

Abnormal Investment Efficiency and Monetary Policy Choice under the Financing Constraint Hypothesis

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Abstract. Early sample studies show that the investment efficiency of state-owned enterprises is lower than that of non-state-owned enterprises due to long-term over-investment in China. In the industries subject to external financing constraints, state-owned enterprises get credit support, resulting in crowding-out effect, which leads to serious financing constraints of non-state-owned enterprises, and investment efficiency is lower than that of state-owned enterprises. In recent years, the frequent regulation of monetary policy has increased the difference between state-owned and non-state-owned enterprises in financing constraints, and the gap between investment efficiency of enterprises has widened. Quantitative monetary policy is asymmetric. Loose interest rate policy can reduce marginal financing costs and improve investment efficiency of non-state-owned enterprises. Credit expansion is more inclined to state-owned enterprises, which has obvious effects on reducing their financing constraints and improving investment efficiency.

Keywords: financing constraints crowding out effect investment efficiency monetary policy choice.

1. Introduction

Under the policy arrangement of slowing down economic growth and capacity removal, improving enterprise investment efficiency has become an important part of promoting enterprise transformation and upgrading and optimizing investment structure. The main factors affecting enterprise financing constraints in China are as follows: firstly, information asymmetry exists in the credit market, and banks require enterprises to pay higher interest or higher guarantee conditions to reduce risks and increase the external financing cost of enterprises. Second, when banks are subject to total credit control, administrative intervention, easy access to credit rationing for state-owned enterprises with political relations, bank preferential loans and crowding-out effect weaken the financing availability of non-state-owned enterprises. Third, China's financial market is still imperfect, and the direct financing channels of non-state-owned enterprises are not smooth. Fourth, frequent regulation and control of monetary policy are the common factors. In recent years, China's monetary policy has been frequently regulated and controlled, the real loan interest rate has changed, the growth rate of loan scale has fluctuated greatly, and the restriction on enterprise financing has been weakened in general, but in 19 cases, the restriction on enterprise financing has been weakened in recent years, because of the tightening of monetary policy, the increasing of long-term borrowing of state-owned enterprises, the decreasing of the growth rate of long-term borrowing of non-state-owned enterprises, and the decreasing of the growth rate of long-term borrowing of non-state-owned enterprises. The gap between state-owned enterprises and non-state-owned enterprises in financing constraints was large in 1998, but it was small in 2001-2008. Since 2008, the financing constraints of non-state-owned enterprises were significantly higher than that of state-owned enterprises.

2. Empirical Model and Data Arrangement

2.1 Research Hypothesis

The representative indicators for measuring financing constraints are investment-cash flow sensitivity (Fazzari et al., 1988). Subsequently, some scholars put forward KZ indicators, Cash-Cash flow sensitivity, WW indicators; the book value of equity capital represents the measurement of enterprise size; the measurement of enterprise size, age, because the financing constraints of non-state-owned enterprises in China are not entirely caused by information asymmetry, listed companies

do not. Direct publication of enterprise financing difficulty, Cash-Cash flow sensitivity coefficient and financing constraints are not monotonous positive correlation, using Cash-Cash flow sensitivity coefficient to measure financing constraints there is an estimation bias [financing constraints degree is attributed to the substitution relationship between internal funds and external funds]. This paper measures financing constraints based on the composite non-linear index SA of enterprise size and establishment years, to invest. The response sensitivity of Capital-Investment opportunity measures investment efficiency, constructs a theoretical model of response sensitivity of investment-investment opportunity, and studies the impact of financing constraints and monetary policy on investment decision. To this end, we propose the following hypothesis.

2.1.1 Investment Efficiency and Financing Constraints

The exterior financing advantages of state-owned enterprises are obvious, and the optimal investment scale is larger than that of non-state-owned enterprises, but it is difficult for state-owned enterprises to invest with the optimal investment scale because of their social responsibility. Their investment opportunities and investment efficiency show no significant or anti-Tobin Q effect. The crowding-out effect of state-owned enterprises reduces the investment opportunities of non-state-owned enterprises and leads to the reduction of investment efficiency of non-state-owned enterprises and the enlargement of financing constraints. The investment efficiency gap between state-owned and non-state-owned enterprises, therefore, we put forward the following hypothesis:

Hypothesis 1: With the passage of time, the investment efficiency of state-owned enterprises has never been significant to the abnormal phenomena of anti-Tobin Q, and then to the significant positive correlation. The property of ownership of non-state-owned enterprises affects their external financing constraints, and their investment efficiency has never been significant to the significant positive correlation, and then to the abnormal phenomena of anti-Tobin Q.

2.1.2 Financing Path, Financing Constraints, Investment Efficiency and Monetary Policy

Only a few listed companies in our country raise incremental funds by issuing additional shares (equity financing only refers to issuing additional shares of Listed Companies in this paper). More listed companies choose debt financing to obtain incremental funds. Bank credit affects the investment efficiency of enterprises, while equity financing has less impact. Non-state-owned enterprises with good profits are subject to lower financing constraints. High financing constraints also force enterprises to improve their competitiveness. At the same time, non-state-owned enterprises tend to hold more cash flow, increase investment and reduce the impact of financing constraints on investment efficiency. High-quality assets gradually reduce, risks increase, marginal financing costs of non-state-owned enterprises increase, financing constraints increase, loose monetary policy can ease the financing constraints of listed companies, improve their investment efficiency, monetary policy tightening, credit resources allocation tends to state-owned enterprises, financing constraints of non-state-owned enterprises highlight, using LR Credit M1 M2 to measure the impact of monetary policy on enterprises. Based on this structure, the following hypotheses are proposed:

Hypothesis 2: The convexity of the cost function of credit financing of non-state-owned enterprises is higher than that of state-owned enterprises, and the financing constraints of non-state-owned enterprises increase.

Hypothesis 3: In the industries with financing constraints, good profitability, high cash holdings can improve the investment efficiency of non-state-owned enterprises. The more the loan stock of non-state-owned enterprises, the less the probability of obtaining additional loans. There is no obvious relationship between investment opportunities and cash flow.

Hypothesis 4: In industries subject to financing constraints, loose monetary policy will reduce the cost of external financing, slow down the constraints of enterprise financing, and increase the efficiency of investment; tighter monetary policy will increase the constraints of financing of non-state-owned enterprises, and reduce the efficiency of investment.

Hypothesis 5: Price-based and quantitative monetary policies exhibit asymmetric effects. Non-state-owned enterprises seldom enjoy preferential loan interest rates. Loan interest rates have a

significant impact on the investment efficiency of non-state-owned enterprises. Credit expansion tends to be more prone to state-owned enterprises, and the improvement of investment efficiency of state-owned enterprises is obvious.

2.2 Model Setting

Based on the investment-investment opportunity sensitivity theory, this paper constructs the following basic models to compare the investment efficiency between non-state-owned enterprises and state-owned enterprises.

$Investment_{it} = \beta_0 + \beta_1 \Psi(TobinQ_{it}) + \beta_2 \Psi(TobinQ_{it}) * private_{it} + Contral_{it} + \epsilon_{it}$ (1), $\Psi(TobinQ_{it})$ stands for $TobinQ_{it}$, $industryQ_{it}$, $(TobinQ_{it} - \mu_{it})$, respectively. Subscript i, t represents enterprise and year, β is estimated parameter, ϵ is perturbation term. Because most state-owned enterprises belong to monopoly industries, TobinQ is related to the nature of ownership, and there may be noise. According to Asker et al. (2011), IndustryQ is selected as another measure of investment opportunities. TobinQ measure depends on the stock price of listed companies, and there will be price deviation between the stock price and the basic economic situation of the company. In order to eliminate the impact of price deviation on enterprise investment decision-making, according to the method of Asker et al. (2011), TobinQ measure depends on the stock price of listed companies. Stock grouping, Investment opportunities are measured by the median μ of TobinQ and price deviation is measured by $TobinQ - \mu$. Control variables include Cash, Cflow, Lever, size, Mangexp, tang, Age, etc.

On the basis of model (1), SA and its interaction terms with investment efficiency difference are introduced, and model (2) [hypothesis 1] is obtained. The requirement for β_2 to be significantly negative.

$Investment_{it} = \beta_0 + \beta_1 \Psi(TobinQ_{it}) + \beta_2 \Psi(TobinQ_{it}) * private_{it} * SA_{it} + \beta_3 private_{it} * SA_{it} + \beta_4 \Psi(TobinQ_{it}) * SA_{it} + \gamma Contral_{it} + \epsilon_{it}$ (2) To test hypothesis 2:3, all samples were divided into financing constrained group FC, intermediate group Mid and non-financing constrained group NFC according to the upper 1/3 and lower 1/3 points of SA. The marginal financing cost of enterprises was indirectly measured by whether they could obtain new loans Increase-loan. On the basis of Loan, the demand and supply factors affecting enterprise loans were introduced. ($TobinQ, CF, Cash, \Delta Credit, \Delta LR, tang, Manexp, SA$), Using Logit model, we get the model (3) and demonstrate the difference between state-owned and non-state-owned enterprises in the possibility of acquiring Increase_Loan.

$Increase_loan_{it} = \beta_0 + \beta_1 * Loan_{it} + \beta_2 * TobinQ_{it} + \beta_3 * Cflow_{it} + \beta_4 * Cash_{it} + \beta_5 * \Delta Credit_{it} + \beta_6 * \Delta LR_{it} + \beta_7 * tang_{it} + \beta_8 * Manexp_{it} + \beta_9 * SA_{it} + \epsilon_{it}$ (3).

2.3 Data Collation and Descriptive Statistics

The sample selected in this paper is the annual data of A-share listed companies in China from 1998 to 2015. The data are from the CSMAR database, and the following samples are excluded: (1) financial listed companies; (2) companies with less than 10 years' continuous listing time; (3) delisting and backdoor listing stocks; (4) companies with debt ratio greater than 100% to eliminate extremes. The effect of the value is that all continuous variables at the enterprise level are tailed by Winsorize to an interval of 1.5% to 98.5%.

Table 1. Variable description

Variable Name	Variable Meaning	Calculating Method
<i>Investment</i>	Enterprise investment	(Cash paid for the purchase and construction of fixed assets, intangible assets and another long-term assets)/Total Assets
<i>TobinQ</i>	Investment Opportunities of Enterprises	Corporate Market Value/Corporate Replacement Cost
<i>IndustryQ</i>	Corporate Market Value/Corporate Replacement Cost	Grouped by industry and weighted by enterprise size, TobinQ is weighted averaged.
<i>TobinQ</i> - μ	Price deviation	Grouped by stock, the median of TobinQ - TobinQ
Variable name	Variable Meaning	Computing method
<i>private</i>	Non-state-owned Enterprise ①	The nature of corporate ownership is non-state-owned enterprises = 1; state-owned enterprises = 0
<i>Cash</i>	Cash Holdings	(Cash and equivalents, transactional financial assets and net short-term investments)/Total assets
<i>CF(Cflow)</i>	Cash flow	Net Cash Flow/Total Assets from Operational Activities
<i>Size</i>	Company size	Logarithm of total assets
<i>tang,itang</i>	Tangible assets, intangible assets	Net tangible assets/total assets, net intangible assets/total assets
<i>Lever</i>	Debt-asset ratio	Total liabilities/total assets
<i>Loan</i>	Loan stock	Corporate Borrowing/Total Assets
<i>Increase Loan</i>	Increased lending	Loan increase = 1; no increase = 0
<i>ROE</i>	Profitability	Total operating profit/shareholder equity
<i>Mangexp</i>	Management costs	Management costs/total assets
<i>Debt</i>	Debt financing	(Short-term debt + long-term debt) / Total assets
<i>SA</i>	Financing constraints	- 0. 737* <i>Size</i> + 0. 043* <i>Size</i> ² - 0. 04* <i>Age</i> (The smaller the SA value, the financing contract, the higher the bundle degree is)
ΔLR	Change of Real Loan Interest Rate	
$\Delta M1, \Delta M2$	Change of Growth Rate of M1 and M2	
$\Delta Credit$	Changes in the Growth Rate of Credit Scale	

Descriptive statistics of variables show that state-owned enterprises have higher cash flow, leverage ratio, listed years and scale, higher credit financing than non-state-owned enterprises, higher average investment rate than non-state-owned enterprises, and non-state-owned enterprises are subject to credit crowding-out effect.

3. Empirical Results

3.1 Investment Efficiency, Ownership Nature and Financing Constraints

Ownership structure, economic environment and economic development objectives change, and the nature of ownership and investment efficiency of enterprises have different conclusions because

of different time periods. The stock market value of Listed Companies in China is facing a sharp short-term decline in 1998, and 2008 is chosen as another time node. Therefore, the estimation results of the three different sample intervals (1998-2008, 1998-2015) model (1) are selected as table 2. The control variables in column 1, 3 and 5 are 0, while those in column 2, 4 and 6 are not 0. The control variables imposed have little effect on the results. However, the investment efficiency of state-owned and non-state-owned enterprises shows different characteristics in different time periods. From column 1 to 2, there is no correlation between independent variables and investment efficiency. This shows that before the reform of non-tradable shares, the proportion of state-owned enterprises in Listed Companies in China was too large, and the state-owned enterprises assumed social responsibility, but the investment opportunities were too small. From column 3 to 4, TobinQ can be seen that the investment efficiency of state-owned and non-state-owned enterprises was not related. The coefficient of TobinQ * private is significantly negative, and the coefficient of TobinQ * private is significantly positive. This shows that with the implementation of the reform of non-tradable shares, the proportion of state-owned shares decreases, investment opportunities increase, investment returns of enterprises exceed financing constraints, investment opportunities of non-state-owned enterprises increase, investment opportunities of state-owned enterprises decrease, and the coefficient of anti-TobinQ phenomenon of investment appears to be significantly negative, while the coefficient of Industry Q * private is negative and not obvious. It shows that the investment opportunities of industries increase, the investment efficiency of state-owned enterprises decreases, and the investment efficiency of non-state-owned enterprises decreases and is not significant. Introducing Mu and price deviation, the coefficient of price deviation is significantly negative, and the coefficient of price deviation private coefficient is significantly positive. This shows that when there are obvious investment opportunities, the investment efficiency of non-state-owned enterprises increases, but the investment efficiency of state-owned enterprises decreases, and the investment of state-owned enterprises appears Tobin Q phenomenon shows that the coefficient of TobinQ is significantly positive and the coefficient of TobinQ * private is significantly negative from column 5 6. This shows that the investment efficiency of state-owned enterprises increases with the increase of investment opportunities, while that of non-state-owned enterprises decreases, and the sensitivity of investment-investment opportunities is lower than that of state-owned enterprises IndustryQ private and the coefficient of price deviation is not significant. Positive, price deviation * ownership property coefficient is small and significantly negative, which indicates that when investment opportunities arise, the investment efficiency of state-owned enterprises will increase, while that of non-state-owned enterprises will decrease. The investment efficiency of non-state-owned enterprises is lower than that of state-owned enterprises, and the gap between non-state-owned enterprises and state-owned enterprises will widen. This is consistent with hypothesis 1.

Table 2. Investment Efficiency and Ownership Nature of Different Sample Intervals

Dependent variable: Investment	1998 ~ 2005		1998 ~ 2008		1998 ~ 2015	
<i>TobinQ</i>	-0.000925 (-0.69)	-0.000496 (-0.39)	-0.002453** (-2.53)	-0.001981** (-2.15)	0.000495*** (-2.88)	0.000447*** (-2.8)
<i>TobinQ* private</i>	0.00203 (-1.11)	0.001347 (-0.78)	0.002490** (-2.57)	0.002023** (-2.2)	-0.000482*** (-2.76)	0.000423*** (-2.61)
<i>Industry_TQ</i>	-0.001053 (-0.18)	-0.002951 (-0.54)	-0.004179*** (-3.43)	-0.003662*** (-3.16)	-0.000427 (-1.14)	-0.000095 (-0.27)
<i>Industry_TQ* private</i>	-0.003237 (-0.51)	-0.000145 (-0.02)	-0.002319 (-1.13)	-0.001435 (-0.74)	-0.000075 (-0.13)	-0.00002 (-0.04)
<i>TobinQ - μ</i>	-0.000925 (-0.69)	-0.000496 (-0.39)	-0.002453** (-2.53)	-0.001981** (-2.15)	0.000495*** (-2.88)	0.000447*** (-2.8)
<i>(TobinQ - μ) * private</i>	0.00203 (-1.11)	0.001347 (-0.78)	0.002490** (-2.57)	0.002023** (-2.2)	-0.000482*** (-2.76)	-0.000423*** (-2.61)

Note: All the explanatory variables in this paper are lagged first order; the figures in brackets represent Z statistics, in which ***, ***, *** represent 1%, 5% and 10% respectively.

The estimated results of model (2) are shown in table 3, and the SA * private coefficient is significantly negative. This shows that there are financing constraints in non-state-owned enterprises, which reduce investment efficiency, and there is a significant negative correlation between financing constraints and investment efficiency. The coefficient of TobinQ * SA and TobinQ * private * SA is significantly negative, indicating that financing constraints reduce the investment efficiency of state-owned enterprises and non-state-owned enterprises, and the ratio of non-state-owned enterprises is lower. Industry_TQ * private * SA coefficient is positive and not significant. It shows that industry_TQ * private * SA coefficient cannot fully reflect the investment efficiency of industry. Non-state-owned enterprises are not subject to financing constraints in industries with relatively low dependence on external financing. The coefficient of * price deviation SA price deviation private coefficient is significantly negative. This shows that when there are obvious investment opportunities, financing constraints reduce the efficiency of enterprise investment. The efficiency of investment of non-state-owned enterprises decreases more than that of state-owned enterprises, and the gap increases. This is consistent with hypothesis 1.

Table 3. Investment Efficiency, Ownership Nature and Financing Constraints

Dependent variable: Investment	<i>TobinQ</i>	<i>Industry_TQ</i>	<i>TobinQ</i> - μ
<i>SA</i> \times <i>private</i>	- 0. 012507*** (- 7. 47)	- 0. 011168*** (- 6. 95)	-0. 012745*** (- 7. 64)
<i>TobinQ</i> \times <i>SA</i>	- 0. 000220*** (- 2. 86)		
<i>TobinQ</i> \times <i>private</i> \times <i>SA</i>	-0. 000093** (- 2. 45)		
<i>Industry_TQ</i> \times <i>SA</i>		-0. 000099 (- 0. 58)	
<i>Industry_TQ</i> \times <i>private</i> \times <i>SA</i>		0. 000014 (0. 11)	
(<i>TobinQ</i> - μ) \times <i>SA</i>			-0. 000190** (- 2. 42)
(<i>TobinQ</i> - μ) \times <i>private</i> \times <i>SA</i>			- 0. 000079** (- 2. 05)
N	2. 07e + 04	2. 20e + 04	2. 07e + 04
R ² w	0. 132999	0. 129273	0. 132889

3.2 Investment Efficiency, Financing Constraints and Financing Channels

The results of the model (3) are as shown in Table 4. The Logit model is used to analyze the factors affecting enterprise loans. Loan is significantly positively correlated with the increase of enterprise loans. It shows that the increase of enterprise loan stock, the decrease of marginal cost of credit financing, the lower financing constraints, and the easier access of enterprises to increase loans. TobinQ CF is not significant with the increase of enterprise loans, indicating that lenders will not take the opportunity of enterprise investment. Cash flow lending cash stock case is significantly positively correlated with the increase of enterprise loans, indicating that the more cash the lender relies on, the easier it is to obtain new loans. This conclusion supports hypothesis 3 The proportion of tangible assets is significantly positively correlated with the increase of enterprise loans, because the high proportion of tangible assets can effectively compensate for the loan losses of lenders, reduce credit risk and make enterprises easier. Mangexp is negatively correlated with the increase of enterprise loans, indicating that the cost of enterprise financing is high (paying high management fees for government credit support), the profitability decreases correspondingly, and the probability of enterprise obtaining increased loans is small. The influence of different monetary policies on the difference of enterprise increasing loans with different interest rates and credit growth rates is shown

in Table 4. Δ Credit is related to the increase of loans. Significant positive correlation Because when monetary policy is loose, credit expansion causes credit scale to increase, enterprise loan availability to increase, loan increase Δ LR is significantly negatively correlated with increasing loan Because when monetary policy is tight, loan interest rate changes Δ LR increases, and monetary policy shocks affect the cost of external financing of enterprises.

The conclusion supports Hypothesis 4 that the monetary policy effect measured by M1 and M2 growth rate changes in Table 6 is consistent with that in Table 4. SA is negatively correlated with the increase of loan because SA increases, the degree of financing constraints of enterprises decreases, the marginal cost of obtaining new loans increases, and the probability of obtaining new loans decreases.

3.3 Investment Efficiency, Financing Constraints and Monetary Policy

From the first column of Table 5, we can see that the TobinQ LR coefficient is significantly negative and the TobinQ private LR coefficient is significantly positive, which indicates that the increase of loan interest rate and enterprise financing cost restrain the investment efficiency of state-owned enterprises; the increase of loan cost forces non-state-owned enterprises to pursue higher return on investment, and the expansion of investment highlights the two coefficients in column 2 are not significant, indicating that the loan interest rate is not financed. Under the constraint condition, the increase of loan interest rate has little effect on the investment efficiency of state-owned and non-state-owned enterprises. The third column shows that the expansion of credit scale has little effect on the investment efficiency of state-owned and non-state-owned enterprises under the financing constraint condition. The fourth column shows that the TobinQ * Credit coefficient is significantly positive and the TobinQ * private * Credit coefficient is significantly positive. Significantly negative, indicating that when the scale of credit expands, credit rationing is prominent, state-owned enterprises get a large amount of credit funds, investment efficiency increases, but investment efficiency of non-state-owned enterprises decreases, which is consistent with hypothesis 5.

Table 4. Factors Affecting Debt Financing

Dependent variable: <i>Increase_Loan</i>	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model7	Model 8
<i>Loan</i>	3. .538579*** (26. 33)	3. .525638*** (25. 28)	3. .525100*** (25. 27)	5. .008860*** (26. 96)	3. 971360*** (26. 69)	3. 976568*** (26. 71)	3. 993259*** (26. 77)	5.032617*** (26. 92)
<i>Tobin_Q</i>		- 0. 000329 (- 0. 72)	- 0. 000329 (- 0. 72)	- 0. 000327 (- 0. 71)	- 0. 000339 (- 0. 73)	- 0. 000331 (- 0. 73)	- 0. 000311 (- 0. 70)	- 0. 000352 (- 0. 59)
<i>CF</i>			0. 000677 (0. 13)	0. 002000 (0. 38)	- 0. 000573 (- 0. 11)	- 0. 000389 (- 0. 10)	- 0. 000783 (- 0. 15)	- 0. 000370 (- 0. 09)
<i>cash</i>				2. 291758*** (12. 06)	2.081231*** (10. 72)	2.082336*** (10. 73)	2.112132*** (10. 86)	2.062913*** (10. 57)
<i>tanga</i>					2.269181*** (6. 51)	2.279113*** (6. 53)	2.338226*** (6. 71)	2.079179*** (5. 93)
<i>Manexp</i>					- 3. 33650*** (- 3. 62)	- 3. 033916*** (- 3. 60)	- 3. 082363*** (- 3. 66)	- 3. 559738*** (- 5. 27)
Δ Credit						0.353083** (2. 33)	0.335761** (2. 30)	0.337518* (1. 73)
Δ LR							- 6. 910018*** (- 3. 33)	- 7. 183983*** (- 3. 36)
<i>SA</i>								- 0. 167723*** (- 7. 83)
N	2. 00e + 03	1. 86e + 03	1. 86e + 03	1. 86e + 03	1. 86e + 03	1. 86e + 03	1. 86e + 03	1. 86e + 03

Table 5. Investment Efficiency, Financing Constraints and Monetary Policy

Dependent variable: Investment	<i>FC_LR</i>	<i>NFC_LR</i>	<i>FC_Credit</i>	<i>NFC_Credit</i>
$TobinQ \times \Delta LR$	- 0. 119511*** (- 3. 19)	- 0. 002753 (- 0. 05)		
$TobinQ \times private \times \Delta LR$	0. 112289*** (3. 69)	- 0. 035026 (- 0. 55)		
$TobinQ \times \Delta Credit$			0. 000115 (0. 02)	0. 009783*** (3. 73)
$TobinQ \times private \times \Delta Credit$			- 0. 000158 (- 0. 02)	- 0. 002732*** (- 2. 73)
N	3. 97e + 03	5. 19e + 03	3. 97e + 03	5. 19e + 03
R ² _w	0. 151592	0. 215885	0. 150915	0. 217070

From Table 6, it can be seen that in column 1, M1*TobinQ private coefficient is not significant. It shows that the increase of M1 will not affect the efficiency of enterprise investment. In column 2, M1*TobinQ private coefficient is significantly positive, and M1*TobinQ private coefficient is not significant. It shows that the improvement of M1 will significantly improve the investment efficiency of state-owned enterprises. Column 3, M2*TobinQ coefficient is significantly positive and M2*TobinQ private coefficient is significantly positive. The private coefficient is significantly negative, indicating that M2 improves the investment efficiency of state-owned enterprises and reduces the investment efficiency of non-state-owned enterprises. The investment of state-owned enterprises has crowding-out effect on the investment of non-state-owned enterprises. Column 4, M2 TobinQ coefficient is significantly positive, M2 TobinQ private coefficient is negative and not significant, indicating that M2 improves the investment efficiency of state-owned enterprises significantly, but This conclusion confirms the hypothesis that the investment efficiency of non-state-owned enterprises is not significantly affected.

Table 6. Investment Efficiency, Financing Constraints and Money Supply

Dependent variable: Investment	<i>FC_M1</i>	<i>NFC_M1</i>	<i>FC_M2</i>	<i>NFC_M2</i>
$\Delta M1 \times TobinQ$	0. 000589(0. 30)	0. 008981*** (3. 61)		
$\Delta M1 \times TobinQ \times private$	0. 000852 (0. 63)	- 0. 003102 (- 1. 06)		
$\Delta M2 \times TobinQ$			0. 010533*** (3. 73)	0. 017306*** (3. 07)
$\Delta M2 \times TobinQ \times private$			- 0. 002010* (- 1. 67)	- 0. 001531 (- 0. 67)
N	3. 98e + 03	5. 19e + 03	3. 98e + 03	5. 19e + 03
R ² _w	0. 150833	0. 217268	0. 151293	0. 217232

4. Robustness Test

In order to test the reliability of the conclusions, table 7 divides SA into two groups and analyses the differences between different variables in financing constraints group and non-financing constraints group. In FC group, non-state-owned enterprises are highly susceptible to financing constraints, with high financing constraints, SA less than average Ave, and enterprise investment I less and volatile. In order to cope with possible investment opportunities, the cash stock of enterprises subject to financing constraints is large and unstable. Gold flow CF is negative, reflecting the current large amount of net cash outflow and volatility of enterprises. TobinQ is less than average in FC and NFC group. Most of the enterprises that are not subject to financing constraints are state-owned enterprises. They bear social responsibility and do not have a large number of investment opportunities. Their credit funds have crowding-out effect on non-state-owned enterprises, lack of investment opportunities for non-state-owned enterprises, and ROE in FC and NFC group is less than

average. Mean value, enterprises have fewer investment opportunities and less investment returns. [Non-state-owned enterprises have small scale, low debt level, low leverage ratio, high financing costs and high proportion of intangible assets, but it is difficult to mortgage intangible assets. This is also the main reason why the cost function of credit financing is more convex than that of state-owned enterprises and the financing constraints increase. This conclusion verifies hypothesis 2.

At the same time, according to the method of Table 7, we divide the two groups into groups with Size as the financing constraint index, and find that the variables of the two groups show the same trend as Table 6. It shows that the linear index Size and the non-linear index SA can better reflect the degree of financing constraint, but the effect of SA is better. In addition, we use WW index as the proxy variable of financing constraint to carry out the above analysis. The conclusions are consistent with Table 7.

Table 7. Descriptive statistical analysis of financing constraints index SA grouping

Group by	<i>SA</i>	<i>I</i>	<i>sd(I)</i>	<i>cash</i>	<i>sd(cash)</i>	<i>CF</i>	<i>sd(CF)</i>	<i>TobinQ</i>	<i>sd(TobinQ)</i>
Financing Constraint Group <i>FC</i>	2.113	0.279	0.0960	0.209	0.0950	-0.550	1.310	3.138	3.026
Non-financing Constraint Group <i>NFC</i>	5.073	0.333	0.0730	0.170	0.0660	-0.167	0.305	2.326	1.265
average value <i>Ave</i>	3.513	0.306	0.0830	0.187	0.0790	-0.323	0.833	5.208	10.88
Group by	<i>ROE</i>	<i>PE</i>	<i>Size</i>	<i>Lever</i>	<i>Manexp</i>	<i>Equity</i>	<i>Debt</i>	<i>intange</i>	<i>Private</i>
Financing Constraint Group <i>FC</i>	0.0690	105.3	19.56	0.392	0.0510	0.133	0.158	0.0500	0.570
Non-financing Constraint Group <i>NFC</i>	0.0850	82.29	22.28	0.533	0.0360	0.0130	0.211	0.0310	0.369
Average value <i>Ave</i>	0.106	85.63	20.88	0.362	0.0390	0.0630	0.188	0.0350	0.512

Note: SD () is the standard deviation. Ave is the average value of variables without grouping. Other values are the average value of each variable within grouping.

5. Conclusion

With the passage of time, the financing constraints of state-owned and non-state-owned enterprises have been alleviated, but in the industries subject to external financing constraints, the government support policy makes it easier for state-owned enterprises to obtain bank credit capital, the investment efficiency of state-owned enterprises is no longer reduced, and the crowding-out effect is produced. The financing constraints of non-state-owned enterprises are serious, the investment efficiency is lower than that of state-owned enterprises, and the investment efficiency the reversal further supports the research of Yu Kun et al. (2014)

When non-state-owned enterprises face the higher convexity of credit financing cost function, the difference of marginal financing cost leads to the difference of financing constraints and investment efficiency. If non-state-owned enterprises hold enough cash and have strong profitability, they can ease the financing constraints caused by monetary policy shocks. Loose monetary policy can ease the financing constraints of enterprises and increase the investment efficiency. Policies will make the financing constraints of non-state-owned enterprises increase and investment efficiency decrease. [In view of the different degree of financing constraints, price-based and quantitative monetary policies show asymmetry][Loose interest rate policies can significantly reduce the marginal financing costs of non-state-owned enterprises, reduce their financing constraints and improve their investment efficiency][State-owned enterprises can obtain external financing at lower costs, and loose interest rate policies It will not significantly reduce its external financing costs. [Credit expansion is more inclined to state-owned enterprises, which has obvious effects on reducing their financing constraints and improving investment efficiency.]Therefore, we should reduce government administrative intervention in the credit market, improve the level of financial development, improve the credit

market mechanism, establish multi-level funding channels, encourage and guide small and medium-sized banks to extend loans to non-state-owned enterprises, and encourage them. Product market competition reduces the degree of information asymmetry in the capital market, implements a sound monetary policy with emphasis on structure, alleviates the financing constraints faced by non-state-owned enterprises, improves the overall investment efficiency of enterprises, and promotes industrial transformation and upgrading.

References

- [1]. HUANG Z Z, XIE J, 2013: "Macro Monetary Policy, Regional Financial Development and Corporate Financing Constraints", *Accounting Research*, 2013, 1:63-69, Jin Qinglu, Kong Xiang, Hou Qingchuan, 2012: "Monetary Policy, Investment Efficiency of Private Enterprises and Value of Corporate Options", *Economic Research*, 2012, 5:96-106.
- [2]. YU H H, XU L B and CHEN B Z, 2010: "Control Right of Ultimate Controlling Shareholders and Overinvestment of Free Cash Flow", *Economic Research*, 2010, 8:103-14.
- [3]. YU K, LI Z G, ZHANG X R, XU J G, 2014: "The Mystery of Enterprise Investment Efficiency: Financing Constraint Hypothesis and Monetary Policy Shocks." *Economic Research*, 2014, 5:106-20.
- [4]. Asker, J., J. Farre - Mensa and A. Ljungqvist, 2011. "Comparing the Investment Behavior of Public and Private Firms." NBER Working Paper. No. 17394.
- [5]. Fazzari, S. G., Hubbard and B. Petersen, 1988. "Financing Constraints and Corporate Investment." *Brookings Papers on Economic Activity*. 19(1): 141 - 59.
- [6]. Hennessy, C. A. Levy and T. Whited, 2007. "Testing Q Theory with Financing Frictions." *Journal of Financial Economics*. 83(3): 691 - 717.
- [7]. Whited, T. and G. Wu, 2006. "Financial Constraints Risk." *Review of Financial Studies*. 19(2): 531 - 59.
- [8]. Wurgler, J. 2000. "Financial Markets and the Allocation of Capital." *Journal of Financial Economics*. 58(1): 187 - 214.