

1990 annual update of seasonal adjustments

This note describes the main methodological changes made as a result of the latest annual review of the seasonal adjustments on the monetary aggregates, financial transactions in the flow of funds matrix and other financial series. The revised adjustments were first introduced in the release of the provisional monetary aggregates for November 1990 and are incorporated in the statistics in this issue of the Bulletin. The method of seasonal adjustment now used in the latest update is new in several respects; the changes that have been made are described below. The final section describes some prospective changes in the frequency of future updates.

Full details of the method introduced in the 1990 update will be given in a *Discussion paper* to be issued in the spring. The comments received from readers of the *Discussion paper* may suggest ways in which the seasonal adjustment procedure can be improved; in any case, the performance of the method will be monitored with a view to identifying any improvements.

The new method makes it both easier and more desirable to update adjustments more frequently than in the past, and changes in the timing of future updates are also considered below.

Methodological changes

(a) A common moving average procedure

Seasonal adjustment methods aim to remove the regular periodic behaviour associated with seasonal influences, by isolating seasonal effects from other types of variation. Like other methods, including its predecessor, the method used in the 1990 update computes the seasonal effect at any particular month or quarter by averaging the effects observed in surrounding years.

In the previous method, the 'moving average' procedure was allowed to differ from one series to another. As a consequence, the resulting seasonal adjustments in practice never 'balanced'; that is, the corresponding seasonally adjusted series did not obey the same accounting constraints as the unadjusted series (for example, M4 should be equal to the sum of its counterparts and all sectors in any given line of the flow of funds matrix should generally sum to zero). There had therefore to be a second stage in which the seasonal adjustments were modified so as to produce the desired set of balanced adjustments.⁽¹⁾

The method adopted in the 1990 update applies the same moving average procedure to all series. In this way it ensures that the seasonal adjustments automatically balance, and therefore that the seasonally adjusted series obey the same accounting constraints as the unadjusted series.

(b) A shorter window

The data entering the moving average can be thought of as being covered by a 'window'. Where the window is relatively long, the seasonal adjustment computed for a given month or quarter tends to change little from one year to the next, since only a small proportion of the data covered by the window is replaced each year as the window 'moves' through the series.⁽²⁾ With a relatively short window, on the other hand, a larger proportion of the data is replaced each year, and the seasonal adjustments can react more quickly to new information; however, a short window also allows the adjustments to respond more to transient variations in the data.

The window used in this update is designed to ensure that, in general, no pattern in the seasonally adjusted series persists for three or more years. It covers a shorter period of data than those used in previous updates. In the earlier method, the window extended over the entire series, though the weighting (which, as noted earlier, could vary from one series to another) was usually concentrated in the seven or eight years around the current observation.⁽³⁾ In the 1990 update, the window is six years long (except at the ends of the series, where it reduces to three), with the weighting reaching a maximum at the midpoint.

Users of the seasonal adjustments should note that, as a consequence of this change to a shorter window, the adjustment applied to a recent observation may be more heavily revised at subsequent updates, when further data are

(1) The need for balanced seasonal adjustments was confirmed by the *Working Party on Seasonal Adjustment of the Monetary Aggregates: Report*, Central Statistical Office, 8 September 1988.

(2) The precise nature of the response to the incoming data is, of course, dependent upon the weights applied.

(3) M0 was an exception, for which fixed-length moving averages were used: they were equivalent to a seven-year window, with the weighting reaching a maximum at the midpoint.

received, than was the case using the earlier method. However, in the absence of revisions to the unadjusted data, there will be no further revision to that seasonal adjustment once four years of subsequent data are available, in contrast to the earlier method when revisions to seasonal adjustments in some cases extended back ten or more years.

(c) Evolving calendar month seasonal adjustments

Data on a calendar month basis exist only from July 1982.⁽¹⁾ Thus in previous annual updates there were barely enough data on which to base evolving monthly seasonal adjustments, which instead were interpolated from quarterly adjustments assuming a fixed intra-quarter pattern. The 1990 update is the first in which seasonal adjustments for monthly series have been estimated direct from monthly unadjusted data.

(d) Treatment of outliers

Atypical observations, often manifested as 'outliers', have the potential to distort estimates of the trend and the seasonal patterns in the series. It is therefore important to identify them and consider the effects they might have.

The seasonal adjustment procedure used in previous updates automatically modified any observation that, after a preliminary seasonal adjustment, lay some way off the underlying trend. Such procedures are widely used; but they do not produce inherently balanced seasonal adjustments, because the outlier modifications are applied independently to different series. (Under the old procedure, the discrepancies thus introduced were removed during the second stage.) Automatic outlier modification procedures also discount information mechanically without seeking to identify the reasons for the apparent anomalies.

In the 1990 update the outliers were identified in the usual way but no use was made of automatic modification procedures. Instead each extreme observation was investigated before deciding whether or not to modify the data. Events that might have given rise to outliers in series are well documented.⁽²⁾ Because of the need to preserve accounting constraints, if an adjustment was made to one series then offsetting adjustments were applied to other appropriate series.

The following amounts (in £ millions) have been added—with due regard to sign—to the unadjusted data before deriving the seasonal adjustments:

M0

(for which the seasonal adjustments are derived from data from June 1969 to October 1990)

1971
Feb.-July Notes and coin -38, -27, -16, -10, -7, -3
(coin circulation temporarily boosted by decimalisation)⁽³⁾

Monthly M2, M4 and M4 lending (financial year constrained)

(for which the seasonal adjustments are derived from data from July 1982 to September 1990)

1986 Sept. Banks' non-interest-bearing deposits -750
Building societies' retail deposits in M2 +750
(result of the TSB flotation)

1986 Oct. Opposite modifications to those in Sept. 1986
(result of the TSB flotation)

1987 Oct. M4 (banks' wholesale deposits) -1,700
(large rise in official reserves; see also 1987 Q4 below)

1988 July M4 (banks' wholesale deposits) -1,300
Bank lending -900, building societies' lending -400
(deadline for ending multiple mortgage interest tax relief; financing of takeover activity)

1989 Feb. M4 (banks' wholesale deposits) -500
(large redemption of gilt-edged stock; see also 1989 Q1 below)

1989 Dec. Bank lending -1,200
M4 (banks' wholesale deposits) -800
(events associated with the privatisation of the water companies, unusual timing of corporation tax, and sizable takeover finance; see also 1989 Q4 below)

Quarterly M4 and its counterparts (financial year constrained)⁽⁴⁾

(for which the seasonal adjustments are derived from data from 1982 Q3 to 1990 Q3)

1987 Q2 Public sector externals -1,600
CG debt sales +1,000
Banks' and building societies' externals +600
(large rise in official reserves)

1987 Q4 Public sector externals -1,700
(see 1987 October above)

1989 Q1 CG debt sales -500
(see 1989 February above)

1989 Q4 Public sector externals +1,800
Banks' and building societies' externals -1,800

(1) See the December 1986 *Bulletin*, page 519.

(2) See for example the *Discussion paper* 'Breaks in monetary series' (*Technical series*, number 23, February 1989) and notes to the statistical annexes of *Quarterly Bulletins*.

(3) In this update the seasonal adjustments on M0 incorporate, for the first time, an adjustment in respect of coin as well as notes.

(4) In addition to the adjustments, outlined above, made to the monthly data, these adjustments were made to the quarterly financial year constrained data.

(large fall in official reserves)
PSBR +400
(see 1989 December above)

Quarterly M4 and its counterparts (calendar year constrained)

(for which the seasonal adjustments are derived from data from 1963 Q2 to 1990 Q3).

1981 Q2 PSBR -1,000
M4 lending +1,000
(impact of the Civil Service dispute)

Flow of funds data (calendar year constrained)

(for which the seasonal adjustments are derived from data from 1963 Q2 to 1990 Q3)

1981 Q2
Line 15 Issue Department's transactions in bills
Central Government +1,000
Industrial and commercial companies -1,000

(e) Deterministic adjustments

In previous updates of the seasonal adjustments, petroleum revenue tax (PRT) and building societies' payments of composite rate tax (CRT) were treated in a special, 'deterministic', way.⁽¹⁾

In this update, however, PRT has been adjusted deterministically only over the period from July 1982 to September 1987 for monthly data and from 1978 Q4 to 1987 Q3 for quarterly data, and building societies' CRT only over the period from July 1983 to June 1989 for monthly data and from 1983 Q3 to 1989 Q2 for quarterly data. After these periods there seems to be no substantial advantage in adopting a special treatment for these items.⁽²⁾

Comparison of old and new seasonally adjusted series

Some differences between new and old series are apparent from the charts:

Monthly monetary aggregates data

In M0, the new seasonally adjusted series of three-month and six-month growth rates no longer display the annual

swings from peak to trough that are discernible in the old from 1986 onwards.

In M4 and M4 lending, the one-month growth rates are smoother using the new seasonal adjustments than the old and, in particular, the within-quarter pattern visible from mid-1988 onwards in the old series is not detectable in the new.

Other features apparent in the old series are largely preserved in the new; for example, the fluctuations in the three-month growth rate of M4 in 1986-87 and the peak in mid-1988 are similar in both cases. However, the downturn in M4 growth in 1990 is somewhat smoother using the new seasonal adjustments.

Quarterly monetary aggregates data

In the sectoral data, the new three-month and twelve-month growth rates for M4 and lending follow similar paths to the old.

Prospective changes in update schedule

The adoption of a relatively short window to determine the seasonal adjustments means that each new observation contains a significant proportion of the information upon which seasonal adjustments for the current and recent previous periods are based. The Bank therefore intends to carry out an update of the adjustments when data to March 1991 become available and hopes to promulgate the results with the April or May 1991 outturn statistics published in May or June.

There are some advantages in going further and moving to 'current updating' (ie re-estimating the seasonal adjustments each month, using the latest observations).⁽³⁾ This would reduce future revisions to the seasonally adjusted data because the seasonal adjustments employed would not need to be forecast so far ahead: for example, there would be no need to base forecasts of this year's seasonal adjustments to M4 on data that ended in September 1990.⁽⁴⁾ Current updating is not without its costs, both in the resources required to carry out the procedures and in the difficulties posed for analysts and commentators who have to absorb the results of frequent updates. During the coming year the Bank will examine the feasibility and desirability of introducing more frequent updating.

(1) See the text and glossary on page 89 of the February 1989 *Bulletin*.

(2) This is in keeping with the recommendations of the *Working Party on Seasonal Adjustment of the Monetary Aggregates: Report*, Central Statistical Office, 8 September 1988. The technique for phasing out the deterministic adjustments will be described in the forthcoming *Discussion paper*.

(3) See the conclusions and recommendations of the *Working Party on Seasonal Adjustment of the Monetary Aggregates*, reproduced on pages 88-9 of the February 1989 *Bulletin*.

(4) Some extrapolation of seasonal adjustments is necessary, since the moving average procedures described earlier do not produce adjustments to data near each end of the series. The amount of data uncovered at each end is half the window length; thus in the current method, for example, the adjustments for the last eighteen months have to be extrapolated.

Chart 1
M0 seasonally adjusted growth rates

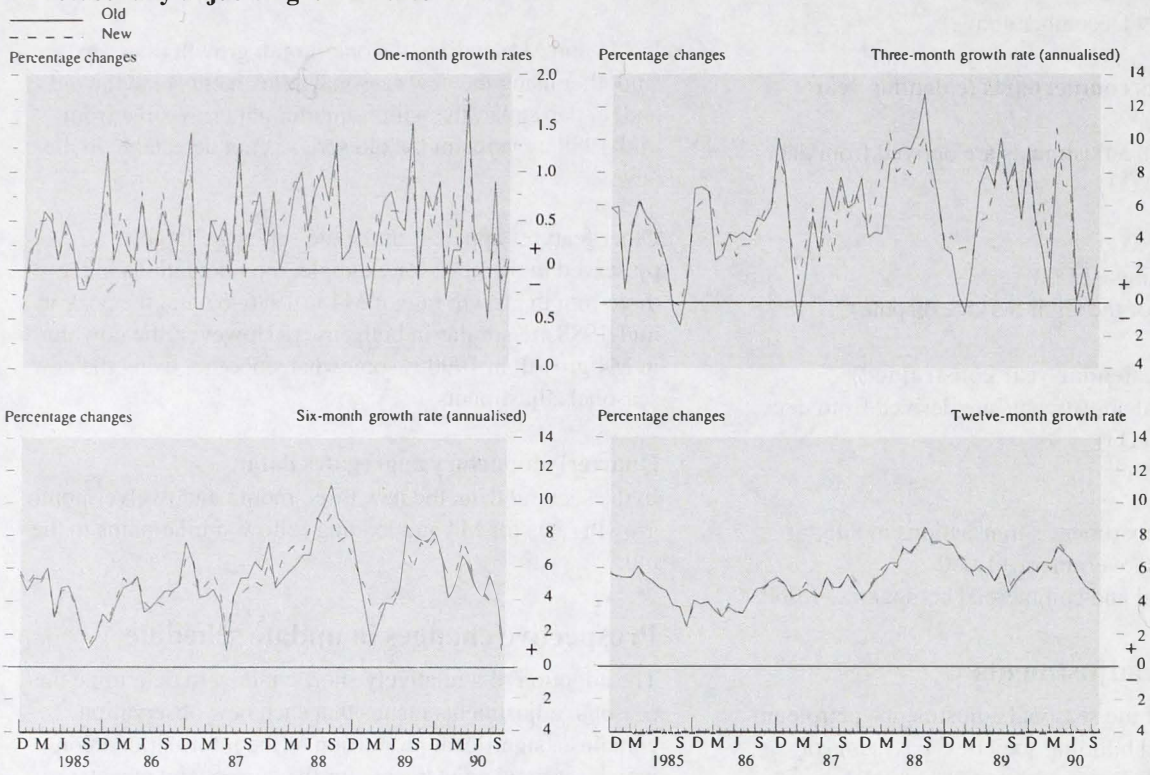


Chart 2
M4 seasonally adjusted growth rates

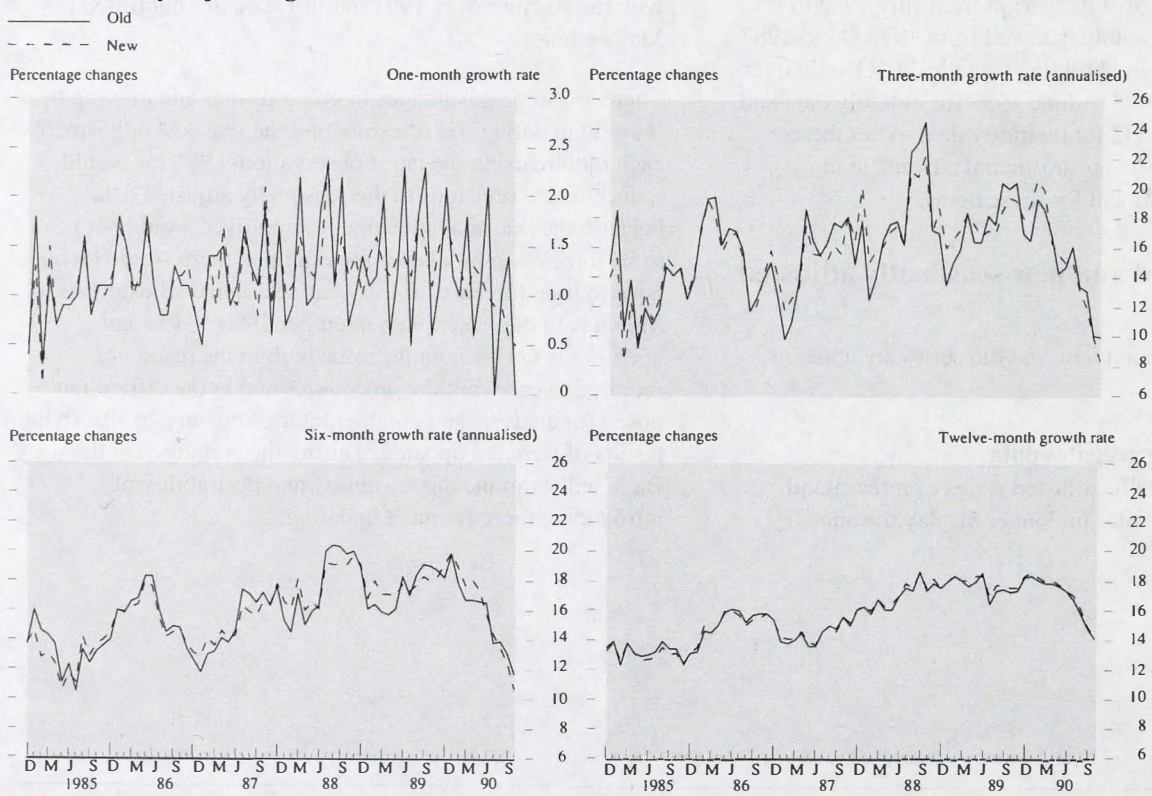


Chart 3
M4 lending seasonally adjusted growth rates

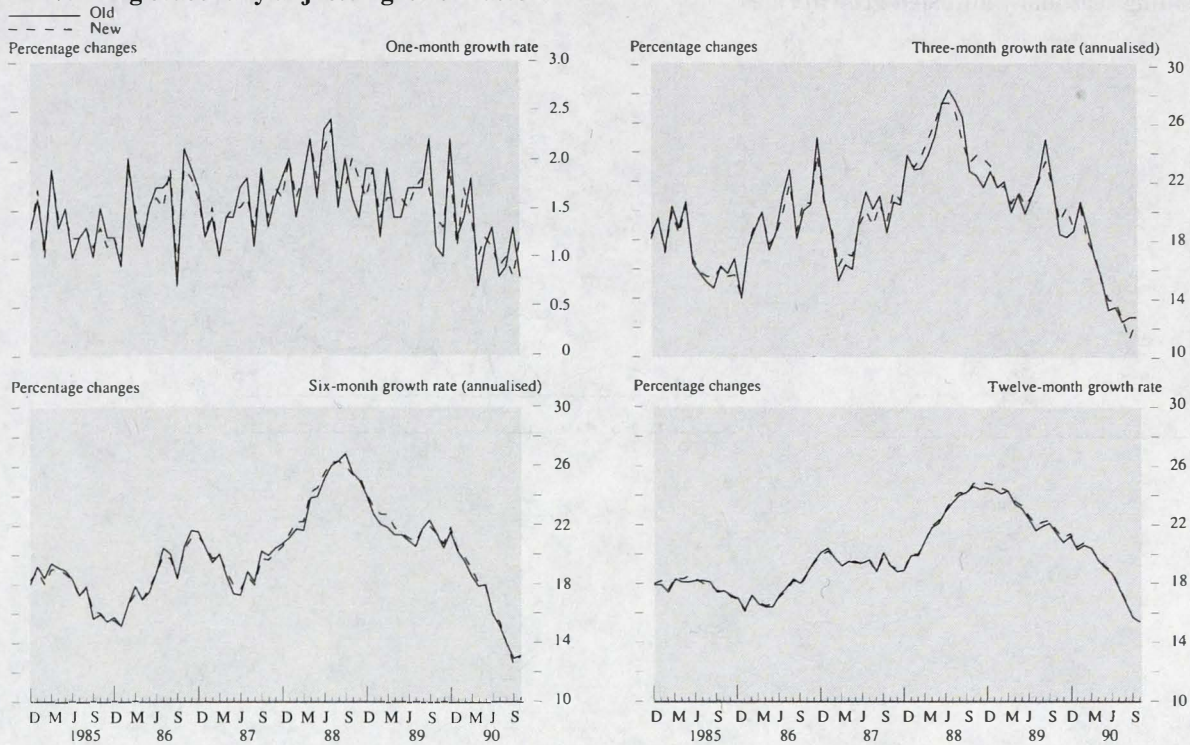


Chart 4
Sectorised M4 seasonally adjusted growth rates

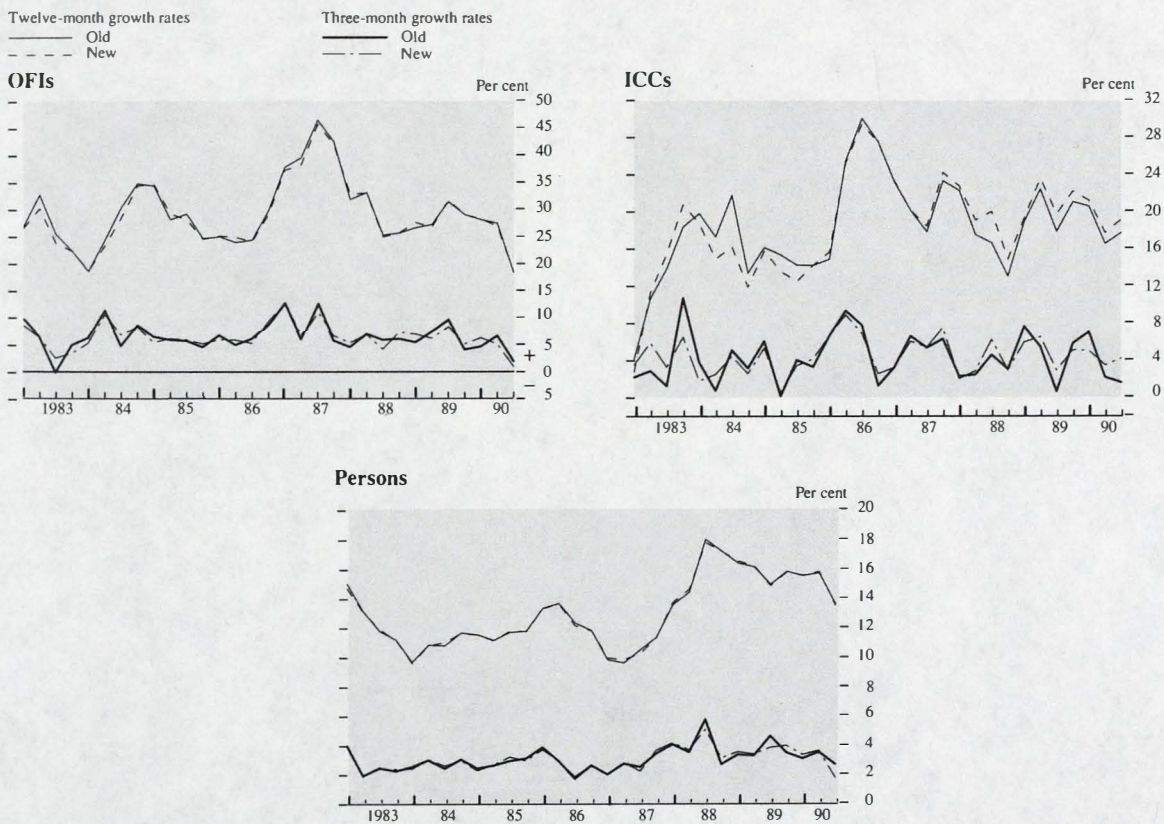
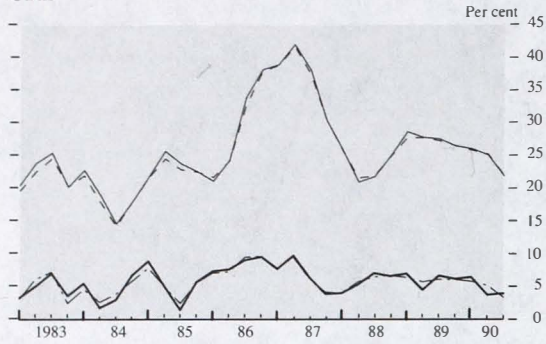


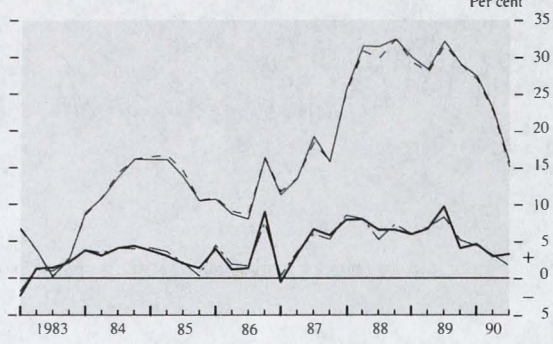
Chart 5
Sectorised M4 lending seasonally adjusted growth rates

Twelve-month growth rates Three-month growth rates
 — Old — Old
 - - - New - - - New

OFIs



ICCs



Persons

