Research on Kinetic Energy Optimization from the Perspective of Financial Friction Threshold Effect

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Abstract: This paper aims to analyze the financial friction coefficient in the kinetic energy of the manufacturing industry by using panel data threshold regression. The results show that: the endogenous financial friction of old kinetic energy is more limited by the cash constraint of investment. The financial friction manifestation of old and new kinetic energy is unstable and in the new kinetic energy shows a fluctuating spiral structure, while the financial friction in the old kinetic energy shows an upward trend. The financial friction caused by currency issuance shows a gradual upward trend, while bad loans and interest rates decrease gradually.

1. Introduction

Financial frictions results in differences in the financing costs of different enterprises (Gilchrist et al., 2013), Related research on the relationship between financial friction and kinetic energy Financial friction leads to insufficient investment, which in turn makes the total assets of enterprises decline. (Myers and Majluf (1984), Stein (1995)). Hsieh and Klenow (2009) in studying the total factor productivity of Chinese enterprises, it is found that the TFP of state-owned enterprises is less than the industry average. Wieland (2013) based on the Keynesian model, it is considered that financial friction is an important reason to reduce output, and in ZLB, financial friction will lead to the decline of output caused by reverse shock. Moll (2014) makes it clear that heterogeneous individuals are affected by the value of their own assets in the face of financial friction. Among them, the representative literature is Buera et al. (2011) and Buera&shin (2013). Buera et al. (2011) Analyze the constraints faced by lending activities in different sectors of the economy through quantitative studies of friction in the financial markets of the United States and Mexico. Buera&shin (2013) introducing financial friction into neoclassical models, financial friction makes the process of resource redistribution and economic readjustment slower than the neoclassical model, the investment rate and TFP of the overall economy rise slowly, and the equilibrium path takes a long time to converge to the new steady state. Caselli&Gennaioli (2013) Using data calibration parameters in the United States and developing countries, it was found that financial friction would result in a difference in capital labor ratio between countries by 75%, and that the induced mismatch of resources could explain 70% of the differences in per capita income across borders. Poilly (2013) Financial friction narrows credit channels, resulting in reduced investment effectiveness and reduced kinetic energy (the effect on investment effectively emerges). Financial friction will inhibit financial development, increase the degree of mismatch of resources, and hinder economic growth. The existence of financial friction makes the ability of enterprises to obtain capital limited, affecting the optimization of enterprise kinetic energy. With regard to the discussion of financial friction, it is highlighting important to clarify the source of financial friction. This paper holds that financial friction is composed of exogenous friction caused by financial institutions and the endogenous friction caused by the manufacturing enterprises themselves. The study of financial friction in generally literature pays less attention to the relationship between the two, and it is necessary to correctly distinguish the relationship between the two. First, with the continuous development of the market economy and the continuous evolution of enterprise kinetic energy, the financial friction formed into this basis is ineviTable alienation, and the perspective of a single financing constraint is not enough to reflect the predicament of enterprise capital acquisition. Second, exogenous and endogenous financial friction is different. This paper holds that the financial

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friction existing on financial institutions is exogenous, while the financial friction existing on manufacturing enterprises is endogenous. As the main subject of financial supply, financial institutions, in addition to their own profits and other business indicators, but also to a large extent by currency circulation, benchmark interest rates and non-performing loans and other factors. The possible innovation points in this paper use the kinetic energy equation structured mutation points to determine the old and new kinetic energy and measure the financial friction in the old and new kinetic energy, and quantitatively analyze the specific influence factors of financial friction.

The discovery of this paper is helpful to deepen the understanding of the effect of financial friction in the kinetic energy of manufacturing industry, and the current loose monetary quantification policy has an effect on the financial friction in the kinetic energy of enterprises, while the influence of cash constraints and bad loans is gradually weakened, so the monetary quantification policy and cash constraints can be combined to play a greater role. In the manufacturing industry, this paper attempts to construct the kinetic energy growth equation on behalf of the enterprise's innovation ability, development ability and profitability, and differentiates the old and new kinetic energy of manufacturing enterprises by looking for the mutation point of the kinetic energy growth equation.

The kinetic energy optimization referred to in this paper refers to the development of the old kinetic energy to the new kinetic energy in the process of the transformation of the old and new kinetic energy.

2. Data and Model

2.1 Data

The data of this paper is derived from the CSMAR database and the sample time interval is from 2006 to 2016. In order to obtain a complete sample for detailed study, this paper is to eliminate the following: First, to eliminate the emergence of ST listed companies, the other is to remove the emergence or withdrawal of listed companies, the third is to eliminate the net profit is negative or there is a missing value of financial data, four is to ensure that the data has enough time series to eliminate the three listing of less.

After doing the above streamlining, the sample company's new kinetic energy company 68, the old kinetic energy company 422, the indicator 241,560.

2.2 Model

2.2.1 Financial institutions

As the main subject of financial supply, financial institutions are affected by business indicators such as their own profits, but also to a large extent have to accept the impact on factors other than profit targets, such as the relevant investment and financing subjects, other local shadow banks exist problems.

The financial friction factors of financial institutions include interest rate, narrow money supply, institutional transaction cost, bridge crossing between enterprises and so on.

Financial friction of Banks

$$f(\tau) = \varphi \ln M1_t + \omega \ln ratio + \gamma \ln np + \mu \tag{1}$$

In the type:M1 denote the narrow money supply, ratio denote the real interest rate, NP denote the financial institutions bad loans (Non-Performing Loan), μ denote that there are in the grey area of the banking system transaction costs and inter-firm bridge payments.

2.2.2 The enterprise sector

Fazzari (1988) Creative will raise the issue of financing constraints from the perspective of the enterprise itself. Khurana et al. (2006) study found that the financial market environment can influence the financing scheme of enterprises.

In this paper, the results of the self-variable front coefficient sett of the SA index and the KZ index are overcome.

Financial friction of enterprises:

$$f(\omega) = \vartheta + \tau(\ln Cash - \ln Investment) + \rho \ln profit + \varepsilon \quad (2)$$

In the type ,Cash mean s cash flow from listed manufacturing companies, investment said business investments, profit said manufacturing companies profits, and Epsilon said cash flow and manufacturing profits in addition to other factors.

3. Empirical Research

3.1.1 Select the indicator

Select 490 Manufacturing Company 2006-2016 data, using the relative index of the net profit of the substitute index, which represents the growth kinetic energy of the enterprise, to calculate, and according to the size of profitability from small to large in order combination. By using kinetic energy equation, the mutation point of Chow in kinetic energy equation is found, and then the transformation point of old and new kinetic energy is determined. Obviously, before and after the mutation point of Chow, it is explained that the kinetic energy growth structure changes, and then the enterprise kinetic energy changes. According to DuPont analysis method, the elasticity coefficient of net profit as main business income is profit capacity, that is, kinetic energy Development Index (Y), and by drawing on the relevant research of enterprise innovation ability of Romer (2009), the flexible coefficient of R&D cost accounting for the change of main business is selected to indicate enterprise innovation ability (X_wx).

And the ability to develop the elasticity factor of construction as a proportion of fixed asset investment as an explanatory variable (X_zj), μ represents the remaining factors in addition to the above factors, including the effectiveness of foreign investment, the impact of the enterprise's own factors and so on.

The kinetic energy equation is constructed by using the above index system.

Table 1. Summary statistics

Variable	OBS	Mean	Std. Dev.	Min	Max
Y	490	0.0805408	0.1706659	-1.167006	2.431128
X_{wx}	490	0.0838136	0.1081523	0.0020603	1.57284
X_{zj}	490	0.2225884	0.589414	0	10.07071

3.1.2 Chow-test

The general least squares estimation is used to estimate the above kinetic energy equation, and the correlation is first tested.(See Table 3 for Data simulation results), through the significance test, it shows that there is a clear correlation between net profit and intangible assets and construction in progress, and the two are positive relations.

In view of the above expressions, the above kinetic energy equation is tested by Chow mutation Point, and the extended single equation analysis is used to determine the combined test by using global maximization and sequential determination, and at 5% confidence level, there is:

Table 2. Single equation regression discontinuity point determination

Sequential F-statistic determined breaks:			1
		Scaled	Critical
Break Test	F-statistic	F-statistic	Value**
0 vs. 1 *	40.24762	120.7429	13.98
1 vs. 2	0.970016	2.910048	15.72

Get one of the discontinuous points and split the structural equations in two:

Table 3. Structural equations net profit, intangible assets and the effect of construction in progress

Variables	Interpreted variables	
Method	OLS	Least Squares with Breaks(423-490)
X_{wx}	0.488483*** (0.054696)	0.509989*** (0.052124)
X_{zj}	1.451683*** (0.095378)	1.655939*** (0.091302)
C	-1.90E+08** (88105190)	-10910618 (2.26E+08)

Note: ***,**,* represents significantly at 1%,5%,10% significant level respectively.

3.2.1 Empirical analysis

Empirical analysis from the endogenous financial friction in the old kinetic energy of manufacturing industry, This paper finds that the friction coefficient of investment cash flow presents a certain regularity to the influence of old kinetic energy, and the overall trend is upward. When the friction coefficient of investment cash flow is negative, it indicates that the investment cash flow has a promoting effect on the development of old kinetic energy. At the same time, the friction coefficient of investment cash flow is increasing in recent years, which indicates that the investment cash constraints of listed enterprises are more and more obvious, and the financing ability of enterprises is limited.

In the financial friction coefficient of profit, the overall upward trend indicates that the financial friction in the company is more and more affected by the increase of the net profit of the company in the study sample.

Table 4. Endogenous financial friction coefficient of old and new kinetic energy

	New kinetic energy			Old kinetic energy		
	(1)*	(2)*	(3)*	(1)	(2)	(3)
2006	-1.38411	22.37765	20.99354	-1.05412	23.40536	24.87475
2007	-0.50621	22.81024	22.30403	0.74438	24.13037	24.12084
2008	-0.79535	22.41206	21.61671	0.12780	23.99304	24.01479
2009	-2.47273	23.15956	20.68683	-0.74221	24.75700	25.15786
2010	-1.62688	23.78139	22.15451	-0.20968	25.36754	26.71153
2011	0.19080	23.91186	24.10266	1.10534	25.60619	25.41990
2012	-0.61886	23.66142	23.04256	-0.15084	25.57074	25.75370
2013	0.21396	23.62195	23.83591	0.04764	25.70606	26.21248
2014	0.79381	23.73511	24.52892	0.36582	25.84667	26.35196
2015	0.82127	23.99573	24.817	0.53309	25.81887	27.21811
2016	1.24878	24.24474	25.49352	1.27084	25.94726	22.35124

NOTE: Data Source, CSMAR database, 2006-2017 related data collation. (1)~(3)means Investment cash flow financial friction, Profit financial friction, Total financial friction.

In the new kinetic energy endogenous financial friction in the manufacturing industry, from the investment cash flow friction coefficient, the old kinetic energy is more sensitive to the investment cash flow than to the new kinetic energy, through the simulation of the 11 data is not difficult to find that the investment cash flow on the old kinetic energy financial friction coefficient of the effect is significantly greater than the new kinetic energy.

Table 5 present that in the manufacturing industry, the impact of bad loans from 2006 to 2016, experienced the process of first descending and then rising, of which the impact of negative loan friction in 2008 deceleration the fastest, The impact of adverse loan friction began to increase in 2013. When examining the influence of interest rate on the coefficient of financial friction, it is not difficult to find that the influence coefficient of interest rate shows a downward trend, which is inconsistent with the traditional view that the increase in currency circulation will increase the

coefficient of financial friction.

Table 5. Specific values of exogenous financial friction

Year	Bad loan	Interest rate	Currency circulation	Financial friction coefficient
2006	1.98952	0.85815	11.74432	14.59198
2007	1.91957	1.17515	11.93531	15.03003
2008	0.98507	1.31687	12.02105	14.32299
2009	0.56872	0.81093	12.30139	13.68104
2010	0.25774	0.84521	12.49359	13.59654
2011	0.08434	1.18845	12.57711	13.84990
2012	0.00797	1.16951	12.64001	13.81749
2013	0.03150	1.09861	12.72870	13.85881
2014	0.22952	1.08411	12.76012	14.07375
2015	0.51998	0.69905	12.90160	14.12064
2016	0.52945	0.40547	13.09511	14.03003

NOTE: Data from CSMAR database, 2006-2016 related data collation.

5. Conclusion

The endogenous financial friction and exogenous financial friction combined with the old and new kinetic energy are considered separately. The following points are clearly recognized: The role of financial friction in kinetic energy shows structural alienation. New and old kinetic energy in the role of financial friction, not only different sizes, but also in the consideration of other situations unchanged, the direction will be different. At the same time, in the test of the conversion standard of the old and new kinetic energy, this paper finds that the net amount of construction in progress has obvious effect As well as the development of new kinetic energy needs of high-tech and so on, enterprises need to do a good job in the early stage of the corresponding budget. Minimizing the negative impact on financial friction makes the transformation of kinetic energy smoother. Reduce the default rate of the banking sector, so that the corresponding financial friction is reduced. Ii Endogenous financial friction occurs more through the increase of net profit. Mainly because of the increase in profit makes the enterprise kinetic energy growth is faster, its capital demand is more and more limited, therefore, enterprises in increasing kinetic energy or expanding production capacity should balance the relationship between the two. On the one hand, we should pay attention to the increase of net profit. Three Currency circulation has a great impact on financial friction. Therefore, it is very important to clarify the relationship between financial friction and old and new kinetic energy, the current quantitative easing of monetary policy has played a role in the financial friction of the old and new kinetic energy, because the old and new kinetic energy is also the role of financial institutions and enterprises, so exogenous financial friction has the effect, Further tracking the effectiveness of financial institutions ' currency circulation channels and money delivery should not only rely on increasing the amount of money invested to ease the financial friction of enterprises.

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