

Unclassified

STD/CSTAT/WPNA(2008)3

Organisation de Coopération et de Développement Économiques
Organisation for Economic Co-operation and Development

01-Oct-2008

English - Or. English

**STATISTICS DIRECTORATE
COMMITTEE ON STATISTICS**

Working Party on National Accounts

TREATMENT OF STATISTICAL DISCREPANCIES

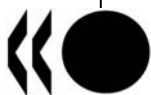
**To be held on 14-16 October 2008
Tour Europe, Paris la Défense
Beginning at 9:00 a.m. on the first day**

This document has been prepared by Hans Wouters, Statistics Netherlands and will be presented under item 6 of the draft agenda

For further information please contact:
Hans Wouters
E-mail: HWTS@CBS.nl

JT03251630

Document complet disponible sur OLIS dans son format d'origine
Complete document available on OLIS in its original format



**STD/CSTAT/WPNA(2008)3
Unclassified**

English - Or. English

ERROR! REFERENCE SOURCE NOT FOUND.

THE DUTCH PRACTICE

Error! Reference source not found.

1 Introduction

1. An important indicator for the quality of sector accounts is the difference between the balancing item 'net lending/net borrowing' resulting from the capital accounts and the same balancing item resulting from the financial accounts. In theory, the outcomes of the two balancing items should coincide for each (sub)sector in the system of sector accounts. In practice, it turns out to be very difficult to attain this ideal situation and thus, statistical discrepancies arise.

2. The general question to be discussed in this paper is how to deal with statistical discrepancies. The discussion will be introduced by providing some background information about this subject in paragraph 2. The general question how to deal with statistical discrepancies can be decomposed into at least two parts. The first aspect concerns the question how initial statistical discrepancies can be explained and reduced. This subject will be dealt with in paragraph 3. The second aspect is the decision to show or to hide the resulting statistical discrepancies after all actions to limit them have been carried out. The pros and cons of showing or hiding statistical discrepancies will be discussed in paragraph 4. The point of view expressed in both paragraph 3 and paragraph 4 largely reflect the Dutch practice of treating statistical discrepancies. Finally, in paragraph 5 the most important conclusions of this paper are summarized.

2 Background information and history of Dutch sector accounts

3. As mentioned in the introduction statistical discrepancies can be defined as the difference between the net lending/borrowing item from the capital accounts and the net lending/borrowing item from the financial accounts. It follows that statistical discrepancies can only be calculated when a full set of both non-financial and financial accounts is available. Because in many countries financial accounts form a relatively young part of the system of national accounts, the possibility to calculate statistical discrepancies is relatively young too. Since financial accounts are compiled and statistical discrepancies can be calculated, an extra tool has become available to judge and to improve the quality of the sector accounts.

4. In The Netherlands (annual) financial accounts were added to the system of sector accounts in 1986, but in first instance on an experimental basis. Only in 1996 financial accounts became a full and integrated part of the Dutch system of annual sector accounts. From the first publication of the full set of sector accounts in 1986 up to 1999 statistical discrepancies were shown explicitly for all institutional sectors. Because since 1999 sources for the financial corporations sector and the government sector were considered to be more or less complete and reliable, the occurrence of statistical discrepancies could be prevented for these sectors.

5. The Dutch quarterly sector accounts only have a short history. Compilation of both non-financial and financial quarterly sector accounts started in 2005. Results of the quarterly sector accounts have been

published in April 2008 for the first time and on an experimental basis. As was the case in the first 13 years for the annual accounts, for the time being it was decided to show statistical discrepancies for all institutional sectors. Because quarterly sources for general government are considered as fairly reliable and stable, from 2008Q1 onwards statistical discrepancies for this sector could be prevented.

Reasons for the decisions taken with respect to the treatment of statistical discrepancies will be presented in the next two paragraphs.

3 Methods to reduce discrepancies

6. In the compilation process of the annual and quarterly sector accounts a number of activities are carried out in order to reach a fairly high quality dataset. Some of these activities are specifically concentrated on the explanation and/or reduction of statistical discrepancies. Below an overview is presented of the methods to realize such a reduction. In order to better understand these methods first a quick and rough overview of the Dutch compilation process is given.

7. Broadly speaking the Dutch compilation process of sector accounts, both quarterly and annually, can be split up into three stages. In the first stage sources for all (sub)sectors are processed and transformed into ESA-variables. This is done for both non-financial and financial accounts, more or less simultaneously. In the second stage horizontal balancing takes place: for each transaction resources and uses, respectively (changes in) assets and (changes in) liabilities, are balanced. In the third stage the resulting outcomes for variables and statistical discrepancies are evaluated and, if necessary, adjusted.

8. In The Netherlands the following practices are used in order to limit statistical discrepancies:

1 Simultaneous compilation of non-financial and financial accounts

9. In The Netherlands non-financial accounts and financial accounts are not only composed within one institution, but are also compiled simultaneously. The parallel compilation provides the best possible conditions to analyze non-financial and financial transactions in mutual coherence and thus also provides optimal conditions to prevent the occurrence of (large) statistical discrepancies.

2 Analyze discrepancies in early stage of compilation process

10. Because for each (sub)sector sources for non-financial accounts and financial accounts are processed simultaneously, it is possible to get an impression of an initial statistical discrepancy in an early stage of the production process. In case of substantial statistical discrepancies, already in this early stage analysis is carried out in order to find explanations for them. In this way statistical discrepancies in the sources can partly be solved. Of course discrepancies may grow (or fall) again in the stage of the horizontal balancing, but experience learns that statistical discrepancies in the final compilation stage in general are much smaller if initial discrepancies are limited. Furthermore, an adjustment carried out on a specific transaction is often counter booked on another transaction in order to keep a small discrepancy still limited after horizontal balancing.

3 Use uncertainty margins of transactions

11. In the third compilation stage of the sector accounts results are assessed and explicit attention is paid to statistical discrepancies and ways to minimize them. This process is carried out by judging the reliability of all transactions for all sectors and defining margins that can be used for adjustments. In practice nearly all discrepancy reducing adjustments are carried out on financial transactions. This is because financial transactions are much more volatile and in general less reliable than most current and

capital transactions. As a consequence the adjustment margins of financial transactions are much larger than those of most non-financial transactions.

12. An important principle in the process of analyzing and reducing statistical discrepancies is that the available margins to reduce discrepancies are never exceeded. The adjustment margins of course vary per transaction, depending on the assumed reliability of each transaction, but also may vary per quarter or year. However, three possibilities to reduce statistical discrepancies by using uncertainty margins are used frequently.

- For non-financial corporations and rest of the world, direct foreign investments (F5 shares and other equity, F4 loans) often offer relatively big margins that can be used to reduce statistical discrepancies. This is predominantly related to the rather vague borderline between resident and non-resident units.
- The holdings of currency and deposits (F2) for the sum of the households and non-financial corporations sector is rather reliable. However, the distribution of these holdings between the two sectors is less certain. So if statistical discrepancies of households and non-financial corporations have an opposite sign the margins of this transaction sometimes may be used to reduce them.
- The composition of other accounts receivable/payable (F7) for financial corporations, especially for MFI's and insurance corporations and pension funds, is rather unclear. Moreover, sources only provide balance sheet information, so the distribution between transactions and other changes is unknown. The F7-estimates for households is predominantly determined as residual by using the transaction identity. For these reasons the margins of this F7-transaction for these (sub)sectors may be used to reduce statistical discrepancies.

13. What possibility or combination of possibilities is used of course depends on the magnitude and sign of the statistical discrepancies and on the sector in which they occur. As mentioned before, in each compilation process other possibilities to reduce statistical discrepancies are studied and used as well.

4 Appointing statistical discrepancies by using covariance and correlation calculations

14. At Statistics Netherlands an experimental method has been developed to identify transactions which are possibly the cause of statistical discrepancies. This method uses a time series of QSA to calculate the correlation coefficient and the covariance between each transaction and the statistical discrepancy. The method is currently used when evaluating the statistical discrepancies that result after benchmarking quarterly sector accounts to new annual data. This tool calculates the covariance between each transaction and the statistical discrepancy and selects the five transactions with the highest covariance. The covariance measures how much the transaction concerned and the statistical discrepancy vary together. A positive covariance means that when the transaction concerned is above its expected value, the statistical discrepancy also tends to be above its expected value. When a high value of a transaction in a certain quarter corresponds with a high statistical discrepancy, a high covariance will result. This could be a reason to investigate the value of the transaction concerned. The tool also calculates the correlation coefficient concerning each transaction. The correlation coefficient is a measure of the tendency of the statistical discrepancy and the transaction concerned to increase or decrease together. High covariances and correlations may imply that the transaction concerned causes the statistical discrepancy shown. This tool could therefore be used as a starting point for an analysis of statistical discrepancies. However, correlation is not causation. The tool filters the transactions which show certain developments in combination with the developments of the statistical discrepancies. The transactions need to be analysed to establish whether or not the transaction is causing the statistical discrepancies. Nevertheless, this method is very promising and will improve when the QSA time series get longer.

4 Reasons to show or eliminate statistical discrepancies

15. In the previous paragraph some possibilities have been presented that are currently used in the compilation process of the Dutch sector accounts in order to improve the quality of the outcomes and to explain and/or reduce statistical discrepancies. However, even after carrying out the discrepancy reducing actions it may turn out that not all statistical discrepancies could be eliminated. Then the question could be raised if the remaining statistical discrepancies should be hidden or should be shown explicitly. Below some arguments are mentioned, first in favour of eliminating statistical discrepancies and then for explicitly showing them.

16. Arguments to eliminate statistical discrepancies could be:

1 In theory statistical discrepancies do not exist

17. From a conceptual point of view statistical discrepancies can not occur. If the principle of double bookkeeping is applied correctly, the budget identity is fulfilled and total resources plus financial transaction in liabilities will equal total uses plus financial transactions in assets.

2 Hiding discrepancies prevents confusion with users

18. Showing statistical discrepancies implies that two different outcomes for net lending/borrowing are calculated and presented: one as the final balancing item of the capital account and one as the balancing item of the financial accounts. Because two net lending/borrowing outcomes are impossible from a theoretical point of view (see the first point mentioned above), it is difficult to explain to users that in practice this variable may show two different outcomes.

3 Vertical balancing improves quality

19. Generally speaking, the balancing process (both horizontal and vertical) will improve the quality of the output. It can be argued that the elimination of statistical discrepancies, that can also be considered as a 'balancing action', will improve the output quality as well.

4 Eliminating discrepancies prevents loss of face

20. By publishing statistical discrepancies it is explicitly admitted that not all consistency requirements have been met. Possibly this can harm the reputation of the compilers. Eliminating the discrepancies would prevent such a possible loss of face.

Arguments to show the statistical discrepancies in the accounts could be:

5 Showing discrepancies better reflects 'status of sources' and encourages to improve these sources

21. Of course a clear relationship exists between the existence and magnitude of statistical discrepancies of a (sub)sector and the availability, completeness and quality of sources for that (sub)sector. For example, in The Netherlands the annual sources for the sector general government are fairly complete and of high quality. For that reason discrepancies in the sources are limited and can be eliminated in the balancing process easily, without harming transactions seriously. On the other hand, for example quarterly sources for non-financial corporations are incomplete and of lower quality. (Much) larger discrepancies in the source statistics and subsequently in the integrated sector accounts are the logic consequence. Explicitly showing these discrepancies reflects the poorer quality of the sources and probably form an incentive for improving the quality of these sources.

6 Transactions are not 'polluted' by allocation of statistical discrepancies

22. Elimination of statistical discrepancies implies an allocation of this discrepancy to one transaction or another. As a consequence these transactions are 'polluted' for the value of the statistical discrepancies that is attributed to them, at least in so far the uncertainty margins are exceeded. The transaction 'other accounts payable and receivable' is a well known candidate for such an allocation of statistical discrepancies. If the statistical discrepancy for a particular sector is rather large, the allocation of this discrepancy to 'other accounts payable and receivable' would change the outcome of this transaction in some cases so heavily that the resulting outcome does hardly show any relationship with the initial values in the source material. Showing statistical discrepancies explicitly will prevent this kind of pollution.

7 Showing discrepancies promotes transparency

23. Publication of statistical discrepancies means that statistical problems are not covered up. Instead they remain visible, which promotes transparency.

24. In the process of compiling sector accounts Statistics Netherlands follows the practice that has been described in paragraph 3. This means that initial statistical discrepancies are reduced as much as possible. However, in practice it turns out that at the end of this process for some sectors relatively large statistical discrepancies still remain. On the basis of the pros and cons mentioned above Statistics Netherlands decided to explicitly show the statistical discrepancies for those sectors. As a consequence in the annual sector accounts statistical discrepancies are published for the sector non-financial corporations, the sector households and non-profit institutions serving households and for the rest of the world account. Until recently, in quarterly sector accounts all sectors could show an explicit statistical discrepancy. Because quarterly sources for general government are considered now as fairly reliable and stable, from 2008Q1 onwards no statistical discrepancies are published for this sector. Annex 1 shows the published statistical discrepancies for annual and quarterly sector accounts, both in absolute amounts and as a percentage of gross domestic product.

5 Conclusions

25. Since 1986 Statistics Netherlands compiles and publishes a full set of annual sector accounts, including the financial accounts. Since then a policy has been developed with respect to the treatment of statistical discrepancies.

26. In the compilation process efforts are made to limit statistical discrepancies as much as possible. Firstly, the compilation processes of non-financial and financial accounts are carried out simultaneously and in mutual coherence, which helps to prevent the occurrence of (large) statistical discrepancies. Secondly, already in a very early stage of the source processing statistical discrepancies are considered and, when possible, solved or reduced. Thirdly, in the final stage of the balancing process explicit attention is paid to statistical discrepancies. For the different sectors and transactions the margins are determined that are 'available' to absorb a part of the statistical discrepancy. The magnitude of these margins is based on the reliability of the transaction and sector. Fourthly, Statistics Netherlands developed a tool that can be helpful to determine to what transaction a statistical discrepancy can be attributed. With help of this tool the correlation coefficient and the covariance between each transaction and the statistical discrepancy can be calculated. This tool is currently used for quarters that are benchmarked to new annual data.

27. Nevertheless, at the end of the compilation process statistical discrepancies may still be existent. Although there are arguments to eliminate these remaining discrepancies, such as possible confusion with users, Statistics Netherlands decided to explicitly show the remaining discrepancies. By doing so no

transactions will be harmed in order to absorb the discrepancy and the discrepancy shown better reflects the fact that sources still contain problems and have to be improved. Furthermore this solution is considered to be more transparent.

28. As a consequence of this choice in the annual sector accounts Statistics Netherlands explicitly shows discrepancies for the sectors of non-financial corporations, households including non-profit institutions serving households and rest of the world account. In the quarterly sector accounts statistical discrepancies are still allowed for all sectors, except general government.

Annex: statistical discrepancies in Dutch annual and quarterly sector accounts

Quarterly sector accounts

| | | S11 | S125 | S121+122 | S123+124 | S1311 | S1313 | S1314 | S14+15 | S2 |
|--------|-------|-------|------|----------|----------|-------|-------|-------|--------|-------|
| 2005-1 | Abs. | -4924 | 67 | 6 | -55 | 72 | 54 | 208 | 7183 | -2611 |
| | % GDP | -3,9 | 0,1 | 0,0 | 0,0 | 0,1 | 0,0 | 0,2 | 5,8 | -2,1 |
| 2005-2 | Abs. | 1229 | 120 | -1 | -103 | 19 | 177 | 15 | -5136 | 3680 |
| | % GDP | 0,9 | 0,1 | 0,0 | -0,1 | 0,0 | 0,1 | 0,0 | -3,9 | 2,8 |
| 2005-3 | Abs. | 3316 | -212 | 1 | -241 | -58 | -183 | -202 | -81 | -2340 |
| | % GDP | 2,7 | -0,2 | 0,0 | -0,2 | 0,0 | -0,1 | -0,2 | -0,1 | -1,9 |
| 2005-4 | Abs. | -302 | 25 | -6 | 399 | -33 | -48 | -21 | -810 | 796 |
| | % GDP | -0,2 | 0,0 | 0,0 | 0,3 | 0,0 | 0,0 | 0,0 | -0,6 | 0,6 |
| 2006-1 | Abs. | -828 | -471 | 16 | 39 | 493 | 54 | -103 | 6249 | -5449 |
| | % GDP | -0,6 | -0,4 | 0,0 | 0,0 | 0,4 | 0,0 | -0,1 | 4,7 | -4,1 |
| 2006-2 | Abs. | 4394 | -240 | 3 | -21 | -84 | 61 | 132 | 2033 | -6278 |
| | % GDP | 3,2 | -0,2 | 0,0 | 0,0 | -0,1 | 0,0 | 0,1 | 1,5 | -4,6 |
| 2006-3 | Abs. | -2276 | 402 | -2 | 160 | -143 | -109 | -155 | -5817 | 7940 |
| | % GDP | -1,8 | 0,3 | 0,0 | 0,1 | -0,1 | -0,1 | -0,1 | -4,5 | 6,1 |
| 2006-4 | Abs. | -4351 | 309 | -17 | -178 | -266 | -6 | 126 | 1319 | 3064 |
| | % GDP | -3,1 | 0,2 | 0,0 | -0,1 | -0,2 | 0,0 | 0,1 | 0,9 | 2,2 |
| 2007-1 | Abs. | -4210 | -535 | -13 | 102 | -158 | 245 | 66 | 6840 | -2337 |
| | % GDP | -3,0 | -0,4 | 0,0 | 0,1 | -0,1 | 0,2 | 0,0 | 4,9 | -1,7 |
| 2007-2 | Abs. | -2973 | -118 | -10 | 401 | -235 | -237 | 121 | -3190 | 6241 |
| | % GDP | -2,1 | -0,1 | 0,0 | 0,3 | -0,2 | -0,2 | 0,1 | -2,2 | 4,4 |
| 2007-3 | Abs. | -4316 | -231 | 3 | -215 | 853 | -282 | -154 | -2052 | 6394 |
| | % GDP | -3,2 | -0,2 | 0,0 | -0,2 | 0,6 | -0,2 | -0,1 | -1,5 | 4,7 |
| 2007-4 | Abs. | 7626 | 884 | 20 | -288 | -460 | 274 | -33 | 1514 | -9537 |
| | % GDP | 5,1 | 0,6 | 0,0 | -0,2 | -0,3 | 0,2 | 0,0 | 1,0 | -6,4 |
| 2008-1 | Abs. | -4194 | 1789 | -0 | -399 | 0 | -0 | 0 | -2510 | 5314 |
| | % GDP | -2,9 | 1,2 | 0,0 | -0,3 | 0,0 | 0,0 | 0,0 | -1,7 | 3,6 |

Annual sector accounts

| | | S11 | S125 | S121+122 | S123+124 | S1311 | S1313 | S1314 | S14+15 | S2 |
|------|-------|-------|------|----------|----------|-------|-------|-------|--------|-------|
| 1995 | Abs. | -4429 | -0 | -0 | -0 | -0 | 0 | -0 | 4102 | 327 |
| | % GDP | -1,5 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 1,3 | 0,1 |
| 1996 | Abs. | -4412 | -0 | -0 | -0 | 0 | -0 | -0 | 3572 | 840 |
| | % GDP | -1,4 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 1,1 | 0,3 |
| 1997 | Abs. | -3451 | -0 | -0 | -0 | 0 | -0 | -0 | 2575 | 876 |
| | % GDP | -1,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,8 | 0,3 |
| 1998 | Abs. | -3727 | -0 | -0 | -0 | 0 | -0 | -0 | 3264 | 463 |
| | % GDP | -1,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,9 | 0,1 |
| 1999 | Abs. | -3647 | -0 | 0 | -0 | 0 | -0 | 0 | 2890 | 757 |
| | % GDP | -0,9 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,7 | 0,2 |
| 2000 | Abs. | -3660 | -0 | -0 | -0 | 0 | -0 | -0 | 1198 | 2462 |
| | % GDP | -0,9 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,3 | 0,6 |
| 2001 | Abs. | -2115 | -0 | 0 | -0 | -0 | -0 | 0 | -818 | 2933 |
| | % GDP | -0,5 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | -0,2 | 0,7 |
| 2002 | Abs. | -2604 | 0 | -0 | 0 | 0 | -0 | -0 | 1960 | 644 |
| | % GDP | -0,6 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,4 | 0,1 |
| 2003 | Abs. | 183 | 0 | -0 | 0 | 0 | 0 | -0 | 1511 | -1694 |
| | % GDP | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,3 | -0,4 |
| 2004 | Abs. | -3854 | -0 | -0 | 0 | -0 | 0 | 0 | 3450 | 404 |
| | % GDP | -0,8 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,7 | 0,1 |
| 2005 | Abs. | -681 | -0 | -0 | -0 | -0 | 0 | -0 | 1156 | -475 |
| | % GDP | -0,1 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,2 | -0,1 |
| 2006 | Abs. | -3061 | 0 | -0 | 0 | -0 | -0 | -0 | 3784 | -723 |
| | % GDP | -0,6 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,7 | -0,1 |
| 2007 | Abs. | -3873 | 0 | 0 | 0 | -0 | -0 | -0 | 3112 | 761 |
| | % GDP | -0,7 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,5 | 0,1 |