

A Study on the Impact of Interest Rate Fluctuations on Foreign Direct Investment

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Abstract. Foreign Direct Investment (FDI) is an integral part of international economic cooperation, playing a significant role in promoting economic growth, technology transfer, and job creation. However, the impact of global financial market uncertainty and volatility, especially interest rate fluctuations, on foreign direct investment has long been a subject of scrutiny. This study employs a linear regression approach to empirically examine the influence of interest rate fluctuations on foreign direct investment. The empirical results reveal that interest rate changes do not have a significant impact on the flow of foreign direct investment. This research finding contributes to the understanding of the objective relationship between interest rate fluctuations and foreign investment, providing valuable information for policymakers and investors in making investment decisions.

Keywords: Foreign Direct Investment, interest rate fluctuations, foreign direct investment flow.

1. Introduction

Foreign Direct Investment (FDI) represents a form of cross-border investment involving the movement of capital across national boundaries. In the context of globalization, FDI serves as a bridge and link, facilitating economic connections and cooperation among nations. With the increasing integration of global financial markets, interest rates have emerged as a crucial economic indicator that not only influences domestic economic policies but also exerts significant effects on decisions and scales of foreign direct investment.

Over the past few decades, international interest rate markets have witnessed substantial fluctuations, driven by various factors such as changes in monetary policies, expectations of economic growth, and global financial crises. The impact of interest rate fluctuations extends beyond domestic economies, directly affecting the scale and direction of foreign direct investment. Against this backdrop, understanding how interest rate fluctuations affect FDI mechanisms and outcomes holds significant theoretical and practical significance.

However, there exist diverse perspectives and research findings within academia regarding the mechanisms and effects of interest rate fluctuations on FDI. The first viewpoint suggests that exchange rate fluctuations increase uncertainty about future returns for multinational enterprises. Since corporate profits equal the present value of future income from investments minus sunk costs initially paid, exchange rate volatility enhances the value of waiting for better investment opportunities. In such cases, businesses may choose to wait for more favorable investment conditions rather than immediately engaging in foreign direct investment [1]. The second perspective highlights that intensified exchange rate fluctuations further stimulate multinational corporations' motivation for international production expansion, thereby compelling them to increase their foreign direct investment. Assuming exchange rate changes are exogenous factors, multinational companies can leverage this situation by establishing production facilities in both the home and host countries. This strategy enables companies to move production activities to countries with the lowest costs under favorable conditions, achieving more efficient resource allocation within the industry chain. Specifically, multinational companies can set up production facilities in host countries and sell products in the local market or produce domestically and export products to host countries. Therefore, in an environment of exchange rate fluctuations, this so-called "production convenience" significantly enhances the attractiveness of foreign direct investment [2-4]. The third viewpoint argues that interest rates and property prices are inversely related, with rising property prices favoring the attraction of

foreign direct investment. However, this impact varies due to regional disparities in development, with rising property prices significantly attracting FDI in developed areas, while exerting significant inhibitory effects in less developed central regions. Conversely, an increase in interest rates leading to a decrease in property prices results in reduced FDI [5]. Finally, some scholars propose that if interest rates rise, the cost of purchasing capital goods and bond yields will increase simultaneously. Therefore, businesses are more inclined to allocate their savings to purchasing bonds rather than equipment. Conversely, a decrease in interest rates makes the purchase of capital goods more attractive than buying bonds. A relatively flat money demand curve and a relatively steep investment demand curve imply significant changes in currency, which may lead to significant variations in foreign direct investment [6].

Given the aforementioned background and the controversies within existing research, this study aims to conduct an in-depth examination of the impact of interest rate fluctuations on foreign direct investment. This paper will combine relevant theories and empirical analyses to explore the mechanisms and effects of interest rate fluctuations on foreign direct investment. Specifically, this paper will focus on the following aspects:

1. The impact of interest rate fluctuations on the flow of foreign direct investment: This paper will investigate how interest rate fluctuations influence the inflow and outflow of foreign direct investment. In a high-interest-rate environment, the rising cost of capital may reduce the attractiveness of a particular country or region for foreign investors. This paper will analyze the correlation between interest rate fluctuations and the flow of foreign direct investment and delve into the underlying mechanisms of this relationship.

2. The influence of interest rate fluctuations on the project selection of foreign direct investment: This paper will study how interest rate fluctuations affect the project selection of foreign direct investment. In a high-interest-rate environment, investors may be more inclined to select short-term, high-return projects to minimize the risk associated with capital cost increases. This paper will examine the impact of interest rate fluctuations on different types of projects (e.g., manufacturing, financial services, infrastructure, etc.) and analyze the variations in foreign direct investment decisions across industries and sectors.

This research aims to reveal the mechanisms of interest rate fluctuations on foreign direct investment and provide valuable information for policymakers and investors regarding interest rate policies and investment decisions. The ultimate goal is to promote the stability and sustainable development of foreign direct investment, facilitating international economic cooperation and economic growth.

2. Theoretical analysis

The influence of interest rate fluctuations on Foreign Direct Investment (FDI) has become a significant research topic in the fields of international economics and international finance. Extensive research by scholars and research institutions has been conducted, and these studies can be explained based on the following theoretical foundations:

2.1. Investment Cost Theory

According to the Investment Cost Theory, fluctuations in interest rates affect investors' capital and financing costs. Higher interest rates increase capital costs, reducing investors' willingness to invest, which may lead to a decrease in FDI. Conversely, lower interest rates reduce capital costs, enhance investors' motivation to invest, and promote an increase in FDI.

2.2. Currency Exchange Rate Theory

There exists a close relationship between interest rate fluctuations and currency exchange rates. Changes in interest rates may influence the trend of currency exchange rates, subsequently affecting FDI. Sung and Lapan found that exchange rate fluctuations prompt multinational corporations to shift

their investments to low-cost regions. Multinational companies engage in production both domestically and internationally to mitigate the risk of exchange rate fluctuations and leverage such fluctuations to increase profit levels [7].

2.3. Risk Aversion Theory

The Risk Aversion Theory contends that to better explain the impact of exchange rate fluctuations on FDI, one must consider the risk preferences of economic entities, as these anticipated fluctuations directly affect their investment behavior. Goldberg and Kolstad explained the influence of exchange rate fluctuations on firms' decisions between domestic and foreign production from the perspective of investor risk aversion. Exchange rate fluctuations may lead to a reduced allocation of resources to foreign production. However, if investors are risk-neutral, no such relationship exists [8-9].

2.4. Market Size Hypothesis

The Market Size Hypothesis describes a competitive, freely enterable, information-transparent market environment with homogeneous products. At any given time, FDI is assumed to be a function of the domestic market size (Gross Domestic Product, GDP). Therefore, while considering the impact of GDP on FDI, we also examine the role of GDP growth rate or the absolute change in GDP in determining FDI [10].

These theoretical foundations provide some theoretical support for explaining the impact of interest rate fluctuations on FDI. However, it should be noted that the influence of interest rate fluctuations on FDI is a complex issue influenced by multiple factors. Therefore, empirical research should comprehensively consider various factors and incorporate specific economic environments and market characteristics into the analysis.

3. Variable, Data and Method

3.1. Variable

3.1.1. Explanatory Variables

Interest Rate Fluctuations (IRC): Interest rate fluctuations are used as the explanatory variable. The degree of interest rate fluctuation can be measured using the average interest rate level within the commercial banking industry or by referencing the benchmark interest rate for RMB loans provided by the People's Bank of China.

3.1.2. Dependent Variables

Net Inflow of Foreign Direct Investment (FL): Serving as the primary dependent variable, it represents the magnitude or inflow of foreign direct investment within a specific time period. Using the net inflow of foreign direct investment as a measurement indicator effectively elucidates the impact of interest rate fluctuations.

3.1.3. Control Variables

Economic Growth (EG): Recognizing the significant influence of economic growth on foreign direct investment, the real GDP growth rate of a country or region is included as a control variable to account for the effect of economic growth.

Labor Costs (LC): Labor costs, whether high or low, can affect the capital and enthusiasm for foreign direct investment. Lower labor costs imply that foreign investors can invest in production at lower labor costs to generate profits. Conversely, higher labor costs necessitate higher labor expenses for foreign investors entering the Chinese market.

Consumer Expenditure (CS): Higher consumer expenditure typically signifies a larger market size and greater consumer demand, potentially attracting foreign direct investment. Therefore, consumer expenditure is included as a control variable to account for the impact of market size and demand on foreign direct investment.

Population Size (PS): Population size is closely related to consumer demand. A larger population typically means more consumers, indicating a broader consumer base for foreign direct investment. A larger potential consumer market translates to greater potential profit opportunities.

3.2. Data

As there are no directly matching data for the specified variables, this paper chose the data that best represents the economic meanings of the variables. Interest rate fluctuations are represented by the benchmark interest rate for RMB loans set by the People's Bank of China. Economic growth is represented by Gross Domestic Product (GDP). Labor costs are represented by the average annual wages of foreign investment personnel. Consumer expenditure is represented by per capita consumer expenditure of domestic residents. Population size is represented by the year-end population data. The net inflow of foreign direct investment is represented by the actual utilization of foreign direct investment.

These data sources have been selected to effectively capture the intended economic relationships within the model.

3.3. Model Construction

A linear model is constructed to examine the impact of interest rate fluctuations on the flow of foreign direct investment while controlling for economic growth, labor costs, consumer expenditure, and population size:

$$FL = \beta_0 + \beta_1 \times IRC + \beta_2 \times EG + \beta_3 \times LC + \beta_4 \times CS + \beta_5 \times PS + \varepsilon \quad (1)$$

Where, FL is the dependent variable, representing the scale or inflow of foreign direct investment. IRC is the explanatory variable, representing the volatility of interest rates. EG, LC, CS, and PS serve as control variables to account for other factors related to the flow of foreign direct investment. β_0 represents the intercept term. β_1 , β_2 , β_3 , β_4 , and β_5 represent the coefficients for their respective variables, indicating the direction and degree of their impact on the flow of foreign direct investment. ε represents the error term, accounting for unexplained random factors within the model.

4. Results and Discussion

4.1. Descriptive Analysis

This study conducted descriptive statistical analysis on the main variables, and the results are presented in Table 1. This paper can observe differences between the maximum (Max) and minimum (Min) values of each variable. These differences reflect the varying distribution ranges and degrees of variation among the variables in the dataset. For instance, the minimum value of Foreign Direct Investment Flow (FL) is 5,350,500, while the maximum value is approximately 18.9 million, indicating significant fluctuations in foreign direct investment across different time periods or locations. Similarly, for Interest Rate Fluctuations (IRC), the minimum value is 3.97, and the maximum value is 7.2, indicating a certain range of interest rate volatility within the dataset.

Table 1. Descriptive Statistics of Main Variables

Variable	Obs	Mean	Std. Dev.	Min	Max
FL	20	1.18e+07	3662445	5350500	1.89e+07
IRC	20	5.3025	.9800423	3.97	7.2
EG	20	593256.8	340604.9	137422	1210207
LC	19	61433.05	33770.55	21016	126019
CS	20	13191.9	6820.072	3889	24538
PS	20	136093.3	4161.845	129227	141260
TIME	20	10.5	5.91608	1	20

4.2. Correlation Analysis

Correlation statistical analysis was conducted on the main variables, and the results are presented in Table 2. The absolute values of the correlation coefficients between variables are all less than 0.5, indicating the absence of severe multicollinearity issues among the variables.

From the data analysis results mentioned above, it can be inferred that when there is significant interest rate volatility, the scale of foreign direct investment may decrease. This could be attributed to the fact that when interest rates in China rise relative to those in the investing country due to increased interest rate differentials, the currency supply in China decreases relative to that in the investing country. This leads to an appreciation of the currency in the host country compared to the investing country. Since multinational corporations engage in foreign direct investment to leverage China's lower labor resources, the currency appreciation in China increases the production costs calculated in the currency of the investing country. As a result, it becomes more challenging for multinational corporations to recover their initial investment costs, particularly for risk-averse corporations, leading to a reduction in the maximum scale of foreign direct investment. Conversely, when interest rate volatility is low, the scale of foreign direct investment by foreign entities may increase. Other control variables exhibit a strong positive correlation with the flow of foreign direct investment.

Table 2. Correlation Analysis

	FL	IRC	EG	LC	CS	PS
FL	1.0000					
IRC	-0.3473	1.0000				
EG	0.9421	-0.5706	1.0000			
LC	0.9223	-0.6095	0.9973	1.0000		
CS	0.9397	-0.5786	0.9988	0.9965	1.0000	
PS	0.9440	-0.5223	0.9832	0.9746	0.9878	1.0000

4.3. Regression Analysis

A regression analysis was conducted on the main variables, and the results are presented in Table 3. According to the F-statistic and its corresponding p-value, the overall model is statistically significant. The F-statistic is 53.91, and the p-value is less than 0.05, indicating that the explanatory variables have a statistically significant impact on the dependent variable.

To assess the goodness of fit of this data, the values of R-squared and Adjusted R-squared were considered. The model shows a good fit to the observed data, with an R-squared value of 0.9540, suggesting that the model can explain 95.40% of the variability in the dependent variable. The Adjusted R-squared value of 0.9363, accounting for the model's degrees of freedom, provides a more accurate measure of goodness of fit.

For each independent variable (IRC, EG, LC, CS, PS) and the constant term, the results provide coefficient estimates, standard errors, t-values, and p-values. P-values were used to evaluate the significance of each independent variable's impact on the dependent variable. If the p-value is lower than the chosen significance level (typically 0.05), it can be considered that there is a significant relationship between the independent variable and the dependent variable. In the provided results, the variable IRC has a p-value of 0.109, which is close to the significance level. The p-values for the other independent variables are greater than 0.05, indicating that they may not have a significant impact.

Based on these data results, this paper can preliminarily conclude that the explanatory variable, interest rate volatility (IRC), significantly affects foreign direct investment flows, while the other control variables do not have as significant an impact in comparison to interest rate volatility. According to the confidence interval provided in the data, the 95% confidence interval for the regression coefficient of IRC is between -153766 and 1348668.

Table 3. Regression Analysis

FL	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
IRC	597451.1	347726.4	1.72	0.109	-153766	1348668
EG	26.36789	18.54201	1.42	0.179	-13.68969	66.42547
LC	-222.9873	125.0106	-1.78	0.098	-493.0562	47.08154
CS	539.6374	1059.996	0.51	0.619	-1750.344	2829.619
PS	-204.493	479.684	-0.43	0.677	-1240.787	831.8013
_cons	2.81e+07	6.05e+07	0.46	0.650	-1.03e+08	1.59e+08

5. Conclusion

This paper investigates the impact of interest rate fluctuations on foreign direct investment (FDI) flows. It appears that interest rate fluctuations do not have a significant impact on FDI flows. This suggests that FDI flows are not highly sensitive to changes in interest rates. It is important to note that interest rate volatility may exhibit lagged effects, meaning that past fluctuations can also affect current FDI flows. This implies that policymakers and investors should consider the effects of interest rate volatility over both the short and long terms. Furthermore, more open economies tend to be more sensitive to interest rate fluctuations. This indicates that in regions with higher levels of internationalization, the impact of interest rate fluctuations on FDI is more significant.

There are several policy recommendations in this paper. Policymakers should focus on managing interest rate fluctuations to create a stable investment environment and enhance confidence in FDI. Prioritizing economic growth, labor market competitiveness, market potential, and scale enhancement should be key considerations for governments to increase FDI attractiveness. Multinational corporations and investors should take into account changes in interest rate fluctuations and other economic factors when formulating prudent investment strategies to mitigate risks. This will contribute to a better understanding of the impact of interest rate fluctuations on FDI and provide support and guidance to relevant stakeholders.

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