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INPUT-OUTPUT MODELS BASED ON COMMODITY FLOW TABLES OR ON MARKET TRANSACTION TABLES?

1. Introduction

For the Federal Republic of Germany, two types of input-output tables are available: commodity flow tables and market transaction tables. Often the question arises what type of table should be given preference for input-output-modelling. Some theoretical arguments are in favour of commodity-based input-output tables, while the available statistical data support the use of institutionally-based tables, i.e. tables which hold the enterprises as units of production.

Two criteria will be used to explore the quality of the commodity flow table and of the market transaction table each for the empirical implementation of input-output-models. One criterion has its origin in the stability of important input coefficients, and the other criterion can be gained from the results of input-output computations using the same exogeneous final demand vectors, but are based on two different sets of input coefficients.

The conclusions indicate that both types of tables are suited for input-output-modelling. The decision for the commodity-based type or for the institutionally-based type depends, in each case, on the specific aim of input-output models. Therefore, it should

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be envisaged to establish a consistent input-output data system for the Federal Republic of Germany, including commodity flow tables and market transaction tables, both.

2. Commodity Flow Tables and Market Transaction Tables

Input-output tables for the Federal Republic of Germany are provided by some institutions. Commodity flow tables are compiled by the Federal Statistical Office (FSO) in Wiesbaden, the Rhinish-Westphalian Institute for Economic Research in Essen, and the Ifo-Institute for Economic Research in Munich, market transaction tables are compiled exclusively by the German Institute for Economic Research (DIW) in Berlin (West) (cf. R. S t ä g l i n (1982)).

The commodity flow tables show as comprehensively as possible the flows of goods and services between the branches of the economy and with the rest of the world. The branches are classified according to the commodities they produce, i.e. they consist of homogeneous production units, each producing one specific commodity group. On the other hand, the market transaction tables draw a picture of the marketed interactions between institutionally defined sectors of production. These sectors are made up of organisational units, i.e. units that prepare their own balance sheet (enterprises) or figure out their own budgetary accounts (local authorities, welfare associations, private households). The units are classified according to their main (characteristic, predominant) outputs.

The commodity flow tables of the FSO consist of 58 branches, respectively commodity groups. They are compiled in line with the concepts of the European System of Integrated National Accounts (ESA)[1]. That involves some shifting in commodity flows to take into account the conceptional differences between the national product compilation of the FSO and the official input-output tables. Accordingly the intermediate production flows include intra-firm deliveries and the marketed commodities are

[1] Statistical Office of the European Communities (1979), European System of Integrated Economic Accounts - ESA, Second edition, Luxembourg.

treated according to the net concept of trade, assuming a direct relationship between the producers and users of goods. The production values of wholesale and retail trade, thus, only account for gross trade margins. Gross output and the commodity flows are valued at producers prices excluding value added tax. In Annex--Table A1 the commodity flow table of the FSO for the year 1980 is shown in its aggregated version covering twelve branches, five final demand components and six primary inputs[2].

The corresponding aggregated market transaction table for the Federal Republic of Germany 1980, compiled by the DIW, is presented in Annex- Table A2. It reflects the same classification as in the FSO table showing twelve sectors of production, five final demand vectors and seven primary input components. A detailed description of the classification is given in the Appendix A. The aggregated market transaction table is derived from the institutionally-based input-output table of the DIW which, originally, holds 60 sectors of production and which was published as a wall chart in cooperation with Spektrum der Wissenschaft[3] (see also R. S t ä g l i n (1985)). The sectoral gross production, in most cases, represents the marketed output, but it also includes changes in input stocks and the formation of fixed capital by enterprises themselves. The production flows within an enterprise, i.e. the intra-firm deliveries of goods and services, are excluded according to this output definition. Thus, the intra-sectoral transactions in the institutional input-ontput table reflect the flows between different enterprises belonging to the same sector only. The method of recording in the market transaction tables of the DIW largely conveys to the concepts used in the FSO compilation of national product. Just one exception has to be mentioned. In the official national product compilation, the total value of turnover is included in the gross value of production for wholesale and retail trading, while in the insti-

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[2] Cf. Statistisches Bundesamt (1984), Fachserie 18, Volkswirtschaftliche Gesamtrechnungen, Reihe 2, Input-Output-Tabellen 1980, Stuttgart und Mainz.

[3] Spektrum der Wissenschaft in Zusammenarbeit mit dem DIW (1985), Input/Output Struktur für die Wirtschaft der Bundesrepublik Deutschland. Input-Output-Wandtafel, Heidelberg und Berlin.

tutionally-based input-output tables these sectors are recorded with their gross trade margins only and, by that, are fully in line with the concept of the commodity flow table of the FSO. The transactions in the DIW input-output table reflect market prices, i.e. producers' prices plus invoiced freight charges, but excluding value added tax (as in the commodity flow tables).

By comparing the two aggregated input-output tables in Appendix A, it becomes clear that the differences between the commodity flow and the market transaction tables are caused by the different statistical units (commodities versus enterprises), the different classification of characteristic and non-characteristic outputs, and the reporting of intrafirm flows. On the other hand, some parts of the two tables, to a large extent, fully correspond to each other, for instance government consumption (element 12/14), total gross value added (element 16-19/1-12), and the components of total gross value added (elements 16/1-12 to 19/1-12). Just the sectoral distribution of these primary inputs varies more or less according to the conceptional differences between the commodity flow table and the market transaction table.

3. The Quality of Commodity Flow Tables and Market Transaction Tables for Input-Output Modelling

Traditional input-output theory favours commodity flow tables since it assumes that there would be a high degree of stability in input coefficients as long as they are based on homogeneous flows of goods and services. Knowing about the difficulties in compiling input-output tables, it is a fact that neither the commodity flow tables nor the market transaction tables can be realized in a theoretically pure way. That is due to the statistical data on intermediate and primary inputs that, in most cases, are available for institutional units only. Therefore, the argument is submitted to use the market transaction tables for input-output modelling, since it is easier to have access to data, and the stability of input coefficients not necessarily is less en-

sured by looking at institutional transactions. It only would be if there were big changes, annually, in classifying the individual enterprises. In the following the differences in the results gained from the two types of input-output tables will be analyzed, using two criteria which are connected with each other.

3.1 Stability of Important Input Coefficients

As input coefficients play a major role in input-output modelling, the first criterion depicts the stability of important input coefficients. One of the many ways to define and to evaluate significant, respectively important, input coefficients[4] is the method of "tolerable limits", first introduced by A. S e k u l i ć (1968) and J. J i l e k (1971) and extended for selected input coefficients by J. S c h i n t k e (1976). The assessment of important coefficients is in line with the theory of error analysis in linear systems. To determine the important input coefficients, sectoral production effects are calculated on the basis of fictive errors in individual coefficients. These inconsistent error simulations within the well-known open static Leontief model permit to distinguish between important and unimportant input coefficients. The results of such error simulations for three commodity flow tables (cf. J. S c h i n t k e (1984)) and three market transaction tables for the Federal Republic of Germany were presented in a contribution to the Fifth IIASA Task Force Meeting on Input-Output-Modelling held at Luxenburg, Austria, October 1984 (cf. J. S c h i n t k e, R. S t ä g l i n (1985)). The so-called degrees of sensitivity which permit the classification of input coefficients according to their influence on sectoral gross output, are calculated on the basis of disaggregated input-output tables of the FSO with 60 branches for the years 1970, 1974, 1975 and for corresponding 56-sector tables of the DIW for 1967, 1972 and 1976. The analysis yields a wide conformity in the results. In both types of input-output tables the important input coefficients constitute nearly one third of all

[4] Criteria for the importance of coefficients are also described by L. T o m a s z e w i c z (1983).

positive matrix elements and cover about 90 percent of total domestic intermediate flows, respectively transactions. The high stability in the shares of all important and unimportant coefficients also applies to the percentage distribution of the important input coefficients according to ten groups, each group representing an interval of sensitivity of ten per cent.

The results on important an unimportant coefficients gained from simulating the effects of errors in input coefficients on gross production values on the basis of commodity flow tables and market transaction tables can be confirmed by new calculations using the up-to-date FSO and DIW input-output tables for the year 1980. Summing up, by the criterion of stable important input coefficients neither the commodity-based nor the institutionally-based tables are preferred as empirical basis for input-output models.

3.2. Results of Alternate Input-Output Computations

The question arises whether the second criterion being derived from the results of alternate input-output computations can favour one of the two types of tables for input-ontput modelling. For that purpose the Leontief model is used to calculate production effects induced by the same exogeneous final demand, first on the basis of a commodity flow table and second on the basis of a market transaction table. The formula of the open static Leontief model is

$$x = (E - A)^{-1} \cdot y = C \cdot y,$$

wherein

x = vector of gross production respectively output,
y = vector of final demand,
$A = (a_{ij})$ = matrix of input coefficients,
E = unit matrix,

$C = (c_{ij})$ = matrix of inverse coefficients[5],

with i, j = 1, ..., n = number of branches, respectively sectors.

For the intended alternate input-output computations the vectors of final demand and gross production are substituted by matrices. The reason is that the final demand components of the aggregated FSO commodity flow table (cf. Table A. 1) are assumed to be the exogeneous final demand. The two matrices of inverse coefficients are derived from the aggregated FSO commodity flow table and from the aggregated DIW market transaction table for the Federal Republic of Germany, 1980, presented in ANNEX--TABLES A1 and A2. That is reflected by

$$FSO\ X^{FSO}_{80} = C^{FSO}_{80} \cdot Y^{FSO}_{80}$$

$$DIW\ X^{FSO}_{80} = C^{DIW}_{80} \cdot Y^{FSO}_{80}$$

wherein

C^{FSO}_{80} = matrix of inverse coefficients derived from the aggregated FSO commodity flow table for 1980,

C^{DIW}_{80} = matrix of inverse coefficients derived from the aggregated DIW market transaction table for 1980,

Y^{FSO}_{80} = matrix of final demand components derived from the aggregated commodity flow table for 1980,

$FSO\ X^{FSO}_{80}$ = matrix of total (direct and indirect) gross production imputed to the FSO final demand components on the basis of the FSO inverse coefficients for 1980,

$DIW\ X^{FSO}_{80}$ = matrix of total (direct and indirect) gross production imputed to the FSO final demand components on the basis of the DIW inverse coefficients for 1980.

5. The term "matrix of inverse coefficient" replaces the exact expression "matrix with elements of the inverse of the Leontief-matrix".

The results of the two input-output computations[6] are presented in Table 1 and 2. Table 1 shows the sectoral production effects ($^{FSO}x^{FSO}_{80}$ and $^{DIW}x^{FSO}_{80}$) induced by the same FSO final demand components (Y^{FSO}_{80}), in millions of DM, and in percentage. The use of the two aggregated FSO and DIW input-output tables results in different levels of gross production but the quotas are quite similar. The differences between the values of imputed gross production according to the FSO table and the ones gained from applying the FSO final demand with the DIW transaction market table are separately shown in Table 2. They are calculated in absolute figures and in percentage deviations where the values of production compiled on the basis of the FSO commodity flow table served as basis.

When looking at the quotas of direct and indirect dependency on final demand components (cf. Table 1), the results can be interpreted as equally reliable for both types of input-output tables in modelling. But in absolute terms, major differences are found in gross production induced by final demand components, ranging from -1225 to -35 403 millions of DM in branch 4 METALS, and from +7098 to +37 598 millions in sector 10 TRADE, TRANSPORT, for instance (cf. Table 2). Having this in mind, the two approaches do not seem to be equally well suited for indentical analytical questions. In other words: The discrepancies between the aggregated FSO input-output table and the aggregated DIW table, due to conceptual differences, become more apparent in the level and in the sectoral pattern of the absolute terms. Largely, the differences in imputed gross production are caused by the intra-firm deliveries taken into account in the commodity flow table only. Therefore, the level of gross production induced in most cases is below that of the FSO table. This statement is supported by additional input-output computations on the basis of the disaggeregated FSO and DIW input-output tables for the year 1980.

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[6] I have to express my thanks to Mr. Stahmer of the FSO and to Mr. Schintke and Mrs. Ludwig of the DIW for assisting in the input-output computations.

Table 1

Sectoral production efects induced by the same final demand components on the basis of two different types of aggregated input-output tables for the Federal Republic of Germany 1980

Branches sectors	Imputed (direct and indirect) gross production induced by the FSO final demand components									
	in millions of DM					quotas in per cent				
	private consum-ption	government consumption	capital formation[a]	exports	final demand	private consumption	government consumption	capital formation[a]	export	final demand
1	2	3	4	5	6	7	8	9	10	11
	Use of the aggregatied FSO commodity flow table									
1. AGRICULT	52 651	4 114	1 882	10 304	68 951	76.36	5.97	2.73	14.94	100.00
2. ENERGY, M	56 817	10 939	14 101	30 732	112 589	50.46	9.72	12.52	27.30	100.00
3. CHEMICAL	114 526	24 124	57 757	109 191	305 598	37.48	7.89	18.90	35.73	100.00
4. METALS	23 451	4 740	50 358	96 369	174 918	13.41	2.71	28.79	55.09	100.00
5. MACH, VEH	56 514	8 419	97 232	137 756	299 921	18.84	2.81	32.42	45.93	100.00
6. ELECTRIC	34 390	9 914	51 736	67 881	163 921	20.98	6.05	31.56	41.41	100.00
7. TIMB, TEX	90 237	8 365	24 190	40 551	163 343	55.24	5.12	14.81	24.83	100.00
8. FOOD, BEV	141 537	7 260	2 285	20 968	172 050	82.27	4.22	1.33	12.19	100.00
9. CONSTRUC	11 567	6 342	169 791	9 878	197 578	5.85	3.21	85.94	5.00	100.00
10. TRADE, TR	209 638	19 420	42 099	72 579	343 736	60.99	5.65	12.25	21.11	100.00
11. SERVICES	333 389	67 754	50 997	58 955	511 095	65.23	13.26	9.98	11.54	100.00
12. PUB, PRIV	38 524	331 780	3 007	3 889	377 200	10.21	87.96	0.80	1.03	100.00
(1-12)	1 163 241	503 171	565 435	659 053	2 890 900	40.24	17.41	19.56	22.80	100.00

Table 1 (cd.)

1	2	3	4	5	6	7	8	9	10	11
	Use of the aggregated DIW market transaction table									
1. AGRICULT	45 468	4 346	2 187	9 227	61 228	74 26	7.10	3.57	15.07	100.00
2. ENERGY, M	64 183	11 181	17 152	34 858	127 374	50.39	8.78	13.47	27.37	100.00
3. CHEMICAL	122 652	25 718	62 434	115 439	326 243	37.60	7.88	19.14	35.38	100.00
4. METALS	13 292	3 515	32 005	60 966	109 778	12.11	3.20	29.15	55.54	100.00
5. MACH, VEH	55 224	9 534	96 999	137 141	298 898	18.48	3.19	32.45	45.88	100.00
6. ELECTRIC	33 450	8 708	53 643	70 666	166 467	20.09	5.23	32.22	42.45	100.00
7. TIMB, TEX	88 016	10 494	23 215	40 913	162 638	54.12	6.45	14.27	25.16	100.00
8. FOOD, BEV	153 046	8 406	3 780	23 533	188 765	81.08	4.45	2.00	12.47	100.00
9. CONSTRUC	12 187	6 972	172 536	10 894	202 589	6.02	3.44	85.17	5.38	100.00
10. TRADE, TR	247 236	26 518	51 245	86 162	411 161	60.13	6.45	12.46	20.96	100.00
11. SERVICES	338 791	65 929	47 164	51 960	503 844	67.24	13.09	9.36	10.31	100.00
12. PUB, PRIV	38 334	331 751	2 677	3 703	376 465	10.18	88.12	0.71	0.98	100.00
(1-12)	1 211 879	513 072	565 037	645 462	2 935 450	41.28	17.48	19.25	21.99	100.00

[a] Incl. changes in stocks.

S o u r c e: Agregated FSO and DIW Input-Output Tables for the Federal Republik of Germany 1980 (cf. Annex).

Table 2

Differences in sectoral production effects induces by the same final demand components on the basis of two different types of aggregated input-output tables for the Federal Republic of Germany 1980

Branches sectors	Differences in imputed (direct and indirect) gross production according to the use of the aggregated DIW market transaction table instead of the aggregated FSO commodity flow table									
	in millions of DM					in per cent (FSO results = 100)				
	private consumption	government consumption	capital formation[a]	exports	final demand	private consumption	government consumption	capital formation[a]	exports	final demand
1. AGRICULT	- 7 183	232	305	- 1 077	- 7 723	-13.64	5.64	16.21	-10.45	-11.20
2. ENERGY,M	7 366	242	3 051	4 126	14 785	12.96	2.21	21.64	13.43	13.13
3. CHEMICAL	8 126	1 594	4 677	6 248	20 645	7.10	6.61	8.10	5.72	6.76
4. METALS	-10 159	-1 225	-18 353	-35 403	-65 140	-43.32	-25.84	-36.45	-36.74	-37.24
5. MACH, VEH	-1 290	1 115	- 233	- 615	-1 023	- 2.28	13.24	-0.24	-0.45	-0.34
6. ELECTRIC	- 940	-1 206	1 907	2 785	2 546	-2.73	-12.16	3.69	4.10	1.55
7. TIMB, TEX	-2 221	2 129	- 975	362	- 705	-2.46	25.45	-4.03	0.89	-0.43
8. FOOD, BEV	11 509	1 146	1 495	2 565	16 715	8.13	15.79	65.43	12.23	9.72
9. CONSTRUC	620	630	2 745	1 016	5 011	5.36	9.93	1.62	10.29	2.54
10. TRADE,TR	37 598	7 098	9 146	13 583	67 425	17.93	36.55	21.72	18.71	19.62
11. SERVICES	5 402	-1 825	-3 833	-6 995	-7 251	1.62	-2.69	-7.52	-11.86	-1.42
12. PUB,PRIV	- 190	- 29	- 330	- 186	- 735	-0.49	-0.01	-10.97	-4.78	-0.19
(1-12)	48 638	9 901	- 398	-13 591	44 550	4.18	1.97	-0.07	-2.06	1.54

[a] Incl. changes in stocks.

Source: As Table 1.

4. Conclusions and New Approaches

The first rough attempt of testing the quality of commodity flow tables and/or market transaction tables for input-output modelling results in stating that both, commodity-based and institutionally-based tables, and not either commodity-based or institutionally-based input-output tables, are equally well suited for modelling purposes. This preliminary statement should be explored in more detail by

- calculating the gross production induced by the DIW final demand components (Y_{80}^{DIW}) as exogeneous variables in the Leontief model, or by a final demand vector aside from the ones given;
- comparing the input coefficients and the inverse coefficients of the aggregated (and disaggregated) FSO commodity flow table nd the DIW market transaction table;
- analyzing the differences in input coefficients and inverse oefficients with reference to the important coefficients in both types of input-output tables.

These reflections can be seen as part of a research project being carried out by the FSO and the DIW jointly and financially supported by the German Research Foundation. The research aims at establishing a consistent input-output system for the Federal Republic of Germany connecting the commodity flow tables and the market transaction tables within the national accounts (cf. R. S t ä d i n, C. S t a h m e r (1985)). For that purpose, basic or linkage tables similar to the use and make matrices described in the United Nations' "System of National Accouts" (SNA)[7] will be taken as starting point. These basic tables show the commodity inputs of institutional sectors (input table) as well as the gross output by institutional sectors and by commodity groups (output table). The following scheme reveals the steps required to transfer commodity flow tables into market transaction tables and vice versa:

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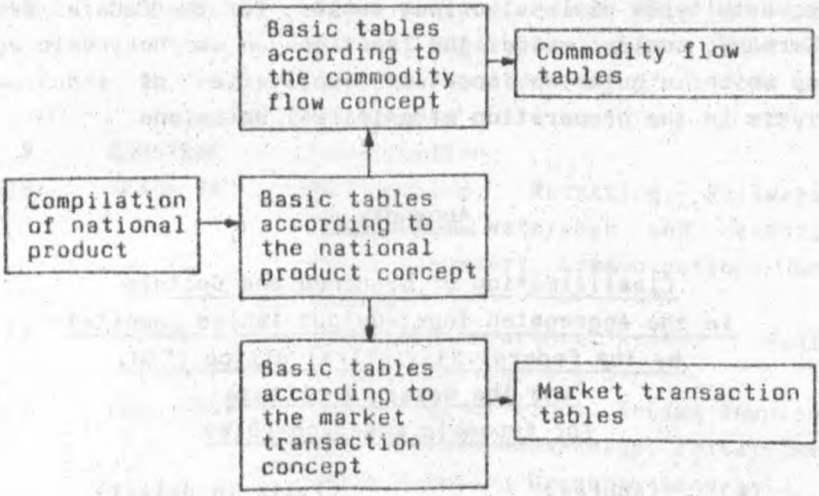
[7] United Nations (1968), A System of National Accounts - SNA, "Studies in Methods", Ser. 6, No. 2, Rev. 3 (New York).



The compilation procedure starts with basic tables according to the national product concept. In a second step these basic tables are converted from the national product concept to the two different input-output concepts including solutions for the treatment of stocks, the trade concept and the intra-firm deliveries. The third step consists of transforming the converted basic tables into commodity flow tables and market transaction tables, respectively. To transform the institutionallydefined columns or the commodity-defined rows of the input table into uniform commodity flow and market transaction classifications, the data of the output table and special transformation matrices (see C. S t a h m e r (1985)) are used.

The existence of such a consistent input-output data system would offer the opportunity to use both types of tables for purposes of economic reasoning and empirical analysis within the overall frame of national accounts (cf. also C. S t a h m e r, (1984), R. S t a g l i n (1984)). The commodity flow tables could be used for applying input-output analysis on questions of raw material dependency, for instance, and the market transaction tables could be taken as a basis for modelling the feedbacks of governmental expenditure programs. An input-output system of this kind would also contribute to answer questions posed earlier in this paper, because it would link the FSO and the DIW tables.

Thus, both types of input-output tables, for the Federal Republic of Germany, could consider the reactions on macroeconomic aggregates which is quite an important application of input-output analysis in the preparation of political decisions.

Appendix A

Classification of Branches and Sectors in the Aggregated Input-Output Tables Compiled by the Federal Statistical Office (FSO) and the German Institute for Economic Research (DIW)

(I)	(K)	(Abbrev)	(Title in detail)
1	1	AGRICULT	Agriculture, Forestry, Fishing and Gardening
2	2	ENERGY,M	Electricity, Gas and Water, Coal Mining, Iron Ore Mining, Potash and Rock Salt Mining, Mineral Oil Extraction, Mining N.E.S.
3	3	CHEMICAL	Chemicals, Building Materials, Mineral Oil Refining, Plastices, Rubber and Asbestos Manufactures, Fine Ceramics, Glass
4	4	METALS	Iron and Steel, Iron and Steel Foundries, Steel Drawing and Cold Rolling Mills, Non-Ferrous Metals, Steel Forging
5	5	MACH,VEH	Constructional Steel, Machinery, Vehicles, Aerospace, Shipbuilding
6	6	ELECTRIC	Electrical Engineering, Precision Engineering and Optics, Hard Ware and Metal Goods, Musical Instruments, Toys, Jewelry and Sport Articles .
7	7	TIMB, TEX	Sawmills and Timber Processing, Cellulose and Paper, Timber Manufactures, Paper and Board Manufactures, Printing and Duplicating, Leather, Textiles, Clothing

8	8	FOOD,BEV	Grain Milling, Edible Oils and Margarine, Sugar, Brewing and Malting, Tobacco Manufactures, Other Food and Beverages
9	9	CONSTRUC	Construction
10	10	TRADE,TR	Wholesaling, Retailing, Railways, Shipping, Waterways and Harbors, Other Transport, Communications (Bundespost)
11	11	SERVICES	Banks and Insurance, Rented Dwellings, Services N.E.S.
12	12	PUB, PRIV	Public Sector (Incl. Social Insurance), Private Households, Private Non--Profit-Making Organizations
		(1-12)	Intermediate Consumption Resp. Final Consumption From Domestic Production
13		IMPORTS	Imported Inputs Resp. Final Imports (CIF)
14		I. DUTIES	Duties on Imports
		(13-14)	Imported Inputs Resp. Final Imports (Ex-Duty Prices)
15		N.DE.TAX	Not Deductible Turnover TAX
		(1-15)	Total Intermediate Consumption Resp. Total Final Consumption
16		TAX-SUBS	Production Taxes Less Subsidies
17		DEPREC	Depreciation
18		EMPL.INC	Compensation of Employees
19		PROP.INC	Gross Profits and Property Income (Operating Surplus)
		(16-19)	Gross Value Added
		(14-19)	Gross Domestic Product Resp. Gross Social Product
20		(1-19)	Gross Production (Input) Resp. Final Use of Social Product
		(1-12)	Intermediate Demand Resp. Components of Gross Domestic Product
13		PRV.CONS	Private Consumption
14		GOV.CONS	Government Consumption

15	CAP.FORM	Gross Fixed Capital Formation
16	STOCKS	Changes in Stocks
17	EXPORTS	Exports
	(13-17)	Final Demand
18	(1-17)	Gross Production (Output) Resp. Origin of Social Product

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Aggregated commodity flow table for the Federal Republic of Germany (1980)
compiled by the Federal Statistical Office (FSO)

Branches / Sectors	1. AGRICULT	2. ENERGY,M	3. CHEMICAL	4. METALS	5. MACH,VEH	6. ELECTRIC	7. TIMB,TEX	8. FOOD,BEV	9. CONSTRUC	10. TRADE,TR	11. SERVICES	12. PUB,PRIV	(1-12)	13. PRV.CONS	14. GOV CONS	15. CAP.FORM	16. STOCKS	17.EXPORTS	(13-17)	(1-17)
1. AGRICULT	7 804	112	372	14	25	35	3 400	40 419	177	201	4 599	1 244	58 502	8 011	-	321	-447	2 564	10 449	68 951
2. ENERGY,M	1 292	30 954	12 282	11 609	2 271	1 101	2 768	1 786	835	6 215	7 071	5 580	83 764	21 373	-	-	777	6 675	28 825	112 589
3. CHEMICAL	6 944	3 133	67 104	5 005	12 645	8 696	10 809	5 420	30 986	10 859	8 866	15 374	185 921	51 353	-	16	5 540	62 768	119 677	305 598
4. METALS	702	1 576	1 780	81 191	31 406	13 997	628	68	5 022	1 051	421	187	138 037	78	-	5 760	1 488	29 555	36 881	174 918
5. MACH, VEH	1 334	4 207	4 913	1 126	46 802	2 753	1 753	1 152	4 992	5 958	2 170	5 810	82 940	34 139	-	66 506	7 321	109 015	216 981	299 921
6. ELECTRIC	414	1 677	2 942	1 395	17 001	16 384	2 108	1 926	6 800	2 196	8 122	7 252	68 217	14 771	-	29 867	2 691	48 375	95 704	163 921
7. TIMB, TEX	515	298	5 228	538	2 957	2 816	32 068	3 098	7 986	6 350	12 645	4 049	78 548	53 249	-	5 505	1 916	24 125	84 795	163 343
8. FOOD, BEV	8 244	48	1 647	113	102	92	529	21 503	90	818	15 915	4 011	53 112	105 269	-	-	-512	14 181	118 938	172 050
9. CONSTRUC	430	1 548	388	269	326	119	146	179	5 550	1 462	8 663	5 329	24 409	2 550	-	163 412	-	7 207	173 169	197 578
10. TRADE, TR	3 313	2 656	16 422	9 506	14 546	7 027	11 590	10 793	10 405	18 264	14 204	13 961	132 687	156 404	-	13 776	557	40 312	211 049	343 736
11. SERVICES	2 043	2 634	16 162	4 933	19 752	11 628	10 335	6 143	9 229	36 085	111 146	53 266	283 356	206 368	-	10 586	-	10 785	227 739	511 095
12. PUB, PRIV	335	289	1 458	435	1 463	431	451	653	932	1 339	5 150	37 139	51 075	27 689	297 900	-	-	536	326 125	377 200
(1-12)	33 370	49 132	130 706	116 134	149 296	65 049	76 665	93 240	83 004	90 798	199 972	153 202	1 240 568	681 254	297 900	295 749	19 331	356 098	1 650 332	2 890 900
13. IMPORTS	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
14. I. DUTIES	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
(13-14)	5 507	12 063	77 324	20 769	26 309	16 712	23 227	21 990	12 104	15 673	17 308	15 336	264 322	70 516	.	24 431	- 431	20 532	114 048	378 370
15. N.DE.TAX	-	-	-	-	-	-	-	-	-	401	4 745	9 404	14 550	62 800	-	18 800	-	300	81 900	96 450
(1-15)	38 877	61 195	208 030	136 903	175 605	81 761	99 892	115 230	95 108	106 872	222 025	177 942	1 519 440	814 570	297 900	337 980	18 900	376 930	1 846 280	3 365 720
16. TAX-SUBS	-855	2 076	21 356	480	2 038	1 005	1 100	14 667	1 866	-3 528	12 636	259	53 100							
17. DEPREC	9 042	12 294	12 959	5 394	12 416	6 469	5 979	5 531	5 060	28 913	57 452	11 811	173 320							
18. EMPL.INC	6 498	25 183	56 011	29 902	101 003	63 763	45 886	23 099	66 771	144 822	90 584	187 188	840 710							
19. PROP.INC	15 389	11 841	7 242	2 239	8 859	10 923	10 486	13 523	28 773	66 657	128 398	-	304 330							
(16-19)	30 074	51 394	97 568	38 015	124 316	82 160	63 451	56 820	102 470	236 864	289 070	199 258	1 371 460							
(14-19)	.	.	.	.	.	.	.	.	.	.	.	.	.							
(1-19)	68 951	112 589	305 598	174 918	299 921	163 921	163 343	172 050	197 578	343 736	511 095	377 200	2 890 900							

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Reiner Stäglin

MODELE INPUT-OUTPUT OPARTE NA TABLICACH STRUMIENI TOWARÓW CZY TABLICACH TRANSAKCJI RYNKOWYCH

Studia nad wrażliwością wskaźników input przy użyciu metody "tolerowanych limitów", rozszerzone dla indywidualnych wskaźników przez J. Schintke, pokazują stabilność ważności relacji input dla obydwu typów tablic. Powstaje pytanie, czy należy użyć tablic transakcji rynkowych jako bazy dla modeli input-output w przeciwieństwie do tradycyjnej teorii input-output opartej na homogenicznych strumieniach produkcji.

Czy są jakieś preferencje dla tablic input-output opartych na strumieniach towarowych i macierzy przedsiębiorstw? Jakie są

następstwa modelowania i praktycznego zastosowania w stosunku do obliczeń input-output?

Na pytania te odpowiada się porównując rezultaty różnych obliczeń input-output. W tym celu egzogeniczne wektory popytu finalnego będą połączone z każdym typem tablic input-output. Tablice oparte na towarach wykorzystywane są dla specjalnych obliczeń. Dlatego potrzebne byłoby opracowanie spójnego systemu input-output dla RFN, z dwoma typami tablic. Bierze się tu pod uwagę dwie podstawowe tablice systemu rachunków narodowych ONZ.