Seasonal Adjustment in Statistics New Zealand

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New Zealand is a small nation

- A human population similar to US sheep population
- GDP USD200million
Many Time Series Agriculture and Tourism Driven

- Major seasonal variation
- A lot of noise and often significant changes in components
- Calendar seasonality different from climate seasonality
  - Temporal aggregation issues
Time series at Stats NZ

- 40 years of seasonal adjustment
  - Variants of Census Method II
  - Currently X-13
- ~5000 series seasonally adjusted each quarter
- Most are for analytical purposes, i.e. not published
Time series at StatsNZ

- StatsNZ is small (~800 FTE)
- No one works solely on time series

**SMA**
Subject Matter Areas, *e.g.* *National Accounts, Overseas Trade*
Responsible for analysing and publishing outputs
Request and utilise seasonal adjustment

**SM**
Statistical Methods teams – broadly economic and social split
Provide methodological support to groups of SMA
Implement, manage and review seasonal adjustments

- In two offices in separate cities
Working in StatsNZ issues

- Best way to train Statistical Methods newcomers?
  - Presently by one-on-one when required training
  - Difficulties in consistency across offices
- Best way to train Subject Matter Area newcomers?
  - As above but may be SM newcomer doing training
- Efficiently identifying problems in outputs
  - SM get involved when asked, so how do we get SMA to properly identify problems – we have many Type I and II errors
  - When does SM newcomer involve experienced SM persons?
Aggregate series

• We do a lot of composite seasonal adjustments
• Either the direct and indirect series are published depending on which seems best
  • And we have changed our decisions
Aggregation Issues

• Measuring quality for alternatives?
  • There is theory and there is practice
  • We use R1 and R2 from StatCan X11-ARIMA

• Composites for balances?
  • Different models

• Handling components that are non-seasonal?
  • Heavy use of type=summary
Ensuring Quality

• Three general areas
  1. Setting up series
  2. Periodic reviews
  3. Ad hoc problems

• Much has not been documented, including why quality measures were chosen
• Reminder: staff, both in SM and SMA, with limited t.s. knowledge
• Balance between checklists, rules and knowledge of where to look and what to do to get information
Seasonal Adjustment Reviews

Series are reviewed often. How often is best?

Broadly, series are evaluated by the following method:

- **Q < 0.8, F-stat > 25**: Seasonally adjust!
- **Q = 0.8-1.2, F-stat = 10-25**: Check out graph and other diagnostics to decide...
- **Q > 1.2, F-stat < 10**: Don’t seasonally adjust!

What problems might be encountered with this method?
Some recent issues

Scenario 1
An established series not currently adjusted (type = summary) has $Q = 1.25$. Should a reviewer take a closer look?

Probably not. This series shouldn’t be adjusted. The quality is bad.

Suppose they tried removing type = summary

Suddenly, $Q = 0.65$!

How long has the actual seasonal adjustment quality been this good and gone unnoticed?

What do type = summary or type = trend actually mean?
Some methodological issues

Scenario 2
A series currently adjusted has Q = 0.73. Should they take a closer look? Maybe.

Suppose, they did, they’d discover this:

Something happened in 2001, from then on Q = 1.34.

Why hasn’t the seasonal break been noticed for 18 years?

Why does the series go back almost 30 years anyway?

Is there a maximum ideal series length?
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Thank You