Improving Investment Efficiency in Enterprises: An Analysis of the Impact of Government Subsidies and Marketization Level

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Abstract. This paper examines the effect of government subsidies and the level of marketization on investment efficiency in Chinese A-share manufacturing companies that are listed on the Shanghai and Shenzhen stock exchanges from 2012 to 2022. Using panel data analysis, we investigate the underlying mechanism of these relationships. The findings reveal that when listed companies experience inefficient investment, government subsidies exacerbate overinvestment and enhance investment efficiency. However, for companies facing underinvestment, government subsidies bridge the capital gap but reduce investment efficiency. Moreover, regions with higher levels of marketization exhibit lower dependency on government subsidies and experience fewer instances of inefficient investment.

Keywords: government subsidies, Investment redundancy, under-investment

1 Introduction

Government subsidies refer to non-reimbursable but conditional transfers provided directly or indirectly by the government to a micro-active economy using fiscal policy instruments, with the aim of achieving its economic objectives. As marketization continues to advance in China, government subsidies are increasingly prevalent and significant in enterprises. The issue of investment efficiency brought about by government subsidies has gradually attracted the attention of scholars and society due to the presence of information asymmetry between the government and enterprises[1]. The government's intervention in enterprises can be seen as either a beneficial or opportunistic approach[2]. On the one hand, government subsidies can provide financial and resource support for enterprises, promote enterprise investment and scale expansion, subsidies can reduce the cost of enterprise financing, alleviate the pressure of funds, facilitate enterprises to better carry out technological innovation, equipment updating and other measures to establish competitive advantage, seize the market opportunity. Van Tongeren's study[3] suggests that providing companies with government funding can alleviate their financial constraints, improve their debt-paying ability, reduce their financial

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risks, and consequently influence their investment decisions. When government subsidies exceed a company's long-term liabilities, it can help alleviate investment shortages. Feldman and Kelley[4] assert that government subsidies themselves send a positive signal to the capital market, which can help eliminate barriers for companies to enter the capital market. On the other hand, government intervention counteracts inappropriate behavior by enterprises, ensuring their normal operations, due to enterprises' profit-centric nature and information asymmetry. Research by Wang Fengxiang and Chen Liuqin shows that politically intervened companies, which align with the government's economic and social objectives, are more likely to receive greater government subsidies[5]. However, the arbitrary power of financial expenditure possessed by the government is susceptible to the potential subsidization of listed companies for specific and self-serving reasons. Consequently, irrational resource allocation driven by self-interest may sacrifice economic growth and public welfare. Shleifer and Vishny[6] investigated and found that local governments may excessively intervene in businesses due to their own political interests, leading to inefficient investments by these enterprises.

The degree of marketization refers to the extent to which the market plays a decisive role in the allocation of resources in a market economy. A more market-oriented economic system is conducive to improving the efficiency of enterprise investment. Firstly, the degree of free flow of resources is higher in regions with a high degree of marketization, and the government has less resources at its disposal, which prompts the government to allocate subsidies more in accordance with the investment demand and improves the allocation efficiency of financial funds. Furthermore, regions with a higher degree of marketization impose stronger internal and external regulatory constraints on listed companies. This leads to a more cautious and efficient investment approach by these companies[7]. Based on this, the following hypotheses are proposed:

H1a: Government subsidies will exacerbate the problem of inadequate investment but will effectively alleviate the problem of excessive investment.

H1b: The higher the degree of marketization, the less prevalent the inefficiency investment problem in enterprises.

2 Research Design

2.1 Data

This paper utilizes the Choice Financial Data Terminal to obtain the relevant panel data of listed companies in the manufacturing industry in China's Shanghai and Shenzhen A-share markets for the time span from 2012 to 2022, with the final form of all data being annual data on calendar days. To ensure data integrity, the initial processing excludes financial companies listed and abnormal samples affected by ST and ST* during the period. Consequently, 33,480 valid annual observations were obtained.

2.2 Construction of regression model

Based on the main research theme of this paper, we develop the following Model (1):

$$I\_over/I\_under_{i,t} = \beta_0 + \beta_1 Sub_{t-1} + \beta_2\, Mindex_{t-1} + \gamma \times ControlVariables_{i,t-1} + \mu_k \sum_{k=1}^{m} Ind_k + \lambda_l \sum_{l=1}^{n} Year_l + \varepsilon_{i,t} \quad (1)$$

Where, $I\_over/I\_under_{i,t}$ denotes the enterprise investment efficiency, by many variables representing investment information after panel regression, the resulting regression residuals are taken to be greater than 0 for all panel datasets; Sub_{t-1} denotes the government subsidies; $ControlVariable_{i,t-1}$ denotes a series of control variables selected, and control industry (*Ind)* and time (*Year*) factors.

This paper employs descriptive statistics, correlation tests, and panel data regression analysis based on the aforementioned models to investigate the impact of government subsidies on corporate investment efficiency and their interplay and underlying mechanisms.

2.3 Variable definitions

2.3.1 Dependent Variable.

This paper refers to Richardson's investment expectation model[8], in which we estimate the expected reasonable investment input for the current year using historical data from the previous period (t-1) and measure the investment efficiency of enterprises using regression residuals.

$$INV_t = \alpha_0 + \alpha_{1*} Growth_{t-1} + \alpha_2 * LEV_{t-1} + \alpha_3 * CF_{t-1} + \alpha_4 * \mathrm{ROA}_{t-1} + \alpha_5 * Size_{t-1} + \alpha_6 * TobinQ_{t-1} + \alpha_7 * FA_{t-1} + \alpha_8 * IVN_{t-1} + \alpha_9 * AGE_{t-1} + \sum Year + \sum Industry + \varepsilon_t \quad (2)$$

Among them, INV indicates the investment level, which is calculated as the proportion of the net cash outflow from constructing fixed assets, intangible assets, and other long-term assets (after deducting the cash recovered from their disposal) to the total assets at the start of the year.

The term *I_over/under* denotes investment efficiency, specifically, it refers to the residual values resulting from the regression of Model (2). A positive residual value suggests an over-investment (*OverInv*) circumstance, wherein a larger residual value indicates a higher degree of over-investment. Conversely, a negative residual value signifies an under-investment (*UnderInv*) situation. To quantify the under-investment degree, the absolute value of the negative residual is taken, with a larger absolute value indicating a higher level of under-investment.

2.3.2 Explanatory Variable.

The explanatory variables in this paper are government subsidies (*Sub*) and the degree of marketization (*Mindex*), where government subsidies are measured in absolute government subsidies using the natural logarithm of the total government amount, and the data on the degree of marketization of each city are added to take into account the different impacts of the same amount of government subsidies on the firms in cities with different degrees of marketization, and to eliminate the differences of different degrees of marketization.

2.3.3 Control Variable.

The process of selecting control variables was conducted with diligent consideration of various factors such as the challenges associated with data acquisition, the adequacy and redundancy of information provided by the indicators, and their potential impacts on investment efficiency. After a thorough evaluation, a total of 11 indicators (Table 1) were chosen and incorporated into the established Model 1.

Table 1. Specific Description of Control Variables

Variable Name	Symbol of Variable	Definition
The Enterprise Scale	*SIZE*	Ln (total assets)
Financial leverage	*LEV*	Asset-liability ratio
Cash Flow from Operations	*CF*	The ratio of cash flow from operating activities to total assets at the beginning of the year
Management Stock Ownership	*MGR*	Executive ownership ratio
Fixed Assets	*FA*	The ratio of fixed assets to total assets at the beginning of the year
Average Return on Total Assets	*ROA*	Net profit before interest and tax*2/total assets at the beginning and end of the period
Book to Market	*BM*	Book value of all assets/asset value
Enterprise Growth	*Growth*	Year-on-year growth in operating revenue
Firm Age	*AGE*	The corresponding date-date of listing of the Company
Time Dummy	*Year*	Use 1 for the current time point and 0 for all other time points
Industry Dummy	*Ind*	Use 1 for the current industry and 0 for other industries

3 Empirical Results and analysis

3.1 Descriptive statistics

The results of descriptive statistics(Table2) indicate that the sample companies exhibit a wide range of investment efficiency, with the maximum value of 4.7282 and the minimum value of -6.6893. This suggests that listed companies in China face challenges of both underinvestment and investment redundancy. The median investment efficiency is positive, indicating that a majority of the listed companies have investment redundancy. Regarding government subsidies, the maximum value is 22.2001, the minimum value is 0, and the standard deviation is 5.8014. These statistics suggest that not all enterprises have received government subsidies, and there is a significant variation in the amount of subsidies received. This highlights the uneven distribution of government financial support resources.

Furthermore, the degree of marketization exhibits variation across regions, with the maximum value of 12.8640 and the minimum value of -0.1610. This regional disparity is likely to have an impact on investment efficiency.

Among the control variables, the standard deviation of the firm's debt ratio and return on assets is 21.0039 and 10.6769, respectively. These statistics indicate substantial differences in the financial position of the sample firms, which may influence their access to government subsidies and ultimately affect investment efficiency.

Table 2. Descriptive Statistics Analysis

count N	I_over/under	Sub	Mindex	Lev	CF	Manager	FA	ROA	EC
mean	0.0076	13.8590	9.9340	38.5330	0.0641	16.9310	0.2696	4.8694	33.2738
std	0.1099	5.8014	1.7770	21.0039	0.1554	21.0420	0.9013	10.6769	14.2356
min	-6.6893	0.000	-0.1610	0.7969	-9.2387	0.000	0.0000	-168.2957	1.8400
max	4.7282	22.2001	12.8640	1150.9690	8.6681	89.9900	113.8563	1003.2190	89.9900

3.2 Correlation analysis

Table 3 demonstrates the correlation coefficients between the level of investment, government subsidy and degree of marketization and all control variables:

Table 3. Relative Coefficient

	I_over/under	Sub	Mindex	Lev	CF	Manager	FA	ROA	EC
I_over/under	1.0000								
Sub	0.0205	1.0000							
Mindex	0.0331	-0.2062	1.0000						
Lev	-0.0110	0.0546	-0.0954	1.0000					
CF	0.0208	0.0186	0.0217	-0.1054	1.0000				
Manager	0.1113	-0.0488	0.1961	-0.2760	0.0325	1.0000			
FA	0.0213	0.0201	-0.0473	0.0385	0.3193	-0.0280	1.0000		
ROA	-0.0234	0.0074	0.0408	-0.2521	0.2707	0.1167	0.0057	1.0000	
EC	0.0144	0.0487	-0.0471	-0.0350	0.0737	0.0002	0.0163	0.0893	1.0000

The findings from the correlation analysis reveal several relationships between variables in the context of investment efficiency and government subsidies. Firstly, the positive correlation that exists between government subsidies and investment efficiency suggests that the provision of subsidies by the government stimulates enterprises to

increase their investment expenditures. However, this also exacerbates the issue of investment redundancy within enterprises. Secondly, a positive correlation is found between the degree of marketization and investment efficiency. This highlights that regions with a higher degree of marketization tend to exhibit a greater level of investment efficiency among enterprises in that area. Lastly, a negative correlation is observed between government subsidies and the degree of marketization. This suggests that regions characterized by a higher level of marketization necessitate less government financial assistance due to the elevated degree of resource mobility within these regions.

3.3 Panel data regression analysis

Table 4. Summary of Regression Results for Hypothesis Testing

	I_over/under		*OverInv*	*UnderInv*
	without Control Variables	**with Control Variables**	**with Control Variables**	**with Control Variables**
const	0.1246***	0.1024***	0.0611***	-0.0556***
L.sub	0.0006***	0.0008***	-0.0000	0.0009***
L.mindex	-0.0134***	-0.0040***	-0.0017	-0.0023**
L.lev		-0.0027***	-0.0004***	-0.0002**
L.cf		0.0131**	0.0178***	0.0574***
L.manager		0.0001	0.0000	0.0002***
L.fa		0.0004	-0.0016**	0.0247***
L.roa		0.0004***	0.0001	0.0004***
L.ec		0.0009***	0.0007***	0.0004***
Time Effects	*Yes*	*Yes*	*Yes*	*Yes*
Industry Effects	*Yes*	*Yes*	*Yes*	*Yes*
No.Observations	18,674	18,674	8,658	10,016
R-squared	0.008	0.154	0.010	0.060

*Note: The data in the table are the regression coefficients of each variable, ***, **, * indicate that they are significant at 1%, 5%, 10% level of significance, respectively.*

Table 4 demonstrates Panel regression results for the hypothesis testing, government subsidies and investment efficiency is significantly positive at the 1% level, meaning that government subsidies not only will not alleviate the situation of under-investment but also exacerbate the problem of inefficient investment, thus highlighting the impact of government intervention. Moreover, the relationship between debt ratio and investment efficiency is significantly negative at the 1% level, which means that the higher the debt ratio, the higher the inefficient investment problem of enterprises will be alleviated. Additionally, cash flow, return on assets, equity concentration and fixed asset ratio are all positively correlated with investment efficiency, indicating that the higher

the cash flow, return on assets, equity concentration and fixed asset ratio of listed companies, the more serious the problem of inefficient investment exists. Furthermore, the significant negative correlation between the degree of marketization and investment efficiency at the 1% level indicates that the higher the degree of marketization, the more the problem of both investment redundancy and under-investment will be reduced. In addition, the regression coefficient between investment redundancy and financial subsidy is significantly negative, indicating that the more financial subsidy from the government, the more the phenomenon of investment redundancy can be alleviated. The regression coefficient between investment insufficiency and government subsidies is significantly positive, indicating that the more financial subsidies received, the more investment insufficiency.

4 Conclusions

Government subsidies have varying impacts on enterprises as per their investment circumstances. To a certain extent, government subsidies influence and change the financing environment and investment decisions of enterprises, enabling them to obtain more financing funds and investment choices, reducing the pressure on funds and seizing market opportunities. However, the actual positive effects of increased subsidies on enterprises need to be further researched and analyzed. At the same time, different external factors with different degrees of marketization also have different impacts on the investment efficiency of enterprises. This paper adopts the dataset comprising of Chinese A-share listed companies from 2012 to 2022 as the research samples, empirically examines the relationship between government subsidies, the degree of marketization and investment efficiency, and draws the following conclusions:

(1) China's listed companies have serious inefficient investment problems, and government subsidies exacerbate the problem of underinvestment, but they will be an effective alleviation of the redundancy problem and promote the enhancement of investment efficiency.

(2) For enterprises in regions with different degrees of marketization, the higher the degree of marketization, the more efficient the allocation of required government financial funds will be, and the problem of inefficient investment will be reduced.

Government subsidies play a crucial role in utilizing financial resources to promote the development of the economy and enhance the efficiency of investment. However, the selection of subsidy recipients must be based on clearly defined objectives and expected outcomes, rather than merely focusing on economic development indicators and political performance. It is imperative to establish a well-designed government subsidy mechanism that tailors policies to address the specific needs of different entities, such as promoting industry reform and innovation, fostering the growth of small and medium-sized enterprises, and supporting micro-enterprise innovation and expansion. At the same time, the government should establish transparent evaluation criteria and subsidy application procedures to prevent financial funds from being misused by the government for certain purposes, to ensure that the application process is fair and just, and

that projects are evaluated on the basis of their quality, potential benefits and sustainability. Public disclosure of subsidy-related information in real time is vital to foster external oversight and regulatory compliance[9]. Furthermore, it is essential for the government to consider the competitive market environment and align subsidy measures with market forces to maximize their beneficial impact and enhance the efficiency of company investments. By striking a balance between marketization and government intervention, subsidies can effectively support sustained and healthy company development[10].

Reference

1. Wang Keming, Liu Jing, and Li Xiaoxi. Research on Industrial Policies, Government Support, and Company Investment Efficiency [J] . Management World, 2017(3): 113-145.
2. Wang Jian, Tang Chang. (2019). Government subsidies, investment efficiency, and business risk. Journal of Zhengzhou Aviation Industry Management Institute, 37(2), 68-90.
3. VAN TONGEREN F W. Microsimulation of corporate response to investment subsidies [J]. Journal of Policy Modeling,1998,20(1):55-75.
4. FELDMAN M P, KELLEY M R. The exante assessment of knowledge spillovers: government R&D policy, economic incentives, and private firm behavior [J]. Research Policy, 2006, 35(10):1509-1521.
5. Fengxiang, W. Liuqin, C. Rational Thinking of Local Governments Providing Financial Subsidies to Local Competitive Enterprises [J]. Economy, 2005(6): 85-91.
6. Shleifer A., Vishny R. Politicians and Firms [J]. Quarterly Journal of Economics, 1994(4): 995 ~1025 .
7. Gang, L., Qingchuan H., Jin, Z. Government Subsidies and Corporate Investment Efficiency: An Empirical Analysis Based on China's Institutional Context
8. RICHARDSON S. Over-investment of free cash flow [J]. Review of Accounting Studies,2006,11(2/3):159-189.
9. Liu, J., Yin, Y., & Wang, L. (2019). Government subsidies, institutional investors, and investment efficiency. Financial and Accounting Monthly, 10.19641/j.cnki.42-1290/f.2019.07.004.
10. Ma, G., & Lv, D. (2022). Government Subsidies, Product Market Competition and Corporate Investment Efficiency. Accounting Friend, 1004-5937(07), 0024-07. http://www.cnki.net