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The Opening Up of Regional Service Industries and Changes in The Scale and Structure of Enterprise Employment

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Abstract

Based on the employment data of listed companies from 2003 to 2019 and the data on the openness of the service industry at the provincial level in China, this paper will explore the changes of the openness of the service industry in the region to the employment scale and employment structure of listed companies. Through model assumptions, data analysis, and double fixed-effect model, this paper uses empirical methods to verify the changes of regional service industry opening on the employment structure of enterprises. The results of this paper show that the opening up of regional service industry has a significant negative impact on the total employment of listed companies, but it promotes the increase of the employment of R&D personnel of enterprises, and also has a positive impact on the proportion of R&D personnel. Through the analysis of the article, we can conclude that expanding the opening up of the service industry will reduce the scale of employment by increasing the competitive effect and substitution effect, but promote the transformation of enterprises into innovative R&D enterprises.

Keywords

Service sector openness, Employment, Double fixed effect, Innovation.

1. INTRODUCTION

1.1. Background

On October 22, 2022, the 20th National Congress of the Communist Party of China was held in Beijing, at which the importance of employment was once again emphasized. The report not only emphasizes the strategic position of employment in the overall development of the country and the priority position in macroeconomic decision-making, but also regards services, assistance and the elimination of unreasonable restrictions and discrimination as the main tasks of employment work in the coming period.With the change and upgrading of the world economic structure, the service industry will play a crucial role in the future economic pattern. According to the white paper "China and the World Trade Organization", from 2005 to 2017, the average annual growth rate of global service trade was 5.4%, exceeding the growth rate of goods trade.

1.2. Literature review

Li Biao et al. (2021) studied the impact of service industry opening on the employment structure of manufacturing enterprises, and the results showed that the opening of the service industry significantly increased the total employment in the manufacturing industry and aggravated the polarization of enterprise employment, that is, the increase of high-skill and low-skill employment in the manufacturing industry and the decrease of medium-skill employment. Sun Xiangxiang and Zhou Xiaoliang (2019) show that whether it is a dynamic panel or a static panel, the opening of the service industry has a significant positive impact on employment, and

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the higher the opening of the service industry, the higher the employment creation effect; The opening up of the service industry has raised the wage level of the service industry, and affected the employment structure of the service industry through the optimal allocation of service factors and regional innovation (Yao Zhanqi, 2020) . Imports of productive services significantly promote the optimization of the employment skill structure of the manufacturing industry, and the import of productive services enhances the technological innovation ability and service innovation ability of the manufacturing industry, and promotes the transformation of enterprises to the upstream and downstream servitization of the value chain (Luo Jun 2021). Regarding the impact of service imports on employment, Cui Riming et al. (2021) based on multi-country or regional panel data confirmed that the expansion of service imports can increase the employment scale of importing countries or regions.

Luo Jun (2021) used the double difference method to systematically analyze the impact of productive service imports on the employment skill structure of manufacturing. The results show that the import of productive services significantly promotes the optimization of employment and skill structure in the manufacturing industry. The import of productive services has improved the technological innovation ability and service innovation ability of the manufacturing industry, promoted the transformation of enterprises to the upstream and downstream of the value chain, and promoted the optimization of the employment skill structure of the manufacturing industry through product upgrading. Fu Jiayu et al. (2022) based on the data analysis of 285 prefecture-level cities from 2001 to 2019, the results show that the opening up of the service industry can improve the production efficiency of manufacturing enterprises, reduce production costs, and then significantly increase the employment scale of manufacturing industry. Liu Zhizhong (2011) found that every 1% increase in the proportion of foreign capital used in the service industry can increase the proportion of employment in the service industry by 0.244%. Sultan et al. (2021) used data from Chinese industrial enterprises from 1998 to 2013 for empirical testing. The results show that there is significant productivity heterogeneity in the impact of service sector opening on employment of manufacturing firms, which promotes employment destruction and net employment growth of low-productivity firms and high-productivity firms, and also promotes the market exit of low-productivity firms. Gao Jing, Liu Guoguang (2022) Based on the perspective of production segmentation in the global value chain, WIOD database is used to measure the servitization of inputs from different sources, and empirically studies the relationship between servitization of manufacturing inputs and high-quality employment in the manufacturing industry. The study found that there is a "U" shaped relationship between the servitization of manufacturing inputs and employment.

2. EMPIRICAL ANALISIS

2.1. Construction of service industry openness indicators

This chapter will introduce the construction method of the service sector opening indicator, and here we refer to the method of Shen Minghao (2016) . This paper will extract and calculate the import and export volume of service trade, the actual use of foreign investment in regional service industries, and the total output value of service industries in each province and region from the statistical yearbooks of each province. Among them, the actual amount of foreign investment used in the service industry is obtained by using the sum of the investment amount used by each service industry in the statistical yearbooks of various places. The specific calculation method is as follows: The specific calculation method is as follows:

$$\mathbf{open} = (\mathbf{SE} * \mathbf{a} + \mathbf{II} * \mathbf{b})/\mathbf{GSP} * \mathbf{100} \quad \textbf{(Formula 1)}$$

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a =(SE/SE+II),b =II/(SE+ II),SE represents the export value of services trade in each region，II represents the total amount of foreign investment in the service industry actually used by the region**, GSP** represents the total output value of each region in the service industry.

2.2. 2.2 Empirical model setting

$$\ln L_{it} = \alpha_0 + \alpha_1 open_t + \delta_t + \gamma_i + \varepsilon_{it} \quad \textbf{(Formula 2)}$$

This chapter mainly introduces the setting of empirical models and data sources. In this paper, Omar Bamieh et al. (2021) were used to establish a baseline regression model. The regression of the double fixed-effect model was carried out by using the openness of service trade and the employment data of listed companies in different years in different regions. In the econometric model, the explanatory variables are the number of employment and employment scale of listed companies, and the core explanatory variables are the degree of openness of the service industry in various provinces and cities in China, the year of addition, the fixed effect of the industry, and other influencing factors at the company level, such as the management of the company, the scale of productivity, and the market environment.

2.3. Empirical results

2.3.1 Benchmark regression results

Table 1. The impact of the opening of the service industry on the employment of listed companies

The variable name	1	2	3	4
	Ols	Ols	FE	FE
lnopen1	-0.039*** (-2.66)	-0.165*** (-18.87)	-0.033** (-2.24)	-0.166*** (-18.89)
lnage		-0.848*** (-9.50)		-0.088*** (-9.87)
lnSale		0.602*** (58.08)		0.601*** (57.91)
size		0.134*** (11.06)		0.137*** (11.19)
Constant terms	7.52*** (556.3)	-8.16*** (-62.04)	7.31*** (157.18)	-8.25*** (-61.71)
Constance Termus	NO	NO	YES	YES

Mixed OLS and fixed-effect models were used to regress the listed employment data and the openness of the service industry, respectively, and the results are shown in Figure 1. Among them, 1.2 is listed as the result of mixed OLS regression and gradual addition of control variables; 3.4 is listed as the addition of time fixed effect, that is, the control of the annual overall shock. From the above results, it can be seen that the higher the degree of openness of the service industry in the region, the employment scale of listed companies will be compressed, showing a negative and significant relationship.

2.3.2 Robustness test

Since there is a certain deficiency in the service industry import index of each province in the benchmark regression test, and the conventional fixed-effect regression model used in the regression method may have certain biases, this section will replace the service industry openness construction method and the double fixed-effect model to prove the robustness of the results.

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Table 2. Results of robustness test 1

The variable name	1	2
	FE	FE
lnopen2	-0.067*** (-5.65)	-0.122*** (-15.64)
lnage		-0.029*** (-4.85)
lnSale		0.496*** (71.46)
size		0.293*** (34.26)
Constant terms	6.85*** (71.62)	-8.77*** (-87.8)
Time fixation effect	YES	YES
Industry fixed effect	YES	YES

In Table 2, the service industry exports of each province in the benchmark regression were replaced by Shen Minghao (2016) in the calculation formula 1, and the regression was carried out, and the conclusion was consistent with that shown in Figure 1, and the opening of regional service industries was negatively significant for the employment of listed companies.

Table 3. Robustness regression results 2

The variable name	1	2
	FE	FE
Lnx2	-0.019* (-5.65)	-0.11*** (-13.05)
lnage		-0.026*** (-4.3)
lnSale		0.492*** (70.47)
size		0.284*** (33.54)
Constant terms	6.86*** (71.70)	-9.34*** (-64.45)
Time fixation effect	YES	YES
Industry fixed effect	YES	YES

In Table 3, the indicator of the openness of the service industry in each region is changed to the dependence of foreign investment in the service industry, and the ratio of the actual utilization of foreign investment in the service industry to the total amount of foreign investment is used to calculate it. According to the results in the chart, it is basically consistent with the above results, and the relationship between the openness of regional service industry and the total employment of listed companies has a significant negative correlation.

2.3.3 Analysis of heterogeneity

The heterogeneity analysis in this paper mainly includes heterogeneity at the regional level and industry level. The provinces are divided into municipalities and non-municipalities, and the southern, eastern and northern regions are regressed to explore the heterogeneity of the impact of the openness of the service industry on the employment of listed companies in different provinces. From the industry level, this paper divides listed companies into 19

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categories according to the industry categories of the national economy, and then adds a dummy variable of whether they are service enterprises according to the definition of service industry, and explores the heterogeneity of regional service industry openness for service enterprises and manufacturing enterprises. According to the nature of company ownership, companies are divided into state-owned, private and foreign-funded enterprises, and the heterogeneous impact of regional service industry openness on the employment of enterprises of different ownership types is explored.

Table 4. Results of regional heterogeneity

Variable name	1	2	3	4
	Service enterprise	Manufacturing enterprise	Service enterprise	Manufacturing enterprise
Lnx2	0.205*** (3.58)	0.024 (0.60)	-0.267** (-6.02)	0.239 (1.88)
lnage	-0.116*** (-3.33)	-0.144*** (-9.03)	-0.111*** (-4.37)	-0.294*** (-4.25)
lnSale	0.595*** (19.96)	0.665*** (39.15)	0.600*** (26.57)	0.468*** (58.24)
size	0.004 (0.10)	0.109*** (5.52)	0.003 (0.12)	0.284*** (28.65)
Constant terms	-4.835*** (-10.33)	-8.853*** (-44.64)	-5.099*** (10.27)	-8.134*** (-70.21)
Time fixation effect	YES	YES	YES	YES
Industry fixed effect	YES	YES	YES	YES

As can be seen from Table 4, in the municipalities directly under the Central Government, the expansion of the opening degree of service industry significantly promoted the employment of service enterprises, but had no significant impact on the employment of manufacturing enterprises. In non-municipalities directly under the central government, the degree of service industry openness significantly inhibits the employment of service enterprises, but has no significant impact on manufacturing enterprises.

Table 5. Results of heterogeneity of enterprise types

Variable name	1	2	3
	State-owned enterprise	Private enterprise	Foreign-funded enterprise
Lnx2	-0.028* (-0.67)	-0.139*** (-11.3)	-0.049*** (-3.72)
lnage	-0.084*** (-3.66)	-0.012 (-0.91)	-0.034*** (-4.13)
lnSale	0.560*** (19.75)	0.443*** (42.47)	0.520*** (52.06)
size	0.330*** (9.67)	0.318*** (25.52)	0.024*** (18.93)
Constant terms	-10.432*** (-18.78)	-8.620*** (-57.36)	-8.385*** (-50.61)
Time fixation effect	YES	YES	YES
Industry fixed effect	YES	YES	YES

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As can be seen from Table 5, the opening degree of regional service industry has the greatest impact on private enterprises, with a coefficient of -0.139, and also has a significant negative impact on foreign-funded enterprises, while it has a small impact on state-owned enterprises.

2.3.4 Impact on employment structure

The above three sections all study the impact of regional openness of service industry on the total employment of listed companies. In this section, we study the impact of the openness of service industry on the employment structure of enterprises. We classify the employment personnel into research and development personnel, senior executives and people with financial background to explore the impact on the employment structure.

Table 6. Results of the impact on employment structure

Variable name	1	2	3
	Number of R&D personnel	Number of senior executives	Number of people with financial background
Lnx2	0.082*** (4.93)	-0.015*** (-3.89)	-0.076*** (9.2)
lnage	-0.084*** (-7.05)	-0.044*** (-16.67)	-0.010 (1.74)
lnSale	0.284*** (16.97)	0.445*** (14.81)	0.051*** (-7.71)
size	0.372*** (19.09)	0.054*** (14.57)	0.939*** (11.96)
Constant terms	-9.446*** (-34.94)	-0.244*** (-5.55)	-0.139*** (-1.56)
Time fixation effect	YES	YES	YES
Industry fixed effect	YES	YES	YES

As can be seen from the above figure, the expansion of the regional opening of the service industry promoted the increase of the number of people with research and development and financial background, and had a inhibitory effect on the number of executives.

3. MECHANISM ANALYSIS

In conclusion, the influence of the improvement of the opening level of service industry on the employment dynamics of manufacturing enterprises is mainly the result of the domestic market competition effect, factor substitution effect and export expansion effect. The increase in the opening level of the service industry intensifies the degree of competition in the domestic market, which will squeeze the sales scale of enterprises in the domestic market, and thus reduce the labor demand of enterprises (employment destruction). The improvement of the opening level of the service industry reduces the price of the service input of enterprises, which will encourage enterprises to use more service input and reduce labor input. The greater the substitution elasticity between the two inputs, the more employment will be reduced by the substitution effect (employment destruction). The improvement of the opening level of the service industry reduces the export product price of enterprises and the productivity threshold of entering foreign markets, which promotes the improvement of the export competitiveness of enterprises and the expansion of export markets, which in turn increases the labor demand of enterprises (job creation). Although the opening of the service industry reduces the productivity threshold for firms entering and leaving the foreign market, only firms with higher

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productivity can cross this threshold to export, so this effect mainly affects high-productivity firms.

4. CONCLUSION

According to the above analysis, for example, the opening up of the service industry in the municipalities with relatively good economy promotes the increase of the total employment of listed companies, especially the service industry enterprises. However, for the regions with relatively poor economy, the opening up of the service industry and the total employment show a reverse trend, which is due to the fact that the opening up of the service industry intensifies the domestic competition, and the industrial productivity in the regions with poor economy is low. The employment destruction effect of competition effect and factor substitution effect offset the employment promotion effect of export expansion, resulting in a decrease in employment. However, the expansion of regional service industry openness has promoted the employment of R&D personnel and financial background personnel of listed companies, which has promoted the transformation of listed companies into high-tech and high-innovation enterprises, and promoted the optimization of employment structure of enterprises. Therefore, expanding the opening of the service industry still has a strong policy advancement.

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