Insolvency Statistics: Seasonal Adjustment Review

April 2020
Contents

Background ........................................................................................................................................ 3
Scope of the review .......................................................................................................................... 3
Analysis ............................................................................................................................................ 4
Summary of outcomes ....................................................................................................................... 5
  Compulsory Liquidations .................................................................................................................. 6
  Creditors’ Voluntary Liquidations .................................................................................................. 6
  Administrations ............................................................................................................................... 6
  Receiverships .................................................................................................................................. 6
  Company Voluntary Arrangements .................................................................................................. 6
  Total Bankruptcy Orders .................................................................................................................. 6
  Bankruptcy Orders – Creditor Petitions .......................................................................................... 6
  Bankruptcy Orders – Debtor Petitions ............................................................................................. 6
  Consumer Bankruptcy Orders .......................................................................................................... 7
  Sole Trader Bankruptcy Orders ...................................................................................................... 7
  Individual Voluntary Arrangements (IVAs) .................................................................................... 7
  Debt relief orders (DROs) ............................................................................................................... 7
  Total Bankruptcy Orders resulting in an Income Payments Order or Agreement ......................... 8
Background

Seasonal adjustment is the estimation and removal of effects on a time series that are a result of the time of year, such as the calendar month or Easter. Accounting for these effects makes it possible to analyse the underlying trend in the data.

A common example is retail sales, which peak as a result of the Christmas shopping period. However, this rapid increase in sales does not indicate a sustained upwards trend. Seasonal adjustment removes the effect estimated to be as a result only of Christmas, leaving the actual story in the data to be assessed.

If a data series is seasonal but is not adjusted to account for this, it is not valid to compare the current time period to the previous one.

The purpose of this annual review was to determine which of the data series included in the Insolvency Service’s National Statistics publication, Insolvency Statistics, should be adjusted to account for seasonality. This is part of the on-going commitment to improve the quality and relevance of the statistics produced by the Insolvency Service.

Scope of the review

Prior to this review, eight series were seasonally adjusted:

- Creditors’ voluntary liquidations
- Individual voluntary arrangements (IVAs)
- Total Bankruptcy Orders
- Administrations Bankruptcy orders – Creditor petition
- Bankruptcy orders – Debtor petition
- Bankruptcy orders – Creditor petition
- Debt Relief Orders (DROs)
- Consumer bankruptcy
- Trader bankruptcy
- Total Bankruptcy Orders resulting in an Income Payments Order or Agreement

These series have been reviewed to determine whether it was still appropriate to apply seasonal adjustment and, if so, whether the model being used was still applicable.

The following series had no identifiable seasonality in the previous review but were also considered for seasonal adjustment:

- Compulsory Liquidation

Data series for Scotland and Northern Ireland were outside the scope of this review.
The data used in this review can be found on the Insolvency Service website:

The revisions policy for seasonally adjusted series is set out in a separate document on our website. Changes to the revisions policy were not considered as part of this review, but the Statistics Team would welcome comments and feedback on this approach.

Analysis

All the data series published by the Insolvency Service contain quarterly flow data. They are series of differing lengths. Compulsory and creditors' voluntary liquidations exist as far back as Q1 1960, compared to IVAs from 1987 and Administrations from 1993. For the purposes of seasonal adjustment, data since Q1 2007 has been used, that is 13 full years of data at the time of this review. Debt Relief Orders were introduced in April 2009, therefore the series for Debt Relief Orders is from Q2 2009.

The Insolvency Service currently constrains the seasonally adjusted series to match the annual calendar year totals in the original data, a common approach. It has previously been advised that this may distort the seasonally adjusted totals, but doing so aids interpretation of the data.

For each series, the following have been reviewed:

- Tests for the presence of seasonality
- regARIMA model, which considers the ARIMA model, as well as features (prior adjustments) such as outliers, level shifts, temporary changes, seasonal breaks as well as Easter and trading day effects
- The optimal choice of filters for the seasonal moving average and trend moving averages

The analysis was carried out using X13-ARIMA-SEATS, the recommended programme for seasonal adjustment for National Statistics.

Detailed comments on each series are given in the following sections.
## Summary of outcomes

<table>
<thead>
<tr>
<th>Series</th>
<th>Decomposition</th>
<th>Model</th>
<th>Priors</th>
<th>Seasonal moving average</th>
<th>Trend moving average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compulsory Liquidations</td>
<td>No seasonality present</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Creditors’ Voluntary Liquidations¹</td>
<td>Multiplicative</td>
<td>Log(0,1,1)(0,1,1)</td>
<td>Easter[15]</td>
<td>3x5</td>
<td>5-term</td>
</tr>
<tr>
<td>Administrations¹</td>
<td>Multiplicative</td>
<td>Log(0,1,1)(0,1,1)</td>
<td>Easter[15] TC2008Q4</td>
<td>3x5</td>
<td>5-term</td>
</tr>
<tr>
<td>Receiverships</td>
<td>Seasonality not tested due to very small numbers of cases.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Company Voluntary Arrangements</td>
<td>Seasonality not tested due to very small numbers of cases.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bankruptcy Orders (total)¹</td>
<td>Multiplicative</td>
<td>Log(0,1,1)(0,1,1)</td>
<td>Easter[1]</td>
<td>3x5</td>
<td>5-term</td>
</tr>
<tr>
<td>Bankruptcy - Creditor petition¹</td>
<td>Multiplicative</td>
<td>Log(0,1,1)(0,1,1)</td>
<td>TD</td>
<td>3x5</td>
<td>5-term</td>
</tr>
<tr>
<td>Bankruptcy - Debtor petition¹</td>
<td>Multiplicative</td>
<td>Log(0,1,1)(0,1,1)</td>
<td>Easter[1] LS2016 Q3</td>
<td>3x5</td>
<td>5-term</td>
</tr>
<tr>
<td>Consumer bankruptcy¹</td>
<td>Multiplicative</td>
<td>Log(0,1,1)(0,1,1)</td>
<td>Easter[1] Q3</td>
<td>3x5</td>
<td>5-term</td>
</tr>
<tr>
<td>Trader bankruptcy¹</td>
<td>Multiplicative</td>
<td>Log(0,1,1)(0,1,1)</td>
<td>AO2010Q4</td>
<td>3x5</td>
<td>5-term</td>
</tr>
<tr>
<td>Individual Voluntary Arrangements¹</td>
<td>Multiplicative</td>
<td>Log(0,1,1)(0,1,1)</td>
<td></td>
<td>3x5</td>
<td>5-term</td>
</tr>
<tr>
<td>Debt relief orders¹</td>
<td>No seasonality present</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Bankruptcy Orders resulting in an Income Payments Order or Agreement¹</td>
<td>Multiplicative</td>
<td>Log(0,1,1)(0,1,1)</td>
<td>Easter[1]</td>
<td>3x5</td>
<td>5-term</td>
</tr>
</tbody>
</table>

¹ Series subject to seasonal adjustment prior to this review

AO – Additive outlier  LS – Level Shift  TC – Temporary Change  Easter[χ] – Easter effect of χ days  TD – Trading day effects
Compulsory Liquidations
Test previously showed no identifiable seasonality present in the compulsory liquidation series, this has been reviewed annually.

Testing again showed no identifiable seasonality present in the compulsory liquidation series. Therefore, this series will not be seasonally adjusted.

Creditors’ Voluntary Liquidations
Earlier reviews have found several outliers in the quarterly series caused by large numbers of connected personal services companies entering liquidation, following changes to claimable expense rules. For this reason, the underlying number of CVLs is used to test for seasonality as this excludes companies from the quarterly series. Similarly to the previous reviews, the series demonstrated significant seasonality. This seasonality is multiplicative; therefore a log transformation will be applied to the data.

Using the pick model function, the ARIMA model $(0,1,1)(0,1,1)$ was selected, along with a 3x5 seasonal moving average and a 5-term Henderson moving average to account for the trend.

Administrations
In previous reviews, the administrations times series demonstrated significant seasonality. During the 2019 review, no seasonality was detected. As the series had previously shown seasonality we chose to continue seasonal adjustment using the previous model and review annually.

This review has found that the series has again demonstrated significant seasonality. Using the pick model function, the ARIMA model $(0,1,1)(0,1,1)$ was selected. A temporary change was identified for Q4 2008, explained by 728 managed service companies entering administration on the same day in September 2008. However, this event appears to affect the series for more than one quarter, as these cases were registered over multiple periods.

Receiverships
Due to the very small numbers of receiverships there was no test for seasonality in the data.

Company Voluntary Arrangements
Due to the very small numbers of receiverships there was no test for seasonality in the data.

Total Bankruptcy Orders
The time series for total bankruptcy orders demonstrated significant seasonality. This seasonality is multiplicative; therefore a log transformation will be applied to the data. There were no changes made to the model since the review in 2019.

Bankruptcy Orders – Creditor Petitions
The time series for creditor petitions demonstrated significant seasonality. This seasonality is multiplicative, therefore a log transformation will be applied to the data. Testing suggested the use of a 3x3 seasonal moving average and a 5-term Henderson moving average. However, further testing of the suggested moving average in comparison to 3x5 seasonal moving average used in last year’s model found no change in AICC. For consistency the previous years seasonal moving average has been retained.
Bankruptcy Orders – Debtor Petitions
The time series for debtor petitions demonstrated highly significant seasonality. This seasonality is multiplicative, therefore a log transformation will be applied to the data.

The review in 2017 detected a level shift in 2016 Q3 and which was included in the prior adjustments to the model. This level shift is likely to be due to a change to the process for people making themselves bankrupt, which has removed the courts from the procedure. Subsequent reviews have not detected this level shift, however further testing found that a lower AIC score was recorded when a level shift for 2016Q3 was included in the model. Therefore this prior effect has been retained in the model as it was in earlier model.

Consumer Bankruptcy Orders
The time series for consumer bankruptcy orders demonstrated significant seasonality. This seasonality is multiplicative, therefore a log transformation will be applied to the data. This review suggested a change to Arima model \((0,1,2)(0,1,1)\), however further testing found the AICC score improved when the previous Arima model \((0,1,1)(0,1,1)\) was retained. For consistency the previous model will be used in this model.

An Easter effect was found to be significant and continues to be included in the model which has also been detected in earlier reviews.

Sole Trader Bankruptcy Orders
The time series for consumer bankruptcy orders demonstrated significant seasonality. This seasonality is multiplicative, therefore a log transformation will be applied to the data.

This review suggested a change to Arima model \((0,1,2)(0,1,1)\), however further testing found the changes in the AICC were negligible when the previous Arima model \((0,1,1)(0,1,1)\) was retained. For consistency the previous model will be used in this model and will continue to be reviewed.

As with the 2018 review testing detected a level shift in 2010 Q4, this corresponds to with a large fall in trader bankruptcies in Q3 2010 and return to previous levels in Q4 2010, as with the previous review further testing using a prior of AO 2010Q4 found the difference in AIC score to be negligible. A prior of AO 2010Q4 will be used in the model.

Individual Voluntary Arrangements (IVAs)
The time series for IVAs again demonstrated significant seasonality. This seasonality is multiplicative; therefore a log transformation will be applied to the data.

There were no changes made to the model since the review in 2019.

An Easter effect was no longer found to be significant and was removed from the model.

Debt relief orders (DROs)
The DROs time series was first tested for seasonality in 2018. That review detected significant seasonality and the time series was seasonal adjusted. The 2019 review, however, found no such seasonality in the time series. For consistency we retained the seasonal adjustment model for 2019 with an intention to review.
This review found, in line with the 2019 review, that no significant seasonality was present. Further testing found that although there were some differences between quarters in DRO levels, these differences were small in scale. For this reason, the DRO time series will no longer be seasonally adjusted.

**Total Bankruptcy Orders resulting in an Income Payments Order or Agreement**

The seasonality present is multiplicative. Therefore a log transformation will be applied to the data. There were no changes made to the model since the review in 2018.

© Crown copyright 2020

You may re-use this document/publication (not including logos) free of charge in any format or medium, under the terms of the Open Government Licence v3.0. To view this licence visit [http://www.nationalarchives.gov.uk/doc/open-government-licence/](http://www.nationalarchives.gov.uk/doc/open-government-licence/).

This document/publication is also available on our website at [https://www.gov.uk/government/collections/insolvency-service-official-statistics](https://www.gov.uk/government/collections/insolvency-service-official-statistics).

Any enquiries regarding this document/publication should be sent to us at [statistics@insolvency.gov.uk](mailto:statistics@insolvency.gov.uk).