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Economic policy uncertainty and mergers and acquisitions: Evidence from China

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ABSTRACT

This study examines the relationship between economic policy uncertainty and mergers and acquisitions (M&As) in China. Using all listed Chinese companies on the Shanghai and Shenzhen Stock Exchanges as well as 4188 M&A deals from the period of 2001–2018, we show that Chinese firms are more likely to make acquisitions during periods of high economic policy uncertainty, which contradicts the behavior of US firms. We further show that state-owned enterprises (SOEs) are less likely than non-SOEs to make acquisitions during periods of high economic policy uncertainty. SOEs are less likely to use only cash for their acquisitions during periods of high economic policy uncertainty. These results indicate the prudence of SOEs regarding acquisitions relative to non-SOEs during periods of high economic policy uncertainty. Moreover, acquisitions during periods of high economic policy uncertainty are associated with an increase in shareholder wealth for acquirers, and this wealth effect is more pronounced for SOEs.

1. Introduction

Should a company invest under uncertainty? To date, there is no consensus in the theoretical literature—the conclusion depends on the nature of the investment, risk aversion behavior, and the competition environment, among others. Under perfect competition, Hartman (1972), Abel (1983), and Caballero (1991) show a positive relationship between uncertainty and corporate investment. In contrast, studies based on the real options approach to investment show a negative relationship between uncertainty and corporate investment (see McDonald and Siegel, 1986). These studies demonstrate that firms are likely to delay irreversible investment under uncertainty (Bernanke, 1983; McDonald and Siegel, 1986; Dixit and Pindyck, 1994; Abel and Eberly, 1994).

Using a news-based proxy of economic policy uncertainty, we examine the relationship between uncertainty and M&A deals in China. Our empirical analysis uses all listed Chinese companies and 4188 M&A deals in China from the period of 2001–2018. Our results show that Chinese firms are more likely to make acquisitions during periods of high economic policy uncertainty, which contradicts the behavior of US firms. Besides, SOEs are less likely than non-SOEs to make acquisitions during periods of high economic policy uncertainty. SOEs are also less likely to use only cash for their acquisitions during periods of high economic policy uncertainty. These results indicate the prudence of SOEs regarding acquisitions relative to non-SOEs during periods of high economic policy uncertainty. Moreover, acquisitions during periods of high economic policy uncertainty are associated with an increase in shareholder wealth for acquirers, and this wealth effect is more pronounced for SOEs.

Previous empirical corporate investment literature mainly focused on two types of uncertainty, namely political uncertainty and economic policy uncertainty. Political uncertainty is normally captured by specific political events which could serve as good exogenous indicators of uncertainty. However, such political events do not provide a continuous measure or variations of economic policy uncertainty. Baker, Bloom and Davis (BBD hereafter) (2016) developed a news-based index to capture economic policy uncertainty. Their index is constructed based on the frequency of newspaper articles containing key policy uncertainty related words.

Studies extensively explored the relationship between uncertainty and corporate investment (see Julio and Yook, 2012; Kang et al., 2014; Gulen and Ion, 2016; An et al., 2016; Jens, 2017). However, the relationship between economic policy uncertainty and M&As is under-researched. This is surprising given that M&As are one of the most important forms of corporate investment (Nguyen and Phan, 2017). To our knowledge, only two studies, namely Nguyen and Phan (2017) and

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Bonaime et al. (2018), investigated the relationship between economic policy uncertainty and M&As. Unlike ours, both studies focused on the US market. There are specific reasons why we focused on China. Firstly, the Chinese capital market has grown rapidly during the last 20 years. To be specific, the total market capitalization of the Chinese stock market has grown from 5320.55 billion RMB in 2000 to 43,492.40 billion RMB in 2018, and an important feature of this growth is numerous M&A deals. Secondly, China is best described as a transitioning economy, and, hence, the influence of economic policy uncertainty on M&As in China may exhibit different patterns when compared with those observed for developed countries. Although conventional real options theory (see, among others, Bernanke, 1983; McDonald and Siegel, 1986) predicts that firms should delay irreversible investment under uncertainty, this theory ignores competitive interactions among agents. Grenadier (2002) shows that competition could erode the value of the option to wait. Yang and Meyer (2015) claim that the speed of action is critical to gaining a competitive advantage in fast-paced markets. This implies that, although firms should delay irreversible investment under uncertainty, the cost of waiting in a competitive market is high. Due to the highly competitive environment in China (Luo, 2003; Williamson et al., 2004; Gadiesh et al., 2007), the uncertainty–M&A relationship in China could be different from that of the US. Consistent with this prediction, our results show that firms in China are more likely to make acquisitions during periods of high economic policy uncertainty—a conclusion that contradicts the behavior of US firms.

In the light of the preceding arguments, we fill the research gap by investigating the relationship between economic policy uncertainty and M&As in China. In particular, we address the following research questions: 1) How does economic policy uncertainty affect the likelihood of making acquisitions? 2) How does economic policy uncertainty affect M&A payment methods? 3) What is the influence of economic policy uncertainty on the acquirers' shareholder value?

To measure economic policy uncertainty, we use economic policy uncertainty (EPU) index of China developed by Baker et al. (2013) and BBD (2016). This EPU index is constructed based on the frequency count of keywords related to policy uncertainty that appear in the South China Morning Post (SCMP). The SCMP is Hong Kong's leading English-language newspaper. Since the media in Hong Kong is not regulated by Mainland China, the wording in the SCMP is less subjective to governmental censorship. As a robustness check, we used another EPU index of China developed by Davis et al. (2019). This alternative EPU index is constructed based on the frequency of keywords related to policy uncertainty that appear in two mainland Chinese newspapers, namely the Renmin Daily and the Guangming Daily.

We examine the relationship between economic policy uncertainty and the likelihood of making acquisitions by using panel probit model. Our result shows a positive relationship between economic policy uncertainty and making acquisitions. The estimations of the probit model can be subject to potential omitted variable bias and endogeneity issue. Unobserved factors, such as investment opportunities and economic development, can be correlated with both economic policy uncertainty and M&A activities. To address the concerns, firstly, we run panel probit regression controlling for macroeconomic conditions and year fixed-effect. Secondly, we run an IV probit model. Following Wang et al. (2014), we use EPU index in US as an instrument of EPU index in China. Our finds are robust to omitted-variable-bias and endogeneity concerns. Using a subsample including only firm-year observations with completed M&A deals, we examine the relationship between economic policy uncertainty and payment method of M&A deals using cross-sectional probit model. Our result shows that SOEs are less likely to use only cash for their acquisitions during periods of high economic policy uncertainty. We further examine the relationship between economic policy uncertainty and short-term acquirer shareholder value using cross-sectional ordinary least squares regression. Our results show that acquisitions during periods of high economic policy uncertainty are associated with an increase in shareholder wealth for acquirers, and this wealth effect is more pronounced for SOEs. Since M&As are managers' decisions rather than a random assignment, the estimation can be subject to self-selection bias, we use Heckman (1979) two-step self-selection correction model and the conclusion regarding the acquirers' shareholder value remains intact. Furthermore, we adopt an alternative EPU index and rerun all the estimations, our conclusions remain intact.

Our study contributes to the literature in two aspects. Firstly, we find that Chinese firms are more likely to make acquisitions during periods of high economic policy uncertainty, which contradicts the behavior of US firms. This highlights the possible acquisition behavior difference between firms in a transition or emerging economy and firms in a developed economy during periods of high economic policy uncertainty. Secondly, to our knowledge, this is the first study employs two measures of EPU index in China based on different newspapers, in particular, newspaper based in Mainland China versus newspaper based in Hong Kong which is less subjective to governmental censorship. We find that two EPU indexes produce a consensus finding regarding the impact of uncertainty on M&A activities.

We proceed as follows. Section 2 presents the literature. Section 3 outlines our hypotheses. Section 4 describes the data, while Section 5 outlines our methodology. Section 6 presents the empirical results, and Section 7 details the robustness checks. Section 8 concludes the paper.

2. Literature review

2.1. Mergers and acquisitions (M&As) in China

Two theories explain M&A decisions. The first is the shareholder wealth maximization theory, which argues that M&As are motived by synergy gains from the combination of two firms (Coase, 1937). The second is the agency theory, which explains that M&As are motived by managerial self-interest (Halpern, 1983; Jensen, 1986; Shleifer and Vishny, 1989) and is arguably value-destroying for the shareholders. While the empirical evidence on the wealth effects of the bidder is mixed in the US case (see, among others, Mulherin and Boone, 2000; Andrade et al., 2001; Moeller et al., 2004, 2005; Faccio et al., 2006; Masulis et al., 2007), most studies find a positive wealth effects of the bidder in the Chinese case (Bhabra and Huang, 2013; Zhou et al., 2015; Chi et al., 2011). There are several features that make the M&A deals in China unique. Firstly, there is significant involvement of SOEs in the M&A deals. Secondly, some of the M&A deals are often characterised by government intervention and political support. Bhabra and Huang (2013) show that the bidders' positive abnormal stock returns around the announcement date are mainly driven by SOEs. Chi et al., (2011) show that bidders with political advantages (measured by the percentage of state ownership) have higher abnormal stock returns around the announcement date. Zhou et al. (2015) compare the short-term and long-term performance of M&As between SOE bidders and non-SOE bidders. They show that SOE bidders outperform non-SOE bidders in the long-term, and the results are mainly driven by the M&A deals during the hot political periods, where there are government interventions. Ma et al. (2016) also show that SOE bidders outperform the non-SOE bidders in the long-term.

Other studies on M&As in China focused on the motivation of the acquisitions and determinants of the acquirer's return. For example, Arnoldi and Muratova (2019) examine the government's influence on acquisition behavior, and find that provincial government-owned firms and politically-tied firms are more likely to conduct unrelated acquisitions within their home province compared to the unrelated cross-province acquisitions. Lin et al. (2009) find that learning and network factors could lead to M&As. Boateng and Bi (2014) examine how payment methods could affect the acquirer's return. They find that acquisitions financed by stocks outperform acquisitions financed by cash in pre-acquisition period and no significant differences between cash payment and stock payment in the post-acquisition period. Li et al. (2018) show that linguistic distance is negatively associated with acquirer's

abnormal return around the announcement date. Furthermore, there is another tranche of literature investigates the motivation and performance of cross-boarder M&A of Chinese firms (Zhu and Jog, 2012; Yang and Hyland, 2012; Lin et al., 2019; Liu et al., 2019; Yu et al., 2020).

2.2. Uncertainty and corporate investment

The relationship between uncertainty and corporate investment is unclear in the theoretical literature. The differences in the conclusions are attributable to the differences in model assumptions and transmission channels explored in prior work. Under the assumption of perfect competition, risk-neutral agent, and constant returns-to-scale production functions, Hartman (1972), Abel (1983), and Caballero (1991) show that output price uncertainty may increase corporate investment. From the real options framework, Bernanke (1983), McDonald and Siegel (1986), Dixit and Pindyck (1994), and Abel and Eberly (1994) show that uncertainty increases real option values, and that firms are likely to delay irreversible investment under uncertainty. However, the real options models ignore competitive interactions among agents. Grenadier (2002) shows that competition could erode the value of the option to wait.

Different sources of uncertainty and form of investments have been analysed in the empirical literature relating uncertainty to corporate investment. Using election years in the US as a proxy of political uncertainty, Julio and Yook (2012) show that firms reduce investment by 4.8% on average during election years compare to nonelection years. Jens (2017) shows that corporate investment declines by 5% before all elections. An et al. (2016) find a similar negative relationship between political uncertainty and corporate investment in China. Using a news-based index of policy uncertainty, Kang et al. (2014) and Gulen and Ion (2016) find that policy uncertainty is negatively associated with corporate investment in the US. Furthermore, Wang et al. (2014) find a negative relationship between economic policy uncertainty and corporate investment in China.

Another tranche of empirical literature focuses on the relationship between uncertainty and M&As. From the risk management perspective, Garfinkel and Hankins (2011) show the increases in cash flow uncertainty encourage firms to make vertical acquisitions. From the agency issue perspective, Duchin and Schmidt (2013) show that economic uncertainty is positively associated with M&As. They argue that this is due to the empire-building action of the managers and that managers believe there are limited investor attention and immediate consequences to conducting bad acquisitions during periods of high uncertainty. Nguyen and Phan (2017) investigate the effects of policy uncertainty on M&As in the US. They find that policy uncertainty is negatively associated with the probability of making acquisition and positively associated with the time to complete M&A deals. Acquirers are more likely to use stock for payments during periods of high policy uncertainty. Furthermore, policy uncertainty is positively associated with the acquirer's abnormal return around the announcement date, and this is due to the acquirer's prudence during the high policy uncertainty period. Bonaime et al., (2018) show that policy uncertainty is negatively associated with M&A activities, and that this negative relationship is mainly due to the real option channel.

3. Hypotheses development

Economic policy uncertainty increases corporate operational and investment risk, and the cost of capital. M&As require large amount of capital and thus tend to be irreversible investment. Pastor and Veronesi (2013), Gilchrist et al. (2014) and Brogaard and Detzel (2015) show that uncertainty could increase the costs of capital. Furfine and Rosen (2011) and Phan (2014) show that policy uncertainty is inclined to stimulate the acquirers' default risk. From the real options framework, Bernanke (1983), Rodrik (1991), and Dixit and Pindyck (1994) show that firms are more likely to delay irreversible investment under uncertainty. However, these real options models ignore competitive interactions among agents. Grenadier (2002) shows that competition could erode the value of the option to wait. Yang and Meyer (2015) claim that the speed of action is critical to gaining a competitive advantage in the fast-paced markets. Although firm should delay irreversible investment under uncertainty, the cost of waiting in a competitive market is high. Due to the highly competitive environment in China (Luo, 2003; Williamson et al., 2004; Gadiesh et al., 2007), M&As could be positively associated with uncertainty. Based on the above argument, we propose the Hypothesis that:

Hypothesis 1. A firm is less likely to make acquisitions during periods of high policy uncertainty. Alternatively, a firm is more likely to make acquisitions during periods of high policy uncertainty.

During periods of high policy uncertainty, the cost of capital tends to be high and the liquidity in the economy tends to be low, meaning that firms are likely to be financially constrained. Besides, policy uncertainty can exacerbate cash flow volatility, which makes companies more vulnerable. Thus, firms pay more attention to their cash holdings during periods of high policy uncertainty. Nguyen and Phan (2017) show that acquirers are more likely to use stocks to pay their deals under high policy uncertainty in order to reduce cash volatility. Thus, we hypothesize that:

Hypothesis 2A. Acquirers are more likely to use only stocks for their M&A deals during periods of high policy uncertainty.

Hypothesis 2B. Acquirers are less likely to use only cash for their M&A deals during periods of high policy uncertainty.

The above arguments suggest that acquisitions during periods of high policy uncertainty can be risky, and, hence, firms should delay acquisitions when facing policy uncertainty. However, the speed of action is critical to gaining a competitive advantage in the fast-paced markets (Njindan Iyke, 2019; Yang and Meyer, 2015). This means firms need to find a balance between conducting risky acquisitions and gaining a competitive advantage during periods of high policy uncertainty. In effect, firms become more prudent and conduct acquisitions that have better expected outcomes during periods of high policy uncertainty. This aside, the cost of financing is high during periods of high policy uncertainty, and firms which make acquisitions tend to be more financially healthy and are exploring investment opportunities to gain competitive advantages. Thus, we hypothesize that:

Hypothesis 3. Acquisitions during periods of high economic policy uncertainty are associated with an increase in shareholder value of acquirers.

Deng et al. (2011) show a positive relationship between the promotion of large SOEs managers who are loyal to the government and corporate performance. Thus, when the economic policy is unclear, the cost of making a mistake or wrong investment is higher for SOE managers than non-SOE mangers. SOEs should be more prudent when making investment decisions than non-SOEs during periods of high economic policy uncertainty. Furthermore, Li and Cheng (2020) show that firms that have political capital are less concerned about competition, since they have competitive advantages such as government protection against competitors (see also Allen et al., 2005; Bai et al., 2006) and favorable bank loans (see also Claessens et al., 2008; Houston et al., 2014). Thus, SOEs should be less likely to make acquisitions than non-SOEs during periods of high economic policy uncertainty. Given the prudence of SOEs regarding acquisitions relative to non-SOEs during high policy uncertainty periods, we hypothesize that:

Hypothesis 4. Acquisitions made by SOEs are associated with a larger increase in shareholder value than acquisitions made by non-SOEs during high economic policy uncertainty periods.

Table 1
The distribution of M&A deals.

Panel A: The distribution of M&A deals by year		
Year	Frequency	Percentage
2001	8	0.19
2002	142	3.39
2003	73	1.74
2004	77	1.84
2005	131	3.13
2006	133	3.18
2007	162	3.87
2008	147	3.51
2009	171	4.08
2010	276	6.59
2011	266	6.35
2012	299	7.14
2013	376	8.98
2014	351	8.38
2015	417	9.96
2016	342	8.17
2017	446	10.65
2018	371	8.86
Total	4188	100
Panel B: The distribution of M&A deals by industry		
Industry	Frequency	Percentage
Consumer Discretionary	667	15.93
Consumer Staples	227	5.42
Energy	102	2.44
Health Care	396	9.46
Industrials	1122	26.79
Information Technology	628	15.00
Materials	701	16.74
Real Estate	338	8.07
Telecommunication Services	7	0.17
Total	4188	100
Panel C: The distribution of M&A deals by payment method		
Payment method	Frequency	Percentage
Cash	3300	78.80
Cash and Stock	348	8.31
Stock	414	9.89
Undisclosed	126	3.01
Total	4188	100

4. Sample and descriptive statistics

We collect all the M&A deals in China between from the period of 2001–2018[1] from Bloomberg. Firm's accounting data are from the Wind database. We obtain daily stock return data from CSMAR (China Stock Market & Accounting Research database). After filtering the M&A deals, our sample contains 4188 completed M&A deals from January 2001 to December 2018. Following Fuller et al. (2002) and Zhou et al. (2015), the filtering process is as follows: 1) Acquirers are public listed Chinese companies on the Shenzhen or Shanghai Stock Exchanges; 2) Acquirers that belong to the financial or utility industry are excluded from the sample because they are highly regulated; 3) If acquirers made multiple M&A deals within one year, we only include the first deal; 4) M&A deals with a deal value below 5 million RMB are excluded from our sample; 5) Acquirers that do not have complete accounting data required for the analysis are excluded from our sample.

The distribution of M&A deals is shown in Table 1. Panels A, B, and C, show, respectively the distribution of M&A deals by year, industry, and payment method. The number of M&A deals increased steadily over the period from 2001 to 2018, but drop significantly during 2003 and 2004. In terms of the industry distribution, acquirers are mainly in consumer discretionary, industrials, and information technology industries. On the other extreme, only 0.17% of the acquirers are in the telecommunication services industry. In terms of the payment method, the majority of the deals are paid in cash.

Table 2
Summary statistics.

Variable	Mean	Std. Dev	Q1	Median	Q3	N
Panel A: Full Sample						
EPU	5.07	0.57	4.57	5.02	5.51	29,588
ROA	0.06	0.43	0.03	0.06	0.09	29,588
Firm size	21.69	1.28	20.81	21.54	22.38	29,588
Cash to total assets	0.17	0.14	0.07	0.13	0.23	29,588
Book leverage	0.48	1.20	0.28	0.44	0.60	29,588
Market-to-book ratio	4.78	297.39	1.48	2.10	3.28	29,588
Past 12-months returns	0.23	0.81	−0.25	−0.01	0.46	29,588
Panel B: M&A Subsample						
EPU	5.11	0.57	4.57	5.13	5.51	4188
ROA	0.07	0.08	0.04	0.06	0.10	4188
Firm size	21.75	1.22	20.89	21.61	22.43	4188
Cash to total assets	0.19	0.15	0.08	0.14	0.25	4188
Book leverage	0.45	0.38	0.26	0.44	0.60	4188
Market-to-book ratio	3.10	15.12	1.51	2.18	3.39	4188
Past 12-months returns	0.30	0.86	−0.22	0.02	0.53	4188
Panel C: Non-M&A Subsample						
EPU	5.06	0.57	4.57	5.02	5.51	25,400
ROA	0.05	0.46	0.03	0.05	0.09	25,400
Firm size	21.68	1.28	20.80	21.53	22.37	25,400
Cash to total assets	0.17	0.14	0.07	0.13	0.22	25,400
Book leverage	0.48	1.28	0.28	0.44	0.61	25,400
Market-to-book ratio	5.06	320.92	1.47	2.09	3.26	25,400
Past 12-months returns	0.22	0.79	−0.25	−0.01	0.45	25,400

Note: This table reports the summary statistics on the key variables used in this study. Panels A, B, and C show, respectively, the summary statistics for the full sample, the subsample including only firm-year observations with completed M&A deals, and the subsample of all the firm-year observations with no M&A deals. The variable definitions are reported in the Appendix.

Table 2 shows the summary statistics of the key variables used in this study. The sample consists of 4188 M&A deals of 2041 unique Chinese firms. Panels A, B, and C, show, respectively the summary statistics for the full sample, the subsample including only firm-year observations with completed M&A deals, and for the subsample of all the firm-year observations with no M&A deals. The definition of variables and construction methods are reported in the Appendix. By comparing the summary statistics between M&A subsample and non-M&A subsample, we observe that firms which made acquisitions have higher return on asset (ROA), have larger size, have higher cash to total assets ratio, lower book leverage, lower market-to-book ratio, and have higher past 12-months stock returns. Besides, M&As tend to happen during periods of high economic policy uncertainty.

To measure economic policy uncertainty, we use the EPU index of China developed by Baker et al. (2013) and BBD (2016). This EPU index is constructed based on the frequency count of keywords related to policy uncertainty that appear in the SCMP.[2] The SCMP is Hong Kong's leading English-language newspaper. The benefit of using such EPU index is that SCMP is less subjective to government censorship from mainland China, since the media in Hong Kong is not regulated by Mainland China. Fig. 1 plots the EPU index from the period of 2000–2018. The EPU index surged after 2016, which could be due to Brexit, Trump Inauguration and the trade war between China and US.

[1] This is the globalization era in China with rapid development in the financial market.

[2] Please refer to BBD (2016) and Baker et al. (2013) for the detailed methodology.

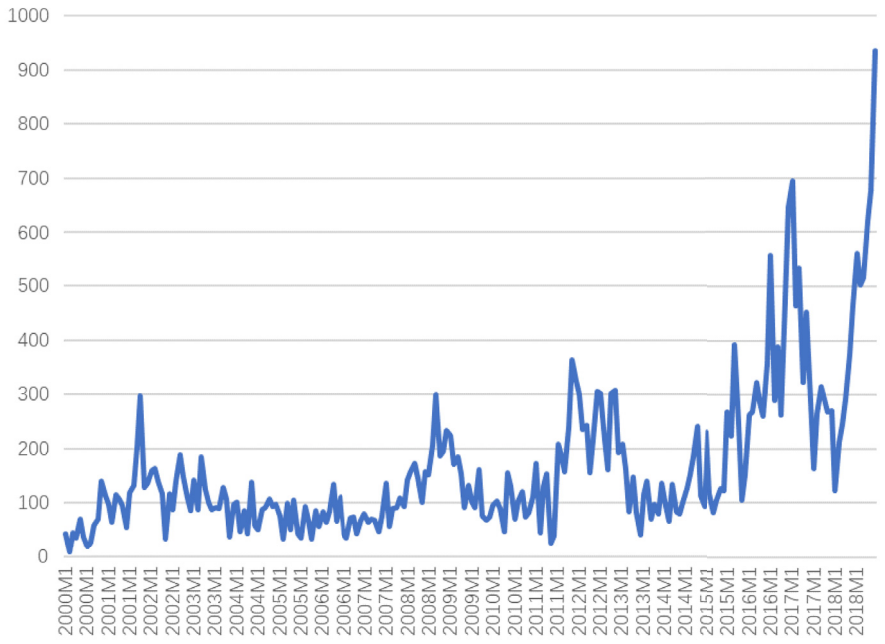

Fig. 1. Economic policy uncertainty index.

5. Methodology

5.1. Economic policy uncertainty and the likelihood of making acquisitions

To investigate the impact of economic policy uncertainty on the likelihood of making acquisitions, we use the following panel probit model:

$$\text{M\&A Dummy}_{i,t} = \alpha + \beta \times \text{EPU}_{t-1} + \lambda \times \text{Control}_{i,t-1} + \gamma \times \text{Industry-fixed effect} + \varepsilon_{i,t} \quad (1)$$

Where M&A Dummy is a dummy variable that takes a value of 1 if firm i made acquisition announcement in year t, and 0 otherwise. EPU is the natural logarithm of the average of EPU index over the last 6-months of the preceding year. We follow Nguyen and Phan (2017) and Bonaime et al. (2018) for the choice of control variables including market-to-book ratio, book leverage, firm size, ROA, cash to total assets ratio, stock return over the last 12 months. We use the one-year lag values of all the control variables since the decision of making an acquisition is based on past information. We expect larger, more financially healthy firms (higher cash to total assets ratio, lower leverage), and firms with better growth opportunities (higher ROA, higher market-to-book ratio, higher past stock returns) to make acquisitions. We also include SOE dummy, which takes a value of 1 if the firm is state-owned, and 0 otherwise. The SOE dummy and the interaction between the SOE dummy and EPU are used to verify the difference between SOEs and non-SOEs. We further control for industry effect. Following follow Nguyen and Phan (2017), we did not include the year fixed-effects. Firms are subject to the same economic policy uncertainty in a given year, meaning that including year fixed-effects could capture most of the explanatory power of economic policy uncertainty. However, we control for proxies of macroeconomics factors and year fixed-effects in the robustness check section.

5.2. Economic policy uncertainty and the payment method of M&A deals

To investigate the impact of economic policy uncertainty on the payment method of M&A deals, we use the following cross-sectional probit model:

$$\text{Stock dummy}_{ij} = \alpha + \beta \times \text{EPU}_{t-1} + \lambda \times \text{Control}_{it-1} + \gamma \times \text{Industry-fixed effect} + \varepsilon_{i,t} \quad (2)$$

$$\text{Cash dummy}_{ij} = \alpha + \beta \times \text{EPU}_{t-1} + \lambda \times \text{Control}_{it-1} + \gamma \times \text{Industry-fixed effect} + \varepsilon_{i,t} \quad (3)$$

Where Stock dummy takes a value of 1 if the payment method is only stock for M&A deal j of firm i, and 0 otherwise. Cash dummy takes a value of 1 if the payment method is only cash for M&A deal j of firm i, and 0 otherwise. EPU is the natural logarithm of the average of EPU index over the last 6-months of the preceding year. Following the same argument in Section 5.1 for the choice of control variables, we include market-to-book ratio, book leverage, firm size, ROA. cash to total assets ratio, and stock return over the last 12 months. We use the one-year lag values of all the control variables. The SOE dummy and the interaction between the SOE dummy and EPU are used to verify the difference between SOEs and non-SOEs. We further control of industry effect. In this analysis, we use the M&A subsamples, which only include firm-year observations that have completed M&A deals.

5.3. Economic policy uncertainty and acquirers' shareholder value

This part of the study aims to examine the effect of economic policy uncertainty on the acquirers' shareholder value. Event study method is used to examine the impact of economic policy uncertainty on the acquirers' short-term abnormal stock returns.

The expected returns are calculated by using the Capital Asset Pricing Model (CAPM), whereas abnormal returns (AR) are calculated by taking the difference between actual returns and expected returns. The formula for calculating AR is as follows:

$$AR_{i,t} = R_{i,t} - \left(\widehat{\alpha}_i + \widehat{\beta}_i\left(R_m - r_f\right) + r_f\right)_{i,t} \quad (4)$$

where $AR_{i,t}$ is the abnormal return for stock i in day t. $R_{i,t}$ is the actual return of stock i in day t. $(\widehat{\alpha}_i + \widehat{\beta}_i(R_m - r_f) + r_f)_{i,t}$ is the expected return of stock i in day t based on the CAPM. $\widehat{\alpha}_i$ and $\widehat{\beta}_i$ are estimated based on 250 trading days, which is from 270 trading days before the announcement date to 20 trading days before the announcement date. Within the 250 trading days, we only keep the estimations if the stock returns are available for at least 150 trading days.

Cumulative abnormal return (CAR) is calculated by summing up abnormal return over the event window period:

$$CAR_{i,T} = \sum_{i=1}^{i=T} AR_{i,t} \quad (5)$$

where $CAR_{i,T}$ is the cumulative abnormal return for stock i for T days of event window. We choose three event windows: 1) 1 day before announcement date to 1 day after announcement date: (−1,+1); 2) 3 days before announcement date to 3 days after announcement date: (−3,+3); 3) 5 days before announcement date to 5 days after announcement date: (−5,+5).

Within each event window, we drop observations if there are missing stock returns within the event window.

After calculating CAR, we employed cross-sectional regression to test whether economic policy uncertainty has an effect on CAR. Following Nguyen and Phan (2017), we use the following cross-sectional ordinary least squares regressions:

$$CAR11_{ij} = \alpha + \beta \times EPU_{t-1} + \lambda \times Control_{it-1} + \varepsilon_{i,t} \quad (6)$$

$$CAR33_{ij} = \alpha + \beta \times EPU_{t-1} + \lambda \times Control_{it-1} + \varepsilon_{i,t} \quad (7)$$

$$CAR55_{ij} = \alpha + \beta \times EPU_{t-1} + \lambda \times Control_{it-1} + \varepsilon_{i,t} \quad (8)$$

Where $CAR11_{ij}$ is the CAR for M&A deal j of firm i with event window (−1,1), $CAR33_{ij}$ is the CAR for M&A deal j of firm i with event window (−3,3) and $CAR55_{ij}$ is the CAR for M&A deal j of firm i with event window (−5,5). EPU is the natural logarithm of the average of EPU index over the last 6-months of the preceding year. Following the same argument in Section 5.1 for the choice of control variables, we include market-to-book ratio, book leverage, firm size, ROA. cash to total assets ratio, stock return over the last 12 months. We use the one-year lag values of all the control variables. In addition, we include the stock and cash dummies, since the payment method may affect the abnormal returns. The SOE dummy and the interaction between the SOE dummy and EPU are used to verify the difference between SOEs and non-SOEs. In this analysis, we use the M&A subsamples, which only include firm-year observations that have completed M&A deals.

Table 3
Economic policy uncertainty and the likelihood of making acquisitions.

	(1)	(2)
	M&A dummy	M&A dummy
EPU	0.092*** (5.34)	0.095*** (4.91)
SOE		0.306 (1.58)
EPU*SOE		−0.091** (−2.37)
Cash to total assets	0.482*** (7.18)	0.487*** (7.35)
Firm size	0.026*** (3.46)	0.039*** (4.99)
Leverage	−0.032 (−1.18)	−0.022 (−1.03)
Market-to-book ratio	−0.000 (−0.02)	0.000 (0.02)
ROA	0.077 (1.56)	0.069 (1.50)
Past 12-months returns	0.081*** (7.19)	0.078*** (6.88)
Constant	−2.260*** (−13.58)	−2.524*** (−14.30)
Industry control	Yes	Yes
N	29,588	29,588
pseudo R^2	0.008	0.010

Note: This table reports the panel probit regression results of equation (1). T-statistics are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively. The variable definitions are reported in the Appendix.

6. Empirical results

6.1. Economic policy uncertainty and the likelihood of making acquisitions

Table 3 shows the estimates of equation (1). Column (1) shows the baseline regression analyzing the relationship between economic policy uncertainty and the likelihood of making acquisitions. Column (2) adds the SOE dummy and the interaction between EPU and the SOE dummy. The coefficients of EPU are positive and significant in both regressions. This indicates that firms are more likely to make acquisitions during periods of high economic policy uncertainty, and thus supporting Hypothesis 1. The sign of the EPU coefficients is in the opposite direction relative to Nguyen and Phan (2017), who found a negative relationship between economic policy uncertainty and the likelihood of making acquisitions. As we argued in Section 3, firms in China may behavior differently when compare to US firms during periods of high economic policy uncertainty. The coefficient of the interaction between EPU and the SOE dummy is negative and significant, indicating that SOEs are less likely than non-SOEs to make acquisitions during periods of high economic policy uncertainty. These results are consistent with our expectation that SOEs are more prudent than non-SOEs when making acquisition decisions during periods of high economic policy uncertainty.

Regarding control variables, the coefficients of cash to asset ratio, firm size, and last 12-months stock returns are positive and significant, indicating that larger firms, and firms with more cash and higher past stock returns tend to make acquisitions.

6.2. Economic policy uncertainty and the payment method of M&A deals

Table 4 shows the regression results of equations (2) and (3). Column (1) shows the baseline regression analyzing the relationship between economic policy uncertainty and the likelihood of using stock only as payment method. Column (2) adds the SOE dummy and the interaction between EPU and the SOE dummy. Column (3) shows the baseline

Table 4
Economic policy uncertainty and the payment method of M&A deals.

	(1)	(2)	(3)	(4)
	Stock dummy	Stock dummy	Cash dummy	Cash dummy
EPU	−0.035 (−0.67)	−0.060 (−1.00)	−0.106** (−2.41)	−0.075 (−1.52)
SOE		−0.862 (−1.62)		1.054** (2.17)
EPU*SOE		0.270** (2.57)		−0.261*** (−2.72)
Cash to total assets	−0.683*** (−2.90)	−0.761*** (−3.19)	0.623*** (3.43)	0.646*** (3.56)
Firm size	−0.174*** (−5.68)	−0.216*** (−6.89)	0.203*** (8.43)	0.229*** (9.26)
Leverage	0.608*** (3.65)	0.486*** (3.02)	−0.150*** (−3.20)	−0.123*** (−2.62)
Market-to-book ratio	0.002** (2.40)	0.002** (2.20)	−0.001 (−1.31)	−0.001 (−1.19)
ROA	−0.594 (−1.11)	−0.430 (−0.86)	1.024* (1.95)	0.901* (1.83)
Past 12-months returns	−0.004 (−0.12)	0.004 (0.10)	−0.079*** (−2.96)	−0.085*** (−3.22)
Constant	2.467*** (3.95)	3.440*** (5.34)	−3.073*** (−5.94)	−3.735*** (−6.98)
Industry control	Yes	Yes	Yes	Yes
N	4055	4055	4062	4062
pseudo R^2	0.046	0.069	0.047	0.053

Note: This table reports the cross-sectional probit regression results of equations (2) and (3). T-statistics are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively. The variable definitions are reported in the Appendix.

Table 5
Economic policy uncertainty and acquirers' shareholder value.

	(1)	(2)	(3)
	CAR11	CAR33	CAR55
EPU	0.588*** (13.35)	1.351*** (13.05)	2.058*** (12.58)
SOE	−1.268***	−3.084***	−5.325***
	(−3.19)	(−3.32)	(−3.59)
EPU*SOE	0.241*** (3.14)	0.586*** (3.26)	1.007*** (3.51)
Stock	0.623 (1.09)	0.554 (0.44)	0.024 (0.01)
Cash	0.315 (0.69)	0.694 (0.68)	0.745 (0.37)
Cash to total assets	−0.562***	−1.212***	−1.740***
	(−3.42)	(−3.07)	(−2.79)
Firm size	−0.064***	−0.142***	−0.186**
	(−2.79)	(−2.63)	(−2.20)
Leverage	−0.004 (−0.04)	−0.021 (−0.06)	−0.332 (−0.62)
Market-to-book ratio	−0.044***	−0.108***	−0.192***
	(−3.08)	(−3.01)	(−3.53)
ROA	−0.019 (−0.05)	−0.327 (−0.31)	−1.104 (−0.69)
Past 12-months returns	−0.056 (−1.59)	−0.136* (−1.67)	−0.267**
			(−2.05)
Constant	−1.600**	−3.717**	−5.766**
	(−2.33)	(−2.42)	(−2.09)
N	2666	2571	2478
adj. R^2	0.118	0.123	0.131

Note: This table reports the cross-sectional ordinary least square regression results of equations (6)–(8). T-statistics are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively. The variable definitions are reported in the Appendix.

regression analyzing the relationship between economic policy uncertainty and the likelihood of using cash only as payment method. Column (4) adds the SOE dummy and the interaction between EPU and the SOE dummy. We did not find consistent results that economic policy uncertainty has a significant effect on the payment method, and thus our results refute Hypothesis 2A and 2B. However, the interaction between EPU and the SOE dummy is positive and significant in column (2) and negative and significant in column (4), indicating that SOEs are more likely than non-SOEs to use only stock as payment method during periods of high economic policy uncertainty. Furthermore, SOEs are less likely than non-SOEs to use only cash as payment method during periods of high economic policy uncertainty. These results are consistent with our expectation that SOEs are more prudent when making acquisitions during high economic policy uncertainty periods.

Regarding the control variables, the coefficient of cash to total assets ratio is negative and significant if the dependent variable is the stock dummy, and is positive and significant if the dependent variable is the cash dummy. This indicates that firms with more cash are more likely to use only cash and less likely to use only stock as payment method. The coefficient of firm size is negative and significant if the dependent variable is the stock dummy, and is positive and significant if the dependent variable is the cash dummy. This indicates that larger firms are more likely to use only cash and less likely to use only stock as payment method. The coefficient of book leverage is positive and significant if the dependent variable is the stock dummy, and is negative and significant if the dependent variable is the cash dummy. This indicates that more leveraged firms are more likely to use only stock and less likely to use only cash as payment method. The coefficient of ROA is positive and significant if the dependent variable is the cash dummy. This indicates that more profitable firms are more likely to use only cash as payment method. The coefficient of last 12-months stock returns is negative and significant if the dependent variable is the cash dummy. This indicates that firms with higher past stock returns are more likely to use only cash as payment method. The results are intuitive because larger firms tend to have better access to the capital market, and have the capacity to pay cash for their acquisitions. High leverage can be interpreted as financial constraint, thus more financially constrained firms have less capacity to pay cash for their acquisitions. More profitable firms are less likely to be financially constrained and have the capacity to pay cash for their acquisitions. Furthermore, for acquirers with higher last 12 months stock returns, the target may think the acquires' stock price is overvalued and is more willing to accept cash payments.

6.3. Economic policy uncertainty and acquirers' shareholder value

Table 5 shows the regression results of cumulative abnormal returns. Columns (1), (2), and (3) show the result of event windows with 3 days, 7 days, and 11 days, respectively. The coefficient of EPU is significant and positive in all the regressions. This indicates that economic policy uncertainty is positively associated with acquirers' shareholder value. This result supports Hypothesis 3 and is consistent with Nguyen and Phan (2017). The longer the event window, the larger the coefficient of EPU. This indicates that the stock market in China is not efficient, the announcement effect on the stock returns tends to be persistent. The coefficient of the interaction between EPU and the SOE dummy is significant and positive, indicating that acquisitions made by SOEs are associated with a larger increase in shareholder value than acquisitions made by non-SOEs during periods of high economic policy uncertainty. The regression results in Section 6.1 and 6.2 show that SOEs are more prudent than non-SOEs when making acquisitions during periods of high economic policy uncertainty, which is consistent with our expectation and supports Hypothesis 4.

Regarding the control variables, the SOE dummy is significant and negative indicating that SOEs, on average, create less shareholder wealth compare with non-SOEs, when making acquisitions. Firm size is significant and negative indicating that larger firms create less shareholder wealth when making acquisitions. Market-to-book ratio is significant and negative indicating that firms with more growth opportunities create less shareholder wealth when making acquisitions.

7. Robustness check

7.1. Controlling for omitted variable bias and endogeneity

There could be unobserved factors related to investment opportunities and economic development that are correlated with both economic policy uncertainty and M&A activities. This raises concerns regarding omitted variable bias in our panel probit regression results in Section 6.1. To address this concern, we re-run the panel probit regression controlling for the macroeconomic conditions and time fixed-effects. Following Nguyen and Phan (2017), we use real gross domestic product (GDP) growth and Leading Macroeconomic Prosperity (LDP) Index as proxies for macroeconomic conditions.[3] Table 6 shows the results of the panel probit regressions. In Columns (1) and (2), we controlled for real GDP growth and its coefficient is significant and positive indicating that firms are more likely to make acquisitions when the real GDP growth is high. Columns (3) and (4) controlled for LDP index and its coefficient is insignificant. Columns (5) and (6) controlled for time fixed-effects, which is captured by year dummy variables. After controlling for macroeconomic conditions and time fixed-effects, the coefficient of EPU remains positive and significant, whereas the coefficient of EPU*SOE remains negative and significant indicating that our results are robust to omitted-variable-bias concerns.

Even after controlling for these macroeconomic conditions and time fixed-effects, there could be other unobserved factors that are correlated with both economic policy uncertainty and M&A activities and thus raise further endogeneity concerns. To address these concerns, we run an instrumental variable (IV) probit model. Following Wang et al. (2014), we use the two-year lag of the US EPU index as the instrument for China's

[3] Data for real GDP growth and LDP index are collected from CSMAR.

Table 6
Economic policy uncertainty and the likelihood of making acquisitions controlling for macroeconomic conditions and time fixed-effects.

	(1)	(2)	(3)	(4)	(5)	(6)
	M&A dummy	M&A dummy	M&A dummy	M&A dummy	M&A dummy	M&A dummy
EPU	0.150*** (5.82)	0.160*** (5.94)	0.094*** (5.33)	0.096*** (4.87)	0.928*** (8.89)	0.924*** (8.89)
SOE		0.262 (1.37)		0.309 (1.59)		0.454** (2.29)
EPU*SOE		−0.084** (−2.21)		−0.092** (−2.38)		−0.117*** (−2.98)
Cash to total assets	0.481*** (7.11)	0.487*** (7.31)	0.482*** (7.19)	0.487*** (7.35)	0.423*** (6.15)	0.426*** (6.26)
Firm size	0.029*** (3.84)	0.043*** (5.51)	0.026*** (3.39)	0.039*** (4.93)	0.013 (1.63)	0.026*** (3.22)
Leverage	−0.039 (−1.27)	−0.029 (−1.13)	−0.031 (−1.17)	−0.022 (−1.02)	−0.042 (−1.40)	−0.033 (−1.30)
Market-to-book ratio	0.000 (0.15)	0.000 (0.84)	−0.000 (−0.03)	0.000 (0.01)	0.000 (0.06)	0.000 (0.16)
ROA	0.078 (1.56)	0.070 (1.51)	0.077 (1.55)	0.069 (1.50)	0.080 (1.55)	0.073 (1.50)
Past 12-months returns	0.085*** (7.47)	0.082*** (7.24)	0.081*** (7.19)	0.078*** (6.88)	0.057*** (3.84)	0.056*** (3.72)
Real GDP growth	0.023*** (2.94)	0.026*** (3.45)				
LDP index			−0.002 (−0.57)	−0.001 (−0.31)		
Constant	−2.814*** (−11.27)	−3.166*** (−12.42)	−2.091*** (−6.14)	−2.433*** (−7.05)	−6.730*** (−11.57)	−6.985*** (−12.02)
Industry control	Yes	Yes	Yes	Yes	Yes	Yes
Time control	No	No	No	No	Yes	Yes
N	29,588	29,588	29,588	29,588	29,588	29,588
pseudo R^2	0.009	0.011	0.008	0.010	0.023	0.024

Note: This table reports the panel probit regression results of equation (1) controlling for macroeconomic conditions and time fixed-effects. T-statistics are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively. The variable definitions are reported in the Appendix.

Table 7
IV probit model of Economic policy uncertainty and the likelihood of making acquisitions.

	(1)	(2)	(3)
	First Stage	Second Stage	Second Stage
	EPU	M&A dummy	M&A dummy
EPU in US	0.410*** (41.46)		
Instrumented EPU		0.348*** (4.74)	0.406*** (4.79)
Instrumented EPU*SOE			−0.300** (−2.54)
SOE			1.403** (2.36)
Cash to total assets	0.077*** (3.42)	0.441*** (6.48)	0.445*** (6.53)
Firm size	0.099*** (40.11)	−0.002 (−0.14)	0.010 (0.82)
Leverage	−0.017*** (−4.84)	−0.027 (−1.07)	−0.017 (−0.75)
Market-to-book ratio	0.000*** (5.65)	0.000 (0.00)	0.000 (0.05)
ROA	0.052*** (3.29)	0.062 (1.33)	0.051 (1.09)
Past 12-months returns	−0.137*** (−35.55)	0.126*** (7.58)	0.120*** (7.04)
Constant	−2.751*** (−27.70)	−1.560*** (−7.64)	−1.964*** (−7.75)
Industry control	Yes	Yes	Yes
N	29,588	29,588	29,588
adj. R^2	0.180		
pseudo R^2		0.008	0.010

Note: This table reports the IV probit regression results of equation (1). T-statistics are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively. The variable definitions are reported in the Appendix.

EPU index. Similar to the measurement of China's EPU index, we use the natural logarithm of the average of the EPU index over the last 6-months in any particular year. Table 7 reports the regression results. Column (1) and (2) report the first and second stage estimates of the IV probit model, respectively. The coefficient of the US EPU index is significant and positive, suggesting that this instrument is relevant. Column (3) reports the second stage results when the SOE dummy and EPU*SOE interaction term are included in the model.[4] The coefficient of the instrumented EPU remains positive and significant, while the coefficient of the instrumented EPU*SOE term remains negative and significant suggesting that our results are robust to endogeneity concerns.

[4] For brevity, we did not report the first stage estimations. The results are available on request. The natural candidate instrument for the interaction between the SOE dummy and EPU is the interaction between the SOE dummy and US EPU index.

7.2. Controlling for self-selection bias

The cross-sectional regressions of CAR may be prone to self-selection bias because M&As are managers' decisions rather than a random assignment. To address the self-selection bias concern, we use the Heckman (1979) two-step self-selection correction model. Specifically, we include the inverse Mill's ratio (IMR)—which is calculated using the coefficient estimates of the panel probit model on the likelihood of making acquisitions—as an additional control variable in our model. Table 8 shows the results using Heckman two-step self-selection correction model. The conclusion regarding acquirers' shareholder value remains intact, and hence our finding is not sensitive to self-selection bias.

Table 8
Economic policy uncertainty and acquirers' shareholder value.

	(1)	(2)	(3)
	CAR11	CAR33	CAR55
EPU	0.596***	1.363***	2.031***
	(11.21)	(10.77)	(9.81)
SOE	-1.212**	-3.002***	-5.479***
	(-2.51)	(-2.72)	(-3.13)
EPU*SOE	0.226**	0.564**	1.047***
	(2.24)	(2.44)	(2.86)
Stock	0.625	0.557	0.020
	(1.47)	(0.57)	(0.01)
Cash	0.316	0.694	0.747
	(0.82)	(0.79)	(0.48)
Cash to total assets	-0.507**	-1.133**	-1.897**
	(-2.02)	(-1.99)	(-2.04)
Firm size	-0.056	-0.131	-0.209
	(-1.63)	(-1.64)	(-1.62)
Leverage	-0.005	-0.025	-0.322
	(-0.05)	(-0.08)	(-0.65)
Market-to-book ratio	-0.046***	-0.112***	-0.183***
	(-2.99)	(-2.97)	(-2.96)
ROA	-0.004	-0.307	-1.147
	(-0.01)	(-0.33)	(-0.78)
Past 12-months returns	-0.048	-0.126	-0.287**
	(-1.27)	(-1.43)	(-2.04)
Inverse Mill Ratio	0.108	0.159	-0.312
	(0.29)	(0.19)	(-0.23)
Constant	-1.998	-4.318	-4.576
	(-1.34)	(-1.27)	(-0.81)
N	2666	2571	2478
adj. R^2	0.122	0.127	0.134

Table 9
The alternative EPU index and the likelihood of making acquisitions.

	(1)	(2)
	M&A dummy	M&A dummy
EPU	0.186*** (8.41)	0.190*** (7.50)
SOE		0.361* (1.65)
EPU*SOE		−0.110** (−2.30)
Cash to total assets	0.449*** (6.71)	0.455*** (6.87)
Firm size	0.019** (2.53)	0.032*** (4.04)
Leverage	−0.034 (−1.28)	−0.024 (−1.14)
Market-to-book ratio	−0.000 (−0.01)	0.000 (0.01)
ROA	0.070 (1.46)	0.063 (1.40)
Past 12-months returns	0.079*** (7.09)	0.078*** (6.98)
Constant	−2.487*** (−14.71)	−2.755*** (−14.99)
Industry control	Yes	Yes
N	29,588	29,588
pseudo R^2	0.010	0.012

Note: This table reports the panel probit regression results of equation (1) based on the alternative EPU index. T-statistics are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively. The variable definitions are reported in the Appendix.

7.3. Alternative EPU index

Although the EPU index based on the SCMP is less subjective to the Mainland Chinese government censorship, the drawback of this index is that it is only based on one newspaper. The best alternative measurement of EPU is the index developed by Davis et al. (2019). This EPU index is constructed based on the frequency of keywords related to policy uncertainty appearing in two mainland Chinese newspapers, namely the Renmin Daily and the Guangming Daily.[5] We retest all the hypotheses using this alternative EPU index.

Table 9 shows the results of panel probit regression in equation (1). The coefficient of the EPU index remains positive and significant, while the coefficient of EPU*SOE term remains negative and significant. These results are consistent with the results in Table 3. Table 10 shows the results based on the cross-sectional probit regression in equations (2) and (3). If the dependent variable is the stock dummy, the results indicate that firms are more likely to use only stock as payment method during periods of high economic policy uncertainty. This supports Hypothesis 2A, which was refuted in Table 4. If the dependent variable is the cash dummy, the results show that SOEs are less likely than non-SOEs to use only cash as payment method during high economic policy uncertainty periods, which is consistent with the results in Table 4. Table 11 shows the results based on the cross-sectional ordinary least squares regressions of equations (6)–(8). These results suggest that the conclusion regarding the acquirers' shareholder value remains intact.

8. Conclusion

This study examines the relationship between economic policy uncertainty and M&As in China. We addressed the following questions: 1) How does economic policy uncertainty affect the likelihood of making acquisition; 2) How does economic policy uncertainty affect the method of payment of M&A deals; 3) How does economic policy uncertainty affect the acquirers' shareholder wealth. Using all listed Chinese companies on the Shanghai and Shenzhen Stock Exchanges as well as 4188 M&A deals from the period of 2001–2018, we show that Chinese firms are more likely to make acquisitions during periods of high economic policy uncertainty, which contradicts the behavior of US firms. We further show that SOEs are less likely than non-SOEs to make acquisitions during periods of high economic policy uncertainty. Besides, SOEs are less likely to use only cash for their acquisitions during periods of high economic policy uncertainty. These results indicate the prudence of SOEs regarding acquisitions relative to non-SOEs during periods of high economic policy uncertainty. Lastly, acquisitions during periods of high economic policy uncertainty are associated with an increase in shareholder wealth for acquirers, and this wealth effect is more pronounced for SOEs.

[5] Please refer to BBD (2016) and Davis et al. (2019) for the detailed methodology.

Table 10
The alternative EPU index and payment method of M&A deals.

	(1)	(2)	(3)	(4)
	Stock dummy	Stock dummy	Cash dummy	Cash dummy
PU	0.134* (1.80)	0.175* (1.90)	−0.156** (−2.56)	−0.114 (−1.61)
SOE		−0.392 (−0.55)		1.317** (2.11)
PU*SOE		0.199 (1.28)		−0.344** (−2.53)
Cash to total assets	−0.669*** (−2.86)	−0.741*** (−3.09)	0.653*** (3.60)	0.667*** (3.68)
Firm size	−0.185*** (−6.05)	−0.228*** (−7.27)	0.202*** (8.41)	0.227*** (9.24)
Leverage	0.650*** (3.96)	0.527*** (3.25)	−0.144*** (−3.07)	−0.118** (−2.46)
Market-to-book ratio	0.002** (2.10)	0.002* (1.95)	−0.001 (−1.52)	−0.001 (−1.41)
ROA	−0.605 (−1.14)	−0.453 (−0.91)	1.019* (1.95)	0.903* (1.84)
Past 12-months returns	0.014 (0.43)	0.017 (0.53)	−0.072*** (−2.84)	−0.074*** (−2.92)
Constant	1.877*** (2.98)	2.547*** (3.69)	−2.866*** (−5.45)	−3.563*** (−6.33)
Industry control	Yes	Yes	Yes	Yes
N	4055	4055	4062	4062
pseudo R^2	0.047	0.071	0.047	0.053

Note: This table reports the cross-sectional probit regression results of equations (2) and (3) based on the alternative EPU index. T-statistics are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively. The variable definitions are reported in the Appendix.

Table 11
The alternative EPU index and acquirers' shareholder value.

	(1)	(2)	(3)
	CAR11	CAR33	CAR55
EPU	0.182*** (3.07)	0.426*** (3.14)	0.631*** (2.99)
SOE	−1.039** (−1.97)	−2.526** (−2.08)	−4.778** (−2.52)
EPU*SOE	0.189* (1.67)	0.463* (1.78)	0.901** (2.20)
Stock	0.656 (1.09)	0.638 (0.48)	0.274 (0.11)
Cash	0.319 (0.66)	0.707 (0.66)	0.953 (0.44)
Cash to total assets	−0.742*** (−4.17)	−1.703*** (−4.03)	−2.515*** (−3.76)
Firm size	0.039* (1.68)	0.102* (1.89)	0.186** (2.24)
Leverage	−0.244** (−2.04)	−0.722* (−1.94)	−1.467*** (−2.67)
Market-to-book ratio	0.008 (0.60)	0.013 (0.40)	−0.003 (−0.08)
ROA	−0.359 (−0.81)	−1.328 (−1.16)	−2.993* (−1.73)
Past 12-months returns	−0.216*** (−6.96)	−0.506*** (−6.84)	−0.836*** (−7.18)
Constant	−1.593** (−2.14)	−3.842** (−2.30)	−6.003** (−2.02)
N	2666	2571	2478
adj. R^2	0.049	0.053	0.062

Note: This table reports the cross-sectional ordinary least squares regression results of equations (6)–(8) based on the alternative EPU index. T-statistics are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% level, respectively. The variable definitions are reported in the Appendix.

Declaration of competing interest

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

Appendix. Variable Definitions

EPU (Economic policy uncertainty): The natural logarithm of the average of EPU index over the last 6-months the year preceding an M&A announcement.

Market-to-book ratio: Market-to-book ratio= (the market value of equity + the book value of assets - the book value of equity)/the book value of assets.

Book leverage: Total debt divided by book value of assets.

Firm size: The natural logarithm of book value of assets.

ROA (return on asset): return on asset is measured by using net profit divided by book value of assets.

Stock: Dummy variable takes a value of 1 if the acquirer use stock only as the payment method, otherwise 0.

Cash: Dummy variable takes a value of 1 if the acquirer use cash only as the payment method, otherwise 0.

SOE: Dummy variable takes a value of 1 if the acquirer is SOE, otherwise 0.

Cash to total assets: Total value of cash holding divided by book value of assets.

Past 12-months returns: The buy-and-hold 12-months stock return of the year preceding an M&A announcement.

CAR (Cumulative abnormal return): Cumulative abnormal return around the announcement date. Three event windows are selected, CAR11, CAR33 and CAR55 indicate (−1, +1), (−3, +3) and (−5, +5) centred on the M&A announcement day, respectively.

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