

Regional differences in effects of FDI on Balance of Payment: An analysis based on China's province-level data

PU Juanbo

Nanyang Technological University of Singapore, Singapore 999002

ABSTRACT. *Foreign Direct Investment (FDI) plays an important role on affecting the economy of one country, a lot of research has been conducted to analyze the outcome of FDI on economy. However, studies focused on the effect of FDI on Balance of Payment (BOP) are relatively few. This study quantitatively analyze the effects of FDI on BOP across 31 provinces in China and compares its impact on economic growth. After dividing the process into eight channels and using some mathematical statistics methods to analyze, some general rules about the regional differences in effects of FDI on Balance of Payment have been found in this paper.*

KEYWORDS: *Foreign Direct Investment (FDI) ;Balance of Payment (BOP)*

1. Introduction

After the 1990s, foreign direct investment has increasingly become one of the main channels of capital inflow in developing countries. (Beebeejaun, A. 2018) A lot of economic research has amply explored the relationship between FDI (foreign direct investment) and economic growth from perspectives of theoretical analysis and empirical analysis. However, the research of the regional differences in the effects of FDI on Balance of Payment has not been gone into as deeply as the former. FDI will not only improve the balance of payment through stimulating the economy but also make it deteriorate because of the debt burden and high level of financial risk (Liang, Y. ,2007). This paper focuses on the effects of FDI on BOP (Balance of Payment) across 31 provinces in China and compares its impact on economic growth. As for the study of the effect of FDI on BOP, this paper divides it into eight channels including positive and negative channels and make comparison among them, after quantitative analysis including regressing and statistical induction, some general rules have been found, therefore, we put forward some policy suggestions according to the findings at the end of this paper.

2. Theoretical analysis: BOP model

2.1 FDI and eight channels

Broadly, FDI includes “mergers and acquisitions, building new facilities, reinvesting profits earned from overseas operations, and intracompany loans”(Guillon, E. & Chauvet, L. ,2013). In this paper, we focus mainly on the narrow sense which refers just to build a new facility, and a lasting management interest in an enterprise operating in an economy other than that of the investor. Based on this premise, we summarize eight channels through which FDI will affect BOP:*Inflow of investment capital, Inflow of reinvested profit, Capital retreat, Import of foreign-invested enterprises, Export of foreign-invested enterprises, Expenditures for external exclusive rights and licensing fees, Profit of foreign-invested enterprises and Wage expenditures of foreign-invested enterprises.*

2.2 Decomposition analysis of BOP

In order to find out the effect of FDI on BOP among different regions, this paper firstly probes into how FDI affect the sub-items of BOP and then get the impact on BOP further. The model we used is summarized as follows:

$$\text{Balance of payments} = \text{current account} + \text{financial account} + \text{capital account. (2.1)}$$

$$\text{Current account} = \text{Trade balance} + \text{Income balance} + \text{Net unilateral transfer (2.1.1)}$$

$$\text{Financial account} = \text{Financial inflows} - \text{Financial outflows (2.1.2)}$$

According to the sub-items of BOP shown above, the effects of eight channels on BOP could be expressed as follows.

Table1 Relationship between eight channels and BOP

Order	Channels	Sub-items	FA/CA	BOP
1	Inflow of investment capital	FI	FA	BOP
2	Inflow of reinvested profit	FI	FA	
3	Capital retreat	FI	FA	
4	Import of foreign-invested enterprises	TB	CA	
5	Export of foreign-invested enterprises	TB	CA	
6	Expenditures for exclusive rights and licensing fees	TB	CA	
7	Profit of foreign-invested enterprises	IB	CA	
8	Wage expenditures of foreign-invested enterprises	NUT	CA	

2.3 Analysis of the effect of eight channels on BOP

(1) Effect of channels on Financial Account

FDI will affect the Financial Account mainly through three channels: *Inflow of investment capital*, *Inflow of reinvested profit* and *Capital retreat*.

Table 2 Effect of channels on Financial Account

Order	Channels	Sub-items	FA	BOP
1	Inflow of investment capital	FI ↑	FA ↑	+
2	Inflow of reinvested profit	FI ↑	FA ↑	+
3	Capital retreat	FI ↓	FA ↓	-

As summarized above, *Inflow of investment capital* and *Inflow of reinvested profit* both affect the financial account through increasing the financial inflows and then improve the balance of payment. Oppositely, *Capital retreat* will reduce the financial inflow by an approximate amount, and then deteriorate the balance of payment. Conjointly analyzing, these two effects are mutually-weakened and as a whole makes limited difference on the balance of payment, therefore, we will not consider deeply about the effect of financial account on balance of payment in this paper.

(2) Effect of channels on Current Account

As the above analysis proves, FDI mainly affects BOP through sub-items of current account instead of financial account. A further study of the effect of channels on current account has been unfolded.

Table 3 Effect of channels on Current Account

Order	Channels	Sub-items	CA	BOP
1	Import of foreign-invested enterprises	TB ↓	CA ↓	-
2	Export of foreign-invested enterprises	TB ↑	CA ↑	+
3	Expenditures for exclusive rights and licensing fees	TB ↓	CA ↓	-
4	Profit of foreign-invested enterprises	IB ↓	CA ↓	-
5	Wage expenditures of foreign-invested enterprises	IB ↑	CA ↑	+

There are three channels affecting current account mainly through affecting the trade balance: *Import of foreign-invested enterprises*, *Expenditures for exclusive rights and licensing fees* and *Export of foreign-invested enterprises*. *Import of foreign-invested enterprises* includes the import of raw materials and production equipment, which will increase the import and then make the trade balance deteriorate, according to the equation 2.1.1, it will negatively affect the current account (Kovacevic, R. 2017)., and then make balance of payment deteriorate as proved by equation 2.1. The situation is the same for the channel of *Expenditures for exclusive rights and licensing fees*. Oppositely, *Export of foreign-invested*

enterprises will positively affect the balance of payment as it will lead to an improved current account.

Profit of foreign-invested enterprises is income payments on FDI by the domestic country that includes the income generated by the initial investment and the reinvested profits, which will lead to the deterioration of the income balance and then worsen the current account as shown by the equation 2.1.1, as a result, balance of payment will also be worse. *Wage expenditures of foreign-invested enterprises* (in this paper means the wage paid to the domestic residents) also affects the current account through income balance, then improves the balance of payment.

2.4 Conclusion of the effect of eight channels on BOP

After analysis of the effect of FDI on the financial account and current account, it is concluded that FDI mainly affects the balance of payment through current account instead of financial account as the effects generated in the financial account are canceled out each other, five channels associated with current account work more in point of affecting the balance of payment.

3. Empirical study: quantitative analysis

3.1 Data and Methodology

This paper collects the data from the *China Statistical Yearbooks Database* and *National Bureau of Statistics of China*, including the data of total export volume of foreign-invested enterprises, total import amount of foreign-invested enterprises, GDP per capita and foreign direct investment amount from 31 provinces of China over 10 years from 2004 to 2014, amount to 1364 observations in total. The methodology used in this paper mainly includes mathematical statistics and regression.

3.2 Analysis and Result

(1) General Analysis

In this part, we mainly focus on two hypotheses: whether FDI will promote the economy and whether different regions behave obviously differently on FDI.

1) Hypothesis one: whether FDI will promote the economy

For the first hypothesis, this paper uses 336 observations and regresses GDP on FDI and then get the result as follows:

Source	SS	df	MS	Number of obs	=	336
Model	5.3109e+10	1	5.3109e+10	F(1, 334)	=	234.93
Residual	7.5507e+10	334	226068939	Prob > F	=	0.0000
				R-squared	=	0.4129
				Adj R-squared	=	0.4112
Total	1.2862e+11	335	383929395	Root MSE	=	15036

GDPpercapita	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
FDI	.0189925	.0012391	15.33	0.000	.016555 .02143
_cons	20484.57	1050.428	19.50	0.000	18418.29 22550.86

Data source:China Statistical Yearbooks Database

Figure.1 Regression GDP on FDI

According to the result, it shows a significant positive correlation between FDI and GDP per capita. In terms of quantity, GDP per capita will increase by 0.01899 unit as the increase of one unit of FDI, as the coefficient tells. With the significant P value, we could infer that FDI plays an big role in promoting the economy.

2) Hypothesis two: whether different regions behave obviously differently on FDI

We use GDP per capita as an indicator of different provinces because the economic behavior of different regions is quite varying in China. (Gao, Y., Zheng, J. & Bu, M., 2014). As for the measurement of the activity level of FDI, we choose the *total export volume of foreign enterprises* and *total import volume of foreign enterprises* as indicators and then regress these two variables on GDP per capita respectively.

Source	SS	df	MS	Number of obs	=	341
Model	2.5157e+15	1	2.5157e+15	F(1, 339)	=	97.68
Residual	8.7310e+15	339	2.5755e+13	Prob > F	=	0.0000
				R-squared	=	0.2237
				Adj R-squared	=	0.2214
Total	1.1247e+16	340	3.3078e+13	Root MSE	=	5.1e+06

Totalexport	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
GDPpercapita	133.3494	13.4926	9.88	0.000	106.8096 159.8891
_cons	-1653731	501638.3	-3.30	0.001	-2640447 -667015.3

Data source:China Statistical Yearbooks Database

Figure.2 Regression total export volume on GDP

After regressing total export volume of foreign enterprises on GDP per capita,

we get a significant positive coefficient of 133.3494 under the 95% confidence level, which tells that when GDP per capita increases one unit, it will stimulate the export of foreign enterprises by the amount of 133.3494. In practical terms, regions with higher GDP level intend to have high total export volume, which will make the trade balance better and then improve the current account and balance of payment.

In addition, we also regress total import volume of foreign enterprises on GDP per capita and get the result as follows:

Source	SS	df	MS	Number of obs	=	339
Model	2.0939e+15	1	2.0939e+15	F(1, 337)	=	159.10
Residual	4.4352e+15	337	1.3161e+13	Prob > F	=	0.0000
				R-squared	=	0.3207
				Adj R-squared	=	0.3187
Total	6.5291e+15	338	1.9317e+13	Root MSE	=	3.6e+06

Totalimport	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
GDPpercapita	121.6707	9.645981	12.61	0.000	102.6968 140.6447
_cons	-1672036	359090.8	-4.66	0.000	-2378378 -965694.4

Data source: China Statistical Yearbooks Database

Figure. 3 Regression of total export volume on GDP

Similarly, the relationship between total export volume of foreign enterprises and GDP per capita is significant under the 95% confidence level, which means that, when GDP per capita increases one unit, the total export volume will also increase by the amount of 121.6707. In terms of balance of payment, it tells that in the regions with higher GDP per capita, the total export volume seems higher than those with lower GDP per capita, and its function of improving balance of payment is more obvious.

3) Results of General Analysis

According to the analysis of general analysis, we get two important conclusions:

Firstly, GDP per capita is proved significantly correlated with FDI and the affecting coefficient of FDI is + 0.01899; Secondly, it is proved that in the regions with higher GDP level, the total export volume and import value seem to be higher than the regions with relatively lower GDP level, which means that in the developed areas, the foreign trade market seems to be more active. Quantitatively, the impact of one unit GDP per capita increase on the export volume is larger than import volume, with the coefficient of 133.3494 and 121.6707 respectively, on the whole, it will improve the trade balance and then the balance of payment in the richer areas.

(2) Heterogeneity studies

In addition to the general analysis, this paper also conducts the heterogeneity studies. It firstly divides the 31 provinces into three groups according to the average GDP per capita over the period of 2004 to 2014, that is: high-income group,

middle-income group, and low-income group. Secondly, it probes into the regional differences on the foreign trade market and balance of payment using descriptive statistics and regressions.

1) Descriptive Statistics

Table 4 Descriptive Statistics of three groups

Group	Number	GDP per capita	FDI	Total export of FIE	Total import of FIE
High income	10	50656	1156288	7195560	5948995
Middle income	10	25251	239436	269581	273693
Low income	11	18648	234184	241526	272017

Data source: China Statistical Yearbooks Database & National Bureau of Statistics of China

We firstly take the average value of GDP per capita, FDI, Total export of FIE and Total import of FIE respectively. For the high-income group including Beijing, Shanghai, Jiangsu and so on, the average GDP per capita is twice of the middle-income group and 2.7 times of low-income group, the average of total export of FIE is 26.7 times of the middle-income group and 29.8 times of the low-income group, and the average import of FIE is 21.7 times of the middle-income group and 21.9 times of the low-income group. For the middle-income group like Jilin, Chongqing and Hunan, its average GDP per capita is quite larger than the low-income group, which is 25251yuan, but for the other variables, the difference between middle-income group and low-income group does not differ obviously. For the low-income group which includes Guizhou, Henan and Qinghai, the average GDP per capita is 18648yuan and the other variables rank lowest among these three groups.

2) Heterogeneity analysis of the effect of FDI on GDP per capita

In order to test the different effects of FDI on GDP per capita among three groups, we regress these two variables of each group respectively and get the regression result shown below:

Table 5 Effect of FDI on GDP per capita among three groups

Variables	High income	Middle income	Low income
FDI	0.009***	0.027***	0.015***
_cons	39102***	18839***	14891***

Data source: China Statistical Yearbooks Database & National Bureau of Statistics of China

It shows that FDI presents positive impacts on the GDP per capita in all three groups with high significant level, which illustrates that FDI will promote the economy in all groups markedly. However, the coefficients of different groups are quite disparate, middle-income group shows the highest coefficient whereas high-income group exhibits the lowest. It may be because those developed areas intend to have better infrastructure and technology than poorer areas, which will lead to a

decreasing marginal effect of FDI. In addition, the investment channels are diverse and various in developed areas, which will whittle the impact of FDI relatively. As a result, the impact of FDI on GDP per capita is not as much as that in the middle and low income groups.

3) Heterogeneity analysis of the effect of GDP on total export of FIE

It is also studied that whether provinces in different income groups show different liveness in the foreign trade market through regressing the total export of FIE on the GDP per capita.

Table 6 Effect of GDP per capita on Export among three groups

Variables	High income	Middle income	Low income
GDP per capita	64.28**	18.67***	26.92***
_cons	3939242***	-201889***	-260401***

Data source: China Statistical Yearbooks Database & National Bureau of Statistics of China

According to the statistic result, there is a common rule in all three groups that the export of FIE will accordingly increase when the economy grows. Quantitatively, FDI promotes the export of FIE most obviously in high-income group, and with least effect in middle-income group, which implies that in high-income group, the economic growth plays a big role of improving the current account and then make the balance of payment improved. The situation in middle-income group is different, the effect of GDP per capita on the improvement of BOP is quite smaller.

4) Heterogeneity analysis of the effect of GDP on total import of FIE

Similarly, we also regress the total import of FIE on the GDP per capita and get the result as follows

Table 7 Effect of GDP per capita on Import among three groups

Variables	High income	Middle income	Low income
GDP per capita	85.27***	16.74***	27.87***
_cons	1628759	-149023***	-243342***

Data source: China Statistical Yearbooks Database & National Bureau of Statistics of China

As shown by the table, the effects of GDP per capita on total import of FIE in all groups are positive, the same as the situation of the Export, the high-income group shows the most obvious response to the increase of GDP, but its intercept is not significant, therefore we do not discuss this item further in this part. However, it is clearly observed that GDP per capita has the least influence to the middle-income group, which implies the negative fluctuation of current account and balance of payment in middle-income group is smallest.

5) Conclusion of Heterogeneity analysis

Derived from the analysis of heterogeneity, two main conclusions are reached.

Firstly, in terms of the effect of FDI on GDP per capita, it is found that FDI has the strongest power in promoting GDP per capita in middle-income group, oppositely, it has the weakest influence in the high-income group; Secondly, in terms of the foreign trade market, GDP per capita has the strongest stimulation on total export and import of foreign-invested enterprise in the high-income group, which means the increase of GDP per capita affect current account strongest in the high-income group, sequentially, the balance of payment will fluctuate strongly in this group. oppositely, the current account and balance of payment will be affected least in the middle-income group.

4. Conclusion and Suggestions

Combining the document literature and the result of this paper, it is found that compared with high-income provinces which have already equipped with diversified investment channels and advanced infrastructure, middle-income and low-income provinces have much more space for FDI to stimulate GDP per capita. From the perspective of the balance of payment, the increase of GDP seems to have the bigger impact on balance of payment in high-income group than the other groups.

Based on the findings, three policy suggestions are developed as follows:

Firstly, encouraging the foreign direct investment in middle and low income provinces such as Yunnan and Guizhou to stimulate the economy through tax benefits or subsidy

Secondly, paying close attention to the export and import of foreign-invested enterprises during the economic upswing, especially in high-income provinces such as Guangdong and Jiangsu, as it has a significant impact on the current account and balance of payment.

Thirdly, promoting the cross-province cooperation and regional complementary to make the best of overflow effect (Mitze, T. & Özyurt, S., 2014), at the same time, improving the innovation condition and the investment efficiency through the provincial government cooperation (Zhang, L., 2017)

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