviation of the constraining effect of dividends on investments. Finally, further investigation reveals that less constrained investments yield in maximizing firm value, as measured by Tobin's Q, especially where *ex-ante* information asymmetry is high.

I subject my results to a set of robustness tests. First, I employ an alternative measure of information asymmetry, namely, the volume-return coefficient of Llorente, Michaely, Saar, & Wang (2002), and show that the main findings hold. Then, I examine whether the reduction in the constraining effect of dividends on investments varies by the ease of access to external financing. The results provide a qualitative evidence that more financially constrained firms witness a greater decline in the constraining effect of dividends on investments compared to firms with easier access to external financing. Finally, I endeavour to control for potential endogeneity concerns arising from the reverse causality between dividends and investments using an instrumental variable approach (Koo, Ramalingegowda, & Yu, 2017; Ramalingegowda et al., 2013). The results are robust to the instrumental variable analysis.

This study provides evidence suggesting favourable outcomes for IFRS adoption in capital markets. Specifically, information asymmetry levels decrease among treatment firms compared to control firms following the exogenous information shock caused by the IFRS mandate, which results in mitigating frictions between managers and investors over dividend policy. The reduction of information asymmetry in turn mitigates the adverse selection and moral hazard problems in capital markets and facilitates debt and equity financing (Christensen, Lee, & Walker, 2009; Florou & Kosi, 2015; Harakeh, Lee, & Walker, 2019a), which lead to alleviate the constraining effect of dividend policy on corporate investment and facilitate growth opportunities. In other words, IFRS adoption reduces the likelihood that firms forgo valuable investments for the sake of paying dividends, which is found to maximize firm value.

The remainder of the paper is structured as follows: section 2 provides the literature review and hypothesis development; section 3 describes the data sample and discusses the research design; section 4 discusses the main results along with the robustness tests; and section 5 concludes.

2. Literature Review and Hypothesis Development

2.1. Information asymmetry and the information shock

The mandatory adoption of IFRS is one of the biggest events in the history of financial reporting, which resulted in an inevitable shock to the corporate information environment (Hung et al., 2015). Several studies take advantage of the introduction of IFRS to study the potential effect of this exogenous change in the information environment on various dimensions in the capital market (see the surveys of Brüggemann et al., 2013 and De George et al., 2016). For example, prior studies tackle the impact of IFRS adoption on financial reporting quality (Barth et al., 2008), analyst forecast accuracy (Horton, Serafeim, & Serafeim, 2013), investment efficiency (Biddle, Hilary, & Verdi, 2009; Schleicher, Tahoun, & Walker, 2010), equity financing (Harakeh et al., 2019a), debt financing (Christensen et al., 2009; Florou & Kosi, 2015), and cost of capital (Daske et al., 2008; Daske, Hail, Leuz, & Verdi, 2013; Li, 2010).

As mentioned earlier, the main purpose of this study is to examine how an exogenous change in the level of information asymmetry impacts the constraining effect of dividend policy on corporate investment. As far as information asymmetry is concerned in the context of IFRS adoption, prior literature provides evidence suggesting a reduction in information asymmetry following the IFRS mandate due to improved financial reporting quality (Armstrong, Barth, Jagolinzer, & Riedl, 2010; Barth et al., 2008), increased disclosure (Leuz & Wysocki, 2016), and enhanced financial statement comparability (DeFond, Hu, Hung, & Li, 2011; Florou & Pope, 2012). Daske et al. (2013) provide an international evidence that shows a general reduction in information asymmetry and an increase in market liquidity among "serious" mandatory IFRS adopters relative to "label" adopters. When referring to "serious" adopters, the authors imply that firms are serious about making changes in their financial reporting policies, as opposed to "label" adopters that make minimal changes, if any. In the same vein, Muller et al. (2011) provide direct evidence that shows a greater reduction in information asymmetry among real-estate firms that mandatorily adopted IFRS in Europe, compared to similar firms that voluntarily adopted IFRS. In Germany, Gassen & Sellhorn (2006) find that IFRS-adopting firms exhibit lower levels of information asymmetry compared to firms reporting under local standards. Other studies report results that show more favorable economic consequences following the IFRS mandate among firms with high information asymmetry *ex-ante* compared to firms with low information asymmetry (Armstrong et al., 2010). Such findings suggest that IFRS adoption is a main contributor to mitigating information asymmetry between managers and investors. A similar finding is documented in Hail et al. (2014) who document a greater reduction in agency problems over dividend policy among firms with higher information asymmetry pre-IFRS adoption.

In light of the discussion above, I expect the level of information asymmetry among firms that mandatorily adopted IFRS to decrease following the information shock as contrasted to firms that did not adopt IFRS. Despite that this is barely a new evidence, yet it should be established using my sample for the sake of the subsequent argument that relates the effect of the information shock on the negative association between dividends and investments.

2.2. Dividends and investments under the information shock

In a capital market with complete information, investing decisions are independent of financing decisions such as the dividend policy (Miller & Modigliani, 1961). The latter theory is further developed by Fama & Miller (1972) who introduce the separation principle that states that investments are independent of dividends under complete information. These theories are empirically supported by some studies (Fama, 1974; Smirlock & Marshall, 1983) and challenged by other studies (Peterson & Benesh, 1983). Nevertheless, more recent studies provide evidence that shows a negative impact for dividends on investments, leading to corporate under-investment problems (Brav et al., 2005; Ramalingegowda et al., 2013). Brav et al. (2005) survey 384 financial executive officers and document that financial managers are reluctant to cut dividends. They conclude that dividends have a significantly negative effect on investment decisions. Specifically, the surveyed managers mention that they might forgo positive net present value investments for the sake of maintaining their dividend payouts to avoid declines in stock prices. In the same vein, Ramalingegowda et al. (2013) show that dividend policy has a significant constraining effect on investment decisions due to poor financial reporting quality. The authors show that the constraining effect of dividends on investments decreases in financial reporting quality. Collectively, recent literature documents a negative impact for dividend policy on corporate investment.

To gain a better understanding of how a positive shock to the information environment might alleviate the constraining effect of dividends on investments, I rely on the adverse selection (Myers & Majluf, 1984) and moral hazard (Jensen & Meckling, 1976) theoretical models. Biddle et al. (2009) find that a higher financial reporting quality contributes to better investment efficiency through mitigating the adverse selection and moral hazard problems that constrain access to financing. In an adverse selection model, the manager is more informed than investors about the fundamental value of the firm, and thus the manager tries to time the issuance of overpriced equity or debt. Under high information asymmetry, investors tend to underprice the issued securities to reach an equilibrium price (Shivakumar, 2000). As such, the manager is hesitant to finance investment opportunities by issuing equity or debt given the price discount put by investors, which might result in forgoing valuable investments due to the scarcity of financial resources. In a moral hazard model, the incentives of the manager diverge from that of the investors as the manager gets involved in negative net present value investments to benefit privately rather than making investment decisions in the best interest of shareholders. Specifically, managers tend to expropriate shareholders' wealth to benefit at the personal level, rather than maximize firm value, by increasing incentive compensation and incurring abnormal expenses (Adams, Hermalin, & Weisbach, 2010). This tendency increases under higher levels of information asymmetry due to the lack of monitoring by investors who have an incomplete information set. As such, investors put more pressure on the manager to distribute earnings, rather than retain them inside the firm, to minimize the risk of losing their initial investment in the firm. Taken together, the constraint on access to external funds (i.e., the adverse selection problem) and the pressure put by investors on the manager to pay dividends (i.e., the moral hazard problem) lead to aggressive competition between dividends and investments and thereby create the constraining effect of dividends on investments.

An information shock that mitigates information asymmetry can provide investors with a better access to information about the fundamental value of the firm and the intrinsic value of potential investment projects. As such, the reduction in information asymmetry lessens the probability that managers will issue overpriced equity or debt, and accordingly alleviates the adverse selection cost of issuing new securities (Bushman & Smith, 2001; Francis, LaFond, Olsson, & Schipper, 2004; Myers & Majluf, 1984). Moreover, a reduction in information asymmetry is also expected to mitigate the moral hazard problem by enhancing the ability of investors to monitor the manager, and therefore enables a more efficient contracting between the principal and the agent (Healy & Palepu, 2001; Jensen & Meckling, 1976). As a result, the constraining effect of dividends on investments is expected to decrease due to lower levels of information asymmetry following the mandatory adoption of IFRS. This argument is stated in the hypothesis below:

Hypothesis H1: The information shock reduces the constraining effect of dividend policy on corporate investment.

To gain more confidence that the information shock articulates through the channel of information asymmetry, I perform a subsample analysis in which I split the sample into high and low information asymmetry firms (in the pre-shock period). To the extent that the information shock alleviates the constraining effect of dividends on investments by mitigating information asymmetry, I expect a greater reduction in asymmetric information and in the negative effect of dividends on investments among the high information asymmetry subsample. This joint hypothesis lends greater support to the validity of H1 by increasing the signal-to-noise ratio, i.e., lower probability of randomness. As such, I hypothesize the following:

Hypothesis H2: Following the information shock, the reduction in information asymmetry and in the constraining effect of dividend policy on corporate investment is greater among firms with higher information asymmetry pre-shock.

The ultimate goal of corporate investment and financing policies is shareholder wealth maximization (Myers & Majluf, 1984). Therefore, my following investigation is, naturally, how the firm value changes following an exogenous shock to the interplay between investments and dividends. To the extent that a lower constraining effect of dividends on investments allows higher discretion for managers over free cash flow, it is unclear how managers exploit this opportunity and how investors react accordingly. On one hand, managers might find less constrained investments an opportunity to invest shareholders' funds in value-maximizing projects (e.g., Allen & Michaely, 2003), which is reflected in higher stock prices, that is, an increase in firm value. On the other hand, managers might take less constrained investments as an opportunity to benefit privately by investing in negative net present value projects (e.g., DeAngelo et al., 2008), which is reflected in lower stock prices, that is, a decrease in firm value. Despite that I tend to adopt the former scenario (i.e., an increase in firm value), the vagueness in expectations leaves the change in firm value following less constrained investments a research question that deserves further investigation.

3. Sample and Methodology

3.1. Sample construction and research design

I construct the sample following prior papers that study the economic consequences of mandatory IFRS adoption, such as Hong et al. (2014) and Florou & Kosi (2015). As mentioned earlier, I use the mandatory adoption of IFRS in 2005 as a source of exogenous variation in the information supplied by firms to the public. For the adoption of IFRS to be treated as an exogenous shock to the information environment, this adoption should be mandatory and not voluntary (Daske et al., 2008; Harakeh et al., 2019a, 2019b; Leuz, 2003). This is an important point raised in prior studies which show that the voluntary adoption of IFRS is associated with firm incentives that might confound the effect of IFRS *per se* (Christensen, Lee, Walker, & Zeng, 2015). In other words, if a firm adopts IFRS voluntarily, then this firm has good intentions to improve its financial information environment, and thus any observed favorable economic consequences should be attributed to the firm incentives and not to IFRS adoption *per se*. As such, studying the impact of voluntary adoption of IFRS in capital markets is prone to self-selection bias since firms select themselves voluntarily to the treatment group (Leuz & Wysocki, 2016). In light of the preceding argument, my sample spans the period 2000-2010 and comprises 25 countries, 18 of which adopt IFRS mandatorily. I exclude the year 2005 from the sample as it is regarded as a transitory year (Hong et al., 2014; Wang & Welker, 2011). I utilize this sample in a difference-in-differences research design that enables the identification of the treatment effect of the information shock on the constraining effect of dividends on investments. Specifically, I select 18 countries that mandated the adoption of IFRS in 2005 to serve as the treatment group and the rest 7 countries that did not mandate the adoption of IFRS to act as the control group. A main advantage of using international data is that it provides substantial variation in country- and firm-level factors, which facilitates the examination of the interplay between the corporate information environment and financial decisions.

For all publicly listed companies between 2000 and 2010, I download accounting data from the Compustat Global fundamental annual file and stock return data from the Compustat Global security file. First, I omit utility firms, financial firms, and firms that have no industry classification. Second, I drop firms with negative book value of equity. Third, I exclude all firms that voluntarily adopted IFRS to eliminate any potential source of self-selection bias (Landsman, Maydew, & Thornock, 2012).[1] Finally, I require that each firm has at least one observation before and one observation after the IFRS mandate to satisfy the requirements of the difference-in-differences research design (Hong et al., 2014; Roberts & Whited, 2013). Imposing these restrictions on the sample might induce bias towards larger and mature firms that survive more than smaller firms. My final sample includes 69,535 firm-years, of which 18,629 are treatment firms. In addition, I extract country-level data that proxy for enforcement of accounting standards and audit quality (Brown, Preiato, & Tarca, 2014), rule of law (Kaufmann, Kraay, & Mastruzzi, 2007), and divergence between domestic accounting standards and IFRS (Bae, Tan, & Welker, 2008).

Table 1 Panel A below shows the distribution of the sample by country in each of the treatment and control groups. The sample distribution in the treatment group is relatively balanced across countries while the distribution in the control group is dominated by the U.S. and Japan that jointly comprise 84% of this group. Table 1 Panel B reports the distribution of firm-years by industry according to the SIC industry classification. The biggest industry in terms of observations

[1] I follow Daske et al. (2008) in labeling IFRS adopters. A firm is considered to be reporting under IFRS if the accounting standards variable in the Compustat Global file indicates "DA", DI, or "DT".

is by far the Manufacturing industry, followed by the Services industry. Moreover, the distribution shows that the number of observations peaked in 2006 at 8310 firm-years and then started declining gradually until it reached 6592 in 2010. This decline in the number of observations might be due to the global financial crisis that struck in 2007-2008 and resulted in shutting down a large number of businesses.

[Insert Table 1 Here]

A conventional practice in studies that involve policy evaluation methods is to replicate the main analysis based on a sample of matched observations that fall on the common support (Roberts & Whited, 2013). I follow prior studies and match each treatment observation to one or more control observation(s) based on year, industry classification, and firm size (Barth et al., 2008, 2012; Florou & Kosi, 2015).[2] The industry classification I use is the Fama & French (1997) 48 industry portfolios and I proxy firm size using total assets. The matching technique I use is the Coarsened Exact Matching (CEM) technique, which is developed by Iacus et al. (2011, 2012) and is widely used in the accounting and finance research (e.g., Duygan-Bump et al., 2013). The CEM technique creates a grid from the common support of each variable I match on, and then matches each treatment observation to one or more control observation(s) in the same cell. Iacus et al. (2011) show that CEM outperforms other matching methods (such as the propensity score matching) as it reduces the imbalance between groups, avoids bad counterfactuals for treatment observations with no close matches, and is orthogonal to the function of the matching metric (such as the probit score in propensity score matching). The CEM criteria results in 50,670 matched observations, of which 18,238 are treatment firm-years.

[2] The main results hold when matching on other variables that explain the dividend policy and investment decisions, such as return on assets and leverage (Fama & French, 2001, 2002); however, the sample size shrinks significantly.

3.2. Modelling the change in information asymmetry

I follow prior studies in empirically modelling the change in the level of information asymmetry around the introduction of the information shock (Daske et al., 2008; Fu, Kraft, & Zhang, 2012; Gassen & Sellhorn, 2006; Muller et al., 2011). The regression equation below follows a difference-in-differences approach that tests the effect of the information shock on the level of information asymmetry among the treatment group relative to the control group.

$$\begin{aligned} Ln(INFOASY_{it}) = {} & \alpha_0 + \alpha_1 SHOCK + \alpha_2 TREAT + \alpha_3 SHOCK \times TREAT \\ & + \sum \alpha_i Firm\_Controls_{it-1} + \sum \alpha_j Country\_Controls_{jt} \\ & + \sum \alpha_k Fixed\_Effects + \varepsilon_{it} \end{aligned} \quad (1)$$

The dependent variable *INFOASY* is a proxy for information asymmetry and is measured annually as the mean of daily bid-ask spread (Muller et al., 2011; Sabet & Heaney, 2015).[3] I proxy information asymmetry using the bid-ask spread due to its precision in directly capturing the asymmetry in information between insiders and outsiders (Leuz & Verrecchia, 2000; Muller et al., 2011).[4] The information shock is included in Equation (1) as the dummy variable *SHOCK* that takes the value 1 if the year is greater than 2005, and zero otherwise. The dummy variable *TREAT* takes the value 1 if the firm is assigned to the treatment group (i.e., was exposed to the information shock), and zero otherwise. The interaction term between *SHOCK* and *TREAT* is the difference-in-differences estimator. I expect α_3 to be negative and significant, indicating a reduction in the level of information asymmetry in the treatment group compared to that in the control group following the information shock.

[3] The results remain unchanged if I calculate the bid-ask spread three months after the fiscal year ends or if I take the median instead of the mean value of the daily bid-ask spread over the fiscal year.
[4] The use of broader measures of stock liquidity (such as the zero-trading-days measure and Amihud [2002] illiquidity measure) yields qualitatively similar results for H2.

In light of prior studies mentioned earlier in this section, I control for firm-specific variables (*Firm_Controls*) that determine the bid-ask spread. These variables are supposed to isolate firm-specific effects that might confound the effect of the information shock on information asymmetry. In doing so, I include variables that control for stock price, return volatility, firm size, market-to-book ratio, and financial leverage (Glosten & Harris, 1988; Leuz & Verrecchia, 2000). Including stock price (*PRICE*) and return volatility (*VOLAT*) respectively controls for order-processing cost and idiosyncratic risk (Muller et al., 2011). I control for firm size by including the natural logarithm of total assets (*SIZE*) as larger firms tend to have lower levels of information asymmetry (LaFond & Watts, 2008; Smith & Watts, 1992). I proxy for investment opportunities by including the market-to-book ratio (Fama & French, 2002) since firms with a richer investment opportunity set tend to have higher uncertainty (Daske et al., 2008). Finally, I include a proxy for financial leverage (*LEV*) since higher levels of financial leverage are associated with higher levels of information asymmetry (LaFond & Watts, 2008).

Moreover, I include control variables at the country level since the effect of the information shock being studied might be affected by other country-specific factors (Leuz, 2003). In particular, I control for the enforcement of accounting standards and the quality of audit in each country using the index of Brown et al. (2014). The aforementioned index is an international index created for 2002, 2005, and 2008. I assign the value of year 2002 in the index to the years 2000-2002 in my dataset, the value of year 2005 in the index to the years 2003-2007 in my dataset, and the value of year 2008 in the index to the years 2008-2010 in my dataset. The enforcement of accounting standards and the quality of audit are main determinants of how serious the adoption of IFRS is (Christensen et al., 2015). In addition, I follow Hong et al. (2014) in controlling for the divergence between the country's domestic accounting standards and IFRS using the index created by Bae et al. (2008). This divergence determines the magnitude of the shock to the corporate information environment (i.e., the magnitude of the shock increases in divergence). Also, I include a proxy for the rule of law using the index of Kaufmann et al. (2007) as this factor determines how effective the IFRS mandate is in creating a shock to the corporate information environment (Hong et al., 2014; Persakis & Iatridis, 2017). Finally, all the regressions in this study include country, industry, and year fixed effects (Hung et al., 2015).

3.3. Modelling the change in the effect of dividends on investments

In modelling the effect of dividends on investments, I mainly follow Ramalingegowda et al. (2013) in developing the regression equation below that examines how the information shock moderates the constraining effect of dividends on investments.

$$\begin{aligned} INVEST_{it} = {} & \beta_0 + \beta_1 DVD_{it} + \beta_2 SHOCK + \beta_3 TREAT \\ & + \beta_4 DVD_{it} \times SHOCK + \beta_5 DVD_{it} \times TREAT + \beta_6 SHOCK \times TREAT \\ & + \beta_7 DVD_{it} \times SHOCK \times TREAT \\ & + \textstyle\sum \beta_i Firm\_Controls_{it-1} + \sum \beta_j Country\_Controls_{jt} \\ & + \textstyle\sum \beta_k Fixed\_Effects + \varepsilon_{it} \end{aligned} \tag{2}$$

The dependent variable *INVEST* is corporate total investment scaled by lagged total assets, where total investment is measured following Richardson (2006), among other. Specifically, corporate investment comprises research and development expenses, capital expenditure, and acquisition expenditure, less cash received from selling property, plant, and equipment, scaled by lagged total assets. The variable *DVD* is common dividends declared, scaled by lagged total assets. The dummy variable *SHOCK* captures the effect of the information shock by taking the value of 1 for years beyond 2005 and zero otherwise. The dummy variable *TREAT* splits the sample into treatment and control groups as it takes the value of 1 if the firm is listed in a country that adopted IFRS in 2005, and zero otherwise. The coefficient on the triple interaction, β_7, captures the difference-in-differences effect of dividends on investments. I expect β_7 to be positive and significant, indicating a reduction in the negative effect of dividends on investments among treatment firms compared to control firms, following the information shock.

I include a vector of firm-specific variables, *Firm_Controls*, which explain the variation in corporate investment and thus control for effects that might confound the moderating impact of the information shock. All control variables are measured at the end of year $t-1$. The selection of the control variables mainly follow Ramalingegowda et al. (2013) and Biddle et al. (2009). I control for economic factors that determine investment decisions, such as firm size (*SIZE*), financial leverage (*LEV*), investment opportunities (*MTB*), asset tangibility (*TANG*), and cash availability (*CASH*). Prior research on corporate investment (e.g., Richardson, 2006) finds that investments increase in investment opportunities, asset tangibility, and cash availability; however, investments decrease in firm size and leverage. Moreover, I include controls for innate factors that might affect investments and be contemporaneously correlated with the expected change in information asymmetry. As such I follow prior research (e.g., Biddle et al., 2009; Ramalingegowda et al., 2013) and include the standard deviation of operating cash flow (*SDOCF*), the standard deviation of sales (*SDSALE*), the standard deviation of investments (*SDINV*), operating cash flow to sales (*OCF*), and an indicator variable for losses (*LOSS*). Finally, I include the same country-level control variables as in Equation (1) to mitigate macro-level factors that might confound the impact of the information shock, in addition to including country, industry, and year fixed effects.

3.4. Modelling the change in firm value

To examine how shareholders' wealth changes following the information shock, I follow Bebchuck, Chen, & Ferrell (2008) in empirically modelling firm value. Bebchuck et al. (2008) and

Gompers, Ishii, & Metrick (2003), among others, use Tobin's Q to measure firm value. Accordingly, the regression equation below is designed to examine the change in the average firm value among the treatment and control groups around the introduction of the information shock using a difference-in-differences approach.

$$Ln(Q_{it}) = \delta_0 + \delta_1 SHOCK + \delta_2 TREAT + \delta_3 SHOCK \times TREAT \\ + \sum \delta_i Firm\_Controls_{it-1} + \sum \delta_j Country\_Controls_{jt} \\ + \sum \delta_k Fixed\_Effects + \varepsilon_{it} \quad (3)$$

The dependent variable *Q* is the measure of firm value, defined as the market value of assets divided by the book value of assets (Bebchuck et al., 2008; Gompers et al., 2003). As mentioned earlier, the information shock is captured using *SHOCK* and the treatment group is identified using *TREAT*. Accordingly, the difference-in-differences estimator is the interaction term *SHOCK×TREAT*, where its coefficient δ_3 captures the change in the average firm value for the treatment group compared to that for the control group around the information shock. The studies mentioned earlier in this section model firm value as a function of a vector of control variables that capture investors' expectations about future cashflows. Accordingly, the control variables included in Equation (3) are firm size (*SIZE*), profitability (*ROA*), financial leverage (*LEV*), capital expenditure (*CAPEX*), and research and development expenditure (*RND*). Finally, as in Equations (1) and (2), I include country-level control variables in addition to country, industry, and year fixed effects.

4. Empirical Results

4.1. Descriptive statistics

I start the empirical analysis by reporting the descriptive statistics of my sample. Table 2 Panel A reports summary statistics of all the variables used in the analysis for the treatment and the control groups separately. Regarding the main variables of the analysis, the mean value of *Ln(INFOASY)* is higher for control firms, suggesting a higher level of information asymmetry compared to firms in the treatment group. Firms in both groups seem to have similar levels of investments (*INVEST*) while treatment firms show a higher level of dividend payout (*DVD*). In addition, the mean value of *Ln(Q)* is higher for the control group, suggesting that the average firm value in the control group is higher than that in the treatment group. In terms of the control variables, firms in both groups appear to have similar stock price volatility, *Ln(VOLAT)*, whereas control firms have a higher stock price, *Ln(PRICE)*, on average. In general, treatment firms are smaller in size (*SIZE*), have higher investment opportunities (*MTB*), have higher sales volatility (*SDSALE*), are less tangible (*TANG*), generate more operating cash flows relative to sales (*CFOSALES*), are more profitable (*ROA*), and report losses less frequently (*LOSS*). Finally, as far as the country-level variables are concerned, treatment countries show a higher level for the rule of law (*LAW*) accompanied with a better enforcement of accounting standards (*ENFORCE*). Domestic accounting standards in treatment countries diverge relatively more from IFRS (*IFRSDIFF*) while the quality of audit seems to be similar in countries of both groups (*AUDIT*).

I then move on to report the Pearson correlation coefficients between the main variables used in my analysis for both groups separately. Table 2 Panel B shows that the correlation between *Ln(INFOASY)* and *SHOCK* is negative and significant for both groups, but the magnitude of the coefficient for the treatment group is double that of the control group. This suggests a greater reduction in the level of information asymmetry among treatment firms following the information shock. Moreover, the correlation coefficient between *DVD* and *SHOCK* is positive and significant for both groups, while the correlation between *INVEST* and *SHOCK* is positive for the treatment group and negative for the control group. This suggests that, following 2005, firms in both groups increased their dividend payout, and treatment firms invested more while control firms invested less compared to pre-2005. Furthermore, the correlation coefficient between *DVD* and *INVEST* shows a negative association between dividends and investments for both groups (yet insignificant for the treatment group). Finally, the correlation coefficient between *Ln(Q)* and *SHOCK* is significantly positive for the treatment group, which suggests an increase in the average firm value for treatment firms, unlike the control group that shows a significant decline in the average firm value.

[Insert Table 2 Here]

4.2. Information asymmetry following the information shock

Table 3 reports results of the regression analysis that tests the effect of the information shock on the level of information asymmetry among the treatment and control groups using the full and matched samples. The obtained coefficients on the control variables are in line with prior research. For example, the results show that stock price volatility has a positive impact on information asymmetry as indicated by the positive and significant coefficient on *Ln(VOLAT)*. This outcome is consistent with prior studies that document a positive association between stock price volatility and information asymmetry (e.g., Fu et al., 2012). The results also suggest that information asymmetry decreases in stock prices, as indicated by the negative and significant coefficient on *Ln(PRICE)*. Moreover, the positive and significant coefficient on *MTB* suggests that firms with more investment opportunities (i.e., growth firms) suffer higher levels of information asymmetry (Daske et al., 2008).

As far as the main variables of interest are concerned, the coefficient on *SHOCK* in Model 3.1, which uses the treatment group in the full sample, is −0.0997 and significant at the 1% level. This result suggests that the level of information asymmetry decreased among the treatment firms by 10% following the information shock. On the other hand, the coefficient on *SHOCK* in Model 3.2, which uses the control group in the full sample, is −0.0112 and statistically insignificant, suggesting no change in information asymmetry following the information shock. Model 3.3 includes the interaction term *SHOCK*×*TREAT* that captures the difference-in-differences effect. The coefficient on *SHOCK*×*TREAT* in Model 3.3 is −0.1348 and highly significant, suggesting that the level in information asymmetry among treatment firms decreased by 13.48% compared to that among control firms following the information shock.

Moving to the regression results using the matched sample, Model 3.4 is analogous to Model 3.1 and shows that the level of information asymmetry decreased by 10.11% post-shock. Model 3.5 uses the matched control group and shows that there is no significant change in the level of information asymmetry post-shock. Finally, Model 3.6 reports the difference-in-differences regression results which show that the level of information asymmetry among the treatment firms decreased by 9.5% relative to that among the control firms post-shock, as indicated by the significant coefficient on the interaction term *SHOCK*×*TREAT*. The results reported in Table 3 suggest a mitigating effect for the information shock on the level of asymmetric information in capital markets. My findings are consistent with prior studies that document lower levels of asymmetric information following mandatory regulations in capital markets, such as Regulation FD (Duarte, Han, Harford, & Young, 2008), Sarbanes-Oxley act (Hutton, Marcus, & Tehranian, 2009), IFRS adoption (Daske et al., 2008; Muller et al., 2011), and mandatory higher reporting frequency by the Securities and Exchange Commission in the U.S. (Fu et al., 2012).

[Insert Table 3 Here]

4.3. Dividends and investments under the information shock

Turning to the main finding of the study, Table 4 reports results of the regression analysis that examines the moderating role of the information shock on the constraining effect of dividends on investments. The obtained coefficients on the control variables in all models of Table 4 are largely consistent with Ramalingegowda et al. (2013) as I use a similar model to theirs. As expected, investment opportunities have a positive impact on investments, which is shown by the positive and significant coefficient on *MTB*. Similarly, more tangible firms and those with better cash liquidity tend to invest more, as suggested by the positive and significant coefficients on *TANG* and *CASH* respectively. This is opposed to firms that rely more on debt and report more losses, as inferred by the negative and significant coefficients on *LEV* and *LOSS* respectively.

As far as the main variables of interest are concerned, the coefficient on *DVD* is negative and significant in all regression models of Table 4, which is consistent with prior literature that documents a constraining impact for dividends on investments (Brav et al., 2005; Ramalingegowda et al., 2013). For the treatment group, Model 4.1 reports a coefficient on *DVD* of −0.3677 and a coefficient on the interaction term *DVD*×*SHOCK* of 0.1554, significant at the 1% and 5% levels respectively. Both coefficient estimates suggest that the negative effect of dividends on investments pre-shock has fallen by around 40% following the shock. On the other hand, Model 4.2 does not report a similar finding for the control group as the interaction term *DVD*×*SHOCK* is insignificant. The difference-in-differences effect is tested in Model 4.3 and captured by the triple interaction term *DVD*×*TREAT*×*SHOCK,* which shows a significant reduction in the negative impact of dividends on investments following the information shock among the treatment firms compared to the control firms. Specifically, the coefficient on *DVD*×*TREAT*×*SHOCK* is 0.2171 and significant at the 1% level, indicating a significant difference-in-differences estimate. Finally, Models 4.4, 4.5, and 4.6 replicate the regression analysis performed in Models 4.1, 4.2, and 4.3, respectively, using the matched sample. The results are consistent between both sets of regressions and yield similar conclusions. When comparing observations that fall on the common support, I find that the negative effect of dividends on investments before the shock becomes similar in magnitude across the treatment and control groups (−0.4403 and −0.4479 respectively), whereas the change in this negative impact following the shock continues to be positive and highly significant for the treatment group. In stark contrast, the change in the negative effect of dividends on investments following the information shock is insignificant for the control group, as indicated by the coefficient on *DVD*×*SHOCK* in Model 4.5. These results yield a positive and significant coefficient on *DVD*×*TREAT*×*SHOCK* in Model 4.6, which indicates a significant difference-in-differences effect and thus rejects the null hypothesis of H1 in favor to its alternative.

Economically speaking, the results in Model 4.4 indicate that a $1 increase in dividend payout among treatment firms, before the information shock, is associated with a $0.44 decrease in total investments. The negative effect of dividends on investments declines by $0.17 following the information shock, as indicated by the significant coefficient on *DVD*×*SHOCK*. On the other hand, the results in Model 4.5 show a similar economic interpretation for the negative effect of dividends on investments among control firms before the information shock, but the change in this negative effect following the information shock is insignificant. Taken together in Model 4.6, those results suggest that, following the information shock, the constraining effect of dividends on investments among treatment firms declines by $0.25 for each $1 paid in dividends compared to that among control firms, as indicated by the significant coefficient on *DVD*×*TREAT*×*SHOCK*. In conclusion to this section, the results reported in Table 4 suggest that the information shock in

2005 results in alleviating the constraining effect of dividend policy on corporate investment among the treatment firms compared to the control firms.

[Insert Table 4 Here]

4.4. The differential impact of the information shock

To the extent that the information shock is expected to alleviate the constraining effect of dividends on investments through mitigating information asymmetry, I expect a greater reduction in asymmetric information and accordingly in the constraining effect of dividends among firms with higher levels of information asymmetry *ex-ante*. To test this expectation (i.e., hypothesis H2), I split each of the treatment and the control groups into high and low information asymmetry subsamples. In doing so, I first calculate the mean value of *INFOASY* for each firm in the years prior to the shock. I then assign firms to the high (low) information asymmetry subsample if the firm's mean value is greater (less) than the sample's median value of *INFOASY*. I perform this step for the treatment and control groups separately and I calculate the median value for each of the two groups annually. According to Conley, Goncalves, & Hansen (2018), the subsample analysis (i.e., median-split) is an empirical practice that proved to be a robust strategy in identifying the causal effect of the variable of interest on the outcome variable.

Table 5 Panel A reports regression results that test the effect of the information shock on information asymmetry using the high and low information asymmetry subsamples in the treatment and control groups. Models 5.1a and 5.2a refer respectively to the low and high information asymmetry subsamples in the treatment group. The coefficient on *SHOCK* for the low information asymmetry subsample (Model 5.1a) is −0.0489 as compared to −0.1190 for the high information asymmetry subsample (Model 5.2a), where both coefficients show high statistical significance. The difference between both coefficients is highly significant as indicated by the high value of the Chi^2 statistic (p-value = 0.0000). That is, the results indicate that the level of information asymmetry within the treatment group declines by approximately 5% for the low information asymmetry subsample compared to an average decline of 12% among firms in the high information asymmetry subsample. Performing the same analysis for the control group yields an insignificant coefficient on *SHOCK* for the low and high information asymmetry subsamples, as reported in Models 5.3a and 5.4a.

Table 5 Panel B reports regression results that examine the moderating impact of the information shock on the constraining effect of dividends on investments. Models 5.1b and 5.2b in Table 5 refer respectively to the low and high information asymmetry subsamples in the treatment group. The coefficient on *DVD* for the low information asymmetry subsample (Model 5.1b) is −0.3669 as compared to −0.6212 for the high information asymmetry subsample (Model 5.2b). These coefficients suggest that the negative impact of dividends on investments is more prominent among firms with higher levels of information asymmetry. More importantly, the coefficient on *DVD*×*SHOCK* in Models 5.1b and 5.2b indicates that, following the information shock, the reduction in the constraining effect of dividends on investments within the treatment group is insignificant for the low information asymmetry subsample and is highly significant (economically and statistically) for the high information asymmetry subsample. Specifically, the coefficient on *DVD*×*SHOCK* in Model 5.1b is 0.0287 with a t-statistic of 0.43 while the analogous coefficient in Model 5.2b is 0.4534 with a t-statistic of 4.47. Both coefficients are statistically different from each other at the 1% level, as indicated by the Chi^2 statistic reported at the bottom of Models 5.1b and 5.2b (p-value = 0.0007). Performing the same analysis for the control group yields an insignificant coefficient on *DVD*×*SHOCK* for the low and high information asymmetry subsamples, as reported in Models 5.3b and 5.4b. In light of the results reported in Table 5, I reach the conclusion that the information shock under study results in alleviating the constraining effect of dividends on investments through the channel of mitigating information asymmetry, and thus I reject the null hypothesis of H2 in favor to its alternative.

[Insert Table 5 Here]

4.5. The information shock and firm value

A natural flow of logic leads to question whether managers tend to exploit the opportunity of less constrained investments to invest efficiently in profitable projects that maximize shareholders' wealth or, in contrast, to benefit privately by investing in value-destroying projects. Either way, the firm value is affected since investors reflect their perception of managers' decisions in stock prices (DeAngelo et al., 2008). To answer the aforementioned question, I examine whether and how the average firm value in the treatment and control groups changes following the information shock. Table 6 Panel A reports regression results for the change in firm value around the information shock, where the dependent variable is the natural logarithm of Tobin's Q (Gompers et al., 2003). Models 6.1a and 6.2a correspond to the treatment and control groups, respectively, and Model 6.3a reports the results from the difference-in-differences regression. The coefficients on the control variables are generally in line with prior studies. For example, the positive and significant coefficients on *ROA* and *CAPEX* indicate that more profitable firms that spend more on capital expenditure are more likely to witness an increase in their value. In contrast, the negative and significant coefficient on *LEV* suggests that firms with more reliance on debt tend to have a lower value. Moving to the main results, the coefficient on *SHOCK* is negative and significant in Models 6.1a and 6.2a, suggesting a reduction in the average firm value in the treatment and control groups after 2005. Specifically, the coefficient on *SHOCK* indicates a 3.3% reduction in the average firm value among the treatment group as compared to an average decrease of 16.7% in firm value among the control group. This reduction is expected due to the global financial crisis that caused a dramatic decrease in the market value of firms (Balakrishnan, Watts, & Zuo, 2016). Nevertheless, the decrease in the average firm value in the treatment group is significantly lower than that in the control group as indicated by the positive and significant coefficient on the difference-in-differences estimator in Model 6.3a (i.e., *SHOCK*×*TREAT*). Despite that the results show a reduction in the average firm value, the results still suggest a more favorable change in the average firm value among the treatment group compared to the control group.

To isolate the effect of the global financial crisis on the change in firm value, I restrict the sample period into two years before the information shock (2003-2004) and two year after (2006-2007). Models 6.4a-6.6a are analogous to Models 6.1a-6.3a while using the restricted (2003-2007) sample period instead of the full sample period. The results in Models 6.4a and 6.5a suggest that the average firm value increases by 17.9% in the treatment group as compared to a 13.9% increase in the control group. The interaction term *SHOCK*×*TREAT* in Model 6.6a captures the difference-in-differences effect and indicates that the average firm value in the treatment group increases by 8.8% relative to that in the control group. The findings in Table 6 Panel A answer the question posed at the end of section 2.2 and suggest that less constrained investments lead to maximizing firm value and increasing shareholders' wealth. It is worth noting that the results of Table 6 hold when using the matched sample and that the main finding of the paper (i.e., Table 4) holds when using the restricted sample period that isolates the effect of the global financial crisis.

For completeness and consistency, I reexamine the findings documented in Table 6 Panel A while splitting the treatment and control groups into high and low information asymmetry subsamples. The procedure of assigning firms to the high and low information asymmetry subsamples is identical to that followed in section 4.4 (i.e., Table 5). Table 6 Panel B reports the regression results for the change in the average firm value among the treatment and control groups, for the high and low information asymmetry subsamples, using the 2003-2007 sample period.[5] Models 6.1b (6.3b) and 6.2b (6.4b) refer to the treatment (control) group using the low and high information asymmetry subsamples, respectively. The coefficient on *SHOCK* in Models 6.1b and 6.2b is 0.1726 and 0.2486, respectively, which suggests that treatment firms in the low information asymmetry subsample witness a 17.26% average increase in their value as compared to a 24.86% average increase in the value of treatment firms in the high information asymmetry subsample. The Chi^2 statistic of 9.32 reported at the bottom of the regressions confirms that the difference is statistically significant at the 1% level. On the other hand, the coefficient on *SHOCK* in Models 6.3b and 6.4b shows that the increase in the average firm value for the control group is 14.51% and 15.58% for the low and high information asymmetry subsamples, respectively. The difference between both coefficients is statistically insignificant, as indicated by the Chi^2 statistic (p-value = 0.417). The results from the subsample analysis support the conclusion that the information shock under study, which results in alleviating the constraining effect of dividends on investments through the channel of information asymmetry, contributes in maximizing the average firm value among the treatment group compared to that among the control group.

[Insert Table 6 Here]

4.6. Robustness tests

In this section, I perform a set of robustness tests to examine the sensitivity of the main finding of the study, that is, the reduction in the constraining effect of dividends on investments following an exogenous reduction in information asymmetry. In doing so, I first use an alternative measure of

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[5] For brevity and exposition purposes, I only report the subsample analysis results of the 2003-2007 sample period as they are more generalizable than the results of the full sample period that covers the global financial crisis. Nevertheless, my conclusions remain unchanged when applying the subsample analysis to the full sample period.

information asymmetry, I then account for firms' access to external financing (which affects dividend and investment policies), and I finally address potential endogeneity concerns.

The theoretical framework of this study revolves around information asymmetry. In the main analysis, I proxy information asymmetry using the bid-ask spread, which captures the level of asymmetric information between insiders and outsiders (Leuz & Verrecchia, 2000; Muller et al., 2011). Nevertheless, given the great importance of information asymmetry in developing the hypotheses of this study, it is vital to ensure that the main findings and conclusions hold when using other measures of information asymmetry in general, and adverse selection in particular. The market microstructure literature has developed a few measures of information asymmetry that are designed to capture adverse selection between insiders and outsiders (Bharath, Pasquariello, & Wu, 2009).[6] I select the volume-return coefficient of Llorente, Michaely, Saar, & Wang (2002) as an alternative measure of information asymmetry as it has been widely used in the corporate finance literature (e.g., Fernandes & Ferreira, 2008; Ferreira & Laux, 2007; Fresard, 2012; Kaniel, Saar, & Titman, 2008) and since it can be feasibly applied to my sample.[7] The volume-return coefficient is intended to capture the amount of private information trading (Ferreira & Laux, 2007; Llorente et al., 2002) and can be estimated from the regression equation below.

$$RET_{it} = \hat{C}_0 + \hat{C}_1 RET_{it-1} + \hat{C}_2 VOL_{it-1} \times RET_{it-1} + \varepsilon_{it} \quad (4)$$

[6] According to Bharath et al. (2009), the main measures of information asymmetry that capture adverse selection in stock markets are the components of the bid-ask spread (George, Kaul, & Nimalendran, 1991; Roll, 1984), the volume-return coefficient (Llorente et al., 2002), and the probability of informed trading (Easley, Hvidkjaer, & O'Hara, 2002).
[7] For example, other measures documented in the market microstructure literature, such as the probability of informed trading measure of Easley et al. (2002), require high-frequency trading data which is unavailable for my international sample.

Where *RET* is daily stock returns and *VOL* is the natural logarithm of daily trading volume detrended by subtracting its 200-day moving average.[8] The coefficient C_2 is estimated for each firm-year and stored in the variable *VOLRET*, which is the information asymmetry measure of Llorente et al. (2002). This measure is developed to capture the amount of private information trading, and thus proxy for adverse selection. The intuition behind the regression model of Equation (4) is that the presence of positive return autocorrelation along with high trading volume suggests that trading is based on private information. Therefore, a positive C_2 indicates more private information trading (i.e., speculative trading) while a negative C_2 is likely to indicate liquidity or hedging trading (Fresard, 2012).

In light of the preceding discussion, and to ensure that the main findings hold for alternative measures of information asymmetry, I replicate the analysis in Table 5 while replacing the bid-ask spread by the volume-return coefficient as shown in Table 7. Table 7 Panel A reports summary statistics for the volume-return coefficient (*VOLRET*) for the treatment and control groups in pre- and post-shock periods. The mean values of *VOLRET* for the control group are 0.060 and 0.067 before and after the information shock, respectively, which indicates a marginal change around the information shock. On the other hand, the mean values of *VOLRET* for the treatment group are 0.081 and 0.050 before and after the information shock, which suggests a significant decrease following the information shock.

Table 7 Panel B reports regression results that test the effect of the information shock on information asymmetry, as measured by *VOLRET*,[9] using the high and low information asymmetry

[8] Following Llorente et al. (2002), I replace zero trading volumes with a constant of 0.00000255 before taking natural logs.

[9] I follow Ferreira & Laux (2007) when selecting the independent variables of the regression equation that models *VOLRET*.

subsamples. Each firm is assigned to either the high or low information asymmetry subsample based on its mean value of *VOLRET* in the years prior to the information shock (following the procedure explained in section 4.4). As shown in Models 7.1a and 7.2a, the coefficient on *SHOCK* for the low information asymmetry subsample is −0.0047 as compared to −0.0180 for the high information asymmetry subsample, where both coefficients are significant at the 1% level. The difference between both coefficients is highly significant as indicated by the high value of the Chi^2 statistic (p-value = 0.0000). That is, firms in the high information asymmetry subsample witness a reduction in the level of asymmetric information four times greater than that witnessed by firms in the low information asymmetry subsample. Performing the same analysis for the control group yields an insignificant coefficient on *SHOCK* for the low and high information asymmetry subsamples, as reported in Models 7.3a and 7.4a.

Table 7 Panel C reports regression results for the subsample analysis of the moderating impact of the information shock on the constraining effect of dividends on investments. Models 7.1b and 7.2b refer to the low and high information asymmetry subsamples in the treatment group, respectively, based on the *VOLRET* measure. The coefficient on *DVD*×*SHOCK* in Model 7.1b is 0.1441 with a t-statistic of 1.91 while the analogous coefficient in Model 7.2b is 0.2242 with a t-statistic of 2.61, which indicates that the reduction in the constraining effect of dividends on investments following the information shock within the treatment group is more significant (economically and statistically) for the high information asymmetry subsample compared to the low information asymmetry subsample. Both coefficients are statistically different from each other at the 10% level, as indicated by the Chi^2 reported at the bottom of Models 7.1b and 7.2b (p-value = 0.0676). Performing the same analysis for the control group yields an insignificant coefficient on *DVD*×*SHOCK* for the low and high information asymmetry subsamples, as reported in Models

7.3b and 7.4b. The results reported in Table 7 reinforces hypothesis H2 which posits that the information shock under study results in alleviating the constraining effect of dividends on investments through the channel of mitigating information asymmetry.

[Insert Table 7 Here]

After reinforcing my main findings using an alternative measure of information asymmetry, I move forward to account for firms' access to external financing, which partially determines investment and dividend policies. Firms that forgo investments for the sake of paying dividends are mostly financially constrained firms that incur a higher cost of accessing external financing, i.e., equity and debt markets. The literature documents that big firms have easier access to external funds due to lower information asymmetry (e.g., DeAngelo et al., 2008; Eckbo, Masulis, & Norli, 2007) and, therefore, I expect dividends to have a greater constraining effect on investments among small firms compared to big firms. As such, to the extent that the information shock is found to mitigate the constraining effect of dividends, I expect the information shock to have a greater impact among small firms due to the greater reduction in information asymmetry, which facilitates external financing (Myers & Majluf, 1984). To examine this prediction, I split each of the treatment and control groups into small and big size subsamples. In doing so, I first calculate the mean value of *SIZE* for each firm in the years prior to the shock. I then assign firms to the big (small) size subsample if the firm's mean value is greater (less) than the sample's median value of *SIZE*. Table 8 reports regression results for the test that replicates the main findings in Table 4 using the small and big size subsamples in the treatment and control groups. Models 8.1 and 8.2 refer to the small and big size subsamples, respectively, within the treatment group. The coefficient on *DVD* is highly significant and equals −0.5279 and −0.3526 for the small and big size subsamples, respectively, which indicates a greater constraining effect for dividends on investments among small firms (i.e., firms with lower access to external financing). More importantly, the coefficient on the interaction term *DVD*×*SHOCK*, which captures the change in the constraining effect of dividends on investments following the information shock, is 0.2279 and 0.1314 for the small and big size subsamples respectively. These coefficients suggest that small firms benefit more than big firms from the information shock in terms of mitigating the constraining effect of dividends on investments. The reduction in the constraining effect for the small size subsample is significant at the 1% level whereas the reduction in the constraining effect for the big size firms is smaller in magnitude and significant at the 10% level. Nevertheless, the Chi^2 test does not indicate a statistical significance for the difference between the coefficients on *DVD*×*SHOCK* for the small and big size firms. Models 8.3 and 8.4 refer to the small and big size subsamples, respectively, within the control group. The coefficient on *DVD* is −0.4237 and −0.2687 for the small and big size subsamples, respectively. Both coefficients are significant at the 1% level, which provides a consistent evidence of a greater constraining effect for dividends on investments among small firms. However, the coefficient on *DVD*×*SHOCK* is insignificant using the small and big subsample within the control group. Collectively, the findings of this section suggest that firms with higher cost of external financing witness a higher constraining effect for dividends on investments. Such firms enjoy a greater reduction in the constraining effect of dividends following the information shock that mitigates information asymmetry and facilitates external financing (Christensen et al., 2009; Harakeh et al., 2019a).

[Insert Table 8 Here]

As far as endogeneity is concerned, a main empirical issue that should be addressed in my study is reverse causality between dividends and investments. In other words, not only maintaining a stable dividend payout policy would limit investment activities, but also investment decisions might have a negative effect on dividend payouts. This two-way relationship between both variables might induce endogeneity issues to a regression equation that models the effect of dividends on investments. Accordingly, I endeavor to address this concern using an instrumental variable approach. In doing so, I follow Ramalingegowda et al. (2013) and use lagged dividends to instrument current dividends as lagged dividends are naturally associated with current dividends (Denis & Osobov, 2008); however, lagged dividends are unlikely to determine current investments.[10] As such, I replicate the regressions reported in Table 4 using 2SLS regressions as shown in Table 9 below. It is worth mentioning that I instrument all the interactions between any exogenous variable and *DVD* using the interaction between the exogenous variable and lagged dividends (Wooldridge, 2010, p. 122). Moreover, Zellner (1962) show that estimating simultaneous equations in two separate stages (i.e., 2SLS) might induce bias to the estimated coefficients if the errors of the two-stage equations are correlated. Zellner (1962) suggests using the seemingly unrelated regression (SUR) estimation method which controls for potential correlation between errors. The dependent variable in the first equation is *DVD* and in the second equation is *INVEST*, where both variables are determined simultaneously and probably exhibit a significant correlation between errors. To address this concern I follow prior studies (e.g., Wruck & Wu, 2009) and incorporate the SUR estimation method in the instrumental variable approach.

Table 9 Panel A reports the second stage of the 2SLS instrumental variable regressions, where all F-tests reported at the bottom of the table reject the null of exogeneity. Models 9.1a and 9.2a correspond to the treatment and control groups, respectively, and Model 9.3a reports the results from the difference-in-differences regression. The results hold when using the instrumental

[10] My results remain unchanged when using ROA as an alternative instrument instead of lagged dividends (Ramalingegowda et al., 2013).

variable approach. The negative effect of dividends on investments continues to persist across all regression models. More importantly, the coefficient on *DVD×SHOCK* in Model 9.1a is positive and significant at the 5% level, which suggests a reduction in the constraining effect of dividends on investments among the treatment firms following the information shock. No similar reduction is found for the control group, as indicated by the insignificant coefficient on *DVD×SHOCK* in Model 9.2a. The coefficient on the difference-in-differences estimator in Model 9.3a, *DVD×TREAT×SHOCK*, is 0.4206 and significant at the 1% level. A similar conclusion can be drawn from Models 9.4a, 9.5a, and 9.6a when running the 2SLS regressions using the matched sample. Table 9 Panel B reports the second stage of the instrumental variable regressions using the SUR estimation method. The results are consistent with those reported in Panel A, which suggests that the findings hold after controlling for potential correlation between the errors of the two-stage equations. Collectively, the results reported in Table 9 suggest that my findings relating the moderating role of the information shock on the constraining effect of dividends on investments hold after controlling for potential endogeneity concerns arising from reverse causality.

[Insert Table 9 Here]

Lastly, to the extent that the constraining effect of dividends on investments is mainly attributed to high levels of information asymmetry and uncertainty (Jensen & Meckling, 1976; Myers & Majluf, 1984), I would expect a greater constraining effect for dividends on research and development (R&D) investments compared to capital investments (Chan, Lakonishok, & Sougiannis, 2001). This is due to the fact that R&D investments are associated with greater uncertainty of future benefits, and thus higher information asymmetry (Brown, Fazzari, & Petersen, 2009; Chan et al., 2001). Accordingly, I would expect the information shock to result in a greater reduction in the constraining effect of dividends on investments among firms that have high R&D investments compared to that among those with low R&D investments. Unreported results confirm this prediction in which I first find a greater negative impact of dividends on R&D investments and then find a greater reduction in the constraining effect of dividends on investments among firms with high R&D expenditure compared to those with low R&D expenditure, following the information shock.

5. Conclusions

In capital markets that suffer information asymmetry, dividend policy has a constraining effect on corporate investment (Ramalingegowda et al., 2013) as managers are reluctant to cut on dividends to finance investment opportunities (Brav et al., 2005). This constraining effect of dividends on investments exacerbates in information asymmetry, and thus an exogenous reduction in the level of information asymmetry between the agent and the principal is expected to alleviate this constraining effect. In this study, I take advantage of the mandatory adoption of new financial reporting standards, namely IFRS, which form an exogenous information shock to the corporate information environment. Using a difference-in-differences research design, I first show that the level of information asymmetry within the treatment group declines following the information shock. Then, I show that this reduction of information asymmetry is accompanied with a reduction in the constraining effect of dividends on investments following the information shock. Next, I run a subsample analysis where I split the treatment and control groups into high and low information asymmetry subsamples. I find that the high information asymmetry subsample within the treatment group benefits more from the information shock as firms witness a greater reduction in asymmetric information. In parallel, the results show that the moderating role of the information shock in mitigating the constraining effect of dividends on investments is more pronounced among the high information asymmetry subsample within the treatment group. Finally, further investigation reveals that lower constraints imposed by dividends on investments contribute to maximizing firm value, especially where *ex-ante* information asymmetry is high. My findings are robust to using an alternative measure of information asymmetry, accounting for firms' access to external financing, and running instrumental variable regressions that address potential endogeneity concerns.

This study contributes to the financial reporting and corporate finance literature by providing an international evidence that imposing and enforcing a fine set of accounting standards yield lower levels of information asymmetry and thus reduce agency conflicts over dividend policy. Lower levels of information frictions and agency conflicts are expected to be accompanied with higher growth in firm value, which opens the question whether firms that benefited from the lower constraining effect of dividends on investments have witnessed improved investment efficiency, and accordingly higher growth. To that end, providing an international evidence that shows favorable outcomes of mandatory IFRS adoption is meant to encourage policy makers in countries that have not adopted IFRS yet to do so. In addition, this study gains more importance from the ongoing global harmonization of accounting standards that facilitates cross-country investments by increasing financial statement comparability (DeFond et al., 2011), which yields economic openness and prosperity.

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Appendix 1: Variable Definition

Variable (sorted)	Definition
AUDIT	An index developed by Brown et al. (2014) that measures the quality of statutory audit around the mandatory adoption of IFRS in 2002, 2005, and 2008. The score ranges between 0 and 32, where higher values indicate a higher quality of audit and a better environment in which auditors perform their role. The value of year 2002 in the index is assigned to the years 2000-2002 in my dataset. The value of year 2005 in the index is assigned to the years 2003-2007 in my dataset. The value of year 2008 in the index to the years 2008-2010 in my dataset.
CAPEX	Capital expenditure, scaled by total assets at the end of year t−1.
CASH	Total cash balance, scaled by total assets at the end of year t−1.
DIVDUM	Dummy variable that takes the value 1 if the firm pays dividends, and zero otherwise.
DVD	Common dividends declared year t, scaled by total assets at the end of year t−1.
ENFORCE	An index developed by Brown et al. (2014) that measures the level of enforcement of accounting standards around the mandatory adoption of IFRS in 2002, 2005, and 2008. The score ranges between 0 and 24, where higher values indicate a better enforcement of accounting standards. The value of year 2002 in the index is assigned to the years 2000-2002 in my dataset. The value of year 2005 in the index is assigned to the years 2003-2007 in my dataset. The value of year 2008 in the index to the years 2008-2010 in my dataset.
IFRSDIFF	An index that measures the extent to which domestic accounting standards in a country diverge from IFRS, developed by (Bae et al., 2008). The score ranges between 0 and 21, where higher values indicate a greater divergence between domestic accounting standards and IFRS. The index does not include a score for South Korea; thus, it is replaced with values of Hong Kong given the similarities in their domestic accounting standards (Ball, Kothari, & Robin, 2000).
INFOASY	Mean of daily percentage bid-ask spread in year t, calculated the ask price minus the bid price, divided by the average of bid and ask prices.
INVEST	Sum of research and development expenditure, capital expenditure, and acquisition expenditure less cash receipts from sale of property, plant, and equipment at the end of year t, scaled by total assets at the end of year t−1.
LAW	An index that measures the strength of legal enforcement, developed by Kaufmann et al. (2007). The score ranges from 0 to 10, where higher values indicate stronger a rule of law.
LEV	Ratio of long-term debt to the sum of long-term debt and market value of equity at the end of year t−1.
LOSS	Dummy variable that takes the value 1 if net income at the end of year t−1 is negative, and zero otherwise.
MTB	Market-to-book ratio, measured as the sum of liabilities and market value of equity, scaled by total assets at the end of year t−1.
OCF	Cash flow from operations to sales at the end of year t−1.
Q	Proxy for Tobin's Q, measured as the market value of assets divided by the book value of assets, where the market value of assets is computed as the book value of assets plus the market value of common stock less the sum of book value of common stock.
RND	Research and development expenses, scaled by total assets at the end of year t−1. Missing values of this variable are replaced with zeros.
ROA	Net income to total assets.
SDINV	Standard deviation of total investment scaled by average total assets over years t−1 to t−5.
SDOCF	Standard deviation of the cash flow from operations scaled by average total assets over years t−1 to t−5.
SDSALE	Standard deviation of sales scaled by average total assets over years t−1 to t−5.
SHOCK	Dummy variable that takes the value 1 for the post-shock period, and zero otherwise.
SHTURN	Mean of daily percentage common shares traded divided by common shares outstanding.

SIZE	Natural logarithm of total assets.
TANG	Property, plant, and equipment, scaled by total assets at the end of year t−1.
TREAT	Dummy variable that takes the value 1 for firms listed in countries that mandated the adoption of IFRS in 2005.
VOLAT	Standard deviation of stock returns in year t.
VOLRET	Volume-return coefficient estimate a regression of current return on lagged return and the interaction between lagged return and lagged trading volume (Llorente et al., 2002).

Table 1: Sample distribution by country, industry, and year

Panel A: sample distribution by country

Treatment group									Control group		
Country	N	%	Country	N	%	Country	N	%	Country	N	%
Australia	1645	8.83%	Greece	421	2.26%	Norway	748	4.02%	Canada	712	1.40%
Austria	235	1.26%	Germany	1428	7.67%	Spain	428	2.30%	Indonesia	1357	2.67%
Belgium	289	1.55%	Hong Kong	1456	7.82%	South Africa	974	5.23%	Japan	20563	40.39%
Denmark	605	3.25%	Ireland	146	0.78%	Sweden	1490	8.00%	Malaysia	1500	2.95%
Finland	630	3.38%	Italy	882	4.73%	Switzerland	508	2.73%	South Korea	2761	5.42%
France	2750	14.76%	Netherlands	829	4.45%	U.K.	3165	16.99%	Thailand	1936	3.80%
									U.S.A.	22077	43.37%

Panel B: sample distribution by industry and year

Industry (SIC code)	2000	2001	2002	2003	2004	2006	2007	2008	2009	2010	Total
Agriculture (0100-0999)	30	36	43	49	60	57	52	38	37	39	441
Mining and construction (1000-1799)	275	445	483	536	603	636	590	513	489	478	5048
Manufacturing (2000-3999)	2174	3556	3802	4050	4275	4327	4086	3650	3586	3567	37073
Transportation (4000-4899)	279	417	435	495	537	525	493	428	414	413	4436
Retail (5000-5999)	489	844	996	1074	1174	1180	1108	994	937	932	9728
Services (7000-8999)	715	1096	1180	1347	1498	1522	1403	1205	1176	1113	12255
Public administration (9100-9999)	30	59	62	62	63	63	58	58	49	50	554
Total	3992	6453	7001	7613	8210	8310	7790	6886	6688	6592	**69535**

Notes: Panel A of this table provides the distribution of observations by country in each of the treatment and control groups. Panel B of this table provides the sample distribution by year and industry according to the SIC industry classification.

Table 2: Summary statistics and correlation matrices

Panel A: Summary statistics of all variables by the treatment and control groups respectively

	Treatment group						Control group					
	N	Mean	S.D.	Q1	Median	Q3	N	Mean	S.D.	Q1	Median	Q3
SHOCK	18629	0.521	0.500	0.000	1.000	1.000	50906	0.522	0.500	0.000	1.000	1.000
Ln(INFOASY)	18629	−3.874	0.704	−4.148	−3.794	−3.452	50906	−3.494	0.636	−3.825	−3.455	−3.089
INVEST	18629	0.101	0.121	0.030	0.064	0.124	50906	0.097	0.127	0.024	0.058	0.120
Ln(VOLAT)	18629	−3.421	0.995	−3.971	−3.646	−3.230	50906	−3.419	0.728	−3.833	−3.505	−3.158
Ln(PRICE)	18629	2.368	1.596	1.095	2.098	3.417	50906	4.570	2.596	2.566	4.134	6.397
DVD	18629	0.021	0.030	0.000	0.010	0.031	50906	0.009	0.018	0.000	0.003	0.010
SIZE	18629	6.285	2.083	4.781	6.121	7.578	50906	8.566	3.144	5.954	8.840	10.921
MTB	18629	1.660	1.400	0.971	1.260	1.798	50906	1.582	1.526	0.887	1.123	1.675
SDOCF	18629	0.058	0.047	0.027	0.044	0.073	50906	0.053	0.045	0.023	0.039	0.065
SDSALE	18629	0.218	0.225	0.073	0.140	0.275	50906	0.145	0.140	0.057	0.103	0.182
SDINV	18629	0.001	0.002	0.000	0.000	0.000	50906	0.001	0.002	0.000	0.000	0.000
TANG	18629	0.265	0.215	0.088	0.217	0.386	50906	0.295	0.206	0.129	0.261	0.418
LEV	18629	0.179	0.203	0.010	0.110	0.277	50906	0.183	0.213	0.002	0.102	0.300
CFOSALES	18629	0.058	0.361	0.032	0.079	0.145	50906	0.030	0.384	0.020	0.064	0.120
LOSS	18629	0.149	0.357	0.000	0.000	0.000	50906	0.241	0.428	0.000	0.000	0.000
CASH	18629	0.106	0.120	0.026	0.064	0.138	50906	0.125	0.126	0.036	0.086	0.168
Ln(Q)	18629	0.326	0.543	−0.029	0.231	0.586	50906	0.251	0.567	−0.120	0.116	0.516
RND	18629	0.114	6.326	0.000	0.000	0.004	50906	0.437	22.170	0.000	0.001	0.028
CAPEX	18629	0.052	0.058	0.017	0.036	0.067	50906	0.054	0.733	0.014	0.030	0.057
ROA	18629	0.035	0.159	0.014	0.046	0.083	50906	0.016	1.215	0.001	0.026	0.061
ENFORCE	18629	15.880	6.229	10.000	19.000	22.000	50906	14.181	7.183	8.000	10.000	21.000
AUDIT	18629	23.302	6.650	18.000	24.000	29.000	50906	23.463	8.101	18.000	26.000	32.000
LAW	18629	1.532	0.466	1.450	1.700	1.800	50906	1.276	0.491	1.250	1.340	1.590
IFRSDIFF	18629	6.894	5.081	1.000	10.000	11.000	50906	6.097	2.498	4.000	4.000	9.000

Panel B: Pearson correlation matrices for the main variables by the treatment and control groups respectively

	Treatment group						Control group				
	SHOCK	*INFOASYM*	*INVEST*	*DVD*	*Ln(Q)*		*SHOCK*	*INFOASYM*	*INVEST*	*DVD*	*Ln(Q)*
SHOCK	1					*SHOCK*	1				
Ln(INFOASY)	**−0.1076**	1				*Ln(INFOASY)*	**−0.0562**	1			
INVEST	**0.0747**	**0.0769**	1			*INVEST*	**−0.0551**	**0.2547**	1		
DVD	**0.0659**	**−0.0619**	−0.0042	1		*DVD*	**0.0943**	**−0.1517**	**−0.0298**	1	
Ln(Q)	**0.0877**	**0.1726**	**0.2996**	**0.2861**	1	*Ln(Q)*	**−0.0178**	**0.2807**	**0.4468**	**0.1462**	1

Notes: Panel A of this table provides the summary statistics for the variables used in the regression analysis. Panel B of this table reports the Pearson correlation matrix between the main variables used in the regression analysis where coefficients in bold indicate significance at the 5% level. All continuous variables are wisorized at the top and bottom percentile. All variables are defined in Appendix 1.

Table 3: The effect of the information shock on information asymmetry

	Full sample			Matched sample		
	Treatment	Control	DiD	Treatment	Control	DiD
	Model 3.1	Model 3.2	Model 3.3	Model 3.4	Model 3.5	Model 3.6
	Ln(INFOASY)	*Ln(INFOASY)*	*Ln(INFOASY)*	*Ln(INFOASY)*	*Ln(INFOASY)*	*Ln(INFOASY)*
SHOCK	−0.0997***	−0.0112	−0.0214***	−0.1011***	−0.0084	−0.0118
	(−6.43)	(−1.49)	(−3.06)	(−6.42)	(−0.73)	(−1.28)
TREAT			−0.3945***			−0.4435***
			(−24.69)			(−26.35)
SHOCK×TREAT			**−0.1348*** **			**−0.0954*** **
			(−10.56)			**(−6.94)**
Ln(VOLAT)	0.0459***	0.2941***	0.2092***	0.0530***	0.4003***	0.2132***
	(4.59)	(18.22)	(20.60)	(5.23)	(23.63)	(20.66)
Ln(PRICE)	−0.1570***	−0.0505***	−0.0593***	−0.1618***	−0.0444***	−0.1061***
	(−20.25)	(−11.48)	(−15.72)	(−20.88)	(−7.96)	(−19.80)
SIZE	0.0965***	0.0131***	0.0316***	0.1008***	−0.0316***	0.0135***
	(16.15)	(3.36)	(9.29)	(16.25)	(−7.87)	(3.34)
MTB	0.0846***	0.0486***	0.0591***	0.0849***	0.0388***	0.0598***
	(14.83)	(21.24)	(24.39)	(14.76)	(18.05)	(24.35)
LEV	−0.1827***	0.0772***	0.1030***	−0.1942***	0.1276***	0.0640**
	(−3.53)	(2.89)	(4.13)	(−3.67)	(4.46)	(2.26)
Intercept	−4.4578***	−1.9255***	−3.0128***	−4.4635***	−1.7526***	−3.1820***
	(−56.47)	(−31.59)	(−63.97)	(−55.60)	(−21.55)	(−60.44)
Country Controls	*ENFORCE*, *AUDIT*, *LAW*, *IFRSDIFF*					
Fixed Effects	Country, Industry, Year					
Adj. R^2	0.2715	0.4488	0.3667	0.2742	0.5606	0.4327
N	18629	50906	69535	18238	32432	50670

Notes: This table reports OLS regression results for the test of the effect of the information shock on the level of information asymmetry. Models 3.1 and 3.4 refer to the treatment group using the full and matched samples respectively. Models 3.2 and 3.4 refer to the control group using the full and matched samples respectively. Models 3.3 and 3.6 refer to the difference-in-differences regressions using the full and the matched samples respectively. The *t*-statistics in parentheses are calculated based on clustered standard errors at the firm level. All continuous variables are wisorized at the top and bottom percentile. All variables are defined in Appendix 1. *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 4: The effect of the information shock on the constraining effect of dividends on investments

	Full sample			Matched sample		
	Treatment	Control	DiD	Treatment	Control	DiD
	Model 4.1	Model 4.2	Model 4.3	Model 4.4	Model 4.5	Model 4.6
	INVEST	*INVEST*	*INVEST*	*INVEST*	*INVEST*	*INVEST*
DVD	−0.3677***	−0.2864***	−0.3172***	−0.4403***	−0.4479***	−0.4663***
	(−6.66)	(−3.76)	(−4.22)	(−7.87)	(−4.61)	(−4.96)
TREAT			−0.0072***			−0.0109***
			(−3.02)			(−4.27)
SHOCK	−0.0081**	−0.0091***	−0.0119***	−0.0033	−0.0368***	0.0048*
	(−2.57)	(−5.24)	(−7.36)	(−0.92)	(−8.86)	(1.86)
DVD×TREAT			−0.0182			−0.0386
			(−0.20)			(−0.36)
DVD×SHOCK	0.1554**	−0.0726	−0.0492	0.1770***	−0.0173	0.0016
	(2.41)	(−0.95)	(−0.64)	(2.73)	(−0.18)	(0.02)
TREAT×SHOCK			0.0129***			0.0106***
			(4.87)			(3.56)
DVD×TREAT×SHOCK			**0.2171****			**0.2508****
			(2.17)			**(2.24)**
SIZE	0.0043***	−0.0059***	−0.0048***	0.0047***	−0.0106***	−0.0056***
	(6.84)	(−19.97)	(−18.19)	(7.17)	(−19.33)	(−12.98)
MTB	0.0158***	0.0199***	0.0191***	0.0174***	0.0211***	0.0208***
	(13.02)	(19.53)	(22.88)	(13.49)	(17.90)	(22.20)
SDOCF	−0.0588**	0.0289	−0.0133	−0.0269	0.0273	−0.0029
	(−1.98)	(1.35)	(−0.76)	(−0.85)	(0.95)	(−0.14)
SDSALE	0.0036	−0.0177***	−0.0066*	−0.0028	−0.0574***	−0.0259***
	(0.69)	(−3.15)	(−1.68)	(−0.54)	(−8.03)	(−5.96)
SDINVEST	16.3836***	10.9369***	12.0084***	17.1208***	10.9823***	12.8104***
	(11.19)	(14.12)	(17.28)	(11.50)	(13.15)	(17.27)
TANG	0.0958***	0.0864***	0.0876***	0.0976***	0.1101***	0.1039***
	(12.58)	(16.39)	(19.95)	(13.82)	(14.36)	(18.91)
LEV	−0.0484***	−0.0322***	−0.0333***	−0.0541***	−0.0578***	−0.0516***
	(−8.84)	(−10.35)	(−12.36)	(−9.12)	(−11.79)	(−13.41)
CFOSALES	−0.0087	−0.0198***	−0.0161***	−0.0122*	−0.0222***	−0.0201***
	(−1.59)	(−5.86)	(−5.59)	(−1.96)	(−5.72)	(−6.07)
LOSS	−0.0159***	−0.0070***	−0.0087***	−0.0111***	−0.0001	−0.0030*
	(−5.94)	(−4.93)	(−6.76)	(−3.99)	(−0.05)	(−1.74)
CASH	0.0579***	0.0420***	0.0455***	0.0707***	0.0882***	0.0820***
	(4.96)	(5.73)	(7.21)	(5.94)	(9.45)	(10.98)
Intercept	0.0213***	0.0947***	0.0846***	0.008	0.1495***	0.0827***
	(3.50)	(22.75)	(23.43)	(1.20)	(22.28)	(16.90)
Country Controls	*ENFORCE*, *AUDIT*, *LAW*, *IFRSDIFF*					
Fixed Effects	Country, Industry, Year					
Adj. R^2	0.1925	0.3638	0.3095	0.1661	0.2976	0.2518
N	18629	50906	69535	18238	32432	50670

Notes: This table reports OLS regression results for the test of the impact of the information shock on the constraining effect of dividends on investments. Models 4.1 and 4.4 refer to the treatment group using the full and matched samples respectively. Models 4.2 and 4.4 refer to the control group using the full and matched samples respectively. Models 4.3 and 4.6 refer to the difference-in-differences regressions using the full and the matched samples respectively. The *t*-statistics in parentheses are calculated based on clustered standard errors at the firm level. All continuous variables are wisorized at the top and bottom percentile. All variables are defined in Appendix 1. *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 5: Subsample analysis by high and low information asymmetry

Panel A: The effect on information asymmetry				
	Treatment group		Control group	
	Low *INFOASY*	High *INFOASY*	Low *INFOASY*	High *INFOASY*
	Model 5.1a	Model 5.2a	Model 5.3a	Model 5.4a
	Ln(INFOASY)	*Ln(INFOASY)*	*Ln(INFOASY)*	*Ln(INFOASY)*
SHOCK	**−0.0489*****	**−0.1190*****	**−0.0091**	**0.0022**
	(−3.80)	**(−20.06)**	**(−1.42)**	**(0.51)**
Firm Controls	*SIZE, MTB, LEV, VOLAT, PRICE*			
Country Controls	*ENFORCE, AUDIT, LAW, IFRSDIFF*			
Fixed Effects	Country, Industry, Year			
H_0: *SHOCK* [Low] = [High]	Chi^2 = 27.8; *p*-value = 0.0000		Chi^2 = 2.24; *p*-value = 0.1346	
Adj. R^2	0.1782	0.2064	0.1809	0.3964
N	10916	7713	26156	24750

Panel B: The effect on the constraining effect of dividends on investments				
	Treatment group		Control group	
	Low *INFOASY*	High *INFOASY*	Low *INFOASY*	High *INFOASY*
	Model 5.1b	Model 5.2b	Model 5.3b	Model 5.4b
	INVEST	*INVEST*	*INVEST*	*INVEST*
DVD	−0.3669***	−0.6212***	−0.0737*	−0.5603***
	(−6.52)	(−7.80)	(−1.69)	(−5.11)
SHOCK	−0.0102	−0.0362***	−0.0221***	0.0151***
	(−1.54)	(−4.83)	(−6.36)	(3.95)
DVD×SHOCK	**0.0287**	**0.4534*****	**−0.0859**	**−0.0435**
	(0.43)	**(4.47)**	**(−1.64)**	**(−0.35)**
Firm Controls	*SIZE, MTB, SDOCF, SDINVEST, TANG, LEV, CFOSALES, LOSS, CASH*			
Country Controls	*ENFORCE, AUDIT, LAW, IFRSDIFF*			
Fixed Effects	Country, Industry, Year			
H_0: *DVD×SHOCK* [Low] = [High]	Chi^2 = 11.47; *p*-value = 0.0007		Chi^2 = 0.06; *p*-value = 0.8032	
Adj. R^2	0.1617	0.1838	0.1876	0.3361
N	10916	7713	26156	24750

Notes: Panel A of this table reports OLS regression results for the test of the effect of the information shock on *Ln(INFOASY)* for low and high information asymmetry subsamples. Panel B of this table reports OLS regression results for the test of the impact of the information shock on the constraining effect of dividends on investments for low and high information asymmetry subsamples. In each of the treatment and control groups, firms are assigned to the high information asymmetry subsample if its mean value of *INFOASY* pre-shock is greater than the median value of *INFOASY*, otherwise the firm will be assigned to the low information asymmetry subsample. Models 5.1(a&b) and 5.2(a&b) refer to the treatment group using the low and high information asymmetry subsamples respectively. Models 5.3(a&b) and 5.4(a&b) refer to the control group using the low and high information asymmetry subsamples respectively. The Chi^2 statistic reported at the bottom of the regressions tests the null hypothesis that the coefficients of interest are equal for the low and high information asymmetry subsamples. The *t*-statistics in parentheses are calculated based on clustered standard errors at the firm level. All continuous variables are wisorized at the top and bottom percentile. All variables are defined in Appendix 1. *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 6: The effect of the information shock on firm value

Panel A: The effect on firm value for the full and the 2003-2007 sample periods

	Full sample period			2003-2007 sample period		
	Treatment	Control	DiD	Treatment	Control	DiD
	Model 6.1a	Model 6.2a	Model 6.3a	Model 6.4a	Model 6.5a	Model 6.6a
	Ln(Q)	*Ln(Q)*	*Ln(Q)*	*Ln(Q)*	*Ln(Q)*	*Ln(Q)*
SHOCK	−0.0331***	−0.1672***	−0.1574***	0.1794***	0.1393***	0.1276***
	(−3.06)	(−22.22)	(−25.34)	(22.06)	(20.42)	(24.84)
TREAT			−0.0093			−0.0285**
			(−0.79)			(−2.37)
SHOCK×TREAT			**0.0832*** **			**0.0818*** **
			(8.37)			**(8.91)**
SIZE	−0.0012	0.0125***	−0.0038*	−0.0015	−0.0023	−0.0142***
	(−0.31)	(4.34)	(−1.85)	(−0.35)	(−0.65)	(−6.50)
ROA	0.2980***	0.0067**	0.0085**	0.5341***	0.0143**	0.0180**
	(4.64)	(2.43)	(2.54)	(3.88)	(2.43)	(2.23)
CAPEX	0.8790***	0.001	0.001	0.8783***	0.0558	0.0728
	(6.63)	(0.27)	(0.22)	(7.06)	(1.44)	(1.44)
LEV	−1.0568***	−0.6834***	−0.7721***	−0.9952***	−0.6192***	−0.7142***
	(−30.85)	(−36.64)	(−46.16)	(−24.56)	(−30.12)	(−38.17)
RND	−0.0003	0.0001	0.0001	−0.0004	0.0004	0.0002
	(−0.47)	(1.25)	(1.10)	(−1.29)	(1.28)	(0.50)
Intercept	0.2719***	−0.3410***	0.1284***	0.1677***	−0.2213**	0.1780***
	(5.56)	(−5.60)	(3.85)	(3.45)	(−2.41)	(5.09)
Country Controls	*ENFORCE, AUDIT, LAW, IFRSDIFF*					
Fixed Effects	Country, Industry, Year					
Adj R^2	0.3206	0.3617	0.3285	0.3184	0.3725	0.3293
N	18629	50906	69535	8686	23237	31923

Panel B: The effect on firm value by high and low information asymmetry for the 2003-2007 sample period

	Treatment group		Control group	
	Low *INFOASY*	High *INFOASY*	Low *INFOASY*	High *INFOASY*
	Model 6.1b	Model 6.2b	Model 6.3b	Model 6.4b
	Ln(Q)	*Ln(Q)*	*Ln(Q)*	*Ln(Q)*
SHOCK	**0.1726*** **	**0.2486*** **	**0.1451*** **	**0.1558*** **
	(17.56)	**(11.38)**	**(21.67)**	**(14.01)**
Firm Controls	*SIZE, ROA, CAPEX, LEV, RND*			
Country Controls	*ENFORCE, AUDIT, LAW, IFRSDIFF*			
Fixed Effects	Country, Industry, Year			
H_0: *SHOCK* [Low] = [High]	Chi^2 = 9.32; *p*-value = 0.0023		Chi^2 = 0.66; *p*-value = 0.4170	
Adj R^2	0.3404	0.2284	0.3485	0.3131
N	5218	3468	12240	10997

Notes: Panel A of this table reports OLS regression results for the test of the effect of the information shock on firm value using the full and the 2003-2007 sample periods, respectively. Models 6.1a and 6.3a refer to the treatment group using the full and the 2003-2007 sample periods respectively. Models 6.2a and 6.4a refer to the control group using the full and the 2003-2007 sample periods respectively. Models 6.3a and 6.6a refer to the difference-in-differences regressions using the full and the 2003-2007 sample periods respectively. Panel B of this table reports OLS regression results for the test of the impact of the information shock on firm value for low and high information asymmetry subsamples using the 2003-2007 sample period. In each of the treatment and control groups, firms are assigned to the high information asymmetry subsample if its mean value of *INFOASY* pre-shock is greater than the median value of *INFOASY*, otherwise the firm will be assigned to the low information asymmetry subsample. Models 6.1b and 6.2b refer to the treatment group using the low and high information asymmetry subsamples respectively. Models 6.3b and 6.4b refer to the control group using the low and high information asymmetry subsamples respectively. The Chi^2 statistic reported at the bottom of the regressions tests the null hypothesis that the coefficients of interest are equal for the low and high information asymmetry subsamples. The *t*-statistics in parentheses are calculated based on clustered standard errors at the firm level. All continuous variables are wisorized at the top and bottom percentile. All variables are defined in Appendix 1. *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 7: Using volume-return coefficient to measure information asymmetry

Panel A: Summary statistics for volume-return coefficient (*VOLRET*)

	Treatment group				Control group			
	Mean (Median)	S.D.	Q1	Q3	Mean (Median)	S.D.	Q1	Q3
SHOCK = 0	0.081 (0.072)	0.105	0.012	0.143	0.060 (0.53)	0.066	0.016	0.098
SHOCK = 1	0.050 (0.045)	0.097	−0.006	0.101	0.067 (0.61)	0.730	0.020	0.111

Panel B: The effect on the volume-return coefficient

	Treatment group		Control group	
	Low *VOLRET*	High *VOLRET*	Low *VOLRET*	High *VOLRET*
	Model 7.1a	Model 7.2a	Model 7.3a	Model 7.4a
	VOLRET	*VOLRET*	*VOLRET*	*VOLRET*
SHOCK	**−0.0047***** **(−3.44)**	**−0.0180***** **(−9.33)**	**−0.0015** **(−1.23)**	**0.0004** **(0.24)**
Firm Controls	*SIZE, MTB, LEV, ROA, DIVDUM*			
Country Controls	*ENFORCE, AUDIT, LAW, IFRSDIFF*			
Fixed Effects	Country, Industry, Year			
H0: *SHOCK* [Low] = [High]	Chi^2 = 34.12; *p*-value = 0.0000		Chi^2 = 1.25; *p*-value = 0.2626	
Adj. R^2	0.0202	0.0803	0.059	0.1384
N	10673	7956	26400	24506

Panel C: The effect on the constraining effect of dividends on investments

	Treatment group		Control group	
	Low *VOLRET*	High *VOLRET*	Low *VOLRET*	High *VOLRET*
	Model 7.1b	Model 7.2b	Model 7.3b	Model 7.4b
	INVEST	*INVEST*	*INVEST*	*INVEST*
DVD	−0.3525*** (−5.46)	−0.4447*** (−6.75)	−0.1949*** (−3.34)	−0.3119*** (−4.45)
SHOCK	−0.0033 (−0.63)	0.0132*** (3.93)	−0.0245*** (−6.96)	0.0017 (0.57)
DVD×SHOCK	**0.1441*** **(1.91)**	**0.2242***** **(2.61)**	**−0.0481** **(−0.68)**	**−0.0937** **(−1.16)**
Firm Controls	*SIZE, MTB, SDOCF, SDINVEST, TANG, LEV, CFOSALES, LOSS, CASH*			
Country Controls	*ENFORCE, AUDIT, LAW, IFRSDIFF*			
Fixed Effects	Country, Industry, Year			
H0: *DVD×SHOCK* [Low] = [High]	Chi^2 = 3.34; *p*-value = 0.0676.		Chi^2 = 0.11; *p*-value = 0.7446	
Adj. R^2	0.1914	0.1582	0.2974	0.394
N	10673	7956	26400	24506

Notes: Panel A of this table reports summary statistics for volume-return coefficient (*VOLRET*) for the treatment and control groups, separately, before and after the information shock. Panel B of this table reports OLS regression results for the test of the effect of the information shock on *VOLRET* for low and high information asymmetry subsamples. Panel C of this table reports OLS regression results for the test of the impact of the information shock on the constraining effect of dividends on investments for low and high information asymmetry subsamples. In each of the treatment and control groups, firms are assigned to the high information asymmetry subsample if its mean value of *VOLRET* pre-shock is greater than the median value of *VOLRET*, otherwise the firm will be assigned to the low information asymmetry subsample. Models 7.1(a&b) and 7.2(a&b) refer to the treatment group using the low and high information asymmetry subsamples respectively. Models 7.3(a&b) and 7.4(a&b) refer to the control group using the low and high information asymmetry subsamples respectively. The Chi^2 statistic reported at the bottom of the regressions tests the null hypothesis that the coefficients of interest are equal for the low and high information asymmetry subsamples. The *t*-statistics in parentheses are calculated based on clustered standard errors at the firm level. All continuous variables are wisorized at the top and bottom percentile. All variables are defined in Appendix 1. *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 8: Subsample analysis by small and big size

	Treatment group		Control group	
	Small size	Big size	Small size	Big size
	Model 8.1	Model 8.2	Model 8.3	Model 8.4
	INVEST	*INVEST*	*INVEST*	*INVEST*
DVD	−0.5279***	−0.3526***	−0.4237***	−0.2687***
	(−7.64)	(−5.64)	(−5.41)	(−4.85)
SHOCK	−0.0294***	0.0100***	−0.0046	−0.0039
	(−5.31)	(3.16)	(−1.29)	(−1.48)
DVD×SHOCK	0.2279***	0.1314*	−0.1467	−0.0955
	(2.76)	(1.69)	(−1.56)	(−1.46)
SIZE	0.0015**	0.0121***	−0.0090***	−0.0070***
	(2.19)	(10.12)	(−28.92)	(−31.91)
MTB	0.0194***	0.0172***	0.0183***	0.0234***
	(17.81)	(20.76)	(38.22)	(43.24)
SDOCF	0.0236	−0.0495*	0.1256***	0.0401**
	(0.74)	(−1.84)	(7.21)	(2.17)
SDSALE	0.0043	−0.0023	−0.0484***	−0.0122**
	(0.76)	(−0.39)	(−8.93)	(−2.50)
SDINVEST	48.7017***	18.9223***	11.7100***	38.9110***
	(12.83)	(27.25)	(37.40)	(23.63)
TANG	0.0940***	0.0976***	0.0945***	0.1073***
	(18.36)	(14.13)	(20.66)	(35.44)
LEV	−0.0520***	−0.0565***	−0.0541***	−0.0473***
	(−8.99)	(−6.43)	(−12.19)	(−15.63)
CFOSALES	0.0184***	−0.0181***	−0.0318***	0.0176***
	(3.21)	(−6.19)	(−18.42)	(6.21)
LOSS	−0.0175***	−0.0073**	0.0011	−0.0018
	(−5.01)	(−2.10)	(0.58)	(−1.17)
CASH	0.0622***	0.0695***	0.0848***	0.0632***
	(5.03)	(6.88)	(14.06)	(9.45)
Intercept	0.0513***	−0.0227***	0.0947***	0.0872***
	(6.53)	(−3.07)	(22.76)	(24.51)
H0: DVD×SHOCK [Small] = [Big]	$Chi^2 = 0.74$; *p*-value = 0.3896		$Chi^2 = 0.12$; *p*-value = 0.7280	
Country Controls	*ENFORCE, AUDIT, LAW, IFRSDIF*			
Fixed Effects	Country, Industry, Year			
Adj. R^2	0.1434	0.1909	0.3796	0.2347
N	8815	9814	23964	26942

Notes: This table reports OLS regression results for the test of the impact of the information shock on the constraining effect of dividends on investments for small and big size subsamples. In each of the treatment and control groups, observations are assigned to the big size group if its value of total assets is greater than the annual median value of total assets, otherwise the observation will be assigned to the small size group. Models 8.1 and 8.2 refer to the treatment group using the small and big size subsamples respectively. Models 8.3 and 8.4 refer to the control group using the small and big size subsamples respectively. The Chi^2 statistic reported at the bottom of the regressions tests the null hypothesis that the coefficients of interest are equal for the small and big size subsamples. The *t*-statistics in parentheses are calculated based on clustered standard errors at the firm level. All continuous variables are wisorized at the top and bottom percentile. All variables are defined in Appendix 1. *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 9: Instrumental variable regressions using 2SLS and SUR estimation methods

Panel A: 2SLS regressions

	Full sample			Matched sample		
	Treatment	Control	DiD	Treatment	Control	DiD
	Model 9.1a	Model 9.2a	Model 9.3a	Model 9.4a	Model 9.5a	Model 9.6a
	INVEST	*INVEST*	*INVEST*	*INVEST*	*INVEST*	*INVEST*
DVD	−0.2469***	−0.4480***	−0.4696***	−0.2660***	−0.4976***	−0.6718***
	(−3.42)	(−4.77)	(−5.86)	(−3.68)	(−4.44)	(−7.18)
TREAT			−0.0120***			−0.0167***
			(−5.79)			(−7.49)
SHOCK	0.0131***	−0.0081***	0.0044***	0.0129***	−0.0134***	0.0019
	(5.21)	(−4.40)	(3.55)	(5.10)	(−5.05)	(1.10)
DVD×TREAT			0.1925*			0.3495***
			(1.90)			(3.12)
DVD×SHOCK	0.1703**	−0.1263	−0.1920**	0.1735**	−0.0804	−0.0806
	(2.06)	(−1.34)	(−2.10)	(2.10)	(−0.73)	(−0.77)
TREAT×SHOCK			0.0074***			0.0089***
			(2.70)			(2.98)
DVD×TREAT×SHOCK			**0.4206*** **			**0.3192** **
			(3.40)			**(2.39)**
Firm Controls	*SIZE, MTB, SDOCF, SDINVEST, TANG, LEV, CFOSALES, LOSS, CASH*					
Country Controls	*ENFORCE, AUDIT, LAW, IFRSDIFF*					
Fixed Effects	Country, Industry, Year					
H0: variabes are exogenous	F-test = 14.77 *p*-value = 0.00	F-test = 27.63 *p*-value = 0.00	F-test = 33.67 *p*-value = 0.00	F-test = 13.60 *p*-value=0.00	F-test = 22.41 *p*-value = 0.00	F-test = 32.59 *p*-value=0.00
Adj. R^2	0.1524	0.3631	0.2554	0.1539	0.3529	0.2429
N	18629	50906	69535	18238	32432	50670

Panel A: SUR regressions

	Full sample			Matched sample		
	Treatment	Control	DiD	Treatment	Control	DiD
	Model 9.1b	Model 9.2b	Model 9.3b	Model 9.4b	Model 9.5b	Model 9.6b
	INVEST	*INVEST*	*INVEST*	*INVEST*	*INVEST*	*INVEST*
DVD	−0.2408***	−0.4539***	−0.4707***	−0.2595***	−0.4985***	−0.6675***
	(−3.74)	(−7.43)	(−7.48)	(−4.02)	(−6.29)	(−8.64)
TREAT			−0.0120***			−0.0168***
			(−6.36)			(−7.65)
SHOCK	0.0134***	−0.0077***	0.0045***	0.0132***	−0.0136***	0.0017
	(5.58)	(−3.73)	(3.88)	(5.50)	(−4.52)	(1.10)
DVD×TREAT			0.1925**			0.3453***
			(2.27)			(3.45)
DVD×SHOCK	0.1656**	−0.1270*	−0.1930**	0.1684**	−0.0831	−0.0837
	(2.19)	(−1.79)	(−2.57)	(2.22)	(−0.92)	(−0.92)
TREAT×SHOCK			0.0073***			0.0091***
			(2.86)			(3.07)
DVD×TREAT×SHOCK			**0.4225*** **			**0.3228*** **
			(4.01)			**(2.62)**
Firm Controls	*SIZE, MTB, SDOCF, SDINVEST, TANG, LEV, CFOSALES, LOSS, CASH*					
Country Controls	*ENFORCE, AUDIT, LAW, IFRSDIFF*					
Fixed Effects	Country, Industry, Year					
Adj. R^2	0.5893	0.6034	0.6181	0.1539	0.3529	0.2429
N	18629	50906	69535	18238	32432	50670

Notes: Panel A of this table reports the second stage of the 2SLS regression results for the test of the impact of the information shock on the constraining effect of dividends on investments. Panel B of this table reports the second stage of the 2SLS regression results using the SUR estimation method. The variable DVD_{t-1} is used to instrument the endogenous variable *DVD*. Models 9.1(a&b) and 9.4(a&b) refer to the treatment group using the full and matched samples respectively. Models 9.2(a&b) and 9.4(a&b) refer to the control group using the full and matched samples respectively. Models 9.3(a&b) and 9.6(a&b) refer to the difference-in-differences regressions using the full and the matched samples respectively. The F-test reported at the bottom of the regressions of Panel A tests the null hypothesis that the instrumented variables are exogenous. The *t*-statistics in parentheses are calculated based on clustered standard errors at the firm level. All continuous variables are wisorized at the top and bottom percentile. All variables are defined in Appendix 1. *, **, *** denote significance at the 10%, 5%, and 1% levels, respectively.