

Macro-Economic Uncertainty, Capital Structure and Corporate Investment

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ABSTRACT

The capital structure and Investment of enterprises is the basis for the existence and development of them. However, there are many unstable factors in Chinese macro-economy. Our research shows that macro-economic uncertainty has a significant effect on the relationship between Capital structure and Corporate investment (RCSCI in brief). The increasing of uncertainty can decrease the positive effect of capital structure on investment. The research also shows that both state-owned enterprises and financial enterprises' RCSCI are less sensitive to the Macro-economic uncertainty so we eliminated these two sorts of companies.

Keywords: *finance, accounting, corporate finance*

1. INTRODUCTION

With the development of global economy, enterprises are facing more and more fierce competition and challenges. So it is very important for enterprises to have good capital structure and investment management. In order to get higher profits, it is highly necessary for companies to understand how macro-economic uncertainty affect the relationship between their capital structure and investment so that they can correct decision in the appropriate time.

The financial theory shows that the increase of macro-economic uncertainty makes it difficult for the company to form a stable forecast for the future economic trend, this prompt the company to change the investing behaviour and their capital structure. In the exiting research, Keynes(1936) highlighted that when firms forecast the rate of return on investment, they will deliberate the level of macro-economic uncertainty. The higher the uncertainty, the greater the risk implicit in the companies' investment, so the demand for investment will be lower. Another argument is that Beaudry(2001) said higher macro-economic uncertainty leads to a lower rate of investment. But as the money supply becomes more and more predictable, the companies' expected earnings will also be more predictable, which eventually leads to higher investment. The classic theory also told that macro-economic uncertainty influences enterprises' financing as well. Moreover, Modigliani and Miller(1958) believed that in a perfect market, the external capital and internal capital of an enterprise could be completely replaced, so the investment behavior was not affected by the financial status of the company, but only related to the investment demand of the enterprise. But in fact, there will never be a perfect market and a lot of research (Bernanke,1989; Gertler, 1990; Gertler,1992) both show that financing has a significant impact on investment.

So how should firms change their financing and investing strategy under different macro-economic uncertainty? What is the relationship between the enterprises' capital structure and their investment? How macro-economic uncertainty influence these relationships? The extant researches mostly focus on how the uncertainty impacts companies' capital structure or investment. However, the research on the combination of macro-level and micro level is lacking. Our contribution is to solve those three questions with some detailed data of Chinese listed companies and to help enterprises to make the correct decision in financing and investing.

2. SAMPLE, VARIABLES AND SUMMARY STATISTIC

We start our sample with all the listed Chinese firms in the CSMAR database during the years 2002-2018. We exclude financial firms and utility firms because their balance sheet is always higher than others and was less sensitive to the macro-economic uncertainty. We winsorize each of the accounting variables at the top and bottom 1% to reduce the influence of outliers.

2.1. Sample and Firm-Level Variables

The enterprise-level variables are as follows:

Size. We measure companies' size with the natural logarithm of their total assets. We choose this measure because it is the broadest possible measure of companies' size.

Tobin's q(q). We measure Tobin's q with total assets value divided by total market value.

MB. The ratio of market value to book value.

Lev. Assets liability ratio of enterprises.

Stock(S). Inventory of the current quarter divided by total assets of the preceding quarter.

Roa. Return on investment ((pre-tax profit/total investment) *100%).

Accounts(A). Receivables of the current quarter are divided by the total assets of the former quarter.

Em1. Total assets divided by total liabilities.

Em2. Short term net assets liability ratio.

Em3. Short term total assets liability ratio.

Em4. Long term net assets liability ratio.

Em5. Long term total assets liability ratio.

Firm Investment(I). (Net fixed value of the current quarter - Net fixed value of the preceding quarter + construction in process) divided by Net fixed value of the preceding quarter.

2.2. Measuring macro-economic uncertainty.

Mu1. We use Mu1 to measure the level of macro-economic uncertainty. We use GRACH(1,1) model to measure the conditional variance of the quarterly rate of change in the GDP of China, all scaled by lagged data. The GRACH(1,1) model is as follows.

$$m_i = \alpha_0 + \alpha_i \sum_{i=1}^n m_{t-i} + e_i \quad (1)$$

$$h_i = r_0 + r_1 e_{i-1}^2 + r_2 h_{i-1} \quad (2)$$

In these two functions, m is the logarithmic first-order difference of macro-economic variables and e is the error term. H is the conditional variance of the error term estimated by the GRACH(1,1) model. According to the equation (1) and (2), we measure the quarterly real GDP change rate of China by GRACH(1,1) model and then we do the first-order autoregression analysis. The conditional variance obtained by the GRACH(1,1) model is used as the measurement index of the macro-economic uncertainty of China.

3. THE RELATIONSHIP BETWEEN ENTERPRISES' CAPITAL STRUCTURE AND INVESTMENT

3.1. Regression Framework

In these sections of the paper, we developed our regression framework. Consider a cross-sectional, quarterly regression of capital structure scaled by lagged data on contemporaneous investment:

$$\frac{I_{i,t}}{A_{i,t-1}} = \alpha_i + \alpha_i + \beta_1 \times EM_i + \beta_2 \times (EM_i \times MU_i) + \beta_3 \times Lev_{i,t-1} + \beta_4 \times LSD_{i,t-1} + \beta_5 \times S_{i,t-1} \quad (3)$$

$$+ \beta_6 \times MB_{i,t-1} + \beta_7 \times Size_{i,t-1} + e_i$$

In equation (1), investment is unknown when q(t-1) and A(t-1) was measured, so q(t-1) and A(t-1) might not accurately predict investment in year t. And because our research focuses on how capital structure impact the investment of the same firms, so we use PSM method to control those variables which are independent of capital structure. The variables are introduced in Table I.

TABLE 1. SAMPLE DESCRIPTIVE STATISTIC

variable	N	mean	sd	min	p50	max
EM1	100000.00	0.047	0.046	0.000	0.033	0.211
EM2	100000.00	0.045	0.051	0.000	0.027	0.252
EM3	97000.00	0.028	0.030	0.000	0.018	0.143
EM4	100000.00	0.023	0.028	0.000	0.016	0.184
EM5	96000.00	0.045	0.058	0.000	0.027	0.435
tobinqa	120000.00	2.225	1.988	0.215	1.628	11.367
Fin	110000.00	0.177	0.137	-0.056	0.173	0.409
tobinqb	120000.00	2.418	2.225	0.224	1.738	12.765
tobinqc	120000.00	2.681	1.927	0.907	2.061	11.857
tobinqd	120000.00	2.908	2.181	0.935	2.201	13.403
mb	120000.00	0.879	0.818	0.088	0.614	4.648
LSDebt	93000.00	1.818	5.480	0.000	0.275	42.105
accounts	110000.00	0.090	0.074	0.001	0.071	0.368
stock	110000.00	0.167	0.154	0.000	0.129	0.778
size	120000.00	21.767	1.264	19.206	21.605	25.696
lev	120000.00	0.448	0.217	0.045	0.447	1.013
roa	120000.00	0.024	0.036	-0.106	0.018	0.148
MU1	120000.00	0.835	0.400	0.384	0.650	1.963
soe	110000.00	0.465	0.499	0.000	0.000	1.000

Table I reports summary statistics for the primary variables used in this study. EM is the variable to measure the assets liability ratio under different circumstances. Tobin's q is measured by total assets value divided by total market value. It is used to show the firm investment. (Here we use tobinqa to represent the investment.) If q>1, the market value of company is higher than the replacement cost of capital. As a result, enterprises will tend to spend more money in investing. If q<1, the result will be opposite to the former. MB shows the ratio of market value to book value. Lev shows the assets liability scale of firms. Accounts is the variable to describe companies' receivables and it is the current quarter divided by the total assets of the former quarter. We measure companies' size with the natural logarithm of their total assets. Roa is pre-tax profit divided by total investment and MU1 is used to measure the macro-economic uncertainty. We defined Investment as the Net fixed value of the current quarter minus the Net fixed value of the preceding quarter and then plus the construction in process, eventually use the former result divided by Net fixed value of the preceding quarter. All of these variables are scaled by lagged assets.

3.1.1. Empirical Findings

3.1.1.1. Mean Difference Comparison

In Table II, the datum shows the gap of investment opportunity between the enterprises with high capital structure and low capital structure. G1(0) are the groups of lower capital structure and G2(1) are the groups of higher asset-liability ratio. We use 5 ways to measure the capital structure. (Can be found at the former of our essay.) The graph reports that no matter what methods we use to define the capital structure, the groups consist of firms with higher capital structure always have stronger trends to do investment. And because the result of the differences of investment tendency are all significant at 1%, we purpose that the level of capital structure might have a positive influence on investment. (*Significant at 10%, **Significant at 5%, ***Significant at 1%)

TABLE 2. MEAN DIFFERENCE COMPARISON

Variables	G1(0)	Mean1	Mean2	MeanDiff
tobinqa (EM1)	27229	2.131	2.283	-0.151***
tobinqa (EM2)	27231	2.056	2.573	-0.517***
tobinqa (EM3)	25568	1.818	2.647	-0.829***
tobinqa (EM4)	26954	2.217	2.308	-0.091***
tobinqa (EM5)	25303	2.168	2.270	-0.102***

3.1.1.2. The Basic Regression

Table III is the basic regression of the research. The dependent variable is an investment. See Table I for variable definitions. For the basic regression formula, see equation (1). All regressions include firm and year fixed effects. From the combination of the graph and the regression, we conclude that when the level of macro-economic uncertainty goes higher, the influence of capital structure on investment will be slightly decreased. And if the macro-economic uncertainty is at the same level, the higher the assets liability ratio is, the more investment firms will make. Standard errors are clustered on both firm and year. Robust t-statistics are reported in the parentheses. (*Significant at 10%, **Significant at 5%, ***Significant at 1%, because of the compatible issues, standard errors are shown in the second line of each variable.)

Table III reports estimates of equation (1) in which investment in the dependent variable. In the fourth model, which uses EM4 and EM2MU1 to measure the capital structure and the macro-economic uncertainty, both EM4, Lsdebt and Constant are positive and significant. And both EM4MU1, MB and Size are negative and significant, consistent with the findings in previous studies (e.g., Wang Yizhong, Frank M. Song(2014)). The EM4 coefficient is 10.84 (standard deviation (SD))=2.047), so the regression shows that a 1-SD increase in EM2 results in a 22.19 increase in investment. Investment (tobinqa) has a mean value of 2.225, so this denotes an increase of 32.1%. The EM4MU1 (interaction of capital structure defined by EM4

and macro-economic uncertainty) coefficient is -8.989 (standard deviation (SD) =2.648), showing that a 1-SD increase in EM4MU1 lead to a 23.80 decrease in total investment, which is about a 31.8% decrease. These report that the assets liability ratio has a positive and significant relationship with the firms' investment while the macro-economic uncertainty can negatively affect these relationships. That means the higher the economic uncertainty is, the smaller the capital structure investment coefficient is.

In the other regressions, we use different ways to measure the capital structure. (The definitions of each EM can be found at I. Sample, variables and summary statistic of our essay.) All of the regressions report the same relation of the variables witch eventually matches our findings.

3.2. Regression Testing.

3.2.1. Variables Controlled

In this part, we control the variables and find out those enterprises with a similar datum at other aspects except the capital structure. That means we want to show how the macro-economic uncertainty impacts the relationship between capital structure and investment visually. After controlling other variables, the sample size has a decrease of about 50000. These make our research become clearer and reduce the error caused by other samples. (*Significant at 10%, **Significant at 5%, ***Significant at 1%, because of the compatible issues, standard errors are shown in the second line of each variable)

$$I_{i,t} = \alpha_i + \alpha_t + \beta_1 \times EM_i + \beta_2 \times (EM_i \times MU_i) + e_i \quad (4)$$

Using equation (2). We found that all EM1 to EM5 has a positive relationship with investment and both EM2 and EM4 are significant. In the fourth regression of the Table IV, which uses EM4 to measure the asset-liability ratio and use EM4MU1 to measure the macro-economic uncertainty. The EM4 coefficient is 7.479 (standard deviation (SD)=1.757), so this regression shows that in enterprises which have similar datum in other aspects but just different in capital structure, a 1-SD increase in EM4 lead to a 13.14 increase in investment. It reports a 30.8 % increase. The EM4MU1 coefficient is -5.115 (standard deviation(SD)=2.147)), showing that a 1-SD increase in EM4MU1 results in a 10.98 decrease in investment, which is about a % decrease. Although in regression (1), regression (3) and regression (5) the EM1MU1, EM3MU1 and EM5MU1 all have a positive relation with investment; they are all insignificant. Combining with the result of Table III, we find that the reliable significant results all report a negative The basic Regression correlation between EM(n)MU1 and investment. (The definitions of each EM can be found at I. Sample, variables, and summary statistic of our essay.)

TABLE 3. BASIC REGRESSION

	inv1	inv2	inv3	inv4	inv5
EM1	1.558				
	7.32				
EM1MU1	9.985				
	14.62				
EM2		6.344***			
		1.719			
EM2MU1		-2.936			
		2.133			
EM3			1.026		
			16.45		
EM3MU1			24.61		
			30.55		
EM4				10.84***	
				2.047	
EM4MU1				-8.989***	
				2.648	
EM5					3.425
					2.86
EM5MU1					0.623
					5.017
MB	-1.113***	-1.113***	-1.079***	-1.114***	-1.116***
	0.227	0.223	0.228	0.223	0.238
Lsdebt	0.01013***	0.0107***	0.00919***	0.00920***	0.0105***
	0.00333	0.00278	0.0028	0.00288	0.00333
Accounts	-2.649	-2.866	-3.078	-2.781	-3.144
	2.25	2.385	2.527	2.401	2.672
Stock	-1.885	-1.463	-1.187	-1.517	-1.545
	1.273	1.021	0.889	1.038	1.09
Size	-0.349***	-0.453***	-0.331***	-0.467***	-0.442***
	0.0843	0.157	0.0828	0.166	0.155
Lev	2.306	2.857	2.257	2.961	3.026
	2.027	2.474	2.036	2.526	2.589
constant	9.641***	11.92***	9.031***	12.28***	11.62***
	1.406	2.918	1.373	3.101	2.822
Firm fixed effects	yes	yes	yes	yes	yes
Year fixed effects	yes	yes	yes	yes	yes
N	82285	82295	78477	81574	77783
r2	0.00415	0.00356	0.00463	0.00354	0.00343

TABLE 4. VARIABLES' CONTROLLED

	inv1	inv2	inv3	inv4	inv5
EM1	0.117				
	10.04				
EM1MU1	18.75				
	23.04				
EM2		3.803**			
		1.491			
EM2MU1		-1.934			
		1.177			
EM3			-6.867		
			19.55		
EM3MU1			31.37		
			34.53		
EM4				6.637**	
				2.898	
EM4MU1				-4.86***	
				3.8	
EM5					0.972
					3.763
EM5MU1					3.338
					6.58
invmills1			3.332	7.5	4.311
			2.927	6.494	4.657
constant	13.34***	14.81**	3.247	-6.715	5.134
	3.004	6.15	3.462	12.43	3.206
Control variables	yes	yes	yes	yes	yes
Firm fixed effects	yes	yes	yes	yes	yes
Year fixed effects	yes	yes	yes	yes	yes
N	31412	30230	74234	79055	75629
r2	0.00431	0.00239	0.00423	0.00317	0.00308

3.2.2. Sample Selection Bias Analysis

In this part of our essay, we analyse the sample selection bias and use invmills1 values to find out that if our research has these problems. We deduce that the sample selection bias of our paper might come from the sorts of firms that we choose. That is because our datum is gained from CSMAR database which only includes the datum of listed companies. It means the datum we use may all consist of high-capital-structure companies because listed firms tend to do more financing than others. Following (James J. Heckman 1979), we use invmills1 values to measure whether there is sample selection bias in our research. If invmills1 values are significant, it means there is a sample selection bias in our study. If not, it means our sample selection can represent the entirety. (*Significant at 10%, **Significant at 5%, ***Significant at 1%)

We set up control groups. In regression (1) and (2), we have not put the invmills1 values into regression but in regression (3) to (5), we do so. Although we put the invmills1 values into regression (4) and have not put it into regression (2), the coefficient of EM(n) is both positive and significant while that of EM(n)MU1 are both negative. And the invmills1 values of regression (3) to (5) are all not significant. As a result, we think there is no sample selection bias in our study. (The definitions of each EM can be found at I. Sample, variables, and summary statistic of our essay.)

COMPARING THE FOURTH REGRESSION OF TABLE IV AND TABLE V, WE FIND THAT THE HIGHER THE LEVEL OF MACRO-ECONOMIC UNCERTAINTY IS, THE LOWER THE EM COEFFICIENT WITH THE INVESTMENT WILL BE. IN TABLE IV, EM4 COEFFICIENT IS 7.479, WHILE EM4MU1 COEFFICIENT IS -5.115, SO THAT THE MU1 COEFFICIENT IS -0.68. IN TABLE V, EM4 COEFFICIENT IS 6.637 WHILE EM4MU1 COEFFICIENT IS -4.86, SO THAT THE MU1 COEFFICIENT IS -0.73. THAT MEANS THE HIGHER MU1 COEFFICIENT IS, THE LOWER EM4 COEFFICIENT WILL BE.

TABLE 5. SAMPLE SELECTION BIAS ANALYSIS

	inv1	inv2	inv3	inv4	inv5
EM1	0.117				
	10.04				
EM1MU1	18.75				
	23.04				
EM2		3.803**			
		1.491			
EM2MU1		-1.934			
		1.177			
EM3			-6.867		
			19.55		
EM3MU1			31.37		
			34.53		
EM4				6.637**	
				2.898	
EM4MU1				-4.86***	
				3.8	
EM5					0.972
					3.763
EM5MU1					3.338
					6.58
invmills1			3.332	7.5	4.311
			2.927	6.494	4.657
constant	13.34***	14.81**	3.247	-6.715	5.134
	3.004	6.15	3.462	12.43	3.206
Control variables	yes	yes	yes	yes	yes
Firm fixed effects	yes	yes	yes	yes	yes
Year fixed effects	yes	yes	yes	yes	yes
N	31412	30230	74234	79055	75629
r2	0.00431	0.00239	0.00423	0.00317	0.00308

3.2.3. Intervening Analysis of ROA

In this section, we discuss how the capital structure has an influence on investment. We try to find out how the capital structure make an influence on firms' investment by impacting the rate of capital return. This means we deduce that the higher the capital structure is, the higher the capital return will be, and the higher the ROA will be, the more investing the enterprises will make. In Panel A, we will talk about if the capital structure has a dominant relationship with the ROA. And then, in Panel B, we will discuss if the ROA has a positive and significant relationship with investment to prove that the capital structure impacts the investment by making a difference to the ROA. And we use regression to measure if the ROA has a dominant relation with the macro-economic uncertainty. If not, the conclusion that the capital structure makes an influence on investment via the ROA will be proved. (*Significant at 10%, **Significant at 5%, ***Significant at 1%, because of the compatible issues, standard errors are shown in the second line of each variables.)

The graph reports that all the measurements of capital structure are positive and significant to the ROA. And from the former Tables, we have concluded that the capital structure has a positive and significant relationship with investment. So we deduce that the capital structure might impact the investment by making a difference in the ROA.

PANEL A. INTERVENING ANALYSIS OF ROA (1)

	inv1	inv2	inv3	inv4	inv5
EM1	2.293*				
	1.301				
EM1MU1	-0.670				
	1.405				
EM2		1.825*			
		1.071			
EM2MU1		0.206			
		1.202			
EM3			5.172*		
			2.807		
EM3MU1			0.439		
			2.662		
EM4				3.697*	
				2.057	
EM4MU1				-1.661	
				2.177	
EM5					2.025**
					1.023
EM5MU1					-0.941
					1.077
constant	4.877***	4.869***	4.620***	5.055***	4.965***
	0.584	0.579	0.579	0.581	0.599
Year fixed effects	yes	yes	yes	yes	yes
Firm fixed effects	yes	yes	yes	yes	yes
N	39565	39566	38215	38935	37618
r2	0.314	0.316	0.327	0.312	0.315

PANEL B. INTERVENING ANALYSIS OF ROA (2)

	tobinqa1	tobinqa2	tobinqa3	tobinqa4	tobinqa5
EM1	5.302***				
	0.86				
EM1MU1	-3.198***				
	1.021				
EM2		6.565***			
		0.78			
EM2MU1		-4.001***			
		0.86			
EM3			12.36***		
			1.617		
EM3MU1			-4.302**		
			1.737		
EM4				9.761***	
				1.498	
EM4MU1				-8.002***	
				1.742	
EM5					4.629***
					0.665
EM5MU1					-3.489***
					0.761
roa	5.044***	4.493***	5.137***	4.499***	4.182***
	1.517	1.548	1.419	1.595	1.55
roaMU1	-0.621	-0.189	-0.694	-0.000305	0.315
	1.794	1.858	1.716	1.918	1.88
Firm fixed effects	yes	yes	yes	yes	yes
Year fixed effects	yes	yes	yes	yes	yes
N	82285	82295	78477	81574	77783
r2	0.366	0.371	0.385	0.365	0.367

In the first regression, the EM1 coefficient is 0.0186 (standard deviation (SD)=0.00696), so this regression shows that a 1-SD increase in EM4 leads to a 12.98% increase in the ROA. In the other regressions, EMn always has a positive and significant relation with the ROA. Although the coefficients are no so big that we can

conclude the capital is the dominant factor acting on the ROA, it does have a strong correlation between them. In Panel B, the term ROA and ROAMU1 are put into the basic regression in order to show the relationship between ROA and investment. The term ROAMU1 is used to show the relationship between ROA and MU1. In all of the five regressions, ROA terms are positive and significant with Tobinqa terms. All of ROA terms are significant at 1% and all of roaMU1 terms are not significant with Tobinqa terms. This phenomenon means that the capital structure affect firms' investment by influencing ROA, regardless of the level of the macro-economic uncertainty.

3.2.4. Intervening Analysis of Financing Constraints

In this section, we continue to discuss how capital structure affect investment. We use financing constraints as mediating variable. This means, the higher the capital structure is, the higher the capital return will be, and the higher the ROA will be, the more the firm will invest. In Panel F, we will talk about if the capital structure has a dominant relationship with the ROA. And then in Panel G, we will discuss if the ROA has a positive and significant relationship with investment to prove that the capital structure impact the investment by make a difference to the ROA. And we use a regression to measure if the ROA has a dominant relation with the macro-economic uncertainty. If not, the conclusion that the capital structure makes an influence on investment via the ROA will be proved. (*Significant at 10%, **Significant at 5%, ***Significant at 1%, because of the compatible issues, standard errors are shown in the second line of each variables.)

PANEL C. INTERVENING ANALYSIS OF FINANCING CONSTRAINTS (1)

	tobinqa1	tobinqa2	tobinqa3	tobinqa4	tobinqa5
EM1	3.428***				
	0.917				
EM1MU1	-1.043***				
	0.053				
EM2		4.781***			
		0.777			
EM2MU1		-1.732**			
		0.862			
EM3			9.340***		
			1.697		
EM3MU1			-0.895***		
			0.849		
EM4				6.470***	
				1.457	
EM4MU1				-3.792**	
				1.587	
EM5					3.181***
					0.666
EM5MU1					-1.649**
					0.739
GFin	1.270***	1.098***	1.236***	1.120***	0.969***
	0.352	0.367	0.332	0.377	0.363
GFinMU1	-1.168***	-1.075***	-1.132***	-1.021***	-0.887***
	0.303	0.332	0.296	0.34	0.338
Firm fixed effects	yes	yes	yes	yes	yes
Year fixed effects	yes	yes	yes	yes	yes
N	82196	82206	78397	81485	77703
r2	0.361	0.367	0.381	0.36	0.361

PANEL D. INTERVENING ANALYSIS OF FINANCING CONSTRAINTS (2)

	inv1	inv2	inv3	inv4	inv5
EM1	2.293*				
	1.301				
EM1MU1	-0.670				
	1.405				
EM2		1.825*			
		1.071			
M2MU1		0.206			
		1.202			
EM3			5.172*		
			2.807		
EM3MU1			0.439		
			2.662		
EM4				3.697*	
				2.057	
EM4MU1				-1.661	
				2.177	
EM5					2.025**
					1.023
EM5MU1					-0.941
					1.077
constant	4.877***	4.869***	4.620***	5.055***	4.965***
	0.584	0.579	0.579	0.581	0.599
Year fixed effects	yes	yes	yes	yes	yes
Firm fixed effects	yes	yes	yes	yes	yes
N	39565	39566	38215	38935	37618
r2	0.314	0.316	0.327	0.312	0.315

PANEL E. STATE OWN ENTERPRISES

	GFin1	GFin2	GFin3	GFin4	GFin5
EM1	0.0637***				
	0.0215				
EM2		0.195***			
		0.0235			
EM3			0.0252		
			0.0474		
EM4				0.273***	
				0.0479	
EM5					0.159***
					0.0221
constant	-0.464***	-0.460***	-0.462***	-0.455***	-0.461***
	0.032	0.0323	0.033	0.0325	0.0329
Year fixed effects	yes	yes	yes	yes	yes
Firm fixed effects	yes	yes	yes	yes	yes
N	82196	82206	78397	81485	77703
r2	0.294	0.299	0.298	0.296	0.301

PANEL F. PANEL F. PRIVATE ENTERPRISES

	inv1	inv2	inv3	inv4	inv5
EM1	8.767***				
	13.96				
EM1MU1	-18.63**				
	32.85				
EM2		5.623**			
		1.676			
EM2MU1		-3.151**			
		1.993			
EM3			-22.25		
			41.38		
EM3MU1			47.70		
			23.94		
EM4				10.59***	
				2.138	
EM4MU1				-10.01***	
				1.459	
EM5					-0.823
					2.596
EM5MU1					8.099
					10.49
constant	9.311***	15.83***	7.071**	16.68***	15.03***
	1.821	5.064	3.201	5.781	4.539
Year effects	fixed	yes	yes	yes	yes
Firm effects	fixed	yes	yes	yes	yes
N	40179	40186	38088	40120	38011
r2	0.00404	0.00290	0.00506	0.00290	0.00293

In this section, we try to find out if financing constrains make an influence on investment. This means we think financing constrains may also the mediating variable between capital structure and investment. In Panel C, the first, second, fourth and fifth regression all show that the capital structure has a positive and significant correlation with financing constrains. And all of them are significant at 1%, thus, we come up with a hypothesis that the capital structure affect investment by make an influence on financing constrains.

To formulate our hypothesis, we put the term GFin (financing constrains) and GFinMU1 into the basic regression which is shown as Panel D. In each of the regression in panel D, both GFin terms and GFinMU1 terms are significant with Tobinqa terms. That means GFin has a positive relationship with investment but it also has a significant correlation with macro-economic uncertainty, which denotes that capital structure impact investment by affecting GFin and the coefficients are influenced by macro-economic uncertainty.

3.2.5. State Own Enterprises and Private Enterprises

In the start of our essay, we have mentioned that state own enterprises' datum is eliminated from our paper. In this section, we will report why we do so and show how macro-economic uncertainty affects the relationship between capital structure and investment of state own enterprises. Using the basic regression model, we set a control group, one of it uses private enterprises' datum and the other uses state own enterprises' datum. Because we have done the basic regression analysis, variables control, sample selection bias analysis and intervening analysis, in this table, we will directly analyse the relation between EM, EMMU1 and investment. (*Significant at 10%, **Significant at 5%, ***Significant at 1%, because of the compatible issues, standard errors are shown in the second line of each variable.)

In Panel E, which reports the regression of state own enterprises, all the measurements of capital structure are positive and significant to investment while all EM(n)MU1 terms are not significant. This means the macro-economic uncertainty might just make a very slight influence on state own enterprises' investing behaviour. This phenomenon is because state own enterprises will be affected by state intervention, which make them better funded than private enterprises. As a result, macro-economic uncertainty impact their investing behaviour slightly.

In Panel F, which report the regression of private enterprises, both the first and the second regressions' EM(n)MU1-coefficients are negative and significant at 5%. In the fourth regression, both the coefficients of capital structure and EM(n)MU1 are significant at 1%. And all EM(n)MU1-coefficients of regression (1) (2) (4) are negative. These report that in private enterprises, it is highly possible that the higher the macro-economic uncertainty is, the lower positive the coefficient between capital structure and investment will be.

4. CONCLUSION

The results in this paper suggest that macro-economic uncertainty have significant and negative effects on the coefficient between capital structure and investment. In the introduction, we have explained how our essay relate to previous researches of finance and economy.

In a recent paper, J Jiang, X Xia and J Yang (2018) study the capital structure management based on investment. The authors point out that 'the flexibility of dynamic investment and capital accumulation induces the firm to take the lower leverage at financing time.' Our paper shows that the level of macro-economic might also make an influence on the relationship of capital structure and investment, thus, considering the effects of macro-economic uncertainty may be useful for future papers researching the relation between capital structure and investment.

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