

Sweden's experience in developing SPPI for imports

**Cross cutting topic: Measurement challenges for import
services**

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Overview

Sweden's international trade in services have increased over the last decades which consequently have raised the interest in services producer price indices (SPPI's) for internationally traded services. Statistics Sweden have compiled SPPI's for imports since 2020¹ which is published at the webpage of Statistics Sweden².

One of the main practical challenges when implementing SPPI's for imports was to establish a data frame for sampling and weights calculations. Creating this data frame was challenging because of lacking classification concordance between SPPI and the data source containing trade values. Another fundamental challenge has been to identify the imported services and establish representative price measures. These issues and the general quality of price indices were evaluated and managed during a two-year test period before publishing the SPPI's for imports.

This paper aims to summarize the general experience in developing and compiling SPPI's for imports.

¹ SPPI for exports was developed simultaneously with SPPI for imports and has also been compiled since 2020. However, details of exported services will not be covered in this report as the objective covers imported services only.

² For more information about the Swedish SPPI and the quarterly publications, see the product page (Statistics Sweden 2023a): <https://www.scb.se/en/finding-statistics/statistics-by-subject-area/prices-and-consumption/producer-and-import-price-index/producer-and-import-price-index/>

Introduction

Sweden is a small open economy with a high degree of international trade. In 2019, the Swedish GDP represented only 0.4% of the world GDP, while Sweden's international trade represented about 91% of its own GDP, see Table 1. Nearby economies such as Germany and Finland have also relatively open economies, while larger economies such as the US and Japan, are more reliant on domestic production. Notably, the Swedish economy's trade relative to world GDP is approximately 0.4% ($=0.4\% \times 91.4\%$), which is comparable to larger economies such as Australia and Egypt.

Table 1. GDP size and trade openness in 2019

GDP size is the ratio of a country's GDP to the world GDP (GDP figures are PPP-adjusted and expressed in constant prices). Trade openness is the ratio of the sum of exports and imports of goods and services to the country's GDP.

	AUS	DEU	EGY	FIN	JPN	SWE	USA
GDP size	1.0%	3.4%	1.0%	0.2%	4.0%	0.4%	15.7%
Trade openness	45.8%	87.7%	41.1%	79.6%	35.2%	91.4%	26.5%

Source: World Development Indicators

The Swedish economy mainly trade with goods, but trading with services have become increasingly more important for the economy. Illustrated by figure 1, trade in services amounted to about 29% of the Swedish GDP in 2019, which can be compared to 10% in 1980. Hence, international trade in services has been growing faster than the GDP over the last decades which naturally raise the interest in SPPI's covering trade in services on international markets. Not only are these price indices valuable as price deflators, but they are also important statistics for economic analysis and evaluating trade policies.

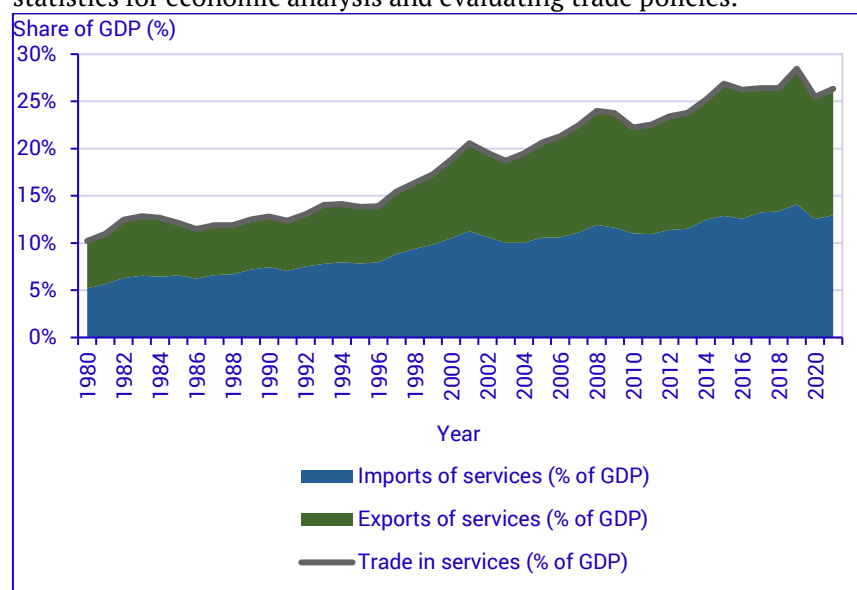


Figure 1 – The ratio of Sweden's international trade with services (sum of exports and imports) to GDP. Time period: 1980 – 2021. Source: Statistics Sweden.

Statistics Sweden has the responsibility to coordinate the system for the official statistics in Sweden. Within the organization, the responsibility to compile producer price indices is allocated to a specific organizational unit called the *section of producer prices* (henceforth PP-section). The PP-section compiles price indices for goods and services for the domestic market as well as the export and import markets (the Consumer Price Index is compiled by a separate organizational unit). Price indices have been compiled by the PP-section for several decades which have generated a collective and cumulated experience and knowledge. Moreover, methodological aspects, IT-systems and work routines have been developed by the PP-section to be as consistent as possible for products and markets. Therefore, it was a logical decision to allocate the responsibility to implement and compile SPPI for imports to the PP-section.

One practical prerequisite facing price index compilers is to have a solid data frame for sampling and calculating weights. This data frame was constructed based on data from the survey of foreign trade in services which provides estimated values of Swedish exports and imports of services. However, establishing the data frame was not a straightforward task, mainly because of lacking classification concordance between the two surveys. This issue was managed by manually text-matching services defined in the survey of foreign trade in services with the classification used in the SPPI. The manual text-matching was considered to be a manageable task, given our circumstances. This data management can be made more generalized if the proper classification concordance tables are available, but to our knowledge it is not apparent if this will be more efficient or generate a data frame with higher quality.

Another challenge when implementing SPPI's for imports was to identify the imported services and establish representative price measures. The services included in the SPPI for imports were already measured on the domestic market, but similarities and differences between different markets were not obvious in advance. Identifying services and price measurement issues were evaluated and refined during a two-year test period before publishing the SPPI's. The test period gave time to manage initial measurement issues, but developments and refinements are still made today, especially in association with new samples.

The remainder of the report is structured by first briefly describing general methodological aspects. Next, the challenge to set up the data frame for sampling and weight calculations is described. Thereafter, descriptive statistics for SPPI for imports are presented and some of the main services are discussed. Lastly, future challenges are summarized.

General methodological aspects

Definition, uses and scope

Statistics Sweden define SPPI for imports as an *input* price index for services imported to the Swedish economy and is calculated on a quarterly frequency³. These price indices represent the average price development for services that is purchased from non-residents and cover all transactions made during the quarter.

The main user of SPPI for imports is the National Accounts which uses the SPPI's as price deflators. Other areas of usage are in economic analysis and, in some cases, in contractual agreements.

The scope of the SPPI should cover all services imported from non-residents. However, this objective is constrained in two aspects:

1. The coverage of purchasers of imported services only covers B2B, which means that B2C transactions are excluded. This is the same coverage as Statistics Sweden uses when compiling import price indices for goods. This constraint is applied in order to be consistent with import price index for goods.
2. The coverage of products is restricted to services corresponding to sections H, I, J, M and N in the national product classification called SPIN 2015⁴.

The sampled observation unit is a combination of enterprise, product (service) and market (imports). The sample and weights are updated every year and is done at the finest classification level possible. The process of sampling and calculating weights are the same for all markets in the SPPI (domestic, exports, imports), with exception for processing the data source, which is described in detail in the next section.

Concepts

Prices

Import prices are valued in terms of *basic prices*, which means that import prices should be based on the real transaction prices between a resident and a non-resident, and the price should take discounts, rebates, etc. into account. Any taxes, VAT and customs duties are excluded. The same valuation principle is used by Statistics Sweden

³ More details on general issues in the Swedish SPPI's, such as index construction, collection procedure etc. is found in the *PPI Production of the statistics* (Statistics Sweden 2023b) and the *PPI Quality declaration* (Statistics Sweden 2023c).

⁴ Swedish Standard Classification of Products by Activity 2015 (Statistics Sweden 2023d).

when compiling import price indices for goods. Thus, this principle is applied to be consistent with import price index for goods.

Index should reflect the average price change during the quarter in Swedish Krona (SEK). Prices are collected in the trade currency and converted to SEK by Statistics Sweden, which makes it possible to use the same currency rates that are used by National Accounts. This means that currency fluctuations are aligned in SPPI and National Accounts.

Delivery of service

Statistics Sweden compiles price indices for imported goods and generally considers goods to be imported when the good crosses the Swedish economic territory. However, delivery of services is generally more complex (services are not delivered in separable units with transferable ownership), which raises the question of how to define delivery of imported services.

Definitions of service deliveries in international trade is provided in the GATS⁵, which distinguish delivery of services in four “modes of supply”: *cross-border trade*, *consumption abroad*, *commercial presence*, and *presence of natural persons*. The different modes are applicable to different services to various degrees. Currently, most services in the Swedish SPPI are considered to be delivered in line with the first mode, *cross-border trade*, which covers services flows from the territory of one member into the territory of another member. For instance, a consultancy service is imported when the consultancy is transmitted from the nonresidential country via telecommunications or mail to the importer in the residential country.

Classification system

The SPPI is a product-based survey following SPIN 2015, the national product classification. The classification is based on CPA ver. 2.1 and has a hierarchical structure with six levels. The first four levels are identical to CPA and a correspondence table is available at finer levels.

Table 2. SPIN 2015 structure

Level	Name	Numerical code structure	Number of classes
1	Section	Alphabetic	21
2	Division	two-digits	88
3	Group	three-digits	262
4	Class	four-digits	576
5	Category	five-digits	735
6	Subcategory	seven-digits	3408

⁵ More information (World Trade Organisation 2023):
https://www.wto.org/english/tratop_e/serv_e/gatsqa_e.htm

Data frame for sampling and weights

Data source

Foreign trade in services is the only data source that is used for sampling and calculating weights in the SPPI for imports. The survey provides estimated values of Swedish exports and imports of services⁶.

Historically, the Riksbank (the Swedish central bank) was responsible for producing the survey. In 2003, the responsibility was transferred to Statistics Sweden who compiles the statistics on behalf of the Riksbank. The statistics form a basis for the balance of payments and National Accounts. It is also widely used in economic policy and analysis.

The survey collects the variables *service*, *direction (export/import)*, *country* and *trade value* which is the total value of all individual transactions in the considered enterprise. Respondents in the survey are domestic enterprises. The export, import and net (exports-imports) values of *services* are aggregated to *service types*. Trade values are also aggregated by countries. *Service types* are classified according to EBOPS 2010⁷, and *services* follows an internal classification made by Statistics Sweden. Figure 2 illustrates imported values in 2022.

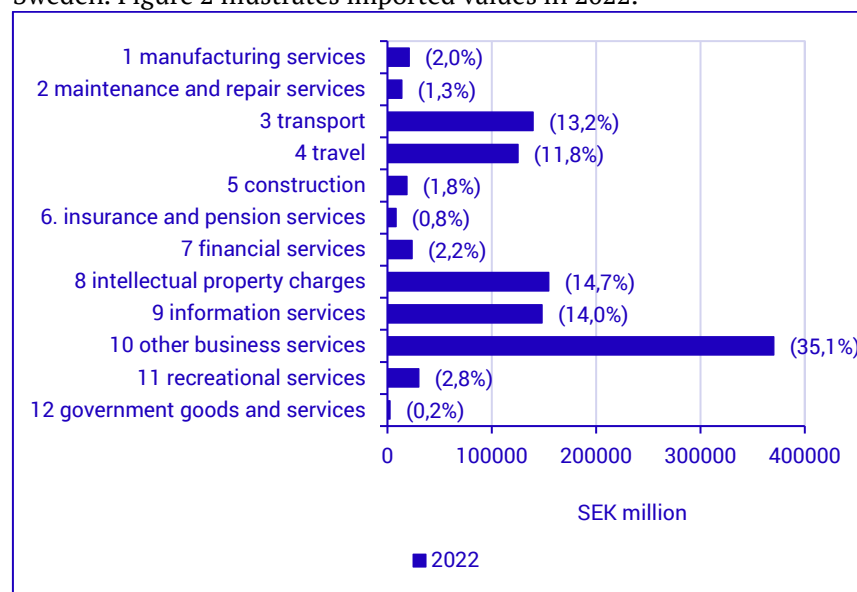


Figure 2 – Imported trade values according to the survey of foreign trade in services, classified by EBOPS 2010. Axis shows SEK in millions, parenthesis shows ratio to total. Time period: 2022. Source: Statistics Sweden.

⁶ For more information of the survey, see the product page (Statistics Sweden 2023e): <https://www.scb.se/en/finding-statistics/statistics-by-subject-area/trade-in-goods-and-services/foreign-trade/foreign-trade-in-services/>

⁷ Extended Balance of Payments Services 2010 (United Nations 2023a).

The problem

The SPPI aims to draw samples and calculate weights with the highest possible accuracy, which ideally is achieved by identifying services on the lowest level, 7-digit code, in the SPIN classification. However, there is no direct concordance between the two surveys' classifications. Thus, a major challenge using the foreign trade statistics as a data frame for sampling and weights calculations has been to establish a reliable product link.

The solution

At the time when the initial product link was established, we were not aware to what extent concordance tables could be used to link the classifications. Instead, the product link was created by manually text-matching *services* in the foreign trade statistics to the SPIN classification. There were only about 70 *services* to match against SPIN and this was assessed to be conducted easily and effectively with manual text-matching. Of the *services* that were assessed to be within the scope of SPPI, about 85% was matched to SPIN. The non-matching 15% mainly relates to R&D services (EBOPS 10.1), which are viewed to be difficult to measure the price development for. Table 3 provides examples of the text-matching results.

Table 3. Text-matching services to SPIN

Services in the foreign trade statistics	SPIN (code and level)
Rail transport with freight	Freight rail transport services (49.200, 5-digits)
Computer services	Computer programming, consultancy and related services (62, 2-digits)
Franchises and trademarks licensing fees	Licensing services for the right to use trademarks and franchises (77.400.02, 7-digits)

Once the initial product link was established it was possible to allocate enterprises and their import values to the SPIN classification. However, it was also evident that this product link was not generally established at the lowest SPIN level, i.e. one *service* in the foreign trade statistics could match to several SPIN codes at the lowest level (7-digits). To establish a more detailed mapping, the product link was *extended* by allocating import values for specific enterprises to finer SPIN levels. The first time the product link was established this *extension* was done by searching for detailed information, e.g. in annual reports, for some of the largest enterprises and manually allocating the import values to finer SPIN levels when possible. At the end, enterprises are allocated to SPIN levels by a general product link and for some enterprises an *extension* to finer SPIN levels exists. This data frame is used to do the sampling.

The first time an enterprise is sampled they receive an initialization questionnaire asking the enterprise to confirm whether they have been classified correctly and to specify a representative service. If an

enterprise has been misclassified, then it is removed from the survey and asked to update the classification. When erroneously sampled enterprises are removed, the weights are calculated, and the survey year begins by sending out the questionnaire for the first quarter.

Information about the sampled enterprises' services received from the initialization questionnaire and during the survey year is used to create additional *extensions* to finer SPIN levels when creating next year's data frame. Using information from the sampled enterprises creates a type of iterative process that refines the product link which will, over time, create a data frame with better quality and more details. This process is in some aspects resource intensive (manually data editing, data storage and conversations with contact persons required), but it is also a validation of the respondent's specification of the service. Figure 3 provide a schematic overview of how the initial product link is extended for a specific type of service.

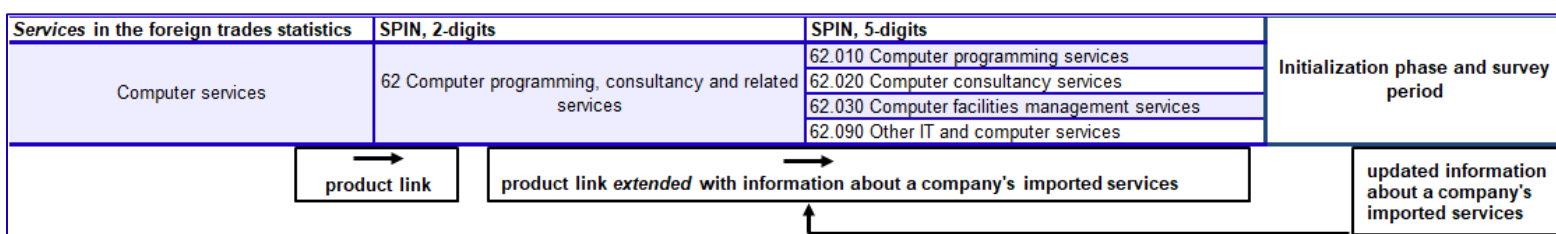


Figure 3 – Illustration of the product link and the extension of allocating an enterprise's import values to finer SPIN levels.

An alternative approach to create the product link is to match multiple correspondence tables. In the Swedish case, a link between the internal classification of *services* to the EBOPS must be established. Thereafter, EBOPS and SPIN can, to some extent, be linked together by using the CPC⁸ and CPA⁹ classifications¹⁰. However, this product link would not necessarily be established at the lowest SPIN level, i.e. the same deficiency as creating the product link with manual text-matching described above. Table 4 illustrates the concordance issue where air transport with freight in EBOPS links to six subcategories (7-digit code) in SPIN.

⁸ Central Product Classification, version 2.1 (United Nations 2023b).

⁹ Classification of Products by Activity, version 2.1 (Eurostat 2023).

¹⁰ More specifically, the product link would be established in the following sequence: internal classification of *services* -> EBOPS -> CPC -> CPA -> SPIN.

Table 4. Concordance between EBOPS and SPIN

EBOPS (3-digit)	CPC (5-digit)	CPA (6-digit)	SPIN (7-digit)
3.2.2 - Air transport with freight	65311	51.21.12	51.211.02 - Scheduled air transport of letters and parcels
			51.212.01 - Non-scheduled air transport of letters and parcels
	65319	51.21.11	51.211.01 - Scheduled air transport of intermodal containers
		51.21.13	51.211.03 - Scheduled air transport of other freight
		51.21.14	51.212.02 - Non-scheduled air transport of other freight
	66032	51.21.20	51.212.03 - Rental services of freight air transport equipment with operator

To summarize, the product link generally lacks concordance on the more detailed levels, whether created by manual text-matching or concordance tables. Thus, the product link must be *extended* with information about enterprises and their imports to achieve allocation to finer classification levels. In the Swedish SPPI, this is an ongoing task which is done primarily by collecting information from sampled enterprises in the survey's questionnaire or by searching for information about the enterprise's imports from external sources. Lastly, table 5 presents an overview of the relation between SPIN och EBOPS at an aggregated level.

Table 5. SPIN sections mapping to EBOPS sections

SPIN sections	EBOPS sections
H – transportation and storage services	parts of 3 transport
I – Accommodation and food services	parts of 4 travel
J – Information and communication services	9 information services; parts of 8 intellectual property charges and 10 other business services
M – Professional, scientific and technical services	parts of 10 other business services
N – Administrative and support services	parts of 8 intellectual property charges and 10 other business services

Main results

Population and weights

The population for the survey year 2023 are based on the foreign trade in services statistics covering 2021. The number of enterprises importing and exporting services in 2021 were approximately 3500 and 2100 respectively. As a comparison, the Swedish economy consisted of about 1.2 million enterprises in the same year¹¹. The average enterprise can be described as importing multiple services, between two to three services, while mainly exporting one service, see table 6.

Table 6. Distribution of the number of imported/exported services by enterprise
Services are defined according to SPIN 2015.

Markets	5%	25% (1st quantile)	50% (median)	75% (3rd quantile)	95%
Imports	1	1	2	3	7
Exports	1	1	1	1	3

The sample frame uses a cut-off limit to exclude the smallest enterprises in the population. The cut-off limit is set to trade values at least equal to 10 million SEK for each stratum. With this cut-off limit the sample frame in 2023 amounted to about 1200 enterprises importing services and 1000 enterprises exporting services. Compared to the population it is evident that numerous enterprises are trading services with values below the cut-off limit.

The sample frame is dominated by a few large enterprises. More specifically, 50% of the total import value in the sample frame is based on the 24 enterprises with the largest import values. In other words, about 2% of the enterprises in the sample frame represent a majority of the total import value. This is also evident when allocating the import values to the SPIN classification. Table 7 illustrates the accumulated import values by section, for instance 50% of the total import value in section H comes from the 18 enterprises with the largest imports in this section.

¹¹ For more information, see the product page (Statistics Sweden 2023f):
<https://www.scb.se/en/finding-statistics/statistics-by-subject-area/business-activities/structure-of-the-business-sector/structural-business-statistics/>

Table 7. Accumulated import values by section

Confidential figures are marked with [...].

Section	50%	75%	90%
H - Transportation and storage services	18	51	108
I - Accommodation and food services	[...]	[...]	[...]
J - Information and communication services	7	27	89
M - Professional, scientific and technical services	14	68	201
N - Administrative and support services	[...]	8	24

The common characteristic of the largest enterprises is that they are multinational enterprises, i.e. having foreign affiliations. This raises the concern whether the import trade values are based on market, “arms-length”, transactions or on transactions within a multinational enterprise’s foreign affiliations made on a strategic basis. The latter is synonymous with *transfer prices* which can be set to practically any value. Such transactions would lack the representativity of market prices under prevailing economic conditions and their usefulness in a price index is doubtful. However, if it is advisable to exclude these transactions from the price index it would be difficult to implement in practice because there are lacking data sources that can be used to verify to what extent the import values are based on *transfer prices*¹². During the survey period information is collected about the type of transaction, e.g. contract price, list price, transfer price etc., for the reported services. Moreover, additional data sources such as annual reports could be exploited to collect more details about the nature of the transactions. These data source could be used to identify transactions with *transfer prices* on a general basis, but it is questionable to what extent they can generate a reliable accuracy. Statistics Sweden’s current praxis is to include transactions based on *transfer prices* in the price index and monitor their price changes with extra care.

Looking closer at the weights, the main weight share in SPPI for imports is concentrated to information and communication services (section J) which represents about 52% of total weights. This section covers imports on computer consulting, telecommunications services as well as music and software publishing. Transportation and storage services (section H) represent about 25% of the total weights, which includes land, sea and air transports as well as warehouse storage. Professional and technical services (section M) and administrative services (section N) represent approximately 10% each of the total weights. Section M

¹² The export values are controlled and managed, if necessary, before finalizing the sample and weight frame. More specifically, each enterprise’s export value is controlled against the enterprise’s total net revenue and its net revenue generated on the domestic market. If the difference between the total net revenue and the net revenue from the domestic market deviates from the export values, there exists an imbalance in the enterprise’s sales figures. We interpret this imbalance to occur because of strategically defined transfer prices in the export sales. Such export values are adjusted, in favor of domestic sales.

covers e.g. management consulting as well as legal and advertising services. Section N covers leasing services and licensing services for intellectual properties and similar products. Lastly, accommodation and food services (section I) only cover accommodations services, which represents about 1% of the total weights. The low weight share for section I is affected by the constraint that only B2B transactions are covered. Figure 4 shows the weight distribution among sections.

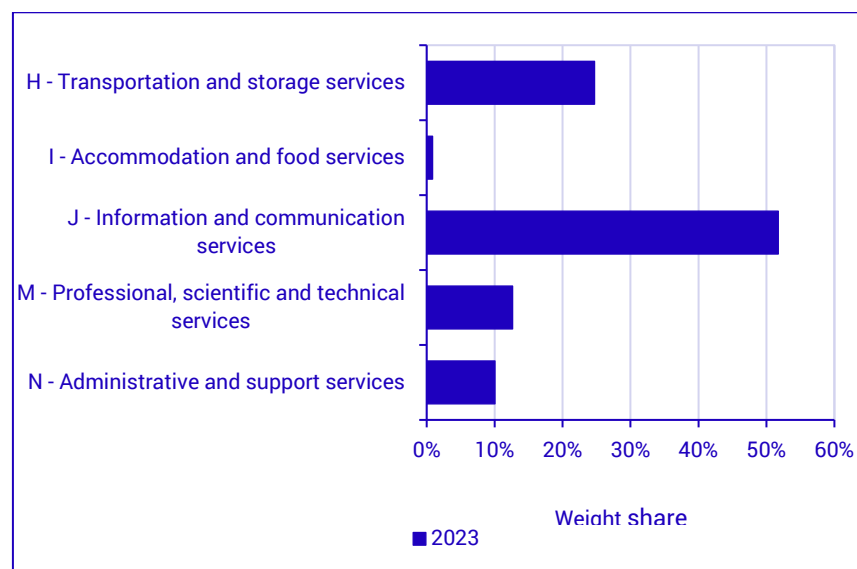


Figure 4 – Weight distribution among sections in SPPI for imports. Survey year 2023. Source: Statistics Sweden.

Main pricing methods

The wide range of services that is covered in SPPI for imports require different pricing methods to measure the imported price development for services. The most frequently used pricing methods are contract pricing and the time-based method. Moreover, the percentage fee method is partially used in sections J and N, and in some cases the unit value method and direct use of prices of repeated services are used. The component and model pricing methods are currently not used in SPPI for imports. Table 8 lists the pricing methods and the main sections in which they are used. To highlight the price measurement for some of the imported services the following sub-sections describes transportation services and computer consultancy services in detail.

Table 8. Main pricing methods

Pricing method	SPIN sections
Direct use of prices of repeated services	when applicable
Contract pricing	H, J and N
Unit value method	when applicable
Percentage fee method	parts of J and N
Component pricing method	-
Model pricing method	-
Time-based method	J and M

Transportation and storage services – Section H

Transportation and storage services covers land, sea and air transports as well as warehouse storage. The weight of section H represent about 25% of the total weight in SPPI for imports and the main services within section H is: freight transport services by road (SPIN 49.41, weight 8,7%), sea and coastal freight water transport services (SPIN 50.2, weight 5,9%), air transport services (SPIN 51, weight 3,3%) and other transportation support services (SPIN 52.29, weight 5,5%).

Freight transport by road and sea (SPIN 49.41 and 50.2)

The first two services, freight transports by road and sea, are similar in many aspects. The typical importer of freight transport services is a domestic industry company who is exporting or importing goods. The SPPI identifies imported freight transport services as purchases of freight transports made by the domestic industry company from a foreign enterprise that provides the transport service. Hence, imported freight transports covers transports that are provided by a foreign transporter regardless of whether the physical transports are made within or outside of Sweden. Freight transports by road are made with lorries and trucks usually between Sweden and a country within Europe. Freight transports by sea have less geographical restrictions and is commonly made within Europe but also between continents.

The prices reported is usually based on transactions within a long-term contract. A few price determining characteristics are collected to ensure that the transport services are comparable over time. For freight transports by road those are: type of cargo, type of vehicle, gross weight of the vehicle and loading and unloading destinations. The price is either reported as price per delivery, or price per ton if the gross weight of the cargo varies between deliveries and significantly affect the price.

For freight transports by sea the price determining characteristics are: Type of cargo, contract/customer, loading and unloading destinations. The price is usually reported per ton.

Quality adjustments are made when price determining characteristics change, e.g. if the destination of delivery changes. The quality change is adjusted on a case-by-case basis but usually an implicit quality adjustment, such as overlap methods, is most commonly applied.

When contract pricing is not applicable the pricing method is determined on a case-by-case basis. Currently, the unit value method has usually been applied, where the respondent reports an average price based on transports with a comparable freight but delivered to different locations. This specification is expected to increase the variation in the reported price, e.g. longer deliveries gives higher prices, but the long-term price trend should be captured as long as there is no systematic shift towards longer and shorter deliveries.

Air transport services (SPIN 51)

Air transport services are divided between air transport of freight and passengers. For air freight services the typical importer is a multinational logistics company with an establishment located in Sweden that imports the air transportation service. Whereas the typical importer for air transport of passengers are tourist agencies which buy tickets for international flights and bundles these flight tickets into packaged holidays. In similarity with freight transports by road and sea, imported air transports covers transports that are provided by a foreign transporter regardless of whether the physical transports are made within or outside of Sweden.

The pricing method is usually based on contracts but the price determining characteristics is different depending on whether it is air transport of freight or passengers. For freight transport the respondent reports: Type of cargo, weight, loading and unloading destinations. The price is usually reported as price per ton. For passenger transport the respondent reports: type of passenger (private or business), destination (departure and arrival), travel class. The price is usually reported as price per ticket.

If contract pricing is not applicable or if any of the price determining characteristics change are managed on a case-by-case basis. Quality change is usually adjusted using an implicit quality adjustment.

Other transportation support services (SPIN 52.29)

In the Swedish SPPI these services mainly cover goods-handling services, but also to some extent different types of brokerage services. The goods-handling services are typically imported by industry companies, which means that they purchase the handling of goods, for instance by warehousing or temporarily protecting goods during transit, from a non-resident. The brokerage services are typically imported by

multinational logistics companies who purchase the transportation services from a non-resident on behalf of their customers.

The prices are usually based on contracts and the price determining characteristics that the respondents report are: Type of cargo, contract/customer, loading and unloading destination, type of transportation. The price is usually reported per delivery, but in some cases the price can also be reported per ton. Changes in the pricing method and quality change are managed on a case-by-case basis.

Computer consultancy services – SPIN 62.02

Computer consultancy services represents 10,7% of the total weight in SPPI for imports. A wide range of consultancy services are covered such as maintenance and installation services of hardware and software, analysis and programming of computer systems as well as costumer support for hardware and software issues. The typical importer is a software developing and/or consultancy company buying computer consultancy services either from an external enterprise in another country, or from a subsidiary or other type of foreign affiliation.

The pricing method is based on the time-based method, where usually hourly rate is reported. To control for some of the price determining characteristics, the respondents specify: type of service, profession and experience level. As mentioned above, there are cases where computer services are imported from foreign affiliations. These transactions are based on transfer prices, which are monitored with extra care, especially large price changes, to ensure that the price index represents the market's price development.

Changes in quality, such as improved productivity, is generally hard to monitor for these services. The types of quality adjustments usually performed is when the type of service or the experience level changes. These adjustments are typically performed with implicit quality adjustments.

Price index (2020 – today)

The SPPI for imports have increased approximately 22% between 2020 and 2023Q2 (most recent publication). The average annual rate of change during this period is 7,7%. Figure 5 shows how SPPI for imports compares to the SPPI's for domestic sales and exports. SPPI for exports have moved very close to the import prices, whereas the domestic price development is trending upwards at a somewhat slower pace. Since 2021, the Swedish krona have depreciated significantly against many of the common trade currencies. To some extent, the deviations in the export and import SPPI against the domestic market could be explained by the currency development. However, it can be difficult to make comparison on the overall SPPI's since different markets are exposed to different types of services, for instance real estate services represent

about 16% of the domestic SPPI, but is not covered in the SPPI's for exports or imports.

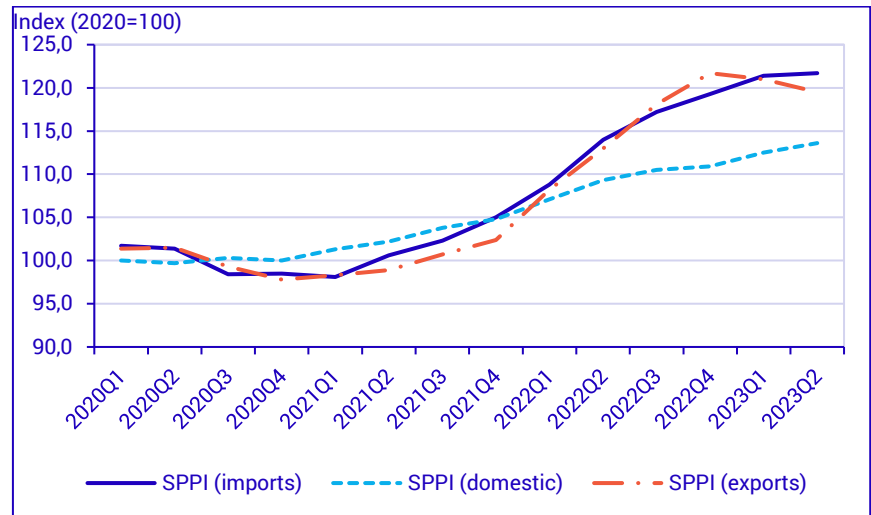


Figure 5 – Total SPPI for imports, exports and the domestic market. Time period: 2020Q1-2023Q2. Source: Statistics Sweden.

The currency effect on the SPPI's can be examined more closely by comparing import price indices for the same services on the domestic market. The motivation to compare these markets is that if importers would not buy services from non-residents, they would have to buy the services from the domestic market. Figures 6 and 7 illustrate the SPPI's for freight transports by road and computer consultancy services between 2020Q1 and 2023Q2. The SPPI's are categorized in domestic and import market, and a KIX-adjusted SPPI for domestic sales¹³ are presented in the figures. For transport services (figure 6) the import prices and the KIX-adjusted domestic prices have increased approximately the same from 2020Q1 to 2023Q2, but the quarterly changes do not necessarily align. For computer consultancy services (figure 7) these two indices fluctuate much more closely, especially in the beginning and the end of the period.

¹³ The KIX-index ("the Krona index") is an effective exchange rate index which indicates the fluctuations in the value of the krona compared to 32 important trading economies. The KIX-adjusted SPPI is simply the domestic SPPI multiplied by the KIX-index. More information (Sveriges Riksbank 2023): <https://www.riksbank.se/en-gb/statistics/search-interest--exchange-rates/explanation-of-the-series/effective-exchange-rate-indices/>

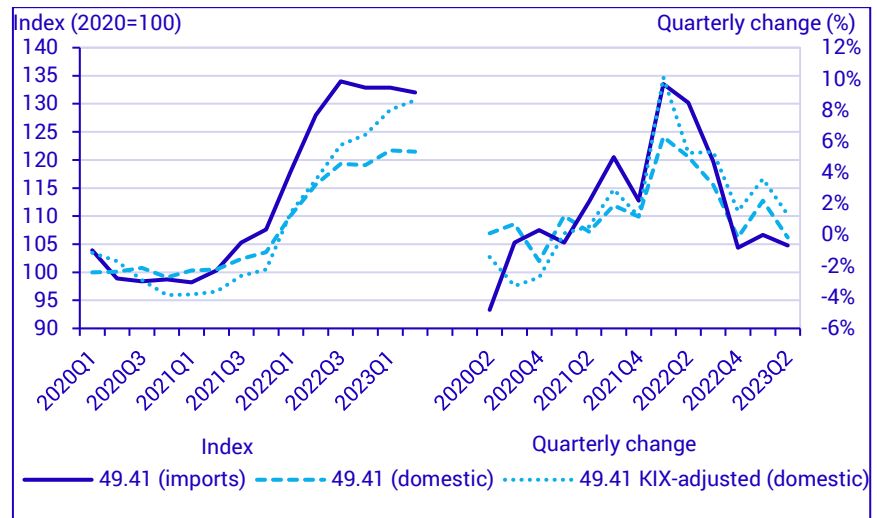


Figure 6 – Freight transport by road, SPIN 49.41. SPPI for imports, the domestic market and a KIX-adjusted index for the domestic market. Left hand side shows index series, right hand side shows quarterly change in percent. Time period: 2020Q1-2023Q2. Source: Statistics Sweden.

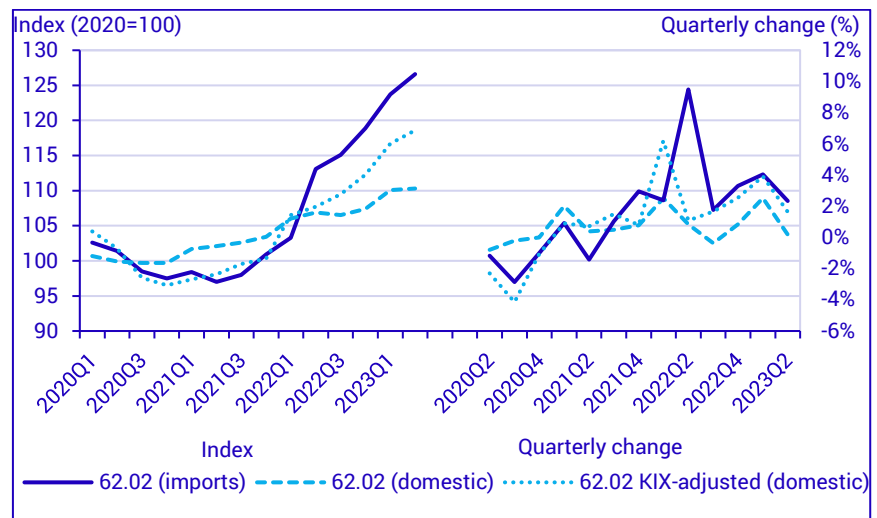


Figure 7 – Computer consultancy services, SPIN 62.02. SPPI for imports, the domestic market and a KIX-adjusted index for the domestic market. Left hand side shows index series, right hand side shows quarterly change in percent. Time period: 2020Q1-2023Q2. Source: Statistics Sweden.

These results give some indications that certain services might have a more uniform price development between markets when accounting for currency fluctuations. Maybe factors such as a higher degree of international competition and ease for consumers to substitute between domestic and international produced services could influence the price development. More research into these questions is certainly needed before making any conclusions. However, compiling SPPI's for imports gives insights into these questions at the same time as they strengthen the price deflators for the National Accounts.

Improvements and further development

Cooperation with National Accounts

Currently, the National Accounts do not use the SPPI's for imports as price deflators. Instead, they are using the KIX-adjusted SPPI's for the domestic market. As illustrated above, this could be reasonable for some services, but certainly not all. The staff at SPPI and National Accounts are planning to go through the available SPPI's for imports and introduce SPPI's that are fit for use as new price deflators.

Development of price measurements for complex imported services

Not all services are created equal and thus some services are more difficult to identify and create representative price indices for. Examples of such imported services are licensing fees for film rights as well as the right to use sound recordings and advertising services. These services have been identified to be difficult to identify the service and isolate the price determining characteristics. Moreover, these imported services are assessed to require relatively extensive resources for market research and to establish contact persons/respondents in the sampled enterprises that are well informed about the purpose of the survey and the information survey requests.

Symmetries in trade prices (experimental)

In theory, trade values should be symmetrical between countries (a country's exports (creditor) should equal the partner country's imports (debtor)). The same symmetrical reasoning should also be applicable for prices (a country's export prices should equal the partner country's import prices). Compiling such price indices is very challenging and probably not applicable in the continuous publication of the SPPI's in the near future. However, constructing these types of indices in an experimental setting could be beneficial for the development of new indices, consistency checks in methodologies and also a general enhanced cooperation between national statistical offices.

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