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Economic policy uncertainty and dividend sustainability: new insight from emerging equity market of China

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ABSTRACT

We examine the influence of Economic Policy Uncertainty (E.P.U.) on dividend sustainability – dividend termination and dividend initiation decision. Using a sample of 1,375 firms over the time span 2000–2015, our main result reveals that during high E.P.U. past dividend payers are more likely to terminate and past non-payers are less likely to initiate dividends. However, firms that rely more on internal finance (I.F.), generate high return on invested capital (R.O.I.C.) and state-owned enterprises (S.O.E.s) are less exposed to E.P.U. Therefore, negative (positive) effect of E.P.U. on firms' dividend initiation (termination) decision is mitigated by considering firms' heterogeneous characteristics. Results also show that firms having high asset growth, maturity, profitability, cash holdings and high firm value are more likely to initiate and less likely to terminate dividend during period of high E.P.U. In addition, effects of E.P.U. on dividend sustainability is higher for firms functioning in high marketised areas relative to low marketised groups. These findings are robust under different robustness check. Finding confirms that transparent and stable implementation of economic policies can improve sustainability of firm's dividend policy.

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1. Introduction

The impact of economic policies on commercial activities has attracted the interest of numerous research studies. Baker, Bloom, and Davis (2016) documented in their recent studies that uncertainty caused by fiscal, monetary, regulatory and trade activities can provoke a significant association between real economy and financial markets. Prior literature explored the association between economic policy uncertainty (E.P.U.) and firm policies (Drobetz, El Ghoul, Guedhami, & Janzen, 2018). However, our understanding of the core question in corporate finance is whether uncertainty caused by economic policies affects the dividend sustainability – dividend termination

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(d_t) and dividend initiation (d_i) decision – of firms is still ignored in both E.P.U. and dividend policy literature.

Existing literature examined the link between uncertainty (see e.g., market uncertainty (Walkup, 2016), cash flow uncertainty (Chay & Suh, 2009), political uncertainty (Huang, Wu, Yu, & Zhang, 2015) and dividend policy. Klumpp (2017) argued that policy changes affect the economic outcome and the environment in which firm operates. But the existing literature ignores the potential impact of E.P.U. on dividend sustainability.

This study analyses the impact of E.P.U. on d_t/d_i decision. It motivates due to following reasons. *First*, E.P.U. may alter the manger's perception regarding stable business environment (Brav, Graham, Harvey, & Michaely, 2005). Policy uncertainty in aggregate affects the real market economy which affects firm growth and future earnings prospects. Baker et al. (2016) illustrates that due to E.P.U., economy gets weaker and recovery takes longer. Therefore, managers need to reduce spending, hiring and investments, as the manager anticipates an increase in perceived cost of external funding causes firm to adopt more conservative payout policy to "save for rainy days".

Secondly, E.P.U. may increase the risk perception of investors which affects dividend sustainability in two ways. First, an increase in investor risk perception leads to an increase in firms' cost of capital (Huang et al., 2015). Second, E.P.U. causes an increase in manager's perceived risk because of the cash flow risk which associated with policy uncertainty (Berkman, Jacobsen, & John, 2011). Thus, firms adjust their dividend policies to align with future expected earnings (Benito & Young, 2003).

Thirdly, there is extant literature on dividend policy, but none of them have revealed the influence of uncertainty caused by government policies or regulations on payout policy. Arguably, this may be because of daunting challenges to measure E.P.U. (Gulen & Ion, 2015). Current study, however, add into dividend policy and E.P.U. literature by using Baker et al. (2016) Index to measure E.P.U.

Fourth, generally uncertainty seems to have both short and long term fluctuations. Recently, Baker et al. (2016) argued that E.P.U. stems from the contribution of government policy makers to uncertainty about monetary, fiscal and regulatory policies which categorised it as a driver of long term fluctuations in decisions. Furthermore, Barrero, Bloom, & Wright (2017) also document that E.P.U. is linked to slow-moving and possibly *more fundamental uncertainty* drivers which considered E.P.U. as long-term uncertainty. Other uncertainty drivers, such as oil prices volatility, are pertinent for shaping short-term uncertainty (Pindyck, 1990), CEO turnover and currency *volatility are* particularly related with both short-run and long-run uncertainty (Stein & Stone, 2013). Firm long-term decisions such as capital *investment are* more prone to long-run uncertainty such as news based policy shocks (Kang, Lee, & Ratti, 2014). Thus, it would be interesting to associate another long-term financial decision with E.P.U. to understand how E.P.U. affects the dividend sustainability of firm.

Fifth, irrespective of uncertainties caused by firm specific sources, technological innovation and environment uncertainties (John, Zhang, & Don, 2015), E.P.U. is the outcome from government regulations and policies that are out of managers control such as; terrorists attacks and commodity shocks, makes E.P.U. hard to safeguard.

However, E.P.U. is associated with event driven uncertainties such as financial and the political crisis, it composes policy uncertainty other than the timeframe netted for the event driven uncertainty (Baker et al., 2016).

Further, this study analyses the impact of E.P.U. on dividend policy in Chinese equity market. In China, policy particularly plays an important role, provides an ideal and unique market setting to assess the impact of E.P.U. on corporate dividend policy due to following reasons. First, China being the second largest economy, still consider as transition economy, moving away from centrally planned to market based economy. During transition phase, Chinese government is continuously facing economic policy issues that are not experienced before (Chen, Jiang, & Tong, 2017). *Second*, Chinese emerging market serve as lever on account of central government to strengthen economic growth, and to smoothen economic transition. As after the financial crisis of 2008 and euro-debt crisis, a significant increase in E.P.U. has been observed in China (Yin et al., 2017). Thus, with the increase in policy uncertainty, China security regulatory commission (C.S.R.C.) has introduced number of regulations such as; S.O.E. share reforms, semi-mandatory dividend policy, I.P.O. periodic closure and reopening reforms (Lei, Wang, W. & Mo, 2015) to better serve the shareholders interest and to cool down market that is in wave of E.P.U. Therefore, it is useful to assess the effect of E.P.U. on dividend sustainability of Chinese firms.

To measure the impact of E.P.U. on dividend sustainability, consistent with Huang et al. (2015), we first categorise firm as past non-payers if it never paid dividend in the past consecutive three years, and find the probability of d_i of non-dividend payers in response to E.P.U. Analogously, a firm is categorises as dividend payer if paying dividend for consecutive three years, and investigate the likelihood of d_t of these past dividend payers in response to E.P.U. Furthermore, we utilises Baker et al. (2016) measure for E.P.U. which is subject to the frequency of articles published in South China Morning Post (S.C.M.P.) – Hong Kong's Leading English-language newspaper.[1] E.P.U. index has wide range of application in business world.[2]

As during uncertainty period, increase in perceived cost of external funding and managers perceived uncertainty causes firms to make prudent payout decision. Therefore, we first establish the channel through which E.P.U. affects firm dividend policy. By taking data for 1,372 Chinese listed firms from 2000–2015, we first investigates whether E.P.U. causes an increase in cost of external equity measured required rate of return by investors, and perceived uncertainty of market participants measured as analyst forecast dispersion (A.F.D.). Our findings confirm that cost of equity and perceived uncertainty of market participants increases during a period of high E.P.U., which identify an important channel that affect dividend sustainability. We further examine firm payout policy under period of E.P.U. Results show that during a period of high E.P.U., past payers/non-payers are more/less likely to terminate/initiate dividend. Precisely, study confirms that one standard-deviation increase in E.P.U. causes past dividend-payers/non-payers to increase/decrease d_t/d_i by approximately 53%/24%.

We also analyse the potential role of firm's heterogeneous characteristics towards d_t and d_i decision during E.P.U. Particularly, firms with higher return on invested capital (R.O.I.C.), rely more on internal finance (I.F.) and S.O.E.s, have ability to

mitigate the negative/positive influence of uncertainty on likelihood of d_i/d_t for past non dividend-payers/past dividend-payers. Additionally, results of firm from various degrees of marketised groups reveal that d_t decision of low marketised group firms are less sensitive to E.P.U. Our findings are robust under different robustness checks. We first used the lagged E.P.U. of U.S.A. as an instrument variable, and also consider the global financial crisis, fiscal and monetary policy as a proxy to E.P.U. and finds similar results.

We introduce the novel relationship between E.P.U. and d_t/d_i decisions. It contributes in existing literature with following ways. *Firstly,* to the best of our knowledge, we first time added new insight into dividend policy literature by answering how E.P.U. shape d_t/d_i decisions. *Secondly*, study contributes in existing literature by analysing the potential role of firm's heterogeneous characteristics towards shaping the d_t/d_i decision during E.P.U. Thirdly, we employ Chinese firms' data because it is still considered as transition economy, relocating from centrally planned to market based economy. Therefore, it is interesting to investigate how an E.P.U. in a transition based economy shape the d_t/d_i decision.

The rest of the article is ordered as follow; section 2 presents the theoretical background and hypothesis development, section 3 is the data and empirical modelling, and finally a brief conclusion is presented in section 4.

2. Theoretical background and hypothesis development

Dividend policy and its determinants are long been an important and debatable topic in financial literature. After the pioneering work of Lintner (1956) on dividend sustainability, a continuous development has been observed in dividend policy literature which results in two strand of theories i.e., signalling theory (John & Williams, 1985) and agency theory (Jensen, 1986). Researcher uses the singling theory to examine the response of market for dividend payout, dividend payment changes and their relation with firms' future earnings (Miletić, 2011). In agency theory context, researchers have studied the determinants of dividend policy at micro and macro level including heterogeneous factors of firms (Mahdzan, Zainudin, & Shahri, 2016), corporate governance characteristics (Sarwar et al., 2018), investor protection (La Porta et al., 2002) and managerial ability (Sarwar et al., 2019). In current decade, the effect of uncertainty on dividend policy has gained wide acceptance of researchers that is followed by two correlated thrusts. The first one focuses on the firm level uncertainty such as; cash flow uncertainty (Chay & Suh, 2009). The second one focuses on the impact of uncertainties regarding firm environment, caused by event-driven activities, such as political uncertainty (Huang et al., 2015), uncertainty caused by financial crisis of 2008 (Bliss, Cheng, & Denis, 2015), and tax policy changes (Buchanan et al., 2017) on firm payout policy. To add more into this growing body of literature, we adopt a different approach by taking a sample of Chinese non-financial listed firms from 2000 to 2015 to analyse the effect of overall E.P.U. on dividend sustainability.

Number of studies have examined the relationship between E.P.U. and firm-level investment such as; Wang, Chen and Huang (2014) argue that capital investment decreases due to an increase in E.P.U. Further, Demir and Ersan (2017) analysed the

impact of E.P.U. on firms' cash holdings, and reveals that firms prefer to hold more cash during period of high uncertainty. The present study augments the existing literature by analysing the potential role of E.P.U. towards dividend sustainability.

Uncertainty is an important channel due to which changes in the economic policies impact financial markets. Capital market risk perception increases during period of uncertainties associated with the possible changes in macro environment (Pastor & Veronesi, 2013). Increase in risk perception associated with E.P.U. may affect dividend sustainability of firms through following two aspects. First, during a period of uncertainty, an increase in the managers' perceived risk, that causes an increase in investors' risk perception, leads to an increase in firms' costs of capital. Financing cost increases due to an increase in information asymmetry during uncertainty period (Huang et al., 2015). Second, E.P.U. causes an increase in manager's perceived risk because of cash flow risk associated with policy uncertainty. Both idiosyncratic and aggregate shocks affect the firm cash flows (Berkman et al., 2011), and thus increase the chances of financial distress. Firms adjust their dividend policies to align with future expected earnings (Benito & Young, 2003). Therefore, with the increase in perceived risk, firms are inclined to implement extemporaneous measure to combat risk, and by adopting most usual way of fund raising and reducing expenditure. However, during uncertainty period it is tough for firms to obtain funds (Lei et al., 2015), while it is feasible to reduce expenses. It is more likely to adjust dividends as they are more flexible unlike employee's compensations and working capital adjustment (Huang et al., 2015). Therefore, an increase in uncertainty is attributed to changes in economic policies and causes an increase in managers' perceived risk, and an increase in investors' required rate of return during high policy uncertainty periods, which yield our first hypothesis as:

> **H_1**: E.P.U. tempt to an increase in manager's perceived risk, and an increase in external cost of capital. During high uncertainty periods, firms are more likely to terminate and are less likely to initiate dividend, *ceteris paribus*.

The literature shows that firm's financial characteristics influence the dividend policy decisions during period of uncertainty. Potential firm characteristics include current or conserve cash, expected losses, fund new investment, low or declining earnings, debt covenant restrictions, high debt payments, credit line cancellation and litigations, cash holding level and cost of external capital (Huang et al., 2015). China has significantly higher return on capital as compare to mature market economies (Wang et al., 2014). Correspondingly, Sun, Xiao and Yang (2010) document that China is significantly enjoying a higher return to capital as compare to major economies of the U.S.A and Japan.

Many strange phenomena are observed in China, like low level of dividends and firms with zero dividend payments in the 1990s. C.S.R.C. has introduced guidelines to instruct listed firms that dividend payments are the precondition for refinancing. These pre-conditioned dividend payments are progressively issued from 2001 to 2004 and then in 2006 to 2008. Firms with refinancing plans have to pay dividend since 2001, as in accordance with semi-mandatory dividend policy and it is not a compulsory requirement but a soft restraint regarding dividend regulations (Li, Wei, & Wu, 2010).

Dividend signalling theory predicts firm with high future performance and high ROIC will continue their dividend payments even during period of uncertainty, to mimic well-positioned in the market, and to get more capital during uncertainty. Based on signalling theory, it is predicted that firms that are better positioned in the market, earn high capital and more retained earnings, generally maintain their dividend during period of uncertainty. Additionally, firms with refinancing plans regulate their dividend payments to attain conditions of refinancing, and investors take dividend yield as one of the condition for investment (Li et al., 2010). During period of uncertainty, firms become more vigilant regarding investment decisions and preferably reduces or delays investments to avoid the negative effect of uncertainty until it get resolved (Pastor &Veronesi, 2013).Therefore, it is likely that higher R.O.I.C. moderates the negative effect of uncertainty on dividend sustainability. We postulate study second hypothesis as:

H2: During periods of high uncertainty, firms having high return to capital are less likely to terminate dividend payments and more likely to initiate dividend payments, *ceteris paribus*.

Primarily, firms' asset growth in China is based on internal financing because external financing environment is dominated by state-owned banks (Guariglia, Liu, & Song, 2011). Consistent with Pecking order theory, firms first rely on internal financing then go for debt, and finally issue the stocks to obtain external equity (Myers & Majluf, 1984). Corporate managers decide to retain excessive free cash flow (F.C.F.) for their personal benefit instead of paying dividend, lead to poor corporate governance that causes agency conflict among managers and shareholders. Firms suffer from agency cost that arise because of management intention to make investment in negative Net Present Value (N.P.V.) projects, could be eliminated by paying dividend to shareholders instead of investing in negative N.P.V. projects (Fairchild, 2010). Thus, firms are better-off with I.F. which mitigates the negative effect of policy uncertainty. Therefore, this could be the case that firms having high internal resources are less exposed to policy uncertainty which effects the dividend sustainability.

This leads to study third hypothesis.

H3: During high uncertainty periods, firms having more I.F. are less likely to terminate and more likely to initiate dividend, all else being equal.

China being a transition economy is dominated by the government interventions. Therefore, state-owned enterprise (S.O.E.) managers which are loyal to government enjoy large benefits and promotions (Deng, Morck, Wu, & Yeung, 2011). S.O.E. employees are highly paid employees in some monopoly industries, and they also make blind investment that are not profitable by turning a blind eye to state effort to preclude economy overheating as documented by *China Daily* in 2017. S.O.E.s pay higher dividend than non-state owned enterprises (N.S.O.E.s) as they have better access to external finance (Sun et al., 2014). This is because S.O.E.s have easy access to loans from state-owned banks, and faces less pressure to use internally generated funds for firm's asset growth which makes S.O.E.s pay higher dividends. Furthermore, S.O.E.s are liable to perform additional responsibilities that are beyond of N.S.O.E.s (Wang et al., 2014). Consistent with agency explanation of dividend

policy, it is expected that S.O.E.s have to bear bureaucratic cost and also the multiple objectives will excel S.O.E.s to pay dividend during period of uncertainty. Therefore, it is important to analyse the uncertainty effect on dividend policy, if any, systematically varies with ownership structure (S.O.E.s or N.S.O.E.s). This leads to the fourth hypothesis:

Hypothesis 4: During periods of high uncertainty, S.O.E.s are less likely to terminate and more likely to initiate dividend payments, *ceteris paribus*.

In China, degree of marketisation and economic development seems to be potholed across different regions. Certainly, some areas are more developed such as; Beijing, Shanghai and Shenzhen, while others cities such as Gansu, Quizhou and Qinghai are fall behind significantly (Lin, Lu, Su, & Chen, 2018).During E.P.U., degree of protection provided by government to market decreases, thus, leads to more fluctuations in stock prices (Pastor & Veronesi, 2013). This argument infers that more planned and marketised regions are influenced by the economic policy uncertainties more negatively which reduces the values delivered by government protection to the market.

Firms operational in these areas are more exposed to economic jolts which arise from changes in economic/monetary policy uncertainties. In fact, emerging economies are least affected by the financial crisis of 2007–2008 as compare to developed economies (Wang et al., 2014). This is also consistent with Calomiris, Love and Pería (2012) that developed countries are significantly affected by the liquidity shocks and credit supply during financial crisis. Thus, we empirically analyse whether the E.P.U. asymmetrically affects the dividend sustainability of firms operating in different regions having different degree of marketisation. This leads to the fifth hypothesis of our study:

H5: During periods of high uncertainty, firms in more marketised provinces/regions are more likely to terminate and less likely to initiate dividend payments, alternatively, firms in less marketised regions are less likely to terminate and more likely to initiate dividend payments, *ceteris paribus*.

3. Data and empirical modelling

3.1. Data

Initial sample of our study consists of 3,329 Chinese firms listed on Shenzhen and Shanghai stock exchange during the time span 2000 to 2015. We have excluded the financial firms due to different requirements for capital structure and profits. By excluding financial listed firms and the firms for which data is not available, our final sample includes 1375 Chinese non-financial listed firms. Study data is winsorised at 1% and 99% to remove outliers. Financial statement data is obtained from China Stock Market and Accounting Research (C.S.M.A.R.) database, and we follow the Baker et al. (2016) for Chinese E.P.U. index.[3]

3.2. Measurement of variables

Dependent variable of our study is dividend sustainability. Our data sample covers large cross-section of firms having a relatively persistent dividend payout with total

firm-year observations of 75,000 from 2000–2015. These facts may lead to issues while estimating changes in dividend policy in reaction to E.P.U. While considering these concerns, the current study emphasises on the dividend policy changes rather on changes itself. Thus, instead of dividend payout, our main variable of interest is *dramatic* fluctuations in dividend payout policy: d_t and d_i . Our main explanatory variable is E.P.U. We also control for number of control variables by following extant literature (Chay & Suh, 2009) including Tobinq (q), assets growth rate (Dta), firm size (Mv), retained earnings (Rete), return on assets (Roa), cash holdings (Cash) and stock return volatility (Std). Appendix A reports the summary statistics of these studied variables.

3.3. The effect of E.P.U. on dividend sustainability

This section is to test our study five hypotheses. To start with study first hypothesis, we first analyse whether policy uncertainty leads to rise in implied cost of capital and market participant perceived uncertainty. This further leads to whether policy uncertainty causes firm to terminate more dividend and initiate less dividend. Next, we analyse how firm heterogeneous characteristics moderates the relationship between E.P.U. and dividend sustainability based on R.O.I.C., I.F. and firm ownership (O.W.N.). Then, we analyse how marketisation level of different region effects the relationship between E.P.U. and dividend sustainability. Last section discuss the robustness test.

3.3.1. Uncertainty, E.P.U. and cost of equity capital

Uncertainty is an important channel due to which changes in the economic policies impact firm dividend policy. This study first examine how policy uncertainty leads to an increase in market participant perceived uncertainty, and cost of equity capital by estimating following econometric equation. In conformity with Huang et al. (2015) market participants' perceived uncertainty is measured through A.F.D., and we follow the Gebhardt, Lee and Swaminathan (2001) residual income valuation model for approximating the implied cost of capital ($ICOC_{gls}$). Thus, we estimate the following equations in Table 1;

Table 1. E.P.U., cost of capital and analyst forecast dispersion.

Variables	ICOC	AFD
EPU	0.036***	0.001**
	(0.001)	(0.0005)
Mv	0.003***	0.001**
	(0.0004)	(0.0003)
LEV	0.004***	0.001**
	(0.0005)	(0.0003)
INF	−0.003***	0.001***
	(0.0002)	(0.0002)
GDP	−0.03***	−0.001***
	(0.0004)	(0.0003)
Observations	43,272	43,272
	0.16	0.04

Notes: S. deviation is given in parentheses. ***, **, or * next to coefficients indicate that coefficients are significantly different from zero at the 1%, 5%, or 10% confidence levels, respectively.
Source: Authors' calculation.

Table 2. E.P.U. and dividend sustainability.

	Model 1 d_t	Model 2 d_i	Model 3 d_t	Model 4 d_i
EPU	0.006***	−0.007**	0.006***	−0.007***
	(0.001)	(0.001)	(0.001)	(0.0002)
Dta			−0.443**	0.136**
			(0.104)	(0.033)
Rete			−0.408**	0.268***
			(0.167)	(0.02)
Roa			−0.189**	0.286***
			(0.101)	(0.022)
Tobinq			−0.727***	−0.263***
			(0.075)	(0.015)
Mv			−0.105**	0.091***
			(0.052)	(0.012)
Cash			−0.298***	0.299***
			(0.054)	(0.016)
Sd			1.260**	−0.15
			(0.276)	(0.245)
Industry dummies			YES	
Number of Observation	39,621	35,388	39,621	35,388
Pseudo R2	0.0281	0.0545	0.0639	0.068

Notes: S. deviation is given in parentheses. ***, ** next to coefficients indicate that coefficients are significantly different from zero at the 1% & 5% confidence levels, respectively.
Source: Authors' calculation.

$$AFD_{i,t} = \beta_1 EPU_t + \beta_2 MV_{i,t} + \beta_3 LEV_{i,t} + \beta_4 INF_t + \beta_5 GDP_t + \varepsilon_t \ldots\ldots \quad (1)$$

$$ICOC_{i,t} = \beta_1 EPU_t + \beta_2 MV_{i,t} + \beta_3 LEV_{i,t} + \beta_4 INF_t + \beta_5 GDP_t + \varepsilon_t \ldots\ldots \quad (2)$$

Here, E.P.U. is economic policy uncertainty, Mv is firm size (Natural Log of market capitalisation), *LEV* is Leverage (Ratio of Total Debt to Total Assets), *INF* is Inflation (Annual Inflation Rate), *GDP* is Gross domestic Production (Standard Deviation of Annual GDP rates).

Table 1 confirms that perceived uncertainty of market participant's and implied cost of capital increase during period of high E.P.U., which identify an important channel through which firms are more(less) likely to terminate(initiate) dividend payments.

3.3.2. E.P.U. and dividend sustainability

To econometrically analyse the dividend policy changes due to E.P.U., we use two models which are based on d_t and d_i dummy. We employ the following logit models (equation 3/4) for analysing the effect of explanatory variables on the probability of d_t/d_i by dividend payers/non-payers.

$$d_{t\ (i,t)}/d_{i(i,t)} = \beta_1 EPU_{i,t} + \beta_2 q_{i,t} + \beta_3 dta_{i,t} + \beta_4 mv_{i,t} + \beta_5 rete_{i,t} + \beta_6 roa_{i,t} + \beta_7 cash_{i,t} + \beta_8 std_{i,t} + \varepsilon_t \ldots. \quad (3/4)$$

Suppose, Y is a dividend decision binary response variable as ($Y \in \{d_t, d_i\}$), Q represents the E.P.U., and M is a vector variable which contains characteristics of firms, industry level fixed effect, and a constant. The Logit regression model for d_t/d_i decision takes the following form that assumes the likelihood of terminating/initiating dividend:

$$P\ (d_t/d_i = 1) = \frac{\mathrm{Exp}(\alpha Q\ + M\beta)}{1 + \mathrm{Exp}(\alpha Q\ + M\beta)} \ldots\ldots \quad (5/6)$$

In equation 5/6, Exp (.) is exponential absolute wherein coefficient estimates are α and β. The chances of firms to d_t/d_i is ratio of likelihood of firms to terminate dividend(P(d_t=1))/initiate dividend(1-P (d_i=1) to the likelihood of dividend paying firms (1-P (d_t=1)/non-paying firms (1-P (d_i=1). In this study, we also control for the firm characteristics as in equation (3/4).

Table 3 logit regression estimates indicate that past dividend payers/non-payers are more/less likely to terminate/initiate dividend during period of high E.P.U. The results of model 3/4 shows that E.P.U. has statistical significant positive/negative impact on d_t/d_i with a coefficient of 0.006/0.007 (highly significant at 1% level). Our result indicates that a past dividend payers/non-payer increases/decreases the d_t/d_i by approximately 53%(=[exp(0.006*61.94)-1]*100%)/24% (=[exp((-0.007)*61.94)-1]*100%) in response of one standard deviation increase in E.P.U., indicating a positive/negative relation with d_t/d_i. Thus finding support our first hypothesis, past payers/non- payers are more/less likely to terminate/initiate dividend during period of high policy uncertainty.

Further, Results confirm that firms which are mature (Rete), profitable (R.O.A.), have high asset growth (Dta), high cash holdings (Cash) and high firm value (q) are more/less likely to initiate/terminate during period of high E.P.U. Firm risk (Std) is positively/negatively and significantly related to d_t/d_i decision.

3.3.3. Firm heterogeneous characteristics, E.P.U. and dividend sustainability

To econometrically investigate the influence of firms heterogeneous characteristics on dividend decisions during E.P.U., we modify our baseline regression equation 3/4. By following the analogy of Tong and Wei (2010), we use the following logit regression equations for analysing the impact of firm heterogeneous characteristics on the probability of d_t/d_i in an equity market of China. Firm heterogeneous characteristics include R.O.I.C. (Net operating profit before interest divided by invested capital), I.F. (Sum of net profit and depreciation normalised by total assets) and O.W.N. (Dummy variable equal to 1 for S.O.E.s, 0 otherwise)

$$d_{t(i,t)}/d_{i(i,t)} = \beta_1 EPU_{i,t} + \beta_2 (EPU_{i,t} * ROIC_{i,t}) + \sum_{j=3}^{9} \beta_j X_{k(i,t)} + \varepsilon_t \quad (7)$$

$$d_{t(i,t)}/d_{i(i,t)} = \beta_1 EPU_{i,t} + \beta_2 (EPU_{i,t} * IF_{i,t}) + \sum_{j=3}^{9} \beta_j X_{k(i,t)} + \varepsilon_t \quad (8)$$

$$d_{t(i,t)}/d_{i(i,t)} = \beta_1 EPU_{i,t} + \beta_2 (EPU_{i,t} * OWN_{i,t}) + \sum_{j=3}^{9} \beta_j X_{k(i,t)} + \varepsilon_t \quad (9)$$

Table 3. Firm heterogeneous characteristics, E.P.U. and dividend sustainability.

	Model 1		Model 2		Model 3		Model 4	
	d_t	d_i	d_t	d_i	d_t	d_i	d_t	d_i
EPU	0.006***	−0.008***	0.006***	−0.008***	0.006***	−0.011***	0.006***	−0.012***
	(0.001)	(0.0002)	(0.0005)	(0.0001)	(0.001)	(0.0003)	(0.001)	(0.0003)
EPU*ROIC	−0.01***	0.016***					−0.009**	0.007**
	(0.003)	(0.002)					(0.003)	(0.002)
EPU*IF			−0.012***	0.012***			−0.009**	0.012***
			(0.003)	(0.002)			(0.004)	(0.003)
EPU*OWN					−0.002***	0.007***	−0.002***	0.008***
					(0.001)	(0.0003)	(0.001)	(0.0002)
Dta	−0.432**	0.105**	−0.443**	0.113**	−0.435**	0.156**	−0.447***	0.118**
	(0.212)	(0.034)	(0.213)	(0.032)	(0.205)	(0.035)	(0.213)	(0.035)
Rete	−0.401**	0.262***	−0.407***	0.266***	−0.427***	0.300***	−0.423***	0.295***
	(0.059)	(0.020)	(0.059)	(0.020)	(0.062)	(0.021)	(0.060)	(0.021)
Roa	−0.157**	0.266***	−0.163**	0.268***	−0.192**	0.268***	−0.154**	0.242***
	(0.058)	(0.020)	(0.058)	(0.022)	(0.057)	(0.023)	(0.058)	(0.023)
Tobinq	−0.725**	−0.268**	−0.736**	−0.265**	−0.746***	−0.277**	−0.751**	−0.282**
	(0.058)	(0.015)	(0.058)	(0.015)	(0.058)	(0.016)	(0.058)	(0.016)
Mv	−0.084**	0.094***	−0.078**	0.097***	−0.107**	0.110***	−0.078**	0.116***
	(0.039)	(0.012)	(0.039)	(0.012)	(0.039)	(0.012)	(0.039)	(0.012)
Cash	−0.286***	0.287***	−0.289***	0.292***	−0.298***	0.311***	−0.284***	0.298***
	(0.053)	(0.016)	(0.053)	(0.017)	(0.053)	(0.017)	(0.053)	(0.017)
Sd	1.30***	−0.155	1.265***	−0.132	1.46***	−0.113	1.499***	−0.108
	(0.278)	(0.245)	(0.280)	(0.245)	(0.280)	(0.250)	(0.285)	(0.250)
Industry dummies					YES			
Number of Observation	39,621	35,388	39,621	35,388	39,621	35,388	39,621	35,388
Pseudo R2	0.0661	0.068	0.066	0.069	0.066	0.074	0.068	0.071

Notes: S. deviation is given in parentheses. ***, ** next to coefficients indicate that coefficients are significantly different from zero at the 1% & 5% confidence levels, respectively.
Source: Authors' calculation.

Here X_k represents the set of control variables as in equation 3/4. In accordance with hypotheses 2–4, we expect a negative/positive regression coefficient $(\beta_2 < 0)/(\beta_2 > 0)$ for the interaction term (E.P.U.*Hetero) and d_t/d_i decisions.

Table 3 shows regression coefficients of equations 7–9 for d_t/d_i decisions. For d_t/d_i decision in model 1, regression coefficient of β_1, between E.P.U. & d_t/d_i is still significant and positive/negative, however, regression coefficient of β_2 that is the interaction term between E.P.U. and R.O.I.C. is statistically negative/positive that confirms that firms having more R.O.I.C. mitigates the positive/negative consequence of E.P.U. on d_t/d_i decision.

Unequivocally, the marginal positive/negative impact of E.P.U. on d_t/d_i decision mitigates with the inclusion of R.O.I.C. The individual impact of E.P.U. on d_t/d_i is measured by the coefficient 0.006/−0.008, whereas with the consideration of R.O.I.C., the coefficient is reduced/increased to −0.01/0.016 that supports our second hypothesis.

In the similar vein, in model 2, a statistically significant and negative/positive coefficient of interaction term E.P.U.*I.F. specifies that during period of high E.P.U., the d_t/d_i decision of companies with more I.F. are affected by E.P.U. to a lesser extent. In model 2, the standalone impact of E.P.U. on d_t/d_i is measured by the coefficient 0.006/−0.008, whereas with the consideration of IF, coefficient is reduced/increased to −0.012/0.012 that supports our third hypothesis that firm that rely more on I.F. mitigates the positive/negative consequence of E.P.U. on d_t/d_i.

Model 3 infers that dividend decision of state owned firms are less prone to E.P.U. The standalone impact of E.P.U. on d_t/d_i is measured by the coefficient 0.006/−0.011, whereas while considering only the S.O.E.s, the coefficient is reduced/increased) to −0.002/0.007 that supports our fourth hypothesis. In model 4, we added all the three interaction term together, and analysed the impact of the firm's heterogeneous characteristics on dividend decisions during policy uncertainty.

3.3.4. Marketisation Impact, E.P.U. and dividend sustainability

To test study a fifth hypothesis, we categorise the firms into high/low marketised set based on the National Economic Research Institute (N.E.R.I.) index, based on the degree of economic development, government interventions, and legal system. It is primarily constructed by Fan, Wang and Zhu (2011) that categorise firms on the basis of regions, and company operating in region with N.E.R.I. index equal or above median value, categorise firm belongs to high marketisation group, else low.

Table 4 reports base line regression estimates for analysing the impact of marketisation relationship between E.P.U. and dividend adjustments. It is clear that there is no obvious difference in d_t/d_i decisions for high and low marketised firms categorised on the basis of the median of N.E.R.I. index value. Therefore, we further categorise sample firms based on marketisation dummy variable, and the dummies are based upon 95, 75, 25 and 5 percentiles to N.E.R.I. index. Results of the firm from various degree of marketised groups reveal that the d_t decision of low marketised group firms are less sensitive to E.P.U. In contrast to high marketised groups, firms from low marketised group initiate more dividends during period of uncertainty in China. These findings are consistent with the rational of Calomiris et al. (2012) that firms in

Table 4. Marketisation impact, E.P.U. and dividend sustainability.

	High marketisation ≥ Median		Low marketisation ≤ Median		Various degree of marketisation	
	d_t	d_i	d_t	d_i	d_t	d_i
EPU	0.007***	−0.008***	0.005***	−0.0089***	0.007***	−0.009***
	(0.001)	(0.0003)	(0.001)	(0.001)	(0.001)	(0.001)
EPU × (MD ≤ 5)					0.005**	0.006***
					(0.001)	(0.001)
EPU × (MD ≤ 5 MARKET ≤ 25 MD)					−0.002**	0.002**
					(0.001)	(0.0001)
EPU × (MD ≤ 25 MARKET ≤ 75 MD)					−0.001*	0.001
					(0.001)	(0.001)
EPU × (MD ≤ 75 MARKET ≤ 95 MD)					0.0002	0.001*
					(0.001)	(0.001)
Dta	−0.350	0.126**	−0.703*	0.163**	−0.453**	0.133***
	(0.231)	(0.041)	(0.404)	(0.060)	(0.209)	(0.034)
Rete	−0.373***	−0.191***	−0.550***	0.715***	−0.410**	0.270***
	(0.074)	(0.026)	(0.113)	(0.051)	(0.061)	(0.020)
ROA	−0.157**	0.155***	−0.317**	0.857***	−0.191**	0.287***
	(0.070)	(0.027)	(0.103)	(0.051)	(0.057)	(0.022)
Tobinq	−0.709***	−0.298***	−0.776***	−0.338***	−0.736***	−0.267***
	(0.069)	(0.019)	(0.105)	(0.032)	(0.058)	(0.015)
Mv	−0.057	0.087***	−0.156**	0.177***	−0.106**	0.091***
	(0.048)	(0.015)	(0.073)	(0.023)	(0.039)	(0.011)
Cash	−0.290***	0.335***	−0.357**	0.344***	−0.291***	0.301***
	(0.062)	(0.019)	(0.105)	(0.035)	(0.052)	(0.016)
Sd	1.419***	−0.207	0.927***	−0.798**	1.212***	−0.158***
	(0.330)	(0.306)	(0.526)	(0.468)	(0.281)	(0.245)
Industry dummies			YES			
Number of observation	38,707	35,194	34,755	33,806	39,621	35,388
Pseudo R^2	0.0637	0.0379	0.0977	0.621	0.0666	0.068

Notes: S. deviation is given in parentheses. ***, **, and * next to coefficients indicate that coefficients are significantly different from zero at the 1%, 5%, and 10% confidence levels, respectively.
Source: Authors' calculation.

Table 5. E.P.U. and dividend sustainability (instrument variable).

	Model 1		Model 2	
	d_t	d_i	d_t	d_i
EPU	0.016***	−0.008***	0.0153***	−0.008***
	(0.002)	(0.0002)	(0.0015)	(0.0002)
Dta			−0.479**	0.032**
			(0.223)	(0.010)
Rete			−0.447**	0.073***
			(0.144)	(0.006)
Roa			−0.102*	0.059***
			(0.054)	(0.007)
Tobinq			−0.545***	−0.031***
			(0.052)	(0.004)
Mv			−0.091*	0.016***
			(0.033)	(0.003)
Cash			−0.269***	0.056***
			(0.042)	(0.004)
Sd			0.556**	0.036
			(0.257)	(0.078)
Industry dummies			YES	
Wald test	0.000	0.000	0.000	0.000
Number of observation	39,889	35,388	39,889	35,388
Model sig	0.000	0.000	0.000	0.000

Notes: S. deviation is given in parentheses. ***, **, and * next to coefficients indicate that coefficients are significantly different from zero at the 1%, 5%, and 10% confidence levels, respectively.
Source: Authors' calculation

developing countries are less exposed to crisis. i.e.. low marketised group firms are less exposed to E.P.U.

3.3.5. Robustness test

Wang et al. (2014), considered E.P.U. as an endogenous variable as E.P.U. can be affected by political forces in a country, and therefore it is difficult to assume E.P.U. as a strictly exogenous variable. Therefore, in conformity with aforementioned, we first check the endogeneity of our main explanatory variable, i.e., E.P.U.[4] We uses lagged U.S.A.-E.P.U. as an instrument variable, and further employ instrumental variable regression method to estimate the relationship between E.P.U. and dividend decisions. There may be a close link between E.P.U. in the U.S.A. and economic policies in China. It is evident that exchange and interest rates of emerging economies are directly affected by the monetary policy of U.S.A. (Ho, Zhang, & Zhou, 2018). The uncertainty in interest rate (E.P.U.) causes firms to rely more on internal financing because of perceived cash flow uncertainty and external cost of capital, therefore it causes change in dividend policy decisions. Therefore, we use U.S.A.-E.P.U. as an instrument variable in this study.

Table 5 presents instrumental variable regression estimates, and produces similar results for d_t/d_i decisions (Model 1 & Model 2) as in Table 2 which confirms our study first hypothesis. Further, Wald test statistics also confirm that variable is not exogenous.

3.3.6. 2008 Financial crisis as a proxy to E.P.U

During financial crisis, the shrinkage in G.D.P. causes drop off in profitability which leads to decrease in dividend payout (Floyd, Li, & Skinner, 2015). This study also

Table 6. 2008 Financial crisis as a proxy to E.P.U.

	Model 1		Model 2		Model 3		Model 4	
	d_t	d_i	d_t	d_i	d_t	d_i	d_t	d_i
FCEPU	0.005***	−0.004***	0.006***	−0.004***	0.006***	−0.007***	0.006***	−0.007***
	(0.0004)	(0.0001)	(0.0004)	(0.0002)	(0.0004)	(0.0003)	(0.0005)	(0.0003)
FCEPU*ROIC	−0.012***	0.009***					−0.010**	0.006*
	(0.002)	(0.002)					(0.003)	(0.003)
FCEPU*IF			−0.016***	0.008**			−0.007*	0.006*
			(0.004)	(0.003)			(0.004)	(0.003)
FCEPU*Ownership					−0.002**	0.007***	−0.002**	0.007***
					(0.001)	(0.0003)	(0.001)	(0.0003)
Dta	−0.488**	0.122*	−0.477**	0.117**	−0.473**	0.116**	−0.494**	0.105**
	(0.221)	(0.033)	(0.219)	(0.034)	(0.213)	(0.034)	(0.221)	(0.034)
Rete	−0.411**	0.299***	−0.407***	0.298***	−0.428**	0.296	−0.420**	0.000
	(0.060)	(0.021)	(0.061)	(0.021)	(0.062)	(0.021)	(0.061)	(0.001)
Roa	−0.158**	0.289***	−0.153**	0.288***	−0.183**	0.291***	−0.152**	0.297***
	(0.053)	(0.022)	(0.058)	(0.023)	(0.058)	(0.023)	(0.059)	(0.021)
Tobinq	−0.756***	−0.284**	−0.742***	−0.284**	−0.754***	−0.280***	−0.76***	−0.282**
	(0.058)	(0.015)	(0.058)	(0.015)	(0.059)	(0.015)	(0.059)	(0.015)
Mv	−0.106**	0.099***	−0.114**	0.100***	−0.131**	0.101***	−0.104**	0.100***
	(0.039)	(0.012)	(0.039)	(0.012)	(0.039)	(0.012)	(0.040)	(0.012)
Cash	−0.311***	0.328***	−0.308***	0.328***	−0.315***	0.331***	−0.303***	0.325***
	(0.054)	(0.017)	(0.054)	(0.016)	(0.054)	(0.017)	(0.054)	(0.017)
Sd	1.465***	0.198	1.495***	0.193**	1.595***	−0.053	1.162***	−0.022
	(0.281)	(0.066)	(0.279)	(0.244)	(0.282)	(0.248)	(0.285)	(0.248)
Industry dummies					YES			
No of Observation	39,621	35,388	39,621	35,388	39,621	35,388	39,621	35,388
Pseudo R2	0.0696	0.0696	0.0696	0.066	0.0685	0.063	0.0716	0.063

Notes: S. deviation is given in parentheses. ***, **, and * next to coefficients indicate that coefficients are significantly different from zero at the 1%, 5%, and 10% confidence levels, respectively.
Source: Authors' calculation

uses 2008 crisis as a proxy to measure the E.P.U. The global financial crisis appeared in August 2007, and the failure of Lehman brother in September 2008 give rise to the crisis and spread over rest of the world, and it jeopardised the real economy. Therefore, we consider the collapse of Lehman brothers as separation point and divide the sample period into two sub-sample periods. We introduce the dummy variable for the period of financial crisis, equal to 1 if the sample period is after 3rd quarter of 2008, else 0. Hence, this study uses the global financial crisis as E.P.U. proxy and provides the robustness of our findings.[5]

Table 6 reports regression estimates by considering the global financial crisis as a proxy to E.P.U. Model 1–4 produce similar results as in Table 2, i.e., during the period of financial crisis, firms are more/less likely to terminate/initiate dividend. Further, firms that rely more on I.F., having high R.O.I.C. and state owned firms mitigates the positive (negative) effect of E.P.U. on d_t/d_i. Therefore, these findings confirm the robustness of our model.

4. Conclusion

By considering the transition of Chinese economy, this article investigates the impact of E.P.U. on dividend sustainability – d_t and d_i *decisons*- for the listed firms of China during 2000–2015. We first institute the channel through which E.P.U. affect firms dividend policy and finds that manager's perceived risk of uncertainty and implied cost of capital increases during E.P.U. that causes past dividend payers to terminate more and past non-payers to initiate less dividends. However, the negative/positive effect of E.P.U. on firms d_t/d_i decision is mitigated by considering firm heterogeneous characteristics. Further, findings show that firms having high asset growth, maturity, profitability, cash holdings and high firm value are more/less likely to initiate/terminate dividend during E.P.U. In addition, findings confirm that firms operating in low marketised groups are less sensitive to E.P.U. while making dividend decisions. These findings are robust under different robustness check. *Firstly*, to control possible endogeneity, we use the lagged E.P.U. of U.S.A. as an instrument variable, and find consistent results. *Secondly*, we consider global financial crisis, fiscal and monetary policy as a proxy to E.P.U. and find similar results.

This is the first study that investigates the impact of E.P.U. on firms payout decisions which has not been investigated before. Therefore, this study also provides important implication for policymakers. To lessen the negative effect of E.P.U. on dividend decision, policy makers need to maintain the transparency, continuity and stability of economies that in-turn affects firms' policies. Moreover there is a need to maintain stable environment for firms by reducing policy uncertainties. Also, firm heterogeneous factors provide caution for firms to mitigate the negative effect of E.P.U. on dividend sustainability. As China is moving towards market economy, therefore firms operating in high marketised areas/provinces are more affected by E.P.U. compared to firms operating in low marketised areas/provinces. Thus, this study could also be generalised to other developed or emerging economies to maintain stable business environment. Future studies should also compare the result of emerging firms with the firms of developed markets to evaluate the influence of

E.P.U. on dividend policy. This study is limited to Chinese non-financial listed firm due to non-availability of data for all study variables and we are focused to the in-depth analysis of relationship between E.P.U. and dividend sustainability of Chinese firms.

Notes

1. *South China Morning Post* (S.C.M.P.) is the first and largest English Newspaper that was founded in 1903 and published by SCMP Group. It is circulated among 104,000 and cover news for HK, Mainland China and Asia.
2. For example, E.P.U. index is used as proxy for political uncertainty for analysing the risk premium in financial markets during period of political uncertainty (Pastor & Veronesi, 2013). Kang et al. (2014) used E.P.U. index for U.S.A. to examine the impact of political uncertainty on firms' investment. Colombo (2013) also uses this index to examine the effect of uncertainty on Eurozone macroeconomics aggregate.
3. www.policyuncertainty.com
4. Endogeneity test of endogenous regressor P. value (0.000) confirms the endogeneity of E.P.U.
5. We also take Fiscal and monetary policy variables as a proxy to E.P.U. for robustness check, and produce similar results. Robustness checks available for readers upon request from author.

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Appendix A

Table A1. Summary statistics.

Panel A: Univariate Analysis

	No of Obs	Mean	Median	SD	Minimum	Maximum
EPU	75,278	123.33	103.46	61.94	45.29	304.22
Dta	75,278	0.064	0.0179	0.493	−0.327	1.071
Roa	75,278	0 .660	0 .752	0.694	−1.569	1.927
Rete	75,278	0.0824	0.141	0.786	−3.193	2.662
q	75,278	2.215	1.94	1.047	0.526	4.79
Mv	75,278	22.34	22.197	1.399	18.748	26.823
Cash	75,278	1.026	0.665	1.201	0	6.378
Std	75,278	0.147	0.131	0.093	0.058	0.351

Panel B : Correlation Matrix

	d_t	d_i	*EPU*	Dta	Rete	Roa	q	Mv	Cash	Std
d_t	—	—								
d_i	—	—								
EPU	0.0611	−0.1732	—							
Dta	−0.0114	0.0146	0.0073	—						
Rete	−0.0328	0.0496	0.0901	0.0117	—					
Roa	−0.0233	0.093	−0.0441	0.008	0.07	—				
q	−0.0578	−0.0851	−0.0334	0.0218	−0.04	−0.0147	—			
Mv	−0.0331	0.0122	0.1164	−0.0699	0.091	0.104	−0.0415	—		
Cash	−0.0269	0.09	0.0474	−0.0203	0.099	0.1555	−0.1801	0.274	—	
Std	0.0158	−0.0347	−0.0104	0.0335	0.07	−0.0598	0.0828	−0.084	−0.0547	—

Notes: This table presents summary statistics of the study main variables. Univariate summary statistics is given in Panel A and correlation matrix in presented in Panel B. From the results of correlation analysis, it is evident that dt is positively related to E.P.U. and di is negatively related to E.P.U. Panel B also shows the preliminary view of degree of associations among all our studied variables.
Source: Authors calculation.