ASSESSING THE QUALITY OF THE BALANCE OF PAYMENTS

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Using statistical data often raises the question of the quality of the analysed data and whether they are credible enough to draw economic or daily policy conclusions from them. Accounting precision is generally not the primary goal of statistics compilation. The quality of statistics as public goods is determined by inevitable compromises between the quality of initial data and the capacities of their providers, the general statistics load, the collection of data, the statistics compilation methods, the accuracy of the data and their publication dates.

Assessing the quality of the balance of payments and other macroeconomic statistics became internationally topical only in 2000. It then became necessary to assess the credibility of the data of countries that had joined the International Monetary Fund's (IMF) Special Data Dissemination Standard (SDDS) also from the perspective of data users[1]. The institutions of the European Union, especially Eurostat and the European Central Bank, are also paying increasing attention to the quality of statistics. These institutions harmonise and publish, at the EU or monetary union level, the indicators that have been calculated with very diverse methods by different countries. At the beginning of 2007, the European Commission conducted a pilot project concerning the quality assessment of the balance of payments statistics that encompassed the EU Member States[2]. From 2008, this project will be implemented every year. The Commission will compile a consolidated report based on the quality reports of the Member States and submit it to the European Parliament.

QUALITY DIMENSIONS OF STATISTICS

The IMF has elaborated a framework for the assessment of the quality of statistical data. This framework requires a strong legal basis, plenty resources and the recognition of the value of quality in an organisation to ensure sufficient quality for statistics.[3] The framework itself comprises the following principles.

The principle of **methodological soundness** – statistics must fully comply with the methodological framework (IMF Balance of Payments Manual 5th Edition) and will be compiled pursuant to internationally accepted standards, guidelines and best practices.

The principle of **accuracy and reliability** – statistical statements must portray the economic reality accurately enough. This requires the right choice of methods and consistency among

[1] In 1995, IMF started to implement the Special Data Dissemination Standard (SDDS) in order to improve the availability of operative and comparable data concerning the countries active in international money and financial markets. This was primarily motivated by the crisis of Mexico in 1994–1995, which referred to an ineffective monitoring of macroeconomic data and the low quality of necessary statistics. Estonia joined the SDDS in 1998.

[2] The project is based on Regulation (EC) No 184/2005 of the European Parliament and of the Council as of January 12, 2005 on the balance of payments statistics.

[3] http://www.imf.org/external/np/rosc/index.htm

source data, consolidated data and statements. In the process of assessment monitor the data sources, the statistical system and their relevance and correspondence to needs are monitored. In addition, the scope and frequency of data adjustments is analysed.

Integrity – the objectivity and security of the balance of payments statistics is ensured by the statistical and institutional environment where it is compiled. This requires professional statisticians, adherence to ethical standards and transparency of operations, but it also means that other institutions may not access the data before publication by compilers.

Serviceability of data – the published balance of payments statistics include all fields or details (items) relevant for the economy under analysis. Statistical data are published with sufficient periodicity and timeliness and are adjusted pursuant to valid revision policies. From the perspective of serviceability, it is also essential that the balance of payments statistics remains consistent with the datasets of other related areas. In view of that, the serviceability criteria are divided into three: relevance, timeliness and consistency.

Accessibility – the published data and their metadata must be easily accessible at all times. The metadata must be up-to-date and the compiler's contact information available so that users could receive additional information, if necessary.

The above-described qualitative quality framework is complete but unfortunately assessments given to statistics based on that framework depend on several subjective factors. Thus, cross-country results cannot always be measured similarly. The temporal comparison of assessments is also complicated.

The following section introduces a few simpler quantitative indicators used by Eurostat, which help to regularly analyse the quality of countries' balance of payments. These indicators provide additional information for analysing external sector data and for forecasting.

TECHNIQUES FOR THE QUANTITATIVE ASSESSMENT OF QUALITY

Accuracy and reliability

Accuracy primarily means how well the statistics portray the reality. By international standards, the sufficient accuracy level of statistical data is 85–90%, which in the context of the balance of payments statistics requires the inclusion of at least 85–90% of the balance of payments transactions in a given period. As a rule, there is no overview of all economic entities performing external transactions, which is why it is difficult to determine the level of accuracy of balance of payments statistics. However, this logic is valid for the assessment of the level of reliability of the data.

Statistical **reliability** is often assessed based on the results of data adjustments. The initially published results are adjusted so as to reflect reality as precisely as possible. In other words, knowing the potential (average) amount of adjustments in the long term and manipulating with initial data, it is possible to draw conclusions about the probable adjustments to the indicator during following periods. Being aware of the items that have been adjusted more extensively (and the range of these adjustments) allows to assess the reliability of the initial or already adjusted indicator and its future changes.

The easiest way to assess the adjustments is using the mean absolute percentage error (MAPE), which is often used to assess the quality of econometric forecast models.
When MAPE has been adjusted to the analysis of the initial and final adjustment results, it may be presented as a formula:

$$MAPE = \frac{1}{N}\sum_{t=1}^{N}\left|\frac{X_t(l_j) - X_t(l_i)}{X_t(l_i)}\right| * 100, \text{ where}$$

N – number of periods in the time series;
$X_t(l_j)$ – most recent value;
$X_t(l_i)$ – initial value.

This formula may be used for all the (debit and credit) items with absolute values in the current account and investment position (external debt statement). The formula shows how much the initial indicator has changed on average.

BACKGROUND INFORMATION BALANCE OF PAYMENTS REVISION POLICY

Upon collection of additional information and changes in methodology, the data of previous periods is adjusted as follows:

Regular adjustment – the data released according to the publication calendar is preliminary and revised upon the release of preliminary statistics of the next periods.

- The revised monthly data is published along with the publication of quarterly statistical data.
- As a rule, adjusted annual data (incl. quarters) is published upon the release of the statistics of the first quarter of the following year and is considered final.

Extraordinary adjustment – in exceptional cases, when significant errors have occurred or changes in the methodology render results incomparably, data can be adjusted retrospectively for more than a year, of which the public will be notified by a respective reference.

When it comes to assessing reliability, it is important to follow the data revision policy (see background information) and the recommended level of reliability. As mentioned above, according to various sources and experts this level in economic statistics is usually 85–90%. Thus, greater attention must be paid to cases where adjustments exceed 10–15%.

Figure 1 demonstrates that since 1995 items of income and current transfers have experienced relatively more adjustments, but the critical level has seldom been substantially exceeded. In such cases, but also in the services debit account for 1999–2002, data have been revised primarily because preliminary indicators have been revised later on. The data quality of the services account largely depends on the availability of travellers' border-crossing survey data necessary for the compilation of the travel services account. The income account is influenced by the retrospective revision of reinvested earnings, which in turn are influenced by the auditing of companies' annual reports and their later revisions. The accuracy of transfers depends on how well the initial assessments of foreign aid received and distributed comply with the later actual data. However, considering the adjustment of the consolidated current account turnover that encompassed all the mentioned items, there is no reason to worry. In 1995–1998 the level of adjustment of the current account turnover reached an average of 8%, whereas in 1999–2002 and 2003–2006 the extent of adjustments remained below 3%.

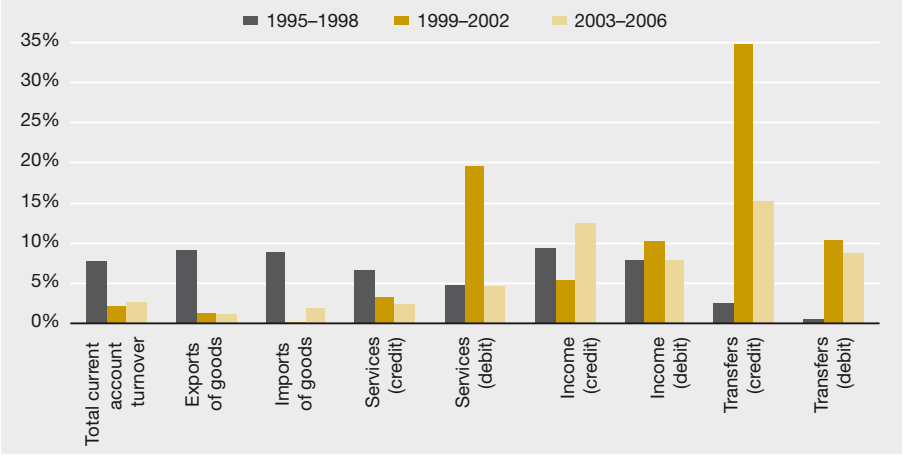

Figure 1. Scope of adjustments in current account items in 1995–2006 (% of initial value)

MAPE is not suitable for the assessment of net items, comprising the majority of financial account items (also the current account's "total" items), because the values may have opposite signs. If one prefers to use a percentage indicator similar to MAPE that would nevertheless take the drawbacks of a mean absolute percentage error into account, dispersion and standard deviation should be applied.

One way is to compare the average deviation of adjustments with an average standard deviation. The acquired root mean square relative error (RMSRE) is calculated according to this formula:

$$RMSRE = \sqrt{\frac{\sum_{t=1}^{N}\left[X_t(l_j) - X_t(l_i)\right]^2}{\sum_{t=1}^{N}\left[\Theta - X_t(l_j)\right]^2}} * 100, \text{ where}$$

Θ – reference value of X.

When using a similar indicator in assessing the accuracy of forecasts, the long-term average of the indicator under estimation is usually chosen as the reference value Θ. In the context of assessing adjustments to the balance of payments statistics, the deviation between the reference value Θ and the later value of the item $X_t(l_j)$ should be similar to the comparison basis stated in the denominator of the MAPE indicator. Analyses have proven that for financial account items the distance of an indicator's later value from the item's mean value in the monitored period is most suitable for this (Θ is the arithmetic mean).

The RMSRE calculated as described above shows the average difference between preliminary published financial account data and revised indicators in ratio to the mean value of a given time series. Although in the case of net items it is not possible to take into account the critical limit of reliability, the indicator nevertheless reflects changes in the quality of preliminary data. In the case of a small country, such as Estonia, there is always the risk that the omission of a single large-scale transaction from statistics may change the later picture significantly.

The credibility of the financial account of the Estonian balance of payments has gradually improved (see Figure 2). Adjustments in 1995–1998, 1999–2002 and 2003–2006 reached 33%, 23% and 20%, respectively. Adjustments were mostly made to direct and other investment items. The most accurate item has been the central bank's gold and foreign exchange reserves. Later adjustments to direct investment items are mostly affected by the above-mentioned indeterminacy of reinvested earnings and the later revision of transactions data (financial schemes). The most volatile components of other investment are trade credit assets and liabilities.

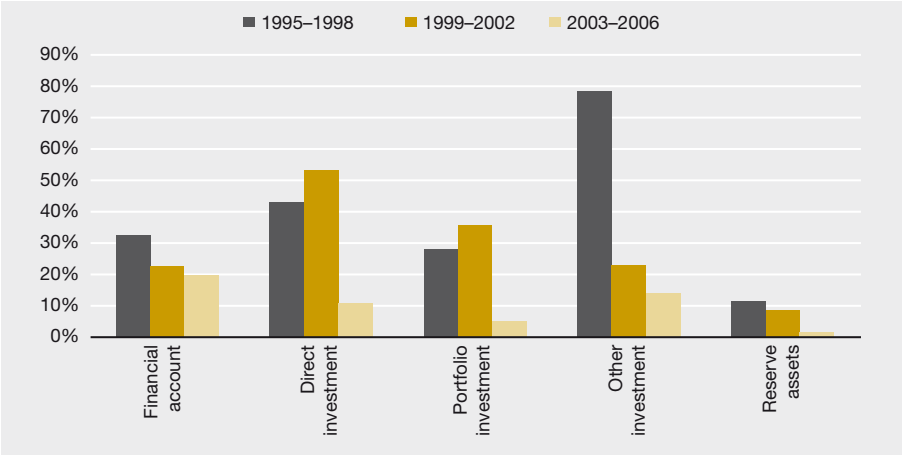

Figure 2. Scope of adjustments in financial account items in 1995–2006 (% of the average value of time series)

Besides the scope of adjustments, the reliability of data can also be assessed by the **reliability of trends** of the preliminary indicator (*Q*). This can be measured by instances per period when changes in an adjusted indicator and a preliminary indicator move in the same direction as the indicator of the previous period:

$$Q = \frac{n_{11} + n_{22}}{N} * 100 \text{ , where}$$

n_{11} – number of periods when the trend of the initial and the adjusted value in relation to the previous period's value is positive;
n_{12} – number of periods when the trend of the initial and the adjusted value in relation to the previous period's value is negative;
N – timeframe, i.e. the number of periods monitored.

The closer the indicator is to 100%, the more trend-reliable the respective balance of payments indicator is. The quality of data may be questioned when after adjustments the trend is reversed in more than a half of the cases, which clearly refers to the possibility of drawing erroneous conclusions based on the data. Nevertheless, data serve an informative purpose only for current account items, as there is generally no trend in the financial account net changes.

Table 1 shows that the reliability of trends of the current account items in the Estonian balance of payments has been good enough. As for the quarterly data of 2003–2006, the same trend has continued at least in case of 80% after the adjustments. Years ago (in 1995–1998) the quality of data was slightly weaker according to this criterion.

Table 1. Reliability of trends of current account items in 1995–2006 (%)

	1995–1998	1999–2002	2003–2006
Current account	100.0	100.0	93.3
Goods	93.3	80.0	93.3
Exports	46.7	100.0	93.3
Imports	73.3	100.0	86.7
Services	93.3	100.0	100.0
Credit	93.3	93.3	100.0
Debit	93.3	80.0	100.0
Income	93.3	93.3	86.7
Credit	86.7	100.0	86.7
Debit	100.0	66.7	86.7
Current transfers	73.3	93.3	80.0
Credit	93.3	60.0	80.0
Debit	100.0	86.7	86.7

Serviceability of data

The criteria of serviceability may be quantitatively assessed based on the timeliness and consistency of the data.

Timeliness is the adherence of the statistics compiler to publication calendars. This can be measured in the hours and days the data was delayed. Estonia has published its balance of payments data according to the publication calendar and without failures throughout the entire history of using the SDDS.

Consistency is best described by the item "errors and omissions". This shows the net volume of transactions not recorded in the balance of payments during the period under analysis. Given the relations between the balance of payments and the investment position, this indicator also characterises the investment position.

Based on errors and omissions, the balance of payments statistics is considered to be consistent if the value of an item is not large in the long run and the respective time series do not reveal extensive fluctuations.[4] According to international practices, the significance of errors is assessed by comparing the respective item with a half of the total current account turnover.

$$\varepsilon = \frac{EO}{\frac{1}{2}\left(|DB_{CA}| + CR_{CA}\right)} * 100 \text{ , where}$$

[4] The ideal value of errors and omissions is zero.

ε – proportion of error;
EO – errors and omissions;
DB_{CA} – current account debit turnover;
CR_{CA} – current account credit turnover.

Errors and omissions may be analysed using the abovementioned method across different period lengths.

The faster the item's total sum decreases by extending the period, the more consistent the balance of payments is, because the opposite values of items equal each other out. Frequently similar values, however, point to a systematic error in initial data or the compilation system. Table 2 gives an overview of the interpretation of the natural values of errors and omissions.

Table 2. Interpretation of the item "errors and omissions" in the balance of payments

Sign	Debit items	Credit items
"+"	Overestimated	Underestimated
"-"	Underestimated	Overestimated

The values of errors and omissions in Estonia's balance of payments have remained relatively stable at all times and have not exceeded the critical 10% limit. In light of the constantly growing current account turnover, the error's quarterly indicator ε has not exceeded 5% in the past few years. Across years, this indicator has remained within 0.1–1.0%, which may be considered an excellent result also in international comparison (see Figure 3 and Table 3). Furthermore, the size of errors compared to the balance of the current account (capital and financial

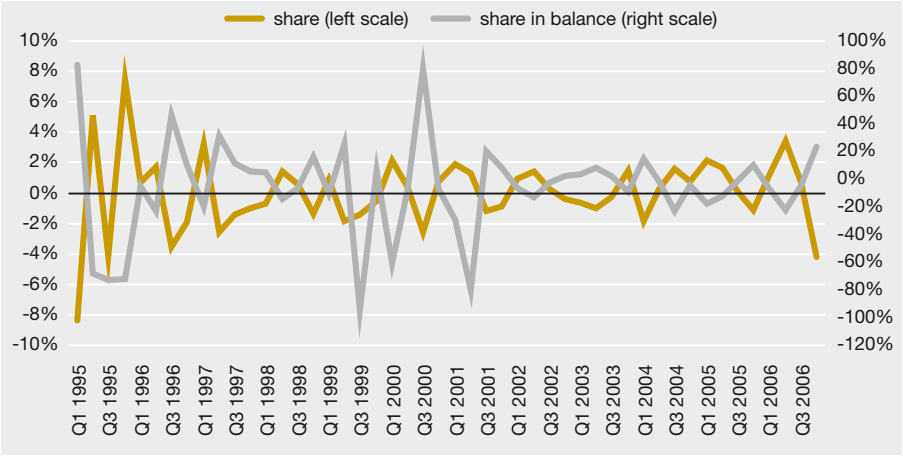

Figure 3. Changes in the share of the item "errors and omissions" in 1995–2006

Table 3. Share of the item "errors and omissions" in different countries in 2006 (%)

Country	Share	Country	Share	Country	Share
Italy	0.1	Romania	0.8	Germany	2.0
Belgium	0.1	Slovenia	0.8	United Kingdom	2.2
Netherlands	0.2	Latvia	0.9	Denmark	2.4
Estonia	0.2	Cyprus	1.1	Sweden	3.5
Finland	0.3	Austria	1.2	Japan	3.8
Poland	0.4	Lithuania	1.3	Hungary	4.3
Luxembourg	0.4	Slovakia	1.5	United States	5.7
Czech Republic	0.5	Bulgaria	1.6	France	6.3
Ireland	0.7	Turkey	1.7	Croatia	11.8
Spain	0.8	Portugal	1.8	Iceland	20.7

Source: Eurostat

accounts) does not give reason to presume that in the event of a potential accumulation of errors among current account (capital and financial account) transactions the direction of the external balance (surplus or deficit) would change. At the backdrop of the increased current account deficit the volume of errors has remained below 25% of the deficit since 2002.

By observing changes in unrecorded transactions through time, no long-term accumulation of errors on the debit or credit side can be noted. On the other hand, two periods can be clearly distinguished: in 1997–1998 the errors systematically accumulated to the minus side, whereas in 2004–2006 they accumulated to the plus side. However, the latter trend changed by the end of 2006 (see Figure 4). As the four-quarter moving value of "errors and omissions" has

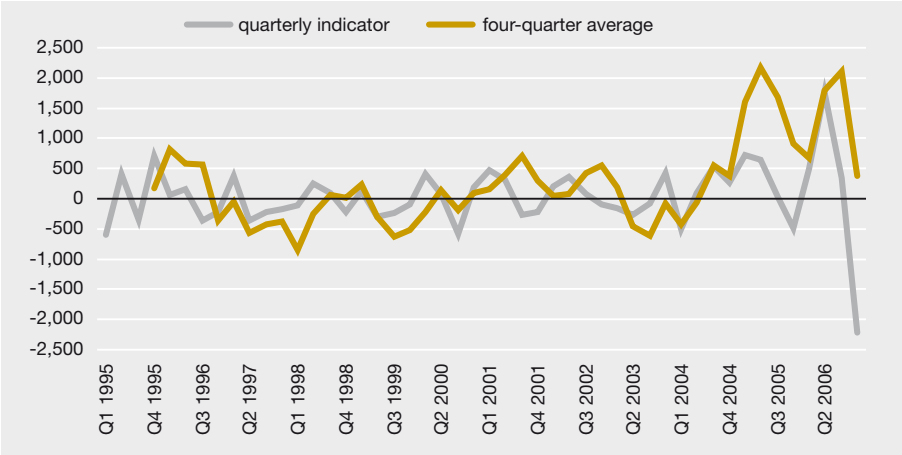

Figure 4. Changes in the item "errors and omissions" in 1995–2006 (EEK m)

generally remained in the same range with the quarterly indicator, no significant systematic deviations have been identified.

Based on the above, we can claim that the share of net items not reflected in the balance of payments statistics is statistically insignificant and according to this quality criterion the time series remain within the required level of reliability (85–90%).

CONCLUSION

Regular monitoring of the described quantitative quality indicator allows to observe changes in the more important quality criteria and detect less reliable components of statistical statements. A short analysis based on the time series of Estonia's balance of payments statistics showed that the quality of these data is sufficient and has improved with years. The article discussed quality indicators separately, but in practice it is should be borne in mind that these indicators are related to each other. Thus, it is necessary to strive for compliance between the desired values, as the improvement of one indicator often entails the deterioration of another indicator, and vice versa.