

# The Selection of Henan Support Industry

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## 1. Index system of regional support industry

① Income-elasticity demand index. Supposed  $y$  is national income,  $x_i$  is the demand quantity produced by the  $i$ th sector, then the income-elasticity of the  $i$ th sector described as:  $\varepsilon_i = y/x_i$ .

② Growth ratio. Assume  $x_i^0$  is the primal demand quantity of the  $i$ th sector,  $r_i$  is the average growth rate, then the quantity demanded by the  $i$ th sector in period  $t$  is described as  $x_i^t = x_i^0(1+r_i)^t$ .

③ Technical advance index. Supposed  $x_i$  is the total industry income of the  $i$ th sector,  $L_i$  is the labor input in the  $i$ th sector,  $K_i$  is the financial input, then Cobb-Douglas production function  $x_i = A e^{bt} L_i^\alpha K_i^\beta$ , where  $b$  stands for technical advance parameter, given the output growth ratio  $\eta_i = \dot{x}_i/x_i$ , then  $\eta_i = b + \alpha \dot{L}_i/L_i + \beta \dot{K}_i/K_i$ .

④ Index of industry incidence degree. It is divided into two class: forward incidence and backward incidence, which is generally called in fluctuation effect. Both of them refer to the change extent of the input-output quantity in other industry caused directly or indirectly by certain industry sector. Responded coefficient and influencing coefficient are two generally used index, supposed  $b_{ij}$  is the total consumption coefficient of the input-output weight that analyzed,  $n$  the sector number, then responded coefficient of the  $i$ th sector as follows:

$$\mu_i = \frac{\sum_{j=1}^n b_{ij}}{\frac{1}{n} \sum_{i=1}^n \sum_{j=1}^n b_{ij}}, \text{ The influence coefficient of the } i\text{th sector is } v_j = \frac{\sum_{i=1}^n b_{ij}}{\frac{1}{n} \sum_{i=1}^n \sum_{j=1}^n b_{ij}}$$

Table 1 Index system of regional leading industry

Index	Symbol	Weight	General	Auxiliary	Leading
1 income-elasticity	$\varepsilon_i$	2.4	$\varepsilon_i < 0.3$	$0.3 \leq \varepsilon \leq 0.8$	$\varepsilon_i > 0.8$
2 growth rate	$r_i$	2.4	$r_i < 10\%$	$10 \leq r_i \leq 25\%$	$r_i > 25\%$
3 contribute rate of technical progress	$\eta_i$	2.4	$\eta_i < 5\%$	$5\% \leq \eta_i \leq 20\%$	$\eta_i > 20\%$
4 responded coefficient	$\mu_i$	1.4	$\mu_i < 1$	$1 \leq \mu_i \leq 2$	$\mu_i > 2$
5 influence coefficient	$v_i$	1.4	$v_i < 1$	$1 \leq v_i \leq 2$	$v_i > 1.2$

## 2. Index model of regional leading industry

The scientific synthetic method is imperative to get a composite index, which can reflect the industry. The fixed weight cluster, on the basis of the grey cluster, is applied to make up the defects of the method of composite exponent and grade.

Assume that the measuring value of the  $i$ th industry of index  $j$  is  $x_{ij}$ ,  $j=1,2,3,4,5$ , the composite valuation of the  $i$ th industry can be performed according to the following steps:

Step1, Divide the value in its range of each index.

Step2, construct the dependent function of the  $j$  index of the  $k$  class.

Step3, Compute the composite value about the class, where  $\sigma_i^k = \sum_{j=1}^6 f_j^k(x_{ij}) \cdot \eta_j, \dots, k = 1,2,3$

Where  $f_j^k(x_{ij})$  is called the dependent degrees for the  $i$ th industry which belongs to the  $k$ th class,

$\eta_j$  is the weight of the  $j$ th index in the composite evaluation.

Step4, According to  $\max_{1 \leq k \leq 3} \{\sigma_i^k\} = \sigma_i^{k^*}$ , divide the level of the same class according to the composite evaluation value,

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One can get the composite evaluation value of the leading industry in Henna province by means of fuzzy fixed weight cluster.

Table 2 The result of the sector composite evaluation

Sector	Result	Sector	Result
Agriculture	Leading	Machinery	Leading
Coal mining and dressing	Auxiliary	Transport Equipment	Leading
Extraction of petroleum and natural gas	Auxiliary	Electric Equipment and Machinery	Leading
Mining and dressing of metals	Leading	Electronic and Telecommunications Equipment	Leading
Mining and dressing of nonmetal minerals	General	Instruments, Metres	Leading
Food processing and production	Leading	Machinery Equipment Repairment	General
Textile	General	Other	Auxiliary
Sewing, leather related products	General	Construction	General
Timber processing and furniture manufacturing	Auxiliary	Transportation of Postal services	Auxiliary
Papermaking and Cultural, Educational Goods	General	Commercial	General
Production and Supply of Electric Power	Auxiliary	Food, Beverage	Auxiliary
Petroleum Processing, Coal and Gas	Auxiliary	Transport	General
Chemical	Leading	Public and Resident Services	Auxiliary
Construction Material and other Nonmetals	General	Cultural, Educational, Scientific Research	Auxiliary
Smelting and Processing of Metals	General	Banking and Insurance	Auxiliary
Metal Products	Auxiliary	Administration	General