USDA's Economic Research Service
has provided this report for historical
research purposes.

Current reports are available in
AgEcon Search

(http://ageconsearch.umn.edu)

and on https://www.ers.usda.gov.

United States
Department of
Agriculture

Economic
Research
Service

**Agriculture
and Rural
Economy
Division**

Data, Linkages, and Models

U.S. National Income and Product Accounts in the Framework of a Social Accounting Matrix

Kenneth A. Hanson
Sherman Robinson

SALES INFORMATION

Purchase copies of this report from ERS/NASS Reports, P.O. Box 1608, Rockville, MD, 20850. Order by title and series number. Write to the above address for price information, or call the ERS/NASS order desk at (301) 953-2515. You may also charge your purchase by telephone to VISA or MasterCard. Foreign customers, please add 25 percent for postage (includes Canada).

Microfiche

Purchase microfiche copies ($6.95 each) from the National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, VA 22161. Order by title and series number. Enclose a check or money order payable to NTIS; add $3 handling charge for each order. Call NTIS at (703) 487-4650 and charge your purchase to your VISA, MasterCard, American Express, or NTIS Deposit Account. NTIS will RUSH your order within 24 hours for an extra $10; call (800) 336-4700.

DATA, LINKAGES, AND MODELS: U.S. NATIONAL INCOME AND PRODUCT ACCOUNTS IN THE FRAMEWORK OF A SOCIAL ACCOUNTING MATRIX. Kenneth A. Hanson and Sherman Robinson. Agriculture and Rural Economy Division, Economic Research Service, U.S. Department of Agriculture. Staff Report No. AGES 89-5.

ABSTRACT

In policy analysis, there is a continuing tension and interplay between issues, models, and data. Issues and models have changed in recent years and there is a need for evolution in the underlying economywide economic database. We discuss accounting frameworks for integrating micro survey data with macro data from the national economic accounts. We take a modeler's perspective, arguing that new accounts are needed to support policy modeling. We discuss in detail the use of a social accounting matrix (SAM). A SAM provides a data framework which reflects an actor/transaction view of the economy and supports disaggregated economywide modeling. We discuss the relationship between a SAM and the existing national economnic accounts for the United States, including the national income and product accounts (NIPA) and the input-output accounts.

Keywords: Social accounting matrix, SAM, national income and product accounts, NIPA, microsimulation model, computable general equilibrium model, CGE model.

ACKNOWLEDGMENTS

```
*******************************************************************
*  This report was produced for limited distribution to the research  *
*  community outside the U.S. Department of Agriculture.              *
*******************************************************************
```

1301 New York Ave., NW
Washington, DC 20005-4788

January 1989

CONTENTS

Data, Linkages, and Models

U.S. National Income and Product Accounts in the Framework of a Social Accounting Matrix

Kenneth A. Hanson
Sherman Robinson

INTRODUCTION

The United Nations is currently revising the system of national accounts (SNA). Such revisions occur only rarely, the last major one being in 1968.[1] There has been an active literature on proposed changes to the U.S. national income and product accounts (NIPA). Carson (1975) describes the historical roots of the U.S. national economic accounts.[2] During the development phase of the 1930's and 1940's, the prevailing economic issues were macroeconomic in nature. The accounts were designed to provide a consistent economywide macro framework for policy analysis. The methodological revolution in Keynesian macro theory and models strongly influenced their evolution.

In the last 25 years, the economic problems facing U.S. policymakers have changed. Distributional and structural issues appeared on the policy agenda. In the 1960's, attention focused on the extent and incidence of poverty. In the 1970's and 1980's, focus shifted to issues such as the sectoral impact of changes in relative prices (for example the oil crises), the slowdown in productivity growth, and changes in the structure of international trade. Policies affecting the distribution of income and industrial structure require analysis at a sectoral and/or micro level. However, such analysis must be reconciled with macro analysis, since macro shocks have been a major force behind many of the structural changes and policy problems.

To support policy analysis, the economic accounts need to reflect these new concerns. One school of thought, led by Ruggles and Ruggles (1982, 1986), argues that the NIPA should be better grounded in micro survey data of households and enterprises. Ruggles and Ruggles want the accounts to reflect an actor/transaction view of the economy.[3] They propose an elaborate set of detailed revisions to the NIPA in their system of integrated economic accounts (or IEA). In prin-

---

*Hanson is an economist with the Economic Research Service. Robinson is a professor at the Department of Agricultural and Resource Economics, University of California, Berkeley.

[1]That revision was strongly influenced by Richard Stone. See Stone (1986a) for a description of the process. Young (1987) reviews the various proposals for revising the U.S. accounts.

[2]For an introduction to the national economic accounts (NEA), see Young and Tice (1985). The macro accounts--the national income and product accounts-- are described in Carson and Jaszi (1981) and the data sources and estimation methods are described in Carson (1987).

[3]The 1982 reference is an article in a symposium issue of the Survey of Current Business devoted to discussions of their proposals.

ciple, the proposed IEA provide a better micro-foundation for the national economic accounts. However, they do not focus on linkages among actors. For example, they neglect inter-industry linkages, ignoring the input-output accounts.

In this paper, we argue for a wider set of accounts called a social accounting matrix (SAM). Stone was a pioneer in the development of the SAM framework.[4] In principle, a SAM provides an accounting framework that includes all economic transactions among actors. Like the IEA, it can provide a basis for integrating micro survey data into the national economic accounts. Indeed, we argue that the IEA are easily accommodated in a SAM framework.

In proposing a SAM framework for the United States, we start from the perspective of a modeler. We wish to develop the accounting basis for models that incorporate both macro and micro phenomena. Two broad types of models attempt to address economic issues from an actor/transaction yet economywide perspective: microsimulation models and computable general equilibrium (CGE) models.[5] Orcutt pioneered the use of microsimulation models.[6] Recent examples of CGE models applied to the United States explore a variety of issues, including tax policy, energy policy, trade and macro policy, agricultural policy, and the economic impact of defense spending.[7] Such models are also widely used in developing countries.[8]

Crucial issues of model design include the specification of actors in an economywide model and the rules governing their behavior and interaction. The actors in a CGE model commonly include households, producers, government, the rest of the world, and a capital account which equilibrates aggregate savings and investment. Each of these can be disaggregated, refining the model's specification of average or representative actors. Microsimulation models, on the other hand, often start with representative samples of micro units such as individual households and firms, simulate their interactions, and aggregate the results. In both these types of models, the proper choice of aggregation depends on the problem at hand and represents a significant part of the modeler's art.

Integrating micro data from household and firm surveys with macro data from the national economic accounts into a social accounting matrix (SAM) provides the data base for disaggregated economywide modeling, both CGE and microsimulation.

---

[4]The United Nations SNA, which he helped design, includes many SAM elements. The SAM framework is widely used in developing countries. See Pyatt and Round (1985) for an introduction to social accounting methods and applications of SAM's in a variety of countries.

[5]There are some economywide models that mix input-output and macroeconometric models. They are usually less based in micro theory than either CGE or microsimulation models, but the dividing line is fuzzy. See, for example, Almon et al. (1974), whose multisectoral input-output models of the United States include econometrically estimated investment equations and focus on dynamic behavior.

[6]Recent examples of U.S. applications include Orcutt, et al. (1976); Forrester, Mass, and Ryan (1976); and Bennett and Bergman (1986). See also the collection of applications in Orcutt, Merz, and Quinke (1986), Haveman and Hollenbeck (1980), and Feldstein (1983).

[7]See Ballard, et al (1985); Hudson and Jorgenson (1974); Adelman and Robinson (1988); Goulder and Eichengreen (1988); Kilkenny and Robinson (1988); and Roland-Holst, Robinson, and Tyson (1988).

[8]Tax and trade CGE models of developed countries have recently been surveyed by Shoven and Whalley (1984). CGE models of developing countries have been surveyed by Robinson (1988) and Dervis, de Melo, and Robinson (1982).

The SAM builds on the input-output accounts, which provide the starting point for any reconciliation between micro and macro accounts.[9] In this paper, we show that the SAM framework supports disaggregated economywide models in a manner analogous to the way the NIPA supports macro models. We also suggest some revisions of the national economic accounts to reflect an actor/transaction view of the economy and to capture market interactions in a SAM framework.

THE SAM FRAMEWORK

There are two important motivations for using a social accounting matrix as part of the national economic accounts. One is flexibility in data organization and the other is compatibility with alternative analytical uses. The SAM provides a convenient presentation of the network of transactions which occur throughout the economy. Much has been written about the definition and properties of a SAM, so our discussion is brief.[10] We focus more on how to reconcile the U.S. national economic accounts in a SAM framework, a necessary step for disaggregated economywide modeling. We also discuss some issues of imputation and aggregation.

SAM Accounting Principles

A SAM provides a complete account of the circular flow of income in an economy. Table 1 provides a simple macro SAM for the United States for 1982. It is a macro SAM because it only includes the macro aggregates and nets out payments for intermediate inputs.[11] A SAM is always square. Each row and corresponding column represents the expenditure and receipt accounts of an economic actor. Expenditures flow from a column account to a row account. Corresponding row and column sums must always be equal by the conventions of double-entry book-keeping. The accounts effectively define five actors (suppliers, households, government, capital account, and the rest of the world). These last four actors receive income and close the circular flow by generating demands for goods produced by suppliers. Reading down the first column, of table 1, one sees that suppliers make payments to factors. They also pay taxes to the government, save, and purchase imports from the rest of the world. Households receive factor income (as the owners of factors of production) and transfers from government. Along the row, they engage in inter-household transfers, pay taxes, and finally consume and save.[12]

The last three accounts capture the major macro balances: savings-investment, the government deficit, and the balance of trade. The capital account collects all savings and spends it on investment goods, thus serving as the net loanable funds market. Along its row, the government collects taxes from the other

---

[9]The United States is fortunate that the same agency produces both the input-output accounts and the NIPA. Since 1964, the two sets of accounts have been reconciled, a major task in most other countries. See Young and Tice (1985) and U.S. Department of Commerce (1984) for a discussion of the reconciliation.

[10]See Pyatt and Round (1985), especially the chapter by King (1985), for an introduction to SAM's.

[11]The SAM is produced by a combination of aggregation and reduction of a larger SAM. The reduction procedure involves spreading accounts to be removed from the matrix in a manner designed to maintain column and row sums of the remaining accounts. The procedure is due to Pyatt (1985).

[12]The inter-household transfers include items from the NIPA such as interest payments and transfers to and from enterprises. There is some netting of various NIPA entries which arise from the reduction procedure.

Table 1--Macroeconomic SAM for the United States

Actors	Suppliers	House-holds	Govern-ment	Capital account	Rest of world	Total
Billion dollars (1982)						
Suppliers	0	2,050.70	641.70	447.30	361.90	3,501.60
Households	2,183.31	49.19	438.31	0	0	2,670.80
Government	582.46	414.17	4.17	0	0	1,000.80
Capital account	400.23	155.44	-109.38	0	0	446.30
Rest of world	335.60	1.30	26.00	-1.00	0	361.90
Total	3,501.60	2,670.80	1,000.80	446.30	361.90	

actors.[13] Down the column, it buys goods and makes transfer payments. The government deficit appears in the column as a withdrawal from the capital account. The rest of the world buys exports in the column account. Along the row, it provides imports and receives net transfers from the domestic actors. Households pay out net remittances and the government makes interest and transfer payments to foreigners. The capital account entry indicates net foreign investment.

The SAM includes three different types of flows. First, market transactions are nominal payments from one actor to another across a market. A real flow crosses the market in the opposite direction (from a row to a column). The entries in the first row and column are of this type (except entries 3 and 4 in column 1). Second, financial flows reflect the working of asset markets. Corresponding to the nominal flow, the purchasing account receives ownership of an asset. The entries in the capital account row are of this type. They summarize the workings of the financial system, generating financial assets corresponding to the new real capital created by the investment expenditure in the column. Finally, all the remaining entries represent pure transfers, either voluntary or involuntary. Nothing goes from the row account to the column account in response to the nominal flow from column to row. Household tax payments and government transfer payments to households (for example social security) are two examples. In the NIPA, both pure transfers and financial transactions are non-productive in that they do not generate any value added. The GNP accounts treat both as transfers.

---

[13]The government-to-government entry arises from combining Federal, State, and local accounts, including various inter-government al transfers.

Figure 1--UNITED STATES macro SAM from NIPA
1982 Billions of Dollars

EXPENDITURES OR OUTLAYS

		1 Com-modity	2 Activity	3 Value added	4 Indirect taxes	5 Employee compensation	6 Proprietor income	7 Property income	8 Statistical discrepancy	9 Enterprise	10 House-hold	11 Govern-ment	12 Capital account	13 Rest of world	Row totals
R E C E I P T S O R I N C O M E	1 Commodity		0								2050.6	641.7	447.3	361.9	3501.6
	2 Activity	3165.9													3165.9
	3 Value added		2907.2												2907.2
	4 Indirect tax		258.8												258.8
	GNP		3166.0												
	5 Employee compensation			1907.0											1907.0
	6 Proprietors			175.5											175.5
	7 Property			435.9											435.9
	National income			2518.4											
	8 Statistical discrepancy		-0.1												-0.1
	9 Enterprise			388.8			175.5	435.9			55.6	47.5			1103.4
	10 Household					1637.5				637.1		396.3			2670.8
	11 Government				258.8	269.6				63.1	409.3				1000.8
	12 Capital account								-0.1	403.2	154.0	-110.8			446.3
	13 Rest of world	335.6									1.3	26.1	-1.0		361.9
	Column totals	3501.6	3165.9	2907.2	258.8	1907.0	175.5	435.9	-0.1	1103.4	2670.8	1000.8	446.3	361.9	

A Macro SAM From the NIPA

Figure 1 is a macro SAM which reconciles with the standard five summary tables of the NIPA.[14] The accounts are designed to ease reconciliation with the NIPA, with separate subtotals for GNP and national income. There are a number of additions to the accounts in table 1.

The supplier account has been split into commodities and activities. Activities produce value added and represent the production side of the economy, paying out value added to factors of production. A separate indirect tax account serves as a convenience account to distinguish value added at factor cost (entry 3,1) and GNP. GNP is defined as value added at factor cost plus indirect taxes, or value added at market prices.

The commodity account represents a giant department store. It buys goods from domestic producers and foreigners (imports) down the column and sells them to demanders (including exports) along the row. The commodity account defines GNP from the expenditure side. It equals the row sum minus imports (entry 13,1).

The SAM presentation with separate accounts for activities and commodities neatly distinguishes factor markets and product markets. The commodity account describes the product markets. It buys wholesale from activities (entry 2,1) and sells retail to demanders along the first row.[15] Activities represent producers who purchase inputs in the factor markets, paying out value added. The macro SAM nets out intermediate inputs, which can be entered as commodities purchased by activities (entry 1,2).

Column 3 maps from value added at factor cost to national income. There is an enterprise account which collects net, non-labor income, including depreciation.[16] This enterprise account has no counterpart in the NIPA.[17] The property income account includes rental income, corporate profits, and net interest from the NIPA accounts. Enterprise income (row 9) represents the before-tax return to property, including depreciation.[18] Column 9 distributes this return to

---

[14]The standard five tables are presented annually in the July issue of the _Survey of Current Business_. The summary tables for 1982 were published in July 1983, although the data for table 1 are based on revised data from the July 1986 issue. In appendices, we present a set of the standard tables for 1982, a mapping from these tables to the SAM entries, and a time series of macro SAM's for 1977-86. The data for the time series come from Wharton Econometric Forecasting. A spreadsheet program for generating the SAM's from the Wharton data is described in Hanson (1988).

[15]The indirect tax account can also be used to distinguish between indirect taxes at the producer level and sales taxes at the retail level. The approach here follows the NIPA convention of treating all indirect taxes as a payment by producers.

[16]Entry (9,3) also includes business transfer payments and subsidies less current surplus of government enterprises, both of which are part of value added but not of national income.

[17]There was once a sixth table in the NIPA which represented a kind of enterprise account. However, it was dropped when the accounts were revised in 1958. See Carson (1975), p. 179.

[18]Note that the employer contribution to social insurance has been included as part of employee compensation, and hence is treated as a return to labor. Note also that property includes not only capital, but also land, copyrights, and royalties.

households (10,9), pays corporate profit taxes to the government (11,9), and saves the remainder as retained earnings plus depreciation (12,9).

In the NIPA, there are four categories of non-labor income: proprietors income, rental income of persons, corporate profits, and net interest. These categories represent income to different types of enterprises in the SAM. The distinction, however, is not important for most models, and the latter three are summed in the SAM in figure 1.

The statistical discrepancy account includes the NIPA statistical discrepancy between GNP computed from the expenditure and income sides. By convention, the NIPA assigns it to savings (entry 12,8). In principle, this account could include all data inconsistencies encountered while compiling the accounts. These inconsistencies could then be treated together. For example, a number of mathematical techniques exist for balancing matrices. They distribute discrepancies across entries, minimizing some criterion function while maintaining equality in row and column sums (as required in the SAM).[19] Such techniques potentially provide a better approach to data reconciliation than current practice in most national statistical agencies, and follow naturally from the SAM approach.

The final four accounts (households, government, capital, and rest of the world) have exact NIPA counterparts. The capital account provides a summary description of the loanable funds market and corresponds to the gross savings and investment account in the NIPA. The government deficit ($-110.8 billion in 1982 and $-147.8 billion in 1986) appears as a withdrawal by government from the capital account, representing crowding out in the loanable funds market. Net foreign investment (entry 13,12) was $-1.0 billion in 1982 and rose to $-143.9 billion in 1986, representing a foreign injection into the loanable funds market.

The SAM in figure 1 is divided into blocks of accounts. The first two rows and columns describe the product and factor markets. The middle diagonal block, defined by rows and columns 3-8, describes the functional distribution of income, mapping from factor income (value added) to categories of national income. The particular functional categories used in the NIPA have a long history. They represent an uneasy compromise between categories appropriate for economic theory and convenient units for data gathering. We shall discuss these choices further below. The bottom middle block (rows 9-13 and columns 3-8) present the mapping from the functional distribution to the institutional distribution. Accounts 9-13 reflect an institutional categorization of economic actors and provide the basic building blocks for macro models. Finally, the lower right diagonal block (rows and columns 9-13) gives the inter-institutional linkages in the economy.

The two lower blocks (middle and right, rows 9-13, columns 3-13) contain only transfer entries. No productive activities or market transactions take place in this region of the SAM. There are financial transactions in the capital account row, where new assets are sold. These transactions neither generate value added nor involve the exchange of goods. These transfer entries, however, are very important for understanding how the economy operates and for modeling that operation.

The institutions in the SAM represent actors whose interrelationships make up much of the macro structure of the economy. For example, consider aggregate

---

[19]See, for example, Bacharach (1970) and Byron (1978). More advanced techniques, based on network theory, are described in Zenios, Drud, and Mulrey (1986). An early proposal for applying this adjustment technique to national accounts is Stone, Champernowne, and Meade (1942).

savings. From the SAM, retained earnings of enterprises (which include deprecia-
tion) amounted to 90 percent of aggregate savings in 1982. The government de-
ficit represented a negative 25 percent in 1982 and grew rapidly in the 1982-86
period. Net foreign investment also grew enormously. Household savings played
a relatively minor role. Any consideration of savings-investment equilibrium
must account for the behavior of these actors and for their changes over time.

From figure 1, note that about 15 percent of total household income comes from
government transfers. These include social security and government pensions,
as well as welfare programs. This transfer income roughly equalled the value
of direct taxes from households. An examination of these transfers is crucial
for any consideration of the distribution of household income (the size distribu-
tion). The distribution of wages and profits (the functional distribution) is
important, but is clearly only part of the story.

There is no information in the macro SAM that is not readily available in the
standard NIPA tables. The SAM, however, presents that data in a form that
emphasizes the linkages among institutional actors. It shows clearly how income
moves from producers to factors to institutions. The matrix presentation
emphasizes the circular flow in the economy, showing the closed nature of the
system in a way difficult to appreciate from the standard tables. One could
construct a more elaborate macro SAM from the detailed NIPA tables, further
disaggregating the institutional accounts and elaborating on the bottom blocks
of the SAM in figure 1. Many macro models take this approach. Instead, we pick
up the story from a microsimulation modeler's point of view. In particular, we
elaborate on the actor/transaction approach and view the accounts in a manner
consistent with micro theory.

THE SAM AS A BASIS FOR CGE AND MICROSIMULATION MODELS

In a disaggregated economywide model, the specification of actors and accounts
follows economic theory more than legal definitions of organizations and sources
of data. Moving from an accounting definition to an approach based on economic
theory involves a number of issues. First, the definition of the accounts must
be clarified, particularly those concerning product and factor markets. Second,
imputations are necessary where productive activities occur, but the goods and
services do not flow across markets. There is a long history of debate about
imputations and the definition of the appropriate boundaries of the economy in
national economic accounting, with no resolution in sight. A modeler's perspec-
tive, however, adds some new twists to the discussion. Third, we consider some
issues relating to defining actors and disaggregating their accounts.

Markets and Accounts

Focusing on markets requires disaggregation of the accounts relating to the pro-
duct and factor markets. figure 2 provides an illustrative U.S. SAM for 1982,
including a three-sector input-output table. To keep the table small, we combine
the commodity and activity accounts into supplier accounts, which include both
domestic production and imports. We have eliminated the various categories of
income recipients in national income, as well as the statistical discrepancy
account. Instead, we have divided value added by functional categories,

Figure 2--United States SAM, 1982
(Billions of Dollars)

		EXPENDITURES OR OUTLAYS												
		1	2 Suppliers:	3	4 Value added:	5	6 Enter-	7	8 Households:	9	10 Govern-	11	12 Rest of	Row
		farming	industry	services	labor	capital	prise	transfer	labor	rentier	ment	Capital	world	totals
R E C E I P T S O R I N C O M E	Suppliers:													
	1 farming	42.1	86.1	4.3				4.2	12.4	2.4	8.6	-0.5	19.6	179.0
	2 industry	44.4	1094.6	389.2				96.2	354.6	76.6	173.9	439.4	192.2	2861.1
	3 services	31.6	458.0	658.5				291.5	978.6	234.3	459.2	8.5	150.1	3270.2
	Value added:													
	4 labor	13.0	640.2	1253.8										1907.0
	5 capital	41.3	230.6	728.3										1000.2
	6 Enterprise					1000.2					47.5			1047.8
	Households:													
	7 transfer										396.3			396.3
	8 labor				1637.5									1637.5
	9 rentier						581.5							581.5
	10 Government	3.1	66.7	189.0	269.5		63.1		206.3	203.1				1000.7
	11 Capital account						403.2	4.5	85.6	63.8	-110.8			446.3
	12 Rest of world	3.5	285.0	47.2						1.3	26.1	-1.0		361.9
	Column totals	179.0	2861.1	3270.1	1907.0	1000.2	1047.8	396.3	1637.5	581.5	1000.7	446.3	361.9	

separating returns to labor and capital.[20] Gross returns to capital include all non-labor income, including capital consumption allowances (depreciation). Households have been disaggregated into three types by major source of income (transfer recipients, wage earners, and rentiers). The other institutional actors remain as before, although we have netted out some of the gross inter-institutional transfers.

The supplier accounts have been created for ease of exposition. It is very important, however, to maintain the distinction between activities and commodities in the underlying data. The two accounts represent different types of product markets, each with its own sectoral prices. Commodities used as intermediate inputs (the use table in the input-output accounts) are valued in producer prices. This treatment implies that the sectoral product markets are at the factory gate. The make table maps from activities (row) to commodities (column). In the United States, the make table has the same sectoring as the use table, with off-diagonal entries to incorporate secondary production. In the figure, commodities are valued at producer prices, so again the market is at the factory gate. The make and use tables are often combined into an industry-by-industry transactions table, as in figure 2.[21]

With the use table defined in producer prices, final demanders pay separately for trade and transportation services. There are large final demands for these services in the input-output account. However, expenditure data based on household surveys are always at purchaser prices, with no final demand for trade and transportation. In principle, the commodity account, with separate make and use tables, can convert goods sold by activities at producer prices into commodities purchased by demanders at purchaser prices.[22] Alternatively, one can define another transition matrix to spread the trade and transportation margins and so map from commodities in producer prices to commodities in purchaser prices.[23] This approach yields three sets of sectoral accounts in the SAM. Note that the choice of sector aggregation for the commodity and activity accounts need not be the same. Final demand in purchaser prices can use a different commodity classification scheme.

The reason for this proliferation of accounts in the SAM is the need to have the activity and commodity accounts reflect market transactions. Along each commodity and activity row, the price of a good should be the same for each demander (column account). Only then does a given nominal dollar flow reflect the same real flow across a single market, regardless of the purchaser. While published input-output tables often violate this principle, it is important to

---

[20]In many multisectoral economywide models, labor is further disaggregated by skill category and land is distinguished as a separate factor.

[21]In the commodity account, goods from domestic producers are combined with imports to provide composite commodities which are sold to intermediate and final demand. The make table describes production of domestic goods, whereas the use table describes intermediate demand for composite commodities.

[22]In the published U.S. input-output accounts both activities and commodities are given in producer prices. However, the underlying data tapes provide data on trade and transportation margins and allow the construction of a use table to generate commodities in purchaser prices.

[23]This is the approach used by Ballard et al (1985) for consumer expenditures. Their transition table is compiled from table B in the input-output account [U.S. Department of Commerce (1984)]. The problem of reconciling commodity classifications among micro data files, the NIPA, and the input-output account also arises with merchandise trade data and investment by type of equipment and structure.

maintain the underlying data properly.[24] Otherwise, it is not possible to re-
cover the real flows corresponding to recorded nominal flows. The input-output
data are then much less useful for microsimulation models or, indeed, for any
economic analysis.

Definitions and Imputations

From the beginning, vexing problems of imputation have been a matter of continu-
ing controversy among the designers of the national accounts. The root problem
is defining the boundaries of productive activities which produce a flow of goods
and services and generate value added. The issues are still controversial, which
suggests that no one definition will serve all purposes. Economists and national
accountants, however, must still define an acceptable production boundary, de-
lineating the productive sphere of the economy. The next problem is to impute
values for those flows that do not pass through product and/or factor markets.

Views on the subject range along a continuum.[25] At one extreme, we could define
as productive only those activities that involve market transactions. Problems
of imputation thus never arise since we define nonmarket activities as nonproduc-
tive and hence of no interest. At the other extreme, some economists want to
expand the definition to include flows of services from various durable goods
and property not now considered in the accounts. These flows do not cross mar-
kets and hence their values must be imputed.

From a modeler's perspective, it would be easier to define the economy to include
only market activities. Unfortunately, such a definition leaves out nonmarket
activities that influence the economic behavior of households and firms on both
the product and factor markets. Important examples include the treatment of
durable goods and fixed assets.

Both governments and private entities own and use assets, raising similar
imputation issues. Eisner (1985) suggests including in GNP an imputed income
flow from government-owned tangible assets such as natural resources and national
parks. From our modeling perspective, Eisner's arguments are not persuasive.
Whether to include the flow of services from nonmarket activities in a model is
a difficult decision. It depends on what actors and what aspects of their be-
havior the model seeks to capture. For instance, CGE models focus on household
demand and producer supply, usually treating government behavior very simply.
Of course, a different modeling perspective will suggest other imputations, so
this debate is open ended.

Owner-occupied housing is an example of a nonmarket productive activity which
is now included in the NIPA, but in a manner inconsistent with the needs of
microsimulation models. The current treatment of owner-occupied housing in the
NIPA and input-output accounts involves creating a synthetic production sector
as a part of real estate. This sector makes expenditures for dwelling mainte-
nance, insurance, taxes, and depreciation. It also receives an imputed rental
payment as part of household consumption expenditure and pays out an imputed
rental income to homeowners, which the NIPA include as a part of household
income.

---

[24]For example, recent U.S. published input-output data break the transac-
tions table into separate make and use tables. Data are also available which
provide trade and transportation margins for every cell in the matrix.

[25]See Young (1987) for a survey of proposals for revising the U.S. national
accounts. Ruggles and Ruggles (1986), and Stone (1986b) discuss imputation
problems and proposals for defining the production boundary.

As an alternative, Ruggles and Ruggles (1986) use household survey data to assign the costs of owner occupancy as a current consumption expense and compute a capital consumption allowance as an element of household savings and income.[26] In contrast with the existing treatment of owner-occupied housing, they do not impute a rental income to households. Nor do they attribute an income flow between households and the synthetic production sector. Instead, the household account produces these housing services. This approach defines income flows consistent with the actual transactions by households and is more useful from the perspective of microsimulation models.

An unfortunate aspect of their approach, however, is that households directly generate value added. The depreciation on homes is counted as services produced by households and is also part of household income and savings. From an economy-wide modeler's perspective, it is cleaner to keep the generation of all value added in the production accounts. In the SAM, all value added comes from input-output activities. The SAM then maps the income flows emanating from production activities through the economy, reconciling the input-output and national income accounts. Ruggles and Ruggles (1986) do not treat the NIPA and input-output accounts together and thus have not worried about their relationship. We suggest keeping the synthetic production sector in the input-output system, but include the income flows as proposed by Ruggles and Ruggles.

Consumer durable goods pose an imputation problem similar to owner occupied housing, but the NIPA treat them differently. In the accounts, consumer durable expenditures are current flows, involving no depreciation or imputed flow of services over time. On the other hand, Ruggles and Ruggles (1986) propose treating consumer durables analogously to owner occupied housing, which is more consistent with the micro theory of household behavior. Disaggregated economywide models are taking greater advantage of micro data to specify household behavior. The NIPA definitions need to evolve to be consistent with the changing models.

A factor market imputation problem arises from the NIPA treatment of proprietors' income. Proprietors are households that have their own business, contributing both labor and capital services. Capturing their participation in factor markets requires separating the returns to labor and capital. They are now lumped together in the proprietors' income entry of the NIPA. Many economists have dealt with the problem, both modelers and those interested in measuring factor productivity. One approach is to impute a proprietor's wage as being equal to the average wage for hired labor. Another approach is to assume a wage share of value added for proprietors equal to that in some reference industry.[27]

Given data limitations, imputations can only approximate the answer that a hypothetical market would generate. Evaluating the adequacy of such approximations is a necessary part of any analysis or modeling exercise. Making the imputations explicit in the accounts would aid such evaluation. In the NIPA, the imputations are hidden in the summary tables and must be dug out of detailed

---

[26]Capital consumption of owner occupied dwellings can be computed as either historical cost or replacement cost. The difference can be significant during times of inflation and, under the Ruggles' proposal, would have a sizable impact on measured household savings.

[27]Kravis (1959) compares several approaches to imputing labor and capital share of proprietors' income. The first approach is used by Ballard, et al. (1985). Christensen and Jorgenson (1973) also use this approach in their factor productivity analysis of the United States. Adelman and Robinson (1978), however, use the second approach in their study of Korea.

supplementary tables. Ruggles and Ruggles (1986) suggest the formation of a core account for market activities and supplementary accounts for nonmarket activities. Their proposed structure of accounts makes it much easier to analyze and modify the treatment of nonmarket activities.

Actors and Accounts

An actor/transaction view of the economy, with a focus on market interactions, leads naturally to some criteria for defining institutional actors. Specifying the actor accounts in the NIPA along the lines of micro theory will bring greater consistency between data and models. Disaggregating actor accounts using micro data allows for a richer network of linkages in an economywide model. The SAM derived from the NIPA provides the account control totals for reconciliation with disaggregated accounts. What disaggregation to use depends on the issues. Examples include labor occupations, enterprise type, financial transactions in the capital account, and social and demographic characteristics of households.

Special Sectors in the Production Accounts

The input-output accounts include several special sectors that provide consistency between input-output totals and national aggregates in the NIPA.[28] From an accounting perspective, these special sectors are convenient and pose no theoretical difficulty. When modeling the production activities of the economy, however, income flows attributed to these sectors may not be consistent with the behavior of suppliers in micro theory. To deal with the modeling problem, special sectors are often combined with other sectors into some catchall sector. Aggregation is a way to sweep a small problem under a relatively large rug. Sometimes, however, the problems are too large or the available rugs are too small.

The rest of world industry sector is a good example. The sector records the international flow of factor services in the input-output accounts. The accounts treat services provided to foreigners from factors of production owned by U.S. residents as exports. The services provided to the United States by factors of production owned by foreigners are imports.[29] During the 1980's these factor income flows changed dramatically. The net balance remained in surplus, but fell from $47.6 billion in 1980 to $25.5 billion in 1987. Given the increase in foreign ownership of U.S. assets, the net surplus will change to a deficit in the future. In the input-output table, the sector will then show negative value added.

The micro theory underlying disaggregated economywide modeling has little to say about these activities. It would be difficult to treat this sector as analogous to sectors producing goods, for example with a production function. One way around the problem of modeling them is to work with gross domestic product (GDP), which excludes value added from the rest of the world. A model

---

[28]Discussion on the input-output accounts and how they are reconciled with the NIPA can be found in U.S. Department of Commerce (1984) and in Young and Tice (1985).

[29]Payments to labor and capital, or value added, are included in the expenditure side of the account. Compensation paid U.S. residents is netted against wages and salaries paid to foreigners in the employee compensation account. Similarly, receipts of income on foreign investment are netted against payments of income on foreign assets in the United States and in the property income account.

would then treat international factor income flows separately from production. In the United States usual practice in models is to use gross national product (GNP). As value added in this sector turns negative, however, the GDP framework becomes more attractive.

Households and Enterprises

In the SAM in figure 2, each category of household receives income from a different source in a one-to-one correspondence. Transfer recipients receive government transfers, wage earners receive employee compensation, and rentiers receive income from the ownership of property. This classification uses only NIPA data and reflects the functional distribution of income. Analysis of the size distribution requires further disaggregation of households and income sources. It requires combining and reconciling micro data from household surveys (including the population census) with the NIPA. In the United States, microsimulation studies of government transfer programs use such data.[30]

There is also an extensive literature on integrating the size distribution in the SAM framework.[31] There is a need for such an approach in the U.S. national economic accounts. The existing household account in the NIPA could, in principle, provide control totals for such a disaggregation. Unfortunately, the definition of households in the NIPA includes nonprofit institutions. NIPA data are thus inconsistent with data from micro surveys which use a different definition of households.

Within the SAM framework, activities are aggregations of establishments within a sector. They purchase inputs on factor and product markets and sell output on product markets. They are different from enterprises which collect gross capital income and distribute it to other institutions. The distinction provides a framework for capturing an establishment-firm dichotomy, which exists in both data and theory. The SAM in figure 2 simplifies the mapping of capital income from production by having only a single enterprise. In principle, one could define enterprise accounts corresponding to multi-product firms, collecting capital income from more than one activity.

In their IEA, Ruggles and Ruggles include nonprofit institutions in the enterprise sector rather than in the household sector. They argue that these institutions do not behave like households and are not included in any micro-based, household survey data. A micro modeler would agree with this argument. It certainly makes no sense to view them as utility maximizing consumers. A modeler would add the argument that on the factor markets, nonprofit institutions behave like other enterprises. They are cost-minimizing producers, even though the value of their output has to be imputed as equalling the cost of production.

Carson and Jaszi (1982, p. 57) criticize the Ruggles and Ruggles because they "have not addressed the problems of relating input-output accounts to their system" and are thus "avoiding what is probably the most important obstacle to a comprehensive integration of economic accounts --the 'establishment-firm' dichotomy." We agree that the IEA do not adequately incorporate the input-output accounts. However, the Ruggles and Ruggles do recognize the dichotomy. They define an enterprise account as part of the IEA, a necessary step in reconcil-

---

[30]For symposiums of microsimulation models using household survey data, see: Orcutt, Merz, and Quinke (1986), Haveman and Hollenbeck (1980), and Feldstein (1983).

[31]Most of this work refers to developing countries. See, for example, Pyatt and Round (1985), Pyatt and Thorbecke (1976), and United Nations (1975).

ing production accounts based on establishments and income and outlay accounts based on firms.[32] This approach is consistent with the SAM approach in which enterprises are seen as important actors.

The Capital Account

In recent years, macro models have emphasized the interplay between real and financial activities. Examples of such issues include the effect of credit rationing on producer supply and household demand, and the impact of government deficits on international capital flows. Analysis of such macro issues in a disaggregated economywide framework requires specifying enterprise current and capital accounts. The goal is to disaggregate the financial activities underlying the investment-savings process. The flow of funds accounts provide the necessary data.[33]

Various supplementary tables reconcile the flow of funds accounts with the NIPA. Reconciling flows, however, is only the first step in integrating current and capital accounts. Stone (1986a) discusses the development of SAM's with financial accounts. Ruggles and Ruggles (1982) propose a set of integrated accounts, but do not use a SAM framework. Ruggles (1987) proposes revisions to the SNA to integrate capital accounts in the national economic accounts.

Defining enterprise accounts in the NIPA that correspond to the enterprises in the flow of funds accounts is necessary for integrating the two accounts and capturing real-financial linkages. Enterprises in the flow of funds accounts are disaggregated by legal form of organization. The types of organizations include corporate and noncorporate private business, government enterprises, and private nonprofit institutions. As for disaggregation by industrial sector, the flow of funds accounts distinguish only among farm, nonfarm, and financial.

CONCLUSIONS

Policies in the 1980's have not resolved problems that emerged in the 1970's. Major swings in macro aggregates in the 1980's have exacerbated the structural shocks forcing adjustment in the U.S. economy. The issues facing the United States in the 1990's will be ones of structural adjustment in production, employment, and trade in a changing world macro environment. Historically, eras of new policy issues have ushered in theoretical and model developments. The development of new models demands the collection and organization of new data.

There is an interplay among issue formation, model development, and data organization. During the 1930's and 1940's, the Keynesian theoretical revolution stimulated the evolution of the NIPA for data organization. The energy crises led to disaggregated economywide energy models integrating the NIPA and input-output accounts. The expansion of government transfer programs in the 1970's motivated the development of microsimulation models based on household data.

Both microsimulation and CGE models focus on the underlying structure of the economic system. They both emphasize market and nonmarket linkages among micro actors. It is through these linkages that the structural adjustment processes we are observing will work themselves out. With the increased focus on struc-

_____

[32]As noted earlier, the BEA dropped any attempt to define an enterprise account in 1958. Given the criticism of Carson and Jaszi, this decision is hard to understand.
[33]See Board of Governors of the Federal Reserve System (1980).

15

ture, there is also an increased need for data to support structural analysis in an economywide framework. The SAM accounting system provides the best available framework for reconciling the accounts of micro actors with the macro aggregates which have traditionally been the focus of statistical data.

REFERENCES

Adelman, Irma, and Sherman Robinson (1978). <u>Income Distribution Policy in De-veloping Countries A Case Study of Korea</u>. Stanford: Stanford University Press.

Adelman, Irma, and Sherman Robinson (1988). "Macroeconomic Shocks, Foreign Trade, and Structural Adjustment: A General Equilibrium Analysis of the U.S. Economy, 1982-1986." In Colin Carter and Walter Gardiner, eds., <u>Elasticities in International Agricultural Trade</u>. Boulder, Col.: Westview Press, forthcoming.

Almon, Clopper, Jr., Margaret B. Buckler, Lawrence M. Horwitz, and Thomas C. Reimbold (1974). <u>1985: Interindustry Forecasts of the American Economy</u>. Lexington, Mass.: D.C. Heath and Company.

Bacharach, M.O.L. (1970). <u>Biproportionate Matricies and Input-Output Change</u>. Cambridge: Cambridge University Press.

Ballard, Charles L., Don Fullerton, John B. Shoven, and John Whalley (1985). <u>A General Equilibrium Model for Tax Policy Evaluation</u>. Chicago: University of Chicago Press.

Bennet, Robert L., and Barbara R. Bergman (1986). <u>A Microsimulated Transactions Model of the United States Economy</u>. Baltimore: Johns Hopkins University Press.

Board of Governors of the Federal Reserve System (1980). "Introduction to Flow of Funds." Washington D.C.

Byron, Ray P. (1978). "The Estimation of Large Social Accounting Matricies," <u>Journal of the Royal Statistical Society, Series A</u>, vol. 141, pt. 3, pp.359-367.

Carson, Carol S. (1975). "The History of the United States National Income and Product Accounts: The Development of an Analytical Tool," <u>Review of Income and Wealth</u>, vol. 21, no. 2 (June), pp. 153-181.

Carson, Carol S. (1987). "GNP: An Overview of Source Data and Estimating Meth-ods," <u>Survey of Current Business</u>, vol. 67, no. 7 (July), pp. 103-126.

Carson, Carol S., and George Jaszi (1981). "The National Income and Product Accounts of the United States: An Overview," <u>Survey of Current Business</u>, vol. 61, no. 2 (Febuary), pp. 22-34.

Carson, Carol S., and George Jaszi (1982). "Comments," <u>Survey of Current Business</u>, vol. 62, no. 5 (May), pp. 57-59.

Christensen, Lauritts R., and Dale W. Jorgenson (1973). "Measuring Economic Performance in the Private Sector." in Milton Moss, ed., <u>The Measurement of Economic and Social Performance</u>, Studies in Income and Wealth, no. 37. New York: Columbia University Press.

Dervis, Kemal, Jaime de Melo, and Sherman Robinson (1982). <u>General Equilibrium Models for Development Policy</u>. Cambridge: Cambridge University Press.

Eisner, Robert (1985). "The Total Incomes System of Accounts," _Survey of Current Business_, vol. 65, no. 1 (January), pp. 24-48.

Feldstein, Martin, ed. (1983). _Behavioral Simulation Methods in Tax Policy Analysis_. Chicago: University of Chicago Press.

Forrester, Jay W., N. J. Mass, and C. J. Ryan (1976). "The System Dynamics National Economic Model: Understanding Socio-Economic Behavior and Policy Alternatives," _Technological Forecasting and Social Change_, vol. 9, no. 1, pp. 51-68.

Goulder, Lawrence H., and Barry Eichengreen (1988). "Savings Promotion, Investment Promotion, and International Competitiveness." Paper prepared for the NBER Universities Research Conference on Trade Policies for International Competitiveness, April 29-30, 1988.

Hanson, Kenneth A. (1988). "NIPA-SAM Time Series Lotus Spreadsheet." Mimeo, U.S. Department of Agriculture, Economic Research Service, July 1988.

Haveman, Robert H. and Kevin Hollenbeck, eds. (1980). _Microeconomic Simulation Models for Public Policy Analysis_. New York: Academic Press.

Hudson, E. A., and D. W. Jorgenson (1974). "U.S. Energy Policy and Economic Growth," _Bell Journal of Economics and Management Science_, vol. 5 no. 2 (autumn), pp. 461-514.

Kilkenny, Maureen, and Sherman Robinson (1988). "Modelling the Removal of Production Incentive Distortions in the U.S. Agricultural Sector." Invited Paper for the XX International Conference of Agricultural Economists, Buenos Aires, Argentina, August 24-31, 1988.

King, Benjamin (1985). "What is a SAM? A Layman's Guide to Social Accounting Matrices," in Pyatt and Round (1985).

Kravis, I.B. (1959). "Relative Income Shares in Fact and Theory," _American Economic Review_, vol. 49, no. 5 (December), pp. 917-949.

Orcutt, Guy, S. Caldwell, R. Wertheimer II, S. Franklin, G. Hendircks, G. Peabody, J. Smith, and S. Zedlewski (1976). _Policy Exploration Through Microanalytic Simulation_. Washington, D.C.: The Urban Institute.

Orcutt, Guy, Jochim Merz, and Hermann Quinke, (1986). _Microanalytic Simulation Models to Support Social and Financial Policy_. Amsterdam: North-Holland Publishing Co.

Pyatt, Graham (1985). "Commodity Balances and National Accounts: A SAM Perspective," _Review of Income and Wealth_, vol. 31, no. 1, pp. 155-169.

Pyatt, Graham, and Jeffrey Round, eds. (1985). _Social Accounting Matrices: A Basis for Planning_. Washington D.C.: World Bank.

Pyatt, Graham, and Erik Thorbecke (1976). _Planning Techniques for a Better Future_. Geneva: International Labour Office.

Robinson, Sherman (1988). "Multisectoral Models of Developing Countries: A Survey," in H.B. Chenery and T.N. Srinivasan, eds. _Handbook of Development Economics_. Amsterdam: North-Holland Publishing Co.

Roland-Holst, David W., Sherman Robinson, and Laura D'Andrea Tyson (1988). "The Opportunity Cost of Defense Spending: A General Equilibrium Analysis." Working Paper No. 8871, Department of Economics, Institute of Business and Economic Research, University of California, Berkeley.

Ruggles, Nancy D. (1987). "Financial Accounts and Balance Sheets: Issues for the revision of SNA," <u>Review of Income and Wealth</u>, vol. 33, pp. 39-62.

Ruggles, Richard, and Nancy D. Ruggles (1982). "Integrated Economic Accounts for the United States, 1947-1980," <u>Survey of Current Business</u>, vol. 62, no. 5 (May), pp. 1-53.

Ruggles, Richard, and Nancy D. Ruggles (1986). "The Integration of Macro and Micro Data for the Household Sector," <u>Review of Income and Wealth</u>, vol. 32, no. 3 (September), pp. 245-276.

Shoven, John B., and John Whalley (1984). "Applied General-Equilibrium Models of Taxation and International Trade," <u>Journal of Economic Literature</u>, vol. 22, no.3 (September), pp. 1007-1051.

Stone, Richard (1986a). "Nobel Memorial Lecture 1984: The Accounts of Society," <u>Journal of Applied Econometrics</u>, 1, pp. 5-28.

Stone, Richard (1986b). "Social Accounting: The State of Play," <u>Scandinavian Journal of Economics</u>, vol. 88, no. 3, pp. 453-72.

Stone, Richard, D.G. Champernowne, and J.E. Meade (1942). "The Precision of National Income Estimates," <u>The Review of Economic Studies</u>, vol. 9, no. 2, pp. 111-125.

United Nations, Statistical Office (1975). "Towards a System of Social and Demographic Statistics." Studies in Methods, series F, no. 18. New York: United Nations.

U. S. Department of Commerce, Bureau of Economic Analysis, Interindustry Economics Division (1984). "The Input-Output Structure of the U.S. Economy, 1977," <u>Survey of Current Business</u>, vol. 64, no. 5 (May), pp.42-84.

Young, Allan H. (1987). "Evaluation of the GNP Estimates," <u>Survey of Current Business</u>, vol. 67, no. 8 (August), pp.18-42.

Young, Allan H., and Helen Stone Tice (1985). "An Introduction to National Economic Accounting," <u>Survey of Current Business</u>, vol. 65, no. 3 (March), pp. 59-76.

Zenios, Starros A., Arne Drud, and John M. Mulrey (1986). "Balancing Some Large Social Accounting Matrices with Nonlinear Network Programming." Technical Report, Dept. of Civil Engineering, Princeton University.

National Income and Product Accounts
Summary Tables, 1982 (Billion $)

Account 1: National Income and Product Accounts

Expenditures

1	compensation of employees	1907.00
2	wages and salaries	1586.12
3	disbursements (2-7)	1586.15
4	wage accurals less disb. (3-12,5-4)	-0.03
5	supplements to wages and salaries	320.88
6	employer contrib. to social ins. (3-20)	157.25
7	other labor income (2-8)	163.63
8	proprietors income with iva/cca (2-9)	175.53
9	rental income of persons with cca (2-10)	13.65
10	corporate profits with iva/cca	149.98
11	profits before tax	169.58
12	profit tax liability (3-17)	63.08
13	profits after tax	106.50
14	dividends (2-12)	66.88
15	undistributed profits (5-6)	39.63
16	inventory valuation adjustment (5-7)	-10.35
17	capital consumption adjustment (5-8)	-9.25
18	net interest (2-15)	272.30
19	national income (value added)	2518.45
20	business transfer payments (2-20)	14.33
21	indirect bus. tax and nontax liability (3-18)	258.83
22	less:subsidies less cur. surplus of gov. ent (3-11)	8.65
23	charges against net national product	2782.95
24	capital consumption allowances with cca (5-9)	383.15
25	charges against gross national product	3166.10
26	statistical discrepancy (5-12)	-0.05
	gross national product	3166.05

Account 1: NIPA, cont.

<u>Receipts</u>

27	personal consumption exp. (2-3)	2050.65
28	durable goods	252.65
29	nondurable goods	770.99
30	services	1027.01
31	gross priv. dom. investment (5-1)	447.33
32	fixed investment	471.83
33	nonresidential	366.70
34	structures	143.30
35	producers durable equipment	223.40
36	residential	105.13
37	change in business inventories	-24.50
38	net exports of goods and services	26.30
39	exports (4-1)	361.93
40	imports (4-3)	335.63
41	gov. purchases of goods and services (3-1)	641.70
42	federal	272.68
43	national defense	193.83
44	nondefense	78.85
45	state and local	369.03
	gross national product	3165.97

Account 2: Personal Income and Outlay

Expenditures

1	personal tax and nontax payments (3-16)	409.33
2	personal outlays	2107.45
3	consumption exp. (1-27)	2050.65
4	interest paid by consumers to bus. (2-18)	55.55
5	transfer payments to foreigners, net (4-5)	1.25
6	saving (5-3)	153.95
	personal taxes, outlays and savings	2670.72

Receipts

7	wage and salery disbursements(1-3)	1586.15
8	other labor income (1-7)	163.63
9	proprietors income with iva/cca (1-8)	175.53
10	rental income of persons with cca (1-9)	13.65
11	personal dividend income	63.93
12	dividends (1-14)	66.88
13	less: dividends received by gov. (3-10)	2.95
14	personal interest income	369.68
15	net interest (1-18)	272.30
16	interest paid by gov. to pers. and bus. (3-7)	110.00
17	less: interest received by gov. (3-9)	68.18
18	interest paid by consumers to business (2-4)	55.55
19	transfer payments to persons	410.58
20	from business (1-20)	14.33
21	from gov. (3-3)	396.25
22	less: personal contrib. for social ins. (3-21)	112.30
	personal income	2670.82

Account 3: Government Receipts and Expenditures

<u>Expenditures</u>

1	purchases of goods and services (1-41)	641.70
2	transfer payments	404.03
3	to persons (2-21)	396.25
4	to foreigners, net (4-6)	7.78
5	net interest paid	60.13
6	interest paid	128.30
7	to persons and business (2-16)	110.00
8	to foreigners (4-7)	18.30
9	less: interest received by gov. (2-17)	68.18
10	less: dividends received by gov. (2-13)	2.95
11	subsidies less current surplus of gov. ent. (1-22)	8.65
12	less: wage accruals less disbursements (1-4)	-0.03
13	surplus or deficit (5-10)	-110.75
14	federal	-145.88
15	state and local	35.13
	government expenditures and surplus	1000.83

<u>Receipts</u>

16	personal tax and nontax payments (2-1)	409.33
17	corporate profits tax liability (1-12)	63.08
18	indirect business tax and nontax liability (1-21)	258.83
19	contributions for social ins.	269.55
20	employer (1-6)	157.25
21	personal (2-22)	112.30
	government receipts	1000.78

Account 4: Foreign Transactions

Receipts
1 exports of goods and services (1-39)   361.93

2 capital grants received by U.S., net (5-11)   0.00

   receipts from foreigners   361.93

Expenditures
3 imports of goods and services (1-40)   335.63

4 transfer payments to foreigners, net   9.03
5   from persons, net (2-5)   1.25
6   from gov., net (3-4)   7.78

7 interest paid by gov. to foreigners (3-8)   18.30

8 net foreign investment (5-2)   -0.98

   payments to foreigners   361.98

Account 5: Gross Saving and Investment

<u>Expenditures</u>

1	gross private domestic investment (1-31)	447.33
2	net foreign investment (4-8)	-0.98
	gross investment	446.35

<u>Receipts</u>

3	personal saving (2-6)	153.95
4	wage accurals less disbursements (1-4)	-0.03
5	undistributed corp. profits with iva/cca	20.03
6	undistributed corp. profits (1-15)	39.63
7	inventory valuation adj. (1-16)	-10.35
8	capital consumption adj. (1-17)	-9.25
9	capital consumption allowance with cca (1-24)	383.15
10	gov. surplus or deficit (-), (3-13)	-110.75
11	capital grants received by U.S., net (4-2)	0.00
12	statistical discrepancy (1-26)	-0.05
	gross saving and stat. discrepancy	446.30

Bridge Between SAM and NIPA Summary Accounts

SAM column account	SAM row account	NIPA, Summary Tables table	description
1 commodity	2 activity	1.27	personal consumption expenditure
		1.31	gross private domestic investment
		1.39	exports
		1.40	imports (-)
		1.41	government purchases of goods and services
		NA	intermediate demand
1 commodity	13 rest of world	1.40	imports
2 activity	1 commodity	NA	intermediate demand
2 activity	3 value added	1.1	compensation of employees
		1.8	proprietors income with iva/cca
		1.9	rental income with cca
		1.10	corporate profits with iva/cca
		1.18	net interest
		1.20	business transfer payments
		1.22	subsidies less current surplus of govt.ent. (-)
		1.24	capital consumption allowances with cca
2 activity	4 indirect tax	1.21	indirect business tax and nontax liability
3 value added	5 emp. comp.	1.1	compensation of employees
3 value added	6 proprietors	1.8	proprietors income with iva/cca
3 value added	7 property	1.9	rental income of persons with cca
		1.10	corporate profits with iva/cca
		1.18	net interest
3 value added	8 stat. discrep.	1.26	statistical discrepancy
3 value added	9 enterprise	1.20	business transfer payments
		1.22	subsidies less current surplus of govt. ent. (-)
		1.24	capital consumption allowance with cca
4 indirect tax	11 government	1.21	indirect business tax and nontax liability
5 emp. comp.	10 households	1.3	wage and salary disbursements
		1.5	supplements to wages and salaries
		3.19	contributions for social insurance (-)
5 emp. comp.	11 government	3.19	contributions for social insurance
5 emp. comp.	12 capital account	1.4	wage accruals less disbursements
6 proprietors	9 enterprise	1.8	proprietors income with iva/cca
7 property	9 enterprise	1.9	rental income of persons with cca
		1.10	corporate profits with iva/cca
		1.18	net interest
8 stat. discrep.	12 capital account	1.26	statistical discrepancy
9 enterprise	10 households	1.8	proprietors income with iva/cca
		1.9	rental income of persons with cca
		1.18	net interest
		1.20	business transfer payments
		2.11	personal dividend income
		2.16	interest paid by govt. to persons and business
		2.17	interest received by government (-)
		2.18	interest paid by consumers to business
9 enterprise	11 government	1.12	corporate profit tax liability
9 enterprise	12 capital account	1.15	undistributed corporate profits
		1.16	inventory valuation adjustment (iva)
		1.17	capital consumption adjustment (cca)
		1.24	capital consumption allowance with cca
10 households	1 commodity	2.3	personal consumption expenditures
10 households	9 enterprise	2.4	interest paid by consumers to business
10 households	11 government	2.1	personal tax and nontax payments
10 households	12 capital account	2.6	personal saving
10 households	13 rest of world	2.5	personal transfer payments to foreigners (net)

11 government	1 commodity	3.1	govt. purchases of goods and services
11 government	9 enterprise	3.7	interest paid to persons and business
		3.9	interest received by government (-)
		3.10	dividends received by government (-)
		3.11	subsidies less current surplus of govt. ent.
11 government	10 households	3.3	transfer payments to persons
11 government	12 capital account	3.13	surplus or deficit
11 government	13 rest of world	3.4	transfer payments to foreigners (net)
		3.8	net interest paid to foreigners
12 capital account	1 commodity	5.1	gross private domestic investment
12 capital account	13 rest of world	5.2	net foreign investment
13 rest of world	1 commodity	4.1	exports of goods and services
13 rest of world	12 capital account	4.2	capital grants received by the U.S. (net)

Notes:

1) Entries in the "statistical discrepancy" row, except for the value added column which is a NIPA entry, are round off errors in the data.

2) The NIPA "table" column refers to the account number and line number in the NIPA Summary Tables published in the July issue of the Survey of Current Business. NA means "not applicable" since intermediate demand does not appear in the NIPA tables.

3) The data come from Wharton Econometric Forecasting Associates, Core Data Banks, and is accessed through the USDA DARTS-2.0 system (Database and Automated Retrieval System). The data base is from July, 1988.

UNITED STATES macro SAM from NIPA
1977 Billions of Dollars

EXPENDITURES OR OUTLAYS

		1 Com-modity	2 Activity	3 Value added	4 Indirect taxes	5 Employee compensation	6 Proprietor income	7 Property income	8 Statistical discrepancy	9 Enterprise	10 House-hold	11 Govern-ment	12 Capital account	13 Rest of world	Row totals
R E C E I P T S	1 Commodity		0								1257.20	387.33	344.05	191.63	2180.20
	2 Activity	1990.48													1990.48
	3 Value added		1824.78												1824.78
	4 Indirect tax		165.65												165.65
O R	GNP		1990.43												
	5 Employee compensation			1176.60											1176.60
I N C O M E	6 Proprietors			152.93											152.93
	7 Property			288.18											288.18
	National income			1617.70											
	8 Statistical discrepancy		0.05	-0.05							-0.08	-0.05	0.08		-0.05
	9 Enterprise			207.13			152.93	288.18			30.50	21.28			700.00
	10 Household					1026.75				363.18		217.45			1607.38
	11 Government				165.65	149.75				73.05	228.13				616.58
	12 Capital account					0.10			-0.05	263.78	90.70	-19.13			335.40
	13 Rest of world	189.73									0.93	9.70	-8.73		191.63
	Column totals	2180.20	1990.48	1824.78	165.65	1176.60	152.93	288.18	-0.05	700.00	1607.38	616.58	335.40	191.63	

UNITED STATES macro SAM from NIPA
1978 Billions of Dollars

EXPENDITURES OR OUTLAYS

RECEIPTS OR INCOME	1 Com-modity	2 Activity	3 Value added	4 Indirect taxes	5 Employee compensation	6 Proprietor income	7 Property income	8 Statistical discrepancy	9 Enterprise	10 House-hold	11 Govern-ment	12 Capital account	13 Rest of world	Row totals
1 Commodity		0								1403.48	425.25	416.84	227.50	2473.06
2 Activity	2249.69													2249.69
3 Value added		2071.55												2071.55
4 Indirect tax		178.05												178.05
GNP		2249.60												
5 Employee compensation			1329.18											1329.18
6 Proprietors			176.23											176.23
7 Property			332.80											332.80
National income			1838.20											
8 Statistical discrepancy	0.09		-1.93							-0.02	-0.27	0.24	-0.03	-1.92
9 Enterprise			235.28			176.23	332.80			36.70	21.65			802.65
10 Household					1157.23				420.30		234.80			1812.33
11 Government				178.05	171.68				83.50	261.13				694.35
12 Capital account					0.28			-1.93	298.85	110.18	-0.43			406.95
13 Rest of world	223.38									0.88	13.35	-10.13		227.48
Column totals	2473.06	2249.69	2071.55	178.05	1329.18	176.23	332.80	-1.93	802.65	1812.33	694.35	406.95	227.48	

UNITED STATES macro SAM from NIPA
1979 Billions of Dollars

EXPENDITURES OR OUTLAYS

		1 Com-modity	2 Activity	3 Value added	4 Indirect taxes	5 Employee compensation	6 Proprietor income	7 Property income	8 Statistical discrepancy	9 Enterprise	10 House-hold	11 Govern-ment	12 Capital account	13 Rest of world	Row totals
R	1 Commodity		0								1566.75	467.80	454.84	291.23	2780.62
E	2 Activity	2508.14													2508.14
C	3 Value added		2318.80												2318.80
E	4 Indirect tax		189.33												189.33
I	GNP		2508.13												
P	5 Employee compensation			1491.40											1491.40
T	6 Proprietors			191.88											191.88
S	7 Property			363.95											363.95
O	National income			2047.23											
R	8 Statistical discrepancy		0.02	-0.98								0.03	0.15	-0.22	0.02
															-0.97
I	9 Enterprise			272.55			191.88	363.95			43.53	21.20			893.10
N	10 Household					1293.83				477.35		262.80			2033.98
C	11 Government				189.33	197.75				88.00	304.65				779.73
O	12 Capital account					-0.18			-0.98	327.75	118.05	11.45		1.10	457.20
M E	13 Rest of world	272.48									0.98	16.33	2.58		292.35
	Column totals	2780.62	2508.14	2318.80	189.33	1491.40	191.88	363.95	-0.98	893.10	2033.98	779.73	457.20	292.35	

30

UNITED STATES macro SAM from NIPA
1980 Billions of Dollars

EXPENDITURES OR OUTLAYS

		1 Com-modity	2 Activity	3 Value added	4 Indirect taxes	5 Employee compensation	6 Proprietor income	7 Property income	8 Statistical discrepancy	9 Enterprise	10 House-hold	11 Govern-ment	12 Capital account	13 Rest of world	Row totals
R E C E I P T S	1 Commodity		0								1732.58	530.33	436.99	350.98	3050.86
	2 Activity	2731.99													2731.99
	3 Value added		2518.73												2518.73
	4 Indirect tax		213.30												213.30
	GNP		2732.03												
O R	5 Employee compensation			1638.20											1638.20
I N C O M E	6 Proprietors			180.68											180.68
	7 Property			384.73											384.73
	National income			2203.60											
	8 Statistical discrepancy	-0.04		4.90							-0.05	0.10	0.01	-0.03	4.90
	9 Enterprise			310.23			180.68	384.73			47.38	27.53			950.53
	10 Household					1421.75				524.15		312.63			2258.53
	11 Government				213.30	216.50				84.80	340.55				855.15
	12 Capital account					-0.05			4.90	341.58	136.90	-34.53		1.20	450.00
	13 Rest of world	318.88									1.18	19.10	13.00		352.15
	Column totals	3050.86	2731.99	2518.73	213.30	1638.20	180.68	384.73	4.90	950.53	2258.53	855.15	450.00	352.15	

31

UNITED STATES macro SAM from NIPA
1981 Billions of Dollars

EXPENDITURES OR OUTLAYS

		1 Com-modity	2 Activity	3 Value added	4 Indirect taxes	5 Employee compensation	6 Proprietor income	7 Property income	8 Statistical discrepancy	9 Enterprise	10 House-hold	11 Govern-ment	12 Capital account	13 Rest of world	Row totals
R E C E I P T S O R I N C O M E	1 Commodity		0								1915.15	588.10	515.54	382.80	3401.59
	2 Activity	3052.69													3052.69
	3 Value added		2801.20												2801.20
	4 Indirect tax		251.50												251.50
	GNP		3052.70												
	5 Employee compensation			1807.40											1807.40
	6 Proprietors			186.78											186.78
	7 Property			449.35											449.35
	National income			2443.52											
	8 Statistical discrepancy			4.10							-0.03		0.03		4.10
	9 Enterprise			353.58			186.78	449.35			51.98	39.75			1081.43
	10 Household					1556.10				609.18		355.65			2520.92
	11 Government				251.50	251.23				81.15	393.35				977.23
	12 Capital account					0.08			4.10	391.10	159.45	-29.68		1.10	526.15
	13 Rest of world	348.90									1.03	23.40	10.58		383.90
	Column totals	3401.59	3052.69	2801.20	251.50	1807.40	186.78	449.35	4.10	1081.43	2520.92	977.23	526.15	383.90	

UNITED STATES macro SAM from NIPA
1982 Billions of Dollars

EXPENDITURES OR OUTLAYS

RECEIPTS OR INCOME	1 Com-modity	2 Activity	3 Value added	4 Indirect taxes	5 Employee compensation	6 Proprietor income	7 Property income	8 Statistical discrepancy	9 Enterprise	10 House-hold	11 Govern-ment	12 Capital account	13 Rest of world	Row totals
1 Commodity		0								2050.62	641.70	447.31	361.93	3501.56
2 Activity	3165.93													3165.93
3 Value added		2907.22												2907.22
4 Indirect tax		258.83												258.83
5 Employee compensation (GNP 3166.05)		3166.05	1907.00											1907.00
6 Proprietors			175.53											175.53
7 Property			435.93											435.93
8 Statistical discrepancy (National income 2518.45)	-0.11		-0.05							0.13	-0.03	-0.04	0.05	-0.05
9 Enterprise			388.83			175.53	435.93			55.55	47.53			1103.35
10 Household					1637.47				637.10		396.25			2670.82
11 Government				258.83	269.55				63.08	409.33				1000.78
12 Capital account					-0.03			-0.05	403.18	153.95	-110.75			446.30
13 Rest of world	335.63									1.25	26.08	-0.98		361.98
Column totals	3501.56	3165.93	2907.22	258.83	1907.00	175.53	435.93	-0.05	1103.35	2670.82	1000.78	446.30	361.98	

33

UNITED STATES macro SAM from NIPA
1983 Billions of Dollars

EXPENDITURES OR OUTLAYS

		1 Com-modity	2 Activity	3 Value added	4 Indirect taxes	5 Employee compensation	6 Proprietor income	7 Property income	8 Statistical discrepancy	9 Enterprise	10 House-hold	11 Govern-ment	12 Capital account	13 Rest of world	Row totals
R E C E I P T S	1 Commodity		0								2234.55	675.05	502.29	352.53	3764.42
	2 Activity	3405.79													3405.79
	3 Value added		3123.18												3123.18
	4 Indirect tax		282.55												282.55
O R	GNP		3405.73												
	5 Employee compensation			2020.70											2020.70
I N C O M E	6 Proprietors			190.88											190.88
	7 Property			507.90											507.90
	National income			2719.48											
	8 Statistical discrepancy		0.07	5.20								0.37	-0.44		5.20
	9 Enterprise			398.50			190.88	507.90				61.88	61.47		1220.63
	10 Household					1730.13				681.83		426.63			2838.58
	11 Government				282.55	291.00				77.25	410.50				1061.30
	12 Capital account					-0.43			5.20	461.55	130.60	-128.55			468.38
	13 Rest of world	358.63									1.05	26.33	-33.48		352.53
	Column totals	3764.42	3405.79	3123.18	282.55	2020.70	190.88	507.90	5.20	1220.63	2838.58	1061.30	468.38	352.53	

34

UNITED STATES macro SAM from NIPA
1984 Billions of Dollars

EXPENDITURES OR OUTLAYS

		1 Com-modity	2 Activity	3 Value added	4 Indirect taxes	5 Employee compensation	6 Proprietor income	7 Property income	8 Statistical discrepancy	9 Enterprise	10 House-hold	11 Govern-ment	12 Capital account	13 Rest of world	Row totals
R E C E I P T S	1 Commodity		0								2430.47	735.85	664.85	383.50	4214.67
	2 Activity	3772.22													3772.22
	3 Value added		3458.35												3458.35
	4 Indirect tax		313.90												313.90
O R	GNP		3772.25												
	5 Employee compensation			2213.95											2213.95
I N C O M E	6 Proprietors			234.50											234.50
	7 Property			580.25											580.25
	National income			3028.70											
	8 Statistical discrepancy		-0.03	5.35							-0.07	-0.18	0.22	0.05	5.35
	9 Enterprise			424.30			234.50	580.25			72.53	73.85			1385.43
	10 Household					1888.80				782.05		437.93			3108.78
	11 Government				313.90	324.90				93.93	440.20				1172.93
	12 Capital account					0.25			5.35	509.45	164.10	-105.03			574.13
	13 Rest of world	442.45									1.55	30.50	-90.95		383.55
	Column totals	4214.67	3772.22	3458.35	313.90	2213.95	234.50	580.25	5.35	1385.43	3108.78	1172.93	574.13	383.55	

UNITED STATES macro SAM from NIPA
1985 Billions of Dollars

E X P E N D I T U R E S   O R   O U T L A Y S

		1 Com-modity	2 Activity	3 Value added	4 Indirect taxes	5 Employee compensation	6 Proprietor income	7 Property income	8 Statistical discrepancy	9 Enterprise	10 House-hold	11 Govern-ment	12 Capital account	13 Rest of world	Row totals
R	1 Commodity		0								2628.99	820.75	643.08	370.93	4463.74
E	2 Activity	4014.89													4014.89
C E	3 Value added		3681.17												3681.17
I P	4 Indirect tax		333.63												333.63
T S	GNP		4014.80												
O R	5 Employee compensation			2367.52											2367.52
I N	6 Proprietors			255.88											255.88
C O	7 Property			610.55											610.55
M E	National income			3233.95											
	8 Statistical discrepancy		0.10	-4.78							-0.02	0.20	-0.28		-4.78
	9 Enterprise			452.00			255.88	610.55			82.58	79.08			1480.08
	10 Household					2013.62				843.83		467.83			3325.27
	11 Government				333.63	354.13				96.43	486.63				1270.80
	12 Capital account					-0.23			-4.78	539.83	125.38	-131.75			528.45
	13 Rest of world	448.85									1.73	34.70	-114.35		370.93
	Column totals	4463.74	4014.89	3681.17	333.63	2367.52	255.88	610.55	-4.78	1480.08	3325.27	1270.80	528.45	370.93	

36

UNITED STATES macro SAM from NIPA
1986 Billions of Dollars

EXPENDITURES OR OUTLAYS

		1 Com-modity	2 Activity	3 Value added	4 Indirect taxes	5 Employee compensation	6 Proprietor income	7 Property income	8 Statistical discrepancy	9 Enterprise	10 House-hold	11 Govern-ment	12 Capital account	13 Rest of world	Row totals
R E C E I P T S	1 Commodity		0								2807.47	871.23	665.95	378.45	4723.10
	2 Activity	4240.27													4240.27
	3 Value added		3891.82												3891.82
	4 Indirect tax		348.45												348.45
O R	GNP		4240.27												
	5 Employee compensation			2507.10											2507.10
I N	6 Proprietors			286.73											286.73
C	7 Property			643.20											643.20
O M E	National income			3437.02											
	8 Statistical discrepancy			-13.63							0.10	-0.07		-0.02	-13.62
	9 Enterprise			468.43			286.73	643.20			89.08	85.23			1572.65
	10 Household					2128.97				906.13		496.05			3531.15
	11 Government				348.45	378.13				106.58	511.43				1344.58
	12 Capital account					0.00			-13.63	559.95	121.65	-144.40			523.58
	13 Rest of world	482.83									1.43	36.55	-142.38		378.43
	Column totals	4723.10	4240.27	3891.82	348.45	2507.10	286.73	643.20	-13.63	1572.65	3531.15	1344.58	523.58	378.43	

37

UNITED STATES macro SAM from NIPA
1987 Billions of Dollars

EXPENDITURES OR OUTLAYS

RECEIPTS OR INCOME		1 Com-modity	2 Activity	3 Value added	4 Indirect taxes	5 Employee compensation	6 Proprietor income	7 Property income	8 Statistical discrepancy	9 Enterprise	10 House-hold	11 Govern-ment	12 Capital account	13 Rest of world	Row totals
	1 Commodity		0								3012.06	924.78	712.91	428.05	5077.79
	2 Activity	4526.69													4526.69
	3 Value added		4160.38												4160.38
	4 Indirect tax		366.30												366.30
	GNP		4526.68												
	5 Employee compensation			2683.40											2683.40
	6 Proprietors			312.95											312.95
	7 Property			682.35											682.35
	National income			3678.70											
	8 Statistical discrepancy		0.02	-8.13							-0.11	0.05	-0.03	0.08	-8.12
	9 Enterprise			489.80			312.95	682.35			92.10	92.65			1669.85
	10 Household					2284.28				975.05		520.63			3779.95
	11 Government				366.30	399.13				133.78	570.35				1469.55
	12 Capital account					0.00			-8.13	561.03	104.23	-104.83			552.30
	13 Rest of world	551.10									1.33	36.28	-160.58		428.13
	Column totals	5077.79	4526.69	4160.38	366.30	2683.40	312.95	682.35	-8.13	1669.85	3779.95	1469.55	552.30	428.13	