

Monetary Policy and Inventory Investment: Panel Data Evidence from China

Yuxin Ning^{1*} and Huanying Wang²

1 Economics and Management school, Xi'an Shiyou University, P. R. China,710065

2 Economics and Management school, Xi'an Shiyou University, P. R. China,710065

3 School of Economics and Management, Faculty of Accounting and Finance,
Xi'an Shiyou University

nyx91@sina.com, 2859293613@qq.com

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Abstract. This study uses 2000-2012 Chinese listed manufacture firms' data to examine the effects of monetary policy on the firms' inventory investment. The paper estimates the firms' inventory investment model using a dynamic neo-classical framework. We find that internal cash flow fluctuation is the most important factor to promote the fluctuation of inventory investment. Trade credit relatively weakens the impacts of monetary policy on inventory investment, and bank loan is the important channel of monetary policy on inventory investment. Our findings could explain the reason for the fluctuation of inventory.

JEL Codes: P34; O17 ,O16 , G32

Introduction

Most economists would agree that inventory investment could not be ignored when they analyze macro economy fluctuation. At the macro level, many economists have known that inventory movements are dominant features of business cycles. Alan. Blinder (1991) found that the drop in inventory investment has accounted for 87% of the drop in GNP during the post war recession in U.S. This fact has also been verified in Chinese markets. Investment inventory has obviously pro-cyclical effect. Inventory Investment is increasing when economy is in ascending stage and investment is sharply decreasing when economy is in recession. However the pro-cyclical phenomenon of inventory investment could not be explained at the micro level. According to inventory smooth theory, the purpose of holding inventories is to avoid the production fluctuation of business cycles, from which we could infer that inventory investment should present counter cyclical features. It is inconsistency of inventory investment between macro features and micro foundation that makes people misunderstand about monetary policy's transmitting channels and impacts. Therefore, monetary policy should decrease inventory investment fluctuation and reduce the impacts of inventory investment on the macro economy. On the other hand, Dose monetary policy influence inventory investment from credit channel or rate channel? Dose monetary policy influence inventory investment from supplies or demands? The replies to the above questions are given from an important research perspective, which we could link micro economy topics with macro economic phenomenon to deplore monetary policy's micro transmission impacts and channels in China.

Since the 2008 financial crisis, macro economical policies had been densely regulated. Interest rate policy and credit policy had been frequently used to regulate economy. Prior to 2007, China had a seriously overheated economy. Government lowed heated economy by continuously raising deposit reserve ratio, raising deposit, loan interest rate and condensing credit amount.

With the explosive of subprime crisis in 2008, our monetary policy has been reversely regulated greatly. The deposit reserve rate and loan interest rate had been decreased and government'4 trillion economical rescuing policy had been pushed up, which trigged great inflation. In 2010 CPI index had reached 5% and government had been obliged to tighten credit and increase

rate.

Frequent adjustment of monetary policy provides “natural experimental scene “to make us to study on the topics about monetary policy, business cycle and inventory investment. Based on the background, we firstly analysis the features of inventory investment , influence of monetary policy and some factors which push inventory investment adjusting and then study on the influences of business credit and short debts on micro effects of monetary policy. The research results show that the fluctuation of inner cash flow is the most important factor which pushes the fluctuation of inventory investment. During different busy cycle, inner cash flow could enlarge impacts on inventory investment. Secondly, the paper also shows that credit trade could weaken monetary policy effects on inventory investment and short debt is the most important channel of monetary policy to influence on inventory investment.

The rest of the paper has structured as follow. Section 2 is about the literature review of inventory investment and the channel of monetary transmission. Section 3 is about the theoretical framework. Section 4 and 5 present the empirical results and robustness tests , and section 6 is about conclusions of the paper.

Literature Review

Microeconomic Effect of Monetary Policy. There are two transmission mechanisms of monetary policy, which are credit channel and interest rate channel. The central bank control money supply and loan scale by increasing reserve ratio, which leads to credit crunch. With the real interest rate going up, investments which are sensitive to interest rate would fall. P.Glenn Hubbard(1995)considered that there were three prerequisites on which these channels played the role. The first is that the central bank could control monetary supply out of money system. Otherwise bank credit could be replaced by these funds. Secondly, enterprises should highly reply on bank credit. Thirdly, the central bank would influence not only short-term nominate rate but also real rate. However, although Cohen and Wenninger(1993)and Escrella and Hardouvelis(1990) testify that American Federal Reserve interest rate has been positively correlated with the 10-year treasury bond interest rates. Many economists don’t agree that short term interest rate would influence long term interest. On the other hand, the variation of inventory investment is highly sensitive to small interest rate adjustment(Kashyap, Stein and Wilcox and Gerfer and Gilchrist,1993). Fazzar and Meyer (1999) consider that the analysis based on macro monetary credit channel and interest rate could not explain large variation of inventory investment, which ignores investment heterogeneity characteristics. Some economists consider that financial accelerator could be used to explain the large variation of inventory investment. Under financial accelerate hypothesis, during credit crunch the interest rate difference between internal financing and external financing market could be enlarged, which make the net wealth of creditors decline. At last, the decline scale of investment for those financial constraints enterprises is more obvious.

Angelopoulou and Gibson (2007) analyzed the panel data of England’s manufacturing enterprises between 1970-1999, and found that there is high sensitivity coefficient between investment and cash flow. Particularly to the small enterprises, the sensitivity coefficient is higher, which confirmed the existence of financial accelerator. Butzen, Fuss and Vermeulen(2001) investigated Belgium enterprises’ panel data by adding up cash flow variables and found that monetary policy play an important role on investment ,which attested that small enterprises were more sensitively to monetary policy. Wesche (2000) studied on the impacts of Austrian’s monetary policy’s credit channel, which illustrated that high leverage enterprises had lower investment scale and sale ratios. The panel data research attested that in the small and medium enterprises investment was more influenced by financial variables , such as cash and leverage.

On the other hand, trade credit and short term bank credit could be regarded as channels of monetary policy and influence the impacts of monetary policy on investments. Nilsen (2002) studied that small enterprises and financial constrained enterprises would increase the amount of trade credit and short term bank credit during credit crunch. Mateut and Mizen (2002) found that.

Bank loan and trade credit weakened micro impacts of monetary policy. Atanasova and Wilson

(2004) found that English small and medium enterprises would increase inter corporation loans to avoid the constraints of credit. De Blasio (2003) made use of Italy' data to attest that trade credit and bank loans could be mutually replaced. Luzhengfei and Yangdeming (2011) attested that there is same situation existing between trade credit and bank loans for Chinese listed enterprises during economic recession. Anil Kashyap, Eremy Stein and James Wilcox(1993)found that inventory investment had positive correlation with commercial paper or bank short term loans. In China, almost no one studied on the relationship between monetary policy and inventory investment from the perspective of micro level. Wuna(2013) studied on dynamic cooperative effects about economic cycle, financing constraints and working capitals, where she found that monetary and financial policy play an important role on micro economic working capital .

Monetary Policy, Economic Cycle and Inventory Investment. There are three points of view to explain why inventory investment is as an unstabilizer of macro-economics. That is respectively cost impact , demand impact and finance impact(Yigang and Wurenhao,2000). Rober. Hall(1999) considered that cost impact hypothesis could not explain the same changing trend of inventory in different departments. Impact of demand doesn't come from rather substitutional effects of demand in different departments than substitution across generations. Rober. Hall(1999) attributed the fluctuation of inventory investment to impact of finance. That is the increasing of inter-temporal substitution rate gives rise to the reduction of inventory investment in different industries. Based on the hypothesis of finance impact, there is closely relationship between inventory investment and internal cash flow. Mitchel(2001) found that enterprise's cash flow has pro cyclical features and there is higher amplitude of fluctuation than other macro indexes. Relatively other investment of enterprises, inventory investment is more influential by enterprises' financial position and cash flow. On the other hand, there is low adjustment cost for inventory balance. In order to balance marginal benefit and marginal cost , it is the best choice for enterprises to adjust inventory investment. Therefore, when monetary policy is contracted, inventory investment could be adjusted at the greater amplitude, which is limited by the constraints of short-term cost.

Review of Literature. Above researches are based on the west mature market environment. Since 2000, there is deep marketization in China, macro regulation more depends on monetary policy. What does micro-effect of monetary policy play on entities? This is the problem which many economists care about. But at present, there is no empirical study has investigated the effects of the monetary policy on inventory investment at micro level in China. Based on the backdrop, the study contributes to the existing literature about the micro impact of monetary policy on inventory investment by using disaggregated firm-level data set.

Inventory Investment Model

Under the hypothesis of finance impact, the great adjustment of inventory is closely associated with enterprise's internal cash flow. The more external capital market is unperfect, the more inventory investment is influential by the internal cash flow. The pro-cyclicality of internal cash flow is the main power to drive the adjustment of inventory investment, which enlarges the effect of monetary policy on micro entities. According to cost smoothing model and Lovell(1961) model, we constitute the inventory investment econometrics model to test the above conclusions:

$$\Delta N_{i,t} = \beta_0 + \beta_1 \Delta S_{i,t} + \beta_2 \Delta S_{i,t-1} + \beta_3 (N_{i,t-1} - S_{i,t-1}) + \beta_4 Cash_{i,t} + v_i + \mu_i + \varepsilon_{i,t} \quad (1)$$

When model(1) $\beta_1 > 0, \beta_2 > 0$,which illustrates that inventory investment is impacted by fluctuation of demanding. $(N_{i,t-1} - S_{i,t-1})$ reflects adjusting rate and direction that inventory is adjusted to the target balance. $\beta_3 < 0$,which illustrates that the level of actual inventory is more than target balance and the inventory investment decrease. The less β_3 is, the less adjustment inventory investment is. If $\beta_4 > 0$, inventory investment could be affected by internal cash flow. μ_j, v_t reflects the time effect and fix effect. In the above model, all variables are divided by the

opening assets to eliminate the effects of heteroscedasticity.

Econometric Methodology

Data /Sample Selection. The panel data of this paper we employ is constructed from Shanghai and Shenzhen Security Market. The time window is 2000-2012. The financial data comes from GSMA. ST and PT companies are dropped up and all variables are winsorized to eliminate the effects of outlier variables. The ultimate effective data covers 309 manufacturing samples with a total of 3994 observes.

All data of the macroeconomic policy comes from Chinese People Bank and Chinese Statistics Annual Book. The paper adopts broad measure of money supply(M2) as monetary policy index. All variables are divided by GDP deflator to eliminate the fluctuation of commodities price. All variables and model tests are tackled on STATA 11.00.

Variables Definitions. In order to estimate the inventory investment model in equation (1), this section briefly discusses the specific definitions of the variables used in this paper. We use inventory investment as dependent variable. Our key dependent variables are revenue and cash flow.

Inventory investment($\Delta Inventory$): It refers the current-period of inventory investment spending at time t, which includes the inventory increment divided by the assets at time t-1.

Revenue(*Revenue*): It refers to the net sales or revenue that has calculated at the year-end –period of sales in particular year. The variable is also divided by the assets at time t-1.

Cash flow(*Cashflow*): It refers to operating income after tax earning plus depreciation, which has calculated at the beginning of period t. the depreciation includes total depreciation , amortization and depletion.

Trade Credit (*Trade*): measured by the percentage of a firm's payables accounts to total assets.

Bank loan (*Shortterm*):measured by the ration of bank loans to total assets .

Monetary policy index:

M2rate: It refers to broad monetary multiplier M2

loanrate:It refers to the growth rate of loan

GD Pr ate:It refers to the growth rate of GDP

Estimation Results

This section shows the results of estimating the baseline inventory investment model in equation.

Description of Statistics Analysis. Statistics analysis of all key variables is illustrated in table 1. The average of inventory balance, inventory investment and cash-flow is respectively 18.15%, 14.59% and 8.03%. The average of credit trade and bank loan is respectively 20.73% and 16.43%. The average of Broad monetary multiplier(M2) is 17.54%, which illustrates that the amount of money supply is great from 2000-2012 in China. Each year the growth rate of M2 is 0.18%. the average macro credit supply rate is 16.5%. Each year the growth rate of credit loan is 0.58%, which illustrates that money supple kept line with the supply of credit loan. From 2000 to 2012, the GDP rate is averagely 10.03%. On the contrary, the growth rate of GDP is downward, that is -0.05%.

Table 1 Summary Statistics of Key Variables

Variables	Average	Medium	Maximum	Minimum	Standard
Inventory balance($N_{i,t} / TA_{i,t-1}$)	0.1815	0.1529	0.6797	0.0154	0.1220
Inventory investment ($\Delta N_{i,t} / TA_{i,t-1}$)	0.1459	0.0626	2.9281	-0.6091	0.4768
Sales($S_{i,t} / TA_{i,t-1}$)	0.8171	0.6881	3.3469	0.0894	0.5518
Cash flow($CasF_{i,t} / TA_{i,t-1}$)	0.0803	0.0678	0.4248	-0.0989	0.0748
Tradeaccount	0.2073	0.1214	3.4207	0.0119	0.3982
Shortterm	0.1643	0.1528	0.5040	0	0.1218
M2rate	0.1754	0.1732	0.2842	0.1227	0.0384
$\Delta M2rate$	0.0018	0.0037	0.1063	-0.094	0.0488
loanrate	0.1635	0.1523	0.3298	0.0601	0.0657
$\Delta loanrate$	0.0058	0.013	0.1775	-0.1333	0.0843
GD Pr ate	0.1003	0.096	0.142	0.078	0.0174
$\Delta GD Pr ate$	-0.0005	0.0045	0.015	-0.0146	0.0167

Economic Cycle, Inventory Investment and Cash-flow Fluctuation. Fig 1 shows the fluctuation of inventory investment and internal cash-flow from 2000-2012. From the fig 1, we find that inventory investment has undergone three short economic cycles. That is respectively 2000-2004 period, 2004-2007 period and 2007-2012 period. In three short economic cycles , the amount of variation of inventory investment is respectively 43.88%, 52.7% and 227.65%. There is the greatest fluctuation from 2007-2012, which illustrates that variation of monetary policy is obviously reflected in inventory investment. In three short economic cycles, the variation of internal cash flow is respectively 13.99%, 38.84% and 43.5%. which illustrates that the change of inventory investment is consistent with that of internal cash flow.

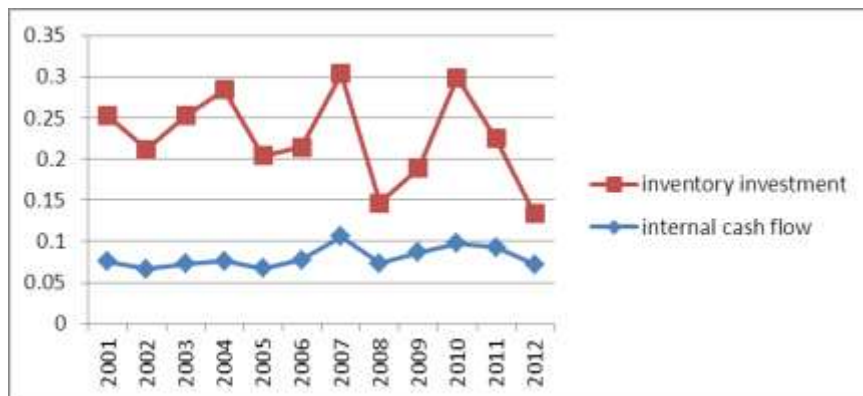


Figure 1. Variation of Inventory Investment and Internal Cash Flow

Estimation Results

Full Samples and Sub Samples. In Table 2, the random effect model estimation shows that the growth rate of revenue has positively related to the inventory investment. For example, one percent growth of revenue leads to the growth of inventory investment by amount 0.451 percent. Meanwhile, the lagged impact of revenue is also positively significantly on inventory investment, which illustrates that the fluctuation of inventory investment is significantly influenced by ultimate demand. The change of the inventory target has impact on inventory investment as anticipated. When the level of inventory is more than sales, inventory investment is down. On the contrary, when the level of inventory is less than sales, inventory investment increases. In full sample, the adjusting rate of inventory to target level of inventory is 8.26 percent. In sub sample, at the 2000-2004 time series , the adjusting rate of inventory is the highest, that is 15.57 percent. Economic estimation in full sample and sub sample has all showed that internal cash-flow has

significantly impact on firm’s inventory investment. For example, in full sample, one percent growth of internal cash flow leads to the growth of inventory investment by amount 1.0632 percent. In different economic time series, the impacts of internal cash flow on inventory investment are different. And the impact of internal cash flow from 2004 to 2007 on inventory investment is the most significantly influential, related coefficient of which is 1.2238. In the second time series, from 2007 to 2012, related coefficient of internal cash flow on inventory investment is 0.9820. the estimating results of empirical test illustrate that it is the prime factor for internal cash flow to promote fluctuation of inventory investment. To one’s extent, the varying of internal cash flow could be used to explain the pro-cyclical inventory investment.

Table 2. Empirical Estimation-Full Sample and Sub Sample

	Random effect model			
	2000-2012	2000-2004	2004-2007	2007-2012
$\Delta S_{i,t} / TA_{i,t-1}$	0.4521(20.22)***	0.6102(8.51)***	0.6685(12.27)***	0.4319(14.40)***
$\Delta S_{i,t-1} / TA_{i,t-1}$	0.0680(3.11)***	-0.1713(-1.89)*	0.0203(0.32)	0.0612(2.36)**
$(N_{i,t-1} - S_{i,t-1}) / TA_{i,t-1}$	-0.0826(-5.47)***	-0.1557(-3.35)***	-0.1054(-2.87)***	-0.1010(-4.76)***
$Cash_{i,t} / TA_{i,t-1}$	1.0632(10.50)***	0.7859(2.79)***	1.2238(5.06)***	0.9820(7.00)***
Concept	-0.0125(-0.98)	0.0171(0.60)	-0.085(-2.72)***	-0.0310(-1.56)
year	Control	Control	Control	Control
Observes	3994	800	798	1597
R-sq	18.51%	6.35%	32.39%	23.00%
Wald chi2(4)	808.25(0.000)***	123.45(0.000)***	297.95(0.000)***	422.48%

Note : ***significant at 1% level, ** significant at 5% level, * significant at 10% level. The p-value of the total coefficient has tested by using Wald statistic.

Incorporating Monetary Policy Variables into Regression Model. In regression model, we study on the impact of macroeconomic policy on inventory investment by incorporating monetary policy variables into regression model. Macroeconomic policy variables are respectively differential variables of GDP rate, M2 rate and credit loan supply rate.

$$\Delta N_{i,t} = \beta_0 + \beta_1 \Delta S_{i,t} + \beta_2 \Delta S_{i,t-1} + \beta_3 (N_{i,t-1} - S_{i,t-1}) + \beta_4 Cash_{i,t} + \beta_5 Cash_{i,t} * \Delta G D P r a t e + v_i + \mu_t + \varepsilon_{i,t} \tag{2}$$

$$\Delta N_{i,t} = \beta_0 + \beta_1 \Delta S_{i,t} + \beta_2 \Delta S_{i,t-1} + \beta_3 (N_{i,t-1} - S_{i,t-1}) + \beta_4 Cash_{i,t} + \beta_5 Cash_{i,t} * \Delta M 2 r a t e + v_i + \mu_t + \varepsilon_{i,t} \tag{3}$$

$$\Delta N_{i,t} = \beta_0 + \beta_1 \Delta S_{i,t} + \beta_2 \Delta S_{i,t-1} + \beta_3 (N_{i,t-1} - S_{i,t-1}) + \beta_4 Cash_{i,t} + \beta_5 Cash_{i,t} * \Delta L o a n r a t e + v_i + \mu_t + \varepsilon_{i,t} \tag{4}$$

Table 3 reports the results of Eq.2, Eq.3 and Eq.4 estimating. From the empirical result of Eq.2, we could find that the coefficient of $\Delta G D P r a t e$ and cash flow is 7.7582, which illustrates that when $\Delta G D P r a t e$ is positive, internal cash flow could enlarge the growth of inventory investment. On the contrary, $\Delta G D P r a t e$ is negative, internal cash flow could also enlarge the downward of inventory investment.

$$\frac{d\Delta N_{i,t}}{dCash} = 1.0594 + 7.7582 \Delta G D P r a t e$$

IF we make $\Delta G D P r a t e$ equal to the highest value 0.015 and lowest -0.046, the highest coefficient of internal cash flow to inventory investment is 1.1758, the lowest coefficient is 0.7025, the span of inventory investment is 67%.

From the empirical result of Eq.3, we could find that the coefficient of $\Delta M 2$ and cash flow is positive, but the significance is weak, which illustrate that the varying of M2 rate has weak effect on inventory investment.

From the empirical result of Eq.4, we could find the coefficient of cross variables of $\Delta loanrate$ and cash flow is positive, which is significant at the level of 5%.

$$\frac{d\Delta N_{i,t}}{dCash} = 1.0570 + 1.3060\Delta loanrate$$

IF we make $\Delta loanrate$ equal to the highest value 0.1775 and lowest -0.1333, the highest coefficient of internal cash flow to inventory investment is 1.289, the lowest coefficient is 0.8829, the span of inventory investment is 46%.

Table 3 Results of Empirical Test

	Full Sample tests		
	Model (2)	Model(3)	Model(4)
$\Delta S_{i,t-1} / TA_{i,t-1}$	0.0608(2.74)***	0.0687(3.13)***	0.0668(3.05)***
$(N_{i,t-1} - S_{i,t-1}) / TA_{i,t-1}$	-0.0822(-5.47)***	-0.0831(-5.49)***	-0.0827(-5.49)***
$CasF_t / TA_{i,t-1}$	1.0594(10.50)**	1.0610(10.47)***	1.0570(10.45)***
$(CashF_{t-1} / TA_{t-1}) * \Delta GD Pr ate$	7.7582(2.14)**		
$(CasF_{t-1} / TA_{t-1}) * \Delta M2$		0.8076(0.73)	
$(CasF_{t-1} / TA_{t-1}) * \Delta loanrate$			1.0306(1.60)*
Observes	-0.0125(-0.99)	-0.0127(-1.00)	-0.0121(-0.95)
Samples	3994	3994	3994
R-sq	18.56%	18.52%	18.51%
Wald chi2(4)	812.32(0.000)***	808.84(0.000)***	810.57(0.000)***

Note : ***significant at 1% level, ** significant at 5% level, * significant at 1% level. The p-value of the total coefficient has tested by using Wald statistic.

Incorporating Trade Credit and Bank Loan Variables into Regression Model. Table 4 reports the OLS regression results. For each of the dependent variables, we include trade credit and bank loan separately in the regression.

When studying on the channel and impact of monetary policy, many researchers pay attention to trade credit and bank loan. Many enterprises could make use of trade credit and bank loan to solve financing problems, which could relax financing constraints owing to the economic fluctuation. Berger and Udell (1998) studied that 15.78% of financing is from trade credit. Rajan and Zingles (1995) find that 17.8% of small firms’ financing in American is from customer lending. The percentage in English is 22%. Relative to bank loan, the cost of credit trade and bank loans is low and it is easy for many enterprise to obtain credit trade and bank loan. Owing to the introduction of credit trade and bank loan, the impact of monetary policy on inventory investment is relatively weak.

We could empirically test above hypothesis by incorporating credit trade and bank loan respectively into Eq.1. We could obtain two Eq.5 and Eq.6.

$$\Delta N_{i,t} = \beta_0 + \beta_1 \Delta S_{i,t} + \beta_2 \Delta S_{i,t-1} + \beta_3 (N_{i,t-1} - S_{i,t-1}) + \beta_4 Cash_{i,t} + \beta_5 Cash_{i,t} * Tradeaccount_{i,t} + v_i + \mu_t + \varepsilon_{i,t} \tag{5}$$

$$\Delta N_{i,t} = \beta_0 + \beta_1 \Delta S_{i,t} + \beta_2 \Delta S_{i,t-1} + \beta_3 (N_{i,t-1} - S_{i,t-1}) + \beta_4 Cash_{i,t} + \beta_5 Cash_{i,t} * Shortterm_{i,t} + v_i + \mu_t + \varepsilon_{i,t} \tag{6}$$

Table 4 reports the estimation results of equation (5) and (6). The empirical result of equation (5) shows that credit trade weakens the positive impact of internal cash flow on inventory investment. The coefficient of cross variable of credit trade and cash flow is -7.4047, of which is significant at level 1%. The empirical result of equation (5) illustrates that during recession, credit trade is the most financing means which weakens the impacts of macroeconomic policy.

The empirical result of equation (6) shows that bank loan strengthen the positive effect of

internal cash flow on inventory investment. The coefficient of cross variables of bank loans and cash flow is 1.6574 , of which is significant at level 1%. The result of equation (5) illustrates that the impact of bank loan on inventory investment is the important channel of macro money policy.

Table 4 Results of Empirical Test

	Model (5)	Model (6)
$\Delta S_{i,t} / TA_{i,t-1}$	0.4452(20.12)***	0.4500(20.14)***
$\Delta S_{i,t-1} / TA_{i,t-1}$	0.0553(2.56)**	0.0638(2.91)***
$(N_{i,t-1} - S_{i,t-1}) / TA_{i,t-1}$	-0.1378(-8.59)***	-0.0858(-5.69)**
$CasF_t / TA_{i,t-1}$	1.7851(14.48)***	0.8790(7.58)***
<i>Tradeaccount</i> * $CasF_t / TA_t$	-7.4047(-10.10)***	
<i>Short term</i> * $CasF_t / TA_t$		1.6574(3.18)***
Concept	-0.0231(-1.81)	-0.0175(-1.73)
Observations	3994	3994
R-sq	21.95%	18.56%
Wald chi2(5)	934.49(0.000)***	819.10(0.000)***

Note : ***significant at 1% level, ** significant at 5% level, * significant at 1% level. The p-value of the total coefficient has tested by using Wald statistic.

Robustness Tests

For further testing the reliable of research conclusions, we confirmed the robustness of our results by dividing the sample into two subsamples according to the firm's 33 percentile and 66 percentile. We empirically tested the small firms, the scale of which is lower than 33 percentile and the large firms, the scale of which is greater than 66 percentile. The result of empirical research was that the coefficients of $CasF_t / TA_{i,t-1}$ to inventory investment is prominently significant at level 1%.

The results of robustness tests turned out that whether in large scale firms or in small scale firms, there was strong positively related correlation between internal cash flow and inventory investment, which was different from the traditional viewpoints. Relative to the small enterprises, the related correlation of the large firms between internal cash flow and inventory investment was higher. After adding macroeconomic policy variables, the large firms had large inventory investments when the economy was in increasing stage. The results of robustness tests confirmed the pro-cyclicality of inventory investment. On the other hand, the results illustrated that there was overdue investment during booming stage. When the economy is contracted, internal cash flow had significantly negative impact on inventory investment. The above results partly explained the great fluctuation of inventory in different economic cycle.

Meanwhile, we added up trade credit and bank loan variables in subsample tests and we had the same conclusions as the full samples. Trade credit weakens the impact of macroeconomic policy on inventory investment and bank loan was the important channel of monetary policy ¹.

Summary and Conclusions

In this paper, we have used a panel of 3499 Chinese listed manufacturing firms over the period 2000-2012 to test some hypothesis about inventory investment during different economic cycles. We have conducted some empirical tests to achieve the objective. Firstly, we divided 2000-2012 time windows into three economic short cycles, which are 2000-2004, 2004-2007 and 2007-2012 cycles. And then, we built inventory investment model by using random effect method to control time effect and firm's fix effect. 2000-2012 full sample and three short cycles samples have been tested. The empirical results showed that the reason for the great fluctuation of inventory investment is not only from demanding factors but also from internal cash flow. The fluctuation of

¹ due to the limitation of space, this section's empirical results are not shown up. If required , you could ask writers for results.(nyx91@sina.com)

internal cash flow from the shock of economy is the main reason why inventory presents unstable position.

Secondly, the paper incorporated some macro monetary variables, trade credit and bank loans into estimation models. The result of empirical tests was that during economic booming, internal cash flow enlarged the impact of monetary policy on inventory investment. The paper showed that trade credit weakened the impact of monetary policy and bank loan strengthened the impact of monetary policy.

The results of our empirical tests gave a possible explanation about why there was great variation of inventory during economic cycles. To reduce the fluctuation of economy, we should let internal cash flow as stable as possible. On the other hand, we should pay more attention to the impacts of trade credit and bank loan. Empirical tests showed that both trade credit and bank loan channel of transmission of monetary policy were operating in China. In order to shed more light on the alternative explanations about the behavior of inventory investment, we should use more firms except manufacture firms to empirically test relative conclusions.

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