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An Empirical Study of the Effects of RMB Exchange Rate on China's Inflows of FDI

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Abstract

This paper studies both the level and volatility effects of RMB real effective exchange rate on the inflow of FDI with the process of Chinese exchange rate regime adjustment. In particular, it also examines different effects of exchange rate on resource-seeking FDI and market-seeking FDI. It concludes that (1) the expected appreciation and temporary volatility of exchange rate of RMB can stimulate the inflow of FDI in a short term, but the effect is ambiguous in the long run; (2) appreciation of exchange rate will reduce the inflow of resource-seeking FDI while increase that of market-seeking FDI; (3) increasing exchange rate volatility in China will reduce the inflow of FDI in the future; (4) appreciation of RMB real effective exchange rate intends to increase capital intensity per contract of resource-seeking FDI but to decrease that of market-seeking FDI.

Keywords: RMB Exchange Rate, FDI, Multinational Enterprises

1. Introduction

China has experienced a sustained and rapid economic growth during the past thirty years. The rank of its GDP and trade in the world moved up to fourth and third respectively in 2008 from eleventh and twenty-fifth in 1980. Many studies have testified that the positive role of inward FDI contributed to such great growth miracle (Young et al, 1997; Zhang et al, 2001; Dunning, 2003). China's FDI ranked top fifth in 2006 compared with rank 60th in 1980. The devaluation of RMB exchange rate may be one of important factors for explaining the inflows of FDI in China.

China's exchange rate regime now experiences its innovative and exploring stage. The RMB exchange rate regime has been reformed since July 2005. The RMB was no longer pegged to the U.S. dollar since then, but fluctuated against a basket of currencies, with a 2% appreciation to the U.S. dollar than before. We had witnessed different degrees of appreciation of the RMB against the U.S. dollar, the Hong Kong dollar, the Japanese Yen and so on after the reform.

How does the reform of the RMB exchange rate regime influence the volume and the composition of future's new foreign investment in China? Exchange rate is regarded as a key factor influential to FDI. The impacts of exchange rate movements on FDI can be categorized into four effects. The first one, "wealth effect", implies that the exchange rate movement changes multinational corporations' (MNCs') power to purchase host countries' assets, thereby influences their proprietorship advantages. The second one, "demand effect", means that the exchange rate movement changes the host country's market scale measured by investment source country's currency, thus influences global distribution of market demands and the host country's locational advantages. The third one, "cost effect", implies that the exchange rate movement changes host

country's factor costs, which are measured by the home country's currency, and then affects the host country's locational advantages. The last one, "risk effect", means that the exchange rate fluctuation enhances the uncertainty of profits measured by the home country's currency, and therefore increases FDI profit risks (Kohlhagen, 1977; Froot and Stein, 1991; Dixit and Pindyck, 1994; Klein and Rosengren, 1994).

One strand of the literature investigating the role of exchange rates on the inflow FDI from a theoretical point of view believes that the appreciation of host country's currency may hurt the FDI inflows (Goldberg & Kolstad, 1995; Froot and Stein, 1991). While other studies argue that the appreciation is not significant factor for the inflows of FDI, it may be has a positive role in making use of FDI. (Stevens, 1998; Bénassy - Quéré et al., 2001).

Different from traditional FDI, a new trend of FDI bloom in developing countries is largely due to a stronger engagement of multinational enterprises (MNE) in the services sectors such as telecommunication, finance, real estate, transport and energy, which is almost oriented by local market-seeking, rather than export-oriented or efficiency-seeking.¹ The theoretical models of Bénassy-Quéré et al. (2001) and Yu (2007) both indicate that the effect of exchange rate on FDI depends on the motivation of the FDI. If it is market-seeking, the appreciation of exchange rate may enlarge the relative market scale to incur the inflow of FDI. The FDI elasticity of exchange rate in developing countries is higher than that of developed countries the developing countries, due to most of the FDI in developing countries are driven by the cost-minimum motivation (Chakrabarti, 2002). Similar conclusion may also be found in Asian experiences. Baek and Okawa (2001) find that the depreciation of the currency of Asian countries to US dollars didn't obviously influence the FDI the whole manufacturing section but positively affect the export-seeking electric power section.

Considering the change of exchange rate includes not only the level but also the uncertainty risk derived from the volatility of exchange rate, where also exists two opposite arguments. Some empirical evidence indicates that the FDI may be deterred by the exchange rate risk in the host countries (Dixit & Pindyck, 1994; Bénassy - Quéré et al., 2001). Dixit and Pindyck believe that the volatility of exchange rate will increase the information-searching cost of the firms, so the risk averse MNE may choose to wait for but not invest immediately in case of dramatic volatility. While some studies show that the uncertainty of exchange rate may stimulate the inflow of FDI. The case of America by Cushman (1985, 1988) indicated that higher exchange rate volatility increased outward FDI in the US for the depreciation of assets in host countries, but the same regression results also showed that expected depreciation of the host country currency had significant negative impact on FDI inflows. The volatility of exchange rate will provide the MNE with temporarily timely opportunities of low-cost acquisition in host countries once the expected depreciation of the exchange rate happened. (Charkrabarti & Scholnick, 2002).

Undoubtedly, exchange rate also constitutes one pillar of China's international competition in attracting foreign investment (Xing, 2006). However, partly because the contradiction between the funds outstanding for foreign exchange and a fixed exchange rate regime pegging single dollar, expansion of trade surplus of China and increasing trade frictions against China have triggered a fierce debate over the reform of Chinese RMB exchange rate regime. Chinese government has to transform its exchange rate regime gradually from a fixed regime to a manageable floating exchange rate regime but pegging single dollar in 1994, and then based on a basket of currencies since July 21, 2005. In the next few years, RMB appreciated against the US dollars, Hong Kong

¹ The definition of market-seeking and export-seeking or efficiency-seeking FDI is widely used in the relevant literature. Market-seeking FDI aims at penetrating the native markets of host countries; while export-seeking or efficiency-seeking FDI is motivated by creating new sources of competitiveness for firms and strengthening existing ones. Here, we classified the latter two patterns into resource-seeking FDI.

dollars, Yen and other currencies in different degrees. The new regime also magnifies the volatility of RMB exchange rate compared the other currency with the pegging single dollar exchange rate regime. So how much will these adjustments of exchange rate regime affect the decision of foreign strategic investors? In this article, we take both the level and volatility of RMB real effective exchange rate effect into consideration, and then we explore exchange rate effect on the inflow of the national FDI, resource-seeking FDI and market-seeking FDI respectively by establishment of vector error correction model and stepwise regression analysis. We also try to investigate the exchange rate effect on the tendency of per contract FDI.

The paper proceeds as follows. Section 2 describes the inflow of FDI (1980~2006) as well as different patterns of inward FDI (1991~2006) with adjustment of RMB real effective exchange rate. Section 3 presents theoretical propositions of the impact of the exchange rate volatility on FDI. Section 4 and 5 give respectively empirical analysis on the inflow of different patterns of FDI. Section 6 draws the policy implication and conclusions.

2. Chinese Inward FDI

Based on the data published by Chinese government, the trends of FDI inflow at national level and different patterns are drawn in Figure 1 and Figure 2 respectively. According to both Graphs, some obvious changes in the inflow of FDI in China can be observed.

Figure 1 illustrates the inflow of FDI in China and RMB real effective exchange rate during 1980~2006. From 1980 to 1992, RMB real effective exchange rate was in depreciation, while the inflow of FDI kept growing. During the period of 1992 and 1994, since the Chinese leader Deng Xiaoping's speech in south and the establishment of market economy consensus which encouraged the speed of opening-up, the inflow of FDI experienced a dramatic increasing, and the RMB real effective exchange rate began to appreciate moderately. In 1997, affected by the Asian Financial Crisis, RMB real exchange rate fluctuated slightly and manifested virtually appreciation to some extent as a result of heavy devaluation of other Asian currencies, which decrease the inflow of FDI in the next few years until 1999. From then on, RMB exchange rate kept stable on the whole. Since entry into WTO in 2000, Chinese began to step into a all-dimensional and wide-ranging opening pattern, the inflow of FDI went in a new expansion era. The inflow of FDI came to its peak in 2005. From 2005, under the pressure of RMB appreciation, new changes of the inflow of FDI appeared: In 2006, the real inflow of FDI (including banking, securities and insurance) was 69.468 billion dollars, 4.06 per cent down compared with last year, and newly signed FDI contracts number was 41485, decreased by 5.76 per cent; while in non-finance field(not including banking, securities and insurance), newly signed FDI contracts number was 41473, decreased by 5.75 per cent. Newly established enterprises from Asian 10 countries (regions) decreased by 6.54 per cent compared with last year, and the real inflow of FDI decreased by 2.37 per cent; newly established enterprises from America decreased by 14.33 per cent, and the real inflow of FDI decreased by 6.41 per cent; newly established enterprises from the former Euro 15 countries decreased by 7.98 per cent, while the real inflow of FDI increased by 2.51 per cent. In 2007 in non-finance field, newly signed FDI contracts number was 37871, decreased by 8.65 per cent. Although the appreciation of RMB against US dollars speeded up, the more depreciation of US dollars against the other currencies such as Euro relieved the stress of the appreciation of RMB real effective exchange rate, and at the same time affected the origin investors of FDI accordingly.

From above description of the relation between the volatility of RMB real effective exchange rate and the total inflow of FDI, the whole level of the inflow of FDI in China is still in a growing

tendency, but we will find the structure effect of exchange rate adjustment on FDI begin to protrude if we do segment research by classifying FDI into resource-seeking FDI and market-seeking FDI in Graph 2.

Figure 2 illustrates inflow of FDI in different sections. Because sectional data of FDI before 1991 are unavailable, the covered years in Graph 2 only limited to period 1991~2006. Before 1994, resource-seeking FDI (*abbrev. RK*) and market-seeking FDI (*abbrev. MK*) were both in a fast expansionary phase. From the first RMB exchange rate regime reform in 1994 to 2005, the inflow of resource-seeking FDI expanded up to 75 per cent of the total FDI in China, and the manufacturing contributed to 70 per cent. During the period, the inflow of market-seeking FDI kept increasing. From 2005, resource-seeking FDI began to decline, while the market-seeking FDI ascended obviously. In 2005, market-seeking FDI arrived at 28.880 billion dollars, increased by 80 per cent compared with last year, which made up the descend of the resource-seeking FDI in the corresponding period. In 2006, the manufacturing was still the mainly field attracting FDI, but both of the newly signed contracts and real inflow capital got down. On the other hand, the inflow and share of market-seeking FDI continued increasing especially centralized in the service trade field such as finance and real estate section.

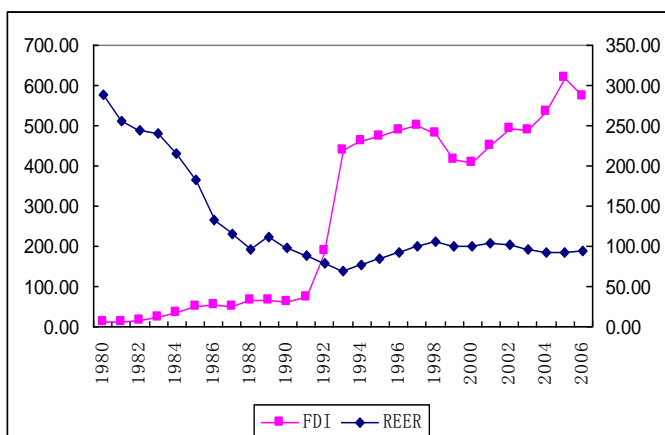


Figure 1. Inflow of FDI in China and RMB real effective exchange rate (1980~2006)

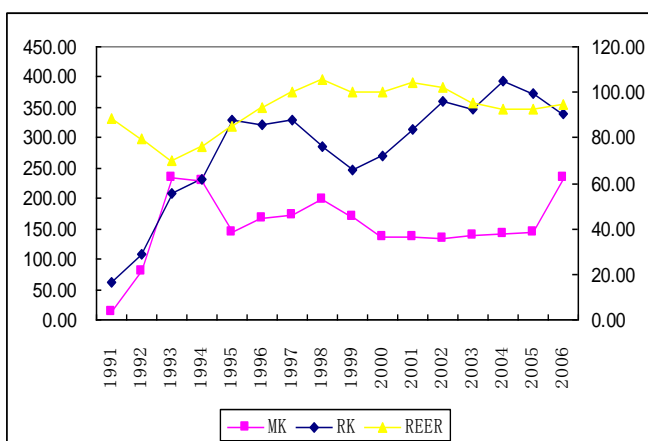


Figure 2. Inflow of different patterns of FDI and RMB real effective exchange rate (1991~2006)

3. Propositions and Empirical Model

3.1 Theoretical Propositions

According to theoretical analyses of Yu (2007), we try to put up four propositions.

Proposition 1: Expected appreciation of exchange rate in China may stimulate the inflow of FDI in a short term, but the in the long run the effect is ambiguous.

Expected appreciation of RMB exchange rate will increase the profit of holding assets denominated in RMB, so FDI may become one of the channels of the foreign capital entering into China until the realization of appreciation. However, the appreciation of host currency may increase domestic assets price while decrease the attraction of domestic stock market to the foreign capital and increase domestic resource cost(e.g. wage and raw material purchasing price) so as to impair the export comparative advantages of the export-oriented FDI. On the other hand, since appreciation of exchange rate in host country may increase the value of the domestic market measured by the foreign currency, market-seeking FDI may prosper instead of resource-seeking FDI. Therefore, different effects of exchange rate on resource-seeking FDI and market-seeking FDI in proposition 2:

Proposition 2: Appreciation of exchange rate in China may reduce the inflow of resource-seeking FDI but increase that of market-seeking FDI.

The volatility of exchange rate will increase the uncertainty risk of exchange gain or loss. Given a risk-reverse investor, increased uncertainty yielded from volatility of exchange rate may remove the motivation of long-term investment no matter what the pattern of FDI.

Proposition 3: Increased exchange rate volatility will reduce the inflow of FDI in the future in all sections.

If Proposition 1 and 2 are testified reasonable, the capital intensity per contract of resource-seeking FDI may increase with the appreciation of RMB exchange rate. As the labor cost in China denominated in home currency rise with the appreciation of RMB. On the contrary, that of market-seeking FDI may decrease since the appreciation has more sensitive effect on the production than that on the cost.

Proposition 4: Capital intensity per contract of resource-seeking FDI may ascend while that of market-seeking FDI may descend with appreciation of RMB exchange rate.

3.2 Empirical Model and Data

Due to the short period since the opening up in early 1980s and unavailable sectional FDI data in China, empirical evidence on the effect of exchange rate volatility on different patterns of inward FDI in China is limited². In this paper, to test the relation between the RMB real exchange rate change and the FDI performance at nation level, the basic regression equation is estimated as Eq.(1):

$$\log FDI_t = a_1 + a_2 \log REER_t + a_3 V_e + a_4 W_t + u_t \quad (1)$$

where FDI_t , $REER_t$, V_e and W_t represent real stocks of FDI, RMB real exchange rate, volatility of the exchange rate and wage respectively. The last term, u_t , is disturbance term with i.i.d..

The definition of above variables and the data sources are described as follows.

(1) The data source and classification of FDI

² See theoretical model to analyze the influence of exchange rate volatility on the structure of FDI in Bénassy-Quéré (2001), Jinping YU(2007).

(a) Inward FDI stocks are based on *Chinese Statistics Yearbooks* and 2006~2007 *Chinese Foreign Investment Statistical Manual*³. Real FDI stocks are constructed with the world consumer price index based on WB, *World Development Report* (CD-ROM) (100 in 2000).

(b) Referring to classification standard of the traded and non-traded goods by Sachs and Larrai(1993), we divide FDI into resource-seeking FDI and market-seeking FDI. The data utilized in classification are subtracted from the Chinese National Industrial Classification Standard and *Sectorial Distribution of FDI in China* published by *Chinese Statistics Yearbook*. The resource-seeking FDI mainly includes Agriculture, Forestry, Animal Husbandry & Fishery, Mining and Manufacturing; and the market-seeking FDI mainly include Construction, Production and Supply of Power, Gas& Water and the tertiary industry.

(2) The data source and calculation of the real effective exchange rate

Though RMB exchange rate has been strictly controlled with lower volatility of normal exchange rate for a long time, its flexibility appears with the development of RMB exchange rate regime reform. The multinational enterprises maximize the expected profits in both making location choice and decisions of FDI. The real effective exchange rate is an important affecting the expected profits denominated in home country's currency. Quarterly real effective exchange rates are based on *World Development Report*. In which, the data of REER are reported in indirect quotation, i.e., the rise in REER indicates the real appreciation of RMB.

The RMB real effective exchange rate volatility Ve_t can't be obtained directly and often be estimated by following methods: Random walk model, AR model, GARCH model and Non-normal residual distribution model, i.e. GARCH (1,1) model (Bollerslev et al.,1992 ;Aguirre & Saidi,2000). Here, GARCH(1,1) and EGARCH(1,1) models are adopted respectively to estimated the lag value of conditional variance σ_{t-1}^2 and the lag value of the square of the disturbance term u_{t-1}^2 , and then figure out the value of Ve_t :

The analysis using quarterly data (1980-2006) with GARCH Model yields

$$\text{Mean equation : } \Delta \log REER_t = 0.42586 \Delta \log REER_{t-1} + u_t \quad (2)$$

(3.27)

$$\text{GARCH(1,1) equation : } \sigma_t^2 = 2.4758 + 0.2319 u_{t-1}^2 + 0.7829 \sigma_{t-1}^2 \quad (3)$$

(0.70) (2.56) (10.65)

$$AIC=-3.795366 \quad SC=-3.694859 \quad LR=205.1544$$

and the analysis with EGARCH Model yields

$$\text{Mean equation : } \Delta \log REER_t = 0.37881 \Delta \log REER_{t-1} + 0.00091 \log \sigma_t^2 + u_t \quad (4)$$

(3.00) (5.01)

EGARCH(1,1) equation :

$$\log \sigma_t^2 = -0.0686 - 0.0559 \left[\frac{u_{t-1}}{\sigma_{t-1}} \right] - 0.1574 \left| \frac{u_{t-1}}{\sigma_{t-1}} \right| + 0.9872 \log \sigma_{t-1}^2 \quad (5)$$

(-3.02E+08) (-32.35) (-4.79) (1554631)

$$AIC=-3.7966 \quad SC=-3.6459 \quad LR=207.2216$$

We use the variance calculated by the EGARCH model as quarterly volatility of RMB real effective exchange rate, the yearly exchange rate volatility Ve_t is estimated by the mean of every four quarters.

³ The statistics in sectorial FDI from two sources comes different because data of banking, securities and insurance were included in the manual since 2005 due to the sharply increasing FDI of these fields in recent years, while statistics in yearbooks hasn't been adjusted yet. So we adopt the latter statistics to reflect the real structure change of FDI in China.

(3) The mean wage of different sections are calculated based on the *Chinese Statistics Yearbooks* with the consumer price index (100 in 2000). The real average wage of resource-seeking FDI and market-seeking FDI are weighted average wages of different sections. The weights are calculated based on the ratio of FDI in each section to total FDI.

4. Effect of Exchange Rate On Inflow of FDI

The long-term dynamic equilibrium relation and short-term shock effect between variables are analyzed by cointegration analysis, causality test and vector error correction model (VECM).

4.1 Cointegration Analysis

The cointegration analysis acquires the stationarity of variables, so we take unit root test at first. The results of the ADF test are reported in Table 1. In which, $PFDI_t$ represents the mean scale of per FDI contract. The test form is indicated by (C,T,n), C represents intercept, T represents trend, n represents lag length; ** denotes that the t-Statistic is obvious at the 1% level to reject H_0 .

Table 1 Results of Tests for Nonstationarity of Variables

Variable	Test Form	ADF Test Statistics	Result
$\log FDI_t$	(C,T,1)	-2.0457	N
$\log PFDI_t$	(C,0,1)	-3.4553**	Y
$\log REER_t$	(C,0,1)	-2.2329	N
Ve_t	(C,T,1)	-1.8071	N
$\log W_t$	(C,0,1)	3.2616	N
$\Delta \log FDI_t$	(C,T,1)	-4.0208**	Y
$\Delta \log PFDI_t$	(0,0,1)	-3.2134**	Y
$\Delta \log REER_t$	(0,0,1)	-2.9217**	Y
ΔVe_t	(0, 0, 1)	-3.5144**	Y
$\Delta \log W_t$	(C, 0, 1)	-3.0665**	Y

The results of ADF test show that except for the average scale of per FDI contract of the state ($\log PFDI_t$), all other variables are I(1) process.

As for the variables obeying I(1) process, there are two methods can be used for cointegration test: EG two-step method and Johansen cointegration test. Compared with the former method, Johansen cointegration test not only overcomes the disadvantage that EG two-step method can't test multivariable, but also indicates the accurate number of the cointegration. Therefore, the results of Johansen cointegration are adopted here.

The results of eigenvalue trace test of cointegration analysis on vector series $\log FDI_t$, $\log REER_t$, Ve_t , $\log W_t$ are shown in Table 2:

Table 2 Eigenvalue Trace Test

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	5% critical value	Prob.
None *	0.633184	51.53196	47.85613	0.0217
At most 1	0.455148	26.45959	29.79707	0.1156
At most 2	0.287037	11.27855	15.49471	0.1949
At most 3	0.106686	2.820419	3.841466	0.0931

Notes: Trace test indicates 1 cointegrating Eqn(s) at the 0.05 level; * denotes rejection of the hypothesis at the 0.05 level.

From Table 2, the result of trace test ($51.53 > 47.85$) rejects H_0 : No. of CE(s)=none at the level of 5 %, which indicates that at least within the optimal lag length, there is a long-term stable equilibrium relation between $\log FDI_t$, $\log REER_t$, Ve_t and $\log W_t$. The normalized cointegrating coefficients are (1.000, 2.538, 0.715, 0.230), and the corresponding long-term relation is:

$$\log FDI_t = -2.538 \log REER_t - 0.715 Ve_t - 0.23 \log W_t - 19.096 \quad (6)$$

(9.70465**) (4.35795**) (0.70576)

From Eq.(6), the coefficients of level and volatility of real effective exchange rate are both obviously negative at the 1% level from 1980 to 2006; while the coefficient of wage is not obviously negative. The elasticity of exchange rate against FDI is larger than that of wage, which indicates that the volatility of RMB exchange rate has a greater influence on investment inclination and inflow of FDI than rising of wage cost. Eq.(6) is basically in agreement with our theoretical proposition, that is, appreciation and increasing volatility of RMB exchange rate play a negative role on the inflow of FDI. As for the wage factor, though the coefficient of wage is not obvious, as the price mirror of labor cost, the wage will increase with the appreciation of RMB due to the price conduction mechanism, which will aggravate the cost of resource-seeking FDI especially for the export- seeking foreign investors so as to decrease the investment. On the whole, as the labor cost of china has been in a low level for a long time with higher wage rigidity, the foreign investors care more about the volatility of exchange rate.

4.2 Granger Causality Test

The Johansen cointegration test just exams whether the long-term equilibrium exists between variables but it can't illuminate the causality between the variables. So we use a Granger causality test to exam the causality between the variables in a short term in Table 3:

Table 3 Results of Granger Causality Test of the variables of the Cointegration

Null Hypothesis:	Obs.	F-Statistic	Pro.	Result
$\Delta \log REER_t$ is not Granger causality of $\Delta \log FDI_t$	22	8.26474	0.00152	reject
$\Delta \log FDI_t$ is not Granger causality of $\Delta \log REER_t$		0.55516	0.69901	accept
ΔVe_t is not Granger causality of $\Delta \log FDI_t$	22	6.93400	0.00372	reject
$\Delta \log FDI_t$ is not Granger causality of ΔVe_t		2.26655	0.11989	accept
$\Delta \log W_t$ is not Granger causality of $\Delta \log FDI_t$	22	2.70199	0.07738	accept
$\Delta \log FDI_t$ is not Granger causality of $\Delta \log W_t$		1.69050	0.21191	accept

In Table 3, the results of Granger causality test of the variables of the Cointegration Eq.(6) show that the level and volatility of RMB exchange rate are the reason for the inflow of FDI, while

the causality between wage and FDI doesn't exist, which also prove that the appreciation of RMB is one of the main reason for the decline of inflow of FDI.

4.3 Vector Error Correction Model (VECM)

Because both the Johansen cointegration test and Granger Causality test mentioned above prove that there is a strong relation between RMB exchange rate and FDI, we continue to analyze the dynamic effect process of the change of RMB real effective exchange rate against FDI by establishment of VECM. We choose the lag length as one and omit the unobvious variable $\log W_t$ listed in Eq.(6). The estimated results are listed by Eq.(7) :

$$\Delta \log FDI_t = 0.216 + 0.565 \Delta \log FDI_{t-1} + 2.462 \Delta \log REER_t + 0.552 \Delta Ve_t - 0.549 ecm_t \quad (7)$$

(0.0664) (3.9208**) (2.6263**) (2.6100**) (-4.9052**)

In which, ** denotes t-statistics is obvious at the 1% level. The volatility of the explained variable FDI_t can be divided into two parts: one is the short-term volatility reflected by the 1st order difference terms (i.e., $\Delta \log FDI_{t-1}, \Delta \log REER_t, \Delta Ve_t$), and the other part is the long-term equilibrium represented by ecm_t . According to Eq.(7), all coefficients of variables are obvious at the 1% level. Therefore, inflow of FDI_t is significantly affected by FDI_{t-1} , the level and volatility of the exchange rate. The appreciation and slightly volatility of RMB exchange rate in a short term help stimulate the inflow of FDI as Proposition 1 assumed. That may be explained as follows: first, the foreign investors would transform the investment pattern of export-seeking or resource-seeking FDI into market-seeking to avoid disadvantages of the cost rising caused by appreciation of RMB exchange rate. We will test this hypothesis in section 5. Secondly, there are time lags for the adjustment of the foreign investment policy due to the existence of sunk cost. The third, foreign funds with FDI name may enter into China to conduct arbitrage the interest of RMB exchange rate appreciation.

The coefficient of ecm is -0.549, which indicates that the long-term equilibrium error correction of the change of RMB real effective exchange rate against the inflow of FDI is considerable. Therefore, we can conclude that the volatility of RMB exchange rate will greatly affect the inflow of FDI no matter in the long run or in the short run.

5. Effect of Exchange Rate on Different Patterns of FDI

In this section, we will do further research on the influence of exchange rate on different patterns of FDI. As the period sample of section segment FDI obtained only 16 years from 1991 to 2006, the sample size isn't large enough to hold cointegration analysis, we use stepwise regression method to establish a proper model. Taking the policy factor such as RMB exchange rate regime in 1994 into account, we add a dummy variable into the model. The basic regression model established is

$$\log FDI_t = a_1 \ln REER_t + a_2 Ve_t + a_3 \log W_t + a_5 \log FDI_{t-1} + b_1 D_t + u_t \quad (8)$$

$$\text{While } D = \begin{cases} 0, t \geq 1994 \\ 1, t \in \text{others} \end{cases}$$

In order to effectively observe the influence of the level and volatility of the exchange rate on FDI, a series of regression models containing different explanatory variables are used for regression. The results of the regression are reported in Table 4:

Table 4 Regression Results of Resource-seeking FDI and Market-seeking FDI

Situation I : Total Inflow

	Resource-seeking FDI		Market-seeking FDI	
	Reg. 1	Reg.2	Reg. 3	Reg.4
C	11.32974** (4.674513)	3.060275** (2.589692)		2.046934** (2.18045)
$\log REER_t$	-1.71352** (-3.26919)		0.38703** (2.992541)	
Ve_t		0.169891 (1.269411)		0.171772** (2.271225)
$\log W_t$	0.483935** (2.841824)	0.568122* (2.286285)	0.171785 (1.657813)	0.246954 (1.473836)
$\log FDI_{t-1}$			0.612937** (5.4281)	0.35772** (3.860448)
D_t	-1.03707* (-5.58353)	-0.99676* (-3.52364)	0.956638** (4.460342)	
R^2	0.889630	0.816034	0.673793	0.587989
DW	1.693962	1.388330	2.483024	1.86444
F-statistics	32.24161	17.74313		5.23278

Situation II : Average Scale of per Contract

	Resource-seeking FDI		Market-seeking FDI	
	Reg. 5	Reg.6	Reg. 7	Reg.8
C	-9.72677 (-6.95796**)	4.037013** (3.200031)	-2.87622 (-1.41495)	9.937617** (8.173368)
$\log REER_t$	2.70114* (7.280338)		2.525747** (5.500491)	
Ve_t		-0.41768** (-3.91447)		-0.34128** (-3.64259)
$\log W_t$	-0.55312** (-3.83388)	-0.69713** (-2.97665)	-0.95599** (-6.48026)	-1.12976** (-5.58691)
$\log FDI_{t-1}$	0.858357** (7.71386)	0.751164** (3.843326)	0.24575** (3.076663)	0.180083
R^2	0.962020	0.902309	0.895941	0.823103
DW	1.414526	1.624351	1.711082	1.350528
F-statistics	92.87527	36.94530	31.56861	20.80896

Notes: *, ** denotes the t-statistics is significant at the 5% and 1% respectively.

5.1 Effect of Exchange rate on Resource-seeking FDI

As for the total inflow of resource-seeking FDI, Table 4 shows that the coefficient of the level of RMB exchange rate is obviously negative, while that of the volatility is positive but not significant. This demonstrates that the depreciation of RMB can stimulate the inflow of resource-seeking FDI, while the appreciation may undermine it. Because almost 60 to 70 percent FDI in China are export-seeking, with the rise of production cost and exchange gain or loss measured by US dollars, the export competition of the export-seeking investors would be impaired and investment shrinks. The effects of volatility of the exchange rate may not affect the resource-seeking FDI obviously. This indicates that the multinational enterprises have the ability to

smooth the risks yielded from exchange rate variation. The coefficient of wage becomes obviously positive, as we have analyzed in section 4.1, the labor cost in China has been in a low level for a long time with higher wage rigidity, so the domestic wage and the inflow of FDI both have a growing space with the opening-up to the international market.

As expected in Proposition 4. The level of exchange rate plays a positive role on the scale of per resource-seeking FDI contract, while the coefficients of volatility of exchange rate and wage are obviously negative. If the exchange rate of the host country appreciates, the critical value of the per capital of the resource-seeking FDI contract will increase, which may reduce the patterns of the foreign investment (Yu, 2007). Since the reform of the RMB exchange rate regime in 2005, although the total inflow of the resource-seeking hasn't changed obviously, the number of FDI contracts newly signed has decreased obviously, and some labor-intensive foreign investments have been eliminated due to the disappearance of the low-cost advantage.

In Situation II, the coefficient of wage becomes obviously negative which indicates the foreign investors may remove their investment out of China in a long run when the domestic wage continues rising with the appreciation of exchange rate or other factors. Because the comparative advantage of the average wage of China is far less than that of the world is one of the most important reasons for FDI flows into the manufacturing and other resource-seeking sections in China.

5.2 Effect of Exchange rate on Market-seeking FDI

With the opening-up and growth of Chinese economy, more and more FDI began to focus on the domestic market. Different performance appears if we divide FDI into two patterns. Both total inflow and average inflow of market-seeking FDI are positively correlated with the level of the exchange rate as hypothesized in proposition 2. However, the effect of exchange rate volatility on average inflow of market-seeking FDI performs the same with that of resource-seeking FDI, which testifies Proposition 3: increasing exchange rate volatility in China will reduce the inflow of FDI in the future no matter what the pattern of FDI. Appreciation of RMB would affect the domestic production and consume construction from two aspects: appreciation of RMB would improve the consume capacity of Chinese; on the other hand, it would burden the cost of the export-seeking enterprises, which may induce the foreign capital to flow into the non export-seeking manufacturing or non-traded sections. Moreover, with improvement of domestic market price mechanism and opening up of Chinese service field, there is a growing tendency for multinational enterprises of banking, telecommunication and business conglomerates to enter Chinese market.

6. Conclusions

This paper has investigated both the level and volatility effects of RMB real effective exchange rate on the inflow of FDI with the process of Chinese opening-up and adjustment of exchange rate regime. In particular, it examines different effects of exchange rate on resource-seeking FDI and market-seeking FDI from the angle of the multinational enterprises. In the case of China, the exchange rate effects on FDI include: (1) expected appreciation and temporary volatility of exchange rate in China stimulate the inflow of FDI in a short term, but the effect is ambiguous in the long run; (2) appreciation of RMB real effective exchange rate reduces the inflow of resource-seeking FDI while increases that of market-seeking FDI; (3) increasing exchange rate volatility in China will reduce the inflow of FDI in the future no matter at overall level or in different sections; (4) appreciation of RMB real effective exchange rate intends to increase capital intensity per contract of resource-seeking FDI but to decrease that of market-seeking FDI.

Additionally, we also find that the wage in China is significant factor for explaining the inflow of FDI, which indicates that China still have comparative advantages in labor cost. However, in further study of the average capital scale of per contact, the correlation between wage and the inflow of FDI turns to be negative, which indicates that at the double stress of the appreciation of exchange rate and rise of wage, the initiative of multinational enterprises may be depressed.

With the further joint into international division system and the market-oriented reforms, the factor advantage of China attracting FDI is undergoing a change. The empirical results of our study manifests that increasing of RMB exchange rate flexibility and the market-oriented reforms of domestic factor pricing will reduce the inflow of resource-seeking FDI and the export of low-cost competition goods, which may end the Chinese competition era of low-cost advantage and cheap goods.

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