FEATURE

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Revisions analysis to quarterly current account balance of payments data

SUMMARY

This article presents the analysis of revisions made to Balance of Payments quarterly current account data between 1998 Q4 and 2003 Q3, and is an update of the previous article published in the August 2005 issue of *Economic Trends*. It focuses on revisions to current account credits and debits and how these influence revisions to the current account balance.

A revision is the difference between a first published estimate and subsequent estimates of the same series. When publishing data, the Office for National Statistics (ONS) is faced with a trade-off between timeliness and accuracy. When data are required swiftly after the end of a reporting period, estimates are based on a limited data set reflecting lower early response rates. When data collected are not seen to be representative of the whole sample, forecasts are used to make the estimate representative. Revisions to these initial estimates may be due to availability of more reliable data, improved methods or a combination of the two.

Balance of Payments (BoP) estimates are published quarterly. Revisions are analysed between the first estimate and the value three years later. Mature data, periods for which three or more years of revisions exist, are available from 1996 Q1 to 2003 Q3. Revisions to initial estimates are tested to determine whether they are significantly different from zero (see Methodology section for testing methods).

This article focuses on the results of revisions analysis to quarterly BoP current account data. Data are analysed by main stage and by component. The article also explores the chronological evolution of revisions and provides explanation for more prominent revisions occurring over the period analysed.

Data

Data are assumed to be mature three years after their initial estimates are published. Once mature, a point in a series is not expected to change as a result of source data; changes to data after maturity are due to methodological improvements.

The three-year period, from first estimate to maturity, can be broken down into main stages, where revisions can be effectively monitored. The key stages are as follows:

- first publication (first): an estimate of quarterly BoP data is published in the BoP First Release, approximately three months after the end of the quarter
- first revision (R1): the second estimate is published around six months after the end of the quarter. The initial revision is a key indicator of the quality of the estimates and is considered to be the most important revision
- *Pink Books* (PB): annual BoP data estimates are published in the *Pink Book*, usually in July. The quarterly estimates are updated again during the production of the first and second estimates of annual BoP data, as figures from new and more comprehensive annual data sources become available. Methodological improvements are mainly made during the publication of *Pink Books,* and
- three-year estimate: value of data three years after the initial estimate. Data are considered as mature and appropriate for analysis

In this article, revisions to BoP current account data are examined over the periods between:

- first publication and R1
- R1 and the first *Pink Book* publication (PB1)
- PB1 and the second *Pink Book* publication (PB2), and
- PB2 and the value three years after the initial estimate (3yr)

For current account data, the time series used runs from 1998 Q4 to 2003 Q3. Taking the analysis up until 2003 Q3 means that all the estimates have had at least three years to mature, and have been through all of the stages discussed above.

Methodology

Revisions to a series are considered to be significant if the mean revision is statistically different from zero. The main part of the analysis is to apply a statistical test to the mean revisions to establish significance. The outcome of the test gives an indication of whether the revisions pattern may have occurred by chance, rather than due to a systematic under- or overestimation of earlier estimates. All statistical tests in this article are conducted at a 5 per cent level.

The significance tests are based on the assumption that the underlying distribution is Normal. **Figure 1** shows the distribution of total revisions to the current account balance, up to three years after first publication; it appears that an approximate bell-shaped distribution exists.

Further, a Jarque Bera test is used to check the suitability of a normal distribution. For current account balance revisions, the test gives a p-value of 0.53 and the hypothesis that the data are normally distributed cannot be rejected. Thus the use of the t-test is appropriate to assess the significance of revisions.

Mean revisions (the average size of revisions over the last five years) and the mean absolute revisions (the average size of revisions over the last five years, without regard to sign) are presented as an indication of the reliability of the latest figures, as is the critical t-value used in each test. When successive revisions in a series are not independent, a modified t-test is used (see **Box 1** for further details).

Reasons for revisions

Details of major revisions can be found in First Releases and *Pink Books*. Large changes occur during the quarters in which *Pink Books* are published (see **Box 2** for the main reasons for revisions). Compilation of data for the annual *Pink Book* is frequently used as the opportunity to make methodological changes. The largest revisions in the period analysed can be attributed to these methodological changes.

During the period analysed, the following major revisions were undertaken:

- September 2001 – several improvements to methods. Trade in goods data were affected due to the inclusion of smuggled goods. Data for trade in financial services were presented on a gross basis, rather than a net basis for the first time, which did not affect current account balances. New international standards for the treatment of interest rate swap settlement receipts and payments were applied. Improved methodology for deriving interest transactions between the UK and Channel Islands and Isle of Man affected income figures. Current transfers figures were revised down due to re-estimation of tax paid on foreign direct investment (FDI)
- June 2002 – income revisions reflected improvements to the estimation of income from property investment and dividend payments on non-residents' investment in UK equity securities. Reassessment of the data on insurance claims, as a result of the events of 11 September 2001 affected current transfers and exports of services
- December 2002 – trade in goods figures were revised down as a result of the incorporation of final HM Customs and Excise data in 2001. The availability of more detailed data from the annual International Trade in Services (ITIS) Survey and the International Passenger Survey resulted in revisions to trade in services figures. Income revisions mainly reflected the inclusion of the annual benchmark inquiries for FDI and non-residents' ownership of UK company shares from the Share Ownership Survey

Figure 1
Distribution of current account balance revisions
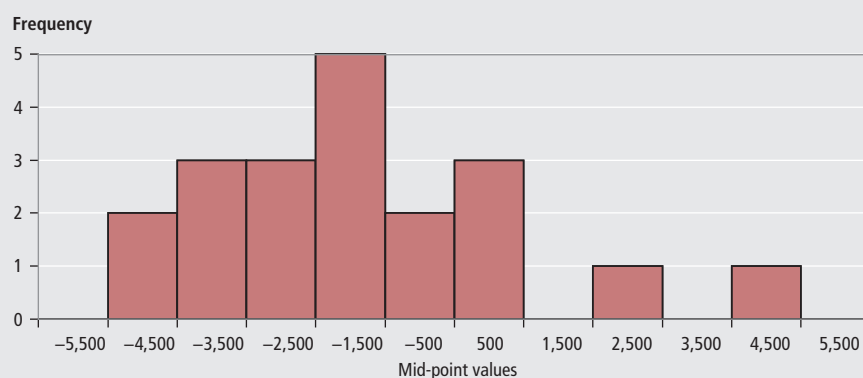
Box 1

Testing for significance in revisions

The modified t-test is used to test whether there is statistical evidence that the mean revision is significantly different from zero. If the test is not significant, this implies that the observed pattern of revisions may have occurred by chance. The t-test compares the calculated mean revision with the variability of the revisions, to determine whether it is statistically different from zero.

However, a standard t-test is based on the assumption that the revisions are independent of each other. This is not true for a time series, as revisions made for one period may be associated with revisions made to previous periods. The modified t-test corrects for this lack of independence by adjusting the estimate of the variability of the revisions to take into account the serial correlation, that is, the extent of the association between successive revisions. A technical description of the modified t-statistics and its calculations are given in Jenkinson (2004).

Box 2

Main reasons for revisions

Revisions are made for three main reasons listed below, the first two being the most common source.

■   Revisions are made as more data become available. ONS or its suppliers receive data in the form of survey responses from economic agents such as companies, households and government at later stages, which then replaces initial estimates. Initial estimates comprise provisional survey data. When these data are not representative of the whole sample, forecasts are used. Naturally, the actual data can vary from the forecast estimates, requiring revisions to be made

■   Revisions are made due to pre-announced improvements in methodology. These improvements can take many forms. It could be that there has been an improvement in data

sources, a new survey or administrative data have been developed, or an existing survey has been improved. An improvement could be made to the compilation or balancing process (which balances the different components of the current account). Alternatively, methodology changes could be the result of bringing existing practices into line with European or International requirements. An example of a pre-announced methodology improvement within ONS was the implementation of the International Monetary Fund's Balance of Payments Manual fifth edition (BPM5), which was introduced in September 1998. This involved restructuring the current account, and all historical data that were affected by BPM5 had to be revised accordingly, and

■   Revisions are occasionally due to unavoidable circumstances, such as errors. These are rarely a significant source of revisions

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■   September 2003 – trade in goods import figures included adjustments to allow for the impact of trade associated with VAT missing trader inter-community (MTIC) fraud for the first time. These adjustments resulted in overall upward revisions to trade in goods debits data. An expanded sample of the annual ITIS Survey resulted in upward revisions to exports and imports of services

■   June 2005 – revised data from HM Revenue and Customs resulted in revisions to trade in goods estimates. General reassessment of data during the annual supply and use balancing process and a review of the use of Chamber of Shipping data used in the transportation account resulted in trade in services revisions. Data for private social benefits and contributions were presented on a gross, rather than net, basis for the first time, which did not affect current account balances

■   June 2006 – several improved methods. A methodological change to the estimation of aviation fuel procured in foreign airports resulted in trade in goods revisions, but these were offset by revisions to services debits so did not affect current account balances. Trade in services revisions mainly affected financial services as a result of the use of improved estimates of UK banks' spread earnings on foreign exchange, derivatives and securities trading activities. Revisions to the investment data set stemmed from the implementations of a new methodology for estimating UK residents' investment in foreign property. Revisions to current transfers from 1999 onwards

were mainly attributable to the use of an improved methodology for estimating UK receipts from the EU's Agricultural Guarantee Fund

Characteristics of revisions to BoP current account
Balance

Figure 2 shows revisions, over three years, to quarterly BoP current account balance estimates. These estimates tend to be revised downward, with average revisions of minus £1.3 billion. A maximum upward revision of £4.2 billion occurred in 2003 Q2 and a maximum downward revision of £4.7 billion in 2000 Q4. It is important to note that the first estimate of the current account balance has recorded a positive figure only twice in the period analysed.

Total revisions can be broken down to reveal their evolution over time. This is displayed in terms of contribution at each of the main stages. **Figure 3** expands on the bars in Figure 2. In four of the 20 periods under examination, the largest revision occurs between first estimate and

first revision: 1998 Q4, 2002 Q1, 2003 Q1 and 2003 Q3. The initial revision makes a substantial contribution in the majority of the other periods. It should also be noted that in 70 per cent of periods, the overall revision is in the same direction as the first revision. For a further eight reference periods, the largest contribution to the overall revision occurs between R1 and PB1. In three of the periods, the largest revisions occur during the PB1 to PB2 stage.

Table 1 shows that mean revisions at all stages are negative. Overall revisions are not statistically different from zero although revisions between R1 and PB1 are. The majority of revisions between these stages are negative, with a sizeable £3.1 billion downward revision in 2000 Q2. The presence of numerous upward revisions at the other stages results in the overall revisions not being significant.

A small revision to the balance may conceal large revisions in both credits and debits. **Figure 4** shows trends within credits and debits and how these contribute to current account balance revisions.

Figure 2
Current account balance revisions

£ billion
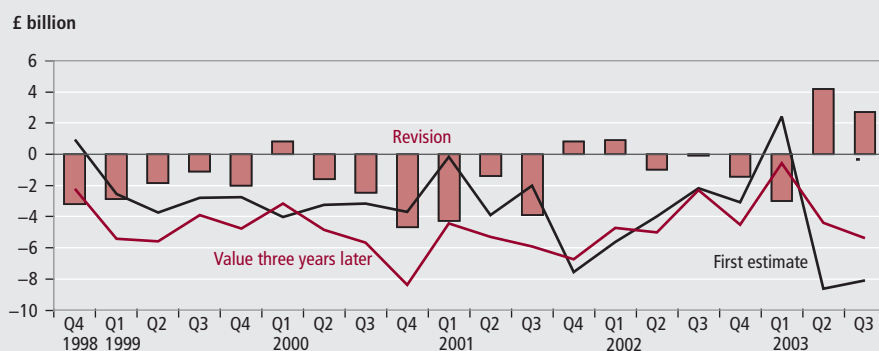
The majority of current account balance revisions have been downward, with the exception of five upward revisions occurring in 2000 Q1, 2001 Q4, 2002 Q1, 2003 Q2 and 2003 Q3, this being due to greater upward revisions (or smaller downward revisions) to debits than credits.

In 70 per cent of periods, credits and debits have been revised in the same direction. Credits and debits have both been revised upward since 2001 Q2, debits having a larger upward revision than credits in 60 per cent of this period.

Credits and debits

Figure 5 and **Figure 6** show, respectively, revisions to current account credits and debits. It is clear that revisions within the current account do not have a large impact on credits and debits overall. The largest single revision to credits is downward by £5.3 billion in 1999 Q1. For the debits account, the largest revision is £5.3 billion in 2001 Q3. This contrasts with account totals of over £80 billion for credits and £100 billion for debits. Upward revisions have been reported for credits and debits since 2001 Q2 and 2000 Q3 respectively.

Figure 7 and **Figure 8** look at the breakdown of current account credit and debit revisions over time, expanding on the bars from Figures 5 and 6, respectively. The direction and magnitude of current account credits and debits revisions have not been consistent over the periods analysed.

It is apparent how major changes associated with certain releases affect data for a number of preceding periods. For instance, there were methodological changes introduced in *Pink Book* 2001. This is represented, in Figure 7, by a large negative first revision in 2001 Q1, sizeable revisions between the first revision and publication of the first *Pink Book* in periods 2000 Q1 to 2000 Q4 and notable revisions in the PB1–PB2 bars between 1999 Q1 and 1999 Q4.

Similar trends due to methodological changes occur when examining current account debits by stage. Adjustments due to trade associated with VAT MTIC fraud, introduced in *Pink Book* 2003, caused a large first revision in 2003 Q1. Related substantial revisions therefore occurred in the R1–PB1 bars in periods 2002 Q1 to 2002 Q4.

Table 2 shows that the revisions to current account credits are not significant overall. However, there is significant evidence to suggest that revisions to current account credits are not equal to zero, between the second *Pink Book* stage and the

Figure 3
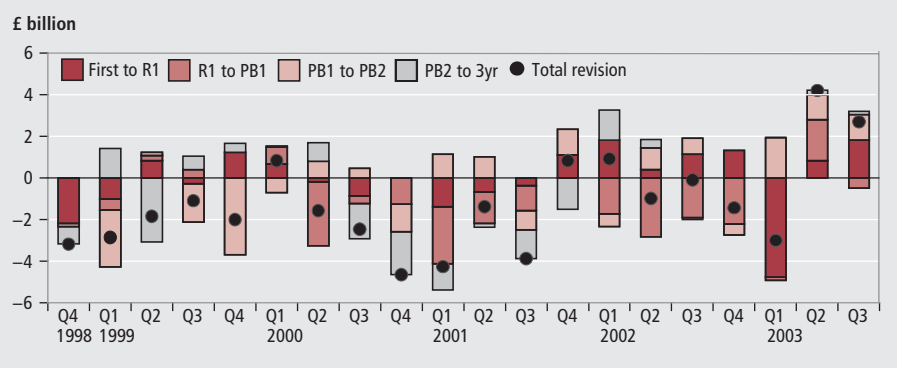### Contribution to current account balance revisions: by stage

£ billion

Table 1
Current account balance testing for significance

£ billion

Balance	Mean absolute revision	Mean revision	Significant?	t-statistic	Critical t value
First to R1	1.14	−0.03	No	−0.10	2.09
R1 to PB1	1.18	−0.84	Yes	−2.25	2.10
PB1 to PB2	1.17	−0.08	No	−0.20	2.09
PB2 to 3yr	0.89	−0.32	No	−1.24	2.09
First to 3yr	2.21	−1.27	No	−1.80	2.11

Figure 4
Overall revisions to current account

£ billion
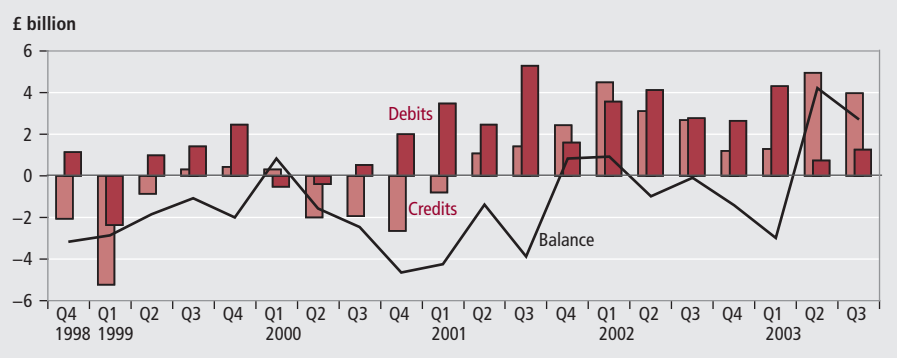
value after three years. The largest average revision occurs between these stages; this is influenced by the majority of revisions being upward during the period analysed.

Continuous upward revisions from 2001 Q1 keeps the PB1 to PB2 stage average high and a single large revision in 2002 Q2 keeps the first to R1 average high. Several

Figure 5
Current account credits revisions

£ billion

Figure 6
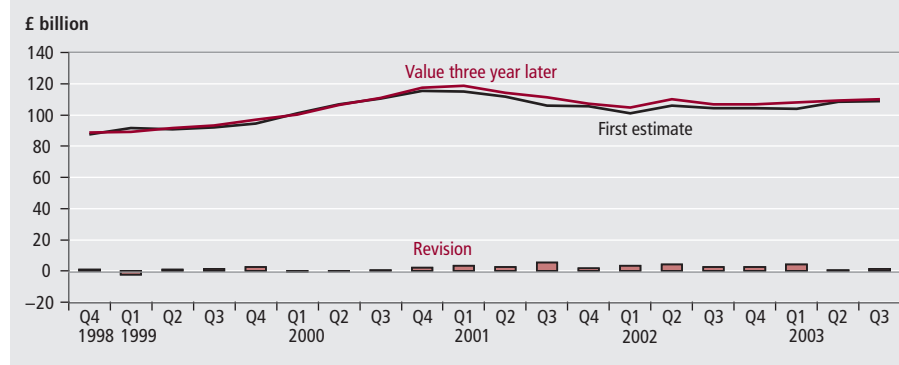### Current account debits revisions

£ billion

Figure 7
Contribution to current account credit revisions: by stage

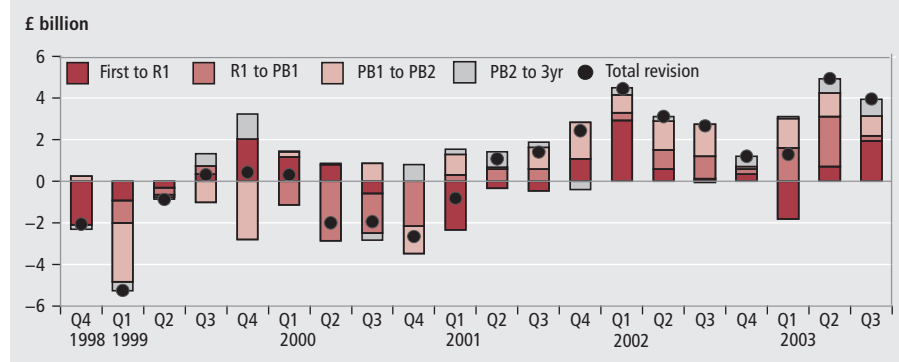£ billion

Figure 8
Contribution to current account debits revisions: by stage

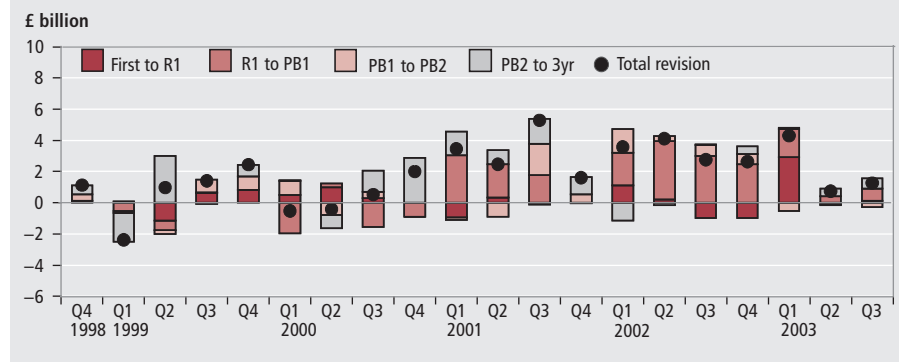£ billion

Table 2
Current account credits testing for significance

£ billion

Credits	Mean absolute revision	Mean revision	Significant?	t-statistic	Critical t value
First to R1	1.05	0.16	No	0.38	2.12
R1 to PB1	0.91	−0.04	No	−0.06	2.26
PB1 to PB2	1.04	0.23	No	0.60	2.10
PB2 to 3yr	0.40	0.25	Yes	2.23	2.09
First to 3yr	2.16	0.60	No	0.41	2.36

downward revisions of over £1 billion occur at the R1 to PB1 stage, leading to a downward average revision.

Examining **Table 3**, average revisions to current account debits are upward at all main stages. There is significance in the debits account, both for total revisions and at the second *Pink Book* to value after three years stage. Only five of the 20 periods examined have a downward revision between these stages. There was no significance identified the last time an analysis of current account revisions was conducted. Looking at Figure 5, it is clear that in the majority of periods, revisions have been upward; revisions have been positive for the last 13 quarters – eight of these have been added since the last analysis.

Components of the current account

The current account comprises four main components:

- trade in goods
- trade in services
- income, and
- current transfers

Revisions are examined in terms of these components.

Balance

Figure 9 provides an alternative analysis of the bars from Figure 3, showing the contribution of each component to the current account balance revisions. The largest average revision of the components within the current account balance comes from trade in goods. The overall average revision and the average revision for current account components, with the exception of trade in services, are negative. Large downward trade in goods revisions between 2000 Q3 and 2003 Q1 are attributed to introducing adjustments for trade associated with VAT MTIC fraud.

Tests show that there is no significance overall or within any component balance revision (**Table 4**). Each of these components can be assessed by main stage. **Figure 10** shows average revisions to the current account and its components, by main stage. The main contributing factor between the first estimate and publication of the first *Pink Book* is trade in goods. Post PB1, income is the largest contributing component.

Table 3
Current account debits testing for significance

£ billion

Debits	Mean absolute revision	Mean revision	Significant?	t-statistic	Critical t value
First to R1	0.62	0.19	No	0.96	2.09
R1 to PB1	1.35	0.80	No	1.20	2.20
PB1 to PB2	0.61	0.30	No	1.90	2.09
PB2 to 3yr	0.98	0.57	Yes	2.21	2.09
First to 3yr	2.20	1.87	Yes	3.23	2.12

The following observations can be made about current account components:

- trade in goods has the largest effect on current account balance revisions, with an average revision of minus £1.4 billion. The largest revision, minus £4.0 billion, occurred in 2002 Q2. The largest average revision occurred between the first revision and publication of the first *Pink Book* Revisions are not significant for any of the main stages

- the average revision for trade in services is £0.6 billion. There is no significance overall or at any of the main stages. This is the only component where average revisions at all the main stages are positive. For 15 of the 20 periods analysed, the revisions are upward, with the largest overall revision of £2.4 billion in 2003 Q2

- the smallest revisions overall are made to the income balance, with an average downward revision of £0.1 billion. Average revisions are greatest between publication of the first and second *Pink Books*

- tests show that current transfer balance revisions are not significantly different from zero overall, or at any of the main stages. Average revisions are greatest at the R1–PB1 and PB1–PB2 stages, with average revisions of minus £0.2 billion. Average revisions at the other main stages have magnitudes of less than £0.1 billion

Credits and debits

Figure 11 and **Figure 12**, respectively, provide an alternative analysis of the bars from Figures 5 and 6. Revisions at component level are examined over the full three-year period.

The largest contribution to average current account credits revisions, at £2.3 billion, comes from trade in services. The largest negative average revision, at minus £1.3 billion, occurs to income credits. Tests show credits 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 the majority of trade in goods revisions. Those revisions that are negative have a magnitude of less than £0.4 billion. Income and current transfers have several large negative

revisions which lead to the overall results not being significant.

The following observations can be made about current account credits components:

- revisions for trade in goods credits are significantly different from zero overall and specifically between the first publication–PB1 period. The average overall revision is £0.3 billion, with upward average revisions of £0.2 billion between R1–PB1 and PB1–PB2 stages. The average revision post PB2 is downward, with a magnitude of less than £0.1 billion. The introduction of estimates for trade associated with VAT MTIC fraud has had a significant impact

Figure 9
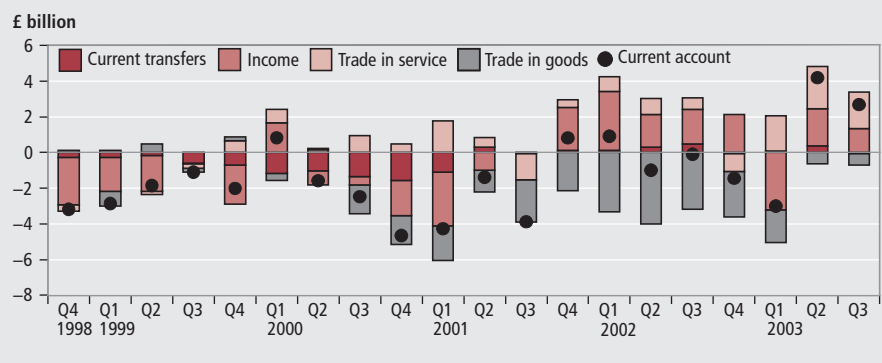### Current account balance revisions: by component

£ billion

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

£ billion

Balance	Mean absolute revision	Mean revision	Significant?	t-statistic	Critical t value
Trade in goods	1.47	−1.38	No	−1.75	2.57
Trade in services	0.89	0.57	No	2.04	2.10
Income	1.80	−0.13	No	−0.21	2.11
Current transfers	0.51	−0.32	No	−0.88	2.45
Total balance	2.21	−1.27	No	−1.80	2.11

Figure 10
Average revisions to current account balance components: by stage
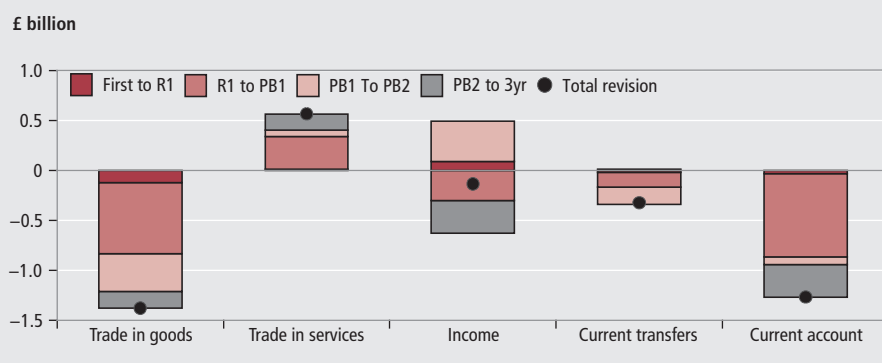
£ billion

- trade in services credits revisions are also significant over the first publication–3yr period, with an average revision of £2.3 billion, with statistical significance in the PB1–PB2 and PB2–3yr stages. Average revisions at all stages are upward. Services data were subject to annual input-output balancing, the results of which were generally published during June of each year, often leading to upward revisions to exports and imports at both the PB1–PB2 and PB2–3yr stages. Changes to the reporting of financial services figures, implemented in September 2001, from net to gross, affect revisions between 1998 Q4 and 2001 Q2. Revisions between 2000 Q2 and 2001 Q2 reflect the revisions made in September 2003 to account for the expansion of the ITIS Survey sample. Revisions from 2003 Q1 to 2003 Q3 are affected by the introduction of the improved data for UK banks' net spread earnings in June 2006

- there is no significance at any stage for income credits. Average revisions are downward at all stages. The largest revisions occur between the first estimate and PB1 stage, with an average of minus £0.5 billion. Revisions

between 1998 Q4 and 2001 Q1 are the result of reclassification of interest rate swaps in September 2001. The single revision in 2003 Q1 was the effect of the inclusion of corrected contributor data for direct investment inquiries

- revisions to current transfers do not show significance at any of the main stages. Average revisions at all the main stages are downward, with an overall average revision of minus £0.8 billion. Revisions between 1998 Q4 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

Examining the debits account by component, it is clear that all current account components are significantly different from zero. The largest contributory stage is that between first publication and publication of the first *Pink Book*. Very few notable revisions are made between the publication of the first *Pink Book* and the value after three years.

The following observations can be made about current account debits components:

- overall trade in goods debits revisions and revisions between the first publication and first revision stage are significantly different from zero. Revisions introduced in September 2001, due to smuggled goods, affect data between 1998 Q4 and 2001 Q1. The greatest influence on trade in goods debits revisions is from the adjustments made for trade associated with VAT MTIC fraud made in September 2003. These affect periods 1998 Q4 to 2003 Q1

- the majority of revisions for trade in services are positive; average revisions at each of the main stages are upward. Tests show that revisions are significantly different from zero overall and for all the main stages with the exception of revisions between R1 and PB1 stages. The revisions to all periods will be affected by input-output balancing. Changes to the reporting of financial services figures, implemented in September 2001, from net to gross, affect revisions between 1998 Q4 and 2001 Q2. Revisions between 2000 Q2 and 2001 Q2 reflect the revisions made in September 2003 to account for the expansion of the ITIS Survey sample

- revisions to income debits are significantly different from zero overall and specifically between the PB1–PB2 period; this is the main stage with the largest average revision of minus £0.6 billion. This is largely due to the inclusion of FDI annual benchmark figures. Revisions are smaller between first publication and the first revision, at minus £0.3 billion, and a downward, yet sizeable, revision of minus £0.5 billion at the R1–PB1 stage. The large downward revision between the publication of the first and second *Pink Books*, along with several other downward revisions, are the effect of the overall revision being significant

- for current transfers, revisions are downward, with the exception of two upward revisions in 2001 Q3 and 2002 Q4. Average revisions at all the main stages are downward, as is the overall revision, averaging minus £0.4 billion. Tests show statistical significance at the first estimate to three-year stage and specifically at the PB1–PB2 stage. Patterns within revisions to current transfer debits appear to coincide with current transfer credits revisions; the re-estimation of tax paid on FDI affects revisions between 1998 Q4 and 2001 Q1 and the reassessment of insurance claims result in the 2001 Q3 upward revision

Figure 11
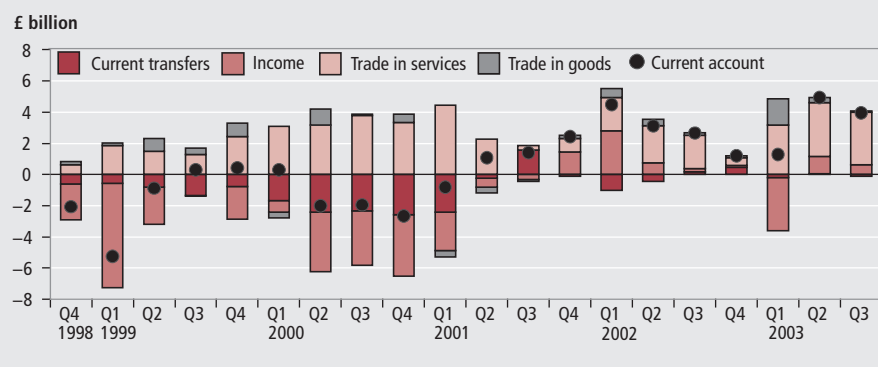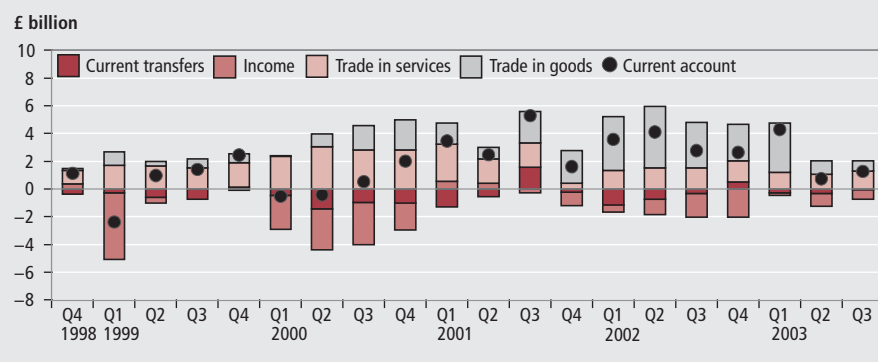### Current account credits revisions: by component

£ billion

Figure 12
Current account debits revisions: by component

£ billion

Conclusion

Major revisions made over the period analysed are mainly due to methodological improvements and availability of later source data, rather than to errors made. Overall revisions to quarterly current account balance data between 1998 Q4 and 2003 Q3 are not significant. ONS will continue to monitor these revisions going forward.

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