

# The Tables Of National Income Flow And The Models Of Transfer In Intersector Flow

Li Baoyu  
 Shanxi Finance and Economics University,  
 Taiyuan, Shanxi, China  
 lby-1@163.net

## 1. The structure, symbols and models of the table of National Income flow

Table 1 **Flow of National Income Table** The symbols in Table 1 are matrixes. W stands for intersector income flows. U stands for each sector's income on each distribution item. Y stands for column vector of value added. G stands for column vector of gross income. S stands for each sector's expenditure on distribution item. Z stands for disposable income's column vector. F stands for column vector of the sum of each income.

	Institutional sector	Distribution of income		Value added	Gross income
		Primary distribution of income	Secondary distribution of income		
Institutional sector	W	U		Y	G
Distribution of income	Primary distribution of expenditure	S			F
	Secondary distribution of expenditure				
Disposable income	Z				
Gross expenditure	G	F			

Supposing there are n sectors and m incomes, the main equations in the table are:

$$(1) U_i + Y \in$$

$$(2) S_i + Z \in$$

The main coefficients which can be calculated from

$$A = G^{-1}U$$

the table directly are:

(1) The coefficient of sectoral income

(2) The coefficient of sectoral expenditure  $R = U F^{-1}$

(3) Sectoral income share  $B = S G^{-1}$

(4) Sectoral expenditure share  $H = F^{-1}S$

## 2. Transfer in intersector flow of income and its models

Though table 1 and its models can show sectors' income and expenditure, it can't show flows between sectors. But studying the income flows between sectors is significant in economic analysis. So we need turn the flow of "sector  $\times$  revenue" into "sector  $\times$  sector", i.e. U or S to W. We have designed two methods: one is to transfer from the direction of income, the other is to transfer from the direction of expenditure.

(1) Transferring income method

That method is to transfer flows of U to W.

Supposing  $w_{ij}$  is income that Sector i gains from Sector j on an item. It should equal to Sector i's total income on the item multiplied by the proportion of Sector j's expenditure on the item to the total expenditure of all the sectors in the whole society on the item. The equation is:

$$W = RS$$

(2) Transferring expenditure method

That method is to transfer flows of S to W. From the point of view of expenditure, the expenditure that Sector j paid to Sector i should equal to Sector j's total payment on the item multiplied by the proportion of Sector i's income on the item to the total income of all the sectors in the whole society on the item. The equation is:

$$W = UH$$

We can set up the model of intersector income flow after we have intersector flows:

$$G=(I-WG^{-1})^{-1}y$$

Similarly, we can set up the model of intersector expenditure flow by Disposable Income column vector(Z):

$$G=(I-W'G^{-1})^{-1}Z$$

### 3.Making The Table of China National Income Flow and analyzing

The paper has set up a table of China National Income's flow of 1992 and 1997, which contains five sectors and nine revenues by means of the data from China Statistical Yearbook 2000. The following is the result of 1997:

$$G = (I - W'G^{-1})^{-1}Y = \begin{pmatrix} 1.0471086 & 0.22936925 & 0.01080056 & 0.0018253 & 0.0649214 \\ 0.0937488 & 1.54221029 & 0.2409182 & 0.0031082 & 0.05981003 \\ 0.28972367 & 0.25709187 & 1.05923138 & 0.04317091 & 0.08764336 \\ 0.8345 & 1.058 & 0.516 & 1.4179 & 0.422 \\ 0.03559954 & 0.00863086 & 0.00053298 & 0.00018171 & 1.15298402 \end{pmatrix} \cdot \begin{bmatrix} 47234 \\ 7040 \\ 21246 \\ 73015 \\ 1611 \end{bmatrix}$$

$$G = (I - W'G^{-1})^{-1}Z = \begin{pmatrix} 1.047 & 0.6257 & 0.644 & 0.54 & 1.04 \\ 0.03423 & 1.5423 & 0.0851 & 0.102 & 0.038 \\ 0.00487 & 0.0727 & 1.05924 & 0.1502 & 0.0075 \\ 0.0029 & 0.032 & 0.1482 & 1.4178 & 0.0082 \\ 0.00221 & 0.0137 & 0.00665 & 0.00931 & 1.1529 \end{pmatrix} \cdot \begin{bmatrix} 47234 \\ 7040 \\ 21246 \\ 73015 \\ 1611 \end{bmatrix}$$

The most typical characteristic of National Income flow matrix is that it can calculate intersector income flow, total income coefficient and total payment coefficient. Without the table, it is difficult to get the data of the Matrix W, and it is also nearly impossible to get them from government statistics.

$(I-WG^{-1})^{-1}$  is total payment coefficient, and  $(I-W'G^{-1})^{-1}$  is total income coefficient. They are very useful in analyzing income model afterwards. For example, they can be used to analyzing not only the relation between value added and disposable income, but also the impacts that a certain income's change make upon other incomes.

Compare the table of 1992 with that of 1997, we can find the following characteristics:

(1) Flow of income increased rapidly and the structure of income changed greatly. Income flow in the whole society was 2755.8 billion in 1992 and 7568.3 billion in 1997; In gross income, taxes on production went up from 12.68% to 14.86%, dividend went up from 0.01% to 2.51%, social insurance income went up from 2.49% to 3.65%, and other transfer went up from 3.78% to 4.6%. But there was a downward trend in interest revenue, taxes on income declined too.

(2) The pattern of sectors' gross flow relatively remained steady, but the structure of flows between sectors had changed. For example, income proportion of unfinancial enterprises (0.424,0.511) and government (0.038,0.051) had risen, but income proportion of financial enterprises (0.449,0.385) and household(0.026,0.021) had declined. On the other hand, income proportion that financial enterprises paid to government (0.188,0.111) had declined, and income proportion financial enterprises paid to household had increased (0.269,0.385).

(3) The pattern of income distribution through foreign branch had changed significantly. In 1992, the main flow of foreign branch's income and expenditure was interest, and income of transfer next. By 1997, dividend had become the main international flow, which signed that China's international capital flow which centered on loan had turned to direct and indirect invest.