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Monetary policy, pyramid structure and enterprise capital investment

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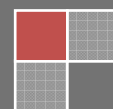
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ABSTRACT

This paper explores how the pyramid layer affects the corporate investment scale from the research perspective of the monetary policy in the government macroeconomic policy. Based on the empirical study of the quarterly data from 2007 to 2013 in listed companies of A-share, this paper has found: when the Central Bank implements tight monetary policies, the pyramid layer has a weakened impact on the corporate investment scale. However, due to the buffer action of the internal capital market, the monetary policy has comparatively small impact on the corporate investment scale.

KEYWORDS

Monetary policy; Pyramid structure; Pyramid Layer; Enterprise capital; Investment Scale.



INTRODUCTION

The macroeconomic policy is not only the leading indicator that affects the corporate investment behavior, but also the uncontrollable element of external economic environment confronted by micro business decisions. As one of the most important aspects of the macro-control, the monetary policy plays a vital role in regulating the micro enterprise behavior and influencing the tendency of macro-economy (Guogang Wang, 2012a)^[1]. Our country has gradually established the regulation mechanism of monetary policy since reform and opening up, and in order to fulfill the established policy goals—price stabilization, promotion of economic growth, as well as full employment and balance of payments, the Central Bank has made full use of various monetary policy tools such as money supply, interest rate, deposit reserves and rediscount rate, etc. to regulate the counter business cycle, hoping that the implementation of monetary policy will contribute to picking up the decline of economic growth or curbing the overheated economic activities, preventing asset bubbles and so on. On a micro level, whether or not the monetary policy will have this counter-cyclical effect depends on the reaction level of corporate investment behavior on the monetary policy. According to economic theories, the monetary policy has an effect on the economic system mainly via monetary channel and credit channel (Bernanke and Blinder, 1992)^[2], and its influence mechanism lies in increasing or decreasing the financing cost of the company, thus influencing the financing scale as well as the corporate investment behavior (Kashyap et al, 1993)^[3].

Based on the macro-economics, the study on the traditional macro monetary policy and the economic output mainly explores the influence of the monetary policy on the macro economic aggregate. In recent years, research on the influence of the monetary policy on investment activities both at home and abroad focuses on the relationship between the monetary policy and the macro investment by analyzing the data from macro regions or the industry level (Weiwei Ying, 2008)^[4]. Yet, there is little research on the present situation of the gap between the micro corporate investment behavior and the macro economic policies (Guohua Jiang and Pingui Rao, 2011)^[5]. Therefore, to probe into the micro effect of the transmission mechanism of the monetary policy by bringing the national macroeconomic policy into the research on the micro corporate investment behavior will contribute to an overall analysis of the factors influencing the decision options of corporate investment, as well as the study on the right judgment of the effective practice of the macro economic policy in micro economic units, thus offering policy-oriented suggestions on working out appropriate economic policies to the government decision-making department.

Although the monetary policy has an independent influence on corporate investment activities, now there is little research on how monetary transmission channel affects micro corporate investment activities, as well as the difference in the transmission mechanism in various organizational structure of the enterprise. Since La Porta, etc.(1999)^[6] revealed that a great number of companies have ultimate controllers and about 26% of the ultimate controlling shareholders adopted the pyramid layer, many scholars have found, by using La Porta's research method, that the pyramid layer is a kind of the corporate organizational form extensively existing throughout the world. Why enterprise groups choose the pyramid layer is that this structure has an advantage in financing, especially in areas where protection for investors is weak. From the aspect of financing constraints in the capital market, the fact that most enterprise groups adopts the pyramid organizational structure can be attributed to two factors, on the one hand, the existence of the pyramid layer helps form an internal capital market in member enterprises, thus making them solve financing problems via internal money dealings and relieve the financing constraints in the external capital market (Friedman, etc., 2003; Fan, 2010)^{[7][8]}, on the other hand, the pyramid layer can help enterprise group members get debt financing from the external capital market. For example, they can improve their financing capacity via the guarantee of the parent company (Berger, Ofek, 1995)^[9], or they can scale up debt financing via the leverage effect of the pyramid layer, and moreover, the more the levels of the pyramid layer, the bigger the leverage effect (Zengquan Li, Xiangang Xin and Xuhui Yu, 2008)^[10]. Hence, if we ignore the difference in the corporate organizational structure and the function of the pyramid control level, we will find it hard to look into how micro company levels react to the regulation of the monetary policy, as well as whether there is a remarkable difference in the reaction to the regulation of the monetary policy by companies with various control levels and property types.

In conclusion, this paper will explore the transmission mechanism in corporate investment activities by the macro monetary policy under the various corporate organizational structures in our country, based on the most recent research findings on neoinstitutional economics, macro monetary theories, and theories of corporate investment activities. The research hypothesis proposed by this paper is that the tightness of the monetary policy is in negative correlation to the investment spending of the company, while the increase in the pyramid layer is in positive correlation to the investment spending and weakens the negative correlation between the monetary policy and the investment spending.

RESEARCH DESIGN

Research variables

This paper requires three groups of variables: the first group is explained variables, that is the capital investment scale of listed companies; the second group is explaining variables, including the tightness index of the monetary policy and the control level of the pyramid ownership structure; the third group is control variables, which means variables such as the growth ability of company, cash holding level, profitability, financial leverage, scale of company and time to market, etc. introduced according to the research results on the influencing factors of corporate investment behaviors by Richardson (2006)^[11] as well as many scholars in our country. The specific definitions of research variables can be seen in Figure 1.

Figure 1 : Chart of Research Variables

Variable symbol	Variable name	Variable definition
Explained Variable		
I_t	Investment Scale	To build quarterly fixed assets, intangible assets, and other cash/ quarter total assets paid by long-term assets
Explaining Variables		
Layer	Pyramid Layer	The number of the longest controlling chains between ultimate controllers and companies (there is only one controlling chain between ultimate controllers and company, the pyramid layer is 1).
$MP1_t$	Tightness of Monetary Policy	The growth rate of generalized money supply M2
Control Variables		
Size	Enterprise Size	The natural logarithm of total assets
Growth	Growth ability	(The operating income of the current quarter—the operating income of the previous quarter)/the operating income of the previous quarter
ROA	Profitability	total assets yield
Lev	Financing Leverage	Gross liability/total assets
CF_t	Operational Cash Flow	The cash flow in the quarterly business activities/total assets
Age	Time to Market	The natural logarithm of the age of listed company
Gdp	Economic Growth	The natural logarithm of GDP
Year	Yearly Control Variable	Making the year 2007 a benchmark, we use 6 yearly dummy variables.
IND	Industry Control Variable	Based on the industry classification guidance issued by CSRC, the manufacturing industry can be sorted into 10 types, totaling 20 dummy variables
Quarter	Quarterly Control Variable	Making the first quarter a benchmark, we use 3 quarterly dummy variables.

Analysis of Investment Scale

The first to test is what influence the tightness of the monetary policy has on corporate investment activities, and then to analyze how much influence the monetary policy has corporate investment activities. So, in order to test the above assumptions, the following econometric models are built, Control being the relative control variable.

$$I_t = \beta_0 + \beta_1 MP + \beta_2 CF_t + \sum Control + \sum Ind + \sum Year + \sum Quarter + \varepsilon \tag{1}$$

$$I_t = \beta_0 + \beta_1 layer + \beta_2 MP + \beta_3 layer * MP + \beta_4 CF_t + \sum Control + \sum Ind + \sum Year + \sum Quarter + \theta \tag{2}$$

Sample Selection and Data Sources

The annual data range of this paper is from 2007 to 2013, totaling 7 years of data. The quarterly data used, compared with the yearly data, can make the most of the data of money supply, thus better reflecting the tightness of the current monetary policy. According to research practice, sample selection excludes: listed companies in the field of finance and real estate; ST, PT companies; companies which made major transactions in asset between 2007 and 2013, leading to dramatic changes in business activities; all companies with missing data and abnormal values. And in the end we get 28479 company/quarterly observed values from 1247 companies.

The research data mainly comes from the financial figures of common listed companies in CSMAR and Wind data base, while the relative data of the pyramid layer is obtained from the annual report data of listed companies via manual query, and data of money supply and GDP comes from the websites of the People’s Bank of China and the State Statistical Bureau. In the course of regression, we make 1% of Winsorize disposal of all the continuous variables except dummy variables to weaken the influence of the outlier. Besides, this paper uses Excel 2010 disposal data and Stata12.0 analysis and disposal data.

Multiple Regression Analysis

The Multiple regression Analysis of the Investment Scale. Use measurement models (1) and (2) to test the previous assumption, and the result can be seen in Figure 3.

Figure 2: Descriptive Statistics of Major Variables

	Obs	Mean	Median	Std.Dev.	Min	Max
I	28497	0.0978	0.0092	0.0236	-0.0091	0.1280
Cf	28497	0.0223	0.0190	0.0439	-0.3240	0.1530
MP ₁	28497	0.1730	0.1757	0.0628	0.0790	0.3240
Layer	28497	2.730	3	0.5840	1	9
ROA	28497	0.045	0.039	0.061	-0.37	1.938
Growth	28497	0.1500	0.0343	0.6690	-0.8420	4.4190
Lev	28497	0.4910	0.4964	0.2170	0.0506	1.2410
CF	28497	0.0494	0.0513	0.074	-0.5020	0.6060
Size	28497	21.4600	21.3220	1.1670	16.5300	28.2600
Age	28497	1.9810	2.2072	0.7320	0.0100	3.1010
Gdp	28497	1.9200	1.9433	0.4340	1.0600	2.7100

Figure 3: The Regression Analysis of the Monetary Policy, the Pyramid Layer and the Corporate Investment Scale

Variable	Dependent Variable (I _t)		Dependent Variable (I _t)	
	Model 1		Model 2	
MP	-0.94**	-0.061*	-0.083**	-0.072**
	-2.248	-1.658	-2.473	-2.251
Layer	—	—	0.004**	.003*
	—	—	2.00	1.87
CF	0.386***	0.392***	0.749***	0.785***
	21.51	21.73	22.83	25.49
MP*layer	—	—	0.017**	0.016**
	—	—	2.334	2.187
Lev		0.025***		0.326***
		10.91		80.20
Size		0.0145***		0.0208***
		13.97		15.10
Grow		2.65e-06		-4.40e-06
		1.39		-0.28
ROA		0.245***		0.149***
		11.560		8.377
Constant	0.095**	-0.045**	0.087***	-0.046**
	19.586	-2.350	15.953	-2.311
Year&Ind&Quarter	Control	Control	Control	Control
N	28497	28497	20536	20536
Adj-R2	0.3690	0.3826	0.8303	0.5997
F-Value	793.77***	708.60***	4188.08***	1078.51***

Note: ***, **, * respectively represents the significance levels of 1%, 5% and 10%; under the coefficient is the value t, and regulated by White Heteroskedasticity.

Empirical Results and Analysis

Descriptive Statistics

First of all, we use research samples to make descriptive statistics of major variables, and the result can be seen in Figure 2. We can see from Figure 2 that the total number of valid observed values in this paper is 28,497 and the mean value of I is 0.0978, which means the investment spending of sample companies account for 9.78% of the total assets, the median being 0.0092 and samples being even, so there exist some companies with big investment rates. According to statistical result of the tightness of the monetary policy, the mean value and the median of MP1 are respectively 0.1730 and 0.1757, indicating samples are even; the mean value and the median of MP2 are both negative, indicating the speed of money supply exceeds

the growth rate of GDP. The mean value of the pyramid layer is 2.73, the median is only 3 layers, with the maximum 9 and the minimum 1, indicating big difference in the internal structure. Descriptive statistical features of other variables are consistent with the mainstream literature.

From the regression result in Figure 3, the new investment of the company is in negative correlation to the tightness of the current monetary policy. In other words, during the period of tight monetary policy, the corporate investment will significantly decrease, and the correlation coefficient is -0.061; meanwhile, the corporate investment level is in negative correlation to the pyramid layer, that is, companies which have more levels in the pyramid layer, will invest more, thus proving the first hypothesis in this paper. When considering the influence that both the monetary policy and the pyramid layer have on the corporate investment, the regression result indicates that the corporate investment volume is in positive correlation to the interaction term of the tightness of the monetary policy and the pyramid layer, the correlative coefficient being 0.017. Thus it can be seen that the tight monetary policy has an inhibiting effect on the corporate investment, but companies can relieve the financing constraints by building an internal capital market in the pyramid layer. The regulating function of the monetary policy has been interfered, so the second hypothesis is verified.

Reliability Test

In order to test the reliability of this paper's conclusion, we have made the following sensitivity analysis: firstly, use the sensitive index of the monetary policy issued by the People's Bank of China to measure the tightness of the monetary policy. Bankers classify the evaluation of the monetary policy into 6 grades: too loose, slightly loose, moderate, slightly tight, too tight and difficult to judge. This paper adopts "slightly tight and too tight", the two grades to measure the tightness of the monetary policy. Bankers think if the monetary policy is slightly tight and its ratio is higher, the tightness degree of the monetary policy is stronger. The advantage of choosing the indicator is that it can more directly measure the tightness of the monetary policy, compared with other indicators such as interest rate, money supply, etc., and moreover, it is not constrained by the macro economic environment; secondly regress after excluding the data of the first and the second quarter in 2007. Since new accounting standards was put into use in 2007, the data of the first and second quarter was in a period when accounting standards are changing, which will probably lead to radical figure regulation, thus affecting test results. The above regression result of the reliability test is not essentially different from the conclusion of this paper. Due to the length of this paper, the above test results are not reported, but they both have proved the reliability of this paper's conclusion.

CONCLUSIONS AND REVELATIONS

Against the background of the transition of the economic system in our country, this paper, from a micro perspective, explores the transmission effect that the macro monetary policy has on the micro corporate capital investment; from the aspect of corporate organizational structure, this paper systematically analyzes the relationship between the pyramid layer and the corporate investment, as well as the difference in its influence on the transmission mechanism of the monetary policy; and from a micro perspective, this paper illustrates the reasons why the macro modulation of the monetary policy is weak and twisted in the decision of micro corporate capital investment.

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