Seasonality in investments, investment plans and their revisions

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Why forecast investments?

- Data quality and timing
  - 16-18% of GDP
  - Business enterprise sector questionnaires 3 times/year
  - Planned and realized quarterly investments

- Users: 2 problems
  - Quarter plans available → Correcting
  - No quarter data available → Forecasting

- Solutions
  - Revisions of the plans + external data
  - Seasonal decomposition, regression
Investments data. Timing and quality.

- Three times a year with uneven intervals
- \( Y \) is whole-year, \( Q \) is quarterly
- Data is a mixture of outcomes and plans

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\begin{align*}
\text{Oct} & \quad \text{Feb} & \quad \text{May} & \quad \text{Oct} & \quad \text{Feb} \\
\bullet \ Y_T^{f, I} & \quad \bullet \ Y_T^{f, II} & \quad \bullet \ Q_1_T^{p1} & \quad \bullet \ Q_1_T^{p2} & \quad \bullet \ Q_1_T^{p3} \\
\bullet \ Q_2_T^{p0} & \quad \bullet \ Q_2_T^{p2} & \quad \bullet \ Q_2_T^{p3} \\
\bullet \ Q_3_T^{p1} & \quad \bullet \ Q_3_T^{p1} & \quad \bullet \ Q_3_T^{p3} \\
\bullet \ Q_4_T^{p2} & \quad \bullet \ Q_4_T^{p0} & \quad \bullet \ Q_4_T^{p3}
\end{align*}
\]
Life could be beautiful

But there are users ...
and their demands
Problem 1. Budget planning.

How to correct $Q2_T^{f0}$ and bring it closer to $Q2_T^{p2(3)}$?
Problem 2. Early GDP for Q1.

How to forecast $Q_{1T}^{p1}$ by using $Y_{T}^{f,I}$ and $Y_{T}^{f,II}$?
Solution to problem 1

- In May we have a “nowcast” for Q2
- It will be revised in October (and February)
- Revision for Q2 depends on revisions for other quarters
- Enterprises overestimate investments when the economic situation is favorable
- Revisions February T+1 – May T constitute a time-series with a seasonal component and a trend
Solution to problem 1

Seasonality in revisions

Revisions February T+1 – May T
Solution to problem 1

Revisions per quarter February T+1 – May T

[Graph showing revisions per quarter from 1991 to 2004 with different markers for Original, Trend, and Seasonal component]
Correcting nowcasts

1. Add the estimated seasonal component
2. Extrapolate and add the trend

Trend ~ Planned investments + Capacity utilization
Solution to problem 1

**Results. Investments Q2.**

The systematic (seasonal) error component is removed.
Solution to problem 2

- Until May, there exist no figures for Q1
- Have to produce a flash GDP for Q1
- Only whole-year plans: in October and February
- Revisions of whole-year plans are early indicators
- Make an ARIMA forecast of Q1
- Disaggregate whole-year revisions into quarters
- Correct an ARIMA forecast of Q1 with help of disaggregated revisions of whole-year plans
Solution to problem 2

Prediction and correction

1. ARIMA forecasts: make a forecast of the \textit{level} (I) and a forecast of the \textit{share} (II) of Q1
2. Decompose the whole-year revisions with a forecasted share of Q1
3. Regress the investment growth on decomposed revisions (III) for Q1
4. Pool forecasts I, II and III.
Solution to problem 2

Results. Investment growth Q1.

A pooled forecast beats all (though not by much)
Conclusions

If phenomena are recurring, forecasting is assisted by treating seasonal components separately. Seasonal decomposition can be useful even with “shaky” data such as revisions and plans. Appropriate for National Statistical Offices. Easy to integrate into production process and help tackle a problem of expected revisions.

The End