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Interindustry Economics
and National Income Theory

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A. Frameworks of Comparison

Within the limits of the broad concepts underlying interindustry and national income accounting, the substance of this paper deals with, first, criteria of social accounting and, second, differences in analytic approach required by the specialized structure of differently composed social accounting systems.

A pattern of interindustry flows of goods and services may, of course, be developed independently of considerations of social accounting or of measures of output for the economy—the two objectives of the national income system. This paper, however, seeks to evaluate the two systems of accounts, in the light of the considerations noted above, in terms of (1) similarities and differences between types of activities and transactions included, (2) the relationship of the respective sector accounts, and (3) the types of analysis for which each is comparatively better suited.

To delimit further the boundaries, the discussion deals with the broad concepts involved in the two types of social accounts—regardless of whether a statistical formulation exists, is inexact, or is incomplete. By dealing with logical rather than statistical frameworks, the bones of the relationship between national income and interindustry accounts are more easily laid bare. The statistical frameworks are often needlessly separative in development, thereby obscuring the basic logical connection. A fresh start in developing the account structures would eliminate many seemingly irreconcilable differences.

1. SOCIAL ACCOUNTING BACKGROUND

From the broadest viewpoint, interindustry and national income accounts may be regarded as special cases, with complementary and integrally related aspects, of quantitative research in a social accounting framework. Historically, the initial developments in social ac-

counting—notably the *tableau économique* of Quesnay—were along interindustry lines. Earlier, political arithmeticians of the seventeenth century, such as Petty, King, and others also recognized in the structure of their accounts the intermediate and final product relationships of economic processes. Up to modern times, however, the models were generally either primitive or restricted to theoretical formulations of general equilibrium systems (of which the interindustry system is merely one empirical representation). Further empirical developments awaited the work by Wassily Leontief from 1931 to 1939, resulting in the construction of interindustry systems for the United States for the years 1919 and 1929. In recent years, this work has progressed extensively.[1]

Substantial conceptual elaboration of the national income accounts was delayed until late in the nineteenth century, even though Adam Smith had already recognized that the value product of a society is equal to its total social income.[2] The National Bureau of Economic Research, in the 1920's, promoted work on the factor payments aspects of national accounts. Federal government participation in this area followed, with the work begun by the Department of Commerce in 1932. These efforts were focused on the aggregative aspects of national income, rather than on the structure of accounts, reflecting in part how statistical information is related to the problems of the times. In the thirties, the principal interest in this field lay in the total of income flows and their relationship to employment. Since resources were plentiful, industrial impacts and considerations of best alternative uses could be neglected.

It was not until the stimulus of alternative resource uses under full employment, during World War II and afterward, that the structure of national income accounting was brought to maturity by the development of an interlocking and balancing set of income and product accounts. The same stimulus, however, accounted for small beginnings of interest in interindustry accounts as a workable tool of analysis. Thus, while the national income accounts could provide, for example, an over-all measure of the diversion of national production to war purposes, they could not tell what changes in the structure of the economy made this possible, or which specific industry's inputs and outputs were affected, or provide answers to a host of other questions that can be answered with the help of the

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[1] W. Duane Evans and Marvin Hoffenberg, "The Interindustry Relations Study for 1947," *The Review of Economics and Statistics*, May 1952, pp. 97-142.

[2] Adam Smith, *Wealth of Nations*, Book IV, Chap. ii.

detailed industry structure of the interindustry accounts. However, adequately developed interindustry systems have been available only recently; this resulted in a limited application of interindustry techniques to problems for which they are best suited. In a sense, therefore, the prior development and use of national income and product accounts was more a matter of historical exigency than of logical development.[3]

2. THE ROLE OF SOCIAL ACCOUNTING

The study of economic relationships, for the most part, is still conducted in theoretical frameworks without empirical content, which means that the validity of many economic concepts is uncertain. Economists have generally deplored this state of affairs and have continued to urge the collection and classification of data. But as one accountant commented, "It is to be feared that most economists and statisticians regard double entry bookkeeping as just that [a monument]—a monument to be admired from afar, rather than a technique to be acquired. They are less attracted by its humble virtues than by the dangerous charms of extrapolation."[4]

The interindustry system of accounts is a double-entry bookkeeping system of economic transactions. It is an organization of economic data in meaningful patterns arranged so that certain types of economic relationships may be used for the testing of economic hypotheses. This is precisely what social accounts do, whether in national income, interindustry, or other form. The interindustry system is a tool, and the foundation for a number of research or analytic applications, of which the Leontief formulation represents only one type. Thus, the interindustry system is not uniquely related to any particular analytic formulation, any more than the national income accounts can be said to be related to a particular type of consumption function. Each account structure is adaptable to many different types of analysis. Whatever insight into economic processes is obtained by the use of the accounts depends on their scope, the meaningfulness of their arrangement, and the skill of the analyst.

3. DIFFERENTIATION AS SOCIAL ACCOUNTS

Interindustry and national income accounts may be compared in many ways, with the most obvious and basic resemblance consisting

[3] The detailed sector accounts became available in final form with the publication of the *Survey of Current Business*, Dept. of Commerce, National Income Supplement, July 1947.

[4] George O. May, *Financial Accounting*, Macmillan, 1943, pp. 14-15.

of the fact that each of the approaches presents a broad national structure of transactions, set out in a consistent manner and adaptable for use in the solution of economic problems.[5] Each of these systems involves summaries of economic data in a particular organization, the parts of which are interrelated. The existence of the interrelated accounts signifies that crosschecks are provided and imbalances are identified. This is the advantage of the accounting approach in securing a useful description of the economic process.[6]

Accounting systems, however, differ in many ways, notably with respect to scope, relevant transactions, and sectors into which the accounting entities are classified. The interindustry accounts and the national income accounts may be distinguished according to each of these characteristics, but where the common objective is a measure of unduplicated final output, the former is a more rigorous type of social accounting.

In the national income approach, the accounts are verified by the general requirement that factor income plus other charges against final product must equal deliveries to final demand sectors—the gross national product. Intermediate uses are theoretically excluded in order to obtain the value of unduplicated output, as measured by deliveries to final demand. Errors of concept or calculation show up in the statistical discrepancy between the total values for the income and the product sides.

In interindustry accounts, the greater number of sectors requires that verification procedures be considerably more extensive, since balances of gross input and output must be achieved for each intermediate sector. For each such sector, input on the income side, comprising current costs of materials and services plus income charges, equals gross output on the product side, including shipments to intermediate as well as final users plus net change in in-

[5] Much of the discussion in this section can be considered an application of the broad principles appearing in J. R. N. Stone, "Functions and Criteria of a System of Social Accounting," in *Income and Wealth Series I*, The International Association for Research in Income and Wealth, 1951.

[6] The proper sphere of social accounting has been rigidly defined as "the accounting of the whole community as a nation, just as private accounting is the accounting of the individual firm" (John R. Hicks, *The Social Framework*, Oxford, 1942). However, social accounting may also be said to begin with two accounts, that of a firm or sector and that of the rest of the economy (or world). The significance of social accounts depends on their contribution to economic analyses; whatever structure makes transactions more meaningful is a form of social accounts. In this sense, the balance of payments statement of a nation was, perhaps, the first form of social accounting.

ventories. The structure of the accounts is so designed that over-all verification cannot exist until all the sectors are arranged consistently in an interlocking fashion, with the accounts of each sector completely balanced.

The effect of this search for balances in both sets of account structures is that, by isolating unidentified transactions within either the statistical discrepancy of the national income accounts or the so-called "unallocated" sector[7] of the interindustry accounts, the arid areas of statistical information are located and inaccuracies are revealed. This process is more effective in interindustry relations than in national income accounting, for the unallocated amounts (both inputs and outputs) are identified for each sector. This permits separate consideration of statistical deficiencies or aberrations in each sector, whereas the national income accounts are most often too aggregative to identify specific industry areas needing investigation. In addition, in the interindustry system the assignment of output to intermediate uses does not end the matter, as in the national income accounts. In the former case, the assignment of product to intermediate use means a specific allocation to an industry (or to the unallocated sector), whose control total—usually determined independently—must cover this allocation. Conceptually, this means a considerably tighter organization of data, since loose ends created by inaccuracies in industry A will plague the analysis of industry B. This means, in other words, that the complete structure of intermediate and final transactions of each industry must be reconciled and crosschecked a number of times, sometimes extending back through three or four chains of inference.

In the national income type of accounting, the netting out of the intermediate products is not subject to the same special type of rigor. Final product, as a residual, may contain unrecognized inaccuracies, revealed sometimes by the size of the statistical discrepancy, except when errors are in the same direction on the income and product sides. However, considerable interest attaches to the year-to-year or quarter-to-quarter movements rather than to absolute levels, and hence these inaccuracies do not have the same significance as they would in interindustry accounts.

The balancing requirements of each system of social accounting have operated to reinforce the statistical accuracy of both sets of accounts, since numerous identities and equivalences exist. This

[7] The statistical discrepancy of the interindustry system is the absolute difference between the unallocated row and the unallocated column.

must be the case, for aside from data problems that sometimes widen the statistical breach between the two sets of accounts,[8] an identical accounting framework can be used to record equivalent statistical absolutes, since the underlying concepts are fundamentally related. Thus, for both interindustry and national income accounts, total factor payments plus certain nonfactor charges must equal the value of final product deliveries outside the processing system (i.e. to final demand); selected components of the household row of the interindustry accounts are equivalent to the income-originating segments of national income; the final demand sectors of the interindustry system are comparable to the gross national product, etc.

The distinction between intermediate and final use is fundamental in social accounts. This does not preclude, however, the establishment of a matrix wherein specified intermediate transactions are more conveniently treated as autonomous flows, or wherein previously autonomous elements are shifted into the matrix, following the development of a stable relationship between inputs and outputs of a particular sector. For some social accounting purposes, the interindustry matrix can and is reshaped to exclude final demand sectors. The composition of the matrix is flexible.

4. DIFFERENTIATION OF ANALYTIC TOOLS

The foregoing discussion emphasizes the fact that interindustry economics may be viewed simply as a system of social accounts. This is apart from any reference to its major analytic use, namely, estimating requirements resulting from the application of a specific bill of goods to a matrix of coefficients. This usage requires an assortment of sometimes controversial assumptions. However, it is in a frame of reference entirely separate from social accounting that questions regarding these assumptions are raised—questions concerning the constancy of input coefficients under varied scales of operation, the effects of changes in relative prices on the use of substitutable goods, and others. If interindustry accounts neglected entirely the analytic use of the matrix, and hence made irrelevant these controversial questions, their use as a disciplined form of social accounting would remain to compel the attention of statisticians interested in measurements of income and wealth. No responsible authority recommends discontinuing national income estimates because aggregative models based on their figures go awry.

[8] One of the overriding nonconceptual considerations for national income accounts is that data be available on a current basis, even though one-time cross-sectional data are more accurate.

The non-analytic use is valuable in estimates of the national product accounts based on production statements for the economy. The problems encountered in the construction of national income accounts from production statistics—the so-called commodity-flow method—are ideally adapted for solution in an input-output framework, if the full logic of this method is accepted. The commodity-flow method of estimation of the National Income Division of the Department of Commerce in 1939 accounted for 84 per cent of the dollar volume of consumer expenditures and 69 per cent of producers' durable equipment. This product-allocation procedure is a loose application of interindustry methods, representing merely the preliminary step of distinguishing between intermediate and final uses, following which the former are distributed throughout the industrial structure, as described above.[9]

In a broad sense, a distinction may also be made between the social accounting and the analytic uses of national income accounts. In this system, transactions are classified according to a set of well-defined accounting standards. Strict adherence to these standards in assigning transactions to the several final demand sectors will, in itself, introduce constraints into the accounts.

These constraints, though perhaps smaller in degree, might be compared to constraints imposed, for example, by the working rule of linearity in the application of the interindustry system. Thus, the small but historic and controversial item entitled "miners' expenditures on explosives, lamps and smithing" is classified as a consumer expenditure in the national accounts, although Simon Kuznets objects to this treatment and suggests that "sizeable areas in personal consumption expenditures are . . . in large part either business costs or capital formation."[10]

Regardless of the merits of this controversy, it is apparent that, in some sense, arbitrariness resulting from the acceptance of a particular definition introduces unavoidable rigidities. This means that estimates of aggregate consumption functions based on Department of Commerce definitions must include whatever business costs are, by definition or usage, included in consumer expenditures.

[9] In recognition of the essential unity of the two systems of accounts, the Netherlands Central Bureau of Statistics' national income and product measures in base years are obtained by following the full product-allocation procedure of the interindustry system. Unification of the two systems has also been achieved in Norway and Israel.

[10] Simon Kuznets, "National Income: A New Version," *The Review of Economics and Statistics*, August 1948, p. 157. See also, in the same issue, Milton Gilbert *et al.*, "Objectives of National Income Measurement: A Reply."

Another type of constraint stems from the development of the Department of Commerce national income statistics in the form of only four sector accounts (plus a consolidated capital account), with receipts and expenditures given for each sector. The limits to the number of sectors, it is explained, "were fixed with due regard to the flow of current information and to the resources we have available for making statistical estimates."[11] However, because the sectors are established in this particular form, a question may well be raised with regard to the implicit constraints imposed in the process. As is the case in any social accounting system—interindustry, national income, or other—the process of aggregating and molding activities into four, ten, or fifty sectors introduces unavoidable constraints.

B. The Structural Relationship of Interindustry and National Income Accounts

The intended analytic uses of particular systems of social accounting largely determine the scope, the relevant transactions, and the specific form of the accounts. To secure perspective for the interindustry system of accounts, several existing account structures are sketched in terms of these three characteristics. Two aspects are discussed in this section; the third, or structural aspect, is discussed in section C.

1. SCOPE AND RELEVANT TRANSACTIONS

The manner by which the scope of a social accounting system can be determined by its intended analytic use is shown by the structure developed by Richard Stone.[12] For five sectors, he distinguishes (1) an operating account designed to show costs and receipts from current economic activity, (2) an appropriation account, which shows current income and expenditures from all productive and nonproductive sources, and (3) a capital or resting account, which indicates the sources and uses of capital funds. The threefold classification is designed to correspond with the three fundamental economic functions of producing, consuming, and adding to wealth.

The national income accounts of the United States—to which interindustry transactions forms are more closely related—consist principally of transactions involving newly produced final product,

[11] Gilbert *et al.*, *op. cit.*, p. 181.

[12] See J. R. N. Stone, "Appendix: Definition and Measurement of the National Income and Related Total," *Measurement of National Income and the Construction of Social Accounts*, United Nations, 1947.

grouped into four sectors of the economy: the business, the personal, the government, and the rest-of-the-world accounts. Intersector capital transactions are not differentiated but are shown consolidated in a savings and investment account. The transactions are classified into two types of account: receipts and expenditure statements for the three nonbusiness accounts—comparable to a combined operating and appropriation account—and an operating (or profit and loss) statement for the business accounts. The former is a catchall, undifferentiated type of account covering a variety of transactions; the latter, on the other hand, has specific operational meaning in accounting.

Against this background of varying types of social accounting structure, we place the interindustry system of the form developed in the United States, which is substantially articulated in terms of the operating statement. The identification of the operating statement as the type of activity relevant to the interindustry structure signifies that the specific form of the accounts involves a balancing of purchases and sales on current account for each intermediate sector. However, the use of accounting terminology and forms results from purely technical reasons. Essentially, a basic analytic objective of interindustry systems is to obtain estimates of requirements for physical goods and services under stated final demand conditions. It is the physical flow of goods and services that is relevant in the matrix, though these are disguised in the financial verbiage of disbursements and receipts, or purchases and sales, which merely provide a means of giving common equivalents to dissimilar quantities.

This "real" flow of goods and services is, of course, valued in money terms,[13] thereby making the transactions matrix useful in terms of cost analysis in its column structure, and of market analysis in its row structure. However, a considerable volume of money transactions—for example, transfers of money for financial claims or for previously existing assets—is excluded from the matrix. Hence, certain types of financial investigations involving sources and uses of funds statements, or balance-sheet changes, cannot be undertaken from a reconstruction of data appearing in the interindustry chart.

It should be stated that the physical flow concept is necessary only

[13] The interindustry table gives valuations of physical flows even when these do not have a financial counterpart—specifically, in the case of imputed values of goods and services contributing to current production. Typical imputations are the various payments in kind to employees, output of captive mines, and rental income from owner-occupied housing.

for the intermediate industries. Within the final demand segment, transactions are included that are not ordinarily considered as flows arising out of current productive activity, e.g. government transfer payments.

The emphasis on current account transactions is not an inevitable concomitant of an interindustry system. Variants of interindustry charts could include capital outlays, e.g. those for fixed assets and inventories. These are, in fact, included in some dynamic systems. However, in the 1947 interindustry study, capital outlays are specifically excluded, in great part to avoid distortions of input ratios which would result from unusual expenditures of the base year. These items are allocated to an exogenous investment sector. The capital consumption allowance is the sole capital cost in interindustry transactions.

2. SIGNIFICANCE OF TRANSACTIONS TOTAL

Though the existing interindustry system is concerned solely with current account activities of the economy, the totals of the transactions included in the national income and in the interindustry accounts have different significance, quite apart from the degree of consolidation of the accounts. The national income aggregates are widely used as "comprehensive measures of economic activity." "(They) reveal important fluctuations and long-term changes in the volume, composition and use of the Nation's output. . . ."[14]

In an interindustry system, however, the value of the total aggregated output (input)—entered in the cell at the right bottom corner of a chart—must be interpreted cautiously. First of all, total transactions within a given year are somewhat related to the classification system. For example, the aggregated total value for a 50-sector chart will usually be less than the aggregated total value for a more detailed chart (e.g. a 100- or 200-sector chart) from which it was developed, because some of the secondary products in the more detailed chart become primary within the 50-sector chart; and hence assumed transfers of these products are suppressed. Second, even with consistent classification systems for a number of years, the transactions total has limited temporal significance, because changing production patterns within industries cause differences in the unit of valuation within sectors. More fundamentally, the existence of duplicated output in the interindustry total and the fact that the

[14] *National Income Supplement, 1951, Survey of Current Business*, Dept. of Commerce, p. 1.

extent of duplication varies considerably over time make it impossible to compare this aggregate with other meaningful aggregates, such as gross national product. For example, the more elongated or roundabout the production process, the greater the interindustry transactions total.

Though limited in the manner it can be interpreted, the figure for total transactions in the interindustry accounts can be used as a measure of the degree of interrelatedness and interdependence of an economy. Presumably, a more highly developed economy would register a greater volume of transactions, while a more primitive economy, where labor services bulk large, would show a relatively smaller volume, assuming the same industry classification system.

In addition, the volume of gross output in relation to the money supply gives an approximation of a type of transactions (required for productive purposes) velocity.[15] In order to obtain a comprehensive transactions measure from the transactions total of the matrix, strictly financial transactions and transfer payments would have to be added and imputations with no financial counterparts subtracted. The index obtained by using total gross output of the interindustry system in relation to the money stock is useful, nevertheless, as a measure intermediate between an income velocity index and a comprehensive transactions velocity index.

Though the present classification system affects the value of total aggregate output, this value may be made independent of any type of classification by (1) eliminating dummy sectors and secondary product transfers, and (2) using the establishment consistently as the basic classification unit. A second use of gross output defined in this qualified sense is to relate it to national income (or GNP); the ratio of the two represents a type of multiplier, revealing the volume of productive transactions required for a given final demand.

C. The Sector Relationship of Interindustry and National Income Accounts

The development of the interindustry system of accounts for 1947 proceeded in terms of its own operational requirements and substantially independently of other frames of reference, such as the national income accounts. In fact, the decision to divide the economy into 450 sectors was accompanied by data problems that increased the individuality of statistical treatment of comparable economic

[15] Transactions velocity is usually defined as $V = P/M$ where P equals total volume of payments and M equals total money stock.

activities. Such problems include the classification of secondary products of industries, the allocation of inventories by stage of fabrication, the availability of some factor charges against gross output solely on an establishment basis while other charges are on a company basis, etc. In addition, certain conceptual differences from national income accounts developed. These were due partly to data problems arising from classification and partly to the requirements of an interindustry chart—for example, the treatment of government transfer payments.

Aside from the thorny data problems and their consequences, however, the conceptual bridge linking the two sets of accounts exists historically, as well as in the current theoretical formulation of the interindustry system. A representation of the latter is shown in an economy of $(n + 1)$ sectors, where known structural relations can be established for n sectors and where the remaining sector is autonomous. In this system, the allocations from the output of the ith sector to intermediate and autonomous (or final demand) sectors may be shown as:

(1) $\quad X_i = X_{ia} + X_{i_1} + X_{i_2} + X_{i_3} + \ldots + X_{ij} + \ldots + X_{in}$

where X_i equals the total output of a nonautonomous sector

$\qquad X_{ia}$ equals that part of the output of X_i allocated to a final demand sector

$\qquad X_{ij}$ equals that part of the output of X_i allocated to a nonautonomous sector.

A simple transposition of one term yields

(2) $\qquad X_i - X_{i_1} - X_{i_2} - X_{i_3} - \ldots - X_{in} = X_{ia}$.

The sum of the X_{ia}'s for all sectors represents that part of total unduplicated output considered as final demand in the national income accounts. The determination of X_{ia} is, of course, the crucial problem for the national income statistician; in interindustry accounts, this is only part of the general problem of allocating the total output X_i. Furthermore, the equivalent of a national income final demand sector may be treated as nonautonomous, depending on the model formulation.

Older studies of interindustry flows have stressed the link to national income accounting, at the same time minimizing the latter as representing only a small part of total transactions and as a "by-product" of a more important endeavor.[16] The nature of the equation

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[16] "It is true that . . . the part of the annual flow of values which is more or less arbitrarily defined as the national income deserves particular attention. To

indicates, of course, the interrelationship of each of its terms; that which is "by-product" depends on the structure of the relevant social accounting system.

1. THE RELATIONSHIP OF THE FINAL DEMAND SECTORS

In the national income accounts the X_{la} term refers to the familiar final demand sectors of government, gross capital formation, net foreign investment, and consumer expenditures. These aggregates do not correspond exactly to the current formulation of the final demand sectors of the interindustry system, for a variety of reasons noted below. It should be emphasized at once, however, that in an accounts structure like the 1947 study the apparent lack of correspondence is largely presentational and statistical in nature. To the extent that a system becomes increasingly "closed" for specific analytic purposes, the similarity to final demand sectors in the national accounts sense may appear to decrease, but there is no reason why those presumably nonautonomous flows cannot be broken out of the matrix for social accounting purposes.

In an "open" model containing as many autonomous flows as the national income components of final demand, the differences existing in the final demand sectors of the two account systems are largely mechanical, resulting from the placing of flows of goods and services for internal consumption in a square matrix. Aside from the presentational aspects, the debit-credit account structure of the final demand categories of the national accounts is constructed in a manner substantially similar to the system of inputs and outputs required by the interindustry system and so appears in the latter's work sheets. In account form, it is possible to trace the various flows of the four current income and outlay sectors and the consolidated capital transactions sector included in the national income system (precisely as in the interindustry system). In fact, aggregates such as the national income or the gross national product are merely summations of debit or credit entries selected from these sectors.

This formulation of the national income statistics in account form is substantially more useful because a great deal of information is presented that otherwise is lost through consolidation of the sectors. The accounts portray the interrelationship of the final demand flows, because each type of transaction is entered in two separate accounts.

a more detached observer, however, it may appear as a mere byproduct of the whole highly complex process of production and distribution of economic values." Wassily Leontief, *The Structure of American Economy, 1919-1939*, 2nd ed., Oxford, 1951, p. 20.

It is in this latter sense of the interrelatedness of flows that the inter-industry system of accounts may be considered an extension of national income accounts, with the latter's business income and product account broken down into more numerous and meaningful intermediate sectors.

The essence of the continuity between the two sets of accounts is illustrated by the rearrangement in Table 1 of the data included in

TABLE 1

Final Demand Sectors of the Department of Commerce
National Accounts, 1947

(*millions of dollars*)

	Business	*Govern-ment*	*Foreign Trade*	*Capital*	*Household*	*Total*
Business		$11,981	$8,826	$30,187	$159,065	$210,059
Government	$33,152	1,069		−13,743	23,641	44,119
Foreign Trade		13		8,895	832	9,740
Capital	20,942		473		3,924	25,339
Household	155,965	31,056	441		5,656	193,118
Total		$44,119	$9,740	$25,339	$193,118	

Source: The entries shown represent a segregation of debit and credit items by type of sector, originally shown in Tables II, III, IV, V, and VI of *National Income Supplement, 1951, Survey of Current Business*, Dept. of Commerce. Data for 1947 appear in this form in the supporting tables shown therein. In the foreign trade account, negative debit entries have been transposed to the right side of the account in obtaining the totals shown above. The negative entry in the government row represents the government's surplus.

the five national accounts developed by the Department of Commerce into a square matrix, similar to that of the interindustry system. Nothing has been added to the original Department of Commerce data; figures for the intermediate sector—the business row and column cell—are omitted. The row and column totals are equivalent in meaning to the totals of the debit and the credit entries of the accounts presented in the Roman-numeraled Tables II through VI of the *National Income Supplement, 1951, Survey of Current Business*. In order to conform with interindustry nomenclature, the personal income and expenditure sector is renamed the household sector, the rest-of-the-world sector is called the foreign trade sector, and the saving and investment sector is known as the capital sector.

The business row of Table 1 shows sales to government, to foreigners, to business on capital account (including net inventory and fixed capital outlays), and to consumers. The total of these items represents, of course, the business gross product in the national in-

come sense, i.e. exclusive of intermediate sales. The charges against the business gross product, broken down by kind of sector paid, are shown in the column. Thus, charges paid to the government sector, amounting to $33 billion, consisted of the corporate profits tax liability, indirect business tax and nontax liability, and employer contributions to social insurance. Charges of $156 billion paid to the household sector include personal income generated in business plus business transfer payments. The capital sector charge of $21 billion is the algebraic sum of those items, such as undistributed corporate profits, that do not represent transactions with other sectors on current account and hence are allocated to the capital sector.

The interrelated flows of the other sectors are similarly depicted. The government row shows receipts from the other sectors, principally taxes, while the column shows government purchases from other sectors. In the household row, payments such as wages and salaries, interest, dividends (and also the nonproductive flows) from other sectors are shown; the column shows purchases, including the balancing item of personal savings charged to the capital account. As noted above, various measures of income and product may be obtained from this detail by differentiation of the productive and nonproductive flows in each sector to permit calculation of gross national product, national income, etc.

The transition from this table to one of interindustry content may be illustrated by the deconsolidation of the foreign trade (rest-of-the-world) account. The totals of this latter account were shown in Table 1 on a netted basis; conforming to the form of presentation used in Table V of the *National Income Supplement, 1951*, p. 50, the account appears as in Table 2.

TABLE 2

Rest-of-the-World Account, 1947

(*millions of dollars*)

Net purchases of goods and services:		Net disinvestment in the U.S.	$8,895
Net purchases of direct services	$ 914	Net purchases from government[a]	13
Net purchases from business	8,826	Net purchases from persons[a]	832
Total payments	$9,740	Total receipts and deficit	$9,740

[a] These are negative debit entries transposed to the right side of the account.
Source: Based on *National Income Supplement, 1951, Survey of Current Business*, Dept. of Commerce, Table V.

The netted form of this table, however, is merely a matter of convenience, as is often the case in national income accounting. The same information could be presented on the gross-flow basis used in the interindustry accounts. Using Department of Commerce data again, the account would appear as in Table 3.

TABLE 3

Foreign Trade (Rest-of-the-World) Account, 1947

(millions of dollars)

Purchases of goods and services:			Net disinvestment	$ 8,895
Purchases of direct services				
(factor payments)ª	$	914		
Purchases from business			Sales to business (imports)	6,908
(exports)		15,734	Sales to government	1,015
Purchases from govern-			Sales to persons (remit-	
ment		1,002	tances, etc.)	887
Purchases from persons				
(remittances, etc.)		55		
Total payments		$17,705	Total receipts and deficit	$17,705

ª For property income this includes net payments.

Source: Based on *National Income Supplement, 1951, Survey of Current Business,* Dept. of Commerce, Table XI.

The entries for the foreign trade sector, as just presented, can be substituted in Table 1, with the data on the receipts side appearing in the foreign trade row and the payments entered in the appropriate cells of the foreign trade column. This substitution converts Table 1 into a matrix quite closely resembling an interindustry arrangement, with exceptions as noted below.

The arrangement of the final demand accounts in the form of a square matrix does not make the national accounts operational in any interindustry sense; it is shown for illustrative purposes as a preliminary means of introduction to interindustry accounts. However, the inclusion of the netted-out intermediate sales and their breakdown into two or more parts could conceivably convert the matrix in substance to a tool of analysis in an interindustry sense.[17]

2. COMPARISON OF FINAL DEMAND SECTORS

There are a number of important distinctions to be made between the two systems of accounts with respect to the treatment of final de-

[17] The analytic implications arising from the use of this type of structure would differ considerably from those deriving from the usual interindustry matrix, since, for example, a number of net flows are included in the final demand sectors, which otherwise are shown on a gross basis.

mand sectors. These arise, for the most part but not exclusively, from the use of gross rather than net flows in the interindustry system, notably in the foreign trade and inventory accounts. This distinction, however, is not basic, since national accounts can be rearranged to portray also some of the gross flows included in the interindustry system, as was done for the foreign trade sector shown above. The household account is, however, a special case, as will be noted later. With respect to the other final demand sectors, the treatment of expenditures by government and consumers and of outlays for producers' durables and construction is substantially equivalent in concept to that in the national income accounts.[18]

In the case of inventories, the national income accounts are concerned primarily with a measure of current output, which is secured by adding algebraically a net change in inventories (valued at current prices) to sales. For interindustry purposes, which are concerned with gross flows, this net change is deconsolidated into a row representing inventory depletions and a column representing inventory increases.[19] The inventory row is, in effect, a balancing entry to account for the excess of use over current output.

In the treatment of foreign trade, national income concepts are carried over into the interindustry accounts, except, of course, that exports and imports are carried almost entirely on a gross basis. However, a distinctive feature is the treatment of unilateral payments. In the interindustry system, exports paid for by the government (relief programs) are allocated directly from industry of origin to the foreign trade account. An entry in the government column balances this type of transaction.[20] The effect of this and other differences in treatment is statistically of small consequence.

As noted earlier, the household account exhibits some features that are different from those of the personal account of national income concepts. In the usual form of an interindustry system, the household row records all the factor payments generated in the course of production, including profits. Moreover, certain nonfactor charges against product, such as depreciation, are included in this

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[18] The ensuing discussion merely touches upon the highlights of the generalized form of the final demand sectors, with special note of their relation to national account concepts.

[19] Actually, the detailed interindustry study contains five inventory sectors—producing industry, government, other manufacturing, wholesale trade, and retail trade.

[20] This treatment, which accounts for real flows rather than for titles to flows, is characteristic of the interindustry system.

row. The inclusion of the latter group of items is purely a matter of convenience, and with the customary additions and subtractions from the household account (as is the case of national income from its account structure), the national income, gross national product, or other measure may be constructed.

It should be noted that the nonproductive flows—generally the transfer payments, such as those paid by government for unemployment insurance and veterans' benefits—are also included in the household row. This is not a complication in calculating the gross national product from these accounts. The nonproductive flows are included in order to retain as much information as possible in the accounts, thus making possible, for example, the construction of a personal income account to be balanced against personal (consumer) outlays. At the same time, payments in the household account may be adjusted to a measure of national income by the exclusion of transfer payments, subsidies, etc., and the inclusion of certain nonfactor charges, such as individual insurance claims.

3. THE TELEPHONE INDUSTRY ACCOUNT: AN EXAMPLE

A discussion of the treatment of a specific industry account, in terms of the distribution of product to intermediate and final demand uses, will highlight the relationship of interindustry to national income sectors. For example, the distribution of the output of the telephone industry may be shown as in Table 4.

TABLE 4

Distribution of Gross Output of the Telephone Sector, 1947

(*millions of dollars*)

Total gross output (in producer's value)[a]			$2,476
Output allocated to final demand sectors		$1,368	
Consumer expenditures (households)	$1,211		
Exports, recorded	3		
Government	119		
New construction	35		
Output allocated to intermediate sectors[b]		1,108	

[a] This amount is exclusive of federal, state, and local excise taxes of $383 million, which must be added to total output to obtain gross output in purchasers' value.

[b] This amount also includes allocation to construction maintenance and certain transfers of secondary products to other industries.

Source: Unpublished data from the 1947 Study of Interindustry Relations, Bureau of Labor Statistics.

The national income analyst will notice immediately both differences and similarities to his own treatment of the telephone industry's output. The construction allocation is on a "put-in-place" valuation basis, which generally corresponds to United States national income practices. Allocations to government, exports, and consumer expenditures are identical in concept with national accounts treatment. Of course, exports are treated gross, rather than net of imports. Analysis of intermediate items might also reveal slight statistical differences. Such differences, it should be emphasized, arise as a result of the quality of data, which often permit alternative judgment decisions on, for example, what should be considered a consumer (or business) expenditure. If there were a producer durable allocation in the telephone industry, here also the differences would be nonconceptual in nature.

The telephone account may now be rearranged in the form of an operating statement, resembling the typical business income and product statement of national income accounting (see Table 5). The charges against total gross output are shown in the traditional manner on the left side of the account. In this sector, the operating statement is equivalent to the production statement of the industry, since there are no inventories for which to account.

TABLE 5

Operating Account of the Telephone Sector, 1947

(*millions of dollars*)

Purchases			Sales		
Purchases of goods and services for use in current production:			Sales to final demand sectors:		$1,368
Materials, fuels, etc.	$	158	Consumer expenditures	$1,211	
Services		286	Exports, recorded	3	
			Government	119	
			New construction	35	
Charges against final demand:					
Wages and salaries		1,260	Sales to intermediate sectors:		1,108
Other income		33			
Profit after taxes		120			
Interest paid		65			
Depreciation		260			
Taxes—corporate, social security, etc.—exclusive of excise taxes		293			
Total gross input		$2,476	Total gross output		$2,476

Source: Unpublished data from the 1947 Study of Interindustry Relations, Bureau of Labor Statistics.

It should be apparent from Table 5 that charges against gross product, as in the national income accounts, are obtained by deducting from total gross output those purchases of goods and services that are used in current production. Similarly, an account for all business, such as the consolidated business income and product account developed by the Department of Commerce, is merely a consolidated operating (or production) account, with intrabusiness sales and purchases on current account eliminated.

4. DEVELOPMENT OF INTERINDUSTRY FLOWS FROM NATIONAL INCOME ACCOUNTS

There was presented above a square matrix that contained Department of Commerce final demand sectors in account form and depicted the interrelationship of the flows within these sectors. The principal distinction between such flows and those shown in the interindustry system, it was noted, is the latter's use, wherever possible, of gross rather than net flows; a number of minor differences were found to be mainly statistical and presentational in nature. Translating the Department of Commerce final demand data into their interindustry equivalents and arranging them into a square matrix along characteristic interindustry lines results in the presentation shown in Table 6. The sectors are similar to those given in the earlier table, which were based on Department of Commerce data, except for (1) the presentation of gross rather than net flows of the accounts involved, and (2) the presentation of a specific figure giving the volume of intermediate transactions.[21]

The matrix presented in Table 6, though conforming in structure to the interindustry account system, is shown merely for illustrative purposes. It is not significantly operational, because only one aggregated intermediate sector is shown. However, with a breakdown of the industrial sector into two parts (for example, between agricultural industries and nonagricultural industries) or more, the interrelationships of the system become evident and significantly operational. With an expansion of the number of sectors, additional structural interrelationships are revealed. To compare with the one-intermediate-sector matrix, there is presented in Table 7 a four-sector interindustry system. It should be emphasized that Table 7 is merely an expansion of the one intermediate sector matrix of

[21] The figures shown in Table 6 are not directly comparable with, nor can they be derived from, Table 1. As noted earlier, this results from differences in statistical treatment and their repercussions.

TABLE 6

Consolidated Interindustry Transactions, 1947 (One Intermediate Sector)

(millions of dollars)

	Industry	Government	Gross Capital Formation	Inventory Change (additions)	Foreign Trade (exports)	Households	Total
Industry	$244,391	$16,231	$33,080	$4,729	$15,620	$156,876	$470,927
Government	27,799	3,458	216	73	831	31,308	63,685
Inventory change (depletions)	4,865				22		4,887
Foreign trade (imports)	6,637	1,313				1,325	9,275
Households	187,235	30,058	218		847	2,116	220,474
Total	$470,927	$51,060	$33,514	$4,802	$17,320	$191,625	$769,248

Source: Based on the 50-sector table in W. Duane Evans and Marvin Hoffenberg, "The Interindustry Relations Study for 1947," *The Review of Economics and Statistics*, May 1952.

TABLE 7

Interindustry Transactions, 1947 (Four Intermediate Sectors)

(*millions of dollars*)

	Agricul- ture and Fisheries	Manufactur- ing and Mining	Services	Construc- tion	Final Demand	Total
Agriculture and fisheries	$10,856	$ 19,409	$ 1,247	$ 92	$ 12,659	$ 44,263
Manufacturing and mining[a]	4,444	76,934	33,541	11,377	87,125	213,421
Services[b]	5,435	31,423	36,990	5,266	105,425	184,539
Construction	199	943	6,228	7	21,327	28,704
Final demand[c]	23,329	84,712	106,533	11,962	71,785	298,321
Total	$44,263	$213,421	$184,539	$28,704	$298,321	$769,248

[a] Also includes gas and electric power utilities.

[b] Also includes trade, transportation, and undistributed flows.

[c] Final demand is the sum of final demand sectors shown separately in Table 6.

Source: Based on the 50-sector table in W. Duane Evans and Marvin Hoffenberg, "The Interindustry Relations Study for 1947," *The Review of Economics and Statistics*, May 1952.

Table 6, which in turn is mainly a rearrangement of Department of Commerce figures for interindustry account purposes.

D. Comparative Limitations in Analytic Use

Though the analytic use of the interindustry relations data is the major topic of another paper presented in this volume, some comment may be appropriate here on those specialized uses of the two accounting systems that arise purely from differences in account structure. It should be stated immediately that the complementarity in account structures carries over naturally and logically to the analytic uses. Each system is oriented to provide information quite often necessary for the completeness of results obtained through use of the other system.

It should be emphasized that economic analysis by means of the interindustry system is still in the research and development stage. The limitations of the system, in terms of the data required to solve many problems, are beginning to emerge. These limitations are related principally to changes in the product, the price, and the technological mixes (or relationships) that occur over time from the base period. The following discussion stresses the potentialities for use rather than the limitations that already exist, or may arise in the test of experience.

In the national income system, transactions are consolidated and aggregated into several final demand sectors from which unduplicated final output is calculated. Results of analysis using these accounts naturally tend to be broad and aggregative, and frequently are concerned with projections of total output in terms of consumption, investment, or other components. Where measures of activity are available on a more detailed basis, notably in the estimates of national income by industrial origin, the data exist but are not structurally or otherwise related, except as parts of a total.

On the other hand, the accounts developed in the interindustry system provide a basis for relating the aggregative final demand sector measures—obtained possibly from analysis of the national account type—to the structure of the economy by translating them into specific industry requirements of materials, output, manpower, and other resources. In fact, it is by using the interindustry system in this manner that any projected pattern of final demand can be tested for reasonableness, structural logic, or internal consistency under given or known conditions of resource availability.

In the usual national accounts model, a given pattern of final demands for consumption, investment, etc., is developed with hardly any regard to the capacity or supply aspects implied in these demands. There is little assurance that a given pattern of investment or consumption goods is not inconsistent with the available resources to fulfill these demands. The employed labor force adjusted roughly for productivity change typically represents the sole concession to the supply side.

The interindustry system goes beyond this to relate all of the relevant inputs—including capital requirements in dynamic systems—that are required to support a given projected pattern of final demand. In this sense, supply may be related to specific demand requirements in an empirical general equilibrium system.

Use of the national accounts model type in statistical formulations of general equilibrium analysis is characterized by the ability to account for interrelationships among a limited number of gross aggregates, such as consumption and investment.[22] The structural rela-

[22] The statistical formulation of a general equilibrium type of analysis—whether in interindustry or national accounts form—does not meet, of course, all of the maximizing and other criteria used in the theoretical exposition of a general equilibrium system. The use of data from the real world inevitably involves the violation of assumptions of competition, price flexibility, movement of resources, etc. However, the statistical construction of general systems, which are intended to describe economic behavior in reality, may be roughly depicted

tionships within these aggregates remain largely unspecified, however, although they are often subject to change. In interindustry analysis, the relationships among a large number of variables affecting the structural composition of the aggregates are specified and taken into account.

From another viewpoint, the national accounts may be considered adaptable to functional (as against cross-sectional) types of analysis, e.g. the relation of consumption expenditures to consumer income, liquid assets, etc., or of investment to profits, output, interest rates, etc. The main purpose of this type of analysis is to estimate over-all figures, ignoring the so-called product mix involved. In less-than-full-employment situations, this type of analysis is particularly appropriate, since the major emphasis is on the effects of policies in terms of raising total output, with the products involved of secondary importance. In this case, interindustry methods again play a complementary role in the analysis; for example, the effects of a given volume of investment on output and employment in specific industries may be determined in order to verify on an additive basis any results previously obtained on an over-all functional basis. Furthermore, such analysis may reveal that the relative effects of plant versus residential contruction expenditures, or construction versus equipment expenditures, may be altogether different from those indicated by an over-all (undifferentiated with respect to product) investment function.

The addition of industrial detail to the aggregative system is the essence of the interindustry system. Important aspects of a problem that do not appear on an over-all basis may be revealed sharply when aggregate data are broken down into specific industry data. For example, it may be revealed by interindustry methods that there is not sufficient steel to meet the requirements of a particular final demand program; alternatively, such a program may not stimulate steel output above a prevailing low rate.

In the context of the topic of this paper, it is perhaps inevitable that emphasis has been given to types of analysis in which interindustry-relations data and methods may have advantages over the more conventional national income and gross national product approaches. However, it must be pointed out that in many instances the converse will be true. For many—if not most—types of problem, the structural interindustry relationships are not relevant, or do not

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as general equilibrium systems, in the same sense that the usual statistical demand function represents a partial equilibrium approach.

affect the results seriously. Furthermore, considerable processing is required to translate a problem into interindustry terms, and the effort entailed may not be commensurate with the need for detailed analysis. In addition, the controversial issues of the effects of changes in the price and product mix and other limitations referred to above may permit only limited answers to some types of problem. This may be the case even after a substantial investment of analytic skill. In all of these cases, the simpler structure of the national income accounts will recommend their use.

C O M M E N T

GERHARD COLM, *National Planning Association*

During the discussions a number of observations have been made concerning the relationship of interindustry economics to social accounting (or national and international economic accounting, as I prefer to call it). Burt Klein, for instance, said in his comment, if I understand it correctly, that the input-output technique is of doubtful usefulness for directly predicting future production but is valuable as a method of social accounting. I think he would agree with me if I say that national economic accounting is a technique indispensable in economic forecasting and that economic forecasting under certain conditions requires that national income and expenditure accounts be supplemented by the input-output technique.

Alexander Henderson was right in reminding us that a discussion of an accounting technique must start with the question of the purposes we wish to serve. With this I agree, though I also recognize the merit in Stanley J. Sigel's remark that statistical systems, once they have been created, live their own lives and may prove their greatest usefulness for purposes not considered at the time of the creation. The story of the origin and later use of national income estimates bears this out. Nevertheless, we spend time and money on a statistical venture only if we are convinced that it serves worthwhile purposes, and the methods that are adopted must be tailored to the needs as they arise.

There are three main purposes in national economic accounting, as Henderson said. National economic accounting can help us (1) in piecing together a variety of types of statistical information in such a manner as to portray the structure and operations of the economy in its national and international aspects, (2) in hypothetical forecasting, which is useful, for instance, in market analysis and investment

programing, and (3) in appraising the economic effects of actual or possible decisions by government, business, labor, and consumers.

It would be useful to have spelled out in detail for each of the systems of social accounting the particular contribution it can make in the pursuit of these purposes. If I have one criticism of the two papers under discussion, it is that they did not go far enough in stating the purposes that are served by national income and expenditure accounts, moneyflows analysis, and input-output analysis. I also feel that they should have added capital accounting as an essential element in a complete system of national accounting.

For hypothetical forecasts, and for appraisal of government and business decisions, national income and expenditure accounts must provide, I believe, the most general frame of reference. When we are dealing with short-run periods, or when we contemplate policies that would not greatly alter the demand structure, we take it for granted that business will adjust supply to demand without difficulties. When we are dealing, however, with longer time periods or policies that do imply a substantial change in demand (consumer, business, foreign, or government), the question arises as to what changes in materials and productive capacity will be required, and what time will be needed to make such changes. As Franco Modigliani said, it is for the answer to this type of question that the input-output technique seems to offer the best approach. But it must be emphasized that the input-output technique can be used for these purposes only within the framework of a general projection of national income and expenditures. I do not agree with Herman I. Liebling when he seems to suggest in his paper that the input-output methods can provide the general framework for the construction of national income accounts. That puts the cart before the horse.

Because of the basic relationship among national income and expenditures accounting, moneyflows analysis, and interindustry economics, a reconciliation among these various aspects of national economic accounting is essential. To give just one example, we must be able to translate estimates of consumer, business, government, and foreign demand, classified by types of goods and services, into estimates of output, classified by industrial establishments and branches of industry. Such translation can never be made in a wholly "rigorous" manner: there will always remain the need for arbitrary allocation of "residuals" that defy translation from one to another type of classification. Nevertheless, one of the most useful by-products of the present comprehensive federal interindustry eco-

nomics program is the forcing of statisticians to attempt a reconcilia-
tion of heretofore irreconcilable statistics.

I would be satisfied if we move further in the same direction,
irrespective of whether or not we accomplish one day a single
grandiose, integrated, all-embracing system of social accounting.
For my taste, some of the present tabulations are already becoming
big and complex enough. I am not sure that our capacity to under-
stand and utilize complex data grows in the same proportion as the
capacity of our computing devices to handle larger masses of data.
What we need, perhaps, is one very simple summary statement of
current transactions and capital accounts, plus a variety of specific
statements for specific purposes. While the goal of an all-embracing
master statement of national and international accounts may be
overambitious, we do need a comprehensive theory of national and
international economic accounting that would show the usefulness
and place of the various kinds of measurement in their interrelation-
ships. With such an all-embracing *concept* of social accounting in
mind, we can proceed actually to develop those elements most ur-
gently needed for the purposes at hand.

GEORGE JASZI, *Department of Commerce*

The papers by Stanley J. Sigel and Herman I. Liebling that I have
been asked to discuss are useful factual comparisons of the national
income, input-output, and moneyflows accounting systems. Even
though I did not find myself in agreement in every respect, to my
mind they do not raise major issues of controversy. Accordingly,
instead of formulating specific comments, I prefer to say a few
words about the course for further research that seems to me to be
indicated by the two papers.

Reading them, I have gathered two major impressions: First, that
there is a close affinity among the three accounting systems even on
a quite moderate level of abstraction; second, that impenetrable
barriers of concrete definitional and statistical difference now stand
in the way of their actual integration.

What is the proper diagnosis of this apparently paradoxical situa-
tion?

There are two plausible explanations. In the first place, the affinity
among the systems may be a specious one. It may be the formal
type of affinity that is established by abstracting from essential dif-
ferences. Perhaps the three systems may cease to appear as inter-
meshing aspects of a single whole once they are worked out con-

cretely in the light of the specific uses to which each of them is to be put.

The other explanation may be that the three systems have been elaborated by separate groups of individuals and organizations that have not been in close touch with one another. The fact that the systems cannot be integrated at present may be due to a remediable historical accident rather than to their essential characteristics.

I do not think that we can say definitely which of the two interpretations is correct. However, I believe strongly that as a working hypothesis we ought to proceed on the latter interpretation. We should make a serious attempt to integrate the three systems.

I am not afraid that the resulting omnibus system would be too complex and unwieldy. The danger of complexity and unwieldiness can always be overcome by an intelligent tabular presentation that proceeds from summary to more-detailed information. Nor do I entertain the suspicion that, because the three systems are useful in distinct types of analyses that would not in any event be undertaken simultaneously or jointly, nothing would be gained by integration. It seems to me obvious that this is not the case. To mention only one example, the analysis of the economic situation that can be conducted with the aid of the national income system could be improved greatly if the information on money and credit flows contained in the moneyflows system could be made an integral part of it.

On the assumption, then, that the attempt to integrate the three systems is worthwhile, how should we proceed with it constructively? I think a double approach is needed. In the first place, we should think at a fairly high level of abstraction of an ideal accounting system, as it were, that would have room for all three of the component systems. The detailed tasks of fitting the three systems into the general framework would be the second line of attack. From the first vantage point, I am much more favorably inclined than Sigel seems to be toward comparisons of national income systems, input-output systems, and moneyflows systems as they *might* be set up, rather than as they *are* set up in actual practice. Only by engaging in this flight of imagination can we hope to construct a general system that will have room for all three.

For instance, it seems to me that it is of limited usefulness to dwell upon those contrasts between the national income and the moneyflows systems that stem from the historical accident that the former, as developed in the United States, contains only one consolidated saving and investment account for the economy as a whole. It

would be more constructive to speculate on the possibilities of integration that would emerge if the present national income system were supplemented by a set of sector saving and investment accounts underlying this consolidated account.

The general outlines of an omnibus accounting system might be as follows. The economy would be divided into three broad sectors —enterprises, households, and government—with further subdivisions, especially of the enterprise sector. For each of these sectors the following accounts would be established:

First, production accounts showing the productive activities of each sector. This would be the locus at which input-output information would be introduced.

Second, appropriation accounts showing the receipts of each sector from its productive activities as well as from other current sources, and the disposition that is made of these receipts for current expenditures and for saving. The main purpose of these accounts would be to free the production accounts from current transactions not related to production.

Third, saving and investment accounts showing the saving of each sector and its borrowing, matched by its investment and lending. It is here that the information specific to moneyflows would be brought in.

Fourth, external accounts showing the transactions of each sector with other sectors. Their main function would be to permit systematic recording of international transactions.

Last, balance sheet accounts showing the assets and liabilities of each sector. This last set of accounts, you will note, is not related directly to the task of integrating the national income, input-output, and moneyflows systems. I have added it only because it is a logical extension of all three of them.

In classifying transactions, it would be necessary to distinguish among those involving goods and services, those involving transfers, and those involving financial claims. Further distinctions within these three broad types would also be drawn. Finally, the basis of recording these transactions would presumably be some form of accrual accounting.

Thought devoted to the construction of some such accounting system as this, which would give us sufficient elbow room to fit together the three component systems, is the first line of attack leading to their integration. This line would be on a higher level of generality

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than the argument of the two papers that I have used as a spring-board for my comments.

The second line of attack that I have indicated as indispensable would be on a level that is much more specific. Let me give you one example of what I have in mind. It is easy to speak glibly, as I have done, of separate production accounts and saving and invest-ment accounts for enterprises, and to hold out the hope of integrating input-output information and moneyflows information in this man-ner. But in implementing this approach, great and perhaps insupera-ble difficulties might be encountered. Production accounts, in order to be useful, must be at least on a technological establishment basis, whereas saving and investment accounts must use the financial entity of the firm as the unit of classification. It is in grappling with concrete problems of this type that we would find out in what man-ner, and to what extent, the integration of the three accounting systems would be a manageable task.

Over-all comparison of the national income, input-output, and moneyflows accounting systems as they have been worked out in United States practice is a useful first step in the constructive task of their integration. The burden of my comments is that, as the next step, an approach both more imaginative and more down-to-earth is needed.