Frontiers in Business, Economics and Management
ISSN: 2766-824X | Vol. 11, No. 2, 2023

Exchange rate And Enterprise Investment Efficiency

Ying Gao*

East China University of Political Science and Law, Shanghai, China
*Corresponding author email: 13381762350@163.com

Abstract: With the change of the political and economic situation at home and abroad, the economic policy and economic environment also change accordingly, and the exchange rate, as an important macroeconomic policy indicator, is also constantly changing. Based on the data of the actual effective exchange rate of RMB released by the Bank of International for International Settlements from 2010 to 2022, this paper verifies the relationship between the actual effective exchange rate of RMB and the investment efficiency of China's A-share listed companies. After empirical analysis, the research results of this paper show that: The rise of the real effective exchange rate of RMB reduces the degree of non-efficient investment of enterprises, mainly reducing the degree of insufficient investment of enterprises, and thus improving the investment efficiency of listed companies. In addition, this paper makes an in-depth analysis from the two aspects of equity concentration and enterprise scale, and concludes that in small-scale enterprises and enterprises with high equity concentration, the positive impact of RMB appreciation on enterprise investment efficiency will be more significant.

Keywords: Real effective exchange rate, Overinvestment, Underinvestment.

1. Introduction

Investment decision is the most important decision in the management decision of the overall direction of an enterprise, which has great influence on both macro and micro economy.From a macro perspective, the success of investment decisions will directly cause the shock of the industry and regional economy, and even have an impact on the overall economic development of the country.From a micro perspective, the foundation of the increase of the company's value lies in the future cash flow, and the increase or decrease of the future cash flow depends on the correct investment decision.Moreover, investment behavior is an important part of the production and operation activities of enterprises. Based on the actual demand of maximizing their own value, enterprises need efficient investment. Therefore, the project with the largest marginal return is the primary choice for enterprise investment. However, in the daily management activities of the company, non-efficient investment has become very universal.Due to the interests of the agent and the principal, produced a series of agent and information asymmetry problem, such as agent because self-interest, ability or too confident in themselves and put the excess money into unprofitable project, may also be because of lack of funds to give up the net present value of positive project, eventually lead to excessive investment and insufficient investment. These inefficient investment behaviors will hinder the development pace of enterprises by affecting the efficiency of their capital allocation.

In addition, the development of the international political and economic situation change also brought great influence to the development of the real economy in our country, combined with COVID-19 outbreak, to the global economy also brought great impact, in the face of economic impact, the government as the most powerful backing, is bound to introduce relevant policies to stabilize the base of economic development, the exchange rate policy is also one of them.At the same time, the market itself will also start its own defense mechanism against this impact, thus affecting the business environment of enterprises. After the exchange rate integration in 1994 and the two exchange rate reforms in 2005, the RMB exchange rate is also playing a more and more important role by the market.As a bridge between the market and the policy, the international trade and the capital flow, the exchange rate change will inevitably have an impact on the operation behavior and operation mode of enterprises.In this context, this paper mainly studies the relationship between the real effective exchange rate of RMB and the investment efficiency of micro enterprises, and conducts empirical analysis.

2. Literature Review

Scholars have carried out a lot of research on the relationship between exchange rate fluctuations and level changes and enterprise investment. According to the studies conducted by Campa and Goldberg (1995), changes in the exchange rate level will affect the company's sales revenue and import input costs, thus affecting the level of enterprise investment; Serven (2005) has found that if a country's degree of financial development is low, the impact of currency fluctuations on corporate investment in the country is negative. And when a country has high levels of openness, the faster the exchange rate fluctuates, the more obvious the inhibitory effect on the investment level of enterprises in the country, but with high levels of financial development and low openness, the impact of exchange rate fluctuations on business investment will be an opposite result[1,2].Tian Suhua (2008) found that the impact of RMB exchange rate changes on investment is closely related to the type of enterprises and the source of funds, that is, the investment effect of exchange rate in different types of enterprises and different sources of funds;Wu Guoding and Jiang Guohua (2015) found that the appreciation of RMB will curb the investment level of enterprises through the export income mechanism, and promote the improvement of the investment level of enterprises through the import cost mechanism.[3,4].Zhao Xiaonan and Liu Xiao (2008) found, through examining the impact of the policy tools such as money supply, interest rate and exchange rate, that the impact of exchange rate fluctuations on the scale of fixed asset investment is positive[5].

Although there are many studies on exchange rate and enterprise investment behavior at home and abroad, there are few documents on the impact of exchange rate on enterprise investment efficiency. This paper analyzes the relationship between exchange rate and enterprise investment data from 2010-2022.

3. Theoretical Analysis

This paper selects the exchange rate index is issued by the international clearing effective exchange rate, effective exchange rate is a kind of weighted average calculation of the exchange rate index, usually with a country and sample countries bilateral trade in the proportion of the foreign trade as weight, the effective exchange rate this index can reflect the overall competitiveness of a country's currency exchange rate in international trade and overall fluctuations.Considering that the effective exchange rate reflects the terms of trade of a country, the appreciation of a country's effective exchange rate is often accompanied by the decline of its product competitiveness. Different from the uncertainty of bilateral exchange rate, which mainly aggravates the transaction and conversion risks of the risks faced by enterprises, the uncertainty of the effective exchange rate more affects the economic risks faced by enterprises.Therefore, when a country's effective exchange rate rises, they may choose to invest more to improve their core competitiveness. At the same time, according to the "relative wealth effect" in the classic transnational investment theory, the currency appreciation of the parent country (i. e., the devaluation of the host country currency) increases the wealth of the home investors, and increases the purchasing power when purchasing assets in overseas markets, which is conducive to investment.Therefore, the first hypothesis of this paper is proposed:

H1: The increase of the real effective exchange rate of RMB will have a positive impact on the investment efficiency of enterprises.

At the same time, in the concentration of different enterprises, higher concentration of enterprise investor rights will be relatively concentrated, the concentration will make investors more ability and power to exercise the constraints of management investment behavior and supervision, management due to short-sighted improper investment decisions make the execution of the probability will be smaller, thus reducing the efficiency of enterprise investment, improve the enterprise investment level as a whole.Therefore, the third hypothesis of this paper is proposed here:

H2: Equity concentration will increase the positive impact of the real effective exchange rate of RMB on the investment level of enterprises.

Whether enough funds can be raised before investment depends on the strength of the enterprise's ability of financing, so financing is very important for enterprise investment. I think the influence of exchange rate on enterprise investment efficiency may be different because of enterprise financing constraints, if an enterprise foreign financing dependence is low, so in the face of exchange rate change risk, relative to other enterprises, its internal resistance will be stronger, the influence of exchange rate on enterprise investment behavior will not be so obvious. Previous studies have shown that the enterprise size is also an important factor affecting the financing ability of enterprises. Lian Yujun, Su Zhi, Wang Zhanxiang all found that large-scale companies face low financing constraints[6,7].Therefore, propose the second hypothesis of this paper, follows:

H3: Financing constraints will amplify the positive impact of the increase of the real effective exchange rate of RMB on the investment level of enterprises.

4. Data Sources and Model Design

4.1. Selection of data

This paper collects the relevant data of the a-share listed companies in China released by the RMB from 2010 to 2022, and the CSMR and Wind data. This paper eliminates the listed companies with missing financial data, and the companies affected by * ST, ST and PT during the samples. In order to eliminate the effect of outliers on the empirical results, winsorize was used to reduce the continuous variables, resulting in 18615 company-annual observations.

4.2. Variable-definition

4.2.1. Measure of investment efficiency

Enterprise investment efficiency is the reverse index of enterprise non-efficiency investment level. The higher the level of inefficient investment, the lower the investment efficiency. For the measurement of enterprise investment efficiency, we refer to the model of Richardson (2006) to calculate the degree of enterprise deviation from the optimal investment level, that is, non-efficient investment. The specific measurement model is as follows[8]:

$$Inv_t = \beta_0 + \beta_1 Growth_{t-1} + \beta_2 Lev_{t-1} + \beta_3 Cash_{t-1} + \beta_4 Size_{t-1} + \beta_5 Ret_{t-1} + \beta_6 Inv_{t-1} + \beta_7 Age_{t-1} + Year + Industry + \varepsilon_t. \quad (1)$$

In the above equation, Inv_t and Inv_{t-1} represents the capital investment in years t and t-1, respectively; $Growth_{t-1}$ is the operating revenue growth rate of t-1 years; Lev_{t-1} is the asset-liability ratio of the t-1 year; $Cash_{t-1}$ represents the t-1 year of cash holdings; $Size_{t-1}$ is equal to the natural logarithm of the total assets at the end of t-1 year; Ret_{t-1} is equal to the t-1-year stock return rate; Age_{t-1} is equal to the natural log of the company. When the residual value in the Richardson model is positive, it means that the enterprise is in the state of excessive investment (Overinvest), and when the residual value is negative, it means that the enterprise is in the state of underinvestment (Underinvest), which means that the greater the absolute value of Underinvest and Overinvest, the higher the degree of non-efficiency investment of the supplier enterprise, and the lower the investment efficiency of the enterprise.

4.2.2. Measure of the real RMB exchange rate

Ba Shusong believe that the real effective exchange rate of the RMB can more truly reflect the real purchasing power of a country's currency and its competitiveness in international trade[9]. For this reason, I chooses the real effective exchange rate of RMB released by the Bank for International Settlements as the measure of the exchange rate.

4.2.3. Control variables

With reference to the previous literature, I control some of the corporate management and financial characteristics that may affect the efficiency of corporate investment[10,11,12], Financial characteristic variables include: enterprise size (Size), enterprise age (Age), asset-liability ratio (Lev), stock return (Ret), working capital ratio (CFO), return on assets (ROA), price-to-book ratio (MTB); Corporate governance indicators include: the CEO's governance capacity (Adminability), administrative expenses (Admincost), and the balance of property rights (CR). Detailed calculation and description are shown in Table 1.

Table 1. Definitions of variables: This table reports the definitions of the listed company variables for the period from 2010 to 2022 that we used in the baseline regression

Variable Name	Definition
	RMB Real Exchange Rate Measures
LnER	The natural logarithm of the RMB real effective exchange rate.
Invest Efficiency Measures	
Inveffficiency	Absolute value of the non-efficiency investment calculated from Richardson's non-efficiency investment model.
Overinvest	Positive non-efficiency investment value calculated by the Richardson’s non-efficiency model.
Underinvest	Negative non-efficiency investment value calculated by the Richardson’s non-efficiency model.
InveffficiencyB	Absolute value of each company’s non-efficiency investment calculated from Biddle's non-efficiency investment model.
OverinvestB	Positive non-efficiency investment value of each company calculated by the Biddle’s non-efficiency model.
UnderinvestB	Negative non-efficiency investment value of each company calculated by the Biddle’s non-efficiency model.
Administrative Capacity	
Adminability	The natural logarithm of total management salary for directors, supervisors and executives.
Admincost	Administrative expense divided by total assets.
CR	The shareholding ratio of the 2-5 largest shareholder divided by the shareholding ratio of the largest shareholder.
Admin	The natural logarithm of the number of board directors.
Firm Characteristics	
ROA	Return-on-assets ratio .
Size	The natural logarithm of total assets.
Lev	The leverage ratio, calculated as total debt divided by total assets.
CFO	The net cash flow generated from operating activities divided by paid-in capital.
MTB	The current closing price is the percentage of owners' equity and paid-in capital.
Age	Company i's age. It equals the number of years the corporation has existed since the IPO year.
Ret	Return on investment.

4.3. Model design

In order to study the impact of people's real effective exchange rate on the investment efficiency of listed companies in China, the paper creates the following panel regression model:

$$Inveffficiency_t = \beta_0 + \beta_1 LnER_t + \beta_2 Adminability_t + \beta_2 Admincost_t + \beta_3 CR + \beta_4 ROA + \beta_5 Size + \beta_6 Lev + \beta_7 CFO + \beta_8 MTB + \beta_9 Age + \beta_{10} Ret_t + Industry + Year + \varepsilon_{t.} \quad (2)$$

The explained variables are the investment efficiency values calculated according to the Richardson model: ABS, Underinvest, and Overinvest, and the explained variables are the natural logarithm LnER of the real effective exchange rate of RMB mentioned above.Among them, Administrative Capacity and Firm Characteristics are the vector of control variables of enterprise financial level and enterprise administrative level respectively. In addition, since the investment efficiency and the real effective exchange rate of RMB may vary greatly because the enterprise is in different industries, this paper controls the fixed effect of the industry.

In order to further investigate the influence of equity concentration and financing constraints on the relationship between the actual effective exchange rate of RMB and the investment efficiency of enterprises, this paper conducts an empirical test from the two aspects of equity concentration and the degree of financing constraints after regressing the full sample.

5. Empirical Results

5.1. Descriptive statistics

Table 2 presents descriptive statistics for the listed company variables from 2010 to 2022 used in this study, including explanatory variables, explained variables and control variables. As can be seen from Table 2, the average logarithm of the natural logarithm of the real effective exchange rate of RMB released by the Bank for International Settlements is 4.575, which is basically consistent with the research data of Chen Yongying et al. (2021), thus proving that our selection of data is relatively reliable[13]. As can be seen from Table 2, the average scale of overinvestment (Overinvest) in the sample is 5.3% of the total assets, the scale of underinvestment is 3.1% of the total assets, and the average absolute value of non-efficiency investment (ABS) in the overall sample is 3.9% indicating that on average, the investment of the sample company deviates from its best investment level is 3.9% of the total assets.Moreover, we can observe that 62.804% of the companies in the overall sample have the phenomenon of insufficient investment, indicating that insufficient investment is one of the reasons for the widespread inefficient investment in Chinese enterprises.

Table 2. Summary Statistics: This Table reports descriptive statistics of the publicly company variables between 2010 and 2022 used in our baseline regression,including dependent, independent, and control variables.

Variable	Obs	Mean	Std. Dev.	Min	Max
ABS	18615	0.039	0.045	0	0.267
Overinvest	6924	0.053	0.067	0	0.397
Underinvest	11691	0.031	0.028	0	0.275
lnER	18615	4.575	0.068	4.385	4.643
adminability	18615	15.361	0.722	13.575	17.323
admincost	18615	0.086	0.066	0.008	0.397
CR	18615	0.729	0.605	0.027	2.732
ROA	18615	0.032	0.067	-0.285	0.2
Size	18615	22.306	1.215	19.95	26.37
Lev	18615	0.436	0.198	0.063	0.894
CFO	18615	0.478	0.878	-1.999	4.426
MTB	18615	3.336	2.685	0.557	16.496
Age	18615	11.242	6.6	3	31
Ret	18615	0.115	0.501	-0.554	2.361

5.2. Correlation analysis

Table 3 presents the correlation coefficients among the variables, the real effective exchange rate and nonefficiency investment degree significantly negative correlation, and insufficient investment degree, preliminary shows that the higher the actual effective exchange rate, the lower the non-efficiency of investment, the higher the company's investment efficiency, preliminary verify the research hypothesis 1.In addition, according to the data in Table 3, it can be seen that the correlation coefficient between each variable is basically lower than 0.5, thus indicating that there is no serious multicollinearity problem between the selected variables in the model of this paper.

Table 3. Correlation analysis: This table reports the correlations between the public company variables for the period from 2010 to 2022 that we used in the baseline regression.

variable	ABS	Overinvest	Underinvest	lnER	adminability	admincost	CR	ROA	Size	Lev	CFO	MTB	Age	Ret
ABS	1.000													
Overinvest	0.990***	1.000												
Underinvest	1.000***		1.000											
lnER	-0.031***	-0.016	-0.051***	1.000										
adminability	-0.065***	-0.074***	-0.128***	0.247***	1.000									
admincost	0.081***	0.082***	0.127***	0.022***	-0.163***	1.000								
CR	0.045***	0.050***	0.053***	0.153***	0.122***	0.087***	1.000							
ROA	0.063***	0.081***	0.012	-0.079***	0.183***	-0.214***	-0.046***	1.000						
Size	-0.061***	-0.045***	-0.151***	0.062***	0.498***	-0.364***	-0.076***	0.069***	1.000					
Lev	-0.041***	-0.027**	-0.104***	-0.117***	0.090***	-0.283***	-0.118***	-0.314***	0.471***	1.000				
CFO	0.016**	0.029**	-0.051***	0.053***	0.246***	-0.177***	-0.018**	0.300***	0.298***	0.026***	1.000			
MTB	0.135***	0.166***	0.125***	0.077***	-0.105***	0.249***	0.067***	0.067***	-0.355***	-0.060***	-0.033***	1.000		
Age	-0.133***	-0.141***	-0.158***	0.050***	0.120***	-0.092***	-0.151***	-0.057***	0.353***	0.244***	0.080***	-0.191***	1.000	
Ret	0.073***	0.123***	-0.011	0.135***	-0.015**	0.025***	0.008	0.162***	-0.064***	-0.050***	0.072***	0.414***	-0.069***	1.000

5.3. Baseline regression analysis

Table 4 shows the benchmark regression results of the RMB real effective exchange rate on the investment efficiency. Column (1) - (3) are the univariate regression results of the relationship between the real effective exchange rate of RMB and investment efficiency, and (4) - (6) are the multivariate regression results of the relationship between the real effective exchange rate of RMB and investment efficiency after the addition of control variables. According to column (1) and (4) of the empirical results, whether in the univariable model or multivariable model, LnER for ABS regression coefficient is negative, it also shows that when the actual effective exchange rate (LnER), the higher the degree of enterprise investment scale deviate from the optimal investment level, the less non-efficiency investment, which also supports our first hypothesis.

In addition, column (2) and (5) as negative but not significant, indicating that we did not obtain evidence between the actual exchange rate of RMB and the efficiency of enterprise investment after adding the control variable. Column (3) and (6) conduct empirical analysis from the perspective of insufficient investment. It can be seen from the coefficient of LnER that the higher the real effective exchange rate of RMB, if an enterprise itself is in the state of underinvestment (Underinvest), the state of underinvestment will become a little weaker, thus verifying the first hypothesis of this paper.

The direction and significance of most of the control variables in Table 4 are also as expected in this paper. Such as CEO management ability (Adminability) and listed fixed number of year (Age) and efficiency investment, excessive investment, insufficient investment regression coefficient are at 1% level significantly negative, this shows that listed fixed number of year and the CEO management ability can significantly inhibit the efficiency of enterprise investment behavior, in the mature, more scientific management, its operation ability will be stronger, also is less prone to low efficiency investment behavior.

Table 4. Baseline regression: This table reports the panel regression results of RMB real effective exchange rate on non-efficient investment, overinvestment, and underinvestment of Chinese A-share listed companies during the sample period from 2010 to 2022 *, ** and *** denote statistical significance at the 10%, 5% and 1% level, respectively.

Dependent Variable	ABS	Overinvest	Underinvest	ABS	Overinvest	Underinvest
	(1)	(2)	(3)	(4)	(5)	(6)
lnER	-0.0595***	-0.0790***	-0.0534***	-0.0212**	-0.0066	-0.0332***
	(0.0080)	(0.0202)	(0.0062)	(0.0082)	(0.0207)	(0.0064)
adminability				-0.0035***	-0.0085***	-0.0025***
				(0.0006)	(0.0014)	(0.0005)
admincost				0.0597***	0.1029***	0.0372***
				(0.0061)	(0.0161)	(0.0046)
CR				0.0032***	0.0058***	0.0022***
				(0.0006)	(0.0014)	(0.0004)
ROA				0.0469***	0.0812***	0.0146**
				(0.0060)	(0.0167)	(0.0044)
Size				0.0019***	0.0046***	-0.0003
				(0.0004)	(0.0011)	(0.0003)
Lev				0.0085***	0.0226***	-0.0048**
				(0.0023)	(0.0060)	(0.0018)
CFO				0.0003	0.0012	-0.0010**
				(0.0004)	(0.0010)	(0.0003)
MTB				0.0013***	0.0020***	0.0009***
				(0.0002)	(0.0004)	(0.0001)
Age				-0.0008***	-0.0010***	-0.0006***
				(0.0001)	(0.0001)	(0.0000)
Ret				0.0033***	0.0111***	-0.0045***
				(0.0009)	(0.0020)	(0.0007)
_cons	0.2957***	0.3985***	0.2594***	0.1231**	0.0740	0.2098***
	(0.0367)	(0.0931)	(0.0286)	(0.0376)	(0.0944)	(0.0291)
N	18615	6924	11691	18615	6924	11691
r2	0.0486	0.0704	0.0636	0.0794	0.1105	0.1128

5.4. Robustness test

In this paper, we refer to the Biddle (2009) model, Calculate the enterprise investment efficiency of the listed companies in the sample of this paper[14].And its robustness regression analysis as a surrogate variable for Richarson investment efficiency.Among them, InvefficiencyB, OverinvestB and UnderinvestB are the enterprise investment efficiency calculated based on the Biddle model, The results are shown in Table 5: By observing the regression coefficient of the real effective exchange rate of RMB, The real effective exchange rate of RMB still has a significant negative correlation between the degree of non-efficient investment and the degree of underinvestment,the increase of the real effective exchange rate of RMB will increase the investment efficiency of enterprises, supporting the hypothesis 1 of this paper.The model passed the robustness test.

5.5. Regulatory effect

5.5.1. Equity concentration

In this section, in order to examine whether the equity concentration of the enterprise will affect the investment effect of the actual effective exchange rate, this paper obtains the sample company 2-5 largest shareholders and the largest shareholder shareholding index, and according to the index of median sample is divided into two groups of high concentration and low concentration of equity, and build virtual variables.The regression results in Table 6 show that the improvement of the real effective exchange rate of RMB will promote the increase of investment efficiency of listed companies, and the positive impact of the effective exchange rate on investment efficiency is more obvious in enterprises with high equity concentration, which is also consistent with hypothesis 2 of this paper.

Table 5. Robust test: This table reports the panel regression results of the RMB real effective exchange rate of non-effective investment, overinvestment and underinvestment of Chinese a-share listed companies during the 2010-2022 sample period calculated according to the Biddle model. *, ** and *** denote statistical significance at the 10%, 5% and 1% level, respectively.

Dependent variable	InvefficiencyB	OverinvestB	UnderinvestB	InvefficiencyB	OverinvestB	UnderinvestB
	(1)	(2)	(3)	(4)	(5)	(6)
lnER	-0.0544***	-0.0746***	-0.0470***	-0.0220***	0.0030	-0.0389***
	(0.0092)	(0.0226)	(0.0053)	(0.0060)	(0.0232)	(0.0054)
adminability				-0.0055***	-0.0098***	-0.0030***
				(0.0006)	(0.0016)	(0.0004)
admincost				0.0468***	0.1120***	0.0129***
				(0.0066)	(0.0184)	(0.0039)
CR				0.0021***	0.0054***	0.0004
				(0.0006)	(0.0016)	(0.0004)
ROA				0.0486***	0.0839***	-0.0007
				(0.0069)	(0.0202)	(0.0037)
Size				0.0030***	0.0066***	-0.0014***
				(0.0005)	(0.0012)	(0.0003)
Lev				0.0110***	0.0421***	0.0047**
				(0.0026)	(0.0069)	(0.0015)
CFO				0.0016***	0.0021	-0.0019***
				(0.0005)	(0.0011)	(0.0003)
MTB				0.0021***	0.0029***	0.0004***
				(0.0002)	(0.0005)	(0.0001)
Age				-0.0005***	-0.0011***	0.0005***
				(0.0001)	(0.0002)	(0.0000)
Ret				0.0024**	0.0096***	-0.0010
				(0.0008)	(0.0023)	(0.0006)
cons	0.2779***	0.3837***	0.2331***	0.1515***	-0.0003	0.2615***
	(0.0424)	(0.1043)	(0.0242)	(0.0269)	(0.1060)	(0.0247)
N	18615	6791	11824	18615	6791	11824
r2	0.0544	0.0685	0.1379	0.0324	0.1110	0.1748

Table 6. This table reports how equity concentration of the enterprise affects the impact of the real exchange rate on investment efficiency. If the equity concentration is higher than the annual industry median, the virtual variable is 1, otherwise, 0.*, ** and *** denote statistical significance at the 10%, 5% and 1% level, respectively.

Dependent variable	ABS	Underinvest	ABS	Underinvest
	(1)	(2)	(3)	(4)
lnER*higher CR	-0.0595***	-0.0534***	-0.0014***	-0.0018***
	(0.0080)	(0.0062)	(0.0004)	(0.0003)
lnER			-0.0030	-0.0013
			(0.0057)	(0.0045)
CRdum			0.0023*	0.0016*
			(0.0010)	(0.0008)
adminability			-0.0049***	-0.0036***
			(0.0006)	(0.0004)
admincost			0.0526***	0.0318***
			(0.0056)	(0.0043)
CR			0.0018*	0.0012
			(0.0008)	(0.0007)
ROA			0.0475***	0.0131**
			(0.0059)	(0.0044)
Size			0.0025***	0.0003
			(0.0004)	(0.0003)
Lev			0.0025	-0.0073***
			(0.0022)	(0.0017)
CFO			0.0010*	-0.0003
			(0.0004)	(0.0003)
MTB			0.0017***	0.0011***
			(0.0001)	(0.0001)
Age			-0.0008***	-0.0005***
			(0.0001)	(0.0000)
Ret			0.0010	-0.0042***
			(0.0007)	(0.0006)
cons	0.2957***	0.2594***	0.0689**	0.0916***
	(0.0367)	(0.0286)	(0.0251)	(0.0197)
N	18615	11691	18615	11691
r2	0.0486	0.0636	0.0451	0.0641

5.5.2. Financing constraints

According to the research of Lian Yujun, Su Zhi and Wang Zhanxiang[6,7], compared with large-scale enterprises, small-scale enterprises face higher financing constraints. In this section, in order to investigate whether the financing constraints of enterprises will have an impact on the investment effect of the actual effective exchange rate of RMB, the paper divided the samples into two subsamples of large-scale enterprises and small-scale enterprises according to the enterprise size, and then conducted regression. The regression results in Table 7 show that the improvement of the real effective exchange rate of RMB will increase the investment efficiency of listed companies, and the positive impact of the effective exchange rate of RMB on the investment efficiency is more obvious in enterprises with high financing constraints, which is also consistent with the hypothesis 3 of this paper.

Table 7. This table reports how financing constraints affect the impact of the real exchange rate on investment efficiency.If the enterprise size is larger than the annual median value of the industry, it is a large-scale enterprise, and otherwise, it is a small-scale enterprise.*, ** and *** denote statistical significance at the 10%, 5% and 1% level, respectively.

	Small-scale		Large-scale	
Dependent variable	ABS	Underinvest	ABS	Underinvest
	(1)	(2)	(3)	(4)
lnER	-0.0222**	-0.0219***	-0.0055	-0.0065
	(0.0073)	(0.0059)	(0.0074)	(0.0056)
adminability	-0.0051***	-0.0045***	-0.0051***	-0.0033***
	(0.0008)	(0.0007)	(0.0008)	(0.0006)
admincost	0.0529***	0.0346***	0.0509***	0.0250***
	(0.0070)	(0.0055)	(0.0095)	(0.0071)
CR	0.0024**	0.0013*	0.0033***	0.0022***
	(0.0008)	(0.0006)	(0.0008)	(0.0006)
ROA	0.0527***	0.0203***	0.0389***	0.0035
	(0.0075)	(0.0058)	(0.0098)	(0.0070)
Lev	-0.0004	-0.0091***	0.0055	-0.0047
	(0.0030)	(0.0024)	(0.0033)	(0.0025)
CFO	0.0006	-0.0004	0.0012*	-0.0003
	(0.0007)	(0.0006)	(0.0005)	(0.0004)
MTB	0.0017***	0.0012***	0.0018***	0.0011***
	(0.0002)	(0.0002)	(0.0002)	(0.0002)
Ret	0.0008	-0.0042***	0.0019	-0.0032***
	(0.0010)	(0.0008)	(0.0011)	(0.0008)
Size	0.0037***	0.0013*	0.0026***	0.0008
	(0.0008)	(0.0007)	(0.0006)	(0.0005)
Age	-0.0006***	-0.0005***	-0.0009***	-0.0005***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
_cons	0.1301***	0.1721***	0.0770*	0.0936***
	(0.0328)	(0.0265)	(0.0338)	(0.0254)
N	9272	6245	9343	5446
r2	0.0410	0.0534	0.0466	0.0484

6. Conclusion

This paper uses the RMB real effective exchange rate index released by the Bank for International Settlements to study the impact of exchange rate on investment efficiency, and takes the empirical data of listed companies in China's A-share market from 2010 to 2022 as samples to conduct empirical tests.In this paper, the investment efficiency is measured by Richardson (2006), and further discussed from the perspectives of financing constraints and equity concentration. The main research conclusions of this paper are summarized as follows:

(1)The real effective exchange rate of RMB has a significant negative correlation with the non-efficient investment of enterprises, and there is a positive correlation between it and the investment efficiency of enterprises.

(2)Compared with enterprises with low equity concentration, the positive correlation between exchange rate and investment efficiency is more obvious in enterprises with high equity concentration. When an enterprise has a high equity concentration, its investors have more motivation and ability to supervise the management and increase the positive impact of exchange rate on investment efficiency.

(3)In the enterprises with high financing constraints, the positive correlation between the exchange rate and the investment efficiency is intensified. When the enterprise has a high financing binding force, the effect of the exchange rate changes to enhance the purchasing power is more significant, so the positive impact of the exchange rate on the investment behavior of the enterprise is more significant.

This paper examines the influence of exchange rate level changes on the investment behavior of enterprises, enriches the literature in the field of exchange rate and investment efficiency, and provides evidence for how the business environment affects the investment efficiency of management. The conclusion of this paper helps investors to understand the behavior of managers, and reminds them that they can reduce financing constraints, curb the business risks due to economic turbulence, and improve their own investment efficiency.

References

[1] Campa J, Goldberg L S. Investment in manufacturing, exchange rates and external exposure [J].Journal of International Economics, 1995, 38(3): 297-320.

[2] Servén L. Real-Exchange-Rate Uncertainty and Private Investment in LDCS [J]. The Review of Economics and Statistics, 2003, 85 (1): 212 -218.

[3] Tian Suhua. The enterprise characteristics of the investment effect of RMB exchange rate change [J]. World Economy, 2008 (5): 44-55.

[4] Wu Guoding, Jiang Guohua. The RMB exchange rate change and manufacturing investment — comes from the enterprise level evidence [J]. Financial Research, 2015 (11): 1-14.

[5] Zhao Xiaonan, Liu Xiao. Empirical analysis of the impact of monetary policy on China's investment level [J]. Journal of Central University of Finance and Economics, 2007 (04): 26-31.

[6] Lian Yujun, Su Zhi. Financing constraints, uncertainty and investment efficiency of listed companies [J]. Management Review, 2009,21 (01): 19-26.

[7] Wang Zhanxiang, Gong Guangxiang, Zheng Tingting. The impact of financing constraints and uncertainty on the efficiency of R & D investment in unlisted manufacturing —— Empirical study based on heterogeneity stochastic frontier function [J]. Journal of Central University of Finance and Economics, 2017 (11): 27-37.

[8] Richardson,S.2006.Over — investment of Free Cash Flow.Review of Accounting Studies,11(2—3): 159-189.

[9] Ba Shusong, Wu Bo, Zhu Yuanqian. Analysis of RMB effective exchange rate calculation and influence of international trade and foreign exchange reserves after the reform of exchange rate system [J]. International Finance Research, 2007 (4): 56-62.

[10] Cohen, D. A., & Li, B. (2020). Customer-Base Concentration, Investment, and Profitability: The U.S. Government as a Major Customer. Accounting Review, 95(1), 101-131.

[11] Wang Dan, Li Dan, Li Huan. Customer concentration degree and enterprise investment efficiency [J]. Accounting Research, 2020 (01): 110-125.

[12] Ak, B. K., & Patatoukas, P . N. (2016). Customer-base concentration and inventory efficiencies: Evidence from the manufacturing sector. Production and Operations Management Journal, 25 (2): 258–272.

[13] Chen Yongying, Polaroid (SOM BOREY), Hu Yang. Study on the influence of exchange rate on enterprise investment efficiency [J]. Friends of the Accounting, 2021 (19): 7.

[14] Biddle, G.C., G. Hilary, and R.S. Verdi. 2009. How Does Financial Reporting Quality Relate to Investment Efficiency. Journal of Accounting and Economics 48: 112–131.