A study of Influencing Factors of industrial location under the background of regional transfer in China

Jing-Ling CHEN

Business College Yangzhou University, Yangzhou, Jiangsu, China

jing_ling_chen@163.com

Keywords: Industrial location, influence factors, regional transfer of industries, agglomeration, interest relations

Abstract: Based on analysis framework of institutional approaches location theory, the paper discusses influence factors on the industrial location from the perspective of stakeholders in decision-making and behavior which includes firm production decision, local government policy and social elements of the supply effect on the industrial location, and then gives an empirical analysis by using 2002-2011 Chinese provincial panel data. What our local governments should do is to improve the investment environment by enhancing social supply capability and breaking the regional barriers, and to promote autonomy in decision-making of production enterprises so as to promote the industry spatial agglomeration in China, which is beneficial to the formation of national value chain.

Introduction

Facing world industrial restructuring and adjustment and transformation and upgrading of Chinese industries in eastern coastal areas, Chinese regions are actively using national resources, speeding up the integration of resources. China are trying to establish local governance of the domestic value chain(DVC), getting rid of vertical restraints from the governance of global value chain. It is an advantageous opportunity to construction DVC by Chinese Large-scale industrial transfer.

According to the new institutional location theory, regional industrial transfer is built on the optimization of dynamic structure of regional industrial system, and it is also affected by government policy, market maturity, competition, supply factors and social support system and other regional industry environment. Location choice behavior of industries is the result of price negotiations among enterprise and supplier, the government, trade unions and other organisations on wages, taxes, subsidies and other the key factors in production process. Among them government is influential in the whole social system. This approach is particularly suitable for large-scale industrial transfer of large enterprises, because the large enterprises have a stronger bargaining power, which can exert influence on the surrounding environment. large enterprises are often playing the leading role in Chinese regional transfer, and producing far-reaching influence in the regional industrial transfer. According to this theory, we discusses the main factors of the industrial location in Chinese industrial transfer, which will help to promote China's industrial transfer, establish the value chains of domestic manufacturing industries, strengthen regional resources integration, and then will realize the coordinated development of regional economy.

Model and index selection

Model

Midelfart et al. constructed an Industrial area selection model including the new classical theory and new economic geography , starting from the industrial technology and intermediate inputs, and elements of the consumption level area supply and demand condition. The basic form model is as follows:

$$\ln\left(r_i^k\right) = \alpha + \sum_j \beta[j]\left(x_i[j] - \bar{x}[j]\right)\left(y^k[j] - \bar{y}[j]\right) + \varepsilon_i^k$$

Expanding the relationship gives the estimating equation:

$$\ln\left(r_i^k\right) = \xi + \sum_j \left(\beta[j]x_i[j]y^k[j] - \beta[j]\bar{y}[j]x_i[j] - \beta[j]\bar{x}[j]y^k[j] + \bar{x}[j]\bar{y}[j]\right) + \varepsilon_i^k$$

The coefficients to be estimated are $\beta[j]$, measuring the importance of the interaction; and fiving level effects in the interaction; and a constant ξ, containing the sum(over j) of the products of all the level effects. The interactions are summarized in Table 1.

Table1: Interactions between region Characteristic and industry Characteristic

Classification	Serial number	Region Characteristic $x_i[j]$	Industry Characteristic $y^k[j]$
Enterprise production decision	J=1	market potential (marp)	Industry Association (inlink)
	J=2	market potential (marp)	Inter-Industry Association (othlink)
	J=3	Investment in fixed assets (fix)	Scale degree (scal)
Government policy influence	J=4	Expenditure (exp)	Operating profit (prof)
	J=5	financial tax income (va)	VAT payable (TEX)
	J=6	Infrastructure (infra)	Industry logistics cost (tran)
Social factors supply	J=7	population (peo)	Labor intensive (lab)
	J=8	financial development (fina)	Borrowed funds (mon)
	J=9	R&D input (rd)	Technology intensive (tech)
	J=10	Human capital (hum)	Technology intensive (tech)

Index selection

The explanatory variable r_i^k : We use the location quotient expressed by production output to reflect a certain industry in particular areas of the relative concentration.

Market potential: Per capita GDP.

Financial tax income is represented by regional fiscal expenditure divided by around GDP

Infrastructure: The Reciprocal of total length of highways and railways per capita, that is

$$\inf ra_i = \frac{peo_i}{Rail_i + Road_i}$$

Financial development: We use the financial institutions and foreign currency deposit balance at the end of the total loans accounted for the proportion of GDP.

Industry Association and Inter-Industry Association: We use the intermediate and other industries in the input output in 2007 input-output table is divided by the total industrial output value to represent.

Scale degree: The per capita net value of industrial fixed assets.

Operating profit: Proportion of industry operating profit in nation

Industry logistics cost: the industry, transportation and warehousing investment divided by the sum of total output value in 2007 Input-output table.

Labor intensive: the average value of each employee the enterprise inside the industry

Technology intensive: the industry R & D expenditures in the enterprise accounted for the proportion of output value in 2007 input-output table

Borrowed funds: table of financial investment divided by the annual fixed assets ratio in 2007 input-output

Other variables are derived the "Chinese statistical yearbook".

Analysis of the results of empirical research

The study sample data is the provincial level data of 2002-2011 in ten years. After China's accession to the WTO, the domestic mode of fragmentation production is impacted by international trade. The process of integration of the domestic market is accelerating and so is regional industrial transfer. Based on practice, we remove the samples of Tibet. And because China's input-output table don't show all the data of two digit manufacturing industries, we report 21 industries. The result is given in table2.

Table2 Effect of industrial transfer of location choice factors estimation

		pool	2002	2005	2008	2011
Enterprise production decision	mpinlink	-5.42e-05	-4.591e-04	-1.048e-04	-2.182e-04	-7.594e-04
		(-0.26)	(-0.31)	(-0.08)	(-0.11)	(-0.15)
	mpothlink	6.31e-07	-6.37e-06	1.00e-06	1.49e-06	1.167e-04*
		(0.44)	(-0.21)	(0.17)	(0.01)	(1.87)
	fixscal	3.292e-04***	-4.93e-05	1.293e-03***	4.85e-05	1.64e-04**
		(6.43)	(-0.40)	(4.35)	(1.54)	(2.19)
Government policy influence	expprof	4.724e-04***	1.113e-04*	1.349e-03***	1.197e-03***	4.632e-04***
		(11.56)	(1.77)	(2.91)	(4.06)	(2.91)
	vatax	-2.17e-08	3.07e-06***	7.71e-08	-1.32e-07	-3.60e-07*
		(-0.22)	(2.76)	(0.10)	(-0.25)	(-2.08)
	infratran	-1.6e-05	-1.95e-05	-6.26e-06	-8.77e-05	-3.737e-04
		(-0.49)	(-0.44)	(-0.41)	(-0.40)	(-0.28)
Social factors supply	peolab	-2.99e-05***	1.87e-05	-1.392e-04*	9.73e-06	-2.28e-05
		(-5.77)	(1.55)	(-1.81)	(0.10)	(-0.22)
	finamon	8.87e-05***	6.66e-06	-1.55e-06	7.91e-06*	5.42e-07***
		(5.11)	(0.55)	(-0.07)	(1.88)	(4.01)
	rdtech	1.04e-10	2.13e-08*	8.85e-09	8.16e-09	1.35e-08
		(0.08)	(1.99)	(0.72)	(0.68)	(0.50)
	humtech	-3.59e-07	-3.15e-05*	-1.32e-05	-1.89e-05	-3.75e-05
		(-0.11)	(-1.93)	(-0.78)	(-0.74)	(-0.61)
C		0.0301***	0.01054***	0.01189***	0.02117***	0.03368***
		(22.82)	(5.72)	(3.84)	(4.73)	(4.43)
R^2		0.2506	0.2782	0.2563	0.2238	0.1941
F-value		65.55	13.23	11.24	8.65	6.26
observed value		5638	815	814	809	797

Note: the values in the parentheses is the T value, * * *, * * *, respectively 10%, 5% and 1% level of significance.

We will first data of 2002-2011 hybrid estimation, mixing coefficient estimation results in Table 2 column second. From the model of the effect, R2 and F values are acceptable. The location choice of industrial transfer plays a leading factors are: interaction of regional fixed asset investment and industrial scale economy, regional government expenditure and industry operating profit interaction, regional population and industry labor intensity, regional financial development and borrowed capital scale interactions, which results in 1% statistical significance level while the statistical effect of other variables do not pass the significance test.

It is assumed parameter values do not change with time in the mixed data estimates. regional and industrial characteristics are changing with time passing which leads to variation of parameters values. Therefore, we need a comprehensive analysis of the estimation results by combining each year.

First, the interaction of local government subsidies and corporate profits has become the stability factors of transfer of location change in China's industrial transfer. Regardless of annual data or mixed data coefficients are positive. Mixed data display that the interaction of local government tax level and industry plays a reverse effect on industry location changes, but not significantly, which is consistent with the pre judgment. Coefficient of the reactions between regional infrastructure construction and industrial transportation cost is always negative, as expected, but the impact on the industry location change is not significant, while the interaction strength is higher than the tax factors.

Second, in the social support factors, regional labor factor which belongs to the classical comparative advantage level of location choice show significant inverse to the industrial location. But annual data have both positive and negative, which tell us that most industries have moved and began to go away from the crowded developed areas, "viscous" Phenomenon has gradually decayed. In contrast, the interaction of regional financial development and industrial scale of borrowed funds has significantly positive effect on industry location changes, and on 1% significant level, which indicate that the capital requirement has become a new important factor showed both in annual data and in mixed data in China's industrial transfer. The interaction coefficient of regional R&D investment and technological intensity is positive, as expected, but the statistical effect is not obvious. We derive that lack of cooperation on the R&D input efficiency is not high. While the interaction coefficient of human capital and technology intensive degree is always negative, inconsistent with the expected, which show that overall technical level and regional technology in China are poor endowment, which restricts industry location changes and spatial agglomeration.

Third, new economic geography theory is not fully applicable to the China manufacturing which emphasize the location choice of industry association. We will divide industry association into intra industry correlation and inter industry linkage. Increasing of correlation degree will push the agglomeration of relevant enterprises and industry. But the results did not appear in China's reality. From the annual data and mixed data, the interaction between potential market and Industry Association is the reverse effect, but not significant, indicating that intra industry division of labor has not formed the relative concentration of the region. Except 2005, data show that the interactions between market potential and industrial association have a positive role, and by 2011 a significant degree has reached 10%, which shows that industrial vertical relation of the manufacturing industry of our country is far more than the horizontal division of labor within the industry. In addition, the interactions between regional fixed asset investment and industrial economy of scale positive effect on industry location, in line with expectations, although the early effect is not ideal, but in followed years and mixed data is significantly positively which is in accordance with the point of view of the new economic geography theory.

Acknowledgement

This research was supported by the National Science Foundation of China under Grant 71303206.

References

[1] Martin, P and G.I.P. Ottaviano. Growing Locations: Industry Location in a Model of Endogenous Growth [J]. European Economics Review, 1999, 43(2):281-302

[2] Hayter Roger. The dynamics of industrial location: the factory, the firm and the production system. New York:John Wiley& Sons Ltd, 1997:265-279

[3] Pellenbarg,P.H., Van Wissen, L.J.G. and Van Dijk, J. Firm migration In P. McCann(Ed), Industrial Location Economics, Northampton, MA, USA: Edward Elgar, 2002

[4] Dixit, A. and J. Stiglitz, Monopolistic Competition and Optimum Product Diversity, American Economic Review, 1977, 67:297-308.

[5] Krugman, P.,History and Industry Location: the Case of the Manufacturing Belt, American Economic Review. 1991,81,:80-83.

[6] Krugman, P., Space: the Final Frontier, Journal of Economic Perspectives.1998, 12:161-174.

[8] Martin P. and C. Rogers, Industrial Location and Public Infrastructure, Journal ofInternational Economics. 1995,39: 335-351

[7] L.K.Cheng, Y.K.Kwan. What are the determinants of the location of foreign direct investment? The Chinese experience. Journal of International Economics, 2000, 51(2):379-400

[8] Paolo Mauro .Corruption and Growth. The quarterly Journal of economics 110,3,1995: 681-712

[9] Meyer Stamer, J., From Industrial Policy to Regional and Local Location Policy: Experience from Stanta Catarina-Brazil, Bull. Latin Am.Res.,18, 1999:451-468.

[10] Lall,Somik V., Location, Concentration, and Performance of Economic Activity in Brazil, World Bank Policy Research Working Paper 3268,2004.