

Research on Method of Determining The Contribution Share of Scientific and Technological Progress

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How to determine the Contribution share of scientific and technological progress in national economic development, is a realistic problem and urgently needs to be resolved. And this paper will make a superficial discussion on how to utilize statistical materials now available for its determination.

1. Explanation on basic formula of calculation.

There are many ways for evaluating scientific and technological progress's effect on national economic development, and the Solow to Growth Equation is the most common one. The Solow Growth Equation is:

$$Y = A + K + L\beta$$

of which: Y the growth rate of national economy, A the growth rate of scientific and technological progress. K the growth rate of funds inputs, L the growth rate of labor inputs.

The formula's direct sense is that the growth rate of economy is the sum of the growth rate of scientific and technological progress, funds inputs and labor inputs, merely times the last two growth rates with α and β respectively.

α is the marginal output coefficient of funds inputs, i.e. the percentage of economic growth as a result of the growth of funds inputs of 1%; β is the marginal output coefficient of labor inputs, i.e. the percentage of economic growth as a result of the growth of labor inputs of 1%. And $\alpha + \beta = 1$.

According to the formula, $A = Y - K - L\beta$

The contribution share of scientific and technological progress in economic development is defined as the percentage of the growth rate of scientific and technological progress to the economic growth rate: $A/Y * 100\%$. In practical work, We take the growth rate of Gross Domestic Product, average share of original value of fixed asset' and floating funds, the employment in society as a whole as the representative of the growth rate of economy, funds inputs and labor inputs, the determining the growth rate of scientific and technological progress and its contribution share. Among the above-mentioned statistical data, the collection and determination of material on funds input (especially the tertiary industry) is the most difficult one. For there hasn't data of the total funds value in society as a whole in current statistical system. Therefore, researchers always firstly collect data of funds inputs form each channel, and evaluate and calculate the data, then determine the growth rate of scientific and technological progress. In the event of inadequate calculating basis on funds inputs, then the growth rate will be unbelievable. Therefore, how to exactly resolve the problem of funds inputs calculating, it is a key.

2. Data collecting and processing

Our specific method and practice are as follows:

2.1. Funds inputs

It can be divided into fixed funds and circulating funds.

As to fixed funds, in terms of theory, the use of net value of fixed assets will be better. However, the determination on net value of fixed assets has much subjectivity. Therefore, We adopt the original value of fixed assets as the representative of the net value of fixed assets. The sources of materials are:
1. From the primary industry mainly. Taking use of the annual reports on foxed assets of countryside, excluding countryside's secondary industry, tertiary industry and original value of residence and subject

to materials on sample survey of countryside household for valuation and Check.

2. From the secondary industry. As to industry, those industries with certain scale, taking use of the annual reports, as to those without certain scale, taking use of the general investigation materials on basic units and the annual reports on sample units for determination. For building industry, taking use of the annual reports of units with Grade 4 or up qualification and the general investigation materials of basic units.
3. From the tertiary industry. It is not easy for collection. However, the general investigation of the tertiary industry organized by nation very ten years has provided us much convenience. As to the gears without general investigation, we could take use of the general investigation materials and multiply proper speed.

As to floaty funds inputs, this needs a lot of accounting and financial uniting for determination, and there are somethmgs that need to be indicated that (1) the tertiary industry. Should be divided into profitable units and non-profitable units. The former needs floating funds and the later doesn't. (2) Agriculture the productive and operational expenditures in agricultural field of peasant households can be calculated as per relevant materials.

2.2.Labor inputs

Inresentyears, the statistical system has replace the labor statistics with employment statistics lohich has provided us much convenience. And, we can say the problem has been resolved.

2.3.price

After the collection of materials on all funds inputs, due to the price change factor, they still wouldn't be comparable. For the comparison, a relatively exact practice is: Firstly converting the current price net invest meant in each year into fixed price then as per the fome lag-coefficient of investment to funds for the calculation of the focal funds value in society as a whole, then determining the base year and calculating the growth rate. In the event of inadequate calculation conductors, we can average the remaining sum of financial years, and use the conversion coefficient of GOP's fixed price to current price for aoyustment, thus making the data comparable.

2.4.Determination of value and value

According to the assumption of production scale's constant returns: α , generally, is determined by the ratio of labor returns in GDP. In most materials, α in 0.7 to 0.8. According to the current situation in Pingding sham city α roughly 0.6. Then we take this as basis, to determine. α

With the above-mentioned method, we have calculated the growth raft of scientific and technological progress and its contribution share in national economic development in 1990's each year. And below is a list of the consequence of calculation in 1992-1994.

Table 1

Year	Y	K	β	Growth rate	Contribution share
1992	11.5	6.1805	1.9292	3.3903	29.5
1993	12.2	7.4480	0.2976	4.4644	36.5
1994	16.3	8.0000	2.6640	5.6360	34.6

The above-mentioned shows since 1991, the growth rate in Pingdingshan city has improved year after year. From 1992's 3.39% to 1994's 5.64% and the contribution share improved from 1992's 29.5% to 1994's 34.6%.