Index of Service Production (ISP)

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### 1. Background

The experimental monthly index for service industries, called the Index of Service Production (ISP) from here on, has been created to be a current indicator of production growth in the service industries, measured in constant prices. The new ISP will also be an indicator for quarterly calculations of production of service within the National Accounts.

In the beginning, the ISP will be published for all the service industries and six activity aggregates

- Trade (motor trade, wholesale trade and retail trade) NACE 50-52
- Hotels and restaurants NACE 55
- Transport, storage and communication NACE 60-64
- Business services NACE 70-74
- Education and training, medical services NACE 80-85
- Other services NACE 90-93

The index will only include the private service sector with the exception of production within credit institutes and insurance companies are excluded.

This documentation explains the method behind the calculation of the ISP. A review is done of each activity where the sources for deflating and output for each activity are presented.

The main part of the documentation is aimed at explaining how the ISP is constructed.

### 2. The theory behind the Index of Service Production

The Index of Service Production (ISO) has the same conceptual basis as the production based measurement of GDP, it is designed to be a short-term indicator for measuring Value Added (VA).

# 2.1 The theory for measuring the value added in the Index of Service Production

The level of value added is defined in the European System of Accounts (ESA) for each activity in constant prices, such as the following:

or in greater detail, one might write

VA = Turnover	minus consumption purchases
	plus changes to inventory
	<i>plus capital</i> formation by the

service producer

GDP is measured at market prices and is the sum of all the industries' taxed value added, plus product taxes (value added tax, alcohol tax, etc.) minus product subsidies.

The Index of Service Production is based on each activity's value added. For example, the production value of road transport activity includes the value of fuel and insurance policies needed to maintain the vehicle and other consumption. The value of these goods and services is deduced to determine their value added.

#### 2.2 Using indicators

The Index of Service Production is calculated in constant prices and as an index. Above all, it is necessary to decide a base year for which prices shall be related to. Then the value added for each activity is estimated in constant prices by converting production and consumption to constant prices, where the latter is deducted from the former. This method, known as double deflation, is very difficult to apply in practice. This requires high quality information regarding value and prices for both production and consumption. Double deflation is also especially uncertain when the value added is small in relation to the production.

There is more information available in practice for production than for consumption, so changes in the production are frequently used as an approximate indicator in order to measure changes in value added.

Even if the relationship between production and consumption is not always stable in separate industries, stability in aggregates of all industries will be higher. For example, if a products or service is transferred from one activity to another, then it not certain whether such changes the total sum of work preformed. If a production indicator overestimates the change in value added in the one activity, the error will go in the opposite direction via an underestimate of value added in the other. In any case, the use of production as an indicator is only as a proxy for what is best used according to the theory.

Below is a list of indicators in order of preference, according to ESA.

1) The indicator that ESA prefers is an output indicator that measures deflated gross output (or turnover) for an activity. This requires an appropriate deflator to cleanse out price alterations.

2) The use of volume indicators is also acceptable according to the ESA ordinance. This requires no deflation but will naturally miss changes in quality or changes in production.

3) Other kinds of indicators measuring input to an activity that is not approved except for certain industries, this is the only available short-term indicator. The most commonly used is employment.

Indicators are selected for the Index of Service Production that can estimate short-term changes according to the following.

- Activity inclusiveness
- Consistency over time
- Reliability and timeliness

Indicators selected for current prices also depend on whether or not there is a suitable deflator.

#### 2.3 Activity classification and weighting

The nomenclature for classifying industries in the Index of Service Production is the Swedish version of the latest activity classification nomenclature titles SIC 2002. Activity indicators are weighed together through the industries' relative contributions to GDP for the service sector based on an activity's value added. The weights in the form of value added in current prices are collected on a broad activity level from the National Accounts (NA) and on a more detailed level from the Structural Business Statistics survey (SBS). The weights will be updated annually but with a delay of about two years. This means that when the index of service production surveys reference year 2007, then the information for National Accounts will refer to 2006 and the Structural Business Statistics survey will refer to 2005.

#### 2.4 Preparatory treatment

All input data for the index of service production must meet certain standards and thus must be prepared in order to follow a given established structure. Because input data comes in many varying forms, the preparatory treatment is unique to the index serving as input in the system.

The price index used by the system is redone such that the price index is explicitly the change, towards some average, from last year's price level. Such recalculations are done for all price indexes.

In the majority of cases, information for output is collected from turnover statistics from the service sector. Information about turnover is expressed with current prices.

### **3. Mathematical formulation of the Index of Service Production**

#### 3.1 What is an index?

An index is used to make it easier to see changes over time for a given variable. An index series starts with a base or a given point in time indicated as a base to which all other figures in the time series refer. An index has the advantage that different types of data can be combined into a consistent base, such as deflated turnover with volume data.

#### 3.2 Index of Service Production

The purpose of the Index of Service Production is to provide a reliable indicator of short-term changes in value added in the private service sector of the economy. An index is the best means to communicate that.

Direct measurement of value added is possible if both output and input can be measured. Such is generally impossible so assumptions are made that changes in gross output represent changes in the value added. The Index of Service Production is thus designed for measuring the volume in output.

**Current prices** measure the value Current prices show the value or goods and services precisely as they are at a given point in time. Uncorrected turnover data is data in current prices.

#### value = price \* quantity

**Constant prices** are used to show how the quantity or volume of goods and services changes. As result they are often called volume measures. The Index of Service Production is a volume index in constant prices.

#### quantity = value / price

The output volume can thus be measured by dividing turnover in current prices by a sound price indicator. This process is called deflation.

Direct volume measures are used in an activity of the Index of Service Production instead of the deflated turnover. All these measurement alternatives can be assumed to employ the same mathematical formula as the one for the deflated turnover, where a price component has a value of 100.

#### 3.3 Mathematical deduction of the Index of Service Production

One of the most common ways of showing volume measures is to express them as constant prices with a set base year. The formula for this can be mathematically expressed as:

$$\mathbf{KP}_{\mathbf{t}} = \mathbf{P}_0 * \mathbf{Q}_{\mathbf{t}}$$

where  $KP_t$  is the value in period t expressed as constant prices P<sub>0</sub> of the base period 0 and Q<sub>t</sub> is the quantity in period t.

An advantage in expressing them in this manner is that resulting values can be aggregated in the same way as values in current prices. They can also be easily understood as the cost of present purchases in the base year.

There are three methods to calculate constant prices: revaluation, deflation and volume extrapolation and each is suitable under given circumstances.

#### 3.3.1 Revaluation

The simplest and most direct method for obtaining value in constant prices for a specific product or service is to multiply physical quantity produced in the present period by the unit price for the base year. This method has the advantage of not needing a value for any other period than the base year. In any case, it is not used for the Index of Service Production because it requires data about physical quantities for a large number of services. This would be difficult, costly and time intensive and would unnecessarily burden companies in an unacceptable manner.

#### 3.3.2 Deflation

Collecting prices for each kind of service would not be feasible, so in practice Statistics Sweden collects data for a reduced number of representative goods and services that indicate the general price movements. These price movements can be used to construct a price index  $(P_t / P_0) * 100$ . Earlier, we stated the following:

#### value = price \* quantity

$$CP_t = P_t * Q_t$$

Thus, by dividing by the price index and then multiplying by 100, a constant price series can be obtained.

 $((P_T *_T)((P_T / P_0) * 100)) *100$ =  $(P_0 *_T / 100) * 100$ 

=  $P_0 * Q_t = KP_t$  which is the value in constant prices.

This is the most common method used in the Index of Service Production, for services with the turnover in current prices and suitable deflators (such as the Retail Trade Price Index and the Service Producer Price Index) are available.

#### 3.3.3 Volume extrapolation

The last method updates the base year's values by using a suitable volume index. This method is regarded by Eurostat as being inferior for providing deflated turnover as a measure of value added, but it is used in absence of deflated turnover.

#### 3.4 Index and weighting

It is possible to obtain values in constant prices with very sparse information. Because the Index of Service Production uses growth as output in order to approximate growth in value added, so this only shows output, volume figures, as an index, relating value to a point in time "t" to the average value in the base year, which is equal to 100, then

$$(P_0 * Q_t) / (P_0 * Q_0) * 100.$$

This gives a volume index for each of the goods and services and the Index Service Production composed of many different services. It is thus necessary to construct an index that gives consideration to the relative weight of each individual service and this is accomplished with weights. To find a suitable weighting system is a key problem in the construction of a Index of Service Production.

There are a number of advantages associated with this method. It is easily understood and usually quite easy to use in order to collect the information. The weights are constant for all future periods. In times of rapid change, these can quickly become out of date. The base year weights are calculated based on the sub-sectors' percentage of the service sector's total value added.

The following results from applying the base year weights to the formula.

$$S_{t} = \frac{\sum_{i \in S} (w_{i}(\frac{Q_{it}P_{i0}}{Q_{i0}P_{i0}})*100)}{\sum_{i \in S} w_{i}}$$

Where  $S_t$  is the index value at time t  $w_i$  is the weight of component i for the index.

This formula assumes complete knowledge of prices, quantities and weights. One needs in practice to estimate all these elements. This leads to deviations between the calculated index, in comparison to the true index that presumes complete information.

A detailed description of how the weight index is calculated for the Index of Service Production is provided in section 7.3.

### 4. Surveys

#### 4.1 Service sector turnover statistics (Turn)

The purpose of these statistics is to measure the turnover development on a monthly basis for trade and other service industries. Turnover statistics form I source used as a proxy for output measurement in almost all industries. Information used from the turnover statistics is expressed in current prices. The deflation of the turnover is done within the framework for the Index of Service Production, which makes it distinct from that done in the turnover statistics. The estimation procedure for turnover statistics is described in section 7.1.

#### 4.2 Turnover statistics calculated from VAT fees

The VAT register contains information about exacted Value Added Tax (VAT) for all companies declaring VAT in a special VAT declaration. The register is built on VAT information from the National Tax Board. The number of companies declaring monthly VAT figures reaches approximately 350 000 companies. The purpose of VAT is primarily to measure the turnover development on a monthly basis for all sectors. Information from VAT is used to a few industries, not surveyed by turnover statistics, as a proxy for the output measurement. The information used for VAT is turnover information in current prices. The deflation of turnover is done within the framework of the Index of Service Production.

#### 4.3 Producer price index, domestic

The producer and import price index present the average price trends in producer and import costs for different sectors and goods categories. Prices are measured in the first phase of distribution when the goods are delivered from Swedish producers as well as to primary purchasers, when goods are brought into Sweden. This price index shows the price trends for domestic supply price development. Information from this price index is used as a deflator for wholesale trade and other service industries where is sound service price index has been lacking.

## 4.4 Service Producer Price Index (SPPI), producer price index for services

The Service Producer Price Index - SPPI - measures the development of prices in industries that provide business services. The SPPI is primarily used by the Swedish national accounts to calculate the production value of services at fixed prices on a product group level. The index measures the average development of prices of transactions during one quarter. Information from SPPI is used as a deflator for a number of service activities such as hotels, transport, computer consultantcy and business services.

#### 4.5 Consumer Price Index (CPI)

The Consumer Price Index is the most commonly used measure of price development and is used as a measure of inflation during labour contract negotiations. CPI refers to how average consumer prices develop for the entire private domestic consumption, that is, those prices consumers actually pay.

A number of different CPIs are used as deflators for the Index of Service Production. For such things as retail trade, information is used from the Retail Trade Price Index (RTPI), which is a collective weighting of different goods categories in the CPI that also belongs to a given activity.

#### 4.6 Factor price index (FPI)

The factor price index is an index measuring the price development for production factors used in the construction activity, such as building, heating, ventilation and air conditioning, electrical work, salaries, machines, transport, fuel, electrical power and projects, etc. The Index of Service Production uses price information from the factor index for transport that is deflators for some other industries within the transport sector.

#### 4.7 Wages and salaries for the private sector

The survey mainly aims to illuminate the development of salary level development within the private sector. Statistics are mainly used as a basis for economic analysis and business cycles evaluations.

In the Index of Service Production, salary indexes are used as deflators for a number of services insures that presently lack a sound service price index.

### 5. Timeliness and periodicity

The timeliness and periodicity of output indicators and deflators used for calculations of the Index of Service Production are reported on in the table below.

Survey	Periodicity	Timeliness
Service sector turnover	Monthly	T+28 for retail trade.
statistics		T+35 for the other
		service sector.
Turnover statistics	Monthly	T+70 for all industries.
(calculated from VAT		
fees)		
Producer price index	Monthly	T+25
for domestic supply.		
Service Producer Price	Quarterly	T+45
Index (SPPI), producer		
price index for services		
Consumer Price Index	Monthly	T+15
(CPI)		
Factor Price Index	Monthly	T+8
(FPI)		
Wages and salaries for	Monthly	T+45. (Preliminary
the private sector		after T+45 and
		definitive after T+60.
		January and February
		are reported together.)

\* Where T stands for the day in the reference period.

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The time plan for the monthly Index of Service Production and the production of the turnover statistics is in accordance with the following.

Activity	Point in
	time
Mailing the turnover questionnaires, month T	T-1
Reviewing questionnaire information, (month T-1)	T+0
Preliminary reminder (month T)	T+10
Last day to submit (month T)	T+15
Telephone reminder (month T)	T+16
Final telephone reminder (month T)	T+19
Reviewing questionnaire information, (month T)	T+25
Applying the deflators	T+45
Preliminary results ready (month T) and Definitive (month T-	T+45-
1)	T+50

#### 6. Data sources

The Index Service Production uses a number of different data sources. The sources used as output indicators and deflators are described in this chapter activity by activity, service sector by service sector. The weights used to aggregate activity sector data on the lower level, to generate a series on the higher level, are shown as a percentage of the service industries' total value added.

#### 6.1 Sales of motor vehicles

Swedish Industrial Classification (SIC), division 50, includes the sale, maintenance, and repair of motor vehicles, sale of spare parts and accessories as well as the sale of fuel. Service sector turnover statistics are the only source Statistics Sweden has for turnover in *sales of motor vehicles*.

Turnover in current prices from turnover statistics is deflated by collectively weighted price indexes for goods categories from the CPI, i.e. the the Retail Trade Price Index and the Service Producer Price Index. The Retail Trade Price Index shows the price changes for consumer goods in Sweden.

SIC	Descrimtion	Same:	Indicator	Weight	
SIC	Description	Source	Indicator	Weight (Index of	Dellator
coue				(Index of Service	
				Productio	
				n	
				=1000)	
Divisi	on 50 Trade in and servic	e of motor	vehicles; retail		
trade	in fuel			42.0	
50.1	Trade in motor vehicles	Turn	Turnover in		1. CPI: Sales of
			current prices		passenger cars
				19.6	(RTPI 50102)
50.2	Automotive service	Turn	Turnover in		1. CPI: Motor
	workshops		current prices		vehicle sales
					(GcNA -34100)
					2. CPI: Spare parts
					(GcNA -34300)
					3. Automotive
					repair (GcNA 50A)
					4. Service
					Production Price
					Index: Automotive
					leasing and rentals
					(Service Producer
		_		9.9	Price Index 71.1)
50.3	Trade in spare parts	Turn	Turnover in		1. CPI: Retail trade
			current prices		in automotive spare
					parts and
					accessories (RTPI
		_		5.5	50.302)
50.4	Sales	Turn	Turnover in		1. CPI: Trade in
			current prices		motor cycles,
					inclusive of repair
					workshops (RTPI
<b>TO -</b>		-	<b></b> .	0.9	50.400)
50.5	Retail trade in fuel	Turn	Turnover in		1. CPI: Petrol
			current prices		stations (RTPI
				6.1	50.500)

#### Index of Service Production: Sources, indicators, weights and deflators

CPI - Consumer Price Index; RTPI- Retail Trade Price Index; GcNA - Goods category National Accounts; SPPI - Service Producer Price Index

#### 6.2 Wholesale trade

SIC division 51 includes company activities that are intermediaries in retail trade, e.g. where purchasers buy directly from producers and sell to retailers. The sector includes sales agents that sell on commission without owning the given goods. Service sector turnover statistics are the only source Statistics Sweden has for *wholesale trade* turnover.

Turnover in current prices from Turnover statistics is deflated by means of collectively weighted the producer price index for domestic supply, which shows the price changes in production for Swedish industrial producers.

SIC	Decominition	Sour	Indicator	Weight	Defleter
sic	Description	Sour	Indicator	wholese	Denator
coue		ce		wholesa	
				le trade	
				(Index	
				01	
				Service	
				Produc	
				tion	
				=1000)	
Division	51 Wholesale and commi	ssion tra	ide, except for		
motor v	ehicles	-		132.6	
51.1	Commission trade	Turn	Turnover in		1. Producer price
	except for motor		current prices		index for domestic
	vehicles				supply Machinery
					and tools
					2. Producer price
					index for domestic
					supply Household
					appliances
					3. Producer price
					index for domestic
				6.5	supply Other
51.2	Wholesale trade in	Turn	Turnover in		1. Producer price
	agricultural products		current prices		index for domestic
	and livestock		1		supply Agricultural
					products
					2 Producer price
					index for domestic
					supply Textiles
					3 Producer price
					index for domestic
				24	supply
513	Wholesale trade in	Turn	Turnover in	2.4	1 Producer price
51.5	foodstuffs beverages	Tum	current prices		index for domestic
	and tobacco		current prices		supply Food
	and tobacco				2 Broducer price
					2. FIGURE price
					supply Detail trade
					in alashalis
					haverages
					2 Dre deserver
					5. Producer price
				17.0	index for domestic
				17.3	supply Other

### Index of Service Production: Sources, indicators, weights and deflators

51.41- 51.42	Wholesale trade in textiles clothing and	Turn	Turnover in		everyday commodities 1. Producer price index for domestic
	shoes			18	supply Textiles and textile products 2. Producer price index for domestic supply Household appliances 3. Producer price index for domestic supply Other
51.43; 51.44 51.47	Wholesale trade in household appliances, glassware, porcelain, and other household goods	Turn	Turnover in current prices	<b>T</b> .0	<ol> <li>Producer price index for domestic supply Building materials</li> <li>Producer price index for domestic supply Household appliances</li> <li>Producer price index for domestic supply Watches, gold and leisure</li> </ol>
51.45- 51.46	Wholesale trade in perfume, cosmetics, medical equipment and pharmaceuticals	Turn	Turnover in current prices	19.4	1. Producer price index for domestic supply Machinery 2. Producer price index for domestic supply Other everyday commodities 2. Phormecourtical
51.51	Wholesale trade in fuels	Turn	Turnover in current prices	12.5	1. Producer price index for domestic
51.52	Wholesale trade in metals and metal ores	Turn	Turnover in current prices	4.6	supply Fuel 1. Producer price index for domestic supply Metal, scrap, etc. 2. Producer price index for domestic supply Watches, gold and leisure items 3. Producer price index for domestic
51.53	Wholesale trade in wood, other building materials and sanitation products	Turn	Turnover in current prices	2.7	supply Other 1. Producer price index for domestic supply Building materials 2. Producer price index for domestic supply Household
51.54	Wholesale trade in	Turn	Turnover in	9.2 6.8	appnances 1. Producer price

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	hardware and heating, ventilation and air conditioning equipment		current prices		index for domestic supply Metal, scrap, etc. 2. Producer price index for domestic supply Machinery, tools 3. Producer price index for domestic supply Building materials
51.55	Wholesale trade in chemical products	Turn	Turnover in current prices		<ol> <li>Producer price index for domestic supply Agricultural products</li> <li>Machinery, tools</li> <li>Producer price index for domestic</li> </ol>
51.56	Wholesale trade in intermediary goods	Turn	Turnover in current prices	3.5	supply Other 1. Producer price index for domestic supply Textiles 2. Producer price index for domestic supply. Machinery, tools 3. Producer price index for domestic currely. Other
51.57	Wholesale trade in waste products and scrap	Turn	Turnover in current prices	5.5	1. Producer price index for domestic supply: Textiles 2. Producer price index for domestic supply: Metals, scrap 3 Producer price index for domestic
51.8	Wholesale trade with machinery and equipment	Turn	Turnover in current prices	1.8	supply: Other 1. Producer price index for domestic supply Machinery, tools 2. Producer price index for domestic supply Household appliances 3. Producer price index for domestic supply Other
51.9	Other wholesale trade	Turn	Turnover in current prices	0.9	<ol> <li>Producer price index for domestic supply Machinery, tools</li> <li>Producer price index for domestic supply Other</li> </ol>

#### 6.3 Retail trade

SIC division 52 includes business activities of retailing goods directly to consumers, e.g. through boutiques, past order, internet and marketing.Service sector turnover statistics are the only source Statistics Sweden has for *retail trade* turnover. Turnover in current prices, from prices turnover statistics are deflated by means of collectively weighted price indexes for goods categories from CPI, via Retail Trade Price Index. The Retail Trade Price Index shows the price changes for consumer goods in Sweden. Smuggled alcohol and tobacco are not included in the Index of Service Production.

Index of Service Production: Sources, indicators, weights and deflators

muca	bei vice i rouucion.	sources,	maicators	weights	
SIC	Description	Source	Indicator	Weight	Deflator
code				(Index	
				òf	
				Service	
				Dradua	
				Frouue	
				tion	
				=1000)	
Division	52 deals with retail trade e	xcept for n	notor		
vehicles,	repair of household applia	nces and p	ersonal		
applianc	es.			92.1	
	Warehouse and wholesale	Turn	Turnover		1. CPI: Warehouse
	market trade, mostly		in current		and wholesale market
	foodstuffs		prices		trade, mostly
	10000500115		prices		foodstuffs (RTPI
52111				5.6	52111)
52111	Trade in feedatuffe with	Tum	Tumporton	5.0	1 CDL Trada in
		Turn	i urnover		
	large variety, mostly		in current		foodstuffs with large
	foodstuffs		prices		variety, mostly
					foodstuffs (RTPI
52112				22.1	52112)
	Other retail trade with	Turn	Turnover		1. CPI: retail trade
	large variety		in current		with wide variety
52120	2		prices	3.3	(RTPI 52100)
	Specialised retail trade	Turn	Turnover		1. CPI: Specialised
	with alcoholic beverages		in current		retail trade with
	with deconone beverages		nrices		alcoholic beverages
52250			prices	17	(PTDI 52250)
52250	Succialized ustail turds	<b>T</b>	Т	1.7	(KIFI 52250)
	Specialised retail trade	Turn	Turnover		1. CPI: Specialised
	with tobacco		in current		retail trade with
<b>500</b> 40			prices		tobacco (RTPI
52260				1.4	52260)
	specialised retail trade in	Turn	Turnover		1. CPI: Trade in
	food		in current		foodstuffs with large
52210-			prices		variety, mostly
52240;					foodstuffs (RTPI
52270				2.3	52112)
	Pharmaceutical trade				1. CPI:
					Pharmaceutical trade
52310				56	(RTPI 52310)
52310 5232 A	Retail trade in health care			5.0	1 CPI · Perfume
5252A (5222	notice and cosmetice				stores (Industrial
(3232-	products and cosmetics			0.4	Stores (muustriai
5255)		T	T	0.4	Price index $52330$ )
	Retail trade in textiles	Turn	I urnover		1. CPI: Retail trade in
			in current	_	textiles (RTPI 52410)
52410			prices	0.4	

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52420	Retail trade in clothing	Turn	Turnover in current prices	11.5	1. CPI: Retail trade in clothing (RTPI 52420)
52430	Retail trade with shoes and leather goods	Turn	Turnover in current prices	16	1. CPI: Retail trade in shows and leather goods (RTPI 52340)
52441- 52442	Retail trade in furniture, carpets and interior design	Turn	Turnover in current	5.0	1. CPI: Furniture stores (RTPI 52441)
52443-	Retail trade in glassware, porcelain and electronic	Turn	Turnover in current	5.8	1. CPI: Retail trade in furniture, etc. (RTPI
52444	items Retail trade in household machinery and appliances	Turn	prices Turnover in current	1.5	52443) 1. CPI: Retail trade in household machinery
52451	Patail trade in radios and	Turn	prices	0.7	and appliances (RTPI 52451)
52452	televisions	1 41 11	in current prices	2.3	radios and televisions (RTPI 52452)
	Retail trade with records, musical tapes and video cassettes	Turn	Turnover in current prices		1. CPI: Retail trade with records, musical tapes and video
52453	Retail trade in musical	Turn	Turnover	0.2	52453) 1. CPI: Retail trade in
52454	nstruments Retail trade in hardware,		in current prices	0.2	(RTPI 52454) 1. CPI: Retail trade in
	building and heating, ventilation and air- conditioning equipment				hardware, building and heating, ventilation and air- conditioning
52461	Retail trade in paint			4.4	52461) 1. CPI: Retail trade in
52462	Retail trade in newspapers, books and paper products			1.1	paint (RTPI 52462) 1. CPI: Retail trade in newspapers, books and paper products
52470	Retail trade in eyeglasses and other optical products			1.4	(RTPI 52470) 1. CPI: Retail trade in eveglasses and other
52481	Retail trade in			1.9	optical products (RTPI 52481) 1. CPI: Retail trade in
	and photographic equipment and photography services				equipment and photography services
52482	Retail trade in watches			0.6	(RTPI 52482) 1. CPI: Retail trade in watches (RTPI
52483	Retail trade in gold items and jewelry			0.3	52483) 1. CPI: Retail trade in gold items and
52484	Retail trade in sport and			1.0	52484) 1. CPI: Retail trade in
52485	leisure items			3.2	sport and leisure items (RTPI 52485)

	Retail trade in toys		1. CPI: Retail trade in
52486		0.6	toys (RTPI 52486)
	Retail trade in flowers and		1. CPI: Retail trade in
	other plants		flowers and other
52487	~	1.6	plants (RTPI 52487)
	Retail trade in small		1. CPI: Retail trade in
<b>53</b> 400	animals	0.0	small animals (RTPI
52488		0.3	52488)
	Retail trade in computers,		1. CPI: Retail trade in
	office machinery and		computers, office
	programming software		machinery and
			programming
52.402		1.0	software (RTPI
52493		1.0	52493)
	Retail trade in		I. CPI: Retail trade in
	telecommunications		telecommunications
52404	equipment	07	equipment (RTPI
52494	Detail the lation of all the	0.7	52494)
	Retail trade in upholstery		1. CPI: Retail trade in
	and floor coverings		upholstery and floor
52405		0.0	coverings (RTPI
52495	De dia statica de la instat	0.2	52495) 1. CDL D:
52401	Boutique trade in art,		1. CPI: Diverse
52491-	coins and stamps	0.0	specialised trade in
52492	(collectibles)	0.2	goods (RTPI 52490)
52490-	Retail trade in boats, boat		1. CPI: Boat and Doat
52499	accessories and other	1.0	accessories (RTP1
	Specialised bounque sales	1.0	52490) 1. CDL Datail trada
	Retail trade in antiques		and remains (aval
	and used goods		and repairs (exci.
52500		0.2	(DTDI 52000)
52500	Mail order trade	0.2	(KIFI J2000) 1. CDI: Potoil trado
	Man order trade		and remains (aval
			and repairs (exci.
52610		24	(DTDI 52000)
52010	Markat square and trade	2.4	(KIFI J2000) 1 CDI: Potail trada
	mise not houtique based		and repairs (aval
	ratail trade		and repairs (exci.
52621	Tetali trade	1 /	(PTDI 52000)
3202A	Papair of household and	1.4	(KIFI J2000) 1 CPI: Popoir of
	nersonal items		household and
	personal terns		nousenoiu allu personal items (RTDI
52700		18	52700)
52700		1.0	52100)

CPI - Consumer Price Index; RTPI - Retail Trade Price Index

#### 6.4 Hotel and restaurant

SIC division 55 includes hotels and other short-term overnight accommodations and restaurants and bar operations. Service sector turnover statistics are the only source Statistics Sweden has for *hotel and restaurant* turnover.

Turnover in current prices from turnover statistics is deflated by a collectively weighted price index derived from the Service Producer Price Index (SPPI) for hotels and the Consumer Price Index (CPI) for restaurants within hotel operations. Turnover in current prices from turnover statistics is deflated by means of a Consumer Price Index (CPI) for restaurants within restaurant operations.

## Index of Service Production: Sources, indicators, weights and deflators

SIC code	Description	Sour ce	Indicator	Weight (Index of Service Produc tion =1000)	Deflator
Divisi	on 55 Hotel and restaura	37.8			
55.1- 55.2	Hotel, campground and lodgings operations	Turn	Turnover in current prices		<ol> <li>SPPI: Hotel operations (55100)</li> <li>CPI: Restaurant operations (GcNA</li> </ol>
55.3- 55.5	Restaurant and bar operations and the management of personnel cafeterias, catering and large-scale kitchen	Turn	Turnover in current prices	13.1	55A) 1. CPI: Restaurant operations (GcNA 55A)
	operations			24.7	

CPI - Consumer Price Index; RTPI - Retail Trade Price Index; SPPI - Service Producer Price Index

#### 6.5. Land transport

SIC division 50 includes transport of goods and people on land, by rail, by bus or taxi. Automobile rentals are not included here, but in SIC division 71. Service sector turnover statistics are the only source Statistics Sweden has for land transport turnover. This is a relevant source for quarterly turnover data, based on questionnaire information and VAT registry.

Turnover in current prices from Turnover statistics is deflated by means of a collectively weighted price index from the service producer price index (SPPI) for freight transport by road, public transport and railway transport and the Consumer Price Index for railway tickets within *the rail transport sector*. Turnover in current prices from Turnover statistics is deflated by means of a collectively weighted price index for murnover statistics is deflated by means of a collectively weighted price index for domestic supply (PPI) for motor vehicles within the sector for *other line-based transport of passengers*. The taxi industry turnover in current prices from Turnover statistics is deflated by means of a Consumer Price Index for *taxi traffic*. Turnover in current prices from Turnover statistics is deflated by means of a collectively weighted price index for *taxi traffic*. Turnover in current prices from Turnover statistics is deflated by means of a collectively weighted service Producer Price Index (SPPI) for *Freight transport by road within, Forwarding agency* and the CPI for petroleum products within the sector of freight transport by road.

SIC code	Description	Source	Indicator	Weight (Index of Service Productio n –1000)	Deflator
Division	560 Land transpor	t transnor	t hy nineline	67.1	
60.1	Transport by rail	Turn	Turnover in current prices	6.6	<ol> <li>SPPI: Freight transport by road (SPPI 60.24)</li> <li>SPPI: Public transport (SPPI 60.211)</li> <li>SPPI: Railway transport (SPPI 60.10)</li> <li>CPI: Railway tickets (GcNA 6011)</li> </ol>
60.21; 60.23	Other line-based land transport of passengers	Turn	Turnover in current prices	15.0	<ol> <li>SPPI: Public transport (SPPI 60.211)</li> <li>CPI: Public transportation tickets (GcNA 6021A)</li> <li>PPI Motor vehicles (PPI 34.1)</li> </ol>
60.22	Taxi traffic	Turn	Turnover in	83	1. CPI: Taxi (GcNA 60.22)
60.24; 60.3	Freight transport by road; Transports by pipeline	Turn	Turnover in current prices	37.3	<ol> <li>SPPI: Freight transport by road (SPPI 60.24)</li> <li>SPPI: Forwarding agency (SPPI 63.4)</li> <li>CPI: Petroleum products (CPI 23.2)</li> </ol>

#### Index of Service Production: Sources, indicators, weights and deflators

CPI - Consumer Price Index; SPPI - Service Producer Price Index; GcNA - Goods category National Accounts, PPI- Producer price index

#### 6.6. Sea transport

SIC division 61 includes transport of goods and passengers on water (coastal and oceanic travel)

The service sector turnover statistics are the only source Statistics Sweden has for *sea transport* turnover. Turnover in current prices from Turnover Statistics is deflated by means of a collective weighting of the price index from the Service Producer Price Index for sea transport, the Consumer Price Index for passenger transport by sea, the Consumer Price Index for restaurants and the Service Producer Price Index for temporary workers within the activity.

## Index of Service Production: Sources, indicators, weights and deflators

SIC code	Description	Sour ce	Indicator	Weight (Index of Service Produc tion =1000)	Deflator
Division	61 Sea transport			9.8	
61	Sea transport	Turn	Turnover in current prices	9.8	<ol> <li>SPPI: Sea transport (SPPI 61)</li> <li>CPI: Sea transports (GcNA 61A)</li> <li>CPI: Restaurants (GcNA 55A)</li> <li>SPPI: Temporary work (SPPI 74.5)</li> </ol>

CPI - Consumer Price Index; SPPI - Service Producer Price Index; GcNA - Goods category National Accounts

#### 6.7. Air transport

SIC division 62 includes air transport of passengers and goods.

The service sector turnover statistics are the only source Statistics Sweden has for *air transport* turnover. Turnover in current prices from Turnover statistics is deflated by means of the Service Producer Price Index (SPPI) for air transport for passengers and goods.

Index of Service Production: Sources, indicators, weights and deflators							
SIC code	Description	Sour ce	Indicator	Weight (Index of Service Produc tion =1000)	Deflator		
Division (	62 Air transport			11.7			
62	Air transport	Turn	Turnover in current prices	11.7	<ol> <li>SPPI: Air transport (SPPI 62101)</li> <li>SPPI: Air transport with goods (SPPI 62102)</li> </ol>		

SPPI - Service Producer Price Index

## 6.8. Other supporting transportation services; activities of travel agencies

SIC division 63 includes activities such as cargo handling and storage, support for land, sea and air transport, arranging and sales of transports as well as travel agencies.

Service sector turnover statistics are the only source Statistics Sweden has for turnover in *support services to transport and travel agencies*. Turnover in current prices from Turnover statistics is deflated by Service producer price index (SPPI) *for forwarding agency, cargo handling and stock handling*. The turnover among the other support services for land transport is deflated by means of three sub-indexes from the Consumer Price Index, which include parking, taxi and toll bridge revenues and by the SPPI for transport of goods by road. Turnover in the travel activity is deflated by means of two Consumer Prices Indexes, one for package tours and one for private travel bookings. A deflation by means of a service price index for the activity is done for *other transport agencies*.

SIC code	Description	Sour ce	Indicator	Weight (Index of Service Produc tion =1000)	Deflator
Division					
agency	businesses	-	- ·	34.3	1 (1997)
63.10	Cargo handling	Turn	Turnover in		1. SPPI
63.21	Other supporting land transport services	Turn	current prices Turnover in current prices	5.5	Forwarding agency (SPPI 63.4) 2. SPPI Cargo handling (SPPI 63.11) 3. SPPI Stock handling (SPPI 63.12) 1. CPI: Parking (GcNA 63210) 2. CPI: Taxi (GcNA 6022) 3. CPI: Toll bridge fees (GcNA 07243) 4. SPPI: Transport by goods on road (SPPI 60.24)
63.22	Other supporting sea	Turn	Turnover in		1. FPI: Building
	transport services		current prices		activity transport
(2) 0.2		-	<b>—</b>	2.1	(FPI 60.11)
63.23	Other support services	Turn	Turnover in		I. FPI: Building
	to air transport		current prices	56	(FPI 60 11)
63 30	Activities of tour	Turn	Turnover in	5.0	1 CPI: Package
00.00	operators	1 0111	current prices	4.4	tours (GcNA

#### Index of Service Production: Sources, indicators, weights and deflators

transport (SPPI 60.24) 3. CPI: Petroleum 13,8 products (CPI 23.2)	63.40 Other transport agencies Turn Turnover in current prices (SPPI: Air transport (SPPI 62.101) 1. SPPI: Other transport agencie (SPPI 63.4) 2. SPPI: Road 2. SPPI: Road
--	--

CPI - Consumer Price Index; SPPI - Service Producer Price Index; GcNA - Goods category National Accounts; FPI - Factor Price Index

#### 6.9. Post and telecommunication

SIC division 64 includes postal and courier activities and telecommunication.

Service sector turnover statistics are the only source Statistics Sweden has for turnover in the *post and telecommunication sector*. Turnover in current prices from Turnover statistics is deflated by means of Service Producer Price index (SPPI).

Index of Service Production: Sources, indicators, weights and deflators						
SIC code	Description	Sour ce	Indicator	Weight (Index of Service Produc tion =1000)	Deflator	
Division 63 Support services to transport and travel						
64.10	Post and courier activities	Turn	Turnover in current prices	20.9	<ol> <li>SPPI: Post and courier services through the national post service (SPPI 64.11)</li> <li>SPPI: Other post and courier services (SPPI 64.12)</li> </ol>	
64.20	Telecommunications	Turn	Turnover in current prices	42.7	1. SPPI: Telecommunications (SPPI 64.2)	

SPPI - Service Production Price Index

#### 6.10. Real estate services

SIC division 70 includes real estate services such as property development, trade in and, administration and mediation of properties.

Service sector turnover statistics are the only source Statistics Sweden has for turnover in all industries except *leasing of dwellings*.

Statistics for newly built apartments in Sweden are used as an output indicator for the leasing of dwellings. This is the only volume indicator used for ht calculation of the Index of Service Production. The salaries index for business services is the deflator used for the development and mediation of properties. The Consumer Price Index for the activity is used as a deflator for the leasing of dwellings and administration of properties for tenant-owned dwelling organisations. The deflation of leasing premises is done by means of a service price index drawn up annually for the activity.

SIC code	Description	Sour ce	Indicator	Weight (Index of Service Produc tion =1000)	Deflator
Division	70 Real estate services			148.8	
70.1, 70.3	Development and mediation of properties	Turn	Turnover in current prices	17.2	1. Wages and salaries Business services (SIC 74)
70.201	Leasing of dwellings		Statistics for newly-built	50.0	1. CPI: Leasing of dwellings (GcNA
70.204	Administration in a tenant-owned dwelling organisation	Turn	apartments Turnover in current prices	2.8	1. CPI: Leasing of dwellings (GcNA 70201C)
70.202 - 70.203, 70.209	Leasing premises and other property administration	Turn	Turnover in current prices		1. SPPI: Rent for premises (SPPI 70.2)
				69.1	

#### Index of Service Production: Sources, indicators, weights and deflators

CPI - Consumer Price Index; SPPI - Service Producer Price Index; GcNA - Goods category National Accounts

#### 6.11. Leasing and hiring

SIC division 71 includes the lease and hire of automobiles, other means of land transport machinery and equipment and rental of household items and goods for personal use.

The service sector turnover statistics are Statistics Sweden's source for the turnover of all industries. *Car hiring* is deflated by means of a Service Producer Price Index (SPPI) for the activity. The lease and hire of other means of land transport is deflated by means of an index, collectively weighted by the three producer price indexes for manufacturing ships, airships and other machines.

*The leasing of machinery and other equipment* is deflated by means of a producer price index for the manufacture of machines. Deflated turnover for the leasing of household items is derived from consumer prices for the activity.

SIC code	Description	Source	Indicator	Weight (Index of Service Production =1000)	Deflator
SIC D	ivision 71 includes the l	ease and <b>b</b>	nire of		
vehicl	es and machinery witho	out operate	or as well as		
house	hold appliances and goo	ods for per	sonal use.	14.6	
71.1	Car hire	Turn	Turnover		1. SPPI: Automotive
			in current		leasing and rentals
			prices	1.3	(SPPI 71.1)
71.2	Lease and hire of	Turn	Turnover		1. PPI Manufacture of
	other means of land		in current		aeroplane (PPI 35.3)
	transport		prices		2. PPI Building and
					repair of boats and ships
					(FFI 55.12) 2 DDI Manufaatuma of
					3. PPT Manufacture of aircraft and spacecraft
				2.2	(PPI 35.3)
71.3	Leasing of machinerv	Turn	Turnover		1. PPI Manufacture of
	and equipment		in current		machinery (PPI 29.5)
	1 1		prices	10.1	
71.4	Leasing of household	Turn	Turnover		1. CPI: Leasing of
	appliances and goods		in current		goods for personal use
	for personal use		prices		(Gc NA 714)
	-		-	0.9	

Index of Service Production: Sources, indicators, weights and deflators

CPI - Consumer Price Index; SP PI - Service Producer Price Index; Gc NA - Goods category National Accounts;

PPI – Producer Price Index for Domestic Supply

#### 6.12. Computer consultants

SIC division 72 includes data processing activities such as consultant operations regarding hardware and software, data processing, database activities as well as maintenance and repair of data processing equipment.

Service sector turnover statistics are Statistics Sweden's source for turnover in the activity. The activity is deflated by means of a service producer price index for *data processing activities*.

SIC code	Description	Source	Indicator	Weight (Index of Service Product ion =1000)	Deflator
Divisi	on 72 Data processing	g activities		68.8	
72	Data processing activities	Turn	Turnover in current prices		1. SPPI: Data processing activities (SPPI 72)
				68.8	

#### Index of Service Production: Sources, indicators, weights and deflators

SPPI - Service Producer Price Index

#### 6.13. Research and development

SIC division 73 includes Research and Development (R&D)

Service sector turnover statistics are the source Statistics Sweden uses for turnover in the activity. The activity is deflated by means of an index for SPPI for architect and technical consultants and with an import price index for radio and telephones.

index of Service Froduction: Sources, indicators, weights and denators						
SIC code	Description	Source	Indicator	Weight (Index of Service Product ion =1000)	Deflator	
Divisi	on 73 Research and dev	elopment		4.8		
73	Research and development	Turn	Turnover in current prices		<ol> <li>SPPI: Architect and other technical consultants (SPPI 74.2)</li> <li>Import price index: Radio and telephone (IMPI 32.2)</li> </ol>	
				4.8		

#### Index of Service Production: Sources, indicators, weights and deflators

#### 6.14. Other business services

SIC division 74 includes business services not elsewhere classified.

Service sector turnover statistics are the only source Statistics Sweden has for turnover in the activity.

The activity is deflated by means of a service price index for legal, financial and technical consultancy services, technical testing and advertising activities. Other business services use a SPPI for temporary workers and security services together with an CPI for cleaning activities.

SIC code	Description	Source	Indicator	Weig ht (Inde x of Servi ce Prod uctio n =100	Deflator
<b>D</b>		•		<u>0)</u>	
<b>Divisi</b> 74.1	on 74 Other business se Legal and financial	<b>rvices</b> Turn	Turnover in	153.0	1. SPPI: Legal
	consultancy services		current prices	49.2	consultancy services (SPPI 74.11) 2. SPPI: Economic consultancy services (SPPI 74.12)
74.2	Architect and other technical consultancy services	Turn	Turnover in current prices	35.6	1. SPPI: Architect and other technical consultancy services (SPPI 74.2)
74.3	Technical testing and analysis	Turn	Turnover in current prices	4.2	1. SPPI: Architect and other technical consultancy services (SPPI 74.2)
74.4	Advertising services	Turn	Turnover in current prices	14.1	1. SPPI: Advertising services (SPPI 74.4)
74.5- 74.8	Temporary work agency, investigation and security services, industrial cleaning and other business services	Turn	Turnover in current prices	50.0	<ol> <li>SPPI: Temporary work agency (SPPI 74.5)</li> <li>SPPI: Security services (SPPI 74.6)</li> <li>CPI: Cleaning (CPI 74.7)</li> </ol>

#### Index of Service Production: Sources, indicators, weights and deflators

SPPI - Service Producer Price Index; CPI - Consumer price index

#### 6.15. Education

SIC division 80 includes education within the private sector. This does not include education under public sector supervision.

Service sector turnover statistics are the only source Statistics Sweden has for turnover in the activity.

The activity is deflated by means of a salaries index used as a proxy for price development for the activity.

SIC code	Description	Source	Indicator	Weig ht (Inde x of Servi ce Prod uctio n =100 0)	Deflator
Division	80 Education			14.4	
80.1-	Compulsory school,	Turn	Turnover in		1. Wages and salaries
80.3	upper secondary and		current prices		Education (SIC 80)
	higher education(s)			0.9	
80.41	Drivers education	Turn	Turnover in		1. Wages and salaries
	activities		current prices	5.7	Education (SIC 80)
80.42	Other adult education	Turn	Turnover in		1. Wages and salaries
			current prices	7.8	Education (SIC 80)

#### Index of Service Production: Sources, indicators, weights and deflators

## 6.16. Health and medical care; social services; Veterinarian services

SIC division 85 includes health and medical care, social services, and veterinarian services in the private sector. This does not include health and medical care, social services, and veterinarian services under public sector supervision.

Service sector turnover statistics are the only source Statistics Sweden has for turnover in the activity. The activity is deflated by means of a salaries index used as a proxy for price development in the activity.

SIC code	Description	Source	Indicator	Weig ht (Inde x of Servi ce Prod uctio n =100 0)	Deflator
<b>Divisio</b> veterina	<b>n 85</b> Health and medical c	care, social	services, and	50.8	
85.1	Health and medical care	Turn	Turnover in current prices	2010	1. Wages and salaries Health and medical care, social services, and veterinarian
85.2	Veterinarian services	Turn	Turnover in current prices	35.5	services (SIC 85) 1. Wages and salaries Index: Health and medical care, social services, and veterinarian services
85.3	Community care and social services	Turn	Turnover in current prices	1.0 14.4	(SIC 85) 1. Wages and salaries Health and medical care; social services; Veterinarian services (SIC 85)

#### Index of Service Production: Sources, indicators, weights and deflators

#### 6.17. Cleaning, sanitation and waste management

SIC division 90 includes sewage and refuse disposal, waste management, and sanitation conducted by private companies.

Service sector turnover statistics are the only source Statistics Sweden has for turnover in the activity. The activity is deflated by means of a service producer price index for transport by road used as a proxy for the price development in the activity.

SIC code	Description	Source	Indicator	Weight (Index of Service Product ion =1000)	Deflator
Divisio	on 90 Cleaning, sanitation	and waste	management	9.7	
90	Cleaning, sanitation and waste	Turn	Turnover in current prices		1. SPPI: Transport by road (SPPI 60.24)
	management			9.7	

#### Index of Service Production: Sources, indicators, weights and deflators

SPPI – Service producer price index

### 6.17. Organisations and religious activities

SIC division 91 includes organisations and religious activities.

Turnover statistics for from the VAT register (VAT) are the only source Statistics Sweden has for turnover in the activity.

The activity is deflated by means of a salaries index used as a proxy for the price development in the activity.

			ļ		
SIC code	Description	Source	Indicator	Weight (Index of Service Product ion =1000)	Deflator
Division 91 Organisations and religious activities				1.3	
91	Organisations and religious activities	VAT	Turnover in current prices		<ol> <li>Salaries Index:</li> <li>Organisations and religious activities (SIC 91)</li> </ol>
				1.3	

#### Index of Service Production: Sources, indicators, weights and deflators

#### 6.18. Recreational, cultural and sporting activities

SIC division 92 includes recreational, cultural, and sporting activities in the private sector. This does not include recreational, cultural, and sporting activities under public sector supervision.

Service sector turnover statistics are Statistics Sweden's source for turnover in *cinema shows, gambling and betting activities as well as cultural, radio, television activities and news reporting.* 

Turnover statistics from the VAT register are used as the output source for *library and sporting activities*. Cinema shows, games and betting activities are deflated by means of a consumer price index for each activity. The other activity aggregate use the wages and salary index as a deflator.

#### SIC Description Source Indicator Weig Deflator code ht (Inde x of Servi ce Prod uctio n =100 0) 32.2 **Division 92 Recreational, cultural and sporting activities** 92.13 Cinema shows Turn Turnover in 1. CPI: Cinema shows current prices 0.5 (RTPI 92.13) 92.11-Film, radio and Turn Turnover in 1. CPI: Film and video 92.12 television production current prices production and 92.20distribution (Gc NA 92.49 922) 2. CPI: Radio and TV broadcasting (Gc NA 922) 3. CPI: Culture (Gc NA 923) 16.3 92.50-Sports, culture and VAT Turnover in 1. Wages and salary other recreation 92.60; current prices index: Recreational, 92.72 cultural and sporting 5.8 activities (SIC 92) 92.71 Gambling and betting Turnover in 1. CPI: Gambling and Turn activities current prices betting activities (RTPI 9.5 92.71)

#### Index of Service Production: Sources, indicators, weights and deflators

CPI - Consumer Price Index; RTPI - Retail Trade Price Index; GcNA- Product group for National accounts

#### 6.19. Other service activity

SIC division 93 includes other personal services not elsewhere classified, which include hairdressing, laundry, funeral activities and physical wellbeing activities.

Service sector turnover statistics are the only source Statistics Sweden has for turnover in the activity.

Turnover in the activity is deflated by means of the consumer price index for each activity except for laundry services where the service producer pirce index is used as a deflator.

SIC code	Description	Source	Indicator	Weig ht (Inde x of Servi ce Prod uctio n	Deflator
				=100 0)	
Division 93 Other service activities				10.5	
93.011	Industrial laundry	Turn	Turnover in		1. SPPI: Laundry (SPPI
			current prices	2.2	93.01)
93.012	Retail laundry	Turn	Turnover in		1. SPPI: Laundry (SPPI
			current prices	0.4	93.01)
93.020	Hairdressing services	Turn	Turnover in		1. CPI: Haircut (RTPI
			current prices	4.8	93.020)
93.03-	Physical well-being	Turn	Turnover in		1. CPI: Funeral and
93.05	activities and funeral		current prices		related activities (RTPI
	parlours			3.1	93.030)
CPI – Con	sumer Price Index: RTPL - Re	tail Trade Pric	ce Index: SPPI- Servic	e producer r	price index

#### Index of Service Production: Sources, indicators, weights and deflators

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### 7. Estimation procedure for Index of Service Production

#### 7.1. Estimation procedure for monthly turnover

This section will describe the estimation procedure in turnover statistics. This is described in greater detail because it is the most important output source for the Index of Service Production. It has been extremely important to make note of the burden placed upon business respondents in designing the survey.

The first variable selected is turnover in current prices in the respective activity group for a period of a specific year  $(Y_{b,k,c}^{Lop})$ .  $Y_{b,k,c}^{Lop}$  estimated using the estimator:

Turnover in current prices in each activity group for a month in a specific year  $(Y_{b,k,c}^{Lop})$ .  $Y_{b,k,c}^{Lop}$  estimated using the estimator:

$$\hat{Y}_{b,k,c}^{Lop} = \sum_{h=1}^{H} \frac{N_{h}}{n_{h}} \sum_{i=1}^{n_{s}} y_{i}^{*} \frac{X_{b}}{\sum_{h=1}^{H} \frac{N_{h}}{n_{h}} \sum_{i=1}^{n_{s}} x_{i}}$$

where

 $y_i$  = Turnover for enterprise (i)  $N_h$  = Number of enterprises in sampling frame for stratum h H = Number of strata in the ordinary sample  $n_h$  = Number of respondents in stratum h b = Activity group k = Month Lop = Current prices c = Year

Auxiliary information from VAT Register

 $X_b$  = Total turnover for an activity group (b) according to the VAT Register regarding the most recent 12-month period

 $x_i$  = Turnover for enterprises (i) according to the VAT Register regarding the most recent 12-month period

#### Non-response

Non-response in the size categories in the sample survey is dealt with using compensation weighting in both the supplementary and ordinary sample. Compensation weighting is used both in the numerator and the denominator in the ordinary sample, this also includes the VAT data that exists for all enterprises. Size categories not included in the sample survey are handled by manual imputation.

#### 7.2. Monthly deflation

#### 7.2.1 Deflators' periodicity

To see how well deflators function in the monthly Index of Service Production, we will first study which periodicity applies to the deflators involved.

## The periodicity of the deflators in the quarterly Index of Service Production

Period	Percentage of value added	Number of deflators
Quarter	32.4	14
Month	44.9	80
Month and quarter	15.8	9
Annual	6.9	1
Total	100%	104

In the table above we can see the monthly deflators for 80 sub-sectors. These deflators are used to deflate approximately 45 percent of the value added. There are quarterly deflators for 14 sub-sectors which make up 32 percent of the value added.

In the table below we will study which quality the deflators have. The deflators have become divided into the following three categories.

- A An output deflator designed for the given activity
- B An out put deflator not wholly designed for the given activity
- C An input deflator or inferior output deflator

#### The quality of the deflators used in Index of Service Production

	Percentage of	Number of
Quality of deflator	value added	deflators
A	48	23
В	48	72
С	8	9
Total	100 %	104

In the table above we can see that 23 deflators maintain the highest quality in the quarterly Index of Service Production. These 23 deflators are used to deflate approximately 48 percent of the value added.

Only 9 of the 104 deflators maintained the lowest quality. These deflators are, in most cases, forms of an input deflator and most often a salaries index.

These deflators are used to deflate approximately 8 percent of the value added. For 14 deflators there is only quarterly data and for 9 deflators there are both monthly and quarterly data.

The following applies to Service Producer Price Indexes.

• During April, one has only one instance of information for the first quarter's price development. A regression model named *exponential smoothing* estimates other instances of quarterly price information. This model is described in greater detail in section 7.2.2 below. The estimated information about other quarter's price development is then used for April, May and June until new information comes from the service producer price index.

## **7.2.2** Projection according to the exponential smoothing method with a multiplicative seasonal component (Winter's method)

Assume that  $x_t$  can be described according to the model

$$x_t = (\alpha + \beta) \times s(t) + \varepsilon_t$$

where  $\alpha$  och  $\beta$  are the model's parameters and s(t) is the model's seasonal component and  $\varepsilon_t$  is the random error term.

Assume that we estimate the values for the above variables for period t+1 at period t.

This estimate can be written as

 $x_{t+1} = (a_t + b_t) \times s_t (t+1)$ 

where  $a_t \operatorname{och} b_t$  are estimates of the model's intercept and slope and  $s_t(t+1)$  is the estimated seasonal component for period t+1 at period t.

 $a_t$  is given by

$$a_{t} = w_{1} \frac{x_{t}}{s_{t-1}(t)} + (1 - w_{1})(a_{t-1} + b_{t-1})$$

And  $b_t$  is given by

$$b_t = w_2(a_t - a_{t-1}) + (1 - w_2)b_{t-1}$$

The seasonal component is calculated as

$$s_t(t-1) = w_3 \frac{a_{t-1}}{x_{t-1}} + (1-w_3)s_{t-1}(t-1)$$

for a specific period when season and interval data agree.

# 7.3. Calculation of index in Index of Service Production and calendar adjustment

## **7.3.1.** Short introduction about the index at Statistics Sweden and the selection of index

Volume index calculations are done in different ways at Statistics Sweden. A chain index is used for National Accounts (NA), the Index of Industrial Production (IIP) and foreign trade statistics. This means that the base period weight is always the previous year. So, constant price calculations are based on current prices from the previous year's prices. The Activity Price Index and foreign trade statistics use an "annual overlap" for index calculations. National Accounts uses "over the year" at least for the activity.<sup>1</sup> The index should have an annual adjustment when using "over the year". The Index of Service Production will be calculated in the same way as the Index of Industrial Production with an "annual overlap" and no annual adjustments are needed.

#### 7.3.2. Calculating the volume index

#### 7.3.2.1 Price index

The basis for the price index calculations are the following.

Retail Trade Price Index (RTPI) Consumer Price Index per goods category (CPI) Wages and salaries Index (SI) Services Producer Price Index (SPPI) Prices for domestic supply (PPI) Factor Price Index (FPI)

7.3.2.1.1 Price index expressed as an average of previous year's prices

 $PI_{(y,m)}^{\Pr Bas(y-1)}$  = price change for month m in year y relative to whole year y-1.

7.3.2.1.2 Price index expressed as an average of present year's prices

$$PI_{(y,m)}^{\Pr Bas(y)} = \frac{PI_{(y,m)}^{\Pr Bas(y-1)}}{\sum_{m=1}^{12} PI_{(y,m)}^{\Pr Bas(y-1)}} * 1200$$

= price change for month m in year y relative to whole year y

<sup>&</sup>lt;sup>1</sup> "Quarterly overlap"

#### 7.3.2.2 Constant price calculations

Let  $O_{(y,m)}$  be turnover for time period t in current prices

Let  $O_{y,m}^{\Pr Bas(r)}$  = be Turnover expressed in terms of the prices of reference period *r* 

Recalculation to constant prices is done in two ways, in part expressed in terms of the present year's prices and in part in the previous year's prices.

#### 7.3.2.2.1 Turnover expressed as an average of present year's prices

$$O_{(y,m)}^{\Pr Bas(y)} = \frac{O_{(y,m)}}{PI_{(y,m)}} * 100 = \text{turnover in constant prices expressed as an}$$

average of the present year's prices.

#### 7.3.2.2.2 Turnover expressed as an average of previous year's prices

$$O_{(y,m)}^{\Pr Bas(y-1)} = \frac{O_{(y,m)}}{PI_{(y,m)}^{\Pr Bas(y-1)}} * 100 = \text{turnover in constant prices expressed as an}$$

average of the previous year's prices.

#### 7.3.2.3 Calculation of annual and monthly links

A calculation of annual and monthly links (VI) are necessary for the "annual overlap" method.

#### The lowest activity level

On the lowest activity level, it is calculated in the following manner.

$$VI_{y,m,(y-1=100)} = 1200 * \frac{O_{(y,m)}^{\Pr Bas(y-1)}}{\sum_{m=1}^{12} O_{(y-1,m)}^{\Pr Bas(y-1)}}$$

#### Aggregate activity level

The weights used for calculating the Index of Service Production are the value added values. The value added values are collected from the National Accounts on a broad activity level and further detailed information is taken from Structural Business Statistics Survey. The value added are expressed in current prices. For the Index of Service Production period (y,m), the value added expressed in terms of the annual values of year y-2.

Let  $W_{b,y}$  = Value added for activity *b* during year *y*. Even if things are expressed in the following manner,

 $W_{b,y-2} = W_{b,y}$  we shall continue to express things as  $VA_{b,y}$ 

$$VI_{B,y,m,(y-1=100)} = \frac{\sum_{b \in B} W_{b,y} * VI_{b,y,m,(y-1=100)}}{\sum_{b \in B} W_{b,y}}$$

#### 7.3.2.4 Calculating the index from annual and monthly links

Based on all annual and monthly links  $VI_{y,m,(y-1=100)}$  The Index of Service Production is calculated according to the following schematic:

- 1) Calculate annual links
- 2) Calculate annual index
- 3) Calculate Index of Service Production

Calculate annual links

$$VI_{y,(y-1=100)} = \frac{\sum_{m=1}^{12} VI_{y,m,(y-1=100)}}{12}$$

Calculate annual index

Here the annual index is calculated with the reference period is the year y. Index year y = 100.

$$TjPI_{y,(y=100)} = 100;$$
  

$$TjPI_{y+1,(y=100)} = TjPI_{y,(y=100)} *VI_{y+1,(y=100)} / 100;$$
  

$$TjPI_{y+2,(y=100)} = TjPI_{y+1,(y=100)} *VI_{y+2,(y+1=100)} / 100;$$
  

$$TjPI_{y+3,(y=100)} = TjPI_{y+2,(y=100)} *VI_{y+3,(y+2=100)} / 100 \text{ etc.}$$

## Calculate Index of Service Production

Individual activity

The Index of Service Production, for the first year *y*, is calculated as follows. The Index of Service Production is equal to 100 for the first year.

$$TjPI_{y,m,(y=100)} = \frac{O_{(y,m)}^{\Pr Bas(y)}}{\sum_{m=1}^{12} O_{(y,m)}^{\Pr Bas(y)}} *1200;$$

The Index of Service Production is then calculated in the following way.

$$TjPI_{y+1,m,(y=100)} = TjPI_{y,(y=100)} * VI_{y+1,m,(y=100)} / 100;$$

#### Aggregated activity

The Index of Service Production for aggregated activity in the first year y is calculated as follows.

$$TjPI_{B,y,m,(y=100)} = \frac{\sum_{b \in B} W_{b,y} * TjPI_{b,y,m,(y=100)}}{\sum_{b \in B} W_{b,y}};$$

The Index of Service Production for aggregated activity in the second yeary is calculated in the same way as for an individual activity.

#### 7.3.2.5 Calculating annual development

The growth figure index shows the development for an activity group for a period of a given year as compared with the same period of the previous year.

$$IU_{y,m,b} = \frac{TjPI_{y,m,b}}{TjPI_{y-1,m,b}} *100$$

#### 7.3.2.6 Calculation of Index of Service Production in current prices

The Index of Service Production in current prices for *individual activity* is calculated in such a manner that the reference period is y (2005), which means that the average is equal to 100.

$$TjPI_{B,y,m,(y=100)}^{Löp} = \frac{O_{y,m,b}}{\sum_{m=1}^{12} O_{y,m,b,(y=2005)}}$$

Aggregated activity level

$$TjPI_{B,y,m,(y=100)}^{Löp} = \frac{\sum_{b \in B} W_{b,y} * TjPI_{(y,m,b)}^{Löp}(y)}{\sum_{b \in B} W_{b,y}}$$

#### 7.3.2.7 Calculating annual development

The growth figure index shows the development for an activity group for a period of a given year as compared with the same period of the previous year.

$$IU_{(y,m),b}^{Löp} = \frac{TjPI_{y,m,b}^{Löp}}{TjPI_{y-1,m,b}^{Löp}} *100$$

#### 7.3.2.8 Calendar adjustment

A calendar adjustment index has been calculated by means of different methods. There is a yearly review of the day weights conducted for SIC 52.11 together with the larger supermarket chains. Remaining categories such as SIC 50 and SIC 52, SIC 55, SIC 92 and SIC 93 use day weights in accordance with a survey conducted during earlier. No calendar adjustment is conducted for industries SIC 73, SIC 80, SIC 85, and SIC 91. Remaining industries use calendar adjustment, estimated from turnover data in X11-Arima.

The calendar adjustment index is re-calculated so that all periods of the base year are equal to 100. A calendar adjustment index compares the calendar of the base years.

Turnover in current prices is divided by the calendar adjustment index CI.

$$O_{y,m}^{Kal} = \frac{O_{(y,m)}}{KI_{(y,m)}}$$

Then operations described in sections 7.3.2.2 - 7.3.2.7 are done again, although with turnover in current prices.

## **7.3.2.9** Calculation of a quarterly and annual Index of Service Production

This section shall describe the calculation of the quarterly Index of Service Production. One does the same when calculating the an annual or accumulated Index of Service Production.

$$TjPI_{y,q,b,(y=100)} = \frac{\sum_{m=1}^{3} TjPI_{y,m,b}}{3}$$

The calculation of the Index of Service Production in constant prices is described above. One does the same when calculating the Index of Service Production in current prices, constant and calendar adjusted prices. See sections 7.3.2.5 and 7.3.2.7 for the calculation of annual development.

#### 7.4. Seasonal adjustment and trend calculation

This shall not be initially applied to the index because data is needed for a number of years before before it becomes relevant.

## Appendix 1

Value added 2004 within the private service sector (SIC 50 - 93)

		Proportion,
		percentage,
Activity	Value added	share
50	35 556	4.5
51	114 353	14.4
52	78 509	9.9
55	27 566	3.5
60	48 676	6.1
61	7 676	1.0
62	8 752	1.1
63	26 439	3.3
64	48 372	6.1
70	109 000	13.7
71	12 347	1.6
72	54 603	6.9
73	3 915	0.5
74	128 136	16.1
80	12 966	1.6
85	42 751	5.4
90	6 374	0.8
91	1 243	0.2
92	21 919	2.8
93	6 955	0.9
Total	796 108	100.0

Source: Structural Business Statistics 2004