Employment and Production-based Proxies for Trade Specialization in Services

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Employment and Production Data as Proxies for Trade Specialization in Services

I. Introduction

Largely neglected by analysts and policymakers until the mid-1980s, global trade in services has expanded significantly in the recent past. Services account for about 20 percent of world trade (merchandise plus services), global exports constituting some US $800 billion in 1990. However, the extensive empirical literature on international trade flows rarely takes cross-border transactions in services into account. In part this is due to the weaknesses of available data on trade in services, weaknesses that have become rather well known in recent years. Only a limited number of industrialized countries collect and report trade in services data at a relatively disaggregated level (e.g., ten categories or more).[1] The goal of this paper is to compare the extent to which production and employment data may be used as proxy indicators for trade specialization in cases where trade data are simply not available or are very aggregated (i.e., the three basic balance of payments categories: transport, travel, and other goods, services and income).

While the level of aggregation at which production and employment data are reported for many developing countries also tends to be quite high, a significant number of countries do report services data at the two-digit ISIC level. In principle, it may therefore be possible to use such data to obtain an indication of the relative (potential) importance of specialization in trade in specific services for these countries. However, before doing so there is a need to have some information concerning the relationship between trade, production and employment data. This paper compares the relatively disaggregated trade in services data that is available for a number of OECD countries with their production and employment data.

[1] In the services context ten service sectors can be regarded as already being quite disaggregated, whereas in the merchandise trade setting ten categories is regarded as a relatively high level of aggregation.

As noted in previous contributions to Voorburg Group meetings, the GATT Secretariat is a user of service statistics, not a producer. This is reflected in the current paper, which focuses not so much on how to improve the comparability of trade and production data on services, but rather on the apparent links between production and trade data that are currently reported by various countries. The specific question examined is the extent to which indices of trade specialization in services are related to indices of production (and employment) specialization. The approach taken is to calculate indicators of relative specialization for each country using trade, production and employment data, respectively, and to compare the results that are obtained using alternative data series.

II. Basic Indicators

Tables 1 and 2 present data on the relative importance of all 'commercial' or marketed services - i.e., excluding government: the sum of ISIC 5 to 8 - and a number of specific service industries in total output and employment of a selected number of OECD countries.[2] The choice of countries and sub-categories of commercial services was determined by the availability of relatively comparable disaggregated data on trade in services. Data are drawn from the national accounts as reported by the OECD and the UNSO.[3] On average, commercial services account for some 54 percent of GDP and 52 percent of total employment in these countries. The service subcategories for which trade data are reported account for about half of service value-added and employment.

Table 3 presents data on the relative importance of service exports in total exports of the sample countries (merchandise plus commercial services). The data for this table are

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[2] Total production and employment is defined as the sum over ISIC 1-9.

[3] Gross output data is drawn from UNSO (1991) while the value added data have been drawn from OECD (1991b). These two sources are fully compatible. Employment data have also been drawn from OECD (1991b). With the exception of trade from the OECD (see below), the data have been extracted from magnetic media, and thus may differ slightly from the publications. It should be noted that banking and insurance data for France, Italy and Spain have been obtained from Price-Waterhouse (1988).

drawn from EUROSTAT (1991) for the EC countries, complemented by OECD (1991a) for the non-EC countries.[4] Services account for 22% on average of total exports, with transportation and travel clearly constituting the most important subcategories. Indeed, measured exports of services in which there is significant policy interest - banking, insurance, communications - are quite small, often representing one percent or less of total exports. However, these industries are also relatively small in terms of GDP or total employment (Tables 1 & 2). As indicated in Table 4, if exports are divided by sectoral gross output, the share of production that is exported tends to be somewhat greater than the share of these industries in total exports. Table 4 suggests that exports of transport and travel services are a significant proportion of gross output. Unfortunately, the absence of comparable trade and production data (collected and reported using the same classification method) implies that not too much confidence can be placed in the absolute value of the numbers contained in Table 4. Thus, the fact that the export share of travel/tourism is relatively high is in part a reflection of the choice of denominator, the output of the hotels and restaurants industries being used as the denominator of the travel export/output ratio.[5] Conversely, while the on the basis of both export/output ratios and export/total export ratios, services such as banking, insurance, and communications appear to be largely nontraded, this may reflect the inadequate coverage of the volume of trade that occurs in these services, relative nontradability of these services, and/or barriers to trade. However, notwithstanding the manifest data problems that exist, the reported ratios should be roughly comparable

[4] It should be noted that Italian construction trade data are estimates based on information on international contracts awarded are published in *Engineering News Record*, various issues. Furthermore, volume data for countries reporting the value of trade in communications was used to estimate Danish trade in communications using the volume (minutes) of international calls reported in Siemens, *International Telecom Statistics*, Munich: Siemens, 1991. Finally, Canada's trade was estimated as being 60% of the figure for 'Consulting and other professional services' reported in OECD (1991a), as a majority of the receipts in this category are stated to arise from companies providing consulting engineering services.

[5] Although foreign vistors obviously buy other services (as well as some goods) in addition to hotel and restaurant services, the latter do account for a substantial share of total expenditure.

across countries.[6]

III. Measures of Specialization

Trade specialization or 'revealed comparative advantage' indices (Balassa, 1965) have been used extensively in the literature as a proxy for determining the pattern of comparative advantage across countries. While only loosely consistent with the theoretical literature on comparative advantage - which relates trade patterns to differences in technology and factor endowments that are reflected in relative costs of goods and services - these indices are nonetheless useful for descriptive purposes.[7] Trade specialization indices are defined as the ratio of exports of a "product" category to a country's total exports, divided by the same ratio for the sum of all the countries in the sample (i.e., $100*[X_{ij}/Y_j]/[X_{iw}/Y_w]$, where X_{ij} are exports of product i by country j, Y_j are total exports of goods and services by country j, and w stands for the group total: the sum of all countries). The value of this index may range from zero to a very large number. If the index is greater than 100 this implies that the country is relatively specialized in the product concerned. A similar ratio can be calculated using data on imports, production or employment. If production or employment statistics are used, the specialization ratio will not necessarily reveal anything about comparative advantage. For example, less efficient countries will tend to use more labor per unit of service output, while production ratios may depend in part on differences in tastes across countries. Nonetheless, they do provide information on 'revealed' specialization, and they may be correlated with trade specialization ratios. The latter issue is addressed below.

Balance-of-payments statistics are currently the only source of information on trade

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[6] An exception being the travel ratio reported for the U.S., as the U.S. only reports value added for the hotel sector.

[7] Indeed, recent empirical research has indicated that 'revealed comparative advantage' indices are highly correlated with what economic theory would predict. Yeats (1990) compared revealed comparative advantage indices with indices based on relative labour and capital inputs for specific products and showed that products in which developing countries have achieved a revealed comparative advantage are highly concentrated in a broad group of labour intensive products.

in services available on a global basis. We therefore use the standard components of the current account of the balance of payments as defined in IMF (1977) and reported on the data tapes of the IMF.[8] "Commercial services" transactions are considered to comprise the sum of "transport" (largely freight and passenger transport by sea and air), "travel" (expenditures by nonresidents - mostly tourists - while staying in a foreign country), and "other services." The last category includes items such as brokerage, insurance, communications, leasing and rental of equipment, technical and professional services, income generated by the temporary movement of labour, as well as property income (royalties).[9]

While country coverage for aggregate categories such as "transport," "travel," and "other services" is relatively comprehensive, this is not the case for more disaggregated data. As more detailed statistics are only available for OECD countries, in practice cross-country comparisons can only be made on the basis of the three aggregate categories. Table 5 reports indices of relative specialization for two country groups and for the sample of OECD countries that is used in this paper for the period 1979-89. Developing countries as a group tend to be relatively specialized in merchandise, while developed countries are specialized in services. However, once the developing country group is disaggregated, a large number of developing countries turn out to be relatively specialized in services (Hoekman and Karsenty, 1992). Most of the policy interest is in the aggregate category 'other goods, services and income' for which detailed information does not exist for most countries. As mentioned earlier, some data do exist for OECD countries. Table 6 reports relative specialization indices for the OECD countries in the sample for four services, where the

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[8] IMF statistics have been complemented by national sources for major service exporters which do not report BOP data to the IMF, such as Taiwan and Hong-Kong.

[9] This follows GATT (1989). Thus, official transactions and investment income are excluded from commercial services. Labour and property income are included because some countries include these items indistinguishably in the aggregate category "other services and income." It should be noted that labor income does not include worker remittances or migrant's transfers. Merchandise insurance is included in transportation, while in the other tables, which contain data derivated from the EUROSTAT and the OECD, merchandise insurance is included in the insurance sub-category of other private services.

denominator of the ratio is now the average of this group of countries. It demonstrates that there appear to be wide differences in specialization across countries. Norway and Denmark are highly specialized in transport, the U.S. and France in banking, Finland in insurance and construction, and the U.S. in communications. The ratios that are reported in Table 6 should be used with care, of course, given the general weaknesses of the data and the small magnitude of the absolute value of the trade flows involved.

Production and employment data can be used to construct similar ratios as the revealed comparative advantage index. These are reported in Tables 7 and 8. While there is less variance for the production and employment ratios than for the trade-based index, it is evident that there are still relatively large differences between countries. This is the case especially for financial services. Thus, compare the U.S. production index of 273 for insurance in the late 1980s with the Norwegian ration of only 16. Less surprising are the differences in the production and employment ratios for hotels and restaurants, where Spain, Portugal, Italy and France are the countries specialized in this sector.

The issue of the realtionship, if any, between the production and employment-based ratios on the one hand and the trade specialization indices on the other is of interest from both a 'data' and a 'policy' perspective. From the data viewpoint, one expects a priori that countries that are relatively specialized on the basis of trade data will also be relatively specialized if production data are used. The same may hold for employment-based ratios, with the caveat that this would only be expected for services that are both tradable and offer little scope for productivity improvements. If existing data suggest that there is only a weak relationship between production and trade-based specialization indices in particular, it suggests that there are problems with the reported data. From a policy perspective, if there are no trade data available, one is forced to use proxies. The question is then whether one can use production or employment-based measures of relative specialization as a proxy for

the likely trade specialization?[10]

Cursory inspection reveals that for the aggregate category of commercial services, the "sign" of the trade-based index tend to be the same as the "sign" of the production-based index. That is, countries with RCAs above (below) 100 also report production-based specialization ratios above (below) 100. Not surprisingly, this is much less the case for the employment-based indicator, suggesting that there are significant differences in average labor productivity across countries. Table 9 reports pair-wise correlation coefficients between the three basic series used in this paper - production, employment and trade shares - by sector and for all services for the countries in the sample. The last line of Table 9 reports the correlation between the three specialization indices.[11] Observe that for most services value added and employment are highly correlated, with the exception of banking. No doubt the lack of a positive relationship is in part a reflection of the heterogeneity of the country coverage for this sector. Value added and trade shares are also highly correlated for transport, travel and communications. For the total of commercial services the correlation is only .37. Employment shares do not appear to be correlated with trade shares, the coefficient being only .28 for all commercial services and negative for a number of specific service industries. The last line of Table 9 indicates that the average correlation between value added and trade-based measures of relative specialization is only .33. This suggests that production-based specialization measures are unlikely to be a good proxy for relative specialization in trade. Employment-based indicators are likely to do an even worse job, the correlation being only .16. However, the correlation coefficient between production and trade shares across all sectors ('all shares') is much higher at .81.

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[10] A number of researchers - e.g., Browne (1991), Gilmer (1990) - have used either production and/or employment 'location quotients' as measures of trade specialization *within* a particular economy. In this setting trade data simply do not exist and proxies must be used.

[11] Only the total is reported, as sectoral correlation coefficients for the specialization indices are identical to those for the three sectoral share series, the former simply consisting of the latter divided by a constant.

IV. Concluding Remarks

This paper has presented and compared three measures of relative specialization in services for a set of OECD countries that report disaggregated data on trade in services. It is well known that trade and production/employment data are generally not readily comparable. Attention was therefore restricted to trade data on transport, travel, banking, insurance, communications and construction, the presumption being that these would be reasonably comparable to production and employment data reported for these sectors. It was found that the correlation between production and trade shares for the aggregate category of commercial services, as well as for transport and travel, was quite significant. In contrast, measures of relative specialization were not highly correlated. The conclusion to be drawn therefore is that production-based measures of relative specialization cannot be used as proxies for trade-based specialization indices.

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TABLE 1

RELATIVE SHARES OF COMMERCIAL SERVICES IN TOTAL OUTPUT FOR SELECTED OECD COUNTRIES

	COMMERCIAL SERVICES		TRANSPORT		HOTELS/ RESTAURANTS[1]		BANKING		INSURANCE		COMMUNICATION		CONSTRUCTION	
	FY	LY	FY	LY	FY	LY	FY	LY	FY	LY	FY	LY	FY	LY
ALL SELECTED COUNTRIES	51.4	54.1	6.0	6.1	2.2	2.6	3.5	5.3	1.2	0.9	2.3	2.5	8.1	7.7
CANADA	53.7	57.0	5.8	5.0	3.2	3.1	1.6	2.4	0.8	0.8	2.9	2.8	8.5	8.3
DENMARK	60.5	60.3	8.7	8.5	1.6	1.8	3.8	3.9	0.6	0.7	1.7	2.3	9.0	8.0
FINLAND	48.3	56.3	7.1	6.9	2.0	2.4	2.9	4.6	1.1	0.9	2.5	2.4	9.3	11.5
FRANCE	53.2	59.2	4.9	4.7	2.5	3.3	5.9	5.1	0.3	0.3	2.4	2.5	8.4	6.2
GERMANY.FR	40.1	39.3	4.3	3.9	1.5	1.5	4.0	4.5	1.3	1.5	2.8	2.7	7.8	6.2
ITALY	56.0	63.0	4.7	5.1	3.2	3.6	5.9	5.2	0.3	0.3	1.2	1.6	8.1	6.7
NETHERLANDS	50.0	51.9	5.6	5.6	2.1	2.2	4.0	4.5	1.8	1.7	2.4	2.6	8.5	7.1
NORWAY	49.0	51.6	10.2	9.0	1.5	1.8	3.7	5.3	0.2	0.2	2.3	3.3	8.2	6.7
PORTUGAL	48.9	51.3	4.2	4.5	3.4	4.0	5.4	8.3	0.5	0.6	1.9	2.3	7.2	7.5
SPAIN	54.9	57.3	4.2	4.5	6.5	7.5	6.5	7.1	0.3	0.4	1.9	1.8	7.3	9.6
USA[1]	54.6	58.8	4.5	3.8	0.8	0.9	2.9	4.0	2.2	2.5	2.7	3.0	6.0	5.4

Notes: FY refers to the first available year, starting from 1979, and LY refers to the last available year, up to 1989.
[1] US reports hotels only.

TABLE 2

RELATIVE SHARES OF COMMERCIAL SERVICES IN TOTAL EMPLOYMENT FOR SELECTED OECD COUNTRIES

	COMMERCIAL SERVICES		TRANSPORT		HOTELS/ RESTAURANTS[1]		BANKING		INSURANCE		COMMUNICATION		CONSTRUCTION	
	FY	LY	FY	LY	FY	LY	FY	LY	FY	LY	FY	LY	FY	LY
ALL SELECTED COUNTRIES	47.0	52.0	5.6	5.8	3.0	4.0	2.5	2.9	1.0	1.2	2.1	2.3	10.1	9.4
CANADA	48.5	50.8	5.6	4.4	5.8	6.4	3.1	3.0	1.1	1.2	2.3	2.7	6.3	
DENMARK	51.6	53.7	6.9	7.7	2.7	2.9	3.6	4.7	1.0	1.2	2.6	2.8	11.4	9.8
FINLAND	44.1	51.5	6.6	7.0	3.6	4.2	2.5	3.3	0.6	0.8	2.4	2.6	10.1	11.8
FRANCE	55.3	62.8	4.5	5.1	3.4	4.6	2.6	2.8	0.9	1.0	2.4	2.7	10.9	9.7
GERMANY.FR	39.1	39.4	4.6	4.6	3.3	3.9	2.5	2.9	0.9	0.9	2.3	2.4	9.6	8.3
ITALY	49.5	60.0	5.5	6.3	4.6	5.0	1.4	1.5	0.5	0.6	1.4	1.6	9.2	8.4
NETHERLANDS	49.4	49.7	5.9	6.4	2.4	2.9	2.7	3.0	1.5	1.6	1.9	2.0	11.4	8.8
NORWAY	49.5	55.9	9.0	8.4	2.6	3.6	2.2	3.1	0.7	1.0	2.8	3.4	9.9	10.4
PORTUGAL	34.5	41.1	3.8	4.0	3.2	4.6	1.5	2.0	0.4	0.5	1.3	1.4	11.3	11.8
SPAIN	45.6	49.7	6.2	5.6	6.9	7.7	2.5	2.3	0.6	0.6	1.3	1.2	8.4	11.0
USA[1]	50.3	55.5	3.9	3.7	1.5	1.9	2.8	3.3	2.1	2.3	1.5	1.2	6.9	6.6

Notes: FY refers to the first available year, starting from 1979, and LY refers to the last available year, up to 1989.
[1] US reports hotels only.

TABLE 3

RELATIVE SHARES OF COMMERCIAL SERVICES EXPORTS IN TOTAL EXPORTS FOR SELECTED OECD COUNTRIES

	COMMERCIAL SERVICES		TRANSPORT		TRAVEL		BANKING		INSURANCE		COMMUNICATION		CONSTRUCTION	
	FY	LY	FY	LY	FY	LY	FY	LY	FY	LY	FY	LY	FY	LY
ALL SELECTED COUNTRIES	22.3	22.0	9.3	8.1	7.3	7.5	0.3	0.6	0.4	0.4	0.2	0.3	0.9	0.6
CANADA	9.6	10.4	5.4	4.0	3.2	3.7	0.2	0.3	0.4	0.5	0.2	0.3	0.5	0.3
DENMARK	26.6	28.4	15.0	16.7	6.6	5.8	0.0	0.1	0.2	0.3	0.3	0.4	.	.
FINLAND	17.1	15.3	7.2	6.2	4.1	3.8	0.0	0.0	2.1	1.4	0.0	0.2	1.6	1.6
FRANCE	23.4	24.2	7.4	6.5	5.6	7.1	0.2	1.8	0.5	0.6	0.1	0.2	1.8	0.6
GERMANY.FR	13.1	11.6	4.3	3.4	2.5	2.4	0.2	0.2	0.1	0.0	0.3	0.3	1.7	0.7
ITALY	21.8	21.4	4.8	5.0	9.0	6.7	0.9	0.8	0.3	0.4	0.1	0.1	2.0	1.2
NETHERLANDS	20.2	19.9	11.2	9.5	1.8	2.4	0.2	0.2	0.0	0.0	0.1	0.3	0.7	0.7
NORWAY	33.6	28.0	24.9	19.3	3.1	3.6	.	.	0.1	0.1	0.1	0.3	0.1	0.6
PORTUGAL	30.0	24.0	7.5	3.9	18.3	16.1	.	.	0.2	0.1	.	.	.	.
SPAIN	35.2	36.2	8.5	7.5	22.8	24.0	0.1	0.5	0.4	0.5	0.5	0.1	0.1	0.2
USA	14.3	22.1	5.6	6.6	3.9	7.4	0.5	1.1	0.7	0.3	0.5	0.6	0.5	0.3

Notes: FY refers to the first available year, starting from 1979, and LY refers to the last available year, up to 1989.

TABLE 4

SECTORAL RATIOS OF EXPORTS TO GROSS OUTPUT FOR SELECTED OECD COUNTRIES

	COMMERCIAL SERVICES		TRANSPORT		TRAVEL[4]		BANKING		INSURANCE		COMMUNICATION		CONSTRUCTION	
	FY	LY	FY	LY	FY	LY	FY	LY	FY	LY	FY	LY	FY	LY
ALL SELECTED COUNTRIES	10.1	11.4	34.4	33.1	41.2	55.5	0.7	1.1	12.1	12.2	1.9	3.0	2.3	1.6
CANADA	3.8	3.7	18.2	14.0	20.5	24.1	2.6	3.2	8.3	7.4	1.6	3.1	0.8	0.6
DENMARK	12.3	15.3	42.5	53.3	77.3	80.8	0.0	1.1	7.9	11.3	5.1	5.3	.	.
FINLAND	8.0	5.0	22.8	16.4	33.6	20.2	0.0	0.1	48.7	30.4	0.6	2.1	2.8	2.0
FRANCE[1]	7.7	7.7	24.2	24.6	32.7	42.2	1.2	1.9	27.9	35.1	1.3	1.7	2.7	1.2
GERMANY.FR	2.9	3.4	13.6	13.3	19.1	22.9	0.8	1.2	1.6	1.1	2.4	3.7	3.4	2.3
ITALY[2]	5.8	4.9	14.9	12.1	36.8	21.8	2.6	3.5	13.5	15.2	1.4	1.2	2.5	1.7
NETHERLANDS	14.9	15.3	68.4	62.8	28.6	42.4	1.8	2.7	0.3	0.1	2.6	5.0	2.2	1.6
NORWAY	20.7	15.8	62.5	52.9	55.1	49.6	.	.	8.6	5.2	2.5	2.9	0.3	1.6
PORTUGAL	10.6	12.9	22.7	18.5	63.0	84.6	.	.	5.6	2.0	.	.	.	.
SPAIN	7.7	10.6	20.8	20.6	35.9	43.8	0.4	0.5	13.7	14.9	4.0	8.4	0.1	0.2
USA[2]	1.4	1.7	6.4	8.0	22.3	31.3	1.3	1.7	1.0	1.1	1.5	1.3	0.3	0.3

Notes: FY refers to the first available year, starting from 1979, and LY refers to the last available year, up to 1989.

[1] Gross output has been estimated for the banking and insurance sectors (see text).

[2] Gross output has been estimated for all sectors on the basis of value added and the average gross output to value added ratios for the other countries.

[3] Gross output has been estimated for the insurance sector (see text).

[4] Gross output of hotels and restaurants are used for the denominator of the ratios.

TABLE 5

INDICES OF TRADE SPECIALIZATION RELATIVE TO THE WORLD: REVELEALED COMPARATIVE ADVANTAGE (RCA)

	MERCHANDISE		COMMERCIAL SERVICES		TRANSPORT		TRAVEL		OTHER PRIVATE SERVICES	
	1979	1989	1979	1989	1979	1989	1979	1989	1979	1989
DEVELOPED COUNTRIES	97.8	98.5	110.4	106.5	108.4	105.2	102.0	98.9	113.5	111.3
DEVELOPING COUNTRIES	105.7	104.4	73.1	81.0	73.2	79.1	99.6	111.5	63.1	67.0
CANADA	109.5	110.2	55.0	55.5	31.7	14.5	81.2	76.2	56.3	68.8
DENMARK	86.9	92.6	161.7	132.3	210.0	178.8	127.3	103.3	131.8	117.7
FINLAND	100.4	104.2	98.1	81.7	111.2	104.5	86.7	64.3	89.0	76.6
FRANCE	86.9	90.0	162.0	143.7	129.6	138.9	108.6	118.8	225.8	163.9
GERMANY.FR	104.8	107.7	77.4	66.6	57.6	62.2	51.1	39.3	102.6	89.8
ITALY	94.8	96.8	124.6	113.9	76.0	91.2	188.6	114.8	120.2	127.9
NETHERLANDS	96.7	98.2	115.6	107.6	168.0	165.0	36.6	41.2	116.4	114.7
NORWAY	80.4	88.5	192.5	150.0	385.4	345.4	64.9	61.1	86.2	70.8
PORTUGAL	84.0	93.7	175.4	127.2	128.0	72.4	385.3	275.3	60.7	49.5
SPAIN	77.8	77.9	205.0	196.1	133.3	138.7	474.4	405.7	69.5	70.5
USA	103.7	95.5	82.5	119.5	88.3	120.1	82.0	129.4	73.3	108.9

TABLE 6

RELATIVE SPECIALIZATION INDICES (RCA) WITHIN THE SAMPLE OF OECD COUNTRIES

	COMMERCIAL SERVICES		TRANSPORT		TRAVEL		BANKING		INSURANCE		COMMUNICATION		CONSTRUCTION	
	FY	LY	FY	LY	FY	LY	FY	LY	FY	LY	FY	LY	FY	LY
CANADA	43.1	47.3	57.8	49.2	42.9	48.8	82.6	43.6	89.6	114.4	70.7	121.2	54.0	48.2
DENMARK	119.3	129.5	161.9	207.3	89.7	76.4	1.9	21.5	39.3	63.4	112.8	134.0	.	.
FINLAND	76.9	69.6	77.5	76.9	36.4	49.9	0.0	1.7	489.9	354.3	19.9	77.3	167.9	260.8
FRANCE	105.1	110.0	79.8	80.4	75.7	94.7	78.3	289.0	115.5	142.2	63.2	62.3	187.5	94.9
GERMANY.FR	58.9	52.9	46.2	42.4	33.5	31.3	60.8	31.6	29.7	1.0	114.3	105.4	186.5	119.3
ITALY	98.0	97.6	52.2	61.9	122.5	89.1	354.6	128.5	62.0	92.1	34.6	40.8	211.7	193.9
NETHERLANDS	90.7	90.6	120.9	118.3	23.9	31.6	59.3	30.4	3.5	1.6	54.5	93.6	79.4	114.4
NORWAY	150.9	127.7	269.2	239.4	42.2	47.2	.	.	31.2	27.7	66.5	97.8	13.4	88.8
PORTUGAL	134.8	109.2	81.5	49.0	249.0	213.9	.	.	44.8	13.4	.	.	.	.
SPAIN	158.0	164.8	92.1	93.2	310.8	318.2	44.6	79.5	84.1	121.5	219.8	48.0	12.9	33.3
USA	64.3	100.8	60.9	82.0	53.5	98.8	200.4	176.1	157.1	69.9	227.3	219.7	52.4	40.4

Notes: FY refers to the first available year, starting from 1979, and LY refers to the last available year, up to 1989.

TABLE 7

PRODUCTION BASED SPECILIAZATION RATIOS FOR THE SAMPLE OF OECD COUNTRIES

	COMMERCIAL SERVICES		TRANSPORT		HOTELS/ RESTAURANTS[1]		BANKING		INSURANCE		COMMUNICATION		CONSTRUCTION	
	FY	LY	FY	LY	FY	LY	FY	LY	FY	LY	FY	LY	FY	LY
CANADA	104.5	105.4	96.1	82.8	145.3	116.6	45.5	45.2	67.8	82.9	125.7	111.5	105.2	107.2
DENMARK	117.6	111.5	145.5	139.2	75.1	67.1	105.8	72.9	51.4	76.5	76.0	94.6	111.4	103.8
FINLAND	93.9	104.1	118.8	113.3	92.0	91.6	81.7	86.8	97.0	99.8	108.6	97.9	115.0	148.8
FRANCE	103.5	109.5	82.4	77.9	115.5	127.0	165.0	96.6	26.0	28.9	105.8	101.4	103.8	81.0
GERMANY.FR	78.0	72.5	70.9	64.4	70.1	58.1	113.8	84.6	107.4	161.7	124.1	111.0	95.7	79.9
ITALY	108.9	116.4	78.2	84.5	146.1	135.4	167.0	98.7	24.5	27.5	54.1	65.7	100.2	86.6
NETHERLANDS	97.2	95.9	93.5	92.3	95.3	83.9	113.3	84.0	148.5	180.2	104.0	106.0	104.3	91.9
NORWAY	95.2	95.4	170.3	147.1	69.6	67.0	105.5	100.2	12.9	16.3	99.6	134.8	101.5	86.9
PORTUGAL	95.0	94.8	69.8	73.7	154.5	153.9	151.9	155.5	45.2	61.9	83.6	94.6	89.2	97.0
SPAIN	106.7	105.8	70.2	73.5	300.1	284.3	182.9	134.4	28.9	40.4	84.3	72.0	90.5	124.1
US[1]	106.2	108.7	74.3	61.7	36.6	33.8	82.5	74.8	182.7	272.7	118.6	121.8	73.8	70.6

Notes: FY refers to the first available year, starting from 1979, and LY refers to the last available year, up to 1989.
[1] US reports hotels only.

TABLE 8

EMPLOYMENT BASED SPECIALIZATION RATIOS FOR THE SAMPLE OF OECD COUNTRIES

	COMMERCIAL SERVICES		TRANSPORT		HOTELS/ RESTAURANTS[1]		BANKING		INSURANCE		COMMUNICATION		CONSTRUCTION	
	FY	LY	FY	LY	FY	LY	FY	LY	FY	LY	FY	LY	FY	LY
CANADA	103.2	97.6	98.6	76.9	190.0	158.9	122.0	102.1	101.5	99.4	111.3	116.6	62.1	70.0
DENMARK	109.7	103.2	122.7	133.7	87.9	73.1	140.5	161.0	98.3	103.2	124.1	123.2	112.9	104.9
FINLAND	93.8	98.9	116.5	121.8	118.0	104.4	99.2	112.3	62.1	69.1	117.0	114.4	100.0	125.6
FRANCE	117.5	120.7	79.2	89.1	110.9	115.6	100.6	94.6	83.8	81.5	118.3	116.4	108.4	103.3
GERMANY.FR	83.1	75.6	81.5	80.1	109.0	98.4	97.1	98.6	88.8	79.1	113.5	105.5	94.6	88.2
ITALY	105.2	115.4	97.7	108.9	152.8	125.7	55.7	50.2	51.4	47.6	67.1	70.1	91.7	90.0
NETHERLANDS	105.0	95.5	105.0	111.2	80.4	71.6	106.7	100.6	141.3	134.3	90.7	87.2	113.1	93.5
NORWAY	105.2	107.5	160.3	145.6	85.1	90.8	85.6	105.4	65.4	84.3	135.5	150.4	98.3	111.3
PORTUGAL	73.4	79.0	67.9	68.5	105.6	114.3	58.9	68.1	37.5	39.2	61.1	63.4	112.4	125.6
SPAIN	97.0	95.6	109.5	97.8	227.1	191.3	98.1	79.3	60.3	49.9	61.9	53.1	83.0	117.1
USA[1]	107.0	106.7	69.2	64.2	50.3	47.1	112.0	112.9	206.6	194.5	72.8	52.7	68.6	70.6

Notes: FY refers to the first available year, starting from 1979, and LY refers to the last available year, up to 1989.
[1] US reports hotels only.

TABLE 9

CORRELATION COEFFICIENTS FOR VALUE ADDED, EMPLOYMENT AND TRADE SHARES AND SPECIALIZATION INDICES[1]

	VALUE ADDED/EMPLOYMENT		VALUE ADDED/TRADE		EMPLOYMENT/TRADE	
	FY	LY	FY	LY	FY	LY
COMMERCIAL SERVICES	0.63	0.78	0.23	0.37	-0.04	0.28
TRANSPORT	0.88	0.91	0.86	0.87	0.83	0.81
TRAVEL/HOTELS RESTAURANTS	0.88	0.87	0.84	0.86	0.55	0.59
BANKING	-0.56	-0.56	0.26	0.23	-0.70	0.32
INSURANCE	0.83	0.82	0.20	-0.17	-0.05	-0.18
COMMUNICATION	0.40	0.52	0.12	0.62	-0.50	-0.08
CONSTRUCTION	0.42	0.56	0.36	0.42	0.41	0.44
ALL SHARES	0.99	0.99	0.79	0.81	0.77	0.81
ALL INDICES	0.64	0.65	0.40	0.33	0.09	0.16

Notes: FY refers to the first available year, starting from 1979, and LY refers to the last available year, up to 1989.

[1] The correlation coefficients for the indices for each sector are the same as the sectoral shares correlation coefficients.