**Market Access, Supply Access and Geographic Concentration of Manufactures in China: An Interregional Input-output Approach**

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**Abstract**: In past decades, manufacturing sectors continue to concentrate into the coastal regions which have enlarged regional disparity between the coastal regions and the inland areas in China. However, some manufacturing sectors have shown a trend to diffuse from the coastal areas to the inland areas recently. Exploring why geographical distribution of manufactures changed may help to gain an insight into China’s regional inequality. New Economic Geography (NEG) provides a new analysis framework which attributes the centripetal forces to market access (MA) and supply access (SA). This paper examined the effects of sector-based MA and SA on changes in spatial distribution of manufactures in China based on interregional input-output approach. Then the determinants of changes in spatial distribution of manufactures are examined with an emphasis with the effects of sector-based MA and SA. The results indicate that MA and SA indeed play an important role in determining spatial distribution of manufactures; however the effects of MA and SA vary across regions and different kinds of sectors. Location choices of the sectors with larger scale economies tend to be affected by MA more than other sectors. Meanwhile, spatial distribution of capital- intensive sectors is affected by SA more than labor-intensive sectors. That means for the industries with larger scale economies near larger markets is very important to save trade cost, however for the capital-intensive industries access to supply is very import for their location choice.

**Key Words:** market access; supply access; spatial distribution of manufactures; NEG; interregional input-output approach; China

**1. Introduction**

Regional inequality is one of the most important issues facing China because it is intertwined with China’s ideological and political struggles and ethnical, economic and social problems (Wei, 2007). During the reform period, the intensification of China’s coast-interior divide has drawn broad attention. The 12 coastal provinces[[1]](#footnote-1), with only 14% of China’s land area, produced 53% of the total GDP in 1978, which increased to 63% in 2006. Regional inequality in China mainly results from the uneven distribution of manufactures across regions during the reform period (Fan and Zhu, 2002; He et al., 2008). The share of the coastal region in industrial output increased from 50% in 1978 to 73% in 2006. Furthermore, most of manufacturing sectors are still tending to concentrate into the coastal areas in recent years. From 2002 to 2007, most of manufacturing sectors has increased their share of number of manufacturing enterprise in the coastal areas. However, some manufacturing sectors have shown a trend to diffuse from the coastal areas to the inland areas.

Actually changes in spatial distribution of manufacturing sectors result from location behavior of new entry firms. Literatures of New Economic Geography emphasize the relative importance of market access, supplier access, trade costs and factor costs for location choice of new entry firms (Krugman and Venables, 1995; Markusen and Venables, 1998, 2000; Redding and Venables, 2004). That is because firms purchase inputs not only from within their own province, but also from other provinces, and firms sell products not only to within their own province, but also to other provinces. New economic geography theories on firm location emphasize a tension between production costs and access to large final goods markets and input suppliers. Amiti and Javorcik (2008) shows that market access and supplier access are the most important factors affecting FDI location choice.

As industrial linkage is an important factor affecting firms’ demands for inputs purchase and its capacity for products provision, inter-industry linkages should be taken into account in measurement of market access and supplier access. Amiti and Javorcik (2008) used the coefficients from national input/output (I/O) table weighted by the inverse of distance as the proxy for inter-regional industrial linkages because they did not have data of industrial input/output across regions. Inter-regional input/output table may provide detailed information about inter and intra-industry linkages across regions. This paper attempts to calculate sector-based market access and supplier access based on an inter-regional input/output approach. Sector-based market and supplier access may provide exact information about industrial input/output across regions and then help to examine the effects of market and supplier access on changes in spatial distribution of manufacturing sectors.

The rest of this paper is organized as follows. Section 2 develops the measurement method of sector-based market and supplier access based on an inter-regional input/output approach. Section 3 provides background information on recent trend in geographic distribution of manufacturing sectors in China. Section 4 presents estimation results of the effects of sector-based market and supplier access on changing spatial distribution of manufacture, and Section 5 concludes.

**2. Data and Method**

2.1 Data sources

The statistic data used in our analysis are from National Bureau of Statistics in China which is based on 2-digit Chinese Industrial Classification. We only focus on manufacturing industries (Table 1). 30[[2]](#footnote-2) of manufacturing sectors are selected for analysis.

**Table 1 Sector Classification**

|  |  |
| --- | --- |
| Code | Industry |
| Sector1 | Agricultural non-staple Food Product Processing Industry |
| Sector2 | Food Manufacturing Industry |
| Sector3 | Drink Manufacturing Industry |
| Sector4 | Tobacco Products Industry |
| Sector5 | Textile Industry |
| Sector6 | Textile Clothing, Shoes and Hats Manufacturing Industry |
| Sector7 | Leather, Furs, Down and Related Products Industry |
| Sector8 | Timber Processing, Bamboo, Cane, Palm Fiber and Straw Products |
| Sector9 | Furniture Manufacturing Industry |
| Sector10 | Paper & Paper Products Industry |
| Sector11 | Printing Industry and Recording Media Industry |
| Sector12 | Cultural Educational and Sports Goods Industry |
| Sector13 | Petroleum processing, Coking and Nuclear fuels processing Industry |
| Sector14 | Chemical Materials and Chemical Products Industry |
| Sector15 | Manufacture of Medicines Industry |
| Sector16 | Chemical Fiber Manufacturing Industry |
| Sector17 | Rubber Products Industry |
| Sector18 | Plastic Product Industry |
| Sector19 | Nonmetal Mineral Products Industry |
| Sector20 | Ferrous Metal Smelting and Rolling Processing Industry |
| Sector21 | Non-ferrous Metal Smelting and Rolling Processing Industry |
| Sector22 | Metal Products Industry |
| Sector23 | Ordinary Machinery Industry |
| Sector24 | Special Equipment Manufacturing Industry |
| Sector25 | Transportation Equipment Manufacturing Industry |
| Sector26 | Electric Equipment and Machinery Industry |
| Sector27 | Manufacture of Communication Equipment, Computers and Other Electronic Equipment Industry |
| Sector28 | Instrumentation and Culture, Office Machinery Manufacturing |

Furthermore, we use China inter-regional IO (IRRO) table 2002 to measure sector-based MA and SA. There are 30 provinces and 60 sectors in this table. However we only focus on manufacturing sectors either. We related MA and SA of the 21 manufacturing sectors to the 30 industries.

2.2 Measurement of sector-based market and supply access

Amiti and Javorcik (2008) used Chinese National IO model 1997 to calculated MA and SA. Amiti’s approach is actually based on gravity model. We adopted Amiti’s approach basically but made some alteration. The main difference is the use of inter-regional IO model in this paper. There are two kinds of relationships need to be contained in MA and SA: the inter-industrial relationship and inter-regional relationship. In Amiti’s approach, inter-industrial relationship is represented by direct input coefficients from national IO model in China. They used distance between provinces to represent spatial relations. Market and demand capacity is represented by GDP share of each province. While in our analysis, the direct input coefficients in inter-regional IO model already covered both inter-industrial relationships and spatial relationships between different provinces. Also, we used total outputs and total inputs of different sectors to obtain the scale of markets and supply capacity of each province which is better than GDP share used in Amiti’s approach.

2.2.1 Supplier access

The supplier access effect comes through the intermediate inputs.

The SA of sector j in region P is defined as



Term  indicate supply capacity of sector i in region L which represent the capability for regional L to provide products of sector i to other sectors in other regions. XiL is total output of sector i in region L.

 is direct input coefficient which represents the inter-regional and inter-industrial relationships which comes from technological and spatial relationships.

Therefore, final *SAjP* represent accessibility of sector j in region p to supply which come from other sectors in other regions.

2.2.2 Market access

Products of one firm can be used for intermediate inputs for other firms, household consumptions and exportation. The difficulties and facilities for firms to supply their products can be reflected by market access MA.



The first part is access to intermediate demands, the second part is access to consumption market and the last part is access to exportation market. is the fraction of industry i’s output produced in L sold to sector j in region P. is the fraction of industry i’s output produced in L sold to final consumption k in region P.  indicate capacity of final consumption k in P. is the exportation fraction of industry i’s output produced in L. indicates the exportation capacity of sector i.

Therefore, final *MAiL* represent accessibility of sector i in region L to markets of other sectors in other regions, markets of final demands from other regions.

**3. Features of change in spatial distribution of manufactures**

Although all manufacturing sectors have concentrative distribution during the past few years, different sectors showed different change trend. Most of the manufactures still concentrated into coastal regions continuously, while the spatial distributions of some sectors have showed up an inverse trend.

We calculated Gini coefficients of sales revenue of certain industries from 2002 to 2007 to examine the general change trend of distribution of industries. Then we analyzed the share of different sectors in order to have detailed information about change in spatial distribution of manufacturing sectors. We combined 31 provinces and autonomous regions into four regions to examine the change in shares of sale revenue[[3]](#footnote-3).

1. Foods, textile and light industries

Gini coefficient of most of foods, textile and light industries in 2007 decreased compared to that in 2002 which means spatial distributions of these sectors are less concentrative in 2007 than that in 2002. Industries of which Gini coefficient decreased including: Food Manufacturing Industry, Drink Manufacturing Industry, Tobacco Products Industry, Textile Clothing, Shoes and Hats Manufacturing Industry and Leather, Furs, Down and Related Products Industry. Most of them are consumer goods industries.

Statistic results in table 3 shows shares of coastal areas of these sectors have decreased. For example, the share of coastal regions in Food Manufacturing Industry decreased about 10% from 2002 to 2007, meanwhile which of Western part had increased 6%. Similarly, shares of coastal regions in Textile Clothing, Shoes and Hats Manufacturing Industry, Leather, Furs, Down and Related Products Industry and Timber Processing, Bamboo, Cane, Palm Fiber and Straw Products also decreased.

**Table 2 Change in Gini coefficients across sectors**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Code | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2007-2002 |
| Sector1 | 0.55 | 0.57 | 0.58 | 0.58 | 0.59 | 0.59 | 0.03 |
| Sector2 | 0.58 | 0.53 | 0.53 | 0.56 | 0.56 | 0.55 | -0.02 |
| Sector3 | 0.51 | 0.53 | 0.52 | 0.53 | 0.53 | 0.5 | -0.01 |
| Sector4 | 0.57 | 0.56 | 0.56 | 0.75 | 0.78 | 0.56 | -0.01 |
| Sector5 | 0.73 | 0.73 | 0.75 | 0.76 | 0.76 | 0.76 | 0.03 |
| Sector6 | 0.78 | 0.79 | 0.78 | 0.78 | 0.78 | 0.77 | -0.01 |
| Sector7 | 0.78 | 0.78 | 0.78 | 0.78 | 0.78 | 0.76 | -0.02 |
| Sector8 | 0.62 | 0.61 | 0.63 | 0.63 | 0.65 | 0.64 | 0.02 |
| Sector9 | 0.67 | 0.72 | 0.74 | 0.74 | 0.73 | 0.73 | 0.06 |
| Sector10 | 0.66 | 0.68 | 0.69 | 0.69 | 0.7 | 0.68 | 0.03 |
| Sector11 | 0.60 | 0.63 | 0.64 | 0.62 | 0.63 | 0.62 | 0.03 |
| Sector12 | 0.83 | 0.83 | 0.83 | 0.84 | 0.84 | 0.82 | -0.01 |
| Sector13 | 0.57 | 0.56 | 0.55 | 0.54 | 0.54 | 0.52 | -0.04 |
| Sector14 | 0.57 | 0.58 | 0.58 | 0.59 | 0.61 | 0.59 | 0.02 |
| Sector15 | 0.49 | 0.48 | 0.47 | 0.49 | 0.5 | 0.49 | 0.01 |
| Sector16 | 0.79 | 0.79 | 0.80 | 0.85 | 0.86 | 0.82 | 0.03 |
| Sector17 | 0.67 | 0.68 | 0.69 | 0.75 | 0.74 | 0.7 | 0.04 |
| Sector18 | 0.72 | 0.73 | 0.73 | 0.72 | 0.72 | 0.72 | 0 |
| Sector19 | 0.58 | 0.56 | 0.57 | 0.58 | 0.6 | 0.59 | 0.01 |
| Sector20 | 0.53 | 0.54 | 0.55 | 0.55 | 0.56 | 0.55 | 0.02 |
| Sector21 |  |  |  | 0.48 | 0.51 | 0.52 |  |
| Sector22 | 0.71 | 0.72 | 0.72 | 0.72 | 0.73 | 0.71 | 0.01 |
| Sector23 | 0.67 | 0.7 | 0.69 | 0.68 | 0.69 | 0.68 | 0.01 |
| Sector24 | 0.65 | 0.65 | 0.65 | 0.65 | 0.65 | 0.62 | -0.03 |
| Sector25 | 0.6 | 0.6 | 0.57 | 0.55 | 0.58 | 0.57 | -0.03 |
| Sector26 | 0.72 | 0.75 | 0.74 | 0.74 | 0.74 | 0.72 | 0 |
| Sector27 | 0.78 | 0.81 | 0.82 | 0.83 | 0.82 | 0.81 | 0.04 |
| Sector28 | 0.74 | 0.77 | 0.77 | 0.79 | 0.78 | 0.76 | 0.01 |

1. Processing and manufacturing industries

Gini coefficient of most of processing and manufacturing industries increased which means the distributions of these sectors tend to be more concentrative.

As a whole, distribution of Processing and manufacturing sectors didn’t change much. But Coastal area’s advantages become more significant in New and Hi-tech Industry. For example, for Manufacture of Communication Equipment Computers and Other Electronic Equipment, share of Coastal area in this sector raised from 87% in 2002 to 94% in 2007.

(3) Raw material industries

Gini coefficient of most of raw material industries increased which means these sectors tend to spatially agglomerate.

Western parts of China are abundant in resources which are supposed to have advantages in developing raw material industries. However in recent years, these sectors grow faster in coastal regions which may because the large demand in coastal regions. We can see from table 3 that the shares of coastal regions continuously increased.

**Table 3 Shares of sales revenue in 2002, 2005 and 2007**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Code | 2002 | | | | 2005 | | | | 2007 | | | |
| Coastal | North eastern | Middle | Western | Coastal | North eastern | Middle | Western | Coastal | North eastern | Middle | Western |
| Sector1 | 0.58 | 0.10 | 0.19 | 0.13 | 0.57 | 0.11 | 0.18 | 0.14 | 0.55 | 0.12 | 0.20 | 0.13 |
| Sector2 | 0.69 | 0.05 | 0.18 | 0.08 | 0.62 | 0.07 | 0.19 | 0.12 | 0.58 | 0.08 | 0.21 | 0.13 |
| Sector3 | 0.56 | 0.07 | 0.17 | 0.20 | 0.57 | 0.07 | 0.17 | 0.19 | 0.51 | 0.07 | 0.21 | 0.21 |
| Sector4 | 0.34 | 0.03 | 0.27 | 0.36 | 0.14 | 0.03 | 0.31 | 0.51 | 0.36 | 0.03 | 0.29 | 0.31 |
| Sector5 | 0.82 | 0.02 | 0.11 | 0.04 | 0.85 | 0.02 | 0.09 | 0.04 | 0.83 | 0.01 | 0.10 | 0.05 |
| Sector6 | 0.91 | 0.02 | 0.06 | 0.01 | 0.92 | 0.02 | 0.05 | 0.01 | 0.89 | 0.03 | 0.07 | 0.01 |
| Sector7 | 0.90 | 0.02 | 0.06 | 0.02 | 0.88 | 0.02 | 0.06 | 0.03 | 0.84 | 0.03 | 0.09 | 0.04 |
| Sector8 | 0.71 | 0.11 | 0.14 | 0.05 | 0.68 | 0.11 | 0.15 | 0.06 | 0.65 | 0.11 | 0.17 | 0.07 |
| Sector9 | 0.81 | 0.07 | 0.09 | 0.03 | 0.85 | 0.06 | 0.06 | 0.03 | 0.79 | 0.08 | 0.07 | 0.05 |
| Sector10 | 0.75 | 0.04 | 0.14 | 0.07 | 0.77 | 0.03 | 0.14 | 0.06 | 0.75 | 0.03 | 0.16 | 0.06 |
| Sector11 | 0.70 | 0.03 | 0.16 | 0.11 | 0.72 | 0.03 | 0.14 | 0.11 | 0.72 | 0.04 | 0.15 | 0.09 |
| Sector12 | 0.96 | 0.01 | 0.03 | 0.00 | 0.97 | 0.01 | 0.02 | 0.00 | 0.95 | 0.01 | 0.04 | 0.00 |
| Sector13 | 0.51 | 0.24 | 0.16 | 0.10 | 0.50 | 0.21 | 0.18 | 0.11 | 0.51 | 0.18 | 0.19 | 0.11 |
| Sector14 | 0.68 | 0.08 | 0.14 | 0.10 | 0.69 | 0.07 | 0.12 | 0.12 | 0.68 | 0.07 | 0.14 | 0.11 |
| Sector15 | 0.62 | 0.10 | 0.16 | 0.12 | 0.61 | 0.09 | 0.17 | 0.12 | 0.59 | 0.10 | 0.19 | 0.12 |
| Sector16 | 0.85 | 0.03 | 0.10 | 0.02 | 0.91 | 0.02 | 0.06 | 0.01 | 0.86 | 0.04 | 0.07 | 0.03 |
| Sector17 | 0.75 | 0.06 | 0.13 | 0.06 | 0.83 | 0.05 | 0.08 | 0.04 | 0.78 | 0.05 | 0.12 | 0.05 |
| Sector18 | 0.83 | 0.04 | 0.09 | 0.04 | 0.83 | 0.04 | 0.09 | 0.05 | 0.82 | 0.05 | 0.09 | 0.04 |
| Sector19 | 0.57 | 0.05 | 0.26 | 0.11 | 0.64 | 0.06 | 0.20 | 0.11 | 0.60 | 0.07 | 0.23 | 0.10 |
| Sector20 | 0.55 | 0.12 | 0.20 | 0.13 | 0.59 | 0.10 | 0.18 | 0.13 | 0.60 | 0.09 | 0.20 | 0.12 |
| Sector21 |  |  |  |  | 0.44 | 0.04 | 0.26 | 0.26 | 0.45 | 0.04 | 0.31 | 0.21 |
| Sector22 | 0.85 | 0.04 | 0.08 | 0.04 | 0.86 | 0.04 | 0.07 | 0.03 | 0.83 | 0.05 | 0.08 | 0.04 |
| Sector23 | 0.74 | 0.08 | 0.10 | 0.07 | 0.76 | 0.08 | 0.10 | 0.05 | 0.73 | 0.10 | 0.11 | 0.06 |
| Sector24 | 0.72 | 0.05 | 0.18 | 0.05 | 0.72 | 0.07 | 0.16 | 0.06 | 0.66 | 0.08 | 0.18 | 0.07 |
| Sector25 | 0.51 | 0.19 | 0.19 | 0.11 | 0.58 | 0.14 | 0.16 | 0.12 | 0.60 | 0.14 | 0.15 | 0.11 |
| Sector26 | 0.83 | 0.04 | 0.09 | 0.04 | 0.85 | 0.04 | 0.09 | 0.03 | 0.82 | 0.04 | 0.10 | 0.04 |
| Sector27 | 0.87 | 0.04 | 0.05 | 0.04 | 0.96 | 0.01 | 0.02 | 0.01 | 0.94 | 0.01 | 0.02 | 0.02 |
| Sector28 | 0.86 | 0.03 | 0.07 | 0.04 | 0.91 | 0.02 | 0.05 | 0.02 | 0.87 | 0.03 | 0.07 | 0.03 |

**4. Effects of MA and SA on change in spatial distribution of manufacturing sectors**

In order to analyze the effects of MA and SA on changes in shares of both sales revenue and employees of different sectors, we constructed an econometric model to test our hypothesis.

4.1 Model Specification

Considering different characteristics of different sectors decided that they will be affected by MA and SA differently, we add interaction term of sector dummies into model to test the different effects. General model is defined as follows.



*CSPit* is change in shares of manufacturing sector i in province P. *PZP* is vector of attributes of region P. *SD* is dummy of attributes of different sectors.

(1) Regional attributes

Technological level, wage level, whether a province is abundant with natural resources and whether it is coastal region are considered to have potential influences on change in shares of manufacturing sectors in this province. We introduced these factors as control variables. Some producing cost variables, for example, land cost and environment cost, are also considered at first, however since they usually have high relativity with our key variables MA and SA, we excluded them from the econometric model.

(2) Industrial attributes

Whether a sector is with significant scale economic effects (scale) and whether a sector is relatively labor-intensive or capital-intensive industry (L/C) are under consideration. The changes in shares of different kinds of industries may be influenced by MA and SA differently.

4.2 Results

Firstly, interaction terms were not introduced into the model. We can acquire a general evaluation of the average effects of MA and SA (however, since MA and SA have a high correlation, they are introduced into model separately). Results of this model are shown in table 4. Generally speaking, MA and SA have positive and significant effects on change in spatial distribution of manufacturing sectors. Their effects are larger and more significant in determining the share change of employees.

Then we introduced interaction terms into econometric model to examine whether different sectors have their own characteristics in the effects of MA and SA on the change of their spatial distribution. There are two kinds of interesting results have showed in our results. (1) Location choice of the sectors with larger scale economies tend to be affected by MA more than other sectors. The reason for this result is that, for these industries, enlarging their scales is more profitable than constructing new branch of firms since they have a high fix cost. Therefore, near large markets is very important for them to save cost. (2) Spatial distribution of the capital-intensive sectors is affected by SA more than labor-intensive sectors. This may result from that some traditional capital-intensive industries are raw material industries, such as Petroleum processing, Coking and Nuclear fuels processing Industry. For these industries, access to supply is very import for their location. (3) Changes in shares of employees are affected by SA and MA significantly, however they seem irrelevant to different industrial characteristics.

Technological level of provinces and whether a region is a resource-abundant region have important influence on spatial distribution of manufacturing sectors. But these two determinants have insignificant influence on distribution change of employees. On the contrary, location of regions has significant influence on distribution of employees. This may be because coastal regions have better living conditions and more job opportunities.

**Table 4 Determinants of change in shares of manufacturing sectors**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Variables | | Change in shares of sales revenue | | | | | | Change in shares of employees | | | | | |
| (1） | （2） | （3） | （4） | （5） | （6） | （1） | （2） | （3） | （4） | （5） | （6） |
| MA | MA | 0.0123 \*\*\* |  | 0.011 \*\*\* |  | 0.015 \*\*\* |  | 0.029 \*\*\* |  | 0.029 \*\*\* |  | 0.028 \*\*\* |  |
|  | -3.193 |  | 2.965 |  | 3.497 |  | 7.839 |  | 7.773 |  | 6.812 |  |
| MA\*scale |  |  | 0.011  \* | |  |  |  |  | 0.405 |  |  |  |
|  |  |  | 1.801 |  |  |  |  |  | 0.067 |  |  |  |
| MA\*L/C |  |  |  |  | -0.006 |  |  |  |  |  | 0.001 |  |
|  |  |  |  |  | -1.440 |  |  |  |  |  | 0.238 |  |
| SA | SA |  | 0.009 \*\* |  | 0.008 \* |  | 0.013 \*\*\* |  | 0.036 \*\*\* |  | 0.036 \*\*\* |  | 0.035 \*\*\* |
|  |  | 2.259 |  | 1.931 |  | 2.944 |  | 9.582 |  | 9.426 |  | 8.168 |
| SA\*scale |  |  |  | 0.007 |  |  |  |  |  | -2.165 |  |  |
|  |  |  | 1.244 |  |  |  |  |  | -0.380 |  |  |
| SA\*L/C |  |  |  |  |  | -0.009\* | |  |  |  |  | 0.001 |
|  |  |  |  |  |  | -1.954 |  |  |  |  |  | 0.111 |
| Technology level | | 0.906 \*\* | 0.998 \*\* | 1.007 \* | 1.001 \*\* | 0.975 \*\* | 1.051 \*\* | -0.064 | -0.246 | -0.061 | -0.276 | -0.075 | -0.249 |
| -1.987 | 2.179 | 2.195 | 2.367 | 2.127 | 2.294 | -0.147 | -0.566 | -0.137 | -0.625 | -0.171 | -0.572 |
| WAGE | | -0.043 \*\*\* | -0.036 \*\*\* | -0.048 \*\*\* | -0.039 \*\*\* | -0.045 \*\*\* | -0.039 \*\*\* | -0.033 \*\*\* | -0.044 \*\*\* | -0.033 \*\*\* | -0.043 \*\*\* | -0.033 \*\*\* | -0.043 \*\*\* |
| -4.183 | -3.533 | -4.505 | -3.701 | -4.352 | -3.807 | -3.404 | -4.552 | -3.311 | -4.405 | -3.329 | -4.472 |
| Resource-dummy | | 0.001 \*\*\* | 0.001 \*\*\* | 0.001 \*\*\* | 0.001 \*\*\* | 0.001 \*\*\* | 0.001 \*\*\* | 0.001 | 0.003 | 0.001 | 0.003 | 0.001 | 0.003 |
| 4.687 | 4.991 | 4.709 | 4.979 | 4.690 | 4.983 | 0.310 | 1.146 | 0.310 | 1.149 | 0.310 | 1.146 |
| Location  Non-Coastal area dummy | | -0.037 | -0.075 | 0.011 | -0.051 | -0.009 | -0.044 | -0.801 \*\*\* | -0.759 \*\*\* | -0.799 \*\*\* | -0.766 \*\*\* | -0.805 \*\*\* | -0.761 \*\*\* |
| -0.173 | -0.354 | 0.052 | -0.238 | -0.045 | -0.208 | -3.910 | -3.773 | -3.869 | -3.791 | -3.914 | -3.769 |
| Notes: (a)\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. (b）second line is t-value | | | | | | | | | | | | | |

**5. Findings and Conclusions**

The findings from above analysis can be summarized as follows.

(1) In the past decade, spatial distribution of most sectors, especially processing and manufacturing industries, has become more concentrative in China. However, the shares of foods, textile and light industries in the coastal areas have decreased.

(2) Sector-based market access and supplier access that are calculated by using inter-regional input-output approach have positive and significant effects on change in spatial distribution of manufacturing sectors. Changes in shares of employees are affected by SA and MA significantly, however they seem irrelevant to different industrial attributes.

(3) Location choice of the sectors with larger scale economies tend to be affected by MA more than other sectors. That means for the industries with larger scale economies, near larger markets is very important to save trade cost. However, spatial distribution of capital-intensive sectors is affected by SA more than labor-intensive sectors. That implies for the capital-intensive industries, such as raw material industries, access to supply is very import for their location choice.

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1. The 12 coastal provinces (containing municipalities) are Liaoning, Hebei, Beijing, Tianjin, Shandong, Shanghai, Jiangsu, Zhejiang, Fujian, Guangdong, Guangxi and Hainan respectively. [↑](#footnote-ref-1)
2. Since location of manufacture of Tobacco is controlled by government in China. It is excluded from our sample. [↑](#footnote-ref-2)
3. The four regions are coastal area, Northeastern area, Middle and Western part of China. Coastal area includes Beijing, Tianjin, Shandong, Jiangsu, Zhejiang , Shanghai, Fujian, Guangdong, Hainan and Hebei. Northeastern area includes Heilongjiang, Liaoning and Jilin. Middle part includes Shanxi, Shaanxi, Henan, Anhui, Jiangxi, Hunan and Hubei. Western part includes Inner Mongolia, Gansu, Ningxia, Qinghai, Xinjiang, Xizang, Yunnan, Guizhou, Guangxi, Sichuan and Chongqing. [↑](#footnote-ref-3)