

The Effect of Foreign Direct Investment (FDI) on Employment in China

by

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Abstract

This paper studied the relationship between employment and FDI in China. China has been the largest recipient of FDI, and it is in the critical moment of economic structural adjustment. So the research of the relationship between employment and FDI can provide some useful recommendations to policy makers. I compared the effect of FDI on employment in 8 sectors. The scatter plot results showed a negative relationship between FDI and employment in Agriculture, Forestry, Animal husbandry & Fishing and FDI has positive effects on employment in the industries of Finance, Mining and Real estate. For the total FDI and employment, there also exists a positive relationship between them. In terms of a Generalist Method of Moments(GMM) test, I eliminated the effect of standard errors on autocorrelation and heteroskedasticity. I also tested overidentifying restrictions to make the results more accurate. Finally, we know that there is a positive relationship between current and past data of employment and FDI.

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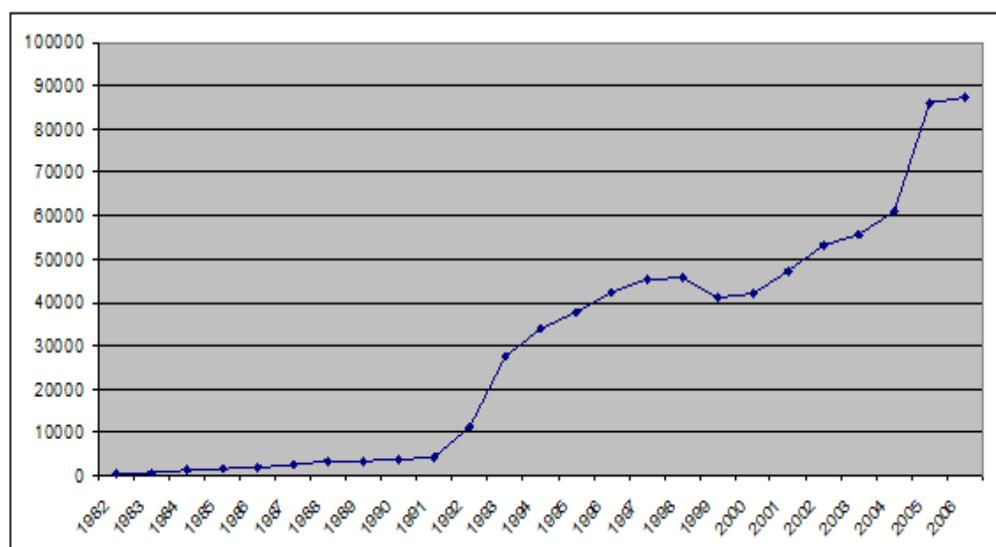
Chapter 1

Introduction

1.1 Background

Foreign direct investment (FDI) has become an important promotion of the economic reform process in China. As a result, China has become one of the largest destinations for cross-border direct investment. From the early 1980s to late 1990s, the contracted FDI inflows to China grew from about US\$ 1.5 billion a year to about US\$ 40 billion a year in 1999. During the same period, China's actual use of FDI grew from about US\$ 0.5 billion to about US\$ 40 billion a year. After 2000, the net FDI inflow increased from 37.5 billion a year to 125 billion a year from 2000 to 2010. It has increased more than 3 times. The following Figure shows the trend of FDI inflows to China.

Figure 1.1. The FDI inflow to China 1983-2006 (million US \$)



1.2 Purpose of Study

Job creation is one of the main challenges for developing countries. Many people believe that FDI can generate many benefits to help solve the capital shortage problem in developing countries, such as China. But in terms of job creation, the effect seems more complicated. It has direct and indirect effects on employment. The effect of the FDI on the employment is one of the most direct expressions of FDI. The following are four different effects of FDI on job creation.

(1) Employment Creation: It means the FDI brings new production capacity and new jobs. Meanwhile, it can improve the development of relevant industries.

(2) Employment Crowding-out: It means the inflow of FDI makes the competition more intense. So some domestic enterprises have had to reduce employment to improve their competitiveness.

(3) Employment Shift: It means the cooperation between foreign and domestic companies will create joint ventures. That will make workers transfer to new enterprises.

(4) Employment Loss: It means the foreign-invested enterprise have their own management methods. Those who have not efficiency or are not suitable for this corporate environment will lose their jobs.

Countries have different FDI situations and economic structures. It is not a wise way to copy others to deal with FDI. If China wants to achieve the positive outcomes

from FDI inflows, it is necessary to know how FDI affects job creation in China. Only in this way, can China design suitable FDI policies and make full use of the inflows. It is a key issue for China's economic restructuring.

In this paper, the most important thing is to analyze the relationship between FDI inflows and employment in the period of 1991-2010, and the effect on different industries in period of 2000-2010. So I will collect the total data of FDI, employment in China and sector data for agriculture, forestry, animal husbandry & fishing, mining, manufacturing, construction, finance, real estate, hotel & restaurant, transportation. These industries are the main ones in China. The study will inform us whether or not the FDI in China has contributed to job creation in total and in different industries respectively.

This paper will consist of the following sections. The current chapter provides an introduction of the topic. It includes the purpose of study, the FDI background in China, the need for study and the statement of problem. Chapter 2 will review the literature and introduce the relational development and knowledge about the topic. In Chapter 3 I will discuss the methodology and data analysis. Chapter 4 will summarize the results from the analysis of the model and provide evidence for future research. Chapter 5 provides a conclusion and recommendations to policy makers.

Chapter 2

Literature Review

There is a large academic literature that focuses on the effect of FDI on the host and home economics. Especially in China, FDI has had a great effect on employment. According to Gao's(2009) study, the use of foreign capital continues to expand, enterprise employment is growing, but the overall growth rate is showing a continued downward trend from about 50 % in the late 1980s to about 5% in the late 1990s . He concluded that this is the result of continued rise in the capital / labor ratio (2009). At the same time, he thought the following three actions may help to make full use of the FDI:

- (1) Do not blindly pursue high capital-and technology intensive foreign investment projects on policy design. The development of labor-intensive industries is still the most important.
- (2) Focus on improving employment by the way of promoting the development of foreign investment related industries.
- (3) Use FDI to improve the Chinese labor market development, and the overall quality of employment.

The effect on the host countries has been considered in different aspects. Most research has emphasized the effect on economic growth, wage levels, technology spillover, foreign trade, employment structure and employment in the host economy(Floyd 2003, Dicken 2007). Most researchers conclude that there would be

higher positive employment effects if the investment takes the form of greenfield investment. On the other hand, there will have a limited, even negative effect on the employment level if foreign capital comes through mergers and acquisitions and buys privatized enterprises. (Dicken, 2007).

Andersen and Hainaut(1998) analyzed the effect of FDI on employment by panel regressions, especially in respect of outflows in source countries. Finally, they didn't find enough evidence that FDI outflows lead to job losses in the source countries. But they found that domestic investment tends to decline in response to FDI outflows and developing countries receive only a small share of global outflows(Andersen and Hainaut 1998).

In 2007, Jayaraman and Singh found there were two cointegration relationships among the variables when formal sector employment and GDP were the endogenous variables. This finding provides some evidence for estimating the marginal effect on the impact of FDI and GDP on employment. The results revealed that both GDP and FDI did have positive and statistically important effect on Fiji's job creation.

In terms of manufacturing industry, Karlsson et al(2007) studied the effect of FDI on job creation in China, based on firm-level information in the Chinese manufacturing during the period 1998-2004. They analyzed both direct and indirect employment effects. Their results showed that, both FDI and private domestic firms have a better

employment growth than the non-private domestic firms. The cross-ownership comparison indicated that the FDI firms have more advantageous characteristics than the firms with other ownerships. They also found that the crowded-out effect of FDI is more important than the competition effect. Finally they concluded that FDI has contributed to job creation in the Chinese manufacturing sector. On the other hand, Axarloglou and Pournarakis (2007) analyzed the effect of FDI inflows on local employment in manufacturing in some states of the United States. In the period 1974-1994, they found the effects were changing from one industry to another. The FDI inflows have positive employment effects in a subgroup of industries such as printing & publishing and transportation equipment & instruments and a negative effect in another subgroup of industries such as leather & stone, clay and glass .

On the direct and indirect employment effects caused by FDI, Wang and Zhang (2005) use data from 1983-2002 to make a measurement study. They found the FDI directly increases the employment and reduces employment by supplanting domestic investment and improving productivity levels indirectly. But the combination of the two effects shows the effect of FDI on employment in China had a significant positive impact. The increase of FDI for each additional one percentage point will bring a 0.008 percentage point increase in actual employment.

Many factors may affect the FDI inflows. It can be affected by the exchange rate. In 2009, Cheng and Yu performed a study of the effect of RMB exchange rate on FDI.

Exchange rate fluctuation can have different effects across countries. For example, Russ (2007) argued that exchange rate fluctuations will affect the decisions of multinational companies entering the market. But he could not distinguish positive or negative effects, because this is decided by the currency impact which is from the host country and overseas markets.

In terms of the indirect effect, Sjöholm(2008) studied the relationship between FDI and technology and found a clear linkage between the employment and technology. On the one hand new technology may make Chinese firms more competitive which permits them to grow and employ more workers. On the other hand new technology may also decrease demand for labor by substituting the low skilled employees with fewer high skilled employees . Hence, the change of technology policies will affect the job creation. Moreover, firm ownership also is an important part of job creation. In China, the main reason for the insufficient job creation is that state owned enterprises(SOEs) are easier to absorb workers than the private sector. Foreign owned multinationals and joint-ventures belong to the private sector, so the private domestic and foreign owned firms are relatively more likely to create jobs than the SOEs.

The effect of FDI on employment has different results across sectors. FDI from multinational firms is one of the main driving forces of economic globalization. We can't deny economic globalization promotes a variety of factors such as production,

talent, capital and technology transfer to the developed regions. This will make an exhibition the imbalance between the developed areas and developing areas. From Zhu(2005), the distribution of FDI in China is extremely uneven. The actual proportion of FDI attracted by China's eastern, central and western regions was 88%, 9%, 3%, respectively in 2000. In terms of the employment problem, Zhu argues that the imbalance in the distribution of employment in the region is an issue we should consider. He found the indirect effect of FDI on China's employment is much larger than the direct effect. The regional employment differences are largely due to most FDI flowing to coastal cities such as Shenzhen, Shanghai and so on. That makes the employment shift from other areas to coastal cities(Zhu, 2005). It can explain the rapid expansion of the employment scale in the coastal industrial sector.

Fung et al(2002) also studied the distribution of FDI in China. They analyzed the policy, trend and impact of FDI in China. In their paper, they discussed the impact of FDI inflow on Chinese economic development and projected the future trend of FDI inflows in China. The authors discussed the effect of FDI on gross national product (GDP), fixed-asset investment, foreign trade, economic transformation and the transfer of advanced technologies. In addition, they studied the World Trade Organization (WTO) and the future trend of FDI in China. In their conclusion, they thought China has made great progress in its reforms after it opened up its market for foreign investment. However, FDI is still concentrated in the southeast and the coastal areas in China. In their paper, the change of FDI policy plays a significant

role in attracting foreign money. The Special Economic Zones (SEZs) were established to permit joint ventures using foreign capital in the late 1970s and early 1980s. After 1984, the SEZs were increased to fourteen coastal cities and Hainan province. These areas can obtain a policy priority to use foreign capital. From the mid-1990s, government policies began to care more on linking FDI promotion to domestic industries to maintain a welcome environment for foreign businesses. All in all, China's policies of FDI experienced about 3 stages: gradual and limited opening, active promoting. All the policy adjustments aim to adapt the development of the economy.

Duan(2011) analyzed more details about the location determination of FDI in China. The following factors may account for the reason of FDI location determination: market size and market potential, labor market, macroeconomic policies, clustering and cluster, scientific research level, openness(Duan,2011). He found that GDP plays a stable role in deciding the location of FDI. Therefore, the development of local economies is a basic condition to obtain more FDI. Labor costs and labor productivity also can affect FDI location. But the latter is more critical. This indicates that the nature of the FDI will change over time and improve the level of workforce skills is more significant in attracting FDI.

Not only Duan but also Akrami(2008) studied the effect of FDI on distribution and employment in developing countries. His thesis showed that FDI played the most

important role in filling the capital gap in developing countries during the second half of the 20 century. If a developing country's economic policy allows free markets and globalization lines, the FDI will only flow into high-technology sectors to mainly produce for exports (Akrami, 2008). As a recipient country, the FDI has good effect on it if the output is exported or if import substitution takes place.

Many researchers have studied the effect of FDI by the analysis of panel data. To estimate dynamic labor demand functions for blue and white collar workers, Arellano and Bond (1991) refined a panel data analysis. Through the GMM estimator, they found FDI had a significantly positive, though quantitatively modest impact on manufacturing employment in Mexico. It also showed there was a positive effect on blue collar employment. But it was diminished with the increase of skill intensity of manufacturing industries.

The empirical evidence from Pakistan, India and China showed that whatever other benefits may be obtained from FDI we should not expect to make any employment opportunities in any of the three countries directly. Zia and Rizvi(2009) estimated the impulse response showed that the growth of the elasticity of employment in Pakistan, India and China is extremely low and employment enhancing policies must be priorities. Buffie (1993), by a two-sector dual economy model, studied the impact of foreign investment on underemployment and domestic capital accumulation. The results showed that foreign investment crowds out domestic capital and has a bigger

effect in the high-wage manufacturing sector than on a one-for-one basis and lowered the level of manufacturing sector in the long- term. By contrast, in the primary export sector, foreign investment will crowd out domestic capital.

Chapter 3

Data, Methodology and Model

3.1 Data

The data in this paper come from the National Bureau of Statistics of China (NBS). The dataset is collected from about 15 sectors by a sample survey to large-size and medium-sized enterprises. For FDI and employment, I chose the sector data of agriculture, forestry, animal husbandry & fishing, mining, manufacturing, construction, finance, real estate, hotel & restaurant, transportation during 2001 to 2010. These industries are the main industries in China. For the whole FDI and employment, I chose the data during the year of 1991 to 2010.

So the study provide enough sector data and period to work on the relationship between the FDI and employment in China. There are two kinds of FDI in the dataset, one is contracted FDI, the other one is actual use of FDI. In this paper, I chose the actual use of FDI, because it will have a more direct effect on employment than contracted FDI.

3.2 Methodology and Model

(1) Scatter Plot

Using the Stata software to create the scatter plot to recognize the relationship (positive, negative, no effect) between the FDI and employment, and to make the results more precise, I chose a function of lagged employment and FDI.

Model: $S = \ln(\text{employment})$

$Y = \ln(\text{FDI})$

Then the scatter plot of S and Y.

(2) Generalist Method of Moments (GMM)

In 1991, Arellano and Bond introduced the GMM to estimate the panel data. In 1998, Blundell and Bond improved it into System GMM. System GMM is a generic method used to estimate parameters in statistical models. It requires a certain number of moment conditions which are specified for the model and it can minimize a certain norm of the moment conditions in sample averages (Wikipedia, 2012). The system GMM is a very useful way to estimate the panel data with a short time period. So in this paper I chose the system GMM.

The following model examines the impact of FDI on employment in a panel dataset of 8 sectors for 10 years (2001 – 2010)

$$E_{it} = \beta_1 E_{i,t-1} + \beta_2 F_{it} + \beta_3 X_{it} + u_{it} \quad (3.1)$$

In above equation (3.1),

E_{it} : The employment of sector i in time t

$E_{i,t-1}$: The I_{it} 's lagged value

F_{it} : It is a matrix of the components of actual use of FDI inflows sector i time t . It is assumed to be endogenous.

X_{it} :The lagged actual use of FDI inflows

u_{it} : The error term. The u_{it} consists of the unobserved sectors effects(v_i) and the observation errors(e_{it})

$$\text{So: } u_{it} = v_i + e_{it} \quad (3.2)$$

Combine equation(1) and equation(2),we can get:

$$E_{it} = \beta_1 E_{i,t-1} + \beta_2 F_{it} + \beta_3 X_{it} + v_i + e_{it} \quad (3.3)$$

In Equation(3.3), if we want to test the autocorrelation of employment, we can suppose $\beta_2=0$, $\beta_3=0$. If we want to test the relationship of employment and FDI, we can suppose $\beta_1=0$, $\beta_3=0$.

So I will use the Arellano-Bond test for autocorrelation with a short time period($T=10$) and some sectors($N=8$). I will use the Sargan test to identify whether overidentifying restrictions are valid or invalid to instruments. Finally, I will perform a regression on employment and FDI.

Chapter 4

Analysis of Results and Conclusion

4.1 Scatter Plot Results

Figure 4.1: Scatter plot of total FDI and employment(1991-2010)

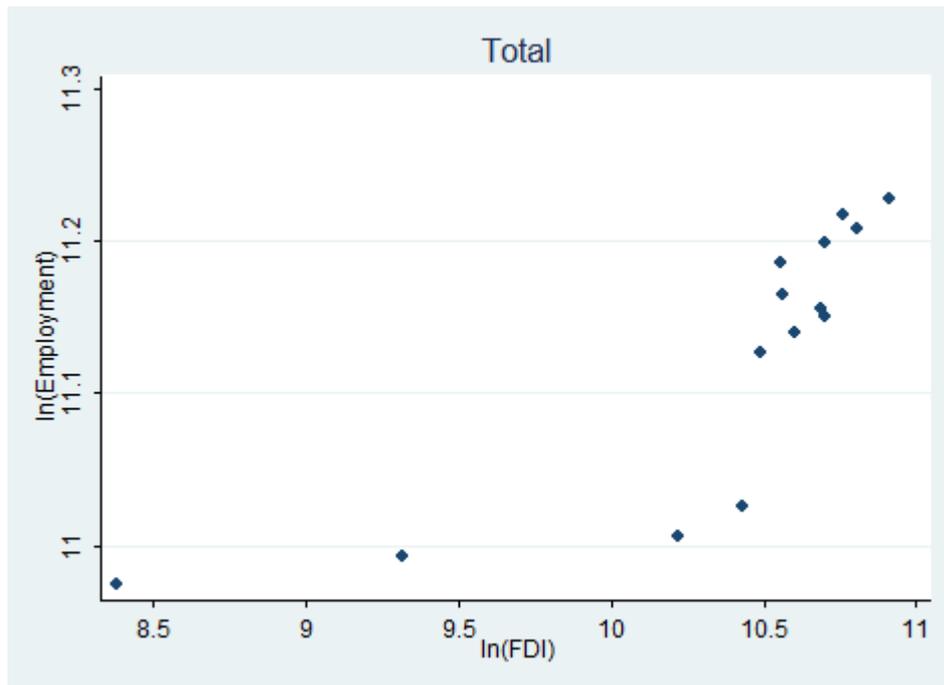


Figure 4.1 shows that there exists a positive relationship between the FDI and employment in China.

The following 8 diagrams will show the relationship between FDI and employment in different sectors in China.

Figure 4.2: Scatter plot of FDI and employment in different sectors

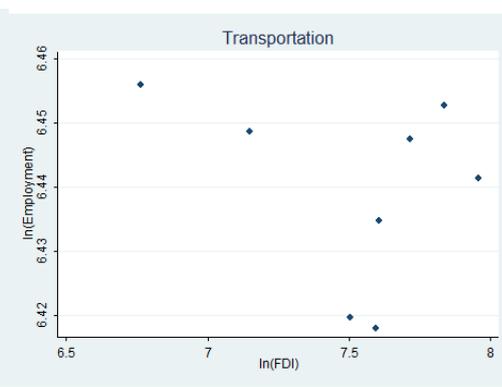
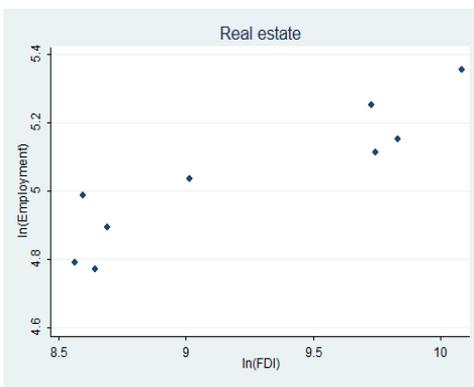
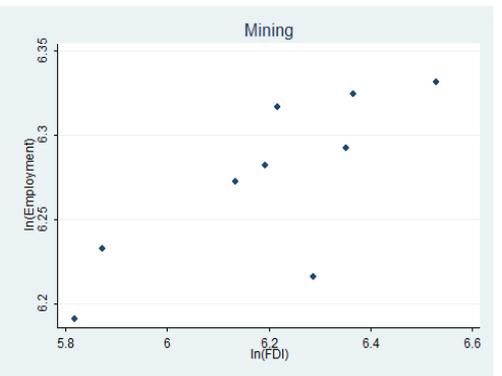
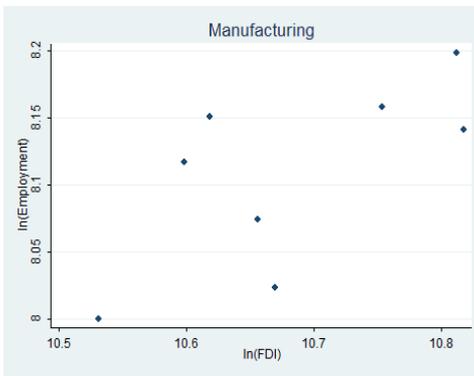
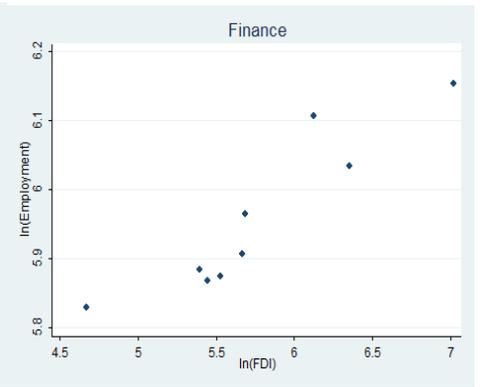
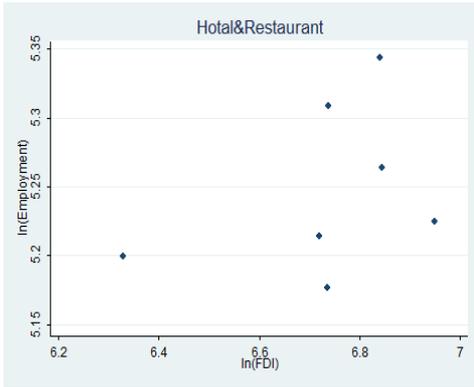
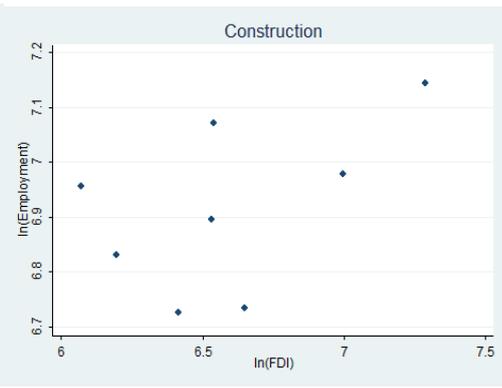
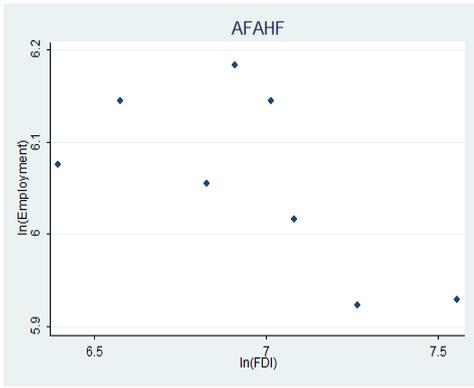


Figure 4.2 indicates that there is a negative relationship between FDI and employment in Agriculture, Forestry, Animal husbandry and Fishing. FDI has a positive relationship with employment in the industries of Finance, Mining and Real estate. But there seems to be no relationship between FDI and employment in the industries of Manufacturing, Construction, Hotel and Restaurant and Transportation .

4.2 GMM Analysis

From the model, the study focuses on the dynamic panel data analysis to estimate employment level as a function of one lagged level of employment, and one lagged level of FDI. Finally, I use three different ways to do the regression to test the autocorrelation: the normal way, add a robust test and add a twostep test. Finally, I used the Sargan test to identify whether overidentifying restrictions are valid or invalid to instruments.

Table 4.1: Estimation Results(normal way)

```

Arellano-Bond dynamic panel-data estimation   Number of obs       =       59
Group variable: lei_dum                       Number of groups    =        8
Time variable: year

Obs per group:   min =        6
                  avg =       7.375
                  max =        8

Number of instruments =       40              Wald chi2(3)       =       41.23
                                                Prob > chi2        =       0.0000

One-step results
-----

```

employment	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
employment					
L1.	.535466	.0855642	6.26	0.000	.3677632 .7031688
fdi					
--.	.002043	.0079024	0.26	0.796	-.0134454 .0175313
L1.	.0056996	.0080054	0.71	0.476	-.0099907 .0213899
_cons	329.3309	98.74693	3.34	0.001	135.7904 522.8713

```

-----
Instruments for differenced equation
GMM-type: L(2/.)employment
Standard: LD.employment D.fdi LD.fdi
Instruments for level equation
Standard: _cons

.
. estat sargan
Sargan test of overidentifying restrictions
H0: overidentifying restrictions are valid

chi2(36) = 43.75997
Prob > chi2 = 0.1753

```

The Arellano-Bond test for autocorrelation has a null hypothesis of no autocorrelation. From Table 4.1, at 5% significance level, only the P value of one lagged level of FDI is bigger than 0.05(0.476). It indicates there is no a relationship between current and past FDI.

Table 4.2: Estimation Results(add robust test)

```

Arellano-Bond dynamic panel-data estimation Number of obs      =      59
Group variable: lei_dum                    Number of groups     =      8
Time variable: year

Obs per group:   min =      6
                  avg =     7.375
                  max =      8

Number of instruments =      40          Wald chi2(3)         =     373.52
                                                Prob > chi2          =     0.0000

One-step results
                                (Std. Err. adjusted for clustering on lei_dum)

```

employment	Coef.	Robust Std. Err.	z	P> z	[95% Conf. Interval]	
employment						
L1.	.535466	.0561382	9.54	0.000	.4254372	.6454949
fdi						
--.	.002043	.0020227	1.01	0.312	-.0019215	.0060074
L1.	.0056996	.0036756	1.55	0.121	-.0015045	.0129037
_cons	329.3309	89.85532	3.67	0.000	153.2177	505.444

```

Instruments for differenced equation
GMM-type: L(2/.)employment
Standard: LD.employment D.fdi LD.fdi
Instruments for level equation
Standard: _cons

```

To eliminate the effect of standard errors on autocorrelation and heteroskedasticity in one-step estimation, I add the robust test. From Table 4.2, at 5% significance level, only the P value of one lagged level of FDI is bigger than 0.05(0.121). Though the P value is also greater than 0.05, however it much smaller than the last result(0.121<0.476). The results show that the standard errors affect the autocorrelation and heteroskedasticity.

Table 4.3: Estimation Results(add twostep and sargan test)

```

Arellano-Bond dynamic panel-data estimation   Number of obs   =   59
Group variable: lei_dum                       Number of groups =   8
Time variable: year

Obs per group:   min =   6
                  avg =  7.375
                  max =   8

Number of instruments =   40                Wald chi2(3)     = 27390.88
                                                Prob > chi2      =  0.0000

```

Two-step results

employment	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
employment					
L1.	.5306931	.0032082	165.42	0.000	.5244051 .536981
fdi					
--.	.0016976	.0008014	2.12	0.034	.000127 .0032683
L1.	.0054735	.0019837	2.76	0.006	.0015855 .0093615
_cons	258.0628	42.82882	6.03	0.000	174.1198 342.0057

Warning: gmm two-step standard errors are biased; robust standard errors are recommended.

Instruments for differenced equation

GMM-type: L(2/.) .employment

Standard: LD .employment D .fdi LD .fdi

Instruments for level equation

Standard: _cons

. estat sargan

Sargan test of overidentifying restrictions

H0: overidentifying restrictions are valid

```

chi2(36)      =  4.568029
Prob > chi2   =  1.0000

```

In the two-step estimation, the standard covariance matrix is robust to panel-specific autocorrelation and heteroskedasticity, but the standard errors are downward biased. From Table 4.3, at 5% significance level, the P value of one lagged level of employment and FDI are less than 0.05. The coefficients are positive. It means that there is a positive relationship between current and past data of employment and FDI. We call this relationship autocorrelation.

The results of the Sargan Tests show a P value is bigger than 0.05, so we accept H0(overidentifying restrictions are valid). It indicates at 5% significance level, the choose of instruments is valid.

Table 4.4: Regression result

Source	SS	df	MS			
Model	48348427	1	48348427	Number of obs =	75	
Residual	22125050.5	73	303082.883	F(1, 73) =	159.52	
				Prob > F =	0.0000	
				R-squared =	0.6861	
				Adj R-squared =	0.6818	
Total	70473477.5	74	952344.29	Root MSE =	550.53	

employment	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
fdi	.0580027	.0045924	12.63	0.000	.0488501	.0671553
_cons	380.8101	73.62799	5.17	0.000	234.0698	527.5505

Table 4.4 shows at 5% significance level, the P value is less than 0.05. So there is a positive relationship between employment and FDI. When the FDI increases 0.058, the employment will increase 1.

Chapter 5

Conclusion and Recommendations

FDI has become one of the most important driving forces in China's economic growth. However, in both academic research and public policy discussion, there is not enough research cover different industries. This paper aims to provide some evidence on the effect of FDI on employment.

After the research, I found that a positive relationship exists between employment and FDI. There is a negative relationship between FDI and employment in Agriculture, Forestry, Animal husbandry and Fishing. FDI has a positive relationship with employment in the industries of Finance, Mining and Real estate. So if policy makers want to increase the employment in Agriculture, Forestry, Animal husbandry & Fishing, they should limit the FDI inflows in these industries. If they want to increase the employment in Finance, Mining and Real estate, introducing more FDI seems a good choice. Furthermore, past employment will affect the current employment and the past FDI will also affect the current FDI. So when the policy makers are studying the current year's policies, they should consider the past data. All in all, FDI has been good for job creation in China. But we should treat the FDI differently across all the sectors in the economy.

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Appendix

Figure 1 Total FDI and Employment of 1991-2010(million \$,ten thousand)

year	FDI inflows	employ ment
1991	4366	58360
1992	11156	59432
1993	27515	60220
1994	33787	61470
1995	35849.2	67947
1996	40180	68850
1997	44237	69600
1998	43751	69957
1999	38753	70586
2000	38399.3	72085
2001	44241	73025
2002	49308	73740
2003	47076.7	74432
2004	54936.4	75200
2005	117208.2	74987
2006	124082	75321
2007	160051.8	76990
2008	175147.7	75564
2009	114214.5	75828
2010	185080.7	76105

Source: National Bureau of Statistics of China

Figure 2 Employment of 8 sectors(ten thousand)

Agricu lture, Forest ry, Animal Husban dry &Fishi ng	Mining	Manufa cturin g,	Constr uction	Financ e	Real estate	Hotel & restau rant	Transp ortati on	year
	561			336	107		2037	2001
	558			340	118		2084	2002
484.5	488.3	2980.5	833.7	353.3	120.2	172.1	636.5	2003
466.1	500.7	3050.8	841	356	133.4	177.1	631.8	2004
466.3	509.2	3210.9	926.6	359.3	146.5	181.2	613.7	2005
435.2	529.7	3351.6	988.7	367.4	153.9	183.9	612.7	2006
426.3	535	3465.4	1050.8	389.7	166.5	185.8	623.1	2007
410.1	540.4	3434.3	1072.6	417.6	172.7	193.2	627.3	2008
373.7	553.7	3491.9	1177.5	449	190.9	202.1	634.4	2009
375.7	562	3637.2	1267.5	470.1	211.6	209.2	631.1	2010

Source: National Bureau of Statistics of China

Figure 3 FDI of 8 sectors(million \$)

Agriculture, Forestry, Animal Husbandry & Fishing	Minining	Manufacturing,	Construction	Finance	Real estate	Hotel & restaurant	Transportation	year
1028	581	36800	709	107	5663		913	2002
1000	336	37467	612	232	5236		867	2003
1114	538	43017	772	252	5950	841	1273	2004
718	355	42453	490	12301	5418	560	1812	2005
599	461	40077	688	6741	8230	828	1985	2006
924	489	40865	434	9010	17089	1042	2007	2007
1191	573	49895	1093	16490	18590	939	2851	2008
1429	501	46771	692	4488	16796	844	2527	2009
1912	684	49591	1461	10122	23986	935	2244	2010

Source: National Bureau of Statistics of China