Research on the Costs Index Compilation of Flue-cured Tobacco Production for the Tobacco Farmers

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ABSTRACT

The existing cost accounting system of flue-cured tobacco production is no longer applicable to the cost accounting of modern tobacco agriculture. Firstly, the new changes in tobacco leaf production are deeply discussed. Second, the model of the production cost index of tobacco farmers is established. Third, the procedure and formwork of the compilation of the cost index are provided. Finally, the case studying, in Anshun city of Guizhou Province, show that the model of cost index and the analysis formwork are helpful for farmers to effective control the costs in the whole tobacco production process.

INTRODUCTION

Tobacco leaf production plays an important role in the Midwest economy, and it is also the pillar industry to promote the economic development of Guizhou Province. The flue-cured tobacco is the main crop for the most of farmers in Guizhou Province. In 2015, the planting area of flue-cured tobacco in Guizhou reached 3.25 million acres [1]. Accurate accounting the cost of tobacco farmers' planting tobacco is significance for the state to make the purchasing prices of leaf tobacco and stabilize long-term mechanism of tobacco leaf production.
As a mature theory, cost accounting, a lot of scholars have made a contribution to the formation of a complete theoretical system, such as Strategic Cost Management [2], Product Life Cycle Cost Theory [3] and so on. There are a lot of theoretical reference in the tobacco farmers costs, such as “Agricultural product cost investigation report system,” formulated by the Ministry of agriculture of People's Republic of China, includes related cost investigation system of Flue-cured Tobacco [4]. But in recent years, everything has changed greatly, such as the professional level, the degree of mechanization, the mode of production and organization of tobacco production, all these lead to the production cost accounting system already has not fully reflect the science of modern tobacco production costs, so it is particularly important to establish a set of farmers tobacco production cost accounting system to compatible with modern tobacco production. In this background, this paper, from two aspects of theory and practical application, studies on the index compilation of tobacco farmers' cost of flue-cured tobacco production.

THE NEW CHANGES IN TOBACCO LEAF PRODUCTION

At present, Anshun city is currently under the jurisdiction of five counties and one district. With the development of modern tobacco agriculture, the promotion of mechanization and the improvement of management level, Anshun Tobacco Company combined the characteristics of the natural environment of the districts and counties to make some adjustments to promote lean management, such as flue-cured tobacco production mode, production organization, management mode and so on. Because of the difference of land contiguous and other conditions, there are differences in the organization of flue-cured tobacco production. There are three types of flue-cured tobacco production organization in Anshun: family farms (100 acres and above), large specialized households(20 acres (including 20 acres) -100 acres) and ordinary farmers (less than 20 acres). The flue-cured tobacco production was divided into three stages: the nursery stage, the transplanting stage, the field management stage and the baking stage. Previously, the nursery stage has three forms: integrated services, nursery specialized households and farmers since the seedlings, but now only cooperatives. Tobacco farmers buy tobacco from cooperatives, according to a unified price.

There are three main capital investment in the whole process of flue-cured tobacco production costs, they are farmers, tobacco companies and government. This paper discusses the production cost index of tobacco farmers. Therefore, in the follow-up study of this paper, only consider the cost of tobacco farmers, ignoring the tobacco companies and the government's capital investment. The cost of tobacco farmers includes the cost of buying tobacco seedlings, material services, cost, labor costs and land costs. Material service costs include direct and indirect costs. Labor costs include domestic labor costs and labor costs. Land costs include the cost of self-owned land and the cost of transfer.
THE MODEL OF THE PRODUCTION COST INDEX OF TOBACCO FARMERS

In the complex social phenomenon, there is a considerable part that cannot be directly reflected, which requires the introduction of a special relative number—index, to process and compare these complex social phenomena. The index is the weighted average of some statistical observations, and is often expressed as a percentage, based on past observations [5].

Investigation of Flue-cured Tobacco Production Costs

The questionnaire was set up according to the actual situation of each stage of flue-cured tobacco production by phased survey method, and the investigation was carried out after the end of each stage.

The index is generally drawn up the Laspeyres Index and Paasche Index. This paper studies the index compilation of tobacco farmer's cost of flue-cured tobacco production, which is a comprehensive index compiled on the basis of the base period, therefore, this paper uses the Laspeyres Index.

Weight Determination

The influence degree and importance of each index to the total index are different. Therefore, when the total index is calculated, the weight will be introduced according to the degree of affecting the production cost of flue-cured tobacco. The greater the influence degree is, the higher the importance is, the higher the corresponding weight.

This paper uses weights for calculating the cost index and the total cost index for each region. In calculating the index of different organizations in each region, the proportion of each survey area of different forms to the total survey area of the area is used as weight. In calculating the total index, the proportion of surveyed area in each area to the total surveyed area is used as weight.

Selection of Base Period

The index compares the reporting period with the base period to reflect the changing trend and extent. This paper chooses 2012 as the production cost index base period for tobacco farmers.

The Model of Tobacco Production Cost Index

The compilation principle of the flue-cured tobacco production cost index is that first determine the same measure and then use the weighted average of the single index.
When the cost index of flue-cured tobacco production is compiled, the price of the base period is chosen as the same measure.

\[ K = \sum_{i=1}^{n} \frac{p_{0i} \times q_{ui}}{\sum_{i} p_{0i} \times q_{0i}} \]  

(1)

Here, \( K \) represents the cost index, 0 represents the base period, 1 represents the reporting period, \( p_{0i} \) represents the price of the base cost of the i cost item, \( q_{0i} \) represents the number of i cost items for the base period, \( p_{ui} \) represents the price of the i cost item in the reporting period, \( q_{ui} \) represents the number of i cost items in the reporting period.

Each form of flue-cured tobacco production cost index is a single index, the total index is the weighted average of different forms of flue-cured tobacco production cost index.

\[ K = \sum_{i=1}^{n} w_i \times k_i \]  

(2)

Here, \( w_i \) represents the weight of different forms, \( k_i \) represents the cost index of different forms.

THE PROCEDURE AND FORMWORK OF THE COMPILATION OF THE COST INDEX

The Compilation of the Production Cost Index of Flue-cured Tobacco of Tobacco Farmers from Different Production Stages

This paper uses the Laspeyres Index, a composite index compiled on the basis of the base period price, so the formula of the cost index for each stage is as follows:

\[ K_n = \frac{\sum_{i=1}^{n} p_{0ni} \times q_{1ni}}{\sum_{i=1}^{n} p_{0ni} \times q_{0ni}} \times 100 \]  

(3)
Here, $K_n$ represents the cost index for each stage, 0 represents the base period (2012), 1 represents the reporting period (2015), $P_0$ represents the price during the base period, $q_0$ represents the number during the base periods, $q_i$ represents the number during the reporting periods, K represents the cost index. $n = 1, 2, 3$ respectively represents transplanting stage, field management stage, baking grading sale stage. $i = 1, 2, \cdots$ represents the cost item in the i-th accounting stage. The upper limit is not set for i, since the number of accounting cost items per period is uncertain. According to the general form of the index, the results will be multiplied by 100 to enlarge, if the value of more than 100 means that the cost increase, on the contrary that cost reduction.

CPI formula is:

$$\text{CPI} = \left( \sum_{i=1}^{n} p_{0i} \times q_{0i} / \sum_{i=1}^{n} p_{0i} \times q_{0i} \right) \times 100$$

[6]. Simplified CPI as $\text{CPI} \approx (P_1/P_0) \times 100$, then $P_0$ and $P_1$ have an approximate relationship, that is $P_0 \approx 100 \times \frac{P_1}{\text{CPI}}$. Substituting $P_0 \approx 100 \times \frac{P_1}{\text{CPI}}$ into (3) yields the following equation:

$$K_n = \sum_{i=1}^{n} p_{0ni} \times q_{0ni} / \sum_{i=1}^{n} p_{0ni} \times q_{0ni} \times 100 \approx \frac{1}{\text{CPI}} \sum_{i=1}^{n} p_{0ni} \times q_{0ni} \times 100$$

(4)

The Compilation of the Production Cost Index of Flue-cured Tobacco of Tobacco Farmers from Different Production Organs

In Anshun City, the organization of flue-cured tobacco production is divided into family farms, large specialized and ordinary farmers. There are some differences in cost investment of different production organization forms in different stages of production, so summing up the cost of each production stage, to compilation of the production cost index of flue-cured tobacco of tobacco farmers from different production organs.

The cost index formula of different organization forms of flue-cured tobacco production is as follows:
\[
K_m = \frac{\sum_{n=1}^{3} \sum_{i=1}^{m} p_{0ni} \times q_{1nm}}{\sum_{n=1}^{3} \sum_{i=1}^{m} p_{0ni} \times q_{0ni}} \times 100
\]  
(5)

Bringing \( P_0 \approx 100 \times \frac{P_1}{CPI} \) into (5) yields:

\[
K_m = \frac{\sum_{n=1}^{3} \sum_{i=1}^{m} p_{0ni} \times q_{1nm}}{\sum_{n=1}^{3} \sum_{i=1}^{m} p_{0ni} \times q_{0ni}} \times 100 \approx \frac{10000 \sum_{n=1}^{3} \sum_{i=1}^{m} p_{1ni} \times q_{1nm}}{CPI \sum_{n=1}^{3} \sum_{i=1}^{m} p_{0ni} \times q_{0ni}}
\]  
(6)

Here, \( K_m \) represents the cost index of the \( m \)-organization form. \( m = 1, 2, 3 \) respectively represents the family farms, large specialized and ordinary farmers.

The Compilation of the Production Cost Index of Flue-cured Tobacco of Tobacco Farmers from Different Regions

Flue-cured tobacco production organization in various regions may be different. How to compile the production cost index of flue-cured tobacco of tobacco farmers from different regions? First of all, the production cost index of each type of production organization in each region is compiled according to the above method, and then the production cost index of flue-cured tobacco from different regions is calculated by taking the proportion of the actual planting acreage of different organizational forms for the proportion of total area as the corresponding weight.

The cost index formula of different regions of flue-cured tobacco production is as follows:

\[
K_h = \sum_{m=1}^{3} (K_{hm} \times W_{hm})
\]  
(7)

Here, \( K_h \) represents the cost indices for different regions. \( h = 1, 2, \ldots, 6 \) respectively represents regions A, B, C, D, E, and F, respectively. \( m = 1, 2, 3 \) respectively represents the family farms, large specialized and ordinary farmers. \( W \)
represents the weight of each organizational form, which is calculated as
\[ W_{hm} = \frac{M_{hm}}{\sum_{m=1}^{3} M_{m}}. \]
Here, M represents the planting area of flue-cured tobacco.

**Compilation of General Index of Production Cost of Flue-cured Tobacco from Anshun City**

When compiling the total cost of flue-cured tobacco production in Anshun City, first of all, the production cost index of each region is compiled according to the above method, and then the total cost of the flue-cured tobacco production of Anshun City is calculated by taking the proportion of the actual planting acreage of different regions for the proportion of total area as the corresponding weight. The general index of production cost of flue-cured tobacco from Anshun city is as follows:

\[ K = \sum_{h=1}^{6} (K_h \times A_h) \]  \[(8)\]

Here, K represents the general index of production cost of flue-cured tobacco from Anshun city. \( h = 1, 2, \ldots, 6 \) respectively represents regions A, B, C, D, E, and F, respectively. A represents the weight of each region, which is calculated as
\[ A_h = \frac{M_h}{\sum_{h=1}^{6} M_h}. \]
Here, M represents the planting area of flue-cured tobacco.

Substituting (4), (6), (7) into (8) yields the following equation:
\[ K = \sum_{h=1}^{6} \left[ \frac{10000 \sum_{n=1}^{3} \sum_{i=1}^{3} P_{0hni} \times q_{0hni}}{\sum_{m=1}^{3} \sum_{i=1}^{3} P_{0hni} \times q_{0hni} \times \sum_{m=1}^{3} M_{m}} \times \frac{M_{hm}}{\sum_{h=1}^{6} M_{h}} \right] \]  \[(9)\]

Here, K represents the cost index, 0 represents the base period (2012), 1 represents the reporting period (2015), \( P_0 \) represents the price during the base period, \( q_0 \) represents the number during the base periods, \( P_1 \) represents the price during the reporting periods, \( q_1 \) represents the number during the reporting periods. \( i = 1, 2, \ldots \) represents the cost item in the i-th accounting stage. \( n = 1, 2, 3 \) respectively
represents transplanting stage, field management stage, baking grading sale stage. 

\[ m = 1, 2, 3 \] respectively represents the family farms, large specialized and ordinary farmers. 

\[ h = 1, 2, \ldots, 6 \] respectively represents regions A, B, C, D, E, and F respectively.

CONCLUSIONS

In this paper, the production cost index of flue-cured tobacco was compiled and applied to the production cost of tobacco farmers in Anshun City, which has two meanings. On the one hand, it not only scientifically and accurately reflects the changing trend and degree of the production cost of flue-cured tobacco in the background of the new change of tobacco production, provides reliable basis for tobacco production and management decision-making, but also can enhances tobacco farmers' control on production cost of flue-cured tobacco, and provides a basis for the tobacco companies to develop tobacco purchase price and subsidy policy. Those can improve the enthusiasm of farmers to promote production and increase income, and maximize the protection of the interests of farmers; on the other hand, it broadens the scope of index's research and application, and provides invaluable experience in applying the index to other industries.

REFERENCES