UNIVERSITY OF GOTHENBURG
SCHOOL OF BUSINESS, ECONOMICS AND LAW

The relationship between foreign direct investments and exchange rates

A quantitative analysis of how the exchange rate is affecting the FDI inflows in South Korea and China

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Abstract

This study investigates the effect of exchange rate movements on foreign direct investment (FDI) inflows. According to previous studies, it seems to be a significant correlation between exchange rate movements and the FDI inflows. However, the result differs depending on different factors and motives. During the last decades, the economic growth within South Korea and China has been massive. Each country has had an annual average growth rate of approximately 10 percentage. Furthermore, South Korea is perceived as an open country with a floating exchange rate. China is rather seen as a closed country with a fixed exchange rate.

In order to analyze the relationship between exchange rate movements and FDI inflows, we created an econometric model where our dependent variable is the annual FDI inflow and the independent variable of interest is the real effective exchange rate. Based on our results, we can conclude that there is a significantly negative correlation between real effective exchange rates and FDI inflows so that an appreciation (depreciation) of the local currency leads to a decrease of FDI inflows (increase of FDI inflows).

Keywords: Foreign direct investments (referred to as FDI), real effective exchange rate, volatility, real interest rate, appreciation, depreciation.

Innehållsförteckning

I. INTRODUCTION

According to several theories, there is a correlation between the movements within the exchange rate and the foreign direct investments (FDI) inflow. However, different theories have several opinions about how these two elements are impacting each other, as well as if the correlation between them seems to be positive or negative. For instance, Lily, et al (2014) as well as Quéré, et al (1999) claims that the correlation is positive, so that an appreciation of the local currency is increasing the FDI inflows. Their explanation for this is that an appreciation would lead to a higher purchasing power among the local consumers, which will have a positive effect on the economic growth and the FDI inflows. Further on, Froot & Stein (1991) and Dewenter (1995) claims that a depreciation of the local currency would stimulate the FDI inflows, since the cost of capital would decrease and it will be cheaper for foreign countries to invest in the domestic country.

We believed that this topic is important and interesting since FDI brings capital, technology and productivity enhancement. All of these variables are rather important for the economic development. Therefore, it would be interesting to observe if exchange rates movements could affect the inflow of capital and hence, indirectly the economic growth.

The topic is discussed and analyzed from different perspectives. For instance, factors such as volatility of the exchange rate, the real interest rate within each country as well as if the exchange rate is fixed or floating is by many theories seen as crucial factors during this context.

Purpose

The general purpose of the study is to test our hypothesis based on theories and thereby, conclude the strengths and weaknesses of the existing theories regarding this subject. We find this topic interesting since different theories have different claims and opinions about the relationship between exchange rates and FDI inflows, all with very logical and relevant explanations for their respective claims.

Research question

Our research question is; Does exchange rate movements impact the FDI inflows in China and South Korea?

Hypothesis

Our main hypothesis is, first and foremost, that we expect that exchange rate movements will have a significant impact on the FDI inflows but based on theories this correlation could move in different directions due to different factors. As mentioned earlier, Froot & Stein (1991) as well as Dewenter (1995) observes a negative relationship between the two factors, so that a weaker local currency would lead to increased FDI inflows and the other way around, which means that a stronger local currency indicates lower FDI inflows. On the other hand, Lily, et al (2014) and Quéré, et al (1999) are finding the opposite results when they are testing the relationship in several developing countries, mostly in Asia. However, we believe that the biggest indirect effect the exchange rate movement has on the FDI inflows is that it increases the cost of capital and makes it more expensive for foreign countries to invest. Thereby, our hypothesis regarding our key research question is that there is a negative correlation between the value of the two currencies and the FDI inflows into the countries. This would mean that an appreciation of the local currency would lead to a decrease of FDI inflows.

We expect that volatility and thereof, risk and uncertainty of the exchange rate has a significant negative effect on the FDI inflows in both of the countries. Besides from this we believe that there are differences between fixed and floating exchange rates regarding this matter.

Regarding the real interest rate, we certainly expect that a higher interest rate increases the demand for investments. Hence, we expect a positive correlation between the real interest rate and the FDI inflows.

II. BACKGROUND AND CORE CONCEPTS

Background

China

China has been perceived as a country with strict capital controls. Moreover, capital controls are referred as taxes or restrictions on international transactions in assets, such as stocks and bonds. Capital controls can also be applied to foreign exchange rates. These capital controls tend to reduce the volatility of capital flows. Hence, it makes it even harder for foreign investors to invest in the country (Neely, 2017).

FDI

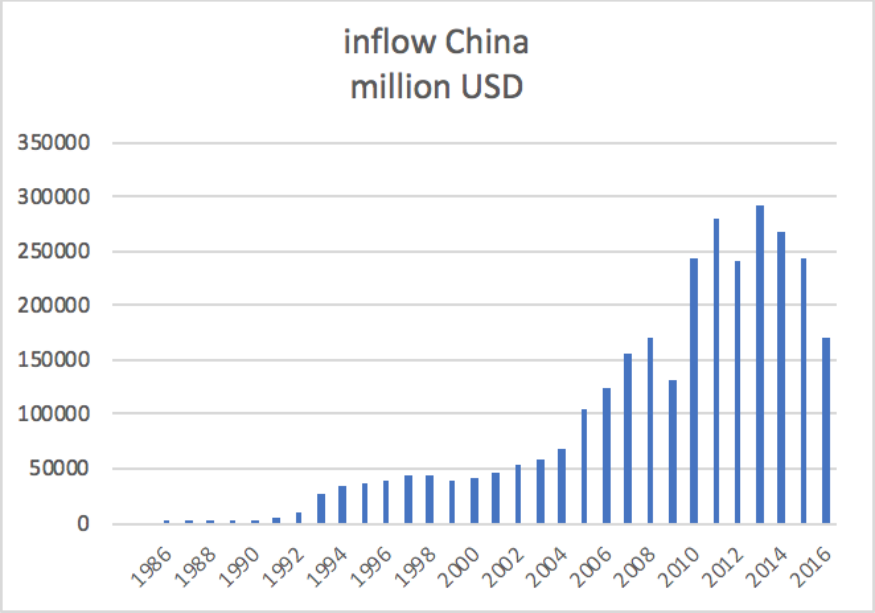
Between 1979-1985, China's governments started to introduce different policies that would attract and allow foreign direct investment into China. However, it was only possible for foreign investors to invest in China through ”joint venture enterprises” with Chinese partners. Due to the regulation, FDI inflows was very low and also restricted to different geographic areas (Wei & Liu 2001). From the year 1986, the restrictions on foreign ownership were reduced, which led to an annual increase of FDI inflows by almost 20 percent.

Moreover, the dominant type of FDI changed from equity joint ventures to contractual joint ventures as well as full-owned enterprises. A higher ratio of export-oriented and technological enterprises combined with a well-developed infrastructure was the main reasons for why China started to be attractive for foreign investors (Wei & Liu 2001). The year 1992, the current leader of China, Deng Xiaoping, started the acceleration of FDI inflows since China would proceed to encourage market-oriented reforms as well as policies in order to open up for foreign investors. This was crucial for the economic development in China and the amount of FDI inflows rose from $4,37 billion in 1991 to $41,7 billion in 1996.

The annual growth rate of FDI inflow proceeded and remained upward trending until 1999, when the amount of FDI dropped by 11 percent. This is mostly due to a demand for acquisitions within OECD and non-OECD countries (Wang, 2011).

Higher entry requirements from WTO (World Trade Organization) forced the Chinese government to reorganize its economic policies and structure. Hence, increased foreign openings within sectors as banking, finance, insurance, and telecommunications was approved.

Furthermore, industrial tariffs and quotas for export and import was also removed. Thereby the amount of FDI inflows increased even further. The financial crisis in 2008 decreased the FDI inflows. However, it only decreased by 2,56 percent. Later on, the Chinese government did some macroeconomic changes as well as stabilize the currency. Therefore, the amount of FDI inflows rose by 17.44 percent in 2009 (Chai & Roy 2006).



Graph 1 - FDI inflow in China, source: World Bank

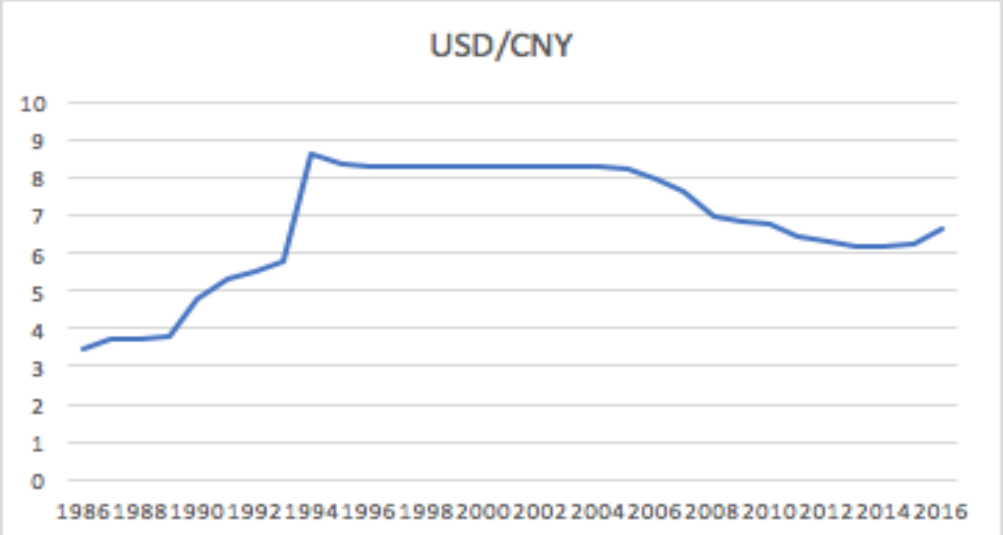
Exchange rate

Before 1979, China used a centralized regime where the government controlled the supply and demand of the exchange rate. Thereof, the exchange rate was fixed (Zhang. J, Liang.Y. 2006). Due to the liberalization policy in 1979, foreign trade systematically started to be decentralized. The Chinese currency was at this moment overvalued, which led to an unprofitable export sector as well as a lack of the foreign exchange reserves. In order to antidote the situation, the Chinese committee introduced a dual track exchange system. A dual track exchange system indicates that a country has two different exchange rates in which its currencies are exchanged. A dual system often consists of both fixed and floating exchange rates (Gang Yi, 2013).

During this time, foreigners were not allowed to own the Chinese currency "renminbi". Instead, they needed to exchange their currency to foreign exchange certificates at the Bank of China (Browne, 2010). Nonetheless, the dual track exchange system generated several misinterpretations. During the time, the United States and IMF (International Monetary Fund) were accusing China of using its dual exchange system as a way of subsidizing exports.

Later on, the dual track exchange rate included foreign exchange swap rate. The introduction of the swap rate was vital for China's further foreign trade transaction (Lin & Shermm, 2003). Since 1994, the Chinese currency has been pegged against the US dollar but systematically adjusted for changes against a basket of major currencies instead. Thereby it was unpegged to the US dollar in 2005. A gradually higher development on the Chinese economic and financial markets led to a significant appreciation of the official exchange rate after 2006, which can be seen in "graph 2".

Today, the official exchange rate in China is seen as a single floating currency. However, it has a daily floating band to plus/minus one percentage. Otherwise, the People's Bank of China has the power to intervene the official exchange rate, which makes it less volatile. Hence, China is still often referred to as a country with a dual track exchange rate system and tight capital controls. China has stated that they will reduce the market interventions and make the official exchange rate even more floating in the future (Gang Yi, 2013).



Graph 2 - Official exchange rate, USD/CNY, source: World Bank.

South Korea

South Korea's economic development has been massive and it has been one of the best performing countries based on GDP per capita for the last decade. South Korea's GDP per capita has been growing from about $158 in year 1960 to almost $27.500 in 2016 (World Bank), which compared to other countries is an extreme growth rate. Between 1986 and 2015, the average annual GDP growth rate was 6,08 percentage. In 1996, South Korea became a member of the Organization for Economic Cooperation and Development (OECD), which officially marked them as a wealthy and industrialized country.

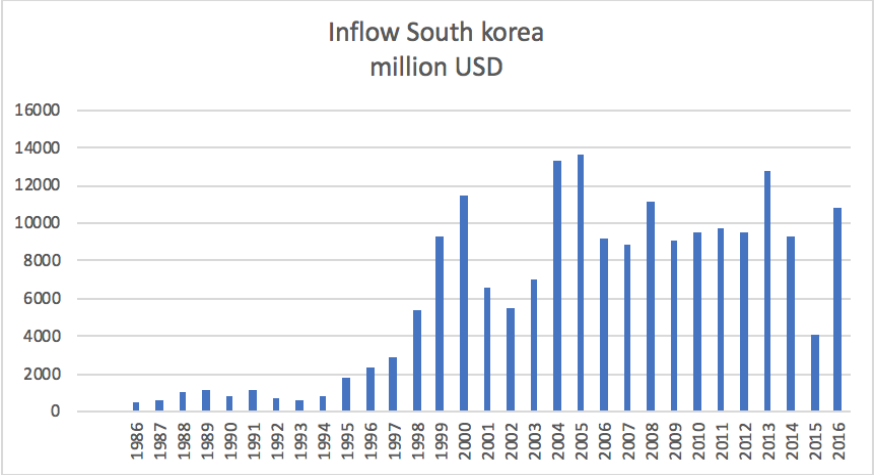
In 2004, they joined the club of trillion-dollar economies, and the country is today ranked as the world's 12th largest economy concerning GDP. Besides from this, South Korea's economy is, and has for many years been, very driven by exports. In 2013, exports of goods and services accounted for 53,9 percent of the GDP (Investopedia).

FDI

As can be seen in "graph 3", South Korea's FDI inflows has been growing from about $500 million to almost $11 billion in only 30 years. Further on, the FDI inflow have averaged around $10 billion from 2006-2016. According to Nordeatrade (2018), investments have been under pressure due to external shocks, including unfavorable international economic context. After 1997, the FDI inflows increased significantly, which could be linked to the fact that they became a part of OECD in 1996. This could in turn be considered as a sign of wealth and legitimacy. Another reason could be that they officially changed to a floating exchange rate regime. According to Aizenman (1992), floating exchange rate regime encourage FDI while fixed exchange rate regime is more conductive to FDI.

After this, the FDI inflows decreased to start increasing rapidly again in 2004. The FDI decreased dramatically in 2015, which according to Nordeatrade (2018) was a result of the withdrawal of Tesco, but only one year after this, in 2016, the FDI inflows reached even higher levels than 2014.

According to Nordeatrade (2018), the growth of the FDI inflows as a result of the economic growth and a higher specialization on information and communication technologies. However, they are mentioning that a big concern for foreign investors is still the lack of general transparency in regulations.

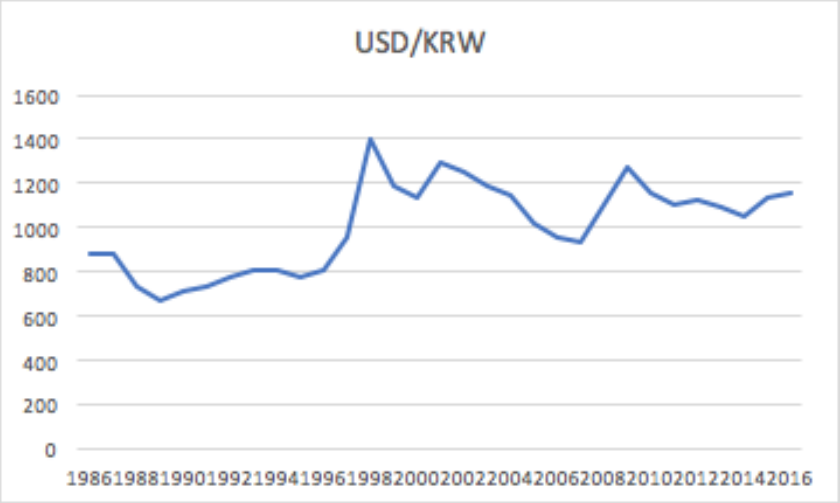


Graph 3 - FDI inflow in South Korea, source: World Bank

Exchange rate

The South Korean Won was in 1902 introduced as the official currency of Korea. Under Japanese rule, Korea had to adapt the Yen, replacing the Won. After World War II, South Korea reestablished the Won as the official currency in 1945. After being replaced one more time, the second Korean won was established in 1962 and the currency was fixed to the US dollar with a pegged rate that changed multiple times up until 1977, when South Korea established a floating exchange rate (XE Corporation, 2018). which we can observe in "graph 4".

Besides from this, the value of the Won against the US dollar has been going up and down without any extreme changes in the long run. As we can notice by observing "graph 4", one US dollar was in 1986 worth approximately 9,000 Won, while it was worth almost 12,000 Won in 2016. In other words, over a 30 year period, the won has depreciated against the US dollar by approximately 25 percent.



Graph 4 - Official exchange rate, USD/KRW, source: World Bank.

CORE CONCEPTS

Foreign Direct Investments (FDI)

Foreign direct investment can be defined as enterprises establishing operations or investments abroad in order to acquire lasting interest in other enterprises. The main purpose is to have an effective relationship with the management for the new investment abroad. (UNCTAD, 1999).

FDI Components

Most of the components within FDI are equity or debt instruments. Equity includes common and preferred shares, reserves, capital contributions as well as the reinvestment of earnings. Debt instruments include different securities such as for instance bonds, debentures, commercial paper, deposits, loans, and trade credit. All cross-border transactions and positions of these different kinds of equities and debt instruments are included in FDI (OECD, 2008).

Different types of FDI

As defined by Chen, et al (2005) market oriented FDI is the expansion of firm's business abroad in order to produce and sell on a foreign market. Instead, cost oriented FDI is the establishment of a foreign subsidiary in order to produce output, which instead is exported back to the firm's origin country.

Positive effects of FDI

Foreign direct investments are rather important since it brings capital, new technology, productivity enhancement and creates employment opportunities for the domestic population. All these factors are crucial for the economic growth and it is also integrating the home country with the global world (OECD, 2002). Buckle, et al (2007) and Borensztein, et al (1998) are concluding that inward FDI should be encouraged in high-technology industries in order to achieve positive spillover effects, while inward FDI should not be encouraged in low-technology industries. In other words, with the right conditions, FDI could lead to positive spillover effects such as technological spillover that could enhance the productivity.

Negative effects of FDI

Exploitation is a somewhat negative effect since labor laws combined with unemployment within the developing countries tend to lead to relatively low wages. Furthermore, the working condition also tends to be weak. Foreign firms have also been accused of violating human and labor rights in countries where such rights tend to be depressed (Arnal & Hijzen. 2008).

Draining of money and resources are mentioned as an adverse effect of FDI. When foreign firms enter the industry, it tends to drain resources, mostly from skilled labor who are attracted by higher wages. This could lead to a lower production and it could even reduce the growth of the industry (Doytch & Uctum. 2011).

Furthermore, foreign firms main purpose with expanding its business is usually to make a profit. The profit could then be transferred back to the origin country instead of being kept in the foreign country (Doytch & Uctum. 2011). Moreover, a higher degree of foreign entry tends to disturb the current market equilibrium, which forces domestic enterprises to decrease its outputs and thereby the average cost tends to increase. Hence, it would be tougher to develop local industries (Aitken & Harrison.1999).

Exchange rates

Exchange rates is a relative measure and thereby, it has to be measured against one or many different currencies. In this thesis, we are using the US dollar (USD) as the reference currency when we are referring to the nominal exchange rate.

We are using direct quotation for the won (KRW) and the yuan (CNY), which means that we measure how much one US dollar is worth in terms of the local currency. For example, USD/KRW is currently approximately 1,082 which indicates that one US dollar is worth 1,082 won.

Nominal exchange rates and real effective exchange rates

The nominal exchange rate is the actual spot exchange rate against a specific foreign currency for which the local currency is traded in. This measurement is not adjusted to any other factors. An effective nominal exchange rate is the local currency relative to a basket of several foreign currencies instead of just one currency. Thereby, the real effective exchange rate is the nominal effective exchange rate (a measure of the value of a currency against a weighted average of several foreign currencies) divided by a price deflator or index of costs (World Bank). Since the real effective exchange rate is focusing on the actual value of the local currency against several major currencies. The fluctuations in the foreign currencies will have a much smaller impact on the real effective exchange rate than if we would, for example, have observed the real or nominal exchange rate against for example US dollar. The real effective exchange rate is also adjusted for the actual inflation, which removes inflation as a potential bias variable.

Real interest rates

First of all, the real interest rate is the actual nominal interest rate adjusted for actual or expected inflation. The adjustment is made by subtracting the actual or expected inflation from the nominal interest rate (Investopedia).

Volatility

Volatility is a measurement of fluctuations of for example the value of a stock or the value of an exchange rate relative to another one. In this thesis, we are calculating the volatility by observing the weekly percentage change of the nominal exchange rate relative to the US dollar for each year.

III. THEORY AND LITERATURE

Negative correlation between exchange rates and FDI inflows

In the regression made by Froot & Stein (1991), it can be concluded that FDI is the only type of capital inflow that is significantly negatively correlated with the value of the US dollar. In their analysis, they conclude that there has been a strong negative correlation between these two factors in the United States between 1973 and 1987. Their results show that a 10 percent US dollar depreciation is associated with additional FDI inflows of approximately $5 billion. The explanation of this is, to summarize, that a weak US dollar makes American assets cheaper relative to foreign countries assets and thereby, the foreign capital inflow is increasing. In another regression, Froot & Stein separate different industries in order to explore whether there is any significant diversity in of how the value of the US dollar is correlated with the FDI inflows across different sectors. Their results are showing that there is no significant diversity, all coefficients are negative, and five of them are significant. Finally, they found that the most prominent exchange rate effect can be found in manufacturing industries, particularly chemicals.

Later on, Dewenter (1995) investigated the relationship between the US dollar and the amount of capital inflow of cross-border acquisitions between 1975 and 1989. The study confirmed that a depreciation of the US dollar is mostly associated with a higher amount of foreign acquisitions into the United States and thereby, the capital inflow increases.

Takagi & Shi in (2011) analyzed the relationship between exchange rate movements and FDI outflows from Japan during 1987 and 2008. They found empirical evidence that a higher value of its local currency (yen) towards the host countries currency would boost the amount of FDI outflows. This also suggest a negative correlation between the exchange rates and the FDI.

Positive correlation between exchange rates and FDI inflows

Lily, et al (2014) argues that during currency appreciation, FDI inflows become positive if the objective is to serve the local market and harmful if the objective is to re-export or reduce cost purpose.

This reasoning is similar to Quéré, et al (1999) who states that an appreciation will lead to increased purchasing power among the local consumers which will have a positive effect on FDI since higher consumption leads to higher economic growth, which in turn is attracting foreign investors. Lily, et al (2014) and Quéré, et al (1999) are testing the long-run correlation between the FDI and exchange rate in several developing countries, mostly in Asian and their empirical results show that the correlation is positive. An appreciation of the local currency will according to their results increase the FDI inflows in the country, and a depreciation would decrease the amount.

Volatility of exchange rate and FDI inflows

According to Campa (1993), Dixit & Pindyck (1994, 1995) as well as Rivoli & Solario (1996), the volatility and the uncertainty of the exchange rate has a negative effect on FDI and discourage the amount of FDI to entry into the specific country. The main reason for this is that companies prefer to wait in order to get better information about the future expectations of the exchange rate. Empirical estimations also confirm that higher volatility and uncertainty of the exchange rate decreases FDI inflows.

Moreover, as the uncertainty of the different circumstances increases, the opportunity cost will also increase. Hence this could lead to a decrease in the FDI inflows for countries who conduct financial volatility. This could also be referred to as the "real option" model. Both Campa (1993) and Dixit (1989) argues that the volatility of the exchange rate can be explained by the real options model. The model can be briefly explained by a firm which owns an option to enter the new market. The option has a price that can be referred as a sunk cost (k) to enter the new market. However, the return from using the option is determined by the expected present value from future profits from the new markets. This option has a value, and the firm will in most case not use the option as long as the expected change from the option is higher than the expected return from the period. In general, the result from option pricing theory is that the value of the option raises when the volatility of the market increases. In our case, the exchange rates also tend to fluctuate. Higher volatility leads to a higher value for the option, the environment is getting more uncertain about the future and therefore tends to wait until they enter the new market (Dixit 1989).

Fixed versus floating exchange rate

Devereux & Engel (2001) as well as Aizenman (1993) stated that the FDI inflows would be more effective with floating exchange rate rather than a fixed exchange rate regime. During 1993 and 2001, they analyzed the optimal choice of the exchange rate and found empirical supports that floating exchange rate is preferred in most of the countries since the economy is better protected from foreign demand shocks with a floating exchange rate, which does not affect the domestic consumption within the specific country.

Also, countries can be a cushion against foreign demand shocks because the relative pricing movements could prevent a high ratio of demand changes within the country. Furthermore, firms tend to price their investment into markets where the local markets currency is the primary currency. This would be persistent since floating regimes usually encourage productions by all firms, including subsidiaries from multinational enterprises.

Literature review

In general, we find both positive and negative aspects regarding our literature. To start with, Froot & Stein (1991) have used observations between 1972 and 1988, which is a relatively short period of time. Also, Froot & Stein (1991) as well as Dewenter (1995) are only focusing on the real exchange rate in United States which could make the results too narrowed, thereby it is hard to draw general conclusion. However, the United States is an advance economy and that could be an explanation why the correlation is negative. Even Takagi & Shi is analyzing the FDI outflows and exchange rates relationship for Japan, also seen as an advance economy. All the conclusions regarding the negative correlations are based on advanced economies, this is something that could make our general conclusions weak.

The studies presented by Lily, et al (2014) and Quéré, et al (1999) have the same shortcomings regarding the number of observations since they are only observing the process in developing countries, mostly in Asia. In order to get a comprehensive view about the correlation between exchange rates and FDI inflows, more countries would most likely be required. Also, these countries could be considered as emerging markets and thereby, this could contribute to why the process differ from the United States and Japan, which is seen as advanced economies.

Further on, Lily, et al (2014) research paper is observing nominal exchange rates against the US dollar for each country, which is more dependent on the value of the US dollar specifically compared to if they would use the nominal- or real effective exchange rate which is weighted against a basket of major currencies.

Regarding Campa (1993), Dixit & Pindyck (1994, 1995) as well as Rivoli & Solario (1996), who are observing how the volatility of the exchange impact the FDI inflows, they are measuring the volatility in different ways. Further on, we have not investigated which method that is most suitable in this context and thereby, we can not draw conclusions about which of the studies that is most reliable regarding our study.

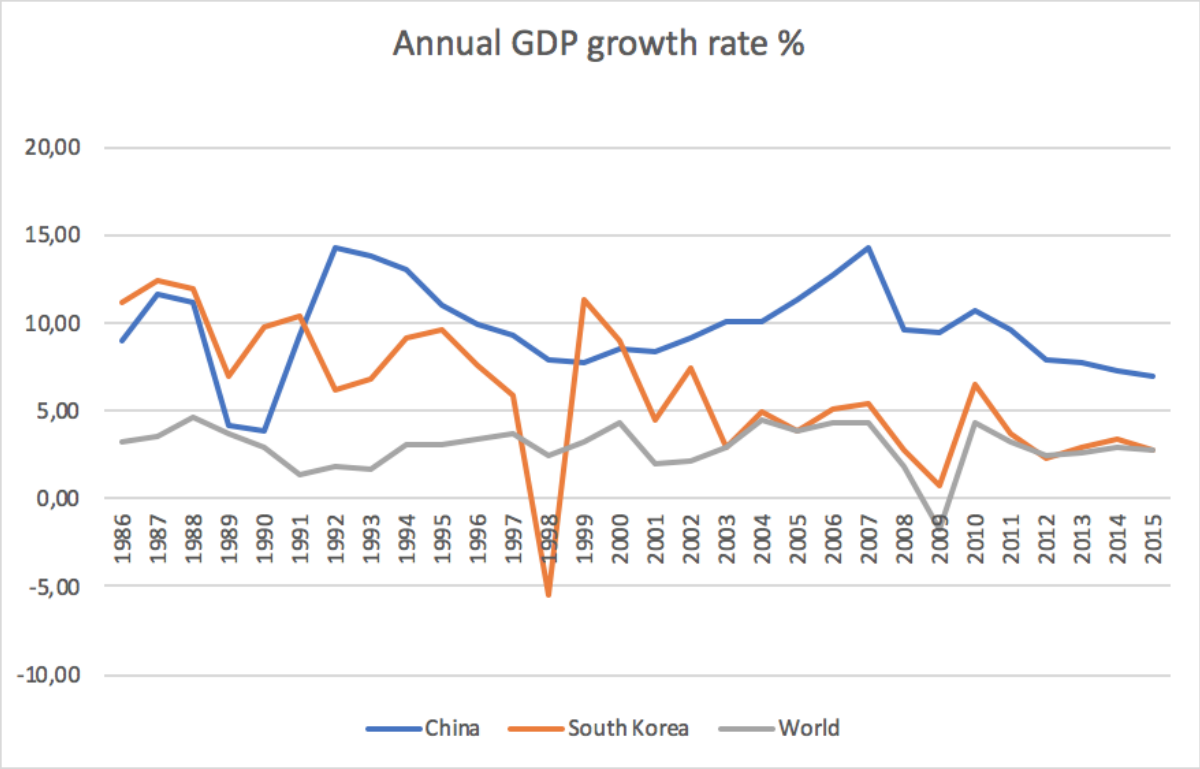
IV. METHOD

Summary of the method

Based on previous theories, this paper will investigate the relationship between the FDI inflows and the value of the exchange rate in South Korea and China in order to test how well the different theories could be implemented in these countries. We have chosen to focus on South Korea and China since, for the last ten years, both countries have grown more than the rest of the world, which we can notice by looking at "graph 5".

Moreover, China is often seen as a country with strict capital controls and fixed exchange rate, and South Korea is rather seen as an open economy with a floating exchange rate. Thereof, we will compare the relationship between FDI and exchange rate between the two countries in order to hopefully be able to conclude differences of this relationship depending on if there is a fixed and floating exchange rate.

In order to reach as specific conclusions as possible, we are using a quantitative method. Which has a focus on the measurements and amounts of the characteristics of the subject studied, whereas characteristics of qualitative research are to focus on the generation of theory rather than the testing of theories from previous research (Bryman & Bell, 2011). Henceforth, we will use a descriptive method in order to describe our collected data, as well as a hypothesis testing method in order, draw conclusions based on our collected data and our hypotheses.



Graph 5 - GDP growth in South Korea and China compared to the rest of the world.
Source: World Bank

Data

Our crucial data is collected from different sources. The annual FDI inflows is collected from the World Bank, the real interest rates from Ychart.com, a financial research platform. The real effective exchange rates are collected from the World Bank as well as "Evaluation of Korea's Exchange rate policy, a research paper published from the University of Chicago.

The weekly average volatility and thereby the nominal exchange rates is collected from investing.com and XE corporations, also seen as financial research platforms. All values are measured between 1986 and 2015. Based on our research question, we believe that a quantitative method is most useful in order to investigate our purpose and draw different conclusions about the relationship between exchange rates and the FDI inflow since we need to use econometric tools to analyze if the exchange rate has a causal impact on the FDI inflows.

Delimitations

Firstly, we will delimit this thesis by only observing China and South Korea between 1986-2015. This gives us 30 observations for each country since we have one observation for each year. Further on, South Korea is seen as an open country with floating exchange rate and China is seen as a strict country with fixed exchange rate. However, Chinas official exchange rates is single floating but has a daily trading span of +/- 1 percent, therefore it is still defined as a fixed regime. The differences between China and South Korea makes it interesting to see if its occur any differences between the two countries.

In our following regressions, we have chosen variables that are parameters for the most important factors in this process. We are aware of the fact that FDI inflows is dependent on several factors, but we have created a simple model in order to illustrate the big picture of the relationship between the exchange rates and the FDI inflows. Our model accounts for the most important variables that could have an impact on the FDI inflows in the two countries.

Our key variable will as said be the exchange rate, while the other two variables, real interest rate and volatility of the nominal exchange rates could be seen as our control variables. Our primary focus is on how exchange rate movements are affecting FDI inflows and not the opposite way. As said, this process is very complex and there are several factors which are related in multiple different ways. For this reason, we will discuss potential limitations of our analysis in the discussion section.

Empirical approach

For the separate regressions for each country, we are conducting Ordinary Least Squares (OLS) regressions, which is also referred to as linear regressions. The OLS regression model writes:

$$Y = \beta 0 + \Sigma j=1..p\ \beta jXj + \varepsilon$$

Y is the dependent variable and $\beta 0$ is the intercept of the model. X j is the independent variables that is affecting Y. ε is the random error with expectation 0 and variance σ^2.

Besides this, we will run fixed effect panel regressions which include both countries in order to observe the general correlation between the variables for both countries. A panel regression is based on panel data, also called cross sectional data. Panel regression allows us to control for both panel unit effect as well as for time effect when we are estimating our regression coefficients. (xlsat.com)

We will also use a significance level of 5 percentage and thereby a confidence interval of 95 percentage. However, we will also observe if the coefficients for the variables are significant at a significance level of 10 percentage as well as 1 percentage. In the following regressions, the FDI inflows will be our dependent variable and the real effective exchange rate will be our variable of interest. The other variables will be used as control variables. In total, we will use 60 observations (one for each year and each country between 1986 and 2015). We have used the following functions and variables in order to account for the most critical factors that are affecting the FDI inflows, except the exchange rate.

South Korea

Equation South Korea:

$$log\ (FDI) = b1 * log\ (real\ effective\ exchange\ rate\ KRW) + b2 * realinterestrate + b3 * volatility + b4 * lLagFDI + b5 * year + U$$

Definitions regarding separate regressions for South Korea

Constant	Value when all the coefficients is 0
Log_FDI	Log of FDI inflows
Log_rerKRW	Log of the annual average of real effective exchange rate for KRW
Real interest rate	Real interest rate %
Volatility	Volatility of nominal exchange rate (mean of all weekly percentage changes for each year) %
Log_lag_FDI	Log of the FDI inflows during the previous year (t-1)
Year	The actual year, consider annual time trend
U	The error term that includes all unobserved variables that have an impact on the dependent variable
b_i	The coefficient before the variable i which tells us how much the FDI inflow is changing when the variable i change by 1 unit or if it is logged, 1%

China

Equation China:

$$\log(FDI) = b1 * \log(real\ effective\ exchange\ rateCNY) + b2 * realinterestrate + b3 * volatility + b4 * \mathrm{l}LagFDI + b5 * year2 + U$$

Definitions regarding separate regressions for China

Constant	Value when all the coefficients is 0
Log_FDI	Log of FDI inflows
Log_rerCNY	Log of the annual average real effective exchange rate for CNY
Real interest rate	Real interest rate %
Volatility	Volatility of nominal exchange rate (mean of all weekly percentage changes for each year) %
Log_lag_FDI	Log of the FDI inflows during the previous year (t-1)
Year	The actual year, consider annual time trend
U	The error term that includes all unobserved variables that have an impact on the dependent variable
b_i	The coefficient before the variable i which tells us how much the FDI inflow is changing when the variable i change by 1 unit or if it is logged, 1%

Fixed effect panel regressions

Equation fixed effect panel regression:

$$log\ (FDI) = b1 * log\ (real\ effective\ exchange\ rate) + b2 * volatility + b3 * realinterestrate + b4 * lLagFDI + b5 * year + b6 * chinadummy + U$$

Definitions regarding fixed effect panel regressions

Constant	Value when all the coefficients is 0
Log_FDI	Log of FDI inflows
Log_rer	Log of the annual average real effective exchange rate for both currencies
Real interest rate	Real interest rate % for both countries
Volatility	Volatility of nominal exchange rate (mean of all weekly percentage changes for each year) % for both countries
Log_lag_FDI	Log of the FDI inflows during the previous year (t-1)
Year	The actual year, consider annual time trend
chinadummy	A dummy variable which separates the two countries and tells us the additional effect for China
U	The error term that includes all unobserved variables that have an impact on the dependent variable
b_i	The coefficient before the variable i which tells us how much the FDI inflow is changing when the variable i change by 1 unit or if it is logged, 1%

Explanation of regressions

First and foremost, we logged the variable FDI which tells us the values of the FDI inflows for each year. We logged this variable in order to reduce the influence of high FDI values on regression outcomes. For the variables "Log (real effective exchange rate) for KRW" and "Log (real effective exchange rate) for CNY", we have logged the real effective exchange rate values of the South Korean won (KRW) and the Chinese yuan (CNY). First of all, a real effective exchange rate variable adjusts to inflation rates and thereby consider pricing level changes. This could hopefully make the variable less bias.

As mentioned, the fact that an effective exchange rate is weighted against an index of several major currencies also gives a more specific indication of how the value of the currency is changing without dependence on how the value of a specific foreign currency is changing. We logged this variable in order to get percentage changes which gives us better explanations of how the exchange rate movements are impacting the FDI inflows. The coefficient for this variable (b1) tells us that if the real effective exchange rate change by one percentage, the FDI inflows will change by b1 percentage.

We also included the variable "real interestrate", which is a parameter for real interest rate in percentage, since we are convinced that it has an impact on FDI inflows. The coefficient b2 tells us that if the interest rate change by one basis point, FDI inflows will change by b2 percentage.

Based on Campa (1993), Dixit & Pindyck (1994, 1995) as well as Rivoli & Solario (1996) theories, we also decided to include the volatility of the nominal exchange rate as a variable. We calculated this by collecting data on weekly average percentage change of the exchange rates for each year. Hence, we calculated the average of these values in order to get one value for each year. The coefficient b3 tells us that if the average weekly volatility for each year change by one basis point, the FDI inflows will change by b3 percentage.

The variable "Log (lag FDI)" is the logged value of the FDI inflows the previous year (t-1). We created this variable to allow the FDI inflows to depend on the previous year's FDI inflows. This tells us that if the value for the FDI inflows for the previous year is changing by one percentage, the FDI inflows will change by b4 percentage for the current year.

Finally, "Year" is a variable for each year (1986-2015). We will include both "Year" and Log (lagFDI) in the regressions since this should reduce both a potential time trend as well as highly persistent variables.

Hence, the model will be more accurate and less bias. The model could be bias if there are some variables within U that are affecting both our dependent variable FDI inflow as well as any of our independent variables, which could be factors such as for instance political risk.

As said, we created fixed effect panel regressions, where we have included the data for both countries in the same dataset. We are using the same variables but we are creating one regression for both countries. In order to separate the two countries, we have created a dummy variable called “Chinadummy”. Hence, South Korea will be the benchmark group and China will be the treatment group. This variable corrects for any differences in FDI inflows between China and South Korea except from the real exchange rate and control variables.

V. EMPIRICAL RESULTS

Table I: Estimated results of separate regressions for South Korea and China

South Korea			
	Reg 1	Reg 2	Reg 3
log (real effective exchange rate) for KRW	-0,55 (0,354)	-0,24 (0,668)	-0,088 (0,885)
log (lag FDI)	0,902 (0,000)***	0,73 (0,000)***	0,723 (0,000)***
year	-0,004 (0,824)	0,016 (0,413)	0,018 (0,380)
real interestrate		0,07 (0,029)**	0,074 (0,026)**
volatility of nominal exchange rate			-0,141 (0,497)
Coefficient of determination	0,8936	0,9132	0,9149
Number of observations	30	30	30
China			
	Reg 1	Reg 2	Reg 3
log (real effective exchange rate) for CNY	-1,014 (0,009)***	-0,903 (0,021)**	-0,904 (0,024)**
log (lag FDI)	0,673 (0,000)***	0,74 (0,000)***	0,74 (0,000)***
year	0,052 (0,023)**	0,04 (0,104)	0,039 (0,113)
real interestrate		-0,203 (0,212)	-0,199 (0,273)
volatility of nominal exchange rate			-0,017 (0,948)
Coefficient of determination	0,9788	0,9802	0,9802
Number of observations	30	30	30

*Note (1) Values without parentheses are estimated coefficients (besides from the last row). (2) P-values in parentheses. (3) *=Significant at 10%, **=Significant at 5%, ***=Significant at 1%.*

Separate regressions for South Korea

To start off, we can observe "Table 1" and conclude that our variable of interest, "Log (real effective exchange rate) for KRW", is not significant, regardless of our three different models. However, we can observe that the coefficient "Log (real effective exchange rate) for KRW" is in absolute values higher in the limited model where we only observe the real effective exchange rate and the two-time variables, compared to when we are including the control variables for real interest rate and volatility.

Even though the real effective exchange rate variable is not significant in any of the regressions, the coefficients are negative in all of the three models. This would suggest that an appreciation of the local currency will lead to decreased FDI inflows and the other way around. "Log (lagFDI)" is significant in all of the regressions and "year" is not significant in any of them. However, including both of the variables would hopefully give us a more comprehensive result than if we would only include one of them since including both of the variables decreases the probability for highly persistent- and time trending variables.

Henceforth, we added the variable "real interestrate" and by observing "Table 1", we can notice that the variable is highly significant in both of the regressions where it is included. The coefficients for this variable is approximately 0,07 for both of the regressions which indicates that if the real interest rate increase by one basis point, the FDI inflows will increase by approximately 0,7 percent.

As we can see by looking at "Table 1", the volatility variable is not significant in the third regression. However, the coefficient which is -0,14 is indicating a negative correlation, so that increased volatility would decrease the FDI inflows. Besides this, the real interest rate variable is still significant when we have added volatility as a variable in the third regression. We can conclude that the time variable "Log (lagFDI)" and the real interest rate variable "real interestrate" is significant in all of the three regressions. However, the real effective exchange rate variable and the volatility variable is not significant in any of the regressions. Based on our data and our regressions, we can thereby state that the real interest rate seems to have a significant impact on the level of FDI inflows in South Korea, while the real effective exchange rate and the volatility of the nominal exchange rate does not seem to have as big of an impact in our regressions.

Separate regressions for China

By looking at "Table 1", we can start by observing that all of the variables in the first regression are highly significant. The coefficients for "Log (real effective exchange rate) for CNY" is approximately equal to -1,0 which indicates that if an appreciation by one percent of the local currency CNY against the weighted average index occur, the FDI inflows would then decrease with -1,0 percentage. The coefficients for the time variables are positive which simply indicates that FDI is increasing over time. When we add the real interest rate variable we can observe that this variable is not significant.

The coefficients for the already included variables changes little when we add the real interest rate variable. The volatility variable is, as we can see in "Table 1", insignificant. The coefficient for this variable is 0,17, but considering the high p-value, we can not draw any conclusions from this. The variable "Log (lagFDI)" is highly significant in all of the three regressions while "Year" is only significant in the first short model. Our most valuable conclusion based on these results is that the real effective exchange rate does, in fact, seem to have a significant impact on the FDI inflows in China, while as an opposite to South Korea, the real interest rate does not seem to have as big of an effect on the FDI inflows.

Table II: Estimated results of the fixed effect panel regression

Fixed effect panel regression			
	Reg 1	Reg 2	Reg 3
log (real effective exchange rate)	-0,701 (0,034)**	-0,697 (0,037)**	-0,642 (0,058)*
log (lag FDI)	0,888 (0,000)***	0,881 (0,000)***	0,873 (0,000)***
year	0,008 (0,554)	0,009 (0,530)	0,01 (0,514)
real interestrate		0,004 (0,819)	0,008 (0,663)
volatility of nominal exchange rate			-0,157 (0,351)
chinadummy	0,212 (0,333)	0,234 (0,334)	0,27 (0,274)
Coefficient of determination	0,9667	0,9668	0,9673
Number of observations	60	60	60

*Note (1) Values without parentheses are estimated coefficients (besides from the last row). (2) Values in parentheses are probabilities of t-statistics (P-values). (3) *=Significant at 10% significance level, **=Significant at 5% significance level, ***=Significant at 1% significance level.*

Fixed effect panel regression

In order to get more observations and to investigate any differences between the countries, we created an assembled fixed effect panel regression that is including both of the countries. This model gives us 60 observations in each regression instead of 30, which allows for a more accurate estimation of the model coefficients. The results of our fixed effect panel regressions are in line with our previous regressions, which is that an appreciation of the local currency, would decrease the FDI inflows.

The coefficient for "Log (real effective exchange rate)" is significant at the 5 percentage level in the first two regressions, and has a significance level of 10 percentage in the third one. (P-value of 0,058).

The coefficients for “Log (real effective exchange rate)” is approximately -0,7 and this coefficient is closer to the one in the regressions where we are only observing China compared to the one where we are only observing South Korea.

Neither the real interest rate variable, the volatility variable, the year variable nor the dummy variable which should separate the effect between the two countries is significant in any of the regressions. However, “Log (lagFDI)” is highly significant in all of the three regressions.

Summary of results

Our regressions indicate that an appreciation of the local currency against the average index of major currencies decreases the FDI inflows. It is possible that the relationship between the exchange rate and the FDI inflows have the same outcome in South Korea, but that other factors could affect the FDI inflows which make this variable insignificant in our regressions. The major reason for why this relationship between the real effective exchange rate and the FDI inflow could be negative is according to what Froot & Stein (1991), Dewenter (1995) as well as Takagi & Shi (2011) mentioned, that the value of the local currency is increasing compared to foreign currencies. Therefore, the local currency becomes more expensive and the cost of capital would increase. Due to the appreciation of the currency, the initiative for the foreign investors to invest into the country would decrease, since their capital will be worth less in the foreign country compared to their own local country.

For instance, investing in Chinese stocks that are listed in yuan would be more expensive, even though the actual price for the stock is not changing. Another example would be an investment in a big construction project where you have to pay for wages, material i.e. in the yuan. Furthermore, in most of our regressions, the real interest is showing a positive correlation with the FDI inflows. Thereby, a higher real interest rate indicates higher FDI inflows. This is consistent with the notion that the return on capital increases. Higher interest rates increase the attraction level for investors to bring their capital into the country. Even though the volatility is insignificant in the regressions, it still shows a negative correlation with the FDI inflows. This is in line with the notion that higher volatility is usually an indication of higher uncertainty and risk for the potential investments. It also increases the risk premium and thereby, the cost of capital increases.

In all our regressions, we can observe that the coefficient of determination is very high (at least above 0,89). As an opposite to the results based on the regressions for South Korea, the real interest rate does not seem to have an impact on the FDI inflows, while the real effective exchange rate seems to have a significant impact in China.

The similarity between the countries is that the volatility variable is not significant. Furthermore, the majority of the regressions also show a negative correlation between the volatility and the FDI inflows in both of the countries as well as in the fixed panel data.

VI. DISCUSSION

According to previous studies, there are several different opinions about the correlation between the exchange rate movements and the FDI inflows. Our results give power to Froot & Stein (1991) and Dewenter (1995) since they, as previously mentioned, claim that the relationship between these two factors would be negative. The result was also equivalent to our expectations and it was the most logical relation in our opinion.

Our results regarding the volatility are equivalent to the hypothesis from theories such as Campa (1993) Dixit & Pindyck (1994, 1995) as well as Rivoli & Solario (1996). They all states a negative correlation between the two factors, this was also something we expected. However, there are several ways to measure the volatility and to get a more accurate model, it could be recommended to use daily average instead of weekly.

Another speculative conclusion that we made is that the correlation between FDI inflows and exchange rate movements tend to be negative in advanced markets, which we can notice by reading results by Froot & Stein (1991), Dewenter (1995) and Takagi & Shi (2011). Looking at the results by Lily, et al (2014) and Quéré, et al (1999), we can observe that the correlation between the two factors is positive and all the countries observed in their studies would be defined as emerging markets. We can not draw any final conclusion regarding this, but it is likely that this is the case because the positive effect of a currency appreciation on FDI inflows is bigger than the negative in emerging markets and the other way around. This is in turn, as previously mentioned, mostly because a stronger currency is a sign of increased purchasing power and thereby, it attracts foreign investors. This effect is, by our speculative conclusion not as strong in advanced markets.

Further on, based on our regressions, we find it hard to see any differences between fixed and floating exchange rate. Devereux & Engel (2001) and Aizenman (1993) believed that floating exchange rate was most preferable in terms of the FDI inflows. We expected the same result as previous studies but it is hard to draw any conclusions regarding this subject. In general, this study and thereby, these results are very limited. This is mainly since we only have 30 observations for each country which in turn is because the FDI inflow is reported yearly. Regarding this, both South Korea and China could be defined as emerging markets in the beginning of our observed time period. However, we would define them as advance markets after the mid 90's.

Outlook

For a deeper study in this field, without any focus on Asia, we would first and foremost recommend using yearly observations for at least 20–30 countries. This is also what we would do if we had the chance to start over with this thesis and thereby, the fact that we did not observe more countries could be seen as the biggest mistake in this case. The reason for why we did not do this is that we believed it would make the study to comprehensive and require to much time and resources. However, our post analysis is that it would be better to observe more countries and not to focus as much on each specific country. If someone were interested in looking at the same years as in this study, that would give you 900 observations, which in turn would give a much more powerful and accurate result, since a higher number of observations obviously reduces the probability of high or low mean values of the observations. In other words, more observations as well as more variables are contributing a better explanation of the process and thereby, the model illustrates a more accurate representation of the reality.

There are also several other variables to consider regarding what is affecting the FDI inflows, such as significant political changes within the country, different kinds of capital inflow regulations, regimes, geographical resources, social structures as well as different technological aspects. Besides this, a good idea would be to consider nominal exchange rates, nominal effective exchange rates, real exchange rates as well as real effective exchange rates as variables, in order to get a more comprehensive and powerful result. This is mainly due to the fact that this would make it possible to specifically observe how the different measurements of the exchange rate differ regarding the impact on FDI inflows.

For instance, if the real exchange rate seems to have a bigger effect against the US dollar compare to the real effective exchange rate, it would be interesting to analyze why the FDI inflows are more sensitive to changes within the local exchange rate against the US dollar than against an average basket of major currencies. However, our opinion is that the real effective exchange rate would be the best indicator in order to distinguish exchange rate movements, independent from foreign exchange rates and inflation.

VII. CONCLUSION

Based on our collected data and empirical results, we found that the real effective exchange rate does have a significant impact on the FDI inflows in China but not in South Korea. However, we are aware that our regressions would not be as accurate and significant as previous studies since we are only using 30 or 60 observations. Nonetheless, our regressions still provide a general description of the relationship between our different variables. Hence, we can draw the conclusion that our results give evidence for our hypothesis regarding the fact that the correlation between exchange rate movements and FDI inflows is negative.

In other words, we find an indication that our hypothesis, as well as Froot & Stein (1991) and Dewenter (1995) theories, are correct during these circumstances. Based on our results, we can not observe any significant differences regarding how the exchange rate is impacting the FDI inflows depending on fixed or floating exchange rate. Finally, we have not made any more in-depth investigation why the real effective exchange rate variable is significant for China but not for South Korea, but there are several eventual reasons for why this could be the case. For instance, several variables contribute to FDI inflows and some variables that we not choose to include in our regressions model could have been more important for South Korea compare to China, thereof the results might differ.

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China:
(https://data.worldbank.org/indicator/BX.KLT.DINV.CD.WD?end=2016&locations=KR&start=1985)
South Korea:
https://data.worldbank.org/indicator/BX.KLT.DINV.CD.WD?end=2016&locations=CN&start=1985

Nominal exchange rate: 1960-2016
USD/KRW, https://data.worldbank.org/indicator/PA.NUS.FCRF?locations=KR
USD/CNY, https://data.worldbank.org/indicator/PA.NUS.FCRF?locations=CN

Real effective exchange rate:
South Korea: 1995-2016
https://data.worldbank.org/indicator/PX.REX.REER?locations=KR
China: 1980-2016
https://data.worldbank.org/indicator/PX.REX.REER?end=2016&locations=CN&start=1985

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APPENDIX

South Korea

Regression 1

Log(FDI), log(real effective exchange rate), log(LagFDI) & year.

```
. reg lFDI lrerKRW llagFDI year2
```

Source	SS	df	MS	Number of obs	=	29
				F(3, 25)	=	69.95
Model	30.5949951	3	10.1983317	Prob > F	=	0.0000
Residual	3.64478569	25	.145791428	R-squared	=	0.8936
				Adj R-squared	=	0.8808
Total	34.2397808	28	1.22284931	Root MSE	=	.38183

lFDI	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lrerKRW	-.5498762	.5818575	-0.95	0.354	-1.748234	.6484818
llagFDI	.9018948	.1362587	6.62	0.000	.6212649	1.182525
year2	-.0042299	.0188112	-0.22	0.824	-.0429723	.0345126
_cons	11.94423	36.88549	0.32	0.749	-64.02286	87.91132

Regression 2

Log(FDI), log(real effective exchange rate), real interest rate, log(LagFDI) & year

```
. reg lFDI lrerKRW real_interestrate2 llagFDI year2
```

Source	SS	df	MS	Number of obs	=	29
				F(4, 24)	=	63.09
Model	31.2662319	4	7.81655798	Prob > F	=	0.0000
Residual	2.97354888	24	.12389787	R-squared	=	0.9132
				Adj R-squared	=	0.8987
Total	34.2397808	28	1.22284931	Root MSE	=	.35199

lFDI	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lrerKRW	-.2401948	.5526469	-0.43	0.668	-1.380802	.9004123
real_intere~2	.0701117	.0301221	2.33	0.029	.0079428	.1322806
llagFDI	.7312467	.1454423	5.03	0.000	.4310687	1.031425
year2	.0161849	.0194332	0.83	0.413	-.0239233	.056293
_cons	-29.23656	38.3308	-0.76	0.453	-108.3475	49.87433

Regression 3

Log(FDI), log(real effective exchange rate), real interest rate, volatility, log(LagFDI) & year

```
. reg lFDI lrerKRW real_interestrate2 vol llagFDI year2
```

Source	SS	df	MS	Number of obs	=	29
				F(5, 23)	=	49.46
Model	31.3265164	5	6.26530329	Prob > F	=	0.0000
Residual	2.91326435	23	.126663668	R-squared	=	0.9149
				Adj R-squared	=	0.8964
Total	34.2397808	28	1.22284931	Root MSE	=	.3559

lFDI	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lrerKRW	-.0876494	.6009403	-0.15	0.885	-1.330789	1.15549
real_intere~2	.0738336	.0309305	2.39	0.026	.0098489	.1378182
vol	-.1414527	.2050381	-0.69	0.497	-.5656063	.2827008
llagFDI	.7225447	.1475966	4.90	0.000	.4172178	1.027872
year2	.0177085	.0197726	0.90	0.380	-.0231943	.0586114
_cons	-32.94438	39.12716	-0.84	0.408	-113.8851	47.99632

China

Regression 1

Log(FDI), log(real effective exchange rate), log(LagFDI) & year

```
reg lFDI lrerCNY llagFDI year2
```

Source	SS	df	MS	Number of obs	=	29
				F(3, 25)	=	384.69
Model	60.4850466	3	20.1616822	Prob > F	=	0.0000
Residual	1.31024145	25	.052409658	R-squared	=	0.9788
				Adj R-squared	=	0.9763
Total	61.795288	28	2.20697457	Root MSE	=	.22893

lFDI	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lrerCNY	-1.014225	.3589823	-2.83	0.009	-1.753563	-.2748874
llagFDI	.6729257	.1136395	5.92	0.000	.4388809	.9069706
year2	.052053	.0215328	2.42	0.023	.0077054	.0964005
_cons	-95.9014	40.95638	-2.34	0.027	-180.2527	-11.55015

Regression 2

Log(FDI), log(real effective exchange rate), real interest rate, log(LagFDI) & year

```
. reg lFDI lrerCNY real_interestrate2 llagFDI year2
```

Source	SS	df	MS	Number of obs	=	29
				F(4, 24)	=	296.33
Model	60.5689221	4	15.1422305	Prob > F	=	0.0000
Residual	1.22636595	24	.051098581	R-squared	=	0.9802
				Adj R-squared	=	0.9768
Total	61.795288	28	2.20697457	Root MSE	=	.22605

lFDI	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lrerCNY	-.9030112	.364938	-2.47	0.021	-1.656206	-.1498161
real_intere~2	-.0203436	.0158787	-1.28	0.212	-.0531155	.0124284
llagFDI	.7399581	.1238075	5.98	0.000	.4844319	.9954843
year2	.03952	.0234042	1.69	0.104	-.0087839	.0878238
_cons	-71.98571	44.54113	-1.62	0.119	-163.9141	19.94267

Regression 3

Log(FDI), log(real effective exchange rate), real interest rate, volatility, log(LagFDI) & year

```
. reg lFDI lrerCNY real_interestrate2 vol llagFDI year2
```

Source	SS	df	MS	Number of obs	=	29
				F(5, 23)	=	227.23
Model	60.569158	5	12.1138316	Prob > F	=	0.0000
Residual	1.22613	23	.05331	R-squared	=	0.9802
				Adj R-squared	=	0.9758
Total	61.795288	28	2.20697457	Root MSE	=	.23089

lFDI	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lrerCNY	-.9037596	.3729209	-2.42	0.024	-1.675205	-.1323139
real_intere~2	-.0198716	.0177022	-1.12	0.273	-.0564915	.0167483
vol	-.0172129	.2587321	-0.07	0.948	-.552441	.5180152
llagFDI	.7395121	.1266357	5.84	0.000	.4775461	1.001478
year2	.0394468	.0239305	1.65	0.113	-.0100572	.0889508
_cons	-71.83172	45.55358	-1.58	0.128	-166.0665	22.40304

Fixed effect panel regressions

Including South Korea and China in the same regression, in order to achieve more observations.

Regression 1

Log(FDI), log(real effective exchange rate), log(LagFDI), year, China=1

```
. reg lFDI lrer llag1_FDI year2 chinadummy
```

Source	SS	df	MS	Number of obs	=	59
				F(4, 54)	=	392.33
Model	181.568429	4	45.3921073	Prob > F	=	0.0000
Residual	6.24778095	54	.115699647	R-squared	=	0.9667
				Adj R-squared	=	0.9643
Total	187.81621	58	3.23821052	Root MSE	=	.34015

lFDI	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lrer	-.7009059	.3218883	-2.18	0.034	-1.346253	-.0555586
llag1_FDI	.8882065	.0847281	10.48	0.000	.7183369	1.058076
year2	.0081474	.0136873	0.60	0.554	-.0192941	.0355889
chinadummy	.2119474	.2169979	0.98	0.333	-.2231072	.647002
_cons	-11.9964	26.54408	-0.45	0.653	-65.21407	41.22128

Regression 2

Log(FDI), log(real effective exchange rate), real interest rate, log(LagFDI), year, China=1

```
. reg lFDI lrer real_interestrate2 llag1_FDI year2 chinadummy
```

Source	SS	df	MS	Number of obs	=	59
				F(5, 53)	=	308.37
Model	181.574653	5	36.3149306	Prob > F	=	0.0000
Residual	6.24155701	53	.117765227	R-squared	=	0.9668
				Adj R-squared	=	0.9636
Total	187.81621	58	3.23821052	Root MSE	=	.34317

lFDI	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lrer	-.6969232	.3252107	-2.14	0.037	-1.349213	-.0446332
real_interestrate2	.0040417	.0175809	0.23	0.819	-.0312211	.0393045
llag1_FDI	.8807192	.0914754	9.63	0.000	.6972426	1.064196
year2	.009254	.0146239	0.63	0.530	-.0200778	.0385857
chinadummy	.2350165	.2408285	0.98	0.334	-.2480243	.7180572
_cons	-14.18347	28.4196	-0.50	0.620	-71.18596	42.81902

Regression 3

Log(FDI), log(real effective exchange rate), volatility, real interest rate, log(LagFDI), year, China=1

```
. reg lFDI lrer vol real_interestrate2 llag1_FDI year2 chinadummy
```

Source	SS	df	MS	Number of obs	=	59
				F(6, 52)	=	256.58
Model	181.679396	6	30.2798993	Prob > F	=	0.0000
Residual	6.13681404	52	.118015655	R-squared	=	0.9673
				Adj R-squared	=	0.9636
Total	187.81621	58	3.23821052	Root MSE	=	.34353

lFDI	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lrer	-.6415513	.3308194	-1.94	0.058	-1.305389	.0222864
vol	-.1570322	.1666848	-0.94	0.351	-.4915097	.1774454
real_interestrate2	.0079216	.018075	0.44	0.663	-.0283486	.0441917
llag1_FDI	.8728068	.091957	9.49	0.000	.6882815	1.057332
year2	.0096307	.0146449	0.66	0.514	-.0197564	.0390177
chinadummy	.2696466	.2438707	1.11	0.274	-.2197158	.7590089
_cons	-15.14344	28.46804	-0.53	0.597	-72.26874	41.98186