Identification and Analysis of Economic Model Based on Longnan Southeast

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Abstract. Through the establishment of the environmental identification and diagnosis model of the regional economic model, we can determine the usable elements, exploitable elements and restricted elements according to the differences in the utilization degree, development potential and constraint strength of each element from many environmental factors. And deeply understand the structure of the system, find out the root causes of the problems in the real system and the way to solve the problem, breakthrough. Based on the identification and analysis of the economic model of Southeast longnan, through the analysis of the identification model, it conforms to the development of Southeast longnan economy and has strong reference significance in other places. The simulation results verify the feasibility and effectiveness of the proposed identification and modeling method.

1. Introduction

The latest individual studies believe that wage income is the main reason for the increase in regional differences [1-3]. Due to time constraints, the latest data on the change in income gap among rural residents came from 1993 to 2005. Most scholars are limited to the study of the social and cultural aspects of the region and do not study the income gap of farmers. Therefore, the change of income gap between 2000 and 2012 is selected as the research stage in this paper. The Gini coefficient model is used to calculate the Gini coefficient in the Southeast and Southeast regions, and the difference of rural income in the region is analyzed. The Gini coefficient is decomposed and the contribution of income structure to Gini coefficient is analyzed. Combined with these two methods, this paper analyzes the difference of economic development in rural areas of Longdong and Southeast China, and puts forward corresponding countermeasures.

In addition, we can also convert certain multivariate systems into multiple single inputs by decomposing the root. Single-output systems, so this paper is based on the assumption that we can approximate an economic system with a linear system so that they are in the same input drive [4]. It has the same system output, determines the linear system model by identification, replaces the economic system, and in the process of identification, we have the system [5-7]. The input is applied so that its output tracks the intended target. Once the output of the system is found to deviate from the
expected target, the deviation is fed back to the Control variables are modified so that the system output at the next moment is consistent with the expected goal, which we call reference output. The adaptive identification algorithm of the model will be given.

Through the establishment of the environmental identification and diagnosis model of the regional economic model [8-32], we can determine the usable elements, exploitable elements and restricted elements according to the differences in the utilization degree, development potential and constraint strength of each element from many environmental factors. And deeply understand the structure of the system, find out the root causes of the problems in the real system and the way to solve the problem, breakthrough. Based on the identification and analysis of the economic model of Southeast longnan, through the analysis of the identification model, it conforms to the development of Southeast longnan economy and has strong reference significance in other places. The simulation results verify the feasibility and effectiveness of the proposed identification and modeling method.

2. Identification structure model
In general, the environmental factors that affect regional economic development can be divided into two categories: natural environment factors and social environmental factors. The complete set of environmental factors of the system D: \( D = \{ \theta, \Theta \} \). \( \theta, \Theta \) are the collection of natural environmental factors and the collection of social environmental factors, each of which is also included. Contains several factors:

\[
\theta = [a_1 \cdots a_n, E_1 \cdots E_n]^T, \quad \Theta = [c_1 \cdots c_m]^T
\]  

(1)

The negative logarithmic likelihood function can be expressed as:

\[
J(\theta, \Theta, \sum) = -J(\theta, \Theta, \sum) \\
= -\frac{L}{2} \ln(2\pi) + \frac{L}{2} \ln(\det \sum) + \frac{1}{2} v^T v_l
\]  

(2)

In the formula (3), \( v(k) \) can be written as:

\[
\begin{align*}
  v(k) &= z_f(k - h_f(k) \theta \\
  \left[v_L = [v(1), v(2), \cdots, v(L)]^T
\end{align*}
\]  

(3)

Supposed

\[
\begin{align*}
  z_L(k) &= C(z^{-1}) z(k) \\
  u_f(k) &= C(z^{-1}) u(k) \\
  h_f &= \begin{bmatrix}
    -z_f(k-1) & \cdots & -z_f(k-n), -u_f(k-1) & \cdots & -u_f(k-n)
  \end{bmatrix}^T
\end{align*}
\]  

(4)

If you fix \( \hat{\Theta} = \Theta \), minimize \( \hat{\Theta} = \Theta J(\theta, \hat{\Theta}, \sum_v) \), you can get
\[
\hat{\theta} = \left[ \sum_{k=1}^{L} H_f(k) \sum_{y}^{-1} H_y(k) \right]^{-1} \left[ \sum_{k=1}^{L} H_f(k) \sum_{y}^{-1} H_y(k) \right]
\] (5)

If \( \hat{\Theta} = \Theta \) and \( \theta = \hat{\theta} \) are fixed, minimize \( J(\theta, \hat{\Theta}, \sum_{y}) \), and according to

\[
\frac{\partial \ln(\det(A))}{\partial A} = (A^{-1})^T
\] (6)

\[
\frac{\partial (x^T A^{-1} y)}{\partial A} = (A^{-1} x^T A^{-1})^T
\] (7)

Since

\[
\sum_{y} = \frac{1}{L} \sum_{k=1}^{L} \hat{\nu}^2(k)
\] (8)

The \( D = \{\theta, \Theta\} \) sequence is divided into several levels according to the size of \( D = \{\theta, \Theta\} \). Potential factors, which belong to the lower level, are disadvantages or constraints.

3. Modelling steps

If the order

\[
\begin{bmatrix}
\hat{\nu}(k) = \hat{C}(z^{-1}) \hat{e}(k) \\
\hat{e}(k) = \hat{A}(z^{-1}) z(k) - \hat{B}(z^{-1}) u(k)
\end{bmatrix}
\] (9)

Then, We can rewrite the above equation (10) to

\[
\hat{e}(k) = \left[ 1 - \hat{C}(z^{-1}) \right] \hat{e}(k) + \hat{\nu}(k)
\]

\[
= -C_1 \cdot \hat{e}(k-1) - C_2 \cdot \hat{e}(k-2) \cdots - C_{n_x} \cdot \hat{e}(k-n_x) + \hat{\nu}(k)
\] (10)

After estimation, it can be obtained by form (10),

\[
\left( H^* \right)^T = \left[ -\hat{e}(k-1) - \hat{e}(k-2) \cdots - \hat{e}(k-n_x) \right]
\] (11)

Available by least squares

\[
\hat{\Theta} = \left[ \sum_{k=1}^{L} (H^*(k))^T H^*(k) \right]^{-1} \left[ \sum_{k=1}^{L} (H^*(k))^T e^*(k) \right]
\] (12)

Using the formula (12) iteration, the model parameter estimate can be obtained.
4. An example of rural economic identification in southeastern Yunnan

The net income of per capita income and various sources of income in rural areas were selected as the objects of analysis. The data were derived from the survey of household basic conditions in the four counties in the southeast of Longnan from 2000 to 2012. The sample was 32 questionnaires in Wushan County, Tianshui City, and 33 in Hui County, Weinan City. There are 30 counties in Zhuanglang County in Pingliang City and 35 counties in Qingyang City. (In order to group the Gini coefficient, 120 survey reports were actually used and 30 were in counties, totaling 120 households.) To identify the rural economy in southeastern Yunnan, the data list is shown in Table 1, 2:

Table 1. Income status of rural households in Longnan region, 2000-2012.

| year | Southeast | Hui County | Wushan County | Huan County | Zhuanglang County |
|------|-----------|------------|---------------|-------------|-------------------|
| 2000 | 1838.42   | 1724.98    | 1314.04       | 1610.72     | 2703.93           |
| 2003 | 2447.11   | 2250.34    | 1903.62       | 2082.52     | 3551.97           |
| 2006 | 3053.24   | 3147.75    | 2435.96       | 2496.33     | 4132.94           |
| 2009 | 4302.11   | 4323.36    | 3667.87       | 3983.52     | 5233.68           |
| 2012 | 6048.38   | 6183.30    | 4532.29       | 5690.33     | 7787.59           |

From 2000 to 2012, the overall income of rural households in the southeast of Longdong showed a significant upward trend. From 1838.42 yuan per person in 2000 to 6048.38 yuan per person in 2012 (table 1). From table 1, it can be seen that the per capita income of Zhuanglang County is always higher than the per capita income of southeastern Yunnan Province, especially in 2012. The rate of growth of Huixian County is consistent with that of the Southeast region of Longdong, and the average household income of the Southeast region of Zhuanglang Gaochu. It can be seen from this that Zhang Lang has the highest economic level and the fastest development in the southeastern region of Longdong, while the development in the other three places is basically the same, and there is no big floating. It coordinates development within the region, reduces the income gap between regions, and promotes the overall development of the southeastern region.

The influence of different source factors on the income gap is further analyzed. Gini coefficient calculation formula:
In Figure 1, 2, 3, based on the identification and analysis of the economic model of Southeast Longnan, through the analysis of the identification model, it conforms to the development of Southeast Longnan economy and has strong reference significance in other places.
5. Summary
(1) Through the establishment of the environmental identification and diagnosis model of the regional economic model, we can determine the usable elements, exploitable elements and restricted elements according to the differences in the utilization degree, development potential and constraint strength of each element from many environmental factors. And deeply understand the structure of the system, find out the root causes of the problems in the real system and the way to solve the problem, breakthrough.

(2) Based on the identification and analysis of economic model, it is in line with the development of economic development in Longnan, and it has a strong reference significance for development in other places.

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