Comments on Seasonal Adjustment

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Direct v. Indirect Seasonal Adjustment

- Can do seasonal adjustment at aggregate or disaggregate level (Hood and Findley (2003))
- Arguments for aggregate/direct
  - What we care about most
  - May work best if seasonal patterns correlated
- Arguments for disaggregate/indirect
  - Preserves additivity and gives us "contributions decompositions"
  - May work best if seasonal patterns not correlated

BEA Resolution (pre seasonality review)

- BEA resolution is a "corner solution"—seasonal adjustment at a very dissaggregate level
  - SA on highly dissaggregated components
  - SA at *monthly* frequency
  - Do not SA some components
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  - SA on highly dissaggregated components
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  - Don't compile data to let anyone do it otherwise
- My preference is for direct adjustment (Maravall (2006)), or at least some compromise

Can Direct and indirect be close?

- Direct and indirect have to be different because of nonlinearity in X-12
- But difference can be small (Ladiray and Mazzi (2003))
- Not if some of the disaggregates are not seasonally adjusted at all in indirect method

Residual Seasonality in topline GDP

Regression with real GDP growth as dependent variable

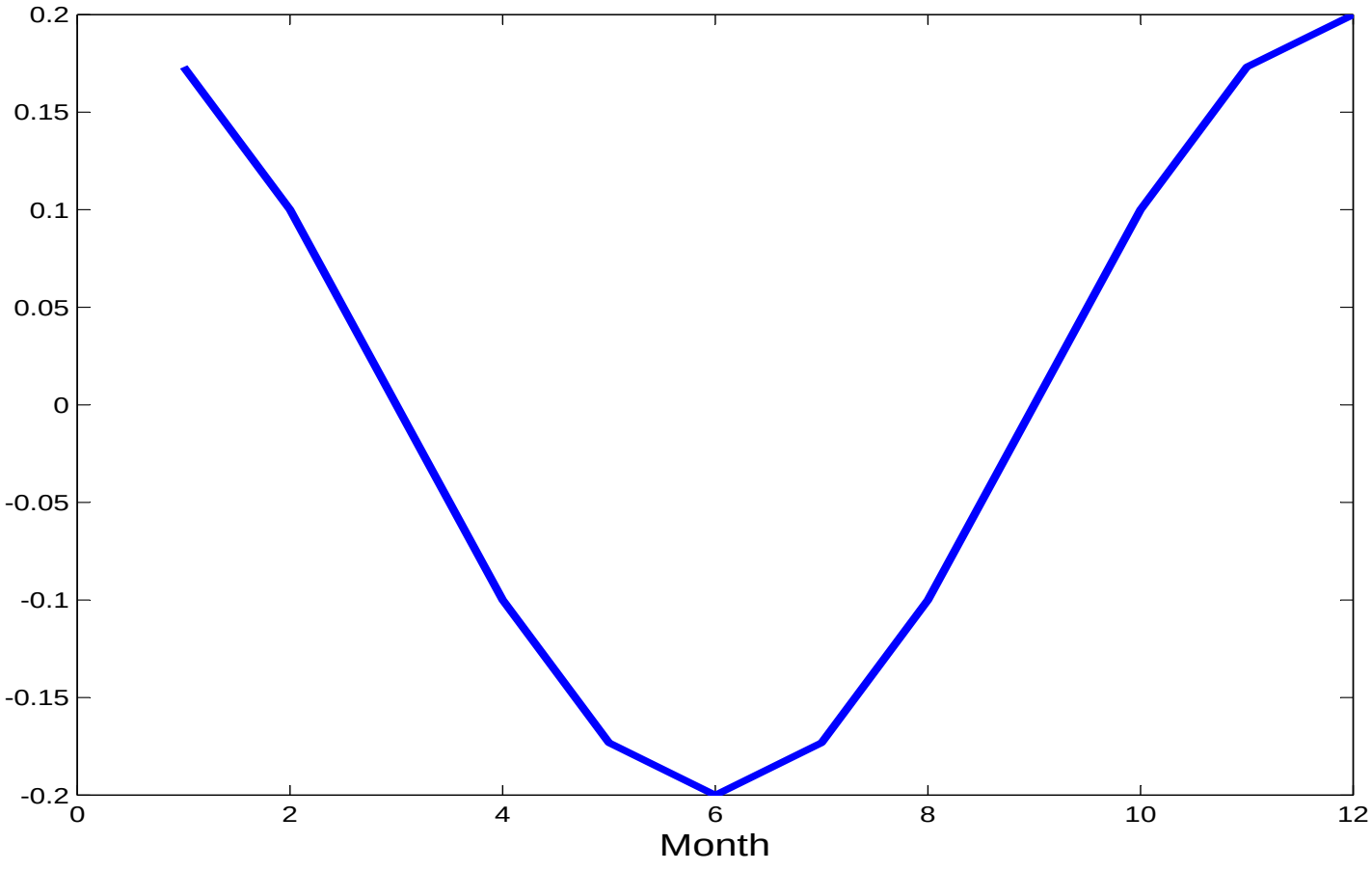
Variable	Coefficient	t-stat
Constant	2.3	5.3
Lagged Growth	0.5	5.3
Q1 Dummy	-2.0	-3.3
Q3 Dummy	-1.2	-2.1
Q4 Dummy	-1.0	-1.7

- p-val for quarterly dummies: 0.013
- Sample period: 1990Q1-2016Q3
- Note data post 2012 are seasonally adjusted differently

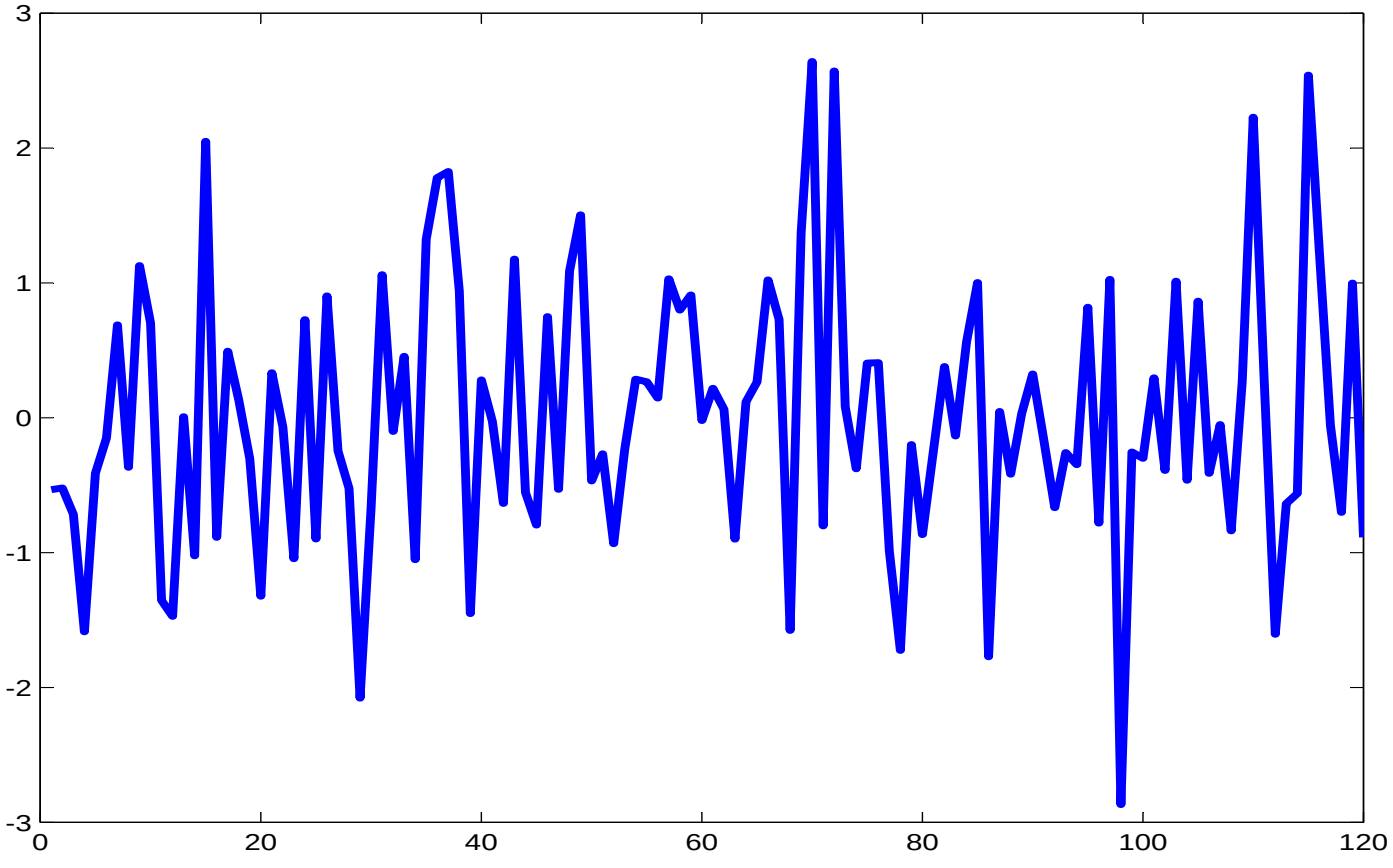
Toy Monte Carlo simulation

- Generate 100 series each of which is Gaussian white noise plus a small stable seasonal
- 120 "monthly" observations for each series
- The same seasonal for each of the 100 components
- Consider 3 approaches for SA of the **sum** over these 100 components
  - Direct
  - Indirect
  - Indirect + Pretest (D8 F-test)

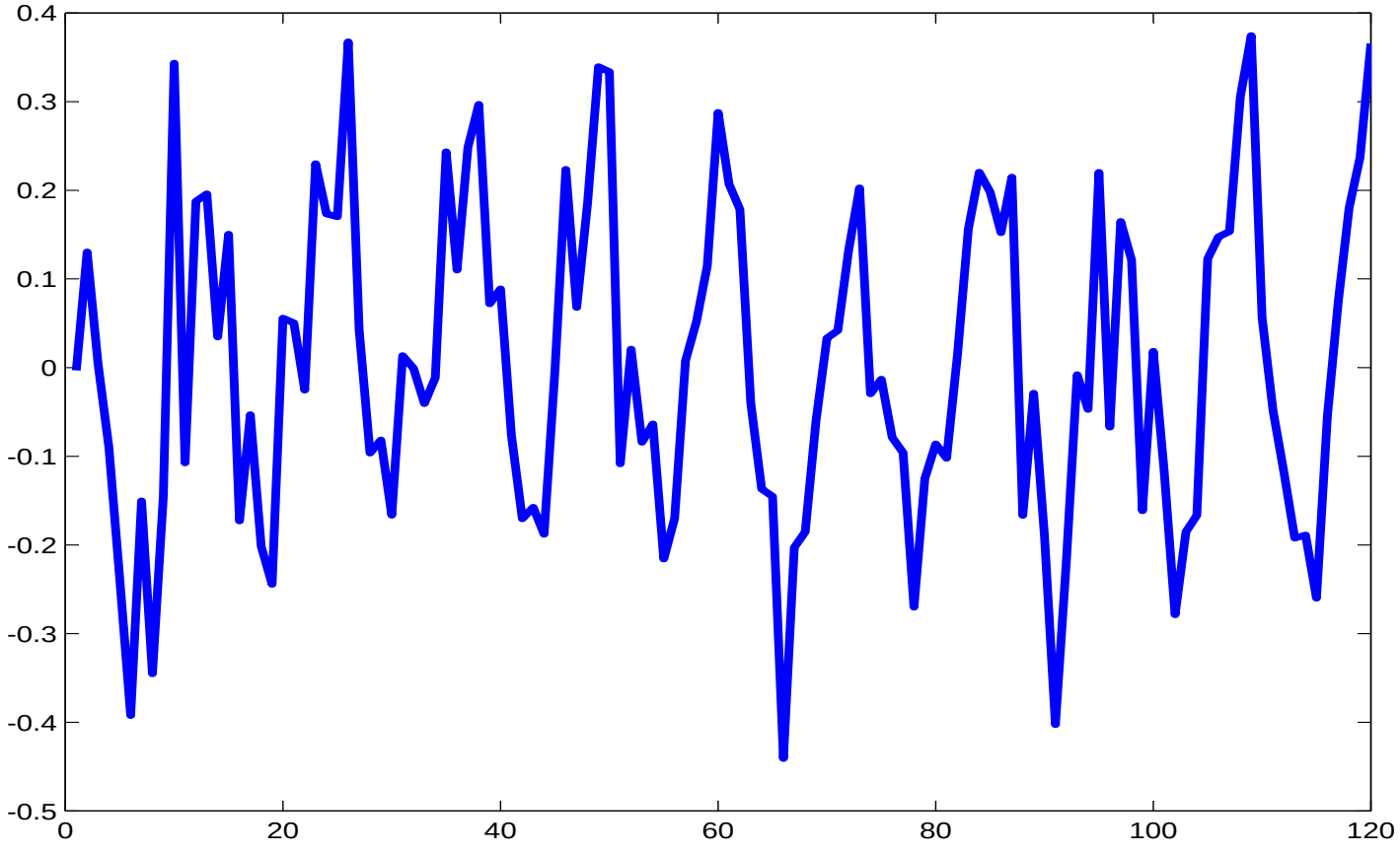
Deterministic Seasonal Pattern



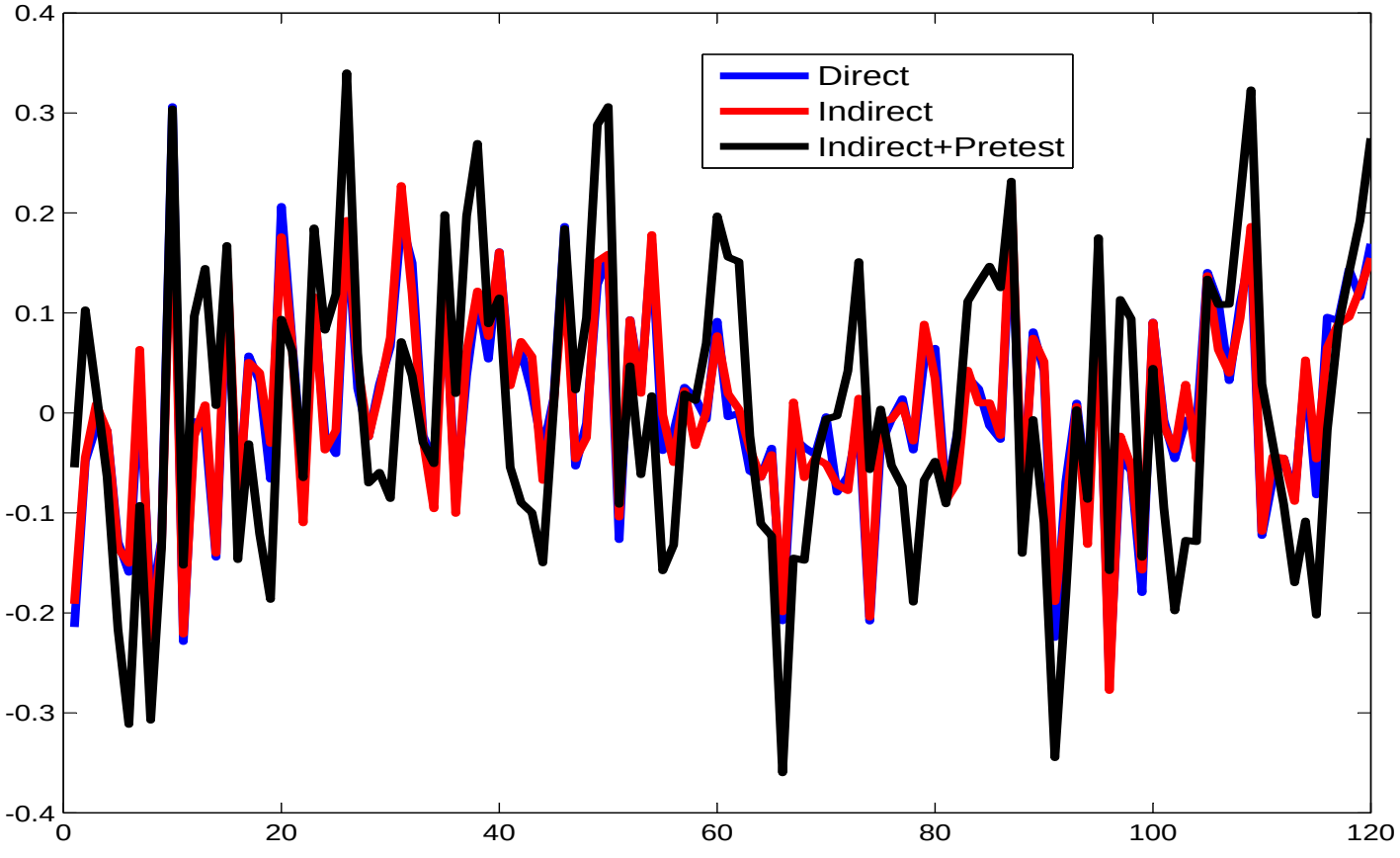
One of the 100 Disaggregates



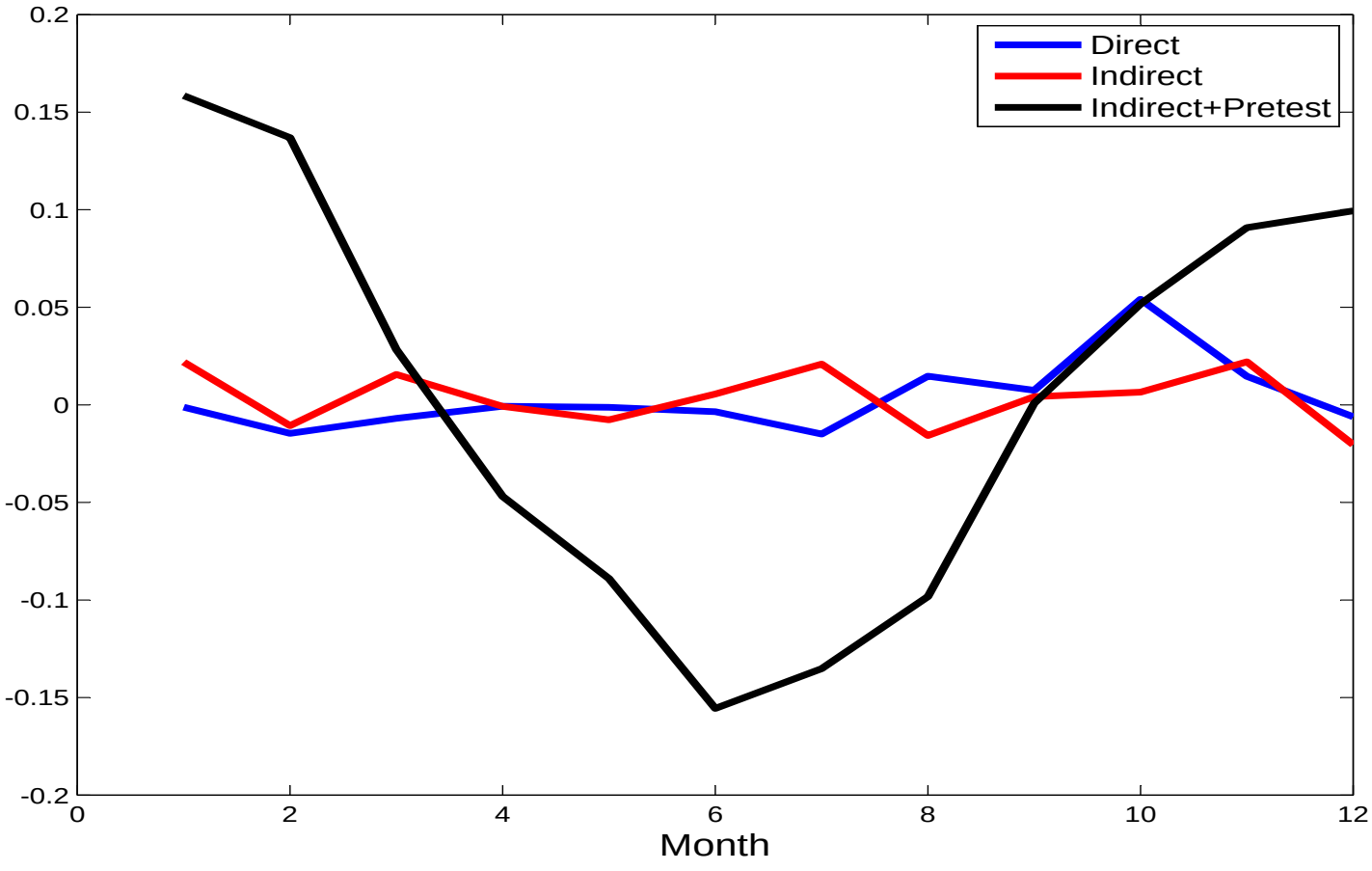
The Aggregate Raw Series



The Aggregate SA Series



Month-Averages of SA Series



Just an Illustrative Story

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- Entirely common seasonal pattern
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- Still it reminds us that in indirect seasonal adjustment we should take account of the quality of the implied aggregate seasonal adjustment

Monthly v Quarterly

- Issue of the level of aggregation for seasonal adjustment arises within time dimension too
- Adjusting monthly data and then aggregating to quarterly frequency is not the same as adjusting quarterly data
- McCulla and Smith (2015) cite this is an important cause of residual seasonality
- In toy Monte-Carlo example, of the 100 disaggregate series:
  - 79 had no detected seasonality at monthly frequency
  - 48 had no detected seasonality at quarterly frequency
- Maybe better to adjust NIPA data at the quarterly frequency

Level of Disaggregation in Indirect SA

- Not a choice between seasonally adjusting headline numbers and at the most disaggregate level
- Can go in between
- In toy Monte-Carlo example, aggregating by a factor of 10, seasonality was detected in 9 of the 10 series

Conclusions: Ways to mitigate residual seasonality

- Be wary of not seasonally adjusting a disaggregate
  - BEA now seasonally adjusts more series (e.g. some inventory investment series)
  - But criteria for residual seasonality in their review seem very stringent (e.g. F-test of 7)
- Seasonal adjustment could be done at quarterly frequency uniformly
- Seasonal adjustment could be at a lower aggregation level
- Publishing NSA data will let users do direct seasonal adjustment
  - Scheduled for 2018