Australian Bureau of Statistics

Statistical Language - Time Series Data

Statistical Language

Time Series Data

What is a time series?

A time series is a collection of observations of well-defined data items obtained through repeated measurements over time.

For example, measuring the level of unemployment each month of the year would comprise a time series. This is because employment and unemployment are well defined, and consistently measured at equally spaced intervals. Data collected irregularly or only once are not time series.

What does a time series show?

A times series allows you to identify change within a population over time. A time series can also show the impact of cyclical, seasonal and irregular events on the data item being measured.

Time series can be classified into two different types: stock and flow.

A stock series is a measure of certain attributes at a point in time and can be thought of as "stock takes". For example, the annual ABS *Prisoners in Australia* collection is a stock measure because it is a count of the number of persons in custody who were the legal responsibility of adult corrective services agencies on the night of 30 June each year.

A flow series is a series which is a measure of activity over a given period. For example, the quarterly ABS *Corrective Services, Australia* collection is a flow measure as it provides prisoner counts taken on each day of the month which are summed and divided by the number of days in that month to determine the mean (average) daily prisoner number for that month.

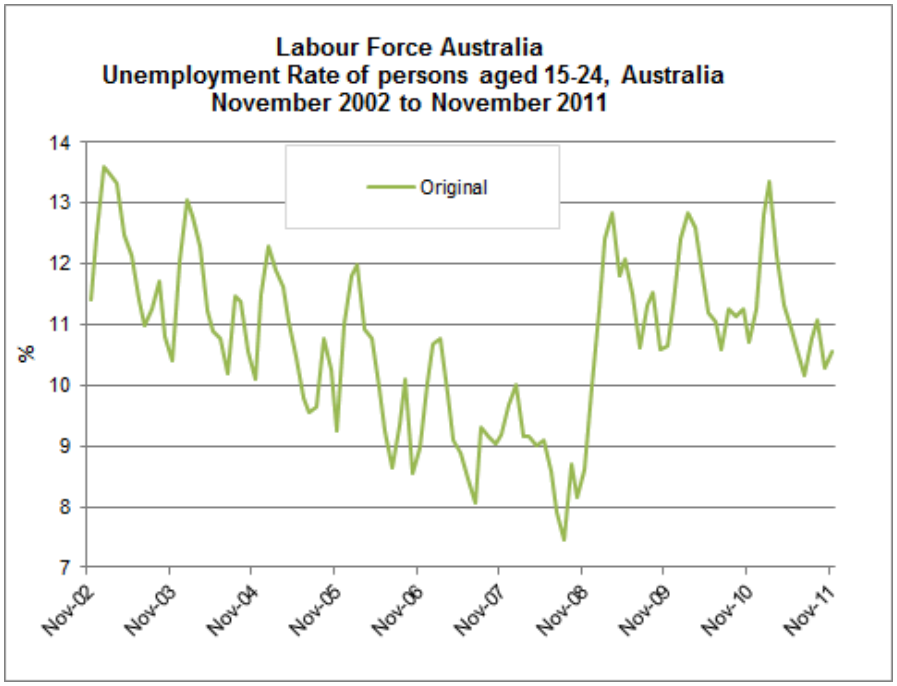
How can a time series be analysed?

An original time series shows the actual movements in the data over time. An original series includes any movements due to cyclical, seasonal and irregular events.

A cyclical effect is any regular fluctuation in daily, weekly, monthly or annual data. For example, the number of commuters using public transport has regular peaks and troughs during each day of the week, depending on the time of day.

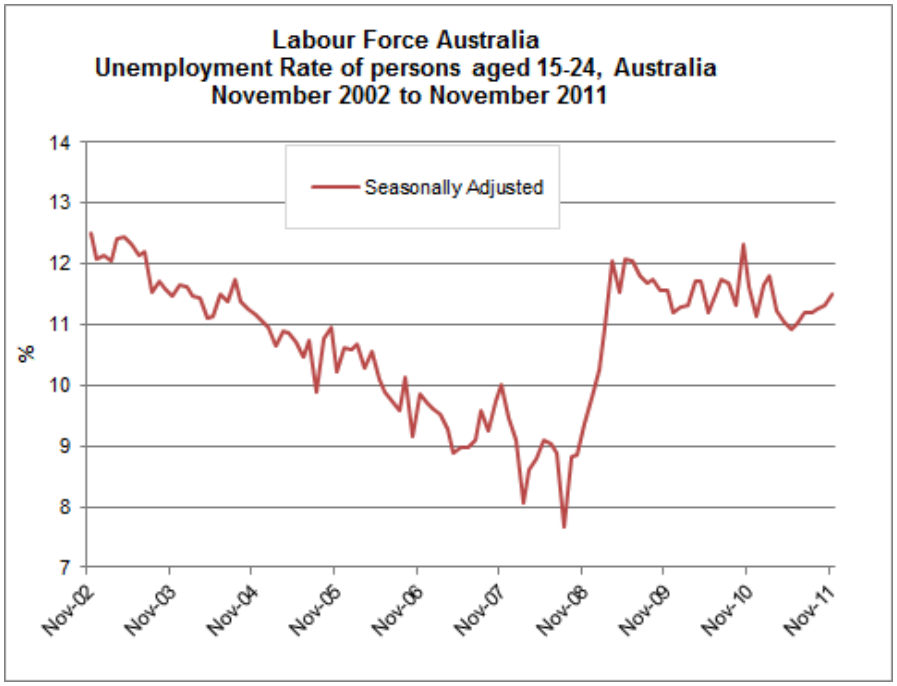
A seasonal effect is any variation in data due to calendar related effects which occur systematically at specific seasonal frequencies every year. For example, in Australia employment increases over the Christmas/New Year period, or fruit and vegetable prices can vary depending on whether or not they are 'in-season'.

An irregular effect is any movement that occurred at a specific point in time, but is unrelated to a season or cycle. For example, a natural disaster, the introduction of legislation, or a one-off major cultural or sporting event.



A seasonally adjusted series involves estimating and removing the cyclical and seasonal effects from the original data. Seasonally adjusting a time series is useful if you wish to understand the underlying patterns of change or movement in a population, without the impact of the seasonal or cyclical effects.

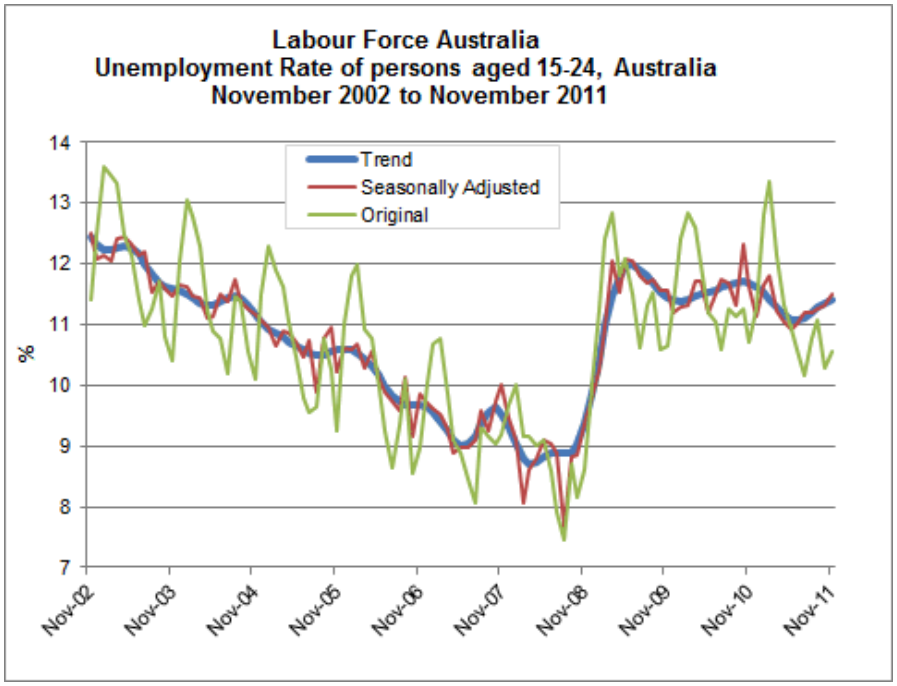
For example, employment and unemployment are often seasonally adjusted so that the actual change in employment and unemployment levels can be seen, without the impact of periods of peak employment such as Christmas/New Year when a large number of casual workers are temporarily employed.



A trend series is a seasonally adjusted series that has been further adjusted to remove irregular effects and 'smooth' out the series to show the overall 'trend' of the data over time.

For example, the trend is often used when analysing economic indicators such as employment and unemployment levels.

A graph combining the three series shows an example of the influence the cyclical, seasonal, and irregular effects can have on values within a dataset.



Further information:

ABS:
3222.0 - Population Projections, Australia, 2006 to 2101
Animated Historical Population Chart
Tourist Accommodation - Room Occupancy Rates Chart
1349.0 - Information Paper: A Guide to Interpreting Time Series - Monitoring Trends
1346.0.55.001 - Information paper: An Introductory Course on Time Series Analysis - Electronic Delivery

External link:
The Joy of Stats (Gapminder)

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