Service Industry Opening Up and Service Industry Structural Upgrading

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Abstract: *Based on the pilot program for innovative development of trade in services implemented in 2016 as a quasi-natural experiment, this paper takes prefecture-level cities and above cities in China from 2006 to 2019 as samples and uses a double-difference model to evaluate the impact of the opening-up of the service industry on the service industry structural upgrading. The empirical results show that the opening-up has a significant positive impact on the structure-upgrading of the service industry, which improved by 5.5%. The conclusion of this paper is of great significance for further expanding the opening of the service industry and optimizing the structure of China's service industry.*

Keywords: *opening-up of the service industry; structural upgrading of the service industry; double difference*

1. Introduction

With the acceleration of China's participation in economic globalization, the strategic focus of China's opening-up has gradually shifted to the service industry. However, the opening-up process of China's service industry is relatively slow. Part of the reason is that in the early stage of reform and opening up, in order to avoid the competition and exclusion of local enterprises by foreign enterprises, China has taken certain protective measures to restrict the opening-up of the service industry, which has protected the relatively fragile service industry to a certain extent, However, it has also caused the lag in the opening level of China's service industry and the long-term deficit in service trade.

In order to implement the important instructions of the report of the 19th National Congress of the Communist Party of China on expanding the opening up of the service industry, in the first half of 2015, the State Council began to deploy the pilot work of innovative development of trade in services, and in February 2016, 15 regions including Tianjin and Shanghai were officially approved as pilot regions.

The two-year pilot program has achieved remarkable results. The import and export of services in the pilot regions account for more than half of the total import and export of services in the country. So, will the opening-up policy of the pilot program help to upgrade the service industry structure in various regions? The research on these issues will help us to evaluate the implementation effect of existing policies, and also help us to clarify the impact mechanism of service industry opening on the upgrading of service industry structure, and then provide suggestions for promoting the optimization of service industry structure.

2. Research design and description

2.1 Econometric model setting

The purpose of this paper is to study the impact of the implementation of this policy on the structural upgrading of the service industry, taking 15 regions as pilot regions in 2016 as the experimental group, and calculating the services of the control group (non-pilot cities) and the experimental group (pilot cities) before and after the implementation of the policy. The change of the industry structure is used to measure the net effect of the opening of the service industry on the service industry structure. Referring to the previous research of scholars, the following double-difference model is constructed.

$$Upgrade_{ct} = \beta_0 + \delta * Open_{ct} + \gamma * X_{ct} + d_t + d_c + \varepsilon_{ct} \tag{1}$$

Among them, $Upgrade_{ct}$ represents the upgrade level of the city's service industry structure, subscript c represents different cities, t represents different years; $Open_{ct}$ represents the dummy variable of the core

explanatory variable service industry openness, X_{ct} is the change over time The characteristic variable at the city level, d_t represents the year fixed effect, d_c represents the city fixed effect, ε_{ct} is the random error term, in the above formula, δ is the core estimation parameter we are concerned about, representing the net effect of the service trade innovation and development pilot policy on the structure of the service industry.

2.2 Variable selection and data description

(1) Explained variable: service industry structure upgrade. Referring to the practice of Yu Yongze and Pan Yan (2019), the structural upgrading of the service industry is measured by the proportion of employment in the producer service industry to the total employment in the service industry.

Table 1: Descriptive statistics of main variables

Variable Name	Variable Description	Sample Size	Mean	Standard Deviation	Min	Max
Upgrade	Proportion of employment in producer services to employment in tertiary industry, logarithmic	3970	3.06	0.34	1.98	8.75
Open	Product of time dummy variable and individual dummy variable	3970	0.01	0.10	0.00	1.00
Pgdp	GDP per capita, logarithmic	3970	10.43	0.74	4.60	15.68
Gov	The proportion of government general public budget expenditure to revenue	3970	2.83	1.90	0.19	18.40
Fdi	The actual amount of foreign capital utilized in the current year, logarithm	3970	9.86	1.87	2.08	14.94
Edu	The proportion of general undergraduate college students	3970	9.54	9.89	6.00	57.17
Urban	Urbanization rate of permanent population	3970	3.94	0.20	3.31	4.54
Score	The infrastructure level score of each city	3970	0.07	0.08	0.01	0.98

(2) Core explanatory variables: the opening of the service industry. According to the basic operation idea of the double-difference model, according to whether it is affected by the policy, that is, whether it belongs to the pilot project of innovative development of trade in services, the individual dummy variable $Treatated_c$ is set. For the control group, the value is 0; at the same time, according to the policy implementation time, the time dummy variable $Time_t$ is set, and the value is 1 after the pilot implementation and 0 before the implementation. The interaction term between the two is $Trated_c*Time_t = Open_{ct}$ which is the core explanatory variable.

This paper selects the statistical data of China's prefecture-level cities and above from 2006 to 2019. This paper finally obtains the data of 283 prefecture-level cities. The data comes from the China Urban Statistical Yearbook, the National Bureau of Statistics and the Statistical Bulletin of Urban National Economic and Social Development, and some missing data are supplemented by linear interpolation. The descriptive statistics of the variables can be seen in Table 1.

3. Analysis of empirical results

3.1 Benchmark regression results

Based on the construction of the above-mentioned double difference model, the city-level control variables that affect the structural upgrading of the service industry are gradually added to equation (1), and the individual fixed effects and time fixed effects are controlled at the same time. The results of the benchmark regression are shown in Table 2 below.

Column (1) is the result without control variables, the interaction term coefficient Open of the dummy variable is significantly positive at the level of 1%, it can be preliminarily judged that the opening of the service industry has significantly promoted the upgrading of the urban service industry structure; columns (2) to (7) are the results after adding relevant control variables. As the number of added control variables increases, the coefficient of the core explanatory variable Open decreases, but it is still significant at the 1% level, which preliminarily validates Hypothesis 1; at the same time, per capita GDP The coefficient is significantly positive, which is in line with expectations; the scale of actual use of foreign capital in cities can significantly promote the upgrading of the service industry structure, and promote the development of high-tech service industries by attracting foreign capital to introduce advanced technology and excellent management experience, which is consistent with existing research

results; Gov, which measures the government deficit, is significantly negative, indicating that the heavier the government's financial burden, the less conducive it is to invest funds in the optimization and upgrading of the service industry; the level of urban infrastructure can facilitate the upgrading of the service industry environment, transportation infrastructure can significantly promote the upgrading of service industry structure by reducing the transportation cost of producer services.

Table 2: Benchmark regression results

Upgrade	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Open	0.09***	0.09***	0.08***	0.07***	0.068***	0.051***	0.055***
	(4.77)	(4.90)	(4.46)	(4.07)	(3.82)	(2.71)	(2.96)
Pgdp		0.03***	0.02**	0.02**	0.02	0.02*	0.02**
		(3.16)	(2.17)	(2.25)	(1.53)	(1.85)	(2.20)
Fdi			0.006**	0.006**	0.004	0.004	0.004*
			(2.44)	(2.34)	(1.49)	(1.62)	(1.66)
Edu				-0.02**	-0.02**	-0.03**	-0.04**
				(-2.20)	(-2.23)	(-2.00)	(-2.97)
Gov					-0.02***	-0.02***	-0.02***
					(-6.39)	(-6.38)	(-6.34)
Score						0.082***	0.071**
						(2.89)	(2.48)
$Score^2$						0.018***	0.015***
						(3.46)	(2.75)
Urban							-2.07***
							(-3.87)
$Urban^2$							0.28***
							(3.89)
Constant	3.00***	2.71***	2.73***	2.73***	2.87***	2.91***	6.69***
	(430.56)	(29.77)	(27.13)	(27.18)	(28.06)	(25.25)	(6.74)
City FE	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES
N	3,970	3,970	3,775	3,775	3,775	3,775	3,775
R^2	0.17	0.17	0.18	0.18	0.19	0.19	0.19

Note: ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively, and the t-test values are in parentheses. The following tables are the same.

3.2 Parallel trend test

The premise of using double difference to evaluate the effectiveness of a policy is that before the policy is implemented, the change trends of the experimental group and the control group are basically the same. Drawing on the research ideas of Bertrand and Mullainathan (2004), a parallel trend test was performed on the change trends of the experimental group and the control group: the model was set as follows:

$$Upgrad_{c,t} = \beta_0 + \beta_1 Before4_{c,t} + \beta_2 Before3_{c,t} + \beta_2 Before2_{c,t}$$
$$+\beta_4 Before1_{c,t} + \beta_5 Current_{c,t} + \beta_6 After1_{c,t} \qquad (2)$$
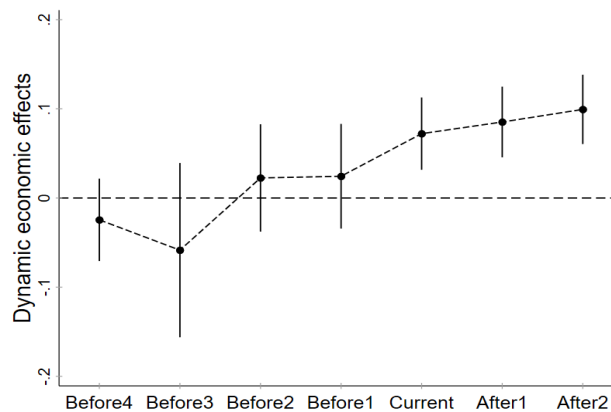$$+\beta_7 After2_{c,t} + \gamma X_{c,t} + d_t + d_c + \varepsilon_{ct}$$

Figure 1: Parallel trend test

Here we examine the trend changes from the four years before the announcement of the pilot program to the two years after the implementation of the policy. If the trends in the pilot cities and non-pilot cities are the same before the pilot, the estimated coefficients of Before4, Before3, Before2, and Before1 should be insignificant, the regression results are shown in Figure 1. Before 2016, all the regression results were insignificant, but after 2016, the coefficients were significantly positive and increased significantly, so they passed the parallel trend test of the double-difference model.

3.3 Placebo test

"Placebo" first appeared in randomized trials in medicine to test whether the improvement in a patient's condition came from the actual effect of the real drug or the psychological effect of a control group taking sugar pills. Similarly, we use this method to verify whether the difference between the explained variables comes from the actual effect of the policy studied or the influence of other random factors. Referring to the practice of Shi Daqian et al. (2018), 15 cities were randomly selected from the sample 283 city stations as the "pseudo-experimental group", and the remaining cities were set as the "pseudo-control group", and then "pseudo-policy dummy variables" were generated. (The interaction term of the two dummy variables), repeat the regression 500 times to obtain the distribution map of the false estimated coefficients. Figure 2 reports the estimated coefficients, density and p-value distribution of the randomly generated experimental groups for 500 times. We can see that the coefficients of the estimated values are all around 0, and most of the p-values are greater than 0.1. The vertical dotted lines in the figure represent the real estimated coefficients in the benchmark regression. It can be seen that our estimated results are not accidental results, and the model does not have a serious problem of missing variables.
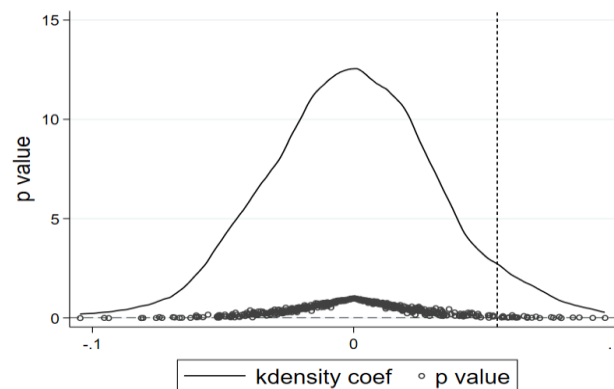

Figure 2: Placebo test

4. Conclusions

Using China's 2006-2019 China Urban Statistical Yearbook data, this paper selects a sample of 283 prefecture-level cities and above and takes the service trade innovation and development pilot implemented by the state in 2016 as a natural experiment to construct a double-difference model to test the openness of the service industry to services. Through theoretical analysis and empirical test, we found that: First, the opening of the service industry can significantly promote the structural upgrading of the service industry, and this promotion effect is 5.5%. This empirical result satisfies the application premise of double difference and passes the parallel trend test and the placebo test.

References

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