



Journal of Applied Sciences

ISSN 1812-5654

science
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A Spatial Econometric Analysis on the Location Determinants of FDI in Producer Services

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Abstract: This study analyzes the location determinants of Foreign Direct Investment (FDI) in producer services from spatial correlation and traditional factors and employs Moran's I index, Spatial Autoregressive Model (SAR) and Spatial Error Model (SEM) to perform empirical test based on the data of 24 provinces of China in the years of 2004-2011. The results indicate that spatial correlation is an important factor influencing the location choice of FDI in producer services, the distribution of FDI in producer services of China presents the feature of spatial agglomeration and positive spatial correlation, adjacent regions share similar values of FDI and the inflow of FDI in producer services of a certain region is correlated to those of its neighbors. As for the traditional factors, the degree of agglomeration in producer services is the most important among the positively correlated factors and the scale of FDI in manufacturing industry is the second important, followed by the degree of openness, the development level of the manufacturing industry and the condition of human capital, while the inflow of FDI in producer services is negatively correlated to system and policy restraints but the correlation is not significant.

Key words: Spatial econometrics model, FDI, producer services, location choice

INTRODUCTION

In recent years, there is a significant increase in the total foreign direct investment attracted by China's service industries. Some more developed provinces appear to have spatial agglomeration of FDI in producer services. Some examples of these producer services include advertising, information technology, computer services, technical services, transportation and logistics, maintenance, business consulting and financial services. The ubiquitous existence of spatial agglomeration of FDI raises two questions. Firstly, what determinants are influencing the location choice of FDI in producer services? Secondly, how can spatial correlation factors explain the spatial distribution of FDI in producer services? Any investment attracting actions of the government might be biased without systemically understanding the location determinants of FDI in producer services. Therefore, it is of great theoretical and practical significance to study the location determinants of FDI in producer services for further attraction of foreign investment, for the development of producer services, as well as for the economic transition of China.

Although, FDI in producer services is developing fast, the focuses of many theoretical researches about the location determinants are on factors influencing FDI in the entire service industries, these factors include market scale, the condition of human capital, the degree of

openness, government intervention (Kolstad and Villanger, 2008; Tang and Wang, 2012), no specialized research separating FDI in producer services from those in the entire service industries has been reported in the literature. Some studies about the location determinants of FDI in manufacturing industry used spatial correlation in their analytical frameworks (Raff and Von der Ruhr, 2001; Wei and Lai, 2009), however, no validations have been performed to determine if such spatial factors is the location determinants of FDI in producer services. Upto date, only a few studies have focused on the location determinants of FDI by use of spatial econometric methods, most of them focused on the manufacturing industry (Porter, 1998; Liang, 2003; Zhu, 2012) but none of them focused on service industries, especially producer services.

Compared to previous study, this study makes two major contributions. Firstly, both the influences of spatial correlation and traditional factors on the location choice of FDI in producer services are taken into account. The traditional factors considered include the level of agglomeration of producer services, system and policy restraints, development level and scale of FDI in the manufacturing industry, the condition of human capital and the degree of openness. Secondly, this study constructs the K-nearest neighbour spatial weight matrix and introduces the interrelation among different regions into the model and spatial econometric method is used to

verify the existence of spatial correlation in the distribution of FDI in producer services in China and to analyze the influences of traditional factors on the location choice of FDI in producer services.

THEORETICAL ANALYSIS AND HYPOTHESIS

Spatial correlation factor: Spatial correlation analysis is based on Tobler's first law of geography, states that everything on earth is associated with other things but things far away geographically are more relevant than close distance things. Cliff and Ord (1972) first proposed the concept of spatial correlation, they think the same kind of variable distribution between a certain region and its adjacent areas exists similar relationship. Specifically, spatial correlation means that the variables in a region are correlated to those of its neighbours. A tendency to spatial agglomeration of similar variables indicates positive spatial correlation and the same variables of the adjacent regions share similar attribute values. On the contrary, a tendency to scatter similar variables indicates negative spatial correlation.

As influenced by continuous regional distribution, many economic activities may be spatially correlated, the spatial distribution of FDI as a geographical phenomenon and economic phenomenon also follows the above rule. Multinational corporations not only consider the local market potential and production conditions when they invest abroad but also pay close attention on these factors of the adjacent regions. In view of strategic layout and avoiding competition, multinationals tend to attach great importance to FDI inflows of the adjacent regions. Therefore, the inflow of FDI in a region is not only closely related to its locational condition but also influenced by that of its neighbours. The new economic geography also confirmed that in addition to traditional location, variables and exogenous policies variables, the location choice of FDI must consider the spatial correlation factor, this is also the theoretical basis for the construction of spatial weight matrix and spatial econometric model to verify the existence of spatial correlation in the distribution of FDI in producer services. Therefore, when the location determinants of FDI in producer services are studied, sufficient attention and consideration should be given to spatial correlation, whether explicit spatial correlation exists or not. The first hypothesis of this study is as follows.

Hypothesis 1: The distribution of FDI in producer services in China shows the feature of spatial correlation and the inflow of FDI in producer services in a region is influenced by that of its neighbours.

Traditional factors: In the Eclectic Theory of International Production, Dunning (2000) stresses and

verifies the location advantages of FDI in services, provides a theoretical basis for the research of FDI in services. The majority of the industry involved in the eclectic theory of international production is producer services, such as financing, insurance, business services, management consulting, transportation, information transmission and computer services, therefore, this study argues that the theory also applies to the location determinants of FDI in producer services. Based on this, combined characteristics of producer services, this study identifies the following determinants.

- **Agglomeration of producer services:** The agglomeration of producer services makes a large number of professional talents with the same quality gathered. The agglomeration of talents encourages information and resources sharing within such agglomeration area and facilitates the service firms to obtain knowledge and technologies. The concentration of service firms with similar specialties will cause fiercer competition among them, this competition will impel these enterprises to update their technologies and continue to innovate (Yu and Song, 2014). In order to enjoy these positive effects of agglomeration of producer services, foreign investment prefer to choose such concentration areas of service firm
- **System and policy restraints:** Among all industries, service industries are subject to the most policy restraints. Therefore, system and policy restraints are the main barriers to FDI in service industries. After joining the WTO, China has been gradually relaxing these restraints and this relaxation has resulted in a significant flow of FDI into producer services. However, as China is in the stage of economic transition, domestic firms still dominate the market in some businesses related to national security, such as telecommunications and finance. There is still an entry threshold remaining on foreign investment in producer services and this entry threshold will continue to be a restraint

Thirdly, development level and scale of FDI in the manufacturing industry. According to the relationship between supply and demand, a higher development level of the manufacturing industry would have higher demand for producer services and multinational corporations will choose to invest directly in those areas with great demand for producer services (Xu, 2013). Therefore, the inflow of FDI in producer services is based on the high development level of the local manufacturing industry. As the production and consumption of producer services are inseparable, in order to provide better services to their existing customers and to avoid loss of customers due to

Table 1: Description of variables

Variables	Code	Indicator	Formula
FDI in producer services	PSFDI	Actual amount of foreign investment utilized in producer services	-----
Level of agglomeration of producer services	PSEMPL	Employment rate in the service industry	Employment in the service industry/Total employment
System and policy restraints	GOV	Degree of government intervention	Government consumption/Total consumption
Scale of FDI in manufacturing industry	MFDI	Actual amount of foreign investment utilized in manufacturing industry	-----
Development level of manufacturing	MD	Output per capita of the secondary industry	Total output of the secondary industry/total population
Condition of human capital	EDU	Total enrollment in higher educational institutions	-----
Degree of openness	OPEN	Foreign trade dependence	Export value/GDP

customer’s multinational operation, these service firms have to follow their customers to make multinational investment. Hence, FDI in producer services will chase FDI in the manufacturing industry.

- **Condition of human capital:** Most producer services are the knowledge-intensive and technology intensive industries, hence, the service providers need personnel with professional knowledge and skills to serve their customers and to gain new knowledge and skills during the provision of services. Financial services, business services, transportation and logistics services, information technology and computer services, as well as scientific research and technological services are industries that highly depend on professional talents
- **Degree of openness:** From the efficiency of economical operation, a higher degree of openness indicates a higher degree of the economic integration between a country or region and the international market. Thus the country or region has a more convenient and rapid access to the international advanced technology and other production factors. Therefore, the inflow of FDI in producer services has a close relationship to the level of openness

Through, the above analysis, this study proposes the following hypothesis and intends to be verified.

Hypothesis 2: Level of agglomeration of producer services is positively correlated to the distribution of FDI in producer services.

Hypothesis 3: System and policy restraints are negatively correlated to the distribution of FDI in producer services.

Hypothesis 4: Development level and the scale of FDI in the manufacturing industry are positively correlated to the distribution of FDI in producer services.

Hypothesis 5: Condition of human capital is positively correlated to the distribution of FDI in producer services.

Hypothesis 6: Level of openness is positively correlated to the distribution of FDI in producer services.

DATA SOURCES AND VARIABLE SELECTION

Data sources: Due to the availability of data, the spatial regions analyzed in this study are 24 provinces of China including, Beijing, Tianjin, Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hebei, Henan, Heilongjiang, Hubei, Hunan, Jiangsu, Jiangxi, Liaoning, Inner Mongolia, Shandong, Shanxi, Shaanxi, Xinjiang, Yunnan, Zhejiang, Chongqing and Gansu. The data come from the statistical yearbooks of each province, China Statistical Yearbooks and China Commerce Yearbooks, which present the actual data from 2004-2011. The input-output table of the year of 2010 is used to calculate the intermediate demand rate of the service industries and five service sectors with intermediate demand rates higher than 60% are identified as producer services. These five service sectors include: (1) Transportation, warehousing and postal services, (2) Leasing and business services, (3) Financial services, (4) Information technology, computer services and software and (5) Scientific research, technical services and geological survey. FDI in producer services, the dependent variable to be explained, is represented as the actual amount of FDI in the five sectors mentioned above and priced in RMB based on the median exchange rates in each year.

Variable selection: According to the above analysis on the location determinants of FDI in producer services, on the basis of consideration of quantitative indicators, differences and alternative, this study finally identifies seven variables (Table 1). Table 1 cannot show the spatial correlation, because it is a factor concerning all spatial units that it works not only in one region but generates and transmits its effects by the spatial interaction among different elements. Therefore, it is necessary to use Moran’s I index and construct a reasonable spatial econometric model to reveal the influences of this factor.

SPATIAL ECONOMETRIC ANALYSIS AND RESULTS

$$\bar{Y} = \frac{1}{n} \sum_{i=1}^n Y_i$$

The purpose of this study is to examine the influences of both spatial correlation and traditional factors on location choice of FDI in producer services. According to the principles of spatial econometrics, a spatial weight matrix is constructed and then the existence of spatial autocorrelation in FDI in producer services is tested. If there is spatial correlation, a spatial econometric model is constructed to test the location determinants.

Construction and selection of the model: Spatial weight matrix is the precondition and foundation of spatial econometric analysis. It introduces $W_{n \times n}$ to define the spatial adjacent correlation between the spatial objects. The $W_{n \times n}$ expresses as the weight matrix of $n \times n$ order which contains exogenous information about space connection between region i and region j . As for the Eq. 1, 2 and 3, the elements of this weight matrix are non-random and exogenous. The most common ways to construct this spatial weight matrix are distance and adjacency methods. For this purpose, the data was collected from 24 provinces in China. There are common boundaries between some of these provinces, therefore, using information provided by Geographic Information (GIS) System spatial analysis, the K-nearest neighbor spatial weight matrix is employed in the analysis and ArcGIS10.1 software is used to construct the spatial distance matrix based on the distances between the gravity centers of the maps of these 24 provinces.

This study employs the global Moran's I index to test whether spatial correlation exists in FDI in producer services. The global Moran's I index measures the similarity of FDI in producer services among the adjacent regions. The global Moran's I index is calculated using Eq. 1:

$$\text{Moran's I} = \frac{\sum_{i=1}^n \sum_{j=1}^n W_{ij} (Y_i - \bar{Y})(Y_j - \bar{Y})}{S^2 \sum_{i=1}^n \sum_{j=1}^n W_{ij}} \quad (1)$$

where, Y_i is the total FDI in producer services of the i -th region, n is the total number of regions, i.e., the 24 provinces in this study, W_{ij} is the $n \times n$ spatial weight matrix:

$$S_2 = \frac{1}{n} \sum_{i=1}^n (Y_i - \bar{Y})^2$$

and:

The range of Moran's I is $[-1, 1]$. When Moran's $I > 0$, there is a positive correlation which means that the adjacent regions are similar at spatial location and have similar FDI behaviors, when Moran's $I = 0$, there is no spatial correlation, when Moran's $I < 0$, there is a negative correlation.

By plotting Moran's I scatter plot, this study divides FDI inflows in producer services of 24 provinces into four quadrants, in order to more accurately identify the spatial correlation of FDI in producer services between different regions. The horizontal axis of Moran's I scatter plot represents the regional standardized values of FDI in producer services after treatment, the ordinate is the average value of FDI in producer services of adjacent units, which is determined by the spatial weight matrix. Four quadrants means four different types of spatial correlation between a region and its adjacent area. There is an aggregated distribution of high FDI in producer services in the first quadrant. This aggregated distribution means the regions with high FDI are surrounded by other regions with high FDI, showing a High-High (HH) positive spatial correlation. There is an aggregated distribution of low FDI in producer services in the third quadrant, showing a Low-Low (LL) positive spatial correlation. The first and third quadrant is spatial agglomeration area which indicates the existence of the positive spatial correlation between similar regions. The regions in the second quadrant have low FDI but are surrounded by regions with high FDI, showing a Low-High (LH) negative spatial correlation. The regions in the fourth quadrant have high FDI but are surrounded by regions with low FDI, showing a High-Low (HL) negative spatial correlation. The second and fourth quadrant is spatial discrete areas, which indicates the existence of spatial negative correlation between different regions. If FDI in producer services is unevenly distributed among the four quadrants which suggests the existence of spatial correlation between the regions, conversely, if FDI in producer services is evenly distributed in four quadrants, which means that the spatial correlation does not exist.

According to the spatial correlation effect in spatial econometrics, the representation of spatial correlation has two basic forms, i.e., the Spatial Autoregressive Model (SAR) and the Spatial Error Model (SEM).

In the SAR, the spatial correlation between variables is expressed as the spatial lag of the dependent variable and is used to examine the influence of the behaviors of adjacent regions on those of other regions in the entire system. The SAR is constructed in Eq. 2:

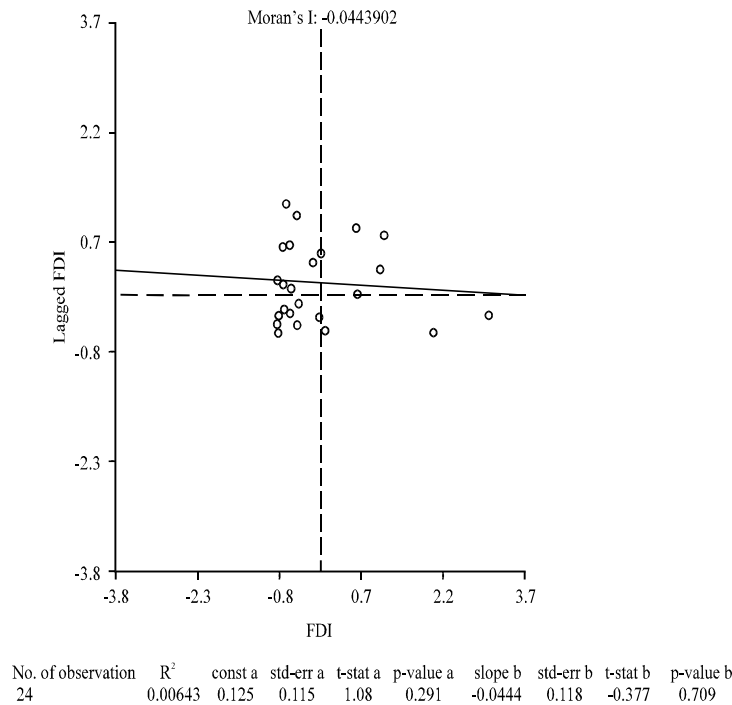


Fig. 1: Moran’s I scatter plot of FDI in producer services

Table 2: Test results of spatial correlation

Year	Spatial distance matrix	
	Moran’s I	p-value
2004	0.177	0.046
2005	0.213	0.022
2006	0.187	0.112
2007	0.284	0.031
2008	0.286	0.034
2009	0.303	0.127
2010	0.311	0.029
2011	0.313	0.035

$$\text{LnPSFDI} = \rho \text{WLnPSFDI} + \beta_1 \text{LnPSFMPL} + \beta_2 \text{LnGOV} + \beta_3 \text{LnMFDI} + \beta_4 \text{LnMD} + \beta_5 \text{LnEDU} + \beta_6 \text{LnOPEN} + \varepsilon \quad (2)$$

The SEM is a SAR included in the error term, used to represent the influence of error impulses caused by the neighbors to the dependent variable on local observations. Its model is constructed in Eq. 3:

$$\text{LnPSFDI} = \beta_1 \text{LnPSEMP} + \beta_2 \text{LnGOV} + \beta_3 \text{LnMFDI} + \beta_4 \text{LnMD} + \beta_5 \text{LnEDU} + \beta_6 \text{LnOPEN} + \varepsilon \quad (3)$$

Where:

$$\varepsilon = \lambda \text{W}\varepsilon + \mu$$

In Eq. 2 and 3, LnPSFDI is the dependent variable, β_i for $i = 1, \dots, 6$, ρ and λ are the spatial autoregressive coefficient, spatial lag coefficient and spatial error

coefficient, respectively, W is the $n \times n$ spatial weight matrix, where n is the number of regions, WLnPSFDI is the dependent variable of spatial lag, $\text{W}\varepsilon$ is the spatial error, and ε and μ are both random error vectors.

Test of spatial correlation: Using the method discussed above, a spatial distance matrix is constructed. Then, Geoda 1.4.6 software is used to calculate the global Moran’s I indices of FDI in producer services of the 24 provinces in the years of 2004-2011 and to perform the test (Table 2). The Moran’s I index of most years passes the test at the 10% significance level except the years of 2005 and 2006, with a value larger than 0 and a trend to increase year by year. The result indicates that the distribution of FDI in producer services of China is positively spatially correlated. According to the concept of spatial correlation, positive spatial correlation indicates that the distribution of FDI in producer services has a feature of spatial agglomeration and adjacent regions share similar values of FDI, the inflow of FDI in producer services of a certain region is related to that of its neighbours. Therefore, the result is consistent with the hypothesis 1.

A Moran’s I scatter plot can identify the spatial correlation of FDI in producer services between different regions more accurately. The result of Moran’s I scatter plot is shown in Fig. 1. According to Fig. 1, the inflows of FDI in producer services of the 24 provinces are divided

Table 3: Spatial correlation pattern about FDI distribution in producer services

Quadrant	Spatial correlation pattern	Provinces
First	HH	Zhejiang, Jiangsu, Liaoning, Shandong and Tianjin
Second	LH	Anhui, Fujian, Guangxi, Hebei, Heilongjiang, Inner Mongolia, Shanxi and Yunnan
Third	LL	Gansu, Guizhou, Henan, Hubei, Hunan, Jiangxi, Shaanxi and Xinjiang
Fourth	HL	Beijing, Guangdong and Chongqing

Table 4: Results of spatial econometric regression

Explanatory variable	Correlation coefficient	
	SAR	SEM
CONSTANT	9.970969	5.475072
LnPSEEMPL	3.55047	3.234313
LnGOV	-0.4634255	-0.7113876
LnMFDI	0.6120545	0.5499114
LnMD	0.215486	0.06966552
LnEDU	0.07568138	0.06808101
LnOPEN	0.2615819	0.2577991
ρ	-0.2268244	-----
λ	-----	-0.3662335
R ²	0.949301	0.946462
Log L	-9.45223	-9.921752

into four quadrants, FDI in producer services is unevenly distributed among the four quadrants, this suggests the existence of spatial correlation of FDI inflows in producer services between the regions.

Figure 1 does not recognize the specific provinces in the distribution of four quadrants, therefore, this study lists the table of spatial correlation pattern about FDI distribution in producer services (Table 3).

As shown in Table 3, there is an aggregated distribution of high FDI and low FDI in producer services in the first and third quadrant, respectively, the first and third quadrant includes a total of 13 regions, accounted for 54.2% of the total sample, indicating that 54.2% of the regions shows positive spatial correlation among 24 provinces and has the characteristics of spatial agglomeration. Thus, this study concludes that there are two positive spatially related agglomeration for the distribution of FDI in producer services of China. One is the high-high agglomeration, mainly concentrated in 5 provinces of the eastern part, meaning the regions with high FDI in producer services are adjacent to each other. The other is low-low agglomeration, mainly in 8 provinces of the Midwest, meaning the regions with low FDI in producer services are concentrated geographically. This further confirms the spatial distribution of FDI in producer services is not completely random and independent distribution, HH and LL space-related model also clearly reflects China's regional imbalance in the distribution of FDI in producer services. The second quadrant shows a Low-High (LH) negative spatial correlation, the fourth quadrant shows a High-Low (HL) negative spatial correlation, the second and fourth quadrant includes a total of 11 regions, accounted for 45.8% of the total sample, indicating that 45.8% of the regions shows

negative spatial correlation among 24 provinces and has the characteristics of spatial discretization. Since the number of samples about spatial agglomeration area are more than the number of samples about spatial discretization area, so agglomeration characteristics of FDI distribution in producer services becomes more obvious in China.

Results of spatial econometric regression and analysis:

After it is verified that there is spatial correlation among FDI in producer services of different provinces, the method discussed above is used to construct the spatial econometric model. At the same time, Geoda 1.4.6 is used to estimate the regression coefficients of the SAR and the SEM models by the maximum likelihood estimation method and to compare these coefficients to identify the traditional factors determining the location of FDI in producer services. The results are presented in Table 4.

As shown in Table 4, no large variation is found in the regression coefficients of each factor which is in line with the hypotheses. The GFs (R², Goodness of Fit) of both models are relatively high but the log-likelihood of SAR is greater than that of SEM, which means the former is more adequate in explanation, with a better simulation effect than the latter. The LogL of the SAR and the SEM are both negative, which means that the distribution of FDI in producer services is not only influenced by the lagging effect between FDI in producer services of one region and those of its neighbours but is also influenced by the error effect transmitted from FDI in producer services of its neighbours under random shocks. Meanwhile, it further indicates that one region can benefit from the inflow of FDI in producer services from its neighbors when it is using local characteristics to attract FDI in producer services.

According to Table 4, the inflow of FDI in producer services is positively correlated to the level of agglomeration of producer services, the scale of FDI in the manufacturing industry, the development level of the manufacturing industry, the condition of human capital and the degree of openness. Among the factors above, the level of agglomeration of producer services is the most important positively correlated factor influencing the location choice of FDI in producer services and the scale of FDI in the manufacturing industry is the second important, followed by the degree of openness, the

development level of the manufacturing industry and the condition of human capital. This means that service firms pay more attention to industry agglomeration and follow the manufacturing enterprises of their own countries when they are planning multinational investment. The inflow of FDI in producer services is negatively correlated to system and policy restraints. However, this correlation is not obvious, this means although FDI inflows in producer services is affected by the degree of government intervention in the economy, the impact in this respect is not large and also shows that the limit of our policies to attract foreign investment in producer services is gradually reduced, the decrease of intervention and control will have a positive impact on FDI inflows in producer services.

CONCLUSION AND POLICY SUGGESTION

This study analyzes the location determinants of Foreign Direct Investment (FDI) in producer services from spatial correlation and traditional factors and employs Moran's I index, Spatial Autoregressive Model (SAR) and Spatial Error Model (SEM) to perform empirical test, based on the data of 24 provinces of China in the years of 2004-2011. Through analysis, the following conclusions are drawn: (1) Spatial correlation is an important factor influencing the location choice of FDI in producer services, the spatial distribution of FDI in producer services of China presents the feature of agglomeration and positive spatial correlation. Meanwhile, adjacent regions share similar values of FDI and the inflow of FDI in producer services of a certain region is correlated to those of its neighbors. (2) As for the traditional factors, the level of the agglomeration in producer services is the most important among the positively correlated factors and the scale of FDI in the manufacturing industry is the second important, followed by the degree of openness, the development level of the manufacturing industry and the condition of human capital. All these factors positively influence the distribution of FDI in producer services. The inflow of FDI in producer services is negatively correlated to system and policy restraints but the correlation is not significant.

According to these conclusions, in order to attract more FDI in producer services, it is not only necessary to consider the impact on traditional factors of FDI location in producer services but also consider the spatial correlation factors. In the process of attracting foreign investment, each province should pay full attention to this inter-regional spatial association. Specifically,

breaking the limitations of administrative divisions and strengthen inter-regional cooperation, especially the developed regions should implement development policies of "rich neighbor" through industry association and market interconnection, in order to achieve common growth of FDI in producer services between the developed regions and the less developed regions. Meanwhile, each province should consider its actual situation to construct the agglomeration area of producer services and make full use of the positive effect of existing agglomeration area to attract FDI in producer services. Each province should strengthen macro-control on the flow of FDI for the mutual promotion between the manufacturing industry and the producer services. Furthermore, they should establish a scientific and sound mechanism to train and introduce professional talents and continue to lower down the entry threshold of FDI in producer services.

ACKNOWLEDGMENT

This study is supported by the Humanity Social Science Foundation of Ministry of Education (No. 12YJC630160), Philosophy and Social Sciences Planning Project in Heilongjiang Province (No. 12E042) and Young Academic Backbone Support Project of Colleges and Universities in Heilongjiang Province (No. 1453G064).

REFERENCES

- Cliff, A. and K. Ord, 1972. Testing for spatial autocorrelation among regression residuals. *Geograph. Anal.*, 4: 267-284.
- Dunning, J.H., 2000. The eclectic paradigm as an envelope for economic and business theories of MNE activity. *Int. Bus. Rev.*, 9: 163-190.
- Kolstad, I. and E. Villanger, 2008. Determinants of foreign direct investment in services. *Eur. J. Political Econ.*, 24: 518-533.
- Liang, Q., 2003. Overseas investment of multinational corporations and industrial agglomeration. *J. World Econ.*, 9: 29-37.
- Porter, M.E., 1998. Clusters and the new economics of competition. *Harvard Bus. Rev.*, 11: 77-90.
- Raff, H. and M. von der Ruhr, 2001. Foreign direct investment in producer services: Theory and empirical evidence. CESifo Working Paper, No. 598, Center for Economic Studies and Ifo Institute for Economic Research, Munich, Germany, October 2001.

- Tang, Y. and L. Wang, 2012. An analysis on determining factors of foreign direct investment in China's service industry: An empirical test based on industrial panel data. *World Econ. Study*, 10: 75-80.
- Wei, J. and M.Y. Lai, 2009. Spatial dependence and FDI location determinants: Spatial econometrical analysis based on chinese urban data. *Finance Trade Res.*, 6: 1-6.
- Xu, B.H., 2013. Constructing and empirical research on producer services development evaluation system based on principal component analysis. *J. Applied Sci.*, 13: 3453-3458.
- Yu, S.H. and F. Song, 2014. Dynamic relationship of foreign direct investment and manufacturing industrial agglomeration. *J. Applied Sci.*, 14: 158-164.
- Zhu, Y.M., 2012. Spatial cluster and regional development of foreign-invested enterprises in yangtse river delta. *China Ind. Econ.*, 1: 66-72.