Analysis of revisions to quarterly current account balance of payments data

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An analysis of revisions has been made to Balance of Payments (BoP) quarterly current account data between 1996 Q4 and 2001 Q3. This article looks at the current account, focusing on revisions to current account credits and debits and how these influence revisions to the current account balance. The article also explores the chronological evolution of revisions and revisions to current account components and provides explanation for the more prominent revisions over the period analysed.

Summary

- Revisions to quarterly current account balance data occurring between first publication and three years after publication, using estimates first published between 1996 Q4 and 2001 Q3, are not shown to be statistically significantly different from zero. The mean overall revision over this period is £-1.2 billion.

- Within current account credits revisions are not significantly different from zero over the same period. Credits are revised up by an average £1.2 billion.

- For debits, revisions are not significant at the testing level used. Debts are revised up by an average £2.4 billion.

- For credits and debits the most sizeable single revision is the first. For credits the average first revision is upward £0.4 billion and for debits the average revision is also upward, £0.5 billion.

- For credits, the components trade in goods and trade in services are significantly different to zero. For trade in goods estimates have been revised up on average £0.3 billion. For services the average revision is £1.9 billion, revisions in all periods are upward.

- For debits significance only exists in the trade in goods component. The average revision is upward £0.9 billion.

Background

The Office for National Statistics (ONS) now regularly publishes information on revisions in the background notes of First Releases (ONS, 2005). In addition, statistical analyses of past revisions are being conducted. An article looking at revisions to quarterly GDP growth and its production and expenditure components (George, 2005) was published in Economic Trends in January 2005 and similar articles for other areas within National Accounts are being published. An analysis of past revisions to UK Trade statistics was published on the National Statistics website in February 2005 (Ruffles, 2005).

Introduction

A revision is the difference between a first published estimate and subsequent estimates of the same series. Revisions are a measure of the reliability of estimates. Changes may be due to the availability of more reliable data sources, improved methods or some combination of the two.

In addition, the UK implemented new international standards during the period analysed which led to changes in the current account components. These
introductions, particularly BPM5 in September 1998, resulted in large revisions. It is evident, in later analysis, that revisions in the 1996 Q4–1998 Q1 period are largely attributed to the adoption of BPM5. It can be argued that a fairer analysis would be possible if these values were stripped out, starting the data frame in 1998 Q2 for example. This would reduce the number of periods with complete data from 20 quarters to 14. We have retained the earlier periods in this analysis as a wider data frame is considered to be of greater benefit. Twenty quarters is the duration used in similar analyses for other areas of National Accounts.

Balance of Payments estimates are published quarterly. The major revisions observed are those between first published estimates and estimates three years later. Complete data, periods for which three years of revisions exist, is available for 20 quarters, 1996 Q4 to 2001 Q3. Revisions to initial estimates are tested to determine whether they are significantly different from zero, that is, to determine whether the pattern of revisions may have occurred by chance rather than because of systematic over or under estimation of earlier estimates (see methodology section for details of testing methods used). This article focuses initially on revisions to the current account balance then looks at credits and debits for the current account and individual components within.

Data
Quarterly estimates are used from 1996 Q4. Estimates are available for all periods until 2004 Q3. Data is assumed to be mature after three years. When mature a point in the series is not expected to change due to source data, changes to data after it matures are attributed to methodological improvements. This three year period can be considered by main stages, key events within the period that may affect improvements may be made when subsequent Pink Books are published, due to methodological changes and as more accurate results become available for surveys and inquiries. The largest revisions in the period analysed can be attributed to methodological changes.

Methodology
Revisions to a series are considered to be significant if the mean revision is statistically different from zero. T-tests are used to establish significance. In this analysis mean revisions (the average size of revisions over the last five years) and mean absolute revisions (giving the average size of revisions over the last five years as an indication of the reliability of the latest figures) are presented, as is the critical t-value used in each test. The significance test relates to the mean revision. The hypothesis tested is that the mean of the revisions is equal to zero. If there is evidence to reject this hypothesis, that is, the t-statistic is greater than the critical value, the mean revision is statistically different from zero. Tests presented in this analysis are conducted at the 5 per cent level. When successive revisions in a series are not independent, a modified t-test is used. A technical description of the modified t-statistic is given in the Economic Trends article ‘Revisions Information in ONS First Releases’ (Jenkinson, 2004). The modified t-test makes use of the term $\alpha$, serial correlation. Use of the standard t-test would overstate the significance of results for a series that is not independent.

T-tests are based on the assumption that the underlying distribution is Normal. Looking at the distribution of total revisions, up to three years after first publication, to the current account balance it is evident that an approximate bell shaped distribution exists (Figure 1).

A Jarque Bera test is used to check for suitability of fit to Normal. With a null hypothesis that the Normal distribution is a good fit for the data, a p-value of 0.53 provides no basis on which to reject this hypothesis. Thus the use of t-tests is appropriate.

Reasons for revisions
Revisions are made for a number of reasons. These can influence the magnitude of and number of periods affected by revisions. Details of major revisions are included in First Releases. Large changes occur during the quarters in which Pink Books are published, due to methodological changes and as more accurate results become available for surveys and inquiries. The largest revisions in the period analysed can be attributed to methodological changes.

Figure 1
Histogram showing distribution of current account balance revisions follow a normal distribution

<table>
<thead>
<tr>
<th>Frequency</th>
<th>0.0</th>
<th>0.5</th>
<th>1.0</th>
<th>1.5</th>
<th>2.0</th>
<th>2.5</th>
<th>3.0</th>
<th>3.5</th>
<th>4.0</th>
<th>4.5</th>
<th>5.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midpoint values</td>
<td>-5500</td>
<td>-4500</td>
<td>-3500</td>
<td>-2500</td>
<td>-1500</td>
<td>-500</td>
<td>500</td>
<td>1500</td>
<td>2500</td>
<td>3500</td>
<td>More</td>
</tr>
</tbody>
</table>
During the period analysed the following major revisions due to methodological changes were undertaken:

- **September 1998.** Balance of payments data in the UK followed the International Monetary Fund’s (IMF) Balance of Payments Manual fifth edition (BPM5) for the first time. This involved restructuring of the current account. There were also changes to the definition of the UK; Channel Islands and the Isle of Man were excluded from UK data.

- **September 2001.** Further methodological changes. Trade in goods data was affected by the inclusion of estimates for smuggled goods and financial services data was presented on a gross basis, rather than a net basis, for the first time. Income figures were revised down as a result of the implementation of new international standards for treatment of interest rate swap settlement receipts and payments and with the incorporation of improved methodology for delivering interest payments and receipts between the UK and the Channel Islands and the Isle of Man. Current transfers were also revised down due to re-estimation of tax paid on Foreign Direct investment (FDI).

- **June 2002.** Reassessment of data available on insurance premiums, as a result of the events of 11 September 2001, affects current transfer credits and debits in services balance in 2001 Q3.

- **September 2003.** Pink Book 2003 published. Missing Trader Intra-Community fraud (MTIC) affects trade in goods and an expansion of the annual International Trade in Services (ITIS) survey leads to upward revisions for trade in services.

The following is an example of revisions due to availability of later data:

- **December 2003.** Corrected contributor information for 1999–2002 was submitted to the Bank of England. Income changes also reflected the inclusion of annual benchmark data from direct investment and financial inquiries for 2002 only.

### Characteristics of revisions to BoP current account

#### Credits and debits

Figures 2 and 3 show revisions over three years to current account credits and debits respectively. It is clear that revisions within the current account do not have a large impact on credits or debits overall. The largest single revision to credits is upward, in the region of £7 billion in 1998 Q1. For the debit account the largest revision in 1997 Q2 is upwards £6.1 billion. This contrasts with account totals of over £80 billion.

Total revisions can be broken down to reveal their evolution over time. This is displayed in terms of contributions at each of the main stages, Figures 4 and 5 expand on the bars in Figures 2 and 3 respectively.

Table 1 shows that revisions to current account credits are not significant overall or at any of the main stages. The largest average revision occurs between R1 and PB1, this is influenced by large upward revisions at this stage between 1996 Q4 and 1998 Q1. A single large first revision in 1998 Q1 keeps the first to R1 average high. A lesser number of upward revisions occur at the PB1 to PB2 stage, leading to a downward average revision.

Average revisions to current account debits are upward at all main stages (Table 2). Largest revisions to debits occur between first publication and PB1 in 65 per cent of periods. Overall revisions are not judged to be significantly different from zero, neither are they at any of the main stages.

Upward revisions in early periods are largely attributable to one stage (Figures 4 and 5), closer inspection of revisions triangles show the revisions up to 1998 Q1 are mainly influenced by changes implemented in September 1998, due to the introduction of BPM5.
Balance

Figure 6 shows the revisions to quarterly BoP current account balance estimates. A maximum positive revision of £2.8 billion occurred in reference period 1998 Q1 and a maximum downward revision of −£4.7 billion in reference period 2000 Q4. Since reference period 1998 Q2 all balance revisions have been downwards, except for a slight positive revision in 2000 Q1.

Small revisions to the balance may conceal large revisions in both credits and debits. Figure 7 shows trends within credits and debits and how these contribute to current account balance revisions.

In 65 per cent of periods credits and debits are revised in the same direction (Figure 7). For initial periods, 1996 Q4 to 1998 Q1, upward revisions to the balance are due to greater upward revisions to credits than to debits. Since 1998 Q2, with the exception of 2000 Q1, all balance revisions have been downward and due to greater upward revisions (or smaller downward revisions) to debits than to credits. It is interesting to note that whilst revisions between 1996 Q4 and 1998 Q1 were uncharacteristically large for both credits and debits, they are similar in size to revisions for all other periods, though in the opposite direction, in the current account balance. This illustrates that while large credit and debit revisions during early periods can be mainly attributed to implementation of BPM5, the changes were across the whole account and led to similar sized revisions for both credits and debits and consequently had less affect on the current account balance.

Table 1
Current account credits testing for significance by stage

<table>
<thead>
<tr>
<th>Stages</th>
<th>Mean Absolute Revision</th>
<th>Mean Revision</th>
<th>Sig?</th>
<th>t-statistic</th>
<th>Critical t value</th>
</tr>
</thead>
<tbody>
<tr>
<td>First to R1</td>
<td>1.11</td>
<td>0.40</td>
<td>No</td>
<td>0.88</td>
<td>2.09</td>
</tr>
<tr>
<td>R1 to PB1</td>
<td>1.86</td>
<td>0.86</td>
<td>No</td>
<td>0.55</td>
<td>2.36</td>
</tr>
<tr>
<td>PB1 to PB2</td>
<td>1.04</td>
<td>−0.12</td>
<td>No</td>
<td>−0.29</td>
<td>2.09</td>
</tr>
<tr>
<td>PB2 to three year</td>
<td>0.37</td>
<td>0.02</td>
<td>No</td>
<td>0.09</td>
<td>2.14</td>
</tr>
<tr>
<td>First to three year</td>
<td>2.98</td>
<td>1.16</td>
<td>No</td>
<td>0.52</td>
<td>2.45</td>
</tr>
</tbody>
</table>

Table 2
Current account debits testing for significance by stage

<table>
<thead>
<tr>
<th>Stages</th>
<th>Mean Absolute Revision</th>
<th>Mean Revision</th>
<th>Sig?</th>
<th>t-statistic</th>
<th>Critical t value</th>
</tr>
</thead>
<tbody>
<tr>
<td>First to R1</td>
<td>0.74</td>
<td>0.52</td>
<td>No</td>
<td>1.56</td>
<td>2.10</td>
</tr>
<tr>
<td>R1 to PB1</td>
<td>1.76</td>
<td>1.09</td>
<td>No</td>
<td>1.04</td>
<td>2.23</td>
</tr>
<tr>
<td>PB1 to PB2</td>
<td>0.73</td>
<td>0.31</td>
<td>No</td>
<td>1.18</td>
<td>2.09</td>
</tr>
<tr>
<td>PB2 to three year</td>
<td>0.80</td>
<td>0.47</td>
<td>No</td>
<td>1.84</td>
<td>2.09</td>
</tr>
<tr>
<td>First to three year</td>
<td>2.75</td>
<td>2.39</td>
<td>No</td>
<td>1.97</td>
<td>2.31</td>
</tr>
</tbody>
</table>
Figure 4
Contribution to current account credit revisions by stage
£ billion

Figure 5
Contribution to current account debit revisions by stage
£ billion

Figure 6
Current account balance revisions, first published estimate to three years later
£ billion
Figure 8 looks at the construction of current account balance revisions over time, expanding the bars from Figure 6. In four of the twenty periods under examination the largest revision occurs between first publication and the first revision; 1997 Q3, 1998 Q1, 1998 Q2 and 1998 Q4. The initial revision makes a substantial contribution in a majority of the other periods. It is also noted that in 75 per cent of periods the overall revision is in the same direction as the first revision. For a further seven reference periods, the largest contribution to the overall revision occurs between R1 and PB1. In five of the periods the largest revisions occur during the PB1–PB2 stage. The largest upward revision, 1998 Q1, was revised upwards by £2.7 billion at the first revision. The largest downward revision, 2000 Q4, was revised downward in each of three stages; R1–PB1, PB1–PB2 and PB2 – three years after publication. The greatest absolute revision, the sum of revisions at all stages regardless of direction, occurred in 2001 Q1; downward revisions occurred in the periods first – R1, R1–PB1 and PB2 to three years after initial publication, and an upward revision of £1.1 billion during the PB1–PB2 stage.

Table 3 shows that mean revisions at all stages are negative. The revisions in the current account balance are not statistically different from zero overall or at any of the main stages. This is most likely prevented due to upward overall revisions in early periods and upward revisions at one or more of the main stages across most periods.
Components of the current account

Credits and debits

The current account comprises four main components:

- trade in goods
- trade in services
- income
- current transfers.

Revisions are examined in terms of these components. Figures 9 and 10, provide an alternative analysis of the bars from Figures 2 and 3. Revisions at component level are initially examined over the full three-year period.

The largest contribution to average current account credit revisions comes from trade in services, £1.9 billion. The largest negative average revision occurs to income credits, −£0.9 billion. Tests show revisions to be significantly different from zero for trade in goods and trade in services. All revisions to trade in services are upward as are a majority of those made to trade in goods credits. Income and current transfers have a number of large negative revisions which lead to results overall not being significant.

For all components of current account credits the largest average contributory stage is that between first publication and publication of PB1, and the greatest revision within this period is that between first publication and R1. The slightest changes are made post PB2.

The following observations are made about current account credit components:

- Revisions for goods credits are significantly different from zero overall and specifically between the first publication–PB1 period. The average revision overall is upward £0.3 billion, with upward average revisions of £0.2 billion between first publication and R1 and in the R1–PB1 period. Average revisions during later stages are small but downward, £0.03 billion in the PB1–PB2 period and £0.01 at the post PB2 stage.

- Service revisions are also significant over the first publication – three year period, average revision £1.88 billion, with statistical significance shown in the PB1–PB2 and PB 2–3 year periods. Average revisions at all stages are upward. Services data is subject to input-output balancing which often leads to upward revisions to exports and imports at both the PB1–PB2 and PB2–three yr stages. Revisions in the earliest periods, 1996 Q4–1998 Q1, are attributed to the implementation of BPM5. Changes to the reporting of financial services figures, implemented in September 2001, from net to gross affects revisions between 1998 Q2 and 2001 Q1. Revisions between 2000 Q2 and 2001 Q3 are also due to revisions made in September 2003 to account for the expansion of ITIS.

- There is no significance at any stage for income credits. Average revisions are downward at all stages, largest

Table 3
Current account balance testing for significance by stage

<table>
<thead>
<tr>
<th>Balance</th>
<th>Mean Absolute Revision</th>
<th>Mean Revision</th>
<th>Sig?</th>
<th>t-statistic</th>
<th>Critical t value</th>
</tr>
</thead>
<tbody>
<tr>
<td>First to R1</td>
<td>0.82</td>
<td>−0.12</td>
<td>No</td>
<td>−0.50</td>
<td>2.09</td>
</tr>
<tr>
<td>R1 to PB1</td>
<td>0.95</td>
<td>−0.23</td>
<td>No</td>
<td>−0.58</td>
<td>2.12</td>
</tr>
<tr>
<td>PB1 to PB2</td>
<td>1.00</td>
<td>−0.42</td>
<td>No</td>
<td>−1.30</td>
<td>2.09</td>
</tr>
<tr>
<td>PB2 to three year</td>
<td>0.79</td>
<td>−0.45</td>
<td>No</td>
<td>−1.90</td>
<td>2.09</td>
</tr>
</tbody>
</table>

First to three year 2.00 −1.23 No −1.52 2.18

Figure 9
Current Account credits revisions by component

£ billion

![Graph showing current account credits revisions by component](image)
between first publication and PB1, average £0.4 billion, and only slightly smaller in the PB1–PB2 period, £0.4 billion. The upward revisions between 1996 Q4 and 1998 Q1 are largely due to the introduction of BPM5, revisions between 1998 Q2 and 2001 Q1 are affected by the reclassification of interest rate swaps in September 2001.

Revisions to current transfers do not show significance at any of the main stages. The average revision between first and third year for current transfers is small and negative, £0.1 billion, with larger average revisions at other stages, an upwards average revision between first publication and PB1 of £0.3 billion and a downward revision of £0.3 billion between PB1 and PB2. Early periods, 1996 Q4 to 1998 Q1, are affected by BPM5 implementation in September 1998. Revisions between 1998 Q2 and 2001 Q1 are influenced by the re-estimation of tax paid on FDI, introduced in September 2001. The single upward revision in 2001 Q3 was made in June 2002 as a reassessment of insurance claims paid out as a consequence of 11 September 2001.

The following observations are made about current account debit components:

- The only component for which revisions are found to be significantly different from zero is trade in goods where three year revisions for all periods are positive, average revision £0.9 billion. There is significant difference at the first publication–R1 stage and R1–PB1 stage. Revisions due to smuggled goods, introduced in September 2001, affect data between 1998 Q2 and 2001 Q1. The greatest influence on trade in goods debit revisions is from adjustments for MTIC made in September 2003. These affect periods 2000 Q2 to 2001 Q3.

- Revisions in most periods for trade in services are positive, average revisions at each of the main stages are upward. Tests show statistical significance at the first-R1 stage. The average revision in the first publication–PB1 period is £0.7 billion and also high in the PB1–PB2 period, £0.6 billion, again probably reflecting the effects of input-output balancing. There appears to be some influence from BPM5 changes made in September 1998 during the periods 1997 Q3 to 1998 Q1. The revisions of September 2001 due to gross reporting of financial services influences periods between 1998 Q2 and 2001 Q1. Revisions made in September 2003 to account for the expansion of ITIS have an affect on revisions between 2000 Q2 and 2001 Q3.

- Although not significant overall there is evidence of significant revisions for income debits between PB1 and PB2, this is the main stage with the largest average revision, £0.4 billion. This is largely due to inclusion of FDI annual benchmark figures. Revisions at earlier stages are considerably smaller, between first publication and the first revision there is a slight upward average revision, £0.02 billion, and a small downward revision, £0.1 billion, at the R1–PB1 stage. As with income credits, revisions to income debits between 1996 Q4 and 1998 Q1 are largely due to the introduction of BPM5.

- For current transfers revisions are upward until 1998 Q1 and then downward for all periods until the most recent, 2001 Q3. The overall average revision is upward, the largest average revisions are upward and occur up to publication of PB1; first publication –R1 average £0.1 billion, R1–PB1 average £0.4 billion. Average revisions in subsequent periods are downward. Patterns within revisions to current transfers debits appear the same as they do for current transfer credits; BPM5 introduction in September 1998 influence revisions between 1996 Q4 and 1998 Q1, the re-estimation of tax paid on FDI in September 2001 affects revisions between 1998 Q2 and 2001 Q1, and the reassessment of insurance premiums in June 2002 result in the upward revision in 2001 Q3.
Balance

The largest average revision of the components within the current account balance comes from income. The overall average revision is negative but the average revision to trade in services balance is positive. Large downward trade in goods revisions between 2000 Q3 and 2001 Q3 are attributed to MTIC fraud adjustments. Goods and services seem to roughly offset one another. Although revisions to the overall current account balance are not significant, those to the balance components for services and income are.

Each of these components can be assessed by main stage. Figure 12 shows average revisions at each stage for each of the balance components.

The following observations can be made about current account balance components.

- The average revision for trade in goods balance is –£0.6 billion. The largest revision occurred in reference period 2001 Q3, –£2 billion. The largest average revisions occurred between publication of PB1 and PB2. Revisions were not significant for any of the main stages.

- Trade in services has significant revisions between first publication of data and three year estimates but not at any of the main stages up to this point. Positive revisions at all stages culminate in significance overall. A majority of the revisions occurred between first publication and PB1, the average overall revision was £0.5 billion with an average of £0.3 billion between first publication and publication of PB1. Annual ITIS survey results replace quarterly estimates at publication of Pink Book 1. A majority of revisions were upwards, for 16 of the 20 periods, with the largest revision between first publication and three years of £1.8 billion in reference period 2001 Q1.

Table 4
Testing for significance of current account balance revisions by component

<table>
<thead>
<tr>
<th>Component</th>
<th>Mean Absolute Revision</th>
<th>Mean Revision</th>
<th>Sig?</th>
<th>t-statistic</th>
<th>Critical t value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trade in goods</td>
<td>0.69</td>
<td>–0.55</td>
<td>No</td>
<td>–1.79</td>
<td>2.18</td>
</tr>
<tr>
<td>Trade in services</td>
<td>0.70</td>
<td>0.48</td>
<td>Yes</td>
<td>2.26</td>
<td>2.11</td>
</tr>
<tr>
<td>Income</td>
<td>1.18</td>
<td>–0.68</td>
<td>Yes</td>
<td>–2.13</td>
<td>2.09</td>
</tr>
<tr>
<td>Current transfers</td>
<td>0.55</td>
<td>–0.47</td>
<td>No</td>
<td>–2.11</td>
<td>2.20</td>
</tr>
<tr>
<td>Total balance</td>
<td>2.00</td>
<td>–1.23</td>
<td>No</td>
<td>–1.52</td>
<td>2.18</td>
</tr>
</tbody>
</table>

Figure 12
Average revisions to current account balance components by main stages

Figure 11
Current account balance revisions by component
Income has the largest effect overall on CA balance revisions. There is significance overall for the income component. The largest revision, in the reference period 2001 Q1, was a downward revision of over £3 billion. The greatest revisions were made between first publication of the data and the publication of PB1, an average revision of −£0.4 billion. Revisions made between PB2 and the 3 year estimate were of a similar magnitude, −£0.4 and significantly smaller, but positive, £0.05 billion, between publication of PB1 and PB2.

The smallest revisions overall are made to the current transfer balance, an average downward revision of −£0.5 billion. Average revisions are greatest between first publication and PB1, −£0.2 billion, and between PB’s 1 and 2, −£0.2 billion. Notably smaller changes occur between PB2 and 3 year estimates, −£0.02 billion.

Conclusion

Major revisions made over the period analysed are due to methodological improvements and updated international standards rather than to the availability of later source data. We will continue to monitor these revisions going forward.

Further analyses

Further analyses are presented in the Annexes that are included in the full version of the article on the National Statistics website at http://www.statistics.gov.uk/cci/article.asp?ID=1125

References


