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Analysis of the Influence Effect of Foreign Direct Investment on Employment Structure

-- An Empirical Study based on the Data of Hebei Province, China

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Abstract

Economics points out that the meaning of employment structure is the composition and distribution of labor resources in different regions, industries, and industries. The study of employment structure can start from many aspects, such as the regional structure of employment, the industrial structure of jobs, and the industry structure of work. There are many influencing factors, including total GDP, labor, etc. Foreign direct investment is also an important aspect that drives changes in the employment structure by affecting the number of jobs in the short term and the quality of workers in a long time. Based on the statistical data of the Hebei Economic Yearbook from 1993 to 2021, starting from a short-term perspective, this paper selects three aspects of employment region, industry, and industry structure to study the impact of foreign direct investment on the employment structure of Hebei Province.

Keywords

Foreign Direct Investment; Hebei Province; Employment Structure.

1. Introduction

As the international flow of production factors becomes more and more liberalized, foreign direct investment (FDI), one of the essential means of economic development, has attracted much attention. Regarding the activities of international capital flow, China is a big country of foreign capital inflow. By the end of 2020, China's total utilization of foreign capital has rapidly increased for more than 40 years and has accumulated to 11,031.16 million US dollars. To a certain extent, FDI has become the carrier of the flow of production factors such as labor and capital. On this basis, FDI drives the evolution of the employment structure by affecting the number of jobs in the short term and the quality of workers in a long time.

In 2021, there will be 9.09 million college graduates in China, and the total number of graduates waiting for employment is vast. In addition, there are urban laid-off and unemployed workers and surplus labor from rural areas. Judging from the growth trend of the number of unemployed people over the years, the total labor force in China will continue to increase, which will cause the growth of labor demand to be slower than the economic growth, so the employment situation is still very severe. Because FDI has become an essential carrier of the flow of production factors, its effect on the distribution of labor factors will also be reflected in various aspects, thereby affecting the employment structure at multiple levels. Based on the description of the above background and problems, it can be found that it is significant to analyze the impact of FDI on employment. From the perspective of employment structure, based on the statistical data of Hebei Province in China from 1993 to 2021, this paper uses empirical analysis methods to conduct empirical analysis and answers the impact of FDI on employment structure. This paper analyzes the feature that FDI drives the change of

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employment structure through short-term effects on employment quantity and long-term impact on labor quality.

2. Literature Review

Regarding the impact of FDI on employment, previous research mainly involves the quantity, structure, and quality of jobs by FDI.

In the research on the impact of employment structure, some scholars believe that FDI has a positive effect, and some believe it is a negative effect. Among them Raveendra et al. [1] analyzed the impact of foreign-invested enterprises entering different industries on employment. The conclusion shows that a developing country without technology transfer to a developing country with relatively abundant labor. In this case, the entry of foreign-invested enterprises into capital-intensive industries will have a negative crowding-out effect on employment in the host country. Other scholars believe that FDI will positively impact careers. Kokko et al. [2] took some Central European countries as the research objects concluded that FDI plays a key role in the employment level of the host country. Shen [3] research has proved that FDI has optimized the employment structure in China's manufacturing sector to a certain extent. Luo [4] selected the panel data to show that FDI significantly promotes employment in the Yangtze River Economic Belt in China.

In addition, Misun et al. [5] believe that the indirect employment effect of FDI on the host country is noticeable. This indirect employment effect is mainly reflected through the impact of FDI on domestic investment. Regarding regional heterogeneity, Zhu [6] believes that the effect of FDI on a country's employment structure mainly comes from the differences in technology, resources, and degree of opening to the outside world between coastal regions and central and western regions. In addition, the research of Zhu et al. [7] also shows that FDI is more attractive to a country's agricultural labor force than non-agricultural labor, so the inflow of FDI will promote the transformation of delivery in the farming sector to the non-agricultural sector, thereby driving The adjustment of a country's employment structure.

3. Overview of FDI in Hebei Province

3.1. The Scale of FDI in Hebei Province

from Table1 that in recent years, the total scale of FDI in Hebei Province has expanded to a great extent. In 2010, the utilization of FDI in Hebei Province was 3,830.74 million US dollars. In 2020, the utilization of FDI in Hebei Province was 11,301.16 million US dollars, and the average annual increase was 720.042 million US dollars.

Table 1. Hebei Province's actual utilization of FDI (ten thousand US dollars)

years	2010	2012	2013	2014	2015	2016	2017	2018	2019	2020
amoun	38307	58048	64472	63719	61775	73538	84895	97029	102774	110311

3.2. Ways of FDI in Hebei Province

Table 2. The primary forms of FDI in Hebei Province

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Sole	32513	38226	40513	30865	36693	49923	50213	49369	50339
joint venture	18273	22915	19981	27147	31259	31160	32399	37468	42790
Corporation	28553	13461	7715	9276	25866	11522	28587	26703	37677

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from the data in Table2, sole proprietorship accounts for the essential proportion. This is because the risk of foreign capital entering the country becomes lower as the investment environment improves. At the same time, foreign companies have accumulated much management experience. Therefore, to prevent the leakage of advanced science and technology, foreign enterprises began to reduce their dependence on local joint ventures in Hebei Province with the spillover of competitive advantages.

3.3. The Regional Distribution of FDI in Hebei Province

Due to the relative advantages of different cities in Hebei Province, their comprehensive strengths vary greatly, so the distribution of FDI is also uneven. Cities with complete infrastructure and a high degree of market openness make foreign-funded enterprises prefer to invest in these cities. The specific data is shown in Figure1.

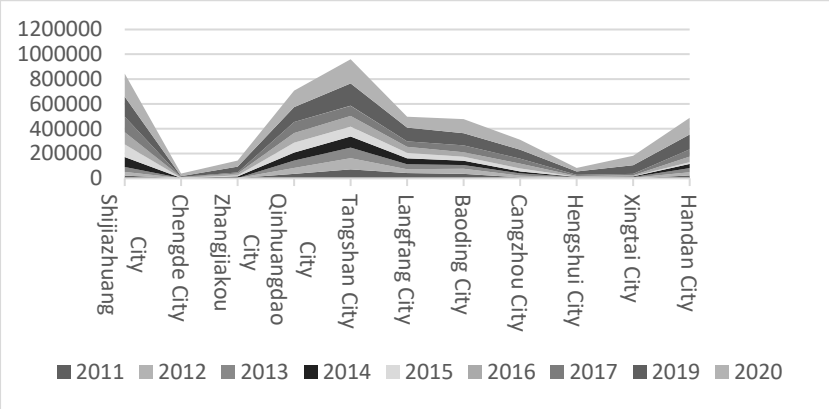

Figure 1. Amount of FDI in different cities

3.4. Industrial Distribution of FDI in Hebei Province

Table 3. Industrial distribution of FDI in Hebei Province

	2012	2013	2014	2015	2016	2017	2018	2019	2020
primary	12702	21386	34772	9518	10405	5579	3669	3669	11497
Secondary	261126	497809	448438	427037	609167	682834	745732	785327	831775
Tertiary	114568	125525	153986	181195	115816	160538	159997	195799	241805

From Table3, it can be seen that although Hebei Province is a large agricultural province, the FDI attracted by the primary industry accounts for a small proportion of the total FDI. The balance of the sector is increasing year by year.

3.5. Industry Distribution of FDI in Hebei Province

As shown in Figure2, from the perspective of the industry distribution of FDI in Hebei Province, the investment in the manufacturing industry accounted for the most significant proportion during the 2012-20 20 years, and the average annual growth rate was 34.36%. On the contrary, the investment in agriculture, forestry, animal husbandry, fishery, mining, residential services, repairs, and other services is getting less and less. To sum up, the characteristic of FDI is that it is mainly concentrated in the manufacturing industry, which shows that the manufacturing industry is an essential driving force for the economic development of Hebei Province.

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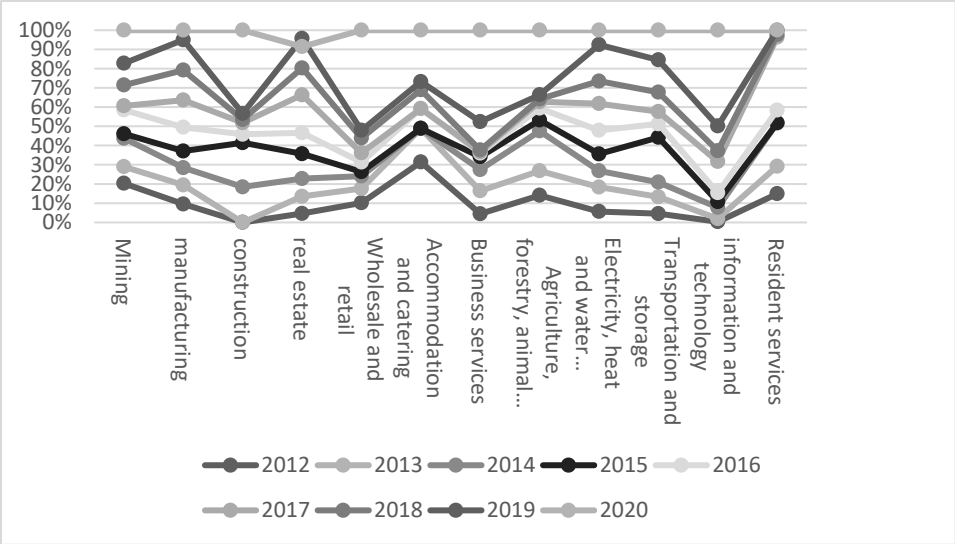

Figure 2. Industry Distribution of FDI in Hebei Province

4. Empirical Analysis of the Impact of FDI on Employment Structure

4.1. The Impact of FDI on the Regional Structure of Employment

Foreign-funded enterprises generally choose a place that can provide a good investment environment, such as a city with relatively comprehensive solid strength, fairly complete welfare policies, and facilities. Due to the different levels of economic development in other cities, foreign-funded enterprises must focus on selected regions. Therefore, after these enterprises absorb local labor factors, it will cause uneven employment distribution to a certain extent.

4.2. The Impact of FDI on the Industrial Structure of Employment

4.2.1. Explain the Data

According to the statistical yearbook of Hebei Province, the data includes FDI in Hebei Province and employment in the primary, secondary, and tertiary industries in Hebei Province. The symbols L1, L2, and L3 represent the number of employed persons in the primary, secondary and tertiary industries; FDI represents the amount of FDI. To prevent the exchange rate from affecting the research results, the FDI has been converted according to the exchange rate of RMB against the US dollar in the current year, and the unit is expressed in 100 million yuan. And because the data used is time-series data, it can be seen from econometrics that time-series data is very susceptible to heteroscedasticity. The method takes the logarithm of all the above variables to avoid this situation. The following research methods are the unit root, cointegration, and Granger causality tests.

4.2.2. Stationarity and Unit Root Tests for Series

According to the requirements of econometrics, the time series must be analyzed to ensure the stability of the research variables. Otherwise, it will lead to "pseudo-regression," which makes the conclusions invalid. Therefore, I use the ADF test method to test the stationarity and consider the results of the AIC information criterion and the SC information criterion to select the optimal number of lag periods. The ADF test results are shown in Table4 (where C is the constant term, T is the trend term, and P is the optimal lag period).

The test results in Table4 show that at the 5 % significance level, the variables of employment in the first, second and third industries and FDI are all non-stationary, and the statistics after the first-order difference in the rejection region are stable. Therefore, LNL1, LNL2, LNL3, and

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LNFDI are single first-order integration, and the following cointegration analysis can be performed.

Table 4. ADF unit root test for each variable

variable		Test Type (C,T,P)			ADF statistic	5% threshold	Is it stable
LNFDI	original value	C	T	1	-2.99	-3.60	unstable
	first-order difference	-	-	0	-6.13	-1.96	smooth
LNL1	original value	C	T	1	-3.36	-3.61	unstable
	first-order difference	-	-	0	-2.44	-1.96	smooth
LNL2	original value	C	T	1	-2.56	-3.61	unstable
	first-order difference	-	-	0	-2.19	-1.96	smooth
LNL3	original value	C	T	0	-2.70	-3.60	unstable
	first-order difference	-	-	2	-1.97	-1.96	smooth

4.2.3. Cointegration Test and Granger Causality Test

First, the cointegration test is carried out on LNFDI and LNLl: the regression equation obtained by the least-squares estimation using the traditional test method of EG test using Eviews10.0 is :

$$\mathrm{LNL1}_t = -0.157824\mathrm{LNFDI}_t + 8.150654 + \mathrm{e}_{1_t} \quad (1)$$

Table 5. The regression results of the impact of FDI on employment in the primary industry in Hebei Province

R2	AdjustR2	DW	F	Prob(F)
0.7204	0.708769	0.947779	61.84244	0.0000

Since the results of model (1) show that there is autocorrelation according to the DW test method, to avoid the influence of autocorrelation, the approach adopted is to add lag variables. The LNL1 and LNFDI distributed lag models are obtained as:

$$\mathrm{LNL1}_t = -0.02579\mathrm{LNFDI}_t - 0.034196\mathrm{LNL1}_{t-1} + 0.011501\mathrm{LNFDI}_{t-1} - 0.012793 \quad (2)$$

Table 6. Regression results of the adjusted model

R2	AdjustR2	DW	F	Prob(F)
0.941536	0.926922	1.981135	75.00361	0.0009

DW=1.981135 in model (2) , and by further sorting out the deformation, the error correction model of LNL1 and LNFDI is obtained:

$$\mathrm{LNL1}_t = -0.02579\mathrm{LNFDI}_t - 0.034196(\mathrm{LNL1}_{t-1} - 0.3363\mathrm{LNFDI}_{t-1} + 3.7411) \quad (3)$$

From model (3), the employment effect of FDI on the primary industry is negative in the short term or in the long term. The model coefficient shows that the employment volume of the primary sector in the short time decreases by 0.02579 % when FDI increases by 1 %. In the

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long run, employment in the primary industry reduces by 0.3363 % for every 1 % increase in FDI.

Then carry out the Granger causality test: It can be seen from Table7 that the lag order is two, and the conclusion is that accepting LNL1 is not the Granger cause of LNFDI, and rejecting LNFDI is not the Granger cause of LNL1. Therefore, the increase in FDI promotes employment in the primary industry in Hebei Province, but the reverse is irrelevant.

Table 7. The causal relationship test

Granger causality	lag	number of	F calculated	P-value	in
LNL1 is not the Granger	2	26	1.79966	0.1924	accept
LNFDI is not the Granger	2	26	3.61038	0.0469	reject

Secondly, the cointegration test is carried out on LNFDI and LNL2: using the traditional test method of EG test using Eviews10.0, the regression equation obtained by the least square estimation is:

$$\mathrm{LNL2_t} = 0.372062\mathrm{LNFDI_t} + 5.099917 + \mathrm{e_{2_t}} \tag{4}$$

Table 8. The regression results

R2	AdjustR2	DW	F	Prob(F)
0.769614	0.760014	1.137620	80.17287	0.0000

Since the results of model (4) show that there is autocorrelation according to the DW test method, the approach adopted is to add lag variables to avoid the influence of autocorrelation. The LNL2 and LNFDI distributed lag models are obtained as:

$$\mathrm{LNL2_t} = 0.039831\mathrm{LNFDI_t} + 0.344617\mathrm{LNL2_{t-1}} + 0.019723\mathrm{LNFDI_{t-1}} + 0.012097 \tag{5}$$

Table 9. Regression results of the adjusted model

R2	AdjustR2	DW	F	Prob(F)
0.966792	0.947933	1.975934	58.77929	0.0035

DW=1.975934 in the model (5), and by further sorting out the deformation, the error correction model of LNL2 and LNFDI is obtained:

$$\mathrm{LNL2_t} = 0.039831\mathrm{LNFDI_t} + 0.344617(\mathrm{LNL2_{t-1}} + 0.0572\mathrm{LNFDI_{t-1}} + 0.0351) \tag{6}$$

from the model (6) that the employment effect of FDI on the primary industry is positive in the short term or in the long term. From the model coefficients, it can be seen that the employment volume of the secondary sector in the short time will increase by 0.039831 % for every 1 % increase in FDI. In the long run, employment in the secondary industry will grow by 0.0572 % for every 1 % increase in FDI.

Then carry out the Granger causality test: It can be seen from Table10 that the lag order is one, and the conclusion is that accepting LNL2 is not the Granger cause of LNFDI, and rejecting LNFDI is not the Granger cause of LNL2. Therefore, the increase in FDI promotes employment

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in the secondary industry in Hebei Province. Still, there is no direct causal relationship between the two in turn.

Table 10. The causal relationship test

Granger causality	lag	number of	F calculated	P-value	in
LNL2 is not the Granger	1	26	4.26747	0.0508	accept
LNFDI is not the Granger	1	26	4.77452	0.0398	reject

Finally, the cointegration test is carried out on LNFDI and LNL3: using the traditional test method of Eviews10.0 to pass the EG test, the regression equation obtained by the least-squares estimation is:

$$\mathrm{LNL3_t} = 0.490136\mathrm{LNFDI_t} + 4.374860 + \mathrm{e_{3_t}} \quad (7)$$

Table11. The regression results

R2	AdjustR2	DW	F	Prob(F)
0.665471	0.651533	0.758116	47.74274	0.0000

Since the results of model (7) show that there is autocorrelation according to the DW test method, the approach adopted is to add lag variables to avoid the influence of autocorrelation. The LNL3 and LNFDI distributed lag models are obtained as:

$$\mathrm{LNL3_t} = 0.0359631\mathrm{LNFDI_t} - 0.204751\mathrm{LNL3_{t-1}} - 0.027022\mathrm{LNFDI_{t-1}} + 0.050231 \quad (8)$$

Table 12. Regression results of 10 adjusted models

R2	AdjustR2	DW	F	Prob(F)
0.94579	0.924779	1.871030	63.59627	0.0006

DW=1.871030 in the model (8), and by further sorting out the deformation, the error correction model of LNL3 and LNFDI is obtained:

$$\mathrm{LNL3_t} = 0.035963\mathrm{LNFDI_t} - 0.204751(\mathrm{LNL3_{t-1}} + 0.1320\mathrm{LNFDI_{t-1}} - 0.2453) \quad (9)$$

From the model (9), it can be seen that the employment effect of FDI on the tertiary industry is positive in the short and long term. The model coefficient shows that the employment of the tertiary sector in the short time will increase by 0.0359 for every 1 % increase in FDI. %, in the long run, the occupation of the tertiary sector will increase by 0.132 % for every 1 % increase in FDI.

Then carry out the Granger causality test: It can be seen from Table13 that the lag order is two, and the conclusion is that accepting LNL3 is not the Granger cause of LNFDI, and rejecting LNFDI is not the Granger cause of LNL3. Therefore, the increase in FDI promotes the rise in employment in the tertiary industry in Hebei Province, but in turn, there is no direct causal relationship between the two; that is, there is a one-way causality between the increase in FDI and the rise in employment in the tertiary industry. Relation.

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Table 13. The causal relationship test

Granger causality	lag order	number of	F	P-value	in
LNL3 is not a Granger reason for	2	26	3.17596	0.0646	accept
LNFDI is not the Granger reason	2	26	4.72888	0.0215	reject

4.3. Regression Results and Conclusions

The increase in FDI has led to a decrease in employment in the primary industry and an increase in jobs in the secondary and tertiary sectors. Comparing the coefficients, it has the most significant impact on the work of the tertiary sector, and the long-term impact is more important than the short-term impact. Finally, the Granger causality test shows that the direct causal relationship between FDI and the employment of the three industries is that FDI increases the work of the three sectors in Hebei Province, but the reverse is irrelevant.

4.4. The Impact of FDI on the Industry Structure of Employment

According to the statistical yearbook data of Hebei Province, it can be seen intuitively that a prominent feature of the number of employed persons is that they are primarily distributed in agriculture, forestry, animal husbandry, fishery, and manufacturing, accounting for the most significant proportion. Because for Hebei Province, the labor-intensive type has a relatively sizeable comparative advantage. In addition, the reason why the employment of FDI enterprises is low in industries such as transportation, warehousing, and post and telecommunications is mainly due to the monopoly of traditional sectors. FDI enterprises in these industries have fewer jobs. In short, the uneven distribution of foreign investment in the sector will lead to uneven distribution of employment to a certain extent and then affect the employment structure.

5. Conclusion and Policy Recommendations

5.1. Conclusion

To sum up the above three aspects of research, it can be concluded that: in terms of the impact on the regional structure of employment, the uneven distribution of FDI in various cities in Hebei Province leads to uneven distribution of jobs in different regions, and work The regional structure is affected; in terms of the impact on the industrial design of employment, FDI reduces the labor force in the primary industry, increases the number of employees in the secondary sector and the tertiary industry, and the number of employment in the tertiary industry gradually increases; In terms of structural impact, FDI is most distributed in agriculture, forestry, animal husbandry, fishery, and manufacturing, and has a relatively sizeable comparative advantage, which is conducive to absorbing surplus labor in these industries.

5.2. Policy Suggestion

5.2.1. Increase in Total FDI

It should promote the further expansion of the scale of Hebei Province's use of FDI; secondly, Hebei Province should strengthen the construction of the investment environment. To improve the corresponding supervision and management system, it is also necessary to improve the soft investment environment to provide a good investment environment for foreign-funded enterprises.

5.2.2. Strengthen the Correlation between Local and Foreign Companies

The foreign investment enterprises in the form of sole proprietorships often have abundant capital and advanced technology, which makes it difficult for local enterprises in Hebei Province to cooperate with them. This will hurt employment in Hebei Province, which will lead to

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unemployment due to the crowding-out effect. Therefore, the degree of association between local enterprises and foreign-funded enterprises should be strengthened.

5.2.3. Promoting the Strategy of Attracting Investment by Combining Labor-Intensive and Technology-Intensive

Investment in labor-intensive industries is currently the main investment direction of Hebei Province, and China's current upgrading to the tertiary sector, upgrading to high-tech industries is the main direction of industrial structure upgrading. Therefore, in the future, when Hebei Province attracts foreign capital, it must be labor-intensive—combining industries with technology-intensive industries, focusing on quantity and quality, to promote the formation of a more advanced industrial structure and employment structure in Hebei Province.

5.2.4. Coordinate the Regional Distribution of FDI

Presently, FDI is mainly invested in Tangshan, Shijiazhuang, Qinhuangdao, and other places, and less in other areas such as Zhangjiakou. Therefore, the Hebei provincial government should give full play to the comparative advantages of the regions with good investment attraction, to play a role in driving the economic growth from other areas, thereby enabling a balanced regional structure of employment.

5.2.5. Coordinate the Industrial Distribution of FDI

From the industrial distribution of FDI in Hebei Province, although Hebei Province is a large agricultural province, the FDI attracted by the primary industry accounts for a small proportion of the total FDI. Suppose the FDI is more distributed in high-tech sectors and attracts the transfer of labor factors to the tertiary industry. In that case, it will help to improve the employment structure.

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