Addendum to article “Retail Sales Index Development: Implementation”

The revisions policy described in the paragraph headed “Revisions policy and practice” has now been updated and the table should be replaced by the following where “t” represents the current calendar year.

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<tr>
<th>Publication month</th>
<th>RSI results published</th>
<th>Earliest month normally open for revision</th>
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Note that in the publication month of the UK National Accounts Blue Book, usually either June or September, the revisions policy for the Blue Book applies instead of the above. The policy is also based on the assumption that the Budget Report takes place in March.

The above policy differs from that previously published for the RSI only in respect of the February publication month. It implied that revisions would be made to all periods from October in the previous year (t-1) when estimates for January are published (in February). We have now reviewed this and believe that it is more helpful to users to take revisions back to January of the previous year. This is to allow any changes in the seasonal pattern to emerge over the most recent months (which would affect the seasonal factors for the previous year) to be represented in the series. It also brings the revisions policy for the RSI in line with National Accounts policy for this period.
Retail sales index development

A number of aspects of the methods and systems used to produce the Retail Sales Index (RSI) have been reviewed. The changes to the Retail Sales Inquiry and Retail Sales Index outlined in this article represent the largest investment of methodological development for the RSI in twenty years. They ensure that RSI methods are soundly based and incorporate standard methods used for other ONS business surveys.

The changes were introduced to the published series from 24 October 2003. They affect all published series, and lead to revisions to levels for all periods and revisions to growth rates from January 2000. The new series shows a different path and more month-on-month volatility, better reflecting the nature of retail sales than the old series.

Introduction

This is the third in a series of Economic Trends articles on the Retail Sales Index. The first, 'Interpreting Retail Sales Data' (April 2003), gave an overview of the RSI. The second 'Retail Sales Index Development' (June 2003), described development and investigatory work under way for the RSI. This third article explains the changes that have been introduced and gives an indication of their impact on the headline RSI. The new RSI methods and data 'went live' on 24 October 2003. Results for the period from January 2000 to December 2002 are shown in this article and were released early to enable users to assess the impact of the changes. This early release on 30 September 2003 is consistent with the National Statistics Protocol on Release Practices and coincided with the annual Blue Book National Accounts dataset.

The Retail Sales Index and the Retail Sales Inquiry

The Retail Sales Index and the Retail Sales Inquiry are explained in an article 'Interpreting Retail Sales Data' published in the April 2003 Economic Trends. The key features of each are listed below:

The Retail Sales Index

- measures movements in average weekly retail turnover in Great Britain;
- based on standard periods of four, four, five weeks each quarter;
- a Laspeyres base-weighted index;
- headline data are presented in constant prices (volume) seasonally adjusted;
- published after 14 working days;
- based on the monthly Retail Sales Inquiry.

The Retail Sales Inquiry

- sample size of 5,000;
- all large 100-plus employees retailers in sample every month;
- stratified random sample of smaller retailers.

Retail Sales Index redevelopment

The development and investigatory work for the RSI described in the June 2003 article 'Retail Sales Index Development' has included:

- rebasing RSI deflators, using 2000 commodity sales data from the Annual Business Inquiry (ABI);
re-running results under the old ‘matched pairs’ methodology from January 2000 to take on late or revised data to provide a benchmark against which to compare the effects of other changes;

- changes to the Retail Sales Inquiry, including survey estimation and other survey processes — in particular a change to ‘ratio estimation’, the ONS standard method for business surveys;

- the use of year 2000 sales data to weight the component series — for both the rerun matched pairs and new estimator series, to understand the effect of estimator changes;

- a review of other processes, including calendar and seasonal adjustment.

The associated changes in the Retail Sales Inquiry and the Retail Sales Index have now been implemented. To avoid a number of separate revisions, these changes are all being introduced at the same time. The rest of this article explains the main changes in methods and approach, and illustrates their impact on the headline RSI. More detailed methodological information is available in a web-only technical report entitled Retail Sales Index – A Description of the New Methods, hereafter referred to as the Methods Report.

Throughout this article there are references in the text and in charts to different versions of the RSI. There are three main versions, defined as follows:

- old RSI – the series published prior to October 2003, re-referenced to 2000=100;

- interim RSI – the series resulting from re-running the old matched pairs methodology with year 2000 component weights and revised data;

- new RSI – the rebased RSI produced using the new ratio estimation methodology (published from 24 October 2003).

Changes to survey estimation and impact on the headline RSI value, not seasonally adjusted series

The feasibility of introducing ratio estimation to the Retail Sales Inquiry was fully explored and the conclusion was that this standard ONS business survey estimation method should be adopted.

The impact of the move to ratio estimation is illustrated in Figure 1 (index levels) and Figure 2 (three-month changes on the same period a year earlier). These graphs show value not seasonally adjusted series for the three different RSIs as defined under RSI development.

Figure 1 indicates that the levels of the three series are similar in 2000, but they move apart during 2001 and 2002, with the index values of the new RSI generally being between those of the old and interim RSIs. In order to interpret the differences between the series it is helpful to look at the growth rates shown in Figure 2.

The new RSI shows a larger decline in growth between December 2000 and January 2001 than the old RSI. Growth rates from mid-2001 to the end of 2001 are similar and, from then on, the new RSI tends to show higher growth.

Some of the differences indicated in Figures 1 and 2 can be attributed to fewer returns being treated as outliers. Unusually high or low turnover returns from retailers are treated as outliers and excluded from general estimation. With the benefit of a longer run of data, previous outlier decisions have been reviewed. A more conservative approach to outlier detection is now being taken and, consequently, there is an increase in the amount of data treated as representative of other retailers in the same industry and of similar size. This has an impact on much of the series. An example of these effects is between December 2000 and January 2001, where the new RSI shows a decline into January of about 0.8 index points more than the old RSI. Also, in spring 2002 unusually strong growth in garden centre and DIY stores was partially
treated as outlier data. Reviewing these decisions has led to an increase of about 0.8 index points for new RSI series between February and March 2002.

Other differences are due to the inclusion of late data not available at the time of publication. For example, the new RSI shows a large increase between January and February 2002 instead of a small decrease due to late-returned data that was excluded from the old RSI. This was because of restrictions associated with the old methodology and its related revisions policy. This late data is included in the interim RSI.

Smaller differences are caused by the method for imputing for non-response, that is, producing an estimate for late returns, having been updated. The changes to imputation are explained in the Methods Report, but do not have a large aggregate impact on the historical series. Updated retail trading-day weights have also been introduced. Trading-day weights are used to bring returned data into line with the Retail Sales Inquiry’s standard four- or five-week periods, for example when survey respondents have provided calendar month data. This improvement is also described in more detail in the Methods Report and leads to some shifts of sales values between months. It does not, however, change the overall story significantly.

The three-months on three-months a year earlier comparisons in Figure 3 show similar movements for the three series. The combined effect of the changes described above are that the new RSI value not seasonally adjusted series is lower than the old RSI in early 2001, and higher in spring 2002. This leads to a large difference in the three-months on three-months annual growth rates during spring 2002. The new RSI and the interim RSI both show much stronger growth than the old RSI during this period.

Changes to deflation and impact on RSI volume not seasonally adjusted series

We have taken the opportunity of rebasing to update some other aspects of the methods used to derive deflators:
the detailed Retail Prices Index (RPI) components have been rebased using year 2000 commodity sales patterns from year 2000 ABI data;

- COICOP (Classification of Individual Consumption by Purpose) classifications have been used to combine RPI commodity components to produce industry deflators;

- industry deflators have been calculated as weighted harmonic means of the RPI commodity indices, as opposed to weighted arithmetic means. This follows analysis of RSI data as to which method gives the best approximation to price deflators that reflect current month expenditure by commodity. More detail is given in the Methods Report;

- all commodities are now used in the calculation of industry deflators. For the old RSI, only commodities that contributed to more than one per cent of the total sales for an industry (based on 2000 ABI data) were included in the calculation of industry level deflators.

Figure 4 below shows the implied deflators. It compares the deflator for the new RSI with what it would have been using the old set of deflators (not rebased). An indication is also given of what the implied deflator would have been without the change in aggregation method.

Figure 4 shows that rebasing the detailed RPI components using 2000 commodity sales patterns gives a deflator showing a lower rate of increase. The change from arithmetic to harmonic aggregation gives a series that has a lower rate again. From early 2002, however, the change in index aggregation methods has had just as large an impact on growth rates as rebasing. Both changes have reduced the deflators (and will have thus increased the RSI volume series). As a result of the deflator changes, the seasonally adjusted volume RSI index is 2.1 percentage points higher in December 2002.

Figure 5 shows the effects of the survey and deflator changes on the RSI volume not seasonally adjusted series. The graph compares the old RSI (based on matched pairs, 1995 weights, old commodity classification, arithmetic mean) with what
the new RSI would be using the old deflators. Also shown is what the new RSI would be with rebased deflators aggregated arithmetically. All the above are compared to the new RSI, the ratio estimator series deflated using rebased deflators, calculated using harmonic aggregation.

Figure 5 shows that the largest changes to the RSI volume not seasonally adjusted series are typically caused by the changes in the value series as explained under changes to survey estimation, from taking on late data and changed outlier decisions. The rebasing of the deflators adds up to an additional 0.9 percentage points to the three months on three months a year ago growth rates, for example in June 2001 (see the gap between the lines called ‘New RSI, old deflation method’ and ‘New RSI, COICOP arithmetic deflation method’).

The move from arithmetic to harmonic deflators typically leads to smaller increases than the effect of rebasing the deflators (see the gap between the lines called ‘New RSI, COICOP arithmetic deflation method’ and ‘new RSI, new deflation method’).

### Changes to seasonal adjustment and impact on RSI volume seasonally adjusted series

This part looks at the impact of updating calendar and seasonal adjustment on the new volume series, based on the new survey processes and the new deflators.

Calendar adjustment deals with moving bank holidays and the fact that the RSI standard periods move one day a year (two in leap years) relative to the calendar (the ‘phase-shift’ effect) and is based on a regression model. The model for the old RSI was derived using data up to the mid-1990s. It has now been revised using data up to the end of 2002.

Seasonal adjustment decomposes a series into trend, seasonal and irregular components, and removes the seasonal part. In line with good practice, we have reviewed and updated the seasonal adjustment parameters. This takes account of recent data, including the revisions from January 2000 as a result of rebasing and the move to ratio estimation.

As part of the review of seasonal adjustment we have looked at the length of the moving average used to identify the seasonal component. The old RSI seasonal adjustment used a very short moving average. This tends to produce a smoother seasonally adjusted series (as part of the irregular is removed at the same time) but is liable to greater revision in the light of later data. The new RSI now uses a longer moving average in identifying the seasonal component, which will lead to a more volatile seasonally adjusted series – but one that should be revised less when additional monthly data becomes available.

### Comparing impact of survey changes and seasonal adjustment changes

In this section we compare the impact of survey changes and seasonal adjustment changes on the RSI volume seasonally adjusted series. Figure 6 shows the new RSI volume index, seasonally adjusted using the old and the new calendar and seasonal adjustment methods.

Figure 6 shows that the largest changes to the index level between the old RSI and the new RSI are driven by changes to the value of the not seasonally adjusted series and by deflator changes.

The mean month-on-month absolute change for the volume-seasonally adjusted series for the period January 2000 to December 2002 is 0.93 per cent for the old RSI, and is 1.06 per cent for the new RSI. The new RSI is thus slightly more sensitive to changes in retail sales over this period.
Revisions policy and practice

A formal revisions policy was introduced when the new RSI was published in October 2003. The previous practice was to take account of returns received up to two months after the end of the month. Seasonal factors were updated by revising results for the previous two months and the same month a year earlier. The new policy is the same as for other ONS short-term economic indicators, except where timing differences require the RSI to adopt a slightly different policy. Long run revisions (for example, methods changes, rebasing) will be introduced at Blue Book. The following table sets out, for each month of 2002, the months that would have been open for revision if the RSI had followed the new revisions policy.

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<th>Publication month</th>
<th>RSI results published</th>
<th>Earliest month open for revision</th>
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Conclusion

The developments to the Retail Sales Inquiry and the Retail Sales Index described in this article follow the most significant review of the RSI for the last two decades.
The RSI team and ONS methodologists have reviewed, and updated where necessary, many aspects of the Retail Sales Inquiry and the Retail Sales Index, including:

- sample allocation;
- trading-day adjustment;
- imputing for non-responders;
- sample estimation methods;
- deflation;
- calendar and seasonal adjustment.

In addition:

- new computer systems have been built, which are more transparent and allow for easier analysis of the results;
- new working methods have been introduced along with documentation;
- staff have been trained in how to use the new approaches and tools.

The results in this article are different from the old RSI series (although many of these changes are due to the periodic RSI rebasing, or would have been taken on as part of rebasing), and a significant amount of time and effort has been put into quality assurance of the new methods and new results.

The main messages from this article are that the new RSI:

- incorporates a range of methodological improvements, which bring the RSI into line with other ONS business surveys and implement the recommendations from earlier reviews;
- shows a broadly consistent story from January 2000, with rebasing and deflator effects leading to increased growth over the period;
- shows a different story in the three-month on three-month a year ago story, with increased growth during 2002;
- is a slightly more volatile series, due to changes to both the survey estimation methods and the updating of calendar and seasonal adjustment.

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References
