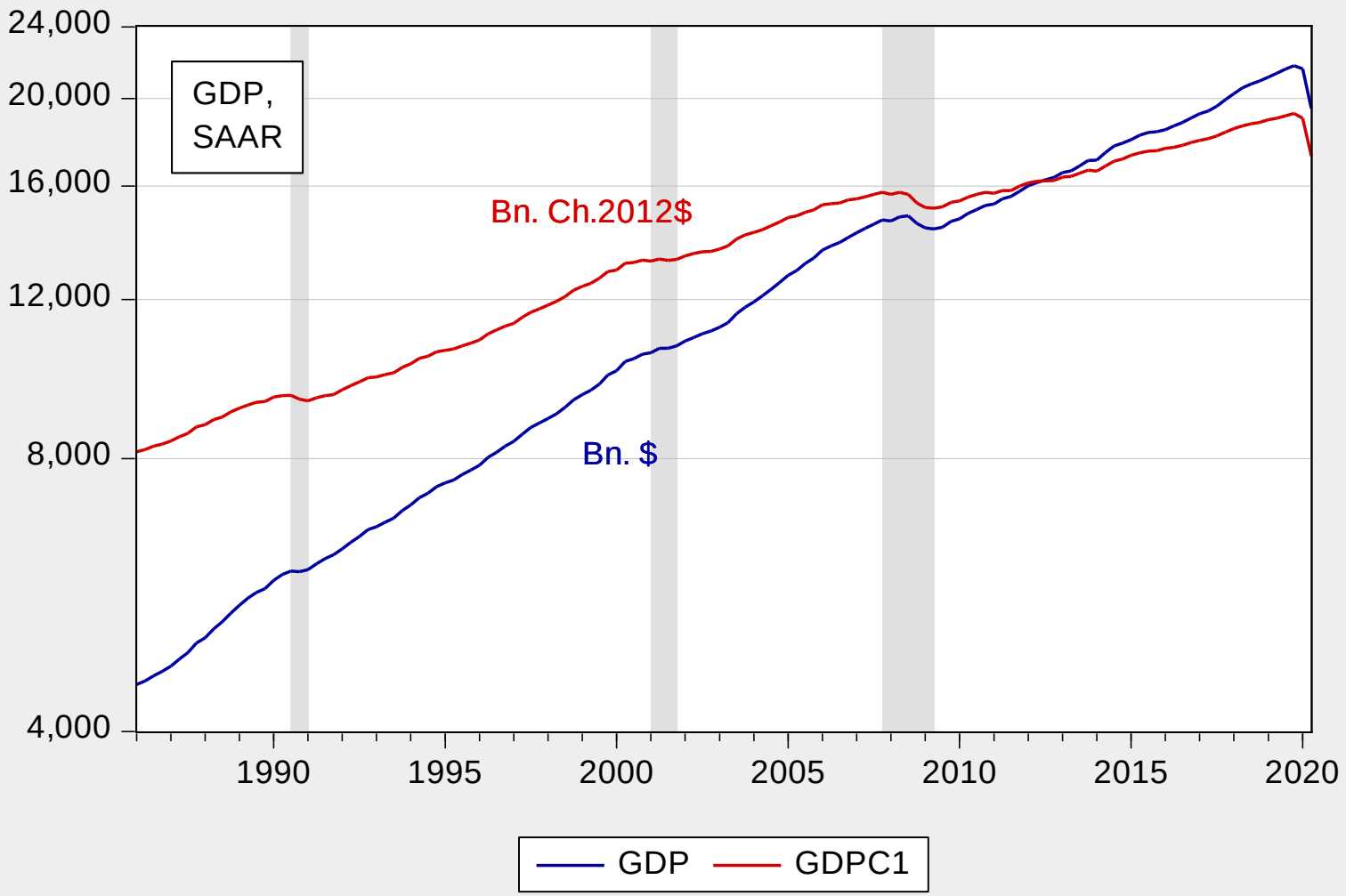
Economics 442
Macroeconomic Policy
Lecture 8
9/30/2020

Instructor: Prof. Menzie Chinn
UW Madison
Fall 2020

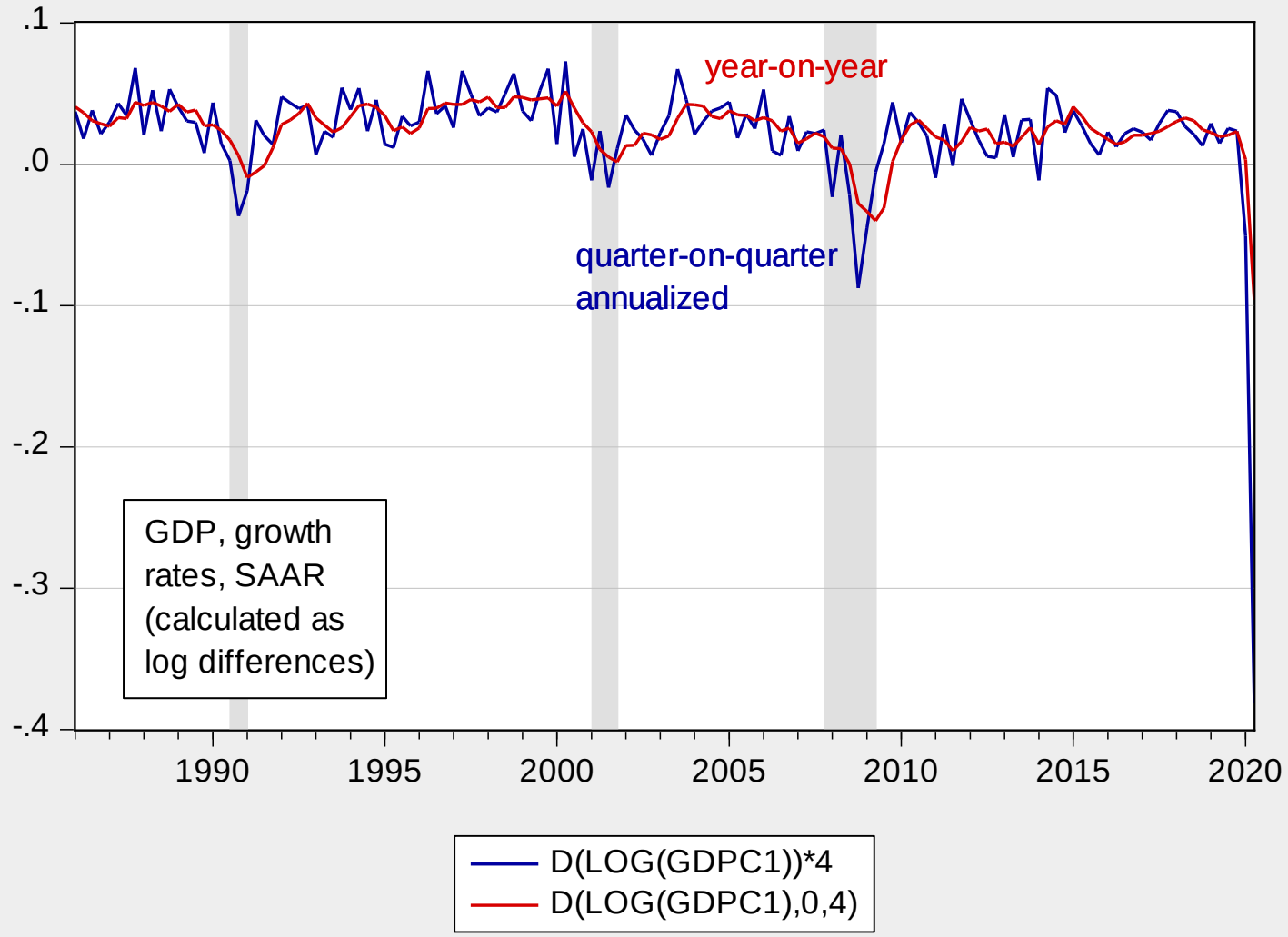
Outline

- Recession vs. output gap
- Real time recession detection
- Recession in Europe!
- Output gap measurement

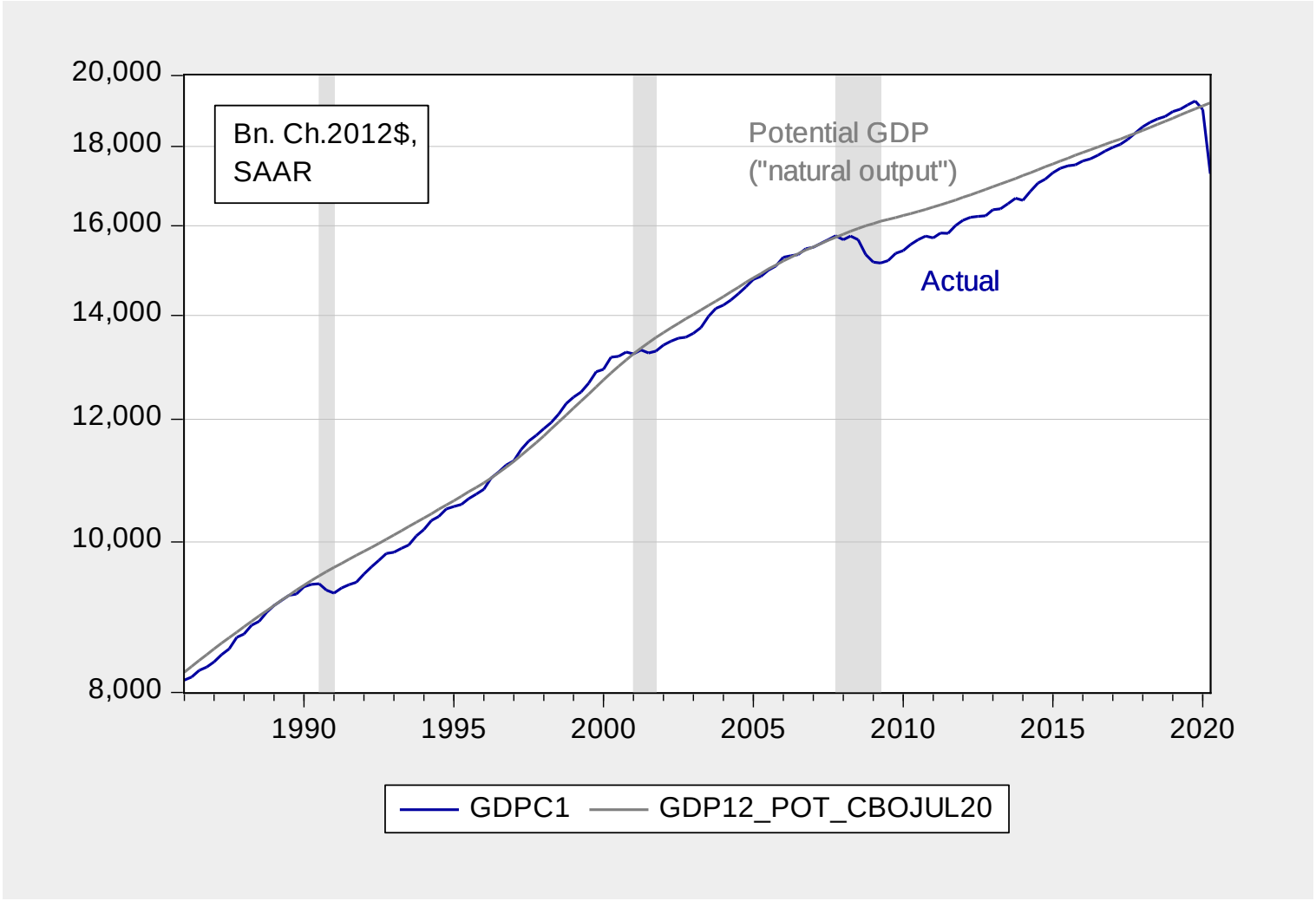
What's a Recession?



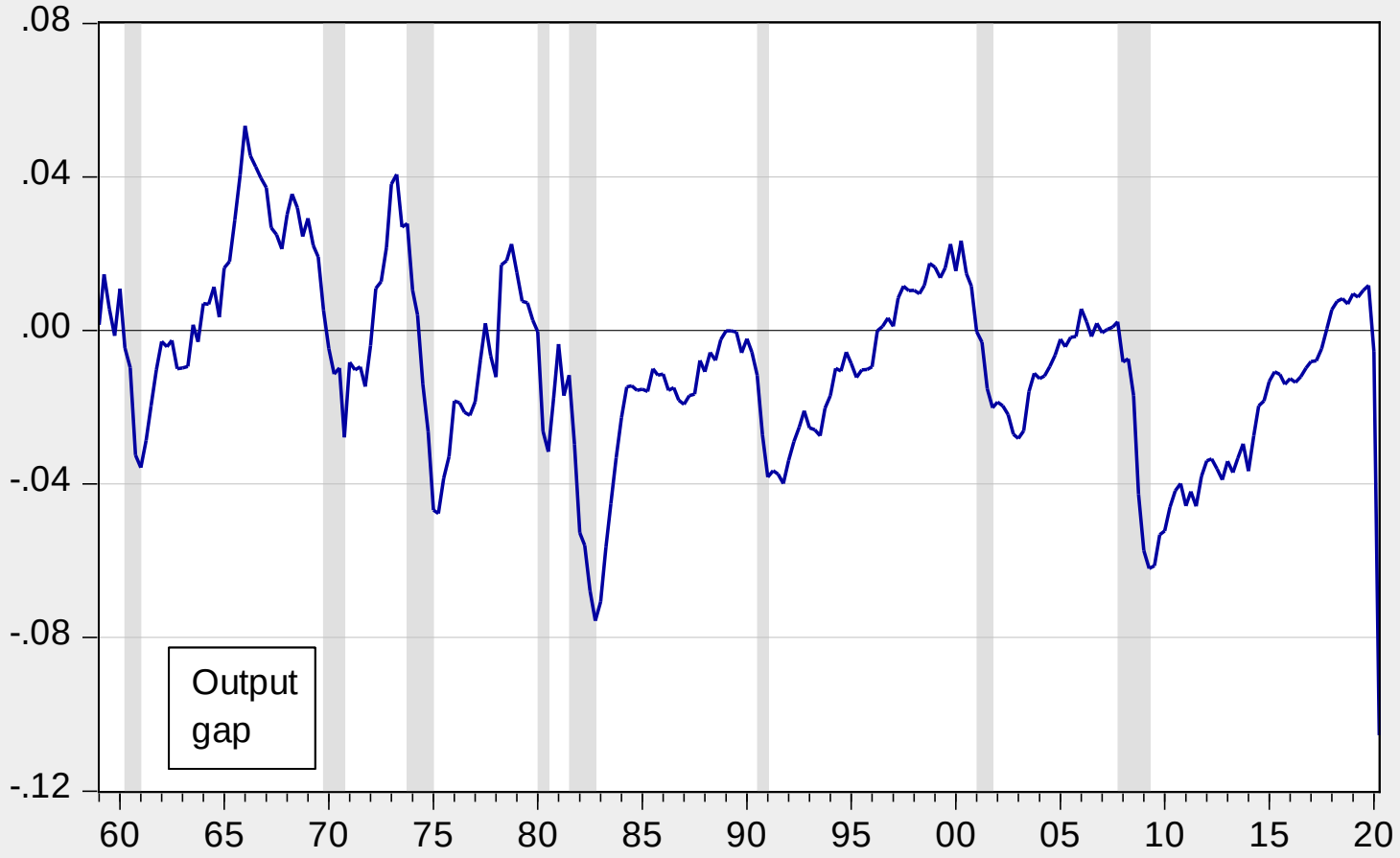
What's a Recession: Growth Rates



What's Not a Recession: A Negative Output Gap



Output Gap



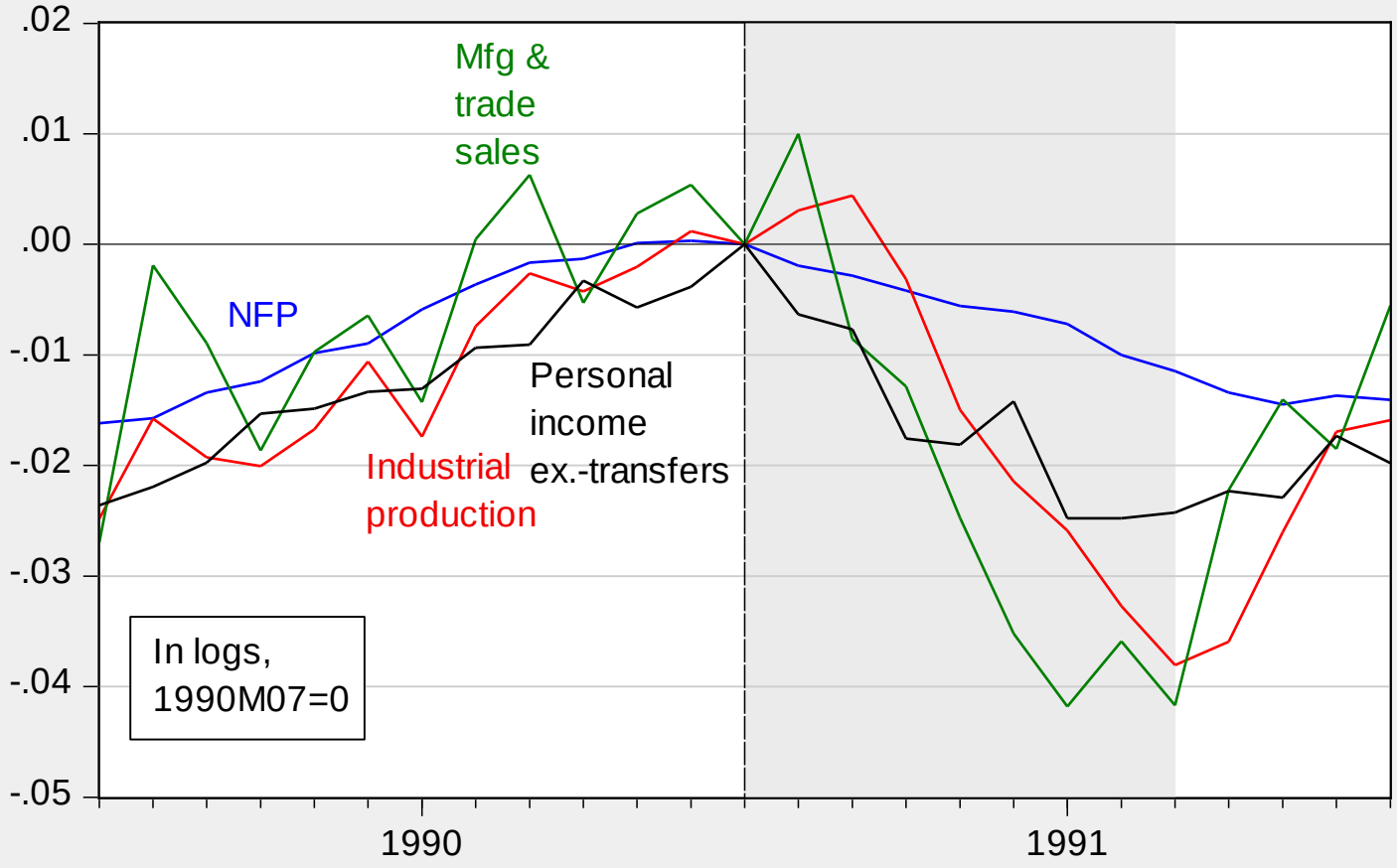
Defined as log(GDP/Potential GDP)

NBER Definition of a Recession

A recession is a period of falling economic activity spread across the economy, lasting more than a few months, normally visible in real GDP, real income, employment, industrial production, and wholesale-retail sales. The trough marks the end of the declining phase and the start of the rising phase of the business cycle. Economic activity is typically below normal in the early stages of an expansion, and it sometimes remains so well into the expansion.

https://www.nber.org/cycles/sept2010.html

1990-91 Recession

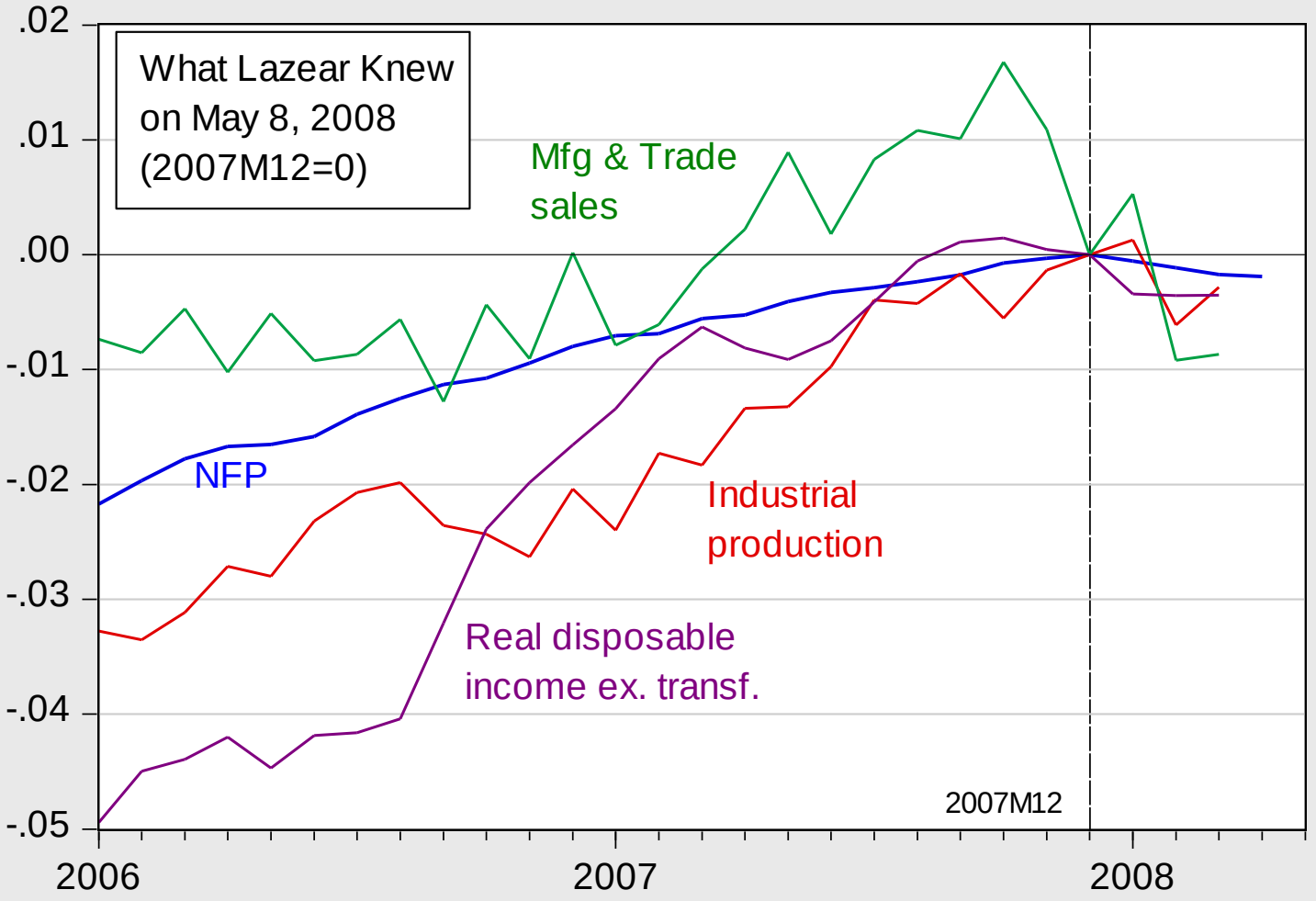


Recessions Are Hard to See in Real Time

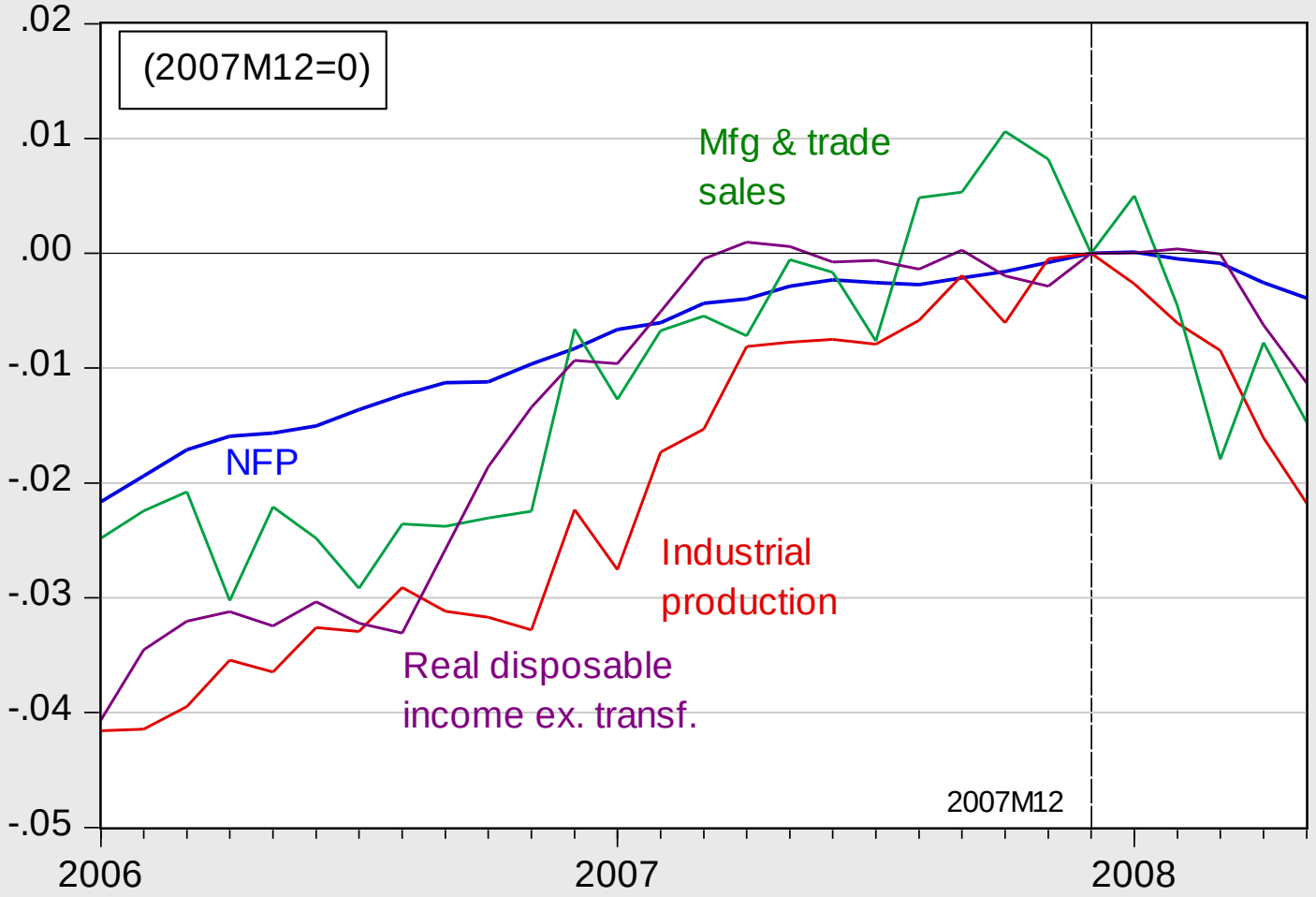
"The data are pretty clear that we are not in a recession."

-- White House Council of Economic Advisers Chairman Ed Lazear, Wall Street Journal, May 8, 2008

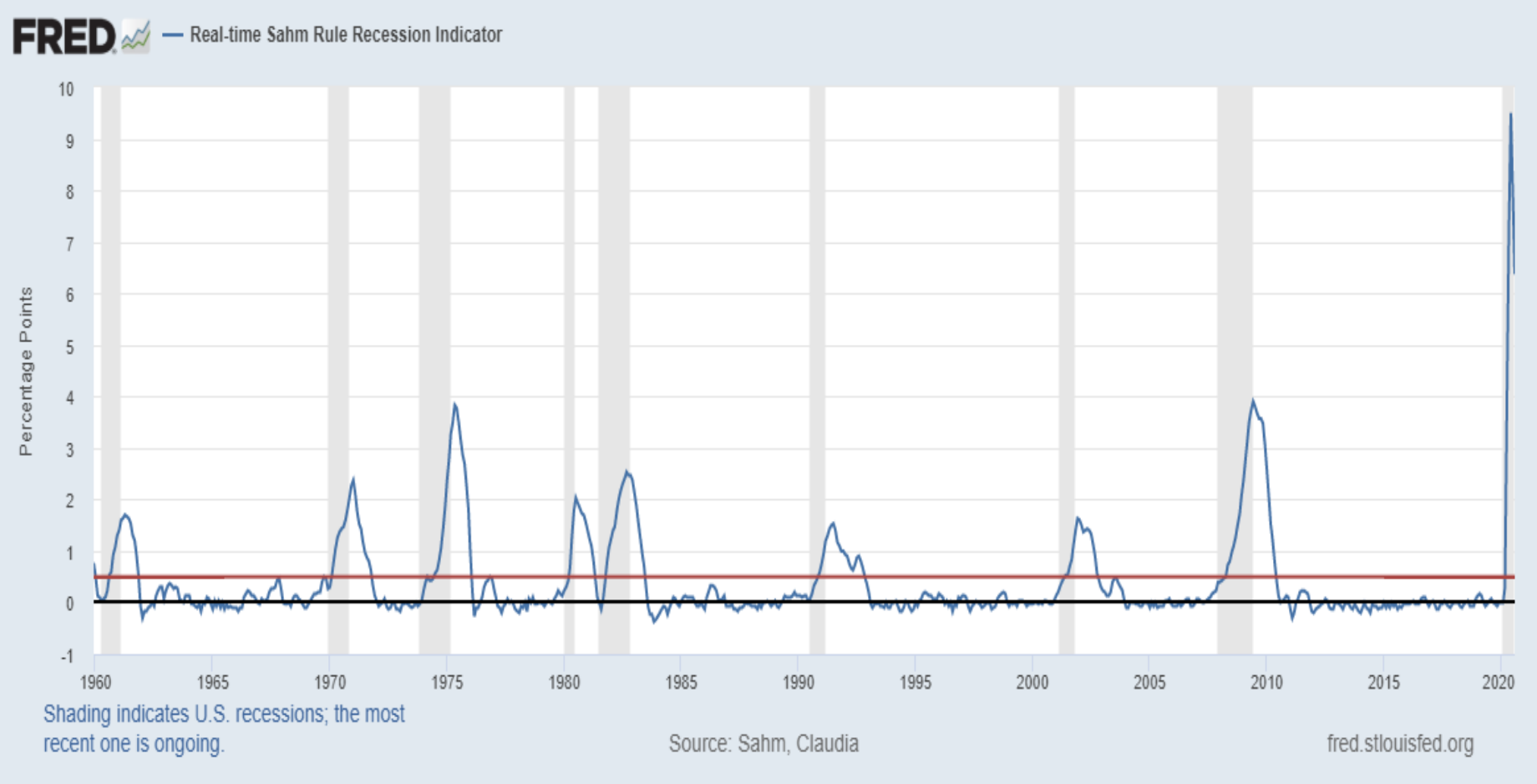
2007-2012 Recession (in real time)



What We Know Actually Happened



Do We Have a Good Real-Time Indicator of When a Recession Starts? "Sahm Rule"



https://fred.stlouisfed.org/series/SAHMREALTIME

“Sahm Rule”

Sahm Recession Indicator signals the start of a recession when the three-month moving average of the national unemployment rate (U3) rises by 0.50 percentage points or more relative to its low during the previous 12 months.

This indicator is based on "real-time" data, that is, the unemployment rate (and the recent history of unemployment rates) that were available in a given month. The BLS revises the unemployment rate each year at the beginning of January, when the December unemployment rate for the prior year is published. Revisions to the seasonal factors can affect estimates in recent years. Otherwise the unemployment rate does not revise.

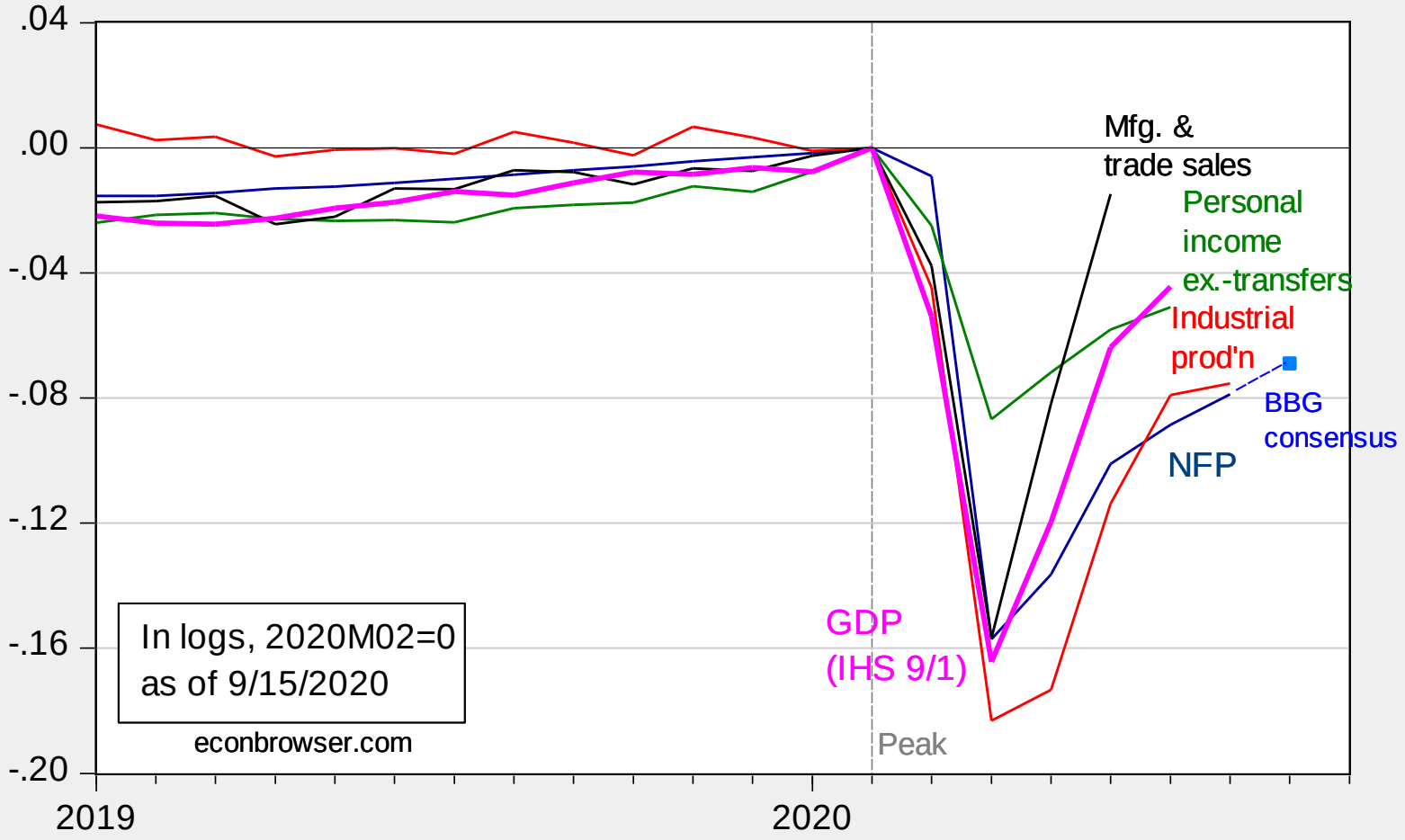
Suggested Citation:

Sahm, Claudia, Real-time Sahm Rule Recession Indicator [SAHMREALTIME], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/SAHMREALTIME, September 27, 2020.

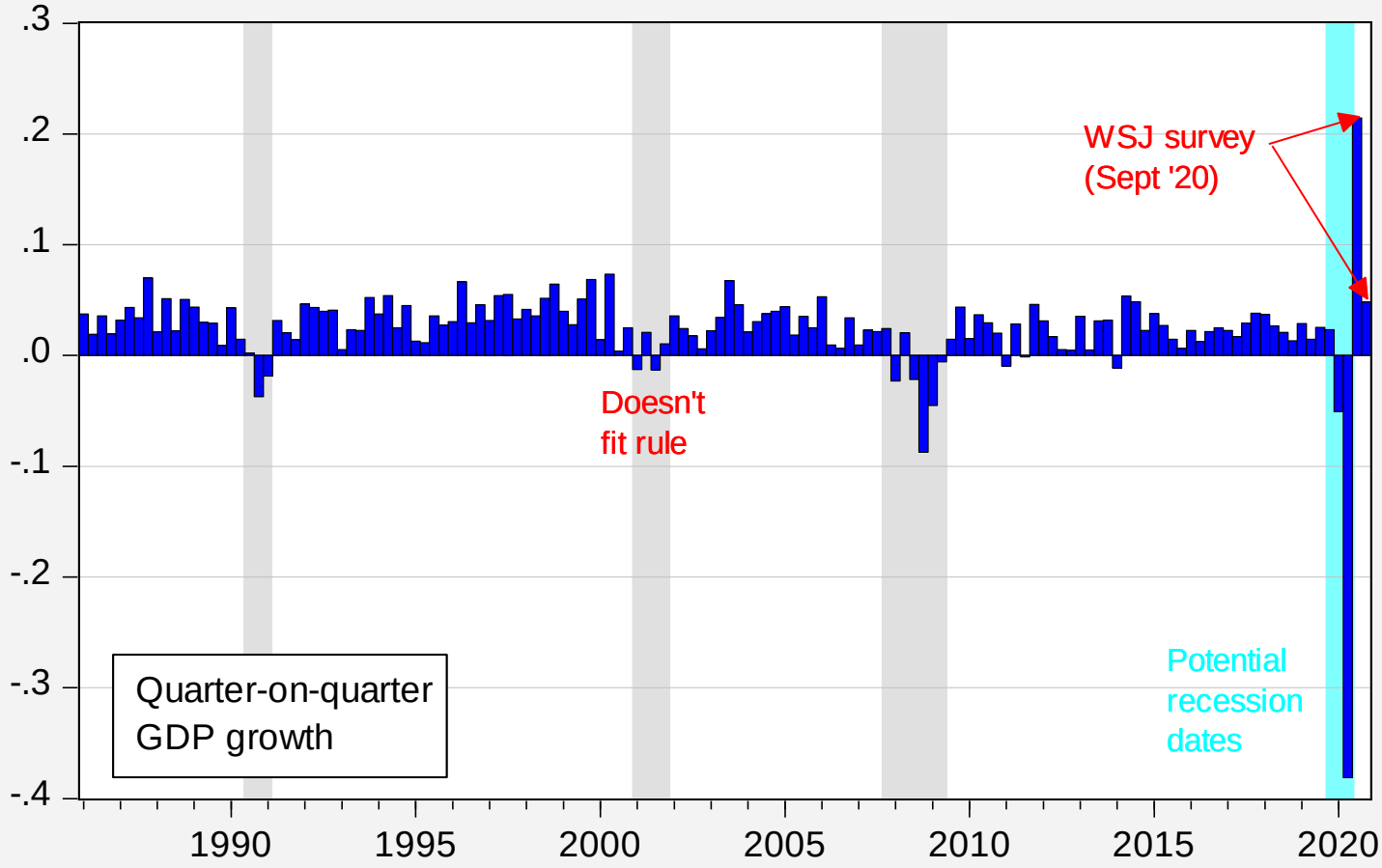
On Recession Pronouncements

- As of May 8th, April UE had breached Sahm rule threshold
- Ed Lazear should’ve hedged, had he known of the Sahm rule

Where Are We Now (as far as we know)?



Why We Don't Use the 2 Quarter GDP Decline Rule of Thumb…



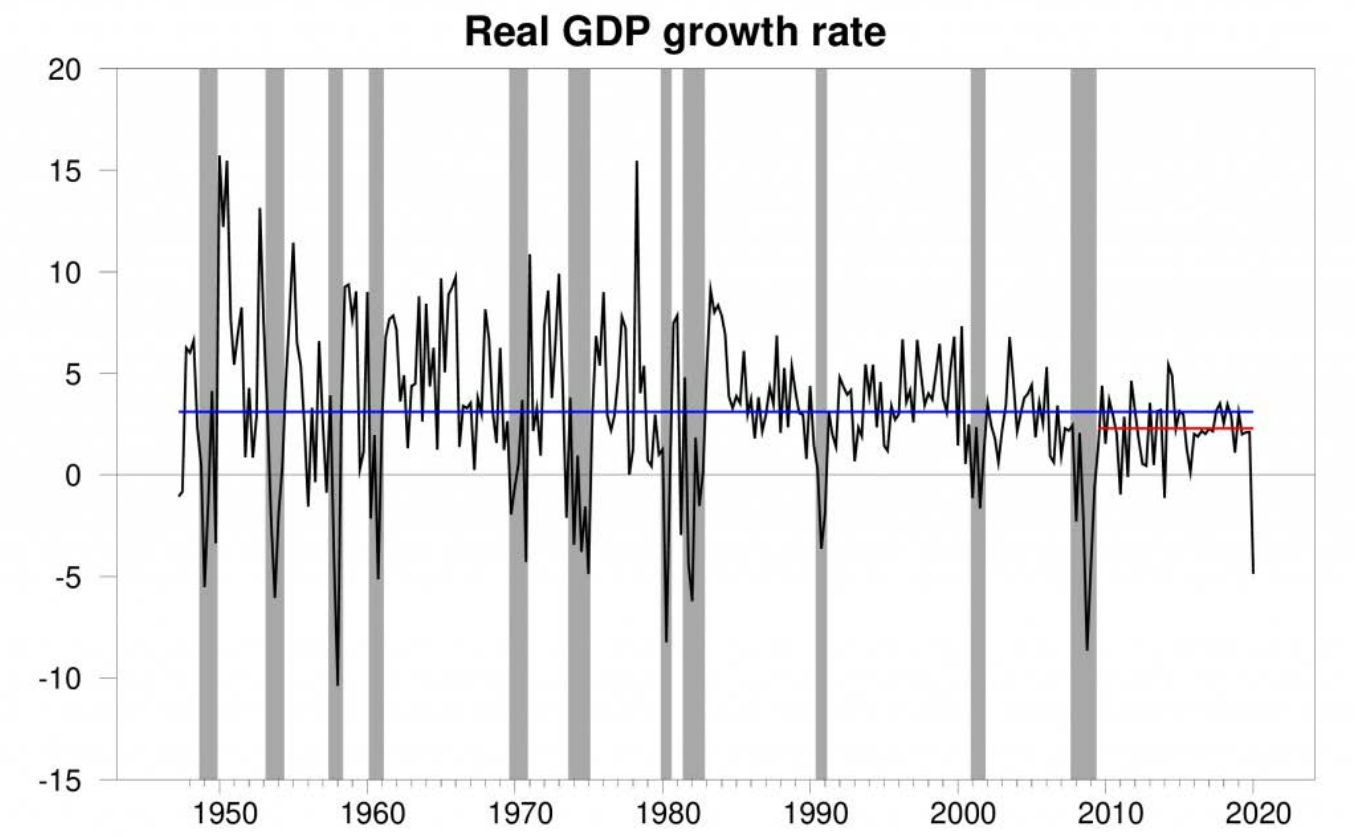
Statistical Approach: Is Economy in Upswing or Downswing

- James Hamilton uses a Markov switching model to characterize economy in two regimes
- High growth and low growth
- Using GDP as released
- Does not *predict* recession
- Is a slightly lagging indicator (e.g., Q3 growth is announced end-of-October)
- Is included in St. Louis Fed FRED

https://fred.stlouisfed.org/series/JHDUSRGDPBR

Hamilton Model in Current Recession

- As of the Q1 advance release (April 29), Markov switching model gives 32.5% probability of being in recession regime



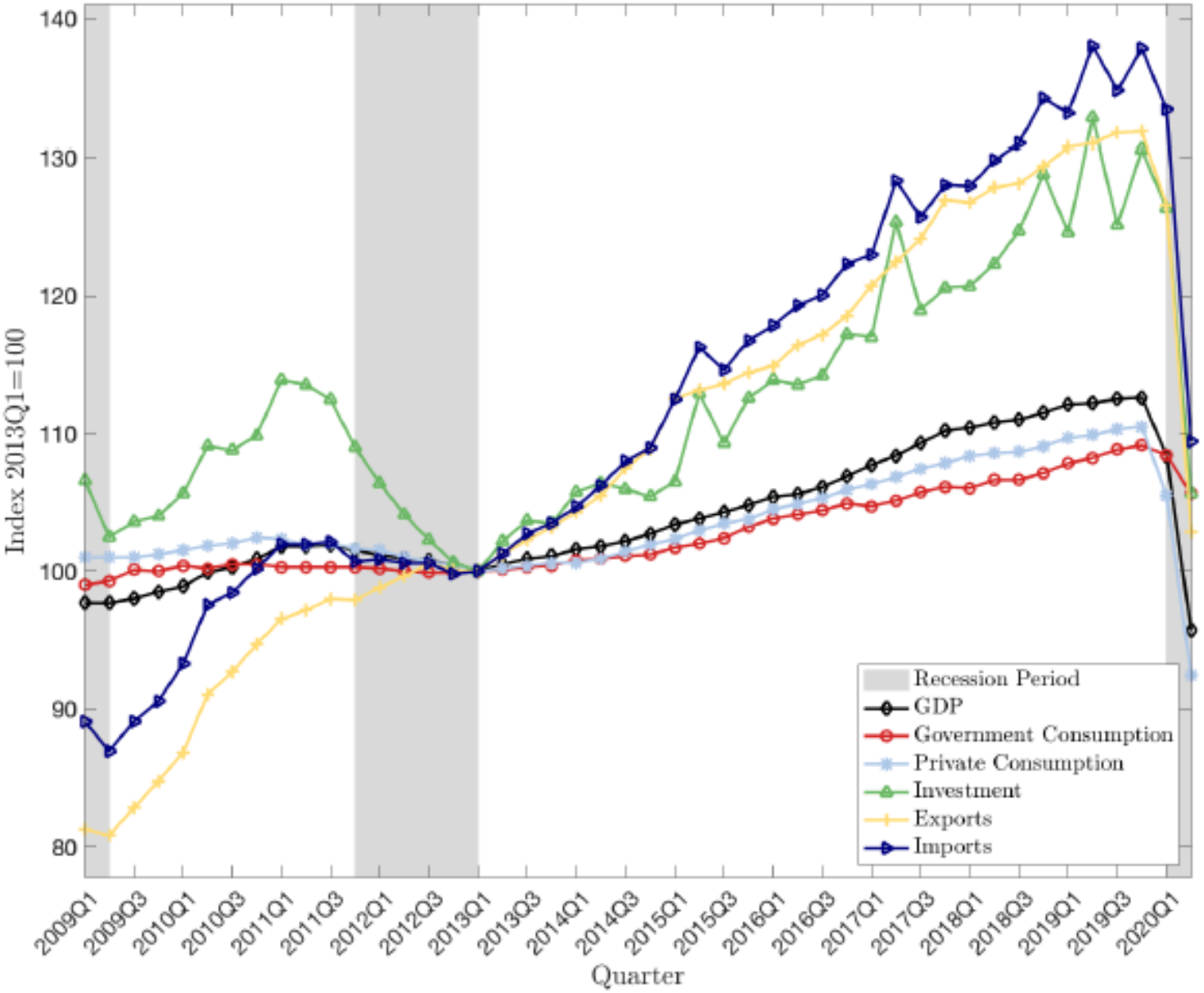
Recession in Europe

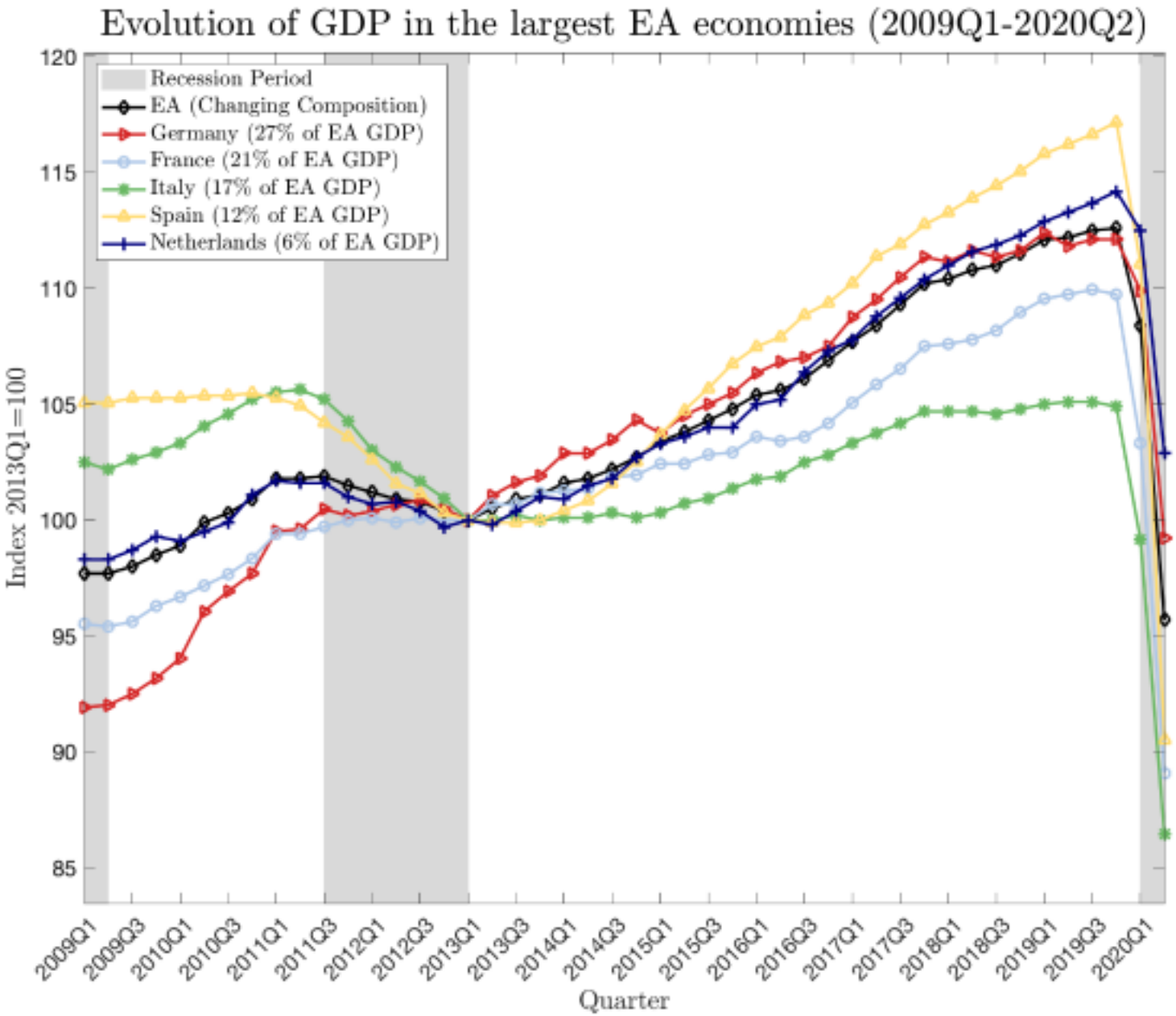
- Just announced yesterday by CEPR (Centre for Economic Policy Research) in London and EABCN (Euro Area Business Cycle Network)
- Why non-governmental organizations typically declare recessions? Because governments don't typically want to announce bad news
- Why wait until now (NBER declared recession in June)? Because drop could've been so short as to not merit being termed a recession

Announcement of Sept. 29

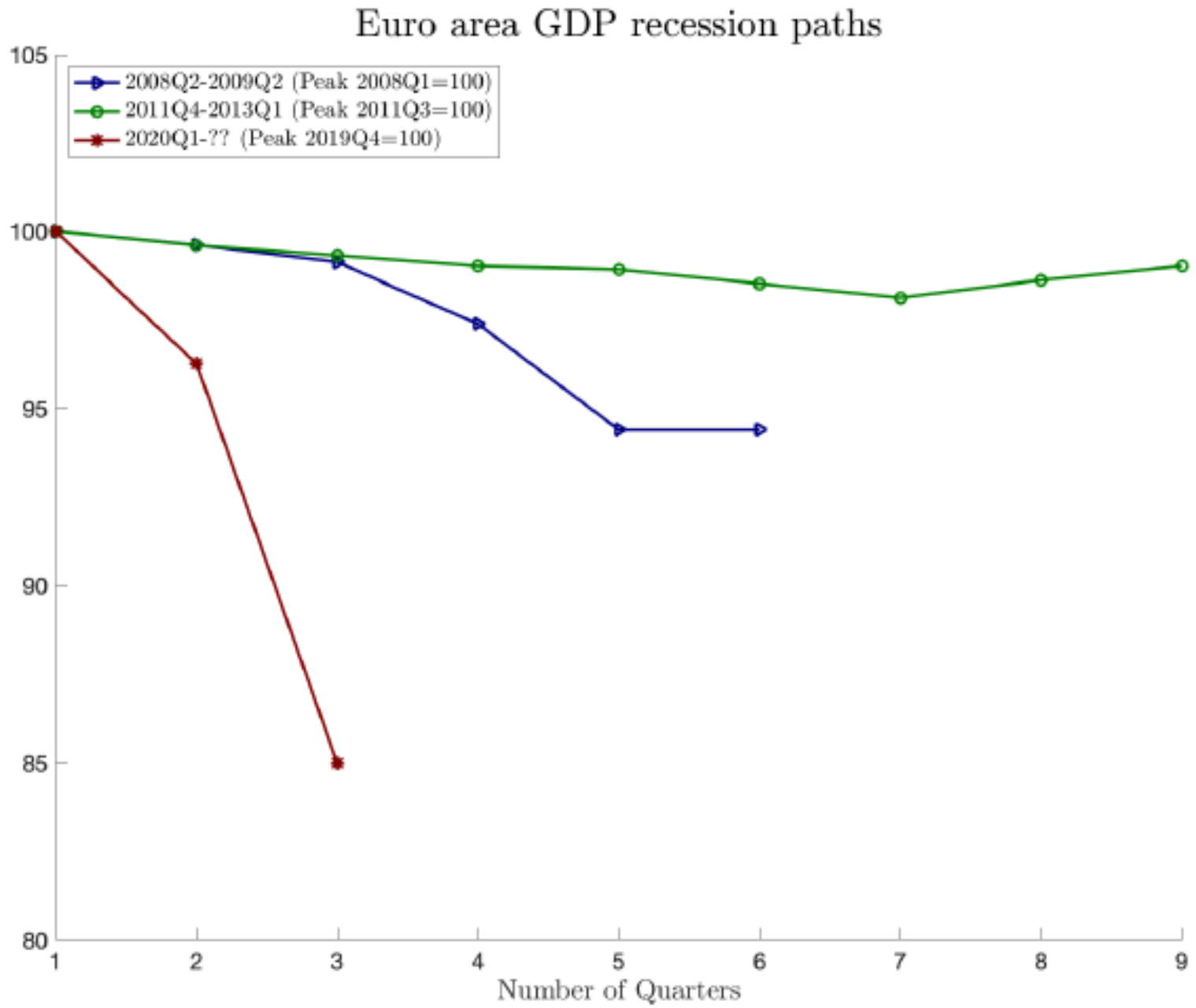
"The [CEPR – EABCN] Committee concluded that the latest euro area expansion reached its peak in 2019Q4. The pace of that now-ended 31-quarter expansion, which had begun in 2013Q2, was the slowest of all euro area recoveries to date. The euro area entered recession during 2020Q1, most likely in March, with economic activity and employment decreasing in 2020Q1 and 2020Q2 across euro area countries at unprecedented speeds and to unprecedented depths."

https://eabcn.org/sites/default/files/eabcdc_findings_september_2020.pdf


Evolution of euro area GDP and main components (2009Q1-2020Q2)
Index 2013Q1=100
Quarter
140
130
120
110
100
90
80
2009Q1
2009Q3
2010Q1
2010Q3
2011Q1
2011Q3
2012Q1
2012Q3
2013Q1
2013Q3
2014Q1
2014Q3
2015Q1
2015Q3
2016Q1
2016Q3
2017Q1
2017Q3
2018Q1
2018Q3
2019Q1
2019Q3
2020Q1
Recession Period
GDP
Government Consumption
Private Consumption
Investment
Exports
Imports


Evolution of GDP in the largest EA economies (2009Q1-2020Q2)
Recession Period
EA (Changing Composition)
Germany (27% of EA GDP)
France (21% of EA GDP)
Italy (17% of EA GDP)
Spain (12% of EA GDP)
Netherlands (6% of EA GDP)
Index 2013Q1=100
120
115
110
105
100
95
90
85
2009Q1
2009Q3
2010Q1
2010Q3
2011Q1
2011Q3
2012Q1
2012Q3
2013Q1
2013Q3
2014Q1
2014Q3
2015Q1
2015Q3
2016Q1
2016Q3
2017Q1
2017Q3
2018Q1
2018Q3
2019Q1
2019Q3
2020Q1
Quarter


Evolution of employment in the euro area (2009Q1-2020Q2)
Recession Period
Employment (Persons)
Employment (Hours Worked)
Index 2013Q1=100
108
106
104
102
100
98
96
94
92
90
88
2009Q1
2009Q3
2010Q1
2010Q3
2011Q1
2011Q3
2012Q1
2012Q3
2013Q1
2013Q3
2014Q1
2014Q3
2015Q1
2015Q3
2016Q1
2016Q3
2017Q1
2017Q3
2018Q1
2018Q3
2019Q1
2019Q3
2020Q1
Quarter


Euro area GDP recession paths
2008Q2-2009Q2 (Peak 2008Q1=100)
2011Q4-2013Q1 (Peak 2011Q3=100)
2020Q1-?? (Peak 2019Q4=100)
105
100
95
90
85
80
1
2
3
4
5
6
7
8
9
Number of Quarters

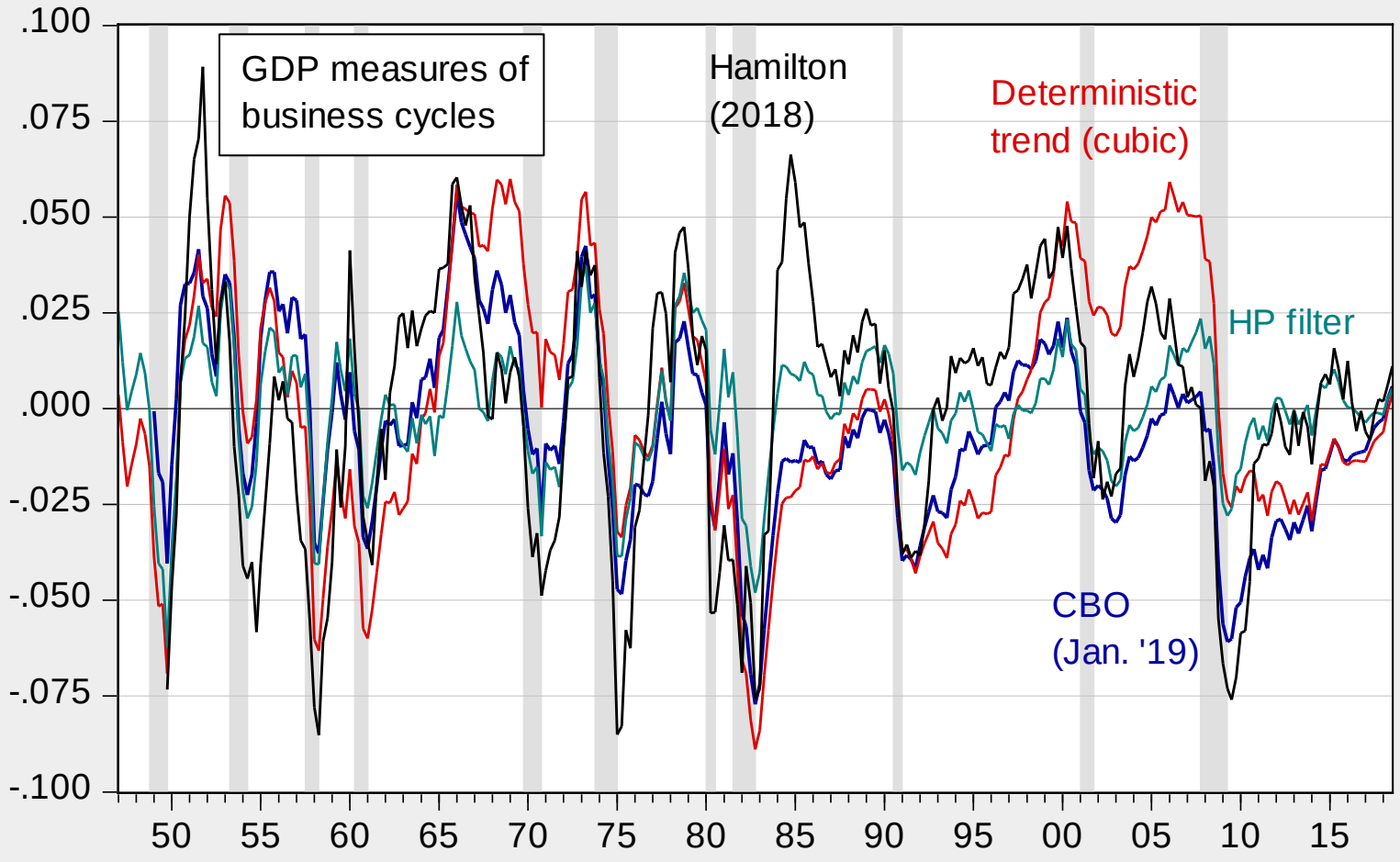
How to Model Output Gap?

- Output gap suggests using time series methods, in some sort of trend-cycle decomposition
- Estimate potential GDP using production function approach, projecting (as in CBO) potential GDP estimate using labor stock, demographics, capital stock, technology.

Trend-Cycle Decomposition

- Can extract trend, cycle using filter (linear deterministic trend, Hodrick-Prescott filter).
- Can extract trend, cycle using more complicated methods assuming correlation, no correlation between trend, cycle.

Gaps – Statistical vs. Production Fn.



Example: Hodrick-Prescott

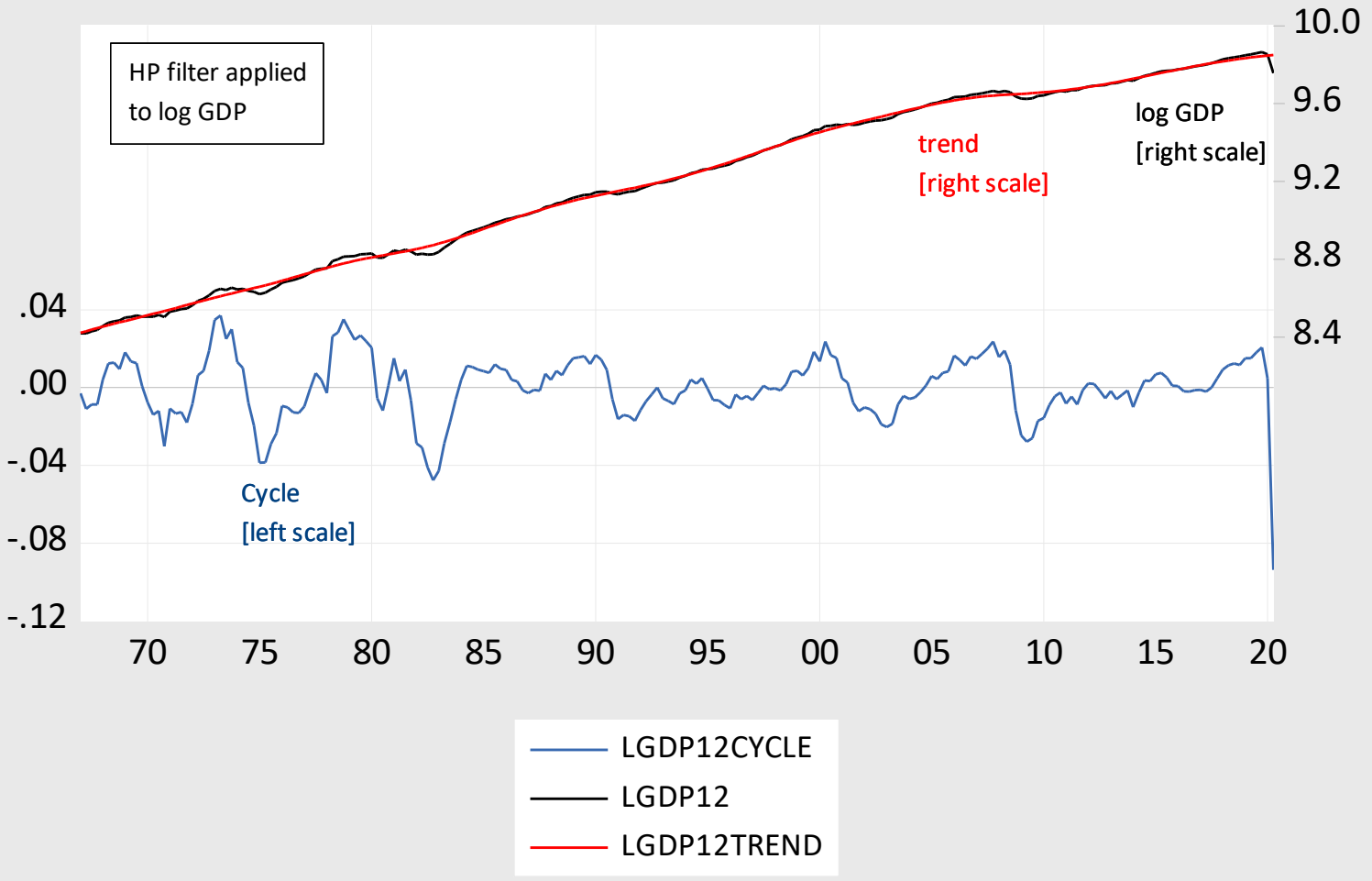
- The most common filter used in macroeconomics
- Not necessarily a “good” filter as it can impart common cycles into series that don’t have common cycles
- But it’s easy to implement: Assume

$$y_t = \tau_t + c_t + \epsilon_t$$

Pick λ

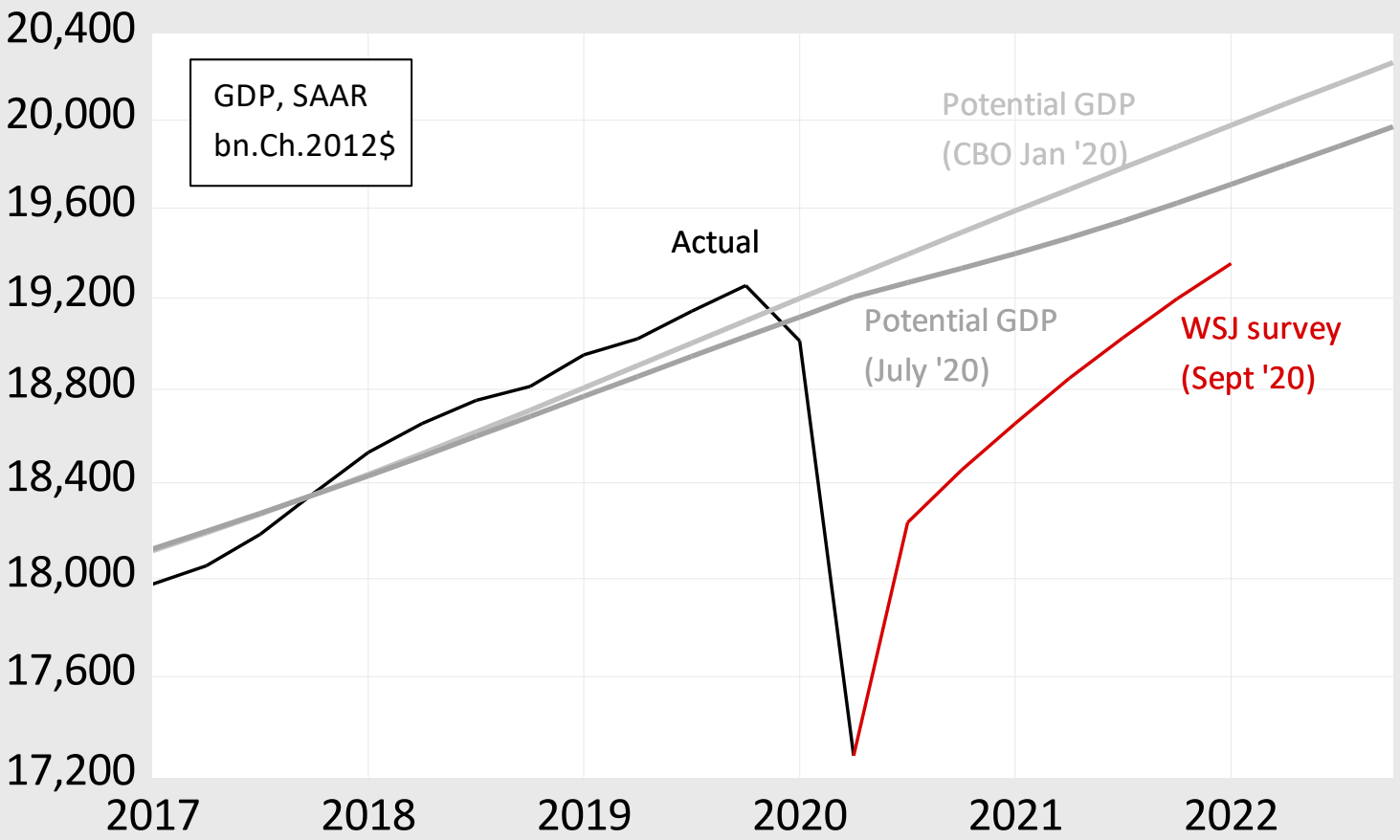
$$\min_{\tau_t} \left[\sum_{t=1}^{T} (y_t - \tau_t)^2 + \lambda \sum_{t=2}^{T-1} \{(\tau_{t+1} - \tau_t) - (\tau_t - \tau_{t-1})\}^2 \right]$$

Hodrick Prescott Filter on log GDP



Note: endpoint problem

Gaps – Production Function Approach



How to Estimate Potential GDP

- Shackleton, "Estimating and Projecting Potential Output Using CBO's Forecasting Growth Model," WP 2018-03

$$(1)\ GDP_x = QGDP_x \times PGDP_x$$

$$(2)\ GDP = GDP_{nfb} + GDP_{farm} + GDP_{house} + GDP_{nonprofits} + GDP_{federal} + GDP_{s\&l}$$

$$(3)\ QGDP_{nfb} = A_{nfb} \times ILAB_{nfb}^{(1-\alpha)} \times ICAP_{nfb}^{\alpha}$$

where

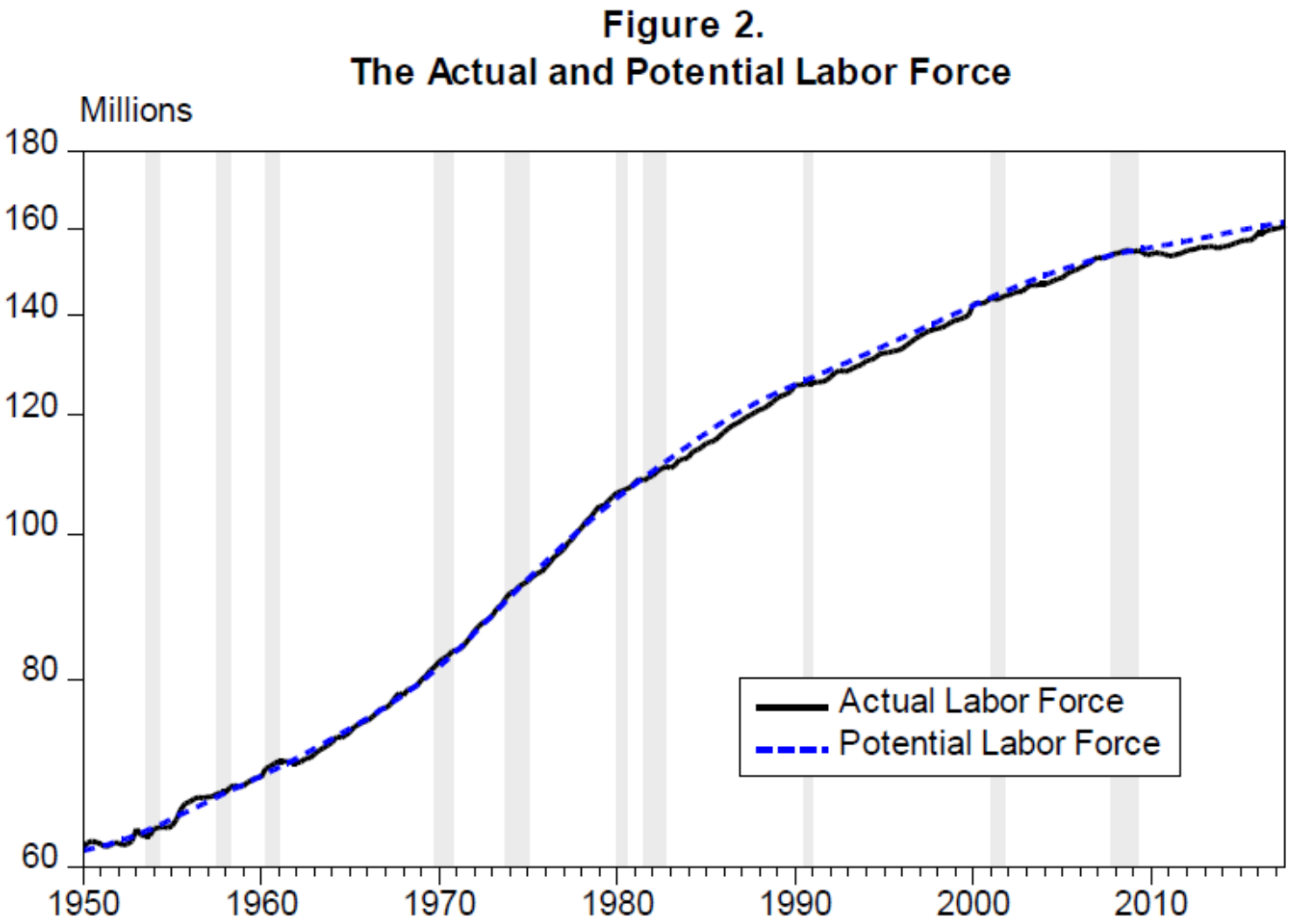
$QGDP_{nfb}$ = real GDP in the nonfarm business sector;
A_{nfb} = an index of total factor productivity in the sector;
$ILAB_{nfb}$ = an index of hours worked in the sector;
$ICAP_{nfb}$ = an index of capital services in the sector; and
α = a parameter that characterizes the relative contributions of labor and capital in the sectoral production process.

Biggest Challenge: Output of NFB

Table 1.
Structure of CBO's Forecasting Growth Model

Sector	Inputs			Percentage of GDP
	Labor	Capital	Productivity	
Nonfarm business	Labor hours	Services from multiple types of capital	Total factor productivity	75
Farm	Labor hours	--	Labor productivity	1
Household	--	Services from owner-occupied housing	--	7
Nonprofit	Labor hours	--	Labor productivity	5
Federal government	Labor hours	Aggregate depreciation	Labor productivity	4
State and local government	Labor hours	Aggregate depreciation	Labor productivity	8

Labor (which has to be projected)



Need to Project Capital Services and Technology (TFP)

- Capital services depends on capital stock, which depends on the amount of investment and depreciation.
- Amount of investment depends on contemporaneous economic conditions (so not a complete separation of cyclical, natural)
- TFP is extremely difficult to estimate (since it's the Solow residual)
- And even harder to project (since we don't know what causes it to change)

Conclusions

- Recessions are declines in economic activity
- Output gaps are deviations of output from potential GDP (natural rate of output)
- Which one is more important? Latter for our models.