

Measuring Real Activity Using a Weekly Economic Index

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September 28, 2021

The views expressed are those of the authors and do not necessarily reflect the position of the Federal Reserve Bank of New York, the Federal Reserve Bank of Dallas or the Federal Reserve System.

Why a Weekly Economic Index (WEI)?

In mid-March, economic activity began to deteriorate rapidly, but:

- Conventional data would be unavailable until April.
- Evolution from one week to the next would be important.

WEI measures real economic activity (not a nowcast):

- ① at a higher frequency
- ② closer to real time

The WEI was first published by the NY Fed on March 30th.

Biweekly publication began on April 27th.

What is the WEI?

WEI is the first principal component of 10 daily and weekly indicators.

Criteria:

- Indicators of real activity
- Weekly or daily
- Timely availability
- Long enough sample to be confident of correlations
- Stable definition and survey instrument
- Provides signal value

These eliminate many interesting series, including popular alternative HF data.

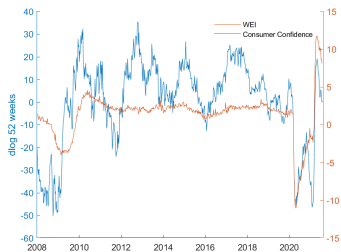
Weekly seasonal adjustment is hard – we use 52-week log changes of NSA series.

The index is scaled to 4-quarter GDP growth.

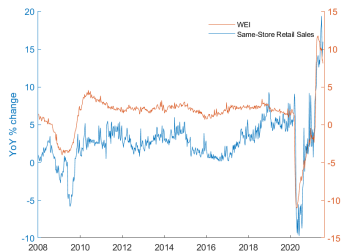
Table 1: Weekly Variables

Series	Native Units	Time available EST, (days from reference week)	Notes
Redbook Research: Same Store, Retail Sales Average, Y/Y % Chg.	NSA, Y/Y % Chg.	1 st Tuesday, 9:00am (3 days)	Sales-weighted, year-over-year same-store sales growth for a sample of large US general merchandise retailers representing about 9,000 stores. By dollar value, the Index represents over 80% of the "official" retail sales series collected by the Department of Commerce. http://www.redbookresearch.com/
Rasmussen Consumer Index	Index	Friday of reference week, 6:00pm (0 days)	Daily survey of 1500 American adults Sun-Thurs. Index is a 3-day moving average based on five questions about the current state of both the economy and personal finances, whether the economy and personal finances are getting better or worse, and whether the economy is in a recession. https://www.rasmussenreports.com/
Unemployment Insurance: Initial Claims	NSA, Thous.	1 st Thursday, 8:30am (5 days)	Number of claims filed by unemployed individuals after separation from an employer. Data collected from local unemployment offices. https://oui.doleta.gov/unemploy/
Insured Unemployment (Continued Claims)	NSA, Thous.	2 nd Thursday, 8:30am (12 days)	Number of continued claims filed by unemployed individuals to receive benefits. Data collected from local unemployment offices. https://oui.doleta.gov/unemploy/
American Staffing Association Staffing Index	NSA, Jun-12-06=100	2 nd Tuesday, 8:30am (10 days)	The ASA Staffing Index tracks temporary and contract employment trends. Participants include a stratified panel of small, medium, and large staffing companies. https://americanstaffing.net/
Federal Withholding Tax Collections	Y/Y % Chg.	1 st Tuesday, 4:00pm (5 days)	Treasury receipts of income and payroll taxes withheld from paychecks. The series is filtered for daily volatility patterns and adjusted for tax law changes. https://taxtracking.com/
Raw Steel Production	NSA, Thous. Net Tons	1 st Monday, 4:00pm (2 days)	Weekly production tonnage provided from 50% of the domestic producers combined with monthly production data for the remainder. https://www.steel.org/industry-data
US Fuel Sales to End Users	NSA, EOP, Thous. barrels/day	1 st Wednesday 10:30am (4 days)	Weekly product supplied of finished gasoline and distillate fuels. This estimates wholesale gasoline, diesel, and aviation fuel sales to retailers and large corporate end users (e.g., airlines, truck fleets). Published by the U.S. Energy Information Administration in the Weekly Petroleum Status Report. https://www.eia.gov/petroleum/supply/weekly/
U.S Railroad Traffic	NSA, car-loads	1 st Wednesday, 9:00am (4 days)	Total carloads and intermodal units reported by railroad companies to the Association of American Railroads https://www.aar.org/data-center/
Electric Utility Output	NSA, Gigawatt Hours	1 st Wednesday, 1:00pm (4 days)	Total output for U.S. (excluding Alaska and Hawaii) investor-owned electric companies. https://www.eei.org/

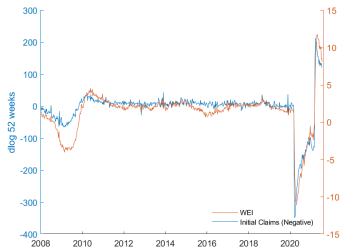
Rasmussen Consumer Index



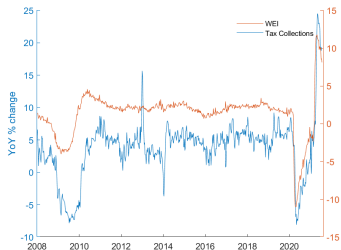
Redbook Retail Sales



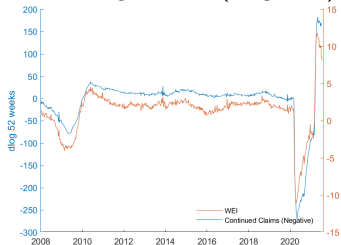
Initial Claims (Negative)



Tax Withholdings



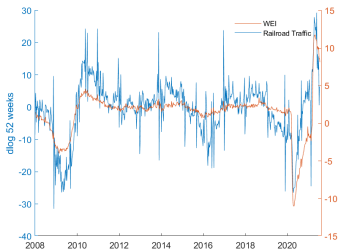
Continuing Claims (Negative)



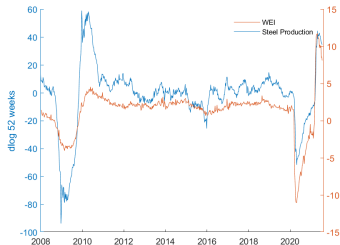
Temp Staffing Index



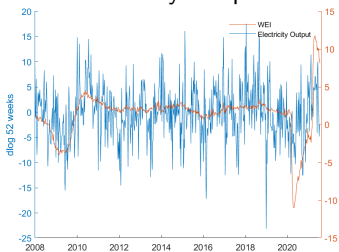
Railroad Traffic



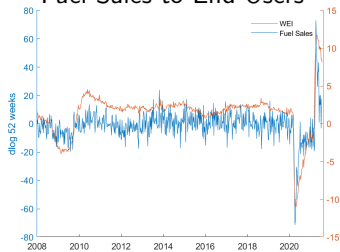
Steel Production



Electricity Output



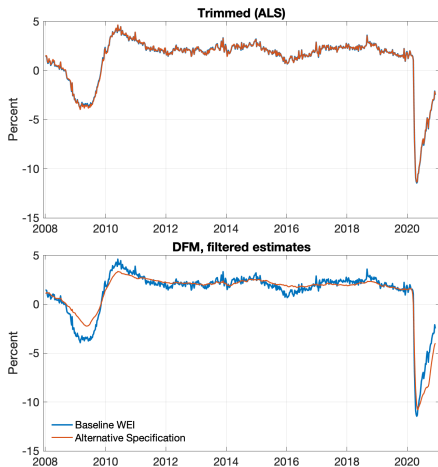
Fuel Sales to End Users



Estimation Results and Methodology

Estimation sample: Jan 1, 2008 to Feb 29, 2020

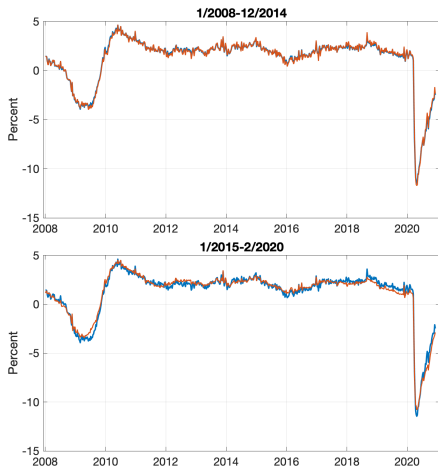
Series	Weights Baseline
Same-Store Retail Sales	0.28
Consumer Confidence	0.23
Initial Claims	-0.37
Continued Claims	-0.41
Staffing Index	0.40
Tax Withholding	0.30
Steel Production	0.36
Fuel Sales	0.22
Railroad Traffic	0.34
Electricity Output	0.12
Total variance explained	55.4



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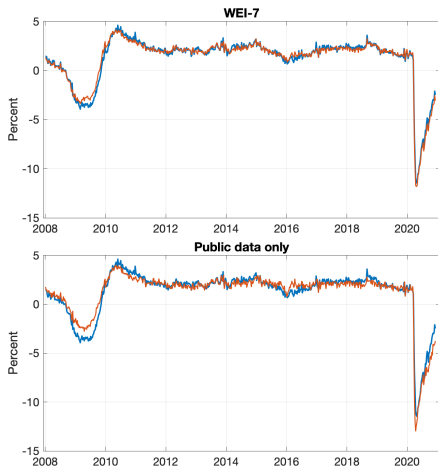
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Updating procedure

The WEI is updated four times:

- 1 Initial estimate (Tuesday following, 3 days): retail, cons conf index, steel
- 2 First revision (Thursday, 5 days): electricity, rail, IC, tax withholding, fuel
- 3 Second revision (next Tuesday, 10 days): staffing index
- 4 Final (Thursday, 12 days): CC

For update d , the WEI is updated using predicted values from

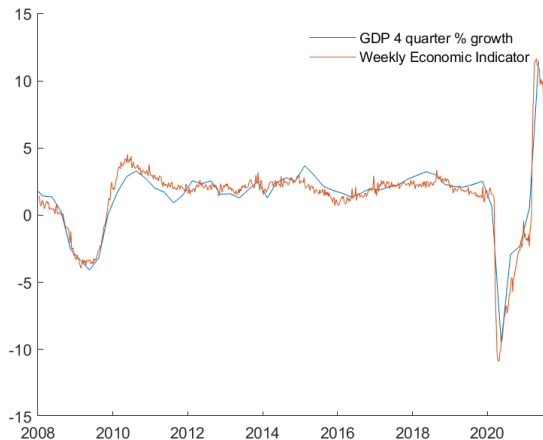
$$WEI_t = \mu^d + \theta_1^d WEI_{t-1}^d + \theta_2^d WEI_{t-1}^d + \sum_{J^d} \delta_j^d X_{jt} + v_t^d,$$

where J^d is the set of releases available for update d .

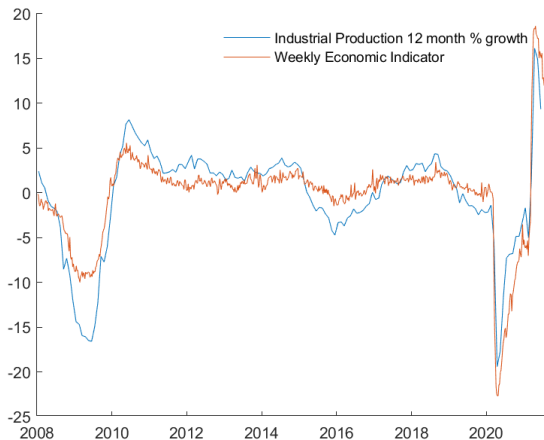
Relationship Between Updates

	RMSE			Correlation		
	First revision	Second revision	Final	First revision	Second revision	Final
Initial estimate	0.92	1.21	1.04	0.96	0.95	0.95
First revision	–	0.55	0.43	–	1.00	0.99
Second revision	–	–	0.73	–	–	0.99

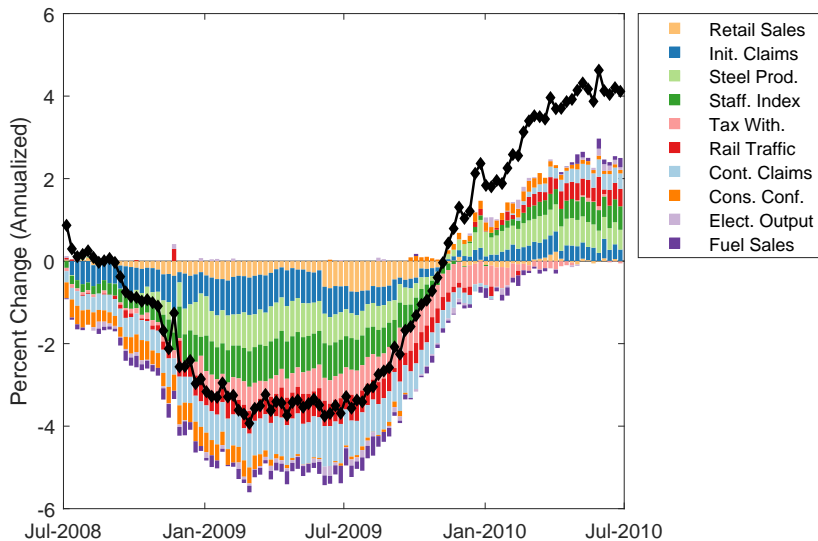
WEI and Real GDP



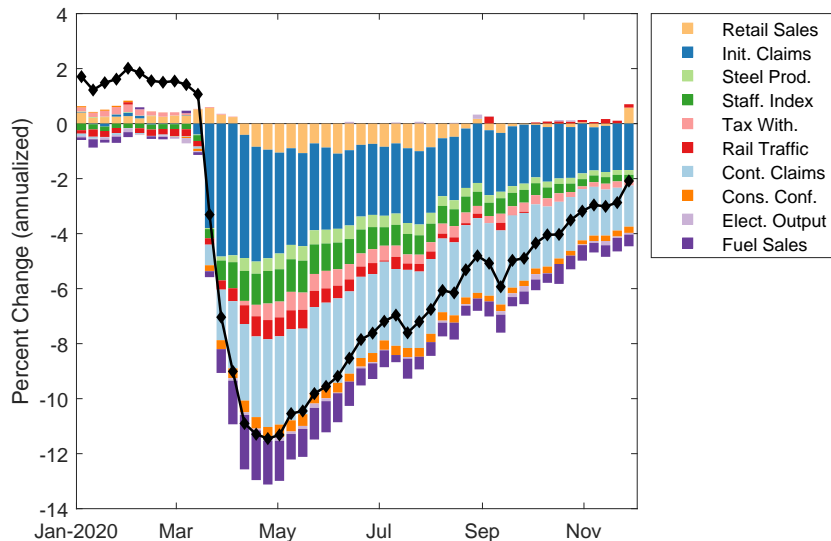
WEI (Rescaled) and Industrial Production



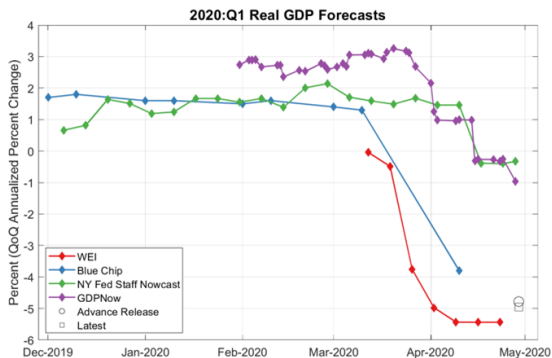
Series Contributions



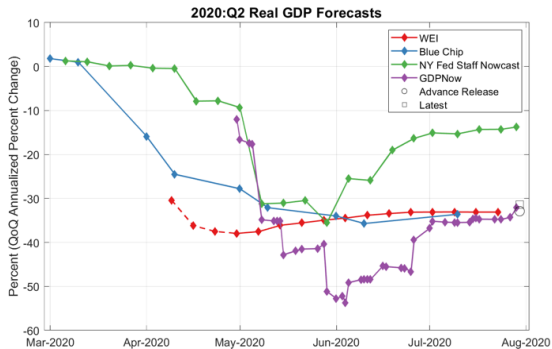
Series Contributions



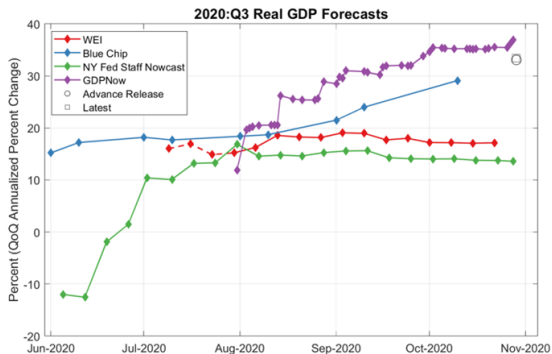
WEI vs GDP forecasts: 2020Q1



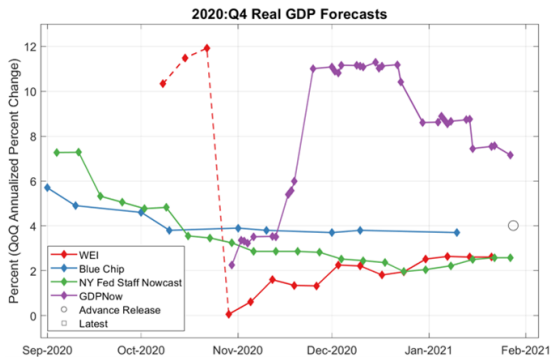
WEI vs GDP forecasts: 2020Q2



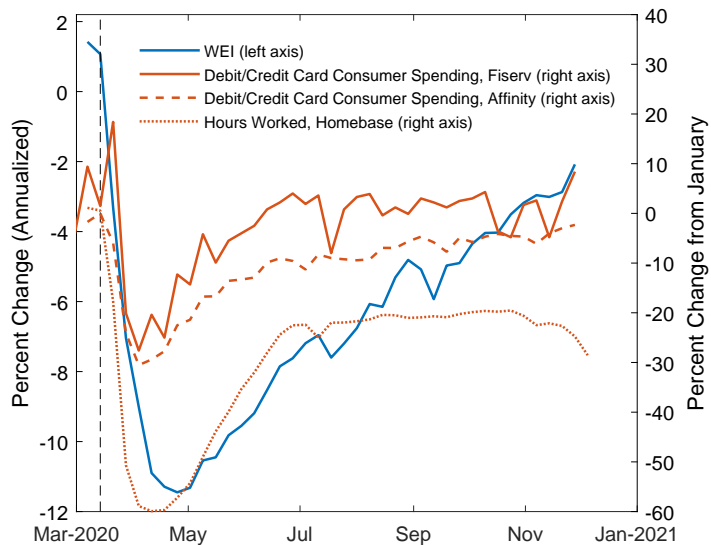
WEI vs GDP forecasts: 2020Q3



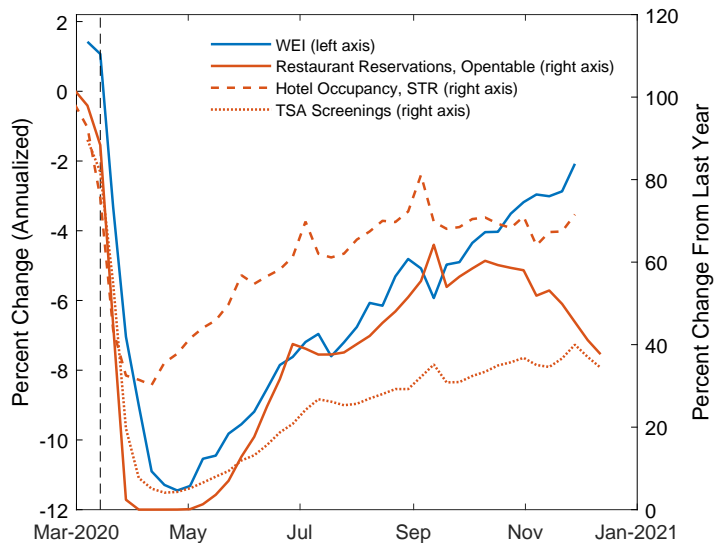
WEI vs GDP forecasts: 2020Q4



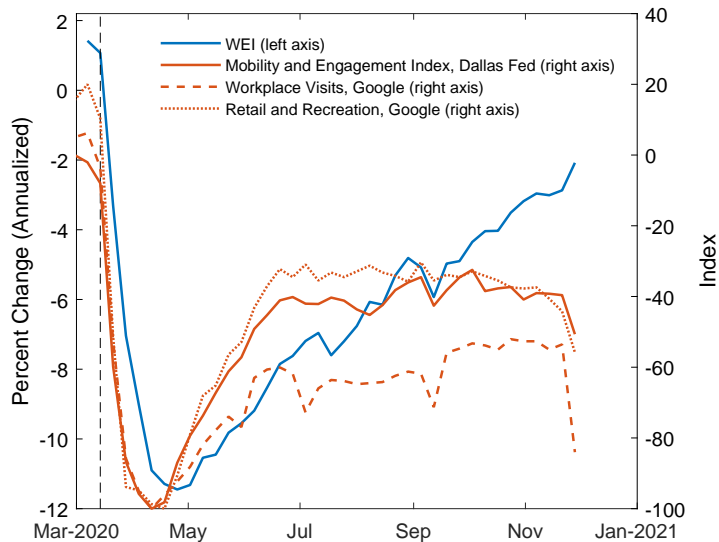
WEI vs Alternative Data



WEI vs Alternative Data



WEI vs Alternative Data



Conclusion

- The WEI has provided a timely signal of real economic activity during the pandemic.
- Similar indices now exist for many other countries, US states, Eurozone, the global economy.
- As alternative data mature, they may be useful for WEI.