BioTechnology

An Indian Journal

Managerial over-confidence and inefficient investment of enterprises-empirical researchbased on view of enterpriselifecycle

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ABSTRACT

This paper analyzes dynamic change of the managerial over-confidence and its influence on the inefficient investment of enterprises on different stages of enterprise's lifecycle and performs empirical validation. The results indicate that the over-confidence of the managers will weaken with evolution of enterprise lifecycle. The managerial over-confidence has no significant difference in the growth period and mature period, but the over-confidence level in the growth period is significantly higher than it in the declination period. The over-confidence level of managers in the growth period will have the strongest influences on the inefficient investment of enterprises. The over-confidence in the mature period and declination period has significantly reducing influences on the inefficient investment.

KEYWORDS

Managerial over-confidence; Self-serving attribution measurement method; Enterprise inefficient investment; Enterprise lifecycle.
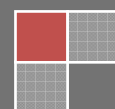
INTRODUCTION

Domestic and foreign scholars have been dedicated to research on explanation and solution of enterprise's inefficient investment for a long period. Modigliani and Miller (1958)[1] proposed classical MM theory, but it is too far from the reality. Later, some scholars relaxed the hypothesis and studied influence of information asymmetry, agency and financing constraint on enterprise's inefficient investment. After 1980, with emerging of finance theory on company behavior, scholars started to know that irrational behaviors of managers will also affect enterprise's inefficient investment, especially over-confidence (Heaton[2], 2002).

So far, most Domestic and foreign scholars study influences of the managerial over-confidence on inefficient investment of enterprises from static view and do not consider change of the managerial over-confidence and difference of its influence on the inefficient investment, so this paper measures the managerial over-confidence of the listed companies on the share A market to check if the managerial over-confidence level significantly changes on different stages of the enterprise lifecycle and analyze the reasons and next dynamically analyzes influence of managerial over-confidence on enterprise's inefficient investment from the view of enterprise's lifecycle. The main contributions are described as follows: (1) Analyze and validate differences of managerial over-confidence on different stages of the enterprise's lifecycle and reflect the change law of the managerial over-confidence. (2) Study and validate the differences of the influences of managerial over-confidence on the enterprise's inefficient investment on different stages of enterprise's lifecycle.

THEORY ANALYSIS AND RESEARCH ASSUMPTIONS

Managerial over-confidence and enterprise's inefficient investment

Roll (1986)[3]first proposed Hubrishypothesis and indicated that the managerial over-confidence will over-evaluate the revenue of the purchased enterprises and lead to excessive expansion and purchase, but the actual payment is far over the revenue. Malmendier and Tate (2005a)[4]found that over-confident CEO is more sensitive to the investment cash flow. Hao Ying (2005)[5] first studied the empirical data of the listed companies in China and found that the over-confident managers are prone to excessive investment and the confidence of managers is positively correlated to the sensitivity of free cash flow for company's investment. The Chinese scholar Ye Bei (2009)[6] and Jiang Fuxiu (2009)[7] also studied similarity, so he proposed the hypothesis 1.

Hypothesis 1: H_1The managerial over-confidence is positively correlated to the enterprise's inefficient investment.
Enterprise lifecycle and managerial over-confidence

As an American managerialist, Ichak. Madith[8] first completely and systematically stated the enterprise lifecycle theory in 1989 and divided the enterprise lifecycle into 3 stages and 10 periods. The domestic scholars simplify the enterprise lifecycle as start-up stage, growth stage, mature stage and declination stage.

To study dynamic change of the managerial over-confidence on different stages of enterprise lifecycle, we can discover the influence factors of this psychological bias based on meaning of the over-confidence. The over-confidence is a bias due to insufficient understanding of people on self-capabilities and knowledge scope (Shefrin, 2001)[9]. The persons with over-confidence psychological bias are excessively optimistic and confident to self-capabilities, knowledge and prediction in future, so it indicates that two factors affect the over-confidence psychological bias. The first factor is the past work experiences of managers. Generally the managers have egocentric attitude to the past work experiences, so it will easily lead to over-confidence. The second factor is adequacy of prediction basis and certainty of results. If the feasibility of the investment projects or the basis for enterprise performance prediction is not adequate and the determined results are fuzzy and uncertain, the managers will have over-confident psychological bias. On the contrary, the prediction basis is adequate and the determination results are clear, the managers will not be over-confident. In addition, the research from scholars indicates that managers will correct over-confidence psychological bias via learning and make the manager's psychology evolve form irrational state to rational state.

The manager's past experiences, determination for further expectation and learning environment will change differently on different stages of the enterprise lifecycle, so the managerial over-confidence will change with the enterprise lifecycle.

On the growth stage, the professional managers are employed by enterprises due to proprietary right and management right separation. The employed managers have high work passion and the enterprise's performance is better on the start-up stage. The enterprises can flexibly adapt the future development and transition. The learning environment is not mature and opportunities are limited, so the managerial over-confidence is the strongest on this stage.

On the maturity stage, the enterprises have more mature products and services, more stable market and enhanced organization integrity. The enterprises can also adapt the future development and transition. The manager's learning environment is perfect in a long period and the learning opportunities are plentiful, so the past experiences make managers enhance self-confidence on the maturity stage. The future expectation has uncertain influences on the managerial over-confidence and learning weakens the managerial over-confidence.

On the declination stage, the enterprise will decline and the manager's control capability will weaken, so most enterprises can not adapt the future development and transition. The learning environment is the most mature. The managers will strengthen learning to find the way in future due to current situations. The learning can better correct over-confidence, so the managerial over-confidence is the weakest on the declination stage.

Based on the above analysis, this paper proposes the second hypothesis.

Hypothesis 2: H$_2$When the enterprises are on different stages of the lifecycle, the managerial over-confidence level will have significant differences.

H$_{2a}$: The managerial over-confidence is the strongest in the growth period.

H$_{2b}$: The managerial over-confidence is the weakest in the declination period.

H$_{2c}$: Compared to the declination period, the managerial over-confidence in the maturity period approximates more to it in the growth period.

Enterprise lifecycle, managerial over-confidence and enterprise's inefficient investment

The existing references, which study inefficient investment from the view of the enterprise lifecycle, are limited. Cao Congyan (2012)[10] studies the relation between free cash flow and inefficient investment from the view of enterprise lifecycle. Li Yunhe and Li Zhan (2012)[11] study evolution of the relation between the manager agency and enterprise's excessive investment with the enterprise lifecycle and validate governance effect of the corporate governance mechanism with the enterprise's lifecycle.

Based on the above theoretical analysis, the managerial over-confidence level reaches the maximum in the growth period. The manager's over-confidence level will have the strongest influence of the enterprise's inefficient investment on this stage. The over-confidence level reaches the minimum in the declination period and its influence on the enterprise inefficient investment will be significantly weakened. The managerial over-confidence level will be affected by history experiences and learning in the maturity period and the change is unstable, so the influence of the managerial over-confidence level on the enterprise's inefficient investment has no significant differences on this stage compared to the growth period, so the following hypothesis are proposed for research:

Hypothesis 3: H$_3$The managerial over-confidence will have the strongest influences on the enterprise's inefficient investment in the growth period;

Hypothesis 4: H$_4$ The managerial over-confidence will have the significantly reduced influences on the enterprise's inefficient investment in the declination period;

Hypothesis 5: H$_5$ The influences of the managerial over-confidence on the enterprise's inefficient investment does not change significantly in the maturity period compared to the growth period.

RESEARCH DESIGN

Variant selection and definition

I. Explained variant

The enterprise's inefficient investment (Ine_Inv) is measured by using the regressive residual by referring to Richardson (2006) model. If the residual is positive, it indicates excessive investment. if the residual is negative, it indicates insufficient investment and is measured by the absolute value. The model (1) is shown as follows:

$$Inv_t = \alpha_0 + \alpha_1 Growth_{i,t-1} + \alpha_2 Lev_{i,t-1} + \alpha_3 Cash_{i,t-1} + \alpha_4 Age_{i,t-1} + \alpha_5 Size_{i,t-1} + \alpha_6 Ret_{i,t-1} + \alpha_7 Inv_{i,t-1} + \sum Ind + \sum Year + \varepsilon_{i,t} \qquad (1)$$

II. Explaining variant

A. Over-confidence variant

Hou Qiaoming (2015)[12] measures the managerial over-confidence by using the self-serving attribution measurement method. IP indicates the positive performance internal attribution, EP indicates the positive performance external attribution, IN indicates the negative performance internal attribution, EN indicates the negative performance external attribution, and "IP-EP+EN-IN" is used to identify and measure the managerial over-confidence (represented with OC).

B. Identification of enterprise lifecycle

Cao Yu (2010)[13] identifies the enterprise's lifecycle by using the negative and positive combination of the cash flow. The combination type of the cash flow is shown as the TABLE 1. The listed companies have passed start-up period, so Maturity and Decline virtual variants are used to divide the enterprise's lifecycle into the growth period, maturity period and declination period.

TABLE 1: Cash flow combination on different enterprise's lifecycle stages

	Start-up period	Growth period	Maturity period	Declination period				
				Elimination period			Declination period	
Operating cash flow	-	+	+	-	+	+	-	-
Investing cash flow	-	-	-	-	+	+	+	+
Financing cash flow	+	+	-	-	+	-	+	-

C. Control variants

The selected control variants are shown as the TABLE 2 according to research from related scholars:

TABLE 2: Variant description

	Variant symbol	Variant name	Variant definition
Explained variant	Inv	Annual added investment outlay	(cash for purchasing and constructing fixed assets, intangible assets and other long assets-net cash for handling fixed assets, intangible assets and other long asset)/total assets at the beginning of the period
	Ine_Inv	Inefficient investment	Absolute value of regressive estimated residual of model (1)
Explain variants	OC	Over-confidence	IP-EP+EN-IN, 0 is for a negative number and indicates non over-confidence
	Maturity	Maturity period	Maturity =1，Decline=0
	Decline	Declination period	Maturity =0，Decline=1；
	Growth	Growth opportunityTobinQ	(market value of equity + market value of net creditor's rights)/asset at the end of period, the market value of non-tradable share is replaced by net assets
	FCF	Free cash flow	Net cash flow for business activities/total asset at the beginning
	Lev	Asset-liability ratio	Total liabilities/total assets
	Cash	Cash holdings	Money fund/total assets at the end of the period
	Age	Listing years	Observation year—IPO time
	Size	Company scale	Natural logarithm of total assets
	Ret	Yield rate of share	Annual return rate of personal shares considering cash bonus reinvestment
Control variants	Roe	Yield rate of net assets	Net profits/shareholder rights and interests balance
	Invest	Previous investment amount	
	Top	Concentration of stock right	Shareholding ratio of the largest shareholder
	Board	Scale of board of director	Director number
	Inde	Ratio of independent director	Independent director/director number
	Industry	Industry variant	Classified according to "Listed company industry classification guide" issued by China's Securities Regulatory Commission in 2012
	Year	Annual variant	1 for 2012 and 0 for 2013

Model construction

This paper constructs the following two models:

$$Ine\_Inv_t = \alpha_0 + \alpha_1 OC_{it} + \alpha_2 Roe_{it} + \alpha_3 FCF_{it} + \alpha_4 Growth_{it} + \alpha_5 Lev_{it} + \alpha_6 Size_{it} + \alpha_7 Top_{it} + \alpha_8 Board_{i,t} + \alpha_9 Inde_{it} + \sum Ind + \sum Year + \varepsilon_{it} \tag{2}$$

$$Ine\_Inv_t = \alpha_0 + \alpha_1 OC_{it} + \alpha_2 OC_{it} * Maturity_{it} + \alpha_3 OC_{it} * Decline_{it} + \alpha_4 Roe_{it} + \alpha_5 FCF_{it} + \alpha_6 Growth_{it} + \alpha_7 Lev_{it} + \alpha_8 Size_{it} + \alpha_9 Top_{it} + \alpha_{10} Board_{i,t} + \alpha_{11} Inde_{it} + \sum Ind + \sum Year + \varepsilon_{it} \tag{3}$$

The model (2) is used to validate the hypothesis 1. The model (3) is used to validate the hypothesis 3, 4 and 5. The direction inconsistency and consistence of the interaction item α_2, α_3 and α_1 indicates that the influence of the managerial over-confidence on the enterprise's inefficient investment will be weakened and strengthened. Single factor variant analysis is used to validate the hypothesis.

Sample selection

This paper selects the companies listed on the Shenzhen and Shanghai main market in 2012-2013 as the total samples and the companies in the finance industry and companies with risk publishing notification, incomplete related variant data

and extremes are excluded. Finally 713 companies are identified as the research sample. The sample data is from CAMAR database.

Descriptive statistics

217 companies in the sample companies are in the growth period, 289 companies are in the maturity period and 207 companies are in the declination period. The mean inefficient investment of these companies is 0.6095 and approximates to median. If the maximum reaches 3.7107, it indicates that the enterprise's inefficient investment is relative severe. The enterprise's over-confidence level is 1.45 and the maximum is 5. The standard deviation is bigger. It indicates that the over-confidences of the enterprise managers are very difference. Other variant values are within the reasonable range and are not listed due to content restriction.

EMPIRICAL ANALYSIS

Validation of dynamic change of managerial over-confidence on different enterprise's lifecycle stages
For the results of single-factor variance analysis are shown as the TABLE 3.

TABLE 3: Single-factor variance analysis results

(I) Lifecycle	(J) Lifecycle	Mean difference (I-J)	Standard deviation	Significance
Growth period	Maturity period	0.201	0.108	0.064
	Declination period	0.275*	0.117	0.019
Maturity period	Declination period	0.074	0.110	0.503

*. The significant level of the mean difference is 0.05.

On the whole, the over-confidence level of the enterprise managers will decrease gradually in the growth stage, maturity stage and declination stage. The managerial over-confidence level reaches the maximum in the growth stage, followed by the maturity stage and declination stage. The managerial over-confidence level reaches the middle value in the maturity stage and has no significant difference from the managerial over-confidence level in the growth stage and declination stage. The managerial over-confidence level has 0.05-level significant difference in the growth stage and declination stage. The difference between the managerial over-confidence level in the growth stage and declination stage is 0.275, so previous two sub-hypothesis of the hypothesis II are validated. The hypothesis that the managerial over-confidence level in the maturity stage more approximates to it in the growth stage is not supported by empirical data. The managerial over-confidence level is affected by history experiences and learning in the maturity stage and the future prediction does not play a decisive role on this stage. The empirical data indicates that the managers of the sample companies are affected much by the learning compared to the history experiencein the maturity stage. The managerial over-confidence level will reduce and the irrational behaviors of the managers will weaken.

Validation of relation among enterprise lifecycle, managerial over-confidence and enterprise's inefficient investment
The OLS regression analysis is performed for the model (2) and (3) to validate influences of the managerial over-confidence on the enterprise's inefficient investment and its change on different enterprise's lifecycle stages. Results are shown as the TABLE 4.

The data results of the column (1) validate the relation between the managerial over-confidence and enterprise's inefficient investment. The correlation coefficient is 0.67 and passes 0.01-level significance test. It indicates that higher managerial over-confidence level will lead to more severe enterprise's inefficient investment, which proves that the hypothesis I is correct. The data results of the column (2) validate change of the managerial over-confidence and enterprise's inefficient investment on different lifecycle stages. The OC variant coefficient is 0.127 and passes 0.01-level significance test. It indicates that the managerial over-confidence is positively correlated to the enterprise's inefficient investment in the growth period. The coefficients of the OC*Decline and OC*Maturity are -0.069 and -0.010 and passes 0.01-level significance test. It indicates that the influences of the managerial over-confidence on the inefficient investment reduce significantly in the declination period, so the hypothesis 3 and 4 are validated. The hypothesis 5 is not validated. The sample data indicates that the influences of the managerial over-confidence on the inefficient investment also reduce significantly in the maturity period.

Robustness validation

This paper validates robustness of the selected variants and repeatedly validates the hypothesis in this paper. The results have no significant change. The detailed results are not listed due to content restriction of this paper.

TABLE 4: Validation results of relation among enterprise lifecycle, managerial over-confidence and enterprise's inefficient investment

	(1)	(2)
Constant	0.998**(2.351)	1.295***(3.045)
OC	0.67***(4.445)	0.127***(6.162)
OC*Maturity		-0.010***(-4.384)
OC*Decline		-0.069***(-2.728)
Roe	0.081(1.594)	0.079(1.559)
FCF	0.645***(2.698)	0.800***(3.246)
Growth	0.022(1.047)	0.020(0.943)
Lev	-0.263**(-2.466)	-0.272***(-2.587)
Size	-0.025(-1.283)	-0.036*(-1.864)
TOP	-0.126(-1.095)	-0.095(-0.834)
Board	0.012(1.064)	0.010(0.954)
Inde	-0.157(-0.478)	-0.176(-.538)
Adjust R^2	0.096	0.119
F	4.035	4.565
N	713	713

*.**.***. The significance level is 0.1, 0.05 and 0.01.

CONCLUSIONS AND IMPLICATION

This paper finds three factors which affect the over-confidencepsychological bias of the managers, including past experiences, future prediction and learning, describes the influences of dynamic change of the managerial over-confidence on the enterprise's inefficient investment on different lifecycle stages, and selects the companies listed on Shenzhen and Shanghai main market in 2012-2013 for empirical validation. The results indicate that the managerial over-confidence level reaches the maximum in the growth period and has the strongest influence on the enterprise's inefficient investment. The managerial over-confidence level does not significantly reduce in the maturity period, but its influence on the enterprise's inefficient investment is significantly weakened. The managerial over-confidence level reaches the minimum and its influence on the enterprise's inefficient investment is the weakest.

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