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Correlation analysis among Free Cash flow, Investment Expenditure and Corporation Value

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Abstract: **Investment decision is one of important components of modern financial management which determines the company's future direction for developing and source of value growth. Investment decision can affect not only the company's financing decision and dividend decision directly, also its profitability, operational risk and development prospect. The evaluation of the investment efficiency is an important standard to judge the success or failure from the investment. It not only plays a decisive role in the sustainable development of the company, also affects and reflects the operational efficiency of the nation's financial system from a macro perspective. But for many reasons, the company's investment decisions can't always be high efficiency like shareholders expect, and the goal of maximizing enterprise value is not so easy that every company can achieve. Subjectively, the existence of moral hazard and adverse selection often makes managers tend to make decisions that work best for themselves rather than for maximizing enterprise value. Objectively, the managers maybe make inefficient investment decisions because of imperfect company's governance structure, macro-economy overheating and low efficiency of country's financial system that it damages the value of the company. Regarding the enterprise investment efficiency, scholars both domestic and overseas have made abundant research, which provides the beneficial guidance and theoretical support for this paper.**

In this paper, it has learned from the research results of scholars at home and abroad based on the agency theory. Firstly, the forecast model about the variable investment spending is set up to identify under-investment and over investment, two types of inefficient investments. Secondly, Starting from the index of free cash flow, combining different enterprise environments and evaluating whether the relationship between free cash flow and investment spending under the condition of different enterprises have significantly different. Lastly, the research about the above referred will be extended to the enterprise value. We will analysis whether the relationship among the three aspects have any significant changes under different business environments. In this paper, we select the machinery and equipment manufacturing industry in China manufacturing industry as the sample. This industry started early. Companies' differences in this field are limited though their sizes are general large-scale. This industry's speculative is weak and not having obvious industrial characteristics though there are many companies. All of these have great benefits for our systemic research combined with enterprise financial indexes.

In this paper, we do our research by using methods like correlation, descriptive analysis and multiple regression analysis and so on. The results show that, the excessive investment does have more relevant with positive free cash flow, but this revelation will vary with the change of enterprises' operation ability. And the indexes of the enterprises' operation ability can also affect the relationship among investment spending, free cash flow and enterprise value.

Of course our research has limitations in some way in this paper. For examples, the accuracy of the expected investment model needs further assessment and improvement, the grouping method in comparative study is comparing single, do the investigation without the external factors of enterprise, etc. These limitations are places where to improve and break through for our research.

Keywords: **Free cash flow; moderate risk investment; inefficient investment; entereprise value.**

1. INTRODUCTION

1.1Research background:

China's fixed asset investment growth rate has been running at a high of more than 20% to form the "Over-Investment" both in practical and theoretical phenomenon. Micro-level companies' inefficient investment (mainly refers to excessive investment) is undoubtedly one of the major forces behind the "over-investment" phenomenon. With the rapid development of capital markets, the flow of funds continue to represent accelerating trend, and then continue to broaden the financing channels of listed companies, which is invisible to reduce the company's financing constraints; especially in China, costs of financing of listed companies in the stock market is very low. This is the reason that many scholars, in the study of Chinese Listed Companies, concern inefficient investment issues rather than underinvestment problems. Even so, the problem of insufficient investment should not be ignored. In China, many scholars' research demonstrate that excessive and insufficient investment problems coexist in Chinese listed companies, and insufficient and excessive investment, as investment would waste resources and damage the value of the business as well.

1.2 Research Goals:

Large number of foreign empirical studies shows that the level of investment expenditure and free cash flow of enterprises has a significant positive correlation: one is when free cash flow of businesses is clearly insufficient, it is limited financing constraints; companies are often forced to give up the right investment opportunities, resulting in insufficient investment; the other is when corporate cash flow more is adequate, due to the agency problems, the managers most likely to disregard the interests of shareholders, and take the cash surplus to the higher risk and can be achieved personal interests of investment projects, leading to excessive investment behavior.

However, whether this kind of theory still applies to China's capital market that processes and institutional environment for the development is completely different? Regard this; Chinese scholars have done a lot of empirical research. Similar to the Western studies, Chinese scholars also adopt a specific viewpoint, they study the sensitive differences between investment expenditure and free cash flow of companies. Some scholars have involved these fields in their research nowadays such as the regulatory environment, ownership concentration, firm size, industry competition, managers' self-confidence and education degree. This study also aims to explore different operating capacity, the significant relationship between the free cash flow and investment expenditure and the difference.

2. LITERATURE REVIEW & THEORETICAL BASIS

2.1 Literature Review:

The cause of "free cash flow sensitivity of investment," the scholars can be divided into two factions: One group regards that financing constraints led to the "investment - free cash flow sensitivity" exists, and the other who argue agency theory as the root of "free cash flow sensitivity of investment". In reviewing the relevant theories from foreign scholars, the author will analyze from two perspectives: the perspective of financing constraints and agency theory.

2.2 Theoretical Basis:

This article does not focus on major breakthrough in theory, but exploratory analyze on the basis of existing classical theory of "free cash flow and investment expenditure". The research is based on three classical theories: M&M theory, agency theory and the free cash flow hypothesis.

M&M theory was proposed by Modigliani and Miller (1958) which demonstrates that business size depends primarily on the value of the company's investment decisions, regardless of capital structure and dividend policy; liabilities will not affect the company's cost of capital, and it means the weighted cost of capital of the company has nothing to do with the company's capital structure. But this theory is based on a set of assumptions of perfect capital markets such as tax-free environment, no asymmetric information, agency costs and transaction costs, etc.

Agency theory originated in 1932, Berle and Means proposed the separation of business and ownership would lead to inconsistencies in the interests of managers and shareholders which is the earliest origins on agency theory based on evidence. Accordingly, although that is the principal objective is to maximize shareholder value of enterprise, with more authority and information to be an agent that will make greater use of this resource to get selfish behavior which is supposed to be the expense of the interests for shareholders.

2.3 Free Cash Flow Hypothesis:

When Jensen did the research of agency problems caused by the separation of ownership, he proposed the concept of "free cash flow" in 1980s. Jensen defines the concept of free cash flow: companies meet the internal positive net value of all investment projects necessary funds remaining portion of cash flow. Free Cash Flow Hypothesis from Agency Theory that is a branch of the continuous development of the formation.

3. RESEARCH ASSUMPTIONS AND EMPIRICAL EMPIRICAL RESEARCH DESIGN

3.1Research Assumptions:

The development of China's capital market is still in early stages, the US capital markets is more developing, listed companies herein generally are low equity financing; furthermore, the background of China's special economic reform, the restructuring of state-owned enterprises absence of the owner, due to the dominance (or strands dominance) serious; business management is affected majorly by national policies and the relationship with local governments which presents the complex relationship between government and enterprises. These factors impact Chinese listed companies' investment decisions on certain extent, causing inefficient investment issues.

Hypothesis 1: There is not only excessive investment, but also there is insufficient investment for Chinese listed companies; excessive investment is more likely to occur in a high free cash flow business and lack of investment is more relevant to low free cash flow business.

Operational capability is the ability of an enterprise uses variety of assets to get profit which can reveal the functioning of the business assets and is an important manifestation of the comprehensive enterprise asset management capabilities. Business operation is a mutual game of a long-term and dynamic process of comprehensive resources allocation from human resources, financial resources, information resources, production resources, and overall coordination of movement. High level of business enterprises operating capacity can coordinate the resources of enterprises so that enterprises earn more profit through the rational allocation of limited resources. But this efficient business model is based on the basic cycle that enterprises continue to invest, re-investment to recover, and then recovered so that when enterprises abound with free cash flow, they may be more prone to invest overcapacity. For the low-level operating capacity of the enterprises, the efficiency of a variety of investment decision-making may be lower; such enterprises may be easier to under-investment (especially in the case of a shortage of free cash flow). Therefore, the author proposes the second hypothesis:

Hypothesis 2: Good operating companies are more prone to "excess cash flow based on the emergence of over-investment" problem; and the poor operating enterprises are more prone to "under-investment emergence because of free cash flow shortage" problem.

3.2 Sample Selection and Data Sources:

This paper selects A-share trading normal equipment manufacturing companies stocks in Shanghai and Shenzhen 2014 as samples. As mentioned above, this paper selects equipment manufacturing company as the research object due to the industry has started relatively early with stable data, weak speculation, investment is large, the industry cycle, the product cycle, and the production cycle and so on.

The sample selection process as: (1) the new shares issued before and after the listing would involve more financial adjustments, the instable financial situation and poor comparability, so the companies are listed after 31 December, 2012 will be removed; (2) to be known as ST or PT enterprises due to successive losses, poor mobility and trading of its shares are more restricted, and the market value of the distortion is severe, so be excluded; (3) to ensure the continuity of data, excluding the missing information of sample data; (4) to reduce the impact of potential data errors caused, excluding the value of singularity company; (5) excluding companies which issue B shares and H shares at the same time.

The data is from the official website of China Securities Regulatory Commission, Shanghai Stock Exchange, Shenzhen Stock Exchange, Net Ease and Flush stock securities trading analysis software. There are ultimately 169 listed companies meet the above requirements by strict accordance with the above principles were screened and removing data, and they become the research target object of this article.

4. DESCRIPTIVE STATISTICS

4.1Analysis of Descriptive Statistics:

It is a very crucial step of this article to determine an expected amount of investment and non-investment enterprise efficiency. Unexpected investment of business will not only be judged a business as over-investment or under-investment, but the relationship between basic research and variables. This research constructs the expected investment model by Richardson's theory (2006) and test results are as shown in Table 4-1:

Table 4-1 Regression analysis of the expected investment model

Expected investment model	R	R2	Adjusted R2	Estimated standard error	D-W The test statistic
1	0.3898	0.1520	0.1243	0.0573	2.0930

A: R2 is the fitted values, the higher the better; D-W is autocorrelation coefficient test, the closer to 2 the better.

From Table 4-1, the model fitted value adjusted R2 is 12.43% which indicates the model can explain the scale of investment in new business projects reaches 12.43% of all. Autocorrelation coefficient of determination, D-W is 2.0930 which is very close to 2 and shows the model does not autocorrelation. Next, the inspection test on the overall significant level model, test results are shown in Table 4-2.

Table 4-2 Expected investment model F-test

Model		Sum of square	df	Mean Square	F	Sig.
1	Regression	0.0905	5	0.0181	5.4853	0.0001***
	Residual	0.5042	153	0.0032		
	Total	0.5944	158			

a:*、**、***Represent a test subject is at 10%, 5% and 1% level is significant.

From Table 4-2, the expected investment model F is 5.4853, and passed the significance test at the 0.01 level, which indicates the equation, reflects the linear relationship among variables. After passing the whole equation by significant test, the next step is test the significance of each independent variable case. Each variable significant level test results are shown in Table 4-3:

Table 4-3 Expected Investment Model T test results

Variable	Expected symbol	Coefficient	Standard deviation	Standardized β value	t	Sig.	Multicollinearity test	
							Tolerance factor	Variance inflation factor
(Constant)		0.0428***	0.0157		2.7267	0.0071		
Growth，t-1	+	-0.0112**	0.0048	-0.2105	-2.3887	0.0181	0.7125	1.4038
Levi，t-1	-	-0.0580**	0.0275	-0.1650	-2.1076	0.0367	0.9047	1.1054
CFOi,t-1	+	0.1239	0.0762	0.1276	1.6280	0.1056	0.8988	1.1128
ROEi,t-1	+	0.0871**	0.0385	0.1760	2.2555	0.0255	0.9103	1.0987
NIi,t-1	+	0.1207*	0.0718	0.1510	1.6795	0.0951	0.6860	1.4579

a:*、**、***represents a test subject is at 10%, 5% and 1% is significant.

From Table 4-3, coefficient symbols of each independent variable and contemplated herein are substantially the same, except for the growth indicators. In the previous expectation, this article assumes that enterprises are stable development which represents the period of growth will continue, even if the inertia force reduction occurs, the process is very slow.

5. EMPIRICAL RESEARCH

Chinese equipment manufacturing companies have the problem of excessive investment and serious underinvestment problem, hypothesis 1 has been partially confirmed. To test the relationship between free cash flow and inefficient investment, this paper will be divided into non-investment spending efficiency investments over UI> 0 and underinvestment UI <0 two parts and the free cash flow is also divided a positive free cash flow FCF> 0 and negative free cash flow FCF <0 into two parts so that each variable were investigated twenty-two correlation. Correlation test results are shown in Table 5-1:

Table 5-1 Pearson correlation test between variables

Pearson test	FCF	FCF>0	FCF<0
UI	0.084	0.030	0.060
Sig.（Two-tailed test）	0.290	0.829	0.541
UI>0	0.068	0.125	0.173
Sig.（Two-tailed test）	0.527	0.551	0.256
UI<0	0.113	-0.026	0.020
Sig.（Two-tailed test）	0.352	0.895	0.879

a:*、**、*** represents a test subject is at 10%, 5% and 1% is significant.

From Table 5-1, the second part of hypothesis 1 has not been confirmed: inefficient investment expenditure and free cash flow of Chinese equipment manufacturing enterprises listed companies contemplated herein and no positive correlation, and the correlation between them did not pass the test of significance. This does not match the conclusions that study based on the A-share manufacturing sample. The reason may come from the following aspects:

First, according to China Investment Conference participating entrepreneurs Chen (2013) views: China is already the world's number one production scale manufacturing country, but its high-end manufacturing lacks of heavy investment in serious shortage. This proposed research selects only heavy machinery and equipment companies as samples, which is to exclude the food, textile and other traditional manufacturing industries because of interference of different industries. Hence, this article obtains different conclusions from previous scholars' studies about the A-share manufacturing sample, the possibly reason is: China's equipment manufacturing industry itself does not show a consistent trend with A-shares of the overall investment characteristics.

Second, Why there is no a significant correlation between negative free cash flow and insufficient investment companies? One possible reason is the company's investment decisions by a very wide range of effects, including not only the internal factors, but also numerous external factors such as national policies, corporate strategy, managers' personal preferences and so on. From the internal factors, the indicators within the enterprise managers are likely to affect investment decisions, while free cash flow is just one of many factors, and is most likely not the key drivers of the manager's investment decisions. In this case, free cash flow has no significant correlation with final investment result which makes sense.

Finally, in addition to the industry itself and companies own problems, research methods may also lead in inconsistent findings. As mentioned before, the expected investment and non-investment are gained by the previous expected investment model derived less than 20% of the linear regression equation to probably cover the important financial information, so that their free cash flow and investment expenditure becomes vague. The free cash flow is a common estimates derived from the two indicators as cash flow statement and the expected investment, not estimates derived from accounting balance sheet, which will also affect the accuracy of the raw data.

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