Scientific
Research
Publishing

Economic Policy Uncertainty and Venture Capital: Evidence from China

Aoyang Zhang

Postdoctoral Station, Institute of Finance, Chinese Academy of Social Sciences, Postdoctoral Research Station, China Huarong Asset Management Co., Beijing, China
Email: 294073060@qq.com

Abstract

Venture capital plays a crucial role in driving the growth of the new economy. However, frequent changes in economic policies can present both opportunities and challenges for venture capital investment. In this study, we conducted an empirical analysis of the relationship between economic policy uncertainty and venture capital investment using provincial-level data from China for the period 2010-2018. Our results indicate that increasing economic policy uncertainty has a negative impact on the growth of venture capital investment, with the magnitude of this effect varying significantly across funding rounds and industries. Further analysis suggests that increasing economic policy uncertainty exacerbates firms' business risks, which in turn reduces venture capital inflows. Our findings contribute to the literature on the impact of economic policy uncertainty on venture capital investment and provide insights for policymakers seeking to foster the development of venture capital and promote innovation.

Keywords

China, Economic Policy Uncertainty, Venture Capital

1. Introduction

Venture capital is a key driver of the new economy and an integral component of modern financial systems. In China, the surge in mass entrepreneurship and innovation has brought increased attention to the role of venture capital as a catalyst for start-up growth. The implementation of the "Made in China 2025" strategy has further emphasized the importance of developing a robust venture capital ecosystem. The origins of venture capital in China can be traced back to 1985, when the central government issued its Decision on the Reform of the

Science and Technology System, which served as the first guiding document for the nascent industry. That same year, the establishment of the China New Technology Venture Capital Corporation marked the beginning of venture capital activity in China. In subsequent years, the Chinese government has introduced a series of policies and regulations aimed at guiding and supporting the development of the country's venture capital industry. By 2018, the value of venture capital transactions in China had reached US$70.5 billion, placing it among the global leaders in this field.

In recent years, as China's economy has transitioned to a "new normal", the central government has introduced a series of economic policies aimed at promoting economic transformation and industrial development. While these policies have achieved some success, frequent changes have led to increased economic policy uncertainty. Data shows that China's economic policy uncertainty has been on an upward trend since 2010 (Baker et al., 2016). Given the policy-sensitive nature of the venture capital industry, these frequent policy changes present both opportunities and challenges. This study presents an empirical analysis of the relationship between economic policy uncertainty and venture capital investment using provincial-level data from China for the period 2010-2018. Our results indicate that increasing economic policy uncertainty has a negative impact on the growth of venture capital investment, with the magnitude of this effect varying significantly across funding rounds and industries. By funding round, angel and VC rounds are more significantly affected, while PE rounds are not. By industry, new industries, life services, and internet industries are negatively affected, while agriculture, healthcare, and hardware manufacturing industries are not significantly impacted. Further analysis suggests that increasing economic policy uncertainty exacerbates firms' business risks, which in turn reduces venture capital inflows.

This study makes several contributions to the literature on venture capital. First, it enriches the field by examining the impact of economic policy uncertainty on venture capital investment from an economic perspective. Second, our findings provide a basis for local governments to formulate industrial policies that take into account the heterogeneous effects of economic policy uncertainty on venture capital investment. By leveraging the selection effects of economic policy uncertainty, local governments can optimize their industrial structure and promote the development of the new economy. Third, our results suggest that increasing economic policy uncertainty can accelerate the exit of start-ups. As such, when governments seek to use changes in economic policy to smooth out economic volatility, they should consider how to minimize the negative impact of such changes on venture capital investment.

The rest of the paper proceeds as follows. Section 2 offers a brief overview of the related studies. Section 3 introduces the data variables and empirical strategy. Section 4 discusses the results, and Section 5 performs the robustness tests. Section 6 concludes the paper.

2. Literature Review and Hypothesis Formulation

2.1. Literature Review

In the realm of economic policy uncertainty research, a consensus has emerged among scholars that such uncertainty exerts a deleterious effect on macroeconomic performance. This effect manifests itself not only in the exacerbation of fluctuations in key macroeconomic and financial asset variables, with attendant consequences for the economic cycle (Fernández-Villaverde et al., 2015; Pástor & Veronesi, 2012; Born & Pfeifer, 2014), but also in the negative impact of economic policy uncertainty on output, employment, and other macro variables, impeding economic recovery (Baker et al., 2012, 2016). Concurrently, attention has turned to the micro-level impact of economic policy uncertainty on enterprise operations (Julio & Yook, 2012; Gulen & Ion, 2016; Kang et al., 2014), with research suggesting that such uncertainty may suppress investment activity by altering the cost structure of corporate operations. Further studies have explored the ramifications of economic policy uncertainty for technological innovation, stock price volatility, and capital market risk (Demir & Ersan, 2017; Pástor & Veronesi, 2013).

Investigations into venture capital have predominantly concentrated on its effects on enterprises. Kaplan & Strömberg (2001) maintain that venture capital is crucial in nurturing small and medium-sized enterprises. Hellmann & Puri (2002) establish that venture capital can markedly enhance a firm's market strategy and extend its sales channels, while Stuart et al. (1999) illustrate that it can aid firms in diversifying their operations. Moreover, reputable venture capital institutions have been shown to boost firms' financing efficiency (Nahata, 2008) and productivity (Chemmanur et al., 2011). Further research has probed the impact of venture capital on corporate innovation behavior, governance structure, value-added, and exit routes (Sun et al., 2019; Li et al., 2018; Hasan et al., 2018). A corpus of literature closely related to this study scrutinizes the effect of legal, public policy, political, institutional, and socio-economic factors on venture capital. Tykvová (2018) analyzed data from 8270 firms in 41 countries to gauge the impact of the legal environment on venture capital and discovered that a propitious legal environment fosters the success of such investments. Song & Lee (2018) determined that independent venture capital firms are vulnerable to government regulations and intervention measures. Cumming and Schwienbacher (2018) examined the impact of public policy on venture capital and ascertained that following the economic crisis, fintech-oriented venture capital migrated towards countries with lax regulatory frameworks and no major financial centers. Ding (2018) explored the influence of ethnic relations in the United States on venture capital and found that venture capitalists sharing an ethnicity with entrepreneurs tended to finance target companies with fewer financing rounds and larger financing amounts.

In summary, while a considerable body of research has investigated the effects of economic policy uncertainty and venture capital on business operations and

management, few studies have directly probed the relationship between these two factors. As an industry sensitive to policy shifts, venture capital is subject to both the opportunities and challenges engendered by frequent changes in economic policies. Given China's vigorous efforts to develop its venture capital industry, this study's examination of the relationship between economic policy uncertainty and venture capital investment holds considerable theoretical and practical significance.

2.2. Hypothesis Formulation

Beginning with Bernanke (1983), a large body of theoretical research has demonstrated that under conditions of uncertainty, investors may become cautious and delay or forgo investment if it is not fully reversible. This is because rising uncertainty increases the value of waiting options. Venture capital investments in start-ups fall into this category (Tian et al., 2018). Furthermore, if a start-up's entire incubation period is characterized by economic policy uncertainty, venture capitalists may delay or cancel their investments, potentially harming the business's continuity. Finally, changes in economic policies may affect the valuation of start-ups and lead to a decline in the size of venture capital inflows.

In summary, this study proposes the following hypothesis:

H1: Increasing economic policy uncertainty has a negative impact on the growth of venture capital investment.

Angel investment, venture capital (VC), and private equity (PE) can all be broadly considered forms of venture capital, differentiated by the stage of the investment project. Angel investments are typically made at the seed stage and focus on early-stage projects or ideas for start-ups. These investments are crucial for establishing and supporting the initial development of a company. VC investments tend to occur during the early and growth stages and are primarily directed towards companies that are experiencing growth. VC intervention can help ensure the smooth operation and continued growth of these companies. PE investments, on the other hand, focus on mature companies that are already well-established. PE intervention is primarily aimed at helping these companies go public. The impact of increasing economic policy uncertainty on venture capital investment may vary depending on the stage of investment. For example, changes in economic policy may inhibit the inflow of venture capital during angel rounds, while having less impact on PE-stage companies, whose markets and valuations are relatively certain. In summary, this study proposes the following hypothesis:

H2: Increasing economic policy uncertainty has a negative impact on venture capital investment in angel and VC rounds, but not in PE rounds.

Venture capital in China is growing rapidly and has expanded into an increasing number of industries, including the internet, life services, healthcare, and new industrial sectors. However, given the differences in capital structure and policy dependence across industries, changes in economic policies may have

varying impacts at the industry level. For example, prior to the introduction of the Double Reduction Policy, start-ups in the K12 online education industry relied on venture capital inflows to support their operations and expansion. After the policy was introduced, however, venture capital investment in this sector declined as the industry's growth prospects diminished. In summary, this study proposes the following hypothesis:

H3: The impact of economic policy uncertainty on venture capital investment varies across industries.

3. Study Design

3.1. Data Sources

This study utilizes venture capital data obtained from the China Research Data Service platform (CNRDS), which provides comprehensive information on portfolio companies, including their names, investment timing, industries, funding rounds, invested amounts, and regions. It is important to note that the distribution of venture capital in China is uneven, with certain provinces still in the early stages of development and receiving less investment during the sample period. To address this issue, the study employs the regional classification method outlined in the China Venture Capital Yearbook to exclude data from less developed regions. The economic policy uncertainty index is derived from Baker et al. (2016), providing a more accurate representation of macroeconomic policy uncertainty in China. Provincial-level control variables are sourced from the CSMAR database. The data on regional venture capital and control variables are matched by provincial code, resulting in a final sample of 44,695 investment observations for 18 provinces during the period 2010-2018, representing 99% of the original data.

3.2. Variable Definitions

- Explained variables. This article measures the size of venture capital investments using the logarithm of both the number of venture capital investments and the amount invested (*lnnumber*, *lnvc*).
- Explanatory variables. To measure macroeconomic volatility in China, this article employs the economic policy uncertainty index constructed by Baker et al. (2016). We measure economic policy uncertainty in the current year using the logarithm of the monthly average economic policy uncertainty index. Higher logarithmic values indicate greater economic policy uncertainty in the current year. For robustness testing, we substitute the weighted economic policy uncertainty index of seven countries that have close trade relations with China and use the US economic policy uncertainty indicator as an instrumental variable.
- Control variables. The control variables include provincial-level gross national product (*lngdp*), population size (*lnpop*), average wage of employees (*lnwage*), and education expenditure (*lnedu*), among others. We also control

for year fixed effects, regional fixed effects, and industry fixed effects to account for individual heterogeneity and macro shocks that do not vary over time. The specific variables are defined in Table 1.

3.3. Model Design

This study employs a fixed effects model to examine the relationship between economic policy uncertainty and venture capital activity.

$$lnnumber_{ict} = \beta_0 + \beta_1 EPU_t + \beta_2 X_{ct} + \lambda_c + \omega_i + \kappa_t + \varepsilon_{ict} \tag{1}$$

$$lnvc_{ict} = \alpha_0 + \alpha_1 EPU_t + \alpha_2 X_{ct} + \lambda_c + \omega_i + \kappa_t + \varepsilon_{ict} \tag{2}$$

In these models, $Lnnumber_{ict}$ and $Lnvcr_{ict}$ represent the number and amount of venture capital investment in industry c of province (city) i in year t, respectively. The EPU_t represents an index of China's economic policy uncertainty, while X_{ct} represents the control variables, including provincial (city) gross national product ($lngdp$), population size ($lnpop$), average wage of employees ($lnwage$), and education expenditure ($lnedu$). λ_c is the regional fixed effect, ω_i is the industry fixed effect, κ_t is the annual fixed effect and ε_{ict} is the residual term.

3.4. Descriptive Statistics

This article utilizes 44,695 venture capital data points, aggregated at the province,

Table 1. Descriptive statistics.

Variable name	Explanation of variables	Obs	Average value	Standard deviation	Minimum value	Maximum value
Panel A Regional + Industry Level Data						
lnnumber	Logarithmic value of the number of venture capital investments	2907	1.431	1.385	0	4.605
lnvc	Logarithmic value of venture capital amounts	2907	6.664	4.861	0	13.751
Exit	Business exit rate	2868	0.054	0.111	0	0.301
Panel B Regional level macro data						
EPU	Economic Policy Uncertainty Indicator	153	5.329	0.529	4.604	6.132
*EPU*1	Trade Weighted Economic Policy Uncertainty Indicator	153	4.778	0.291	4.275	5.143
*EPU*2	Indicators of US economic policy uncertainty	153	4.763	0.296	4.222	5.069
*EPU*3	Indicators of global economic policy uncertainty	153	4.854	0.482	4.197	5.732
lnedu	Logarithm of education expenditure	153	15.938	0.488	14.647	17.145
lnwage	Logarithm of the average employee's salary	153	10.945	0.344	10.298	11.890
lnpop	Logarithmic value of population size	153	8.527	0.568	7.170	9.337
lngdp	Logarithmic value of GNP	153	10.236	0.521	8.978	11.485

Data source: CNRDS, CSMAR database.

industry, and year levels, resulting in a final sample of 2907. We also apply a 1% tail reduction to the main variables before and after analysis. Descriptive statistics are presented in Table 1.

4. Analysis of the Empirical Results

4.1. Baseline Regression

Table 2 presents the regression results of the impact of economic policy uncertainty on venture capital investment. Column (1) examines the impact on the quantity of venture capital investment, while column (2) examines the impact on the amount of venture capital investment. The coefficients of EPU_t are significantly negative at the 1% and 5% levels of significance, respectively, indicating that rising economic policy uncertainty inhibits the increase in venture capital investment in terms of both quantity and amount. This confirms hypothesis H1. A possible explanation for this is that economic policy uncertainty exposes start-ups to increased risk, causing venture capitalists to become cautious and delay or cancel investments in start-ups.

Table 2. Impact of economic policy uncertainty on venture capital.

Explained variables	lnnumber	lnvc
	(1)	(2)
EPU	−1.149***	−3.534**
	(0.302)	(1.495)
lnedu	0.160	0.753
	(0.155)	(0.726)
lnwage	0.888**	4.496**
	(0.353)	(1.807)
lnpop	1.840**	6.716**
	(0.851)	(3.393)
lngdp	0.044	0.365
	(0.169)	(0.833)
Observation	2907	2907
adj. R^2	0.574	0.396
Provincial fixed effects	Yes	Yes
Industry fixed effects	Yes	Yes
Year fixed effects	Yes	Yes

Note: ***, **, * indicate estimates are significant at the 0.01, 0.05, 0.1 levels; figures in brackets are standard errors.

4.2. Analysis of Round Heterogeneity

Table 3 presents the regression results for different rounds of venture capital investment. Columns (1) and (2) show the results for the angel round. The coefficients of EPU_t are significantly negative at the 1% level of significance, indicating that rising economic policy uncertainty discourages venture capital investment at the angel round stage. Columns (3) and (4) show the results for the VC round. The coefficients of EPU_t are also significantly negative at the 1% and 5% levels of significance, respectively, indicating that rising economic policy uncertainty also discourages venture capital investment at the VC stage. Columns (5) and (6) show the results for the PE round. The coefficients of EPU_t are negative but not significant, suggesting that changes in economic policy do not affect venture capital investment in the PE round. This confirms hypothesis H2. A possible explanation for these results is that the angel and VC rounds target the founding and development stages of enterprises. Rising economic policy uncertainty can affect the establishment and development of enterprises, causing venture capitalists to be cautious in making investments. In contrast, venture capital investment in the PE round targets mature enterprises with strong industry competitiveness and sound exit mechanisms, so the impact is smaller.

Table 3. Analysis of round heterogeneity.

Explained variables	lnnumber	lnvc	lnnumber	lnvc	lnnumber	lnvc
	Angel Round		VC round		PE Wheel	
	(1)	(2)	(3)	(4)	(5)	(6)
EPU	−1.516***	−4.038***	−1.376***	−5.922**	−0.155	−1.448
	(0.268)	(1.474)	(0.387)	(2.345)	(0.256)	(2.164)
lnedu	0.588	0.714	0.511	0.262	0.284	0.471
	(0.367)	(1.303)	(0.376)	(1.808)	(0.264)	(1.927)
lnwage	3.861***	12.956***	3.890***	17.922***	0.781	7.502
	(0.861)	(3.228)	(0.916)	(5.225)	(0.602)	(4.990)
lnpop	4.831**	6.322	4.534**	7.786	3.251**	15.216
	(1.979)	(5.496)	(1.995)	(8.626)	(1.497)	(9.343)
lngdp	−0.674	0.810	−0.411	1.787	0.159	2.406
	(0.430)	(1.643)	(0.428)	(2.090)	(0.297)	(2.262)
Observation	2907	2907	2907	2907	2907	2907
adj. R^2	0.467	0.465	0.412	0.337	0.267	0.255
Provincial fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

Note: ***, **, * indicate estimates are significant at the 0.01, 0.05, 0.1 levels; figures in brackets are standard errors.

4.3. Industry Heterogeneity Analysis

Table 4 explores the impact of economic policy uncertainty on venture capital investment in different industries. The results show that rising economic policy uncertainty inhibits venture capital investment in the internet, life services, and new industries, while having no effect on the agriculture, healthcare, and smart hardware industries. This confirms hypothesis H3. These results suggest that the impact of economic policy uncertainty is inconsistent across industries involving agriculture, healthcare, and new industries (including those related to the IC industry, Industry 4.0, and new energy) where the government places importance and encourages development. For the new industry sector, despite a series of national policies and regulations to guide its healthy development, frequent changes in economic policies can ultimately inhibit risky investments in the industry. In contrast, the agricultural and medical and health sectors are relatively less affected. Therefore, when local governments formulate industrial development policies, they should take into account the impact of macroeconomic policies.

4.4. Analysis of Intermediary Effects

Pástor & Veronesi (2013) contend that economic policy uncertainty heightens the operational risk faced by enterprises. As an industry acutely sensitive to policy shifts, changes in economic policy may hasten the exit of start-ups, precipitating a decline in both the number and value of venture capital investments. The operational risk confronting enterprises may constitute a conduit through which economic policy uncertainty curbs venture capital. This article employs the exit ratio (*Exit*) of start-ups as a gauge of operational risk and utilizes a mediation effect model to dissect the underlying mechanism.

The mediating effects model involves first regressing the dependent variable (*lnnumber* and *lnvc*) on the independent variable (EPU_t); second, regressing the mediating variable (*Exit*) on the independent variable; and finally, regressing the dependent variable on both the independent and mediating variables. Therefore, the mediating effects model for this article is shown below:

$$Exit_{ict} = c_0 + c_1 EPU_t + c_2 X_{ct} + \lambda_c + \omega_i + \kappa_t + \varepsilon_{ict} \tag{3}$$

$$lnnumber_{ict} = e_0 + e_1 EPU_t + e_2 Exit_{ict} + e_3 X_{ct} + \lambda_c + \omega_i + \kappa_t + \varepsilon_{ict} \tag{4}$$

$$lnvc_{ict} = h_0 + h_1 EPU_t + h_2 Exit_{ict} + h_3 X_{ct} + \lambda_c + \omega_i + \kappa_t + \varepsilon_{ict} \tag{5}$$

Columns (1) and (2) present the baseline regression results. Column (3) displays the regression results with the inclusion of the mediating variable (*Exit*), while columns (4) and (5) exhibit the regression results with the inclusion of both the mediating variable (*Exit*) and the independent variable. The findings in column (3) of Table 5 suggest that an increase in economic policy uncertainty elevates the business risk for start-ups. The coefficients of EPU_t in columns (4) and (5) are significantly negative, as is the coefficient of *Exit*, indicating that business risk serves as a mediating factor.

Table 4. Industry heterogeneity analysis.

Explained variables	lnnumber	lnvc	lnnumber	lnvc	lnnumber	lnvc
	Internet industry		Life Service Industry		New Industries	
	(1)	(2)	(3)	(4)	(5)	(6)
EPU	−1.773***	−5.590**	−0.973**	−2.184**	−1.009***	−5.785**
	(0.501)	(2.637)	(0.448)	(0.969)	(0.315)	(2.261)
lnedu	0.042	−3.966**	−0.589	−3.458	0.420	−0.007
	(0.439)	(1.733)	(0.788)	(3.057)	(0.440)	(1.780)
lnwage	4.273***	16.870***	2.900	11.266	3.465***	16.123***
	(1.104)	(5.977)	(2.325)	(10.900)	(1.149)	(5.124)
lnpop	1.069	−3.217	5.883	28.378**	0.456	−4.389
	(2.082)	(10.280)	(3.659)	(11.400)	(1.836)	(9.692)
lngdp	0.326	6.534**	−0.199	−0.562	0.011	2.255
	(0.629)	(2.677)	(0.912)	(2.907)	(0.515)	(2.167)
Observation	918	918	1377	1377	153	153
adj. R^2	0.579	0.419	0.594	0.442	0.251	0.146
Provincial fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Explained variables	lnnumber	lnvc	lnnumber	lnvc	lnnumber	lnvc
	Agriculture		Healthcare industry		Smart hardware industry	
	(1)	(2)	(3)	(4)	(5)	(6)
EPU	0.804	5.928	−0.724	−0.649	−0.184	−2.970
	(0.678)	(6.178)	(1.586)	(6.166)	(1.435)	(7.284)
lnedu	−0.605	−6.878	0.145	−3.261	−0.110	−4.059
	(0.846)	(5.113)	(0.683)	(5.415)	(0.716)	(2.763)
lnwage	4.145	18.299	−0.510	−0.070	2.703	7.221
	(3.704)	(14.101)	(1.581)	(13.296)	(1.920)	(8.852)
lnpop	−2.621	−18.212**	−1.840	−0.314	5.352	12.670
	(2.136)	(6.841)	(1.980)	(13.653)	(3.360)	(12.043)
lngdp	0.285	0.586	0.215	1.810	0.056	5.197
	(1.135)	(5.063)	(0.818)	(6.049)	(0.785)	(3.375)
Observation	153	153	153	153	153	153
adj. R^2	0.521	0.363	0.662	0.376	0.657	0.356
Provincial fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

Note: ***, **, * indicate estimates are significant at the 0.01, 0.05, 0.1 levels; figures in brackets are standard errors.

Table 5. Analysis of intermediary effects.

Explained variables	lnnumber	lnvc	Exit	lnnumber	lnvc
	(1)	(2)	(3)	(4)	(5)
EPU	−1.149***	−3.534**	0.169***	−0.941***	−3.378**
	(0.302)	(1.495)	(0.054)	(0.316)	(1.547)
Exit				−0.744***	−2.735**
				(0.176)	(1.100)
lnedu	0.160	0.753	−0.073*	0.211	−1.364
	(0.155)	(0.726)	(0.044)	(0.242)	(1.060)
lnwage	0.888**	4.496**	0.475***	3.407***	12.926***
	(0.353)	(1.807)	(0.113)	(0.670)	(3.284)
lnpop	1.840**	6.716**	0.395*	1.166	0.517
	(0.851)	(3.393)	(0.205)	(1.093)	(5.570)
lngdp	0.044	0.365	0.301***	−0.006	2.914**
	(0.169)	(0.833)	(0.046)	(0.301)	(1.431)
Observation	2907	2907	2868	2868	2868
adj. R^2	0.574	0.396	0.079	0.577	0.395
Provincial fixed effects	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes

Note: ***, **, * indicate estimates are significant at the 0.01, 0.05, 0.1 levels; figures in brackets are standard errors.

5. Robustness Tests

This article addresses the endogeneity issue arising from omitted variables by incorporating macro-level provincial variables and controlling for regional, annual, and industry fixed effects. To ensure the robustness of the results, the economic policy uncertainty indices of countries with close trade relations with China are employed as instrumental variables for China's economic policy uncertainty index, weighted according to their respective shares of trade with China. The countries selected include the United States, Japan, South Korea, the United Kingdom, France, Germany, and Italy. In addition, the one-period lagged US economic policy uncertainty index is utilized as an alternative instrumental variable. Fluctuations in this alternative instrumental variable would influence China's economic policy uncertainty but would not directly affect China's venture capital. Finally, to address potential reverse causality concerns, the explanatory and control variables are lagged by one period in the regression analysis. The corresponding regression results are presented in Table 6. Columns (1) and (2) display the results obtained using trade-weighted instrumental

Table 6. Robustness tests.

Explained variables	lnnumber	lnvc	lnvc	lnnumber	lnvc	lnnumber
	Trade weighted EPU		United States EPU		China EPU	One period behind
	(1)	(2)	(3)	(4)	(5)	(6)
EPU1	−2.555***	−4.700***				
	(0.313)	(1.199)				
EPU2			−1.686***	−3.095***		
			(0.068)	(0.267)		
L. EPU					−1.189***	−3.000***
					(0.337)	(1.748)
lnedu	0.281*	−0.583	0.373*	−1.003	0.260	−0.629
	(0.167)	(0.788)	(0.221)	(1.354)	(0.227)	(1.094)
lnwage	4.270***	10.051***	5.670***	12.271***	3.898***	10.364***
	(0.166)	(0.695)	(0.220)	(1.194)	(0.713)	(3.800)
lnpop	0.457***	0.131	0.607***	0.225	0.478	−1.285
	(0.123)	(0.559)	(0.163)	(0.960)	(0.934)	(5.302)
lngdp	0.321***	3.022***	0.426***	5.195***	−0.457	2.459
	(0.092)	(0.421)	(0.122)	(0.723)	(0.313)	(1.498)
Observation	2907	2907	2907	2907	2584	2584
adj. R^2	0.622	0.453	0. 622	0.453	0.559	0.37
Provincial fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

Note: ***, **, * indicate estimates are significant at the 0.01, 0.05, 0.1 levels; figures in brackets are standard errors.

variables; columns (3) and (4) show the results obtained using the US economic policy uncertainty indicator; columns (5) and (6) present the results obtained using the one-period lagged Chinese economic policy uncertainty indicator and control variables. The coefficients of EPU_t are all significantly negative at the 1% level of significance, indicating that an increase in economic policy uncertainty inhibits risky investment. Therefore, the conclusions of this article can be considered reliable.

6. Conclusions and Recommendations

This article empirically examines the impact of economic policy uncertainty on venture capital investment using Chinese provincial-level venture capital data from 2010-2018 and the China Economic Policy Uncertainty Index constructed by Baker et al. (2016). The results indicate that an increase in economic policy

uncertainty inhibits venture capital investment. The benchmark regression results remain robust after controlling for potential omitted variables and reverse causality. Heterogeneity analysis reveals that an increase in economic policy uncertainty inhibits venture capital investment in angel and VC rounds, with less impact on PE rounds. By industry, new industries, life services, and internet industries are negatively affected, while industries such as agriculture, healthcare, and hardware manufacturing are insignificantly impacted. Finally, the mediating effects analysis suggests that an increase in economic policy uncertainty exacerbates business risks for firms and inhibits venture capital inflows.

Based on these findings, the article offers the following policy recommendations:

Firstly, actively develop the venture capital industry. Although China's venture capital industry is rapidly growing, it has not yet formed a mature system and lags behind the mature venture capital industry in the United States. The government should strive to improve the economic system environment, coordinate and promote industry development, and ensure timely and effective policy implementation and enforcement.

Secondly, there is heterogeneity in the impact of economic policy uncertainty. Local governments can leverage the selection effect brought about by uncertainty to optimize the industrial structure and ultimately promote the development of the new economy. This should be done while taking into account local realities and implementing targeted initiatives to mitigate the negative impact of economic policies.

Thirdly, start-up survival in China is a serious issue, and increasing uncertainty in economic policies accelerates start-up exits. Therefore, when frequently introducing or changing economic policies, the government should actively improve the local financial market, reduce enterprise financing costs, mitigate the negative impact of economic policy uncertainty, and create a favorable external environment for enterprise survival.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

References

Baker, S. R., Bloom, N., & Davis, S. J. (2012). *Has Economic Policy Uncertainty Hampered the Recovery?* Becker Friedman Institute for Research in Economics Working Paper No. 2012-003. The Becker Friedman Institute for Research in Economics. https://doi.org/10.2139/ssrn.2009451

Baker, S. R., Bloom, N., & Davis, S. J. (2016). Measuring Economic Policy Uncertainty. *The Quarterly Journal of Economics, 131,* 1593-1636. https://doi.org/10.1093/qje/qjw024

Bernanke, B. S. (1983). Irreversibility, Uncertainty, and Cyclical Investment. *The Quarterly Journal of Economics, 98,* 85-106. https://doi.org/10.2307/1885568

Born, B., & Pfeifer, J. (2014). Policy Risk and the Business Cycle. *Journal of Monetary Economics, 68,* 68-85. https://doi.org/10.1016/j.jmoneco.2014.07.012

Chemmanur, T. J., Krishnan, K., & Nandy, D. K. (2011). How Does Venture Capital Financing Improve Efficiency in Private Firms? A Look Beneath the Surface. *The Review of Financial Studies, 24,* 4037-4090. https://doi.org/10.1093/rfs/hhr096

Cumming, D. J., & Schwienbacher, A. (2018). Fintech Venture Capital. *Corporate Governance: An International Review, 26,* 374-389. https://doi.org/10.1111/corg.12256

Demir, E., & Ersan, O. (2017). Economic Policy Uncertainty and Cash Holdings: Evidence from BRIC Countries. *Emerging Markets Review, 33,* 189-200. https://doi.org/10.1016/j.ememar.2017.08.001

Ding, N. (2018). Ethnic Ties in US Venture Capital Stage Financing. *Asia-Pacific Journal of Financial Studies, 47,* 306-328. https://doi.org/10.1111/ajfs.12212

Fernández-Villaverde, J., Guerrón-Quintana, P., Kuester, K., & Rubio-Ramírez, J. (2015). Fiscal Volatility Shocks and Economic Activity. *American Economic Review, 105,* 3352-3384. https://doi.org/10.1257/aer.20121236

Gulen, H., & Ion, M. (2016). Policy uncertainty and corporate investment. *The Review of Financial Studies, 29,* 523-564. https://doi.org/10.1093/rfs/hhv050

Hasan, I., Khurshed, A., Mohamed, A., & Wang, F. (2018). Do Venture Capital Firms Benefit from a Presence on Boards of Directors of Mature Public Companies? *Journal of Corporate Finance, 49,* 125-140. https://doi.org/10.1016/j.jcorpfin.2017.04.018

Hellmann, T., & Puri, M. (2002). Venture Capital and the Professionalization of Start-up Firms: Empirical Evidence. *The Journal of Finance, 57,* 169-197. https://doi.org/10.1111/1540-6261.00419

Julio, B., & Yook, Y. (2012). Political Uncertainty and Corporate Investment Cycles. *The Journal of Finance, 67,* 45-83. https://doi.org/10.1111/j.1540-6261.2011.01707.x

Kang, W., Lee, K., & Ratti, R. A. (2014). Economic Policy Uncertainty and Firm-Level Investment. *Journal of Macroeconomics, 39,* 42-53. https://doi.org/10.1016/j.jmacro.2013.10.006

Kaplan, S. N., & Strömberg, P. (2001). Venture Capitalists as Principals: Contracting, Screening, and Monitoring. *American Economic Review, 91,* 426-430. https://doi.org/10.1257/aer.91.2.426

Li, H., Wu, X., & Ye, Y. (2018). Venture Capitalists' Value-Enhancing Activities under Weak Protection of Law. *Pacific-Basin Finance Journal, 50,* 26-40. https://doi.org/10.1016/j.pacfin.2017.12.006

Nahata, R. (2008). Venture Capital Reputation and Investment Performance. *Journal of Financial Economics, 90,* 127-151. https://doi.org/10.1016/j.jfineco.2007.11.008

Pástor, L., & Veronesi, P. (2012). Uncertainty about Government Policy and Stock Prices. *The Journal of Finance, 67,* 1219-1264. https://doi.org/10.1111/j.1540-6261.2012.01746.x

Pástor, L., & Veronesi, P. (2013). Political Uncertainty and Risk Premia. *Journal of Financial Economics, 110,* 520-545. https://doi.org/10.1016/j.jfineco.2013.08.007

Song, C.-S., & Lee, Y. (2018). Monitoring Role of Venture Capital in the Initial Public Offerings: Evidence from Korea. *Emerging Markets Finance and Trade, 54,* 2382-2399. https://doi.org/10.1080/1540496X.2017.1399121

Stuart, T. E., Hoang, H., & Hybels, R. C. (1999). Interorganizational Endorsements and the Performance of Entrepreneurial Ventures. *Administrative Science Quarterly, 44,* 315-349. https://doi.org/10.2307/2666998

Sun, S. L., Chen, V. Z., Sunny, S. A., & Chen, J. (2019). Venture Capital as an Innovation Ecosystem Engineer in an Emerging Market. *International Business Review, 28,* Article ID: 101485. https://doi.org/10.1016/j.ibusrev.2018.02.012

Tian, X., Wang, Y., & Ye, K. (2018). *How Does Policy Uncertainty Affect Venture Capital?* https://doi.org/10.2139/ssrn.2910075

Tykvová, T. (2018). Venture Capital and Private Equity Financing: An Overview of Recent Literature and an Agenda for Future Research. *Journal of Business Economics, 88,* 325-362. https://doi.org/10.1007/s11573-017-0874-4