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ECONOMIC POLICY UNCERTAINTY, BANK CREDIT, EXTERNAL DEMAND, AND CORPORATE INVESTMENT

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Abstract:

The studies on economic policy uncertainty are growing recently, since it is an important topic in many economic research areas such as financial crisis, economic forecasting, corporate investment and so on. Using the data of Chinese listed companies from 2004 to 2013 and following the non-dynamic threshold panel model, this study investigates how economic policy uncertainty influences the corporate investment of firms with different external demands through bank credit. To our best knowledge, the research on the influence channel of the bank credit is new in the literature. The effects of economic policy uncertainty on corporate investment through bank credit are obvious, and the effects are more significant for firms with low external demand than those that have high external demand. However, this result is influenced by the varying characteristics of controlling shareholders and industries as well as the different degrees of financial development. The effects of economic policy uncertainty are also significant for state-owned firms, manufacturing firms and high financial development group with low external demand.

Keywords: economic policy uncertainty; credit channel; firm heterogeneity; external demand; threshold panel model

JEL Classification: G32, D80, E22, E60

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1. Introduction

How economic policy uncertainty influences corporate investment has always been a central issue for academic communities. The financial crisis in America led to a global economic recession in 2008. Although the government adopted an easy monetary policy, such measure did not quickly revive the American economy. Consequently, some scholars have begun to study the relationship between economic policy uncertainty and corporate investment at the firm level (*e.g.*, Baker *et al.* 2016; Gulen and Ion, 2012; Brogaard and Yook, 2015). In fact, the economic policy uncertainty may undermine the waiting option value of investment, thereby making the firm cautious in its investment decisions. In other words, the fiscal or monetary policy has a controlling influence over the economy.

We investigate how economic policy uncertainty influences the corporate investment of firms with different external demand through the channel of bank credit. We posit that such effects are influenced by the different ownership properties, industries, and degrees of financial development of Chinese listed companies from 2004 to 2013.

This study has three contributions to the literature. (1) Recent studies mainly investigate whether the economic policy uncertainty influences the investment of firms, but the inside mechanism of such effect, especially the role of bank credit channel has received insufficient attention. Our study fills this gap by probing the ways in which the investment of firms with different external demand are influenced by the policy uncertainty through the bank channel. We also look into the heterogeneity of firms via the varying characteristics of their controlling shareholders and industries as well as the varying degrees of their financial development. (2) This study uses the threshold panel model introduced by Hansen (1999) to measure the heterogeneity of firms. This method relies on data-driven processing to overcome the errors generated by subjective methods, such as median ranking. (3) The Chinese market data are used for the study due to the following two benefits, a) Bank credit is the most significant channel of external financing for firms in the special financial system of China (Allen *et al.*, 2011). For most companies, their long-term borrowing and short-term borrowing come from bank credit, rather than bond financing due to the immature debt and IPO marketing. According to central bank data, at the end of 2014, the amount of corporate bond financing reached 2.39 trillion yuan, non-financial enterprises and other sectors of bank loans to 6.48 trillion yuan. Therefore, the economic policy uncertainty may influence the bank credit of firms as well as their investment. It also can reflect more precise effects of bank credit channel than those markets in developed countries. b) Chinese developing marketing economy is usually thought to be more sensitive to the economic policies, which will be a good example to explore the relationship between policy uncertainty and firm financing decisions.

The rest of this paper is organized into seven sections. Following the Introduction, the second section gives the literature review. The third section provides the relevant theoretical background in the literature and develops the main research hypotheses. The fourth section describes the research samples, variables, and the proposed model. The fifth section presents the empirical results. The sixth section presents the robustness checks. The last section concludes the paper.

2. Literature Review

The study of economic policy uncertainty is currently drawing more attention to researchers and there is a growing literature on the relationship between the economic uncertainty and the investment of firms. Due to the economic reform in China, policy uncertainty was getting

more closed attention and recently some scholars had focused on this topic. For instance, Tan and Zhang (2017) explored and identified the transmission mechanism of economic policy determinism that affects corporate investment behavior on the basis of China Economic Policy Uncertainty Index constructed by Baker *et al.* (2016). The test results with Chinese listed companies have shown that the uncertainty of China's economic policies transmits to the corporate level through real option channels and financial friction channels and inhibits the investment of enterprises.

In fact, such uncertainty may affect an external financing channel before the investment of a firm. The investment level of a firm depends on its financing capacity. If the degree of the economic policy uncertainty increases, then the probability of debt default (Greenwald and Stiglitz, 1990; Gilchrist and Zakrajsek, 2014) and the external financing environment may be influenced (Bernanke and Blinder, 1992; Bernanke and Gertler, 1995). At the same time, a high uncertainty may increase the risk premium and cost of external financing (Pastor and Veronesi, 2013), subsequently influencing the investment. In addition, the company's investment expenditure also depends on the level of internal financing (such as cash flow, etc.), or that investment spending is subject to financing constraints. Liu *et al.* (2011) used panel data of listed companies in China's manufacturing industry from 1998 to 2009 to analyze the influence of the interactive relationship between financing constraints and uncertainty on the investment behavior of manufacturers. The results show that the greater degree of uncertainty the company faced, the more easily affected by financing constraints are its investment expenditure.

Corporate sales accelerator theory posits that the investment of firms is often related to the changes in external demand, and a high demand promotes capital expenditure. Given the effect of economic policy uncertainty, the capital expenditure may vary because of the different external demand for each type of firm (Bloom *et al.*, 2001; Baum *et al.*, 2006; Abdul-Haque and Wang, 2008). In addition, the economic policy uncertainty may have different effects on the investment of firms across different economic cycles, ownership properties, industries, and areas with varying degrees of financial development. For example, by investigating the Chinese listed companies from 2003 to 2012, Wang *et al.* (2014) find that the effects of economic policy uncertainty on investment greatly differ among the firms with a high return on invested capital, with a great utilization of internal finance, and without state ownership. Li and Yang (2013) show that the economic policy uncertainty has different effects on corporate investment before and after the financial crisis as well as for state- and non-state-owned firms.

3. Theoretical Background and Hypotheses Development

Bank credit is the main resource for firms to obtain external funds. A high economic policy uncertainty increases the extent of information asymmetry between banks and firms. Banks will then increase their interest rates to obtain information about a firm, thereby distorting the allocation of bank credit funds and increasing the cost of external financing (Baum *et al.*, 2009; Talavera *et al.*, 2012). Therefore, the economic policy uncertainty may influence corporate investment through bank credit. When the economic policy uncertainty increases, banks cannot clearly anticipate the liquidity requirements and are therefore forced to tighten their credit expenditures. Such uncertainty may also influence credit fund allocation by influencing the behavior of bank supervisors (Mario Quagliariello, 2009).

Corporate sales acceleration theory posits that sales income affects firm capital expenditure (Fazzari *et al.*, 1988), but it yields a lag effect. Firms cannot adjust their capital expenditures quickly because of the adjustment cost (Abel and Blanchard, 1986; Love, 2003). A high uncertainty weakens the reaction of firms to external requirement shocks (Bloom *et al.*, 2007), leads to the uncertainty of a business environment, and then influences investment expenditure. For firms with high external demand, a high economic policy uncertainty will influence their credit financing cost and then result in a less investment expenditure. However, most firms believe that high external requirements will increase their income and generate additional profit. Under this circumstance, these firms are willing to invest at a high cost of bank credit. By contrast, because of the existing economic policy uncertainty, firms with low external demand suffer from unstable business environments and exteriors that are insensitive to product demand, thereby leading to a volatile income. Consequently, the extent of investment expenditure reduction through bank credit is lesser for firms with a high external demand than for those with a low external demand. Therefore, we hypothesize that **Hypothesis 1:** Bank credit channel exists, and the economic policy uncertainty significantly affects the investment of the firms with low external demand through bank credit, however the effect for firms with high external demand is nonsignificant.

Shareholder property influences corporate investment; hence, the effect of economic policy uncertainty may be heterogeneous for firms with different shareholder properties. Given that the government and state-owned enterprises in China have a “nature relationship” (Wang *et al.*, 2014), these enterprises bear a huge amount of policy burden and receive additional government support (Lin and Li, 2004). Thus, these enterprises can benefit from policy distortion and receive more loans than private enterprises. Political connections also have a noted role, which helps state-owned enterprises obtain loans easily (Yu *et al.*, 2012). Banks will reduce their bank credit when the economic policy uncertainty increases, and this behavior significantly affects the investment of state-owned enterprises. Contrarily, given that non-state-owned enterprises have no “nature relationship” with the government, they cannot easily obtain funds from the bank and are forced to turn to business loans (Rao and Jiang, 2013). Therefore, the economic policy uncertainty has no marked effect on non-stated-owned enterprises.

The capital structure of an enterprise is linked to its industry. Capital structure varies considerably from one industry to another (Guo *et al.*, 2003). Wang *et al.* (2014) specify that macroeconomic uncertainty influences the investment of firms through different channels of demand for funds between manufacturing and non-manufacturing industries. Thus, the influence of economic policy uncertainty on the investment of firms with different external demands may be heterogeneous across various industries. Accordingly, we conclude that

Hypothesis 2: Bank credit channel exists, and the economic policy uncertainty nonsignificantly affects the non-state-owned enterprises with different levels of external demand through bank credit, whereas it significantly affects the investment of state-owned enterprises with low external demand through the same channel.

Hypothesis 3: Bank credit channel exists, and the economic policy uncertainty nonsignificantly affects non-manufacturing industries with different levels of external demand through bank credit, whereas it significantly affects the investment of manufacturing industries with low external demand through the same channel.

The effect of economic policy uncertainty on investment through bank credit varies across regions with different levels of financial development. For instance, firms from regions with a less developed financial system cannot easily obtain funds from banks. These firms are also vulnerable to government interventions; hence, their investment are nonsignificantly changed by an increasing economic policy uncertainty. However, private enterprises grow

rapidly along with financing reformation, thereby inciting fierce competition in the market. At the same time, the financing channels and tools for eluding policy supervision increase in number. Under these circumstances, if the degree of economic policy uncertainty is increasing, then the firms become vulnerable to external interference.

We then hypothesize that

Hypothesis 4: Bank credit channel exists, and the economic policy uncertainty nonsignificantly affects the firms that have different levels of external demand in regions with less developed financial system through bank credit, whereas it significantly affects the investment of firms that have low external demand in regions with mature financial systems through the same channel.

4. Sample Selection and Choice Of Variables

4.1 Sample

We use the data from the annual financial statements of selected Chinese listed companies to understand further the effects of economic policy uncertainty. Our sample period starts from 2004 to 2013 and the sample size is 671 firms. To measure the economic policy uncertainty, we use the monthly China economic policy uncertainty index released jointly by Stanford University and the University of Chicago. We exclude the “special treatment” shares, “particular transfer” shares, companies with incomplete data, and financial companies from the analysis. All data are winsorized to minimize the influence of outliers (*i.e.*, observed values outside of the 1% and 99% quantiles). The data from Chinese listed companies are available through many financial databases like Wind and CSMAR (The China Stock Market & Accounting Research). Meanwhile under China’s unique financial system background and policy environment, Chinese listed companies are vulnerable to macroeconomic policies and the bank-led financial system, and the bank credit is an extremely important external financing channel for enterprises and plays a vital role in corporate investment. Thus the Chinese data are suitable to explore the effect of economic policy uncertainty on corporate investment through bank credit.

4.2 Variable Definitions

Table 1 illustrates the definitions and computations of all variables. The manufacturing and non-manufacturing industries are sorted based on the industry codes released by the China Securities Regulatory Commission. Fan, Wang, and Zhu (2011) constructed an index of the degree of economic development, government intervention, and legal system in their work, “NERI index of marketization of China’s provinces.”

Table 1

Variable definitions

Variable	Implication	Computing method
<i>I</i>	Current new investment	Corporate investment is measured as the capital expenditures divided by the total assets at the beginning of the fiscal year, and capital expenditure is calculated as the sum of the cash paid for the acquisition of fixed assets, intangible assets, and other long-term assets.
<i>Epu</i>	Economic policy uncertainty	The log of monthly economic policy uncertainty index of the arithmetic average from 2004 to 2013 is taken as the economic policy uncertainty index of the year.
<i>Credit</i>	Bank credit	Bank credit is measured as the sum of long-terms and short-term loans divided by the total assets at the beginning of the fiscal year.

Variable	Implication	Computing method
<i>Q</i>	Tobin's q	Tobin's q is measured as the market value of the traded and non-traded shares plus the total debt and is then divided by the total assets.
<i>CF</i>	Cash flow	Cash flow is computed as the net operating cash flow divided by the total assets at the beginning of the fiscal year.
<i>Lev</i>	Leverage	Leverage is expressed as the debt asset ratio.
<i>Size</i>	Size	Size is expressed as the natural logarithm of the current total assets.
<i>Sale</i>	External demand	External demand is measured as the cash received from the sales of goods and services divided by the total assets.

To this end, we partition our sample based on the financial development index. The companies located in regions with an index reading that is equal to or above the median value are categorized into the high degree of financial development group, while the other companies are categorized into the low degree of financial development group.

4.2.1. Interpreted Variables

(1) Corporate Investment (*I*). This paper uses the ratio of corporate capital expenditure to total assets to measure corporate investment. The calculation formula can be described as follows:

$$I_{it} = \frac{Capital_{it}}{TA_{it-1}}$$

Among them, $Capital_{it}$ represents the capital expenditure in the period *t* where *i* refers to a company. TA_{it-1} is the total assets of the company at the *t*-1 period.

4.2.2. Explanatory Variables

(1) Economic Policy Uncertainty Index (*Epu*). The measurement of economic policy uncertainty in this paper uses the monthly China Economic Policy Uncertainty Index announced by the Stanford University and the University of Chicago jointly.

(2) Bank credit (*Credit*). It is difficult to obtain information about the listed companies' bank borrowings from the corporate financial statements or public databases. This paper considers the use of surrogate indicators to represent corporate bank credit. Shi and Li (2009) pointed out that the most of China's short-term loans can only be obtained from banks, and most of the long-term financing of enterprises also comes from banks. Therefore, this paper follows Wang and Mao (2009) and Jie (2013), using the sum of short-term loans and long-term loans of enterprises as a substitute indicator for bank loans, and standardizing the total assets at the beginning of the period. The specific calculation formula is:

$$Credit_{it} = \frac{long\ term\ borrowing + short\ term\ borrowing}{initial\ total\ assets}$$

4.2.3. Control variables

(1) Tobin Q (*Q*). This paper follows the calculation method of Tobin Q proposed by Yu (2014), which can be expressed as follows:

$$Q = \frac{Stock\ market\ capitalization + the\ book\ value\ of\ the\ debt}{the\ book\ value\ of\ the\ total\ assets}$$

Among them, the total market value of the stock is divided into the circulation market value and non-circulating market value of corporate. The market value can be obtained by

multiplying the company's stock price by the number of shares traded. The non-tradable value is calculated by multiplying the net assets per share by the number of non-tradable shares. The book value of the debt and the book value of the total assets are expressed by total liabilities and total assets, respectively.

(2) Cash flow (CF). In empirical research, the internal cash flow of the enterprise is usually regarded as an important variable affecting the investment of the enterprise. This paper uses the ratio of the net cash flow generated by the business activities to the total assets to measure the cash flow of the enterprise. The calculation formula is:

$$CF = \frac{\text{Net cash flow generated by business activities}}{\text{initial total assets}}$$

(3) Debt-asset ratio (Lev). The Debt asset ratio can reflect the composition of the capital structure of the enterprise, and further the capital structure will have a certain impact on the investment behavior of the enterprise. This paper adopts the lag of one period of the debt asset ratio.

(4) Size of the company (Size). Empirical evidence indicates that the size of the firm may have a certain relationship with the financing capacity of the firm so that it affects the investment. This paper uses the method of Yu Kun et al. (2014) to measure the size of a listed company by taking the total assets in logarithm.

(5) Sale (External demand) The company's accelerator theory indicates that sales revenue equals to the output volatility (also external demand). This index is taken from Wang *et al.* (2014), measured as cash received from sales of goods and services divided by total assets at the beginning of the fiscal quarter.

4.3 Summary Statistics

Table 2 summarizes the descriptive statistics of the variables with the sample size of 671. Capital expenditure is 7% of the total assets on average but can reach as high as 40.3% because of various business operation modes and industry characteristics. The firms also significantly differ in terms of their bank credit. The average bank credit is 24.2% of the total assets and can reach as high as 66.1%, which indicates that different firms have different capital structures or firms in the growth period borrow money from banks, thereby resulting in high liabilities. The size differing among the firms are obvious and are related to their Chinese characteristics. Given that state-owned enterprises serve as the backbone of the national economy, they must bear more policy burden (Lin and Li, 2004) and must be larger than non-state-owned enterprises.

Table 2

Descriptive statistics

Variables	Mean	SD	Min	Median	Max
<i>I</i>	0.070	0.079	-0.054	0.046	0.403
<i>Epu</i>	4.731	0.412	4.174	4.665	5.499
<i>Credit</i>	0.242	0.133	0.006	0.234	0.661
<i>Q</i>	1.616	0.815	0.776	1.324	5.635
<i>CF</i>	0.052	0.085	-0.232	0.050	0.306
<i>Lev</i>	0.544	0.163	0.162	0.550	0.958
<i>Sale</i>	21.853	1.093	19.389	21.757	24.887
<i>Size</i>	0.820	0.581	0.073	0.675	3.214

4.4 The model

Threshold regression models are usually used for addressing the question whether regression functions are identical across all observations in a sample or are falling into discrete classes. Based on the threshold panel model of Hansen (1999) and the previous research about the influence of economic policy uncertainty on investment (Gulen and Ion, 2012; Wang *et al.*, 2014), we propose the following model to analyze how economic policy uncertainty influences investment expenditure through bank credit:

$$I_{it} = \mu_i + \alpha_1 Q_{it-1} + \alpha_2 CF_{it-1} + \alpha_3 Epu_{it-1} + \alpha_4 Credit_{it-1} + \alpha_5 Lev_{it-1} + \alpha_6 Size_{it-1} + \beta_1 * Epu_{it-1} * Credit_{it-1} * I \cdot (Z_{it-1} \leq \gamma) + \beta_2 * Epu_{it-1} * Credit_{it-1} * I \cdot (Z_{it-1} > \gamma) + \varepsilon_{it}$$

where: I_{it} is the capital expenditure, Epu_{it-1} is the economic policy uncertainty in the previous period, and $Credit_{it-1}$ denotes bank credit. Q_{it-1} is measured at the beginning of the period, CF_{it-1} denotes cash flow in the previous period, Lev_{it-1} is the leverage ratio in the previous period, $Size_{it-1}$ is the firm size, $Epu * Credit$ is the cross term of the economic policy uncertainty and bank credit, Z is the threshold variable that represents external demand, and ε_{it} is the error term. $I \cdot$ represents an indicative function that equals to 1 when the condition reaches an instantaneous value and equals to 0 otherwise. μ_i represents the fixed effects and is used for obtaining idiosyncrasy under different conditions.

Since we think the influence of economic policy uncertainty on the investment of firms with different external demand may be heterogeneous across various industries, the threshold panel model is appropriate here for two reasons: 1) the heterogeneous effects correspond to the threshold parameter in the model, thus the existence of the possible heterogeneous effects could be tested in the model; 2) this model relies on data-driven processing to estimate the threshold parameter, which overcomes the possible errors generated by subjective methods, such as median ranking.

5. Empirical Results

5.1 Effects of Economic Policy Uncertainty on Firms with Different Levels of External Demand

Table 3 shows our empirical findings about the effects of economic policy uncertainty on the corporate investment of firms with different levels of external demand through bank credit and also with different characteristics of controlling shareholders. As shown in models (1) to (2), we leave out control variables in model (1) and add control variables in model (2). The threshold value (γ) of external demand is 0.869, which is significant at $P=0.00$. Therefore, the economic policy uncertainty has a threshold effect on the corporate investment of firms with varying levels of external demand through bank credit. The coefficients ($Epu \cdot Credit$) of the cross terms of economic policy uncertainty and bank credit are nonsignificant (t value = -1.289 and -0.349, respectively) regardless of the external demand level of the firms. That is, the effects of economic policy uncertainty on corporate investment through bank credit are nonsignificant. In this study, such uncertainty may be related to the lost macroeconomic variables and cause endogeneity issues, thus affecting the empirical results. We perform the robust checking test in the next section.

Table 3

Overall Effect and Effect under Different Controlling Shareholder of Economic Policy Uncertainty on Corporate Investment through Bank Credit

Independent variable	(1)	(2)	(3)	(4)	(5)	(6)
			State-owned		Non-state-owned	
$Epu \cdot Credit \cdot I(Sale_{it-1} \leq \gamma)$	-0.020 (-1.236)	-0.021 (-1.289)	-0.025 (-1.202)	-0.029 (-1.411)	-0.016 (-0.605)	-0.013 (-0.49)
$Epu \cdot Credit \cdot I(Sale_{it-1} > \gamma)$	-0.004 (-0.260)	-0.006 (-0.349)	-0.011 (-0.510)	-0.015 (-0.740)	0.000 (-0.013)	0.002 (0.088)
<i>Epu</i>	-0.011*** (-2.662)	-0.004 (-0.933)	-0.009 (-1.657)	0.003 (0.569)	-0.015*** (-2.126)	-0.012 (-1.79)
<i>Credit</i>	-0.033 (-0.417)	0.071 (0.912)	-0.001 (-0.011)	0.127 (1.299)	-0.081 (-0.642)	-0.005 (-0.044)
<i>Q</i>		0.008*** (6.316)		0.011*** (5.763)		0.006*** (3.454)
<i>CF</i>		0.062*** (5.347)		0.080*** (5.266)		0.043*** (2.443)
<i>Lev</i>		-0.130*** (-8.621)		-0.129*** (-6.278)		-0.128*** (-5.751)
<i>Size</i>		-0.004 (-1.555)		-0.008* (-1.917)		-0.002 (-0.484)
Threshold value (γ)	0.869***	0.869***	0.850***	0.850***	0.664***	0.664***
P value of threshold	0.03	0.000	0.007	0.010	0.000	0.003

Note: ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

5.2 Effect of Economic Policy Uncertainty on the Heterogeneity of Enterprise Investment

Table 3 shows that the P values of the threshold are less than 0.01 from models (3) to (6), which indicate that all models have significant threshold effects. Models (3) and (4) present the empirical results for state-owned enterprises, and models (5) and (6) present those for non-state-owned enterprises. We leave out control variables in models (3) and (5) and add control variables in models (4) and (6). The coefficients of the cross terms between economic policy uncertainty and bank credit are nonsignificant (t value = -1.411, -0.74, -0.49 and 0.088, respectively) regardless of the external demand level of state-owned and non-state-owned firms.

Table 4 shows the empirical findings about the effects of economic policy uncertainty on the corporate investment of firms with different industries and different degree of financial development through bank credit. The P values of the threshold are less than 0.05 from models (1) to (4), indicating that all models have significant threshold effects. Models (1) and (2) present the empirical results for firms in the manufacturing industry, and models (3) and (4) present the empirical results for firms in the non-manufacturing industry. We leave out control variables in models (1) and (3) and add control variables in models (2) and (4). The coefficients of the cross terms between economic policy uncertainty and bank credit are nonsignificant (t value = -1.481, -0.591, -0.87 and 0.931, respectively) regardless of the external demand level of manufacturing and non-manufacturing industry.

Table 4 indicates that the P values of threshold are less than 0.05 from models (5) to (7), implying that these models have significant threshold effects. Models (5) and (6) present the

empirical results for firms in regions with a high degree of financial development, and models (7) and (8) present the empirical results for firms in regions with a low degree of financial development. We leave out control variables in models (5) and (7) and add control variables in models (6) and (8). The coefficients of the cross terms between economic policy uncertainty and bank credit are also nonsignificant (t value = -1.521, -0.568, -0.585 and -0.139, respectively) regardless of the external demand level of low financial development group and high financial development group.

Table 4

Effect under Different Industries and Different Degree of Financial Development of Economic Policy Uncertainty on Corporate Investment through Bank Credit

Independent variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Manufacturing		Non-manufacturing		High degree of financial development		Low degree of financial development	
$Epu \cdot Credit \cdot I(Sale_{it-1} \leq \gamma)$	-0.036 (-1.548)	-0.034 (-1.481)	-0.013 (-0.579)	-0.020 (-0.870)	-0.025 (-1.221)	-0.03 (-1.521)	-0.022 (-0.797)	-0.016 (-0.585)
$Epu \cdot Credit \cdot I(Sale_{it-1} > \gamma)$	-0.013 (-0.570)	-0.013 (-0.591)	0.029 (1.129)	0.025 (0.931)	-0.006 (-0.286)	-0.011 (-0.568)	-0.009 (-0.312)	-0.004 (-0.139)
Epu	- 0.011*** (-2.035)	-0.007 (-1.245)	-0.012* (-1.804)	0.001 (0.169)	-0.013*** (-2.487)	-0.003 (-0.533)	-0.007 (-0.947)	-0.004 (-0.533)
$Credit$	-0.029 (-0.265)	0.092 (0.858)	-0.043 (-0.389)	0.051 (0.463)	-0.017 (-0.174)	0.108 (1.143)	-0.038 (-0.282)	0.041 (0.305)
Q		0.009*** (5.629)		0.005*** (2.792)		0.008*** (5.033)		0.006*** (3.437)
CF		0.081*** (4.885)		0.037*** (2.381)		0.054*** (3.860)		0.076*** (3.791)
Lev		- 0.167*** (-8.375)		- 0.077*** (-3.429)		-0.128*** (-6.602)		-0.140*** (-5.817)
$Size$		0.001 (0.091)		- 0.012*** (-3.047)		-0.008*** (-2.291)		0.002*** (0.314)
Threshold value(γ)	0.463***	0.463***	2.152**	2.342**	0.869***	0.897***	0.525**	0.524
P value of threshold	0.000	0.000	0.017	0.023	0.000	0.000	0.03	0.063

Note: The t value is bracketed, and ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

6. Robustness Test: Controlling For Endogeneity

The economic policy uncertainty may not be strictly exogenous, since some macroeconomic indicators are unmeasurable or omitted in the model, which might be correlated with the economic policy uncertainty index and cause endogeneity issues. According to Wang et al.

(2014), there is a certain relationship between economic policy uncertainty and the country's political power. Meantime, external shocks are the sources of macroeconomic fluctuations of emerging economies, and their interest rates or exchange rates are easily affected by US monetary policy, so there is a strong correlation between China's economic policy uncertainty and US economic policy uncertainty. Therefore in this study, we use a one-period lag of American economic policy uncertainty as an instrumental variable to solve such problems, since USA is the largest trading partner of China. Table 5 presents the regression results between the China economic policy uncertainty and the one-period lag of American economic policy uncertainty. We use Epu_{it} as the dependent variable. The coefficient of the one-period lag of the American economic policy uncertainty ($EpuA_{it}$) is significant, that is, the China economic policy uncertainty is correlated with the one-period lag of American economic policy uncertainty. And we do the Hausman test, receiving that the P value (0.017) is less than 0.05 which indicates the model have endogeneity issues.

Table 5

Regression Results between the China Economic Policy Uncertainty and the One-period Lag of the American Economic Policy Uncertainty

Independent variable	Estimator	t value
C	0.619***	6.39
Q_{it-1}	0.133***	23
CF_{it-1}	-0.439***	-8.6
$EpuA_{it-1}$	0.539***	39.15
$Credit_{it-1}$	-0.124***	-3.17
Lev_{it-1}	0.159***	4.84
$Size_{it-1}$	0.062***	13.49
F Value	613.5	
R-squared	0.379	

Note: ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

In Table 6, we use an Epu of America as the IV to explore the valid effects under different levels of external demand and different characteristics of controlling shareholders of economic policy uncertainty on the corporate investment of firms through bank credit. As to the other variables, they are fully in line with those shown in Table 3. Models (1) and (2) present the results of different levels of external demand. The interaction term of the firms with low external demand becomes significant. And the coefficient of cross terms between economic policy uncertainty and bank credit (β_1 and β_2) at least one is significant in model (1) and model (2), which indicates the existence of the bank credit channels in hypothesis 1. The coefficient of the cross terms between economic policy uncertainty and bank credit is equal to -0.038 (t value = -2.046) for firms with a low external demand, that is, the economic policy uncertainty significantly weakens the positive effect of bank credit on corporate investment. And the t value is nonsignificant for firms with a high external demand. This circumstance indicates that the economic policy uncertainty significantly restrains the investment of the firms with low external demand through bank credit, but it nonsignificantly affects the firms with high external demand. This is because the higher external demand means that the company's strong profitability in the future will make the company willing to obtain bank loans at a higher cost. On the contrary, for companies with low external demand, the unstable business environment owing to policy uncertainty will make the company's sales revenue more uncertain, reduce its profit confidence, and the company's investment desire will decline. This is consistent with our hypothesis 1. So this circumstance indicates

that the potential endogeneity problem is effectively controlled by adopting the American economic policy uncertainty as an instrumental variable. Moreover, the effects of Tobin's q and cash flow on the dependent variable are significantly positive, because that high external financing costs do not enable companies to obtain the financial support needed for optimal investment. They can only rely heavily on internal financing. At the same time, companies with more growth opportunities have relatively large investment expenditures. The coefficients of leverage and enterprise scale are significantly negative. In other words, the leverage and enterprise scales significantly negatively influence corporate investment.

Table 6

Overall Effect and Effect under Different Controlling Shareholder of Economic Policy Uncertainty on Corporate Investment through Bank Credit (IV Method)

	(1)	(2)	(3)	(4)	(5)	(6)
Independent variable			State-owned		Non-state-owned	
$EpuA \cdot Credit \cdot I(Sale_{it-1} \leq \gamma)$	-0.043*** (-2.293)	-0.038*** (-2.046)	-0.051*** (-2.206)	-0.043** (-1.895)	-0.038 (-1.237)	-0.035 (-1.132)
$EpuA \cdot Credit \cdot I(Sale_{it-1} > \gamma)$	-0.027 (-1.445)	-0.022 (-1.228)	-0.037 (-1.598)	-0.030 (-1.315)	-0.022 (-0.721)	-0.019 (-0.631)
$EpuA$	-0.004 (-0.780)	0.003 (0.482)	-0.003 (-0.473)	0.008 (1.123)	-0.004 (-0.575)	-0.003 (-0.388)
$Credit$	0.074 (0.822)	0.153 (1.728)	0.122 (1.087)	0.198 (1.787)	0.027 (0.185)	0.101 (0.698)
Q		0.008*** (6.412)		0.011*** (5.615)		0.006*** (3.748)
CF		0.062*** (5.340)		0.080*** (5.274)		0.042*** (2.386)
Lev		-0.131*** (-8.604)		-0.129*** (-6.272)		-0.129*** (-5.750)
$Size$		-0.005* (-1.728)		-0.008* (-1.795)		-0.003 (-0.789)
Threshold value (γ)	0.869***	0.869***	0.850**	0.850**	0.664***	0.664***
P value of threshold	0.000	0.000	0.013	0.017	0.000	0.000

Note: ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Models (3), (4), (5), and (6) present the results of different characteristics of controlling shareholders through bank credit. The effects of economic policy uncertainty are heterogeneous across these characteristics. The interaction term of the state-owned enterprises with low external demand becomes significant. The coefficient of cross terms between economic policy uncertainty and bank credit (β_1 and β_2) at least one is significant from model (3) to model (4), which indicates the existence of the bank credit channels in hypothesis 2. It is well known that the State-owned enterprises in China will receive more attention and support from the financial system and thus have more risk exposure of policy uncertainty. The coefficient of the cross terms between economic policy uncertainty and bank credit is equal to -0.043 (t value = -1.895) for state-owned firms with low external demand, that is, the economic policy uncertainty has a high inhibition degree on the investment of state-owned firms with low external demand through bank credit. The state-

owned enterprises are more likely to obtain policy protection and timely access to policy information, so that they can more accurately determine the timing of investment, further, state-owned enterprises with high external demand are willing to invest when they meet the economic policy uncertainty so they may reduce the negative impact the uncertainty brings on corporate investment. However, the effects of economic policy uncertainty on the corporate investment of non-state-owned firms through bank credit are nonsignificant regardless of their external demand level. Therefore, hypothesis 2 is supported. The rest of the coefficients do not show any significant changes.

In Table 7, we use an IV design to explore the valid effects under different industries and different degree of financial development of economic policy uncertainty on the corporate investment of firms through bank credit. As to the other variables, they are fully in line with those shown in Table 4.

Table 7
Effect under Different Industries and Different Degree of Financial Development of Economic Policy Uncertainty on Corporate Investment through Bank Credit (IV Method)

Independent variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Manufacturing		Non-manufacturing		High degree of financial development		Low degree of financial development	
$EpuA \cdot Credit \cdot I(Sale_{it-1} \leq \gamma)$	-0.065*** (-2.547)	-0.054*** (-2.120)	-0.023 (-0.871)	-0.029 (-1.128)	-0.054*** (-2.326)	-0.055*** (-2.426)	-0.040 (-1.281)	-0.029 (-0.935)
$EpuA \cdot Credit \cdot I(Sale_{it-1} > \gamma)$	-0.042 (-1.668)	-0.033 (-1.328)	0.019 (0.655)	0.013 (0.455)	-0.035 (-1.499)	-0.037 (-1.614)	-0.027 (-0.863)	-0.017 (-0.549)
$EpuA$	0.001 (0.089)	0.002 (0.342)	-0.012 (-1.592)	0.002 (0.306)	-0.004 (-0.723)	0.007 (1.052)	-0.001 (-0.065)	-0.001 (-0.064)
$Credit$	0.111 (0.909)	0.192 (1.579)	0.000 (-0.001)	0.097 (0.767)	0.119 (1.086)	0.227*** (2.105)	0.050 (0.324)	0.104 (0.688)
Q		0.009*** (5.670)		0.006*** (2.927)		0.008*** (5.058)		0.007*** (3.492)
CF		0.080*** (4.802)		0.037*** (2.38)		0.054*** (3.866)		0.076*** (3.747)
Lev		-0.168*** (-8.366)		-0.076*** (-3.397)		-0.127*** (-6.542)		-0.140*** (-5.812)
$Size$		-0.002 (-0.414)		-0.011*** (-2.549)		-0.009*** (-2.461)		0.002 (0.303)
Threshold value γ	0.463***	0.463***	2.152**	2.342**	0.869***	0.869***	0.524*	0.524
P value of threshold	0.000	0.000	0.023	0.027	0.000	0.000	0.05	0.067

Note: The t value is bracketed, and ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Models (1), (2), (3), and (4) present the results of the instrumental variable method for firms with different industries. There are significant differences in the capital structure of different industries in China's listed companies, especially between manufacturing and non-manufacturing. The interaction term of the manufacturing firms with low external demand becomes significant, and the rest of the coefficients do not show any significant changes. The coefficient of cross terms between economic policy uncertainty and bank credit (β_1 and β_2) at least one is significant from Model (1) to Model (2), which indicates the existence of the bank credit channels in hypothesis 3. However, the effects of economic policy uncertainty on the corporate investment of non-manufacturing firms through bank credit are nonsignificant regardless of the external demand level. Investment of these industries (utilities, transportation, and financial services, etc.) are regulated by the

government, and not susceptible to uncertain economic policy. This may be related to China's industrial policy. China has long been adhering to the philosophy that manufacturing prospers the country, and the Chinese government has a great support for manufacturing. In general, through bank credit, the economic policy uncertainty significantly reduces the corporate investment of manufacturing firms with low external demand, but nonsignificantly reduces that of non-manufacturing firms regardless of the external demand level. Therefore, hypothesis 3 is supported.

The effects of economic policy uncertainty on the corporate investment of firms through the channel of bank credit are heterogeneous across different financial development areas. Models (5), (6), (7), and (8) present the results of the instrumental variable method. The interaction term of the high financial development group with low external demand becomes significant, and the rest of the coefficients do not show any significant changes. The coefficient of cross terms between economic policy uncertainty and bank credit (β_1 and β_2) at least one is significant from Model (5) to Model (6), which indicates the existence of the bank credit channels in hypothesis 4. The coefficients of the cross terms between economic policy uncertainty and bank credit are nonsignificant (t value = -0.935 and -0.549, respectively) in the low financial development group, that is, the effects of economic policy uncertainty on corporate investment through bank credit are nonsignificant. The enterprises in less economically developed regions facing the information disadvantages as results of policy uncertainty will increase their financing costs. Additionally, banks cannot supervise the enterprises in underdeveloped regions, and such companies have fewer research reports and lower quality, so banks are usually reluctant to lend to them. However, in areas with a high degree of financial development, the economic policy uncertainty has a high inhibition degree on the investment of the firms with low external demand through bank credit. Therefore, hypothesis 4 is supported.

7. Conclusions and Suggestions

We use the data of Chinese listed companies from 2004 to 2013 and the threshold panel model to analyze the influence of economic policy uncertainty on the corporate investment of firms with varying levels of external demand through the bank credit channel. The study on the bank channel shows that:

The influence on firms with low external demand is more obvious than that on firms with high external demand.

The influence is heterogeneous because these enterprises have varying natures of shareholders, different industry characteristics, and regions with varying degrees of financial development. Specifically, (a) the economic policy uncertainty nonsignificantly affects the non-state-owned enterprises, but strongly inhibits the investment of state-owned enterprises with low external demand; (b) the economic policy uncertainty can also significantly inhibit the investment of firms with low external demand in the manufacturing industries, but does not significantly affect the investment of firms with different levels of external demand in the non-manufacturing industries; (c) such effect may also vary across firms located in regions with varying degrees of financial development. The economic policy uncertainty does not significantly affect the investment of firms in regions with a low degree of financial development, but strongly inhibits the investment for firms with low external demand in areas with a high degree of financial development.

From the above results, this study may lead to the following suggestions for policy makers. First, the economic policy uncertainty may change the financing environment of enterprises and their investment. Therefore, the government should consider the negative influence of

economic policy uncertainty and ensure the openness, stability, and durability of such policies. Second, the influence of economic policy uncertainty may also differ depending on the situations of enterprises, such as their nature of shareholders, industry characteristics, and degree of financial development. Therefore, the government should formulate reasonable policies for different types of enterprises. Third, policy makers must consider the negative influence of the delay effect of policies and reduce the brewing time, especially during recession.

The relevant question in this study is whether the economic policy uncertainty in China is sufficiently measured by EPU, since China is a developing country and has a very strict press censorship. How to develop a more suitable measure for China's economic policy uncertainty opens an important avenue for the future research.

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