

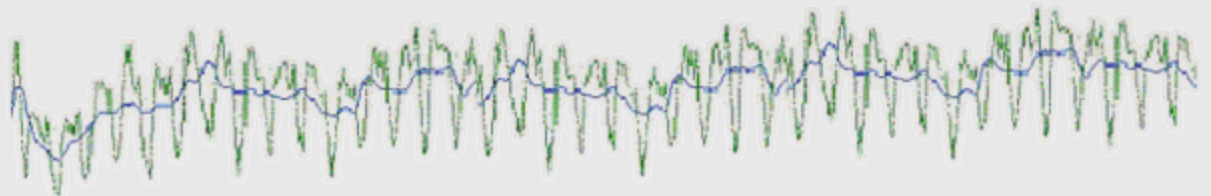
SHOWDOWN AT THE SAPW!

Forecasts versus Published Data

Elijah L. Hood and Catherine C.H. Hood

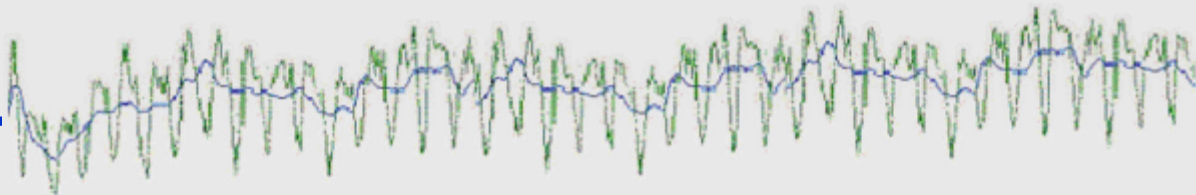
Catherine Hood Consulting

SAPW, November 2019



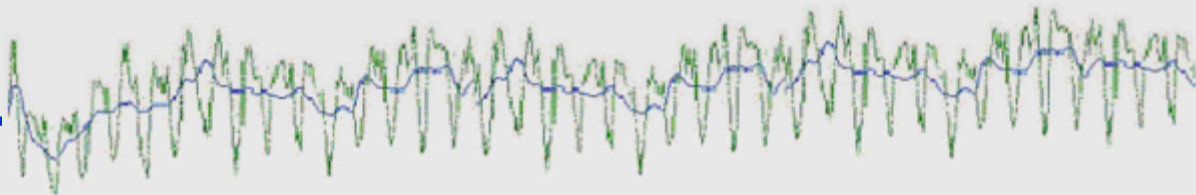
Background

- A subset of clients purchase our one-step-ahead forecasts so they can better predict the movements of the stock markets around press releases.
- To help them with their predictions, we do a periodic review of
 - how our forecasts stack up against the first published numbers, and
 - possible residual seasonality in the first published data.



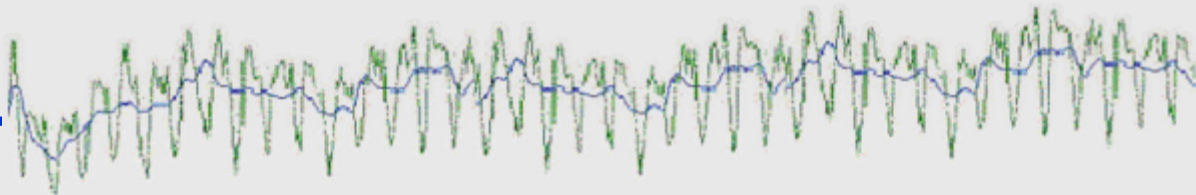
Data - Anonymous

	Data Source	No. of Series	Min Length	Max Length	Mode Length
Long Series	Source A	29	3	10	10
	Source B	17	8	10	10
Short Series	Source C	7	2	2	2
	Source D	11	2	2	2
	Source E	9	5	5	5



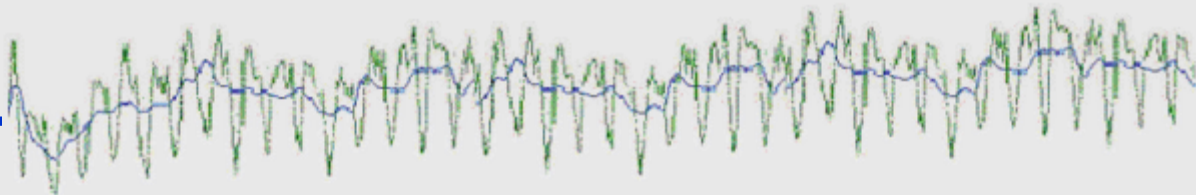
Data - US Starts and Permits, and NAR

	Data Source	No. of Series	Min Length	Max Length	Mode Length
Long Series	US Housing Starts	10	10	11	11
	US Building Permits	11	10	10	10
	NAR	10	10	10	10
Short Series	none				



Short series analysis

- Finding seasonality through visual inspection
 - Percent differences forecast versus published
 - Percent differences forecast versus published, by month
 - First difference of the published series, by month



Formulas

- Percent differences:

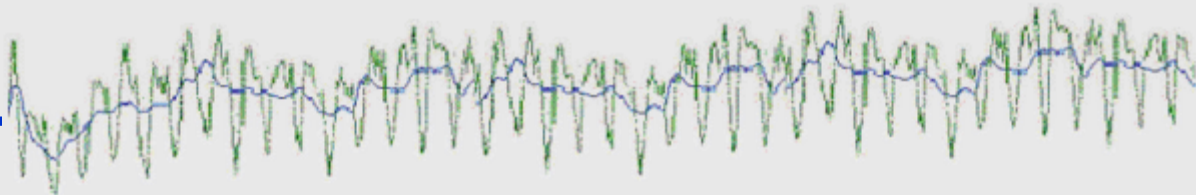
$$D = 100\% * \left(1 - \frac{p}{f}\right)$$

where

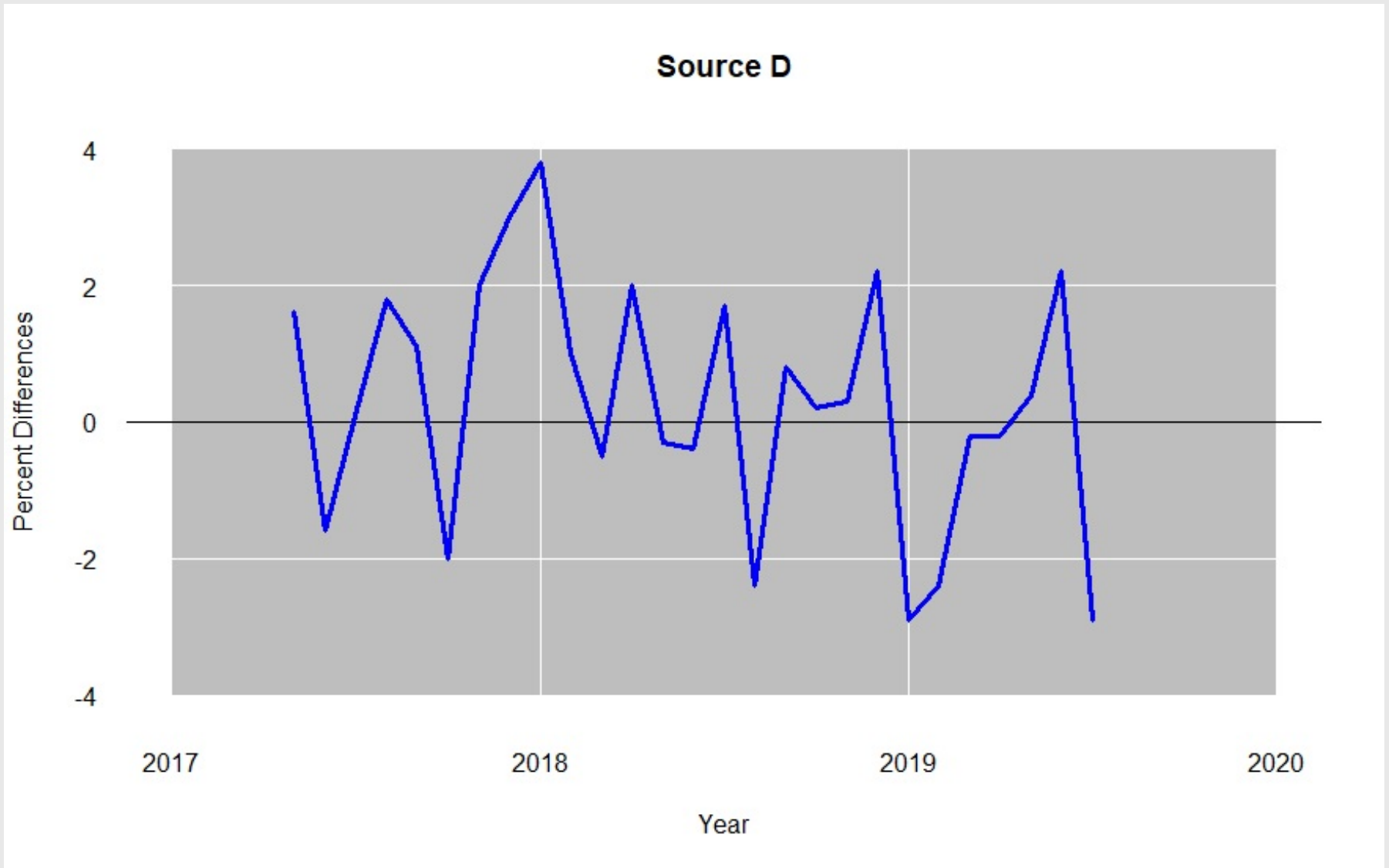
p = first published seasonally adjusted series

f = projected/forecasted seasonally adjusted series

- Published first differences: $p_t - p_{t-1}$

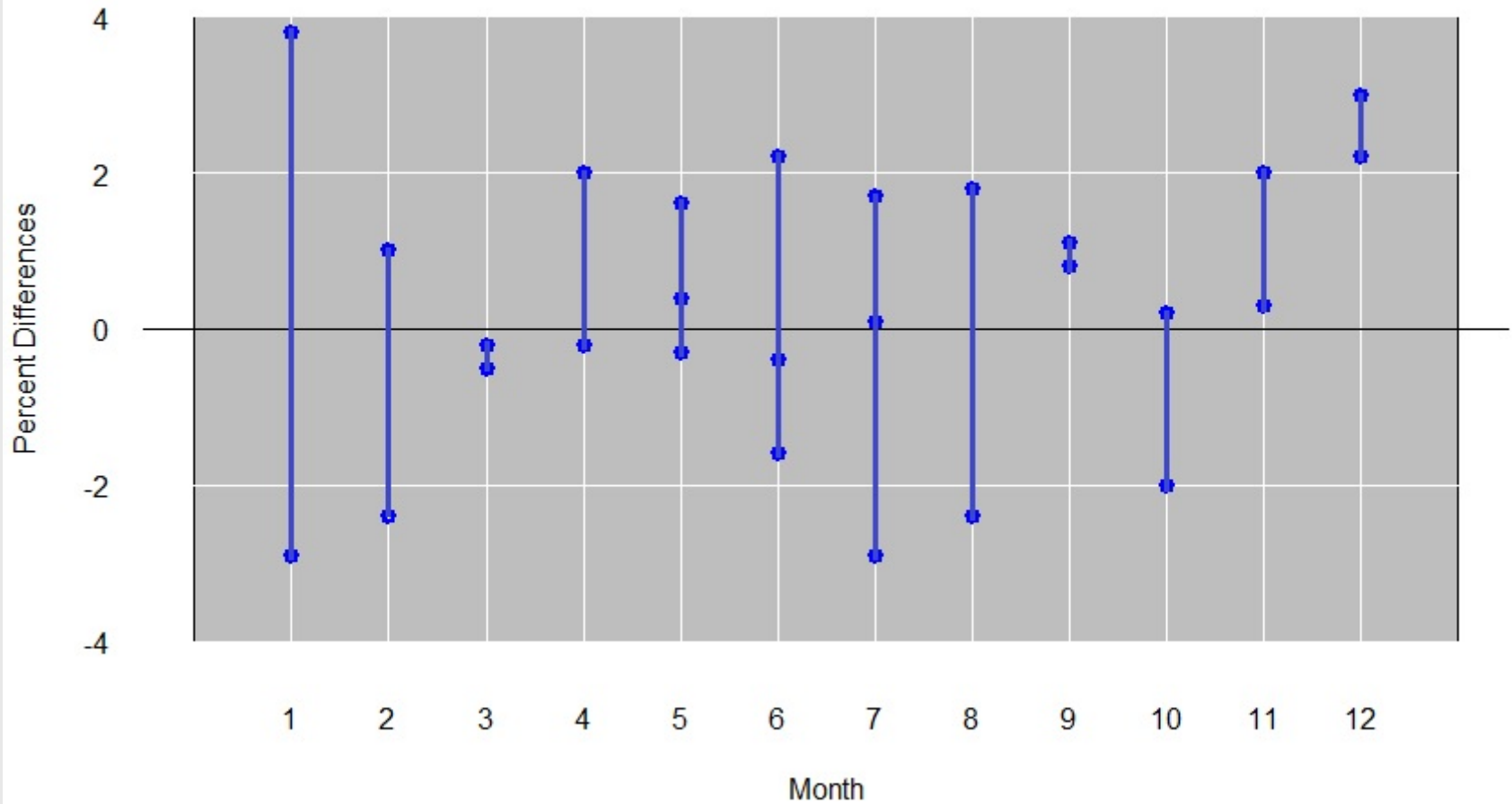


Visual Inspection: Percent Differences



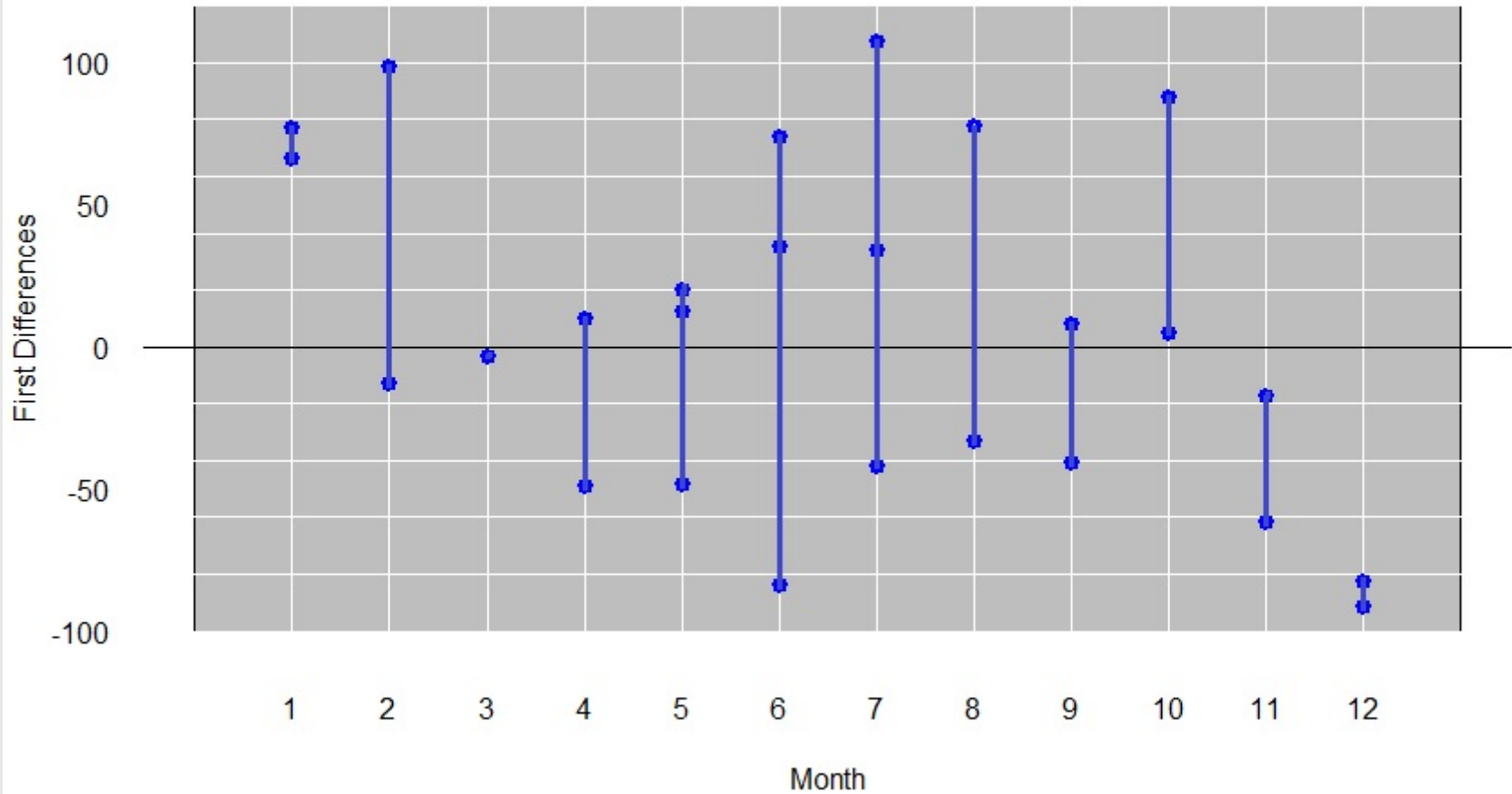
Percent Differences by Month

Source D by Month



First Difference of Published, by Month

Source D, First Published



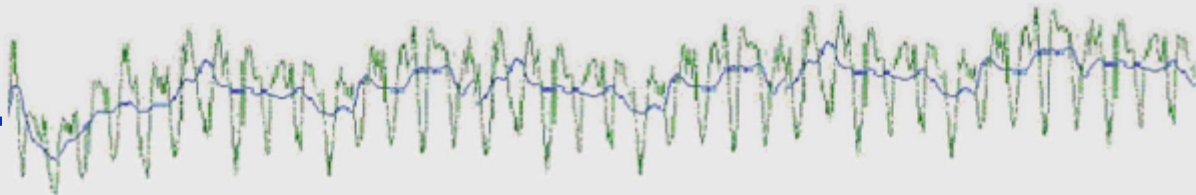
Finding Bias: Formulas

- Let D = percent differences
- Sum: $\sum D$
- Average Percent Differences:

$$\sum \frac{D}{n}$$

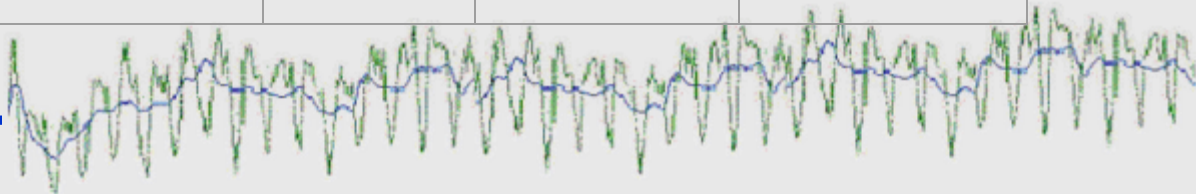
- Absolute Average Percent Differences:

$$\sum \frac{|D|}{n}$$



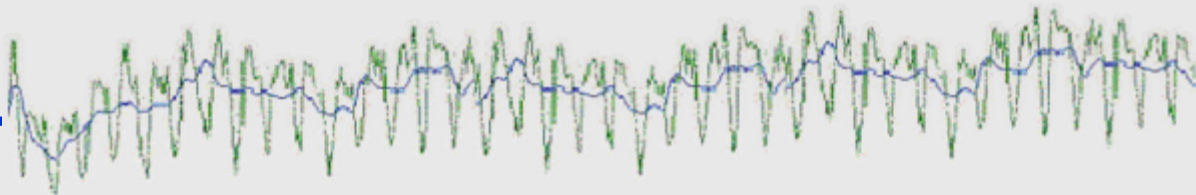
Bias Stats Summary Table

Data Source	Series	Sum	Average	Absolute Average
Source C	Shows most bias	10.03	0.39	1.09
	Shows least bias	2.17	0.08	0.73
Source D	Shows most bias	38.09	1.41	3.94
	Shows least bias	2.76	0.10	1.84
Source E	Shows most bias	-12.79	-0.19	3.35
	Shows least bias	-0.19	0.00	0.24



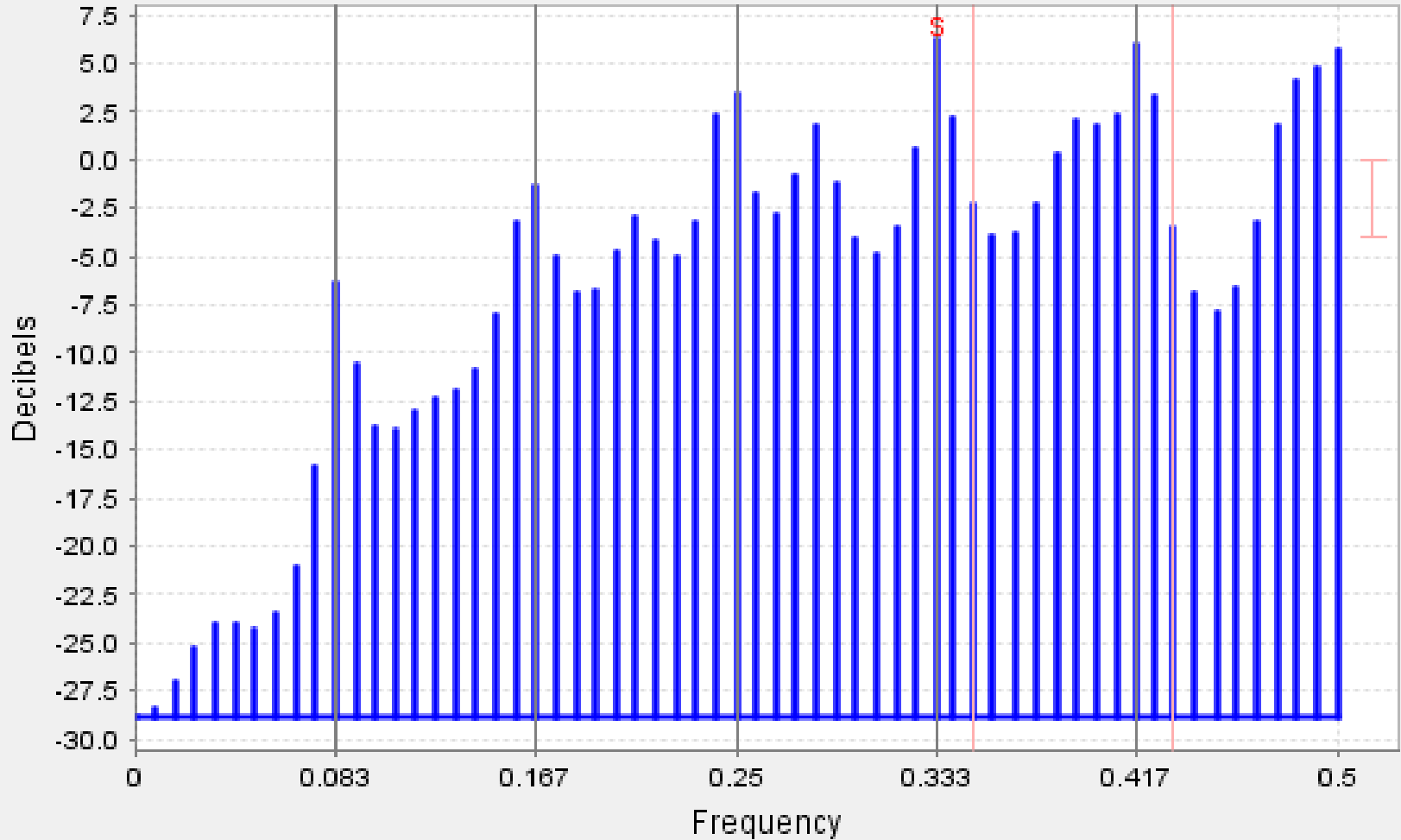
Long Series Analysis

- Seasonality diagnostics from X-13:
 - M7 stats showed no indication of seasonality.
 - Out of 76 long series,
 - 11 had seasonal peaks;
 - 7 had seasonal peaks at frequencies 1, 2, or 4;
 - 4 had seasonal peaks at frequency 5; and
 - 8 had peaks that were almost seasonal but not quite significant.

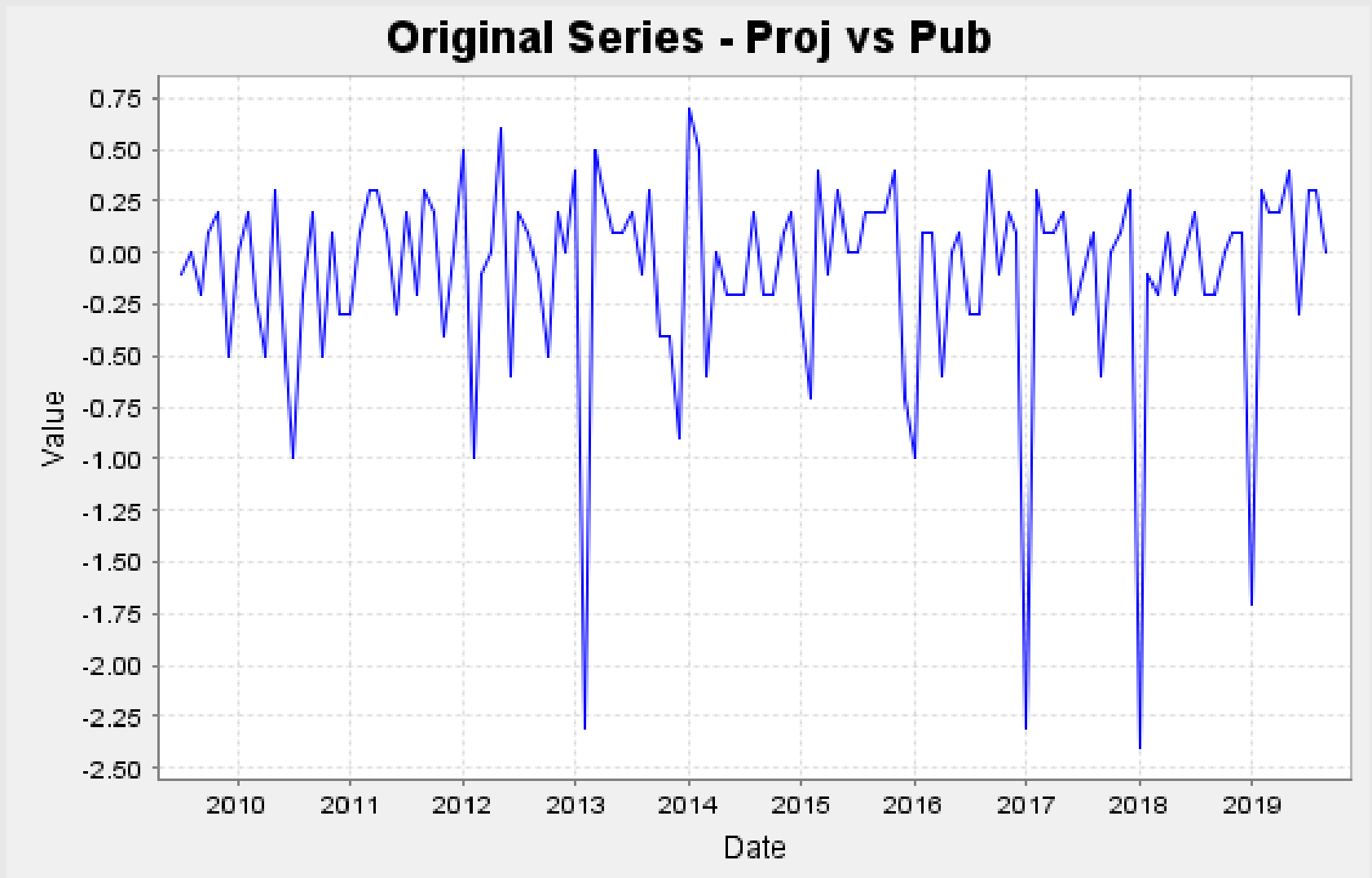


Seasonal Peaks in Spectrum Graphs

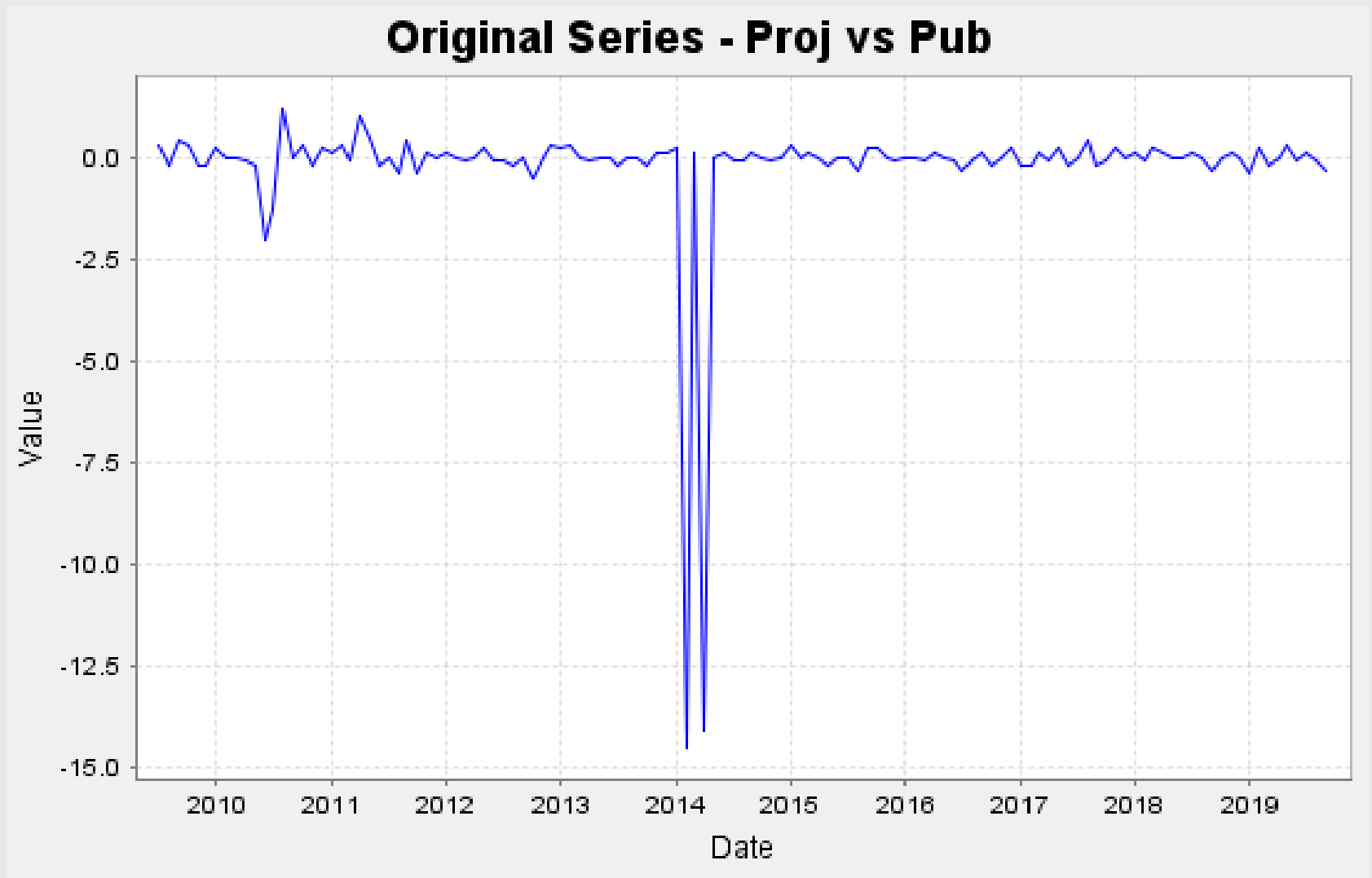
Spectrum of the Prior Adjusted Original Series - Proj vs Pub



Benchmarking Spikes

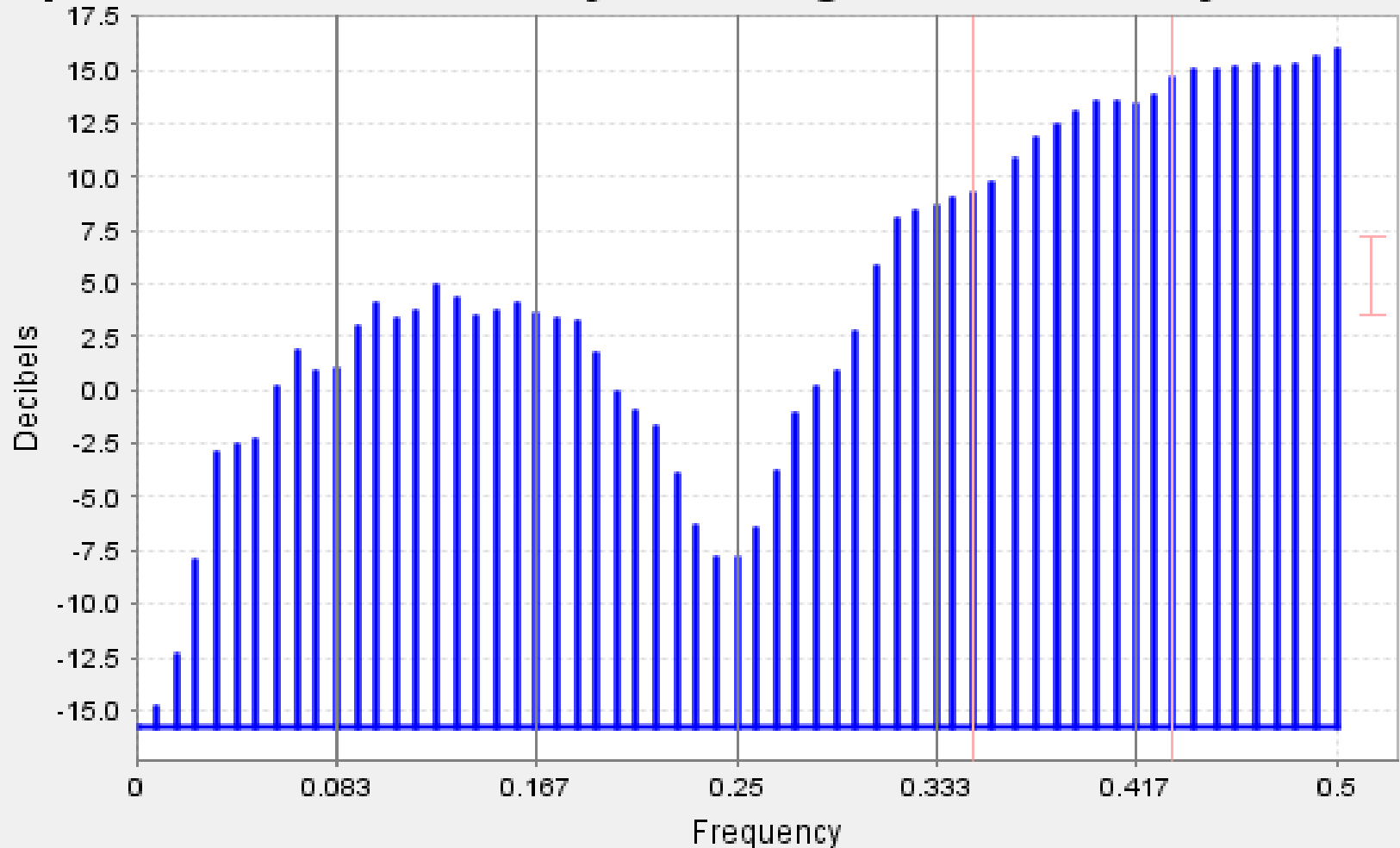


2014 Bias Spikes



An Oddity

Spectrum of the Prior Adjusted Original Series - Proj vs Pub

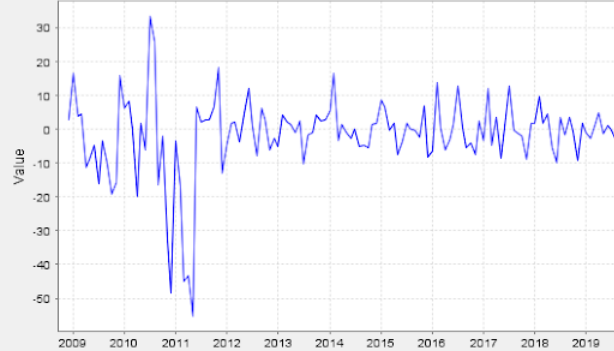


NAR Bias and Recovery

Original Series - Proj vs Pub



Original Series - Proj vs Pub



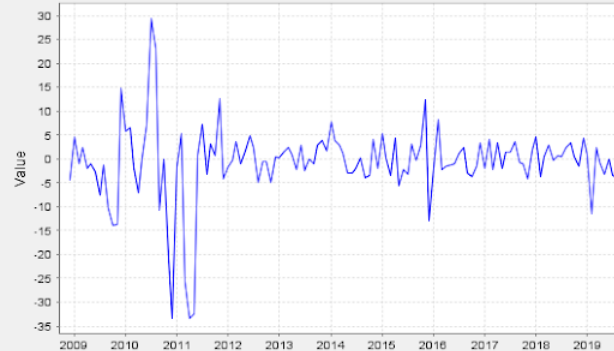
Original Series - Proj vs Pub



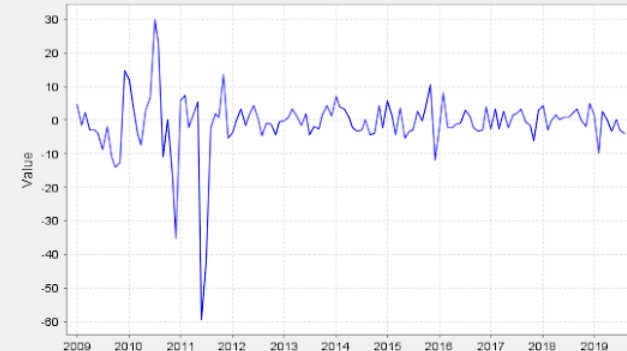
Original Series - Proj vs Pub



Original Series - Proj vs Pub



Original Series - Proj vs Pub



Original Series - Proj vs Pub



Original Series - Proj vs Pub



Original Series - Proj vs Pub

