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Analysis of the Impact of International Transfer of Service Industry on the Development of Service Industry in Chongqing

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Abstract. This paper uses the regression model to have an empirical analysis, both in the short term and in the long run, the impact of international transfer of service industry on the development in the modern and traditional service industry in Chongqing. The finding is that the international transfer of service industry in the service industry in Chongqing has enhanced the overall development of the service industry, and its influence on the modern service industry is remarkably stronger than that of the traditional service industry, thus optimizing the interior structure of the service industry.

Introduction

The international transfer of service industry is both the natural extension of the globalization of manufacturing industry and the major adjustment power to promote economy and structure in the host country. According to statistics, the proportion of service industry in the world FDI has increased from 25% in 1970s to about 70% in the 21st century. In the future, that service industry absorbs FDI will edge out manufacturing industry to become the man body in the FDI structure. Since Chongqing became a municipality directly under the Central Government in 1997, service industry has witnessed a rapid development of FDI. In 2012 alone, service industry in Chongqing signed 125 contracts of introducing foreign investment, with an increase of 39.02%; these contracts are worth 3.99976 billion US dollars, with an increase of 87.39%; the real amount of the foreign capital is 442935 billion US dollars, with an increase of 74.79%.

Research of scholars both at home and abroad shows that the international transfer of service industry plays an important role in advancing the development of the service industry in host countries. Banga & Goldar(2004) has done an empirical research on the effect that FDI in the service industry in India in the 1990s has played on its industries, with the result that the liberalization of service trade not only plays a positive effect on the development of its service industry but also enhances the growth of industrial output and the increase of productivity. Arnold, Javorcikand Mattoo（2007）has made a quantitative analysis of the effect that FDI in the service industry in the Czech Republic has played on the production efficiency of manufacturing industry, and the result indicates that there is an apparent positive correlation between FDI in the service industry and the enterprise management performance of downstream manufacturing industry. Lijuan Zhuang, Haiying He (2005) and Feng Dai (2005) do empirical research by using time series data of more than 20 years in Chinese service industry and they think FDI is one of the most important reasons for the improvement of Chinese service industry. GUiyong Zha (2007, 2009) empirically analyzes the overflow effect and the capital effect of Chinese service industry's attraction of FDI. In short, FDI in service industry enhances the economic growth of host countries and the optimization of industrial structure. However, there is little research on the change of the

interior structure of service industry, as well as how it influences the development of the traditional and modern service industry. Moreover, there is no literature to support what differences between them.

In conclusion, this paper, based on the service industry in Chongqing, mainly studies whether there are significant differences between the effect thatthe international transfer of service industry has on the traditional service industry and the modern service industry.

Model Building

This paper chooses SFDI(the international transfer of service) actually used in the service industry in Chongqing and the annual data of the added value of service industry as the sample data, and also uses SFDI actually used in the service industry in Chongqing, the added value of service industry, as well as the proportion of modern and traditional service industry in their respective field as the analysis variable. The service industry defined in this paper refers to the various trades in the service industry. Modern service industry specifically includes information transmission, computer and software, financial industry, scientific research, technical service, geological prospecting industry, health and social security industry, culture, sports and entertainment industry, real estate, business service industry, as well as environment administration and education, while traditional service industry includes communications and transportation, storage and postal service, wholesale and retail, accommodation and catering industry, etc. This paper uses data which comes from CHONGQING STATISTICAL YEARBOOK over the years, and has model operation and data analysis via Eviews6.0 software. In order to unify unit with the added value of service industry and make them comparable, this paper, based on data processing, takes into account factors such as changes in the exchange rate between Chinese Yuan and American Dollar, etc.

The ultimate influence that SFDI in service industry has on the change of industrial structure is reflected by the contribution to the added value of SFDI actually used by modern and traditional service industry. Therefore, the proportion of the actually used SFDI between modern and traditional service industry is regarded as the explanatory variable and the proportion of their respective added value is regarded as the explained variable. In order to eliminate the potential heteroscedasticity, we use the absolute value of the index value of the explanatory variable and the explained variable to build the following empirical model to analyze the specific effect SFDI has on the change of industrial structure in service industry:

$$\ln GDP_{it} = C + \beta \ln SFDI_{it} + u_t \quad (1)$$

$$\ln GDP_{it} = C + \alpha \ln SFDI_{it} + \beta \ln SFDI_{i(t-1)} + \chi \ln SFDI_{i(t-2)} + u_t \quad (2)$$

Thereinto，i stands for modern and traditional service industry, and t stands for a particular year; GDP_{it}stands for the percentage in each year of the added value of modern and traditional service industry in the added value of service industry in Chongqing; $SFDI_{it}$ stands for the percentage in each year of the actually used SFDI of modern and traditional service industry in SFDI of service industry in Chongqing. $SFDI_{i(t-1)}$ and $SFDI_{i(t-2)}$ are the values of the first and second advance period respectively.

The Empirical Study on the impact of international transfer of service industry on the development of service industry in Chongqing

Because the non-stationary in the time series data will probably change as time goes on,

regression analysis by directly using relevant data may lead to the phenomenon of "spurious regression". Consequently, ADF test should be done prior to regression analysis in order to verify if there exists a long-term stable relationship between data, and then Granger causality test can be analyzed.

This paper first does ADF test on ln(GDP1) and Ln（$SFDI_1$, ln(GDP_2) and Ln（$SFDI_2$） respectively (Subscripts 1 and 2 stand for the index values of modern and traditional service industry), and finds that they are both stationary series; then this paper analyzes the causal relationship by using Granger causality test, and finds that Ln（SFDI1）is the cause for ln(GDP1), but the revere is not true, while Ln（SFDI2）and ln(GDP2) interact as both cause and effect. Thus, we can infer that the more SFDI actually used by modern service industry, the more effect it has on the change of industrial structure of service industry in Chongqing.

This paper makes regression analysis of short-term effect model (1) and long-term effect model (2) respectively by using OLS analytical method. First, make regression analysis of model (1) by using data in service industry in Chongqing between 1999 and 2016, and the result can be seen in Fig. 1.

Fig. 1 Regression Result of Short-term Effect

	Modern Service Industry	Traditional Service Industry
Constant	-0.572568(-40.91597***)	-0.599348(-18.66426***)
LN(SFDI)	0.375959(4.692048***)	0.073390(5.511084***)
R-squared	0.687650	0.752304
Adjusted R-squared	0.656414	0.727534
S.E. of regression	0.029532	0.030381
F-statistic	22.01532	30.37204
Prob(F-statistic)	0.000852	0.000258

Note: the numerical value in the bracket is the value of coefficient t, ***means being remarkable at the level of a=0.01.

From the regression result in Fig.1, we can see modern service industry ln(SFDI1) as well as its added value ln(GDP1) and traditional service industry ln(SFDI2) as well as its added value ln(GDP2) are both remarkably correlated to each other. The relevancy R and the adjusted R are both greater than 0.81, fitting each other very well; the probability of the value P corresponding to the value F is less than the significance level 0.01, which indicates the integrity of the equation is conspicuous, and the equation has a strong explanatory power, for various coefficients have undergone tests at the significance level 0.01. 1% SFDI increase in the modern service industry in Chongqing has led to 0.376% increase in its added value, while 0.01. 1% SFDI increase in the traditional service industry in Chongqing has led to 0.073% increase in its added value. It can be seen that the effect that SFDI in service industry has on the modern service industry in Chongqing is 5.15 times more than on the traditional service industry in Chongqing. In the short run, the increase of SFDI in that very year plays more important role on the development of the modern service industry in Chongqing.

Besides, SFDI has marked aggregation overflow effect of capital, technology, talents, and information, etc., industrial economic development can be advanced by the new supply caused by SFDI in the area through one or two years. Therefore, this paper makes regression analysis by using model (2) in the second advance period to reflect the industrial effect of SFDI on the service industry in Chongqing. The result of regression test can be seen in Table. 2.

Table. 2 Regression Result of Long-term Effect

	Modern Service Industry	Traditional Service Industry
Constant	-0.533733(-36.58791***)	-0.528254(-15.41420***)
LN(SFDI)	0.438459(2.904299**)	0.048262(3.408909**)
LN($SFDI_{t-1}$)	0.163509(2.092262*)	0.034661(3.251543**)
LN($SFDI_{t-2}$)	0.090325(1.124596)	0.024467(2.075409*)
R-squared	0.858048	0.915611
Adjusted R-squared	0.787072	0.873416
S.E. of regression	0.019966	0.018163
F-statistic	12.08930	21.69976
Prob(F-statistic)	0.005914	0.001272

Note: the numerical value in the bracket is the value of coefficient t, * means being remarkable at the level of a=0.1, ** means being remarkable at the level of a=0.05, and *** means being remarkable at the level of a=0.01.

The regression analysis in Fig. 2 shows that in modern service industry, ln(SFDI), ln(SFDIt-1) and ln(GDP1) have distinct linear relationship, with conspicuous nature of fitting and equation integrity. But SFDI in the previous two years makes little contribution to the modern service industry in Chongqing. In the traditional service industry, ln(SFDI), ln(SFDIt-1) ln(SFDIt-2) and ln(GDP2) have distinct linear relationship, with conspicuous nature of fitting and equation integrity.

From analysis of the long-term effect, we can see the increase of SFDI in modern and traditional service industry in the previous year and that very year enhances the development of modern and traditional service industry in that very year, and moreover, the increase of SFDI in the traditional service industry in the previous two years can also enhance the growth of traditional service industry in that very year. The effect of SFDI in that very year and SFDI in the previous year on the modern service industry in that very year is respectively 9.15 times and 4.69 times more than on the traditional service industry in that very year. the increase of SFDI in service industry is more beneficial to the development of service industry as well as the change and promotion of the structure of service industry.

In the end, this paper makes an overall regression on the change of SFDI in the modern and traditional service industry in Chongqing and the change of total value of service industry in Chongqing by building model from the aspect of absolute value and discusses the effect of the actually used SFDI in the two types of service industry on the total value of service industry:

$$\ln(GDP_s) = \alpha + \beta \ln(SFDI_1) + \chi \ln(SFDI_2)$$

There into, GDPs stands for the added value of service industry in Chongqing, SFDI1 stands for the actually used SFDI in the modern service industry, and SFDI2 stands for the actually used SFDI in the traditional service industry. The regression result by using the data between 1999 and 2016 in Chongqing can be seen in Fig. 3.

Fig.3 The Overall Regression Result

Variable	Coefficient	Std. Error	Prob.
C	17.84412	0.705080	0.0000
Ln($SFDI_1$)	0.400662	0.043355	0.0000
Ln($SFDI_2$)	-0.049380	0.067703	0.4843
R-squared	0.968825	_	_
Adjusted R-squared	0.961898	_	_
F-statistic	139.8504	_	_
Prob(F-statistic)	0.000000	_	_

Seen from Fig. 3, the square of the goodness of fit R is 0.961, which shows this regression equation can well explain the relationship between independent variables SFDI1, SFDI2 and the dependent variable GDPs; the integrity of the regression equation is also distinct. The increase of SFDI in modern service industry is beneficial to the increase of the GDP in the service industry in Chongqing, while the traditional service industry has negative correlation, but the effect is not distinct.

Conclusions and Suggestions

It can be seen from the research results of this paper that SFDI in that very year and in the previous year leads to bigger rate of return for the added value of modern service industry than for the added value of traditional service industry, thus further enhancing the development of modern service industry in Chongqing. In conclusion, SFDI plays a positive influence on the added value of the service industry in Chongqing, and at the same time enhances the overall development of the service industry in Chongqing and optimizes the interior industrial structure. Therefore, this paper suggests that we should on the one hand continue to improve the investment environment, and on the other hand continue to direct foreign capital to the financial industry, the logistics industry, and mountain tourism, etc., as well as high-end production service industries such as development and design, software design, and information, etc.

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