

The Real Effects of Economic Policy Uncertainty and Financial Constraints on Chinese Firms' Investment

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Abstract: The tough economic situation has ignited lots of study about the effect of economic policy uncertainty and its implications for economics. The paper uses the sample of Chinese listed companies between 2000 and 2018, I research the influence of economic policy uncertainty on Chinese investment. And then I choose a key influencing factor, financial constraint, to study its impact on investment rate considering economic policy uncertainty. The results tell me that both of economic policy uncertainty and financial constraint significantly decrease Chinese companies' investment rate. The results further show that financial constraint alleviates the negative impact of the uncertainty on Chinese investment.

1. Introduction

The expectations about the future economic environment is the foundation for economic agents to make economic decisions, and uncertainty about the future has real influence for economic activity (Bloom, 2009). A mass of literature has proved that uncertainty shock has significantly negative impact on economics. Financial frictions are not only now regarded as an crucial point that magnifies these business cycle shocks, but also can amplify the negative effects of uncertainty (Alessandri and Mumtaz, 2019). Therefore, the standpoint about the magnified mechanism driving finance has received lots of attention.

Financial constraint is one of the most important types of financial frictions, which can impact firms' decision, such as investment and financing decision. Nowadays, China is increasingly concerned about the impact of uncertainty shocks, and Chinese firms are more affected by financial constraint because of less developed financial market than developed countries. And only few literature studies Chinese firms' financial constraint and analyzes how uncertainty shocks affect Chinese firms' investment. Some literature has proved uncertainty shocks have a negative on Chinese listed firms (Wang et al., 2014), it's worthwhile to research how uncertainty shocks affect Chinese listed firms. Thus, I test the correlativity between Chinese economic policy uncertainty, firms' financial constraint and investment using Baker et al. (2016) index to quantify policy uncertainty. The results display that both of economic policy uncertainty and financial constraint negatively relate to investment. Additionally, financial constraint can weaken the negative impact of economic policy

uncertainty on investment.

The economic policy uncertainty indexes built by Baker et al. (2016) are based on news, and Chinese economic policy uncertainty is based on the information of Chinese newspapers. Besides, there are some other proxies of uncertainty, such as VIX index, stock market volatility, disagreements in economic forecasts, and model-based economic uncertainty index built by Jurado et al. (2015). Measures of uncertainty based on newspaper information have become it is a very effective method to observe certain situation at a higher frequency than was allowed previously (Da et al. 2014), therefore, the news-based uncertainty index is widely used. I also use different indexes measuring economic policy uncertainty in robustness tests, my results support the conclusions drawn in the basic equation again.

A number of approaches have been proposed to evaluate the magnitude of firms' financial constraints. The existing measures of firms' financial constraints include KZ index (Baker et al., 2003), the WW index (Whited and Wu, 2006), and the SA index (Hadlock and Pierce, 2010), as the FCP index (Schauer et al., 2019). I will use KZ index, dividend size, interest coverage ratio to construct Chinese listed firms' financial constraint indexes.

The arrangement of my paper is as follows. The second part shows the literature view and develops the important hypotheses. The third part is the dataset and empirical results. The final part is the conclusion.

2. Literature Review

Lots of research has proved that economic uncertainty has a large real impact on economics. And the literature depicts some main transmission mechanisms through which uncertainty has negative impact on economics. Compared to other main mechanisms, including precautionary incentives (Leduc and Liu, 2016; Basu and Bundick, 2017), the investment's irreversibility (Bernanke, 1983; Bloom et al., 2018), labor market frictions (Leduc and Liu, 2016), and Zero Lower Bound of interest rate (Caggiano et al., 2017), the most important mechanism works through financial frictions.

The financial sector not only plays a crucial part in business cycle fluctuations, but also is the key point in the conduction of shocks originating in other parts of the economy (Jermann and Quadrini, 2012). Recent literature think that financial frictions is the most important reason of propagating and exacerbating the uncertainty shocks (Gilchrist et al., 2014; Alessandri and Mumtaz, 2019). Carrière-Swallow and Céspedes (2013) said emerging economies undertake much more severe negative impacts of uncertainty shocks than developed countries and credit channel can explain up to one-half of the increased fall in investment. They also underline the part played by credit constraints in amplifying the effects of uncertainty shocks. Alfaro et al. (2018) exam the finance uncertainty multiplier using the financial constraints as financial friction, and prove that financially constrained firms cut real inputs more intensively than unconstrained firms facing an uncertainty shock.

Lots of the literature has concentrated on the significance of the financial constraint in transmitting uncertainty shocks. Therefore, I use EPU index measuring economic policy uncertainty constructed by Baker et al. (2016) to exam the negative effects of uncertainty shocks on Chinese listed firms' investment. Besides, I also want to test the effects of financial constraint on Chinese listed firms' investment.

3. Data and Sample

In this part, I exhibit my dataset. I research the correlativity between economic policy uncertainty and

Chinese investment that are based on the panel dataset containing 3682 Chinese listed companies between 2000 and 2018.

The data containing investment, financial constraint and control variables are obtained from the China Stock Market Accounting Research (CSMAR) database. The macroeconomic variables are from CEIC database. Since the new third board is a market for the transfer of shares of small and medium-sized enterprises and the quality of enterprises is uneven, I do not consider such companies. The sample mainly includes these companies publicly listed on China A-share market. I exclude some companies that have missing data on key variables. Finally, the unbalanced panel data covering 3,682 listed companies and 37529 observed values are obtained.

I measure the economic policy uncertainty according to the EPU Index constructed by Baker et.al (2016). They measure Chinese economic policy uncertainty by counting the words that mention ‘economic policy uncertainty’ in Hong Kong’s South China Morning Post. The index showed a trend of rising fluctuation from 2000 to 2018(Figure 1).

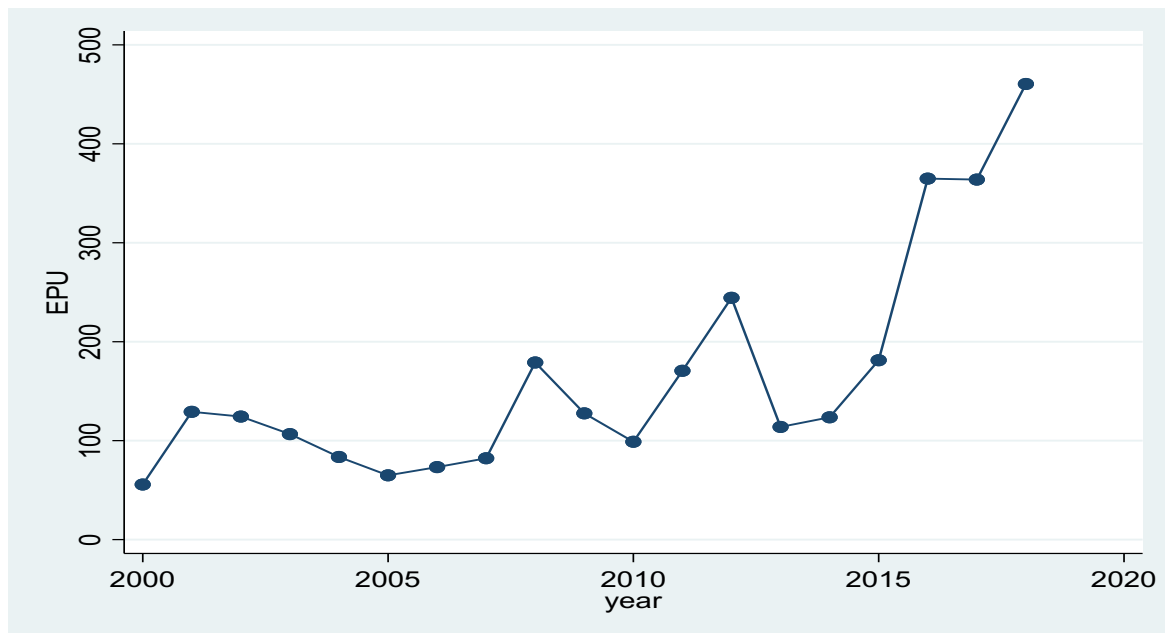


Figure 1: This figure shows Chinese economics policy uncertainty indexes from 2000 to 2018 constructed by Baker et al. (2016).

According the literature about measuring financial constraint (Campello and Chen,2010), and due to the data integrity, I constructed the comprehensive index of financing constraint. I sort firms based on the dividend size, interest coverage ratio and KZ index separately, then rank and divide them into five equal parts and give them a point of 1 to 5 to each group. The composite index results from summing up these three scores. Specifically, the composite underlying ranks in this case take values between 1 and 5 and higher underlying ranks are associated with higher degrees of financial constraints. We can see the concrete description about the variables in the sample from Table 1. The comprehensive index(F_index) ranges from 3 to 15, and the EPU index ranges from 55.69 to 460.5.

Table 1: Descriptive statistics.

VARIABLES	Observations	mean	sd	min	max
I (Investment rate)	37,457	0.0545	0.0574	-0.113	0.749

EPU	37,529	201.7	127.7	55.69	460.5
F_index (Financial Constraint index)	20,293	9.175	2.761	3	15
value	37,529	46.79	619.2	0.1355	27350
TBQ	37,529	2.603	77.77	0.153	14,810
ROA	37,529	-0.0327	11.10	-2,146	108.4
PE	33,503	128.2	2,533	0.302	420,285

4. The Effects of Economic Policy Uncertainty

This section tests the effects of economic policy uncertainty and financial constraint on investment. Before implementing empirical regressions, it is useful to look at correlation between major explanatory variables (Table 2). Though the correlation coefficient between EPU index and financial constraint index is significantly negative, the absolute values are small enough, which means there is no strong collinearity between them, therefore I continue to do more empirical tests in the rest section.

Table 2: Correlation test of core explanatory variables.

	EPU	F_index
EPU	1.000	-0.020***
F_index	-0.020***	1.000

4.1. Methodology

To research the impact of economic policy uncertainty and financial constraint on Chinese listed companies' investment rate, I use panel regression model with fixed effects. This approach is particularly suited to solve the problem of individual differences effectively. Therefore, I estimate the following regression:

$$I_{i,t} = \alpha_i + \lambda_t + \beta * EPU_t + \gamma * F_index_{i,t} + \theta * indexEPU_{i,t} + \delta * X_{i,t} + u_{i,t} \quad (1)$$

My dependent variable, I, equals the sum of fixed assets, intangible assets and other long-term assets purchased by the companies divided by total assets. EPU, which is called explained variable, is the index constructed by Baker measuring economic policy uncertainty; and F_index aim to measure the financial constraints; indexEPU denotes the intersection of the financial constraint and economic policy uncertainty.

Additionally, the core explanatory variable, I include a battery of control variables(X) in my regression model. I include five variables—GDP, enterprise market value(value), Tobin's Q(TBQ), PE ratio(PE), return on asset(ROA)—to control for the change in the underlying economic activity of the companies to ensure that any documented association between economic policy uncertainty and investment rate is due to the presence of the economic policy uncertainty and not a change in economic activity. Also, the two constant terms, α is the control of fixed effects of individual firm; λ denotes time fixed effect.

4.2. Empirical Result

Table 3: The effect of economic policy uncertainty on investment.

	(I)	(II)	(III)	(IV)
	I	I	I	I
EPU	-0.0795*** (-29.31)	-0.0645*** (-10.54)	-0.0251*** (-3.54)	-0.0791*** (-3.16)
F_index		-5.07*** (-16.68)	-4.34*** (-12.09)	-5.16*** (-9.48)
value			-0.0000461** (-2.50)	-0.0000443** (-2.44)
GDP			2.52*** (8.44)	2.53*** (8.50)
TBQ			-0.0969 (-1.26)	-0.101 (-1.31)
PE			-0.000185*** (-6.88)	-0.000188*** (-7.02)
ROA			-0.182 (-0.03)	-0.577 (-0.11)
indexEPU				0.00631** (2.32)
_cons	0.0706*** (128.96)	0.113*** (38.54)	0.0792*** (17.46)	0.0861*** (14.82)
<i>N</i>	37448	20239	17456	17456
<i>R</i> ²	0.036	0.045	0.038	0.039
adj. <i>R</i> ²	0.036	0.045	0.038	0.038

Notes: t statistics in parentheses * p < 0.1, ** p < 0.05, *** p < 0.01

Equation (1) is estimated using OLS method and an unbalanced panel of annual observation of 3682 Chinese listed companies from 2000 to 2018. The first column in Table 3 reports the baseline regression, which only includes the explained variable (investment) and core explanatory variable (economic policy uncertainty index), and I find from the results that investment rate is related to economic policy uncertainty and the relationship is negative and significant. In column II, I add another key variable, financial constraint index(F_index). I obviously find that the negative correlativity between economic policy uncertainty and investment, meanwhile, the coefficient of financial constraint index is also significantly negative. Since the columns (I) and (II) only includes two key variables without any other control variables, I can only observe the correlation roughly, so I will explain the specific economic intuition after adding control variables

In column (III), I add some control variables, including GDP, market value, Tobin's Q, PE and ROA. I see that if the degree of economic policy uncertainty become higher, the investment rate of companies will be smaller. Similarly, the stronger the financial constraint, the smaller the investment rate, and this effect is significant. The effects of economic policy uncertainty and financial constraint on investment are consistent with column (II).

The last column of the table 3, I introduce the interaction term of economic policy uncertainty and

financial constraint index, I can see from the test results that although the two indexes show strong negative relationship, the intersection coefficient is significantly positive, that indicates that financial constraint alleviates the negative influence of economic policy uncertainty on Chinese investment, even when the uncertainty increases, companies with stronger financial constraint have a high willingness originally to invest but don't have enough resources, thus their investment rate decrease less. And companies with smaller financial constraints are likely to face the situation that the growing uncertainty brings the increased cost of financing. As a result, the greater economic policy uncertainty results in companies with weak financial constraint reducing investment due to the increase of the cost of capital investment and even giving up good investment opportunities. On the contrary, companies with smaller financial constraint will have a smaller decrease of investment when they face better investment opportunities.

4.3. Robustness Checks

4.3.1. Different Measures of Economic Policy Uncertainty

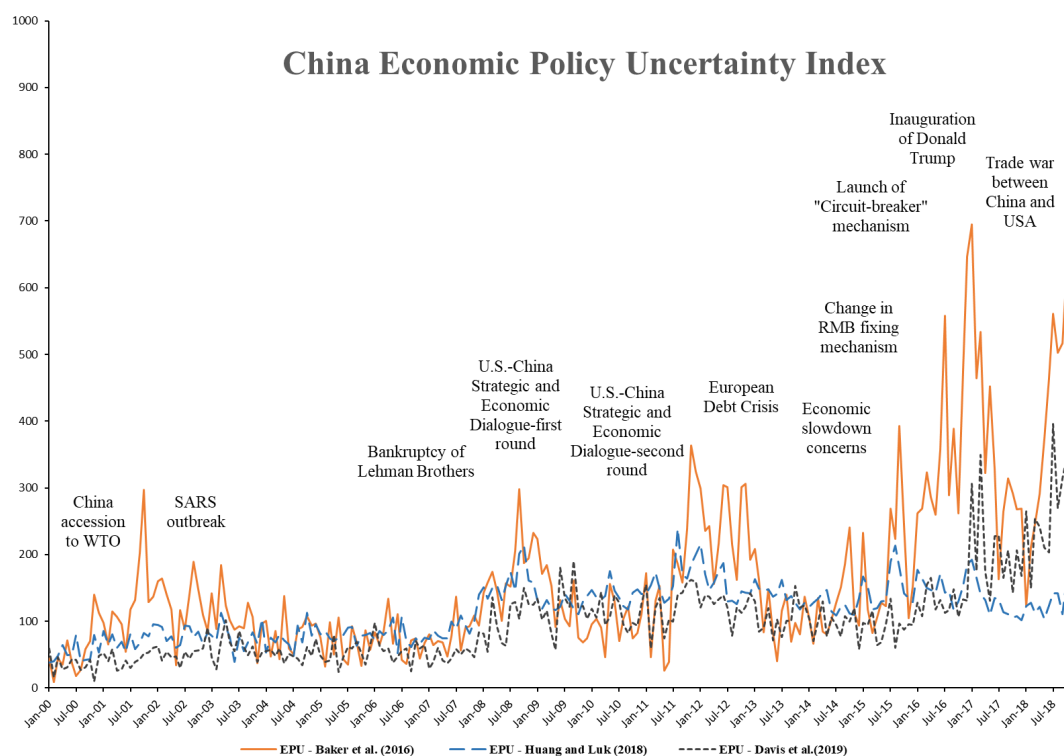


Figure 2: Several China Economic Policy Uncertainty Indexes between January 2000 and December 2018. This figure shows several China economics policy uncertainty indexes built by Baker et al. (2016), Huang and Luk (2019), Davis et al. (2019), respectively.

In addition to the EPU index (Bloom et al.,2016), we also do a robustness test using other measures for policy uncertainty. Several China Economic Policy Uncertainty Indexes between January 2000 and December 2018 are plotted in Figure 1, which shows that EPU index is more volatility than other indexes. As the EPU index (Bloom et al.,2016) is generated from texted-based analysis from a Hong Kong-based English newspaper, the South China Morning Post, which maybe cause some problems. The Hong Kong-based newspaper tends to care about the Hong Kong economy, as a result, it can not

totally reflect the real situation of China's economic policy uncertainty. Besides, if this paper only use one newspaper, the different editorial policies or preference will generate enormous impact, and it won't be easy to built uncertainty index by policy category. Therefore, there are two policy uncertainty about China are constructed by Huang and Luk (2019) and Davis, Liu and Sheng (2019).

Huang and Luk (2019) select 10 newspapers with the most complete data and published in major cities of China from the huike news database and make statistics on articles that relate to economy uncertainty and policy in newspapers, and summed them up into the economic policy uncertainty index. The index built by Davis, Liu and Sheng and they choose three keywords including economic, policy and uncertainty. The articles are divided by month and count if they include one of the three keywords.

These indexes have a similar trend and reflect some key domestic policy changes, including China accession to WTO, SARS outbreak, the unanticipated RMB depreciation, change in fixing mechanism and international capital flight during 2015, and the failed plan of the "circuit-breaker" mechanism in 3 of economic policy uncertainty, companies with high financial constraint will decrease investment less (Table 4, column (II)(IV)). I can easily find the robustness test results basically consistent with the results of equation (1).

4.3.2. Addressing Endogeneity Bias

Table 4: The effect of economic policy uncertain from on investment.

	(I)	(II)	(III)	(IV)
	EPU(Yun Huang et al.)		EPU(Davis et al.)	
EPU_H	-0.0554*** (-3.49)	-0.176*** (-3.07)		
EPU_D			-0.00653 (-0.43)	-0.126** (-2.32)
F_index	-4.26*** (-11.86)	-5.94*** (-7.01)	-4.34*** (-12.06)	-5.63*** (-8.36)
value	-0.0000464** (-2.52)	-0.0000443** (-2.45)	-0.0000516*** (-2.66)	-0.0000499*** (-2.62)
GDP	2.85*** (10.62)	2.85*** (10.65)	2.93*** (10.87)	2.94*** (10.91)
TBQ	-0.0899 (-1.17)	-0.0963 (-1.26)	-0.0977 (-1.27)	-0.102 (-1.33)
PE	-0.000190*** (-6.82)	-0.000187*** (-6.93)	-0.000183*** (-6.97)	-0.000180*** (-7.07)
ROA	1.42 (0.26)	1.13 (0.21)	-0.304 (-0.06)	-0.678 (-0.13)
indexEPU_H		0.0139** (2.30)		
indexEPU_D				0.0137** (2.35)

_cons	0.0790*** (17.94)	0.0937*** (11.32)	0.0727*** (16.84)	0.0839*** (12.45)
<i>N</i>	17456	17456	17464	17464
<i>R</i> ²	0.039	0.040	0.038	0.038
adj. <i>R</i> ²	0.039	0.039	0.037	0.038

Note: *t* statistics in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

5. Conclusion

As recovering of the economy and trade wars create new turmoil, economic policy uncertainty is starting to rise. Meanwhile, lots of firms are influenced by the risks of the crisis and trade wars, the relationship between economic policy uncertainty and Chinese investment attract increasing attention from scholars.

In this paper, using 3682 Chinese listed companies' data between 2000 and 2018, I test the effect of economic policy uncertainty on Chinese investment rate and the relationship between financial constraint and Chinese investment rate. I further try to study the influence of financial constraint on Chinese investment rate with the change of economic policy uncertainty.

I find that the companies always lower investment rate while economic policy uncertainty rises. Additionally, the financial constraint generates an affect which is significant on firms' investment. However, if added the intersection of economic policy uncertain and financial constraint, the coefficient is significantly positive. It suggests that high degree of financial constraint can alleviates the negative impact Chinese investment from economic policy uncertainty.

I then do robustness tests using different indexes measuring economic policy uncertainty, I can see the negative effect of economic policy uncertainty and financial constraint on investment from the results. And the intersection of them is positive significantly, which supports the results of equation (1).

This finding does not imply that companies should not undertake economic policy uncertainty, but it suggests an additional reason for caution. companies which are greatly affected by economic policy uncertainty should adjust financial constraint's degree in a manner that achieves the best investment behavior. But the degree of financial constraint is often beyond the control of individual companies, it is better for the next study to find the channel of achieving the best investment behavior by changing the degree of financial to adapt the increased economic policy uncertainty. I predict these studies should include the banking behavior, consuming behavior and even individual investment concept.

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