



# A Study on Investment Efficiency and Influencing Factors of Chinese A-Share Tourism Listed Companies

## --Based on Richardson Investment Model

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**Abstract.** There are inefficient investment behaviors in tourism industry, and the efficiency of investment activities is crucial to the long-term stable development of listed tourism companies. Based on Richardson investment efficiency model, this paper uses DIFF-GMM dynamic panel regression to study the changes of investment efficiency of 18 state-controlled and non-state-controlled tourism listed companies in A-share in China. The results find that the stability of investment efficiency level is weaker for non-state-owned tourism listed companies and stronger for state-controlled tourism listed companies; the investment level and cash flow situation in the previous period have a positive effect on the investment level in the current period; a moderate gearing ratio can effectively stifle inefficient investment. This paper provides some reference and suggestions for tourism enterprises when making investment decisions.

**Keywords:** Tourism listed companies, Richardson investment model, investment efficiency.

## 1 Introduction

Tourism industry, as an emerging as well as complex labor-intensive industry, can promote economic development. 2019 years, the tourism economic revenue was damaged by the new corona virus pneumonia epidemic.

There are non-efficient investment behaviors in tourism industry, and whether the investment activities are effective is crucial to the long-term stable development of tourism listed companies. For the rapidly developing tourism listed companies, the efficiency investment of tourism listed companies is a favorable guarantee for the enterprises to achieve good business performance and obtain sustainable development ability. This study analyzes based on the perspective of equity structure and regional external differences of tourism listed companies, which enriches the research perspective of tourism listed companies. So far, there are more studies on the efficiency of corporate investment in academia, but there are fewer studies on the influencing factors of non-efficient investment in tourism enterprises. In this paper, we will study the

influencing factors that restrict the inefficient investment behavior of enterprises, and safeguard the due rights and interests of external small and medium-sized investors; explore how each local government can further optimize the market environment and promote the perfect development of capital market.

## 2 Literature review

### 2.1 Assessment of the efficiency of corporate investments

Investment efficiency refers to the ratio between the revenue that can be obtained through investment activities and the resources consumed in investment activities<sup>[1]</sup>, which is a specific index for evaluating the performance of the enterprise's investment behavior<sup>[2]</sup>. However, enterprises often encounter the following problems in their operational practice: the existence of a variable and unstable market environment; the lack of resource endowment or low level of economic development in the region; internal management omissions that make it difficult to grasp the opportunities for enterprise development, which lead to over-investment or under-investment<sup>[3]</sup>. Therefore, it is important to conduct relevant investment efficiency assessment analysis.

Research on investment efficiency has been covered in several industries, while involving multiple assessment methods. For example, Peng Youyuan (2016) used DEA model to measure the investment efficiency of technology innovation listed companies<sup>[4]</sup>, Guan Xuemei et al. (2019) combined two methods of stochastic frontier method and data envelopment analysis DEA when studying the investment efficiency of forestry listed companies<sup>[5]</sup>, Cui-oi et al. (2020) used crossover DEA model to study the investment efficiency of logistics listed companies<sup>[6]</sup>, Zhou Wenjuan (2013) used the production method to determine four input indicators of investment efficiency of listed companies<sup>[7]</sup>, Wu Xiangming et al. (2013) used the DEA-Malmquist index to study the investment efficiency of listed tourism companies<sup>[8]</sup>, and Xu Xia et al. (2021) used the multiplicative difference method to assess the impact of e-government reform on the investment efficiency of enterprises<sup>[9]</sup>.

The Richardson model method is one of the more common assessment methods, and numerous scholars use the model with continuous modification and improvement of its variables. In using the Richardson model, the most basic thing to achieve an accurate measurement of investment efficiency of listed companies is to clarify the optimal investment level of enterprises<sup>[10]</sup>, and existing researchers mostly take the perfect capital market as the premise in their studies, so the marginal Q, which represents the investment opportunities of companies, becomes the best explanatory variable for the optimal investment level of enterprises<sup>[11]</sup>.

### 2.2 Factors affecting the efficiency of enterprise investment

There are numerous factors influencing the efficiency of corporate investment, which are mainly divided into two aspects: internal and external. The internal influencing factors generally include private gains in control, free cash flow, equity concentration

and equity checks and balances, and accounting information quality <sup>[12]</sup>. Besides, in the case of separation of ownership and operation of the company, conflicts of interest between executives and shareholders, executive change <sup>[13]</sup>, managerial overconfidence <sup>[14]</sup>, and management power <sup>[15]</sup> are also important reasons that affect investment efficiency. Corporate social responsibility is one of the factors that affect investment efficiency, and Lei Guangyong et al. (2014) elaborated investment efficiency from the perspective of social trust and audit choice, and found that the higher the audit quality, the higher the investment efficiency, while social trust has a reinforcing effect on this effect <sup>[16]</sup>.

### 3 Methodology

#### 3.1 Selection of research sample

This paper explores the impact of investment efficiency and influencing factors of tourism enterprises by using Chinese A-share listed tourism enterprises from 2008-2019 as the research object. The selected data are derived from the Cathay Capital (CSMAR) database, and the year 2008 is chosen as the starting point of the study, and the time range is 2008 - 2019 accounting cycle. When the controlling shareholder is a state-owned shareholder, this paper considers the enterprise as a "state-owned holding company"; when the controlling shareholder is a non-state-owned shareholder, this paper considers the enterprise as a "non-state-owned holding company".

At the same time, this paper draws on existing research practices and treats the research sample as follows: (1) excluding ST and ST\* companies in the sample period; (2) excluding non-mainboard listed companies; (3) excluding companies listed for less than one year; (4) excluding companies with missing relevant data. In addition, in order to exclude the influence of frequent changes in the nature of enterprises in the sample period on the research findings, this paper excludes the samples with changes in the nature of enterprises in the sample period. After processing, this paper finally obtained a total of 18 samples with a total of 12 years of data from 2008-2019.

**Table 1.** Sample of A-share listed tourism companies

Holdings	Securities Code	Securities Name
	000428	Huatian Hotel
	000430	Zhangjiajie
	000524	Lingnan Holdings
	000610	Xi'an Tourism
State-owned Holding Company	000721	Xi'an Catering
	002059	Yunnan Tourism
	002186	Quanjudu
	600054	Huangshan Tourism
	600258	Shougang Hotel
	600358	CITS United
	600706	Qujiang Travel
	600754	Jinjiang Hotel

	601007	Jinling Hotel
	000796	Caesar Travel
	002033	Lijiang Travel
Non-State Holding Company	002153	Shiji Information
	002159	Sante ropeway
	600749	Tibet Travel

Data source: WIND database, each stock under the travel industry classification

### 3.2 Model construction and index selection

The Richardson investment efficiency model is a model based on time series panel data to calculate the optimal level of investment for a firm's theory. The core is a measure of a firm's current level of investment as well as an estimate of the firm's theoretical level of investment. Since traditional OLS regression can result in inconsistent parameter estimates or unstable results, this study uses a differential GMM estimation model to calculate the expected normal level of firm investment. The differential GMM model assumes that the random disturbance terms are not serially correlated and uses variable lag order as the instrumental variable. Second, the difference between the actual level of firm investment and the estimated normal level of firm investment (regression residuals) is used to represent the difference between the actual investment behavior of firms and the theoretical optimal investment. If the residual  $\varepsilon > 0$ , the firm has over-investment; if the residual  $\varepsilon < 0$ , the firm has under-investment, both of which are "inefficient investment".

Based on this, the panel mixed-effects regression model (1) is constructed.

$$Invest_{i,t} = \beta_0 + \beta_1 Growth_{i,t-1} + \beta_2 Size_{i,t-1} + \beta_3 Lev_{i,t-1} + \beta_4 Cash_{i,t-1} + \beta_5 Age_{i,t-1} + \beta_6 Ret_{i,t-1} + \beta_7 Invest_{i,t-1} + \Sigma Year + \varepsilon_{i,t} \tag{1}$$

The explanatory variables in the model lag one period behind the values of the explanatory variables. In this paper, the meaning of individual variables in the construction of the investment expectation model is described in Table 2.

**Table 2.** Meaning of variables in model (1)

	Variable Symbols	Variable Name	Variable definition and processing
Explained variables	Invest <sub>i,t</sub>	Investment expenses for the year	Cash paid to construct fixed assets, intangible assets and other long-term assets in the statement of cash flows - Net cash recovered from disposal of fixed assets, intangible assets and other long-term assets + Cash paid to purchase subsidiaries and other business units - Cash received from disposal of subsidiaries and other business units, normalized by total assets at the beginning of the year
Explanatory variables	Growth <sub>i,t-1</sub>	Enterprise growth	Growth rate of main business income in the previous year (Tobin's Q value)
	Size <sub>i,t-1</sub>	Enterprise	The natural logarithm of the company's total

	size	assets at the end of the previous year
$Lev_{i,t-1}$	Gearing ratio	Total liabilities at the end of the year divided by total assets at the end of the previous year
$Cash_{i,t-1}$	Cash holding level	The sum of the company's money capital and short-term investments divided by the total assets at the end of the previous year
$Age_{i,t-1}$	Number of years on the market	Current year minus the company's listing year plus the natural logarithm of 1
$Ret_{i,t-1}$	Stock Return	Growth rate of earnings per share for the previous year
$Invest_{i,t-1}$	Prior Year Investment Expenses	The value of the variable corresponding to the dependent variable taken in the previous period
$\Sigma year$	Year Dummy Variable	1 for a definite year, 0 otherwise

## 4 Estimation of the results of the investment efficiency assessment model

### 4.1 Descriptive statistics and correlation test of investment expectation model variables

The empirical process of this paper uses STATA 16.0 software. Table 3 and Table 4 show the results of descriptive statistics analysis and correlation of each variable in the investment efficiency analysis. From the results of descriptive statistics, the median value of asset-liability ratio of listed tourism companies is 0.4366, in which the median value of asset-liability ratio of state-owned holding companies is higher than the overall median value; the median value of asset-liability ratio of non-state-owned holding companies is lower than the overall median value. The median value of cash flow of tourism listed sample companies is -244000000, which easily leads to different investment problems of companies.

Table 4 mainly reflects the correlation between the variables, and then determine whether there is multicollinearity between the variables. There is a significant correlation between investment expenditure in the previous period and investment expenditure in the current period of listed tourism companies. The size of the company has a facilitating effect on the investment behavior of the company.

**Table 3.** Descriptive statistics of variables

Panel A: Basic description statistics					
Variable	Obs	Mean	Min	Max	Std. Dev.
$Invest_{i,t}$	198	0.0681954	-0.0132173	0.2730608	0.0655326
$Growth_{i,t-1}$	198	0.1952181	-0.818682	3.745806	0.7776823
$Size_{i,t-1}$	198	21.18968	17.426	24.4974	0.9717777

Levi, t-1	198	0.4366088	0.115754	2.529196	0.2951602
Cashi, t-1	198	-244000000	-6600000000	332000000	726000000
Agei, t-1	198	13.66667	1	25	5.551787
Reti, t-1	198	0.2353613	-0.709961	2.276876	0.6693132
Investi, t-	198	0.0681384	-0.0349805	0.2835414	0.065858

Panel B: Comparison of differences in key variables

Variable	State-owned holding company			Non-state-owned holding company		
	obs	Mean	Std. Dev	obs	Mean	Std. Dev
Levi, t-1	106	0.4293118	0.3429404	37	0.5118961	0.2851993
Cashi, t-1	106	-265000000	937000000	37	-267000000	371000000
Reti, t-1	106	0.1950003	0.6189948	37	0.3111428	0.7472299

Data source: 2008-2019 (CSMAR database)

Table 4. Correlation analysis among variables

Variable Name	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Investi, t	1.000							
(2) Investi, t-1	0.606***	1.000						
(3) Levi, t-1	-0.017	0.010	1.000					
(4) Cashi, t-1	0.031	0.001	-0.035	1.000				
(5) Reti, t-1	0.026	-0.035	0.019	0.078	1.000			
(6) Growthi, t-1	-0.109	-0.179**	0.070	0.052	-0.014	1.000		
(7) Sizei, t-1	0.144**	0.336***	-0.189**	-0.215**	-0.012	-0.235**	1.000	
(8) Agei, t-1	-0.278**	-0.283**	0.033	-0.148**	-0.086	-0.035	-0.144**	1.000

Note: \*\*\*Significant at 1% level; \*\*Significant at 5% level; \*Significant at 10% level.

#### 4.2 Investment efficiency model DIFF - GMM regression analysis

Since the lagged period of the explanatory variables in the Richardson model is one of the explanatory variables, the OLS regression will result in pseudo-regression of the parameter estimation results. In this paper, the DIFF-GMM regression estimation model is used, that is, the basic model is subjected to first-order difference to remove the effect of fixed effects, and a set of lagged explanatory variables are used as instrumental variables for the corresponding variables. The regression results in Table 5 are obtained. As shown in the table, the results of the second-order serial test of the regression model, AR (1) P-value of 0.008 is less than 0.05 and AR (2) P-value of 0.509 is greater than 0.10, Hansen test supports the hypothesis that the regression model is only first-order serially correlated and there is no second-order serial correlation. The tests all pass and the equation estimation results are basically credible.

In the regression results of the variables, it can be seen that the regression coefficients of investment expenditure and flow level in the last period are positive and positively correlated with investment expenditure, which may indicate that the level of

cash flow can provide security for corporate investment behavior. In contrast, the regression coefficients of company size, gearing ratio, years of listing, company growth and profitability are negative. There is a negative correlation with investment spending, which means that the larger the five indicators are, the more they will inhibit the investment of listed companies. This may be because the larger the company is, the higher the cost of internal investment trial and error, the larger the number of decision makers, the deeper the investment due diligence, and the more prudent the investment decision will be. High gearing can lead to "investment distortion", and the higher the gearing level, the more likely it is to discourage inefficient investment. The limited impact of the number of years a company has been listed on investment efficiency may be due to the existence of multiple related business operations or shell listings in the selected sample of tourism companies. Company growth and profitability are more influenced by macroeconomic factors, which have a negative impact on the level of investment.

**Table 5.** Model (1) DIFF-GMM regression results

Explanatory variables	Coefficient	Standard deviation	t-test	p-value
Growth <sub>i, t-1</sub>	-0.0066391	0.0025428	-2.61	0.018
Size <sub>i, t-1</sub>	-0.0065955	0.0049532	-1.33	0.2
Levi <sub>i, t-1</sub>	-0.0127149	0.0061212	-2.08	0.052
Cashi <sub>i, t-1</sub>	1.66E-12	1.67E-12	1	0.332
Age <sub>i, t-1</sub>	-0.0021046	0.0016278	-1.29	0.212
Ret <sub>i, t-1</sub>	-0.0033884	0.0049042	-0.69	0.498
Invest <sub>i, t-1</sub>	0.5253851	0.1538759	3.41	0.003
Year	Control			
	AR (1) test p-value		0.008	
	AR (2) test p-value		0.509	
	Hansen test p-value		0.677	

### 4.3 Analysis of investment efficiency results

In this paper, the residuals of the Richardson model are divided into samples with residuals greater than 0 and less than 0. Among them, residuals greater than 0 indicate over-investment and residuals less than 0 indicate under-investment. As shown in Table 6, overall, 84 of the sample observations of tourism listed companies selected in this paper have residuals greater than 0, and there is the phenomenon of over-investment, accounting for 42.42% of the overall; 114 residuals are less than 0, and there is the phenomenon of under-investment, accounting for 57.58% of the overall. The mean value of the overall residuals of the sample is -6.06061E-09, which indicates that there is a general underinvestment in listed tourism companies.

**Table 6.** Investment efficiency measurement results

	Observations	Proportion
$\varepsilon > 0$	84	42.42%
$\varepsilon < 0$	114	57.58%

In this paper, we categorize and study whether the company's holding is state-owned or not, and there are differences in the investment efficiency of state-owned holding companies and non-state-owned holding companies. Thus, the investment efficiency of state-owned holding companies is relatively stable, which may be due to the relatively stable cash flow and larger asset volume of state-owned holding companies. While non-state holding companies have more flexibility in their investment sectors.

## 5 Conclusion and suggestions

### 5.1 Conclusion

This paper uses DIFF-GMM regression model to treat the sample under the control of endogeneity. This paper finds that the level of investment expenditure and flow of tourism companies in the last period has a catalytic effect on investment expenditure, and the level of cash flow can provide security for corporate investment behavior. And company size, gearing ratio, years of listing, company growth and profitability are negatively related to investment spending. High gearing may lead to "investment distortion", and the higher the gearing level, the more likely it is to discourage inefficient investment. The investment level of state-controlled tourism companies is more stable than that of non-state-owned tourism companies. Overall, there is an underinvestment situation in China's listed tourism companies; this may be due to the sensitivity and vulnerability of the tourism industry itself, which is highly susceptible to macroeconomic changes. In addition the scope of operation of each listed company is expanding, tourism listed companies are still in the stage of rising and exploring, and there are still deficiencies in management experience and investment decisions.

### 5.2 Suggestions

Comprehensive above conclusions, this paper gives the following recommendations.

(1) GOVERNMENT DEPARTMENTS SHOULD CREATE A GOOD BUSINESS ENVIRONMENT. For a long time, China's tourism industry development can not be separated from the government's strong support, thus, the government introduced preferential policies to attract investment in tourism plays an important leading role in attracting the main tourism investment. At present, the lack of investment efficiency of tourism enterprises is more obvious, more need for the government to form policy guidance, financial support, to encourage market capital into tourism services, with a view to improving investment returns and enterprise value.

(2) TOURISM ENTERPRISES SHOULD IMPROVE THE EFFICIENCY OF RESOURCE ALLOCATION. Asset-liability ratio increase means that the enterprise financing increase, too high asset-liability ratio will cause non-efficient investment,



therefore, listed companies should moderate control cash flow; maintain moderate asset-liability ratio. State-controlled enterprises may also issue an appropriate amount of corporate bonds to attract small and medium-sized investors.

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