



## Choice for Leading Industry in Guangdong Industry

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### Abstract

Regional leading industry is the core power to impel development of regional economy; to push forward development of regional leading industry is a necessary channel for realizing efficient allocation of regional resources, and is the key to boosting rationalization and high-level of regional industrial structure. In this article, the authors establish index system of choice for industrial leading industry, apply factor analysis, and comprehensively assess and select leading industries in Guangdong Province according to factor analysis model.

**Keywords:** Industry, Regional leading industry, Factor analysis, Industrial choice

Regional leading industry refers to a specialized industry or industry cluster that has/have broad market prospects and strong technical progress ability, represents/represent direction or tendency of industrial structural evolution, can spur and promote the entire regional economic development in a certain period of a local economic development. Studies at home and abroad indicate that, regional leading industry is a core power to impel development of regional economy; to push forward development of regional leading industry is a necessary channel for realizing efficient allocation of regional resources, and is the key to boosting rationalization and high-level of regional industrial structure. The rapid growth of industrial economy is the primary motive of rapid growth of the entire economy. However, a comprehensive view of studies on choice for intra-regional leading industry in Guangdong Province, we can find that most studies lay particular stress on qualitative analysis, with relatively fewer quantitative analysis and studies. Therefore, the authors of this article adopt the factor analysis method, select and confirm those leading industries in Guangdong Province with a combination of qualitative analysis and quantitative analysis.

## 1. Establishment of choice of index system for leading industries

Currently, there still exist differences between choice and assessment studies in regional leading industries, but there is also some commonness. This article establishes the six index systems for assessing and choosing regional leading industries (See Table 1). These index systems mainly refer to the model in “Model of Choice for Regional Leading Industry and Its Empirical Study” by Zhang, Xiaoping, and make some corrections based on this model.

**INSERT TABLE 1 Here**

## 2. Application and comprehensive evaluation of the model

This article applies factor analysis to comprehensively assess and select leading industries in Guangdong Province.

### 2.1 Application of the model

We can calculate the factor scores and comprehensive scores of all industries in Guangdong Province (See Table 2), according to factor score computation module (1-1) and the comprehensive score computation module (1-2), the variance contribution rate of all major factors, and loading factors of primary indices within all factors;

$$F_{ji} = A_{j1}X_{1i} + A_{j2}X_{2i} + A_{j3}X_{3i} + \dots + A_{jp}X_{pi} \quad (1-1)$$

$$F_j = F_{1j} + F_{2j} + \dots + F_{mj} \quad (1-2)$$

In formula 1-1,  $X_{1i}, X_{2i}, X_{3i}, \dots, X_{pi}$  are respectively the value of the original variable for the sample of No.  $i$ ,  $A_{j1}, A_{j2}, A_{j3}, \dots, A_{jp}$  represent respectively the factor value coefficient between the factor of No.  $j$  and the original variable of No.  $1, 2, 3, \dots, p$ .

In formula 1-2,  $F_j$  ( $j=1, 2, 3, \dots, 35$ ) is the comprehensive score of each industry;  $F_{mj}$  ( $m=1, 2, 3, 4, 5, 6$ ) refers to the product of each primary factor value and its corresponding factor variance contribution rate.

**INSERT TABLE 2 HERE**

We can calculate the industries with the comprehensive score ranking the first twelve according to the overall conditions of factor score of all industries in Guangdong (See Table 2). As for choice for leading industries in Guangdong, we should avoid too high comprehensive score caused by too high factor score of all industries, and should not determine those as leading industries with a simply high comprehensive score.

**INSERT TABLE 3 HERE**

### 2.2 Comprehensive assessment of candidate industries in leading industries in Guangdong

Based on the above analysis results, we make a sequencing on available data. We classify alternative industries into five levels according to a simple statistic method, namely, the frequency of industries ranking the first twelve in all indices: the first level is a frequency above 5 times, the second level 4 times, the third level 3 times, the fourth level 2 times, and the fifth level 1 times. Industries at the fifth level just stand out in part of indices, so they are temporarily excluded from analysis of leading industries. Frequency of industries ranking the first twelve in the six factors is seen as Table 4.

**INSERT TABLE 4 HERE**

In the following, we are going to analyze the above industries at the four levels in details, and sort out leading industries that are adequate for the industrial development of Guangdong Province.

At the first level, Communication equipment, computer, and other electronic equipment manufacturing stands out respectively in output scale, and social benefit, especially ranking the second in geographic predominance and the third in social benefit predominance. Development of Communication equipment, computer, and other electronic equipment manufacturing has a strong external competitiveness, which accords with the export-oriented economy in Guangdong, and which, in addition, helps relieve the austere employment pressure in Guangdong. Therefore, Communication equipment, computer, and other electronic equipment manufacturing should be vigorously developed in the future in Guangdong.

At the second level, Electrical apparatus and equipment manufacturing not only has its predominance in output scale and economic benefit, but has its geographic competitiveness and technical driving predominance, which complies with requirements of the new industrialization path, and which should be defined as the leading industry to be prioritized in the future in Guangdong. Transport and communication Facilities manufacturing has also a good growth potential predominance in addition to its output scale predominance and economic benefit predominance. Furthermore, in terms of the industrialization progress, Transport and communication Facilities manufacturing is a significant symbol that a developed country has entered the high-level period of industrialization. Therefore, development of Transport and communication Facilities manufacturing is very important in propelling transformation of Guangdong from “Second, Third, First” to the industrialization anaphase of “Third, Second, First”, and it should be regarded as the leading industry to be significantly supported. In addition to its predominance in output scale, Metal product industry is at an upper-middle level in other aspects, which indicates that Metal product industry belongs to the industry with better

comprehensive level. What's more, Metal product industry is an advanced industry of real estate and mechanical equipment manufacturing, which has a great influence upon industry chain, and should be considered the leading industry in Guangdong. Although Ferrous metal mining & dressing has better comprehensive benefit, still it can't be the leading industry in Guangdong because it's a non-renewable resource, not in accordance with the principle of sustainable development.

At the third level, although Nonferrous metal mining & dressing has better industrial growth potential and technical driving predominance, still it can't be the leading industry in Guangdong because it doesn't comply with the principle of sustainable development. Fuel Gas production and supply has a strong social growth potential, geographic predominance and social benefit, but it is not fully developed in the industrial scale and economic benefit, and its capacity of technical driving is relatively weak, so it can't be the leading industry in Guangdong. Nonferrous metal mining & dressing has its technical driving predominance, but it doesn't accord with the principle of sustainable development, so it can't be the regarded as the leading industry in Guangdong. Nonferrous metal smelting and rolling processing has strong industrial growth potential and technical driving predominance, but its features of high consumption of energy and high pollution don't comply with requirements of the new industrialization path, so it can't be the leading industry in Guangdong. Chemical raw material and chemicals manufacturing has its industrial scale predominance and economic benefit, and, besides, it has a great growth potential predominance. With transfer of the international chemical engineering, status of the chemical industry seems more and more significant. Therefore, it should be the leading industry to be particularly supported in the future in Guangdong. Electricity and heat Production and supply has better industrial scale, economic benefit predominance and industrial growth potential predominance, but it ranks the lowest in the geographic predominance and technical progress within the 35 industries. Therefore, it can't be the leading industry in Guangdong.

At the fourth level, Exploitation of petroleum and natural gas has better economic benefit and social benefit, and its geographic predominance and growth potential belong to the upper-middle level. Petroleum and natural gas are universally recognized most important energy resources. And ocean contains most of petroleum and natural gas resources in the world. Development of ocean energy resource industry is helpful for sufficient use of resources and for mitigating status quo of energy shortage. Therefore, Guangdong Province should positively support petroleum and natural gas as the leading industry. Plastic product industry has better output scale and geographic predominance, but it causes serious environmental pollution, which does not comply with sustainable development principle, so it can't be regarded as the leading industry in Guangdong. Furniture Manufacturing has relatively good geographic predominance, but its industrial scale is weak, without good economic benefit and technically innovative ability, so it can't be classified as the leading industry in Guangdong. Stationery and sporting goods manufacturing has better geographic competitiveness predominance and economic benefit, but it's still impossible to form a scale merit. Its technically innovative ability is weak, and its contribution to the social benefit is not obvious, so it can also not be regarded as the leading industry in Guangdong. Textile clothing, shoe and cap manufacturing has its geographic predominance and social benefit, but it belongs a traditional industry, without good technically innovative ability and social benefit, so it can't be regarded as the leading industry in Guangdong. Mechanical manufacturing of instrument, cultural and office supplies has its geographic predominance and social benefit, but in general, its foundation of industrial scale is weak, with low technical progress ability and growth potential, so it can't be classified as the leading industry in Guangdong. Special hardware manufacturing and Universal equipment manufacturing both have good technically innovative ability and social benefits. From 2005 to 2007, the average growth speed of their output attain respectively 31% and 29%, with a powerful growth trend, so they should be the leading industries to be significantly supported in the future in Guangdong. Chemical fiber manufacturing has strong technically innovative ability and growth potential, and Chemical fiber manufacturing and Chemical raw material and chemicals manufacturing are collectively called Chemical Industry, because they have relatively strong association benefit. Therefore, Chemical fiber manufacturing should also be classified as the leading industry in Guangdong. Water production and supply has its growth potential predominance, but its output scale, technically innovative ability and social benefit can't embody characteristics of the new industrialization, so it can't become the leading industry. Ferrous metal smelting and rolling processing has relatively good output scale and growth potential predominance, but it causes serious environmental pollution, and great consumption of energy resources, which doesn't comply with status quo of energy shortage in Guangdong, so it can't become the leading industry in Guangdong.

### 3. Conclusions

From the above analysis, it is clear those leading industries that should be prioritized include: Communication equipment, computer, and other electronic equipment manufacturing, Electrical apparatus and equipment manufacturing, Transport and communication Facilities manufacturing, Metal product industry, Chemical raw material and chemicals manufacturing, Special hardware manufacturing, Universal equipment manufacturing, Chemical fiber manufacturing, and Exploitation of petroleum and natural gas.

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Table 1. The six index systems of choice for leading industries in Gaungdong Province

| Basic principle                     | Corresponding index               | Formula                                                                                                                                                                                                                                |
|-------------------------------------|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Output scale                        | Proportion of output value        | $\text{Scale} = \frac{\text{output value of an industry}}{\text{output value of all industries}}$                                                                                                                                      |
|                                     | Proportion of sales revenue       | $\text{Proportion of sales revenue} = \frac{\text{sales value of an industry}}{\text{total sales values of all industries}}$                                                                                                           |
|                                     | Proportion of total assets        | $\text{Proportion of total assets} = \frac{\text{total asset value of an industry}}{\text{total asset values of all industries}}$                                                                                                      |
|                                     | Proportion of profit and tax      | $\text{Proportion of profit and tax} = \frac{\text{profit and tax amount of an industry}}{\text{profit and tax amount of all industries}}$                                                                                             |
|                                     | Proportion of fixed assets        | $\text{Proportion of fixed assets} = \frac{\text{total fixed assets of an industry}}{\text{total fixed assets of all industries}}$                                                                                                     |
|                                     | Proportion of ownership interest  | $\text{Proportion of ownership interest} = \frac{\text{ownership interests of an industry}}{\text{ownership interests of all industries}}$                                                                                             |
| Economic benefit of industry        | Overall labour productivity       | $\text{overall labour productivity} = \frac{\text{total output value of an industry}}{\text{employees of the industry}}$                                                                                                               |
|                                     | Profit-tax rate of fixed assets   | $\text{Profit-tax rate of fixed assets} = \frac{\text{profit and tax amount of an industry}}{\text{total fixed assets of the industry}}$                                                                                               |
|                                     | EVAR of fixed assets              | $\text{EVAR of fixed assets} = \frac{\text{value added of an industry}}{\text{total fixed assets of the industry}}$                                                                                                                    |
|                                     | Total asset contribution factor   | $\text{Total asset contribution factor} = \frac{\text{total profits} + \text{total scots} + \text{interest expense}}{\text{average asset amount}}$                                                                                     |
|                                     | Profit-tax rate of output value   | $\text{Profit-tax rate of output value} = \frac{\text{profit-tax amount of an industry}}{\text{total output value of the industry}}$                                                                                                   |
|                                     | profit ratio of sales             | $\text{profit ratio of sales} = \frac{\text{profit amount of an industry}}{\text{sales value of the industry}}$                                                                                                                        |
| Geographic predominance of industry | Location quotient of value added  | $\text{Location quotient of value added} = \frac{\text{value added of an industry in a region} / \text{total value added in the region}}{\text{value added of the industry in the country} / \text{total value added in the country}}$ |
|                                     | Location quotient of total output | $\text{Location quotient of total output} = \frac{\text{output value of an industry in a region} / \text{total output value in the region}}{\text{output value of the industry in the country} / \text{output value in the country}}$  |
|                                     | Location quotient of employees    | $\text{Location quotient of employees} = \frac{\text{employees in an industry in a region} / \text{total employees in the region}}{\text{employees in the industry in the country} / \text{total employees in the country}}$           |

|                                |                                                    |                                                                                                                                                                                                                     |
|--------------------------------|----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                | Market share                                       | Market share = $\frac{\text{sales value of an industry in a region}}{\text{sales value of the industry in the country}}$ / $\frac{\text{total sales value in the region}}{\text{total sales value in the country}}$ |
| Social benefit of industry     | Employment proportion                              | Employment proportion = $\frac{\text{employees in an industry in a region}}{\text{total employees in the industry in the region}}$                                                                                  |
|                                | Elastic coefficient of employment of gross product | Elastic coefficient of employment of gross product = $\frac{\text{growth speed of employees in an industry}}{\text{growth speed of the total output in the industry}}$                                              |
|                                | Elastic coefficient of employment of value added   | Elastic coefficient of employment of value added = $\frac{\text{growth speed of employees in an industry}}{\text{growth speed of value added in the industry}}$                                                     |
| Growth potential of industry   | Increment speed of output value                    | Increment speed of output value = $\sqrt{\frac{\text{total output of report period}}{\text{total output of base period}}} - 1$                                                                                      |
|                                | Increment speed of value added                     | Increment speed of value added = $\sqrt{\frac{\text{value added of report period}}{\text{value added of base period}}} - 1$                                                                                         |
|                                | Increment speed of fixed assets                    | Increment speed of fixed assets = $\sqrt{\frac{\text{fixed assets of report period}}{\text{fixed assets of base period}}} - 1$                                                                                      |
|                                | Increment speed of profit and tax                  | Increment speed of profit and tax = $\sqrt{\frac{\text{profit and tax amount of report period}}{\text{profit and tax amount of base period}}} - 1$                                                                  |
|                                | Increment speed of sales revenue                   | Increment speed of sales revenue = $\sqrt{\frac{\text{sales value of report period}}{\text{sales value of base period}}} - 1$                                                                                       |
| Technical progress of industry | Contribution rate of technical progress            | Contribution rate of technical progress = $\sqrt{\frac{\text{growth speed of technical progress}}{\text{growth speed of total output}}} - 1$                                                                        |

Table 2. Factor score and comprehensive score of each industry in Guangdong in 2007

| Industry                                                                        | Comprehensive score | F1    | F2    | F3    | F4    | F5    | F6    |
|---------------------------------------------------------------------------------|---------------------|-------|-------|-------|-------|-------|-------|
| Exploitation of petroleum and natural gas                                       | 0.99                | -0.41 | 2.24  | 4.91  | -0.26 | 0.05  | -0.94 |
| Ferrous metal mining & dressing                                                 | 0.08                | -0.33 | 0.80  | 0.08  | -1.04 | 0.36  | 1.51  |
| Nonferrous metal mining & dressing                                              | 0.43                | -0.22 | 1.89  | -0.60 | -0.62 | 1.42  | 2.35  |
| Nonmetalliferous ore mining & dressing                                          | -0.26               | -0.54 | 0.01  | -0.57 | -0.66 | 0.12  | 0.66  |
| Agricultural and sideline processing                                            | -0.30               | -0.29 | -0.36 | 0.05  | -0.62 | -0.73 | 0.09  |
| Food manufacturing                                                              | -0.32               | -0.43 | 0.14  | -0.36 | -0.33 | -0.85 | -0.43 |
| Beverage manufacturing                                                          | -0.37               | -0.49 | -0.55 | 0.69  | -0.74 | -0.98 | -0.64 |
| Smoking material product industry                                               | 0.18                | -0.31 | 4.40  | -2.11 | 0.15  | -0.87 | -1.04 |
| Textile industry                                                                | -0.39               | -0.04 | -0.63 | -0.40 | -0.44 | -0.85 | -0.64 |
| Textile clothing, shoe and cap manufacturing                                    | -0.04               | -0.27 | -0.29 | 0.05  | 0.86  | -0.26 | -0.21 |
| Leather, pelt, and down products industry                                       | -0.14               | -0.53 | -0.20 | -0.31 | 1.16  | -0.49 | -0.26 |
| Wood processing and bamboo, rattan, palm and straw-made product industry        | -0.26               | -0.52 | -0.35 | -0.12 | -0.50 | -0.16 | 0.62  |
| Furniture Manufacturing                                                         | -0.03               | -0.72 | -0.26 | 0.02  | 1.41  | 0.10  | -0.03 |
| Paper & Paper Products                                                          | -0.29               | -0.29 | -0.67 | -0.09 | -0.03 | -0.27 | -0.63 |
| Printing industry and record medium reproduction                                | -0.28               | -0.69 | -0.46 | -0.10 | 0.84  | -0.58 | -0.77 |
| Stationery and sporting goods manufacturing                                     | -0.03               | -0.85 | 0.02  | -0.65 | 2.46  | -0.04 | -0.59 |
| Oil processing, coking plant and fuel processing                                | -0.26               | -0.11 | -0.22 | -0.39 | -0.65 | -0.45 | 0.20  |
| Chemical raw material and chemicals manufacturing                               | 0.10                | 0.80  | 0.02  | 0.01  | -0.75 | 0.41  | -0.74 |
| Medicine manufacturing                                                          | -0.52               | -0.41 | -0.30 | -0.13 | -0.95 | -1.59 | -0.28 |
| Chemical fiber manufacturing                                                    | -0.15               | -0.43 | -0.61 | -0.20 | -0.80 | 1.17  | 1.11  |
| Rubber product industry                                                         | -0.43               | -0.64 | -0.91 | 0.26  | -0.44 | -0.46 | -0.35 |
| Plastic product industry                                                        | 0.10                | 0.02  | -0.28 | -0.11 | 1.09  | 0.03  | 0.03  |
| Nonmetallic minerals product industry                                           | -0.11               | 0.27  | -0.46 | -0.25 | -0.45 | -0.02 | 0.05  |
| Ferrous metal smelting and rolling processing                                   | -0.28               | -0.07 | -0.72 | -0.24 | -1.05 | 0.22  | 0.29  |
| Nonferrous metal smelting and rolling processing                                | 0.05                | -0.07 | -0.19 | -0.13 | -0.47 | 0.24  | 2.16  |
| Metal product industry                                                          | 0.22                | 0.24  | -0.18 | 0.01  | 0.87  | 0.17  | 0.55  |
| Universal equipment manufacturing                                               | -0.16               | -0.17 | -0.87 | 1.04  | -0.85 | -0.57 | 0.58  |
| Special hardware manufacturing                                                  | -0.13               | -0.17 | -0.37 | 0.17  | -0.45 | -0.06 | 0.32  |
| Transport and communication facilities manufacturing                            | 0.35                | 0.93  | 0.33  | -0.01 | -0.55 | 0.83  | 0.41  |
| Electrical apparatus and equipment manufacturing                                | 0.63                | 1.52  | 0.16  | -0.17 | 1.42  | -0.39 | 1.02  |
| Communication equipment, computer, and other electronic equipment manufacturing | 1.46                | 4.10  | -0.08 | 0.82  | 1.78  | -0.67 | 1.12  |
| Mechanical manufacturing of instrument, cultural and office supplies            | -0.11               | -0.58 | -0.27 | 0.05  | 1.37  | -0.71 | -0.44 |
| Electricity and heat Production and supply                                      | 0.17                | 2.80  | -0.11 | -0.94 | -2.00 | 0.98  | -2.88 |
| Fuel Gas production and supply                                                  | 0.34                | -0.67 | -0.44 | 0.21  | 1.07  | 4.40  | -1.12 |
| Water production and supply                                                     | -0.23               | -0.44 | -0.22 | -0.48 | 0.20  | 0.53  | -1.11 |

Table 3. Industries with the comprehensive score ranking the first twelve

| Ranking | Industry                                                                        | Comprehensive score |
|---------|---------------------------------------------------------------------------------|---------------------|
| 1       | Communication equipment, computer, and other electronic equipment manufacturing | 1.46                |
| 2       | Exploitation of petroleum and natural gas                                       | 0.99                |
| 3       | Electrical apparatus and equipment manufacturing                                | 0.63                |
| 4       | Nonferrous metal mining & dressing                                              | 0.43                |
| 5       | Transport and communication Facilities manufacturing                            | 0.35                |
| 6       | Fuel Gas production and supply                                                  | 0.34                |
| 7       | Metal product industry                                                          | 0.22                |
| 8       | Smoking material product industry                                               | 0.18                |
| 9       | Electricity and heat Production and supply                                      | 0.17                |
| 10      | Chemical raw material and chemicals manufacturing                               | 0.10                |
| 11      | Plastic product industry                                                        | 0.10                |
| 12      | Ferrous metal mining & dressing                                                 | 0.08                |

Table 4. Frequency of industries ranking the first twelve in the six factors

| L<br>E<br>V<br>E<br>L | Industry                                                                        | Ranking of all factors |                  |                |                         |                  |                                 | Frequency of the first twelve |
|-----------------------|---------------------------------------------------------------------------------|------------------------|------------------|----------------|-------------------------|------------------|---------------------------------|-------------------------------|
|                       |                                                                                 | Scale predominance     | Economic benefit | Social benefit | Geographic predominance | Growth potential | Technical progress predominance |                               |
| 1                     | Communication equipment, computer, and other electronic equipment manufacturing | 1                      | 11               | 3              | 2                       | 28               | 4                               | 5                             |
| 2                     | Electrical apparatus and equipment manufacturing                                | 3                      | 6                | 22             | 3                       | 22               | 6                               | 4                             |
|                       | Transport and communication Facilities manufacturing                            | 4                      | 5                | 15             | 23                      | 5                | 11                              | 4                             |
|                       | Metal product industry                                                          | 7                      | 13               | 14             | 9                       | 11               | 10                              | 4                             |
|                       | Ferrous metal mining & dressing                                                 | 20                     | 4                | 8              | 33                      | 8                | 3                               | 4                             |
| 3                     | Nonferrous metal mining & dressing                                              | 11                     | 14               | 21             | 21                      | 9                | 2                               | 3                             |
|                       | Fuel Gas production and supply                                                  | 32                     | 26               | 6              | 8                       | 1                | 34                              | 3                             |
|                       | Nonmetalliferous ore mining & dressing                                          | 29                     | 10               | 31             | 27                      | 12               | 7                               | 3                             |
|                       | Nonferrous metal smelting and rolling                                           | 11                     | 14               | 21             | 21                      | 9                | 2                               | 3                             |

|   |                                                                      |    |    |    |    |    |    |   |
|---|----------------------------------------------------------------------|----|----|----|----|----|----|---|
|   | processing                                                           |    |    |    |    |    |    |   |
|   | Chemical raw material and chemicals manufacturing                    | 5  | 8  | 13 | 29 | 7  | 29 | 3 |
|   | Electricity and heat Production and supply                           | 2  | 12 | 34 | 35 | 4  | 35 | 3 |
| 4 | Exploitation of petroleum and natural gas                            | 21 | 2  | 1  | 15 | 14 | 31 | 2 |
|   | Plastic product industry                                             | 8  | 20 | 18 | 7  | 15 | 17 | 2 |
|   | Furniture Manufacturing                                              | 34 | 18 | 12 | 4  | 13 | 18 | 2 |
|   | Stationery and sporting goods manufacturing                          | 35 | 9  | 33 | 1  | 17 | 25 | 2 |
|   | Textile clothing, shoe and cap manufacturing                         | 16 | 21 | 10 | 10 | 20 | 19 | 2 |
|   | Mechanical manufacturing of instrument, cultural and office supplies | 30 | 19 | 9  | 5  | 29 | 24 | 2 |
|   | Special hardware manufacturing                                       | 14 | 25 | 7  | 19 | 18 | 12 | 2 |
|   | Chemical fiber manufacturing                                         | 24 | 30 | 23 | 30 | 3  | 5  | 2 |
|   | Universal equipment manufacturing                                    | 13 | 34 | 2  | 31 | 26 | 9  | 2 |
|   | Water production and supply                                          | 25 | 16 | 30 | 12 | 6  | 33 | 2 |
|   | Ferrous metal smelting and rolling processing                        | 10 | 33 | 24 | 34 | 10 | 13 | 2 |