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A Different Look at Inward FDI into Mainland China

Ying Zhang

A Different Look at Inward FDI into Mainland China

An empirical study on relationship of FDI and GDP and

FDI Externalities on China Economic Growth[1]

Ying Zhang

UNU-MERIT

zhang@merit.unu.edu

ABSTRACT

This paper aims to find out the relationship between inward FDI into China and China's economic development. According to the descriptive analysis of FDI data from 1980 till 2007, we firstly found that there is a sectoral and regional biased distribution with regard to the inward FDI into China; we saw that the contribution of inward FDI to China's economic development exhibits a reversed U shape (the turning point locates in the year of 2001). In order to figure out the main reason and the causal-effect relationship between inward FDI into China and China's economic growth, we used ECM and Granger Causality Test based on the data between 1978 and 2001 in the second part. We found that within this period the causal-effect relationship between China's economic development and inward FDI was bi-directional and the causal impact of China's economic development on FDI was larger than the impact of FDI on China's economic development. To discover the reason of reduced FDI contribution to China's economic development since 2001onwards, we used the fixed-effect panel analysis based on a panel dataset consisting 31 provinces in China from 2001 to 2005. We found that inward FDI in China since 2001 onwards has negative spillover effect on China's economic development. We argue that the reason might be the duplication effect of foreign firms, negative externalities of backward, forward and horizontal relationships between foreign and domestic firms, increased welfare loss, and China's regional economic disparity.

Key Words: Foreign direct investment; economic growth; externalities, spillovers; China

JEL Codes: O19, O24, O40, P41

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1.INTRODUCTION

China started to execute Economic reforms in the end of 1978, since which foreign investment has been widely welcomed. Over the past three decades until the end of 2007, China has become the second largest FDI recipient in the world, following United States. Only in 2007, the FDI inflow in China has reached 83.5 billion US dollars, 56% increase from 2004[2].

Foreign investments are classified into direct investment and other means of investment. The direct investment includes the mode of Sino-Foreign joint ventures, joint exploitation, exclusively foreign-owned enterprises, foreign-funded share-holding companies, and joint development. Figure 1 exhibits the trend of foreign direct investment inflow in China since 1980. From it, we can see that FDI inflow has been overwhelming since 1992 when Deng Xiaoping circuited in China's south coastal areas and SEZs for strengthening foreign investment policies. In 1998 FDI reached its first peak of US$45463 million. Afterwards, FDI inflow experienced a fluctuated increasing period with ups and downs respectively in 2003 and 2005.

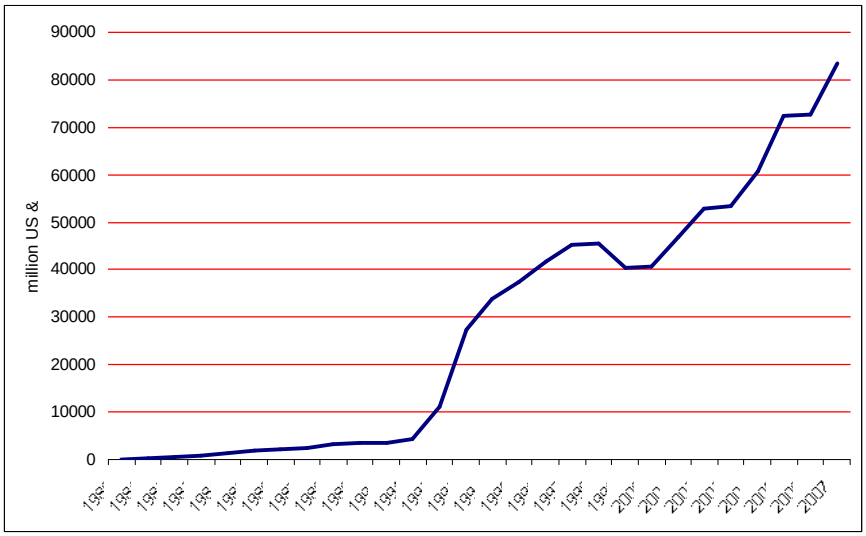

Figure 1 FDI inflow in China (1980-2007)

Source: UNCTAD database and author's calculation

However, with the increasing amount of FDI each year, the ratio of FDI over capital formation in China is still very low, roughly same as the average level of all developing countries and even lower than the most Asian economies as well as Eastern European economies. In order to find out the main reasons, in this paper we are motivated to clarify the causal-effect relationship between FDI and China's economic development and their corresponding bi-directional effects in different stages of economic development.

[2] All the numbers mentioned here are calculated by author according to the data from China Statistic Yearbook and UNCTAD database.

We will provide a brief overview on FDI in China in terms of its descriptive statistical analysis on provincial distribution (section 2.1), sectoral distribution (section 2.2), and FDI policies (section 2.3). We will use ECM model and Granger Causality Test to exam the short- and long-term FDI-economic development causality relationship based on the data from 1978 till 2001 (section 3.1); and based on a panel dataset from 2001 till 2005, we will estimate the spillover effect of FDI on China's economic growth (section 3.2). Finally in section 4 we will deliver our conclusion and remarks.

2. OVERVIEWING FDI IN CHINA

In this section, we will firstly focus on the descriptive statistics of FDI into China in terms of provincial and sectional distribution; after that the main characteristics as well as critiques of China's FDI policy will be discussed.

2.1 Provincial distribution of FDI

The most prominent feature of provincial distribution of FDI in China is "divergent phenomenon". The regional distribution of FDI in China (see figure 2) exhibits that the east regional provinces occupied 85 percent of FDI inflow overtime while inland China could not catch up. By 2006, more than 86% of inward FDI were located in the coastal regions and only 14% were associated with inland (China Statistic Yearbook, 2007). It is argued to have more association with the first generation of FDI policies, which aimed to set up four special economic zones in the coast regions in 1979-1980s.

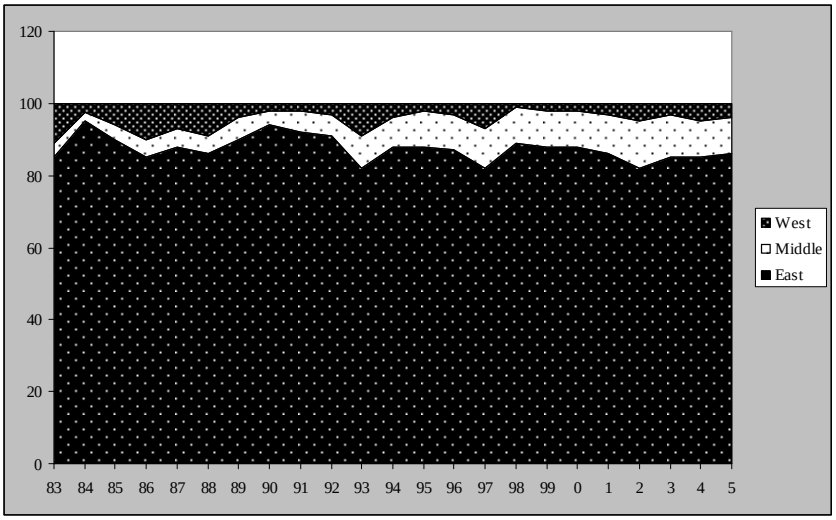

Figure 2: Regional Distribution of FDI by districts (1983-2005)

Source: China Statistic Yearbook and author's calculation

2.2 Distribution of FDI by sub-sectors and trends

The sectoral distribution of FDI in China displayed several characteristics (see table 1).

Firstly, foreign investment has generally switched from labor-intensive manufacturing industries to the technology-intensive manufacturing industries. In sectors such as information transmission, computer services, and software industry, foreign investment increased rapidly by more than 100 percent.

Secondly, foreign capital invested in China exhibits a nature of multiplicity. Foreign capital invested not only in manufacturing industry, but also presented in agriculture and service industries. From table 1 we can see that foreign capital distributed each industry but the share of FDI in manufacturing industry still accounts majorly (2 percent increase from 2000 to 2006).

Thirdly, foreign capital, which was invested in the real estate and construction industry before the time of China's accession to WTO, has gradually stepped into the other sectors such as wholesale, retail trade and technical services.

2.3 Chinese policies on FDI

China's huge amount of FDI cannot be separately discussed from Chinese FDI policies. Since the time when this policy was initiated in 1979, Chinese FDI policies have obtained a well-known reputation. In general, this policy was featured by five characteristics and in this part we will briefly elaborate them one by one.

Table 1. Distribution of FDI by sub sectors (comparison between 2000 and 2006)

Sector	2000				2006			
	Number of Projects (unit)	Share %	Contracted Value (USD 10 000)	share	Number of Projects (unit)	Share %	Contracted Value (USD 10 000)	share
Agriculture, Forestry, Animal Husbandry and Fishery	10355	2.85	123.1	1.82	951	2.29	319863	1.65
manufactuing	265609	72.99	4115.34	60.87	24998	60.28	12082629	62.37
Construction	9059	2.49	196.91	2.91	325	0.85	214702	1.11
Transport, Storage and Post	4027	1.11	163.86	2.42	1017	4.93	822364	4.25
Information Transmission, Computer Services and Software								
Wholesale and Retail Trades	18410	5.06	233.96	3.41	5724	13.8	941796	4.86
Hotels and Catering Services								
Real Estate	37252	10.24	1594.43	23.6	2402	5.78	2949040	15.22
Public Management and Social Organizations								
Health, Social Security and Social Welfare	1030	0.28	47.73	0.71	261	0.58	111315	0.57
Culture, Sports and Entertainment								
Scientific Research, Technical Service and	2510	0.69	21.24	0.31	1035	2.50	260234	1.34

Source: China Statistic Yearbook and author's calculation

1) Industrial promotion

Chinese government promotes China's industrialization process partially by FDI policies. There are three important sub-policies embedded in this policy system: "market for technology", "export promotion", and "upgrading industrial structure".

The policy of "market for technology" was derived from the principle of import substitution. Following this policy, a large amount of technologies was transferred from foreign firms to Chinese firms. This approach was purposed to strengthen foreign firms' commitment in meeting local content requirement, foreign exchange balance, and ownership restriction. This policy was dominantly used before 2001; After China's access to WTO, these import substitution measures were repealed or replaced.

Different from "market for technology" policy, "export promotion" strategy was much more proactive. Export-oriented foreign-invested firms are therefore granted preferential treatments in terms of low tax rate or exemption of industrial and commercial tax. Firms which are more export-oriented can enjoy benefits like trade facilitation and exchange facilitation from export processing zones and customs warehouses.

The third strategy "upgrading industrial structure" is a policy that was just promoted more recently and still only for some coastal cities. This policy mainly aims to set up High Technology Parks, provide grants to expatriates to start up new businesses, and promote agglomeration as well as cluster buildup. It also strongly encourages multinational corporations to establish research & development centers and regional headquarters in China.

2) Spatial gradualism of FDI liberalization

Spatial gradualism of FDI liberalization is the second characteristic of FDI policy in China. Due to this policy, foreign investment destination has been extended from coastal regions in 1980 in the first four coastal cities' Special Economic Zones (Shenzhen, Zhuhai, Shantou, and Xiamen) to the entire coastal region of 14 coastal cities, deltas of Yangtze, Pearl, Minan Rivers in 1988, and also some inland regions in 1990s. By 1999, there has been a big leap in terms of FDI destination when the whole western region was opened for FDI (Catin, Luo and Huffel, 2005) (see figure 3).

Figure 3. Spatial Gradualism of the open-door policies in China

Source: Catin, Luo and Huffel (2005)

3) Decentralized FDI administration

Together with spatial gradualism of FDI liberalization, FDI policies started to decentralize FDI administrations. In order to encourage technology-based FDI projects and attract more export-oriented investment, the FDI projects are classified into four categories as seen in table 2. According to this classified categories, municipal and county-level governments were granted authorities to approve and administrate FDI projects. Since 1985 local governments could approve the FDI projects up to 10million USD per project. From 2004 onwards, provincial governments have authorities to verify FDI projects up to 100million USD or restrict categories up to 50 million USD/project.

Table 2 The encouraged, restricted, prohibited and permitted FDI projects in China

Encouraged Projects	• Infrastructure or underdeveloped agriculture; • New/advanced technologies that can upgrade product function, save energy, improve economic efficiency, or prevent/control pollution; • Export oriented
Restrict Projects	• Technology has been developed or transferred; • Production has exceeded domestic demand; • Under experiment or monopolized by the State; • In the exploration of rare and mineral resources.

Prohibited Projects	• Jeopardize national security or public interests; • Damage environment, natural resources or human health; • Use sizeable amounts of arable land; • Technologies unique to China
Permitted Projects	Those which are not in any of the above groups

4) Incentive Instruments

One strategy is the provision of various corporate income tax, by which foreign investors are incented by a five-year tax reduction[3]. The second incentive is an exemption of import duties. Foreign companies, which are in the encouraged industries, can be exempted from import duties as well as value added tax, consumption tax, and customs duties on imported capital goods.

5) Local competition on FDI promotion

In order to attract more FDI into specific province, local government uses different policies to compete each other. Generally, policies such as surcharging of the corporate income tax (3%), free or subsidized use of land, and exemption of other administration fees & charges as well as free provision of physical infrastructures in Build, Operate and Transfer (BOT) are overwhelmingly selected by local governments. In order to ensure the administrative and operational efficiency, some of the provincial governments such as Ningbo government spend heavily in organizing foreign investment fairs[4] and streamlining the approval process.

China has achieved big success in attracting FDI and obtained many praises due to FDI policies, however, there are still a number of FDI policy *side effects* in China. *Firstly,* in spite that China has generated huge trade surplus with most developed countries in many categories, the trade conflicts especially in the textile exports with Unite States, Europe Union was never stopped.

Secondly, in order to stimulate export, China Central Bank persisted in fixed exchange rate in currency; therefore, other trade partners including Chinese firms may lose welfare if RMB refuses to take appreciation. China's large trade surplus accompanied by complicated monetary policy such as fixed

[3] This consists of a 2-year tax holiday and a subsequent 3-year 50 percent tax reduction. Reduced tax rates are provided to foreign manufacturing firms located in the designed areas of china such as special economic zones (15% reduction), open coastal economic zones (24%) and the central and western regions (15%). A further 10% tax reduction is for those foreign manufacturing firms which have transferred advanced technology or export-oriented.

[4] Empirical studies confirm that these activities named investment generation in literature are the least cost effective and is not associated with higher FDI flows (Wells and Wint, 2001)

exchange rate may also lead to expand domestic liquidity and eventually causes the domestic inflation (in 2007, 2008, it is rather obvious).

Thirdly, as many economists mentioned, round tripping is another negative consequence of China's export-oriented FDI policy. This is due to the tax and fiscal incentives offered to foreign investors rather than domestic firms. In order to enjoy the preferential treatments, many domestic firms transfer their capital overseas and then invest back to China as foreign investors. Only the round tripping of FDI through Hong Kong (China) has been 25% of Hong Kong outward FDI flows.

Besides, regional income disparity and local private firms' difficulty in accessing to credits are another two side effects of FDI policy in China (which will be illustrated in section 3.2).

3. RELATIONSHIP OF FDI AND ECONOMIC GROWTH IN CHINA

In academic area, there have been many studies focusing on the impact of FDI on China's economic growth (i.e. Sun and Parikh, 2001; Graham and Wada, 2001; Liu, 2002; et al.). All of these studies used data before 2001 and had the similar result that inward FDI has significant positive effect on China's economic growth.

However, in the descriptive data analysis over 28 years (1980-2007) FDI and China's GDP, we found that the contribution of FDI stock to GDP decreases steadily from 2000 onwards (Figure3.A). Although from the figure 1 it can be seen that FDI inflow into China increase constantly, the ratio of FDI over GDP (figure3.A), over export (figure 3.B) as well as import (figure 3.C), and over gross fixed capital formation (figure 3.D) are decreasing at the similar rate. Therefore, in this section, we aim to figure out the role of FDI in China's economic development, arranging from 1978 till 2005. We divided this examination work into two parts, firstly in section 3.1 we used ECM model and Granger Causality Test based on the data before 2001 to exam the short- and long-term causality relationship between FDI and economic development; afterwards, we estimated the spillover effect of FDI on China's economic growth by using a panel data set including 31 provinces from 2001 till 2005.

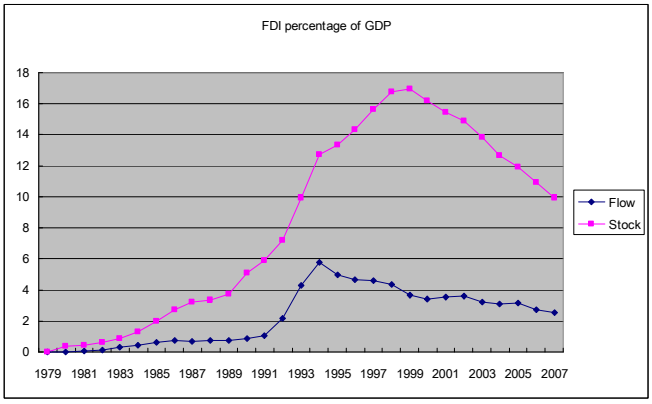

Figure3.A. Percentage of FDI in GDP per year (1979-2006)

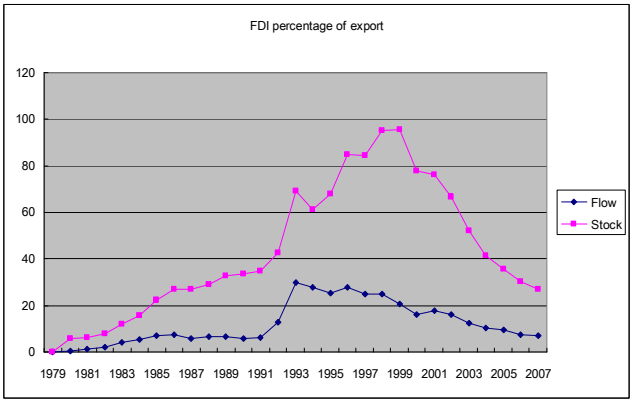

Figure 3.B. FDI thousand of export (1979-2007)

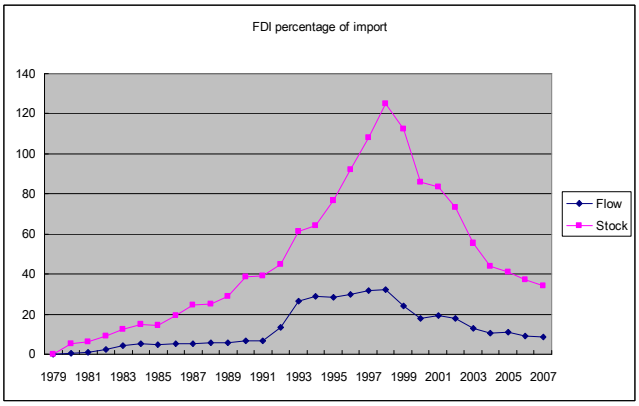

Figure 3.C. FDI percentage of import (1979-2007)

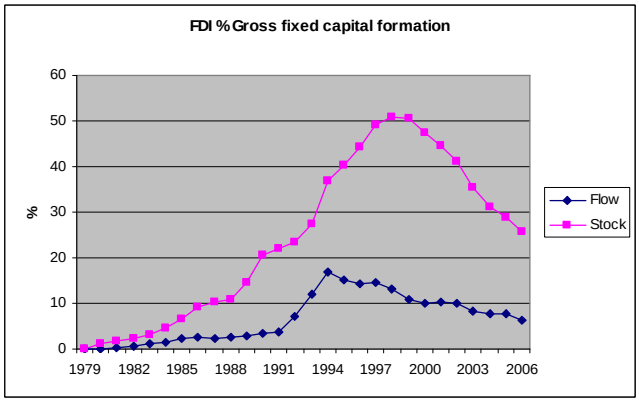

Figure 3.D. FDI % gross fixed capital formation (1979-2006[5])

Source: UNCTAD database and author's calculation

3.1 The causality relationship between FDI and GDP based on data from 1978-2001

3.1.1 Econometric Model

1) Test of Stationarity/ Nonstattionarity

The precondition of time series analysis is to avoid "spurious regression" and to keep time serious data in a stationarity order. Cointegration is one of methods to test this condition and exam the feasibility.

ADF unit root test is aimed to evaluate the Tau value which equals coefficient of Y_{t-1} (as equation 1) divided by its standard error. Technically, if the absolute value of the tau exceeds the MacKinnon critical

[5] The statistic data of gross fixed capital formation of 2007 is not available in China Statistic Year Book until now, thus the data analysis in this figure is till 2006. Some figures give the ratios related to 2007 is because it is calculated from data available at UNCTAD database.

tau values, the null hypothesis that δ =0, which indicates the time series is stationary, must be refused, and Vice Versa.

$$\Delta Y_t = \alpha + \beta \bullet t + \delta \bullet Y_{t-1} + \sum_{i=1}^{m} \theta_i \Delta Y_{t-i} + \varepsilon_t \qquad (1)$$

Where ε_t is a pure white noise error term and $Y_{t-1} = Y_{t-1} - Y_{t-2}$, $Y_{t-2} = Y_{t-2} - Y_{t-3}$, etc.

The number of lagged difference m can be computerized by AIC (equation 2).

$$AIC = -\frac{2L + 2k}{n} \qquad (2)$$

Where L is logarithm likelihood item, n is number of observation, k is the number of estimated variables.

2) Cointegration test

According to Engle and Granger (1987), if all the Y_{it} in the $Y_t = (Y_{it}, \ldots, Y_{mt})$ follows I (1) and $\beta^T Y_t$ is stationary where β is a vector, then there exists a cointegration relationship in the series Y_t. There are two ways to identify cointegration: E-G two steps and JJ methods. Since JJ can overcome many disadvantages of E-G and can be applied to small samples, we applied it in our estimation. The JJ model is as equation (3)

$$Y_t = \pi_0 + \pi_1 Y_{t-1} + \cdots + \pi_m Y_{t-m} + \varepsilon_t \qquad (3)$$

Where $Y_t = (Y_{1t}, \cdots Y_{nt})'$, π_0 is a (n*1) vector, π_i is a (n*n) matrix where i=1,…,m and m can be determined by AIC which we mentioned before.

In JJ test, maximum latent root is used for testing the number of cointegration vector, in which the assumed null hypothesis is the maximum number of cointegrated vector equaling to r based on the following statistic:

$$TR = -T \ln(1 - \lambda_{t+1}) \qquad (4)$$

Where λ_{t+1} is latent root.

If TR exceeds Jonansen critical value, null hypothesis[6] will be rejuected. For example, if we reject the H0 where $r=r_0-1$ and accept another H0 where $r=r_0$, the number of cointegration vector is r_0.

[6] Averagely, the test starts from r=0

3) Error Correction Model

According to the Engle principle, if variables have cointegration relationship, the cointegrated regression can be altered to an error correction model (Engle and Granger, 1987). The advantage of this model is it can gradually delete the non-related variables based on t value and reflect the relationship of variables in a short-term and long-term time segments. The error correction model is as equation (5).

$$\Delta Y_t = lagged(\Delta Y, \Delta X) - \lambda \mu_{t-1} + \varepsilon_t \qquad 0<\lambda<1 \quad (5)$$

Where μ_{t-1} is disequilibrium error item or say the long-term equilibrium deviation iterm. λ is the short-term adjusted coefficient.

3.1.2 Data and Result and discussion

The data of FDI and GDP we used is from China Statistic Yearbook. The time range is from 1978 till 2001 (24 observations).

1) Stationarity Test

The results of unit root test are shown in table 3.

Table 3 ADF unit root test

Variables	Tau value	AIC value	Markinnon Critical Value(5%)
ln GDP	-0.0826	-3.5486	-2.9969
ln FDI	-1.9098	0.7882	-2.9969
lnGDP(t)-lnGDP(t-1)	-3.6046	-3.7437	-3.0038
lnFDI(t)-lnFDI(t-1)	-3.5862	0.9506	-3.0038

From table 3 we can see that the absolute tau values of GDP and FDI do not exceed the critical Markinnon value at 0.05 significant level, meaning that GDP and FDI may exist unit root and the data is nonstationary. Secondly, the tau values of first difference GDP and first difference FDI are higher than critical values at 5% significant level, which means that in this case GDP and FDI are of I(1).

2) Cointegration Test

Table 4 lists the main results from cointegration test. Since E-G methods ask for large pool of samples by which our case could not meet, JJ method was used to take the test.

Table 4 Cointegration Test of variables

Cointegrated Variables	H0	Maximum Eigenvalue	likelihood statistic	5% critical value	1% critical value
ln GDP	r=0*	0.6354	35.1419	25.32	30.45
ln FDI	r=1	0.4049	11.9386	12.25	16.26

*indicate at 5% significance level we refuse H0: r=0
The lagged difference for cointegration relationship is 1

The hypothesis is started from r=0. From the table 4 we can see that the likelihood statistic is 35.1419 which is larger than the critical value 25.32 at 5% significant level, therefore we refuse H0 where r=0 and accept H1 where r=1. In the test of null hypothesis where r=1 the likelihood is smaller than critical value at 5% significant level, thus we accept H0 where r=1.

It can be concluded that at 5% of significant level, GDP and FDI have one cointegrated relationship. In other words, *GDP and FDI in China have long-term equilibrium cointegrated relationship.*

3) Error Correction Model (ECM) and Granger Test

ECM is used to estimate the short-term and long-term impact across a variety of variables. When the first-difference lnGDP and first-difference lnFDI are confirmed having stationarity, ECM can be regressed in which $vecm_{t-1}$ is one difference error correction item whose coefficient represents the impact of last period's error correction on this period's economic growth. The coefficients of other variables indicate the short-term impact. Table 5 shows the result of our ECM regression.

From the result, we can see firstly that the coefficient of vecm is significant, which implies that GDP and FDI have interactional relationship and China's rapid growth is the main reason of foreign capital inflow.

Secondly, the bi-directional impacts between FDI and GDP are at different scale. The absolute value of coefficient of vecm in equation (1) of GDP ECM is 0.19, which is smaller than that of equation (2) of FDI ECM. This means that from the long-run perspective, *the impact of GDP on FDI is larger than the impact of FDI on GDP*.

Thirdly, from table 5, it can be seen that the Equ. (1) of GDP ECM does not incorporate first difference FDI lagged item $\Delta \ln FDI_{t-1}$, however in the Equ (2) of FDI ECM the variable of $\Delta \ln GDP_{t-1}$ is considered. $\Delta \ln FDI_t$ in the Equ (2) has a significant positive sign, which implies that from the short-term perspective FDI has less impact on China economic growth than GDP's impact on FDI. This might be due to the digestion time of investment.

Table 5. Error correction model regression

Equ. (1) GDP ECM (error correction model) Dependent variable $\Delta \ln GDP_t$		Equ.(2) FDI ECM (error correction model) Dependent variable $\Delta \ln FDI_t$	
$\Delta \ln GDP_{t-1}$	0.93** (t=4.11)	$\Delta \ln GDP_{t-1}$	5.88** (t=4.33)
$\Delta \ln FDI_{t-1}$	Delete by ECM	$\Delta \ln FDI_{t-1}$	0.24* (t=2.66)
$Vecm_{t-1}$	-0.19* (t=1.63)	$Vecm_{t-1}$	-0.46*** (-6.49)

*The AIC and SC statistic in this model is respectively -3.78 and -3.49, which indicates that ECM is well fit. The asterisks ***, ** and * indicate levels of significance at 1, 5 and 10 percent, respectively.*

This conclusion is also consistent with the results of Granger Causality Test. See table 6. Of there, the significant level in the table 6 represents the probability to accept the null hypothesis. Based on the result, we can 80.94% be sure that FDI is not the granger reason of GDP, however with 3.97% confidence to say that GDP is not the short-term granger reason of FDI (96.03% sure that GDP is the granger cause of FDI).

Table 6. Granger Causality Test

Null hypothesis	F value	Significant level
lnFDI is not granger cause of lnGDP	0.2139	0.8094
lnGDP is not granger cause of lnFDI	2.9203	0.0397

3.2 The relationship between GDP and FDI after 2001

3.2.1 Model Specification

The analysis in the previous sections shows that GDP is the granger cause of FDI and FDI is not the granger reason of GDP. According to the graph 3. A in which the contribution of FDI to China's GDP is shown decreasing, we may ask a question "does FDI's spillover effect become negative after 2001?" Therefore, in this section, we used a panel dataset including 31 provinces from 2001 to 2005 to estimate the relationship between FDI spillovers and economic growth. The model we used is an updated C-D model applied by Feder (1982) and Levin and Raut (1997) as follows.

$$Y = AL^{\beta 1}K^{\beta 2}, A = B[1+\theta(\frac{F}{Y})]F^{\alpha} \qquad (6)$$

Where Y=GDP, L=labor input, K=stock of domestic capital, F=stock of FDI, and A=total factor productivity level. The stock of FDI and the share of FDI stock in GDP endogenously determine the total factor productivity A.

Therefore, we can have

$$\dot{Y} = \beta + \beta_1 \dot{L} + \beta_2(\frac{I}{Y}) + \beta_3(\frac{I_F}{Y}) + \beta_4 \Delta(\frac{F}{Y}) + \varepsilon \qquad (7)$$

Where a dot over a variable indicates its rate of growth; I and I_F are domestic investment and FDI flows, respectively.

Therefore, the effect of externalities of FDI on the transition and technology diffusions can be captured by $\beta_3(\frac{I_F}{Y})$; the coefficient of changes on the ratio of the FDI stock to GDP $\Delta(\frac{F}{Y})$ reflects the superior productivity of foreign-invested enterprise[7](Zhang, 2001).

Because of the provincial FDI stock data is not available in China statistic Yearbook, the variable $\Delta(\frac{F}{Y})$ was ignored in the examination. We only take the first three independent variables into account.

3.2.2 Data, estimated results and discussion

The dataset for each variable are received from self-calculation from China Statistic Yearbook. The growth rate of real GDP for each province is taken as a proxy for $\dot{Y}$; the growth rate of population is used in place of $\dot{L}$, assuming a constant unemployment rate over years. The domestic investment-output ratio (I/Y) is computed as a ratio of nominal gross fixed capital formation over nominal GDP. The FDI-output ratio $\frac{I_F}{Y}$ is computed as the ratio of nominal realized FDI inflows (in US dollars) to nominal GDP.

We collected 155-observation panel dataset covering 31 provinces (groups) ranging 5 periods from 2001 till 2005. The regressed result can be seen in table 7.

Table 7 Results of panel estimation: 2001-2005

Dependent Variables	GDP Growth Rate
Independent Variables	
$\dot{L}$	4.56 (2.53)*
I/Y	0.18(0.098)*

[7] Feder (1982) postulates that: (1) the economy consists of two sectors, FDI sector and the rest of the domestic economy; (2) the output of the FDI sector generates an externality effect; (3) labor and capital serve as the conventional inputs in both sectors; and (4) production function and relative marginal products of inputs differ across the two sectors.

I_F / Y	-3.6188(0.76)***
Constant term	0.1186(0.045)*
R-square	0.25
F	13.62
Observation	155
Significance	***0.01; **0.05; *0.1

The Domestic investment that is indicated by the ratio of gross fixed capital formation and GDP has positive effect on GDP growth rate at 10 percent of significance level; and the labor force enlargement shows positive influence on the GDP growth.

The most interesting and surprising result in this regression is the coefficient of FDI inflow over GDP $_{I_F / Y}$. The negative sign indicates that FDI has negative externalities on technology transition and diffusion. The next space is given to discuss the implications from this result.

Firstly, three levels of connections between foreign investors and Chinese local firms determine the orientation of FDI externalities of technology diffusion. The positive FDI externalities of technology diffusion, as prior studies expressed, leads to an increased national technological capability and intensified competition between foreign and domestic companies. As foreign and domestic firms interacted more through backward, forward ties, and horizontal connection[8],

(1) Backward-oriented FDI spillovers[9] may be positive due to direct knowledge transfer, higher requirements, and competitive pressure, or may be negative due to immiserising growth and captive relationship;

(2) The positive FDI spillovers via forward connections are due to better services provided by foreign-invested firms and higher wages from foreign firms; Negative spillovers of forward ties may exist on account of higher monopolistic & oligopolistic rent and lower wages from Chinese local companies;

(3) From the horizontal connection point of view, FDI externalities might be positive due to forcement impact, which pushes local firms to improve productivity and efficiency by imitation and innovation; or negative effects because of the competitive pressure leading to large elimination of local competitors (Figure 4).

[8] Actually the second point we discussed can be regarded as the horizontal relationship. But the difference is that the second point lies on the horizontal relationship between foreign-invested companies rather than foreign and domestic companies.

[9] Spillover effects are externalities of economic activities or process upon those who are not directly involved in it; and externality. An externality occurs when an economic activity causes *external cost* or *external benefits* to third party stakeholders who did not directly affect the economic transaction. (Baumol, 1972)

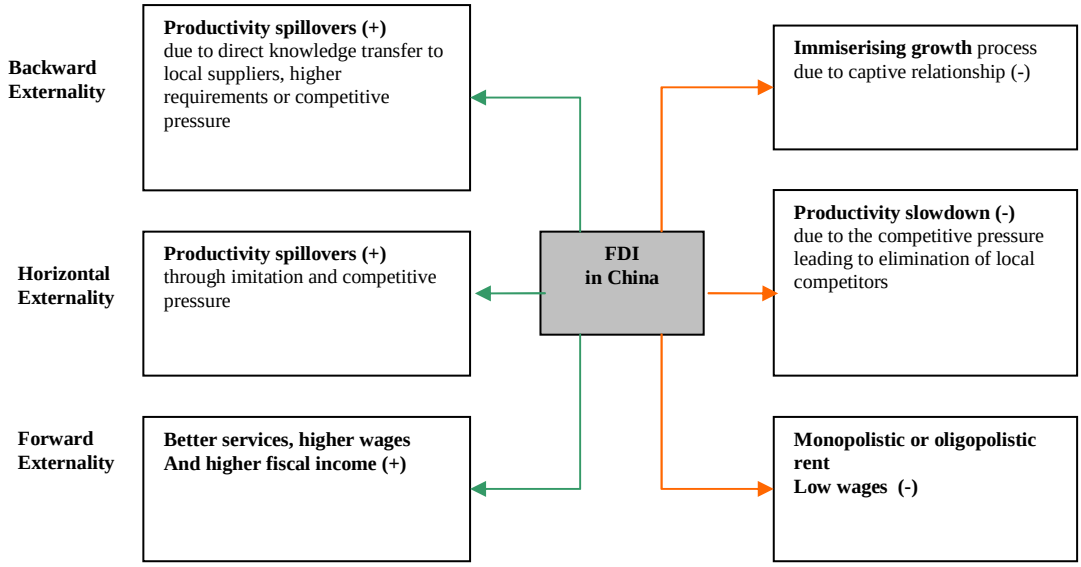

Figure 4 Potential externalities from FDI in China

Secondly, the negative sign on the ratio of FDI inflow over GDP also indicates the external cost from the whole social welfare. According to Baumol (1972), the overall cost and benefit to society is defined as the sum of the economic costs and benefits for all parties involved. In the competitive market, the existence of externalities indicates that either too much or too little of the good would be produced and consumed comparing to the overall cost and benefits to society. If there exists an external cost/negative externality (for example pollution), the good will be overproduced by a competitive market, as the producer does not take the external costs into account. This point provides a very good explanation for the paradox puzzle that positive FDI stocks is accompanied by a negative FDI externalities in China.

Thirdly, FDI policy in China is another reason causing the negative FDI externalities. (1) The biased policy towards foreign firms and China's east region generates a number of social/economic problems such as market distortions, welfare loss, and regional income disparity etc. Because local firms have no protection from property disposal and difficulties in access to credit, FDI inflows into China are driven by fundamental inefficiency of the Chinese economy (Huang, 1999). The private entrepreneurs therefore take use of foreign investors to cede their claim on future cash flows. Such kind of circle investment causes a welfare loss for the whole society.

(2) The spatial gradualism of openness to FDI leads to a rapid growth of the coastal provinces but did not diffuse positive externalities to inland regions (Cation, Luo and Huffel, 2005). Agglomeration effect and geographical concentration derived from the labor force reallocation become another two consequences of this regional income disparity. Coastal regions encountering this Matthew Effect generate more economy growth than inland areas.

(3) This Matthew Effect was strengthened additionally by FDI Decentralized administration in China causes. Local governments are granted authority to reserve major part tax revenue from FDI to local economy development. Therefore, in order to improve investment climate, coastal regions, which have sufficient fund to improve investment climate, are able to attract more FDI than inland regions. Regional economy disparities are certainly formed and become the outcome of FDI negative externalities. We argue that if there are no central government interventions in FDI tax revenue distribution, the FDI externalities will still not be diffused to inland China.

4. CONCLUSION

In this paper, we aim to find out the role of inward FDI in China's economic development over the past three decades. In order to avoid overlapping study from previous research, we divided the estimation work into two parts. In the first part, we used ECM Test based on the data from 1978 till 2001 to figure out GDP has positive impact on FDI while FDI in the short-term has no obvious impact on China economic growth; in the long term, the impact of GDP on FDI is larger than the impact of FDI on GDP. This result is consistent with the result of Granger Causality Test, which displays that GDP is the granger reason of FDI with 96.03% confidence whereas FDI can only be 18.06% sure of granger reason of GDP in the short-term.

In the second part, we used a panel dataset covering 31 provinces from 2001 to 2005 to estimate the relationship between FDI spillovers and GDP. The results show that from 2001onwards, FDI has significant negative spillover effect on GDP. The arguments for this result are given to the imbalanced combination of diversified foreign-domestic connections, enlarged regional income disparity, and aggressive welfare lost. We argue that the negative externalities of FDI are the side effects of China's FDI policy. We suggest that (1) export-oriented FDI policy should be "re-evaluated" by considering its negative impact on other trade-partners and welfare loss of domestic investors. (2) Political instruments such as "internalization" of FDI externality cost (i.e. internalizing the pollution externality cost) need to be optimized to improve the overall social utility. (3) The efficiency of FDI in China should be improved to motivate foreign investment incentive in inland China. (4) The technological capability of Chinese firms needs to be developed in the national innovation system; therefore their position in the international production supply chain can be upgraded.

There are still some limitations in this study. For instance, the shortage of provincial data associating with FDI stock in the China National Statistic Yearbook and the lack of discussion in the effect of national innovation system on FDI and economic growth. Future studies are therefore suggested to emphasize on these points.

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