

# **SPPIs by customer sector – ”the Swedish experience”**

**VOORBURG GROUP MEETING PARIS 2019**



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# SPP by customer sector – “the Swedish experience”

## Voorburg Group Meeting Paris 2019

Producer            Statistics Sweden,  
Economic Statistics Department  
SE-104 51 Stockholm, Sweden  
+46 10-479 40 00

Enquiries           Rohan Draper  
+46 10-479 42 48  
[rohan.draper@scb.se](mailto:rohan.draper@scb.se)

Marcus Fridén  
+46 10-479 43 19  
[marcus.friden@scb.se](mailto:marcus.friden@scb.se)

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# Foreword

The views expressed by the authors of this paper do not necessarily represent the official view of Statistics Sweden.

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Rohan Draper  
Senior Advisor

Marcus Fridén  
PPI Manager

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# Background

## Introduction

This paper explores the concept of segmenting SPPIs by customer sector to disassemble price indices for analysis and interpretation. The concept is discussed in terms of output service producer price indices (SPPIs) using Sweden as the reference country. This paper does not seek to be the definitive guide on segmentation but does aim to bring together the limited current documented theory and provoke discussion towards the development of a definitive guide.

## Segmentation

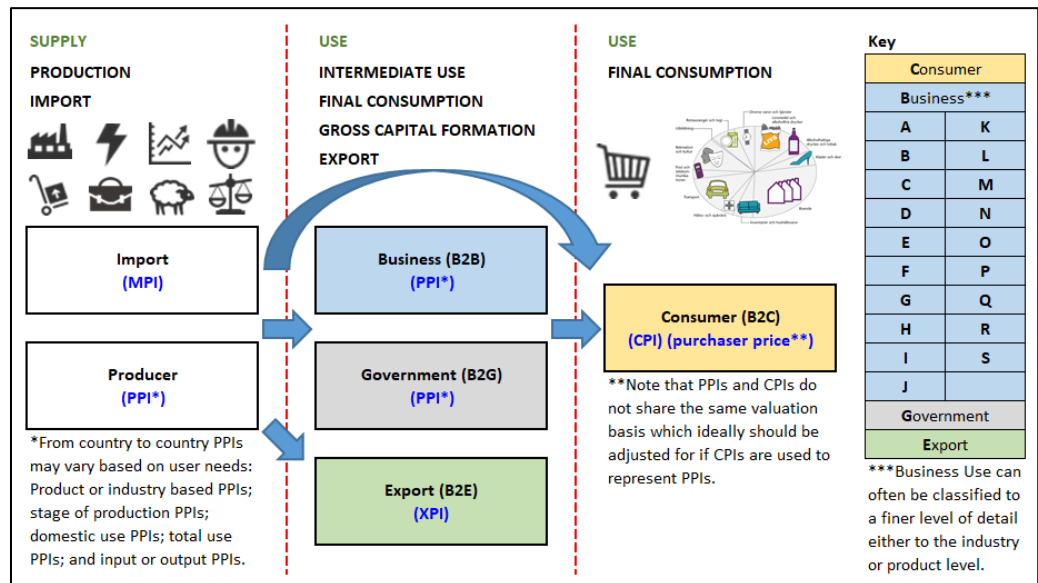
There seems to be a form of consensus peppered throughout the Eurostat-OECD Methodological Guide for Developing Producer Price Indices for Services (2014) that segmentation is an effective means of developing, analysing and producing SPPIs. The example from the methodological guide comes from the French experience where SPPIs are not only disaggregated by use for analysis purposes but are also published. As per the methodological guide, the French disaggregate utilising the follow definitions:

- **Domestic Business-to-Business SPPIs (B2B)** - measure transaction price changes for services sold by national producers to national businesses; they cover domestic production sold to legal entities established in France (including the general government sector, French affiliates of foreign groups, etc.).
- **Domestic Business-to-Consumer SPPIs (B2C)** - measure transaction price changes for services sold by national producers to households in the national territory; CPIs are the main source for these indices; valued at purchasers' prices, they are however adjusted to basic prices by deducting any taxes including VAT and trade margins.
- **Domestic Business-to-Export SPPIs (B2E)** - measure transaction price changes for services sold by national producers to foreign markets. In the case of France, transaction prices are converted to Euros and therefore include exchange rate effects. Note that intra-group transactions are included.<sup>1</sup>

When exploring these segments this paper will broadly follow the above definitions in the Swedish context, however, this paper will also explore **Business-to-Government (B2G)** as a separate potential segment. This paper will therefore discuss segmentation of SPPIs through the lenses of use by business, government, households (consumers) and finally services destined for export.

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<sup>1</sup> SPPI by destination - the French experience. Eurostat-OECD Methodological Guide for Developing Producer Price Indices for Services (2014)



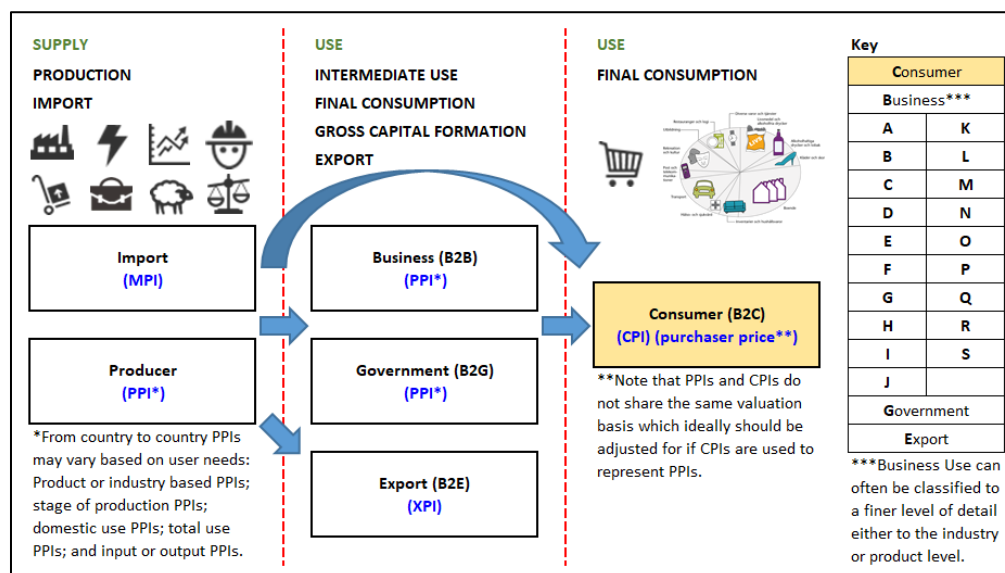
Each level of segmentation represents an opportunity to study price development behaviour from an alternate perspective giving rise to the potential for increased estimation understanding and quality.

### Swedish SPPI Overview

The Swedish SPPI is produced as part of the general suite of PPIs production activities. That is, Producer price indexes for both goods and services, as well as import price indexes, are produced by the same staff and utilise the same production system. The only thing that separates goods and services is the publication frequency. Based on regulations stipulated by Eurostat, PPIs for goods are collected and published monthly, whereas PPIs for services are collected and published quarterly.

In Sweden PPIs use the Swedish version of the European product classification CPA 2.1. Sample frame for SPPI is the Structural Business Statistics (SBS).

# Business-to-Consumer (B2C)



## Overview

Household consumption of services, as compared with goods, is often a transaction that occurs directly between the producer and the consumer without any overt form of intermediation and is traditionally predominately for final consumption. This presents the price statistician with an opportunity to utilise consumer price indices (CPIs) to represent the household share of output and where applicable even able to be utilised to represent total output.

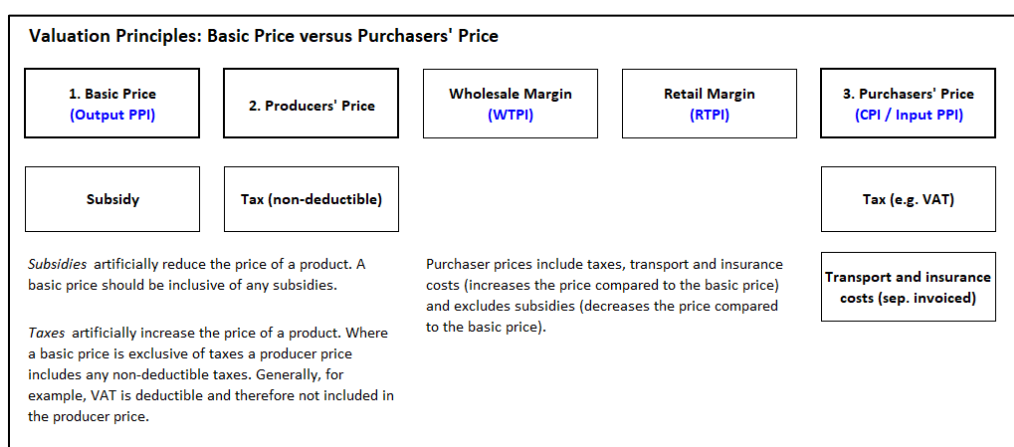
Literature hints at potential criteria for a selection framework to determine CPI suitability but stops short of providing a formalised and structured approach.<sup>2</sup> Considerations when using CPIs in PPI production based on literature and the authors' of this paper include:

- **Business-to-Consumer Proportion.** A determination of the prevalence of Business-to-Consumer transactions as a proportion of total use should be made to support any implementation of CPIs. Input-output supply use tables and benchmarking surveys are good sources for such information. Usage of CPI can be either as a total replacement for PPI or as a partial replacement for
- **Imports versus domestic supply.** A determination of the prevalence of imports compared with domestic production as respective proportions of total

<sup>2</sup> Kat Pegler and Ciaren Taylor (ONS, 2014) further the discussion in their report at the 29<sup>th</sup> Voorburg Group meeting and the second edition of the Eurostat-OECD Methodological Guide for Developing Producer Price Indices for Services (2014) provides a broader level of advice.

supply. Such an assessment can be enhanced by a determination of the homogeneity, or lack thereof, of domestically produced and imported products. In this sense homogeneity in terms of product type and price development. Caution is advised where there is a large amount of imported supply that may not be homogeneous to domestic production and/or may be utilised by businesses but not consumers. Pegler & Taylor (ONS, 2014) put forward a suggested analysis of %-supply from imports graphed to absolute difference between annual inflation of PPI and CPI as a means of assessment which is could be a valid analysis for countries where both indicators exist.

- **Classification comparison.** A classification comparison should be made between CPI and PPI to ensure that coverage is relatively the same type of activities. A somewhat classic example of where classifications are misaligned is *honey* serving as a good example of the importance of classification comparisons.
  - o Industry classifications, for example, ISIC Rev.4 – Honey classified to 0149 Raising of other animals as “bee-keeping and production of honey and beeswax”.
  - o Product classifications, for example, CPC 2.1 – Honey classified to 029 Other animal products as 02910 Natural honey.
  - o Consumption classifications, for example, COICOP 2018 – Honey classified to 01.1.8 Sugar, confectionery and desserts (ND) as 01.1.8.3 Jams, fruit jellies, marmalades, fruit purée and pastes, honey (ND).
  
- **Valuation basis.** Differences in the pricing basis (or valuation principle) will need to be adjusted for when utilising CPIs where output PPIs utilise basic prices and CPIs utilise purchasers’ prices. The potential differences include, for example, value added tax; excise duties; subsidies; and insurance. Sweden produces a form of CPI where changes in taxes are removed from the movements and in the absence of other effects serves as a good option to represent household use.





- **Collaboration between PPI and CPI.** In Sweden, we calculate that approximately 22% of total use of service based production is attributable to households<sup>3</sup>. Usage of CPI therefore presents an excellent opportunity, but in equal measure a potential risk. In utilising the CPI the responsibility and decision making regarding imputation, quality adjustment and regular updates is effectively outsourced outside of the PPI team. Collaboration between PPI and CPI is therefore essential to ensure that indicators remain fit-for-purpose over time.
- **Respondent Burden and Production Costs.** Reduction in respondent burden and production costs following the “collect once use many times” paradigm is seen to align with the use of CPI. A. Fraisse (2014) states,

“the use of CPI data can be done either exclusively... or conjointly with other producer price data not covered by the CPI, especially those relating to business users (collected by a dedicated SPPI survey)”.

Where household use equals total use we have a clear cut opportunity to utilise CPI. In this case, with the correct adjustment, we rather than a proxy have an equivalent index. We have a further case of equivalence where it can be determined that price developments for household purchasers are homogeneous with business purchasers. A low technical coverage of the household segment can in this case equal full representativeness.

The result is either cost savings for the price statistics unit or the option of refocusing funds to invest more in the production of indices that require, for example, larger samples or more sophisticated solutions to ensure their high quality.

Considering the widespread usage of CPIs as either proxy or equivalent solution for representing SPPIs, Sweden suggests that it would be advisable to conduct a multilateral empirical study to ratify international experiences and create a formalised structured approach. Furthermore, findings could be worthwhile to be provided to the Ottawa Group due to importance of harmonisation across PPIs and CPIs.

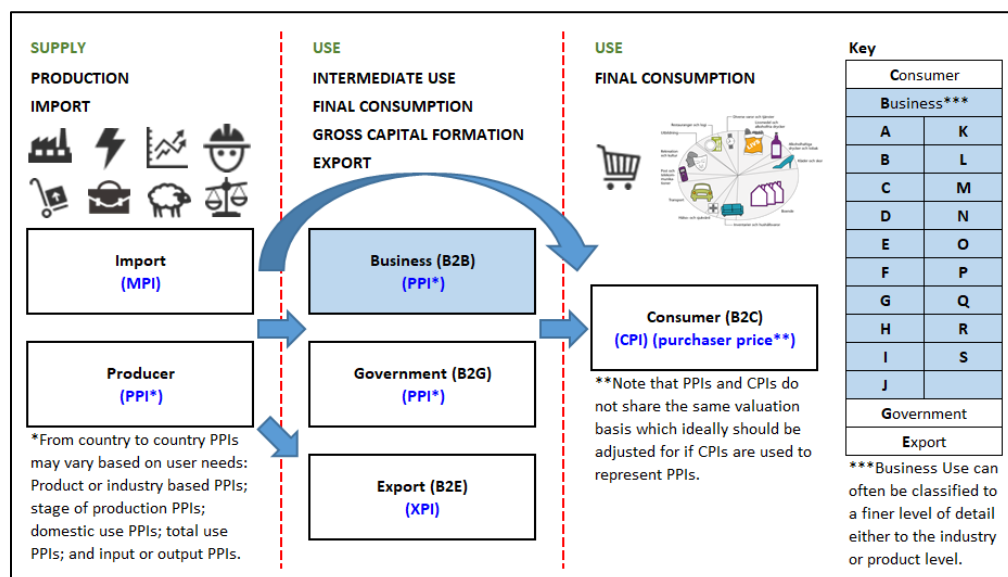
## Swedish Experience

A raft of adjusted CPIs are utilised in the production of PPI and are either utilised to represent direct household consumption only (based on estimates from supply use tables) or total output.

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<sup>3</sup> According to Supply-Use tables from National Accounts for the year 2016, sections H to S

# Business-to-Business (B2B)



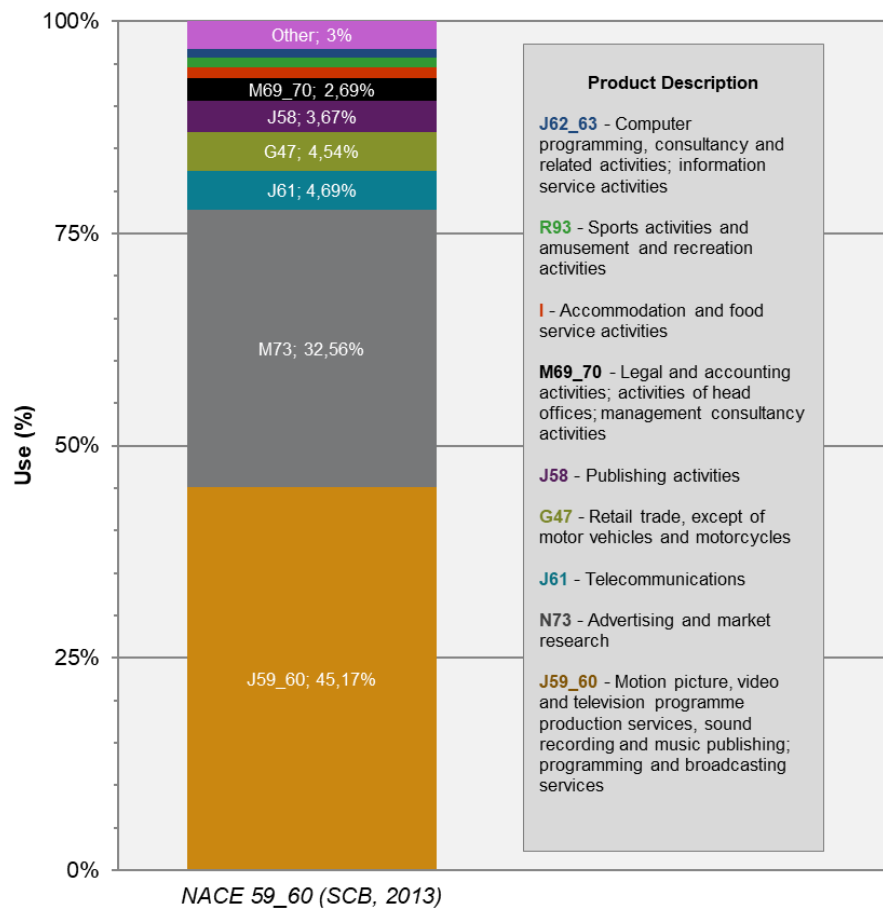
## Overview

The Business-to-Business segment can be seen as a residual post the removal of B2C; B2G and B2E. The actors in the transaction process are domestic businesses providing products to other domestic businesses. In practice, this often includes production for government use too, however, for the purposes of this paper B2G is a separate segment. In regards to official SPPI methodologies that cover this segment readers are recommended to see the most recent Eurostat-OECD Methodological Guide for Developing Producer Price Indices for Services. This segment is the most thoroughly documented segment when calculating SPPIs.

## Swedish Experience

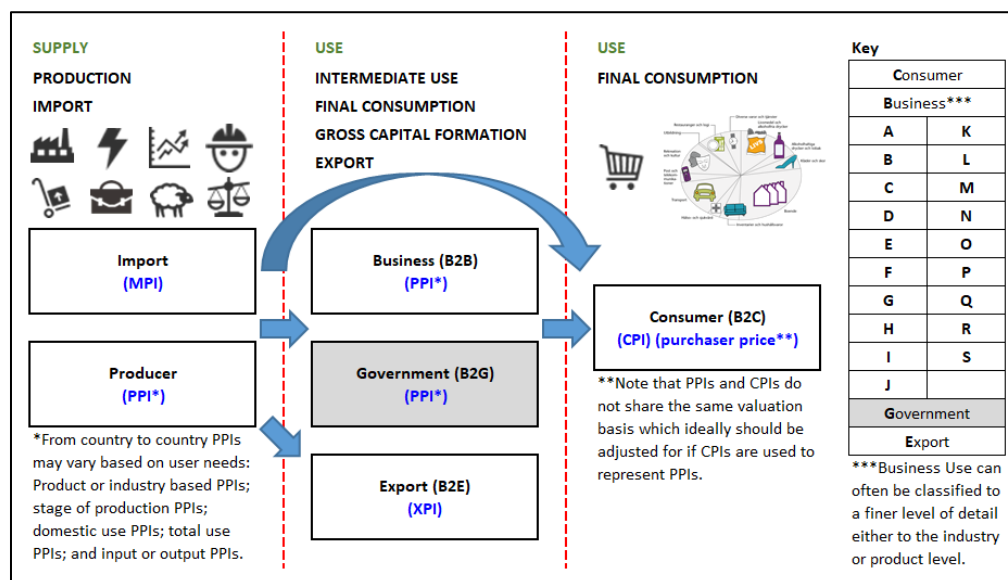
Beyond general methods and traditional index construction, Sweden utilises segmentation of the B2B segment to gain a practical understanding of the major purchasing industries. Combined with a cost side analysis the price statistician can gain insight into the entire supply chain. This type of analysis is usually completed when setting up new indices from scratch and when conducting specification reviews. The B2B segment is disaggregated to the finest level of detail that supply-use tables and other supplementary information allows and major demand side industries are mapped. The following graph provides an example of such an analysis for NACE 59 (incl. 60).

### NACE 59 (incl. 60) - Use (Demand) % of B2B



We observe that Use primarily comes from the subject industry but also “advertising and market research”, “telecommunications”, “retail trade”, “publishing activities” and “legal and accounting activities”. Such a disaggregation can be useful to understand what sort of buyers that specifications should be representing. For example, if we were utilising a contract based pricing method, discussions with data providers can be supported with knowing which industries contracts should likely be representing. When reviewing an index and current specifications it might raise the question of why some industries are represented by contracts and not others.

# Business-to-Government (B2G)



## Overview

Business-to-Government represents those transactions that align with government demand of output. Generally, such transactions are lumped together with B2B transactions. Sweden is exploring the potential to measure these transactions separately.

## Swedish Experience

In Sweden, this segment represents an opportunity to explore the usage of a currently untapped data source. Governmental purchases are centralised via the “Statens Inköpscentral” (National Procurement Service). There is a requirement on government authorities to utilise the National Procurement Service and applicable to all levels of government from local to federal.

“In short, the task [of the National Procurement Service] is to offer central government authorities coordinated framework agreements for goods and services of general use. Central government authorities are obliged to use the National Procurement Services framework agreements unless they find another form of procurement better overall. When a central government authority decides not to use a coordinated framework agreement for a particular procurement, the authority is obliged to notify the National Procurement Services of the reason.” (Kammarkollegiet, 2019)<sup>4</sup>

<sup>4</sup> <https://www.avropa.se/topplankar/In-English/>

The contracts that are business-to-government have already surfaced in discussions that Statistics Sweden has had with producers. However, until now they have been reported on a case-by-case basis with the producers themselves reporting the price data. The utilisation of transaction (contractual) information from Statens Inköpscentral can be said to reduce provider burden whilst also reducing data collection costs. Arguably, the quality of the data also increases as with greater certainty we can say that the data is being reported in the same way and representing almost a population of transactions where businesses provide products to government.

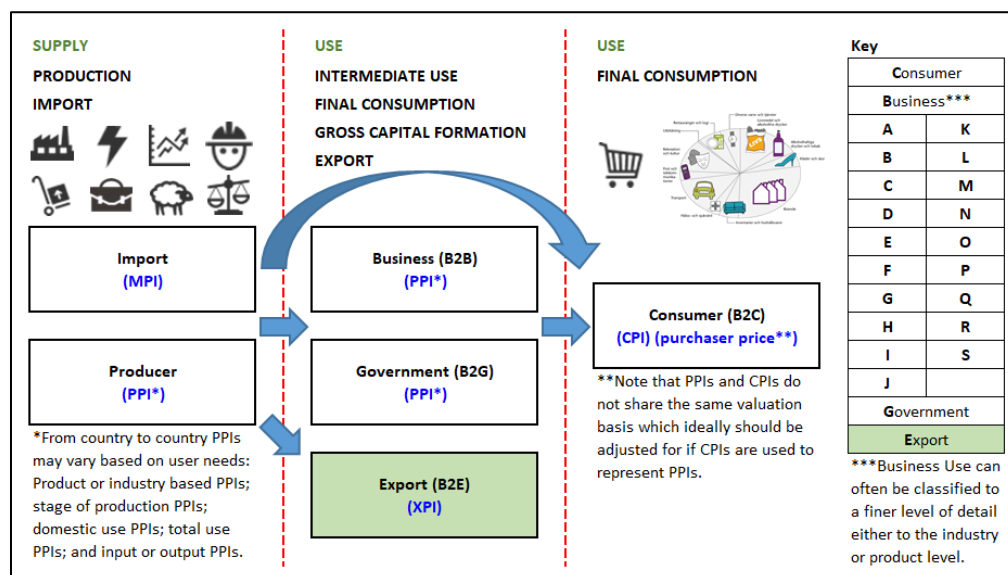
“The National Procurement Services concludes and administers more than 1 900 unique framework agreements over 43 fields, for example a wide variety of ICT products and services, office furniture, office equipment, hotels and conferences, safety and security, transportation and vehicles etc.”<sup>5</sup>

In some cases, at least to our knowledge, the government contracts are escalated using various price indices. For “Hotels and similar accommodation services”, for example, the prices are adjusted on a particular date with the SPPI for “Hotels and similar accommodation services”. This information is publicly available on their website. In such cases we would not need to survey these transactions explicitly. Instead, we could utilise an index directly for the BtoG part, if BtoG were to have a separate node in the aggregation structure. Our current challenge is to find a high quality solution for calculating weights to separate out this segment.

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<sup>5</sup> <https://www.avropa.se/topplankar/In-English/>

# Business-to-Export (B2E)



## Overview

Products that have different economic destinations should be considered as different products. Not directly measuring one destination, e.g. exports, would require the assumption that the price development is the same for both destinations. If this is not true, this would result in biased estimates of GDP, when using PPI's for deflation.

For goods PPI, the concepts of export and import is commonplace (although the use of the customs frontier or the ownership principle as the definition of export and import significantly affects the way to measure it). For service PPI's, the measurement of exports of services has largely been neglected historically. The Swedish PPI (as well as it's sub component SPPI) has always been a Business-to-all index. Exports of services has always been included, although often not explicitly measured. The definition of exports of services are revenues from sales to non-residents (i.e. persons or entities situated outside of Sweden) as described in the 2008 SNA. In the weights used for PPI, all revenues, whether coming from domestic or foreign customers, are included. However, users still often think of SPPI as equivalent to a domestic service producer price index. In order to clarify this, Statistics Sweden started to measure export and import prices for services explicitly in 2018. The different markets are indicated with a variable in the production system. Indexes are calculated separately for each market and all levels of product groups, up to the top. On each level, domestic and export is combined to form a total output SPPI.

## Swedish Experience

As part of Balance of Payments, a survey of foreign trade in services is conducted quarterly at Statistics Sweden. The survey uses a Swedish version of the Extended Balance of Payments Services Classification (EBOPS). Using a correspondence table between EBOPS and CPA<sup>6</sup>, data from foreign trade in services was linked to SBS data for all combinations of enterprise and product code for the year of 2015. Revenue for the domestic market was calculated by subtracting the export value from total revenue for all combinations of enterprise and product code. A sample was then drawn for the domestic and export market respectively, asking explicitly for prices for domestic and foreign customers separately. Misclassifications were not more prevalent than usual, which would indicate that the correspondence table was largely correct. However, some respondents reported that they did not have sales to the type of customer, domestic or foreign, for which they had been sampled. This would indicate problems with over-coverage and under-coverage in the foreign trade in services survey. That it existed was known beforehand. This is a minor problem since this can be corrected for in the sample frame.

The foreign trade in services survey covers more services than what is in scope for most countries SPPI's, like merchanting, repairs and maintenance of goods or financial services<sup>7</sup>. Revenues not included in net turnover might also be reported as foreign trade in services, e.g. some licenses and royalties. Discussions with turnover statistics and National Accounts need to take place to decide whether or not to include this in SPPI.

The foreign trade in services survey is not a census and does not claim to cover all transactions. The weight for exports in SPPI is therefore likely to be underestimated. For 2019 the share of exports in the overall SPPI is 12 percent<sup>8</sup>. On a disaggregated level the share of exports can be substantial, e.g. for Water transport services, Publishing services and Motion picture, video and television programme production services the share is over 50 percent. Exports of services also has a significant share in Air transport services and Computer programming services.

An important factor in foreign trade in services, as with goods, is the exchange rate. Any country, especially those who do not have Euro or US Dollar as currency, is highly affected by the exchange rate. Measuring representative transactions is important for any price index, and measuring prices in the correct currency is just as important. The overall effect of the exchange rate did not increase particularly when introducing export prices explicitly in the Swedish SPPI. However, it is much more apparent that prices in foreign currencies belong to the export market, and not the domestic market.

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<sup>6</sup> A correspondence table between EBOPS 2010 and CPA 2008 can be found on the Eurostat website <https://ec.europa.eu/eurostat/web/international-trade-in-services/methodology>

<sup>7</sup> In Swedish Balance of Payments, the share of services is around 30 percent of total exports of goods and services

<sup>8</sup> In comparison, for goods PPI the share of exports is 46 percent in Sweden

The SBS collects data on revenue from foreign customers, but only in total, and not broken down by product. This data is only used by PPI for validation purposes, when data from existing sources are deemed questionable.

The experience so far, with the limited amount of time where we have surveyed exports explicitly, is that the price movements differ, and sometimes substantially, from that on the domestic market. The kind of services provided to foreign customers are many times also very different from those provided to domestic customers. As time goes by there will be more data available, which will make it easier to analyze the differences in price movements and pricing strategies for domestic versus foreign customers.



# Business-to-All (B2ALL)

## Swedish Experience

Currently Swedish SPPIs do not attempt to produce outputs for each segment but rather use segmentation as a tool to increase representativeness and understanding of outputs. The B2B segment represents the vast majority of use in the Swedish SPPI. Data is almost solely collected via direct collection and as of today we do not collect B2G separately. Direct collection is approximately responsible for 83% of our movements with the remaining 17% derived from CPIs.

Section	CPI usage (B2C)	Direct Collection (B2B; B2G; B2C)	Direct Collection (B2E)
H	9%	78%	13%
I	69%	31%	0%
J	8%	64%	28%
L	45%	55%	0%
M	0%	93%	7%
N	10%	77%	13%
R	100%	0%	0%
S	65%	35%	0%
<b>Total SPPI</b>	<b>17%</b>	<b>71%</b>	<b>12%</b>

Where the CPI is not used to represent B2C, Sweden sometimes asks companies to provide data on B2C and B2B products separately, for example, when measuring “Hotel and similar accommodation services” and “Rental and leasing services of motor vehicles”. Such direct collection occurs in combination with B2B when we are not satisfied that CPI methods produce an output that aligns to the needs of PPI.

For example, in Section I, “Accommodation and food services”, there are no explicit measures of BtoE in Sweden. CPI is being used for Food and beverage services, and sales to non-resident customers at Swedish restaurants are included in those indices and cannot be split for customer type. The present purpose of B2E in Sweden is not to publish an overall B2E index. National Accounts would use domestic SPPIs to deflate exports in section I, and the most correct thing to do would be to utilise the CPI index for exports in SPPI, with an explicit weight for exports. The ability for a restaurant to price discriminate between resident and non-resident customers is considered fairly unlikely. Therefore the assumption that the price development for the domestic and export market of Food and beverage services seems reasonable.

Sweden has unpublished data at varying qualities equivalent to the 6-digit CPA for internal use. This data may allow for the application of a segment based calculation approach and/or increased options for the analysis of our SPPIs. Future work will be to look into the viability of the usage of this data.

# Conclusions

Segmentation is a valid option for price statisticians where either centralised data sources can lead to improved cost effectiveness; where there is a large extent of heterogeneity between segments (either based on products consumed or price development); where users, for example National Accounts, are interested in segment based solutions; and/or price statisticians see a benefit in an alternative form of aggregation, analysis and imputation. The most readily available segments, at least from the Swedish experience, are B2C; B2B and B2E with B2G more of an emerging possibility that requires further study.

**Respondent Burden and Production Costs.** Application of B2C and B2G segments indicates in the former a proven capacity to reduce burden and production costs. In the latter, at least from the Swedish perspective, the centralised government contracts via the National Procurement Service indicates a potential data source to tap into if accurate weights for the segment can be estimated.

**Collaboration.** Application of data segmentation should ideally be applied in a partnership of national statisticians working with prices, short term statistics, annual benchmarks and National Accounts to ensure that solutions are harmonised across the system of economic statistics.

**Imputation.** Applying the different segments mentioned in this paper makes it possible to make imputations in a more diversified way. A missing BtoG transaction for a particular product group could use other BtoG transactions in another product group as basis for imputation, instead of using a BtoB or BtoAll index. In Sweden missing BtoE transactions are imputed by the development of other similar BtoE transactions only.

**International Best Practise.** Current material concerning segmentation is sparse and lacks proper international ratification. Sweden would like to see a more comprehensive and centralised source of information identifying a structured approach concerning the application of best practice when utilising segmentation within the construction of SPPIs. This seems an like an important step considering the widespread usage of CPIs and the current push towards the implementation of export based SPPIs.