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Economic policy uncertainty and stock price crash risk

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ABSTRACT

We examine the impact of economic policy uncertainty (*EPU*) on firm-specific crash risk. Based on a large sample of Chinese listed firms over the period from 2000 to 2017, we provide empirical evidence that firms are more likely to experience stock price crashes when *EPU* increases. Cross-sectionally analysis further reveals that the impact of *EPU* on stock price crash risk is stronger for firms whose returns are more sensitive to *EPU*. More specifically, young stocks, small stocks, high volatility stocks, and growth stocks, which have higher valuation uncertainty *per se*, are more sensitive to *EPU* and are more affected by *EPU* in terms of crash risk. We further show that *EPU* is significantly and positively associated with aggregated stock price crash risk at the market level.

1. Introduction

In this study, we empirically investigate the influence of economic policy uncertainty (*EPU*) on stock price crash risk, which refers to a significant negative drop in stock price, in the Chinese A-share market. Economic policies, including monetary, fiscal, regulatory and tax affairs, shape the environments where firms operate. There has been a growing interest in the economic consequences of economic policy uncertainty. Most existing studies have focused on the impact of economic policy uncertainty on corporate investment behavior as well as investment efficiency (Bernanke, 1983; Rodrik, 1991; Leahy and Whited, 1995; Bloom et al., 2007; Bloom, 2009; Julio and Yook, 2012; Durnev, 2010; Jens, 2017). In recent periods, special attention has been devoted to the implications of economic uncertainty for asset pricing. A couple of theoretical and empirical papers have analyzed the effects of *EPU* on stock markets. Pastor and Veronesi (2012, 2013) document that higher *EPU* leads to lower contemporaneous stock prices and higher expected future returns. Boutchkova et al. (2012) show that political risk is translated into higher return volatility. Brogaard and Detzel (2015) conjecture that *EPU* is an economically important risk factor in asset pricing.

Though past studies have investigated the influence of *EPU* on stock return and volatility (e.g., Pastor and Veronesi, 2012, 2013; Boutchkova et al., 2012), the impact of *EPU* on the third moment of stock return, i.e. stock price crash risk, has received insufficient attention. In this study, we attempt to fill this void by empirically investigating the influence of *EPU* on stock price crash risk at both the individual stock level and market level in Chinese A-share market. We expect *EPU* to be positively related to stock price crash risk as managers' incentives and abilities to withhold bad news, which is an important determinant of crash risk, are both strengthened during high *EPU* periods. High *EPU* is followed by increased fluctuation in companies' earnings and cash flow, resulting in managers' greater tendency to distort financial information in order to smooth earnings or alleviate short-term performance pressures. In addition, high *EPU* adds to the information asymmetry between corporate insiders and outside investors (e.g., Nagar et al., 2019), which increases investors' reliance on corporate disclosures in making investment decisions and managers' ability to manipulate earnings. Therefore, we expect high *EPU* to be followed by greater stock price crash risk especially among stocks with greater

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valuation uncertainty.

We conduct the investigation in Chinese A-share market mainly for two reasons. First, the Chinese A-share stock market is one of the most popular and important emerging markets and has drawn much attention and investments worldwide. However, as a developing country, China makes frequent adjustments of its economic policies. Therefore, it is worthwhile to investigate the impacts of economic policy uncertainty on A-share market. Second, China experienced an astonishing market crash in June 2015 with the A-share market index plunged by around 30% and more than $3 trillion of market value wiped out. By investigating the influence of economic policy uncertainty on Chinese A-share market, we aim to identify potential determinants of stock price crash risk. Such findings would have practical implications for market participants in China as well as in other developing markets.

To measure economic policy uncertainty, we resort to Baker, Bloom and Davis (2016), which quantify economic policy uncertainty using textual analysis of policy-related news articles in various media. They construct *EPU* indices for multiple countries and regions, including China. Following studies on crash risk (e.g., Chen et al., 2001; Hutton et al., 2009), we measure quarterly firm-specific crash risk using four proxies: (1) the negative skewness of firm-specific daily returns (*NCSKEW*); (2) the down-to-up volatility of firm-specific daily returns (*DUVOL*); (3) the likelihood of the occurrences of stock price crash events (*FREQ*); and (4) an indicator of occurrences of stock price crash events (*CRASH*).

Our empirical investigation is conducted based on a large sample of Chinese listed firms over the period from 2000 to 2017. We document strong and robust evidence that firms are more likely to experience stock price crashes during high *EPU* periods. A one-standard-deviation increase in *EPU* is associated with a 5.33% increase in $NCSKEW_{it}$ and a 2.00% increase in $DUVOL_{it}$. The results remain strong after we control for various firm-specific determinants of crash risk, firm fixed effects and time fixed effects.

Our cross-sectional tests further demonstrate that the influence of *EPU* on crash risk is not constant across firms. It is stronger among firms with higher *EPU* return betas, which are those that are more sensitive to *EPU* changes. Given that *EPU* return beta cannot be observed directly, we take one step further to explore the relation between *EPU* return beta and observable firm characteristics, which could help us to better understand the cross-sectional variation of the influence of *EPU* on crash risk and identify those that are more likely to have high crash risk when *EPU* increases. Our investigation reveals that younger firms, smaller firms, more volatile firms, and firms with higher growth firms, which tend to have higher valuation uncertainty, have higher *EPU* return betas and tend to have stronger relation between crash risk and *EPU*.

Finally, we aggregate stock price crash risk at the market level and examine its relation with *EPU*. The results show that *EPU* is significantly and positively associated with aggregated crash risk at the market level. Our findings echo studies of Brogaard and Detzel (2015) and Pastor and Veronesi (2012), which argue that *EPU* creates systematic risk in stock markets and that the effect of *EPU* could not be fully diversified.

By exploring how *EPU* affects stock price crash risk, our study is related with Jin et al. (2019), but offers new insights. Jin et al. (2019) document that *EPU* is associated with stock price crash through its relation with manager's bad news hoarding behavior and investors' heterogeneous beliefs. Our study extends theirs in two perspectives: we investigate the cross-sectional variation in the influence of *EPU* on crash risk of individual stocks and we investigate the relation between *EPU* and crash risk at the market level.

This study contributes to the literature in several ways. First, we add to literature on how *EPU* brings real effects in financial markets. Existing studies have explored the impact of *EPU* on stock return and volatility, which are the first and second moments of return (e.g., Pastor and Veronesi, 2012, 2013; Boutchkova et al., 2012). Our study furthers these studies by examining the impact of *EPU* on the third moment of stock return, or stock price crash risk. Stock price crash risk is an important characteristics of stock return distribution but differs from both return and volatility in that it captures the risk that there are abrupt and large-scale declines in stock prices, which do not occur often but would have significant impacts on investors and markets once they take place. By empirically investigating the influence of *EPU* on stock price crash risk at both the individual stock level and the market level in Chinese A-share market, this study helps market participants to better understand and assess of the influence of *EPU* on financial markets.

Second, we enrich literature on determinants of crash risk. We provide evidence that *EPU* adds to firm-specific stock price crash risk and argue that the effect may take place as managers' incentives and abilities to withhold bad news are enhanced in high *EPU* periods. And we find that *EPU's* explanatory power for crash risk is beyond that of other determinants identified by existing studies. Such results complement previous studies on how variables directly or indirectly associated with managerial bad news hording behavior would affect crash risk (e.g., Bleck and Liu, 2007; Hutton et al., 2009; Jin and Myers, 2006; Kim et al., 2011a, 2011b; Kim and Zhang, 2016).

Third, our cross-sectional analyses show that the influence of *EPU* on crash risk is not constant across firms. Firms that have higher *EPU* return betas are more likely to be affected by *EPU* in terms of crash risk. More specifically, young firms, small firms, high volatility firms, and growth firms are more likely to have high *EPU* return betas and have stronger positive relation between crash risk and *EPU*. These characteristics could be helpful in identifying firms that would have greater increases in crash risk when *EPU* increases.

Finally, to our knowledge, we are the first to document that *EPU* affects aggregated crash risk at the market level. These pieces of evidence have practical implications for both investors and regulators. By understanding the influence of *EPU* on crash risk, investors could adjust their investments accordingly and regulators could improve investment environments by reducing uncertainty associated with economic policies.

The remainder of the paper proceeds as follows. Section 2 develops hypotheses. Section 3 introduces sample, variables and research design. Section 4 presents empirical results. Section 5 concludes.

2. Hypothesis development

2.1. Economic policy uncertainty and stock returns

There has been growing interest in the implications of economic policy uncertainty for asset pricing. Pastor and Veronesi (2012, 2013) are among the first to argue that stock prices would fall when *EPU* is high. They conjecture that investors demand additional compensation for holding stocks when *EPU* increases, as the uncertainty of firms' future operations and profitability increases during high-*EPU* periods. Therefore, when *EPU* increases, stock prices drop simultaneously, resulting in higher expected future returns that would compensate investors who are willing to hold risky assets during high *EPU* periods. Brogaard and Detzel (2015); Kelly et al. (2016), and Colak et al. (2017) provide supporting empirical evidence. Chen et al. (2017) and Li (2017) show that the negative relation between *EPU* and contemporaneous stock returns holds in European, Chinese, and Indian markets as well. Lam et al. (2018) conjecture that policy risk is an important systematic pricing factor yet has received insufficient attention.

2.2. Managerial bad news hoarding and stock price crash risk

Existing studies on stock price crash risk have identified managerial bad news hoarding as an important determinant of such risk. Corporate managers have incentives, abilities and opportunities to overstate financial performance and conceal bad news due to a variety of factors, such as compensation contracts and career concerns (e.g. Ball, 2001, 2009; Graham et al., 2005; Kothari et al., 2009). Chen et al. (2001) maintain that managers can withhold bad news only up to a certain point. When the total amount of bad news accumulated over time reaches a tipping point, it becomes too costly or impossible to keep withholding bad news. Managers have to release accumulated hidden bad news all at once, resulting in an abrupt, significant and negative drop in stock price, or stock price crash (Hutton et al., 2009; Jin and Myers, 2006). Consistent with the argument of Chen et al. (2001), many following studies show that crash risk is higher when managers have greater incentives or abilities to withhold bad news (e.g., Kim et al., 2011a, b).

2.3. Hypothesis development

We posit that *EPU* has the potential to affect firm-specific stock price risk as it influences managerial bad news hoarding behavior, which is an important determinant of crash risk as suggested by aforementioned studies. More specifically, we conjecture that *EPU* affects both managers' incentives and abilities to withhold bad news. Firms' operations are facing greater uncertainty in high *EPU* periods, resulting in greater volatilities in future earnings and cash flows. High *EPU* is also expected to exert negative impacts on firm performance in the short-term. Therefore, managers have greater incentives to manipulate earnings to smooth firm performance and to lessen short-term performance pressures during high *EPU* periods. Further, investors are facing greater valuation uncertainty and information asymmetry when *EPU* is higher (e.g., Nagar et al., 2019) and have to rely more on managers' disclosures in assessing firm value. Managers therefore have greater abilities to conceal bad news and manipulate earnings. To the extent that managers' incentives and abilities to withhold bad news are strengthened when *EPU* is high, we expect *EPU* to be positively associated with stock price crash risk at the individual stock level as stated in our first hypothesis:

H1. *Firm-specific stock price crash risk increases with economic policy uncertainty.*

We further investigate the cross-sectional variation in the influence of *EPU* on crash risk across stocks. Pastor and Veronesi (2012) and Nagar et al. (2019) document that different firms have different exposures to *EPU*, as captured by *EPU* return beta, and firms with higher *EPU* return betas are more affected by *EPU*. It is reasonable to expect that firms with returns more sensitive to *EPU* would also be more affected by *EPU* in terms of crash risk, as such stocks are more likely to experience significant and abrupt drops in prices when *EPU* increases. These considerations lead to our second hypothesis:

H2. *The influence of EPU on crash risk increases with EPU return beta.*

However, *EPU* return beta is difficult to observe directly. We therefore take one step further to examine the relation between *EPU* return beta and observable firm characteristics. Given that *EPU* affects crash risk as it magnifies uncertainty of firms' future operations, we conjecture that firms that are more affected by *EPU* should be those that have higher valuation uncertainty *per se*. The valuation uncertainty could be inferred from firms' characteristics such as firm age, size, volatility, growth potential, and alike (e.g., Baker and Wurgler, 2006, 2007; Colak et al., 2017).

Pastor and Veronesi (2012) argue that the effect of *EPU* on real economic activities and financial markets are non-diversifiable. Consistently, Chen et al. (2017) show that *EPU* is significantly negatively associated with market returns in Chinese A-share market. Białkowski et al. (2008) document that stock market volatility increases during the week of national elections, suggesting that economic policy uncertainty adds to market volatility as well. We therefore expect *EPU* to affect crash risk not only at the individual stock level, but also at the aggregated market level. These considerations lead to our third hypothesis:

H3. *Economic policy uncertainty is significantly and positively related to aggregated stock price crash risk at the market level.*

3. Sample, variable constructions, and research design

3.1. Data and sample

Our sample consists of firms listed on the Chinese A-share market over the period from 2000 to 2017. We obtain stock return data, accounting data and macroeconomic data from the China Stock Market & Accounting Research (CSMAR) Database. We exclude (1) financial firms, (2) firms with fewer than 30 trading days in a fiscal quarter, and (3) firm-quarter observations with required variables missing. Our final sample is comprised of 96,564 firm-quarter observations and 2756 unique firms. To mitigate the influence of outliers, we winsorize continuous variables at the 1% and 99% levels respectively.

3.2. Variable construction

3.2.1. Economic policy uncertainty

Baker et al. (2016) develop *EPU* indices based on newspaper coverage for major economies, which have been widely used in related studies. They construct the *EPU* index for China based on a scaled count of articles about policy-related economic uncertainty in South China Morning Post (SCMP), Hong Kong's leading English-language newspaper. The index is at the monthly frequency and could be downloaded from their website[1]. In the context of our research, as our regressions are performed on a quarterly basis, we take the arithmetic average of the monthly *EPU* index over a given quarter to obtain quarterly *EPU*.

3.2.2. Stock price crash risk

We measure stock price on a quarterly basis using four measures following previous studies (e.g., Chen et al., 2001; Hutton et al., 2009; Kim et al., 2011a, 2011b; Kim and Zhang, 2016; Piotroski et al., 2015). To calculate firm-specific crash risk, we first perform the following expanded market model using daily returns within each quarter:

$$r_{i,t} = \alpha_j + \beta_{1,i} r_{m,t-2} + \beta_{2,i} r_{m,t-1} + \beta_{3,i} r_{m,t} + \beta_{4,i} r_{m,t+1} + \beta_{5,i} r_{m,t+2} + \varepsilon_{i,t}, \tag{1}$$

where $r_{i,t}$ is return on stock i on day t and $r_{m,t}$ is the value-weighted market return for all stocks in the A-share market. The lead and lag terms of market returns are included to allow for nonsynchronous trading. Firm-specific daily return, denoted by W_{jt}, equals to ln $(1 + \varepsilon_{i,t})$.

Our first crash risk measure is the negative conditional return skewness (*NCSKEW*) measure of Chen et al. (2001). Specifically, *NCSKEW* for a given firm in a fiscal-quarter is calculated by taking the negative of the third moment of firm-specific daily returns normalized by the standard deviation of firm-specific daily returns raised to the third power:

$$NCSKEW_{it} = -\left[n(n-1)^{\frac{3}{2}} \sum W_{it}^3 \right] / [(n-1)(n-2)(\sum W_{it}^2)^{3/2}], \tag{2}$$

where n is the number of trading days for firm i in quarter t. A higher *NCSKEW* indicates higher crash risk.

Our second crash risk measure is down-to-up volatility (*DUVOL*). We identify days with firm-specific daily returns, or W_{jt}, below the quarterly average as "down" days, and those with W_{jt} above the quarterly average as "up" days. *DUVOL* is the natural logarithm of the ratio of the standard deviation of W_{jt} over down days to its standard deviation over up days:

$$DUVOL_{it} = \ln\left\{ [n_u - 1) \sum_{down} W_{jt}^2 \right] / [n_d - 1) \sum_{up} W_{jt}^2]\}, \tag{3}$$

where n_u is the number of "up" days and n_d is the number of "down" days for firm i within quarter t. A high *DUVOL* suggests higher crash risk.

The third crash risk measure $FREQ_{it}$ is the frequency of crash days during the fiscal-quarter. Following Piotroski et al. (2015), we define crash days as those on which the underlying firm's firm-specific daily returns are at least 2 standard deviations below average firm-specific daily returns during the fiscal-quarter. We than scale the number of crash days during a given quarter by the number of total trading days in the quarter to obtain $FREQ_{it}$.

The last crash risk measure is the likelihood of crash day, which is denoted by $CRASH_{it}$. It is an indicator variable that equals one if a firm experiences one or more crash days during the fiscal-quarter period, and zero otherwise. Following Hutton et al. (2009) and Kim et al. (2011a), we define crash days in a given fiscal-quarter for a given firm as those days on which firm-specific daily returns are at least 3.2 standard deviations below average firm-specific daily returns over the entire fiscal-quarter.

3.2.3. EPU return beta

We rely on *EPU* return beta to capture individual firms' exposures to *EPU*. We run the following monthly regression for each sample stock over the past 36 or 48 months to obtain *EPU* return beta:

$$RET_{it} = a_{it} + \beta_{it}^{MKT} MKT_t + \beta_{it}^{SMB} SMB_t + \beta_{it}^{HML} HML_t + \beta_{it}^{EPU} EPU_t + \varepsilon_t, \tag{4}$$

where RET_{it} is firm i's excess return, *MKT* is excess market return, and *SMB* and *HML* are size and book-to-market factors of Fama and

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French (1993). We take the absolute value of the coefficient on *EPU*, or $|\beta_{it}^{EPU}|$, to capture a firm's return sensitivity to *EPU*. We take absolute value of the coefficient of *EPU* as either a highly positive or negative coefficient on *EPU* indicates that the underlying stock is heavily affected by *EPU* changes. Stocks with higher *EPU* return betas ($|\beta_{it}^{EPU}|$) are expected to be more affected by *EPU*.

3.3. Research design

To test our main Hypothesis **H1**, we estimate the following regression that links our measures of stock price crash risk in quarter *t* to *EPU* with a set of factors that might affect crash risk controlled:

$$CRASHRISK_{it} = \beta_0 + \beta_1 EPU_t + \beta_c Control_{it-1} + \varepsilon_{it}, \tag{5}$$

where the dependent variable $CRASHRISK_{it}$ is measured by $NCSKEW_{it}$, $DUVOL_{it}$, $CRASH_{it}$, or $FREQ_{it}$, and the major variable of interest is EPU_t. We use logit regressions when the dependent variable is $CRASH_{it}$, and OLS regressions when the dependent variable is $NCSKEW_{it}$, $DUVOL_{it}$, or $FREQ_{it}$.

We include a set of control variables following past studies (e.g., Chen et al., 2001; Kim et al., 2011a, 2011b; Callen and Fang, 2013; DeFond et al., 2014), including: (1) the lagged terms of crash risk; (2) market value in natural logarithm terms ($SIZE_{it-1}$); (3) total debt divided by total assets ($LEVERAGE_{it-1}$); (4) net income divided by total assets (ROA_{it-1}); (5) book-to-market ratio (BM_{it-1}); (6) stock returns over the last quarter (RET_{it-1}); (7) institutional ownership (IO_{it-1}); (8) detrended stock trading volume ($DTURN_{it-1}$) calculated as the average share turnover for the current fiscal quarter minus the average quarterly share turnover over the previous fiscal quarter; (9) accrual quality ($ABACC_{it-1}$) constructed following Hutton et al. (2009); (10) stock volatility ($SIGMA_{it-1}$) calculated as standard deviation of firm specific daily returns over quarter *t-1*. We also control for firm fixed effects, year and quarter fixed effects, and cluster standard errors at the firm level.

4. Empirical results

Table 1 presents the descriptive statistics for all the variables used in the regression analyses. The sample mean of *CRASH* is 0.119, indicating that 11.9% of firm-quarter observations experience at one or more stock price crash events on average. The sample mean and median of *NCSKEW* are -0.467 and -0.490, respectively. The average quarterly *EPU* in mainland China is 153.6, which is higher than that of the U.S. (115.6), consistent with the notion that China, as an emerging country, tend to have higher economic policy uncertainty than developed countries. The standard deviation of *EPU* in mainland China is also higher than that of the U.S. The

Table 1
Descriptive Statistics. This table presents the descriptive statistics of stock price crash risk measures, *EPU* index, *EPU* beta and control variables. All variables are defined in the Appendix.

Variable	N	Mean	Min	25%	Median	75%	Max	Std
Economic policy uncertainty measure								
EPU_t	97	153.600	32.490	76.850	103.500	167.100	744.800	132.900
Stock price crash risk measures								
$NCSKEW_{it}$	138788	−0.467	−2.086	−0.944	−0.490	−0.011	1.324	0.692
$DUVOL_{it}$	138788	−0.394	−2.567	−0.811	−0.378	0.040	1.647	0.730
$CRASH_{it}$	138,788	0.119	0.000	0.000	0.000	0.000	1.000	0.323
$FREQ_{it}$	138788	0.018	0.000	0.000	0.017	0.031	0.058	0.015
The moderating effect								
$EPU\ beta1_{it}$	96564	2.270	0.027	0.658	1.490	2.930	13.600	2.460
$EPU\ beta2_{it}$	96564	1.860	0.021	0.560	1.270	2.460	10.500	1.930
Control variables								
$SIZE_{it}$	96564	0.218	0.191	0.209	0.216	0.225	0.256	0.013
$LEVERAGE_{it}$	96564	0.480	0.062	0.324	0.483	0.630	1.094	0.211
ROA_{it}	96564	0.030	−0.274	0.011	0.031	0.058	0.191	0.063
BM_{it}	96564	0.540	0.089	0.341	0.518	0.725	1.114	0.250
$DTURN_{it}$	96564	0.000	−0.009	−0.001	0.000	0.001	0.010	0.003
IO_{it}	96564	0.288	0.000	0.031	0.246	0.498	0.864	0.256
DA_{it}	96564	0.001	0.000	0.000	0.001	0.001	0.006	0.001
RET_{it}	96564	0.049	−0.432	−0.117	0.002	0.163	1.006	0.261
$SIGMA_{it}$	96564	0.021	0.007	0.015	0.020	0.026	0.046	0.008
Firm characteristics								
AGE_{it}	115037	10.030	−4.000	5.000	9.000	14.000	28.000	5.793
PPE_A_{it}	114852	0.249	0.002	0.111	0.216	0.358	0.741	0.176
SG_{it}	112867	0.256	−0.764	−0.039	0.119	0.322	5.754	0.776
ROE_{it}	113155	0.035	−0.432	0.009	0.031	0.069	0.261	0.084
Market level variables								
$Log\ of\ Total\ Market\ Value_t$	76	22.680	20.700	21.080	22.980	23.730	24.530	1.386
$Log\ of\ Total\ Trading\ Volume_t$	76	27.100	24.830	25.730	27.490	27.990	29.370	1.249
$Log\ of\ Total\ RMB\ Trading\ Volume_t$	76	29.400	26.970	27.860	29.850	30.490	32.200	1.440
$S.D.\ of\ Stock\ Returns_t$	76	0.217	0.082	0.149	0.189	0.261	0.539	0.102

Table 2

Correlations. This table reports Pearson correlations among major variables of interest. All variables are defined in the Appendix. $*p < 0.10$, $**p < 0.05$, $***p < 0.01$.

Variable		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
$NCSKEW_{it}$	A	1														
$DUVOL_{it}$	B	0.951***	1													
$CRASH_{it}$	C	0.477***	0.509***	1												
$FREQ_{it}$	D	0.663***	0.575***	0.222***	1											
EPU_{it}	E	0.034***	0.00300	0.058***	0.061***	1										
$EPU\ beta1_{it}$	F	−0.022***	0.011***	−0.059***	−0.065***	−0.240***	1									
$SIZE_{it-1}$	G	−0.091***	−0.091***	0.00100	−0.052***	0.240***	−0.156***	1								
$LEVERAGE_{it-1}$	H	−0.037***	−0.030***	−0.039***	−0.040***	−0.075***	0.089***	0.252***	1							
ROA_{it-1}	I	0.001	0.003	0.028***	0.006**	0.053***	−0.048***	0.146***	−0.407 − 0.407***	1						
BM_{it-1}	J	−0.116***	−0.105***	−0.025***	−0.081***	−0.202***	−0.045***	0.493***	0.312***	−0.153***	1					
$DTURN_{it-1}$	K	0.028***	0.044***	−0.010***	0.008**	−0.053***	0.014***	−0.00300	0.008**	−0.014***	0.103***	1				
IO_{it-1}	L	−0.017***	−0.028***	−0.00400	0.007**	0.323***	−0.184***	0.476***	0.020***	0.214***	−0.00100	−0.008**	1			
$ABACC_{it-1}$	M	0.019***	0.019***	−0.014***	0.007**	−0.017***	0.060***	−0.146***	0.108***	−0.102***	−0.141***	−0.006**	−0.041***	1		
RET_{it-1}	N	0.075***	0.094***	−0.034***	0.027***	−0.104***	0.119***	−0.015***	−0.00300	0.012***	0.076***	0.278***	0.014***	−0.018***	1	
$SIGMA_{it-1}$	O	0.013***	0.052***	−0.088***	−0.028***	−0.061***	0.244***	−0.163***	0.030***	−0.090***	−0.140***	0.317***	0.007**	0.087***	0.313***	1

Table 3

EPU and Stock Price Crash Risk. This table examines the relation between economic policy uncertainty and firms' stock price crash risk. All continuous variables are winsorized at both 1% and 99% levels. Standard errors are clustered at the firm level. Firm fixed effects, year and quarter fixed effects are also controlled in all regressions. All variables are defined in the Appendix. The *t*-statistics are in parentheses. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

	$NCSKEW_{it}$ (1)	$DUVOL_{it}$ (2)	$FREQ_{it}$ (3)	$CRASH_{it}$ (4)	$NCSKEW_{it}$ (5)	$DUVOL_{it}$ (6)	$FREQ_{it}$ (7)	$CRASH_{it}$ (8)
EPU_t	0.020***	0.037***	0.001***	0.315***	0.079***	0.158***	0.004***	0.868***
	(6.714)	(11.998)	(10.619)	(8.433)	(7.085)	(13.492)	(14.403)	(6.406)
$NCSKEW_{it-1}$					0.017***			
					(4.825)			
$DUVOL_{it-1}$						0.028***		
						(7.920)		
$FREQ_{it-1}$							−0.001	
							(-0.415)	
$CRASH_{it-1}$								−0.151***
								(-4.643)
$SIZE_{it-1}$					0.356	−0.319	−0.018	22.866***
					(0.574)	(-0.538)	(-1.405)	(8.258)
$LEVERAGE_{it-1}$					0.136***	0.138***	0.001***	−0.534***
					(6.328)	(6.709)	(2.610)	(-5.234)
ROA_{it-1}					−0.206***	−0.263***	−0.002**	0.461*
					(-4.119)	(-5.225)	(-2.096)	(1.775)
BM_{it-1}					−0.333***	−0.314***	−0.003***	−0.919***
					(-15.159)	(-15.063)	(-7.747)	(-9.029)
$DTURN_{it-1}$					3.103***	2.225***	0.057***	13.393**
					(3.590)	(2.650)	(2.934)	(2.558)
IO_{it-1}					0.107***	0.113***	0.001***	0.108
					(6.107)	(6.881)	(4.049)	(1.289)
$ABACC_{it-1}$					1.401	0.759	0.007	−9.388
					(0.531)	(0.301)	(0.129)	(-0.723)
RET_{it-1}					0.368***	0.372***	0.005***	0.577***
					(30.981)	(31.532)	(18.750)	(7.577)
$SIGMA_{it-1}$					2.220***	0.178	−0.038***	−20.294***
					(5.019)	(0.423)	(-3.980)	(-8.865)
Constant	−0.443***	−0.609***	0.014***	–	−0.409***	−0.438***	0.019***	–
	(-25.513)	(-31.566)	(29.657)		(-3.335)	(-3.713)	(7.263)	
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj.(Pseudo) R^2	0.076	0.109	0.084	0.08	0.105	0.137	0.098	0.095
N	138788	138788	138788	135224	96564	96564	96564	93634

average and standard deviation of *EPU* return beta is 0.0227 and 0.0246, respectively, revealing that there is a large variation in firms' sensitivities to the *EPU* index. The distributions of other variables are mainly consistent with those reported in prior studies.

Table 2 reports the Pearson correlation among the main variables of interest. The four stock price crash risk measures (i.e., *NCSKEW*, *DUVOL*, *FREQ,* and *CRASH*) are highly correlated with each other. Furthermore, *EPU* is significantly positive related with each of the four crash risk measures, which is consistent with our prediction that firms tend to have higher crash risk when *EPU* is higher. For the control variables, *SIZE*, *BM*, and *LEVERAGE* are negatively correlated with crash risk, whereas *ABACC*, *DTURN*, *RET*, and *SIGMA* positively correlated with crash risk. These pieces of evidence are consistent with findings in the literature (e.g., Chen et al., 2001; Hutton et al., 2009; Kim et al., 2011a, 2011b).

4.1. EPU and stock price crash risk

Hypothesis **H1** predicts that *EPU* is positively related with stock price crash risk, which is tested based on Eq. (5) with results reported in Table 3. In columns (1) to (4), we examine the hypothesis using univariate regressions, and in columns (5) to (8), we include control variables into regressions. Across all the eight columns, *EPU* is significantly positively associated with crash risk at the 1% level. The relation is robust to different measures of crash risk and to the control of other determinants of crash risk. The results render strong support to our argument that firms' crash risk increases with economic policy uncertainty. In terms of economic significance, a one-standard-deviation increase in *EPU* is associated with a 5.33% increase in $NCSKEW_{it}$ and a 2.00% increase in $DUVOL_{it}$. It suggests that the influence that *EPU* brought on individual stocks' crash risk is not ignorable.

Coefficients of the control variables are generally consistent with findings in prior studies. For instance, the trading volume measure $DTURN_{it-1}$ is significantly and positively associated with crash risk, which is consistent with Chen et al. (2001), which argue that opinion divergence increases future crash risk. The positive coefficient of RET_{it-1} confirms that higher past returns lead to higher crash risk. And the positive coefficient of $ABACC_{it-1}$ is consistent with Hutton et al. (2009) that firms with higher accruals are more likely to experience stock price crash risk.

Table 4

Cross-Sectional Analysis: *EPU beta* and Stock Price Crash Risk. This table examines the moderating effect of *EPU* return beta on the relation between economic policy uncertainty and stock price crash risk. *EPU* beta1 and *EPU* beta2 are calculated by running firm-level regression of monthly excess returns on monthly *EPU* index based on data over the past 36 and 48 months, respectively. All continuous variables are winsorized at both 1% and 99% levels. Standard errors are clustered at the firm level. Firm fixed effects, year and quarter fixed effects are also controlled in all regressions. All variables are defined in the Appendix. The *t*-statistics are in parentheses. $*p < 0.10$, $**p < 0.05$, $***p < 0.01$.

	$NCSKEW_{it}$ (1)	$DUVOL_{it}$ (2)	$FREQ_{it}$ (3)	$CRASH_{it}$ (4)	$NCSKEW_{it}$ (5)	$DUVOL_{it}$ (6)	$FREQ_{it}$ (7)	$CRASH_{it}$ (8)
EPU_t	0.030***	0.040***	0.000***	0.110***	0.031***	0.042***	0.001***	0.108***
	(6.144)	(8.929)	(5.069)	(5.563)	(6.220)	(9.142)	(5.414)	(5.269)
$EPU_t*EPU\ beta1_{it}$	0.924***	0.736***	0.017***	1.669**				
	(5.827)	(4.827)	(5.226)	(2.176)				
$EPU\ beta1_{it}$	−0.960***	−0.860***	−0.026***	−2.701**				
	(-4.521)	(-4.072)	(-5.772)	(-2.288)				
$EPU_t*EPU\ beta2_{it}$					0.858***	0.581***	0.015***	2.097**
					(4.276)	(3.044)	(3.676)	(2.230)
$EPU\ beta2_{it}$					−0.995***	−0.801***	−0.022***	−2.988**
					(-3.658)	(-2.996)	(-3.953)	(-2.037)
$NCSKEW_{it-1}$	0.013***				0.013***			
	(3.533)				(3.570)			
$DUVOL_{it-1}$		0.018***				0.018***		
		(5.255)				(5.271)		
$FREQi_{t-1}$			−0.012***				−0.012***	
			(-3.520)				(-3.541)	
$CRASHi_{t-1}$				−0.196***				−0.196***
				(-6.124)				(-6.141)
$SIZE_{it-1}$	0.175	−0.454	−0.020	21.958***	0.219	−0.407	−0.020	21.866***
	(0.280)	(-0.757)	(-1.568)	(7.990)	(0.351)	(-0.679)	(-1.535)	(7.957)
$LEVERAGE_{it-1}$	0.137***	0.140***	0.001***	−0.547***	0.137***	0.139***	0.001**	−0.551***
	(6.326)	(6.685)	(2.580)	(-5.399)	(6.302)	(6.667)	(2.513)	(-5.432)
ROA_{it-1}	−0.200***	−0.255***	−0.002*	0.598**	−0.200***	−0.254***	−0.002	0.598**
	(-3.995)	(-5.016)	(-1.660)	(2.316)	(-3.990)	(-4.997)	(-1.630)	(2.319)
BM_{it-1}	−0.319***	−0.301***	−0.003***	−0.799***	−0.323***	−0.304***	−0.003***	−0.795***
	(-14.447)	(-14.312)	(-6.689)	(-7.904)	(-14.676)	(-14.516)	(-6.724)	(-7.868)
$DTURN_{it-1}$	0.070	−1.452*	−0.027	−6.887	0.027	−1.494*	−0.027	−6.816
	(0.090)	(-1.855)	(-1.502)	(-1.435)	(0.034)	(-1.908)	(-1.512)	(-1.420)
IO_{it-1}	0.109***	0.116***	0.001***	0.111	0.109***	0.115***	0.001***	0.113
	(6.186)	(6.945)	(4.044)	(1.337)	(6.190)	(6.946)	(4.062)	(1.362)
$ABACC_{it-1}$	1.065	0.423	−0.002	−11.080	1.141	0.484	−0.001	−11.058
	(0.400)	(0.165)	(-0.033)	(-0.860)	(0.429)	(0.190)	(-0.021)	(-0.858)
RET_{it-1}	0.365***	0.369***	0.005***	0.344***	0.364***	0.369***	0.005***	0.344***
	(43.896)	(43.116)	(24.630)	(5.969)	(43.837)	(43.050)	(24.547)	(5.975)
$SIGMA_{it-1}$	2.859***	1.371***	0.019**	−8.167***	2.954***	1.455***	0.020**	−8.214***
	(7.676)	(3.771)	(2.341)	(-4.005)	(7.935)	(4.007)	(2.433)	(-4.036)
Constant	−0.463***	−0.468***	0.019***	–	−0.472***	−0.480***	0.019***	–
	(-3.707)	(-3.894)	(7.332)		(-3.777)	(-3.989)	(7.199)	
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj.(Pseudo) R^2	0.064	0.079	0.055	0.073	0.064	0.079	0.055	0.073
N	96564	96564	96564	93634	96564	96564	96564	93634

4.2. The cross-sectional variation

In Section 4.1, we document that firm-specific crash risk increases with *EPU* generally. However, the influence of *EPU* on crash risk might not be constant across firms. We next turn to examine the cross-sectional variation in the relation between *EPU* and crash risk. As put forward in our hypothesis *H2*, we expect the relation to be stronger among firms whose returns have greater sensitivities to *EPU*, or have higher *EPU* return betas. We compute *EPU* return beta for individual firms as described in Section 3.2.3. To test *H2*, we estimate the following regression:

$$CRASHRISK_{it} = \gamma_0 + \gamma_1 EPU_t + \gamma_2 EPU\ beta + \gamma_3 EPU*EPU\ beta + \gamma_c Control_{it-1} + \varepsilon_{it}, \tag{6}$$

where *EPU* beta are measured by *EPU* beta1 or *EPU* beta2, which are calculated by running firm-level regressions of monthly excess returns on monthly *EPU* index, as shown in Eq. (4), based on data over the past 36 and 48 months, respectively. The definition of all other variables is the same as in Eq. (5). We expect the coefficient of *EPU* * *EPU beta* to be significantly positive. The results are reported in Table 4.

In columns (1) to (4), the coefficient of *EPU* * *EPU* beta1 is significantly positive when different crash risk measures are employed. When we use *EPU* beta2 as an alternative measure to proxy for firms' return sensitivity to *EPU* in columns (5) to (8), the results are quite similar. The evidence is consistent with our conjecture laid out in *H2* that the influence of *EPU* over crash risk is stronger for

firms that have greater exposures to *EPU*, or have higher *EPU* return betas.

4.3. EPU return beta and observable firm characteristics

Section 4.2 shows that the relation between *EPU* and individual stocks' crash risk increases with *EPU* return beta. The problem with *EPU* return beta is that it is not easy to observe. Therefore, in this subsection, we further investigate the relation between *EPU* return beta and observable firm characteristics, which would help market participants to easily identify firms whose crash risk would be greatly affected by *EPU*.

We expect firms with greater valuation uncertainty *per se* to be more affected by *EPU*, namely to have higher *EPU* return betas. We identify firms with higher valuation uncertainty based on a couple of firm characteristics. Baker and Wurgler (2006, 2007) conjecture that the valuation of stocks with short earnings history, small size, high volatility, low tangibility, and high growth potentials is ambiguous for unsophisticated investors. Thus, these stocks are considered to have higher valuation uncertainty. We measure firm age (*AGE*) based on the number of years since a firm's first appearance on CSMAR, size as the logarithm of market capitalization (*SIZE*), return volatility (*SIGMA*) based on standard deviation of daily returns for the fiscal quarter, and asset tangibility (*PPE_A*) based on property, plant, and equipment over total assets. Characteristics associated with growth potentials include book-to-market ratio (*BM*) and sales growth (*SG*). Book-to-market ratio (*BM*) is the book value of equity divided by the market value of equity at the end of the fiscal-quarter. *SG* is the change of net sales divided by prior-quarter net sales.

We regress *EPU* return beta on these firm characteristics on a quarterly basis, with both firm and time fixed effects controlled, and obtain the following regression results:

$$EPUbeta = 0.382_{(t=6.851)} - 0.007_{(t=-13.670)}AGE_{it-1} - 0.011_{(t=-2.999)}SIZE_{it-1}$$
$$+ 0.477_{(t=17.007)}SIGMA_{it-1} - 0.013_{(t=-0.833)}PPE\_A_{it-1} - 0.097_{(t=8.776)}BM_{it-1}$$
$$+ 0.005_{(t=3.354)}SG_{it-1} + \varepsilon_{it}, \tag{7}$$

where the dependent variable *EPU* beta is proxied by *EPU* beta1$_{it}$. The results suggest that younger firms, smaller firms, firms have higher volatility, and firms with higher growth potentials, which are usually more difficult to value, tend to have higher *EPU beta*. The evidence is consistent with our expectation.

4.4. EPU and market-level stock price crash risk

In previous sections, we have shown that *EPU* affects stock price crash risk at the firm level. We next aggregate crash risk at the firm level into a crash risk measure at the market level and examine the extent to which it is affected by *EPU*. Specifically, we estimate the following model in this subsection:

$$CRASHRISK_t = \beta_0 + \beta_1 EPU_t + \beta_c Control_t + \varepsilon_t, \tag{8}$$

where the dependent variable $CRASHRISK_t$ refers to aggregated stock market crash risk, calculated as the value-weighted average of firm-level stock price crash risk. Following prior studies, we also include commonly used macroeconomic variables that may affect market level crash risk. The control variables include *Log of Total Market Value*, *Log of Total Trading Volume*, *Log of Total RMB Trading Volume*, which are the natural logarithm of one plus total market value, one plus total trading volume in shares, and one plus total trading volume in RMB, respectively. We also control *S.D. of Stock Returns*, which is the standard deviation of firm daily returns in the

Table 5
EPU and Market-level Stock Price Crash Risk. This table reports the effect of economic policy uncertainty on aggregated crash risk at the market level, which is obtained by value-weighting crash risk of individual stocks. All variables are defined in the Appendix. The *t*-statistics are in parentheses. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

	$NCSKEW_t$	$DUVOL_t$	$FREQ_t$	$CRASH_t$	$NCSKEW_t$	$DUVOL_t$	$FREQ_t$	$CRASH_t$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
EPU_t	0.072**	0.080**	0.021**	0.001**	0.058**	0.061**	0.011	0.001*
	(2.511)	(2.551)	(2.247)	(2.337)	(2.011)	(2.014)	(1.140)	(1.788)
Log of Total Market Value$_t$					−0.308*	−0.274	0.018	−0.005
					(-1.794)	(-1.535)	(0.327)	(-1.571)
Log of Total Trading Volume$_t$					−0.304	−0.355*	0.017	−0.007*
					(-1.569)	(-1.767)	(0.273)	(-1.837)
Log of Total RMB Trading Volume$_t$					0.131	0.096	−0.105	0.002
					(0.659)	(0.464)	(-1.661)	(0.597)
S.D. of Stock Returns$_t$					−0.113	−0.207	−0.088	−0.009
					(-0.318)	(-0.563)	(-0.780)	(-1.276)
Constant	−0.660***	−0.794***	0.036	0.011***	9.953***	11.437***	2.206**	0.238***
	(-7.774)	(-8.637)	(1.299)	(6.485)	(3.117)	(3.450)	(2.179)	(3.807)
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.517	0.535	0.528	0.506	0.584	0.631	0.615	0.619
N	76	76	76	76	76	76	76	76

Table 6

The Long-term Effect: *EPU* and Stock Price Crash Risk. This table examines the long-term impact of *EPU* on firms' stock price crash risk. All continuous variables are winsorized at both 1% and 99% levels. Standard errors are clustered at the firm level. Firm fixed effects, year and quarter fixed effects are also controlled in all regressions. All variables are defined in the Appendix. The *t*-statistics are in parentheses. $*p < 0.10$, $**p < 0.05$, $***p < 0.01$.

	Crash risk in quarter $t + 1$				Crash risk in quarter $t + 2$				Crash risk in quarter $t + 3$			
	NCSKEW (1)	DUVOL (2)	FREQ (3)	CRASH (4)	NCSKEW (5)	DUVOL (6)	FREQ (7)	CRASH (8)	NCSKEW (9)	DUVOL (10)	FREQ (11)	CRASH (12)
EPU_t	0.102***	0.204***	0.005***	1.124***	0.065***	0.129***	0.003***	0.710***	0.102***	0.204***	0.005***	1.124***
	(7.085)	(13.492)	(14.403)	(6.406)	(7.085)	(13.492)	(14.403)	(6.406)	(7.085)	(13.492)	(14.403)	(6.406)
$NCSKEW_{it-1}$	0.017***				0.017***				0.017***			
	(4.825)				(4.825)				(4.825)			
$DUVOL_{it-1}$		0.028***				0.028***				0.028***		
		(7.920)				(7.920)				(7.920)		
$FREQ_{it-1}$			−0.001				−0.001				−0.001	
			(−0.415)				(−0.415)				(−0.415)	
$CRASH_{it-1}$				−0.151***				−0.151***				−0.151***
				(−4.643)				(−4.643)				(−4.643)
$SIZE_{it-1}$	0.356	−0.319	−0.018	22.866***	0.356	−0.319	−0.018	22.866***	0.356	−0.319	−0.018	22.866***
	(0.574)	(−0.538)	(−1.405)	(8.258)	(0.574)	(−0.538)	(−1.405)	(8.258)	(0.574)	(−0.538)	(−1.405)	(8.258)
$LEVERAGE_{it-1}$	0.136***	0.138***	0.001***	−0.534***	0.136***	0.138***	0.001***	−0.534***	0.136***	0.138***	0.001***	−0.534***
	(6.328)	(6.709)	(2.610)	(−5.234)	(6.328)	(6.709)	(2.610)	(−5.234)	(6.328)	(6.709)	(2.610)	(−5.234)
ROA_{it-1}	−0.206***	−0.263***	−0.002**	0.461*	−0.206***	−0.263***	−0.002**	0.461*	−0.206***	−0.263***	−0.002**	0.461*
	(−4.119)	(−5.225)	(−2.096)	(1.775)	(−4.119)	(−5.225)	(−2.096)	(1.775)	(−4.119)	(−5.225)	(−2.096)	(1.775)
BM_{it-1}	−0.333***	−0.314***	−0.003***	−0.919***	−0.333***	−0.314***	−0.003***	−0.919***	−0.333***	−0.314***	−0.003***	−0.919***
	(−15.159)	(−15.063)	(−7.747)	(−9.029)	(−15.159)	(−15.063)	(−7.747)	(−9.029)	(−15.159)	(−15.063)	(−7.747)	(−9.029)
$DTURN_{it-1}$	3.103***	2.225***	0.057***	13.393***	3.103***	2.225***	0.057***	13.393***	3.103***	2.225***	0.057***	13.393***
	(3.590)	(2.650)	(2.934)	(2.558)	(3.590)	(2.650)	(2.934)	(2.558)	(3.590)	(2.650)	(2.934)	(2.558)
IO_{it-1}	0.107***	0.113***	0.001***	0.108	0.107***	0.113***	0.001***	0.108	0.107***	0.113***	0.001***	0.108
	(6.107)	(6.881)	(4.049)	(1.289)	(6.107)	(6.881)	(4.049)	(1.289)	(6.107)	(6.881)	(4.049)	(1.289)
$ABACC_{it-1}$	1.401	0.759	0.007	−9.388	1.401	0.759	0.007	−9.388	1.401	0.759	0.007	−9.388
	(0.531)	(0.301)	(0.129)	(−0.723)	(0.531)	(0.301)	(0.129)	(−0.723)	(0.531)	(0.301)	(0.129)	(−0.723)
RET_{it-1}	0.368***	0.372***	0.005***	0.577***	0.368***	0.372***	0.005***	0.577***	0.368***	0.372***	0.005***	0.577***
	(30.981)	(31.532)	(18.750)	(7.577)	(30.981)	(31.532)	(18.750)	(7.577)	(30.981)	(31.532)	(18.750)	(7.577)
$SIGMA_{it-1}$	2.220***	0.178	−0.038***	−20.294***	2.220***	0.178	−0.038***	−20.294***	2.220***	0.178	−0.038***	−20.294***
	(5.019)	(0.423)	(−3.980)	(−8.865)	(5.019)	(0.423)	(−3.980)	(−8.865)	(5.019)	(0.423)	(−3.980)	(−8.865)
Constant	−0.444***	−0.508***	0.017***	–	−0.428***	−0.477***	0.018***	–	−0.444***	−0.508***	0.017***	–
	(−3.649)	(−4.328)	(6.574)		(−3.510)	(−4.056)	(6.882)		(−3.649)	(−4.328)	(6.574)	
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj.(Pseudo) R^2	0.105	0.137	0.098	0.095	0.105	0.137	0.098	0.095	0.105	0.137	0.098	0.095
N	96564	96564	96564	93634	96564	96564	96564	93634	96564	96564	96564	93634

Table 7

Subperiod Tests: *EPU* and Stock Price Crash Risk. This table examines the relation between economic policy uncertainty and firms' stock price crash risk, using data from January 2009 to December 2017. All continuous variables are winsorized at both 1% and 99% levels. Standard errors are clustered at the firm level. Firm fixed effects, year and quarter fixed effects are controlled in all regressions. All variables are defined in the Appendix. The *t*-statistics are in parentheses. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

	$NCSKEW_{it}$ (1)	$DUVOL_{it}$ (2)	$FREQ_{it}$ (3)	$CRASH_{it}$ (4)	$NCSKEW_{it}$ (5)	$DUVOL_{it}$ (6)	$FREQ_{it}$ (7)	$CRASH_{it}$ (8)
EPU_t	0.059***	0.088***	0.002***	0.424***	0.532***	0.763***	0.017***	2.123***
	(18.427)	(27.153)	(25.712)	(11.020)	(17.600)	(25.507)	(24.999)	(6.879)
$NCSKEW_{it-1}$					−0.002			
					(-0.387)			
$DUVOL_{it-1}$						0.006		
						(1.340)		
$FREQ_{it-1}$							−0.026***	
							(-6.257)	
$CRASH_{it-1}$								−0.323***
								(-7.795)
$SIZE_{it-1}$					−1.675*	−2.038**	−0.047**	35.397***
					(-1.893)	(-2.404)	(-2.550)	(8.207)
$LEVERAGE_{it-1}$					0.159***	0.128***	0.001	−0.671***
					(5.165)	(4.454)	(1.170)	(-4.378)
ROA_{it-1}					−0.016	−0.047	−0.003*	0.330
					(-0.228)	(-0.677)	(-1.700)	(0.872)
BM_{it-1}					−0.300***	−0.270***	−0.003***	−1.417***
					(-10.054)	(-9.636)	(-4.640)	(-9.471)
$DTURN_{it-1}$					2.398**	1.736*	0.051**	14.851**
					(2.393)	(1.827)	(2.250)	(2.538)
IO_{it-1}					0.074***	0.077***	0.001**	−0.014
					(3.473)	(3.860)	(2.005)	(-0.135)
$ABACC_{it-1}$					−2.949	−2.365	0.028	−20.832
					(-0.878)	(-0.762)	(0.393)	(-1.288)
RET_{it-1}					0.397***	0.386***	0.005***	0.396***
					(26.009)	(25.719)	(14.318)	(4.257)
$SIGMA_{it-1}$					2.367***	0.441	−0.032***	−21.897***
					(4.320)	(0.856)	(-2.730)	(-7.836)
Constant	−0.717***	−0.967***	0.007***	–	−1.215***	−1.728***	−0.011***	–
	(-42.022)	(-52.509)	(15.993)		(-7.388)	(-10.762)	(-3.087)	
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj.(Pseudo) R^2	0.075	0.109	0.080	0.065	0.108	0.143	0.099	0.083
N	94404	94404	94404	90436	63467	63467	63467	59368

given quarter. Time fixed effect is controlled as well.

Table 5 reports results of the regressions of quarterly aggregated stock market crash risk on *EPU*. All the crash risk measures are economically and statistically significantly related to stock market crash risk. For instance, in column (5), the coefficient of *EPU* is 0.058 ($t = 2.011$), indicating that a one-standard-deviation increase in *EPU* is associated with a 11.21% increase in value-weighted stock market crash risk.

Overall, results in Table 5 confirm that crash risk at the market level also increases with *EPU*, suggesting that *EPU* affects crash risk not only at the individual stock level, but also at the market level in a systematic way.

4.5. Robustness checks

4.5.1. The long-term effect

We further examine the explanatory power of *EPU* for firms' crash risk in the long run. We regress crash risk one quarter, two quarters, and three quarters ahead on *EPU* in quarter *t* and present the results in Table 6.

Our findings show that *EPU* is still significantly and positively associated to firms' future crash risk across all twelve columns when different crash risk measures are used and when different periods are examined. The results presented in Table 6 suggest that the explanatory power of *EPU* for firm's crash risk persists up to three quarters ahead.

4.5.2. Sub-period tests

We conduct sub-period tests to mitigate concerns that our results may be sensitive to the sample period chosen. We repeat the tests based on a more recent period, that is the post-2008 global financial crisis period from January 2009 to December 2017. The results are reported in Table 7 and are qualitatively similar to those based on the whole sample period.

Table 8

Alternative Measures of *EPU* and Stock Price Crash Risk. This table presents results of robustness checks where we replace quarterly observations with annual observations. All continuous variables are winsorized at both 1% and 99% levels. Standard errors are clustered at the firm level. Firm fixed effect and year fixed effect are both controlled in all regressions. All variables are defined in the Appendix. The *t*-statistics are in parentheses, *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

	$NCSKEW_{it}$ (1)	$DUVOL_{it}$ (2)	$FREQ_{it}$ (3)	$CRASH_{it}$ (4)	$NCSKEW_{it}$ (5)	$DUVOL_{it}$ (6)	$FREQ_{it}$ (7)	$CRASH_{it}$ (8)
EPU_t	1.81694***	1.94635***	0.00161***	1.30125***	0.04416***	0.06027***	0.00104***	0.07142
	(152.483)	(152.420)	(12.521)	(32.438)	(3.458)	(4.810)	(3.668)	(1.102)
$NCSKEW_{it-1}$					−0.06669***			
					(-9.443)			
$DUVOL_{it-1}$						−0.07125***		
						(-10.267)		
$FREQ_{it-1}$							−0.09486***	
							(-14.325)	
$CRASH_{it-1}$								−0.74241***
								(-8.902)
$SIZE_{it-1}$					7.45083***	6.69866***	0.11144***	32.01455***
					(5.558)	(5.019)	(4.111)	(5.489)
$LEVERAGE_{it-1}$					0.02104	0.03944	0.00134	−0.26013
					(0.446)	(0.823)	(1.391)	(-1.279)
ROA_{it-1}					−0.33636***	−0.25333**	−0.00078	−0.14057
					(-3.377)	(-2.452)	(-0.369)	(-0.295)
BM_{it-1}					−0.75957***	−0.74281***	−0.01000***	−1.89312***
					(-16.912)	(-16.607)	(-10.211)	(-8.189)
$DTURN_{it-1}$					−3.38904**	−4.56204***	−0.12548***	−3.80644
					(-2.227)	(-2.973)	(-3.404)	(-0.424)
IO_{it-1}					0.07214**	0.10662***	0.00165**	−0.13653
					(2.067)	(3.076)	(2.083)	(-0.766)
$ABACC_{it-1}$					−0.00547	−0.00895	0.00017	0.40582
					(-0.107)	(-0.174)	(0.152)	(1.567)
RET_{it-1}					0.03222***	0.01841	−0.00030	0.01427
					(2.827)	(1.578)	(-1.197)	(0.237)
$SIGMA_{it-1}$					−0.01839	−0.02626	−0.00458	−1.33505
					(-0.077)	(-0.104)	(-0.772)	(-1.302)
Constant	−1.60616***	−1.78081***	0.01369***	–	−1.65856***	−1.64978***	−0.00092	–
	(-49.843)	(-57.979)	(24.904)		(-6.291)	(-6.264)	(-0.175)	
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj.(Pseudo) R^2	0.811	0.821	0.038	0.460	0.637	0.688	0.057	0.205
N	36157	36157	36157	33727	26332	26332	26332	17981

4.5.3. Alternative crash risk measures

We also conduct robustness checks where we replace quarterly observations with annual observations, to see whether the results are sensitive to the frequency that we use in constructing dependent and independent variables. We take the arithmetic average of the monthly *EPU* index over a given year to obtain annual *EPU* and reconstruct the four crash risk measures at the annual intervals. The results are shown in Table 8.

Consistent with the evidence shown in Table 3, the coefficient of EPU_t is positive and significant when each of the four crash risk measures at the annual frequency is employed in Table 8, supporting Hypothesis *H1* that firms during high *EPU* time tend to have higher stock price crash risks.

5. Conclusions

This study investigates the impact of economic policy uncertainty on stock price crash risk at both the individual stock level and the market level. Utilizing a sample of Chinese publicly listed firms from 2000 to 2017, we find that *EPU* is positively and significantly related to crash risk at the individual stock level. The positive association remains robust after controlling for various firm-level characteristics and potential predictors of crash risk.

Further, cross-sectional tests show that the relation between *EPU* and price crash risk is stronger for firms with higher *EPU* return beta, which tend to be younger, smaller, more volatility, and with higher growth potentials.

Lastly, we document that *EPU* is significantly and positively associated with aggregated stock price crash risk at the market level, which is consistent with the notion that *EPU* exhibits influence over stocks that cannot be fully diversified away and affects stocks in a systematic way.

Acknowledgements

Appendix A. Variable Definitions

Economic Policy Uncertainty

EPU: Monthly *EPU* index is constructed based on the number of news articles that contain the *EPU* terms and is obtained from http://www.policyuncertainty.com/. We take the arithmetic average of the monthly *EPU* index over a given quarter or a given year to obtain quarterly and annual *EPU*, respectively.

Stock Price Crash Risk Measures

NCSKEW: The negative skewness of firm-specific daily returns over a given quarter calculated as negative one times the third moment of firm-specific daily returns divided by its standard deviation raised to the third power, where firm-specific daily returns are obtained from the residual returns of Eq. (1).

DUVOL: The down-to-up volatility of firm-specific daily returns calculated as the logarithm of the ratio of the standard deviation of firm-specific returns during "down" days to that during "up" days over one quarter. "Down" ("Up") days are those on which firm-specific daily returns are below (above) the quarterly average. Firm-specific daily returns are obtained from the residual returns of Eq. (1).

Freq: The frequency of crash days during the fiscal-quarter, where crash days are defined as those on which the underlying firm's firm-specific daily returns are at least 2 standard deviations below average firm-specific daily returns during the fiscal-quarter. Firm-specific daily returns are obtained from the residual returns of Eq. (1).

Crash: The likelihood of a crash over a given quarter. It is an indicator variable that equal one for a firm that experiences one or more crash weeks during a given quarter period, and zero otherwise. A week is defined as a crash week if firm-specific weekly return during the week falls at least 3.09 standard deviations below its quarterly mean. Firm-specific daily returns are obtained from the residual returns of Eq. (1).

EPU beta

EPU beta1: Stock return sensitivity to the *EPU* index based on Eq. (4) using data over the past 36 months ending in quarter *t*. For display purposes, we multiply *EPU* beta1 by 100 throughout our paper.

EPU beta2: Stock return sensitivity to the *EPU* index based on Eq. (4) using data over the past 48 months ending in quarter *t*. For display purposes, we multiply *EPU* beta2 by 100 throughout our paper.

Control Variabless

SIZE: The natural logarithm of market value of equity.

B/M: Book-to-market ratio calculated by book value of equity divided by market capitalization.

LEVERAGE: The ratio of total liabilities to total assets.

ROA: The ratio of earnings to total assets.

DTURN: The average monthly share turnover over the current fiscal-quarter minus average monthly share turnover over the prior fiscal-quarter.

IO: The percentage of institutional investor ownership.

ABACC: The accrual quality measure constructed following Hutton et al. (2009). It is the three-year moving sum of the absolute value of discretionary accruals, estimated based on modified Jones model.

RET: The average of firm-specific daily return over the fiscal-quarter period.

SIGMA: The standard deviation of daily firm-specific returns for the fiscal-quarter.

PPE/A: The ratio of property, plant and equipment over assets.

SG: The change of net sales divided by prior-quarter net sales.

AGE: The number of years since the firm became a publicly traded company.

Log of Total Market Value: The natural logarithm of one plus total market value.

Log of Total Trading Volume: The natural logarithm of one plus total trading volume in shares.

Log of Total RMB Trading Volume: The natural logarithm of one plus total dollar trading volume in RMB.

S.D. of Stock Returns: The standard deviation of firm daily returns in a given quarter.

References

Ball, R. (2001). Infrastructure requirements for an economically efficient system of public financial reporting and disclosure. Brookings-Wharton papers on financial

services, 2001(1), 127-169.

Ball, R., 2009. Market and political/regulatory perspectives on the recent accounting scandals. J. Account. Res. 47 (2), 277–323.

Baker, S.R., Bloom, N., Davis, S.J., 2016. Measuring economic policy uncertainty. Q. J. Econ. 131 (4), 1593–1636.

Baker, M., Wurgler, J., 2006. Investor sentiment and the cross-section of stock returns. J. Finance 61 (4), 1645–1680.

Baker, M., Wurgler, J., 2007. Investor sentiment in the stock market. J. Econ. Perspect. 21 (2), 129–152.

Bernanke, B.S., 1983. Irreversibility, uncertainty, and cyclical investment. Q. J. Econ. 98 (1), 85–106.

Białkowski, J., Gottschalk, K., Wisniewski, T.P., 2008. Stock market volatility around national elections. J. Bank. Financ. 32 (9), 1941–1953.

Bleck, A., Liu, X., 2007. Market transparency and the accounting regime. J. Account. Res. 45 (2), 229–256.

Bloom, N., Bond, S., Van Reenen, J., 2007. Uncertainty and investment dynamics. Rev. Econ. Stud. 74 (2), 391–415.

Bloom, N., 2009. The impact of uncertainty shocks. econometrica 77 (3), 623–685.

Boutchkova, M., Doshi, H., Durnev, A., Molchanov, A., 2012. Precarious politics and return volatility. Rev. Financ. Stud. 25 (4), 1111–1154.

Brogaard, J., Detzel, A., 2015. The asset-pricing implications of government economic policy uncertainty. Manage. Sci. 61 (1), 3–18.

Callen, J.L., Fang, X., 2013. Institutional investor stability and crash risk: monitoring versus short-termism? J. Bank. Financ. 37 (8), 3047–3063.

Chen, J., Hong, H., Stein, J.C., 2001. Forecasting crashes: trading volume, past returns, and conditional skewness in stock prices. J. financ. econ. 61 (3), 345–381.

Chen, J., Jiang, F., Tong, G., 2017. Economic policy uncertainty in China and stock market expected returns. Account. Financ. 57 (5), 1265–1286.

Colak, G., Durnev, A., Qian, Y., 2017. Political uncertainty and IPO activity: evidence from US gubernatorial elections. J. Financ. Quant. Anal. 52 (6), 2523–2564.

DeFond, M.L., Hung, M., Li, S., Li, Y., 2014. Does mandatory IFRS adoption affect crash risk? Account. Rev. 90 (1), 265–299.

Durnev, A., 2010. The Real Effects of Political Uncertainty: Elections and Investment Sensitivity to Stock Prices.　Available at SSRN 1549714. .

Fama, E.F., French, K.R., 1993. Common risk factors in the returns on stocks and bonds. J. financ. econ. 33 (1), 3–56.

Graham, J.R., Harvey, C.R., Rajgopal, S., 2005. The economic implications of corporate financial reporting. J. Account. Econ. 40 (1–3), 3–73.

Hutton, A.P., Marcus, A.J., Tehranian, H., 2009. Opaque financial reports, R2, and crash risk. J. financ. econ. 94 (1), 67–86.

Jens, C.E., 2017. Political uncertainty and investment: causal evidence from US gubernatorial elections. J. financ. econ. 124 (3), 563–579.

Jin, X., Chen, Z., Yang, X., 2019. Economic policy uncertainty and stock price crash risk. Account Finance 58, 1291–1318.

Jin, L., Myers, S.C., 2006. R2 around the world: new theory and new tests. J. financ. econ. 79 (2), 257–292.

Julio, B., Yook, Y., 2012. Political uncertainty and corporate investment cycles. J. Finance 67 (1), 45–83.

Kelly, B., Pástor, L., Veronesi, P., 2016. The price of political uncertainty: theory and evidence from the option market. J. Finance 71 (5), 2417–2480.

Kim, J.B., Li, Y., Zhang, L., 2011a. CFOs versus CEOs: equity incentives and crashes. J. financ. econ. 101 (3), 713–730.

Kim, J.B., Li, Y., Zhang, L., 2011b. Corporate tax avoidance and stock price crash risk: firm-level analysis. J. financ. econ. 100 (3), 639–662.

Kim, J.B., Zhang, L., 2016. Accounting conservatism and stock price crash risk: firm-level evidence. Contemp. Account. Res. 33 (1), 412–441.

Kothari, S.P., Shu, S., Wysocki, P.D., 2009. Do managers withhold bad news? J. Account. Res. 47 (1), 241–276.

Leahy, J.V., Whited, T.M., 1995. The effect of uncertainty on investment: some stylized facts (No. w4986). Bur. Econ. Res. Bull. Aging Health.

Lam, S.S., Zhang, H., Zhang, W., 2018. Does policy instability matter for international equity markets? Int. Rev. Financ.

Li, X.M., 2017. New evidence on economic policy uncertainty and equity premium. Pacific-basin Financ. J. 46, 41–56.

Nagar, V., Schoenfeld, J., Wellman, L., 2019. The effect of economic policy uncertainty on investor information asymmetry and management disclosures. J. Account. Econ. 67 (1), 36–57.

Pastor, L., Veronesi, P., 2012. Uncertainty about government policy and stock prices. J. Finance 67 (4), 1219–1264.

Pástor, L., Veronesi, P., 2013. Political uncertainty and risk premia. J. financ. econ. 110 (3), 520–545.

Piotroski, J.D., Wong, T.J., Zhang, T., 2015. Political incentives to suppress negative information: evidence from Chinese listed firms. J. Account. Res. 53 (2), 405–459.

Rodrik, D., 1991. Policy uncertainty and private investment in developing countries. J. Dev. Econ. 36 (2), 229–242.