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A NATIONAL ACCOUNTS MATRIX FOR THE NETHERLANDS*)

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Abstract

Currently, the national accounts in most countries use two formats for presentation: matrices for the Input-Output tables and T-accounts for the transactions of institutional sectors. This paper demonstrates that presently available national accounts can easily be transformed into a National Accounts Matrix (NAM). This may improve both the transparency and the analytic usefulness of the complete set of accounts.

Contents

1. Introduction

As in many other countries, the set of detailed tables in the aanual national accounts publication of the Netherlands currently contains two formats for presentation: 1) T-accounts for the incomes, expenditures, capital and financial transactions of institutional sectors, and 2) input-output matrices for information on the flow of goods and services and on the structure of production costs [Centraal Bureau voor de Statistiek, 1992].

In the T-accounts for institutional sectors, input-output figures are lacking, as these data are more usefully classified by industry branches and product groups. Therefore, in a sequence of accounts for institutional sectors the supply and use of goods and services and the production process are only shown at an aggregate level.

On the other hand the input-output tables and supply and use tables lack an overview of some important economic processes, such as (re)distribution of income, capital transactions and financial transactions. Both the sequence of accounts and the supply and use tables fulfil a specific function in the national accounts. In addition to this, it is expedient to present the whole system of national accounts in one framework. Such a framework takes the form of a matrix, partly because supply and use tables can only be included in this form. Besides, a matrix presentation offers the possibility of choosing the most relevant economic unit and the most relevant classification of units in each account of the system. As in reality various types of unit are involved in different economic processes, in this way the relation between various types of transactions in the economy can be traced better.

Let us take an example to illustrate this. If Dutch households start to buy more bicycles, the production of bicycles in our country will probably rise. This may mean that production workers in bicycle factories work overtime and thus earn more money. This money ends up in their household's purse and subsequently these households may purchase

more goods and services. In this example the extra consumption of a certain type of good (bicycles) therefore leads to more production by certain industries (e.g. metal products manufacturing and trade), by which higher incomes result for some categories of employees (e.g. manual workers), which in turn leads to higher incomes for some groups of households (among others the group whose main source of income is compensation of employees from the private sector). Four types of unit are thus involved in this series of transactions: a product, an establishment unit, an employee and a household.

The national accounts matrix traces this money flow and records both the paying and the receiving party for each transaction. This registration of transactions also has advantages for certain modelling analyses based on the national accounts.

2. A consolidated matrix presentation

Transactions in the economy are shown at a meso level in table 4. Before discussing this table we give an overview of the structure of the matrix as this appears from tables 1 to 3. These tables contain a consolidated matrix presentation of the national accounts and serve to provide an insight in the inter-relations among the values of macro-economic aggregates in 1987, 1988 and 1989, respectively. In this way the connections between the main domestic and national indicators, such as gross domestic product (GDP), net national income (NNI), disposable income and the current external balance can be read directly from each of these tables.[1] By way of illustration we shall now discuss table 3. The structure of this table is exactly the same as that of tables 1 and 2.

The rows contain the receipts recorded by origin, and the columns the payments by destination. Obviously the totals of the rows (receipts) and the columns (payments) are equal. If an account results in a balancing item, this will usually be in the column of the account concerned. This balancing item is then equal to the sum of the row minus the other items in the column. For example, GDP is the balancing item of the production account (account 2 in the table) and equals production (row 2) minus intermediate consumption (see column 2). The matrix roughly follows the standard accounts scheme of the revised SNA up to and including the financial accounts.[2]

The first row and column show the goods and services account. Macro-estimates for the year 1989 for the supply and use of goods and services, measured in purchasers' prices, are recorded here. The first row presents the various categories of use of goods and services: intermediate consumption, final consumption expenditure, changes in

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1) In the tables all main macro-aggregates are in a thick outlined box.

2) This table is rather similar to the aggregate Social Accounting Matrix (SAM) presented in the revised System of National Accounts [United Nations, 1992: table XX.4]. Refer also to Keuning [1991].

Table 1. An aggregate National Accounts Matrix for the Netherlands (1987, milliard guilders)

ACCOUNT		1.Goods and services	2.Production	3.Generation of income	4.Primary distribution of income	5.Secondary distribution of income	6.Use of income	7.Capital	8.Gross capital formation	9.Destination of new fixed capital formation	10.Type of fixed capital formation	11.Financial	12.Financial	13.Rest of the world	14.Rest of the world	Total
	Classification	Products	Industries	Primary input cat.	Sectors	Sectors	Sectors	Sectors		Industries	Prod. assets	Sectors	Fin.assets	Current	Capital	
1.Goods	Product groups	Trade and transport margins 0.0	Intermediate consumption 404.3				Final consumption expenditure 337.7		Changes in inventories -0.4		Gross fixed capital formation 90.7			Exports (f.o.b.) 219.3		Use at purchasers' prices 1051.6
2.Production	Industries	Output at basic prices 806.3														Output at basic prices 806.3
3.Generation of income	Primary input categories		Gross Domestic Product at basic prices 401.9	Value added tax not handed over to the government 1.7										Compensation of employees from the rest of the world 1.2		Generated income 404.8
4.Primary distribution of income	Institutional sectors	Taxes less subsidies on products 37.7		Net National Generated Income at basic prices 353.5	Property income 154.4						Value added tax on land, etc. 0.9			Property income from the rest of the world 29.7		Quid-pro-quo income 576.2
5.Secondary distribution of income	Institutional sectors				Net National Income at market prices 390.9	Current taxes on income,wealth etc and current transfers 337.5								Current taxes and current transfers from the rest of the world 9.2		Secondary income 737.6
6.Use of income	Institutional sectors					Net Disposable Income 368.9										Disposable income 368.9
7.Capital	Institutional sectors *)			Consumption of fixed capital 46.5			Net Saving 51.2	Capital transfers *) 20.7							Capital transfers from the rest of the world 0.9	Capital income 121.3
8.Gross capital formation								Gross capital formation 91.2								Gross capital formation 91.2
9.Destination of new fixed capital formation	Industries								Gross fixed capital formation (new assets) 93.9							Gross fixed capital formation (new assets) 93.9
10.Type of fixed capital formation	Produced assets								Purchases less sales of existing fixed assets -2.3	Gross fixed capital formation (new assets) 93.9						Gross fixed capital formation 91.6
11.Financial	Institutional sectors							Net Lending of the Nation 7.5					Borrowing of the nation 114.8			Lending of the nation 122.2
12.Financial	Financial assets											Lending of the nation 122.2			Borrowing from the rest of the world 24.8	Increase in assets 147.0
13.Rest of the world Current		Imports (c.i.f.) 207.6		Compensation of employees to the rest of the world 1.1	Property income to the rest of the world 31.0	Current taxes and current transfers to the rest of the world 11.2									Current External Balance 8.6	Current payments to the rest of of the world 259.4
14.Rest of the world Capital								Capital transfers to the rest of the world 2.0					Lending to the rest of the world 32.2			Capital payments to the rest of the world 34.2
Total		Supply at purchasers' prices 1051.6	Input at basic prices 806.3	Allocation of generated income 404.8	Destination of quid-pro-quo income 576.2	Destination of secondary income 737.6	Expenditures 368.9	Capital outlays 121.3	Gross capital formation 91.2	Gross fixed capital formation (new assets) 93.9	Gross fixed capital formation 91.6	Lending of the nation 122.2	Increase in liabilities 147.0	Current receipts from the rest of the world 259.4	Capital receipts from the rest of the world 34.2	

*) Including acquisition less disposals of land.

Table 2. An aggregate National Accounts Matrix for the Netherlands (1988, milliard guilders)

ACCOUNT	Classification	1.Goods and services	2.Production	3.Generation of income	4.Primary distribution of income	5.Secondary distribution of income	6.Use of income	7.Capital	8.Gross capital formation	9.Destination of new fixed capital formation	10.Type of fixed capital formation	11.Financial	12.Financial	13.Rest of the world Current	14.Rest of the world Capital	Total
		Products	Industries	Primary input cat.	Sectors	Sectors	Sectors	Sectors		Industries	Prod. assets	Sectors	Fin.assets			
1.Goods and services	Product groups	Trade and transport margins 0.0	Intermediate consumption 425.1				Final consumption expenditure 341.8		Changes in inventories 0.3		Gross fixed capital formation 96.4			Exports (f.o.b.) 240.3		Use at purchasers' prices 1103.9
2.Production of income	Industries	Output at basic prices 842.6														Output at basic prices 842.6
3.Generation of income	Primary input categories		Gross Domestic Product at basic prices 417.5	Value added tax not handed over to the government 1.2										Compensation of employees from the rest of the world 1.2		Generated income 419.8
4.Primary distribution of income	Institutional sectors	Taxes less subsidies on products 36.9		Net National Generated Income at basic prices 366.3	Property income 155.4						Value added tax on land etc. 1.0			Property income from the rest of the world 32.0		Quid-pro-quo income 593.6
5.Secondary distribution of income	Institutional sectors				Net National Income at market prices 402.7	Current taxes on income,wealth etc and current transfers 347.9								Current taxes and current transfers from the the rest of the world 12.6		Secondary income 763.4
6.Use of income	Institutional sectors					Net Disposable Income 401.2										Disposable income 401.2
7.Capital	Institutional sectors *)			Consumption of fixed capital 51.2			Net Saving 59.4	Capital transfers *) 18.5							Capital transfers from the rest of the world 0.8	Capital transfers 129.9
8.Gross capital formation								Gross capital formation 97.7								Gross capital formation 97.7
9.Destination of new fixed capital formation	Industries								Gross fixed capital formation (new assets) 99.9							Gross fixed capital formation (new assets) 99.9
10.Type of fixed capital formation	Produced assets								Purchases less sales of fixed assets -2.5	Gross fixed capital formation (new assets) 99.9						Gross fixed capital formation 97.4
11.Financial	Institutional sectors							Net Lending of the Nation 11.9					Borrowing of the nation 197.9			Lending of the nation 209.8
12.Financial	Financial assets											Lending of the nation 209.8			Borrowing from the rest of the world 47.2	Increase in assets 257.0
13.Rest of the world Current		Imports (c.i.f.) 222.4		Compensation of employees to the rest of the world 1.2	Property income to the rest of the world 35.5	Current taxes and current transfers to the rest of the world 14.3									Current External Balance 12.9	Current payments to the rest of of the world 286.3
14.Rest of the world Capital								Capital transfers to the rest of the world 1.8					Lending to the rest of the world 59.1			Capital payments to the rest of of the world 60.9
Total		Supply at purchasers' prices 1103.9	Input at basic prices 842.6	Allocation of generated income 419.8	Destination of quid-pro-quo income 593.6	Destination of secondary income 763.4	Expenditures 401.2	Capital outlays 129.9	Gross capital formation 97.7	Gross fixed capital formation (new assets) 99.9	Gross fixed capital formation 97.4	Landing of the nation 209.8	Increase in liabilities 257.0	Current receipts from the rest of the world 286.3	Capital receipts from the rest of the world 60.9	

*) Including acquisition less disposals of land.

Table 3. An aggregate National Accounts Matrix for the Netherlands (1969, milliard guilders)

ACCOUNT		1.Goods and services	2.Production	3.Generation of income	4.Primary distribution of income	5.Secondary distribution of income	6.Use of income	7.Capital	8.Gross capital formation	9.Destination of new fixed capital formation	10.Type of fixed capital formation	11.Financial	12.Financial	13.Rest of the world	14.Rest of the world	Total
	Classification	Products	Industries	Primary input cat.	Sectors	Sectors	Sectors	Sectors		Industries	Prod. assets	Sectors	Fin.assets	Current	Capital	
1.Goods	Product groups	Trade and transport margins 0.0	Intermediate consumption 460.2				Final consumption expenditure 356.3		Changes in inventories 5.4		Gross fixed capital formation 103.1			Exports (f.o.b.) 267.7		Use at purchasers' prices 1192.6
2.Production	Industries	Output at basic prices 903.8														Output at basic prices 903.8
3.Generation of income	Primary input categories		Gross Domestic Product at basic prices 443.6	Value added tax not handed over to the government 1.3										Compensation of employees from the rest of the world 1.1		Generated income 446.0
4.Primary distribution of income	Institutional sectors	Taxes less subsidies on products 40.1		Net National product income at basic prices 386.6	Property income 189.3						Value added tax on land etc. 1.0			Property income from the rest of the world 47.2		Quid-pro-quo income 646.1
5.Secondary distribution of income	Institutional sectors				Net National income at market prices 429.6	Current taxes on income,wealth etc and current transfers 349.6								Current taxes and current transfers from the rest of the world 13.2		Secondary income 792.3
6.Use of income	Institutional sectors					Net Disposable income 427.8										Disposable income 427.8
7.Capital	Institutional sectors *)			Consumption fixed capital 54.9			Net Saving 71.5	Capital transfers *) 17.3							Capital transfers from the rest of the world 0.9	Capital income 144.7
8.Gross capital formation								Gross capital formation 109.5								Gross capital formation 109.5
9.Destination of new fixed capital formation	Industries								Gross fixed capital formation (new assets) 106.9							Gross fixed capital formation (new assets) 106.9
10.Type of fixed capital formation	Produced assets								Purchaces less sales of fixed assets -2.8	Gross fixed capital formation (new assets) 106.9						Gross fixed capital formation 104.1
11.Financial	Institutional sectors							Net Lending of the Nation 15.6					Borrowing of the nation 143.7			Lending of the nation 159.3
12.Financial	Financial assets											Lending of the nation 159.3			Borrowing from the rest of the world 51.4	Increase in assets 210.7
13.Rest of the world Current		Imports (c.i.f.) 248.6		Compensation of employees to the rest of the world 1.3	Property income to the rest of the world 47.2	Current taxes and current transfers to the rest of the world 15.0									Current External Balance 16.9	Current payments to the rest of of the world 329.1
14.Rest of the world Capital								Capital transfers to the rest of the world 2.2					Lending to the rest of the world 67.0			Capital payments to the rest of the world 69.2
Total		Supply at purchasers' prices 1192.7	Input at basic prices 903.8	Allocation of generated income 446.0	Destination of quid-pro-quo income 646.1	Destination of secondary income 792.3	Expenditures 427.8	Capital outlays 144.7	Gross capital formation 109.5	Gross fixed capital formation (new assets) 106.9	Gross fixed capital formation 104.1	Lending of the nation 159.3	Increase in liabilities 210.7	Current receipts from the rest of the world 329.1	Capital receipts from the rest of the world 69.2	

*) Including acquisition less disposals of land.

inventories, gross fixed capital formation and exports (fob). For the economy as a whole the balance of paid and received trade and transport margins always equals zero. This figure is thus put in cell (1,1), i.e. the intersection of row 1 with column 1. These margins do play a role in a more detailed overview of the economy (see table 4 below).

The first column shows the supply: every product is either produced by a domestic industry (cell 2,1) or imported (cell 13,1). The output of establishment units is given in basic prices, i.e. excluding product-related indirect taxes (VAT, excise, etc.) less subsidies. In this valuation the production of for example food, alcohol and tobacco is given exclusive of charged trade and transport costs. The taxes less subsidies on products are part of the government's primary income - see row 4. The sum of the amounts in the first column corresponds with the total supply, measured in purchasers' prices. In this way the totals of the first row and the first column are equal by definition.

The second row and column contain the production account. The connection between the first and second account is the output of industries (cell 2,1). In the second column the input costs are recorded. These consist of intermediate consumption of goods and services produced domestically and imported plus the primary input categories, which add up to the value added. In the valuation chosen here the total of value added corresponds with GDP at basic prices. The first two rows and columns together form the consolidated supply and use tables, albeit that in the supply tables the rows and columns are reversed.

The third row and column show the generation of income account. Here a number of primary input categories are distinguished (wages and salaries, operating surplus, etc.). GDP is transferred from the column of the production account to this account, subsequently increased by the wage bill earned abroad by resident employees (cell 3,13) and reduced by the compensation of employees paid to non-residents (cell 13,3). The VAT paid by the consumer to the seller, but not transferred by the seller to the tax authorities is part of both the output value and GDP at basic prices. This is really an implicit government subsidy in favour of the

operating surplus/mixed income of the establishment units involved. This is shown in cell (3,3). After booking the consumption of fixed capital on the capital account a new balancing item remains, between GDP and NNI. This balancing item is mainly relevant in a more detailed table. Here it is called net national generated income (NNGI) - see the third column.

Account 4 describes the primary distribution of income for the institutional sectors. These receive the NNGI from the generation of income account and also property income from abroad (cell 4,13). Property income transactions that do not involve the rest of the world change only the composition, not the size of national income (cell 4,4). In this account the government receives the product-related indirect taxes less subsidies and in cell (4,10) some levies which are directly connected to investment in housing and buildings. Other taxes less subsidies on production belong to the part of NNGI which falls to the government (see cell 4,3). To get NNI, property income paid to abroad must be deducted. This is done in column 4. The national income is valued at market prices.

Subsequently, the secondary distribution of income account (account 5) records the redistribution of earned national income by means of unrequited income transfers (taxes on income, wealth, etc., social contributions and benefits and other current transfers), some of which again flow to and from abroad - see cells (5,13) and (13,5). Obviously in the Netherlands considerable amounts are involved in the redistribution of incomes among institutional sectors - compare, for example, the amount in cell (5,5) with that in (5,4). The balancing item of row and column 5 corresponds with the net disposable national income.

The use of income is shown in account 6. Disposable income resulting from the secondary income distribution is spent on final consumption expenditure and net saving in column 6.

The row of the capital account for domestic sectors (account 7) records gross capital incomes: consumption of fixed capital, net saving

and unrequited capital transfers (legacy duties, investment subsidies, etc.) received from other sectors and from abroad. The column gives capital outlays: capital transfers paid to other sectors and to abroad, the balance of acquisitions and disposals of land (which equals zero at the macro level), and gross capital formation. This results in the balancing item net lending of the nation.

To get a better insight in the dynamics of the economy a detailed overview of the investments in fixed assets is important. For this reason a number of separate accounts is included in this matrix, mainly distinguished by a different classification. In these accounts too the purpose of the matrix is to demonstrate the connection between various types of transactions.

To illustrate this, let us take another look at the example of the increased demand for bicycles. In the example cited above it was assumed that the extra production of bicycles was realized by means of working overtime. However, it is just as conceivable that the management of the enterprise under which the bicycle establishment falls decides to use retained earnings (i.e. saving) to expand the production capacity of the bicycle factory. This might mean that the construction of a new assembly plant is necessary. In other words: a non-financial enterprise invests in a certain establishment unit (the bicycle factory), which leads to the acquisition of a certain type of produced asset (buildings, specific machines) which in turn leads to a demand for various goods and services (construction, construction-technical advice, metal products etc.), by which the production in the various industries concerned (construction industry, construction-technical consultancy bureaus, etc.) as well as imports might increase. This results in the generation of additional income and so forth.

Showing these flows in the Netherlands' NAM involves two problems. First, although the present national accounts contain estimates of total fixed capital formation per sector and per industry of destination, it is not known exactly which sector invests in which industry. Secondly, only for newly available capital goods the destinations are known.

For these reasons the matrix also comprises a so-called dummy account for gross capital formation (account 8). This is an account which is not divided into several rows and columns, even in a detailed presentation. On the row of this account is the total fixed capital formation per sector, as resulting from the capital account for the institutional sectors. The column shows the changes in inventories in cell (1,8), investment in fixed assets which are new for the Netherlands, specified by industry of destination, in cell (9,8) and sales of existing fixed assets, in as far as these are purchased by households for consumption purposes or exported, in cell (10,8).

The destination of fixed capital formation is described in account 9. The row shows the investment in fixed assets per industry and in the column this is specified by type of produced asset.

The investment per type of asset (buildings, transport equipment, machinery, etc.) is given in account 10. In the row it is broken down into sales of existing fixed assets on the one hand and fixed capital formation of new assets per industry of destination on the other; in the column it is shown by product group.

In summary, it can be said that this presentation enables a linkage of fixed capital formation per institutional sector as shown in the capital account and fixed capital formation per product group as shown in the supply and use tables. To realize this objective completely it is intended to specify investments per sector also by industry of destination in the future. In that case, the dummy account 8 can be deleted.

Row and column 11 comprise the financial account for the institutional sectors. The balancing item net lending which results from the capital account is ideally the same as the balance of the financial account. Therefore, by way of exception, the balancing item of this account is shown in the row and not in the column. Apart from a statistical discrepancy, this balancing item corresponds with the changes in assets (cell 12,11) less the changes in liabilities (cell

11,12). The latter concerns taking on new liabilities such as the negotiation of new loans, share emissions, etc. less the paying off of existing debts. The changes in assets concerns the net acquisition of financial assets (among other things by acquiring bonds, lending money or buying shares). The sale of existing financial assets is recorded here with a minus sign.

The twelfth row and column of this matrix record which financial assets and liabilities have been created or traded in the period under review, including such transactions with the rest of the world.

The current account of the balance of payments is shown in row and column 13. This account is set up from the viewpoint of the rest of the world; current receipts from the rest of the world are recorded in the column and current payments to the rest of the world in the row. The current external balance of the Netherlands with the rest of the world is seen from a Dutch viewpoint here. This means that it is booked on the row of the current account for the rest of the world and in the column of the capital account for the rest of the world, instead of the other way around. If there is a deficit on the (Dutch) current account, a negative amount would be recorded here.

The capital account for the rest of the world (row and column 14) is also compiled from the viewpoint of the rest of the world.

3. A more detailed National Accounts matrix

Table 4 comprises a detailed national accounts matrix for 1989. Nearly all the cells in the previous table are now specified into submatrices and vectors. The structure of this matrix and the numbering of the accounts correspond exactly with those of the consolidated matrices. The figures in every submatrix of this table add up to the figures in the corresponding cells of table 3. In this way the interrelationships in a submatrix of this table can be seen within the wider framework of the general, macro-economic picture.

As noted earlier, several classifications are used in this table. First of all, 23 product groups are distinguished in the goods and services account, whereby the last four groups - trade and transport margins, fixed assets produced on own account, work-in-progress and existing fixed assets - in fact refer to specific use categories.

The treatment of trade and transport margins is apparent from the submatrix in the top left hand corner of this table. This submatrix is a specification of cell (1,1) in the previous table. On the row for these margins (1t), the margins on every group of goods and services in the column concerned are recorded. In the column for these margins, i.e. in cell (1t,1t), the total of the margin is recorded with a minus sign. This means that row 1t always adds up to zero. Column 1t shows the production value of these margins per industry in the rows of account 2. The total of these values corresponds with the total of the margins, which is recorded with a minus sign in row 1t. Therefore column 1t also adds up to zero and in this case too the equality of row and column total is guaranteed.

Sales of existing fixed assets are included in as far as these are purchased by households for consumption purposes (cell 1w,6e) or exported (cell 1w,13). These sales are shown in row vector (1w, 10) with a minus sign. The sum of this row therefore always equals zero and there is nothing in column 1w. This column has therefore been omitted here.

In the production account a classification by ten industries is used. This is a combination of the classification of economic activities in the input-output table. Just as in the input-output table, a category indirectly paid financial intermediation services is distinguished (2j). In this case the row is empty and in the column a positive intermediate consumption and a negative operating surplus are shown.

The generation of income account distinguishes four primary input categories.[3] The submatrix (3, 2) therefore specifies GDP at basic prices by these four categories and by ten industry classes. Total wages and salaries of Dutch nationals are obtained by increasing the sum of the elements in row vector (3a, 2) with the balance of wages and salaries received from and paid to abroad (cell 3a,13 and cell 13,3a). To get total operating surplus/mixed income in the economy, the VAT paid by the consumer but not handed over to the government by the collecting firm must be booked as an implicit government subsidy in favour of the operating surplus or mixed income of the establishment units concerned. This is shown in cell (3c,3d).

In the column of the generation of income account, the consumption of fixed capital per sector is booked directly on the capital account (vector 7, 3c), so that the current accounts yield net balancing items. The net operating surplus for financial intermediaries is negative (cell 4b,3c), as this is compensated by property income which is on balance positive - compare the total of the row vector (4b, 4) with that of the column vector (4, 4b).

The accounts for the primary and secondary distribution of income can best be shown per sector.[4] Submatrix (4, 4) does not specify the various types of transactions concerning property income (interest, dividends, etc.), but shows which sector has paid such incomes to which other sector. Similar transactions with abroad are shown in vectors

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3) There are plans to distinguish wages and salaries and employers' social contributions by different groups of employees in the future.

4) A specification of the sector households by different socio-economic categories is very relevant in such a matrix. This is currently in progress.

Table 4. A more detailed National Accounts Matrix for the Netherlands (1969, mln gld)

ACCOUNT			1. Goods and services															
		Code	1a	1b	1c	1d	1e	1f	1g	1h	1i	1j	1k	1l	1m	1n	1o	1p	1q
1. Goods and services	Basic foods	1a																	
	Food, beverages and tobacco	1b																	
	Textiles, clothing and leatherwear	1c																	
	Wood and building materials	1d																	
	Paper, printing and publishing	1e																	
	Petroleum and petroleum products	1f																	
	Other chemical products	1g																	
	Metal and other manufacturing products	1h																	
	Transport equipment	1i																	
	Electricity, gas, water and coal	1j																	
	Construction	1k																	
	Hotels, restaurants and cafes	1l																	
	Repair of consumer goods	1m																	
	Transport and storage services	1n																	
	Communication services	1o																	
	Finance, business services and real estate	1p																	
	Government services and education	1q																	
	Medical and social services	1r																	
	Goods and services n.e.c.	1s																	
	Trade and transport margins	1t	4703	18596	9918	9805	3879	2999	11272	24029	4847	173							
	Fixed assets produced on own account	1u																	
	Work-in-progress	1v																	
	Existing fixed assets	1w																	
2. Production	Agriculture, hunting, forestry and fishing	2a	26846	16216	132	16	0	0	0	5	0	0	34	0	0	0	0	26	0
	Mining and quarrying	2b	263	0	0	730	0	1387	0	0	0	13709	0	0	0	0	0	1	0
	Manufacturing	2c	20115	54402	9767	16042	25943	20175	50382	60304	18441	467	2803	0	0	0	2	2	1085	0
	Public utilities	2d	0	0	0	0	0	0	0	0	0	17823	0	0	0	0	0	530	0
	Construction	2e	0	0	0	39	0	0	0	63	47	0	70822	0	0	203	0	484	0
	Trade, hotels, restaurants, cafes and repair of consumer goods	2f	14	100	1080	271	318	0	299	3899	107	0	114	15056	8903	128	0	5053	0
	Transport, storage and communication	2g	0	14	0	1	110	0	0	0	440	0	182	51	223	31398	12359	805	0
	Other services and n.e.c. (except 2i)	2h	0	0	0	0	6374	0	0	18	0	0	0	784	71	55	9	117825	0
	Government and education	2i	9	78	0	0	213	0	0	18	132	0	1451	185	0	11	0	5122	89334
	Indirectly paid financial intermediation services	2j	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3. Generation of income	Wages and salaries	3a																	
	Employers' social contributions	3b																	
	Operating surplus/mixed income (gross)	3c																	
	Other taxes less subsidies on production	3d																	
4. Primary distribution of income	Non-financial corporations	4a																	
	Financial intermediaries	4b																	
	Insurance corporations and pension funds	4c																	
	Central and local government	4d	-283	5055	3778	1615	1211	6202	1869	5392	4506	1630	7262	1500	1056	-3068	10	-421	
	Social security funds	4e																	
	Households (including unincorporated enterprises)	4f																	
5. Secondary distribution of income	Non-financial corporations	5a																	
	Financial intermediaries	5b																	
	Insurance corporations and pension funds	5c																	
	Central and local government	5d																	
	Social security funds	5e																	
	Households (including unincorporated enterprises)	5f																	
6. Use of income	Non-financial corporations	6a																	
	Financial intermediaries	6b																	
	Insurance corporations and pension funds	6c																	
	General government	6d																	
	Households (including unincorporated enterprises)	6e																	
7. Capital	Non-financial corporations	7a																	
	Financial intermediaries	7b																	
	Insurance corporations and pension funds	7c																	
	Central and local government	7d																	
	Social security funds	7e																	
	Households (including unincorporated enterprises)	7f																	
	Acquisition less disposals of land	7g																	
8. Gross capital formation		8																	
9. Destination of fixed capital formation (new assets)	Agriculture, hunting, forestry, fishing	9a																	
	Mining and quarrying	9b																	
	Manufacturing	9c																	
	Public utilities	9d																	
	Construction	9e																	
	Trade, hotels, restaurants, cafes and repair of consumer goods	9f																	
	Transport, storage and communication	9g																	
	Operation of dwellings	9h																	
	Other services and n.e.c. (except 9h and 9j)	9i																	
	Government and education	9j																	
10. Type of fixed capital formation	Dwellings and non-residential buildings	10a																	
	Civil engineering works	10b																	
	External transport equipment	10c																	
	Livestock	10d																	
	Machinery and other equipment	10e																	
	Transfer costs	10f																	
11. Financial (institutional sectors)	Non-financial corporations	11a																	
	Financial intermediaries	11b																	
	Insurance corporations and pension funds	11c																	
	Central and local government	11d																	
	Social security funds	11e																	
	Households (including unincorporated enterprises)	11f																	
12. Financial (financial assets)	Monetary gold and SDR's	12a																	
	Currency and deposits	12b																	
	Bills, bonds and shares(incl.other equities)	12c																	
	Other credits	12d																	
	Insurance technical reserves	12e																	
	Other accounts receivable, payable	12f																	
	Statistical discrepancy	12g																	
13. Rest of 14. the world	13. Current	13	17122	14584	13550	11678	9106	20795	28578	72594	21874	2584	10						
	14. Capital	14																	
TOTAL			89811	109055	40225	39017	47156	51428	92390	166322	48394	36187	82298	17556	13253	28727	12380	130640	89334

					2. Production										3. Generation of income				4. Primary distribution of income					
1r	1s	1t	1u	1v	2a	2b	2c	2d	2e	2f	2g	2h	2i	2j	3a	3b	3c	3d	4a	4b	4c	4d	4e	4f
					13120	0	42831	0	22	77	0	85	112	0										
					2187	7	7880	127	92	4402	291	3304	560	0										
					81	2	3994	0	102	572	94	303	154	0										
					298	18	8609	2	11216	589	36	926	467	0										
					101	48	18977	59	328	5436	999	6133	1703	0										
					809	182	21244	89	1092	355	1985	723	797	0										
					1350	156	26285	211	2366	1103	85	3068	879	0										
					1178	556	35499	673	10262	2787	1194	2804	3712	0										
					55	5	3291	1	118	3472	828	80	1464	0										
					1196	845	8506	9132	129	1501	433	1732	820	0										
					371	63	1546	186	15589	814	2157	5304	4668	0										
					15	8	780	14	34	826	195	1448	483	0										
					39	18	456	50	809	813	830	826	186	0										
					43	296	891	4	291	326	1860	363	468	0										
					184	54	1211	142	139	1611	584	3213	786	0										
					1150	326	10339	747	2694	11263	2517	16724	7587	18028										
					5	0	70	0	0	0	0	81	208	0										
					332	72	867	119	123	249	172	3015	1091	0										
					538	347	19161	1128	1365	8102	7603	7076	2192	0										
		-88891			0	0	0	0	0	0	0	0	0	0										
					0	0	0	0	0	0	0	0	0	0										
					0	0	0	0	0	0	0	0	0	0										
					0	0	0	0	0	0	0	0	0	0										
8	209	131	0	0																				
0	62	0	133	0																				
0	11023	4670	715	838																				
0	1001	0	661	0																				
0	495	435	65	0																				
67	6240	73015	43	0																				
37	241	8670	430	0																				
56956	24624	770	36	0																				
847	277	0	635	0																				
0	0	0	0	0																				
					2399	731	43065	2516	13958	29645	16141	96278	34030											
					636	164	11302	502	5064	7087	3679	19886	11961											
					17024	12321	34626	5130	6888	32916	13907	78742	3367	-18028										
					736	71	57	3	-11	721	410	1498	387					1300						
																	83100			8370	820	180	10	1110
																	-9430		16300		420	9260	50	14700
																	1480		9020	10680		12750	10	3960
529	2242																	2570	14200	2470		3970		1070
																			70	960	10	100		20
															199620	54090	58160		4060	13260	37440	3080		
																			38180					
																				5980				
																					2610			
																						32370		
																							1090	
																								349360
																	38080							
																	900							
																	140							
																	3940							
																	100							
																	12020							
12	34261														1260				17160	26280	70	3720		
56956	87675	0	2718	838	43647	16905	295156	19815	72472	114679	56120	207502	78113	0	195880	54090	188190	3870	101990	66000	41370	65430	1160	370120

Table 4. A more detailed National accounts matrix for the Netherlands (1988, mln gld)

	5. Secondary distribution of income						6. Use of income					7. Capital						8. Gross capital formation	9. Destruction of fixed capital formation (new assets)							
Code	5a	5b	5c	5d	5e	5f	6a	6b	6c	6d	6e	7a	7b	7c	7d	7e	7f	8	9a	9b	9c	9d	9e	9f	9g	9h
1a										0	580							-355								
1b										123	46691							-239								
1c										0	22985							77								
1d										0	8082							856								
1e										0	7689							136								
1f										0	8267							-328								
1g										0	10485							1028								
1h										144	18439							2025								
1i										0	8743							2023								
1j										0	8325							130								
1k										0	1871															
1l										0	13746															
1m										0	6324															
1n										13	5142															
1o										0	3963															
1p										379	45480															
1q										68196	864															
1r										1911	50500															
1s										869	14373							-561								
1t																										
1u																										
1v																		838								
1w											1937															
2a																										
2b																										
2c																										
2d																										
2e																										
2f																										
2g																										
2h																										
2i																										
2j																										
3a																										
3b																										
3c																										
3d																										
4a																										
4b																										
4c																										
4d																										
4e																										
4f																										
5a					20	40																				
5b																										
5c																										
5d	14080	1030	830	80130	1020	51440																				
5e			30	2810		81330																				
5f				39250	87670																					
6a	25330																									
6b		4650																								
6c			1950																							
6d				57330	5740																					
6e						332490																				
7a							25330								6880											
7b								4650							240											
7c									1950						400											
7d										-10890		280			8200		1120									
7e										2200				80	170											
7f											48000			320	1530	110										
7g												1350	40	20	-2860		1450									
8												84670	1410	240	12240	290	30660									
9a																		5282								
9b																		1158								
9c																		16071								
9d																		3832								
9e																		1918								
9f																		9686								
9g																		12091								
9h																		29153								
9i																		15547								
9j																		12175								
10a																			1250	164	2816	319	347	2956	1367	27023
10b																			395	6	114	1742	46	99	1182	
10c																		-2795	633	9	543	32	435	1824	5362	
10d																			76							
10e																		-46	2902	977	12532	1726	1071	4717	4108	
10f																			126	2	66	13	17	90	72	2130
11a												4010														
11b													4640													
11c														1830												
11d															-25150											
11e																2150										
11f																	28140									
12a																										
12b																										
12c																										
12d																										
12e																										
12f																										
12g																										
13	90			11680	890	2300																				
14															800		1420									
	39510	5680	2610	171320	95960	477560	25330	4650	1950	63075	332490	70290	4090	2490	450	2550	62790	109552	5282	1158	16071	3832	1918	9686	12091	29153

		10. Type of fixed capital formation						11. Financial (institutional sectors)						12. Financial (financial assets)					13.-14. Rest of the world		Total
																			13. Current	14. Capital	
Si	Sj	10a	10b	10c	10d	10e	10f	11a	11b	11c	11d	11e	11f	12a	12b	12c	12d	12e	13	14	
					76														12252		68610
						71													43520		109055
						732													11198		40224
						4041													5878		39018
						26													7518		47155
																			16422		51427
						460													44849		92390
						28030													81018		166321
				12222		862													14141		48395
		100																	5538		36187
		39034	9085			313													1308		82287
																					17559
																					10254
																			19210		28727
																			513		12380
		4353	320			571	2733												5416		130838
																					89304
																			6		56257
			106				38												17988		80675
																					0
		121	1117	218		1262															2718
																					838
				-2795		-46													904		0
																					43645
																					18305
																					295158
																					19815
																					72472
																					114681
																					56119
																					207502
																					78113
																					0
																			1120		199883
																					54091
																					188193
																					3072
																			10400		101990
																			31700		88000
																			3570		41370
		873																	80		65429
																					1180
																			1410		370120
																			1270		39510
																					3980
																					2610
																			10610		171320
																					95380
																			1280		477560
																					23330
																					4850
																					1850
																					83070
																					332490
																					70290
																					8080
																					2460
																				120	450
																					2350
																				810	82790
																					0
																					106510
																					5282
																					1156
																					18071
																					3832
																					1918
																					9886
																					12081
																					28153
																					15547
																					12175
4914	3427																				44580
466	8575																				10827
3273	328																				8644
																					76
8805	1680																				36372
89	165																				2770
															-16800	46260					33670
														43750	7180	7080					62630
															-200	100	34720				36450
														380	16910	-12760					-20640
																-140					2010
																17040					45180
									-80												-80
								19050	18680	2720	-2570	1840	14870							10140	64610
								4570	5480	19100	-26570	370	-2580							22330	22710
								250	42770	14320	8110	-250	-80							23630	98750
													35210							-570	34440
								10410	-4230	80	540	140	-240							-6700	0
								-610	0	230	-150	110	-2100							2520	0
																				16910	329118
														-80	20500	15420	31190	-80			89190
15547	12175	44581	10628	8645	76	36372	2771	33670	62630	36450	-20640	2010	45180	-80	64610	22710	88750	34640	329128	89190	

(4, 13) and (13, 4).

Product-related taxes less subsidies per product group are given on row 4d. These contribute to the primary income of the central and local government, which is transferred in the column to the secondary distribution of income account - see cell (5d,4d). As submatrix (5, 4) shows balancing items and no transactions, and as the classifications in accounts 4 and 5 are the same, this submatrix takes the form of a diagonal matrix. Submatrix (5, 5) shows which sector has paid direct taxes, social contributions, social benefits and other unrequited income transfers to which other sectors.

The sector classification in the use of income account is not exactly identical to the one in the two preceding accounts. As for each product group only the consumer expenditure of the general government - central and local government and social security funds - is known, these subsectors are combined. The disposable income of this sector therefore consists of the sum of the disposable incomes of the subsectors - see cells (6d,5d) and (6d,5e).

In the capital account these two subsectors are again distinguished and the savings for both are shown separately - see cells (7d,6d) and (7e,6d). Moreover a dummy row (7g) is included for the balance of acquisitions and disposals of land. This means that the intersection of this row and columns 7a-7f give the value of the land which every sector has bought on balance. As the rest of the world cannot buy or sell land by convention, the total of these balances always equals zero for the domestic sectors. Consequently there is nothing in column 7g and this column is omitted.

Gross capital formation per sector is given on the dummy row 8 and gross fixed capital formation by industry of destination in the dummy column 8. This column also records: changes in inventories per product group - see vector (1, 8), and the purchases less sales of existing fixed assets, per type of asset - see vector (10, 8).

Investments by industry of destination are in account 9. Here roughly the same classification is followed as in the production account; an exception to this is that the operation of dwellings is shown separately (account 9h), while in this case no branch 'indirectly paid financial intermediation services' is needed. Submatrix (10, 9) shows the type of fixed capital formation in each industry. For this purpose six types of asset are distinguished in account 10. The relationship between the product group classification and these types of asset is apparent from submatrix (1, 10).

Account 11 shows the financial transactions per sector. Here the classification of accounts 4, 5 and 7 is followed. The balancing item net lending per sector is on the diagonal of submatrix (11, 7), while changes in financial assets and liabilities per sector and per type of financial asset are shown in submatrices (11, 12) and (12, 11). To this end, five types of financial assets plus two dummy accounts are distinguished in account 12: one dummy account for the balance of other accounts receivable or payable (e.g. on account of financially non-completed transactions) and one for the statistical discrepancy between the balancing item net lending and the balance of changes in financial assets and liabilities per sector. In both cases the row adds up to zero, so that no column is necessary.

The accounts for the rest of the world (13 and 14) are not subdivided. The connection between the two accounts is formed by the current external balance of the Netherlands with the rest of the world on an accrual basis (cell 13,14).

4. Some applications

In conclusion, we will briefly touch upon some of the applications of the NAM. First, it has already been stated that the aggregate tables yield a quick summary of the values of macro-economic variables and their interrelations. Evidently, the same applies if such tables do not contain annual values but rates of change between two successive years. This is shown in tables 5 and 6.[5)]

At a glance, it is clear from these tables that the Dutch economy grew faster in 1989 than in 1988. In fact, the percentage change of all balancing items other than net lending of the nation and the current external balance was larger in the most recent year. These exceptions were related to the much faster growth of gross capital formation in 1989 and to an acceleration of imports which surpassed that of exports in that year. These events may in fact be connected, as the detailed tables show that the imports of e.g. transport equipment declined in 1988, but increased relatively much more than total imports in 1989. If we compare the changes in GDP and NNI, it is evident that particularly the NNI growth was much more favourable in 1989. This is mainly due to the exceptional jump in property income from abroad in that year.

Other applications of the NAM concern all kinds of extended input-output analyses, as the NAM itself is in fact a supply and use table plus additional accounts for institutional sectors and such. This implies, for instance, that an analogous, but wider inverse matrix can be computed. In other words, the input-output model is then 'closed' with respect to some accounts [Miller and Blair, 1985: section 2.5].

The NAM for the Netherlands presented in this paper was compiled by putting existing national accounts data in a matrix format. This means that for almost any country similar NAMs can be compiled at short

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5) These tables give the growth rates in nominal terms. In fact, it also possible to compile a NAM at constant prices of a certain base year so that a similar table can be filled with real growth rates (cf. Keuning [1993, forthcoming]).

Table 5. Rates of change in aggregate transactions and balancing items for the Netherlands: 1987-1988 (%)

ACCOUNT		1.Goods and services	2.Production	3.Generation of income	4.Primary distribution of income	5.Secondary distribution of income	6.Use of income	7.Capital	8.Gross capital formation	9.Destination of new fixed capital formation	10.Type of fixed capital formation	11.Financial	12.Financial	13.Rest of the world	14.Rest of the world	Total
	Classification	Products	Industries	Primary input cat.	Sectors	Sectors	Sectors	Sectors		Industries	Prod. assets	Sectors	Fin.assets	Current	Capital	
1.Goods	Product groups	Trade and transport margins 0.0	Intermediate consumption 5.1				Final consumption expenditure 1.2		Changes in inventories -173.3		Gross fixed capital formation 6.3			Exports (f.o.b.) 9.6		Use at purchasers' prices 5.0
2.Production	Industries	Output at basic prices 4.5														Output at basic prices 4.5
3.Generation of income	Primary input categories		Gross Domestic Product at basic prices 3.9	Not remitted value added tax -31.0										Compensation of employees from the rest of the world 0.0		Generated income 3.7
4.Primary distribution of income	Institutional sectors	Taxes less subsidies on products 3.2		Net National product income at basic prices 3.6	Property income 0.6						Value added tax on land etc. 15.1			Property income rom the rest of the world 7.9		Quid-pro-quo income 3.0
5.Secondary distribution of income	Institutional sectors				Net National income at market prices 3.0	Current taxes on income,wealth etc and current transfers 3.1								Current taxes and current transfers rom the rest of he world 39.2		Secondary income 3.5
6.Use of income	Institutional sectors					Net Disposable income 3.2										Disposable income 3.2
7.Capital	Institutional sectors *)			Consumption of fixed capital 5.5			Net saving 16.0	Capital transfers *) -10.5							Capital transfers from the rest of the world -7.8	Capital income 7.1
8.Gross capital formation								Gross capital formation 7.2								Gross capital formation 7.2
9.Destination of new fixed capital formation	Industries								Gross fixed capital formation (new assets) 6.4							Gross fixed capital formation (new assets) 6.4
10.Type of fixed capital formation	Produced assets								Purchases less sales of existing fixed assets 7.2	Gross fixed capital formation (new assets) 6.4						Gross fixed capital formation 6.3
11.Financial	Institutional sectors							Net Lending of the Nation 59.2					Borrowing of the nation 72.4			Lending of the nation 71.6
12.Financial	Financial assets											Lending of the nation 71.6			Borrowing from the rest of the world 90.6	Increase in assets 74.8
13.Rest of the world Current		Imports (c.i.f.) 7.1		Compensation of employees to the rest of the world 12.1	Property income to the rest of the world 14.8	Current taxes and current transfers to the rest of the world 27.9									Current External Balance 50.2	Current payments to the rest of the world 10.4
14.Rest of the world Capital								Capital transfers to the rest of the world -9.5					Lending to the rest of the world 83.3			Capital payments to the rest of the world 77.9
Total		Supply at purchasers' prices 5.0	Input at basic prices 4.5	Allocation of generated income 3.7	Destination of quid-pro-quo income 3.0	Destination of secondary income 3.5	Expenditures 3.2	Capital outlays 7.1	Gross capital formation 7.2	Gross fixed capital formation (new assets) 6.4	Gross fixed capital formation 6.3	Lending of the nation 71.6	Increase in liabilities 74.8	Current receipts from the rest of the world 10.4	Capital receipts from the rest of the world 77.9	

*) Including acquisition less disposals of land.

Table 6. Rates of change in aggregate transactions and balancing items for the Netherlands, 1968-1969 (%)

ACCOUNT		1.Goods and services	2.Production	3.Generation of income	4.Primary distribution of income	5.Secondary distribution of income	6.Use of income	7.Capital	8.Gross capital formation	9.Destination of new fixed capital formation	10.Type of fixed capital formation	11.Financial	12.Financial	13.Rest of the world Current	14.Rest of the world Capital	Total
	Classification	Products	Industries	Primary input cat.	Sectors	Sectors	Sectors	Sectors		Industries	Prod. assets	Sectors	Fin.assets			
1.Goods	Product groups	Trade and transport margins 0.0	Intermediate consumption 6.2				Final consumption expenditure 4.2		Changes in inventories 1663.0		Gross fixed capital formation 7.0			Exports (f.o.b.) 11.4		Use at purchasers' prices 8.0
2.Production	Industries	Output at basic prices 7.3														Output at basic prices 7.3
3.Generation of income	Primary input categories		Gross Domestic Product at basic prices 6.3	Net remitted value added tax 9.6										Compensation of employees from the rest of the world -5.9		Generated income 6.2
4.Primary distribution of income	Institutional sectors	Taxes less subsidies on products 3.0		Net National product income at basic prices 6.1	Property income 6.9						Value added tax on land etc. -5.9			Property income from the rest of the world 47.2		Quid-pro-quo income 6.8
5.Secondary distribution of income	Institutional sectors				Net National income at market prices 6.7	Current taxes on income,wealth etc and current transfers 0.5								Current taxes and current transfers from the rest of the world 2.6		Secondary income 3.8
6.Use of income	Institutional sectors					Net Disposable income 6.6										Disposable income 6.6
7.Capital	Institutional sectors *)			Consumption of fixed capital 7.2			Net Saving 20.5	Capital transfers *) -6.4							Capital transfers from the rest of the world 12.0	Capital income 11.4
8.Gross capital formation								Gross capital formation 12.1								Gross capital formation 12.1
9.Destination of new fixed capital formation	Industries								Gross fixed capital formation (new assets) 7.0							Gross fixed capital formation (new assets) 7.0
10.Type of fixed capital formation	Produced assets								Purchases less sales of existing fixed assets 14.3	Gross fixed capital formation (new assets) 7.0						Gross fixed capital formation 6.9
11.Financial	Institutional sectors							Net Lending of the Nation 31.4					Borrowing of the nation -27.4			Lending of the nation -24.1
12.Financial	Financial assets											Lending of the nation -24.1			Borrowing from the rest of the world 6.6	Increase in assets -18.0
13.Rest of the world Current		Imports (c.i.f.) 11.9		Compensation of employees to the rest of the world 5.0	Property income to the rest of the world 32.9	Current taxes and current transfers to the rest of the world 4.3									Current External Balance 31.5	Current payments to the rest of the world 15.0
14.Rest of the world Capital								Capital transfers to the rest of the world 23.3					Lending to the rest of the world 13.3			Capital payments to the rest of the world 13.6
Total		Supply at purchasers' prices 8.0	Input at basic prices 7.3	Allocation of generated income 6.2	Destination of quid-pro-quo income 6.8	Destination of secondary income 3.8	Expenditures 6.6	Capital outlays 11.4	Gross capital formation 12.1	Gross fixed capital formation (new assets) 7.0	Gross fixed capital formation 6.9	Lending of the nation -24.1	Increase in liabilities -18.0	Current receipts from the rest of the world 15.0	Capital receipts from the rest of the world 13.6	

*) Including acquisition less disposals of land.

notice. Note that if there is a transaction category for which only total receipts and payments of transactors are known but not who paid whom, this can always be solved by inserting a dummy account. In the present NAM for the Netherlands, for example, this concerns fixed capital formation, which cannot yet be cross-classified by institutional sector of origin and by industry of destination, although the row and column totals of such a submatrix are available (refer to account 8 in table 4; see also United Nations [1992: section XX.B.2 and table XX.3]). In addition, it does not pose a problem as the same amount of detail is not available for each account. In our case, this concerned e.g. the split of the general government sector into central and local government on the one hand and social security funds on the other; this separation could not be maintained in the use of income account (account 6 in table 4), but that did not imply that these subsectors had to be combined in all other accounts, for which sufficient information was available.

Although this NAM may be useful in its own right, it can also be seen as an intermediate stage towards a full-fledged Social Accounting Matrix (SAM).[6] That would involve two main extensions: a breakdown of the household sector into socio-economic subgroups and a breakdown of compensation of employees by types of employed person. Whereas the former subdivision is already foreseen in the central framework of the revised SNA, the latter specification might also require some priority in view of the relevance of an integrated analysis of labour markets on the one hand and markets for goods and services, assets, etc. on the other.

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6) It is referred to the revised SNA's chapter on SAMs [United Nations, 1992: chapter XX], Pyatt and Round [1985] and Alarcón et al. [1991] for a more detailed treatment of the concepts, the construction and the applications of the SAM-framework.

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NA/01 Flexibility in the system of National Accounts, Van Eck, R., C.N. Gorter and H.K. van Tuinen (1983).
This paper sets out some of the main ideas of what gradually developed into the Dutch view on the fourth revision of the SNA. In particular it focuses on the validity and even desirability of the inclusion of a number of carefully chosen alternative definitions in the "Blue Book", and the organization of a flexible system starting from a core that is easier to understand than the 1968 SNA.

NA/02 The unobserved economy and the National Accounts in the Netherlands, a sensitivity analysis, Broesterhuizen, G.A.A.M. (1983).
This paper studies the influence of fraud on macro-economic statistics, especially GDP. The term "fraud" is used as meaning unreporting or underreporting income (e.g. to the tax authorities). The conclusion of the analysis of growth figures is that a bias in the growth of GDP of more than 0.5% is very unlikely.

NA/03 Secondary activities and the National Accounts: Aspects of the Dutch measurement practice and its effects on the unofficial economy, Van Eck, R. (1985).
In the process of estimating national product and other variables in the National Accounts a number of methods is used to obtain initial estimates for each economic activity. These methods are described and for each method various possibilities for distortion are considered.

NA/04 Comparability of input-output tables in time, Al, P.G. and G.A.A.M. Broesterhuizen (1985).
It is argued that the comparability in time of statistics, and input-output tables in particular, can be filled in in various ways. The way in which it is filled depends on the structure and object of the statistics concerned. In this respect it is important to differentiate between coordinated input-output tables, in which groups of units (industries) are divided into rows and columns, and analytical input-output tables, in which the rows and columns refer to homogeneous activities.

NA/05 The use of chain indices for deflating the National Accounts, Al, P.G., B.M. Balk, S. de Boer and G.P. den Bakker (1985).
This paper is devoted to the problem of deflating National Accounts and input-output tables. This problem is approached from the theoretical as well as from the practical side. Although the theoretical argument favors the use of chained Vartia-I indices, the current practice of compilating National Accounts restricts to using chained Paasche and Laspeyres indices. Various possible objections to the use of chained indices are discussed and rejected.

NA/06 Revision of the system of National Accounts: the case for flexibility, Van Bochove, C.A. and H.K. van Tuinen (1985).
It is argued that the structure of the SNA should be made more flexible. This can be achieved by means of a system of a general purpose core supplemented with special modules. This core is a fully fledged, detailed system of National Accounts with a greater institutional content than the present SNA and a more elaborate description of the economy at the meso-level. The modules are more analytic and reflect special purposes and specific theoretical views.

NA/07 Integration of input-output tables and sector accounts; a possible solution, Van den Bos, C. (1985).
The establishment-enterprise problem is tackled by taking the institutional sectors to which the establishments belong into account during the construction of input-output tables. The extra burden on the construction of input-output tables resulting from this approach is examined for the Dutch situation. An adapted sectoring of institutional units is proposed for the construction of input-output tables.

NA/08 A note on Dutch National Accounting data 1900-1984, Van Bochove, C.A. (1985).
This note provides a brief survey of Dutch national accounting data for 1900-1984, concentrating on national income. It indicates where these data can be found and what the major discontinuities are. The note concludes that estimates of the level of national income may contain inaccuracies; that its growth rate is measured accurately for the period since 1948; and that the real income growth rate series for 1900-1984 may contain a systematic bias.

NA/09 **The structure of the next SNA: review of the basic options**, Van Bochove, C.A. and A.M. Bloem (1985).
There are two basic issues with respect to the structure of the next version of the UN System of National Accounts. The first is its 'size': reviewing this issue, it can be concluded that the next SNA should contain an integrated meso-economic statistical system. It is essential that the next SNA contains an institutional system without the imputations and attributions that pollute the present SNA. This can be achieved by distinguishing, in the central system of the next SNA, a core (the institutional system), a standard module for non-market production and a standard module describing attributed income and consumption of the household sector.

NA/10 **Dual sectoring in National Accounts**, Al, P.G. (1985).
Following a conceptual explanation of dual sectoring, an outline is given of a statistical system with complete dual sectoring in which the linkages are also defined and worked out. It is shown that the SNA 1968 is incomplete and obscure with respect to the links between the two sub-processes.

NA/11 **Backward and forward linkages with an application to the Dutch agro-industrial complex**, Harthoorn, R. (1985).
Some industries induce production in other industries. An elegant method is developed for calculating forward and backward linkages avoiding double counting. For 1981 these methods have been applied to determine the influence of Dutch agriculture in the Dutch economy in terms of value added and labour force.

NA/12 **Production chains**, Harthoorn, R. (1986).
This paper introduces the notion of production chains as a measure of the hierarchy of industries in the production process. Production chains are sequences of transformation of products by successive industries. It is possible to calculate forward transformations as well as backward ones.

NA/13 **The simultaneous compilation of current price and deflated input-output tables**, De Boer, S. and G.A.A.M. Broesterhuizen (1986).
A few years ago the method of compiling input-output tables underwent in the Netherlands an essential revision. The most significant improvement is that during the entire statistical process, from the processing and analysis of the basic data up to and including the phase of balancing the tables, data in current prices and deflated data are obtained simultaneously and in consistency with each other.

NA/14 **A proposal for the synoptic structure of the next SNA**, Al, P.G. and C.A. van Bochove (1986).

NA/15 **Features of the hidden economy in the Netherlands**, Van Eck, R. and B. Kazemier (1986).
This paper presents survey results on the size and structure of the hidden labour market in the Netherlands.

NA/16 **Uncovering hidden income distributions: the Dutch approach**, Van Bochove, C.A. (1987).

NA/17 **Main national accounting series 1900-1986**, Van Bochove, C.A. and T.A. Huitker (1987).
The main national accounting series for the Netherlands, 1900-1986, are provided, along with a brief explanation.

NA/18 **The Dutch economy, 1921-1939 and 1969-1985. A comparison based on revised macro-economic data for the interwar period**, Den Bakker, G.P., T.A. Huitker and C.A. van Bochove (1987).
A set of macro-economic time series for the Netherlands 1921-1939 is presented. The new series differ considerably from the data that had been published before. They are also more comprehensive, more detailed, and conceptually consistent with the modern National Accounts. The macro-economic developments that are shown by the new series are discussed. It turns out that the traditional economic-historical view of the Dutch economy has to be reversed.

NA/19 **Constant wealth national income: accounting for war damage with an application to the Netherlands, 1940-1945**, Van Bochove, C.A. and W. van Sorge (1987).

NA/20 **The micro-meso-macro linkage for business in an SNA-compatible system of economic statistics**, Van Bochove, C.A. (1987).

NA/21 **Micro-macro link for government**, Bloem, A.M. (1987).
This paper describes the way the link between the statistics on government finance and national accounts is provided for in the Dutch government finance statistics.

NA/22 **Some extensions of the static open Leontief model**, Harthoorn, R.(1987).
The results of input-output analysis are invariant for a transformation of the system of units. Such transformation can be used to derive the Leontief price model, for forecasting input-output tables and for the calculation of cumulative factor costs. Finally the series expansion of the Leontief inverse is used to describe how certain economic processes are spread out over time.

NA/23 **Compilation of household sector accounts in the Netherlands National Accounts**, Van der Laan, P. (1987).
This paper provides a concise description of the way in which household sector accounts are compiled within the Netherlands National Accounts. Special attention is paid to differences with the recommendations in the United Nations System of National Accounts (SNA).

NA/24 **On the adjustment of tables with Lagrange multipliers**, Harthoorn, R. and J. van Dalen (1987).
An efficient variant of the Lagrange method is given, which uses no more computer time and central memory then the widely used RAS method. Also some special cases are discussed: the adjustment of row sums and column sums, additional restraints, mutual connections between tables and three dimensional tables.

NA/25 **The methodology of the Dutch system of quarterly accounts**, Janssen, R.J.A. and S.B. Algera (1988).
In this paper a description is given of the Dutch system of quarterly national accounts. The backbone of the method is the compilation of a quarterly input-output table by integrating short-term economic statistics.

NA/26 **Imputations and re-routeings in the National Accounts**, Gorter, Cor N. (1988).
Starting out from a definition of 'actual' transactions an inventory of all imputations and re-routeings in the SNA is made. It is discussed which of those should be retained in the core of a flexible system of National Accounts. Conceptual and practical questions of presentation are brought up. Numerical examples are given.

NA/27 **Registration of trade in services and market valuation of imports and exports in the National Accounts**, Bos, Frits (1988).
The registration of external trade transactions in the main tables of the National Accounts should be based on invoice value; this is not only conceptually very attractive, but also suitable for data collection purposes.

NA/28 **The institutional sector classification**, Van den Bos, C. (1988).
A background paper on the conceptual side of the grouping of financing units. A limited number of criteria are formulated.

NA/29 **The concept of (transactor-)units in the National Accounts and in the basic system of economic statistics**, Bloem, Adriaan M. (1989).
Units in legal-administrative reality are often not suitable as statistical units in describing economic processes. Some transformation of legal-administrative units into economic statistical units is needed. This paper examines this transformation and furnishes definitions of economic statistical units. Proper definitions are especially important because of the forthcoming revision of the SNA.

NA/30 **Regional income concepts**, Bloem, Adriaan M. and Bas De Vet (1989).
In this paper, the conceptual and statistical problems involved in the regionalization of national accounting variables are discussed. Examples are the regionalization of Gross Domestic Product, Gross National Income, Disposable National Income and Total Income of the Population.

NA/31 **The use of tendency surveys in extrapolating National Accounts**, Oudde-ken, Frank and Gerrit Zijlmans (1989).
This paper discusses the feasibility of the use of tendency survey data in the compilation of very timely Quarterly Accounts. Some preliminary estimates of relations between tendency survey data and regular Quarterly Accounts-indicators are also presented.

NA/32 **An economic core system and the socio-economic accounts module for the Netherlands**, Gorter, Cor N. and Paul van der Laan (1989).
A discussion of the core and various types of modules in an overall system of economy related statistics. Special attention is paid to the Dutch Socio-economic Accounts. Tables and figures for the Netherlands are added.

NA/33 **A systems view on concepts of income in the National Accounts**, Bos, Frits (1989).
In this paper, concepts of income are explicitly linked to the purposes of use and to actual circumstances. Main choices in defining income are presented in a general system. The National Accounts is a multi-purpose framework. It should therefore contain several concepts of income, e.g. differing with respect to the production boundary. Furthermore, concepts of national income do not necessarily constitute an aggregation of income at a micro-level.

NA/34 **How to treat borrowing and leasing in the next SNA**, Keuning, Steven J. (1990).
The use of services related to borrowing money, leasing capital goods, and renting land should not be considered as intermediate inputs into specific production processes. It is argued that the way of recording the use of financial services in the present SNA should remain largely intact.

NA/35 **A summary description of sources and methods used in compiling the final estimates of Dutch National Income 1986**, Gorter, Cor N. and others (1990).
Translation of the inventory report submitted to the GNP Management Committee of the European Communities.

NA/36 **The registration of processing in make and use tables and input-output tables**, Bloem, Adriaan M., Sake De Boer and Pieter Wind (1990, forthcoming).
The registration of processing is discussed primarily with regard to its effects on input-output-type tables and input-output quotes. Links between National Accounts and basic statistics, user demands and international guidelines are examined.

NA/37 **A proposal for a SAM which fits into the next System of National Accounts**, Keuning, Steven J. (1990).
This paper shows that all flow accounts which may become part of the next System of National Accounts can be embedded easily in a Social Accounting Matrix (SAM). In fact, for many purposes a SAM format may be preferred to the traditional T-accounts for the institutional sectors, since it allows for more flexibility in selecting relevant classifications and valuation principles.

NA/38 **Net versus gross National Income**, Bos, Frits (1990).
In practice, gross figures of Domestic Product, National Product and National Income are most often preferred to net figures. In this paper, this practice is challenged. Conceptual issues and the reliability of capital consumption estimates are discussed.

NA/39 **Concealed interest income of households in the Netherlands; 1977, 1979 and 1981**, Kazemier, Brugt (1990).
The major problem in estimating the size of hidden income is that total income, reported plus unreported, is unknown. However, this is not the case with total interest income of households in the Netherlands. This makes it possible to estimate at least the order of magnitude of this part of hidden income. In this paper it will be shown that in 1977, 1979 and 1981 almost 50% of total interest received by households was concealed.

NA/40 **Who came off worst: Structural change of Dutch value added and employ-- ment during the interwar period**, Den Bakker, Gert P. and Jan de Gijt (1990).
In this paper new data for the interwar period are presented. The distribution of value added over industries and a break-down of value added into components is given. Employment by industry is estimated as well. Moreover, structural changes during the interwar years and in the more recent past are juxtaposed.

NA/41 **The supply of hidden labour in the Netherlands: a model**, Kazemier, Brugt and Rob van Eck (1990).
This paper presents a model of the supply of hidden labour in the Netherlands. Model simulations show that the supply of hidden labour is not very sensitive to cyclical fluctuations. A tax exempt of 1500 guilders for second jobs and a higher probability of detection, however, may substantially decrease the magnitude of the hidden labour market.

NA/42 **Benefits from productivity growth and the distribution of income**, Keuning, Steven J. (1990).
This paper contains a discussion on the measurement of multifactor productivity and sketches a framework for analyzing the relation between productivity changes and changes in the average factor remuneration rate by industry. Subsequently, the effects on the average wage rate by labour category and the household primary income distribution are studied.

NA/43 **Valuation principles in supply and use tables and in the sectoral accounts**, Keuning, Steven J. (1991).
In many instances, the valuation of transactions in goods and services in the national accounts poses a problem. The main reason is that the price paid by the purchaser deviates from the price received by the producers. The paper discusses these problems and demonstrates that different valuations should be used in the supply and use tables and in the sectoral accounts.

NA/44 **The choice of index number formulae and weights in the National Accounts. A sensitivity analysis based on macro-economic data for the interwar period**, Bakker, Gert P. den (1991).
The sensitivity of growth estimates to variations in index number formulae and weighting procedures is discussed. The calculations concern the macro-economic variables for the interwar period in the Netherlands. It appears, that the use of different formulae and weights yields large differences in growth rates. Comparisons of Gross Domestic Product growth rates among countries are presently obscured by the use of different deflation methods. There exists an urgent need for standardization of deflation methods at the international level.

NA/45 **Volume measurement of government output in the Netherlands; some alternatives**, Kazemier, Brugt (1991).
This paper discusses three alternative methods for the measurement of the production volume of government. All methods yield almost similar results: the average annual increase in the last two decades of government labour productivity is about 0.7 percent per full-time worker equivalent. The implementation of either one of these methods would have led to circa 0.1 percentage points higher estimates of economic growth in the Netherlands.

NA/46 **An environmental module and the complete system of national accounts**, Boo, Abram J. De, Peter R. Bosch, Cor N. Gorter and Steven J. Keuning (1991).
A linkage between environmental data and the National Accounts is often limited to the production accounts. This paper argues that the consequences of economic actions on ecosystems and vice versa should be considered in terms of the complete System of National Accounts (SNA). One should begin with relating volume flows of environmental matter to the standard economic accounts. For this purpose, a so-called National Accounting Matrix including Environmental Accounts (NAMEA) is proposed. This is illustrated with an example.

NA/47 **Deregulation and economic statistics: Europe 1992**, Bos, Frits (1992).
The consequences of deregulation for economic statistics are discussed with a view to Europe 1992. In particular, the effects of the introduction of the Intrastat-system for statistics on international trade are investigated. It is argued that if the Statistical Offices of the EC-countries do not respond adequately, Europe 1992 will lead to a deterioration of economic statistics: they will become less reliable, less cost effective and less balanced.

NA/48 **The history of national accounting**, Bos, Frits (1992).
At present, the national accounts in most countries are compiled on the basis of concepts and classifications recommended in the 1968-UN-guidelines. In this paper, we trace the historical roots of these guidelines (e.g. the work by King, Petty, Kuznets, Keynes, Leontief, Frisch, Tinbergen and Stone), compare the subsequent guidelines and discuss also alternative accounting systems like extended accounts and SAMs.

NA/49 **Quality assessment of macroeconomic figures: The Dutch Quarterly Flash**, Reininga, Ted, Gerrit Zijlmans and Ron Janssen (1992).
Since 1989-IV, the Dutch Central Bureau of Statistics has made preliminary estimates of quarterly macroeconomic figures at about 8 weeks after the end of the reference quarter. Since 1991-II, a preliminary or "Flash" estimate of GDP has been published. The decision to do so was based on a study comparing the Flash estimates and the regular Quarterly Accounts figures, which have a 17-week delay. This paper reports on a similar study with figures through 1991-III.

NA/50 **Quality improvement ofthe Dutch Quarterly Flash: A Time Series Analysis of some Service Industries**, Reininga, Ted and Gerrit Zijlmans (1992).
The Dutch Quarterly Flash (QF) is, just like the regular Quarterly Accounts (QA), a fully integrated statistic based on a quarterly updated input-output table. Not all short term statistics used to update the QA's IO-table are timely enough to be of use for the QF, so other sources have to be found or forecasts have to be made. In large parts of the service industry the latter is the only possibility. This paper reports on the use of econometric techniques (viz. series decomposition and ARIMA modelling) to improve the quality of the forecasts in five parts of the service industry.

NA/51 **A Research and Development Module supplementing the National Accounts**, Bos, Frits, Hugo Hollanders and Steven Keuning (1992).
This paper presents a modified national accounting system tailored to a description of the role of Research and Development (R&D) in the national economy. The main differences with the standard National Accounts are some changes in basic concepts (e.g. own-account production of R&D is considered as capital formation) and the introducton of additional, more detailed, classifications (e.g. new subsectors).

NA/52 **The allocation of time in the Netherlands in the context of the SNA; a module**, Kazemier, Brugt and Jeanet Exel (1992).
This paper presents a module on informal production, supplementing the National Accounts. Its purpose is to incorporate informal production into the concepts of the SNA. The relation between formal and informal production is shown in the framework of a Social Accounting Matrix (SAM). To avoid a controversial valuation of informal production, the module constists of two SAMs. One expressed in actual prices with informal labour valued zero, and one which expresses the embedded informal labour input measured in terms of hours worked.

NA/53 **National Accounts and the environment, the case for a system's approach**, Keuning, Steven J. (1992).
The present set of main economic indicators should be extended with one or a few indicators on the state of the environment. This paper lists various reasons why a so-called Green Domestic Product is not suitable for this purpose. Instead, a system's approach should be followed. A National Accounting Matrix including Environmental Accounts (NAMEA) is presented and the way to derive one or more separate indicators on the environment from this information system is outlined.

NA/54 How to treat multi-regional units and the extra-territorial region in the Regional Accounts?, De Vet, Bas (1992, forthcoming).
This paper discusses the regionalization of production and capital formation by multi-regional kind-of-activity units. It also examines the circumstances in which a unit may be said to have a local kind-of-activity unit in the extra-territorial region and what should be attributed to this "region".

NA/55 A historical Social Accounting Matrix for the Netherlands (1938), Den Bakker, Gert P., Jan de Gijt and Steven J. Keuning (1992).
This paper presents a Social Accounting Matrix (SAM) for the Netherlands in 1938, including related, non-monetary tables on demographic characteristics, employment, etc. The distribution of income and expenditure among household subgroups in the 1938 SAM is compared with concomittant data for 1987.

NA/56 Origin and development of the Dutch National Accounts, Den Bakker, Gert P. (1992).
This paper describes the history of national accounting in the Netherlands. After two early estimates in the beginning of the nineteenth century, modern national accounting started in the 1930s on behalf of the Tinbergen model for the Dutch economy. The development spurred up after World War II to provide data to the government for economic planning purposes. In the 1980s, the development was towards a flexible and institutional approach.

NA/57 Compiling Dutch Gross National Product (GNP); summary report on the final estimates after the revision in 1992, Bos, Frits (1992).
This summary report describes the sources and methods used for compiling the final estimate of Dutch Gross National Product after the revision of the Dutch National Accounts in 1992. Attention is focused on the estimation procedures for 1988.

NA/58 Major changes and results of the revision of the Dutch National Accounts in 1992, Department of National Accounts (1992, forthcoming).
The revision in 1992 has improved the Dutch National Accounts in three ways. First, new and other data sources have been used, like Production statistics of service industries, the Budget Survey and Statistics on fixed capital formation. Secondly, the integration process has been improved by the use of detailed make- and use-tables instead of more aggregate input-output tables. Thirdly, several changes in bookkeeping conventions have been introduced, like a net instead of a gross registration of processing to order.

NA/59 A National Accounting Matrix for the Netherlands, Keuning, Steven and Jan de Gijt (1992).
Currently, the national accounts typically use two formats for presentation: matrices for the Input-Output tables and T-accounts for the transactions of institutional sectors. This paper demonstrates that presently available national accounts can easily be transformed into a National Accounting Matrix (NAM). This may improve both the transparency and analytic usefulness of the complete set of accounts.

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