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VOLUME MEASURES IN ISIC 6 AND 7 SERVICES INDUSTRIES: COUNTRY PRACTICES AS A BASIS FOR INTERNATIONAL GUIDELINES

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1. INTRODUCTION

This paper is directly related to the objective of proper constant-price estimation in the services part of the national accounts. The scope of the paper is ISIC 6 Wholesale and retail trade, restaurants and hotels and ISIC 7 Transport and communications. In studying these two major divisions of services industries for the given objective, there is a need to examine rather closely a wide range of activities and services.

Volume measures should be considered both from an industry and a commodity point of view, as the latter in most instances also forms the basis for value added estimates in constant prices. The commodity (= product) details are very much at stake in the process of decomposition of output and input values into price and volume components. Therefore, basically the products are the ones to be measured in terms of volumes, subsequently leading to activity estimates in volume terms. A short-cut to value added in constant prices without dealing with or reflecting volumes of products is a sort of last resort and should definitively not be recommended.

The two ISIC major divisions constitute a major part of the services activities. Wholesale and retail trade represent between 14 - 15 per cent of GDP (1980) at the world level, whereas transport and communications count for approximately 6 per cent of GDP. Pending upon whether restaurants and hotels are included or not, the two ISIC major divisions at least count for more than 20 per cent of the global GDP, maybe close to one fourth.

The average growth rates in the two service groups were 4,6 respectively 5,1 per cent in the period 1970-75, significantly above the growth rate for GDP at 4,1 per cent. Ten years later in 1980-85, the figures were 2,6 and 2.4 per cent, close to the growth rate of 2,6 per cent for GDP.

This paper is an intermediate report, primarily a summary study report on the country practices in this field. It gives a clue to what kind of guideline proposals to be expected if current practices were the basis for guidelines. At the end of the paper, some points for discussion are raised so as to clarify to which extent this should be a guiding criterion, and to discuss other principal matters. Following as a next step, (1) the full report of the country practices study will be completed, (2) some empirical comparison will be carried out (on Norwegian data) to study implications of alternative methods and indices, (3) further references or studies should be reviewed, (4) conceptual issues should be discussed and (5) finally make the guideline proposals on methods and indices to be used in these two services industries. Pending upon the discussion at the Ottawa meeting, there might be possible to conclude this work by early spring 1990 at the latest.

2. CONCEPTUAL ISSUES

2.1 GENERAL ISSUES

United Nations in its 1979 Manual on National Accounts at Constant Prices has a good presentation on most of the questions that arise with respect to volume measures in the services area. Serving as reference to the findings of the study (see chapter 3), the following chapter 2 will review some of the main recommendations of the Manual. Apart from that, no review of conceptual matters is found in the paper.

A basic concern is of course the identification of services. Unless this is achieved, the construction of volume measures is in fact impossible. The point of departure should therefore be one rooted in a detailed approach. Consistency with the current values of the same services is of course important. The quantity measures are sensitive to variations in the effective demand of the services, and the quality of many services may be sensitive to over-crowding. There is much simpler in general to apply the deflation approach where standard prices are available than to build up volume measures directly from quantity data. Using the former approach, the quality change problem is to be watched in relation to the characteristics of the services being priced.

As to the choice between deflation approach and extrapolation approach, the Manual distinguishes between three different situations: complete information and recording of values, quantities and prices, incomplete price and quantity information and incomplete value data. In the first case, it is immaterial whether to use deflation or extrapolation. In the second case, the Manual stresses the preference for price deflation, due to the fact that price relatives generally display less variation than quantity relatives. In the third case, however, extrapolation is the only possibility. Attention must be on coverage to be as extensive as possible, because errors from ommission of items are likely to be much more serious for volume indices than price indices. In this latter case values are estimated by extrapolating bench-mark figures by means of both price and volume indices.

2.2 SPECIAL ISSUES IN TRADE AND TRANSPORT

(i) VOLUME CONCEPT OF TRADE MARGINS

Trade and transport margins is a subject of special interest due to its special content and its link to the valuation concepts of purchasers' and producers' values. Gross output in wholesale and retail trade is by convention measured by gross margins rather than full transaction value in order not to exaggerate the role of distribution in the economy. While the definition of distributive services is not particularly difficult, to quantity them seems the more difficult. The Manual stresses that the

volume of trade margins must not be measured directly and cannot be assumed remaining constant per unit of goods sold. In practice, however, approximations are needed in the light of data available.

In practice, the measurement of the volume of distributive services must be based on the volume of goods sold by distributors, weighted by the values of the margins attached to them rather than by their sales values. There seems to be no practical or operational way in which the amount of services per unit of goods can be quantified and measured.

(ii) VOLUME MEASURES IN TRANSPORT INDUSTRIES

When it comes to the transport margin, this is considered a physical transformation in the producer's goods. The value of transport margins at constant prices can be obtained by multiplying the goods sold in the current year by the transport margins in the base year. The margin consists of two elements: distance (or number of kilometres) and price per kilometre. The relevant volume measure for the gross output of the freight transport industry is one in which ton-kilometres are weighted by fixed prices or rates per ton-kilometre. An adjustment factor introduced for changes in distances between base year and current year, will tend to change the price index and not the volume index. In practice, despite changes in distances and in the transportation system itself (new roads, bridges or tunnels) the two indices of volume for margins and volume for goods transport may be expected to be very close to each other.

The quantity units to be measured in transport consist of the ton-kilometres and passenger-kilometres, i.e. represent less problems compared to distribution. It is important that the data are sufficiently disaggregated as to kinds and qualities of transport provided (road, rail, air, sea etc. respectively speed, frequency, comfort, safety, punctuality, reliability etc.). Deflation is preferred to extrapolation due to the variation in the lengths of journeys undertaken and the fact that it is not usual to aggregate the distances travelled by individuals or goods. A main practical problem is to ensure that the price indices allow for changes in quality when these occur.

3. STUDY OF COUNTRY PRACTICES

3.1 THE UNSO QUESTIONNAIRE

The main part of this paper deals with the country practices obtained from the questionnaire on price and quantity indices of services submitted to the UNSO during the last two years. This material so far contains replies from 46 countries, of which 21 are developed countries and 25 are developing countries.

Developed:	Australia	Austria	Belgium
	Canada	Denmark	Finland
	France	FRG Germany	Greece
	Iceland	Ireland	Italy
	Japan	Luxembourg	Netherlands
	New Zealand	Norway	Spain
	Sweden	United Kingdom	USA

For some of these countries information was extracted or supplemented from the OECD (see below).

Developing:	Argentina	Bangladesh	Belize
	Botswana	Brazil	Chile
	Cyprus	Hong Kong	Hungary
	India	Indonesia	Korea. Rep.
	Kuwait	Malaysia	Mauritius
	Mexico	Panama	Peru
	Philippines	South Africa	Sri Lanka
	Thailand	Trinidad and Tobago	Turkey
	Yugoslavia		

The two European countries are included here rather as non-OECD countries. The representation of developing countries are particularly weak from Africa (only 3 countries).

(ii) VARIOUS APPROACHES

The UNSO adopted the same questionnaire design as used by the OECD some years before, resulting in the OECD publication "Measurement of value added at constant prices in service activities". By doing so, the UNSO aimed for a compatible and global coverage of the data collected for the industrialized countries. General questions were raised as a supplement to the questionnaire. The questionnaire itself was heavily directed towards value added data by kind of activities. This seems to have created some confusion as to the recording of gross output (and intermediate consumption) volume measures. The questionnaire, however, no doubt conveyed a considerable amount of information, or provided a possibility for this pending upon the statistical capabilities of the countries.

In analysing the questionnaire data, the following set of methods is used to classify in a precise way the various approaches followed by the countries. Please remind that attention here is at production data (gross output, intermediate consumption and value added) and not at supply and disposition of commodity data.

Various approaches used for value added volume measures

A.	Deflation	B.	Extrapolation
AA-	Double deflation		
AA-P	Pure double deflation		
AA-P/G	- Gross output part		
AA-P/I	- Intermediate consumption part		
AA-M	Mixed double deflation		
AA-M/G	- Gross output part		
AA-P/I	- Intermediate consumption part		
A-	Single deflation = Deflation of current value added	B-	Single extrapolation = Extrapolation of base year value added
A-G	Deflation of current value added	B-D	Volume measure obtained by deflation of gross output value indicator
		B-Q	Volume measure based on physical quantities
		B-W	Volume measure obtained by deflated wage bill
		B-E	Volume measure based on numbers employed

A more precise description is given by the following scheme. Please note the difference between A-G and B-D, tne latter assumed requiring a value indicator different from current value added in order to arrive at the extrapolating volume indicator, while the former means a more current volume indicator (although implicit in character).

Definitions of approaches used

AA-P	$G(t)/Pg - I(t)/Pi$
AA-M	$G(0)*Qg - I(t)/Pi$
A-G	$G(t) - I(t) /Pg$
B-D	$G(0) - I(0) * Vg/Pg$
B-Q	$G(0) - I(0) * Qg$
B-W	$G(0) - I(0) * Vw/Pw$
B-E	$G(0) - I(0) * Qw$

G(0) and G(t) = Gross output in base year and year t
I(0) and I(t) = Intermediate consumption in base year and year t
Vg and Vw = Value index of gross output and wages (wage bill)
Qg and Qw = Volume index of gross output and employment
Pg and Pw = Price index of gross output and wage rate
Pi = Price index of intermediate consumption

Summing up, there are 4 main classes of approaches used: double deflation (AA-P or AA-M), single deflation (A-G), extrapolation by implicit indicator (B-D or B-W) and extrapolation by direct indicator (B-Q or B-E). The gross output-based approaches B-D and B-Q could be regarded as having a wider scope than the employment-based approaches B-W and B-E.

(iii) INDICES INFORMATION

The UNSO questionnaire focusses both on approaches used and indices used to arrive at volume measures. Information on indices is given as supplementary remarks to the indication of approach used in each case. When countries do not supply these supplements, they have still been included among responding countries with an indication of "not available" in the indices part of the study (however left out if approach used is unclear as well).

The information on indices used is somewhat variable in form and scope. In a number of cases, general expressions are used (relevant indices, special indices and the like), from which it may be problematic to classify them further. This also imply that the stratification aspect is dealt with in a variable way by the respondents. Some countries have indicated in an elaborated manner the various treatments for each of the main parts of one particular questionnaire item, while others have not provided for this.

Lastly, one word of caution: Use of the deflation approach does not necessarily mean application of direct price indices, and use of extrapolation approach not necessarily direct volume indices. This is seen from the definitions above, which correspond as such:

Price indices	AA-P, A-G, B-D and B-W
Volume indices	AA-M, B-Q and B-E

3.2 MAIN FINDINGS

(i) THE DEFLATION - EXTRAPOLATION CHOICE

Table 1 summarizes in percentage shares the choice of the countries between deflation and extrapolation in estimating constant price value added of the ISIC 6 and 7 services industries.

Table 1. Deflation ratios by services industries and by industrialized and developing countries. Percentages.

Services industries		I	D	Total
Wholesale and retail trade				
61	Wholesale trade	48	52	50
62	Retail trade	43	48	46
Restaurants and hotels				
631	Restaurants, cafes etc.	57	52	55
632	Hotels,camps,lodging places	52	42	47
Rail transport				
711.1P	Passengers	55	48	51
711.1F	Freight	50	48	49
Road transport				
711.2P	Passengers	48	48	48
711.2F	Freight	52	46	49
Pipeline transport				
711.P		64	63	63
Supporting services to land transport				
711.S		63	58	60
Water transport				
712.P	Passengers	43	45	44
712.F	Freight	43	43	43
Air transport				
713.P	Passengers	57	44	50
713.F	Freight	57	43	50
Services allied to transport				
7191	Services incidental to transp.	45	55	50
7192	Storage and warehousing	53	65	58
Communications				
72.T	Telephone	52	48	50
72.P	Postal services	52	50	51
72.O	Other	53	50	51
Non-weighted average		52	50	51

The main finding of this first issue is that the deflation and extrapolation approaches are pretty much equally distributed. In 14 out of 19 activities the deflation ratio for all countries is between 45 and 55 per cent. Deflation is more clearly used in three activities (ratios between 58 and 63 per cent), while water transport only is clearly on the extrapolation side (43-44 per cent).

One other main finding is that the difference observed between industrialized and developing countries is quite small. The non-weighted average of the deflation ratio is exactly 50 per cent in developing countries, while 52 per cent in the I-countries. The largest difference is for air transport, also however the activity in which double deflation is most used in the I-countries.

(ii) USE OF DOUBLE DEFLATION

The use of the double deflation method in the services industries is examined in table 2.

Table 2. Double deflation ratios by services industries and by industrialized and developing countries. Percentages.

Services industries	I	D	Total
Wholesale and retail trade			
61	38	20	27
62	38	20	27
Restaurants and hotels			
631	38	13	25
632	38	17	27
Rail transport			
711.1P	50	24	37
711.1F	50	24	37
Road transport			
711.2P	43	24	33
711.2F	43	25	33
Pipeline transport			
711.P	55	38	47
Supporting services to land transport			
711.S	44	32	37
Water transport			
712.P	43	23	33
712.F	43	22	32
Air transport			
713.P	57	24	39
713.F	57	26	41
Services allied to transport			
7191	45	25	35
7192	47	35	42
Communications			
72.T	43	24	33
72.P	43	25	33
72.O	42	23	32
Non-weighted average	45	24	34

One main finding here is that - while keeping close to the 50 per cent mark for the industrialized countries - the double deflation ratio drops to less than 25 per cent for the developing countries. Almost all I-countries that use deflation actually use the double deflation approach, while 1 of 2 developing countries using deflation resort to single deflation instead. The differences of 15 to 25 lower percentages in developing countries apply to a majority of activities.

In total, slightly more than 1 of 3 countries practise double deflation in ISIC 6 and 7 services industries. Another finding is that ratios are close to identical within the respective activities, i.e. passengers versus freight.

When double deflation is used in a particular country, it is found that the method tended to be used throughout all the activities. This is seen from table 3, listing the countries using the double deflation method. It is seen that 14 countries practise double deflation in most activities surveyed, while only 5 countries do this on an ad hoc basis.

Table 3. Double deflation countries in ISIC 6 and 7 services industries. Number of countries.

INDUSTRIAL	Canada	17
	France	17
	Netherlands	17
	Norway	17
	Denmark	16
	FRG Germany	16
	Italy	16
	Japan	16
	Spain	8
	Sweden	7
	Belgium	2
	Iceland	2
	USA	2
DEVELOPING	Botswana	17
	Mexico	17
	Cyprus	14
	Hungary	14
	Korea, Rep.	14
	Thailand	12

(iii) STRATIFICATION AND SPECIFICS

The stratification issue could be examined directly in terms of details and specified information provided or indirectly, e.g.by looking at shortcomings from items of the questionnaire. Not many countries have provided for sub-item details to be studied, those are countries that most likely exercise a detailed approach to the national accounts as such. Countries providing most details for this study include Australia, Austria, Canada, Denmark, Finland, FRG Germany, Netherlands and Norway, which all are countries in a better-off position in national accounts in general.

An indirect measure of the stratification achievement could be seen from table 4 on the specific method ratio of the UNSO questionnaire. This measure reveals to what extent the items

specified in the questionnaire actually are estimated. If not estimated, the items might be included in other items, thus becoming combined sector measures. A combined method is for example a case when no breakdown is given for passengers and freight, but please note that the specific method category still applies if both are estimated by using the same price or volume index, e.g. combined index of passenger-kilometres and ton-kilometres for both parts.

Table 4. Specific method ratio by services industries and by industrialized and developing countries. Percentages.

Services industries	I	D	Total
Wholesale and retail trade			
61	86	72	78
62	86	72	78
Restaurants and hotels			
631	81	74	77
632	81	75	78
Rail transport			
711.1P	80	71	76
711.1F	80	71	76
Road transport			
711.2P	90	76	83
711.2F	90	75	82
Supporting services to land transport			
711.S	94	84	89
Water transport			
712.P	81	82	81
712.F	71	83	77
Air transport			
713.P	76	72	74
713.F	71	70	70
Services allied to transport			
7191	80	85	83
7192	89	88	89
Communications			
72.T	81	88	85
72.P	76	88	82
72.O	68	77	73
Non-weighted average	81	78	80

The specific method ratio is on average estimated to approximately 80 per cent both for industrialized and developing countries. This means that 1 of 5 items of the questionnaire are combined with similar items to form a more aggregated level. This may or may not be serious: from activities point of view, the breakdown seems more detailed than the one used for international reporting to take a reference point. However, the sub-groupings of the UNSO questionnaire are not universially an activity breakdown, e.g. passengers versus freight are commodities rather than activities.

The specific method ratios do show small variations only. On the low side air freight transport often is combined with air passenger transport, while combination is most unusual in storage and warehousing. It is also seen that other communications such as telex, telegrams etc. are combined with telephone in 1 of 3 industrialized countries, while following a normal pattern in developing countries.

(iv) TYPE OF INDICES USED

This is considered the most important issue of the paper: the review of the price and volume indices used by the countries. As a basis for guideline proposals, an important criterion should be the prevailing state of affairs, despite improvements needed. In analysing existing indices, it should be quite imperative whether countries use specific and relevant indices (for short: special indices) or resort to more general, combined and non-relevant indices (general indices).

Classifying price and volume indices used by the countries into these two groups of special and general indices creates some borderline cases, naturally. However, as details in chapters 3.3 and 3.4 illustrate, the dividing line has been drawn rather unproblematic, taking into consideration type of indices used (e.g. CPI usually suited for passenger transport, but not for freight transport) and weights embodied in a combined index. A third category of "not available" has been included, since the indication of the methods used generally points to type of indices used as well (unspecified double deflation is conventionally classified as implying price indices).

When presenting the so-called special indices ratios in table 5, they are primarily shown by including category of "not available" in general indices. In the column of adjusted special indices ratios the denominator is however total of special and general indices (i.e. indices explicitly mentioned by the countries).

Table 5. Special indices ratios by services industries and by industrialized and developing countries. Percentages.

Services industries	I	D	Total	Adj.total
Restaurants and hotels				
631	81	30	55	62
632	76	42	58	67
Rail transport				
711.1P	75	52	63	76
711.1F	90	52	71	85
Road transport				
711.2P	76	28	50	64
711.2F	76	38	56	69

Pipeline transport				
711.P	55	13	37	70
Supporting services to land transport				
711.S	44	21	31	38
Water transport				
712.P	48	32	40	53
712.F	67	35	50	67
Air transport				
713.P	76	60	67	91
713.F	67	43	55	75
Services allied to transport				
7191	25	20	23	30
7192	21	18	19	27
Communications				
72.T	52	40	46	60
72.P	48	33	40	53
72.O	32	36	34	45
Non-weighted average	59	35	47	61

Table 5 summarizes a number of points to be learned from countries' use of indices for the volume estimation of value added in transport, communications, restaurants and hotels. The following three points might be of most importance:

(1) Approximately only one half of the indices used could be characterized as relevant and specific for the purposes they should serve. At least 40 per cent of the indices are general, non-relevant and not particularly suitable for this kind of estimation.

(2) The state is much better in the industrialized countries than in developing countries; close to 60 per cent use special indices in the former group, while only 35 per cent in developing countries. This means that 2 of 3 developing countries lack suitable indicators for volume measurement in these services industries.

(3) There is a rather large variation between the various services industries, particularly in the I-countries. In this group of countries the special indices ratio varies from 75 - 90 per cent in restaurants and hotels, rail transport, road transport and air passenger transport to as little as 20 - 25 per cent in services allied to transport. Also in developing countries these ratios deviate quite substantially, from 60 per cent down to 13 - 18 per cent.

In the next two chapters, a more closely examination is carried out on the appropriatness of the price and volume indices used in each of the activities. This also include the wholesale trade and retail trade sectors, left out in table 5 for various reasons (e.g. notion of special indices not prevalent in these cases).

3.3 FINDINGS ACCORDING TO ISIC 6 SERVICES INDUSTRIES

(i) WHOLESALE AND RETAIL TRADE

Wholesale trade

Deflation and extrapolation are equally frequent in use in the estimation of volume measure for this activity. This appears to be surprising, even more so that more European countries apply the extrapolation than the deflation approach.

Main methods used	I	D	T
B-D	11	6	17
AA-	8	5	13
A-G	2	8	10
Other	-	6	6

However, the three leading methods (B-D, AA- and A-G) are all methods requiring price indices. Only in 6 developing countries use is made of quantity indicators in this sector.

Rather than studying the dual use of special and general indices, like in other activities surveyed, it should be interesting to examine more closely the stratification aspect in the trade sectors, or more specifically, to which extent commodity flows are involved in the estimation. The commodity flow ratio, i.e. percentage of countries applying the commodity flow method, is disappointingly low, even in the industrialized countries.

Broad methods	I	D	T
Commodity flow method	8	4	12
Other aggregate methods	13	21	34

Only 1 of 4 countries follows a disaggregated approach in this respect, in developing countries only 1 of 6 countries.

There is a most notable difference between the better-off countries using the methods of double deflation and detailed commodity-flows (Canada, Cyprus, Denmark, France, Netherlands, Norway and probably Turkey) compared to a situation of quantity extrapolation and non-commodity flows (countries particularly in Latin-America). In the full report these cases will be surveyed more closely. The direct volume indices used in the latter cases are however related to goods, but in a very aggregated way. As regards the overwhelming majority use of price indices, these are again all over the spectrum from detailed commodity based in the better-off group, to those countries applying broad indices like wholesale price index, CPI, index of retail prices, general index of agricultural and industrial products etc. The better-off group also include countries following the B-D method

(Australia, FRG Germany, Indonesia, Korea and Sweden), in addition to the seven AA- countries mentioned above.

Retail trade

Extrapolation is more used than deflation in retail trade, both in I-countries and developing countries. Compared with wholesale trade this is due to a changeover from A-G to B-D method for two of the countries. Otherwise the picture is quite similar for the two trade sectors, including the same 6 countries applying B-Q.

Main methods used	I	D	T
B-D	12	7	19
AA-	8	5	13
Other	1	10	11

Also in respect of using the commodity flow method and choice of price indices, the situation is more or less the same in the two sectors. The commodity flow ratios are exactly like presented above for wholesale trade. In Europe, 1 of 3 countries uses the commodity flow method for this task. The most observed difference in terms of the price indices used, is from using wholesale price indices in wholesale trade to retail price indices in retail trade, quite naturally. There are still examples of countries following broad wholesale price index even for retail trade. Otherwise, it is noted that I-countries not being in the abovementioned better-off group to a considerable degree apply specific CPI indices for this activity.

(ii) RESTAURANTS AND HOTELS

Restaurants, cafes etc.

Deflation is more used than extrapolation. This is observed at all levels, also by region (regions of America, Asia and Europe, deflation ratio close to 55 per cent).

Main methods used	I	D	T
A-G	4	9	13
B-D	8	8	13
AA-	8	3	11
Other	1	6	7

Three methods (A-G, B-D and AA-) are rather equally frequent in use in this service industry. Most interesting is the absence of method B-Q, only used by 3 developing countries. This reflects how difficult it is to find appropriate volume indicators for the restaurant sector.

A clear lesson of this study is the wide use of price indices in this sector and the specific use of relevant consumer price indices. Indication of the specific nature of the CPIs varies, from very specific (eating out, restaurant meals, expenses at restaurants,cafes etc., food away from home, food eaten outside, food and beverages outside home), to composite but still specific (expenditure for hotels, cafes, restaurants etc.) and to relevant but not specific (relevant components, various component indices, subgroup, subgroups, relevant indices, relevant parts, relevant deflator, by commodity).

Indices used	I	D	T
Price indices	20	17	37
Special indices	17	7	24
Relevant CPI	15	6	21
General indices	2	6	8
Volume indices	1	6	7
General indices	1	6	7

The predominantly use of a specific CPI deflator is the major finding in this sector. It should also be observed that a number of countries still use general price indices, either total CPI or for wider consumption groups, e.g. food, drinks, tobacco and room rates. The 7 countries using volume indices resort to general or other inappropriate indices (numbers employed or combined employment indicators, other kind of input volume indicator, combined index of real wages and number of tourists or even value added volume index of all other sectors!).

Hotels, camps, lodging places etc.

Extrapolation is more used than deflation, both in total and in developing countries, while deflation is in a small majority in I-countries, in Europe and Asia.

Main methods used	I	D	T
B-Q	5	7	12
AA-	8	4	12
B-D	5	5	10
Other	3	8	11

Compared with the restaurant sector the most striking difference is that the quantity indicator method B-Q has become widely used, particularly in developing countries. This is due to the use of special volume indices, in particular number of bed-nights or guest-nights in accommodation, but also other less articulated indices (specified index in hotels, index of visitor arrivals) and other general indices mentioned for the restaurant sector above.

The same favourable position of specific CPI indices also applies to the hotel and accommodation sector. Here again specifics

differ from clear indications (hotel charges), through combinations to relevant unspecified indices.

Indices used	I	D	T
Price indices	15	15	30
Special indices	12	6	18
Relevant CPI	9	2	11
General indices	3	5	8
Volume indices	6	9	15
Special indices	4	4	8
General indices	-	5	5

Though special price indices is the majority choice of the hotel industry, the predominance is not as high as for the restaurant sector, the reason for which is that special volume indicators also find considerable support.

3.4 FINDINGS ACCORDING TO ISIC 7 SERVICES INDUSTRIES

(i) RAIL TRANSPORT

Rail transport - passengers

Deflation is slightly more used than extrapolation in total, but more predominantly for I-countries and for Asia and Europe (55-60 per cent). Extrapolation is used by a majority of developing countries and in most Latin-American countries.

Main methods used	I	D	T
B-Q	8	9	17
AA-	10	5	15
Other	2	7	9

The split between the two most frequently used methods (B-Q and AA-) reflects the close to even distribution between extrapolation and deflation approaches just mentioned.

This also implies that use of price indices and volume indices is indeed divided into two almost equal size groups. A preference might be given to the volume indices from a more frequent and consistent use of special indices. In particular, there is a widespread use of the indicator of passenger-kilometres, in most cases used as such, while others resort to a combined or weighted index of passenger-kilometres and freight ton-kilometres. Some developing countries lack the distance dimention, resorting to number of passengers carried or number of journeys (by type).

Indices used	I	D	T
Volume indices	11	10	21
Special indices	9	7	16
Passenger-km etc.	9	3	12
Pure passenger-km	6	1	7
General indices	1	1	2
Price indices	9	11	20
Special indices	6	4	10
CPIs	2	2	4
General indices	3	3	6

General volume indices are almost non-existent, but one I-country reports using tom-miles also for passenger rail transport. CPI indices dominate the price indices side, but more than half of CPI indices reported have to be classified as general (total CPI, for road transport, weighted components, purchases of transportation services). The special price indices refer to railway fares, tariff series etc., but also to composite index (fare and freight index).

Rail transport - freight

Extrapolation is slightly more used than deflation, in Latin-American countries significantly more used. The two methods B-Q and AA- dominate even more in freight than for passenger rail transport. It should be stressed that mixed double deflation (AA-M) using volume indicator for gross output is equally frequent in use as pure double deflation (AA-P) in the freight part.

Main methods used	I	D	T
B-Q	10	11	21
AA-	10	5	15
Other	-	5	5

This reflects a wider use of volume indices than price indices, and furthermore, the majority use of volume indices almost exclusively means special indices, in particular ton-kilometres. More countries use ton-kilometres on the freight side than passenger-kilometres on the passenger side, probably due to the lack of CPI or other suitable price indices. The consistent use found in I-countries is lacking in developing countries. In the latter group indicators of cargo handled, physical indicators or relevant volume indices are also reported. In both I-countries and D-countries a weighted combined passenger-km and ton-km indicator is existent.

Indices used	I	D	T
Volume indices	15	12	27
Special indices	14	9	23
Ton-km etc.	13	5	18
Pure ton-km	9	3	12
General indices	-	1	1
Price indices	5	9	14
Special indices	4	2	6
General indices	1	3	4

On the price indices side, general indices of CPI are used and more specialized indices of rates and tariffs, including unit value index for one country referring to private railway fares.

(ii) ROAD TRANSPORT

Road transport - passengers

Extrapolation is somewhat more used than deflation both in the industrialized and developing countries. Deflation is the majority method in Asia and Europe, however.

Main methods used	I	D	T
B-Q	6	10	16
AA-	9	6	15
Other	6	9	15

Two methods dominate, B-Q and AA-, like for rail transport. Category other is equally divided between methods A-G and B-D, while one I-country practises wage bill deflating (B-W).

Most use is made of price indices, particularly in the industrialized countries. Special indices are more developed in the I-countries, and like for rail transport two main alternatives compete: price indices mostly based on CPI details and volume indices measured in terms of passenger-kilometres. In this case, the CPI indices are used by most countries, i.e. CPI for bus fares and taxi fares, for bus, tram and taxi components, for bus transport and the like. Some of the CPI indices reported are turned to the general indices (total CPI, weighted components, purchases of transportation services). Other price indices are clearly on the relevant side (e.g. average fare of central government road passenger transport, price index based on passenger-km tariffs, deflator of passenger fare receipts, net price index for bus, coach and tramway transport, bus and taxi fare index), while others are general (wage deflator, price index for transport etc.).

Indices used	I	D	T
Price indices	12	15	27
Special indices	9	4	13
Relevant CPI	4	2	6
General indices	3	4	7
Volume indices	9	10	19
Special indices	7	3	10
Passenger-km etc.	7	2	9
Pure passenger-km	5	1	6
General indices	1	5	6

Among volume indices used the preferred indicator is passenger-kilometres, particularly in industrialized countries. Some variations occur: passenger-km and ton-km combined, passenger-km and journeys, number of passengers and kilometres travelled. Some developing countries resort to general volume indices, such as number of vehicles, passengers and freight, combined number of trucks, buses and taxis, goods vehicles and taxis registered, the indirect indicator of gas and diesel consumption and quantity indices of sectors demanding road transport services.

Road transport - freight

Extrapolation is slightly more used than deflation, in 23 countries against 22. The order is however reversed for the industrialized countries and the regions of Asia and Europe.

Main methods used	I	D	T
B-Q	9	8	17
AA-	9	6	15
Other	3	10	13

The same two methods, B-Q and AA-, are preferred in both passenger and freight road transport. Neither employment nor wage extrapolation are used by any country.

Volume indices are more often used than price indices in freight road transport, unlike in passenger road transport. It seems as if pure ton-kilometres is more used than pure passenger-kilometres as a volume indicator. The reason for this might be that few alternatives (especially CPI indices) are available on the freight side. While ton-kilometres most often are used, combinations with passenger-kilometres also occur in the I-countries. Other special volume indices are based on number of licensed vehicles by category, transported goods per truck, total tonnage carried and tons of freight. Like in passenger road transport, some countries resort to general indices, including one I-country using some sort of weighted volume index of all other production groups.

Indices used	I	D	T
Volume indices	13	12	25
Special indices	10	6	16
Ton-km etc.	10	1	11
Pure ton-km	9	-	9
General indices	2	4	6
Price indices	8	12	20
Special indices	6	3	9
General indices	2	3	5

Price indices used are different forms of tariff series, unit value index, rate per ton-kilometre, average revenue per ton-mile and other freight indexes, including more general indices related to broad groups of CPI or weighted input transport index.

(iii) PIPELINE TRANSPORT

Deflation is clearly more used than extrapolation in pipeline transport (for almost 2 of 3 reporting countries). A smaller coverage in this industry is partly due to the fact that pipeline transport is not applicable. Double deflation is mostly used, but often as mixed double deflation.

Main methods used	I	D	T
AA-	6	3	9
B-Q	3	3	6
Other	2	2	4

Volume indices are in majority in pipeline transport. The volume indicators are ton-km (and cubic-metres), volume of oil and gas transported or capacity measures for pipelines, while two countries resort to more general indicators (total volume index of other transport and storage and volume indicator of sectors demanding this service). Two countries report price indices (transfer marginals index, weighted components of CPI).

Indices used	I	D	T
Volume indices	7	3	10
Special indices	5	1	6
General indices	1	1	2
Price indices	4	5	9
Special indices	1	-	1
General indices	-	1	1

(iv) SUPPORTING SERVICES TO LAND TRANSPORT

Deflation is used by 60 per cent of the countries, and by practising either of the two deflation methods more often than the quantity extrapolation method B-Q.

Main methods used	I	D	T
AA-	7	6	13
A-G	3	5	8
B-Q	1	6	5
Other	5	2	7

Price indices naturally are predominant in this sector, as it is hard to find appropriate volume indices for direct use. Three countries only have such volume indices (number of kilometres by rented cars, terminal and parking lot use index and indicator of toll used). The other volume indices used are general in nature (combined agricultural and industrial production index, road and rail transport index, employment indices, tourist nights index and car numbers and number of establishments etc.). Problems of finding relevant price indices are also prevalent, reflecting that countries mostly resort to general indices. Some specifics are part of CPI (expressway tolls, public parking, car leasing), others are mainly connected with car rentals. The general price indices are partly CPI indices, partly transport price indices (fare and freight index etc.). The most specific indices are developed in industrialized countries.

Indices used	I	D	T
Price indices	13	12	25
Special indices	6	2	8
Relevant CPI	3	-	3
General indices	5	6	11
CPI's	3	4	7
Volume indices	3	7	10
Special indices	1	2	3
General indices	2	5	7

(v) WATER TRANSPORT

Water transport - passengers

Extrapolation is the majority method, both in industrialized and developing countries. Deflation is equally frequent in use in Asia and Europe, however.

Main method used	I	D	T
B-Q	10	9	19
AA-	9	2	11
Other	2	8	10

The quantity indicator method B-Q is clearly the most used. Some countries also follow the mixed version double deflation method (volume indicator for gross output).

Volume indices are more used than price indices. However, many of the volume indices are general in nature. This actually means that special price indices are more often preferred than special volume indices in this sector. They are not always specified in a precise way (specially constructed, relevant transport service etc.), but in other cases they are (CPI for boat and ferry or for water transport, passenger fare indices). One country uses rather uniformily unit value index (when CPI indices are not used). General price indices (CPI or other) are also used.

Indices used	I	D	T
Volume indices	12	11	23
Special indices	5	3	8
Passengers etc.	5	2	7
General indices	5	5	10
Price indices	9	11	20
Special indices	5	4	9
General indices	2	3	5

The volume indices are more consistent, especially regarding use of passenger numbers in I-countries. Just two countries use passenger-kilometres (for inland water transport in one case). Other countries in this group resort to ton-kilometres, here included among general indices (non-relevant). Other general indices used are number of boats, numbers employed, volume of traffic carried, other physical indicators or indirect measure.

Water transport - freight

Extrapolation is also in majority in freight water transport. The situation is pretty much the same as in passenger water transport, also according to main methods used.

Main methods used	I	D	T
B-Q	10	12	22
AA-	9	5	14
Other	2	6	8

Volume indices are in the majority use position. Compared with the passenger part, the volume indices are more specific and consistent and based on tonnage or tons transported. The aspect of distance transported is included by a few countries, but normally not. Tons indicator variations also occur (tonnage of freight handled at harbours and cargo loaded and unloaded). Countries resorting to general indices usually follow indices of both passenger and freight water transport.

Indices used	I	D	T
Volume indices	12	13	25
Special indices	7	5	12
Tons,tonnage etc.	7	4	11
General indices	3	4	7
Price indices	9	10	19
Special indices	7	3	10
Freight rates etc.	4	2	6
General indices	1	3	4

Price indices used are mostly special in terms of freight fares and rates. In some cases specific transport services are referred to, like avergae rate per kg for selected destinations. General price indices do also occur in this activity (wide areas of CPI or general price index of ISIC 7).

(vi) AIR TRANSPORT

Air transport - passengers

Deflation and extrapolation are used by 23 countries each in this sector. Deflation is preferred by a majority of industrialized countries, while extrapolation in developing countries.

Main methods used	I	D	T
B-Q	8	12	20
AA-	12	6	18
Other	1	7	8

Volume indices are practised a lot more than price indices in this sector. This is reflected from the fact that B-Q is the most frequently used method and mixed double deflation being more commonly used than pure double deflation. Furthermore, it is seen that indeed all volume indices are classified as special indices. The predominant indicator is passenger-kilometres, used by 11 countries, while 3 countries combine passenger-kilometres and ton-kilometres, and another 2 countries use passengers transported. Other volume indices are based on traffic carried, departing passengers etc. Price indices used are also mostly special indices, like CPI for air transport, price deflator for domestic flights, other passenger fare indexes etc. Three

countries resort to general indices of CPI.

Indices used	I	D	T
Volume indices	15	13	28
Special indices	12	9	21
Passenger-km etc.	10	4	14
General indices	-	-	-
Price indices	6	12	18
Special indices	4	6	10
Relevant CPI	2	1	3
General indices	1	2	3

Air transport - freight

Deflation and extrapolation are equally frequently used also in this case, leaning to a preference for deflation in I-countries and for extrapolation in developing countries. The situation is similar to the one observed in passenger air transport, i.e. methods B-Q and AA- used by all but 5 countries.

Main methods used	I	D	T
B-Q	9	12	21
AA-	12	6	18
Other	-	5	5

Volume indices are used by more than 2 out of 3 countries. The indicator ton-kilometres has a correspondingly strong position here as passenger-kilometres in passenger air transport. One difference is that general volume indices occur, in countries resorting to passenger-kilometres and the like also in the freight portion of air transport. Price indices also have some support. Special indices are reported by 6 countries, mostly freight fare indices (including cargo rates deflator), while 3 countries resort to general CPI indices.

Indices used	I	D	T
Volume indices	17	13	30
Special indices	12	6	18
Ton-km etc.	11	4	15
General indices	2	3	5
Price indices	4	10	14
Special indices	2	4	6
General indices	1	2	3

(vii) SERVICES ALLIED TO TRANSPORT

Services incidental to transport

Deflation and extrapolation are equally frequent in use, but in this case deflation is in excess in developing countries and extrapolation in industrialized countries. Although AA- and B-Q also in this case are the methods mostly used by the countries, the category other is relatively large.

Main methods used	I	D	T
AA-	9	5	14
B-Q	5	8	13
Other	6	7	13

Price indices are more used than volume indices. It is observed that few countries find special indices and instead have to resort to general indices, either price or volume. Most frequent are general price indices, of which various broad CPI indices dominate. Other general price indices are indices of broad transport coverage or of branches served by transport., Those 5 countries reporting special price indices use special input-based indices (wages, input goods, transport services etc.), price indices of travel agencies and forwarding tariff index etc.

Indices used	I	D	T
Price indices	12	11	23
General indices	7	5	12
CPIs	3	3	6
Special indices	3	2	5
Volume indices	8	9	17
General indices	4	5	9
Special indices	2	2	4

On the volume side, 4 countries are specific, e.g. index of loaded and unloaded goods in ports and tonnage data for containers carried on vessels discharged/loaded. The general volume indices used are either referred to numbers employed, passengers transported, entrances and departures of international passengers, volume measures of most or all transport sectors or combined imported and exported goods and index of manufacturing production.

Storage and warehousing

Deflation is the most frequently used approach both in industrialized and developing countries, particularly in the latter category.

Main methods used	I	D	T
AA-	9	6	15
B-D	7	1	8
B-Q	2	5	7
Other	1	5	6

Double deflation is clearly the most used method, followed by another method requiring price indices.

Thus, price indices predominates the estimation of volume measures in the storage and warehousing sector. These are however mainly general price indices since special indices are difficult to obtain. Those 5 countries reporting special price indices use special input based indices, unit value index or warehousing charges per metric ton combined with employment. Gneral price indices used either refer to CPI measures, wholesale price index, electricity price index, general price index of transport or other transport categories, average revenue per ton-mile, deflated turnover of wholesale trade or index of branches using transport services.

Indices used	I	D	T
Price indices	15	12	27
General indices	10	5	15
CPIs	4	3	7
Special indices	3	2	5
Volume indices	4	5	9
General indices	2	2	4
Special indices	1	1	2

Two countries only report special volume indices (volume of grain stored, utilized storage space). General volume indices used reflect volume indices of services incidental to transport (loaded and unloaded goods in ports etc.) or combined volume indices of other transport etc.

(viii) COMMUNICATIONS

Communications - telephone

Deflation and extrapolation are equally frequent in use, with a slight preference of deflation in industrialized countries and of extrapolation in developing countries. It is especially in Latin American countries the latter is the case.

Main methods used	I	D	T
B-Q	8	12	20
AA-	9	6	15
Other	4	7	11

The predominant method is B-0 in telephone communications. Double deflation is second in order, in this case with a clear majority using the double price deflation version.

Price indices are though more used than volume indices according to practices in both industrialized and developing countries. CPI indices are used in 8 countries, but mostly general referring to communications as a whole. Other price indices include rates of charge deflators and tariff indices etc., and next general combined indices of the communications industry or even fare and freight index of whole ISIC 7, while one country uses a minimum wage rate index.

Indice used	I	D	T
Price indices	11	13	24
General indices	6	5	11
CPIs	3	3	6
Special indices	5	3	8
Volume indices	10	12	22
Special indices	6	7	13
Telephones,calls	3	7	10
General indices	2	1	3

Volume indices are either based on specified number of minutes, words and the like or most often number of calls or number of telephones, number of lines, number of installations etc. Number of telephones and number of calls also serve as combined indicator. The combination of number of calls and real growth rate indicator is classified among the few general volume indices.

Communications - postal services

Deflation is slightly more used than extrapolation, both in total and in the two main groups of countries. The American region however has preference for extrapolation. Use of the different methods mainly follows the pattern of telephone communications. One special feature: extrapolation method of employment B-E is used by one country.

Main methods used	I	D	T
B-0	8	9	17
AA-	9	6	15
Other	4	9	13

Price indices has a wider coverage than volume indices. And more countries resort to general price indices than using special price indices. This is partly due to general CPI (communications or wider groups) being more frequently used than CPI for postage. Other price indices used are net price index for mail delivery service, indices of tariffs, rates of charge deflator and cost

index of posted letters, parcels and packages and general indices relating to total communications industry, fare and freight index of ISIC 7, minimum wage rate index and combined indicators of charges and tariffs in communications.

Indices used	I	D	T
Price indices	10	15	25
General indices	6	6	12
CPIs	3	4	7
Special indices	4	3	7
Volume indices	11	9	20
Special indices	6	5	11
Postal articles	2	5	7
General indices	3	1	4

On volume indices, the special indicators are mostly number of postal articles etc. and volume indices of mail carried. In one case telegrams,telex etc. are included as well. Most cases for general volume indices imply the use of volume indices for telephone communications.

Communications - other

Deflation is slightly more used than extrapolation also in this case. The picture is the same as for postal services. The methods B-Q and AA- are on top as in rest of communications. The country that uses B-E in postal services here switches to B-W (i.e. using wage deflator rather than employment indicator).

Main methods used	I	D	T
B-Q	7	10	17
AA-	8	5	13
Other	4	7	11

Price indices are more used than volume indices, but are mainly general since CPI indices do not refer particularly to telex, telegrams etc. but often cover communications as a whole. There are also other references to postal services and telephone services. The special price indices are mostly rates of charge oriented. Volume indices used are based on number of minutes or words transmitted, number of telegrams and telexes, licensed numbers etc., while other countries resort to general indices by employing indices referring to telephone indicators.

Indices used	I	D	T
Price indices	10	12	22
General indices	8	5	13
CPIs	4	3	7
General indices	2	3	5
Volume indices	9	10	19
Special indices	4	5	9
Telex,telephones	2	4	6
General indices	3	1	4

4. TOWARDS UN GUIDELINES

4.1 PROVISIONAL CONCLUSIONS FROM THE STUDY

As already stated in the introduction of this paper, this is not the occasion for presenting definite proposals of guidelines on price and volume indices to be used in volume measures of ISIC 6 and 7 services industries.

Some provisional conclusions might however emerge from this country practices study. One striking fact that cuts through nearly all cases reviewed in chapters 3.3 and 3.4, is the ultimate choice between price and volume indices. The split between deflation and extrapolation approaches in all these cases closely follows the 50 per cent dividing line among countries.

There are two principal recommendations to be advocated, irrespective of which side is taken in the deflation/extrapolation issue. Both relate to the methods to be adopted. One is for as much stratification or specific treatment as possible. At least the level of items of the UNSO questionnaire is a prerequisite, stressing e.g. the breakdown on passengers and freight to be followed in the various parts of transport. Communications are probably satisfactorily treated in three sub-categories. The stratification should however be pursued further in supporting services to land transport and services allied to transport, at least in services incidental to transport. The same is likely the case in road transport and water transport in order to arrive at more specific indices in each case. Weighted or combined indices might otherwise be the alternative treatment to this problem.

The second general recommendation would be the preference for double deflation. The study has revealed that approximately half the industrialized countries use double deflation in most of these services industries and others have potentiality to use this method (cf. air transport with even higher score). Developing countries do indeed show a poor performance in this respect, with coverage in most cases around 25 per cent, and even as low as around 15 per cent in restaurants and hotels. It is expected, however, that development of double deflation technique could

emerge from the development of statistical capabilities in general. From the study it is for instance seen that some of the NIC countries (Korea and Thailand) already have adopted the double deflation method in this area.

In addition to arguments set forward in favour of double deflation in earlier contexts, I should like to stress two other points at this conjuncture. One is the obvious fact that constant-price estimation is commodity-related and should only in a secondary sense be occupied with short-cuts in value added residual estimation. The other point is one of flexibility: double deflation, as demonstrated in this paper, is not a prerequisite for one or the other choice of price or volume index. If a country wishes to use a volume indicator, this could in the mixed version of double deflation be combined with price deflation on intermediate consumption, i.e. at the same time as volume indicator is used to form an implicit price deflator for gross output.

Leaving aside recommended methods to be used, then turn to the price or volume indices. The following head words could be put forward as the bearing conclusions by services industries from this study (in gross output context):

Wholesale trade	Price indices/ (detailed)
Retail trade	Price indices/ (detailed)
Restaurants,cafes etc.	Price indices/ Relevant CPI
Hotels,camps,lodging places	Price indices/ Relevant CPI
Rail transport-pasasengers	Volume indices/ Passenger-kilometres etc.
Rail transport-freight	Volume indices/ Ton-kilometres
Road transport-passengers	Volume indices/ Passenger-kilometres etc.
Road transport-freight	Volume indices/ Ton-kilometres
Pipeline transport	Volume indices/ Ton-kilometres
Supporting services to land transport	Price indices/ (various)
Water transport-passengers	Volume indices/ Passengers
Water transport-freight	Volume indices/ Tons (various)
Air transport-passengers	Volume indices/ Passenger-kilometres etc.
Air transport-freight	Volume indices/ Ton-kilometres
Services incidental to transport	Price indices/ (various)
Storage and warehousing	Price indices/ (various)
Communications-telephone	Volume indices/ Telephones,calls
Communications-postal services	Volume indices/Postal articles
Communications-other	Volume indices/ Telex,telegrams

The general impression from this list is the many items allocated to volume indices. Again, what is reviewed here is solely present country practice in each responding country, and the list reflect positions of highest frequence in terms of alternatives among special indices reported.

4.2 POINTS FOR DISCUSSION

On the basis of the information and issues presented in this paper, several points for discussion should be taken into consideration:

(1) Is it preferable to adopt a flexible attitude to the various issues raised, or should uniform methods and types of indices be pursued as a goal for the implementation ?

(2) Related to the first question, should guideline proposals be presented at a relatively detailed level with as concrete and specific choice of price or volume indices as possible or should we resort to more general proposals in this respect ?

(3) How much weight should be paid to the present country practises study, and what other criteria should be given proper consideration, and by which weight, in the shaping of the guideline proposals ?

(4) What should be the ambition level of the guidelines, the best possible ones experienced by the most refined practices presently known or foreseeable in near future, or more pragmatic guidelines which could be followed by a great number of countries in forseeable near future ?

(5) To what extent should present state in the developing countries influence the guideline proposals ?