A Study of Three Sectors Employment Effects Resulting from Foreign Direct Investment-Empirical Analysis on the Data from Shanghai

Ko Po-Sheng
Department of Wealth and Taxation Management
National Kaohsiung University of Science and Technology
Kaohsiung, Taiwan
psko@cc.kuas.edu.tw

Wu Cheng-Chung
Department of Finance
Suqian College
Jiangsu, China
wu_0110@yahoo.com.tw

Mai Ying-Shih
Department of International Business
National Kaohsiung University of Science and Technology
Kaohsiung, Taiwan
Mys1200@yahoo.com.tw

Xu Zhongrong
Department of Marketing
Suqian College
Jiangsu, China
57348328@qq.com

***Abstract*—With the development of China's reform policy, China's economy has integrating into the global economy. As a result, more and more foreign capital continues to flow into China. Since 1990, foreign direct investment (FDI) was mainly concentrated in the Yangtze River Delta region, and Shanghai enjoyed strong economic strength, thanks to its abundant human resources and convenient transportation network; as these are excellent qualities for attracting foreign investment, Shanghai became one of the major cities attracting FDI. FDI has had a tremendous impact on many aspects in Shanghai, including employment. Therefore, Shanghai was chosen as the research object of this paper. This paper is organized as follows. Firstly, a theoretical analysis of the employment effects of FDI is presented. Secondly, after combining the actual utilization of FDI and employment in Shanghai, an empirical analysis of the effects of FDI on employment's quantity, employment's distribution and employment quality is carried out by collecting relevant data and establishing regression models. This study finds that while FDI does exert a positive influence on the quantity of employment in Shanghai's tertiary industry, it is not conducive to primary and secondary industries. In addition, FDI has shown positive and negative impacts on the quality of employment. Lastly, some suggestions are proposed to enhance the positive role of FDI on employment.**

***key words*—Foreign Direct Investment, Employment Effects, Three Sectors, Shanghai, China's economy.**

I. Introduction

In the last decade, China has grown rapidly because of FDI, and in 2002, China replaced the United States as the world's largest recipient of FDI. Shanghai is the metropolitan area of the Yangtze River Delta (YDA) and has exceptional conditions to attract foreign investment; therefore, Shanghai has turned into the major recipient of FDI in China.

The massive FDI inflows significantly affect Shanghai in many aspects, and employment is one of them. This research selects Shanghai as its subject and focuses on studying the effects of FDI on the "quantity of employment", "the employment distribution in three sectors of the economy", and "the effect on employment quality".

The analysis shows that the FDI in actual use in Shanghai kept growing every year, and that both total employment and employment in foreign companies were also increasing. With regard to the three sectors of the economy, FDI flooded into the tertiary sector, followed by the secondary, and the primary got the least. In conclusion, this research finds that FDI certainly affects the amount of employment and the employment distribution in the three sectors of the economy. The next section presents an empirical analysis on the effects to employment caused by FDI in Shanghai by establishing relevant models.

II. Literature Review

2.1 Definition of FDI

Helpman (2006) new developments in the world economy have triggered research designed to better understand the changes in trade and investment patterns, and the reorganization of production across national borders. Although traditional trade theory has much to offer in explaining parts of this puzzle, other parts required new approaches. Particularly acute has been the need to model alternative forms of involvement of business firms in foreign activities because organizational change has been central in the transformation of the world economy.

" FDI" stands for "Direct International Investment", also known as "Foreign Direct Investment", which means investors

This is an open access article under the CC BY-SA 4.0 license (https://creativecommons.org/licenses/by-sa/4.0/)

participate in the entity's production and operation, and exercise substantial control over management. The yield relies on the condition of the entity's operation and exhibits high variability.

2.2 Analysis of the Theories on Employment Effects from FDI

Among contemporary studies, most of the scholars suggest that the employment effects caused by FDI in the host countries are mainly on three aspects: quantity of employment, employment distribution in the three sectors of the economy as well as quality of employment.

(1) Effects on Quantity of Employment

Alfaro et al. (2004) examine the various links among foreign direct investment (FDI), financial markets, and economic growth. We explore whether countries with better financial systems can exploit FDI more efficiently. Empirical analysis, using cross-country data between 1975 and 1995, shows that FDI alone plays an ambiguous role in contributing to economic growth. However, countries with well-developed financial markets gain significantly from FDI. The results are robust to different measures of financial market development, the inclusion of other determinants of economic growth, and consideration of endogeneity.

(2) Effect on Employment Generation

Aboal et al. (2015) reveal that product innovation is associated with employment growth. There is (weaker) evidence that process innovation displaces labor, especially in high-tech firms. There is evidence that innovation is more complementary to skilled than to unskilled labor. Product innovation seems to have a larger positive effect on skilled labor, especially in high-tech industries. Process innovation in general displaces unskilled labor but is neutral in terms of skilled labor.

" Effect on Employment-Generation" means the FDI will create considerable job opportunities and boost employment. Generally speaking, the effects on employment by FDI are "Direct Generation Effect" and "Indirect Generation Effect".

A. Direct Generation Effect

" Direct Generation Effect" means the FDI creates job opportunities and increases employment directly in the host country. When an international company enters with "Greenfield Investment", it will bring net capital into the host country. The international company will establish subsidiaries or an operation base there. The newly-founded company will recruit local people and increase employment in the host country.

B. Indirect Generation Effect

" Indirect Generation Effect" means the job opportunities in host countries are increased with other approaches.

Firstly, the FDI will form an "enterprise-correlation effect" by increasing the job opportunities in local companies which associate with the inter-country companies. The entering of the FDI's companies will drive the operation of the local companies. When the demand of the foreign companies is equal to the domestic companies' output, the demand of the products will rise, and then the local companies' scale of production will be expanded. The labor demand of domestic companies will have a surplus due to the shortage of employees, and then the domestic companies will have to recruit new employees in order to increase productivity. Therefore new job opportunities will be generated indirectly.

Secondly, FDI will increase the quantity of employment indirectly by the "spillover effect". Foreign companies often introduce new technologies and new types of industry into the host countries. Meanwhile, it will accelerate the development of the latest high-tech industry in the host countries and increase employment in multifarious industries. Therefore, numerous job opportunities will be generated indirectly. In addition, the FDI inflow brings capital which will rapidly spur productivity like the effect of economy of scale. As a result, the host countries' factors of production will be properly dispensed, and the not-utilized factors will be able to be utilized. The dominant resources can be employed efficiently to escalate new productivity and generate more new job opportunities.

(3) Crowding-Out Effect

The "Crowding-Out Effect" often appears when an international company enters through "merger" or "acquisition"; as a result, a "reasonable" downsizing will occur, crowding out employees and cutting down employment. Moreover, the international companies usually have more strict criteria concerning employees' working skills than the local firms do; therefore it is a common phenomenon that local employees are laid off as a result of not meeting the skill requirements of the foreign companies. In addition, the foreign companies are more capital-intensive, so the operation mode should crowd out some employment in labor-intensive local companies. The entering of FDI will fuel the competition of the local market and eliminate the lame companies, thereby causing a considerable level of unemployment and reducing job opportunities.

(4) Effects from FDI on Employment Distribution in Three Sectors of the Economy

From an industrial perspective, the effects of FDI on the employment distribution in the three sectors will vary because of the different scope of influence from FDI in every sector.

A. Effects on Employment in the Primary Sector

Compared to other sectors, the impact from FDI on the primary sector is not great. The primary sector is mainly agriculture/farming and is usually run by "family", so it does not require additional employees. Furthermore, as the agricultural industry of a country is vital for the citizens, the authorities will usually impose more restrictions on foreign entities wishing to engage in this field; as a result, foreign companies will make relatively low investment in this sector. In addition, related technologies are currently advancing at blinding speed. Since the agricultural industry also applies modern methods to production, this will lead to less demand on the labor force. As a consequence, the FDI certainly will not have any remarkable impact on the primary sector.

IJBAMR

This is an open access article under the CC BY-SA 4.0 license (https://creativecommons.org/licenses/by-sa/4.0/)

B. Effects on Employment in the Secondary Sector

In China, the secondary sector, mainly manufacturing, always plays the leading role in the national economy. FDI weighs heavily in this sector; therefore FDI has a more significant influence on employment in this sector.

C. Effects on Employment in the Tertiary Sector

In contemporary society, after material demands have been fulfilled, the demand for incorporeal service and spiritual satisfaction will be boosted, and it will lead the tertiary sector to blossom. Accordingly, foreign companies will keep increasing direct investment into the tertiary sector. The labor demand in the service industry is large, so FDI will surely have a greater scale of influence on employment in the tertiary sector.

(5) FDI Effects on the Quality of Employment

Regarding the quality of employment, FDI has both positive and negative effects.

A. Positive Effects

Cui, Xiaoning and Li, Zhi (2003) suggest that FDI can contribute to the improvement of employment quality in the host countries. Foreign companies often offer better wages, benefit packages and working environment; they also introduce new know-how and technologies to the employees in the host countries. Most of the foreign companies put a lot of effort into quality training, and enhancing workers' skills, so that after being recruited, employees have the opportunity to get training to improve various abilities. Meanwhile, the employees' quality and skills will be cultured and improved due to a superior working environment.

B. Negative Effects

Qin Liu (2008) discuss negatives effects of FDI on Anhui's industrial structure and better use of foreign investment to develop economy, the articles analyzes industrial distribution of FDI in Anhui province, and then draws the conclusion that structure inclination of FDI increases structure wind age of three industries, enlarges development level of three industries, and that structure inclination of foreign capital industry helps excess dilation of consumable industry. The articles proposes exerting advantage and leading foreign capital to improve FDI.

The negative effects usually appear in regard to the foreign companies' negligence of employees in host countries. More and more foreign enterprises discriminate against the host country's social security system for the employees. That mainly happens in small-sized foreign companies, as some or all employees are unable to obtain basic social security services. To keep costs down, some foreign companies even provide very undesirable and poor working conditions with no security assurance, which raises considerable safety concerns about the working environment.

In conclusion, the analysis on the theory of employment quantity, employment distribution of the three sectors of the economy and employment quality reveals that FDI has both positive and negative effects. The following sections present research on FDI's specific effects on the three aspects through empirical analysis.

III. Research Method

3.1 Research object

(1) Effects on Quantity of Employment

According to the foresaid analysis, the FDI inflow will have a direct effect on the number of employed in the foreign companies and indirect affect the total employment level in Shanghai. Therefore, an analysis of the effects on the quantity of employment by FDI in Shanghai follows, covering two aspects: the amount of hiring in foreign companies and the total amount of employment.

(2) Relevant Analysis on FDI and the Amount of Employment in Foreign Companies in Shanghai

A. Models and Variables

Most of the relevant studies suggest that the introduction of FDI will have a direct effect on the employment in the foreign companies, so we chose the "actual FDI inflow in Shanghai" as the independent variable and the amount of employment in foreign companies as dependent variable to establish the following model:

$$q_t = \beta_0 + \beta_1 fdi_t + \mu_t$$

The "q" stands for the "amount of employment in foreign companies in Shanghai", and "fdi" stands for the "actual FDI inflow in Shanghai". "μt" stands for random error, which reflects the uncertainties between "q" ("amount of employment in foreign companies ") and "fdi" ("actual FDI inflow").

B. Model Operating and Output

This section deals with the question: When the discrepancy of the relative figures is huge, will it seriously impact the regression results? Therefore, the currency of FDI value was converted from US$100 million to RMB￥100 million for the regression analysis. The "q" is the "amount of employment in foreign companies in Shanghai", and the unit is "per 10 thousand people".

(3) Analysis of the Relation between FDI and Total Employment

The aforesaid analysis of the theory has explicated that the FDI has both positive and negative effects on the amount of employment in the host country. In order to research the specific effects of FDI on the amount of employment in Shanghai. The following will provide an analysis through the establishment of models.

$$Q_t = \beta_0 + \beta_1 FDI_t + \beta_2 W_t + \mu_t$$

(4) Effects Related to the Three Sectors of Economy

Due to the diversity of the investment in the three sectors, the labor market shows a varied distribution, with Shanghai's employment mainly concentrated in the tertiary sector. In order to have a more precise analysis of the effects on employment,

This is an open access article under the CC BY-SA 4.0 license (https://creativecommons.org/licenses/by-sa/4.0/)

this study has chosen the amount of capital invested (FDI1, FDI2 and FDI3) and Consumer Price Index (CPI) as explanatory variables, and employment in the primary, secondary and tertiary sectors as response variables (LAB1, LAB2 & LAB3) to run the regression analysis for the period of 1999 – 2008. In order to eliminate the multicollinearity and obtain a faultless regression output, the regression analysis was based on getting the natural log in this research.

According to the condition of FDI in actual use in Shanghai, this study has turned the model into the following one:

Primary Sector:

$$LnLAB_{1t} = \beta_0 + \beta_1 LnFDI_{1t} + \beta_2 LnCPI + \mu_t$$

Secondary Sector:

$$LnLAB_{2t} = \beta_0 + \beta_1 LnFDI_{2t} + \beta_2 LnCPI + \mu_t$$

Tertiary Sector:

$$LnLAB_{3t} = \beta_0 + \beta_1 LnFDI_{3t} + \beta_2 LnCPI + \mu_t$$

IV. The Results of Empirical Analysis

4.1 GLS (generalized least squares) regression analysis

The results from GLS (generalized least squares) regression analysis are as follows:

TABLE 1: RESULT OF REGRESSION OF AMOUNT OF EMPLOYMENT IN FOREIGN COMPANIES

Variables/ Estimation	Coefficient	Sigma	T-value	P-value
c	13.642	11.097	1.229	0.253
fdi	0.1465	0.022	6.497	0.000
R^2	0.840			
Adjusted R^2	0.820			
F value	42.215			

The coefficient of determination R^2 in Table 1 is 0.841, which shows that the whole equation fitting is good. Under the condition that the significance level was preset at 5%, the F-number in the equation is larger than the critical number, 4.74, indicating that the result of the regression equation is significant. The t value corresponding to fdi is much greater than the critical number $t_{0.025}$ (10-3) =2.365, which shows that the fdi has a significant influence on the amount of employment in foreign companies.

The economic interpretation of the model is that for every RMB ¥ 100 million of FDI flowing into Shanghai, foreign companies will add 1470 employees.

4.2 Analysis of the Relation between FDI and Total Employment

Shanghai has recorded the relevant statistics on FDI since 1981, but the amount and scale of FDI was fairly small until 1992, so the time span of the statistics in this article is 17 years, between 1992 and 2008. Besides the factor of FDI, the research takes the wage issue into account as a fundamental factor affecting the amount of employment. Therefore the formation of the corresponding models is based on actual FDI inflow with wages as the explanatory variable, and the amount of employment in Shanghai as the response variable. The statistics on FDI deal with the amount of "foreign direct investment in actual use", and the unit is 100 million. Wages are the total wages of employees in Shanghai in each corresponding year, and the unit is 100 million. Employment is the amount of total employment in Shanghai, and the unit is 10K people. The relevant figures are all from the "Shanghai Statistical Yearbook" and "China Financial Statistical Yearbook" in each corresponding year.

TABLE 2: REGRESSION RESULT OF TOTAL AMOUNT OF EMPLOYMENT

Variable/ Estimation	Coefficient	Sigma	T-value	P-value
C	827.37	33.588	24.632	0.000
FDI	0.179	0.063	2.834	0.013
W	-0.121	0.037	-3.252	0.005
R^2	0.640			
Adjusted R^2	0.599			
F value	12.483			

The above analysis shows that the coefficient of determination R^2 is 0.641, which indicates that the whole equation fitting is good. The degree of freedom is 14 and the critical number coefficient is: $F_{0.05}$（2，14）=3.74. The regression equation is: $F > F_{0.05}$, which displays a significant linear relationship and shows that the explanatory variable and response variable are at high levels in regard to interpretation. When looking at t-value, under the condition that the significance level was preset at 5%, the critical number is t (17-3) =2.145 and the t-number corresponds to the FDI critical number of t ,which shows that the FDI has a significant effect on the gross employment in Shanghai.

The economic interpretation of aforementioned model is that every $100 million of actual FDI flowing into Shanghai will create 1790 job vacancies, which indicates that FDI will boost the growth of employment in Shanghai, a positive effect on the quantity of employment. In conclusion, FDI inflow will definitely increase employment in foreign companies and total employment in Shanghai, which indicates that FDI stimulates the labor market.

4.3 Effects Related to the Three Sectors of Economy

The models were analyzed via Eviews9.0, and the verification results are as follows:

(1) Primary Sector:

$$LnLAB_1 = 25.292 - 0.010 LnFDI_1 - 4.516 LnCPI$$

t (6.995) (-0.133) (-5.821)

This is an open access article under the CC BY-SA 4.0 license (https://creativecommons.org/licenses/by-sa/4.0/)

R^2 =0.83 F=17.042

(2) Secondary Sector:

$$LnLAB_2 = 0.474 - 0.291LnFDI_2 + 1.484LnCPI$$

t (0.219) (-3.042) (3.049)

R^2 =0.671 F=7.141

(3) Tertiary Sector:

$$LnLAB_3 = -2.776 + 0.182LnFDI_3 + 1.668LnCPI$$

t (-1.056) (3.399) (2.741)

R^2 =0.946 F=61.560

The coefficients of determinations for the three models are 0.83, 0.671 and 0.946, respectively, which shows goodness of fit. The F-number in each equation is greater than the critical number, 4.74, which indicates that the result of the regression equation is significant. Under the condition that the significance level was preset at 5%, and the critical number is $t_{0.025}$（10-3）=2.365, the t value corresponding to the FDI flowing to primary sector is -0.133, whose absolute value is less then $t_{0.025}$ =2.365. This indicates that FDI has no significant effect on the primary sector in Shanghai. But the t absolute values in the secondary and tertiary value are both greater than $t_{0.025}$, which means that the FDI has significant effects on the secondary and tertiary sectors in Shanghai.

The test on the model shows that each percentage point added to FDI will cause a 0.01 percentage point reduction of employment in the primary sector, and a 0.29 percentage point reduction of employment in the secondary sector, but will raise employment in the tertiary sector by 0.18 percentage point. The result signifies that FDI will not benefit the labor force's expansion in the primary and secondary sectors, but definitely will boost employment in the tertiary sector. The output meets the actual condition in Shanghai.

V. Conclusion and Suggestion

On the basis of the empirical analysis on the effects of FDI on Shanghai, the conclusions regarding the quantity of employment, quality of employment and employment distribution of the three sectors of the economy, along with suggestions are as follows.

(1) Quantity of Employment

The regression analysis on FDI in relation to quantity of employment in Shanghai indicates that FDI will facilitate the growth of employment. From the viewpoint of employees hired by foreign companies, every $100 million of actual FDI inflow to Shanghai will bring direct employment growth of 1470 people. For the total amount of employment, every $100 million of actual FDI inflow will increase 1640 vacancies. FDI has created appreciable opportunities of employment in Shanghai through both direct and indirect effects in increased employment, but the effects are not really remarkable. From another point of view, according to the statistics, wages increased in Shanghai after the introduction of foreign companies, and that drove a huge amount of the labor force to relocate to Shanghai. Moreover, the foreign companies expanded the demand of local companies, further increasing the demands of the local labor market, which also boosted employment in Shanghai.

This research suggests that Shanghai should utilize its exceptional location, abundant labor force and enormous economic capabilities to attract more FDI inflow, to enable foreign companies to expand and create more job opportunities. In this stage, the types of FDI in Shanghai are mainly joint venture, wholly-owned and associated enterprise. Therefore, Shanghai can innovate its way of exploiting the FDI and develop more channels for increasing the inflow. Shanghai's Government could encourage the local private companies to have more interactions with foreign companies, and use these platforms for local companies to learn from foreign companies. The local private sector also can learn the methods of internationalizing, such as fund raising in the international financial market, joint venture or incorporation with foreign companies. Furthermore, Shanghai should further improve its mechanisms of labor market operation to encourage the flow of various professionals among different organizations, to take full advantage of the FDI and achieve full employment. Eventually, Shanghai should keep the economy growing stably, which will create more job opportunities.

(2) Distribution of Employment

The empirical analysis shows that FDI does indeed increase employment in the tertiary sector, but not the primary and secondary sector in Shanghai; however the effect on the tertiary sector is not prominent. This study deems the reason is that the tertiary sector in Shanghai is mainly low-end service industry instead of high-end.

This study suggests that Shanghai should put greater effort into enhancing employment in the primary and secondary sectors and increase job opportunities by offering more vacancies. On the other hand, Shanghai should encourage foreign companies to expand their investment in the tertiary sector, define further development and speed up developing the high-end service sector. Four fields are proposed to be focused upon: financing and insurance, air logistics, specialized services and technological R&D. In the meantime, a relevant incentive policy should be drawn up in order to attract more FDI to Shanghai and effectively stimulate employment.

(3) Quality of Employment

The FDI has both positive and negative effects on the quality of employment in Shanghai. FDI certainly enhances the quality of employment to a considerable degree, raises wages and, most significantly, offers training and of job skills improvement.

In regard to quality of employment, Shanghai City's Government should intensify the protection of employees in foreign companies and ensure at least minimal job security. The government should also provide seminars to assist the employees to learn the stipulations in contract regulations, to know and protect their rights, thereby enhancing their

IJBAMR

This is an open access article under the CC BY-SA 4.0 license (https://creativecommons.org/licenses/by-sa/4.0/)

awareness of self-protection to improve their quality of employment.

The whole research reveals that large-scale FDI inflow will bring multiple effects. In general, FDI thrives on the labor market in Shanghai and increases the job opportunities in the tertiary sector as well as enhances the quality of employment. However, the expansion of the FDI diminishes employment in the primary and secondary sectors and also has some negative effects on the quality of employment. Therefore, Shanghai should keep expanding the scale of FDI on the one hand to increase the positive effects. On the other hand, FDI should be directed to the primary and secondary sectors, and the protection of employees in foreign companies should be intensified. Then the upgrading in the primary and secondary sectors can be expedited and the negative effects on the employment quality resulting from FDI will be reduced.

REFERENCES

[1] Aboal, D., Garda, P., Lanzilotta, B. and Perera, M.(2015). Innovation, Firm Size, Technology Intensity, and Employment Generation: Evidence from the Uruguayan Manufacturing Sector, Emerging Markets Finance & Trade, 51 (1), 3-26.

[2] Alfaro, L., Chanda, A., Kalemli-Ozcan, S. and Sayek, S.(2004). FDI and economic growth: the role of local financial markets. Journal of International Economics, 64 (1), 89-112.

[3] Cui, Xiaoning and Li, Zhi. (2003). Empirical Analysis on the Economic Effects by FDI in China, World Economic Study, 44.

[4] Helpman, E.(2006). Trade, FDI, and the Organization of Firms, Journal of Economic Literature, 44 (3), 589-630.

[5] Qin Liu (2008). Negative effects of FDI on Anhui's industrial structure and countermeasures, Journal of Liaoning Technical University, 5, 488-490.

IJBAMR

This is an open access article under the CC BY-SA 4.0 license (https://creativecommons.org/licenses/by-sa/4.0/)