Prospective change in seasonal adjustment methodology:
consultation with users: summary of responses

This note summarises the responses received to a consultation paper on the Bank’s prospective change of its seasonal adjustment method, gives the Bank’s comment on the responses and lists the next steps towards implementation of the new method around the end of 2003.

Background

1 In November 2002 the Bank issued a consultation paper announcing its plans to change the seasonal adjustment methodology that it uses in the monetary statistics. The paper set out the reasons for the prospective change and possible resultant differences in the seasonal adjustments. In particular, ‘additivity’ in the seasonally adjusted series (ie precisely preserving the accounting relationships of the non-seasonally adjusted series) is no longer seen as essential, thus opening the way for the change from GLAS, a comparatively simple moving-average method, to X-12-ARIMA, a more sophisticated method which, though still based on moving averages, includes features such as a time-series-modelling component, the ability to produce multiplicative – proportionate – adjustments as well as additive ones, and systematic removal of calendar effects such as those resultant on the length of the month.

Responses to the consultation paper

2 The paper was put on the Bank’s website on 20 November, simultaneously with the monthly release of the provisional broad money and credit statistics; paper copies were made available and were sent to recipients of paper copies of the money and credit release. The paper was also sent to those who attended the Bank’s March 2000 Workshop on seasonal adjustment and to certain other statisticians in central banks, and it was included in the November (website-only) edition of Monetary and Financial Statistics. Comments were invited by 10 January 2003.

3 Eleven responses have been received, two from UK official bodies, four from other central banks, three from academic specialists in seasonal adjustment, one from a banking association and one from an economist in a financial institution.

Main points made in the responses

Choice of method

4 Eight respondents explicitly welcomed the Bank’s decision to change the method used; of these, six explicitly welcomed the choice of X-12-ARIMA as the new method.
Reasons quoted in support of X-12-ARIMA included its range of options, its provision of diagnostics on the nature and quality of its seasonal adjustments, and its status as an international standard. Of those who welcomed the choice of X-12-ARIMA, one respondent commented that the model-based method TRAMO-SEATS has some benefits as a supplement to X-12-ARIMA; another said that, while model-based methods have considerable theoretical appeal, there are reservations among seasonal adjustment specialists over the difficulty of identifying good models for some series, the robustness of model-based adjustment and its quality in some situations. One respondent who welcomed the choice of X-12-ARIMA pointed out that multivariate methods could also be used as a tool to supplement univariate methods such as X-12-ARIMA or TRAMO-SEATS. No one objected to the move away from GLAS, but two respondents noted the extra cost of using X-12-ARIMA (including the need to maintain proper training, especially because of the method’s greater complexity), and of these one commented that the cost will be justified only if the new method’s capabilities are fully used. The latter respondent noted also that the availability of the extra options in the new method increased the importance of maintaining the dialogue between the producers and the users of the statistics.

Alternative methods to adjust weekly series

5 Notes and coin (in M0) will no longer be seasonally adjusted on a weekly frequency. This is because X-12-ARIMA does not have a supported programme for weekly series, and for resource reasons we wanted to choose the same seasonal adjustment method for all series (our tests show that X-12-ARIMA – with its sophisticated treatment of calendar effects – produces at least as good monthly results for notes and coin as our current method, GLAS). Respondents noted two techniques other than GLAS that might be used to adjust weekly observations.1

Use of options within X-12-ARIMA

6 A respondent noted that X-12-ARIMA provides a test to indicate whether the seasonality of a series is multiplicative (proportionate to the amounts outstanding) or additive, and two other respondents said that the seasonality of monetary series is likely to be multiplicative.

7 X-12-ARIMA identifies extreme values (‘outliers’) and provides for them to be modified or completely discounted. Respondents from a producer of statistics that uses X-12-ARIMA commented that it is important to monitor the automatic detection of outliers, and that their institution keeps outlier correction to a minimum because of the

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arbitrary nature of the correction. Another respondent welcomed use of the automatic treatment because it reduces subjectivity.

8 Three respondents welcomed X-12-ARIMA’s ability to adjust for calendar effects.

9 On frequency of updating, a producer of statistics noted that they generally update only annually, as the seasonality of their series tends to be stable, but monitor the appropriateness of the adjustments regularly between annual updates. Another respondent asked whether the modelling part of the method should not be updated concurrently (ie on arrival of each new observation), if it is an important element in determining the adjustments.

10 Two respondents noted that revisions will go further back to the extent that a longer filter is used. One respondent disliked revisions, on the grounds that they are a nuisance and reduce confidence in the statistics.

Additivity

11 Full use of X12-ARIMA to produce the best seasonal adjustments for each individual series entails that additivity (precise preservation of accounting identities) will no longer be automatically maintained in the seasonally adjusted series. One respondent wanted additivity to be in general maintained where (as in the monetary statistics) accounting identities are involved, but envisaged that this constraint could be relaxed if relaxation was fully justified. One respondent cited the value of additivity for those doing short-term monetary analysis and concluded that, even if there are good statistical reasons why precise additivity is impossible, lack of additivity should be minimised. Another respondent noted that the frequent understanding of seasonal adjustment as a transformation of the actual world into a world where no seasonal and calendar effects occur would suggest that additivity should be maintained; but he went on to note instances in which direct adjustment of an aggregate would be justified (implying potential lack of additivity with the components of that aggregate). Three respondents made the point that the uses to which people put the statistics were relevant (eg a focus on growth rates or on a limited set of core series – rather than a matrix of economic accounts – could make additivity less important). Five respondents, including the academic specialists who commented on this section of the paper, explicitly or implicitly supported not requiring additivity.

12 The consultation paper noted that the lack of additivity may not be substantial, and that the diagnostics available in X12-ARIMA can indicate that indirect seasonal adjustment of an aggregate (ie where the seasonally adjusted aggregate is defined as the sum of its seasonally adjusted components) is of similar quality to direct adjustment of the aggregate itself. On the paper’s point that indirect adjustment is likely to be better when the components have differing seasonal patterns from each other, that are comparatively clearly identifiable, a respondent noted that a further precondition for superiority of indirect adjustment is that these differing patterns must themselves shift
over time. Another respondent suggested that seasonality is identified better on more highly aggregated time series, both because of the diverse factors at work and because seasonality can never be more than an estimate. One respondent said that priority should be given to obtaining the best estimates of seasonality for series that are of greater economic interest (e.g., in his opinion M2/retail M4 and M4).

13 Two respondents noted—without necessarily supporting use of these options—possible treatments of the residuals between components and aggregates (where the aggregate is seasonally adjusted ‘directly’, rather than indirectly by summing its seasonally adjusted components): adding them to series whose seasonality is least certain, or adding them to less meaningful series. Two other respondents opposed ‘losing’ the residuals, preferring that their existence and, for any non-trivial ones, their cause (identified from the diagnostic tools available in X-12-ARIMA) should be noted in the statistics. One of these respondents emphasised the importance of retaining the expertise of the producers of the statistics on their institutional environment, both to aid consideration of the residuals and more generally.

Constraint over a 12-month period

14 Three respondents explicitly agreed with the paper’s proposal to cease constraining the seasonal adjustment to zero systematically over any 12-month period, as this in principle worsens the adjustments. One respondent did, though, prefer constraining, particularly— for his modelling purposes—of the public sector net cash requirement on a calendar year basis (for the sake of consistency with seasonally adjusted data published by the Office for National Statistics).

Bank of England comment

15 The Bank is grateful for the advice and comments received, which covered users of the statistics, institutions already applying X-12-ARIMA, and academic specialists in seasonal adjustment. There was general support for the switch to X-12-ARIMA. As the consultation paper noted, full use of X-12-ARIMA will mean that precise additivity is no longer maintained. We believe that it is best to utilise the method fully, to produce the best adjustments for key series, in the light of the present way that the Monetary Policy Committee and others generally use the monetary statistics. Nonetheless we recognise the value, even for the way that the statistics are now generally used, of having statistics that at least broadly obey the accounting constraints of the non-adjusted series. Our work so far, covering a number of the main areas of the monetary statistics, shows that lack of additivity is unlikely to be material. The statistics should be transparent, in respect of how aggregates have been produced (directly by seasonally adjusting them in their own right, or indirectly by summing components) and of the size of residuals (between aggregates and their components and between different ways of producing the aggregates) and their treatment.
Next steps

16 The Bank is continuing work, with a view to introducing the new method around the end of 2003. We want to leave open the possibility of further external consultation; but, given the results of our work so far and the advice readily available from the board that is controlling the work, it is likely that the guidance given in the responses described here will be sufficient, supplemented by, if appropriate, further bilateral contacts.²

Bank of England
20 February 2003

² The board controlling the work includes Bank statisticians and Bank users of the statistics, the Head of the Time Series Analysis Branch of the Office for National Statistics, and two external consultants. Advice has been readily supplied also by the US Census Bureau, which is the main custodian and developer of X-12-ARIMA.