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Article

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Intersystem Comparison between the Federal Republic of Germany and Hungary on the Basis of SNA Type and MPS Type Input-Output Tables*

by György Boda** and Reiner Stäglin

1. Introduction

Two years ago the German Institute for Economic Research (DIW) and the Hungarian Central Statistical Office started a co-operation in order to compare the economic structures of the Federal Republic of Germany (FRG) and of Hungary on the basis of input-output tables. The cross-country comparison was regarded as a contribution to the activities of the Statistical Commission of the United Nations Economic and Social Council which emphasized the advantages of bilateral comparisons in order to test and clarify the methodology of intersystem analysis (United Nations, 1986a). Additionally, the illustrative calculation of input-output indicators for the FRG and Hungary based on the System of National Accounts (SNA) and the System of Balances of the National Economy (MPS) can be classed with the International Comparison Project (ICP) of the United Nations Statistical Office although this project is mainly concentrated on the comparison of real product and purchasing power parities across countries (Drechsler, 1985 and 1987).

The envisaged input-output comparison consists of different steps. Firstly, the main SNA-MPS type indicators will be derived and evaluated. Secondly, the structural differences between the West-German and the Hungarian economies will be analyzed using the traditional input measures and a common 12 sector classification. That includes an updating of the matrices for the primary input structure of final uses and for the final allocation structure of primary inputs being computed by Augustinovics (1970) for Hungary and EEC countries already for the early sixties. Thirdly, specific economic problems with respect to foreign trade dependencies and sectoral productivity pattern in the FRG and Hungary will be dealt with but that presumes a more detailed breakdown of the input-output tables and a valuation of the interindustry transactions at constant prices.

In this paper some results of the first two steps of the bilateral comparison will be presented. The investigations are experimental and their outcome should be classified as a preliminary workshop report.

2. The role of input-output tables in the SNA-MPS conversion

The numerous differences between SNA and MPS are well-known. They relate to fundamental concepts and definitions, to peculiarities in the institutional set-up, and to sources of data used in the accounts and balances (Arvay, 1967; United Nations, 1977; Wessels, 1986).

The most important difference between the underlying concepts and definitions of SNA and MPS refers to the definition of economic production. In SNA, practically all activities belonging to the production of goods and services are embraced by the concept of production. In MPS, economic production is restricted to industries producing material goods but also services of material character such as transportation, communication and trade. The result is that non-material services, among them government services, finance, scientific and research activities, housing, medical and educational services, are excluded from the MPS production sphere (Rutgaiser, 1975; Kigyossy-Schmidt und Schwarz, 1983; Gajecki and Kasiewicz, 1987). The difference in the production concept „has, of course, a substantial impact on the comparability not only

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** György Boda war bis zum Herbst 1990 Mitarbeiter des Ungarischen Statistischen Zentralamtes in Budapest. Der Beitrag ist unter Mitarbeit von Frau Ingrid Ludwig vom DIW und von Herrn Lajos Féhér vom Ungarischen Statistischen Zentralamt entstanden.

Table 1

Sector Classifications used for Comparision

Common Classification (12 sectors)	DIW Classification (Germany) (55 sectors)	CSO Classification (Hungary) (89 sectors)
1. Agriculture and food industries	1. Agriculture, forestry and fishing 36. Food (except beverages) 37. Beverages 38. Tobacco manufacture	49. Meat industry 50. Poultry and egg processing industry 51. Dairy milk products 52. Canning and preserving industry 53. Flour-milling industry 54. Baking and pastry goods 55. Sugar industry 56. Production of wheats 57. Vegetal oil industry 58. Production of spirits and starch 59. Wine industry 60. Breweries 61. Mineral water and soft drinks 62. Tobacco industry 69. Agriculture 70. Forestry
2. Energy and mining	2. Electricity and steam 3. Gas 4. Water 5. Coal mining 6. Crude petroleum, natural gas and other mining 8. Mineral oil refining	1. Coal mining 2. Petroleum and natural gas 3. Bauxite mining 4. Mining of other ores and minerals 5. Electricity 23. Petroleum refining 24. Production and distribution of gas 77. Water management
3. Chemicals	7. Chemical industry and fissile materials 9. Plastics manufacture 10. Rubber manufacture	25. Organic and inorganic chemicals 26. Fertilizers and plant protecting materials 27. Plastic and artificial fiber materials 28. Plastic products 29. Rubber products 30. Pharmaceutical chemicals 31. Cosmetics and household chemicals
4. Metals	14. Iron and steel industry 15. Industry of non-ferrous metals 16. Foundries 17. Drawing and cold rolling mills	6. Ferrous metallurgy 7. Aluminium metallurgy 8. Other non-ferrous metallurgy
5. Capital goods	18. Constructional steel and rail vehicles 19. Machinery 20. Office and electronic data processing machinery and equipment 21. Manufacture of road vehicles 22. Shipbuilding 23. Aerospace 24. Electrical engineering 25. Precision engineering and optics, watches and clocks 26. Manufacture of hardware and metal goods	9. Machinery and equipments 10. Transport equipments 11. Electrical machinery and appliances 12. Telecommunicational and vacuum-technical equipments 13. Precision instruments 14. Metal products

continued: **Sector Classifications used for Comparision**

Common Classification (12 sectors)	DIW Classification (Germany) (55 sectors)	CSO Classification (Hungary) (89 sectors)
6. Construction	11. Industry of building materials 12. Fine ceramic industry 13. Glass and glass industry 39. Surface and underground construction 40. Completion constructional services	15. Bricks, tiles and fire-proof materials 16. Quarrying 17. Lime and cement 18. Production of prefabricated building components 19. Asbestos cement 20. Insulating construction materials 21. Pottery, china, earthenware and grinding stones 22. Glass and glass products 64. Overground construction 65. Underground construction 66. Fitting and mounting 67. Designing for construction 68. Private construction activity
7. Consumption goods	27. Musical instruments, toys, sport equipments, jewellery, etc. 28. Saw-mills and timber processing 29. Manufacture of wood products 30. Cellulose and paper processing 31. Manufacture of paper products 32. Printing and duplicating 33. Textile industry 34. Leather, leather and shoe industry 35. Clothing industry	32. Boards and sawwood products 33. Building joineries 34. Furniture industry 35. Other wood processing industry 36. Paper industry 37. Printing industry 38. Cotton industry 39. Flax, hemp and jute industry 40. Wool industry 41. Silk industry 42. Production of smallware 43. Knitwear industry 44. Leather and fur industry 45. Shoe industry 46. Clothing 47. Handicrafts and home industry 48. Other manufacturing 63. Private artisans
8. Trade	41. Wholesale trade and recycling 42. Retail trade	75. Home trade 76. Foreign trade
9. Transport and communication	43. Railways 44. Shipping, waterways, harbors 45. Other transport 46. Postal and telecommunication services	71. Railways 72. Road transportation 73. Other transportation 74. Telecommunication
10. Financial institutions, insurances, dwellings	47. Credit institutes 48. Insurance (except social security) 49. Rented dwellings	81. Financial institutions 82. Housing services
11. Other services	50. Hotels, restaurants and residences 51. Cultural, research and publishing services 52. Market health and veterinary services 53. Other market services	78. Other material activity 79. Personal services 80. Business services 85. Social and recreation services 86. Education 87. Cultural services, sports 88. Scientific services
12. Public services and non-profit organisations	54. Public administration and social security 55. Non-profit organisations and private households	83. Urban and village public utilities 84. Social insurance and health service 89. Public administration and other services

of production aggregates of SNA and MPS, but also of categories of consumption (both intermediate and final), distribution and redistribution of income" (see United Nations, 1986a, page 9). On account of these discrepancies the United Nations Statistical Commission initiated, more than one decade ago, international work on experimental illustrative calculations of the gross domestic product (GDP) of countries using MPS and the net material product (NMP) of countries using SNA (United Nations, 1982).

These calculations of GDP and NMP are based on standard conversion tables which show the adjustments needed to derive SNA aggregates from MPS data and vice versa (United Nations, 1977, chapter V). For implementing the conversion tables, input-output matrices represent the most important statistical base (Stäglin, 1986). The disaggregation of intermediate demand, final demand and primary input components provide the data which are needed to carry out the transition between SNA and MPS balances and accounts.

2.1 Experiences with regard to intersystem linkages

The results of many intersystem comparisons confirm „that a correct conversion of SNA to MPS is not possible without the help of input-output tables" (see Boda, Koos Balsay, Molnar, 1988, page 18).

The experimental calculations of SNA-MPS aggregates performed both by the Statistical Office of the United Nations Secretariat and by countries on a bilateral basis represent one group of intersystem studies. In these studies relationships between the SNA aggregates GDP, final consumption expenditures and gross capital formation on the one hand and the MPS aggregates NMP, final consumption expenditures and net capital formation on the other hand are derived. Recent results are available for Canada (1976), France and Hungary (1976), Finland and Bulgaria (1982), and a new bilateral study is in hand for Czechoslovakia and Finland (see United Nations, 1986a, page 23, and United Nations, 1989). The France/Hungary results have its origin in a comparison of national accounting concepts and data carried out by the French INSEE and the Hungarian Statistical Office (Personnaz, Milot, Horvath, 1981).

A second group of intersystem comparisons is given with country studies in which the differences between SNA and MPS are derived from input-output tables only, i.e. conversion tables are not taken into account. Studies of such a kind have been carried out for EEC countries around 1965 (Menges et al., 1977), for Austria and Hungary 1964 (Fay und Fink, 1976), for the region of Baden-Württemberg and Hungary (Münzenmaier, 1979) and for the Federal Republic of Germany 1980 (Stäglin, 1986). It is not striking that Hungary often belongs to the countries concerned as the Hungarian Central Statistical Office represents one of the very few institutions which compile balances of gross output and GDP according to SNA as well as balances of social product and national income according to MPS on a yearly basis (Boda, Koos Balsay, Molnar, 1988). The same is true for the compilation of input-output tables which exist as SNA type and MPS type tables, both. This fact was of advantage for the joint research project of the two partners DIW and CSO. Some illustrations of the German-Hungarian intersystem comparison will be given next.

2.2 Methodological approaches used

The intersystem comparison belongs to the second group of country studies mentioned above. The overall analysis is based on indicators R_k which express the relation between aggregated input-output data according to SNA and according to MPS:

$$R_k = \frac{\text{SNA type aggregates}}{\text{MPS type aggregates}}$$

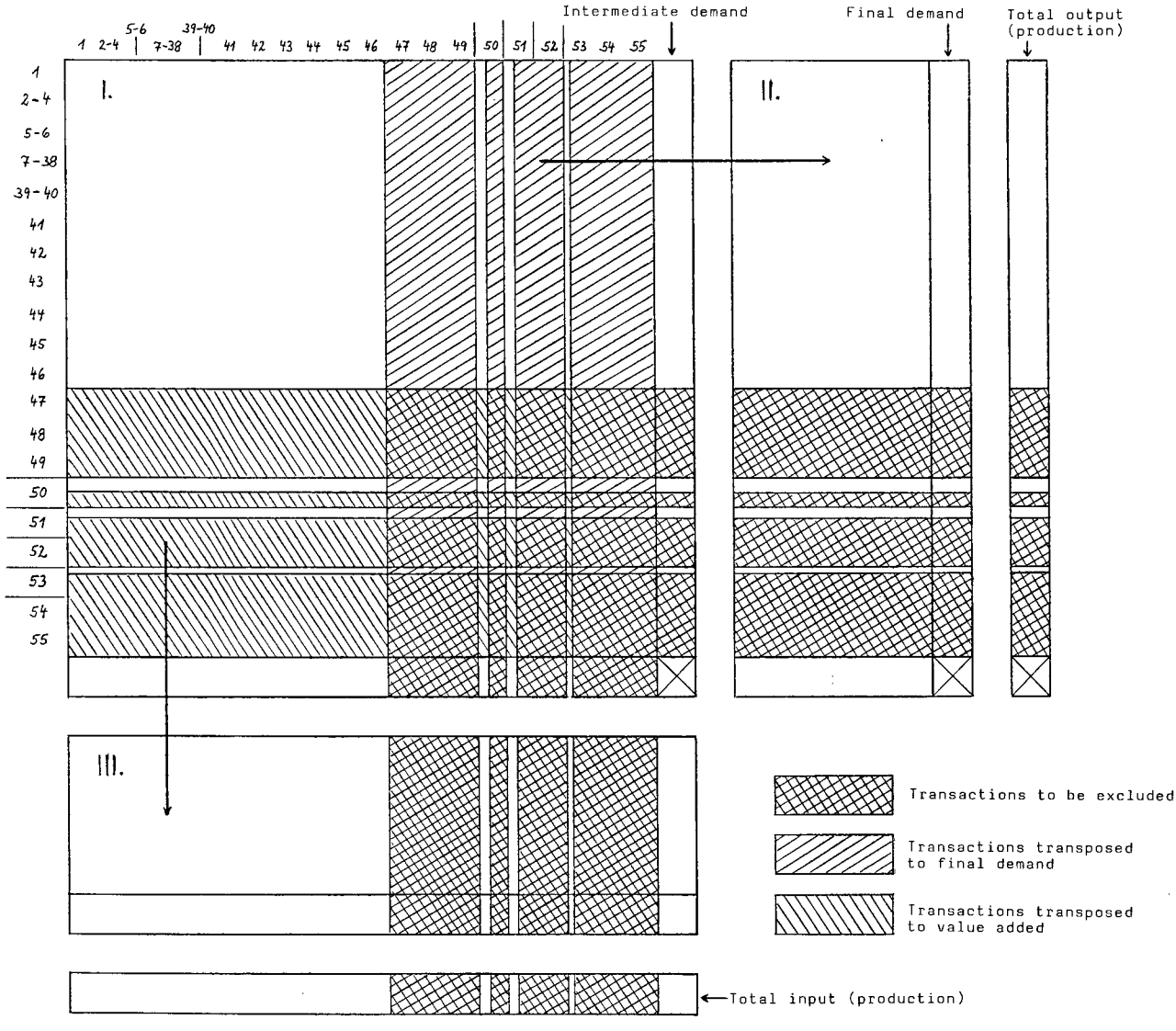
The input-output indicators are calculated for

- gross output (R_1)
- domestic intermediate consumption (R_2)
- domestic final use (R_3)
- total resources (R_4)
- total intermediate consumption (R_5)
- total final use (R_6).

The indicators R_1 to R_3 differ from R_4 to R_6 because of the imports which are included in the second group.

In order to compile the indicators it is necessary to convert the SNA type input-output table into an MPS type table. Starting with the 55 production sectors of the DIW classification (see Table 1), the non-material sectors and subsectors have to be identified first. From Figure 1 it becomes clear what input-output transactions are connected with the SNA-MPS conversion. It can be seen which rows and columns have to be eliminated, totally or partly, from the SNA type input-output table in order to arrive at intermediate demand, final demand and production values according to the MPS concept. That applies to the sectors 47 to 55 of which only a part will be excluded from sectors 50 Hotels and restaurants, 51 Cultural, research and publishing services, and 53 Other market services. Additionally, those transactions are marked in Figure 1 which will be transposed to final demand and to value added. They are given with the material inputs of non-material sectors or services industries respectively on the one hand and with the non-material outputs to material sectors on the other. Examples are the intermediate inputs of sectors 47 Credit institutes and 48 Insurance from the material sectors 1 Agriculture and 2-4 Energy, and,

FIGURE 1 **Input-output transactions connected with the SNA — MPS conversion**



among others, the intermediate outputs of sectors 47 and 48 to branches 1 and 2-4.

The material inputs of the non-material sectors are most relevant for the calculation of input-output indicators. Provided that they are not transposed to final demand as being done in Figure 1, the MPS type intermediate demand would be enhanced and the corresponding final demand would be diminished. That would result in different indicators.

The SNA-MPS conversion induces no consequences for total output and total input (production) of the 46 material sectors. That can also be seen from Figure 1. Besides, the sectoral production values according to MPS are applied to derive the MPS type intermediate and final demand figures using the output pattern from the SNA type input-output table.

The same methodological approach described so far is used in the conversion process of the Hungarian CSO. There exists an algorithm which provides the transition between the national balances of SNA and MPS via an SNA type input-output table (Boda, Koos Balsay, Molnar, 1988, pages 14-18). Here it becomes obvious, too, that the conversion process is not a mechanical one although many SNA and MPS input-output aggregates show a formal analogy. Because of the deviating definition of appropriate sectoral production, final demand and primary input components the SNA-MPS conversion cannot be performed with the same accuracy for each category. Some sectors, for instance, credit institutes and public services, play a different role in both systems, and the same is true for government consumption and taxes minus subsidies. Conversion problems with respect to imports have also not been solved definitely. Consequently

the SNA-MPS conversion with the West-German and Hungarian input-output tables can only be seen as approximative. This should be kept in mind when the input-output indicators compiled are evaluated in the following (see Tables 4 and 5).

The same is of value for the other methodological approach used in the sectoral analysis of the intersystem comparison. It is given with the traditional input pattern derived for intermediate inputs and final demand on the basis of 12 sector SNA type input-output tables for Germany and Hungary each. The input pattern are represented by the input coefficients.

$$\frac{x_{ij}}{x_j} \cdot 100 \text{ and } \frac{y_{il}}{y_l} \cdot 100.$$

They are classified into three groups of importance

$$\leq 10\ \%,\ 11\ \% - 25\ \%,\ \geq 26\ \%$$

starting with 5 % as the minimum input share to be quoted in the resulting representation (see Figures 2 and 3). This restriction makes possible to concentrate the comparison on the relevant input portions.

3. Input-output data for the FRG and Hungary

3.1 Input-output tables for the FRG 1976, 1980, 1984

Input-output tables for the FRG are compiled by the Federal Statistical Office (FSO), Wiesbaden, the Rhinish-Westphalian Institute for Economic Research (RWI), Essen, and the DIW, Berlin. The tables differ with regard to conception, especially to statistical units, and compilation procedures. The FSO input-output tables are commodity-based, in line with the European System of National Accounts, and they are derived from make and use matrices (Stahmer, 1983; Statistisches Bundesamt, 1989). The RWI tables which include interindustry flows of domestic and imported origin are also commodity-defined but they are estimated according to a combination of primary data available and model extrapolation (Hillebrand, 1990). The DIW input-output tables represent the only ones which are enterprise-based. They are compatible with the official FSO national accounts data and they are estimated on the basis of the input and output method complemented by MODOP, the **mo**del of **do**uble **p**roportionality (Stäglin, Schintke, Ludwig, 1991).

From the set of input-output tables available for the FRG, the DIW matrices for 1976, 1980, 1984 have been selected for the cross-country comparison. They consist of 55 institutionally-based production sectors (see Table 1), five final demand components and six primary inputs. The imports are shown in a primary input row by destination although they reflect the result of a detailed import matrix. The interindustry transactions are fundamentally valued at producers prices. The enterprise-based input-ouput tables of the DIW correspond, more or less, with the Hungarian tables by organisations.

3.2 Input-output tables for Hungary 1976, 1981, 1986

In Hungary the input-output tables are an integrant part of national accounts. They are compiled by the CSO according to SNA and MPS principles, both. In accordance with international practices and the needs of five year economic planning an input-ouput table with about 89 sectors (for classification scheme see Table 1) is established every four to five years (see, for instance, Hungarian Central Statistical Office, 1985). These big tables are worked out according to organisations and activities as well on the basis of make and use matrices. In the intermediate years small input-output tables with 20 to 25 sectors are compiled according to organisations and activities, too, at current and at constant prices (Boda, Koos Balsay, Molnar, 1988). In every case, the tables show inputs by domestic and foreign origin, and the interindustrial transactions are valued at producers prices.

For the intersystem comparison between Germany and Hungary the big CSO input-output tables for 1976, 1981, 1986 were chosen as they correspond best with the years of references of the DIW tables.

3.3 German and Hungarian input-output tables in a common 12 sector classification

The first two steps of the envisaged intersystem comparison do not require detailed input-output tables. For that reason a reduced version was derived using a common 12 sector classification being presented in Table 1 together with the detailed basic DIW and CSO input-output classifications. The matrices were constructed as SNA type and MPS type tables, each, falling back on the transitions to be implemented during the SNA-MPS conversion. Thus, three input-output tables according to SNA and three tables according to MPS are available for the FRG and Hungary. Of these input-output data two SNA type tables with 12 production sectors are presented exemplarily in Tables 2 and 3.

Both input-output tables represent transactions at current prices, a deflation could not be carried out until now. The German table for 1984 is in Millions DM (see Table 2), the Hungarian table for 1986 is in Millions Forints (see Table 3). The two tables follow the same classification but, nevertheless, they are not fully comparable. That is caused by the different meaning of the same sectors and categories in the two economic systems, for example,

Table 2

The German Input-Output Table for 1984 in Common Classification

(Millions DM)

	1 Agr. food	2 Energy mining	3 Chemi-cals	4 Metals	5 Capital goods	6 Con-struct	7 Consump. goods	8 Trade	9 Transp. commun.	10 Finance dwelling	11 Other serv.	12 Public, organ.	13 (1-..-12)	14 Private consump.	15 Governm. consump.	16 Capital format.	17 Stocks	18 Exports	19 (14-..-18)	20 (13+19)
1 Agr, food	85513	367	3380	339	2034	894	3654	2094	365	4258	23196	1891	127985	118879	4900	1069	235	28889	153972	281957
2 Energy,m	10279	101953	24019	17206	12690	11083	6446	8146	13643	6554	7064	613	219696	67057	10008	2195	−1820	14448	91888	311584
3 Chemical	5001	3492	42984	1816	26129	11523	11683	1272	1181	927	4385	431	110824	18451	12051	1405	1497	83943	117347	228171
4 Metals	215	1449	1682	21545	45308	5701	857	389	432	189	96	0	77863	2297	760	2861	1138	39563	46619	124482
5 Cap.good	4535	5913	4056	4835	113788	11652	3581	4355	4792	3548	5691	604	167350	78338	14585	102629	−928	241975	436599	603949
6 Construct	2355	2238	1472	2036	5088	37616	749	2015	1992	9823	1372	162	66918	6281	7742	162374	20	11654	188071	254989
7 Con.good	4346	1033	5637	874	9123	7372	24624	2860	1636	3307	9554	278	70644	58067	6133	6111	743	42089	113143	183787
8 Trade	10035	6432	9647	5682	19453	8671	7926	32687	1960	1448	4988	467	109396	135602	9134	5932	5300	19066	175034	284430
9 Tran,com	5112	7350	4063	3975	9698	10753	4123	17145	38430	3293	10640	779	115361	30951	8975	5840	508	29166	75440	190801
10 Fin,dwel	5873	780	561	519	2887	2353	867	3402	2006	89391	2560	241	111440	180391	1535	0	275	1579	183780	295220
11 Oth.serv	10329	3314	11756	6867	27377	13831	11100	33589	6477	24488	64505	6500	220133	83548	53481	11834	−368	22102	170597	390730
12 Pub,org	2191	796	1477	773	3394	1573	1163	1886	1226	7342	2539	596	24956	28442	193996	350	0	816	223604	248560
13 Imports	36912	84093	39854	18557	79221	12328	36244	7864	13846	2727	10005	774	342425	121963	16117	32320	0	39565	209965	552390
14 N.de.tax	81	264	123	198	679	149	150	186	795	5115	1605	934	10279	73303	10813	19710	0	1865	105691	115970
15 Tax-subs	14730	23170	1640	−800	3290	2110	1160	−310	−5940	10020	8190	280	57540	0	0	0	0	0	0	57540
16 (1-..-15)	197507	242644	152351	84422	360159	137609	114327	117580	82841	172430	156390	14550	1832810	1003570	350230	354630	6600	576720	2291750	4124560
17 Deprec	17420	17070	9410	7170	22430	8840	7590	11860	23230	51120	30020	15820	221980	0	0	0	0	0	0	221980
18 Empl.inc	34410	31950	50630	30470	183740	82880	48840	97560	60680	46200	64940	218190	950490	0	0	0	0	3510	3510	954000
19 Prop.inc	32620	19920	15780	2420	37620	25660	13030	57430	24050	25470	139380	0	393380	0	0	0	0	10550	10550	403930
20 (17-..-19)	84450	68940	75820	40060	243790	117380	69460	166850	107960	122790	234340	234010	1565850	0	0	0	0	14060	14060	1579910
21 (16+20)	281957	311584	228171	124482	603949	254989	183787	284430	190801	295220	390730	248560	3398660	1003570	350230	354630	6600	590780	2305810	5704470

Table 3

The Hungarian Input-Output Table for 1986 in Common Classification

(Millions Forints)

	1 Agr. food	2 Energy mining	3 Chemi-cals	4 Metals	5 Capital goods	6 Con-struct	7 Consump. goods	8 Trade	9 Transp. commun.	10 Finance dwelling	11 Other serv.	12 Public, organ.	13 (1-..-12)	14 Private consump.	15 Governm. consump.	16 Capital format.	17 Stocks	18 Exports	19 (14-..-18)	20 (13+19)
1 Agr, food	293335	6123	6208	2024	11631	13578	11992	16493	4147	5890	10189	8423	390033	192299	519	10463	11048	91347	305676	695709
2 Energy,m	28416	86741	16859	19928	13857	15803	9489	5786	12413	5259	8503	14677	237730	43559	8942	12720	4984	16135	86340	324070
3 Chemical	24960	3067	16548	2287	8012	4592	7991	1306	1293	145	1916	3775	75891	18119	822	450	−376	47519	66534	142425
4 Metals	4787	3407	721	20580	31759	11620	1754	987	2082	71	232	276	78276	2865	168	186	2057	28069	33345	111621
5 Cap.good	10519	9970	2802	2821	53982	14494	4396	2171	6820	763	2179	3696	114613	19013	1858	40850	7253	164510	233484	348097
6 Construct	13227	4760	1210	1121	3706	24509	1376	2178	1862	6403	7074	2268	69694	4427	7181	139402	681	10916	162606	232300
7 Con.good	12909	3397	4350	1579	13540	10279	36432	4457	4268	924	6316	6242	104692	52542	505	869	7378	47035	108329	213021
8 Trade	34977	5803	5436	5060	16180	8537	12276	2966	3573	1659	7099	6378	109942	65226	1207	2578	301	7068	76379	186321
9 Tran,com	8747	8436	1683	788	11200	11518	3121	27035	7921	3826	8374	7896	100544	28389	2899	4958	−82	15615	51779	152323
10 Fin,dwel	923	547	219	129	558	420	228	832	472	1267	1021	1355	7970	38914	10306	1302	− 8	0	50514	58484
11 Oth.serv	6989	7205	3352	1032	6623	2743	1796	4786	2739	3050	6242	4453	51010	86470	4767	149	123	1891	93400	144410
12 Pub,org	2889	1312	297	350	1011	1621	713	2254	1404	1535	2781	3305	19470	49624	76807	0	−20	0	126411	145881
13 Imports	53641	64440	40188	32199	48253	17175	43623	5726	10468	496	6413	20299	342921	62189	0	43478	−1586	0	104082	447003
14 N.de.tax	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15 Tax-subs	5708	8682	7301	10585	6534	988	5519	1367	6611	547	2205	−1387	54657	32886	0	3772	−192	457	36923	91581
16 (1-..-15)	502027	213888	107172	100482	226846	137875	140705	78344	66073	31832	70544	81655	1757443	696522	115981	261178	31561	430561	1535802	3293246
17 Deprec	25295	19880	5584	3719	7877	5298	4719	3705	17820	10870	6811	5378	116956	0	0	0	0	0	0	116956
18 Empl.inc	132457	26255	9021	8504	42747	53733	40877	41239	36937	8304	51849	51335	503258	0	0	0	0	0	0	503258
19 Prop.inc	35930	64047	20648	−1084	70627	35394	26720	63033	31493	7478	15206	7513	377005	0	0	0	0	0	0	377005
20 (17-..-19)	193682	110182	35253	11139	121251	94425	72316	107977	86250	26652	73866	64226	997219	0	0	0	0	0	0	997219
21 (16+20)	695709	324070	142425	111621	348097	232300	213021	186321	152323	58484	144410	145881	2754662	696522	115981	261178	31561	430561	1535802	4290465

Table 4

Derivation of Main German SNA and MPS Indicators from Table 2
(Millions DM)

SNA Input-output table	1 Material sectors	2 Non-material sectors	3 Sectors total (1+2)	4 Final use	5 Output total (3+4)
1 Material sectors	960479	105558	1066037	1398113	2464150
2 Non-material sectors	158367	198162	356529	577981	934510
3 Imports	328919	13506	342425	209965	552390
4 Taxes and subsidies	41675	26144	67819	105691	173510
5 Material consumption (1-..-4)	1489440	343370	1832810	2291750	4124560
6 Value added	974710	591140	1565850	14060	1579910
7 Inputs total (5+6)	2464150	934510	3398660	2305810	5704470

MPS Input-output table	1 Material sectors	2 Final use	3 Output total (1+2)
1 Material sertors	960479	1503671	2464150
2 Imports	328919	223471	552390
3 Taxes and subsidies	41675	131835	173510
4 Material consumption (1+2+3)	1331073	1858977	3190050
5 Non-material inputs	158367		
6 Value added	974710		
7 Total new value (5+6)	1133077		
8 Inputs total (4+7)	2464150		

Indicators:

Gross output:			**Total resources:**		
In SNA:	3572170	(elem.1,5 + elem. 2,5 + elem. 4,5)	In SNA:	4124560	(SNA Gross output + elem. 3,5)
In MPS:	2637660	(elem.1,3 + elem. 3,3)	In MPS:	3190050	(MPS Gross output + elem. 2,3)
R_1 :	1,354		R_4 :	1,293	
Domestic intermediate consumption:			**Total intermediate consumption:**		
In SNA:	1490385	(elem.1,3 + elem. 2,3 + elem. 4,3)	In SNA:	1832810	(SNA Dom.int.cons. + elem. 3,3)
In MPS:	1002154	(elem.1,1 + elem. 3,1)	In MPS:	1331073	(MPS Dom.int.cons. + elem. 2,1)
R_2 :	1,487		R_5 :	1,377	
Domestic final use:			**Total final use:**		
In SNA:	2081785	(elem.1,4 + elem. 2,4 + elem. 4,4)	In SNA:	2291750	(SNA Dom.final use + elem. 3,4)
In MPS:	1635506	(elem.1,2 + elem. 3,2)	In MPS:	1858977	(MPS Dom.final use + elem. 2,2)
R_3 :	1,273		R_6 :	1,233	

credit institutes, government activities and taxes minus subsidies, as has already been mentioned above. But despite the differences in some variables, the input-output tables are classified practicable enough to be used for the intersystem comparison.

4. Intersystem comparison between the FRG and Hungary

It has been demonstrated in the introduction that the intercountry comparison consists of different steps and that the results of the first two of them will be dealt with in the paper. That includes the derivation of SNA-MPS indicators for overall analysis and the calculation of traditional input pattern for sectoral analysis.

4.1 Overall analysis based on input-output indicators

4.1.1 Derivation of SNA-MPS indicators for Germany

In accordance with the methodological approach described in chapter 2.2, six indicators are derived from the three German and Hungarian SNA type and MPS type input-output tables. The SNA-MPS conversion to be exemplified as basic requirement for compiling the indicators has been realized on a very high aggregated level. That can be seen from Table 4 in which only material and non-material production sectors are differentiated in the two aggregated German SNA and MPS input-output matrices for 1984 derived from Table 2. It becomes clear which SNA and MPS figures contribute to the various indicators R_1 to R_6 and to what amount the results differ. The basic figures of R_2 and R_3 add up to R_1 and the same applies to R_5 and R_6 resulting in R_4. The differences between the domestic and the total indicators are due to imports. The taxes and subsidies are considered to be part of material consumption and of total output and input, too (see Table 4).

4.1.2 Results for the FRG and Hungary

The same procedure pointed out in Table 4 for Germany 1984 has been applied to the other input-output tables taken as a basis for the intersystem comparison. The re-

Table 5

The Summary of the Main SNA and MPS Indicators
at current prices

	1	2	3	4	5	6	7 = 1/4	8 = 2/5	9 = 3/6
	SNA			MPS			SNA/MPS		
	1976	1980	1984	1976	1980	1984	1976	1980	1984
Germany (Millions DM):									
1 Gross output	2244470	2978750	3572170	1739051	2258287	2637660	1,291	1,319	1,354
2 Domestic intermediate consumption	956225	1240355	1490385	711831	879019	1002154	1,343	1,411	1,487
3 Domestic final use	1288245	1738395	2081785	1027220	1379268	1635506	1,254	1,260	1,273
4 Total resources	2535960	3417500	4124560	2030541	2697037	3190050	1,249	1,267	1,293
5 Total intermediate consumption	1134380	1514290	1832810	883222	1141852	1331073	1,284	1,326	1,377
6 Total final use	1401580	1903210	2291750	1147319	1555185	1858977	1,222	1,224	1,233
	1976	1981	1986	1976	1981	1986	1976	1981	1986
Hungary (Millions Forints):									
1 Gross output	1283850	2052132	2846243	1157641	1833681	2497468	1,109	1,119	1,140
2 Domestic intermediate consumption	595121	1030089	1414522	530732	903380	1204257	1,121	1,140	1,175
3 Domestic final use	688729	1022043	1431721	626909	930301	1293211	1,099	1,099	1,107
4 Total resources	1508204	2368583	3293246	1381995	2150131	2944470	1,091	1,102	1,118
5 Total intermediate consumption	756279	1272219	1757443	679346	1128362	1519970	1,113	1,127	1,156
6 Total final use	751925	1096363	1535802	702649	1021769	1424500	1,070	1,073	1,078
Germany / Hungary:									
1 Gross output							1,164	1,179	1,188
2 Domestic intermediate consumption		—			—		1,198	1,237	1,266
3 Domestic final use							1,142	1,147	1,150
4 Total resources							1,144	1,150	1,156
5 Total intermediate consumption							1,154	1,176	1,191
6 Total final use							1,142	1,141	1,143

suiting aggregated SNA and MPS input-output data for the FRG 1976, 1980, 1984 and for Hungary 1976, 1981, 1986 such as the connected indicators are summarized in Table 5. Additionally, the ratios between the six SNA-MPS indicators of the two countries are given neglecting the differing years of reference.

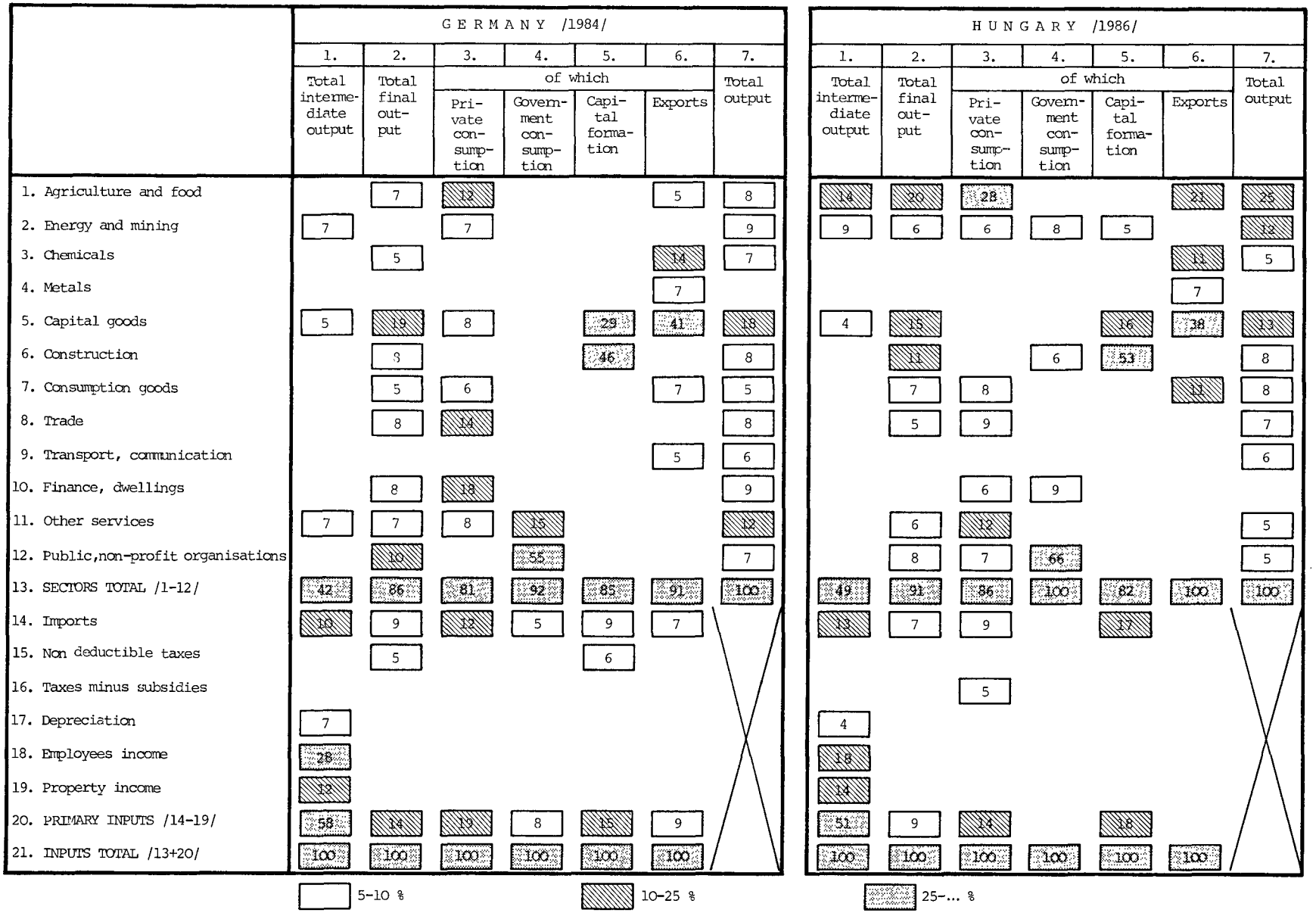
Three main conclusions can be derived from the evaluation of the German and Hungarian SNA-MPS indicators presented in Table 5:

- All indicators express a steady growth in the period of observation, i.e. the deviation between SNA and MPS figures becomes larger. That mainly goes back to the faster increase of non-material sectors compared with the material sectors.
- The German SNA-MPS indicators are greater than the Hungarian ones and the intervals become larger in the observation period.
- The increase of the non-material sectors takes effect mostly within the intermediate transactions. That becomes obvious from the faster development of SNA-MPS indicators for domestic and total intermediate consumption compared with the corresponding indicators for domestic and total final use. The increase of the German indicators R_2 for domestic intermediate consumption (1976: 1.343 — 1984: 1.487) represents the largest change with about 11 % followed by R_5 with 7 %. The correponding growth rates for the Hungarian indicators R_2 and R_5 are only about 5 % and 4 % respectively.

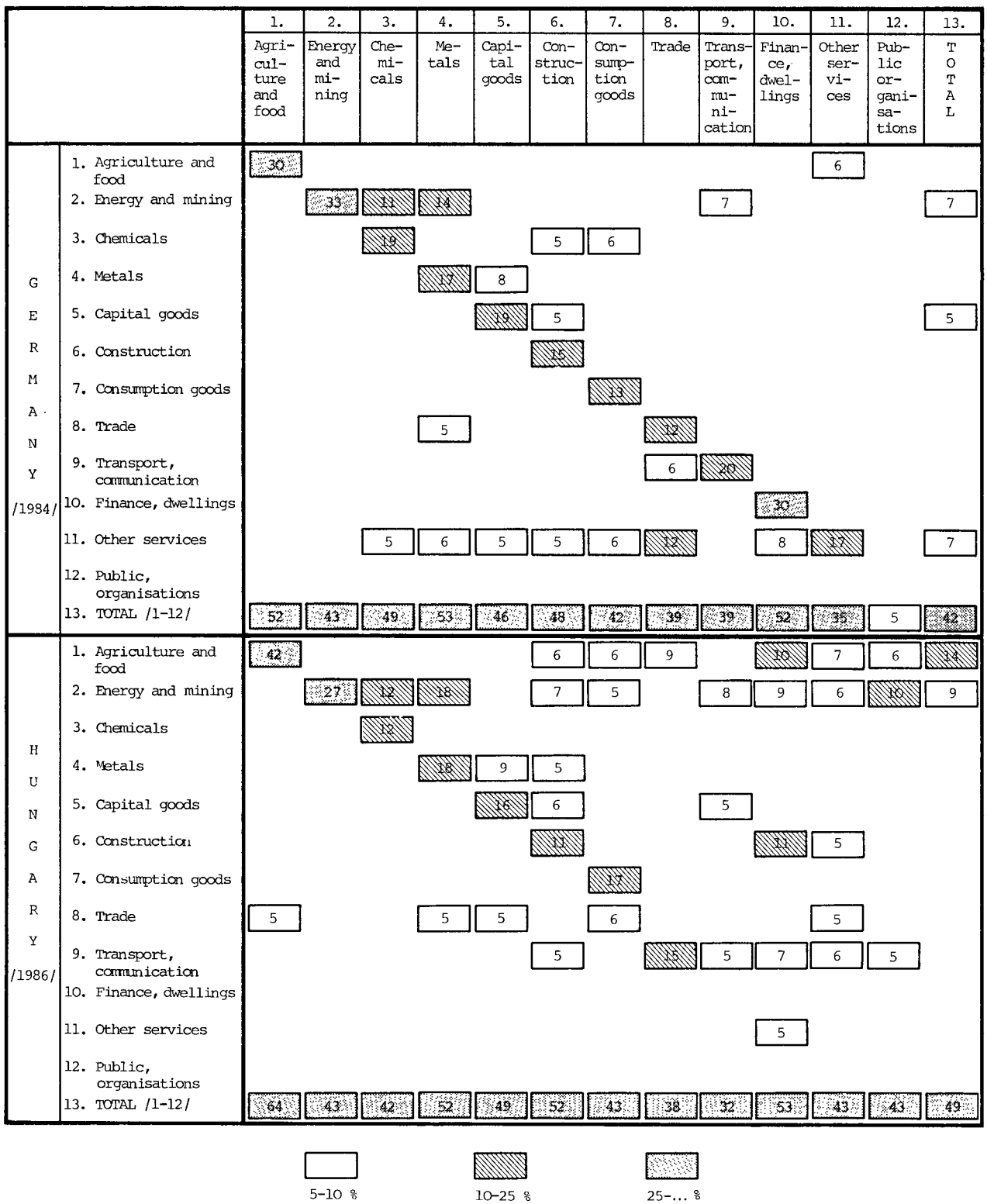
These discrepancies ensued from the comparison of SNA-MPS indicators for the FRG and Hungary can be traced back to structural differences although it has to be kept in mind that the comparison is only based on data at current prices. First, it is known that well-developed countries show a larger portion of non-material sectors in overall production, i.e. the share of services is greater compared with countries at a lower stage of development. Second, it can be assumed that the evolution of the non-material sphere has not been speeded up by the Hungarian economic policy between 1976 and 1986. That might change in the next future as the first signals in order to set a new course can be perceived.

THE STRUCTURE OF THE FINAL USE

FIGURE 2



THE GERMAN AND HUNGARIAN INPUT COEFFICIENTS



4.2 Sectoral analysis based on input pattern

In line with the methodological approach presented in chapter 2.2 for the sectoral intercountry comparison, the input coefficients are calculated for final demand components and intermediate inputs of the 12 production sectors. The main results summarized in three groups of important input shares and expressed in percentages are shown for Germany 1984 and Hungary 1986 in Figures 2 and 3.

4.2.1 Comparison of final use structures in the FRG and Hungary

The evaluation of input structures in Figure 2 confirms the statement on backwardness of Hungarian non-material sectors compared with the German situation. Analyzing the output distribution of the non-material sectors 10 Finance, dwellings, 11 Other services, and 12 Public, non-profit organizations, the differences in the input structures of the users become evident. The share of the three non-material sectors in total output comes up to 28 % in Germany and to 10 % in Hungary (see Figure 2, last column). Except from the discrepancies in government consumption which can be attributed partly to unsolved conceptual problems — the same is the case for sector 12 Public, non-profit organisations —, the main differences occur in the shares of sector 11 in total intermediate output (Germany 7 %, Hungary 0 %) and of sector 10 in total final output (Germany 8 %, Hungary 0 %). Even if a part of these striking differences can be traced back to divergent definitions and concepts in the two countries, the results stand for a lower stage of development in the Hungarian non-material sphere. The services sectors in Hungary deliver most for private consumption, i.e. they are final output oriented whereas in the FRG a large and growing amount of services is provided for intermediate consumption.

Independent from the different role of non-material sectors in the two systems, the results in Figure 2 can also be interpreted as illustration of the diverging production structures in Germany and Hungary. The Hungarian economy reflects a more traditional character compared with the progressive situation in the German economy. The traditional sectors, among them agriculture and food, energy and mining, metals add up to 37 % of total output in Hungary whereas the corresponding German shares amount to 17 %. That has its origin in the different position of agriculture in the two countries which likewise results in different export shares. The statement about the traditional production structure of the Hungarian economy can still be underlined if the consumption goods are taken into account which run up to 8 % of total output in Hungary as against 5 % in Germany. The progressive sectors which embrace chemicals and capital goods from the manufacturing part cover a portion of 18 % in Hungary and a corresponding one of 25 % in Germany. This and some other information can be gained from Figure 2, too, but will no more be dealt with in our context.

4.2.2 Comparison of input coefficients for the FRG and Hungary

The input coefficients presented in Figure 3 confirm the observations made with respect to the different production structures in the FRG 1984 and Hungary 1986. It proves true that the inputs from sector 11 Other services which play an important role in many German production sectors are of no relevance for the Hungarian economy. In Germany about one third of the non-main diagonal elements represent inputs from non-material sectors whereas in Hungary these inputs are negligible.

The distribution of input shares according to the three groups of importance confirms again the effective role of the traditional sectors of agriculture and food, energy and mining, and metals in the Hungarian economy. But the significance of the progressive sectors chemicals and capital goods for Germany can not be proved with Figure 3. That is mostly due to the fact that the intermediate output of sector 5 Capital goods consists of spare parts, accessories, repairs etc. while the investment goods belong to final output. In addition it should be kept in mind that some of the differences between the German and Hungarian intermediate input structures are certainly caused by methodological discrepancies as is the case with sectors 10 Finance, dwellings and 12 Public, non-profit organisations. These sectors and some other components have to be investigated in more detail within the joint research project of the DIW and CSO in the near future.

5. Conclusion

The workshop report has offered the first results of an intersystem comparison between the FRG and Hungary based on SNA type and MPS type input-output tables for both countries. It was underlined that input-output tables for different countries, despite a common sector classification, will never be fully comparable but they can be used approximatively to derive SNA-MPS indicators and input pattern as well for intercountry comparison. Under this premise it was possible to illustrate the different role of non-material sectors in the FRG and Hungary and to inquire into the reasons for this difference. The same was performed for the deviations disclosed in the German and Hungarian production structures.

In the future the missing steps of the intersystem comparison have to be completed. That will include a definite solution of the conceptual problems, especially the mentioned ones in regard of finance, public services, govern-

ment consumption, and imports. Further, a deflation of the input-output data has to be implemented on the basis of official indexes for the FRG and Hungary. The matrices for the primary input structure of final uses and for the final allocation structure of primary input will be computed and compared for the two countries, too. Finally, the size of the comparable input-output table according to SNA and MPS has to be extended in order to analyze foreign trade dependencies and sectoral productivity differences between the FRG and Hungary.

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