The Natural Behavior of Unemployment

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29. October 2020
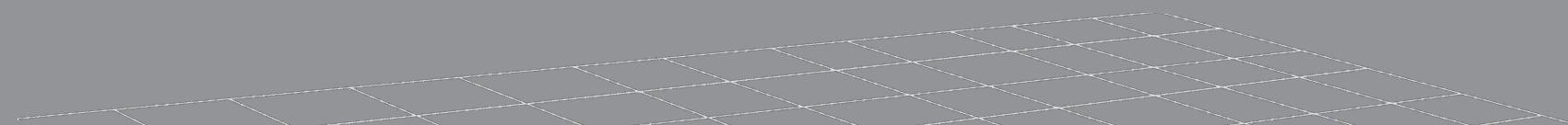
Poll Results

1. When inflation is steady, neither rising nor falling over time,
   a) Unemployment is above its natural rate
   b) Unemployment is at its natural rate
   c) Unemployment is below its natural rate

Bob Hall

2. The natural rate of unemployment
   a) Is constant over time at around its long-term level of 5 percent.
   b) Has declined over time in recent decades, to 3.5 percent in February 2020, before the pandemic
   c) Behaves according to stable principles, rising sharply in crises and declining slowly during periods of economic calm.

3. High unemployment early in the pandemic (multiple choice)
   a) Completely departed from historical behavior--inflation remained stable at close to 2 percent.
   b) Was consistent with historical behavior if workers who retain jobs but are on temporary layoff are not considered to have a downward effect on inflation.
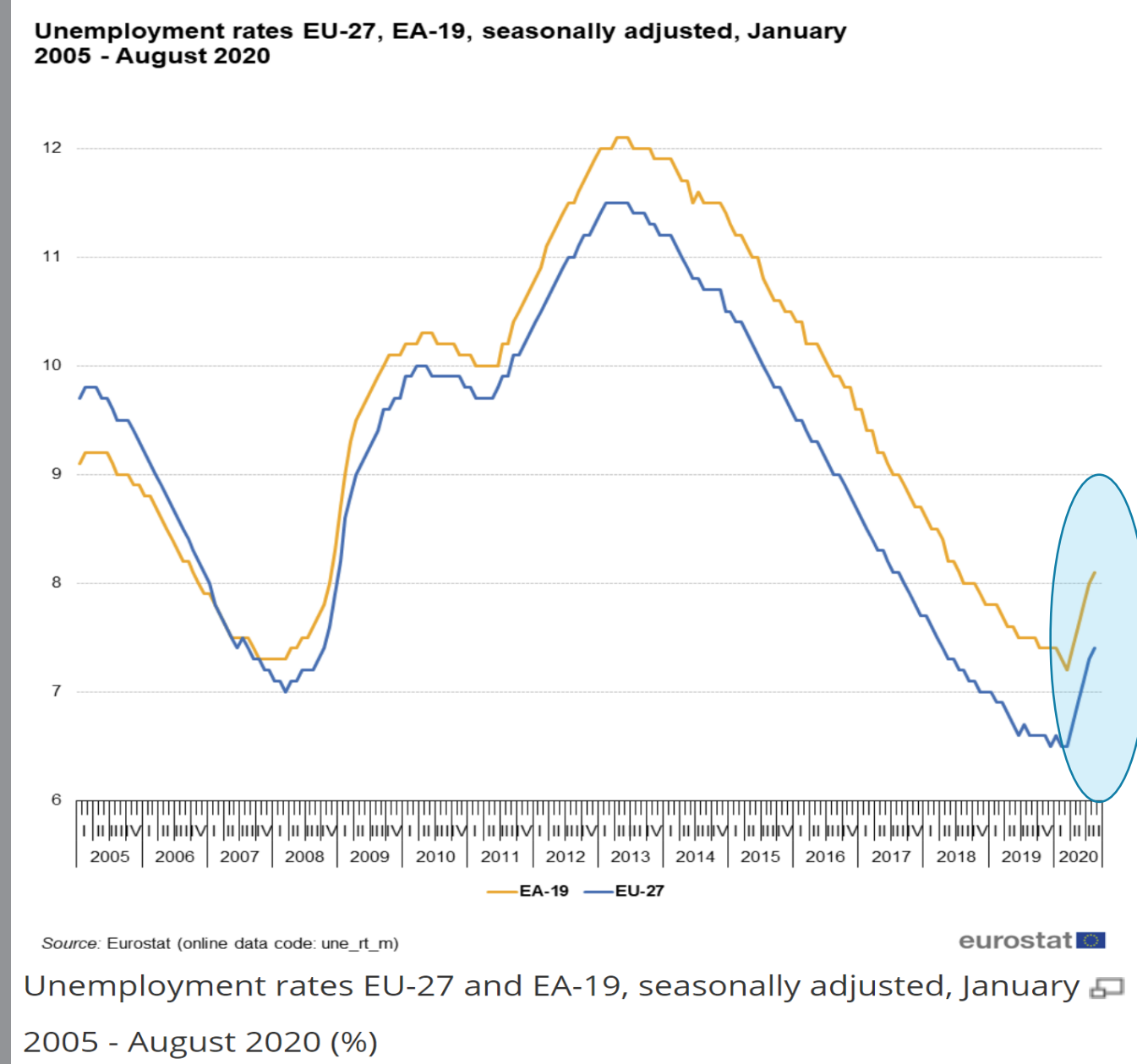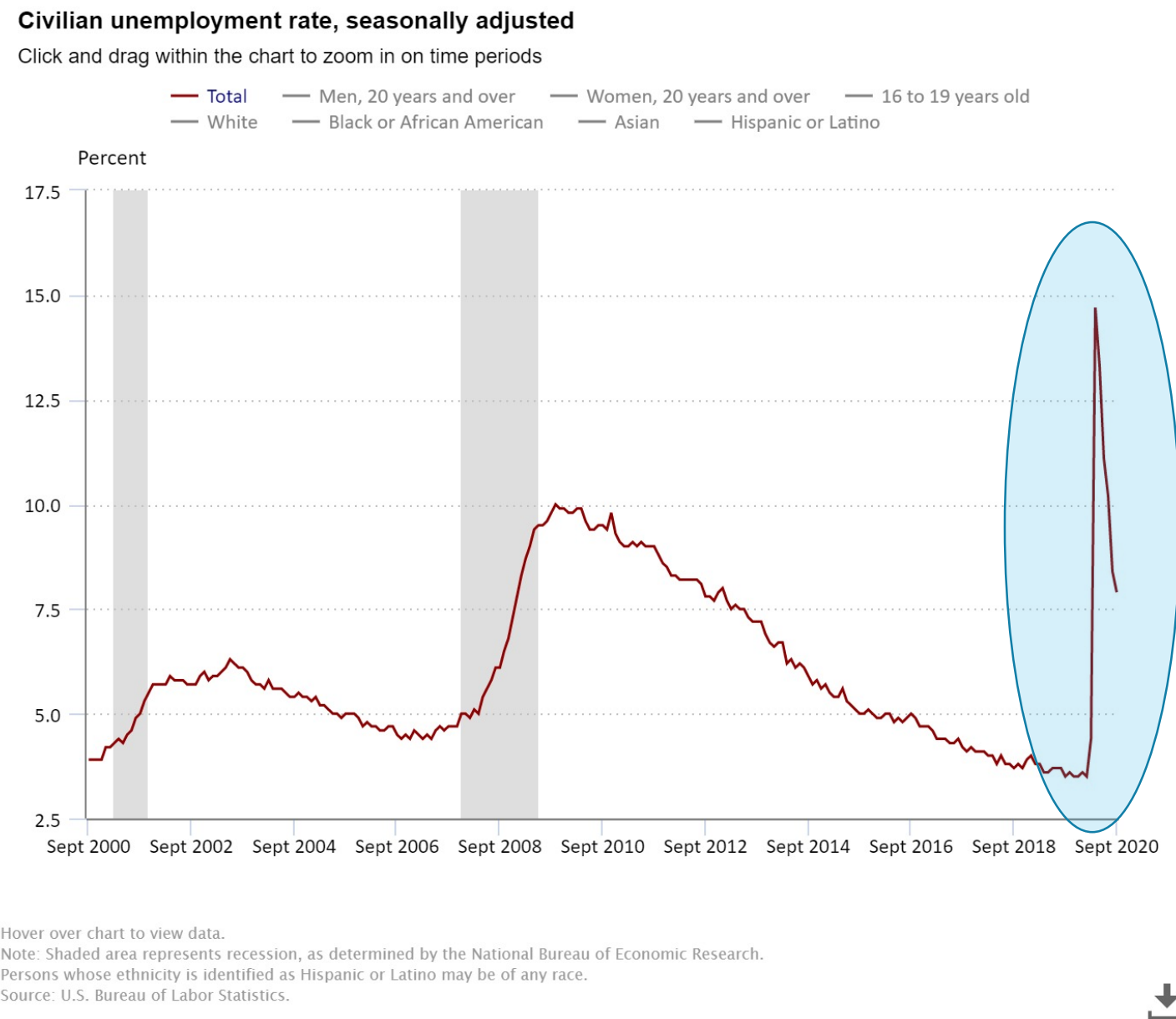   c) Subsequently declined much faster than following other crises.
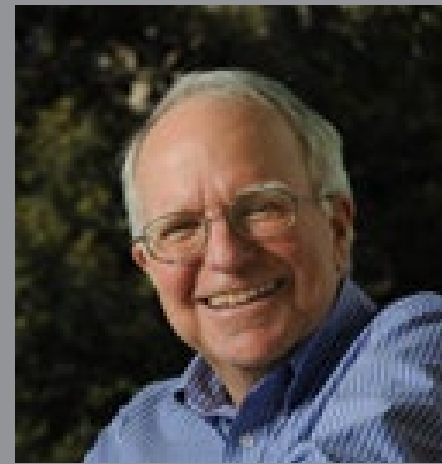
Unemployment rate – policy dependency

See earlier webinar with Erik Hurst (ADP data)
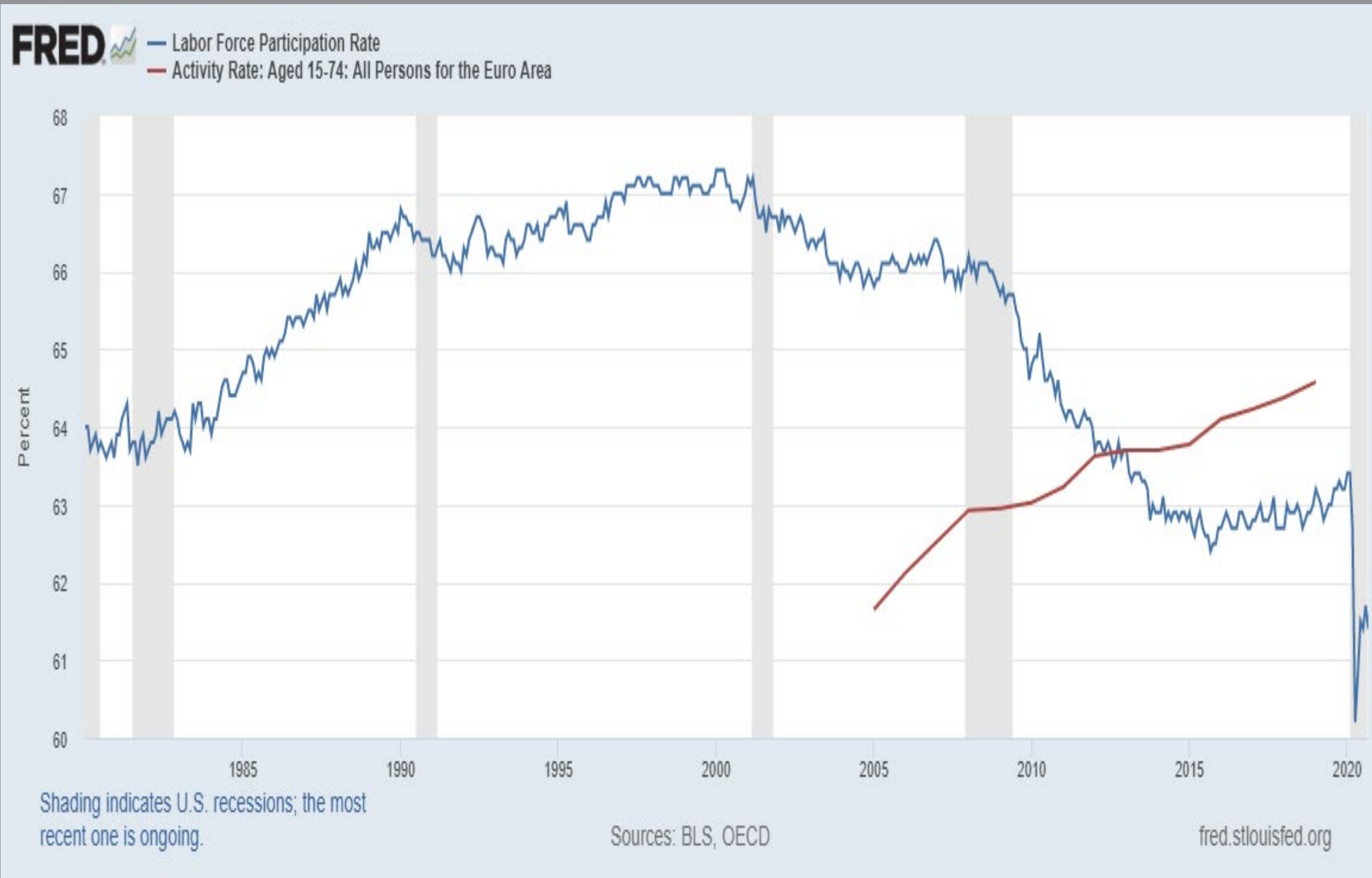
- USA
  - Breaks: job-worker matches

- Europe
  - maintain match: "Kurzarbeit"

Civilian unemployment rate, seasonally adjusted
Click and drag within the chart to zoom in on time periods

Total — Men, 20 years and over — Women, 20 years and over — 16 to 19 years old
White — Black or African American — Asian — Hispanic or Latino

Hover over chart to view data.
Note: Shaded area represents recession, as determined by the National Bureau of Economic Research.
Persons whose ethnicity is identified as Hispanic or Latino may be of any race.
Source: U.S. Bureau of Labor Statistics.

Unemployment rates EU-27, EA-19, seasonally adjusted, January 2005 - August 2020

EA-19 — EU-27

Source: Eurostat (online data code: une_rt_m)

Unemployment rates EU-27 and EA-19, seasonally adjusted, January 2005 - August 2020 (%)

3

Labor market reforms

12,7

2nd oil crisis

9,3

GFC Lehman

10,3

9,1

Economic miracle

11,0

8,7

1st oil crisis

7,2

7,6

7,1

German unification

4,7

Rezession

3,8

Unemployment rate

Germany

Full employment

2,1

0,7

1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

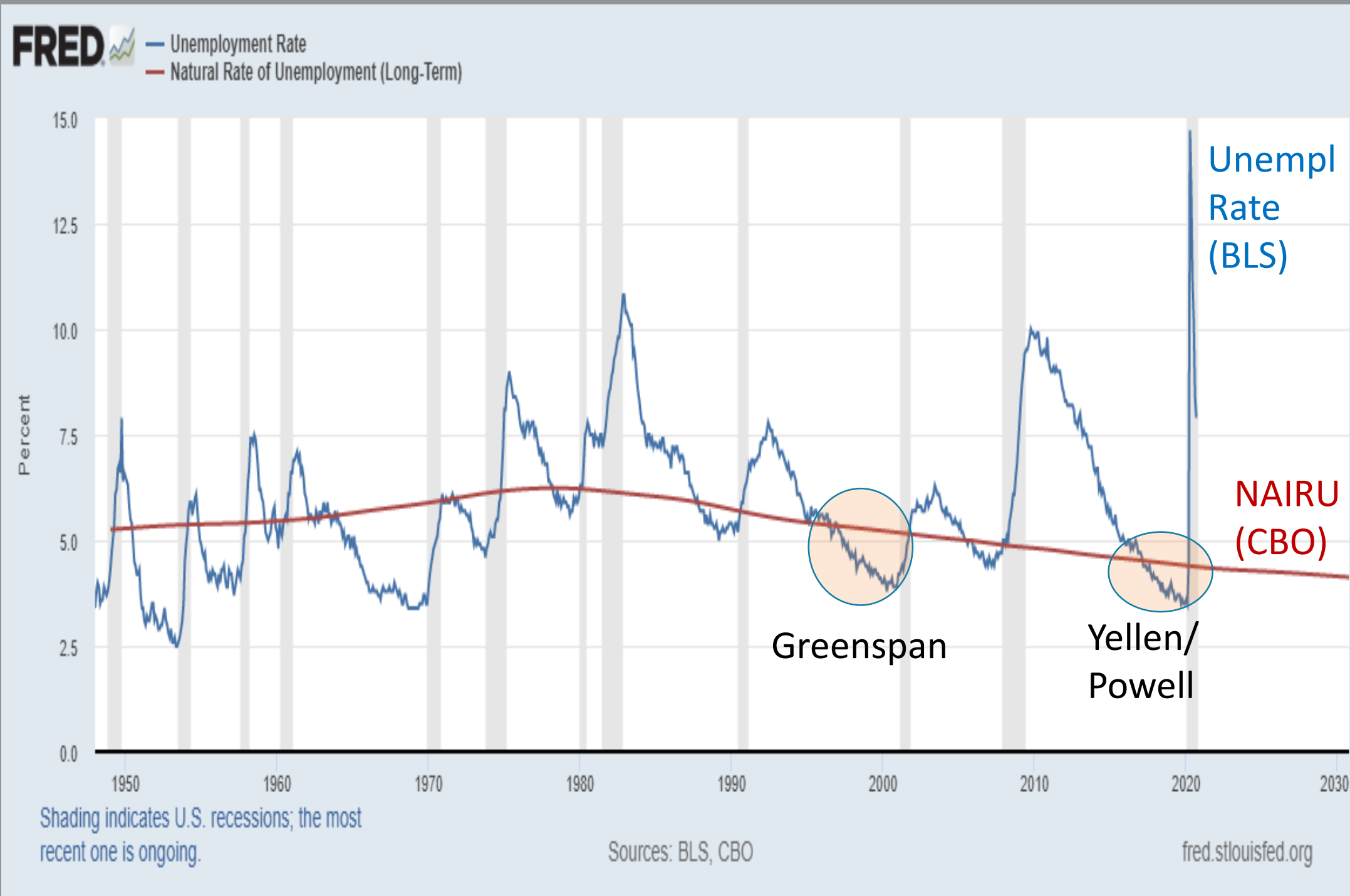Quelle: Bundesagentur für Arbeit, Daten: Statistik der BA

NAIRU

- Is there a NAIRU?
  - Phillips curve

- How is it connected to r^*?
  (Menger, Wicksell, Laubach-Williams)

- How to u^* ?

- Better matching technology
  - Labor-search models?
    (Davis-Haltiwanger, Shimer,…)

NAIRU

- **Fed's inclusion drive**
  No inflation explosion
  - Greenspan inclusion drive
  - Powell inclusion drive

- New Fed policy framework
  - Essentially eliminated NAIRU

Thank you!

markus@princeton.edu

The Natural Behavior of Unemployment

Robert E. Hall   Marianna Kudlyak

MILTON FRIEDMAN, 1967, ORIGINATES THE NATURAL RATE OF UNEMPLOYMENT

The "natural rate of unemployment" ... is the level that would be ground out by the Walrasian system of general equilibrium equations, provided there is imbedded in them the actual structural characteristics of the labor and commodity markets, including market imperfections, stochastic variability in demands and supplies, the cost of gathering information about job vacancies and labor availabilities, the costs of mobility, and so on. (Friedman, 1967)

Nomenclature

We take the non-accelerating-inflation rate of unemployment (NAIRU) to be a synonym for the natural rate

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In this paper

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► Rather, we study the behavior of unemployment in recoveries and document a regularity of the process.

► We believe that macro models should generate paths of unemployment with these properties.

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After describing our approach and its findings, we return to the problem of inferring the path of the natural rate from observed unemployment

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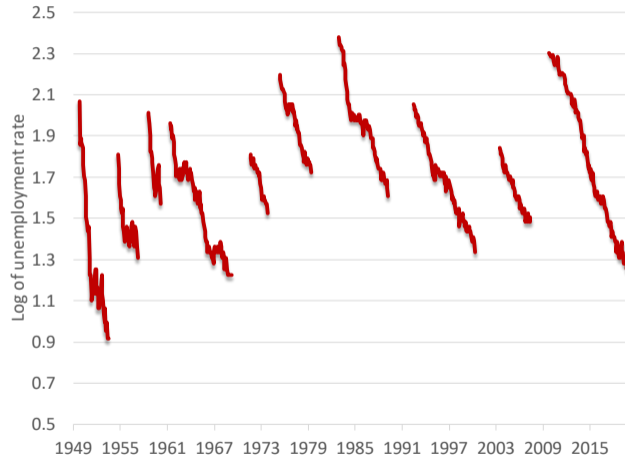
The glide continues until unemployment reaches approximately 3.5 percent or until another economic crisis interrupts the glide.

THE PATHS OF LOG-UNEMPLOYMENT DURING RECOVERIES

OUR PLACE IN THE LITERATURE

► Dupraz, Nakamura and Steinsson (2019) document the asymmetry of the business cycle and cite a large earlier literature on that subject.

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▶ We measure the rate of recovery of unemployment from recession-highs and demonstrate how uniform the rate is.

▶ We develop a framework for inferring the natural rate from the observed behavior of unemployment.

RECENT INFLUENTIAL PAPERS WITH MANY REFERENCES

Crump, Nekarda, and Petrosky-Nadeau (2020); Crump, Giannoni, Eusepi, and Sahin (2019); Barnichon and Matthes, (2017); Coibion and Gorodnichenko (2015); Jorgensen and Lansing (2019); Hazell, Herreno, Nakamura and Steinsson (2020); Laubach (2001); and Staiger, Stock and Watson (1997)

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Measurement

Measuring the business cycle

Two issues:
1. What measure: output, unemployment, or latent "economic activity"?

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Two issues:
1. What measure: output, unemployment, or latent "economic activity"?

2. Do we need to use a bandpass filter to remove a non-cyclical slower-moving trend?

Following Romer & Romer (2019), we consider unemployment as an indicator little affected by forces other than the business cycle, so that choice of measure obviates filtering.

.

WE CONSIDER THE GENERAL CLASS OF STATISTICAL MODELS

$$f(u_t) = x_t + \epsilon_t,$$

where $f(\cdot)$ is a monotonic transformation, x_t is the systematic trend component capturing the business cycle, and ϵ_t is the random unsystematic component, taken to be uncorrelated with x_t.

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We use two econometric approaches:
- a chronology-based approach
- Hamilton's (1989) Markov regime-switching model

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Chronology-based approach

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Overall, the trend component is a linear spline.

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Model for a single recovery

$$12(\log u_T - \log u_0) = -\beta\,T + \epsilon_T - \epsilon_0$$

We include the 12 so that the recovery rate β of the recovery that starts in month T (high point) and ends in month 0 (low point) is in log points per year.

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We use a quasi-bootstrap procedure to approximate the sampling distribution of $\hat{\beta}$.

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Available chronologies

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2. The output of a chronology-finding algorithm of Dupraz-Nakamura-Steinsson (DNS) applied to unemployment.

3. A chronology of the unemployment rate based on observed business cycle peaks and troughs (HK).
   - ▶ Dates are similar to DNS; however, we pick the latest points for peaks and troughs, consistently with our definition of the recovery.
   - ▶ Results are quite similar to DNS.

Results

ESTIMATED ANNUAL LOG UNEMPLOYMENT RECOVERY RATE, CHRONOLOGY-BASED

	Chronology		
	NBER	Dupraz-Nakamura-Steinsson	Hall-Kudlyak
Full sample			
Annual recovery rate, log points	0.087	0.132	0.129
Standard error	(0.016)	(0.017)	(0.017)
Standard deviation of recovery rate across recoveries	0.076	0.084	0.084
Standard error	(0.119)	(0.117)	(0.115)
After 1959			
Annual recovery rate, log points	0.067	0.106	0.103
Standard error	(0.013)	(0.007)	(0.007)
Standard deviation of recovery rate across recoveries	0.025	0.011	0.016
Standard error	(0.038)	(0.039)	(0.038)

Estimated Annual Log Unemployment Recovery Rate, by Recovery
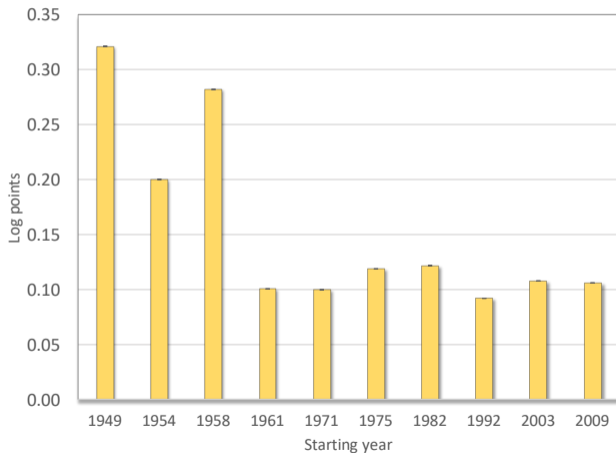
FITTED LINEAR TRENDS IN LOG UNEMPLOYMENT, BY RECOVERY AND CONTRACTION
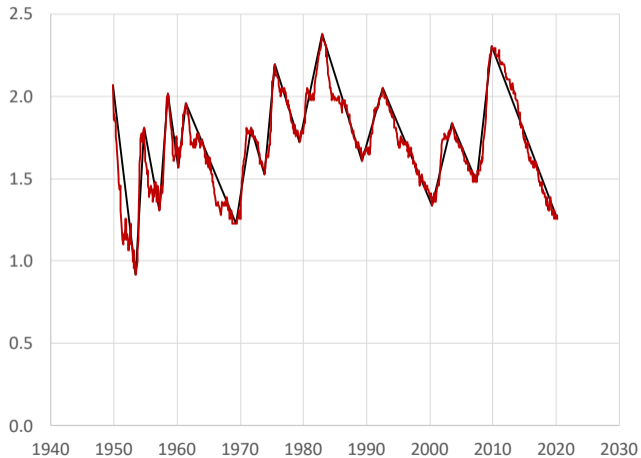
ESTIMATED ANNUAL LOG UNEMPLOYMENT RECOVERY AND CONTRACTION RATES, HIDDEN-MARKOV-BASED

	Full sample	*After 1959*
Starting observation	Oct-49	May-61
Ending observation	Feb-20	Feb-20
Annual recovery rate, log points	0.066	0.070
Standard error, quasi-bootstrap	(0.042)	(0.039)
Standard error, information matrix	(0.015)	(0.014)
Annual contraction rate, log points	0.700	0.433
Standard error, quasi-bootstrap	(0.103)	(0.051)
Standard error, information matrix	(0.078)	(0.053)

COMPARISON OF CHRONOLOGY- AND HIDDEN-MARKOV-BASED LOG UNEMPLOYMENT RECOVERY RATE ESTIMATES

	Full sample	*Later sample*
Return rate, chronology based	0.132	0.106
Return rate, hidden-Markov based	0.066	0.070
Difference	0.066	0.036
Quasi-bootstrap standard error of difference	(0.015)	(0.012)

The key difference between the two approaches is the precision of information about turning points. In the regime-switching model, turning points are latent unobserved events and the model yields a probability that a given month is a turning point. Chronologies, instead, treat turning points as unambiguous events.

Inferring the natural behavior of unemployment from the observed behavior

Behavior of Unemployment vs a Constant Natural Rate

► We suggest that a notion of the natural behavior of unemployment should replace the notion of a single natural rate fixed over time.

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▶ We suggest that a notion of the natural behavior of unemployment should replace the notion of a single natural rate fixed over time.

▶ The natural behavior of unemployment differs from the observed behavior according to principles similar to the literature on short-run deviations of actual unemployment from the natural rate of unemployment.

Volatile Unemployment and Stable Inflation in the Past 30 Years

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- ▶ Friedman's analysis implies that years of stable inflation are years when the unemployment rate is at its natural level.

- ▶ High volatility of unemployment and highly stable inflation over the past 30 years suggest that most of the movement in unemployment is movement of the natural rate.

- ▶ So one idea would be to take actual unemployment rate as a good approximation to the natural rate.

Existing Approaches to Measuring the Natural Rate of Unemployment over Time

1. A longer-run average of the actual unemployment rate

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3. A solution from a model with nominal frictions removed

OUR VIEW ON MEASUREMENT

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Our view on measurement

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Our results suggest that all types of crises set a similar path of unemployment in motion, once the initial impulse to unemployment occurs.

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Conclusions

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We have developed a parsimonious statistical model of the behavior of observed unemployment

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We have developed a parsimonious statistical model of the behavior of observed unemployment

It describes:
(1) occasional sharp upward movements in unemployment in times of economic crisis, and
(2) an inexorable downward glide at a low but reliable proportional rate at all other times.

The glide continues until unemployment reaches approximately 3.5 percent or until another economic crisis interrupts the glide.

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Conclusions (cont.)

The natural rate of unemployment derived from this model would be state-dependent. It would be contingent on the severity of the most recent crisis shock and the number of months into the recovery.

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In other words, the natural rate of unemployment in a given month is the average over history conditional on the level at its most recent business-cycle high level and number of months that have elapsed from the trough to the given month.

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We don't yet have a position on the non-contingent natural rate

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As for policy,

The Fed's new policy of not resisting the downward glide in unemployment during periods of calm is consistent with our conclusions.

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Recovery from the 2020 Pandemic

The 2020 Pandemic Put Spotlight on the Unemployed with and without Jobs

Both *jobless-unemployment* and *recall-unemployment* are associated with lower aggregate work effort and corresponding loss of earnings.

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Jobless-unemployment follows the principles of modern search-and-matching models, while workers suffering recall unemployment are waiting for recall.

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Findings

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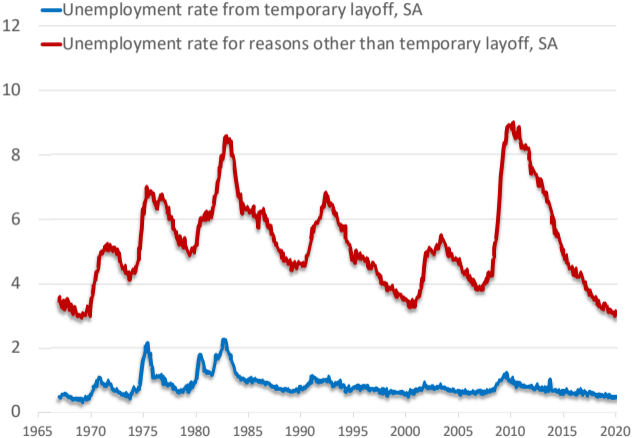- The pandemic caused an explosion of recall unemployment.

FINDINGS

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- In the pandemic, recall-unemployment returned rapidly toward normal while jobless-unemployment rose somewhat.

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• Prior to the pandemic, recall-unemployment was unimportant.

• The pandemic caused an explosion of recall unemployment.

• In the pandemic, recall-unemployment returned rapidly toward normal while jobless-unemployment rose somewhat.

• We are monitoring the evolution of *jobless-unemployment* and *recall-unemployment* to gauge the recovery.

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HISTORICAL RECALL- AND JOBLESS-UNEMPLOYMENT

PANDEMIC RECALL- AND JOBLESS-UNEMPLOYMENT

■ Unemployment rate from temporary layoff, SA
■ Unemployment rate for reasons other than temporary layoff, SA