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# THE USE OF PRICE MEASUREMENTS FOR THE PRIVATE SERVICE SECTOR IN SWEDEN

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## Introduction

This paper outlines the present situation in real output and price measurements of services and the efforts to improve the calculations of the real output for the service sector in Sweden.

In order to calculate the real output the national accounts need

a) output specifications by industry and by commodity (service product) in current prices

b) input specifications by industry and by commodity (service product) in current prices

c) price change measurements for these commodities or volume indicators

The new service statistics are customized to suit the demands of the national accounts, at least as far as current output and its distribution by activity and commodity groups are concerned. The new statistics will fill the production matrix (activity/commodities), the generation of value added and to a minor extent the input matrix (use matrix) of the national accounts system.

The present breakdowns by activity and commodity groups (service products) used in the input/output tables of the national accounts are listed in Annex 1. The disaggregations are rather few as the statistics on services still are sparse. The expanded new service statistics will become much more detailed by activity as well as service products. In due time the national accounts might increase the number of commodity groups in their system.

For the inputs, the data gaps are considerable. Compared with the manufacturing industries, a less detailed breakdown by input items might be necessary. Anyway, we will have to expand the service statistics by cost specifications in order to get the statistics joined to the overall system of the national accounts.

For the input-output calculations the national accounts strongly advocate that we include trade margin surveys in our programme. We have asked for funds for this, and are prepared to start intermittent surveys, beginning in 1989 with the wholesale trade sector.

Our new service statistics will also help to distribute value-added by institutional sectors (enterprises, household and government).

The present methods used in the national accounts to measure the service production at constant prices are listed below together with some suggestions on how to improve the measurements.

## Wholesale and retail trade

Method: Consumer and producer price indices for the preliminary estimates. Value added in contant prices for final estimates are calculated by applying a fixed value-added rate to constant price estimates of the value of goods traded.

Comments: Starting now, turnover data by commodity groups will be supplied every three years. As mentioned before, trade margins in wholesale trade might be studied the next year. If we get funds, we will copy a similar survey recently made in Norway. This survey covers five parts, i. e.

a) overall business figures
   -total turnover
   of which: sales of goods
   sales of own produced goods
   sales of services
   hire services, specify
   other activities, specify

b) links with other companies and trade chains

c) purchases of traded goods by kind-of-delivery group

   from: foreign suppliers (own import)
   domestic suppliers:
   producers (industry, agriculture, etc)
   other wholesalers

   cross-classified by:

   internal deliveries from other establishments within the same company

   purchases from other companies within the same company group

   purchases from suppliers with which cooperation is established

   purchases from suppliers with which there is no organized cooperation existing

d) sales of traded goods by kind-of-consumer group

to: private consumers
public authorities
private and public companies outside the wholesale trade
other wholesalers

e) sales by commodity groups:

Amounts in thousands of SEK: purchases, sales, stock per 1/1 and 31/12, special fees and subsidies - all by commodity groups adjusted to the groups used in the I/O tables of the national accounts

Restaurants and hotels

Method: Price indices from the CPI

Improvements in sight: Prices of canteen services

Comments: New production statistics were compiled for the year 1986. Canteen services accounted for eight per cent of the industry's total turnover.

Railway transport

Method: Passenger transport - price indices from the CPI
Goods transport - volume (ton-km) indicator

Improvement in sight: (goods transport) quantity index weighted by average price per tonkm for some commodity groups

Bus and car passenger transport

Method: CPI- indices

Freight transport by road

Method: factor price index of lorry transports, adjusted by a weighted unit price index that can be computed by three-year intervals

Comments: Some important changes in the supply of data in this sector in Sweden were described in a paper presented at an informal meeting in Geneva in September this year. The paper is enclosed in Annex 2. As can be seen from this paper the availability of price data has recently deteriorated by turning a yearly survey of lorry transports to an intermittent survey (every three year).

We should need price indices for international lorry transports, machinery works and newspaper distribution.

Water transport

Method: Volume indicators (number of passengers, and quantity of loaded and unloaded goods), price indices of scheduled freights, trip charters and crude oil freights

Air transport

Method: Volume indicators (number of passengers and passenger-kilometres, ton-km for freights)

Services allied to transport

Method: For forwarding services, the production value in current and constant prices is extrapolated by the production in railway transport, lorry transport and water and air transport.

Comments: A price index for travels by package tours to foreign countries by air has been developed and will soon be computed on a regular basis. Probably it will also be used in the compilation of the Swedish CPI. Such tours represent about 1 per cent of the total weight in the CPI.

Another new price index to be introduced covers self-drive car hire, both for business and private consumption.

Financial institutions, insurance

Method: The value-added in constant prices is extrapolated by the numbers of gainfully employed, and on the assumption that the labour productivity increases by 2 per cent each year.

Real estate

Metod: The rent value in constant prices is extrapolated by the stock of dwellings. The value in current prices is computed by reflating with the CPI index for rental dwellings. This valuation is also used for owner-occupied housings and some non-residential property.

Comments: We have asked for funds to expand our statistics in this field, starting in 1989. We will suggest that brokerage of real property constitutes a separate activity. The prices of these services are determined by the brokerage rates and the price development of the properties. We have good information on the transaction prices of residental buildings.

Business services except machinery and equipment rental and leasing

Method: Deflation by a labour cost index for salaried employees within the manufacturing industry. (We do not have an index for labour costs or salaries of the employees in the service producing sector).

Comments: This is the last [illegible] subsector of the service industry in Sweden, and it amounts to 3 per cent of the whole private service sector. We plan to examin the possibilities to collect price data.

We think we might be able to collect prices for some data processing services. We know that there are a lot of tariff or list prices for these services. For services like "placing of advertisments for clients in newspapers or magazines", we also think a price collection might be feasible. There are some enterprises in Sweden who exclusively perform such services. However, for the great majority of services produced in this sector we are very uncertain about the prospects.

Education, health and veterinary services

Method: The production values in constant prices are extrapolated by the numbers of gainfully employed. Values in current prices are derived by reflating. Both labour costs index for salaried personnel and various price indices are used depending on the subsector in question.

Comments: Proxy methods are used because private production is fairly small. When more detailed information on the output becomes available, deflation with price indices will be used.

Recreational and cultural services

Method: The production value is deflated by the appropriate components of the CPI

Repair and laundry services

Method used: The production value is deflated by the appropriate components of the CPI

Improvement in sight: Price indices might be computed for laundry services which are intermediate consumption

ANNEX 1

SERVICE ACTIVITY AND SERVICE PRODUCT DIVISION IN SWEDISH INPUT/OUTPUT TABLE

| ISIC, Rev 2 | Activity | Service products |
|---|---|---|
| 63 | Restaurants and hotels | Restaurants, cafés<br>Hotels, other lodgings |
| 7111 | Railway transport | Goods transport<br>Passenger transport<br>Loc transport subcontractor<br>Other<br>Goods transport, imports<br>Passenger transport, imports |
| 7112 | Urban and inter-urban passenger transport | Bus goods transport<br>Bus passenger transport<br>Bus, subcontractor<br>Passenger transport, imports |
| 7113 | Other passenger land transport | Bus, car passenger transport<br>Bus, car goods transport |
| 7114 | Freight transport by road | Goods transport<br>Lorry hire<br>Goods transport, imports |
| 7116 | Supporting services to land transport | Car parking<br>Self-drive car hire |
| 7121/2 | Water transport | Goods transport<br>Passenger transport<br>Time charter rents<br>" " " , imports |
| 7123 | Supporting services to water transport | Navigation aids<br>Loading and discharging<br>Harbour services<br>" " , imports |
| 713 | Air transport | Goods transport<br>Passenger transport<br>" " , imports<br>Other<br>" , imports |

| | | |
|---|---|---|
| 719 | Services allied to transport | Forwarding services<br>Travel agency services |
| 72001 | Post | Postal services<br>" " , imports |
| 72002 | Telecommunication | Telecom services<br>" " , imports |
| 832 | Business services | Engineering services<br>" " , imp<br>Other business services<br>" " , imports |
| 833 | Machinery rental and leasing | Rental and leasing services |
| 92 | Sanitary and similar services | Cleaning services<br>Other services |
| 931/2 | Education and research | Education services<br>Research services |
| 933/4 | Health services, welfare institutions | Health services<br>Veterinary services |
| 935/9 | Organizations | Organizations services |
| 94 | Recreational and cultural services | Radio and television<br>Tape recording<br>Author services<br>Arts, etc<br>Lotteries<br>Amusements |
| 951 | Repair services | Household repairs<br>Car and bicycle repairs |
| 952/9 | Miscellaneous services | Laundry services<br>Barber shop services<br>Photographic services<br>Other personal services |

# METHODS USED IN SWEDEN FOR THE COMPILATION OF PRICE AND QUANTITY INDICES IN THE TRANSPORT SECTOR

## A. Introduction

1. Statistics on goods transport on road dominates in this memo. The reason is that in Sweden road transport constitutes the largest part of the transport sector. Passenger transport is not discussed.

## B. Goods transport on road

2. Up to 1987 the Swedish statistics on goods transport on road provided figures on ton-kilometres (tkm) and a price index (Laspeyres') based on actual market prices. Only the tkm-measurement was used in the Swedish national accounts (NA) for measuring the volume development. In 1987, however, the survey from which these figures derived, was discontinued as a yearly survey, and is to be replaced by an intermittent survey made every third year. The reason is discussed below.

3. The new intermittent statistics on goods transport on road are based on a sample of about 4 000 lorries in operation each quarter. The survey population is confined to lorries with a loading capacity of 2 metric tons or more. For each selected lorry the survey period is limited to one calendar week. In order to cover the seasonal variations in the transport market, the sample covers every week and a separate part of the sample is studied quarterly. The previous yearly survey had a sample size of 2 000 lorries per quarter.

4. The survey gives estimates of the transport performance by lorries and trailers incl semitrailers as a whole, with separate estimates for transports by lorries incl trailers and semitrailers operated for hire or reward - licensed lorries - and transports by lorries operated on own account. The transport performance is measured in carried tons, ton-kilometres, capacity ton-kilometres, vehicle kilometres, time used in hours and freight revenues. Lorries operated for transports for hire or reward are analyzed by loading capacity, industrial branch, commodity carried, length of haul and by region of origin and destination. International transports are measured to and from the Swedish border only.

5. The previous, yearly survey was also used to compute a weighted unit value index for road transport. The index was made by grouping the freight revenue and corresponding tkm data of each transport into homogeneous segments according to kinds of goods transported and transport distances. Quantity indices were computed in the same way. Both Laspeyres' and Paasche's indices could be computed. Only yearly indices were computed.

6. In 1986 a thorough examination was made concerning the quality of the "price" data observed from the survey. It stressed the complexity of constructing price indices based on actual market prices. It revealed as well that the measurement errors ought to be controled better, that the number of "outliers" which did not fit the grouping at all was high, that certain added variables probably would improve the results, e.g. the scope of the transport agreement, terminal time, a code for return freight and capacity utilisation based on both weight and volume. Extending the index computations in this way would have permitted the use of more sophisticated methods like multiple regression analyses. However, to enlarge the survey with more variables is considered unrealistic. The number of questions is already very large. Also, there are special problems in asking lorry owners or haulage contractors questions about freight revenues as they do not always have immediate access to information about the freight for a single transport. The transport agreements are to a great extent handled by forwarding companies. The relevant question is rather, should we drop questions on freights from the survey and concentrate on physical data?

7. For the benefit of the NA, a new yearly survey was introduced in 1985 as a replacement for the one mentioned above. It is an industry survey and it covers both road freight transport companies and forwarding agents. In this survey the turnover figures are broken down yearly into lorry transport services and other services. Intermittently (every third year) a more detailed classification can be shown, i e lorry transport services, courier transport services (by cars), machine-work services, newspaper distribution, furniture removals, sales of soil, sand, gravel and so forth, sales of other goods and other revenues. The transport industry structure explains why the new survey was necessary. Most road haulage contractors in Sweden are very small with only one lorry in operation and with no hired staff. The transport services are sold by a few very large companies whose operations are both national and international. There are also about 250 agencies with predominantly local operations and with a large amount of side activities such as sales of soil, sand, etc. The haulers are subcontractors to these transport selling companies. If you are interested in the transport prices paid by the owners of the transported goods, the transport selling companies are the ones to ask. However, they have no easy access to those prices and they are only able to provide tariff or list prices, which are poor approximations for actual market prices.

8. The new survey produces figures about the net sales from carriers and forwarding agents to buyers of transports by lorries where the internal sales between the transporting and transport selling companies have been eliminated. The figures from the 1985 survey shows:

Sales of goods transport by lorries from sellers
SEK, thousands of millions, 1985

| Local forwarding agents | Haulage contractors | Forwarding agents | Total |
|---|---|---|---|
| 5,8 | 6,1 | 7,8 | 19,7 |
| 29% | 31% | 39% | 100% |

Thus, the total sales of transports by lorries in 1985 were estimated to about 20 billions (thousands of millions). The sales of other services from these companies, excl forwarding agents, were estimated to SEK 5 billions. The lorry sample survey mentioned in para 3-5 gave an estimate of SEK 11 billions, which is about half the industry sample result. This can be explained by the following facts:

-the industry survey includes all transports by lorries as well as cars (courier activity).

-the industry survey includes the provision received by the agents, which covers costs for storage, re-loading, document administration, delivery of VAT-taxes and custom duties etc.

-there might be missing values in the lorry survey due to forgetfulness from the respondents when reporting the transports that have taken place during the week.

9. The recent changes in the transport statistics surveys have totally changed the availability of price and quantity data.

a) ton-kilometre figures are not longer available yearly, only intermittently

b) it is likely that prices derived as unit values will only be available intermittently too

10. In Sweden, the following data on prices of lorry transports are now available:

a) a factor (cost) price index related to the costs of operating a lorry. The covered cost items are insurance, tax, depreciation of the lorry, repair and maintenance, wages and salaries, interests, tyres, fuel and administration costs. Price indices for these items are weighted together to a total index. The weights are fixed for some years ahead.

b) unit value indices computed on basis of data from the big forwarding agents, data about revenues from transports within the Swedish border and the corresponding figures in ton.

c) market prices of oil transports - a kind of administered prices

d) it is likely that prices for lorry transports of timber will soon be available from a private data base

11. From now on, deflation in the NA is made by the factor price index. Earlier the unit value index was used for yearly computations and the ton-kilometre volume index for quarterly computations. The figures in table 1 illustrate the differences in the outcomes of the two index calculations.

Table 1. Comparison between the factor price index and the unit value index for lorry transports.

| | Increase in per cent from the previous year | |
|---|---|---|
| | Unit value index Weighted | Factor price index |
| 1977 | 10 | 13 |
| 1978 | 7 | 11 |
| 1979 | 7 | 9 |
| 1980 | 14 | 16 |
| 1981 | 14 | 11 |
| 1982 | 9 | 8 |
| 1983 | 11 | 8 |
| 1984 | 3 | 7 |
| 1985 | 12 | 10 |
| 1986 | 5 | 4 |
| 1987 | 5 | 6 |
| Average 1987/76 | 8.7 | 9.8 |

The weighted unit value index is a Laspeyres' index. It measures the average change of prices per tkm weighted by that combination of kinds of goods and transport distances that existed during the base period.

12. The figures in Table 1 indicate an average differance of 1 per cent per year during the period 1976-1987. By definition the factor (cost) price index does not permit items such as improved efficiency and changed transport margins to have an impact upon the index. Thus, there is reason to believe that a factor price index in general overestimates the market price increases.

C. Other transport sectors

13. In case of goods transport by rail, in Sweden the ton-kilometre measure is used as a volume indicator. Data on tkm by groups of goods are available as well, and if freight data for the same groups could be delivered -it is possible- a weighted unit price index could be compiled on a yearly basis. For quarterly calculations we would also be able to compute a Paasche quantity index.

14. In the case of harbour activities tons of freight handled are used as a volume indicator, while for water transports price indices are used. No changes are at hand. In particular oil transports priced in US dollars seem to cause problems, and a use of ton-kilometres as a volume indicator would be preferable if the origins of the oil transports were known. As this is not the case, we have to accept the price indices. A revision is studying available indices and which are the most appropriate for deflation purposes. As far as forwarding services are concerned, the best course seems to be to use a mix of the deflators already used for rail, road, water and air transport respectively.

15. A new price index of self-drive car hire is about to be introduced. It would replace the current volume indicator.

D. Summary

16. A new program on transport statistics has recently been implemented in Sweden. There is reason to believe that the estimates of the level of, and the changes in, production and value added in current prices have been improved. A change for the worse might have occured as far as the availability of price data is concerned. However, we do not as yet know. The weighted unit value index suffers from shortcomings that is difficult to handle within the survey in question. Instinctively one feels that the use of the ton-kilometre indicator as a volume measurement for road transports is unreliable. It is difficult to define homogenous groups, in which the quality remains unchanged over time. It is perhaps easier in the case of goods transport by rail and by water. The use of a factor (cost) price index as the only measure of price movements of goods transport on roads is unsatisfactory. The new intermittent lorry survey will include data on freight revenues. Unit value indices with three year links could therefore be used as a check, and if necessary also for corrections of the factor price index series.

Some price data for Swedish lorry transports

Transport prices are usually given in SEK per ton-kilometre. The following table shows the distribution of lorry transports by class of prices and class of distances. The number of transports are averages from 1980-1983 and the prices are from 1983. Timber and oil transports and special transports are excluded, as well as all transports distances less than 50 kilometres.

| SEK/tkm | 50-109 | 110-159 | 160-209 | 210-309 | 310-509 | 510-700 | >700 | Total |
|---|---|---|---|---|---|---|---|---|
| 0 - .20 | 4 | 37 | 41 | 57 | 140 | 119 | 82 | 517 |
| .21 - .40 | 938 | 957 | 653 | 783 | 759 | 348 | 137 | 4575 |
| .41 - .60 | 1256 | 572 | 276 | 327 | 322 | 133 | 34 | 2929 |
| .61 - .80 | 447 | 205 | 143 | 184 | 130 | 54 | 15 | 1178 |
| .81 -1.00 | 276 | 211 | 103 | 115 | 74 | 22 | 6 | 807 |
| 1.01-1.20 | 267 | 145 | 74 | 74 | 53 | 15 | 7 | 653 |
| 1.21-1.40 | 232 | 134 | 84 | 46 | 39 | 11 | 1 | 547 |
| 1.41-1.60 | 196 | 93 | 42 | 52 | 20 | 5 | 1 | 409 |
| 1.61-1.80 | 198 | 90 | 41 | 27 | 13 | 4 | 1 | 374 |
| 1.81-2.00 | 196 | 69 | 18 | 31 | 12 | 7 | 0 | 333 |
| 2.01-2.20 | 183 | 65 | 15 | 17 | 6 | 2 | 0 | 288 |
| 2.21-2.40 | 163 | 51 | 14 | 16 | 9 | 1 | 0 | 254 |
| 2.41-2.60 | 137 | 46 | 16 | 14 | 12 | 1 | 1 | 227 |
| 2.61-2.80 | 140 | 24 | 13 | 12 | 5 | 2 | 0 | 196 |
| 2.81-3.00 | 112 | 35 | 12 | 18 | 4 | 1 | 2 | 185 |
| 3.01-3.20 | 97 | 35 | 13 | 5 | 4 | 2 | 1 | 157 |
| 3.21-3.40 | 89 | 41 | 6 | 11 | 2 | 0 | 0 | 149 |
| 3.41- | 1151 | 271 | 85 | 50 | 28 | 10 | 2 | 1597 |