

Nordström, Tomas

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MOSES macro Accounting System: Updating Procedures

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**MOSES MACRO ACCOUNTING SYSTEM
- UPDATING PROCEDURES**

by

Tomas Nordström

This is a preliminary paper.
Comments are welcome.

Aug., 1988

MOSES Macro Accounting System - Updating Procedures

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1. Introduction

The macro accounting system has basically two functions in MOSES. Firstly, it integrates the outcome of industrial firm-level processes of the micro part of the model into the framework of the total national economy. The links between the micro and macro parts of the model are of course two-sided. The micro solutions affects the macro development through demand for raw material and investment goods, labour etc. It also sets guide lines for wages and prices for the whole economy. However, developments outside industry provide restrictions on the micro solutions in terms of available labor, and prices of goods needed in the production process.

Secondly, the macro accounting system assures consistency of solutions in a book-keeping sense. This is not the least important when aggregate prices, e.g., for private consumption, are constructed. Consistent macro-deflators are also needed to properly allocate net lending of the total economy (i.e. the current account) between domestic sectors.

The distinguishing feature of MOSES is its specification of the industrial sector in terms of individual firms. This is also where the main modeling effort lies. Specifying and updating the micro part is a heavy task. For this reason the macro accounting system must be constructed as simple and transparent as possible. This puts restrictions on the number of sectors outside industry, the treatment of indirect taxes and subsidies etc.

The difference of data sources for the micro and macro parts of the production system involves serious problems.

The basis for the macro accounting system is the Swedish System of National Accounts. These are not directly consistent with the firm level data of the micro part of MOSES for many reasons. The firms in each sector are only a sample, firms may produce goods properly belonging to another sector (the macro accounting system allows for no mixed output), definitions of production, sales and employment may differ etc. As in the System of National Accounts ample use of residuals is unavoidable in the model. The sources of these residuals may well be easily identified, e.g., small business production and employment, undeclared taxable income. Some efforts are made to "model" even the residuals in MOSES. It is obvious, however, that too large residuals weakens the micro foundation of the macro results.

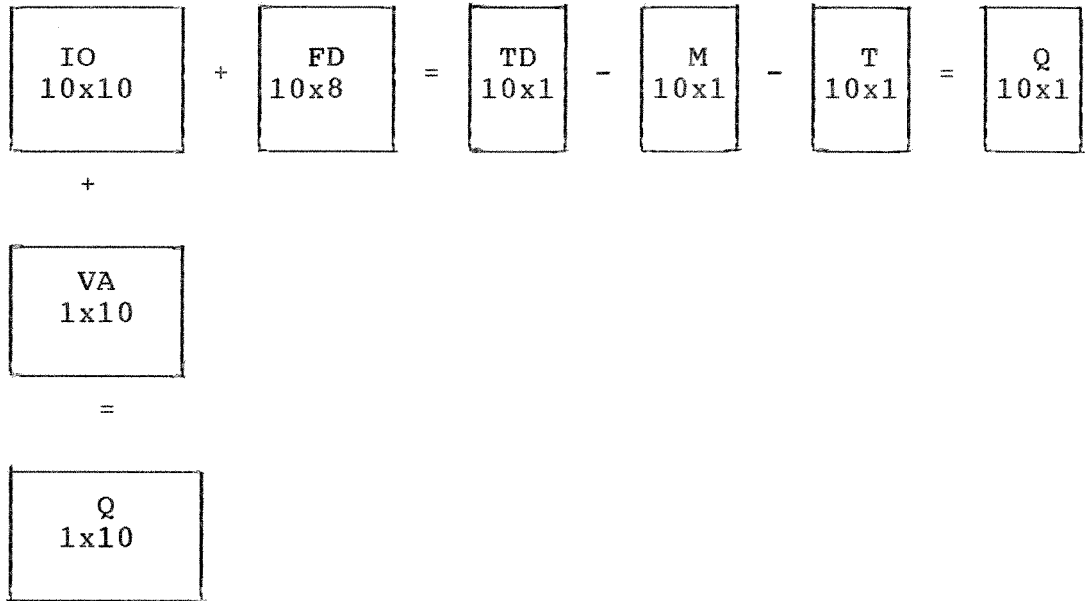
This paper deals with the specification and updating procedures of the macro accounting system of MOSES. A manual showing the use of data sources and programs for updating is given in Section 4. Before going into details, however, Section 2 will give some basic principles for the IO-system in the model, and Section 3 some general remarks on data sources. The relations between the micro and macro parts in MOSES will not be discussed further.

2. Some Basic Input-Output Relations

The macro accounting system is build up by a number of identities showing supply and demand for each commodity in fixed and current prices. The number of commodity balances is equal to the number of production sectors (which is ten in in MOSES) and no commodity is produced in more than one sector.

Following the format given in "The MOSES Manual, Part 2, The Initialization Process" (IUI, Working Paper No. 118, 1983) the layout of the commodity balances are given by Figure 1. The matrix diagram reads as follows. IO is a 10x10 input-output matrix, where e.g. the first row tells the value (in fixed or current prices) of commodity 1 that is used as input in the ten production sectors. The latter are given by column index. Final demand is divided into eight components (cf. Appendix 1). The matrix FD gives these components in terms of commodity composition. Summing each row of IO and FD over column-indices results in the vector TD, which is total demand in purchasers' prices. If imports (cif), M, and indirect taxes net, T, is subtracted from total demand, we are obviously left with domestic production of each commodity in producers' prices, Q. However, Q is also the sum of the value of input into each sector plus value added in purchasers' prices since each sector produces one and only one commodity. This is seen from the lower part of the figure, where the vertical sum of IO for each sector plus value added, VA, is equal to output Q. Thus output of each commodity can be computed in two ways - from the supply side or from the demand side. These should always give identical results:

Figure 1 Macro Accounting System Layout



$$Q_i^S = \sum_j IO_{ji} + VA_i = Q_i^D = \sum_j IO_{ij} + \sum_j FD_{ij} - M_i - T_i$$

Summing over commodity index i results in the GDP identity for the market sector:

$$\sum_{ij} IO_{ji} + \sum_i VA_i = \sum_{ij} IO_{ij} + \sum_{ij} FD_{ij} - \sum_i M_i - \sum_i T_i$$

or

$$GDP = VA + T = FD - M$$

where GDP is given in purchasers' prices.

3. Data Sources

Commodity balances are regularly produced by Statistics Sweden. Only every fifth year, however, is detailed primary data collected. In between extrapolations are made on the basis of data from other statistical branches. Extrapolated matrices are available with 45 commodities (cf. Appendix 2), while the results of the more thoroughly worked through IO-accounts distinguish between twice as many commodities.

Although the quality of the extrapolated matrices doubtless is lower than in the full scale IO inquiries, they may still be good enough to use as an accounting framework for MOSES. It should be observed that even the larger IO-system will have to be extrapolated to fit National Accounts for the base year of the models simulations. The lags in publication of the full IO-accounts is disturbing.

Still in spring 1986 the latest vintage available is 1975 while the extrapolated system is published with a lag of two years. Also, although commodities and sectors in MOSES are defined in a bit unconventional way requiring strongly disaggregated data, the gain in having 90 instead of 45 commodities may not even compensate the cost of more complicated aggregation and data handling procedures. Neither is the more comprehensive coverage of the full IO-accounts in terms of e.g. matrices for imports and indirect taxes of immediate interest of application in MOSES.

Appendix 2 gives the complete 45x45 system of commodity balances for 1982 which is used to update the macro accounting system in MOSES. All figures are in fixed prices with 1980 as index base. This matrix system must accordingly not only be transformed to the ten MOSES-commodities (-sectors) but also be reflated to current prices. As can be seen from the final demand matrix only total gross investments is given compared to the four components required in MOSES. The investment vector will be split up after aggregation and reflation. Also three kinds of indirect taxes are distinguished besides custom duties. They will simply be added to one net tax already in the aggregation program.

Finally, before getting into details, one general remark should be made about the treatment of deflators (price-indices) in MOSES. All values in fixed prices are assumed to be given in producers' values. To compute private consumption in current purchasers' prices from its value in fixed purchasers' prices the price index must include not only the change in commodity tax rate but also the base

year rate itself. If the base year tax rate is 20 % the price index in purchasers' prices is said to be 1.20 for the base year. This is a bit at odds with the common use of the concept of an index number, but will be adopted in the subsequent presentation.

4. Program Manual

As stated in the previous section updating of the macro accounting system involves two elements. One is to adapt the available IO-statistics to MOSES format. The other is to reflate the system to current prices. The second part is necessary only because commodity-balances are still only published in fixed prices by Statistics Sweden. (Regularly published tables in current prices are underway.) These two steps are taken in the order given above in the updating procedure, i.e. first aggregation and then reflation. There is no compelling reason for this. Given the assumptions that has to be made in the reflation computations (cf. below) the results would, however, not necessarily be identical if the steps were taken in reversed order.

4.1 Aggregation Program

The program that transforms the 45 commodity-balanced available from Statistics Sweden is written in FORTRAN. It is called IO82.FOR and is stored as a SOS-file on the DEC-10 machine at Stockholms Datorcentral. The complete code is given in Appendix 4 and will be described step by step with reference to line numbers.

Line 100 - 1800: Comment statements.

Line 1900 - 2100: Declaration of variables.

Line 2200 - 2700: OPEN statements.

The 45 sector system is stored on file SCB82.DAT. After some completions and rearrangements row - and columnsums of this system is printed on KON82.DAT to check correct punching of SCB82.DAT as well as consistency with National Accounts (cf. below). The 45x10 aggregation matrix (cf. Appendix 3) is stored on AMD.DAT and the resulting 10x10 MOSES system is stored on MO82.DAT. AX.DAT and X82.DAT are dummy-names (cf. below).

Line 3200: Read parameters.

The first line in SCB82.DAT sets some "parameters". The first, KFIL, identifies the aggregation matrix to be used. In the program shown the matrix is stored on AMD.DAT connected to unit 30 by the OPEN statement on line 2400. Thus the first number of the first line of SCB82.DAT should be 30. The second number, IFIL, gives the unit number of the output file. In this case the aggregated system is stored on MO82.DAT, so IFIL should be 40 (cf. OPEN-statements). IDIM is the dimension of the aggregated system. By setting these parameters properly the program can easily be used for alternate aggregation matrices and dimensions without interfering with the standard application. The filenames AX.DAT and X82.DAT are used for such exercises requiring the aggregation matrix to be stored in AX.DAT, KFIL to be 31, IFIL to be 41 and IDIM whatever dimension is desired. The result is stored on X82.DAT.

Line 330 - 4100: Read 45x45 system.

TILL = supply
FD = final demand
IO = intermediate goods
Cf. Appendix 4.

Line 4200 - 4600: Add tourist services.

The commodity balances must be corrected for tourist services to make private consumption equal not to consumption in Sweden as given by IO-data but to Swedish residents' consumption. This is accomplished by adding export of tourist services, TUEX, to exports of services and expenditures of Swedish tourists abroad, TUIM, to import of services. Net tourist expenditures are added to private service consumption. Note that this does not affect the value of GDP. Figures for TUEX and TUIM are found in the National Accounts.

Line 4700 - 5000: Trade margins.

The commodity balances account for trade margins on each commodity. To avoid double counting the figure for production of trade services must exclude aggregated trade margins which of course makes the recorded figure close to zero for book-keeping reasons. The program lines just add total margins to production, TILL(36,1), and again subtract them in the new supply column TILL(I,9) which is zero for all I except 36 (the trade sector) where it is put equal to minus aggregated margins.

In this way we can properly solve for value added in the trade sector. The balance of resources in

purchasers' prices for the whole economy will then read: value added in producers' prices + indirect taxes + imports = final demand. For each commodity, however, trade margins must be added to the supply side.

Line 5100 - 8400: Sum over rows and columns.

Note that FD(I,7) stands for sum of final demand per commodity, while FD(I,8) is sum of total demand, i.e. including demand for intermediate goods.

Line 8500 - 11200: Calibrate to National Accounts.

For different reasons total figures for the components of supply and demand in the 45x45 system may not exactly equal the National Accounts. Differences are put in sector 45 (other services). Note that differences in gross production are treated as residuals to assure that supply equals demand. This implies that total market sector GDP in producers' prices must be equal to the National Accounts figure since all other components of the balance of resources are equal.

Line 11300 - 15100: Control print out.

This part checks that the system, i.e. SCB82.DAT, was correctly punched by computing total supply and demand for each commodity etc. Also computation of columnsums, e.g. total gross investments, allows for checks against National Accounts. Note that value added is computed as a residual. Differences in this sum compared to National Accounts is an easy indicator of errors in the system (cf. Appendix 4).

Line 15200 - 15700: Read aggregation matrix.

Unit number KFIL is given in SCB82.DAT.

Line 15800 - 18100: Aggregation.

Dimension of aggregated matrix, IDIM, is given in SCB82.DAT.

Line 18200-19300: Result print out.

Unit number IFIL is given in SCB82.DAT.

4.2 Reflation Program

The program MO82.FOR computes commodity balances in current prices given fixed prices balances and National Accounts. The complete code is given in Appendix 5. The system matrices are the same as in the aggregation program IO82.FOR (cf. also Appendix 2). For each matrix in fixed prices, however, a matrix in current prices is defined by adding the letter "L" to the name. Also for the supply and final demand matrices deflator matrices are defined by putting the letter "P" before the name. So TILL(I,J) is the supply matrix in fixed prices, TILLL(I,J) in current prices and PTILL(I,J) the name of the corresponding deflators.

Line 100 - 900: Comment statements.

Line 1000 - 1500: Declaration of variables.

Line 1600 - 1800: OPENT statements.

The matrices IO, FD and TILL are stored on MO82.DAT, which is an output-file of IO82FOR. PRIS82.DAT contains National Account data. On MOIO82.DAT, finally, the results are written. These include some rearrangements of the fixed price matrices (cf. below).

Line 1900 - 7600: Read and rearrange fixed price matrices.

After reading the commodity balances from MO82.DAT the rearrangements take place on line 3900. First, trade margins are added to row number 10 in the IO matrix, i.e., they are treated as input of services in each sector. The implication is that trade margins are related to domestic output rather than to absorption - a simplification that is justified if the components of supply and demand grow at a fairly equal rate. Note that trade margins must also be added to gross output to keep value added unaffected. The second rearrangement is to subtract the residual between total supply and demand from gross output (line 4400). Finally indirect taxes and subsidies are added and an aggregated "tax rate" is defined with public sector purchases and private consumption a tax base. This is again a short cut which seems defensible in a model focusing on firm behavior like MOSES.

Line 7700 - 10200: Read National Accounts in current prices.

VALP is value added in current prices as given by National Accounts and aggregated to MOSES' sectors (this is done outside the program). Note that DVALP, a residual in National Accounts, is distrib-

uted proportionally between the ten sectors (cf. line 9500). This is a bit at odds with the treatment of the residual in fixed prices, FD(I,6), whose distribution is given by the FD-matrix. Preliminary deflators for exports and imports can be constructed from National Accounts. Since it is not possible to identify exactly the MOSES-sectors in published National Accounts, multiplying these deflators with values in fixed prices will not add up to total recorded values in current prices. The adjustments are laid on sector 1-4 since these are the sectors that are more difficult to identify in National Accounts than the other sectors (line 9600-9700). It should be emphasized that the program requires data input in this section to be consistent. The solution algorithm will not converge if aggregated value added plus commodity taxes plus imports differ from final demand. This is certainly no problem if all figures are taken from the same source. If, however, a revised figure for e.g. investments is taken from another source it is necessary to change some other component of the aggregated balance of resources.

Line 10300 - 16700: Computation of prices.

In order to explain the solution of prices (deflators) and the simplifying assumptions which are used it is necessary to make a short digression.

In fixed prices each commodity balance i is given by (with index i running from 1 to 10)

$$Y_i + M_i + T_i = \sum_j IO_{ij} + FDA_i + FDB_i + E_i \quad (1)$$

where Y_i = gross output excl. indirect taxes
 M_i = imports cif
 T_i = indirect taxes
 IO_{ij} = use of commodity i in sector j
 FDA_i = domestic final demand charged with indirect taxes (intermediate goods in public sector plus private consumption)
 FDB_i = domestic final demand not charged with indirect taxes (fixed investments, stock-building, exports)
 E_i = exports.

Note that trade margins are included in Y and IO .

The strategic assumption in the computation of prices is that the price of a commodity excluding taxes is independent of its use. With this assumption commodity balances in current prices are given by

$$PY_i \cdot Y_i + PM_i \cdot M_i = PH_i (\sum_j IO_{ij} + FDA_i (1 - TRB_i) + FDB_i) + PE_i \cdot E_i \quad (2)$$

where PY_i = deflator for gross output
 PM_i = deflator for imports
 PH_i = deflator for domestic demand excl. taxes
 PE_i = deflator for exports
 TRB_i = tax rate in fixed prices, i.e. the tax rate in the base years.

Note that the base FDA of indirect taxes T includes taxes. The tax rate TRB is given by T/FDA .

As can be seen from (1) and (2) commodity balances in current prices are formally constructed simply by multiplying each component in the fixed price balance by an appropriate price index.

At this stage of the updating procedure commodity-balances in fixed prices are already solved so all variables in (1) are known. Among prices in (2) only PY and PH are unknown since PM and PE are computed directly from National Accounts (cf. 7700 - 10200). This leaves us with 20 variables to determine and so far 10 equations. The 10 missing equations are derived from the supply (cost) side:

$$PY_i \cdot Y_i = VALP_i + \sum_j PH_j \cdot IO_{ji} \quad (3)$$

where $VALP_i$ = value added in producers' prices.

(3) simply states that the value of output equals total costs plus excess profits. Technically, when updating the system VALP, which consists of labor and capital cost as well as excess profits, is exogeneous.

The equations (2) and (3) will determine PY and PH. However, to get a set of prices consistent with National Accounts we must also compute the deflator for FDA, i.e. in purchasers' prices. This deflator obviously differs from PH to the extent that indirect tax rates have changed from the base year of the price indices to the year for which we solve the system.

The relation between PH and PFDA can be derived in the following way. Let TR be the current tax rate. Then, if TL are indirect taxes in current prices, we get for each commodity:

$$TL_i = TR_i \cdot PFDA_i \cdot FDA_i$$

The current value of tax-charged demand in purchasers' prices equals tax-charged demand excluding taxes plus taxes, i.e. $PFDA_i \cdot FDA_i = PH_i \cdot FOA_i \cdot (1-TRB_i) + TR_i \cdot PFDA_i \cdot FDA_i$. Solving for $PFDA_i$ yields:

$$PFDA_i = PH_i \cdot (1-TRB_i)/(1-TR_i) \quad (4)$$

This relation between the deflator $PFDA$ for tax-charged demand in fixed purchasers' prices and the deflator PH for demand in fixed producers' prices is, like all relations used in the updating procedures, an identity that assures consistency in a book-keeping sense.

Although all deflators by definition take the value unity in the base year the MOSES program treats all variables in fixed prices as given in producers' prices. The pseudo price-index that transforms the fixed price value excluding taxes to current price value including taxes will not be unity for the base year. To see this, let's call the pseudo price-index P , defined as:

$$P_i \cdot FDA_i \cdot (1-TRB_i) = PFDA_i \cdot FDA_i$$

This gives P_i in terms of the proper price index $PFDA_i$ as

$$P_i = PFDA_i/(1-TRB_i)$$

Also P_i can be expressed in terms of PH using (3) above:

$$P_i = PH_i/(1-TR_i)$$

The use of such a pseudo index is of course perfectly alright as long as the relations to PFDA and PH given above are fulfilled.

The relations (2)-(4) allow us to compute the balance of resources in purchasers' prices for the whole market sector of the economy. Adjustments will be necessary to make these aggregated results fit with the National Accounts. Among these adjustments the treatment of indirect taxes deserves special attention. For the current year we only know the total amount of commodity based indirect taxes in current prices from the National Accounts. The computation of current tax rates will be based on tax rates in fixed prices, i.e. tax rates for the base year of price indices. Adjustments are made proportionally until computed total current taxes is in accord with National Accounts. Since changes in tax rates in fact differs between commodities this procedure is a short cut that can be defended only on the grounds that MOSES is not a model for detailed analysis of indirect taxes. However, this kind of crudeness in the macro part of the system may give rise to troublesome residuals in other parts of the system using more precise data from other sources. So far no comprehensive investigation has been made in MOSES to identify and estimate the effects of such residuals.

The basic equations (2)-(4) are solved by a Gauss-Seidel algorithm. Usually the system converges fairly rapid - after 5-10 iterations. Line 10600 - 11400 set preliminary values for endogenous

variables PY and TR (cf. definitions above). Export prices are used as initial prices for domestic demand, PH. The variable PP, which will be explained below, is set to unity.

The first task is to compute PH, the price of domestic demand in producers' prices. Disregarding PP for a moment, HP in line 11900 is exactly the component in (2) multiplied by PH. Then PH is given by the right hand side of (2) decreased by exports in current prices divided by HP (line 12100).

The variable PP is an "adjustment" constant. When the system is solved on the assumption of equal prices PH throughout all components of domestic demand for each commodity, the aggregated value of each final demand component in current prices will, not surprisingly, differ from National Accounts. The PPs adjust prices PH to exact accordance with National Accounts. For each component, e.g. private consumption, one constant PP is applied to each commodity price PH. By implication the solution will in fact yield prices on domestic demand that do differ between components for a certain commodity. The price of commodity 1 in private consumption will be $PP(2) \cdot PH(1)$, while the price of the same commodity used for investments will be $PP(3) \cdot PH(1)$. A similar approach is taken on the supply side of the system where the basic hypothesis, that market sales from the public sector have the same price as gross output from industry, is modified by PP(5) to achieve accordance with National Accounts.

So far all computations have been based on the preliminary PY. Given PH, however, new values of PY can be computed from the cost side given value added (VALP). These new PY is compared to the PYS from the previous iteration (or, in the first

iteration, with the preliminary values). The iteration loop is halted if all differences between actual and previous solutions of PY does not affect the fourth decimal of the price-index. (In fact the condition is even a bit tougher than that.) If this condition is not fulfilled for some PY the calculations are repeated with the actual PY used to compute PH. The value is stored in PY1 to permit comparison with PY as computed in the new iteration.

If the break condition is fulfilled the loop is left and PH is recomputed with the last PY.

Linde 16800 - END: Print out.

All variables are computed in current prices and the three basic matrices, the input matrix, the final demand matrix and the supply matrix, are printed on MOIO82.DAT. Adjustment constants PP, some of the deflators and tax rates are also printed. Note that the deviation of the PPs from unity can be seen as a check on the hypothesis that (producers') prices are equal between domestic demand components. Large deviations should be analyzed. Also the difference between tax rates in fixed and current prices should be considered. Information that tax or subsidy rates for some commodity has changed distinctively different from the others could be used to improve the accuracy of the price-indices.

APPENDIX 1 MOSES MACRO-SECTORS

- 1 Raw material
- 2 Intermediate goods
- 3 Investment goods and consumer durables
- 4 Consumption goods (excl. durables)
- 5 Agriculture, forestry, fishing
- 6 Mining and quarrying
- 7 Oil
- 8 Construction
- 9 Electricity
- 10 Other services

APPENDIX 2 THE 45x45 COMMODITY BALANCES

The system of commodity balances is given as three matrices in the tables below. Since the same format is used in the aggregation and reflation programs the variables in the tables will be described more closely.

Table 1 is the supply matrix called TILL in the programs. With i as commodity index the matrix shows with appropriate column index added in the table:

- TILL($i,1$) = gross production in producers' prices
(excl. residual)
- TILL($i,2$) = sales of market products from the
public sector (note that public
enterprises is recorded in the first
column of TILL)
- TILL($i,3$) = imports cif
- TILL($i,4$) = customs duties and import levels
- TILL($i,5$) = trade margins
- TILL($i,6$) = commodity taxes
- TILL($i,7$) = subsidies
- TILL($i,8$) = value added taxes

Table 2 shows final demand, FD:

- FD($i,1$) = use of intermediate goods in the
public sector
- FD($i,2$) = private consumption
- FD($i,3$) = gross investments
- FD($i,4$) = stock building
- FD($i,5$) = exports
- FD($i,6$) = residual between supply and demand

Table 3, finally, is called IO and shows the intermediate use of each commodity (row index) in each production sector (column index).

Table 1 Supply Matrix

IOR TILLGANGSSIDEMATRI

VARUSNI	AR 1982 FASTA PRISER		MOTTAGARPRIS		TUL	UP	HMAR	SVS	SUB	MOM	SUMMA
	1	2	3	4							
	IPRO	OF FÖR	IMPOR								
01 JORDBR	20186	53	4689	108	25036	4421	372	-4536	1667	26960	
02 SKOGSBR	9585	365	712		10662	1229			90	11981	
03 FISKE	626		91		717	128		-16	73	902	
04 JÄRNGR	1627		3		1630	48				1678	
05 I JÄRN	1173		981		2154	168				2322	
06 RAOLJA MM	1179	54	14359		15592	299			52	15943	
07 SK LIVS	26630	40	1305	228	28203	6150		-728	5017	38642	
08 KONK LIVS	13333	32	4544	239	18148	5047	491	-183	2812	26315	
09 DR TOBAK	3594		954	17	4565	3142	9225	-10	3046	19968	
10 TEXTIL	7941	52	10622	344	18959	10361			4577	33897	
11 SÄGVERK	11480	28	318		11826	1461			42	13329	
12 TRÄVARU	12802	28	1596	16	14442	3252			1040	13734	
13 MASSA	7384		256		7640	410				8050	
14 PAPPER	13981		392		14373	975			60	15408	
15 PAPPV	6237		872	4	7113	744	6		204	8067	
16 GRAFISK	16672	53	938		17663	1534	215		1072	20484	
17 GUMMI	2194		1880	29	4103	764			259	5126	
18 KEMIK BASPL	11723		9761	46	21530	1949			63	23542	
19 AN KEMISK	9057	204	4825	12	14098	3660	182	-2520	1022	16442	
20 PLASTVAROR	3122		1349	12	4483	787	9		311	5590	
21 PETROLEUM	16549		16190		32739	4621	8457		123	45940	
22 JORD O STEN	7918		1910	18	9846	2035	34		211	12126	
23 JÄRN O STAL	16263		4542	16	20821	2865			6	23692	
24 I JÄRNMET	7702		3862	4	11568	1416			2	12986	
25 METALLVAROR	21686	115	7430	32	29263	2479	37		690	32469	
26 MASKINER	32536		16238	166	48940	4343			516	53799	
27 TRANSPORTM	31463		11862	103	43428	5293	658		2414	51793	
28 INSTRUMENT	2998	65	3579	50	6692	1259			486	8437	
29 ELEKTRO	19241		10582	187	30010	3904			1589	35503	
30 VARV	7007		1099	2	8108	193			178	8479	
31 AN TILLV	1744	22	1566	21	3353	1843			699	5895	
32 EL O VÄRME	20279		989		21268		2404			23672	
33 GAS	330				330					330	
34 VATTEN	1564				1564					1564	
35 BYGGNAD	74250				74250				5716	79966	
36 VARUHANDEL			2356		2356	1538				3894	
37 HOTELL REST	9041	886			9927				1008	10935	
38 SAMFÄRDSSEL	45596	467	5904		51967		152		224	52343	
39 POST O TELE	14856		534		15390					15390	
40 BANK O FÖRS	26061		34		26095					26095	
41 BOSTÄDER	52933				52933					52933	
42 FASTIGHETER	10966	363			11329					11329	
43 UPPDRAG	29898	1270	2716		33884				964	34848	
44 REPARATIONER	9933		34		9967				1435	11402	
45 ÖVR PR TJ	29103	1994	227		31324	610	1218		367	33519	
SUMMA	670443	6091	152101	1654	830289	78928	23460	-7993	38035	962719	

Table 2 Final Demand Matrix

FINAL-DEMAND MATRIS

VARUSNI	INSATS	MOTTAGARPRIS		INV	LAGER	EXPORT	ÖVRIGT	RES	SUMMA
AR 1982	FASTA PRISER	OFF	PR.KONS						
01 JORDBR	16339	405	8844	322	82	1251		-283	26960
02 SKOGSBR	11138		498	653	427	150		-885	11981
03 FISKE	306	9	397			334		-144	902
04 JÄRNGR	659				46	1014		-41	1678
05 I JÄRNG	2256				-3	694		-625	2322
06 RÅOLJA MM	16084	206	107		222	356		-1032	15943
07 SK LIVS	8457	1860	26450		69	1544		262	38642
08 KONK LIVS	8013	523	15343		5	1272		1159	26315
09 DR TOBAK	1627	24	17253		35	139		890	19968
10 TEXTIL	5424	935	25305	256	98	3738		-1859	33897
11 SÅGVERK	6612	88	39		-489	7002		77	13329
12 TRÄVARU	11055	395	5302	844	-287	3193		-1768	18734
13 MASSA	3055				15	4955		25	8050
14 PAPPER	5555	242	82		-4	10277		-744	15408
15 PAPPV	5003	368	748		-131	2391		-312	8067
16 GRAFISK	12145	1991	5227		6	654		461	20484
17 GUMMI	2948	127	1353		-50	873		-125	5126
18 KEMIK BASPL	15379	82	360		333	5539		1849	23542
19 AN KEMISK	6275	2370	5100		16	3824		-1143	16442
20 PLASTVAROR	3024	449	1291		-5	914		-83	5590
21 PETROLEUM	23556	2408	15340		-808	6313		-869	45940
22 JORD O STEN	10100	317	940		-202	1564		-593	12126
23 JÄRN O STÄL	16772	82	45		-724	8504		-987	23692
24 I JÄRNMET	9078	85	19		-28	3618		214	12986
25 METALLVAROR	17001	857	2267	3249	-505	7037		2563	32469
26 MASKINER	15339	1394	984	15508	-1225	22571		-772	53799
27 TRANSPORTM	13812	1893	11931	6090	-689	19689		-933	51793
28 INSTRUMENT	1268	709	1579	2168	-65	2362		416	8437
29 ELEKTRO	11857	1486	5958	5008	-960	10849		1305	35503
30 VARV	1540	487	991	1828	-279	3907		5	8479
31 AN TILLV	631	418	3510	69	-81	944		404	5895
32 EL O VÄRME	11630	2076	9574			384		8	23672
33 GAS	57	4	120					149	330
34 VATTEN	1226	307						31	1564
35 BYGGNAD	19379	3771		56816					79966
36 VARUHANDEL	1534					1538		822	3894
37 HOTELL REST	2407	821	7410					297	10935
38 SAMFÄRDEL	29295	3273	7401			12880		-506	52343
39 POST O TELE	6509	1658	4530			497		2196	15390
40 BANK O FÖRS	21924	243	2425			14		1489	26095
41 BOSTÄDER			52933						52933
42 FASTIGHETER	7518	2893	749					169	11329
43 UPPDRAG	18977	5157	477	6422		6301		-2486	34848
44 REPARATIONER	4817	277	6366			82		-140	11402
45 ÖVR PR TJ	12184	3070	18879			492		-1106	33519
SUMMA	399765	43760	268127	99233	-5181	159660		-2645	962719

IOR VARA-BRANSMATRIS, INSATSDELEN

86-01-08

AR 1982	FASTA PRISER		MOTTAGARPRIS											
VARUSNI	101	102	103	104	105	106	107	108	109	110	111	112	113	114
01 JORDBR	639						11143	3516	320	80		3		
02 SKOGSBR	19	398			2			27		7	5257	561	2270	2322
03 FISKE	33						2	198						
04 JARNGR				164										
05 I JARNG					12									
06 RAOLJA MM	142			5	2	67				4			10	190
07 SK LIVS	81						4810	1008	83	148				
08 KONK LIVS	3370		9				496	3035	92	2		4	6	63
09 DR TOBAK								2	519					
10 TEXTIL	67	73	39	9	35		54			2551		278	48	239
11 SAGVERK			1			3	6			4	881	1457	961	788
12 TRXVARU	42	46	24		27			23	8	14	40	1976	20	222
13 MASSA										3			14	2886
14 PAPPER	43	6	4				158	77	51	55			19	2
15 PAPPV	8			1		4	245	314	74	53	1		162	8
16 GRAFISK	25	13		3	4	6	33	43	41	39	44		63	13
17 GUMMI	53	33		1			5		5	10			3	
18 KEMIK BASPL	1500	25		14	42	8	146	276	22	419	57	588	557	696
19 AN KEMISK	61		9	19	16	35	7	44	24	27	58	209	5	89
20 PLASTVAROR	2	4		1	2	8	169	164	54	62			37	4
21 PETROLEUM	673	202	87	81	35	25	374	184	57	195	140	155	242	728
22 JORD O STEN	69			33	24	11	11	97	125	12		379	24	46
23 JARN O STAL				7							22	27	25	52
24 I JARNMET							8	106	10			4		
25 METALLVAROR	54	54	2	24	43	14	39	217	340	68	209	592	106	129
26 MASKINER	619	327		39	38	75	33	22	12	120	79	27	113	157
27 TRANSPORTM				4	6									
28 INSTRUMENT														
29 ELEKTRO			2	3	4		5	8	2	6	35	33	36	145
30 VARY			41											
31 AN TILLV										35				2
32 EL O VARME	482	40		131	106	79	227	106	33	102	212	170	444	1243
33 GAS							3							
34 VATTEN				1		4	16	10	2	11	22	9	5	14
35 BYGGNAD	843	108		57	45	6	118	54	23	38	45	50	53	103
36 VARUHANDEL							13	12	1	31	73	29	96	123
37 HOTELL REST				4	3		19	12	6	21	8	18	7	16
38 SAMFARDESEL	216	761	6	410	70	69	448	246	80	99	283	272	27	82
39 POST O TELE	15	3		4	6	2	46	46	8	41	19	45	10	33
40 BANK O FORS	322	21	8	30	29	3	149	100	39	57	57	97	72	227
41 BOSTADER														
42 FASTIGHETER				5	3	2	77	42	9	22	23	19	16	28
43 UPPDRAG	207	25		16	20	3	357	216	104	227	121	258	78	215
44 REPARATIONER	210	39		14	15	4	100	20	14	17	89	43	22	18
45 OVR PR TJ	95	3		9	3	1	135	44	10	66	64	88	34	91
SUMMA	9890	2181	232	1089	592	429	19452	10269	2168	4646	7839	7675	5324	11706

Table 3 Input Matrix

IOR VARA-BRANSCHMATRIS, INSATSELEN

86-01-08

	ÅR 1982 FASTA PRISER			MOTTAGARPRIS										
VARUSNI	115	116	117	118	119	120	121	122	123	124	125	126	127	128
01 JORDBR			75	2	21									
02 SKOGSBR	42			3	39			2	3		7			1
03 FISKE														
04 JÄRNGR									495					
05 I JÄRNG								25	385	1423	409	2		
06 RAOLJA MM			4	285	20		13723	604	74	23	4	4	10	
07 SK LIVS				1	139			7						
08 KONK LIVS			4	104	88									
09 DR TOBAK				28	28	1								
10 TEXTIL		4	193	13	4	7		9	54		20	167	345	17
11 SÄGVERK	76		2	2	22			9			45	18	182	3
12 TRÄVARU	8	4	11	2				47	64	8	216	207	699	4
13 MASSA	16			123		4								
14 PAPPER	1512	2209	1	34	32	30	18	43	2	6	7	12	40	
15 PAPPV	597	880	1	72	262	64		45	2		71	109	59	10
16 GRAFISK	12	3915	10	46	188	35	59	82	41	2	130	229	133	22
17 GUMMI		18	240	13				6	1		5	351	919	19
18 KEMIK BASPL	334	21	301	4164	1318	1277	178	251	169	161	169	132	147	
19 AN KEMISK	87	291	24	151	1160	1	84	10	25	3	561	132	263	14
20 PLASTVAROR	21	18		76	164	50	21	58	2		90	442	360	6
21 PETROLEUM	78	101	56	1373	292	40	985	510	1621	107	337	349	424	18
22 JORD O STEN	4	3	2	23	68	11	51	1075	243	19	108	162	299	15
23 JÄRN O STAL	7	3		3		16	4	168	5940	13	4032	2617	2362	39
24 I JÄRNMET	9	1		55	154	2		15	468	3756	991	293	457	53
25 METALLVAROR	9	64	57	49	164	5	157	103	336	465	2247	2027	1116	35
26 MASKINER	9	27	16	226	36	56	206	41	376	49	356	6311	1646	42
27 TRANSPORTM											4	201	8290	
28 INSTRUMENT		4		3	4						39	173	266	508
29 ELEKTRO	7	4	4	38	6	10	47	30	157	5	246	703	1366	127
30 VARV													18	
31 AN TILLV		4	2		6					60	3	8	3	
32 EL O VÄRME	97	95	45	602	96	101	68	250	819	262	318	285	261	15
33 GAS		3							29		4	2		
34 VATTEN		6	2	12	5	2	44	7	8	1	17	21	18	2
35 BYGGNAD	25	80	15	44	62	25	18	67	108	37	127	206	169	12
36 VARUHANDEL	47	6	8	68	40	8	55	18	89	30	85	244	239	26
37 HOTELL REST	7	37	7	23	29	6		20	23	6	39	76	51	8
38 SAMFÄRDESEL	80	181	33	110	152	67	9	257	303	89	341	452	421	27
39 POST O TELE	23	247	12	33	47	12	20	39	48	18	88	168	112	19
40 BANK O FÖRS	104	91	24	64	83	27	100	83	181	59	145	240	163	26
41 BOSTADER														
42 FASTIGHETER	13	17	5	22	17	4	23	20	35	13	37	50	56	4
43 UPPDRAG	127	1090	74	194	292	74	77	226	279	92	382	619	762	102
44 REPARATIONER	6	30	5	16	17	7	5	52	31	9	50	57	115	5
45 ÖVR PR TJ	15	307	28	37	50	29	21	55	98	15	177	275	212	30
SUMMA	3372	9761	1261	8114	5105	1971	15973	4234	12509	6731	11907	17344	21983	1209

Table 3 (cont.)

IOR VARA-BRANSMATRIS, INSATSDELEN

86-01-08

AR 1982	FASTA PRISER					MOTTAGARPRIS								
VARUSNI	129	130	131	132	133	134	135	136	137	138	139	140	141	142
01 JORDBR														
02 SKOGSBR			15				77		241			2	62	10
03 FISKE							128						35	
04 JÄRNGR									73					
05 I JÄRNG														
06 RAOLJA MM	10		52	5		8	775						52	11
07 SK LIVS			14							1379	582			
08 KONK LIVS										653				
09 DR TOBAK										947	60			
10 TEXTIL	16	68	64				360	150		55	175	72	31	
11 SAGVERK	4	151	140	5			1313				140			194
12 TRÄVARU	62	105	26				6398	326	13	235	37			10
13 MASSA				9										
14 PAPPER	52	1	62	3			112	77	3	119	9	33	3	2
15 PAPPV	119	2	25	3			402	690	41	21	12	45	5	5
16 GRAFISK	191	46	38	19		4	327	1673	42	272	486	280		144
17 GUMMI	135	18	35	5			187	227		602				
18 KEMIK BASPL	596	296	131	6		22	988	23						
19 AN KEMISK	87	176	142			6	1373	51	37	246	49	12	186	20
20 PLASTVAROR	287	6	36	3			216	309	102	39	14	53	5	2
21 PETROLEUM	141	85	44	3040	106	25	1409	1368	318	5188	114	250	416	773
22 JORD O STEN	197	106	17			3	6515	71	176				84	
23 JÄRN O STAL	283	514	93				545							
24 I JÄRNMET	1005	29	508				1073	49						
25 METALLVAROR	221	881	114	67	2	14	5727	279	20	422	52	11	238	24
26 MASKINER	335	808	10	1098			1488	151		131	35	11		
27 TRANSPORTM		157					3	139		1310				
28 INSTRUMENT	25	43					17	22		3		12	2	
29 ELEKTRO	5298	168	20	183		17	1888	434	21	111	190		112	9
30 VARV		732								749				
31 AN TILLV	4		140				26	75	15	15	7	22	3	1
32 EL O VÄRME	191	64	30	637	2	64	184	989	109	528	219	124	618	559
33 GAS				16										
34 VATTEN	14	6	5			30								
35 BYGGNAD	241	33	7	2126	24	299		494		1016	954		616	264
36 VARUHANDEL	151	35	7										10628	838
37 HOTELL REST	65	10	6	17		2	111	738	14	202	63	200	34	22
38 SAMFÄRDESEL	285	38	18	25		2	2677	10242	34	8446	1061	288	6	2
39 POST O TELE	154	17	8	34		3	228	1118	31	496	609	1481	99	33
40 BANK O FÖRS	192	33	10	35	2	3	349	592	45	584	104	15883	654	332
41 BOSTÄDER														
42 FASTIGHETER	37	8	3				137	2234	336	183	351	996		
43 UPPDRAG	799	112	52	47		6	722	1859	76	850	492	1964	268	100
44 REPARATIONER	18	13	3	80	2	17	555	794	55	1835	47	29	51	22
45 ÖVR PR TJ	205	44	17	131		1	511	1220	150	518	256	301	3699	463
SUMMA	11420	4805	1892	7594	138	526	36821	26394	4986	25078	5233	22028	18070	3646

Table 3 (cont.)

IOR VARA-BRANSCHMATRIS, INSATSELEN

VARUSNI	AR 1982 FASTA PRISER		MOTTAGARPRIS		SUMMA
	143	144	145		
01 JORDBR	2		146		16339
02 SKOGSBR					11138
03 FISKE					306
04 JARNGR					659
05 I JARNG					2256
06 RAOLJA MM					16084
07 SK LIVS			205		8457
08 KONK LIVS			87		8013
09 DR TOBAK	15		27		1627
10 TEXTIL	32	72	103		5424
11 SAGVERK	38		157		6612
12 TRAVARU			141		11055
13 MASSA					3055
14 PAPPER	99	8	43		5555
15 PAPPV	38	8	416		5003
16 GRAFISK	1601	132	1601		12145
17 GUMMI	2	9	46		2948
18 KEMIK BASPL	36	44	265		15379
19 AN KEMISK	92	114	275		6275
20 PLASTVAROR	67	9	61		3024
21 PETROLEUM	434	84	292		23556
22 JORD O STEN		17			10100
23 JARN O STAL					16772
24 I JARNMET			32		9078
25 METALLVAROR	7	57	140		17001
26 MASKINER	1	210	3		15339
27 TRANSPORTM		3698			13812
28 INSTRUMENT	111		36		1268
29 ELEKTRO	65	171	141		11857
30 VARV					1540
31 AN TILLY	167	7	26		631
32 EL O VARME	136	152	335		11630
33 GAS					57
34 VATTEN			52		1226
35 BYGGNAD		43	138		19379
36 VARUHANDEL					1534
37 HOTELL REST	151	36	290		2407
38 SAMFARDESEL	299	58	223		29295
39 POST O TELE	308	96	630		6509
40 BANK O FURS	227	70	208		21924
41 BOSTADER					
42 FASTIGHETER	1743	36	892		7518
43 UPPDRAG	4092	132	1169		18977
44 REPARATIONER	40	94	152		4817
45 OVR PR TJ	294	128	2254		12184
SUMMA	10097	5485	10586		399765

Table 3 (cont.)

APPENDIX 3 AGGREGATION MATRIX

The 45 sector system does not allow for an exact specification (aggregation) of the sectors in MOSES (cf. Appendix 2 and IUI Working Paper No. 118, 1983, Appendix E). The distribution of commodities between MOSES sectors shown in the table below is no more than a quick quesstimate and can easily be improved.

BRANSCHINDELNING INSATS "45-NIVÅN"

Insats- kod IO	SNR	Benämning
101	1100	Jordbruk
102	1200	Skogsbruk
103	1300	Fiske
104	2100	Järnmalmgruvor
105	2200	Icke järnmalmgruvor
106	2300	Andra gruvor, mineralbrott
107	3111	Skyddad livsmedelsindustri
108	3112	Konkurrerande livsm.ind.
109	3120	Dryck- och tobaksindustri
110	3200	Textilindustri
111	3411	Sågverk
112	3412	Övrig trävaruindustri
113	3421	Massaindustri
114	3422	Pappers- och pappindustri
115	3423	Pappvaruindustri
116	3430	Grafisk industri
117	3510	Gummivaruindustri
118	3521	Kemikalie- och plastindustri
119	3522	Annan kemisk industri
120	3523	Plastvaruindustri
121	3530	Petroleumraff. Smörjmedel
122	3600	Jord- och stenvaruindustri
123	3710	Järn-, stål- o. ferroleg.verk
124	3720	Ickejärnmetallverk
125	3811	Metallvaruindustri
126	3812	Maskinindustri
127	3813	Transportm.ind. exkl. varv
128	3814	Instrumentindustri
129	3830	Elektroindustri
130	3843	Skeppsvarv
131	3900	Annan tillverkningsindustri
132	4100	El- och värmeverk
133	4200	Gasverk
134	4410	Vattenverk
135	5000	Byggnadsindustri
136	6100	Varuhandel
137	6300	Restaurang och hotell
138	7100	Samfärdsel
139	7200	Post- och televerk
140	81+82	Banker och försäkringsinst.
141	8300	Bostadsförvaltning
142	8400	Annan fastighetsförvaltning
143	8500	Uppdragsverksamhet
144	9510	Rep. av hushållsvaror o. fordon
145	9 övr.	Övriga privata tjänster

1 1986-01-16
T.N.

Aggregeringsmatris AMO (45,10)

IO45	Mått - sektorer; Andelar av IO45 sektor										SNR	
	1	2	3	4	5	6	7	8	9	10		
Jord					1.0							1100
Skog					1.0							1200
Fiske					1.0							1300
Järnmalen						1.0						2100
Icke järnmalen						1.0						2200
Riöolja, kol uun							1.0					2300
Skogdad livsm.				1.0								3111
Konk. utbrutt livsm.				1.0								3112
Dryck & tobak				1.0								3120
Textil		0.2	0.2	0.6								3200
Sigverk	1.0											3411
Övrig trä *)		0.50	0.25	0.25								3412
Massa	1.0											3421
Papper		1.0										3422
Papperor *		0.8		0.2								3423
Grafik				1.0								3430
Gummi		0.8		0.2								3510
Plast & kemi		1.0										3521
Övr. kemi (läkem)		0.5		0.5								3522
Plastoror		0.5		0.5								3523
Petroleum							1.0					3530
Jord & sten *)		0.9		0.1								3600
Järn & stål	0.5	0.5										3710
Icke järn verk	0.5	0.5										3720
	Rävaror	Insats- varor	Investerings- varor	Konsum- varor	Jord, skog	Gruv	Olja	Byggnads	EL	Privata tjänster		

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**APPENDIX 4 AGGREGATION PROGRAM CODE (IO82.FOR),
VARIABLES AND PRINT OUT**

Besides the basic variables defined in Appendix 2
the following main variables are used:

VA(i) = value added in producers' prices

Y(i) = gross production in producers' prices
(incl. residual)

AGG(i,j) = aggregation matrix (cf. Appendix 3).

FD NR,TINR are aggregate values (columnsums) of
respective component of final demand and
supply taken from National Accounts.

```
00100 C PROGRAM I082.FOR.
00200 C KONTROLL OCH BEARBETNING AV SCB:S 45*45 MATRIS 1982
00300 C INDATA P1 SCB82.DAT, KONTROLLDATA P2 KON82.DAT
00400 C AGGREGERINGSMATRIS P3 AMD.DAT (AX.DAT)
00500 C RESULTAT P4 M082.DAT (X82.DAT)
00600 C TILLIGG GARS FÖR TURISTTJÄNSTER (EJ MED I SCB-MATRISEN)
00700 C SEPARAT KOLUMN BILDAS FÖR HANDELSMARGINALER, MED NOLLOR I
00800 C ALLA CELLER UTOM FÖR VARUHANDELN SOM GES VÄRDEN MINUS
00900 C SUMMA MARGINALER. DÄRMED KAN SUMMA HANDELSMARGINALER DIREKT
01000 C SÄTTAS IN I CELLEN FÖR PRODUKTION I VARUHANDELN (36)
01100 C TILL:1=PROD 2=OFS 3=IMP 4=TULL 5=HMMAR 6=SVS
01200 C 7=SUB 8=MMOM 9=HMMAR
01300 C FD: 1=LF 2=PK 3=INV 4=LAG 5=EXP 6=RES
01400 C KORRIGERING TILL SENASTE AGGREGERADE NR-DATA
01500 C GARS I TJÄNSTSEKTORN.
01600 C NR-VÄRDEN FÖR FINAL DEMAND=FDNR(1-6),
01700 C DITO FÖR TILLFÄRSEL (EXKL BRUTTOPROD)=TINR(2-9),
01800 C VÄRDEN LÄSES IN SIST I SCB82.DAT
01900 C REAL FD(46,8),TILL(46,10),IO(46,46),VA(46),Y(46)
02000 C REAL FD(11,11),TILL(11,10),IO(11,11),VA(11),IOX(11,46)
02100 C REAL FDNR(6),TINR(9),AGG(45,10)
02200 C OPEN(20,FILE='SCB82.DAT')
02300 C OPEN(21,FILE='KON82.DAT')
02400 C OPEN(30,FILE='AMD.DAT')
02500 C OPEN(31,FILE='AX.DAT')
02600 C OPEN(40,FILE='M082.DAT')
02700 C OPEN(41,FILE='X82.DAT')
02800 C LIS SCB-MATRISEN, TURISTTJÄNSTER OCH NR-DATA
02900 C FIL-NUMMER FÖR AGGREGERINGSFIL (KFIL), FÖR RESULTATFIL
03000 C (JFIL) SAMT FÖR DIMENSION FÖR AGGREGERAD MATRIS(IDIM)
03100 C LIGGER FÖRST I SCB82.DAT.
03200 C READ(20,*(3I,*)KFIL,IFIL,IDIM
03300 C DO 1 I=1,45
03400 C READ(20,*(8F,*)(TILL(I,J),J=1,8)
03500 C DO 2 I=1,45
03600 C READ(20,*(4F,*)(FD(I,J),J=1,6)
03700 C DO 3 I=1,45
03800 C READ(20,*(11F,*)(IO(I,J),J=1,11)
03900 C READ(20,*(11F,*)(IO(I,J),J=12,22)
04000 C READ(20,*(11F,*)(IO(I,J),J=23,33)
04100 C READ(20,*(12F,*)(IO(I,J),J=34,45)
04200 C LIS TURISTTJÄNSTER OCH KORRIGERA PRIV KONS, EXPORT OCH IMPORT
04300 C READ(20,*(2F,*)TUEX,TUIM
04400 C FD(45,2)=FD(45,2)+TUIM-TUEX
04500 C FD(45,5)=FD(45,5)+TUEX
04600 C TILL(45,3)=TILL(45,3)+TUIM
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04700 C BILDA HANDELSMARGINALER FOR PRODUKTION I VARUHANDELN
04800 DO 24 I=1,45
04900 TILL(36,9)=TILL(36,9)-TILL(I,5)
05000 TILL(36,1)=TILL(36,1)-TILL(36,9)
05100 C =====
05200 C BERKNING AV SUMMOR I SCB-MATRISEN
05300 C =====
05400 C TILLFARSELMATRISEN
05500 DO 4 I=1,45
05600 DO 5 J=1,9
05700 TILL(I,10)=TILL(I,10)+TILL(I,J)
05800 TILL(46,10)=TILL(46,10)+TILL(I,10)
05900 DO 6 J=1,9
06000 DO 7 I=1,45
06100 TILL(46,J)=TILL(46,J)+TILL(I,J)
06200 SL5=SL5+TILL(46,J)
06300 C IO-MATRISEN
06400 DO 9 I=1,45
06500 DO 9 J=1,45
06600 IO(I,46)=IO(I,46)+IO(I,J)
06700 DO 10 J=1,45
06800 DO 10 I=1,45
06900 IO(46,J)=IO(46,J)+IO(I,J)
07000 DO 12 I=1,45
07100 IO(46,46)=IO(46,46)+IO(I,46)
07200 C FINAL DEMAND MATRISEN
07300 DO 15 I=1,45
07400 DO 16 J=1,6
07500 FD(I,7)=FD(I,7)+FD(I,J)
07600 FD(I,8)=IO(I,46)+FD(I,7)
07700 DO 18 I=1,45
07800 FD(46,7)=FD(46,7)+FD(I,7)
07900 FD(46,8)=FD(46,8)+FD(I,8)
08000 DO 20 J=1,6
08100 DO 21 I=1,45
08200 FD(46,J)=FD(46,J)+FD(I,J)
08300 SL3=SL3+FD(46,J)
08400 SL4=SL3+IO(46,46)
08500 C KOLUMNSSUMMOR I FD- OCH TILL-MATRISENA KORRIGERAS TILL
08600 C AKTUELLA NR-VERDEN. EVEN BRUTTOPRODUKTIONEN KORRIGERAS.
08700 READ(20, '(6F)')FDNR
08800 READ(20, '(8F)')(TINR(I), I=2,9)
08900 DO 26 I=1,6
09000 SS1=FDNR(I)-FD(46,I)
09100 S1=S1+SS1
09200 FD(45,I)=FD(45,I)+SS1
09300 FD(46,I)=FD(46,I)+SS1
26
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02400 FD(45,7)=FD(45,7)+S1
02500 FD(46,7)=FD(46,7)+S1
02600 FD(45,8)=FD(45,8)+S1
02700 FD(46,8)=FD(46,8)+S1
02800 DO 27 I=2,9
02900 S52=TINR(I)-TILL(46,I)
10000 S2=S2+S52
10100 TILL(45,I)=TILL(45,I)+S52
10200 TILL(46,I)=TILL(46,I)+S52
10300 C BRUTTOPRODUKTIONEN I TJINSESEKTORN KORRIGERAS SJ ATT
10400 D KORR ANV=KORR TILLF
10500 TILL(45,1)=TILL(45,1)+S1-S2
10600 TILL(46,1)=TILL(46,1)+S1-S2
10700 TILL(45,10)=TILL(45,10)+S1
10800 TILL(46,10)=TILL(46,10)+S1
10900 C BERIKNING AV BRUTTOPRODUKTION (MINUS RES) OCH F\RDLINGSVIRDE
11000 DO 22 I=1,46
11100 Y(I)=TILL(I,1)-FD(I,6)
11200 VA(I)=Y(I)-IO(46,I)
11300 C
11400 C UTSKRIFT AV SUMMOR I SCB-MATRISEN F\R KONTROLL
11500 C
11600 WRITE(21, '( /,A) ' ) TILGJNG PER VARA: '
11700 DO 8 K=1,5
11800 WRITE(21, '(9F8.0) ' ) (TILL(I,10), I=(K-1)*9+1, K*9)
11900 WRITE(21, '( /,A,F8.0) ' ) SUMMA TILGJNG= ' , TILL(46,10)
12000 WRITE(21, '( /,A) ' ) TILGJNG PER KOMPLEMENT: '
12100 WRITE(21, '(9F8.0) ' ) (TILL(46,J), J=1,9)
12200 WRITE(21, '( /,A,F8.0) ' ) SUMMA TILGJNG= ' , SL5
12300 WRITE(21, '( /,A) ' ) INSATS PER VARA: '
12400 DO 11 K=1,5
12500 WRITE(21, '(9F8.0) ' ) (IO(I,46), I=(K-1)*9+1, K*9)
12600 WRITE(21, '( /,A,F8.0) ' ) SUMMA INSATS= ' , IO(46,46)
12700 WRITE(21, '( /,A) ' ) INSATS PER BRANSCH: '
12800 DO 13 K=1,5
12900 WRITE(21, '(9F8.0) ' ) (IO(46,J), J=(K-1)*9+1, K*9)
13000 DO 14 J=1,45
13100 SL2=SL2+IO(46,J)
13200 WRITE(21, '( /,A,F8.0) ' ) SUMMA INSATS= ' , SL2
13300 WRITE(21, '( /,A) ' ) FINAL DEMAND PER VARA: '
13400 DO 17 K=1,5
13500 WRITE(21, '(9F8.0) ' ) (FD(I,7), I=(K-1)*9+1, K*9)
13600 WRITE(21, '( /,A) ' ) ANVENDING PER VARA: '
13700 DO 19 K=1,5
13800 WRITE(21, '(9F8.0) ' ) (FD(I,8), I=(K-1)*9+1, K*9)
13900 WRITE(21, '( /,A,F8.0) ' ) SUMMA ANVENDING= ' , FD(46,8)
14000 WRITE(21, '( /,A) ' ) ANVENDING PER KOMPLEMENT: '

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14100 WRITE(21, '(7F8.0)') IO(46,46), (FD(46,J), J=1,6)
14200 WRITE(21, '(/,A,FS.0,A,FS.0)') ' SUMMA ANVINDNING=', SL4,
14300 1 ' SUMMA FINAL DEMAND=', SL3
14400 WRITE(21, '(/,A)') ' BRUTTOPRODUKTION (MINUS RES): '
14500 DO 25 K=1,5
14600 WRITE(21, '(9F8.0)')(Y(I), I=(K-1)*9+1, K*9)
14700 WRITE(21, '(/,A,FS.0)') ' SUMMA BRUTTOPRODUKTION=', Y(46)
14800 WRITE(21, '(/,A)') ' FÄRDLINGSVÄRDE: '
14900 DO 23 K=1,5
15000 WRITE(21, '(9F8.0)')(VA(I), I=(K-1)*9+1, K*9)
15100 WRITE(21, '(/,A,FS.0)') ' SUMMA FÄRDLINGSVÄRDE=', VA(46)
15200 C
15300 C LIS AGGREGERINGSMATRISEN AGG OCH IO-SYSTEMETS DIMENSION IDIM
15400 C SAMT NUMMER P J UTSKRIFTSFILER.
15500 C
15600 DO 55 K=1,45
15700 READ(KFIL,*)(AGG(K,I), I=1, IDIM)
15800 C FINAL DEMAND-MATRISEN
15900 DO 80 J=1,8
16000 DO 80 I=1, IDIM
16100 DO 81 K=1,45
16200 FD1(I,J)=FD1(I,J)+AGG(K,I)*FD(K,J)
16300 FD1(IDIM+1,J)=FD1(IDIM+1,J)+FD1(I,J)
16400 C TILLFÄRSEL-MATRISEN
16500 DO 82 J=1,10
16600 DO 82 I=1, IDIM
16700 DO 83 K=1,45
16800 TILL1(I,J)=TILL1(I,J)+AGG(K,I)*TILL(K,J)
16900 TILL1(IDIM+1,J)=TILL1(IDIM+1,J)+TILL1(I,J)
17000 C IO-MATRISEN RADVIS
17100 DO 84 J=1,46
17200 DO 84 I=1, IDIM
17300 DO 85 K=1,45
17400 IOX(I,J)=IOX(I,J)+AGG(K,I)*IO(K,J)
17500 IOX(IDIM+1,J)=IOX(IDIM+1,J)+IOX(I,J)
17600 C IO-MATRISEN KOLUMNVIS
17700 DO 86 I=1, IDIM+1
17800 DO 86 J=1, IDIM
17900 DO 87 K=1,45
18000 IO1(I,J)=IO1(I,J)+AGG(K,J)*IOX(I,K)
18100 IO1(I, IDIM+1)=IO1(I, IDIM+1)+IO1(I, J)
18200 C
18300 C UTSKRIFT AV RESULTAT
18400 C
18500 WRITE(IFIL, '(/,A)') ' INSATS-MATRISEN: '
18600 DO 100 I=1, IDIM+1
18700 WRITE(IFIL, '(11F7.0)')(IO1(I,J), J=1, IDIM+1)

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18800 WRITE(IFIL, '(/,A)') ANVINDNINGSMATRIS:
18900 DO 101 I=1, IDIM+1
19000   WRITE(IFIL, '(I2,SF8.0)') I, (FD1(I,J), J=1,8)
19100   WRITE(IFIL, '(/,A)') TILLFARSEL-MATRIS:
19200   DO 102 I=1, IDIM+1
19300     WRITE(IFIL, '(I2,F8.0,SF7.0,F8.0)') I, (TILL1(I,J), J=1, 10)
19400   END
```

APPENDIX 5 REFLATION PROGRAM CODE (MO82.FOR),
VARIABLES AND PRINT OUT

Beside variables defined in Appendices 2 and 4 the following main variables are used:

TRB(i) = base year tax rate
TR(i) = current tax rate
VALP(i) = value added in current producers' prices
PVA(i) = ditto deflator
PH(i) = price of domestic demand excl. taxes.
PP(i) = adjustment factor for PH.

For IO, FD, TILL and Y the following rule applies.

The letter "P" before the name denotes the corresponding price index. The letter "L" added at the end of the name denotes the corresponding value in current prices.

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00100 C PROGRAM M082.FOR
00200 C MATRIS AGGREGERADE TILL MOSES-NIV].
00300 C HANDELSMARGINALER LIGGS IN I IO-MATRISEN (RAD 10)
00400 C OCH ADDERAS TILL BRUTTOPRODUKTIONEN.
00500 C DERMED INNEHILLER SJVIL TILLF\RSEL SOM ANVINDNING
00600 C DUBBELRIKANDE HANDELSMARGINALER. F\RIDLINGSVIRDE TILL
00700 C PRODUCENTPRIS FJR RITT VIRDE.
00800 C SAMTLIGA INDIREKA SKATTER (INKL TULLAR) BELASTAR
00900 C PRIVAT KONSUKTION OCH OFFENTLIG INSATSANVINDNING.
01000 REAL FD(11,8),TILL(11,10),IO(11,11),VA(11),Y(11)
01100 REAL FDK(11,8),TILLK(11,10),IOK(11,11),SHARE(11)
01200 REAL T(11),TRB(11),TR(11),TL(11)
01300 REAL VALP(11),FDL(11,8),TILLL(11,10),IOL(11,11),YL(11)
01400 REAL PP(5),PH(11),PY1(11),PY(11),PFD(11,8),PTILL(11,10)
01500 REAL PVA(11),PT(11),HP(11),SL(11)
01600 OPEN(30,FILE='M082.DAT')
01700 OPEN(31,FILE='PRIS82.DAT')
01800 OPEN(32,FILE='M0I082.DAT')
01900 C =====
02000 C BERIKNA OCH SKRIV UT F\RS\RJNINGSBALANSER I FASTA
02100 C PRISER P] MOSES-FORMAT
02200 C =====
02300
02400 C LIS IO-MATRISEN P] SCBFORMAT MED MOSESAGGREGAT
02500 C OBS!!!! HANDELSMARGINALERNA I TJINSTESEKTORNS PRODUKTION!!
02600 C (AGGREGERINGSPROGRAM I082.FOR, UTSKRIFT P] M082.DAT)
02700 C INSATS-MATRIS
02800 READ(30,'(//)')
02900 DO 1 I=1,11
03000 1 READ(30,'(11F7.0)')(IO(I,J),J=1,11)
03100 C ANVINDNINGSMATRIS
03200 READ(30,'(//)')
03300 DO 2 I=1,11
03400 2 READ(30,'(I2,8F8.0)')K,(FD(I,J),J=1,8)
03500 C TILLF\RSEL-MATRIS
03600 READ(30,'(//)')
03700 DO 3 I=1,11
03800 3 READ(30,'(I2,F8.0,8F7.0,F8.0)')K,(TILL(I,J),J=1,10)
03900 C LIGG IN HANDELMARGINALER I IO-MATRISEN OCH BERIKNA
04000 C BRUTTOPRODUKTION INKL RESIDUAL

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04100      DO 4 I=1,11
04200      IO(10,I)=IO(10,I)+TILL(I,5)
04300      IO(11,I)=IO(11,I)+TILL(I,5)
04400      4      Y(I)=TILL(I,1)+TILL(I,5)-FD(I,6)
04500      C      SUMMERA INDIREKTA SKATTER
04600      DO 5 I=1,11
04700      5      T(I)=TILL(I,4)+TILL(I,6)+TILL(I,7)+TILL(I,8)
04800      C      BERIKNA FÄRDNINGSVÄRDE OCH SKATTEKVOT
04900      DO 6 I=1,11
05000      IF(I.NE.6)TRB(I)=T(I)/(FD(I,1)+FD(I,2))
05100      6      VA(I)=Y(I)-IO(11,I)
05200      C      BERIKNA IO-KOEFFICIENTER MM
05300      DO 7 I=1,11
05400      DO 7 J=1,11
05500      IOK(I,J)=IO(I,J)/Y(J)
05600      7      IF(J.LE.5)FDK(I,J)=FD(I,J)/FD(11,J)
05700      C      BERIKNA NÄRINGSLIVETS BNF
05800      C      TILLFÄRSEL (INKL OFF FÄRSELJNING OCH SKATTER)
05900      DO 8 I=1,10
06000      BNPT=BNPT+VA(I)+TILL(I,2)+T(I)
06100      C      ANVÄNDNING
06200      8      BNPA=BNPA+FD(I,1)+FD(I,2)+FD(I,3)+FD(I,4)+FD(I,5)-TILL(I,3)
06300      WRITE(32, '(/,A,2F10.0)') BNPT, BNPA: ', BNPT, BNPA
06400      WRITE(32, '(/,A)') INSATS-MATRIS: '
06500      DO 9 I=1,11
06600      9      WRITE(32, '(11F7.0)')(IO(I,J),J=1,11)
06700      WRITE(32, '(/,A)') ANVÄNDNINGSMATRIS: '
06800      DO 10 I=1,11
06900      SL(I)=0
07000      DO 42 J=1,5
07100      42      SL(I)=SL(I)+FD(I,J)
07200      10      WRITE(32, '(12,6F8.0)') I, (FD(I,J),J=1,6)
07300      WRITE(32, '(/,A)') TILLFÄRSEL-MATRIS: '
07400      DO 11 I=1,11
07500      11      WRITE(32, '(12,5F8.0,F8.4)') I, Y(I), TILL(I,2), TILL(I,3), T(I),
07600      1VA(I), TRB(I)
07700      C      =====
07800      C      LIS NR-DATA MM FÄR AVSTÄMNING
07900      C      =====
08000      READ(31, '(5F)')(VALP(I), I=1,5)

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08100      READ(31, '(6F)')(VALP(I), I=6, 10), DVALP
08200      READ(31, '(5F)')(PFD(I, 5), I=1, 5)
08300      READ(31, '(5F)')(PFD(I, 5), I=6, 10)
08400      READ(31, '(5F)')(PTILL(I, 3), I=1, 5)
08500      READ(31, '(5F)')(PTILL(I, 3), I=6, 10)
08600      READ(31, '(8F)')(FDL(11, I), I=1, 5), TILL(11, 3), TL(11), TILL(11, 2)
08700      C      KORRIGERINGAR
08800      DO 20 I=1, 10
08900      VALP(11)=VALP(11)+VALP(I)
09000      SL1=SL1+PFD(I, 5)*FD(I, 5)
09100      IF(I.LE.4)SL2=SL2+PFD(I, 5)*FD(I, 5)
09200      SL3=SL3+PTILL(I, 3)*TILL(I, 3)
09300      20    IF(I.LE.4)SL4=SL4+PTILL(I, 3)*TILL(I, 3)
09400      DO 21 I=1, 10
09500      VALP(I)=(1+DVALP/VALP(11))*VALP(I)
09600      IF(I.LE.4)PFD(I, 5)=(1+(FDL(11, 5)-SL1)/SL2)*PFD(I, 5)
09700      IF(I.LE.4)PTILL(I, 3)=(1+(TILL(11, 3)-SL3)/SL4)*PTILL(I, 3)
09800      FDL(I, 5)=PFD(I, 5)*FD(I, 5)
09900      21    TILL(I, 3)=PTILL(I, 3)*TILL(I, 3)
10000      VALP(11)=0
10100      DO 40 I=1, 10
10200      40    VALP(11)=VALP(11)+VALP(I)
10300      C      =====
10400      C      BERIKNING AV PRISER
10500      C      =====
10600      C      PRELIMINARA VERDEN
10700      DO 22 J=1, 10
10800      SL1=0
10900      IF(J.LE.5)PP(J)=1
11000      DO 23 I=1, 10
11100      23    SL1=SL1+IOK(I, J)*PFD(I, 5)
11200      TR(J)=TRB(J)
11300      PY1(J)=VALP(J)/Y(J)+SL1
11400      22    PY(J)=VALP(J)/Y(J)+SL1
11500      C      ITERATIV L\SNINGSALGORITM
11600      IX=0
11700      100   IX=IX+1
11800      DO 25 I=1, 10
11900      HP(I)=IO(I, 11)+(PP(1)*FD(I, 1)+PP(2)*FD(I, 2))*(1-TRB(I))+
12000      1PP(3)*FD(I, 3)+PP(4)*FD(I, 4)

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12100 25      PH(I)=(PY(I)*(Y(I)+PP(5)*TILL(I,2))-FDL(I,5)+TILL(I,3))/HP(I)
12200 C      BERIKNA SKATTEKVOT
12300      SL1=0
12400      SL3=0
12500      DO 26 I=1,10
12600      SL2=(PP(1)*FD(I,1)+PP(2)*FD(I,2))*(1-TRB(I))
12700      SL3=SL3+PH(I)*SL2/(1-TR(I))*TR(I)
12800      SL1=SL1+PH(I)*SL2/(1-TR(I))
12900 26      CONTINUE
13000      DO 27 I=1,10
13100      IF(I.NE.6)TR(I)=(TL(11)-SL3)/SL1+TR(I)
13200 27      CONTINUE
13300 C      BERIKNA PRISKORRIGERINGAR
13400      DO 28 I=1,5
13500 28      SL(I)=0
13600      DO 29 I=1,10
13700      DO 30 J=1,2
13800 30      SL(J)=SL(J)+PH(I)*PP(J)*(1-TRB(I))/(1-TR(I))*FD(I,J)
13900      SL(3)=SL(3)+PH(I)*PP(3)*FD(I,3)
14000      SL(4)=SL(4)+PH(I)*PP(4)*FD(I,4)
14100 29      SL(5)=SL(5)+PY(I)*PP(5)*TILL(I,2)
14200      DO 31 J=1,4
14300 31      PP(J)=FDL(11,J)/SL(J)*PP(J)
14400      PP(5)=TILL(11,2)/SL(5)*PP(5)
14500      DO 34 J=1,10
14600      SL1=0
14700      DO 32 I=1,10
14800 32      SL1=SL1+IOK(I,J)*PH(I)
14900 34      PY(J)=VALP(J)/Y(J)+SL1
15000      IFOR=0
15100      DIFFS=0
15200      DO 33 I=1,10
15300      DIFF=((PY(I)-PY1(I))*10000)**2
15400      DIFFS=DIFFS+DIFF
15500 33      IF(DIFF.GE..1)IFOR=1
15600      IF(IX.GE.2)TYPE '(I3,F10.2)',IX,DIFFS
15700      IF(IFOR.EQ.0)GOTO 1000
15800      DO 35 I=1,10
15900      SL1=PY(I)
16000 35      FY1(I)=SL1

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16100      GOTD 100
16200      CONTINUE
16300      DO 36 I=1,10
16400      FVA(I)=VALP(I)/VA(I)
16500      HP(I)=IO(I,11)+(PP(1)*FD(I,1)+PP(2)*FD(I,2))*(1-TRB(I))+
16600      1PP(3)*FD(I,3)+PP(4)*FD(I,4)
16700      PH(I)=(PY(I)*Y(I)+PP(5)*TILL(I,2))-FDL(I,5)+TILL(I,3)/HP(I)
16800      C
16900      C
17000      C
17100      UTSKRIFTER P1 MOI082.DAT
17200      C
17300      C
17400      WRITE(32, '(//,A)') ' L'PANDE PRISER 1982: '
17500      DO 47 I=1,10
17600      YL(I)=PY(I)*Y(I)
17700      TILL(I,2)=PP(5)*PY(I)*TILL(I,2)
17800      SL1=PP(1)*FD(I,1)+PP(2)*FD(I,2)
17900      SL2=(1-TRB(I))/(1-TR(I))
18000      TL(I)=TR(I)*PH(I)*SL2*SL1
18100      PFD(I,1)=PH(I)*PP(1)*SL2
18200      PFD(I,2)=PH(I)*PP(2)*SL2
18300      PFD(I,3)=PH(I)*PP(3)
18400      PFD(I,4)=PH(I)*PP(4)
18500      DO 52 J=1,4
18600      FDL(I,J)=PFD(I,J)*FD(I,J)
18700      DO 47 J=1,10
18800      IOL(I,J)=PH(I)*IO(I,J)
18900      IOL(I,11)=IOL(I,11)+IOL(I,J)
19000      YL(11)=YL(11)+YL(J)
19100      IOL(11,11)=IOL(11,11)+IOL(11,J)
19200      WRITE(32, '(//,A)') ' INSATS-MATRIS: '
19300      DO 50 I=1,11
19400      WRITE(32, '(11F7.0)')(IOL(I,J),J=1,11)
19500      WRITE(32, '(//,A)') ' F'RIDLINGSVERDE: '
19600      WRITE(32, '(11F7.0)')VALP
19700      WRITE(32, '(//,A)') 'BRUTTOPRODUKTION: '
19800      WRITE(32, '(11F7.0)')YL
19900      WRITE(32, '(//,A)') ' FINAL DEMAND-MATRIS: '
20000      WRITE(32, '(//,6(A9)') 'OFFLF', 'PRIVK', 'INV', 'LABER', 'EXPORT',

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20100 1'SUM
20200 DO 44 I=1,11
20300 DO 45 J=1,5
20400 45 FDL(I,6)=FDL(I,6)+FDL(I,J)
20500 44 WRITE(32, '(6F9.0)')(FDL(I,J),J=1,6)
20600 WRITE(32, '(7A)')(TILLF\RSEL)
20700 WRITE(32, '(7,5(A9))')(PROD, OFS, IMP, IND SK, SUM)
20800 DO 41 I=1,11
20900 TILL(I,5)=YL(I)+TILL(I,2)+TILL(I,3)+TL(I)
21000 41 WRITE(32, '(5F9.0)')(YL(I),TILL(I,2),TILL(I,3),TL(I),TILL(I,5))
21100 WRITE(32, '(A,5F6.3)')(PP, (PP(I),I=1,5))
21200 WRITE(32, '(A,10F6.3)')(PE, (PED(I,5),I=1,10))
21300 WRITE(32, '(A,10F6.3)')(PM, (PTILL(I,3),I=1,10))
21400 WRITE(32, '(A,10F6.3)')(PY, (PY(I),I=1,10))
21500 WRITE(32, '(A,10F6.3)')(PH, (PH(I),I=1,10))
21600 WRITE(32, '(A,10F6.3)')(TRB, (TRB(I),I=1,10))
21700 WRITE(32, '(A,10F6.3)')(TR, (TR(I),I=1,10))
21800 END

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