

THE STRUCTURE OF INCOME REDISTRIBUTION WITHIN THE FRAMEWORK OF AN EXTENDED SYSTEM OF NATIONAL ACCOUNTS

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1. In what follows we shall be concerned with the structure of income redistribution between the market sector and the general government within the framework of an extended system of national accounts. In section 2 our discussion begins with the presentation of basic concepts in matrix form which constitutes the basis of national accounts. In the discussion the author claims that the matrix form of national accounts has the distinct advantage of showing the logical connection between the concepts, either basic or derived, which constitutes any system of national accounts. In section 3 the function of government activities will be discussed. The author postulates the sectoring of the market sector at large and the general government on account of the genuine function of government activities. The discussion in this section ends with the presentation of a system of extended national accounts which provides a basis for the fuller analysis of income redistribution to follow. The structure of income redistribution will receive through treatment in section 4. The author points out that the distinction between the primary distribution and the redistribution of factor income is of extreme importance to the structure of income redistribution. He also argues that the structure of income redistribution is thoroughly exhibited by some important sub-matrices which are derived from the matrix of a system of national accounts presented in section 3. The section is concluded by offering some comments on the classification of transfer concepts. In section 5 the author suggests an interesting use of the information which is furnished with the structure of income redistribution for the analysis of the incidence of income transfers on the real disposable income of consumers.¹

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¹ This article is an outgrowth of the works made by the author during the tenure as an expert member of the National Economic Accounting Council. The National Economic Accounting Council was organized by the Economic Planning Agency in 1963 for updating Japanese system of national accounts and improving the estimates of constituent elements of Japanese national accounts. The Council was terminated after submitting the report entitled *Measures for the Improvement of National Economic Accounting* to the Director of Economic Planning Agency in the spring of 1965. Based on this report the Economic Planning Agency published thoroughly revised estimates of national accounts.

2. One of the outstanding characteristics any system of national accounts possesses is displayed by the structure which is constituted by and interwoven of basic concepts. Reflection will show the fact that logical concepts which bear the characteristics of the logical relation may be formulated in rigorous form by some binary relations determined by primitive characteristics. The most convenient and essential scheme which exhibits these binary relations is a matrix form.

Let us suppose flow of goods and services within a closed system. A closed system may consist of a single transaction unit, such as a consumer or a firm, or as a set of these units. A national economy may be regarded as a particular example of the latter. A matrix of basic concepts is shown in Table 1 below.

TABLE 1. A SYSTEM OF BASIC CONCEPTS FOR A CLOSED UNIT

	(i)	(ii)	(iii)
(i)	flow of intermediate products	consumption	gross capital formation
(ii)	net products	income transfer	dissaving
(iii)	capital consumption	saving	transfer of real capital

Here, the matrix consists of three rows and columns respectively. Each of them represents one of basic economic activities which are made of (i) production, (ii) income and its consumption and (iii) accumulation of real capital stocks. Each of basic concepts in the matrix is expressed by a binary relation of flow of goods and services between these activities. The binary relation is defined here as the flow of goods and services from one activity to another activity. For instance, flow of intermediate products are those flow of goods and services from the production activity to its own production activity. In the same way, consumption is defined as the flow of goods and services from the production activity to the consumption activity. Capital formation is defined as the flow of goods and services from the production activity to the accumulation activity. Capital formation is expressed either in 'gross' or 'net' term depending upon whether capital consumption which is defined as the flow of goods and services from the accumulation activity to the production activity is included or not. Factor income is defined in this matrix as the flow of factor services from the income and its consumption activity to the production activity. Similar to flow of intermediate products, income transfer is defined as the flow of factor income from the income and its consumption activity to their own activity. Saving is the flow of goods and services flown into the income and its consumption activity in contradistinction with dissaving which is defined as the flow of goods and services from the income and its consumption activity to the accumulation activity. Transfer of real capital is the flow of goods and services within the accumulation activity.

Attention is particularly called to the concept of saving. Just as the concept of dissaving is looked as if resources released from the accumulation of real capital stocks for use, saving in the matrix of Table 1 is regarded as resources set free from consumption for the source of the accumulation of real capital stocks. Saving is often called a 'balancing item' in the sense that it is determined as the residual item between factor income and consumption. For this statement it should be borne in mind that a balancing relation must be presupposed

between factor income on the one side and consumption and saving on the other, prior to calling saving a 'balancing item'.²

A matrix presentation of basic concepts has several advantages. First of all, it furnishes the conceptual framework of macro-economic aggregates in a compact form. Second, the use of a matrix form ensures the property of the fully articulated system for this conceptual framework. Third, it is often the case that a more complicated system is required for this conceptual framework. As we shall see in the subsequent section, a more complicated system is easily deduced from a compact form if the system is expressed by a matrix form. As the fourth advantage of the matrix presentation it may be pointed out that each symmetrical element of the matrix in Table 1 pertains to 'gross' and 'net' concepts. For example, the element which is symmetrical with gross capital formation is capital consumption. If capital consumption is cancelled out from this matrix, it easily turns out that capital formation in this matrix be recorded in terms of 'net' concept. Virtually similar argument is applied to saving and dissaving. Saving is expressed as 'net' saving if dissaving is put to zero and disappears from this matrix.

The matrix of Table 1 is supplemented by two more considerations. These are (1) the construction of open system taking note of the existence of outside units and (2) the subdivision of basic economic activities. As we shall see in the subsequent sections, the following subdivision of basic economic activities is meaningful to the analysis of government activities:

TABLE 2. SUBDIVISION OF BASIC ECONOMIC ACTIVITIES

Basic Economic Activities	Subdivided Activities
Production	
Income and its consumption	Formation of income Consumption of income
Accumulation	Formation of capital Financing of capital

Taking account of the subdivided activities the following conceptual framework is constructed, and it is expressed by a matrix form in Table 3, where the following notations are used for the simplification purpose.

B: net lending to the rest of the world

C: purchase of goods and services for consumption

D: capital consumption allowances

E: sales of goods and services to the rest of the world

F: flow of financial claims as assets

G: net transfer payments of factor income

² It seems that this explains why saving is postulated in the so-called value classes by Aukrust. The author's definition of saving differs from Stuvell's argument in that the definition is free from the assumption concerning the balancing relation. For these points, see O. Aukrust, *Nasjonalregnskap: Teoretiske prinsipper*, Oslo 1955, pp. 98-99, and G. Stuvell, *Systems of Social Accounts*, Oxford 1965, pp. 43-45. Assuming this balancing relation, it is of course possible that saving in the author's definition is regarded as a balancing item.

TABLE 3. AN EXTENDED FORM OF BASIC CONCEPTS

			income and its consumption			accumulation	
			production	formation of income	consumption of income	capital formation	capital financing
			1	2	3	4	5
income and its consumption	production	1	<i>U</i>		<i>C</i>	<i>V</i>	
	formation of income	2	<i>Q</i>	<i>G</i>			
	consumption of income	3		<i>Y</i>			
accumulation	capital formation	4	<i>D</i>				<i>J</i>
	capital financing	5			<i>S</i>		<i>F-N</i>

I: purchase of goods and services from the rest of the world

J: net domestic capital formation

K: net inflow of capital transfer

N: flow of financial claims as liabilities

P: net national product at factor cost³

Q: net domestic product at factor cost

S: saving

T: indirect taxes minus subsidies

U: flow of intermediate products

V: gross domestic capital formation

Y: disposable income

Z: net receipts of factor income

3. So far we have discussed a matrix presentation of simplified national accounts which furnishes the basis of more detailed analysis of government activities. The genuine role of government lies in the supply of public goods and services which neither be produced by private enterprises nor supplied by households. As the public goods and services are often defined as those goods and services whose marginal utility of one economic unit is equal to

³ The autor follows the conventional use of 'net national (or domestic) product at factor cost', although he prefers the use of 'net national (or domestic) product at factor income'.

that of others, the public goods and services are essentially for collective use of the public. In other words, the public goods and services may be defined as those goods and services which satisfy the collective wants for the community as a whole. The essential nature of the collective wants is that they cannot split up for the need of specific individual excluding the satisfaction of other people's need. The examples of such collective wants are the maintenance of justice and order and the security and defense of the community. There exist, of course, some collective wants which fall into border-line cases. The collective wants for health and education may be cited as the cases. In principle the improvement of health and sanitary condition of the community, for example, may be allotted for the need of specific individuals. It may be also the case that the health service is conveniently and economically supplied by a private individual. In spite of these possibilities medical cares of the community tend to rely heavily on those services which are organized by the government agencies, as the social security schemes are widely introduced by the central and local government. Although the condition is somewhat different in satisfying wants for education, the reliance on the state or local budget for financing the supply of these educational services by the private institutions has become a growing tendency in many countries. Despite the obscurity of such border-line cases it is claimed that the concept of public goods and services remains to be a useful concept for describing the nature of government activities.

Related to the supply of public goods and services, a few additional comments are raised. First, as one of the international standards of national accounts carefully states, these public goods and services are organized by the public authorities 'not normally to sell' for the community.⁴ This statement suggests that the supply schedule of the public goods and services may not be explained by the theory of optimum production. One may insist that the public authorities could be looked as if it were the unit of decision making which purports to attain its optimum, because for these public authorities tax rates could play a similar part to the prices of general goods and services. It has been maintained by Lindahl that the community is possible to attain Pareto optimum provided that the community's tax rates are determined such levels that they may be equitable and acceptable. But the determination of optimum tax rates cannot be explained by the optimum behaviour of the public authorities. As Johansen has once made a point, the question of 'powers' of socio-economic groups which constitute the community and the bargaining process between these groups exert strong influence on the determination of the tax rates.⁵ The requirement that the optimum tax rates must be determined exogeneously is resulted from the non-existence of market concerning for the public goods and services. It may be concluded from this brief discussion that non-marketability of public goods and services bears deep significance on the analysis of government activities. In the recent proposal for revising SNA (E/CN. 3/345) non-marketable commodities such as the public goods and services are conceptually distinguished from marketable commodities. This indicates the fact that the nature of public goods and services must attract special attention for fitting them into the conceptual framework of national accounts in an explicit manner.

Second, in view of the fact that the supply of public goods and services for satisfying collective wants is largely financed by tax revenues, their supply exerts strong influence on

⁴ United Nations, *A System of National Accounts and Supporting Tables*, 3rd ed., New York 1964, section 88.

⁵ Leif Johansen, *Public Economics*, Amsterdam 1965, pp. 133.

the income distribution of the community through direct and indirect channels. The disposable incomes of both corporations and households are subject to changes brought by the direct taxes on their primary factor incomes. The income distribution of the community is also influenced by changes in selling prices caused by the incidence of indirect taxes. It should be noted that the effect of supply of public goods and services on the income distribution of the community is of no less importance for the analysis of government activities.

As we have recognized in the previous discussion, the distinction between those government activities which refer to the supply of public goods and services and those which do not refer to the supply of public goods and services is meaningful from the viewpoint of classification of government activities. The former activities may be termed the pure government activities, while the latter are government business activities. As the international standards of national accounts put, business activities refer to those which 'produce goods and services for sale at a price intended approximately to cover the cost of production'.⁶ Sectoring of government agencies naturally follows from the classification of government activities. A set of government agencies which carry on the pure government activities is termed the general government. A set of government agencies which are engaged in the government business activities is termed the public enterprises.

It is of great interest to compare the definition of the government sector in Japanese national income statistics with that in the international standards as indicated in Table 4. As a basis of comparison, we select definitions of the government sector in Japanese national income statistics, United Nations, *A System of National Accounts and Supporting Tables*, 3rd ed., and United Nations, *A Manual for Economic and Functional Classification of Government Transactions*, New York 1958. It easily turns out from this table that the government sector in Japanese national income statistics encompasses not only the general government but also the public enterprises whose definitions have been given previously. It is a misnomer to apply the term the general government to the government sector as defined in the Japanese national income statistics, although the terminology of general government account is used in the national accounts of Japanese national income statistics.⁷

TABLE 4.

	Japanese National Income Statistics	UN Manual	UN SNA	
Government General Account	↑ Government ↓	↑ Government ↓	↑ General Government ↓	
Government Special Account (non-enterprise)				
Government Enterprises			↑ Independent Public Bodies ↓	↑ Enterprises ↓
Ancillary Agencies				
Independent Public Enterprises or Public Corporations				

⁶ United Nations, *A System of National Accounts and Supporting Tables*, 3rd ed., New York 1964, section 88.

⁷ This is the point which had already been made in the *Report of the Research Committee of National Economic Accounting*, March 1962. The committee was organized by the Economic Planning Agency as the predecessor of National Economic Accounting Council for reviewing the improvement of Japanese national accounts. The author also served as an expert member of the Committee.

The definition of government sector closely resembles to the term of the public sector which is contradistinguished from the private sector. The distinction between the public sector and the private sector is usually drawn by the administration boundary of government agencies. It appears, at least for the author, that this sectoring makes obscure both the functional and the behavioural characteristics of government activities, because this is highly inconvenient for analyzing the efficiency of government activities. Summing up the discussion he prefers distinguishing the general government from the public enterprises to the distinction between the public and the private sectors.

As a point of departure of fitting the government activities into a general conceptual framework of national accounts it is sufficiently meaningful that the general government is distinguished from a set of economic units including the public enterprises, which may be termed the market sector at large. The market sector at large may be further subdivided according to different types of function like enterprises (including the public enterprises) and the households and non-profit institutions. The matrix of national accounts in Table 3 is easily

TABLE 5. A SYSTEM OF EXTENDED NATIONAL ACCOUNTS

activities		Domestic Economy														Rest of the World				
		production		formation of income				consumption of income		capital formation		capital financing								
		I	II	I		II		I	II	I	II	I		II						
sector	sector	no.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15			
Domestic Economy	production	I	1	U^I	U^{II}					C^I		V^I	V^{II}					E^I		
		II	2								C^{II}									
	formation of income	I	3	Q^I															Z^I	
			4			P^I			G^{II}											
		II	5		Q^{II}															Z^{II}
			6	T			G^I	P^{II}												
	consumption of income	I	7				Y^I													
		II	8						Y^{II}											
	capital formation	I	9	D^I											J^I					
		II	10		D^{II}													J^{II}		
	capital financing	I	11												F^I					
			12							S^I				N^I		K^I		K^I		
		II	13														F^{II}			
			14								S^{II}				K^{II}	N^{II}			K^{II}	
Rest of the World		15	I^I	I^{II}		G^I		G^{II}						B^I		B^{II}				

extended so that the dual sectors may be included in the matrix. The extended matrix of national accounts is shown in Table 5.⁸ I and II in this matrix stand for the market sector at large and the general government respectively.

4 We have noted in the section 3 the significance of the supply of public goods and services from the viewpoint of the income distribution of the community. In order to make the process of income formation and redistribution of income clear it is extremely useful that the formation of income is subdivided into two stages as we have made in the construction of the matrix in Table 5. First of these may be termed the primary distribution of factor income which describes the process of distribution of net product to factors of production and formation of factor income. Second of these may be termed the redistribution of factor income which describes the process of redistribution of factor income between recipients and spending units of factor income. The primary distribution of factor income for the market sector at large and the general government is represented by the row (and column) 3 and 5 in Table 5 respectively. Similarly, the redistribution of factor income is represented by the rows (and columns) 4 and 6 in the same table.

Suppose that the row (and column) 1 in Table 5 is further subdivided by a number of production sectors and that the row (and column) 3 in the same table is also subdivided according to a number of types of factor income. Then it easily turns out that Q^I in Table 5 which stands for the net domestic product originated from the market sector at large constitutes a rectangular sub-matrix whose row and column distinguish types of factor income and production sectors respectively. In detail, the matrix is written as below:

TABLE 6. THE SUB-MATRIX OF THE FACTOR INCOME ORIGINATED IN THE MARKET SECTOR [q_{pq}^I]

	column no.	1
row no.	sector	production sectors
3	types of factor incomes	$q_{11}^I \dots \dots \dots q_{1q}^I$ $q_{p1}^I \dots \dots \dots q_{pq}^I$

It is generally recognized that the major categories of factor income are formed by (i) the compensation of employees and (ii) the operating surplus.

The factor income originated from the production sectors are distributed to the recipients

⁸ The matrix shown in Table 5 is virtually a revised version of an integrated national accounts developed in detail by the author in the article, "An Integrated System of National Accounts as Transaction Matrix," (in Japanese) *Keizai Kenkyu*, July 1963.

of factor income through the process of the primary distribution of factor income. In Table 5 this process is essentially characterized by a transformation of Q^I into P^I . Suppose the row (and column) 4 is further subdivided according to a number of recipients of factor income. As the column 3 is already subdivided into types of factor income, P^I is virtually expressed by a sub-matrix whose row and column indicate the classification of factor income according to its recipients and to its types respectively. In detail, the matrix is written as below:

TABLE 7. THE SUB-MATRIX OF THE FACTOR INCOME RECEIVED BY THE MARKET SECTOR [p_{rp}^I]

		column no.	3
		row no.	sector
4	recipients of factor income		$p_{11}^I \dots\dots\dots p_{1p}^I$
			$p_{r1}^I \dots\dots\dots p_{rp}^I$

It is conceived in this matrix that the recipients of factor income may be classified according to a number of income classes. Yet, the classification does not preclude it from another classification which is based on other socio-economic characteristics. It may be also noted that P^I is defined as the net *national* product (at factor cost) subject to the net factor income from abroad, Z^I .

The factor income distributed among its recipients through the process of the primary distribution of factor income is, moreover, redistributed between the recipients and spending units of factor income. The redistribution of factor income is essentially characterized as a transfer of purchasing power from the recipients to the spending units of factor income. Thus, various types of transfer of factor income take a leading part in the process of the redistribution of factor income. Two concepts are closely associated with the redistribution of factor income. They are (i) the transfer of factor income and (ii) the disposable income. The transfer of factor income is defined here as a unilateral transfer of purchasing power in the form of factor income from the recipients to the spending units of factor income and is often called the income (or current) transfer. The transfer of factor income is distinguished from the capital transfer which is characterized as a unilateral transfer of purchasing power that is directly related to acquisition of assets and liabilities. Taking into account of the transfer of factor income between the recipients and spending units of factor income, the disposable income is derived from the factor income. Supposing that the row (and column) 6 is further subdivided according to the government agencies as recipients of factor income, the transfers of factor income between the market sector at large and the general government (G^{II} and G^I) are expressed in matrices as indicated below:

TABLE 8. THE SUB-MATRICES OF INCOME TRANSFERS BETWEEN THE MARKET SECTOR AND THE GENERAL GOVERNMENT

[g _{rt} ^{II}]		6	[g _{tr} ^I]		4
row no.	sector	government agencies as recipients of factor income	row no.	sector	recipients of factor income
4	recipients of factor income	$g_{11}^{II} \dots \dots \dots g_{1t}^{II}$ \vdots \vdots $g_{r1}^{II} \dots \dots \dots g_{rt}^{II}$	6	government agencies as recipients of factor income	$g_{11}^I \dots \dots \dots g_{1r}^I$ \vdots \vdots $g_{t1}^I \dots \dots \dots g_{tr}^I$

A sub-matrix which expresses the disposable income of the market sector at large is easily derived from the matrices [p_{rp}^I], [g_{rt}^{II}] and [g_{tr}^I]. It clearly indicates that the redistribution of factor income is made between the recipients and the spending units of factor income, because the row and column of this matrix stand for the spending units and the recipients of factor income respectively. The matrix is shown, in detail, below:

TABLE 9. THE SUB-MATRIX OF THE DISPOSABLE INCOME OF THE MARKET SECTOR [y_{sr}^I]

[y _{sr} ^I]		4
row no.	sector	recipients of factor income
7	spending units of factor income	$y_{11}^I \dots \dots \dots y_{1r}^I$ \vdots \vdots $y_{s1}^I \dots \dots \dots y_{sr}^I$

A word may deserve to note that one to one correspondence between the recipients and the spending units of factor income does not necessarily exist. Yet, the statistics of family budgets which form a major source of information on [y_{sr}^I] may not distinguish the difference between the recipients and the spending units of factor income. In the case, the classification according to different income levels may be universally used for the subdivision of both the row (and column) 4 and the row (and column) 7.

The disposable income of the general government may be derived in the same way as that of the market sector at large. Let us suppose that the row (and column) 2 is further subdivided according to a number of government agencies which constitutes the general government and that the row (and column) 5 is also subdivided by a number of types of factor income. Then, Q^{II} , which stands for the net domestic product originated from the general government, is expressed as a sub-matrix. The row of this matrix exhibits a type of factor income, and its column represents the classification of government agencies. Through the process of the primary distribution of factor income, the net domestic product originated from the general government is distributed into the government agencies as recipients of factor income. As the row (and column) 6 is subdivided according to the government agencies as the recipients of factor income, P^{II} , which stands for the net national product received by the general government, is transformed into a sub-matrix, whose row indicates a classification of the government agencies as the recipients of factor income and column the types of factor income. In detail, the structure of the sub-matrix is shown below:

TABLE 10. THE SUB-MATRIX OF THE FACTOR INCOME RECEIVED BY THE GENERAL GOVERNMENT [p_{lp}^{II}]

		column no.	5
		row no.	sector
6	government agencies as recipients of factor income		$p_{11}^{\text{II}} \dots \dots \dots p_{1p}^{\text{II}}$
			$p_{l1}^{\text{II}} \dots \dots \dots p_{lp}^{\text{II}}$

After the same manner as the derivation of the disposable income of the market sector at large, a sub-matrix which represents the disposable income of the general government is derived from the matrix of factor income received by the general government, [p_{lp}^{II}], and those which stand for the transfer of factor income between the market sector at large and the general government, [g_{rt}^{II}] and [g_{lr}^{I}]. The matrix of the disposable income of the general government is written as below:

TABLE 11. THE SUB-MATRIX OF THE DISPOSABLE INCOME OF THE GENERAL GOVERNMENT [y_{ut}^{II}]

		column no.	6
		row no.	sector
8	government agencies as spending units of factor income	y_{11}^{II}	y_{1t}^{II}
		y_{u1}^{II}	y_{ut}^{II}

In the derivation of this matrix, an assumption is made that the row (and column) 8 is subdivided according to the government agencies as spending units. Thus, the row in this matrix stands for a classification of the government agencies as spending units, and its column stands for a classification of government agencies as the recipients of factor income.

Attention is particularly drawn to the matrices which represent the transfer of factor income between the market sector at large and the general government, i.e. [g_{rt}^{II}] and [g_{tr}^I]. As the structure of these matrices clearly points out, the concept of income transfer is characterized by a unilateral transfer of purchasing power from the recipients to the spending units of factor income. It is true that the additional classification of the concept of income transfer may complicate the structure of an extended system of national accounts. But, considerable interest attaches to the additional classification of income transfer as it unfolds the nature of income transfer. Taking note of the fact that the concept of income transfer is considered as the link which connects between the recipients and the spending units of factor income, it may be of taxonomic use that the types of income transfer are classified into the following three categories:

- (i) voluntary transfer
- (ii) contractuary transfer
- (iii) compulsory transfer

The classification is based on the nature of initiative displayed by the person concerned. The voluntary transfer is termed as it is solely determined by the voluntary will of either the recipients or the spending units of factor income. If the income transfer is initiated by legal or other kinds of enforcement effected by either the recipients or the spending units of factor income, the income transfer is termed the compulsory transfer. The contractual transfer is termed as it is made by the mutual agreement between the recipients and the spending units of factor income.

It may be noted that our classification of income transfer is more strict and rigorous in determining the nature of income transfer than what is rendered in the revised SNA. The classification in the revised SNA is formulated under the four headings: (i) transactions arising

from the ownership of corporate and quasi-corporate enterprises and other property, (ii) other requited (contractual) payments and receipts for example, transactions in connection with casualty insurance or broken contracts, (iii) obligation to, and commitments of, government organs, all of which are unrequited (non-contractual) transfers and (iv) other unrequited but voluntary grants. As it easily turns out that the headings (i) and (ii) of this classification fall into the category of contractual transfer in our classification and that the remaining headings (iii) and (iv) correspond to the compulsory transfer and the voluntary transfer of our classification respectively, our classification of the income transfer is more precisely re-grouped than what is classified in the revised SNA.⁹

It should be noted that indirect taxes and subsidies fall into the different category of the transfer concept and be omitted from the categories of income transfer stated above. As the leading function performed by indirect taxes and subsidies is to translate the market price valuation into the factor cost (or income) valuation, they are not primarily concerned with the transfer of factor income. In order to stress the conceptual difference, it may be of some use to form a new category which characterize indirect taxes and subsidies. For convenience they may be termed the indirect transfer as they do not designate directly the transfer of factor income. In contradistinction to the indirect transfer, the transfer of factor income may be termed the direct transfer.

5. The structure of income redistribution which is discussed in the preceding section contains valuable information which serves for the analytical use of national accounts. In this section we shall be concerned with one of the possible use of this information for the analysis of tax burden.

For the sake of simplification, it is assumed in the subsequent discussion that there exists one to one correspondence between the recipients and the spending units of factor income. The income redistribution account for i -th recipients of factor income may be presented by a equation:

$$y_i + g_i^I = p_i + g_i^{II}, \quad (1)$$

where

$$y_i = \sum_s y_{si}, \quad p_i = \sum_p p_{ip}$$

$$g_i^{II} = \sum_t g_{it}^{II}, \quad g_i^I = \sum_t g_{it}^I$$

If the money income received of i -th sector is defined by the equation,

$$r_i = p_i + g_i^{II}, \quad (2)$$

the (2) is reformulated by the following equation:

$$y_i + g_i^I = r_i \quad (3)$$

If the system of proportional rate of income transfer would be placed on the market sector at large, the system would yield a hypothetical income redistribution account which differs from the actual one that is indicated in (1). Let g_i^{I*} and y_i^* stand for hypothetical transfer payments from i -th recipients of factor income to the general government under the system of proportional rate of income transfer payments and a hypothetical disposable income which follows from the system of proportional rate of income transfer payments respectively. Generally speaking, the transfer payments of the general government to the market sector at large

⁹ United Nations, *A System of National Accounts*, Studies in Methods, Series F No. 2 Rev. 3, New York 1969. The point refers to section 7.39. of this publication.

is not immune from a change in the system of income transfer payments of the market sector at large. But, it is reasonable to assume that the disposable income of a recipient of factor income is adjusted to a change in the system of income transfer. The following hypothetical income redistribution account is obtained as a result of the system of proportional rate of income transfer payments.

$$y_i^* + g_i^{1*} = r_i \quad (4)$$

What we are concerned with is the differential effect of incidence of income transfer payments on the real disposable income of a recipient of factor income, if a change in the system of income transfer payments occurs. If such change in the system of income transfer would be the case, a different set of prices would be offered for consumers. In order to make comparison of actual prices with hypothetical prices arising from the incidence of the system of proportional income transfer payments, the following price index may be constructed, and it may be used for the derivation of the hypothetical disposable income in real term.

$$p^* = \frac{\sum p_i^* x_i}{\sum p_i x_i} \quad (5)$$

It is implied by the price index that the deflator which is used for the derivation of the real disposable income under the actual system of income transfer payments is put equal to one. Thus, the real disposable income of i -th recipient under the actual system of income transfer payments, which is expressed by \bar{y}_i , is same as the nominal disposable income, i.e.

$$y_i = \bar{y}_i = r_i - g_i^1 \quad (6)$$

The real disposable income of i -th recipient of factor income under the hypothetical system of proportional income transfer payments (\bar{y}_i^*) is given by

$$\bar{y}_i^* = \frac{1}{p^*} (r_i - g_i^{1*}) \quad (7)$$

The (absolute) effect of the incidence of income transfers on the real disposable income of a recipient of factor income is measured by the difference between the actual and the hypothetical disposable income in real terms, which is written by

$$A_i = \bar{y}_i - \bar{y}_i^* \quad (8)$$

The difference is further rearranged by

$$A_i = \left(1 - \frac{1}{p^*}\right) \bar{r}_i + (\bar{g}_i^{1*} - \bar{g}_i^1) \quad (9)$$

where

$$r_i = \bar{r}_i, \quad \bar{g}_i^{1*} = \frac{g_i^1}{p^*}, \quad \bar{g}_i^1 = g_i^1$$

It easily turns out from (9) that the total effect of the incidence of income transfers consists of two additive terms. The first term, $\left(1 - \frac{1}{p^*}\right) \bar{r}_i$, may be called the gain (or loss) of real disposable income of a recipient of factor income due to a change in relative prices arising from a progressive or regressive system of income redistribution. In short, it may be termed the gain (or loss) of real disposable income due to the change in relative prices. If the prices under the hypothetical system of income transfer exceeds the actual prices, there exists the gain of real disposable income due to the change in relative prices. The gain arises because the actual prices become more favourable to consumers than the hypothetical prices. The second term, $(\bar{g}_i^{1*} - \bar{g}_i^1)$, may be termed the gain (or loss) of real disposable income due to the income redistribution. If \bar{g}_i^{1*} exceeds \bar{g}_i^1 , the difference amounts to the real saving of a recipient.

The total effect of the incidence of income transfers is reduced to

$$\Delta_i = (g_i^{I*} - g_i^I), \quad (10)$$

if the prices are kept unchanged throughout the different systems of income redistribution, i.e.

$$p^* = 1.$$

The derivation of (9) reminds us that the formula closely resembles what is called the terms of trade effects within the framework of national accounts. The resemblance can not be overlooked as a mere coincidence. What is common to both problems is the fact that they are concerned with the deflation of national accounts. The resemblance suggests that for the measurement of the real incidence of income transfers we can not neglect the gain (or loss) of real disposable income due to a change in relative prices.¹⁰

¹⁰ The striking similarity of formal character between our problem and the topics of terms of trade effects becomes more apparent, if we deeply investigate the construction of national accounts in constant prices. The issue receives through treatment in my unpublished article entitled "The Impacts of Changes in Terms of Trade on A System of National Accounts in Constant Prices: An Attempt of Synthesis".