The Influence of Macroeconomic Variables, Investment Incentives and Government Agreements on China’s FDI Inflow

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Abstract: Over the past two decades, foreign direct investment flowing into developing countries has experienced widespread growth and increasingly fierce competition. This caused the host government provided higher investment incentives and increased the number of bilateral investment treaties and regional investment agreements. This article explores the effectiveness of government policies and investment agreements in attracting FDI flows. In order to analyze the impact of economic variables such as infrastructure conditions, labor costs, annual GDP growth, real effective exchange rate, tax incentives, and bilateral investment treaties on China’s FDI over a 25-year span, this paper uses the OLS method to perform regression analysis on FDI inflow Multicollinearity and autocorrelation tests are performed on the model. It can be seen from the research that economic fundamentals is an important determinant of FDI inflows, and national incentive policies have also greatly promoted FDI inflows. However, the role of government agreements in attracting foreign direct investment into China is not obvious.

1. Introduction

Capital flows, especially foreign direct investment (FDI), is one of the main means of globalization and international integration in developing countries. International trade has greatly improved. According to the World Investment Report, FDI flows increased to US $ 1.45 trillion in 2013, and the share of developing countries’ inflows increased to a (record) 54%. This evolutional trend of foreign capital inflows has intensified the debate about the main factors affecting foreign investment and how to use these variables to maximize regional foreign capital inflows. For a long time, the role of foreign direct investment in the development process of the country has been a hot topic. Although these debates provide rich insights into the relationship between foreign direct investment and economic growth, there is still more room for empirical analysis to test the causality of FDI inflows. Regarding to the macro and micro factors that affect FDI inflows, the predecessors have done some research. The exploration and utilization of these factors have made the attractiveness of countries with different geographic locations continuously increase. China is willing to accept investment in its own country, because direct investment inflows bring capital and technology into the country, which also drives domestic employment, and the potential for capital inflows to serve the country and contribute to economic balance and stability. Therefore, the tariffs and restrictions previously faced by foreign investors have been replaced by various investment incentives. These measures will pave the way for tariff-free and fair trade between investors and our country. Various bilateral and multilateral investment treaties signed between our government and other countries to protect and promote foreign direct investment are also emerging. These All are to strengthen China’s international trade and increase the inflow of foreign direct investment.

2. Literature review and statement of question

2.1 Macroeconomic variables and FDI

With regard to the decisive factors for FDI inflows, the first is to combine the qualitative and quantitative methods to study the relationship between FDI and economic growth. Rashmi (2003) has
concluded through research that market size, labor costs, technology level, external debt and Economic basis variables such as power generation have a significant impact on FDI. Liu Junrong et al. (2008) used the econometric model to find that GDP growth rate, household consumption growth rate, M2 supply growth rate, and government expenditure growth rate all affect FDI inflows, suggesting that we should improve China’s economic strength, effectively regulate and focus on the quality of economic development to attract foreign investment. Other studies have also used co-integration analysis to determine the macroeconomic factors that affect China’s FDI inflows, and found that exchange rates and trade openness are statistically significant. Through empirical analysis, Broadman and Sun (1997) conducted quantitative analysis of FDI inflows in China’s regions and departments, and finally concluded that the main determinants are GNP, infrastructure construction, geographic location, labor costs, and labor quality. Qiu Shanshan (2010) through empirical comparative analysis, obtained market size and potential market size, real wage level, economic growth rate and actual tariff rate are the decisive factors affecting China’s FDI inflows. In some literatures, it is generally discussed that multinational companies invest in specific locations, mainly because of the host country’s strong economic foundation, such as a large market size and stable macroeconomic environment. Kerr and Peter (2001) conducted a time series analysis of the influencing factors of China’s FDI and found that exchange rates, interest rates, wage levels and market openness are closely related to foreign investment in China. Zhang Ji (2006) analyzed the US investment in China over the past 18 years and found that market potential, economic growth, market openness, labor costs, and social stability are the main decisive factors for China to attract US investment.

Many researchers have pointed out that FDI inflows in Asia are negatively correlated with inflation levels, and most use macroeconomic parameters or other vehicles such as investment incentives as a measure of China’s FDI. However, with the emphasis on FDI and the intensified competition of the host country to attract FDI inflows, when examining the ability of a specific region or host country to attract foreign investment, the focus on the literature may focus more on macroeconomic related variables. Variables include not only economic factors but also government initiatives that are government-inspired, as well as bilateral, interregional or multilateral agreements signed by specific entities. This requires us to review and consider the basic literature on the determinants and effects of foreign direct investment in China.

2.2 Bilateral investment agreements and FDI

Bilateral investment agreements are mainly able to protect investors, promote investment liberalization, reduce investment barriers and strengthen bilateral or multilateral capital flows. However, scholars have different opinions on whether bilateral investment agreements can promote FDI inflows. Lu Minghong (2000) analyzed the data of hundreds of countries and found that the bilateral investment agreement has a positive correlation between the nominal inflows and nominal stocks of FDI. Jeswald and Nicholas (2005) believe that there is evidence that bilateral investment agreements have a particularly strong effect on encouraging FDI inflows from developing countries. Swenson (2005) analyzed the data of the 1990s by setting variables such as specific time, internal national attractiveness, and investor status as control variables, and concluded that the bilateral investment agreement can help developing countries attract FDI inflows.

However, some scholars believe that there is no obvious relationship between bilateral investment agreements and FDI inflows. For example, Chen An (2006) analyzed the three prerequisites for the conclusion of international investment agreements and found that the effect of bilateral investment agreements on attracting FDI inflows is not obvious, not even effective. Liu Jing (2017) stated that the existing bilateral investment agreements are generally not very protective investment, and the contradiction that the promotion effect of FDI inflows is not obvious as well as prominent. Hallward (2003) used panel data to conduct empirical analysis, and the results showed that the investment effect of the bilateral investment agreement is not obvious, and the agreement itself may supplement rather than replace the institutional factors of the host country. Cheng Huifang and Ruan Xiang (2004) used the gravitational model as a sample of more than 30 countries making direct investment in China.
The analysis results show that the sign of the bilateral investment agreement is in line with the expected result, but it is not statistically significant. J. Tobin and S. Rose (2005) used panel data from 63 developing countries in the 15 years from 1985 to 2000, and analyzed that bilateral investment agreements have basically no effect on FDI flows.

Through the above summary of the research conclusions, we can find that although the relevant bilateral investment agreements can promote FDI inflows, and there has not been a more consistent conclusion, but with the increase in the number of bilateral investment agreements signed by the host country, foreign direct investment inflows have indeed In order to explain this phenomenon, we review the history of China’s signing of bilateral investment agreements. In the 1980s, the number of Chinese bilateral investment agreements has increased substantially, but the significant increase in China’s FDI inflows was observed in 1992 after. It can be seen that a single legal regulation may not constitute a quantitative relationship with FDI inflows. We must combine the changes in the entire economic environment to conduct an empirical analysis.

2.3 National investment policy and FDI

In order to attract foreign direct investment inflows, promote their economic growth and achieve national development goals, the host country usually adopts some investment incentive policies for foreign investment inflows. These policies usually include fiscal incentives, financial incentives, and others. As for fiscal incentives, there are already mature views showing that such national investment policies can be basically divided into two categories: one is incentives-based competition policy (incentives-based), and the other is rules-based competition policy (rules -based). At present, many host countries in the world use investment incentives to attract FDI into their own countries.

Regarding the research on the relationship between investment incentives and FDI, the conclusions formed in the current literature are quite controversial. Jiang Xiaojuan (2003) proposed that according to China’s national conditions, preferential policies should be used to attract foreign investment, and that investment incentives can attract foreign direct investment Inflow, and thereby promote economic growth. Ma Shuanyou (2001) analyzed the influencing factors influencing FDI inflow through regression model and found that tax incentives are positively correlated with FDI inflow. Li Zonghui and Lu Minghong (2004) used panel data models and empirical analysis methods to test whether tax incentives are effective for FDI inflows. The regression results show that tax incentives can indeed promote FDI inflows.

However, some scholars hold the opposite view. Buettner et al. (2007) believe that preferential tax policies have little effect on the initial decision of FDI inflows. Zhang Yang and Liu Hui (2006) used provincial-level panel data and empirically analyzed the influencing factors of FDI inflows, and concluded that the level of economic development and openness of the country or region are the main factors affecting FDI inflows. The tax incentives are not very effective for FDI. Pan Yiming (2006) analyzed the combination of theory and reality, and conducted an empirical analysis of the influencing factors of FDI, and found that the preferential tax policies have not significantly promoted FDI inflows.

This research attempts to study the determinants of China’s FDI inflow based on macroeconomic variables that have been used in previous literature studies, combined with selected government policies for investment incentives, as well as regional and bilateral investment agreements. Factors provide broader prospects and comprehensive analysis. This article also attempts to compare the inflow of foreign direct investment from the 1990s to the first decade of this century, and the reasons for attracting investors to inflow or outflow.

3. Metrological analysis

3.1 Model construction and variable selection basis

The data sources for this study are the World Bank’s World Development Indicators, the website of the Ministry of Foreign Affairs of China, the website of the Ministry of Commerce of China, and the website of the National Bureau of Statistics of China.
3.1.1 Model building

Based on the above domestic and foreign research results and the research goals of this article, this article will build the following model:

\[
F_{DI_t} = \beta_1 + \beta_2 A_{TE_t} + \beta_3 W_{SW_t} + \beta_4 G_{DP_t} + \beta_5 R_{EER_t} + \beta_6 T_{AX_t} + \beta_7 B_{IT_t} + U_t
\] (1)

Among them, FDI represents the natural logarithm of the net inflow of foreign direct investment, ATE represents the energization rate, WSW represents the percentage of total laborers with wages and salaries, GDP represents the annual growth rate of gross national product, and REER represents the real effective exchange rate. In the index (based on 2010), TAX indicates the relative degree of tax incentives, BIT indicates the number of bilateral investment agreements, and U indicates random disturbance items.

This model is a time series estimate from 1989 to 2018, which uses time series data spanning 30 years. The impact of economic fundamentals is assessed by variables such as infrastructure availability, labor costs, GDP, and real exchange rate. These are the variables used in the previous literature to determine the factors affecting FDI inflows in various regions. It also reviewed the impact of investment incentives in selected countries and bilateral agreements between China and other countries. In the following, this article will discuss in detail the method used, the variables and data sources selected using the specified model above.

3.1.2 Variable selection basis

Overall economic policy helps strengthen the fundamentals of the economy. Various literature resources have analyzed and reviewed the determinants of FDI in different regions. According to a large number of literatures on economic fundamentals, this paper uses electricity rates to replace the availability of infrastructure, and wages and salaries to replace labor costs. This article also uses GDP and real exchange rates. The study found that market variables, human capital quality, macroeconomic stability, financial health, and the availability of infrastructure in the economy will have a positive impact, while cost variables (such as labor costs and energy costs) are expected to be negatively correlated with FDI inflows. The definitions of the above variables and the expected symbols inferred from literature and data sources are as follows:

1) Availability of infrastructure

Various papers believe that the higher the availability of infrastructure, the lower the cost of infrastructure, and the greater the ability of the host country to attract foreign direct investment. However, different studies use different methods to obtain the availability of infrastructure. Some variables used include land and property rents, infrastructure index and transportation costs. We use a variable to illustrate the availability of infrastructure, that is, the energization rate. Other literature uses the variable of energy production (equivalent to tons of coal per 1,000 people), but due to the lack of data, another variable is used in this paper, namely the rate of electricity (percentage of the population). This paper anticipates that the electricity rate is positively related to FDI inflows.

2) Cost factors

Factors that cause differences in investment costs across countries are classified as cost factors. These costs include labor costs, capital costs, and infrastructure costs. Cost factors have a significant impact on the choice of resource-seeking and efficiency-seeking FDI investment locations. In order to obtain labor costs and available skilled labor, this article uses wages and salaries of workers as a percentage of all workers, which helps to understand more clearly when foreign investors are hiring and conducting business. How much does it cost, and provides an estimate how to budget the workers' wages and the total number of people required based on the type of business invested. We anticipate that the proportion of all state-owned wage workers will be positively correlated with foreign direct investment inflows.

3) Real exchange rate

There are various conclusions on the impact of the depreciation of the real exchange rate of the host country on the inflow of foreign direct investment. Foreign investors may benefit or suffer due to depreciated exchange rates, they may also benefit from the greater purchasing power of the host
country, and there is a conclusion that they may obtain lower production costs, so exports are easier, so this may attract foreign direct investment seeking resources and efficiency. However, there are also conclusions that if foreign investors believe that devaluation may continue after they enter a country, it means that the cost is too high relating to their investment, which may result in them not entering. Therefore, we expect that the depreciated exchange rate will encourage foreign direct investment to flow into the host country, as this will reduce the investment costs of foreign companies.

4) National foreign direct investment and investment policy

In a liberalized system, national foreign direct investment policies that attract foreign investors into host countries are greater importance. However, some relevant scholars have concluded that it is quite tedious to test the impact of FDI-specific policies on data, such as providing incentives and removing restrictions on foreign company operations, because they are not only difficult to separate from other factors but also unclear. Another difficulty in empirically testing the impact of these policies is the difficulty of quantifying these policies. Looking for empirical tests of the impact of government policies on FDI flows, you can find that they are usually based on benchmark surveys at a certain point in time or observe the impact of a particular country over a period of time. There are two main types of FDI incentives provided by developing countries to attract FDI inflows.

The first is financial incentives, which is a policy aimed at reducing the tax burden of enterprises; the second is economic incentives, which directly contribute to the company from the government, including direct capital subsidies or subsidized loans. Fiscal incentives include tax incentives in the form of reduced standard corporate income tax rates, tax holidays, capital tax accelerated depreciation allowances, import tariff exemptions, and export tariff preferences. Financial incentives include subsidies, subsidized loans, loan guarantees, etc. The focus of this study is the financial incentives provided by the host country, especially those related to tax incentives. We use the variable of relative tax preference to represent the degree of fiscal incentives. The data of this variable is equal to the ratio of foreign-related taxes to the total national industrial and commercial tax revenue ratio and the industrial output value of foreign-invested enterprises to the national total industrial output value. The data is calculated based on the "China Foreign Investment Statistics" report released by the Ministry of Commerce of China. This article anticipates that the relative degree of tax incentives will have a positive impact on FDI inflows.

5) Bilateral investment treaty

The history of China’s conclusion of BITs can be traced back to 1982. To date, China has signed 118 BITs (including re-signing) with 104 countries, and the capital inflow has increased from 0.43 billion U.S. dollars in 1982 to 242.489 One hundred million U.S. dollars. In the middle and late 1990s, China began to conclude a large number of BITs. From the mid-late 1980s to the early 1990s, the number of BITs concluded by China experienced a first round of rapid growth, from 13 in 1985 to 43 in 1992. Therefore, this article uses the number of bilateral investment agreements concluded between China and other countries as an explanatory variable affecting FDI inflows. We expect that the impact of bilateral investment agreements on FDI inflows will be positive.

3.2 Empirical results and inspection

In order to estimate the impact of macroeconomic variables, investment incentives, and government agreements on FDI inflows, this paper uses time series data for regression analysis. The natural logarithm of net foreign direct investment inflows is used as the explanatory variable, while the electricity rate, the percentage of wage and salary workers, the annual GDP growth rate, the real exchange rate index, the relative degree of tax preferences and the number of bilateral investment treaties are the explanatory variables.

3.2.1 Model fitting results

In view of the availability of data, this paper selects a total of 25 years from 1994 to 2018, uses eviews10.0, and uses OLS least squares to perform regression. The regression results are shown in Table 1.
### Table 1: Regression results

<table>
<thead>
<tr>
<th>Type</th>
<th>C</th>
<th>BIT</th>
<th>ATE</th>
<th>GDP</th>
<th>REER</th>
<th>TAX</th>
<th>WSW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coefficient</td>
<td>-5559.677**</td>
<td>-0.035253</td>
<td>82.34324***</td>
<td>0.073664***</td>
<td>-1.752826**</td>
<td>14.74391**</td>
<td>-66.46331***</td>
</tr>
<tr>
<td>T-statistic</td>
<td>-2.310855</td>
<td>-0.019165</td>
<td>3.173198</td>
<td>6.149915</td>
<td>-2.389353</td>
<td>2.506075</td>
<td>-5.964902</td>
</tr>
<tr>
<td>Prob.</td>
<td>0.0329</td>
<td>0.9849</td>
<td>0.0053</td>
<td>0.0000</td>
<td>0.028</td>
<td>0.022</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

R² = 0.950978  A-R² = 0.93463  D-W = 1.96877

Note: ** and *** represent significant levels at 5% and 1% respectively.

### 3.2.2 Multicollinearity test

In order to avoid the influence of the multicollinearity problem on the accuracy of this model, this paper uses a stepwise regression method to introduce explanatory variables in sequence. After the exchange rate stability factor is found during the model establishment, the parameter estimation symbol is negative, which does not meet the test of economic significance. When the dummy variable measures the social stability factor, it is found that it also fails the test. Therefore, this article finally deletes these two variables and builds the model (1).

### Table 2: Correlogram of residuals squared

<table>
<thead>
<tr>
<th>Autocorrelation</th>
<th>Partial Correlation</th>
<th>AC</th>
<th>PAC</th>
<th>Q-Stat</th>
<th>Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>0.144</td>
<td>0.144</td>
<td>0.5851</td>
<td>0.444</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>0.141</td>
<td>0.123</td>
<td>1.1716</td>
<td>0.557</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>0.220</td>
<td>0.191</td>
<td>2.6591</td>
<td>0.447</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>-0.23</td>
<td>-0.32</td>
<td>4.4237</td>
<td>0.352</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>-0.15</td>
<td>-0.15</td>
<td>5.1887</td>
<td>0.393</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>-0.21</td>
<td>-0.18</td>
<td>6.8691</td>
<td>0.333</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>-0.18</td>
<td>0.025</td>
<td>8.1892</td>
<td>0.316</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>-0.12</td>
<td>-0.06</td>
<td>8.8190</td>
<td>0.358</td>
</tr>
<tr>
<td>9</td>
<td></td>
<td>-0.14</td>
<td>-0.10</td>
<td>9.7433</td>
<td>0.372</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>1...</td>
<td>-0.12</td>
<td>-0.20</td>
<td>10.435</td>
</tr>
<tr>
<td>11</td>
<td></td>
<td>1...</td>
<td>-0.16</td>
<td>-0.22</td>
<td>11.715</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td>1...</td>
<td>-0.12</td>
<td>-0.17</td>
<td>12.541</td>
</tr>
</tbody>
</table>

### 3.2.3 Autocorrelation test

When testing autocorrelation problems, this paper first uses the Dubin-Walson test. According to the table lookup, when the significance level is 5%, the number of sample observations is 25, and the number of explanatory variables is 6, dL = 0.8682, dU = 2.013, the DW value in the model is between the two, namely There is no autocorrelation between the original explanatory variables. Through further inspection, a correlation diagram is generated. As shown in Figure 1, it is found that the p-value accepts the null hypothesis, and the autocorrelation coefficient and partial correlation coefficient both fall between the dotted lines, so it can be considered that there is no autocorrelation problem.

### 3.3 Results analysis

Time series analysis is used here, with a time span from 1994 to 2018 and a span of 25 years. The estimated R-square of the model is 95.10%, and the adjusted R-square is 93.46%. Except for bilateral investment treaties, all sources of funds have a positive impact on the inflow of foreign direct investment. Empirical research results show that the main factors affecting China’s FDI inflows are macroeconomic factors and government incentive policies, and the impact of government agreements on FDI inflows is not significant.

Judging from the results of the model, the annual GDP growth rate is statistically significant, with the highest t-value, 6.15, and significant at 1%. It shows that the model explains 93% of the impact of
the annual GDP growth rate change on FDI inflows. The result also shows the importance of developing the infrastructure foundation, which is consistent with most research conclusions. From the table, the analysis shows that investors are attracted to China’s higher GDP growth rate. Specifically, the results show that for every 1% increase in GDP, inflows of foreign direct investment increase by about 0.74%. Evidence shows that strong economic growth is still a necessary condition for China to attract FDI inflows.

The percentage of wage laborers to total laborers also has a significant impact on FDI, because as the number of employed people decreases, the level of wage costs in a country is also greatly affected. Cheap labor is the decisive factor in stimulating and attracting foreign direct investment to specific countries. When the employment rate is reduced, it means that labor costs are reduced, which will attract more FDI inflows, because some investors and foreign companies are more willing to invest in countries with relatively low wage costs.

The real effective exchange rate also has a statistically significant effect on China’s FDI inflows, with a t-value of -2.39, which is higher than the accepted economically significant critical t-value of 2.00 and is significant at the 5% level. This result is consistent with the view that the decline in the value of money is associated with an increase in inflows of foreign direct investment. This is because the depreciation of the currency will cause the relative wealth status of foreign investors to rise, thereby reducing the relative cost of capital. This allows foreign investors to make greater investments in the currency of their country.

Tax incentives are positively correlated with FDI inflows, because the results show that the t-value is 2.51, which is higher than the critical value of 2.00. This is in line with most previous research conclusions that once the impact of economic fundamentals is controlled, incentives play a secondary role in attracting foreign direct investment. According to the results, it can also be found that the bilateral investment agreement has a t value of -0.02 and a P value of 98.49%, indicating that it cannot affect China’s FDI inflows.

4. Conclusion

This article attempts to make a comprehensive analysis of the determinants of China’s FDI inflows. Most papers or existing literature are mainly focused on economic variables that affect China’s FDI inflows. Although this is correct to a certain extent, over time, other factors have been included in the interpretation of foreign direct investment in many countries. Therefore, the contribution of this article is a clearer explanation of the new policies added and considered when discussing the determinants of FDI in a region. It can also be seen that although China has signed many bilateral trade agreements with other countries, the empirical results reflect that the bilateral investment agreements are very insignificant among the influencing factors of FDI inflows. Although it cannot be concluded that the signing of more bilateral investment agreements will lead to an increase in FDI inflows, this is a promotional measure worthy of in-depth discussion. The national fiscal incentive policy, as a factor in determining FDI, also plays an important role in attracting FDI into China.

References


