

PRODUCTION OF STATISTICS

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Contact details

Statistical agency	Swedish Central Bank
Contact information	Statistics Sweden, Foreign trade in services
E-mail	uht@scb.se
Telephone	010-479 50 00 (Statistics Service)

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1 Context of the statistics

The statistics on foreign trade in services describe Sweden's imports and exports of services by quarter and year. The estimation basis mainly consists of reported values from a sample of Swedish companies and public authorities, supplemented by administrative data.

This document describes the design and implementation of the survey that generates the statistics on Sweden's foreign trade in services. Read more about the quality of these statistics in the quality declaration, available under the documentation heading, at <https://scb.se/en/finding-statistics/statistics-by-subject-area/trade-in-goods-and-services/foreign-trade/foreign-trade-in-services/>. The quality declaration and this document apply to the preliminary as well as the final statistics.

The survey results are an important basis for Sweden's balance-of-payments statistics as well as a main component when Statistics Sweden calculates Sweden's GDP. The statistics are also used by other public authorities and other economic analysts in Sweden. In addition to domestic users, the statistics are reported to foreign bodies, including the EU, OECD, IMF and UN.

Foreign trade in services does not normally cover goods. There are, however, exceptions in which flows of goods give rise to services. Construction services also contain the goods bought by the project abroad, and travel also includes goods that are consumed abroad.

2 Survey design

2.1 Target characteristics

The target population includes the transactions defined in the Balance of Payments and International Investment Position Manual, Sixth Edition (BPM6).

The *target units* are groups of transactions grouped into service types according to the Extended Balance of Payments Services Classification (EBOPS).

The target variables are (1) the total service value in SEK one million by *Service Type*, *Direction* (Export/Import), and *Country* as well as (2) the difference between the total service value for Export and the total service value for Import by service type or by country.

2.2 Frame procedure

To begin with, there is no register of relevant transactions in order to obtain the estimates of the target variables. A possible solution to this issue is to survey Swedish companies and public authorities (hereafter referred collectively to as companies for simplicity's sake) that perform FTS. However, no register of the companies with the desired property is available either. The only solution to this difficulty is to construct such a register of companies, or equivalently a frame, by predicting the ability of the companies, which are active at the time of frame construction, to perform FTS during the coming reference year. Once the frame is constructed, a sample of approximately 6 100 companies is drawn from this frame. This procedure is repeated annually at the beginning of each reference year (February).

As mentioned in section 1, the estimation basis also includes administrative data, which, however, does not require the construction of a frame of companies.

When constructing the frame, the aim is that the frame should not only provide good coverage of the values for Swedish companies' foreign trade in services for the entire reference year, but also good coverage in terms of services rendered, as defined in BPM6 (Balance of Payments and International Investment Position Manual, Sixth Edition).

The way of constructing the frame is complex and involves several steps. Below is an overview and brief description of the main steps.

The main steps of the frame procedure:

Step 1. *Create a basic frame*

The basic frame consists of all active legal entities (LE) in Statistics Sweden's Business Register, which contains information on the industry and sector affiliation of each unit. The basic frame is supplemented with data from various sources to identify the companies that have the potential to carry out foreign transactions at some point during the year, regardless of the direction (export or import) or service.

Companies with very good conditions will be included in the sample with a probability of 1. These legal entities are called *fully surveyed*. Table 1 lists the sources with fully surveyed companies.

Table 1. *Indication sources containing fully surveyed legal entities.*

Indication source	Number of legal entities sample 2023
Key companies with significant FTS (VIF)	358
Non-profit institutions serving households (HIO)	33
Money Transfer Organisations (MTO)	21
Volvo	10
Ericsson	2
SAS	1
Riksbank	1
Government agencies	58
Regions	20
Municipalities	10

Note that not all fully surveyed companies are expected to operate foreign trade in services to the same extent as VIF companies¹. Some of the companies are selected to be fully surveyed to ensure reporting on specific services, such as insurance services. A further reason for considering certain companies as fully surveyed is to reduce the proportion of 'nil' reports (as well as the non-response rate). These companies may have large transactions within their industry group, but not necessarily as large as VIFs. Nor do they have to report on specific services.

Another note on Table 1 is that there are overlaps between sources, for example nine regions are also identified as VIFs.

Table 2 provides indication sources used to identify legal entities that will be included in the sample with probability less than 1. These legal entities are referred to as *sampled*.

¹ The contribution of VIF companies to annual estimates of the main aggregates *Transport* and *Other services* usually varies between 60% and 80%. For the service categories at the lower levels of aggregation, the contribution of VIFs can be 100%.

Table 2. *Indication sources for sampled legal entities.*

Indication source	Source characteristic(s)
VAT register for 5 previous years	Contains data on annual imports of services, exports of services, merchanting as well as on annual turnover in the 5 years prior to sampling
Monetary Financial Institutions (MFIs) and securities companies from ESA/BFN/FSR	Contains data on financial services (not included in the VAT source above)
FEK Companies	Includes merchanting and manufacturing data collected in the Structural Business Statistics (FEK) survey two years prior to sampling
Insurance companies from the website of the Swedish Financial Supervisory Authority	Contains data on insurance services (not included in the VAT source above)
Companies with Swedish Fundraising Control 90-accounts	Contains data on transfers (not included in the VAT source above)
Foreign-owned companies	Indicates the foreign-owned companies with branches in Sweden
Foreign trade in goods (FTG)	Contains data on FTG collected by the Foreign trade – Exports and imports of goods survey one year prior to sampling
Production of commodities and industrial services (IVP)	Indicates companies with manufacturing services
Sample data for 5 previous years	Contains data on the frequency of sampling, the response rate, the size of the annual data submitted and overcoverage

Step 2. *Determine the Actor status of each legal entity in the base frame*

The *Actor status* is a variable with two levels, namely *Probable actors* and *Improbable actors*, and is assumed to represent the probability of performing foreign trade in services in the reference year in question ². Regardless of the actor status are all the LE: s assumed to be associated with positive probabilities to perform FTS. However, probable actors are judged more likely to have foreign trade in services (not necessarily of significant size) than improbable actors.

² Fully surveyed companies have *Probable operator* status.

The Actor status of each sampled LE is determined by taking into account the following characteristics:

- Industry and/or Sector
- Service VAT and merchanting data for the previous year
- Number of samples in the last 5 years an LE has been included as well as its response rate during these years
- Annual data submitted and its size (for companies included in last year's sample)
- Number of indication sources.

It should be emphasised that the above-described identification criteria for probable actors are of an empirical nature, in the sense that cut-off values for service VAT and merchanting data for different industries/sectors vary from year to year depending on the available data.

Step 3. Determine the annual turnover of each legal entity

Annual turnover is an important variable. It is used both for the delimitation of the frame and for stratifying legal entities into different size classes. For most legal entities in the basic frame, the annual turnover from the previous year's VAT register is used. In case the annual turnover in the VAT register is missing then the annual turnover from the business register is used. However, for legal entities in three industries/sectors the just mentioned annual turnover is deemed unreliable. For this reason, their annual turnover is taken from additional sources of turnover (see Table 3).

Table 3. *The sources of turnover of sampled legal entities in three industries/sectors.*

Source of turnover	Industry/Sector
Standardised Accounting Statement (SRU) according to tax returns from the Swedish Tax Agency (collected 2 years before sampling)	VAT-exempt industries with industry codes 79, 85, 86, 87, 88
Turnover from ES/FS (collected 2 years before sampling)	Industry codes 64, 65, 66
Total costs of municipalities (collected 2 years before sampling)	Sector 131311

where industry code 79: Travel agency and tour operator activities and other travel and related services; industry code 85: Education, industry code 86: Health care; industry code 87: Residential care services; industry code 88: Out-patient social

services; industry code 64: Financial services, except insurance and pension funds; industry code 65: Insurance, reinsurance and pension-fund activities, except compulsory social security insurance; industry code 66: Support services to financial services and insurance;

The annual turnover of probable actors is further summarised with their reported values submitted during the previous year, if available. Where such data are not available, the previous year's service VAT data are used. The summation is done to avoid eliminating probable actors when delimiting the frame.

Step 4. *Delimit the frame*

Delimitation criteria vary depending on the sub-population. The sub-populations with specific delimitation criteria are:

- Foreign-owned legal entities,
- Legal entities with trade in goods,
- Legal entities submitting VAT data in groups,
- Legal entities in industry groups with high overcoverage the previous year,
- Improbable operators.

Like the identification criteria for probable actors, the delimitation criteria are composite, i.e., they take into account several characteristics for each LE, namely:

- number of sources,
- last year's service VAT and merchanting data,
- number of sample legal entities have been included in the last 5 years
- response rate in the last 5 years,
- availability and size of the annual data submitted (for companies included in last year's sample)
- operator status.

Furthermore, the (recalculated) annual turnover is used as an additional cut-off variable. Legal entities with annual turnover of less than SEK 1 million are eliminated from the basic frame under the assumption that their foreign trade in services is negligible. However, this assumption does not apply to legal entities in financial and VAT-exempt sectors, whose annual turnover may be less than SEK 1 million. To reduce the number of 'nil' reports, higher cut-off thresholds on annual turnover can be applied for improbable actors and/or for those sub-populations with a high level of over-coverage in the previous year. During the delimitation

process, several manual expert assessments are also carried out among both excluded and retained companies, which may lead to updates of the cut-off criteria. In this way, the delimitation criteria are also of an empirical nature, like the identification criteria for probable operators.

During the delimitation process, preliminary checks for undercoverage are made using last year's service VAT data. Regular checks for undercoverage are also carried out throughout the reference year using up-to-date service VAT data made available during the year.

The final delimited frame usually consists of between $\approx 60,000$ and $\approx 80,000$ legal entities, including the fully surveyed legal entities.

2.3 Procedures for sampling and exclusion

2.3.1 Sampling procedure

The foreign trade in services survey makes a stratified *simple random sample* from the delimited frame. The stratification involves dividing all LE:s in the frame into disjoint sets, or strata, and then drawing samples of varying sizes from the different strata. Stratification is done in three dimensions: industry group, actor status and size.

For the stratification into industry groups, the Swedish Standard of Industrial Classification of All Economic Activities (SNI) codes are used. The industry codes classify companies and establishments according to business activity and is used in the FTS to divide LE:s according to the type of service they produce. From 1 January 2008, the SNI2007 standard is used (see [Statistics Sweden's Business Register - Statistics Sweden \(scb.se\)](https://www.scb.se/en/StatisticsSweden/BusinessRegister)).

The stratification according to actor status is described above in section 2.2 (see Step 2 within the frame construction procedure).

Before 2024, one used the so called the *cum \sqrt{f}* method for dividing into size classes. In general, the method is as follows:

- Order the units by size using the stratification variable.
- Divide the units into a number of classes with the same class width. There is no rule regarding the number of classes. This number depends on the number of units. Four to six times the number of size strata within each category stratum is usually fine.
- Calculate $\sqrt{f_j}$ for each class, where f_j is the number of units in class j .

- Form larger groups by combining neighbouring classes so that the sum of $\sqrt{f_j}$ is approximately equal for all groups.
- Each final group becomes a stratum.

In the survey of foreign trade in services, the stratification variable is annual turnover, specifically the recalculated annual turnover obtained in Step 3 of the frame construction procedure. Since new turnover data were used in each sample, the boundaries of any given size class varied from year to year. As a consequence, the same companies could have different size classes even if their annual turnover in the present year's sample is the same as their annual turnover for last year's sample. This in turn led to relatively low overlaps between two consecutive samples. To introduce more stability in the size class division (and to increase overlaps between samples), it was decided to test the approach of fixed size class boundaries that do not change depending on the year. Note that fixed size class boundaries have always been applied and continue to be applied to fully surveyed companies (companies with annual turnover less than SEK 5 billion are given size class 5, otherwise it becomes size class 6). The flexible size class boundaries obtained using the cum \sqrt{f} method were applied to sampled companies, which, unlike those fully sampled, were sorted into four size classes from 1 (the smallest size class) to 4. From the 2024 sample onwards, fixed size class boundaries are also to be applied to sampled companies.

In order to obtain an appropriate 'timeless' composition of size class boundaries per industry group and Actor status for sampled companies, the corresponding size class boundaries that were applied to the 2020-2023 samples, were summarized by combining median calculations (per industry group and Actor status) and subjective assessments.

It should also be noted that, before the limits of size classes 1-4 are determined, a further step in the sampling process is carried out, namely the determination of additional fully surveyed legal entities among the sampled legal entities. This is done with the aim of harmonizing the framework with regard to annual turnover. The underlying algorithm selects companies whose annual turnover represents a large proportion of the total annual turnover of each industry group. The algorithm also takes into account last year's service VAT and merchanting data, actor status, last year's size class,

the number of LE:s in each industry group, the number of samples each company was in during the previous 5 years and their response rate during the previous 5 years. Expert assessment is also used to assess the reasonableness of including the companies selected by the algorithm.

With the information on industry group, actor status and size class in hand, the stratum is then formed by combining these three dimensions so that each legal entity in the delimited frame appears in only one stratum. The survey usually has around 200 strata.

After stratification, allocation is carried out, the purpose of which is to determine the number of companies to be drawn from each stratum. In the survey of foreign trade in services, allocation is made under the conditions that

- the minimum sample size per stratum is five (5) legal entities,
- the estimates of certain types of services fulfil predetermined precision requirements in terms of the relative standard deviation, defined as the ratio of *standard deviation to point estimate*. In total, 29 service types are associated with predetermined precision requirements (see Appendix 1).

The choice of allocation method is influenced by the fact that the strata cut across service types, rather than coinciding with them, because companies within the same stratum may contribute data to estimates of different types of services. As a consequence, classic Neyman allocation cannot be applied. Instead, a numerical allocation is made (so-called optimal Neyman allocation). For this purpose, the Bethel allocation programme, developed by the Italian National Institute of Statistics (ISTAT), is used.

The Bethel algorithm requires access to the population distribution (in terms of mean and variance) of transaction value. As data for the current reference year have not yet been collected, data submitted from eight previous quarters are used to obtain estimates of the population mean and variance for each combination of Stratum and Service Type. Before the 2023 sample, Export values were merged with Import values. The main reason for this approach was to avoid estimates of the population distribution based on just a few observations. However, one possible disadvantage of such an allocation approach is that it fails to account for differences between the distributions in terms of direction, which may lead to misleading allocations within certain

strata. For the 2023 sample, allocation was done without merging Export and Import values.

Running the Bethel algorithm results in a vector of values indicating the number of companies to draw from each stratum. Manual adjustments to the results are made:

1. to fulfil the requirement that total sample size is approx. 6,100 companies (pre-determined in consultation with the Riksbank),
2. to avoid drastic changes in the sample size per stratum compared to last year's sample. Otherwise, the risk of a low rate of overlap between this year's and last year's sample increases ³.
3. to minimise the reporting burden on small businesses. This is achieved by reducing the sample size in strata with small size classes (primarily in size classes 1 and 2). Reduction is made if, and only if, it does not lead to an unacceptably low number of companies to select in the stratum in question. To compensate for the reduction, the sample size is increased within the stratum associated with larger size classes (primarily size class 4).

After all adjustments, *selection probabilities* (or *inclusion probabilities*) are first calculated, which, within a stratified simple random sample, are defined as follows:

$$\pi_h = \frac{n_h}{N_h}$$

where n_h denotes the number of units to draw from stratum h , and N_h denotes the number of units contained in stratum h ,

and then a stratified simple random sample of companies is drawn from the delimited frame. These companies are contacted by letter and, after each expired quarter of the survey year, report on foreign transactions, using a web-based questionnaire.

If units with significant foreign trade in services are added during the year, they can be manually added to the sample for inclusion in the next quarter's survey. This could be, e.g., start-up companies that were not in the Business Register at the beginning of the reference year, but which trade in services abroad on a large scale.

³ Negative consequences of a low overlap rate are (1) increased costs required to train new entrepreneurs to participate in the survey, (2) increased non-response rates among new companies, and (3) reduced comparability of the statistics between years.

2.3.2 Exclusion from sampling (cut-off)

The delimitation criteria have been described in Step 4 of the frame construction procedure (see section 2.2).

Delimitation entails that some legal entities trading in services abroad will not have a chance to be included in the sample, not being included in the frame. A balance has been struck between the extra reporting burden of including small units and the impact on the statistics. Exclusion is deemed to have very little impact on the statistics, so the benefits in terms of reduced reporting burden are of greater importance.

2.4 Collection procedure

2.4.1 Data collection

Data collection is done through direct collection from the LE:s selected in the sample under consideration and, to some extent, through collection of register data. Direct collection is used as the data cannot be obtained from other sources.

LE:s included in the sample are contacted before the end of the current quarter and are informed about the survey and its procedures. Collection is done via an online form or, in some cases, by file upload. The deadline for units to submit their report is normally around two weeks after the end of the quarter. In special circumstances, a deferral may be granted for units to report later.

Units are obliged to provide information in accordance with *Lagen om Sveriges riksbank* (Swedish Code of Statutes 1988:1385) and *Riksbankens föreskrifter* (RBFS 2002:4).

Prior to the deadline, two separate reminders (in addition to the covering letter) are sent by e-mail to notify non-respondents and remind them of their obligation to provide information. If no response is received by the deadline, the unit is contacted by post. After this, non-respondents are contacted twice more by e-mail.

Throughout the collection period, Statistics Sweden's collection unit is available by email and telephone to answer questions and assist with reporting.

In addition to direct collection from the sampled units, data on travel are also collected from registers.

2.4.2 Measurement

Data collection consists of reporting the value of all exported or imported services for the quarter.

The questionnaire asks whether the unit conducted any foreign trade in services during the quarter and, if so, to what extent. The units report the value of all transactions summarised by service and by direction (export and/or import). Services are listed in the appendix to the Quality Declaration. Furthermore, the units allocate all services according to the country of the counterpart. Data are collected in SEK 1,000.

2.4.3 Non-response follow-up

Non-response is defined as units failing to respond upon the compilation of statistics. The non-response rate for foreign trade in services is usually quite low, around 20 per cent upon first publication. In recent quarters, however, non-response rate tends to increase. Thanks to submissions made after the first publication, non-response gets lower at the time of revision. Non-response is generally lower among the most significant companies, which reduces the impact of non-response on the statistics.

Statistics Sweden works actively to minimise non-response. In addition to sending out reminders to non-respondents, Statistics Sweden is available to answer questions and assist units in responding.

The approximately 200 units with the greatest impact on the statistics are prioritised in the work to reduce non-response.

For more information regarding the imputation methods used to compensate for non-response in the estimation, see section 2.7.2 *Estimation of statistical target characteristics*.

2.5 Processing

Values identified as incorrect are adjusted. In the first instance, the unit in question is contacted and asked to submit new data. If this fails, an individual assessment is made of the unit, and the incorrect value is corrected using knowledge of the unit and similar units, previously submitted values and/or values from other sources.

Item non-response (incomplete reporting) can be dealt with similarly to incorrect values. If country data are not specified for trade in services, either fixed quotas or adaptive allocation formulae are used to allocate services to counterpart countries.

Unit non-response (non-reporting) is compensated for differently depending on the size and type of the unit. Larger fully surveyed units are imputed using their own submitted data from the previous quarter. Fully surveyed public authorities are imputed with their submitted values from the same quarter of the previous year, as they often have a more distinct seasonal pattern in their transactions.

Mean compensation is used for sampled objects. This means that the value of the non-response unit is imputed using the mean value of the service in the relevant stratum.

2.6 Editing

Before publication, the data material is processed and continuously edited to maintain a high level of quality of the statistics.

2.6.1 Editing during direct collection

Each submitted value is automatically checked. Checks are made directly upon collection, and units, if they fail the checks, must make corrections or comments before the report can be submitted. As an example, country-distributed values may not add up to the value of the service, or the unit may have reported no foreign trade in services while its VAT return to the Swedish Tax Agency indicates the opposite.

2.6.2 Editing of microdata and collected statistical values

Automatic checks are made even after the report has been submitted. For example, large increases or decreases in value from previous quarters and new services not previously reported by the unit are flagged. The values failing the automatic checks are reviewed manually by Statistics Sweden. To this end, all units subject to checking are arranged in a prioritised list determined by the probability and potential severity of the error. The list is then reviewed from the highest priority to the least.

2.6.3 Editing of macro data

Values are also examined at the macro level. There is a strong emphasis on studying time series, graphically and numerically. This involves

looking at types of service rather than services. Service types are the various aggregations of services that are subsequently published.

If a service type seems to experience a suspiciously large increase or decrease, micro-values are studied to determine which unit(s) and service(s) are responsible for the increase/decrease. These are then individually evaluated to determine whether the values are plausible and addressed as necessary.

The review places great emphasis on those companies with the greatest impact on the statistics. These are also reviewed to some extent in consultation with other products at Statistics Sweden.

2.6.4 Review of accounts

Figures and text are carefully scrutinised before publication. What is published is proofread by one or more individuals before being posted.

2.7 Estimation procedure

2.7.1 Principles and assumptions

When creating the frame, it is assumed that units outside the frame either have no foreign trade in services or their trade in services is so negligible that it does not affect the statistics significantly.

One of the basic assumptions is that all objects, regardless of stratum or other characteristics, have the same trade pattern in terms of country distribution. This is mainly due to the difficulty in finding patterns in the submitted country distributions, which makes it difficult to make a better estimate of country distribution. This assumption is applied in the cases with those units that did not (for any reason) submit the country of counterpart but the total service value per direction across all countries.

Some trade areas cannot be reliably estimated with collected data and are therefore estimated using models instead. These models are regularly reviewed for replacement by collected data where possible.

2.7.2 Estimation procedure for statistical target characteristics

All statistical target variables are estimated using the Horvitz-Thompson estimator. For estimates by service type and direction across all countries, this is determined by:

$$\hat{t}_j = \sum_{i=1}^n w_i y_{ij} \quad (1)$$

where \hat{t}_j is the estimate of service type j , w_i is the weight, or adjustment factor, of unit i , and y_{ij} is the reported value of unit i for service type t_j , and n is the total sample size across all strata. Weight w_i is given by $w_i = \frac{N_h}{n_h}$ if unit i belongs to stratum h , $h=1, 2, \dots, H$. For the foreign trade in services survey, the weight is interpreted as that each company in stratum h , which is included in the sample, represents itself and $\left(\frac{N_h}{n_h} - 1\right)$ other companies, which are in the same stratum h in the framework but not in the sample.

Regardless of the service type, the value y_i can be either a value reported by the unit or an imputed value. Imputation methods depend on the size of non-response companies.

Unit non-response among smaller companies, in size classes 1-4, is compensated by mean compensation, which entails that imputation is made with the mean of the submitted values per service in the stratum in question (for further discussion of this assumption, see section 2.2.6). In practice, mean compensation is done, not explicitly, but implicitly by recalculating the weights during the estimation in the following way: $w_i = \frac{N_h}{m_h}$, where m_h , assumed to be greater than zero, represents the number of responding units in stratum h .

The disadvantage of mean compensation is that it can lead to overestimation if there are significantly different values within the stratum. To avoid such overestimation, these companies, known as outliers, are moved to a separate stratum where they represent only themselves. In the original strata, the weight is corrected for the number of outliers that have been removed.

For large companies (size classes 5 and 6), historical values are imputed according to a specially developed imputation method, which distinguishes between companies and public authorities. Prior to 2023, large companies were imputed with previous quarterly data (if available), while the non-response among public authorities was compensated for by imputing values for the public authority available in the corresponding quarter of the previous year. This is because many transactions carried out by public authorities have distinct seasonal patterns.

As of 2023, a new imputation method will be implemented, whose main difference from the old method is that imputed values are based on four previous quarters instead of one previous quarter.

The predictive power of the new imputation method has been studied in a Monte Carlo study, which indicated that the new method leads to better predictions of true but late responses, compared to the old imputation method, with the exception of (1) values of *Import* transactions generated by public authorities and (2) values of *Merchanting* transactions in both directions, i.e., import and export, generated by private companies. Historical values for these types of transactions are still imputed using the old imputation method. Values to be imputed for other types of transactions are obtained according to the new imputation method, which consists of the following three steps for each non-response unit $i, i=1, 2 \dots, n$:

1. Determine the *Number of services* to impute as follows
 - Count the number of services (both reported and imputed) by direction and by quarter in the four quarters preceding the current quarter,
 - Randomly select a value for *Number of services* for each direction;
2. Determine the services to be imputed as follows
 - List all services (both reported and imputed) available in four previous quarters. The same service in the same direction can occur at least once and no more than four times;
 - Randomly draw without replacement a service from the list. Services that occur over several quarters are more likely to be selected, compared to those that occur only occasionally. Eliminate from the list the service you have drawn together with all its repetitions. Continue to draw services until the number of services determined in step 1 above has been drawn.
3. Take the median of the available previous values per selected service and direction.

In connection with the publication of the statistics for the second quarter of 2024, a new imputation method has been implemented in addition to the method described above. The new method generates imputed values for large companies in size classes 5 and 6, which either lack historical values or have historical values that have been in the system for a long time. The new method collects data on service turnover from VAT returns (to be denoted *VAT*). Below are the main steps of the new method:

1. Fit the *simple linear regression model* to the data for the m_h responded sample objects within Stratum h that have both submitted data (to be

denoted by $total_ServiceValue$) and VAT for one and the same direction r (Export and Import, respectively):

$$total_ServiceValue_{rhi} = \alpha + \beta * VAT_{rhi} + \epsilon_{rhi}, \quad i = 1, \dots, m_h.$$

2. By using the estimates of the regression parameters predict $total_ServiceValue$ for the objects that lack submitted data within the same Stratum h and direction r , but have VAT :

$$total_ServiceValue_{rhi} = \hat{\alpha} + \hat{\beta} * VAT_{rhi}, \quad i = 1, \dots, (n_h - m_h).$$

3. Distribute the predicted $total_ServiceValue$ using the service distribution observed within Stratum h on direction r .
4. Make manual adjustments to predicted service values and/or service distribution in case the prediction for some particular company does not match subject knowledge of the company in question.

Note that the model above has not been fitted within the following industry groups: Money Transfer Organizations (MTO), travel agencies, the insurance industry, Household Nonprofit Organizations (HIO). This is due to essential discrepancies between submitted service values and service VAT within these industry groups, which in turn may be caused by the differences in definitions of the survey variables and service VAT within these industry groups. The method has been implemented for both the first and second quarters of 2024.

For estimates of values distributed by country, the same estimator from Eq. (1) is used, but the index j represents a combination of service type and country. Also note that the weights for country-distributed data may differ from the weights for undistributed data. This is because those companies with neither imputed nor submitted country-distributed data are considered non-response companies, even if they have undistributed data. Compensation for the loss of country-distributed data is thus done in the same way as in the case of undistributed data. However, there is one exception, namely that the outlier status applies only to undistributed data, which also contributes to the difference between the weights for undistributed and country-distributed data.

Using the weights for country-distributed data, country-distributed estimates are obtained according to the following estimation procedure:

1. Calculate empirical country shares by type of service at the lowest level of aggregation.
2. Apply the empirical country shares to the corresponding undistributed estimates, yielding the calculated country-distributed estimates of service types at the lowest level of aggregation.
3. Sum the calculated country-distributed estimates into estimates of service types at the higher levels of aggregation.

Whatever the type of data, the estimation procedure is the same for preliminary and final statistics. Upon publication of quarters 1-3, the statistics for the previous quarter are revised. When quarter 4 is published, the seven previous quarters are revised and the statistics for the four quarters of the previous year are considered final. In addition, extraordinary revisions are sometimes carried out as needed.

When the statistics for a given quarter are revised, the Quality Declaration publishes the size of the revision in SEK millions and an associated 95 per cent confidence interval.

Upon publication of the fourth quarter, the quarterly estimates are summarised and published as annual statistics.

2.7.3 Accuracy assessment procedure

The point estimates are supplemented by uncertainty measures, which are also published. The uncertainty measure used is an estimate of the relative standard deviation:

$$RSA = \frac{\hat{\sigma}_j}{\hat{t}_j} \quad (2)$$

where $\hat{\sigma}_j$ is the estimated standard deviation of \hat{t}_j , whose definition is given in Eq (1). The estimated coefficients of variation for the estimates presented in Statistics Sweden's statistical database (SSD) can be found in the survey's Quality Declaration <https://www.scb.se/en/finding-statistics/statistics-by-subject-area/trade-in-goods-and-services/foreign-trade/foreign-trade-in-services/>. Note that the relative standard deviation is calculated only for undistributed estimates.

To obtain point estimates and their relative standard deviation, the ETOS programme, developed by Statistics Sweden, is used.

2.7.4 Disclosure protections

The statistics published are at such an aggregated level that there is no risk of disclosure of individual data. The omission of more detailed statistics is always subject to an individual assessment, and no data are released from which it would be possible to distinguish the reporting of individual units.

3 Implementation

3.1 Quantitative information

The delimited frame for the year 2024 contained 83,169 units, which is the largest frame size since 2012. A possible explanation for this increase is increased service VAT information for the year 2023, which is an important indication of a possible trade in services in the coming year 2024.

Within the frame, 823 were fully surveyed companies. The number of strata was 216, while the number of industry groups was 33. Probable actors accounted for 36% of the frame. The share of individual companies was 2,22%.

The 2024 sample consisted of 6,100 objects, including 823 fully surveyed companies that were included in the sample with probability 1. Probable actors accounted for 80,7% of the sample. Individual companies made up a very small proportion of the sample: 0.44%.

Table 4 gives the distribution across size classes in the delimited frame 2024 and the 2024 sample, respectively.

Table 4. *The distribution across size classes in the 2024 frame versus the 2024 sample.*

Size class	Frame	Sample
1	69,6%	20,4%
2	21,1%	32,2%
3	6,5%	22,6%
4	1,8%	11,3%
5	0,8%	10,3%
6	0,2%	3,2%

The overlap with the 2023 sample was 63%, which is an increase of 8% compared to the overlap between the 2023 sample and the 2022 sample. Of these overlapping companies, 13% have a new size class,

8% have a new actor status, and 2% have changed industry group compared to the 2023 sample.

3.2 Deviations from the survey design

There is a break in the time series between 2012 and 2013, as the latter years were revised in connection with the publication of Q4 2023.

Appendix

Appendix 1. Service type with corresponding precision requirements.

Type of service	Max. relative standard deviation (%)
1. Air transport	5.00
2. Rail transport	7.50
3. Maritime transport	5.00

4. Road transport	5.00
5. Other transport	5.00
6. Travel currency	5.00
7. Postal and courier services	7.50
8. Telecommunication services	5.00
9. Construction services	5.00
10. Insurance services (compensation)	7.50
11. Insurance services (premiums)	7.50
12. Financial services	5.00
13. Computer and information services	5.00
14. Audiovisual and artistic services (as of 2020)	7.50
15. Licences/royalties	5.00
16. Management and PR	5.00
17. Manufacturing and repair (as of 2020)	7.50
18. Research and development services	5.00
19. Legal services	7.50
20. Accounting, book-keeping and auditing services	7.50
21. Agricultural, mining and waste treatment/de-pollution services	7.50
22. Other business services	5.00
23. Marketing services	5.00
24. Merchanting services	5.00
25. Operating leasing	5.00
26. Technical services	5.00
27. Commissions on goods	5.00
28. Personal services	7.50
29. Acquisition/disposal of intangible assets	7.50