Discussion of
Understanding U.S. Inflation During the COVID Era
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Focus: Examine the drivers of recent surge in inflation and present projections.

Use a multi-step regression framework to decompose the surge in inflation:

- Tight labor market as measured by vacancy-to-unemployment ratio
- Headline shocks passed through to core inflation explained by energy and auto
- Soft vs. hard landing depends on the shape of the Beveridge curve and inflation expectations

Main Takeaway: Supply chain disruptions and energy prices account for bulk of the surge in inflation. Future will depend on labor market adjustment and inflation expectations.

1. **Regression framework**
   - A multi-step approach: Sensitive to endogeneity issues
   - Uncertainty: Hard to assess

2. **Tightness measure**
   - Gold standard? Trends and measurement challenges
   - Bad fit to 1970s: Troublesome

3. **Scenario analysis**
   - Unemployment inflow rate: Key to soft vs. hard landing
   - Beveridge Curve: Inconsistent with unemployment dynamics

4. **Way forward**
   - Model-based measurement approach
   - Unified approach: New Keynesian Phillips Curve coupled with rich labor market data

The paper employs a consecutive **regress and predict** approach.

Start from:

$$\pi_t = \pi_t^C + \pi_t^H$$

π_t = headline inflation
π_t^C = core inflation
π_t^H = headline inflation shocks

Phillips Curve Regression:

$$\pi_t^C - \pi_t^* = c + \underbrace{\kappa_1 \frac{v_t}{u_t} + \kappa_2 \left(\frac{v_t}{u_t}\right)^2 + \kappa_3 \left(\frac{v_t}{u_t}\right)^3}_{labor\ market} + \underbrace{\eta_1 \left(\pi_t - \pi_t^C\right) + \eta_2 \left(\pi_t - \pi_t^C\right)^2 + \eta_3 \left(\pi_t - \pi_t^C\right)^3}_{headline\ shocks}$$

π_t^C depends on

- expected inflation, π_t^*: SPF ten year
- tightness, v_t/u_t: HWI+JOLTS, Barnichon (2010)
- headline inflation shocks: π_t^H

Headline inflation regressions: Regress π_t^H on various measures

- energy-price shocks
- auto-price shocks
- backlogs of work
- goods share of aggregate consumption

Shocks? All endogenous to shifts in demand, shifts in composition of demand, labor supply constraints, change in willingness to work etc.
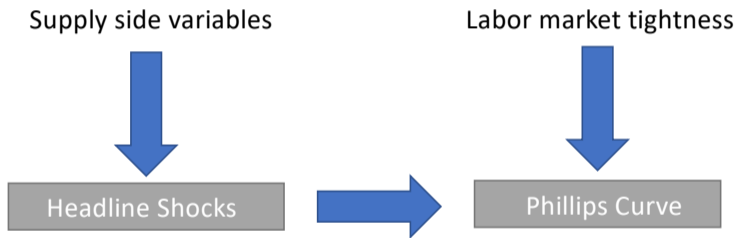
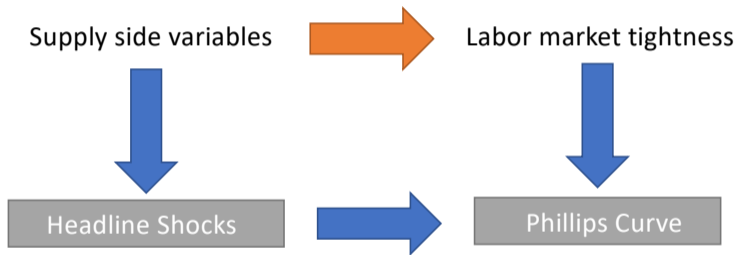**Decomposition:** Use two reduced-form relationships consecutively to decompose the rise in inflation.
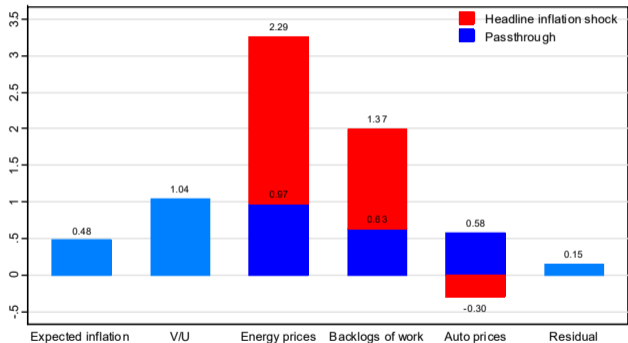
Headline inflation rose from 1.28% to 8.48% from December 2020 to July 2022.

- Expected inflation: **6.7%**
- V/U: **14.4**%
- Energy prices: **45.2**%
- Backlogs+auto prices: **31.7**%

Is This Approach Reasonable?

Supply side variables

Labor market tightness

Headline Shocks → Phillips Curve

Simultaneous Growth of Wages and Import Prices

	Average 4-Quarter Change	
	2009:Q4-2019:Q3	2020:Q2-2022:Q1
Wage Growth (ECI)	2.2%	**4.1**%
Import prices (excl. petroleum)	0.3%	**6.7**%
- Industrial supplies excl. petroleum	0.7%	**27.2**%
- Capital goods	−0.4%	**2.2**%
Core CPI	1.9%	**4.8**%

Reference: Amiti, Heise, Karahan and Şahin (2022)

No Correlation between Input Prices and Wages in 2013-2019
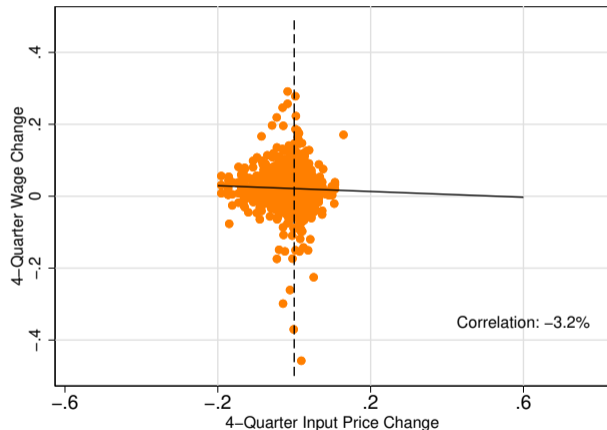
- Consider 6-digit NAICS industries
- **Wages:** Weekly earnings from QCEW
- **Input Prices:** Construct using BEA's Input-Output Matrix

Reference: Amiti, Heise, Karahan and Şahin (2022)

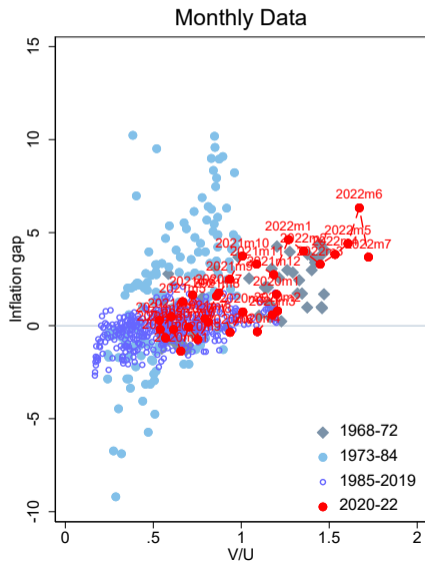# Positive Correlation Between Wages and Input Prices in 2021
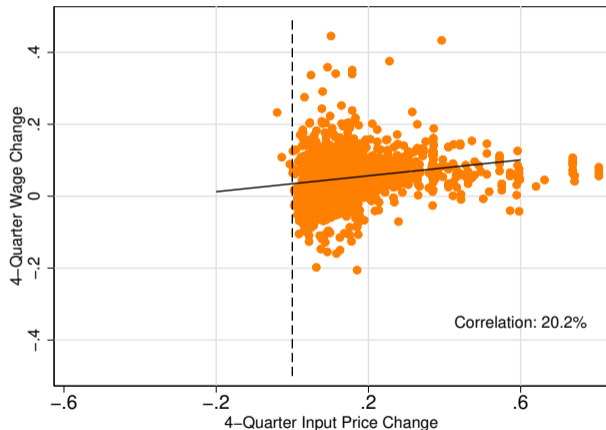
- Rising input prices are associated with increasing wages across industries

- Part of wage growth due to substitution from inputs towards domestic labor

- About 1/3 of the pick-up in wage inflation due to import price shocks alone

Reference: Amiti, Heise, Karahan and Şahin (2022)

- Economists have long been pursuing the perfect measure of slack.
- Emphasis on labor market tightness is nothing new (Perry, 1970, BPEA):

  For instance, many (including myself) argue that what matters is the difference between available jobs and available employees to fill those jobs.

- Abraham, Haltiwanger and Rendell (BPEA, 2020) developed a sophisticated measure of tightness
- The historical performance of the tightness measure problematic (1970s)
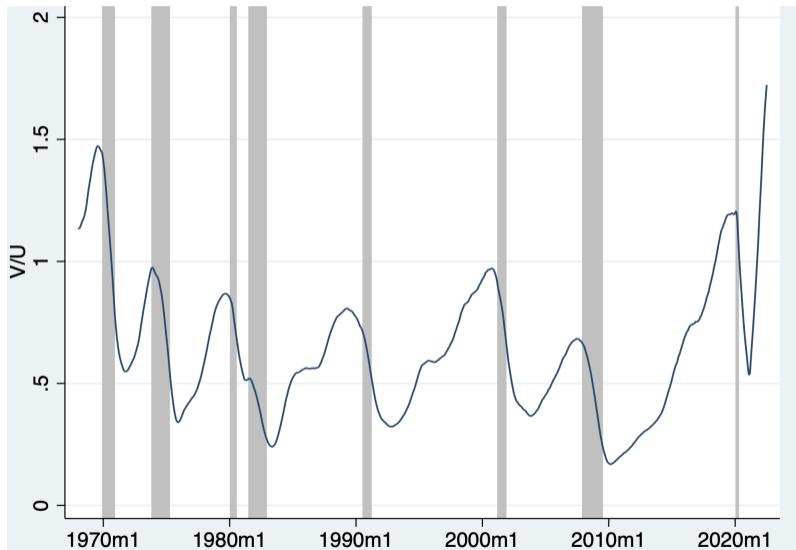
Monthly Data

Using Tightness Alone Does Not Solve Trend and Composition Issues

- The analysis starts in 1985
- Core CPI inflation ↑ 5.6 ppts in 1970s
- Core CPI inflation ↑ 4.5 ppts in 2021-22
- Caution against episode-specific indicators!

Using Tightness Alone Does Not Solve Trend and Composition Issues
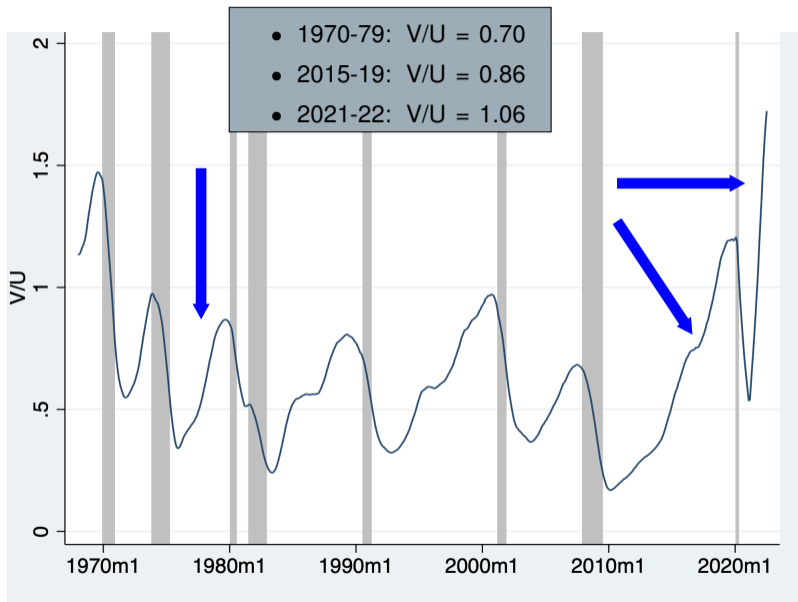
- 1970-79: V/U = 0.70
- 2015-19: V/U = 0.86
- 2021-22: V/U = 1.06

- The analysis starts in 1985
- Core CPI inflation ↑ 5.6 ppts in 1970s
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- Caution against episode-specific indicators!

- Assume a log-linear relationship between tightness and unemployment

$$\frac{v}{u} = au^{b-1}$$

- Use a fitted Beveridge curve to convert the unemployment projections to tightness
- Revert the headline shocks to 0 over 12 months
- Use the Phillips Curve with implied V/U to compute the core inflation gap
- Make different assumptions for inflation expectations

Crucial assumption: There is a one-to-one mapping between the unemployment rate and tightness

3. Scenario Analysis and the Beveridge Curve

Unemployment accounting identity implies:

$$U_{t+1} = s_t(1 - U_t) - f_t U_t$$

s_t is the inflow rate to unemployment and f_t is the outflow rate from unemployment.

Search and matching frictions typically summarized by the matching function:

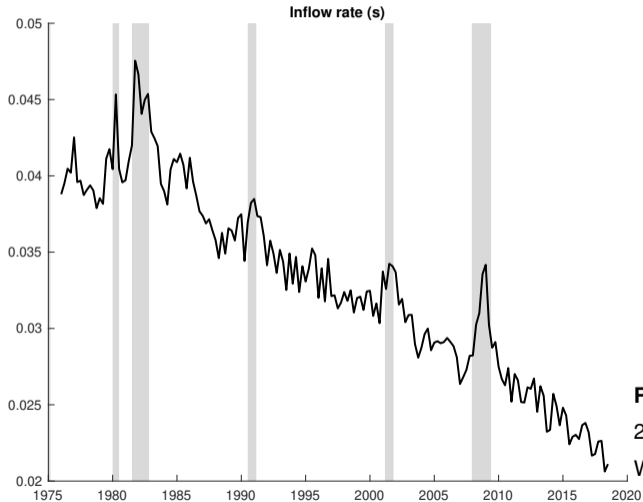$$f = H/U = M(V, U)/U = A\left(\frac{V}{U}\right)^\sigma$$

Flow steady-state implies a Beveridge curve of the form:

$$u = \frac{s}{s + f} = \frac{s}{s + A(V/U)^\sigma}$$

The position of the Beveridge curve depends on the unemployment inflow rate.

References: Pissarides (1985), Elsby, Michaels, and Ratner (JEL, 2015), Figura and Waller (2022)

Inflow rate (s)

- Soft landings associated with small increases in *s*
- Negative monetary policy shocks affects *s* first.
- Rapid increase in *s* and slow, hump-shaped declines of *f*.
- Soft vs. hard landing discussion should take into account *s*.

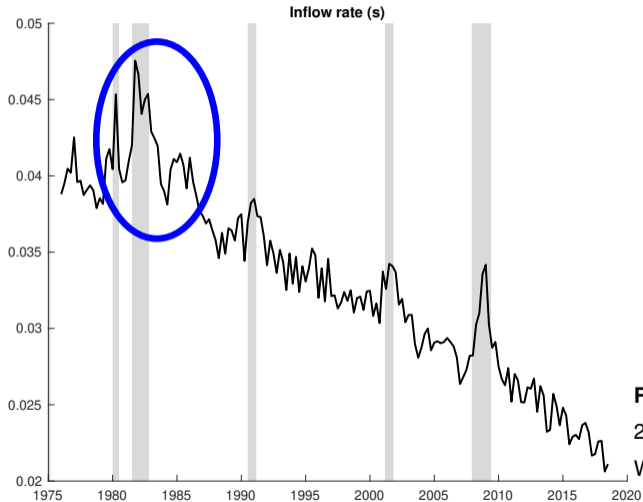**References:** Hall (AER, 2005), Shimer (AER, 2005), Elsby, Hobijn, and Şahin (BPEA, 2010), White (2018)
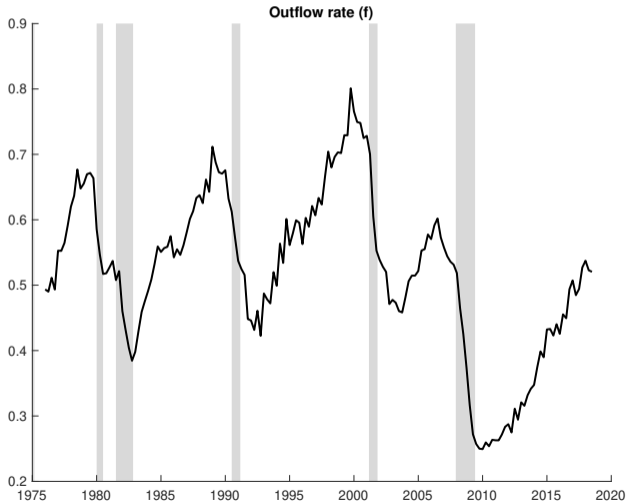
Soft Landing vs. Hard Landing in the Flow Space

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Soft Landing vs. Hard Landing in the Flow Space

Outflow rate (f)

- Slowdown in f during recessions
- Outflow rate is crucial in recovery dynamics
- Similar behavior in soft vs. hard landing

Model-based measurement approach that accomodates rich data better suited to identify drivers and implications of inflation.

- Uncertainty quantification
- More transparent
- Easier to implement counterfactual analysis
- Easier to incorporate sector-specific indicators
- Model and data-based regressions help with identification
- Policy analysis

Recent Examples: Amiti, Heise, Karahan and Şahin (2022), Crump, Eusepi, Giannoni and Şahin (2019, 2022), di Giovanni, Kalemli-Özcan, Silva, Yildirim (2022)

Example: Model-based Measurement Approach

Estimate a forward-looking New Keynesian Phillips Curve using three key inputs:

1. Unemployment flows by demographics
   $\longrightarrow$ Help pin down the *secular trend* of unemployment, $\bar{u}$

2. Estimate wage and price NKPCs using Bayesian methods
   $\longrightarrow$ Informative about *unemployment-inflation* trade-off
   $\longrightarrow$ Use multiple measures of wages at the same time

3. Survey-based Inflation expectations (Six-months-ahead and Five-to-ten years ahead)
   $\longrightarrow$ Informative about *current and future* slack

Reference: Crump, Eusepi, Giannoni and Şahin (2019, 2022)

Secular Trend of Unemployment at 4.2%

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- Dual aging has been reducing trend unemployment

Natural Rate of Unemployment u^* Increased to Almost 7%
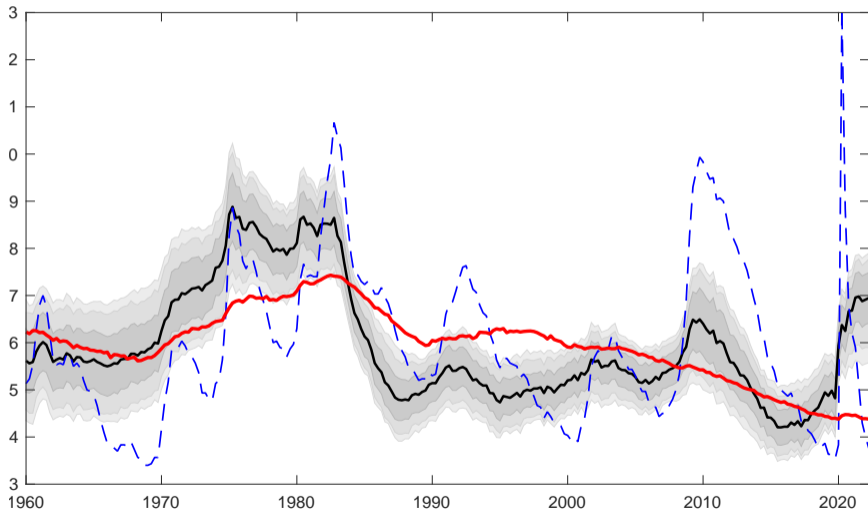
Source: Crump, Eusepi, Giannoni and Şahin, 2022

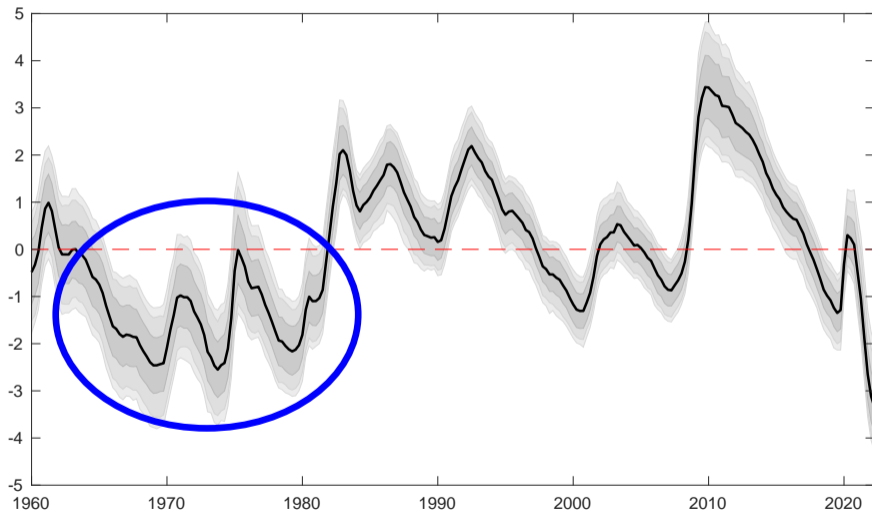# Natural Rate of Unemployment u^* Increased to Almost 7%
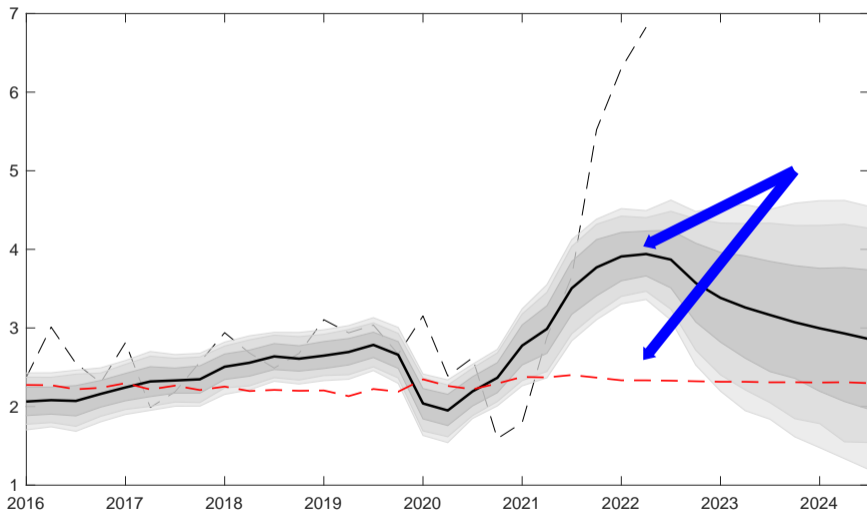
Sharp Reversal of the Unemployment Gap

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Underlying Inflation Above Long-run Trend

Mostly Due to Wage Growth

Underlying Wage Growth Highly Correlated with Job-filling Rate
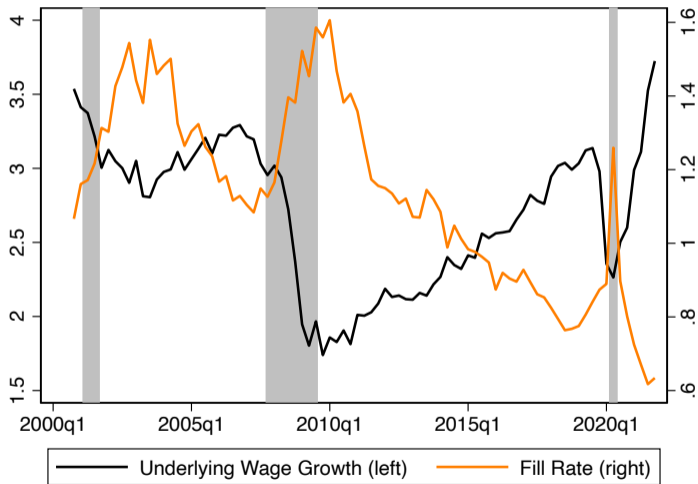
Summary

Timely and thought-provoking paper on a timeless topic!

1. **Regression framework**
   - Hard to provide well-identified decompositions and quantify uncertainty

2. **Tightness measure**
   - Highly relevant measure but it has its own shortcomings
   - Cannot ignore the 1970s!

3. **Scenario analysis**
   - Unemployment inflow rate: key to soft vs. hard landing argument

4. **Way forward**
   - Model-based measurement approach