Feature article: Producing high quality long time series

The OECD Main Economic Indicators (MEI) database has long been regarded as one of the best sources of high quality comparable statistics for short-term economic indicators across OECD Member countries. One of the key principles of the MEI database, and that which gives it a comparative advantage over other sources of international statistics, is its policy of maintaining long time series to support empirical analysis.

During 2004, the OECD has undertaken a major project to review the quality of long time series maintained in the Main Economic Indicators database. The results of this review are now complete, and changes to improve methodologies and thus the quality of the time series in the database have recently been introduced. These changes, which are described in detail below, were previously announced to users of the MEI through this publication and the database notes included with electronic products.

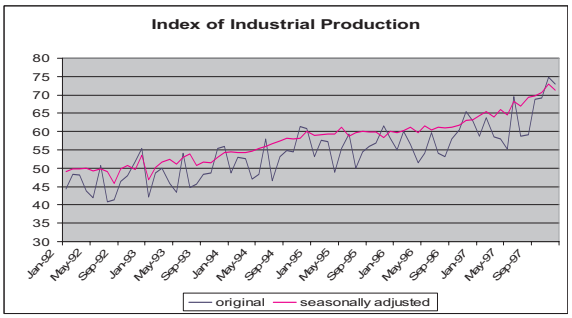
Linking time series

The first major issue tackled in the project was to review the method used to link different vintages of historical time series (expressed in index form) in order to create long time series in the MEI database. The need to link different vintages of countries time series for a particular subject arises when there may have been a change in methodology, classification or base year for a subject and the country only provides a short time series on the new basis. In most cases the country provides a new time series that has some period of overlap with the former series. Provided the overlap in the old and new time series is for a period of at least one year, the following two methods are the most common for linking the series:

» The 12-month (or 4-quarter) link method, which calculates a linking factor as the average of the first common year of observations of the new series divided by the equivalent observations of the old series;

» The first common period link method, which calculates a linking factor as the ratio of the first observation of the new series to the equivalent observation of the old series.

The first common period link method preserves the monthly (or quarterly) growth rate at the linking point from the old series. This method was previously the preferred method for linking time series in the MEI database. However, where both an original and seasonally adjusted version of the same series requires linking, this method can produce a spurious relationship between these two series if their linking factors are not identical. This problem was identified for several series, with an example of the impact shown in the graph below.



This problem often arises if there has been revisions to the monthly growth rates in the new version of the time series for the overlapping period with the old version, or if different seasonal adjustment methodologies have been used for the old and new versions of the time series. Under these circumstances, the 12-month link method is more likely to produce linking factors for the seasonally adjusted and original series which are very close, and thus the problem of inconsistencies in these two series is avoided by using this method. This result can also be shown to hold (approximately) algebraically, and a detailed paper on this issue is available from the OECD on demand.

Where revisions to monthly growth rates have been made to the new version of the time series for the overlapping period with the old version, the 12-month link method provides the most robust method for linking the time series provided the revisions are not biased in a particular direction. In the case where there is no revision to the monthly growth rates between the old and new versions of the series for the overlapping period, the 12-month link method and the first common period method yield the same result.

As a result of both theoretical and detailed empirical analysis, the 12-month link method is now the preferred method for linking different vintages of time series in the MEI database. Several changes were made to long time series on the MEI database containing links to adopt this new method, which has corrected the problem of the spurious relationship between seasonally adjusted and original versions of the same time series which existed in some cases.

However an exception to this rule is made in the case of price indices, where use of the first common period link method is preferred. This is due to the fact that in general price indices do not exhibit seasonality, and empirical analysis also revealed that revisions to monthly growth rates to the new version of the time series for the overlapping period with the old series were more likely to be biased in a particular direction.

For more information on OECD methodology for linking long time series, see http://www.oecd.org/document/21/0,2340,en_2649_33715_2073813_1_1_1_1,00.html.

OECD Main Country Groupings

The MEI publishes the following set of 'OECD Main Country Groupings' or 'area totals': OECD Total; OECD – Europe; EU 15; Euro area; Major Seven (United States, Canada, Japan, United Kingdom, France, Germany, Italy) for the following subjects: Industrial Production, Composite Leading Indicators, Passenger Car Registrations, Retail Trade, Consumer Prices, Producer Prices, Hourly Earnings, Standardised Unemployment Rates, Civilian Employment, Monetary Aggregates and International Trade.

The process for calculating these OECD area totals was the second major activity of the recent review, and it had the following key aims:

» introduce country weights for the year 2000;

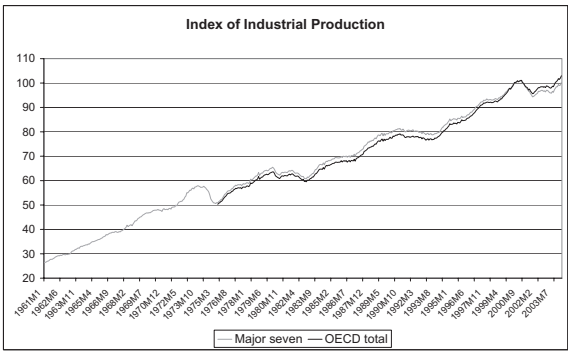
» increase the length of historical time series where possible.

The weights used to combine country data in forming area totals differ depending on the subject. Industrial Production, Composite Leading Indicators, Retail Trade, Consumer Price Indices, Producer Price Indices and Monetary Aggregates all use relevant aggregates in the base year (e.g. GDP in industry, Household Private Final Consumption Expenditure, Money Supply) adjusted by Purchasing Power Parities. Other series using weights that are not adjusted by Purchasing Power Parities are Passenger Car Registrations (number in the base year, smoothed) and Hourly Earnings (manufacturing employment in the base year). Other subjects area totals (Standardised Unemployment Rates, Civilian Employment and International Trade) are simply based on the sum of contributing countries data.

Where weights are used, area total series now use weights relating to the year 2000. These weights are updated on a 5 yearly basis coinciding with the introduction of a new base year. Due to the impact of differing rates of inflation between countries, area totals Consumer Price Indices and Producer Price Indices are annually re-weighted chained Laspeyres indices.

The historical time series for area totals were extended by two methods. The first involved restricting the period that transition economies (Poland, Hungary, Czech Republic and Slovak Republic) could contribute to area totals to 1990 onwards, at which point the series is chain linked to a 'reduced country' version of the area total. The second involved estimating some countries data to extend the period for which the area total could be calculated.

As an example of the outcome of this process, the historical OECD Total series for the Index of Industrial Production has been extended from 1995 to 1975, and the Major Seven series for Retail Trade from 1990 to 1975.



For more detailed information on OECD methodology for estimating area totals, see http://www.oecd.org/document/56/0,2340,en_2649_33715_2073848_1_1_1_1,00.html.

For further methodological information about the processes used for the OECD Main Economic Indicators publication and online dataset, including information on how to subscribe to the full database, see www.oecd.org/std/mei.