



China's economic policy uncertainty and firm-level investment in Southeast Asian economies: The role of trade connection and financial development

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ABSTRACT

Previous studies primarily focus on the nexus between economic policy uncertainty and corporate investment within that country. This paper examines the impact of China's economic policy uncertainty on firm-level investment in Southeast Asian economies. Using the sample of 3600 firms in Southeast Asia over the period 2010–2021, we find that firms reduce investment when China's economic policy uncertainty increases. We investigate the effect channels and find that trade connection with China exacerbates the negative influence of China's uncertainty on capital expenditures. At the same time, a higher level of a nation's financial development weakens the impact. Our further analysis of firm features representing irreversibility shows that the effect of China's economic policy uncertainty and the mechanisms are more pronounced among firms with higher irreversibility. Our results support the option-to-delay theory and highlight the cross-border influence of policy uncertainty from major countries to smaller ones.

1. Introduction

China has been the biggest trade partner of Asian countries in the recent decade. As reported by the Association of Southeast Asian Nations, the value of trade between China and Asia increased to \$507.9 billion in 2019 from \$235.5 billion in 2010.¹ More impressively, according to Oh (2017), China has surpassed America, Japan, and Europe to be the most important trading counterpart in the Asian region since 2009. These statistics reveal the significant role of China's policies in international trade and investment in Asia.

The dominance of China, as the second-largest economy, has attracted the attention of researchers. Some scholars have focused on the increasing influence of China's economy on the global economy in general and Southeast Asian economies in particular. Zhang et al. (2019) raise the question of whether the leading role of the U.S. economy in international energy, commodity, credit, and stock markets, is influenced by Chinese economic policy. Ahmed and Huo (2019) report the effects of prices and volatility from China on Asian-Pacific markets before and during China's stock market crash. Shi and Wang (2023) find that while economic policy uncertainty from the U.S. can impact the European equity markets' volatility during the global financial crisis, the influence of economic policy uncertainty from China surpasses that of the U.S. in several countries in Asia after the crisis. These studies suggest that policy uncertainties in China probably affect other countries, especially those in the Asian region, due to the tight connection between them and this second-largest economy (Zhang et al., 2019).

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¹ <https://asean.org/our-communities/economic-community/integration-with-global-economy/asean-china-economic-relation/>.

This study investigates the effect of China's economic policy uncertainty on firm's investment in the six economies in Southeast Asia. The integration of these small economies in the region is expected to open an avenue for importing policy uncertainties from a major economy, China, which is in the same region since they have interdependent and competitive relations in trade activities. The effect of China's uncertainty on the real economic activities of the selected countries can be identified by analyzing how firms in these countries adjust their investment behaviors. Using the data from 2010 to 2021, we find that firms in the Southeast Asian region reduce investment expenditures when China's economic policy uncertainty increases. These results are robust after controlling for firm-specific variables, macroeconomic conditions, the U.S.'s and country-level economic policy uncertainties, using alternative measures of China's economic uncertainty, considering sample dominance and special events, and addressing endogeneity concerns. Investigating the mechanisms through which China's uncertainty impacts investment, we find that trade connections with China and the country's financial development are channels of the effect. Firms in countries with higher export growth to China suffer a stronger impact of uncertainty from China, while the negative effect of China's economic uncertainty on investment is mitigated by a higher level of financial development. In cross-sectional analysis for firm characteristics representing irreversibility, we find that firms with higher irreversible investments suffer a more substantial decrease in investment than firms with lower ones when China's economic uncertainty increases, and the above mechanisms are stronger for high-irreversibility firms.

This study provides three contributions. Firstly, although a large body of research examines the influence of economic policy uncertainty on firm-level investment (Gulen & Ion, 2016; Liu & Zhang, 2020; Suh & Yang, 2021; Wang et al., 2014), most of these studies concentrate on within-country effects (*i.e.* the impact of a country's uncertainty on corporate investment within the same country), while few ones are devoted to the effect of economic policy uncertainty from a major country on firm investment in its neighboring countries. Therefore, this paper enriches the literature on the effect of economic policy uncertainty from a country on real activities in others, highlighting the reliance of smaller economies on the bigger ones.

Moreover, once we focus on the effect of economic policy uncertainty in a larger country on investment in other smaller ones, an important question arises regarding the channels through which the effect can take place. This question is underexplored by the current literature, given that previous studies emphasize the uncertainty-investment relationship within a single country. Therefore, our study contributes to the existing literature by identifying the country-level transmission channels through which economic uncertainty in a large country affects firm-level investment in a small, neighboring country with close trade and capital market ties.

Last but not least, cross-sectional analyses for the characteristic of irreversibility in determining the impact of external uncertainty on firm investment enrich the literature regarding option-to-delay theory in explaining firms' investment behaviors when facing external policy uncertainty.

The remainder of this work is organized as follows: The following section presents the literature and the development of hypotheses. Section 3 presents the methodology and data collection. We present and discuss the results in Section 4 and conclude the paper in Section 5.

2. Literature review and hypothesis development

The effect of economic policy uncertainty on firms' investment originates from the option theory, which predicts an inverse nexus between economic uncertainty and firm-level investment. According to Pindyck (1991), large capital expenditures have two important characteristics, *irreversible* and *able to be delayed*. The first characteristic, *irreversible*, makes an investment costly to be disinvested once it has been undertaken because investments in machinery, plant, and equipment are industry- or firm-specific, making them not suitable to be transferred to other usages without a significant loss in their economic value, and it may be difficult for firms to withdraw because of institutional arrangements and government regulations. The second characteristic, *able to be delayed*, may make an investment more valuable to postpone until the management gets more information regarding operating costs, product prices, and market conditions, which allows them to judge the rate of return and decide when to invest before committing the capital.

Because of their irreversibility, large capital expenditures are exposed to uncertainties that affect investment evaluation. Bernanke (1983) asserts that macroeconomic uncertainties regarding fiscal (tax, government spending) or monetary policy may influence future cash flows, while uncertainties in interest rate and inflation rate can determine both future cash flows and discount rate (Bernanke, 1983; Pindyck, 1991). In addition, uncertainties in future operating costs and output prices can impact future cash flows.

2.1. Main prediction

When uncertainties are considered, an irreversible investment opportunity contains a call option that allows the holder (*e.g.*, company) to buy the project at the exercise price (*e.g.*, initial investment cost) today or at any possible point of time in the future, which is named as an option to delay. From the perspective of the option theory, greater volatility in the future price of the underlying asset (*e.g.*, project) increases the option value, *ceteris paribus* (Pindyck, 1991). Dixit and Pindyck (1994) provide a prediction of the option to delay theory that, under uncertainty, firms may withhold investment to wait for more information. As soon as the company invests in the project, it exercises the option, spends money at this time, and gives up the value (*e.g.*, suffering a loss) of waiting for the new information arrival that may reveal the possible time points at which the investment may be more profitable. This loss, which must be included in the investment costs, makes it more costly than traditionally perceived explicit costs (*e.g.*, the original cost of purchase and installation). Because the option to delay is more valuable with greater uncertainty, the firm tends to be reluctant to exercise it to avoid the loss, implying that higher uncertainty results in a decline in capital investment. The theoretical model of Stokey (2016) illustrates the prediction that uncertainty in tax policy prevents a firm from investing at least temporarily and makes it follow a wait-and-see strategy.

Most empirical studies support this prediction, showing that an increase in country-level economic policy uncertainty dampens firms' capital expenditures in that country. Baker et al. (2016) propose a measure of economic policy uncertainty and find a negative effect of policy uncertainty on firm-level investment rates. Goodell et al. (2021) confirm the results of Baker et al. (2016), stating that lower economic policy uncertainty promotes capital expenditures. Cui et al. (2021) investigate the exposure of China's economic policy uncertainty on firm-level innovative investments. They find that EPU exposure reduces firm investment in innovation, and the main channels of effect are operational risk and financial distress. Zhou et al. (2024) examine the effect of economic policy uncertainty on firms' technological innovation and find a negative impact. Examining the consequence of economic policy uncertainty on mergers and acquisitions, Nguyen and Phan (2017) document that policy uncertainty reduces M&A activities of U.S. firms, while it takes longer time for firms to complete a deal in heightened policy uncertainty. Bonaime et al. (2018) also report a negative association between policy uncertainty and mergers and acquisitions. Cezar et al. (2020) examine the effect of uncertainty on cross-border investment and find that cross-border capital flows to the affected countries are delayed because of uncertainty. Chen et al. (2019) find that economic policy uncertainties decrease different types of US firms' investments, including long-term, short-term, and total investments. Julio and Yook (2012) investigate whether international investment activities are depressed by the uncertainty in government policies in the U.S. They find that foreign investment drops significantly surrounding elections, much larger than the decrease in investment by domestic corporations. The authors assert that the channel of the negative effect is the irreversibility of investment, especially cross-border investment flows. Wang et al. (2014) investigate the influence of economic policy uncertainty on investment of Chinese firms and conclude that corporate investment suffers an adverse effect of the uncertainty. Chen et al. (2020) find that Australian economic policy uncertainty dampens corporate investment, and the impact can last up to four years. Montes and Nogueira (2022) find that Brazil's political and economic policy uncertainty reduces the confidence of business that, in turn, serves as a mechanism through which uncertainties impact investment.

The existing literature concentrates on the economic policy uncertainty-corporate investment relationship within a particular country, with little focus on the effect of economic policy uncertainty from a major economy on firm-level investment in other countries. Recently, Suh and Yang (2021) examine the influence of global and U.S. uncertainty, given the globally leading role of the U.S. economy, on firm-level investment from 36 countries. Lee et al. (2021) report a negative effect of Chinese economic policy uncertainty on U.S. firm investment. Nevertheless, no study investigates the effect of a major country's uncertainty on firms' investment in smaller neighboring nations in the same region.

The increasing influence of China's economy on the global economy in general and Asian economies in particular has caught attention in the recent decade. Zhang et al. (2019) raise the question of whether the leading role of the U.S. economy in some international markets, energy, commodity, credit, and the stock market, is threatened by Chinese economic policy. Ahmed and Huo (2019) show evidence of the influence of prices and volatility from China on Asian-Pacific markets before and during China's stock market crash. Their findings suggest that China is an influential emerging country in the region in the context of increasing integration. Tsai (2017) reports evidence highlighting the role of economic policy uncertainty from China, Europe, Japan, and the U.S. in 22 global stock markets. They conclude that "EPU in China is the most influential, and its contagion risk spreads to different regional markets, except for Europe; the effect of EPU in the United States is inferior to that in China". Because of the high trade dependence between Southeast Asian countries and China, we expect that China's uncertainty is important and influential to corporate investment in Southeast Asian economies. Therefore, we set our main prediction below:

H1. Economic policy uncertainty from China dampens the firm's investment in the Southeast Asian region.

2.2. Mechanism

Suppose that China's economic policy uncertainty harms a firm's investment in Southeast Asian nations, one question about the channels of the effect may immediately arise. To identify possible transmission mechanisms, it is helpful to see how a firm's investment links to its key inputs and outputs. One of the inputs for a firm to conduct its investments is the ability to obtain capital, which partly relies on the level of financial development. In addition, when making investments, a firm may depend on imported materials. Hence, uncertainty in exporting countries can impact a firm in an importing nation. Furthermore, the outcome of firm investments is products and services that meet demand from domestic and/or foreign customers. Firms exporting their products to a foreign country will probably be affected by the uncertainty, which reduces the demand from foreign customers. Thus, we will explore mechanisms of China's economic policy uncertainty impact on investment through trade connection and financial development.

Some relevant evidence indicates the effect of economic uncertainty on a country's international trade. For example, Novy and Taylor (2020) show that higher economic uncertainty in a country lowers imports of firms. Sharma and Paramati (2021) show an inverse long-run relationship between domestic and international policy uncertainty and Indian imports. Lee et al. (2021) find that Chinese economic policy uncertainty reduces investment in U.S. firms, and the effect is stronger for firms located in states that have large export value to China. To some extent, the prevailing policy uncertainty in the importing countries is believed to reduce the demand for imported commodities. This, in turn, leads the exporters to reduce capital investments planned to meet the customer's demand (Handley & Limao, 2015).

Based on this literature, we expect that firms' investment in Southeast Asia can be affected by China's uncertainty through trade linkage between them and Chinese partners. An increase in China's uncertainty reduces the demand for imported goods of the Chinese trading partner. In response to the reduction in demand, the exporter delays its planned investments and waits until the high uncertainty goes over. In addition, China's uncertainty may also indirectly affect the investment of non-exporters. When the exporters to China delay investments, their demand for capital goods or supplies from domestic partners decreases, thus reducing the domestic

partners' investment needs. This reasoning leads to the following hypothesis:

H2. The negative effect of economic policy uncertainty from China on firm's investment in the Southeast Asian region is exacerbated through trade linkage.

The influence of economic policy uncertainty on real activities is also expected to vary with the levels of financial development since it can affect the ability of firms to access external funds. Gochoco-Bautista et al. (2014) investigate corporate investment in five Asian emerging markets and show that financial development influences the external financing constraints of firms. A higher financial development level is believed to reduce financial frictions (Kıvanç Karaman & Yıldırım-Karaman, 2019) and absorb unexpected shocks better (Lensink, 2001), thus mitigating the negative effect of uncertainty on investment. With this expectation, we explore whether a country's financial development moderates the influence of China's uncertainty on investment. This paper hypothesizes:

H3. Financial development mitigates the negative effect of economic policy uncertainty from China on corporate investment in the Southeast Asia region.

3. Methodology and data

3.1. Economic policy uncertainty measurement

Following Guan et al. (2021), we utilize the monthly China's economic policy uncertainty index based on two mainland Chinese newspapers constructed by Davis et al. (2019) to measure China's annual EPU, which is said to be more objective than other Chinese uncertainty indexes. Accordingly, the annual EPU is calculated as the natural logarithm of the geometric average of 12 monthly EPU indexes of a particular year. For the robustness checks, we also employ the logarithm of the arithmetic average of 12 monthly EPU indexes and the geometric average of 12 monthly trade policy uncertainty indexes.

3.2. Investment and other variables

Following the established investment literature, we define firm investment (*INV*) as capital expenditures in year *t* divided by the book value of total assets at the end of the year *t-1*. Control variables are also selected based on the literature about the determinants of investment, including Tobin's *Q* (*TOBINQ*), cash flows (*CF*), sales growth (*SALEG*) (Gulen & Ion, 2016; Julio & Yook, 2012; Kadanakkam et al., 1998; Suh & Yang, 2021; Wang et al., 2014). Tobin's *Q* represents growth opportunities. A firm that has more growth opportunities is expected to invest more. Cash flows represent available internal financing resources, and firms are found to invest more when they have surplus internal cash flows. Firms that have higher sales growth tend to make more investments. Besides, leverage (*LEV*) is included as it has been reported to harm investment (Aivazian et al., 2005; An et al., 2016; Duchin et al., 2010; Lang et al., 1996; Wang et al., 2014). Firm size (*SIZE*) is also included without the sign expectation since its effect direction on investment is inconclusive (see Wang et al. (2014), An et al. (2016), and Chen et al. (2019)). In addition to firm characteristics, the macroeconomic condition is also controlled, given its possible impacts on firm investment. We add two country-level macroeconomic indicators into our empirical model following the literature, including inflation rate (Chen et al., 2019) and real economic growth (An et al., 2016; Chen et al., 2019; Gulen & Ion, 2016; Julio & Yook, 2012). We also include the U.S. uncertainty and country-level uncertainty. The definition of these variables is presented in the Appendix A1.

3.3. Empirical models

To investigate the impact of economic policy uncertainty from China on firms' investment in Southeast Asian countries, we first test Hypotheses 1 by employing the model:

$$INV_{ijt} = \alpha_0 + \theta EPU_{t-1} + \beta X_{ijt,t-1} + \pi Z_{jt,t-1} + FirmFE + \varepsilon_{ijt} \quad (1)$$

i, *j*, and *t* denote firms, countries, and years. *INV*, the dependent variable, is capital expenditures. *EPU*, the independent variable of interest, represents China's economic policy uncertainty. *X* is a vector of firm-specific characteristics (including *TOBINQ*, *CF*, *SIZE*, *LEV*, and *SALEG*). *Z* is a vector of country-level variables and U.S. uncertainty, including the growth rate of real gross domestic product (*GDPG*), inflation rate (*INF*), country-level uncertainty, and economic policy uncertainty from the U.S. We include firm fixed effects to account for the impact of unobserved firm-level variables. The standard errors are clustered at the year and country level² that captures the most variation in our main variable – China's EPU (following Abadie et al. (2023) and Briscoe-Tran et al. (2024)). All the firm-level variables are winsorized at the 1 % level. The definition of the variables is presented in Appendix A1.

To investigate the trade channel of the effect of uncertainty from China on Southeast Asian firm-level investment holds, we add an interaction variable representing trade activities in Model (1), yielding the following model:

$$INV_{ijt} = \alpha_0 + \theta EPU_{t-1} + \gamma EPU_{t-1} * TRADE_{jt} + \delta TRADE_{jt} + \beta X_{ijt,t-1} + \pi Z_{jt,t-1} + FirmFE + \varepsilon_{ijt} \quad (2)$$

To evaluate the role of different aspects of the trade, we use total trade, export-to-China, or import-from-China separately. By doing

² We would like to thank the reviewer for his/her comment.

Table 1
Summary statistics of the variables.

Variable	N	Mean	SD	Min	p25	Median	p75	Max
<i>INV</i>	32,996	0.0442	0.0621	0.0000	0.0056	0.0213	0.0558	0.3894
<i>EPU</i>	32,423	5.1366	0.5162	4.4985	4.6947	4.8529	5.6201	5.9089
<i>AEMU</i>	32,996	5.1755	0.5255	4.5230	4.7090	4.8622	5.6359	5.9671
<i>TPU</i>	32,423	4.9444	0.9812	3.4390	4.2554	4.5491	5.9466	6.4619
<i>USEPU</i>	32,423	5.0239	0.2928	4.5165	4.9201	5.0043	5.1517	5.7436
<i>WUI</i>	32,996	0.1250	0.0928	0.0000	0.0492	0.1075	0.1717	0.3847
<i>TOBINQ</i>	32,996	1.4186	1.3733	0.2093	0.7570	1.0250	1.5014	10.1148
<i>CF</i>	25,714	0.0727	0.0991	(0.2946)	0.0257	0.0651	0.1184	0.4290
<i>SIZE</i>	32,996	19.0801	2.1005	15.0794	17.6357	18.7526	20.1486	26.2903
<i>LEV</i>	32,996	0.4532	0.2437	0.0063	0.2656	0.4504	0.6374	0.9996
<i>SALEG</i>	32,996	0.0229	0.3676	(1.4145)	(0.1143)	0.0333	0.1705	1.5449
<i>ROA</i>	32,996	0.0769	0.1415	(0.2910)	0.0147	0.0547	0.1109	0.8594
<i>TRADE</i>	32,995	0.1273	0.1452	(0.1488)	0.0412	0.0918	0.2071	0.5842
<i>EXP</i>	32,996	0.1352	0.1988	(0.2189)	(0.0012)	0.0748	0.2311	0.7002
<i>IMP</i>	32,995	0.1339	0.1465	(0.1203)	0.0537	0.1080	0.2085	0.4903
<i>FD</i>	32,423	0.5675	0.1695	0.2902	0.3637	0.6587	0.7201	0.7616
<i>FI</i>	32,423	0.5830	0.1678	0.2832	0.4053	0.6851	0.7143	0.7739
<i>FM</i>	32,423	0.5297	0.1706	0.2606	0.3409	0.6075	0.6813	0.7352
<i>GDPG</i>	32,996	0.0420	0.0326	(0.1000)	0.0338	0.0473	0.0603	0.1356
<i>INF</i>	32,996	0.0261	0.0261	(0.0115)	0.0088	0.0228	0.0347	0.1712

This table shows the summary statistics of the variables employed in this study. *INV* is investment. *EPU*, *AEMU*, and *TPU* are measures of China's EPU. *USEPU* is the U.S. economic policy uncertainty. *WUI* is country uncertainty. *TOBINQ* is growth opportunity. *CF* is cash flow. *SIZE* is firm's size. *LEV* is leverage. *SALEG* is sales growth. *ROA* is profitability. *TRADE* is the growth rate of trade value with China. *EXP* is the growth rate of export value to China, and *IMP* is the growth of import value from China. *FD*, *FI*, and *FM* are financial, institutional, and market development indexes. *GDPG* is growth rate of real GDP. *INF* is inflation rate. The definition of the variables is presented in Appendix A1. The firm-level variables are winsorized at the 1 % level.

so, we can explore which aspect is more influential. We measure them using their growth rate rather than the absolute value because higher trade growth, especially export-to-China, implies that firms need to invest more to meet the fast-growing trade activities. Therefore, in Model (2), *TRADE* is the growth rate of the bilateral trade value of country *j* with China in year *t*. or its components: the export growth to China (*EXP*), and the import growth from China (*IMP*). *X* and *Z* are vectors of firm-specific characteristics and country-level variables and U.S. uncertainty, similar to those in Model (1). Based on Section 2, given an increase in China's economic uncertainty, the investment of firms in a country that has a tighter link with China in trade activities possibly experiences a larger decrease in investment than firms in other countries. This means that γ is expected to be negative.

To examine whether the impact of China's uncertainty on firm investment is subject to country-level financial development, we introduce an interaction term between *FD* and *EPU* to the model (1) to have the model (3):

$$INV_{i,j,t} = \alpha_0 + \theta EPU_{t-1} + \gamma EPU_{t-1} * FD_{j,t} + \delta FD_{j,t} + \beta X_{i,j,t-1} + \pi Z_{j,t-1} + FirmFE + \varepsilon_{i,j,t} \quad (3)$$

To assess the role of different aspects of financial development, we use the degree of financial development and its components – financial market and institutional development. Since they are annually indexed type themselves, we use their levels. Therefore, *FD* is the national financial development index, or its components: financial institution (*FI*) and financial market (*FM*) of country *j* in year *t*. *X* and *Z* are vectors of control variables, similar to those in Model (1). In Model (3), the explanatory variable of interest is $EPU_{t-1} * FD_{j,t}$. A higher financial development level may mitigate the negative impact of economic uncertainty from China on investment, meaning that γ is expected to be positive.

3.4. Sample selection and data

Our sample comprises 3600 non-financial companies that are listed on the official stock exchanges of six selected Southeast Asian nations (Singapore, Thailand, Malaysia, Philippines, Indonesia, and Vietnam). Appendix A2 shows the number of firms from each country in the sample. These six countries are chosen because their trade values with China can represent that of the total Southeast Asian region. The research period is from 2010 to 2021 and the data is in the form of an unbalanced panel. All the data for computing firm-level data and macroeconomic data are obtained from Refinitiv Eikon Datastream. Economic policy uncertainty data is collected from <https://www.policyuncertainty.com>. Missing values and negative equity values are excluded. Table 1 presents the summary statistics of the variables utilized in this study, while Table 2 is the Pearson correlation matrix of variables.

4. Empirical results

4.1. Impact of China's EPU on corporate investment in southeast Asian countries

Table 4 shows the regression results for Model (1). Column (1) indicates the outcomes of the regression using China's EPU alone.

Table 2
Matrix of correlation coefficients.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1. <i>INV</i>	1.000							
2. <i>EPU</i>	−0.083 ^a	1.000						
3. <i>AEPU</i>	−0.086 ^a	1.000 ^a	1.000					
4. <i>TPU</i>	−0.065 ^a	0.964 ^a	0.962 ^a	1.000				
5. <i>USEPU</i>	−0.069 ^a	0.793 ^a	0.796 ^a	0.705 ^a	1.000			
6. <i>WUI</i>	0.006	−0.046 ^a	−0.031 ^a	−0.110 ^a	−0.038 ^a	1.000		
7. <i>TOBINQ</i>	0.242 ^a	0.005	0.002	0.009 ^c	−0.005	0.057 ^a	1.000	
8. <i>CF</i>	0.278 ^a	−0.080 ^a	−0.082 ^a	−0.064 ^a	−0.059 ^a	−0.002	0.403 ^a	1.000
9. <i>SIZE</i>	−0.010 ^c	0.039 ^a	0.037 ^a	0.033 ^a	0.017 ^a	−0.007	−0.087 ^a	0.068 ^a
10. <i>LEV</i>	0.097 ^a	0.019 ^a	0.015 ^a	0.027 ^a	0.016 ^a	−0.032 ^a	0.057 ^a	−0.019 ^a
11. <i>SALEG</i>	0.125 ^a	−0.047 ^a	−0.045 ^a	−0.007	−0.079 ^a	0.005	0.137 ^a	0.251 ^a
12. <i>ROA</i>	0.209 ^a	−0.077 ^a	−0.080 ^a	−0.062 ^a	−0.059 ^a	0.013 ^b	0.328 ^a	0.662 ^a
13. <i>TRADE</i>	0.031 ^a	0.073 ^a	0.075 ^a	0.113 ^a	0.093 ^a	0.023 ^a	0.011 ^b	0.118 ^a
14. <i>EXP</i>	0.034 ^a	0.083 ^a	0.066 ^a	0.137 ^a	0.102 ^a	−0.131 ^a	0.007	0.114 ^a
15. <i>IMP</i>	0.027 ^a	0.002	0.020 ^a	0.022 ^a	0.046 ^a	0.177 ^a	0.005	0.091 ^a
16. <i>FD</i>	−0.089 ^a	0.004	0.004	−0.003	−0.001	0.099 ^a	−0.017 ^a	−0.138 ^a
17. <i>FI</i>	−0.098 ^a	0.031 ^a	0.031 ^a	0.022 ^a	−0.003	0.065 ^a	−0.013 ^b	−0.155 ^a
18. <i>FM</i>	−0.078 ^a	−0.023 ^a	−0.022 ^a	−0.027 ^a	0.001	0.129 ^a	−0.021 ^a	−0.115 ^a
19. <i>GDPG</i>	0.069 ^a	−0.455 ^a	−0.441 ^a	−0.300 ^a	−0.602 ^a	−0.140 ^a	−0.014 ^b	0.107 ^a
20. <i>INF</i>	0.083 ^a	−0.310 ^a	−0.290 ^a	−0.257 ^a	−0.204 ^a	−0.045 ^a	−0.034 ^a	0.116 ^a

This table shows the Pearson correlation of the variables. *INV* is investment. *EPU*, *AEPU*, and *TPU* are measures of China's EPU. *USEPU* is the U.S. economic policy uncertainty. *WUI* is country uncertainty. *TOBINQ* is growth opportunity. *CF* is cash flow. *SIZE* is firm's size. *LEV* is leverage. *SALEG* is sales growth. *ROA* is profitability. *TRADE* is the growth rate of trade value with China. *EXP* is the growth rate of export value to China, and *IMP* is the growth of import value from China. *FD*, *FI*, and *FM* are financial, institutional, and market development indexes. *GDPG* is growth rate of real GDP. *INF* is inflation rate. The definition of the variables is presented in Appendix A1. The firm-level variables are winsorized at the 1 % level. a ($p < 0.01$), b ($p < 0.05$), and c ($p < 0.1$).

The specifications in Columns 2 and 3 are extended to control for both firm characteristics and country-level variables. In addition, it is possible to suspect that the link between China's EPU and corporate investment may come from the influence of EPU from a larger, globally dominant country, the U.S., or from the influence of domestic uncertainty. To address this concern, we include the U.S. economic policy uncertainty (*USEPU*) or national uncertainty (*WUI*), yielding the result in Column 4 of Table 3.

The coefficients of *EPU* are negative and significant at the 1 % level in all four specifications. This result proves that the increase in China's economic uncertainty lowers corporate investment in Southeast Asia. An increase of one standard deviation in China's EPU is associated with a decrease of 5 %³ standard deviation in firm's investment. The finding is aligned with the prediction of the option-to-delay theory proposed by Bernanke (1983), Pindyck (1991), and Dixit and Pindyck (1994), and is consistent with many previous within-country studies such as Gulen and Ion (2016), Chen et al. (2020), Montes and Nogueira (2022), among others. This finding supports Hypothesis 1.

Looking into the control variables, some firm-level conventional determinants of corporate investment retain their impacts on firm investment among specifications. For instance, *TOBINQ*, *CF*, and *ROA* have significant positive effects, while *LEV* and *SIZE* have negative ones. For country-level variables, *GDPG* and *INF* have positive impacts on firm investment, while U.S. economic uncertainty and domestic uncertainty are insignificantly related to firm investment.

4.2. Transmission mechanisms

In this section, we examine the possible mechanisms through which China's economic policy uncertainty impacts the investment of Southeast Asian firms: international trade and financial development.

4.2.1. International trade

The impact of the trade activity is presented in Table 4, where trade activity is measured as the growth rate of total trade value or its separate components: the growth rate of export value to China and import value from China. The table shows that trade impacts firm investment, as shown by the significantly negative coefficient of the interaction term *EPU*TRADE* (Column 1). When separating total trade into export value to China and import value from China, the former shows an effect with a negative and significant coefficient of the interaction term *EPU*EXP* in (Column 2), while the latter has no influence, with an insignificant coefficient of *EPU*IMP* (Column 3). Thus, it can be concluded that the capital investment of the firms with a higher export growth, not the import growth, to China is highly exposed to the uncertainty in China. An increase in China's uncertainty reduces China's demand for imported goods from Southeast Asian countries. In response to the reduction in demand, firms in Southeast Asian countries delay their planned investments

³ $-5\% = \theta \frac{SD \text{ of } EPU}{SD \text{ of } INV} = -0.006 \frac{0.5162}{0.0621}$.

(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
1.000										
0.182 ^a	1.000									
0.044 ^a	0.114 ^a	1.000								
0.103 ^a	−0.176 ^a	0.225 ^a	1.000							
−0.067 ^a	0.042 ^a	0.136 ^a	0.072 ^a	1.000						
−0.069 ^a	0.075 ^a	0.114 ^a	0.035 ^a	0.832 ^a	1.000					
−0.055 ^a	−0.001	0.120 ^a	0.093 ^a	0.844 ^a	0.448 ^a	1.000				
0.064 ^a	0.002	−0.041 ^a	−0.215 ^a	−0.286 ^a	−0.295 ^a	−0.215 ^a	1.000			
0.071 ^a	0.015 ^a	−0.053 ^a	−0.243 ^a	−0.359 ^a	−0.354 ^a	−0.288 ^a	0.982 ^a	1.000		
0.055 ^a	−0.010 ^c	−0.028 ^a	−0.181 ^a	−0.204 ^a	−0.227 ^a	−0.135 ^a	0.982 ^a	0.929 ^a	1.000	
−0.035 ^a	0.016 ^a	0.148 ^a	0.105 ^a	0.220 ^a	0.295 ^a	0.118 ^a	−0.240 ^a	−0.233 ^a	−0.238 ^a	1.000
−0.068 ^a	0.051 ^a	0.062 ^a	0.097 ^a	0.321 ^a	0.321 ^a	0.285 ^a	−0.529 ^a	−0.556 ^a	−0.484 ^a	0.394 ^a

and wait until the high uncertainty passes. The results support *Hypothesis 2* and are also consistent with previous studies, such as [Handley and Limao \(2015\)](#), [Novy and Taylor \(2020\)](#), and [Istiak \(2022\)](#).

4.2.2. Financial development

The interference of financial development into the effect of China's economic policy uncertainty on firm investment is presented in [Table 5](#). The coefficient of the interaction terms $EPU*FD$ is positive and significant at the 1 % level. Regarding the components of financial development, the result is similar for both FI and FM , with the coefficients of $EPU*FI$ and $EPU*FM$ being positively significant at 5 % level, but the economic significance of the effect of FI is larger than that of FM . This result suggests that financial development alleviates the adverse impact of economic uncertainty from China on firm investment, and the impact comes largely from the development of financial institutions rather than the development of the financial market. For the Southeast Asian countries in our sample, five out of six countries (except Singapore) are developing ones in which financial systems are typically dominated by financial institutions (namely, banked-based financial systems). Therefore, it is explainable for the higher economic significance of the development of financial institutions. In general, the impact of financial development is consistent with the reasoning that a higher level of financial development acts as a shock absorber for firm investment against external uncertainty, supporting *Hypothesis 3*.

4.3. Robustness checks

4.3.1. Alternative measures

4.3.1.1. Alternative measures of China's economic policy uncertainty. As a first robustness check, we re-estimate model (1)–(3) using the natural logarithm of the arithmetic average of 12-monthly China's EPU index – $AEPU$ and (2) TPU – natural logarithm of the geometric average of 12-monthly of China's trade policy uncertainty index proposed by [Davis et al. \(2019\)](#). TPU is used as we expect China's trade policy uncertainty from China may be a reasonable measure of China's EPU, especially when international trade is one of China's EPU impact channels on firm investment. [Section 4.2.1](#) shows that the effect of international trade primarily comes from export activity; thus, afterward, we will employ export for trade activities in our robustness checks.

The results presented in Panel A for $AEPU$ and in Panel B for TPU ([Table 6](#)) are similar to those of EPU in [Table 3](#). The coefficients on $AEPU$ and TPU are negative and significant, consistent with the prediction of the option-to-delay theory. Meanwhile, the coefficient on interaction terms between $AEPU$ (TPU) and EXP is also negative and significant. In contrast, the coefficient of interaction terms between $AEPU$ (TPU) and FD is positive and significant as hypothesized.

4.3.1.2. Alternative measure of trade activity and financial development. In previous regressions, we used the continuous trade and financial development variables. In this section, we replace these continuous ones with binary variables. We define $EXPH$ as a dummy variable taking the value of 1 if the growth rate of export value is above the median; otherwise, 0; and FDH as a dummy variable taking the value of 1 if FD is higher than the median; otherwise, 0. We re-estimate models (2) and (3) with the binary variables. [Table 7](#) presents the results, which confirm our findings.

Table 3
China's EPU and investment.

	(1)	(2)	(3)	(4)	
	INV	INV	INV	INV	VIF
<i>EPU</i>	−0.014*** (−8.688)	−0.007*** (−5.710)	−0.006*** (−4.225)	−0.006*** (−3.491)	2.93
<i>TOBINQ</i>		0.008*** (8.644)	0.008*** (8.812)	0.008*** (8.863)	1.27
<i>CF</i>		0.047*** (6.877)	0.047*** (6.993)	0.047*** (6.834)	1.41
<i>SIZE</i>		−0.011*** (−6.829)	−0.011*** (−6.365)	−0.011*** (−6.437)	1.11
<i>LEV</i>		−0.006* (−1.751)	−0.007** (−2.133)	−0.007** (−2.143)	1.14
<i>SALEG</i>		0.001 (1.155)	0.001 (0.790)	0.001 (0.793)	1.1
<i>ROA</i>		0.062*** (7.632)	0.060*** (7.356)	0.060*** (7.405)	1.43
<i>GDPG</i>			0.036 (1.518)	0.044* (1.883)	2.12
<i>INF</i>			0.040* (1.732)	0.039* (1.680)	1.34
<i>USEPU</i>				0.002 (0.424)	3.62
<i>WUI</i>				0.006 (0.809)	1.16
Constant	0.112*** (13.480)	0.279*** (8.796)	0.255*** (7.924)	0.247*** (7.412)	
Observations	28,279	22,306	22,306	22,306	Average VIF = 1.69
F-Statistics	75.484	60.951	46.364	39.280	
Adj R-squared	0.369	0.407	0.408	0.408	
Firm FE	Yes	Yes	Yes	Yes	
SE clustered	Country-Year	Country-Year	Country-Year	Country-Year	

This table shows the effect of China's EPU on corporate investment in six Southeast Asian countries. *INV* is investment. *EPU*, *AEP*, and *TPU* are measures of China's EPU. *USEPU* is the U.S. economic policy uncertainty. *WUI* is country uncertainty. *TOBINQ* is growth opportunity. *CF* is cash flow. *SIZE* is firm's size. *LEV* is leverage. *SALEG* is sales growth. *ROA* is profitability. *TRADE* is the growth rate of trade value with China. *EXP* is the growth rate of export value to China, and *IMP* is the growth of import value from China. *FD*, *FI*, and *FM* are financial, institutional, and market development indexes. *GDPG* is growth rate of real GDP. *INF* is inflation rate. The definition of the variables is presented in Appendix A1. The firm-level variables are winsorized at the 1 % level. T-statistics are in parentheses. *, **, *** denote 10 %, 5 %, 1 % significance level, respectively.

4.3.2. Extreme events excluded

During the research period, there were some years in which unexpected events created significantly high uncertainty, such as the COVID-19 pandemic and China's 2015 stock market crash. Of course, China's policy uncertainty can capture the high uncertainty at these special times. However, if the results are dominated only by policy uncertainties at the time when the events occur, the results will not be generalizable. To address this concern, we exclude years in which the extreme events occurred and re-estimate the model. The years excluded from the sample include 2019, 2020 - the period of the COVID-19 pandemic, and 2015 - the year of China's stock market crash. The regression results excluding each of these years are presented in Table 8, showing the negative effect of China's EPU on the investment of firms in Southeast Asian countries (Panel A). Besides, the mechanisms of the effect through international trade (Panel B) and financial development (Panel C) qualitatively remain unchanged, confirming that our main results are robust to extreme events.

4.3.3. Controlling for sample dominance

From the sample distribution in Appendix A2, we realize that Malaysia and Singapore have a significant number of firms and observations, followed by Vietnam and Indonesia. This raises a concern that these countries may dominate the impact of China's EPU on corporate investment. We address this suspect by removing each of these countries from the sample and re-estimating the models. Panel A of Table 9 reveals that the impact of China's EPU on investment remains qualitatively unchanged from the results in Table 3. For the mechanisms, Panel B and C depict that the interaction variables' coefficients remain of the expected sign, and three out of four regressions with country exclusion (except Vietnam) show at least one channel has a statistically significant effect.

4.3.4. Endogeneity issue

As the final robustness check, we deal with the endogeneity issue. Since this paper emphasizes the impact of economic policy uncertainty from a major country (China) on corporate investment in other countries, China's economic uncertainty can be considered an exogenous variable. However, there is still a concern about endogeneity arising from the interdependence among the countries in the sample. Thus, we apply instrumental variable regression to minimize the concern. We use the logarithm of the number of deaths in China caused by natural disasters as an instrument for China's economic policy uncertainty. The reason for employing this instrument

Table 4
International trade channel.

	(1)	(2)	(3)
	<i>INV</i>	<i>INV</i>	<i>INV</i>
<i>EPU</i>	−0.002 (−1.021)	−0.003* (−1.706)	−0.003 (−1.205)
<i>TRADE</i>	0.151** (2.050)		
<i>EPU*TRADE</i>	−0.029* (−1.948)		
<i>EXP</i>		0.113** (2.501)	
<i>EPU*EXP</i>		−0.021** (−2.331)	
<i>IMP</i>			0.112 (1.272)
<i>EPU*IMP</i>			−0.023 (−1.276)
<i>TOBINQ</i>	0.009*** (8.955)	0.009*** (9.000)	0.009*** (8.909)
<i>CF</i>	0.046*** (6.800)	0.046*** (6.785)	0.047*** (6.810)
<i>SIZE</i>	−0.010*** (−5.758)	−0.010*** (−5.546)	−0.010*** (−6.294)
<i>LEV</i>	−0.008** (−2.584)	−0.009** (−2.653)	−0.008** (−2.363)
<i>SALEG</i>	0.001 (0.521)	0.001 (0.486)	0.001 (0.712)
<i>ROA</i>	0.060*** (7.300)	0.059*** (7.208)	0.060*** (7.390)
<i>GDPG</i>	0.039 (1.516)	0.024 (0.867)	0.046* (1.896)
<i>INF</i>	0.026 (1.221)	0.020 (0.976)	0.037* (1.674)
<i>USEPU</i>	−0.001 (−0.416)	−0.003 (−0.807)	0.001 (0.259)
<i>WUI</i>	0.006 (0.745)	0.008 (1.163)	0.006 (0.672)
Constant	0.233*** (6.892)	0.243*** (7.318)	0.232*** (6.817)
Observations	22,306	22,306	22,306
F-Statistics	33.337	35.982	34.265
Adj R-squared	0.408	0.409	0.408
Firm FE	Yes	Yes	Yes
SE clustered	Country-Year	Country-Year	Country-Year

This table shows the impact of China's EPU on corporate investment in six Southeast Asian countries through the trade channel. *INV* is investment. *EPU* is China's EPU. *USEPU* is the U.S. economic policy uncertainty. *WUI* is country uncertainty. *TOBINQ* is growth opportunity. *CF* is cash flow. *SIZE* is firm's size. *LEV* is leverage. *SALEG* is sales growth. *ROA* is profitability. *TRADE* is the growth rate of trade value with China. *EXP* is the growth rate of export value to China, and *IMP* is the growth of import value from China. *GDPG* is growth rate of real GDP. *INF* is inflation rate. The definition of the variables is presented in Appendix A1. The firm-level variables are winsorized at the 1 % level. T-statistics are in parentheses. *, **, *** denote 10 %, 5 %, 1 % significance level, respectively.

is that if natural disasters cause greater death losses for a country, the government is more likely to adjust the national economic policy to recover from the adverse effects, making deaths from disasters in China relevant to China's economic policy uncertainty. In addition, the number of deaths from disasters in China is unlikely to correlate directly with firm-level investment in Southeast Asian countries. We report the Hansen test for overidentification to ensure the instruments are valid. Table 10 shows the outcome of the instrument regression, which is similar to the main results and supports our hypotheses.

In short, after using alternative measures for variables of interest, controlling for the endogeneity potential, considering sample dominance and extreme events, utilizing alternative measures of China's economic policy uncertainty, and using binary variables for international trade and financial development, the finding remains unchanged: Economic policy uncertainty from China reduces firm-level investment in Southeast Asian countries, supporting the prediction of the option-to-delay theory, and the impacts take place through international trade and financial development channels.

Table 5
Financial development channel.

	(1)	(2)	(3)
	INV	INV	INV
<i>EPU</i>	−0.022*** (−3.793)	−0.020*** (−3.095)	−0.017*** (−2.768)
<i>FD</i>	−0.090* (−1.754)		
<i>EPU*FD</i>	0.024*** (2.994)		
<i>FI</i>		−0.129*** (−3.237)	
<i>EPU*FI</i>		0.022** (2.596)	
<i>FM</i>			−0.072 (−1.263)
<i>EPU*FM</i>			0.019** (2.009)
<i>TOBINQ</i>	0.009*** (8.809)	0.009*** (8.735)	0.009*** (8.796)
<i>CF</i>	0.046*** (6.726)	0.047*** (6.864)	0.046*** (6.702)
<i>SIZE</i>	−0.010*** (−6.035)	−0.010*** (−5.835)	−0.010*** (−5.915)
<i>LEV</i>	−0.008** (−2.401)	−0.008** (−2.579)	−0.008** (−2.348)
<i>SALEG</i>	0.001 (0.622)	0.001 (0.634)	0.001 (0.592)
<i>ROA</i>	0.060*** (7.366)	0.060*** (7.302)	0.060*** (7.383)
<i>GDPG</i>	0.064*** (3.177)	0.050** (2.369)	0.063*** (2.982)
<i>INF</i>	0.039** (2.169)	0.028 (1.439)	0.036* (1.948)
<i>USEPU</i>	0.003 (0.805)	0.001 (0.458)	0.002 (0.500)
<i>WUI</i>	−0.001 (−0.058)	0.004 (0.441)	0.000 (0.052)
Constant	0.292*** (6.869)	0.313*** (8.443)	0.279*** (6.470)
Observations	22,306	22,306	22,306
F-Statistics	37.154	41.449	36.001
Adj R-squared	0.408	0.408	0.408
Firm FE	Yes	Yes	Yes
SE clustered	Country-Year	Country-Year	Country-Year

This table shows the impact of China's EPU on corporate investment in six Southeast Asian countries through the channel of financial development. *INV* is investment. *EPU* is China's EPU. *USEPU* is the U.S. economic policy uncertainty. *WUI* is country uncertainty. *TOBINQ* is growth opportunity. *CF* is cash flow. *SIZE* is firm's size. *LEV* is leverage. *SALEG* is sales growth. *ROA* is profitability. *FD*, *FI*, and *FM* are financial, institutional, and market development indexes. *GDPG* is growth rate of real GDP. *INF* is inflation rate. The definition of the variables is presented in Appendix A1. The firm-level variables are winsorized at the 1 % level. T-statistics are in parentheses. *, **, *** denote 10 %, 5 %, 1 % significance level, respectively.

4.4. Further analysis

4.4.1. Irreversibility

We have stated previously that the option-to-delay theory explains the impact of uncertainty on investment activities, and capital investments are often irreversible. Our results so far have depicted that China's EPU reduces the capital expenditures of Southeast Asian firms, supporting the prediction of the option-to-delay theory. Our analyses have also provided insights into the country-level transmission channels of the impact, but we have not pointed directly to a firm's characteristic representing asset irreversibility.

In this additional analysis, we consider this feature. To do so, we use PPE (Net Property Plant and Equipment scaled by total assets) as a criterion for the classification of asset irreversibility. We divide our sample into high PPE and low PPE using its median, where firms with PPE above the median are categorized as high PPE firms (HPPE), and others are low PPE ones (LPPE).⁴ Then, we re-estimate the models for the two subsamples of high and low PPE firms. We expect that the capital expenditures of the firms with high irreversibility are more sensitive than those with low irreversibility. This means that the coefficients on *EPU*, *EPU*EXP*, and *EPU*FD* are

⁴ The results (unreported) are similar for alternative classification: PPE above versus below its mean, PPE in the top quintile versus others.

Table 6
Alternative measures of China's EPU.

	Panel A			Panel B		
	(1)	(2)	(3)	(1)	(2)	(3)
	INV	INV	INV	INV	INV	INV
<i>AEPU</i>	−0.006*** (−3.459)	−0.003* (−1.676)	−0.021*** (−3.761)			
<i>AEPU*EXP</i>		−0.020** (−2.317)				
<i>EXP</i>		0.110** (2.495)			0.074*** (3.230)	
<i>FD</i>			−0.088* (−1.731)			−0.027 (−0.714)
<i>AEPU*FD</i>			0.024*** (2.987)			
<i>TPU</i>				−0.002** (−2.578)	−0.001 (−1.090)	−0.010*** (−3.735)
<i>TPU*EXP</i>					−0.014*** (−2.806)	
<i>TPU*FD</i>						0.012*** (3.109)
Observations	22,306	22,306	22,306	22,306	22,306	22,306
F-Statistics	39.212	35.690	36.908	39.430	37.542	37.229
Adj R-squared	0.408	0.409	0.408	0.407	0.409	0.408
Controls	Included	Included	Included	Included	Included	Included
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
SE clustered	Country-Year	Country-Year	Country-Year	Country-Year	Country-Year	Country-Year

This table shows the impact of China's EPU and the channels of the effect on corporate investment in six Southeast Asian countries with alternative measures of China's EPU uncertainty. *INV* is investment. *AEPU*, and *TPU* are alternative measures of China's EPU. *EXP* is the growth rate of export value to China. *FD* is financial development index. The definition of the variables is presented in Appendix A1. All firm-level variables are winsorized at the 1 % level. The control variables are included. The definition of the variables is presented in the Appendix A1. The firm-level variables are winsorized at the 1 % level. T-statistics are in parentheses. *, **, *** denote 10 %, 5 %, 1 % significance level, respectively.

Table 7
Alternative definition of trade and financial development.

	(1)	(2)
	INV	INV
<i>EPU</i>	−0.003 (−1.569)	−0.010*** (−4.762)
<i>EXPH</i>	0.040*** (3.324)	
<i>EPU*EXPH</i>	−0.007*** (−3.129)	
<i>FDH</i>		−0.038*** (−3.303)
<i>EPU*FDH</i>		0.007*** (3.277)
Observations	22,306	22,306
F-Statistics	37.514	41.216
Adj R-squared	0.409	0.408
Controls	Included	Included
Firm FE	Yes	Yes
SE clustered	Country-Year	Country-Year

This table shows the channels of China's EPU influence on corporate investment in six Southeast Asian countries with alternative definitions of trade activity and financial development measures. *INV* is investment. *EPU* China's EPU. *EXPH* is high export growth. *FD* is high financial development. The control variables are included. The definition of the variables is presented in the Appendix A1. The firm-level variables are winsorized at the 1 % level. T-statistics are in parentheses. *, **, *** denote 10 %, 5 %, 1 % significance level, respectively.

Table 8
Extreme events excluded.

	(1)	(2)	(3)
	<i>INV</i>	<i>INV</i>	<i>INV</i>
	2019 excluded	2020 excluded	2015 excluded
Panel A			
<i>EPU</i>	−0.007*** (−3.601)	−0.005*** (−3.169)	−0.006*** (−3.466)
Observations	20,115	20,074	20,395
F-Statistics	36.298	41.142	36.881
Adj R-squared	0.406	0.410	0.399
Controls	Included	Included	Included
Firm FE	Yes	Yes	Yes
SE clustered	Country-Year	Country-Year	Country-Year
Panel B			
<i>EPU</i>	−0.004** (−2.051)	−0.000 (−0.131)	−0.003* (−1.710)
<i>EXP</i>	0.125*** (2.869)	0.164*** (3.990)	0.104** (2.242)
<i>EPU*EXP</i>	−0.023*** (−2.741)	−0.032*** (−3.886)	−0.019** (−2.071)
Observations	20,115	20,074	20,395
F-Statistics	34.348	38.173	36.397
Adj R-squared	0.407	0.411	0.400
Controls	Included	Included	Included
Firm FE	Yes	Yes	Yes
SE clustered	Country-Year	Country-Year	Country-Year
Panel C			
<i>EPU</i>	−0.023*** (−4.064)	−0.020** (−2.586)	−0.021*** (−3.231)
<i>FD</i>	−0.103* (−1.958)	−0.077 (−1.244)	−0.081 (−1.476)
<i>EPU*FD</i>	0.026*** (3.027)	0.022** (2.022)	0.023** (2.544)
Observations	20,115	20,074	20,395
F-Statistics	35.602	37.131	34.640
Adj R-squared	0.407	0.411	0.400
Controls	Included	Included	Included
Firm FE	Yes	Yes	Yes
SE clustered	Country-Year	Country-Year	Country-Year

This table shows the effect of China's EPU and the channels of the effect on corporate investment in six Southeast Asian countries without years of COVID-19 and the year of China's stock market crash. *INV* is investment. *EPU* is China's EPU. *EXP* is the growth rate of export value to China. *FD* is financial development index. The control variables are included. The definition of the variables is presented in the Appendix A1. The firm-level variables are winsorized at the 1 % level. T-statistics are in parentheses. *, **, *** denote 10 %, 5 %, 1 % significance level, respectively.

larger and more significant for highly irreversible firms than for low ones.

The results presented in Table 11 are expected. Specifically, in the first two columns, the coefficient of *EPU* remains high, negative, and significant at 1 % level for the high irreversible firms (coef. = −0.011, $t = -4.289$), but it is less significant and much lower for the low irreversible firm (coef. = −0.003, $t = -1.864$), around four times in terms of the coefficient magnitude. The results in Columns 3 and 4 show the same pattern of coefficient magnitude of *EPU*EXP*, except their insignificance for both subsamples. In Columns 5 and 6, the coefficient of *EPU*FD* is positive and significant at 1 % level for firms with high irreversibility versus 5 % level for firms with low irreversibility. The coefficient magnitude for the high irreversibility subsample is three times higher than that of the low irreversibility subsample (0.065 versus 0.019). In general, the findings state that firms with greater irreversibility reduce their capital expenditures much more than firms with low irreversibility when China's EPU increases, consistent with the theory of option-to-delay, and the effect is more pronounced for firms in countries that have high growth of export to China and have higher financial development.

4.4.2. International trade and financial development mechanisms – Put together

We have learned that the impact of China's EPU on corporate investment in Southeast Asian countries can occur through international trade or the level of financial development separately, but we do not know whether both mechanisms survive when they are jointly considered. To shed light on answering this, we run a regression with the inclusion of both interaction terms, *EPU*FD* (*TPU*FD*) and *EPU*EXP* (*TPU*EXP*). The result in Table 12 shows that financial development retains its expected impact with a positive and significant coefficient of interaction variable, *EPU*FD* (*TPU*FD*). Similarly, the interaction term of international trade, *EPU*EXP*

Table 9

China's EPU and investment: Controlling for sample dominance.

	(1)	(2)	(4)	(6)
	<i>INV</i>	<i>INV</i>	<i>INV</i>	<i>INV</i>
	Malaysia excluded	Singapore excluded	Vietnam excluded	Indonesia excluded
Panel A				
<i>EPU</i>	−0.006** (−2.559)	−0.006*** (−3.280)	−0.006*** (−3.411)	−0.006*** (−3.059)
Observations	15,470	16,296	18,388	17,921
F-Statistics	25.910	32.656	53.696	33.115
Adj R-squared	0.415	0.412	0.414	0.399
Controls	Included	Included	Included	Included
Firm FE	Yes	Yes	Yes	Yes
SE clustered	Country-Year	Country-Year	Country-Year	Country-Year
Panel B				
	(1)	(2)	(4)	(6)
	<i>INV</i>	<i>INV</i>	<i>INV</i>	<i>INV</i>
<i>EPU</i>	−0.018*** (−3.073)	−0.019*** (−3.187)	−0.013 (−1.622)	−0.029*** (−6.200)
<i>FD</i>	−0.084 (−1.458)	−0.033 (−0.537)	−0.054 (−0.829)	−0.104** (−2.273)
<i>EPU*FD</i>	0.020** (2.460)	0.019** (2.092)	0.011 (0.946)	0.036*** (5.147)
Observations	15,470	16,296	18,388	17,921
F-Statistics	24.306	36.679	51.413	38.799
Adj R-squared	0.415	0.413	0.414	0.402
Controls	Included	Included	Included	Included
Firm FE	Yes	Yes	Yes	Yes
SE clustered	Country-Year	Country-Year	Country-Year	Country-Year
Panel C				
	(1)	(2)	(4)	(6)
	<i>INV</i>	<i>INV</i>	<i>INV</i>	<i>INV</i>
<i>EPU</i>	−0.003 (−1.563)	−0.004* (−1.793)	−0.005* (−1.842)	−0.003 (−1.347)
<i>EXP</i>	0.136*** (2.804)	0.069 (1.215)	0.049 (0.810)	0.127*** (2.786)
<i>EPU*EXP</i>	−0.026** (−2.666)	−0.012 (−1.050)	−0.009 (−0.737)	−0.023** (−2.561)
Observations	15,470	16,296	18,388	17,921
F-Statistics	29.788	29.608	53.437	39.767
Adj R-squared	0.415	0.413	0.414	0.401
Controls	Included	Included	Included	Included
Firm FE	Yes	Yes	Yes	Yes
SE clustered	Country-Year	Country-Year	Country-Year	Country-Year

This table shows the effect of China's EPU and the channels of the effect on corporate investment in six Southeast Asian countries, excluding countries with a large number of observations: Malaysia, Singapore, Vietnam, and Indonesia. The control variables are included. The definition of the variables is presented in the Appendix A1. The firm-level variables are winsorized at the 1 % level. T-statistics are in parentheses. *, **, *** denote 10 %, 5 %, 1 % significance level, respectively.

(*TPU*EXP*), remains unchanged with a negative and significant coefficient. We conclude that the impact of China's EPU on firm-level investment in Southeast Asian countries occurs through both export activity and financial development channels, supporting our hypotheses 2 and 3.

5. Conclusion and implications

In this study, we analyze the impact of economic policy uncertainty from China on corporate investment in the Southeast Asian

Table 10
IV regression.

	(1)	(2)	(3)
	INV	INV	INV
<i>EPU</i>	−0.006*** (−5.340)	−0.003*** (−2.609)	−0.021*** (−6.016)
<i>EXP</i>		0.107*** (3.772)	
<i>EPU*EXP</i>		−0.020*** (−3.436)	
<i>FD</i>			−0.084*** (−2.900)
<i>EPU*FD</i>			0.023*** (4.658)
Observations	21,995	21,995	21,995
F-Statistics	87.036	73.977	73.861
Hansen J statistic (overidentification test of instruments)	0.885	2.473	0.103
Instrument	<i>DEATHS</i>	<i>DEATHS</i>	<i>DEATHS</i>
Controls	Included	Included	Included
FIRM FE	Yes	Yes	Yes

This table shows the effect of China's EPU and the channels of the effect on corporate investment in six Southeast Asian countries employing the two-stage least squares approach. The control variables are included. The definition of the variables is presented in the Appendix A1. The firm-level variables are winsorized at the 1 % level. Z-statistics are in parentheses. *, **, *** denote 10 %, 5 %, 1 % significance level, respectively.

Table 11
High versus low irreversibility.

	(1)	(2)	(3)	(4)	(5)	(6)
	INV	INV	INV	INV	INV	INV
	HPPEH	LPPE	HPPEH	LPPE	HPPEH	LPPE
<i>EPU</i>	−0.011*** (−4.289)	−0.003* (−1.864)	−0.007** (−2.044)	−0.003 (−1.665)	−0.055*** (−6.455)	−0.015*** (−2.830)
<i>EXP</i>			0.152 (1.517)	−0.000 (−0.008)		
<i>EPU*EXP</i>			−0.028 (−1.407)	0.001 (0.121)		
<i>FD</i>					−0.235*** (−2.745)	−0.079* (−1.798)
<i>EPU*FD</i>					0.065*** (5.412)	0.019** (2.565)
Observations	10,848	11,458	10,848	11,458	10,848	11,458
F-Statistics	31.040	6.327	28.701	10.477	43.499	7.854
Adj R-squared	0.376	0.480	0.377	0.480	0.380	0.481
Controls	Included	Included	Included	Included	Included	Included
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
SE clustered	Country-Year	Country-Year	Country-Year	Country-Year	Country-Year	Country-Year

This table shows the effect of China's EPU and the channels of the effect on corporate investment in six Southeast Asian countries between firms with high and low irreversibility. The control variables are included. The definition of the variables is presented in the Appendix A1. The firm-level variables are winsorized at the 1 % level. T-statistics are in parentheses. *, **, *** denote 10 %, 5 %, 1 % significance level, respectively.

region. Controlling for firm-level characteristics and country-level variables, taking the potential endogeneity issue into account, altering measures for China's economic policy uncertainty, and considering the possible influence of sample-dominant countries, we find a significant negative effect of China's economic policy uncertainty on investment. We also find that the export growth of a country to China and financial development are the mechanisms through which economic uncertainty from China affects firm investment in the Southeast Asian region. Based on the literature about the option-to-delay, we incorporate the firm feature representing irreversibility into the analysis and find that the impact of China's economic policy uncertainty or its mechanism is stronger for firms with high irreversibility, which supports the prediction of the option-to-delay theory.

The findings suggest that firm-level investment in smaller countries is unavoidably influenced by external uncertainty, especially

Table 12
Trade and financial development channel: Putting together.

	(1)	(2)
	<i>INV</i>	<i>INV</i>
<i>EPU</i>	−0.014** (−2.244)	
<i>EPU*EXP</i>	−0.018** (−2.221)	
<i>EPU*FD</i>	0.016** (2.004)	
<i>EXP</i>	0.096** (2.304)	0.063** (2.642)
<i>FD</i>	−0.050 (−0.994)	−0.004 (−0.106)
<i>TPU</i>		−0.005* (−1.817)
<i>TPU*EXP</i>		−0.012** (−2.420)
<i>TPU*FD</i>		0.007* (1.717)
Observations	22,306.000	22,306.000
F-statistics	36.339	36.650
Adj R-squared	0.409	0.409
Controls	Included	Included
Firm FE	Yes	Yes
SE clustered	Country-Year	Country-Year

This table shows the impact of China's EPU on corporate investment in six Southeast Asian countries through both the channels – Trade and Financial Development. The definition of the variables is presented in the Appendix A1. The control variables are included. The firm-level variables are winsorized at the 1 % level. T-statistics are in parentheses. *, **, *** denote 10 %, 5 %, 1 % significance level, respectively.

from the major country that has international trade or investment connections. Nevertheless, a country can modify the effect by reducing its dependence on a particular partner in international trade. Enhancing a nation's financial development is also a way to mitigate the external economic uncertainty on the investment of domestic companies.

Author statement

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Declaration of competing interest

I have no potential competing interests to declare.

Appendix A

A.1. Definition of variables and data sources

Variable	Name/Definition	Data source
<i>EPU</i>	China's economic policy uncertainty (China's EPU) The natural logarithm of the geometric average of 12 monthly economic policy uncertainty indexes constructed by Davis et al. (2019)	https://www.policyuncertainty.com/wui_quarterly.html
<i>AEPU</i>	An alternative measure of China's EPU The natural logarithm of the arithmetic average of 12 monthly economic policy uncertainty indexes constructed by Davis et al. (2019)	
<i>TPU</i>	An alternative of measure of China's EPU. The natural logarithm of the geometric average of 12 monthly trade policy uncertainty indexes constructed by Davis et al. (2019)	
<i>USEPU</i>	The U.S economic policy uncertainty. The natural logarithm of the geometric average of 12 monthly US. economic policy uncertainty indexes proposed by Baker et al. (2016)	
<i>WUI</i>	Country-level uncertainty. Ratio of the number of related-uncertainty words divided by total word counts in the Economist Intelligence Unit reports of four quarterly country reports of a particular year of each country multiplied by 1000. Calculated based on the World Uncertainty Index proposed by Ahir et al. (2018), is a	Refinitiv's Eikon Datastream
<i>INV</i>	Firm's investment. Capital expenditure over lagged total assets.	
<i>CF</i>	Cash Flows. Operating cash flows over lagged total assets.	
<i>TOBINQ</i>	Growth opportunities. Firm's market-to-book value of lagged total assets.	
<i>SIZE</i>	Firm Size. Natural logarithm of lagged total assets.	
<i>SALEG</i>	Sales growth. (Sales _t - Sales _{t-1}) / Sales _{t-1} .	
<i>ROA</i>	Profitability. Operating income over lagged total assets.	
<i>LEV</i>	Leverage. Total liability over lagged total assets.	
<i>TRADE</i>	Trade value growth between country J and China.	
<i>EXP</i>	Export growth of country J to China.	
<i>EXPH</i>	High export growth. Dummy variable, taking a value of 1 if <i>EXP</i> is above the median; otherwise, 0.	International Monetary Fund
<i>IMP</i>	Import growth of country J from China.	
<i>GDPG</i>	Real GDP growth.	
<i>INF</i>	Inflation rate.	
<i>FD</i>	Financial development index.	
<i>FI</i>	Institutional development index.	
<i>FM</i>	Financial market development index.	International Monetary Fund
<i>FDH</i>	High financial development. Dummy variable, taking a value of 1 if <i>FD</i> is higher than the median; otherwise, 0.	

A.2. Sample

This table shows the sample distribution.

Country	Firms	Percentage	Observations	Percentage
Indonesia	695	19.31 %	5239	15.88 %
Malaysia	776	21.56 %	8258	25.03 %
Philippines	196	5.44 %	1492	4.52 %
Singapore	701	19.47 %	6959	21.09 %
Thailand	545	15.14 %	5161	15.64 %
Vietnam	687	19.08 %	5887	17.84 %
Total	3600	100.00 %	32,996	100.00 %

Data availability

Data will be made available on request.

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