Understanding U.S. Inflation During the COVID Era

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Headline Inflation = Core Inflation + Headline Shocks

Core: Underlying inflation that depends on expectations, labor market tightness.

- Measure: Cleveland Fed weighted median CPI. Strips out relative price shocks in any industry (not only food and energy). Also consider other measures.

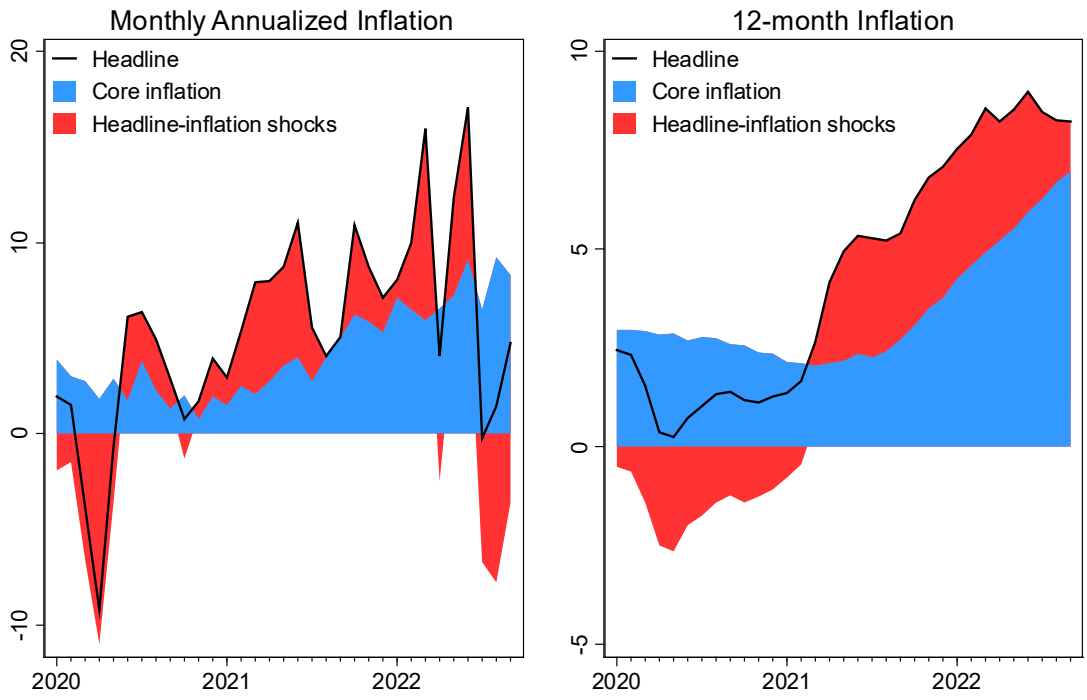
Headline shocks: High-frequency, relative price shocks. COVID examples.

- Measure: Deviation of headline from core.

This paper:

1. Explain both core and headline shocks during COVID era so far.
2. Assess what might happen in the future.

Figure 1. CPI Inflation: Headline, Core, and Headline-inflation Shocks, 2020-2022



Note: Core inflation is median CPI inflation from the Federal Reserve Bank of Cleveland.

Explaining Core Inflation

Expectations:

- Long-term expectations. Hazell and others (2022).
- Measure: SPF 10-year ahead forecast. Also consider Michigan 5-year ahead.

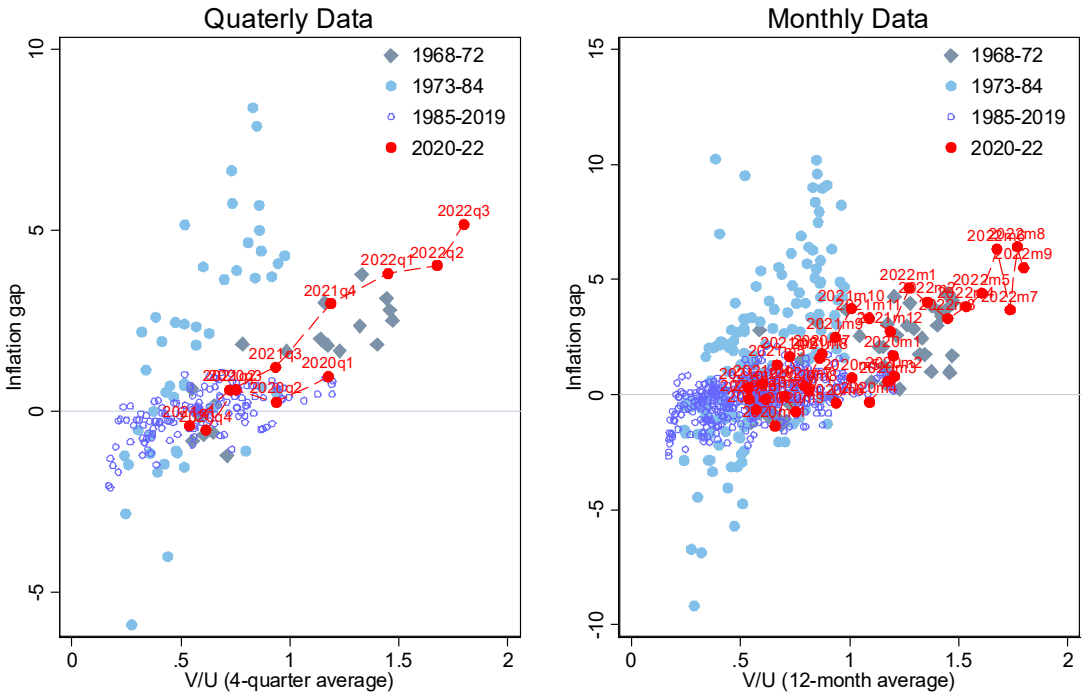
Labor market tightness:

- Measure: Vacancy/unemployed ratio (V/U). Furman and Powell (2022) and others.
- Focus on effect over time (12-month average).
- Contrast results with traditional measure (unemployment).

Pass-through of past headline shocks :

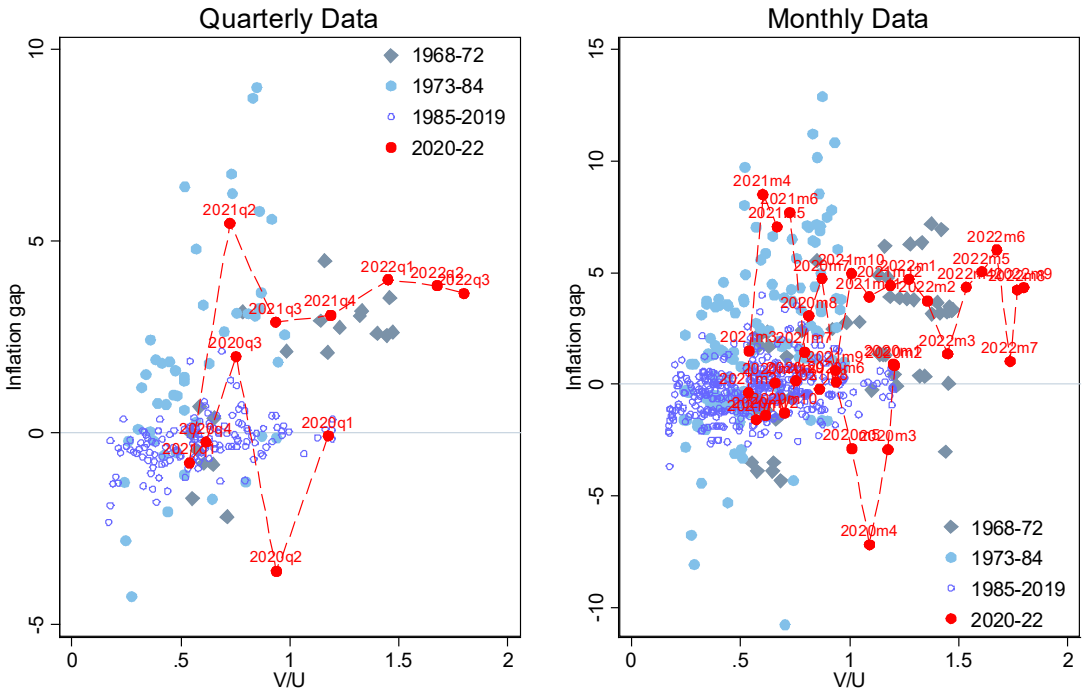
- Channels: wages or other costs. Blanchard (2022), di Giovanni and others (2022).
- Focus on pass-through over time (12-month average).

Figure 3. Inflation Gap vs. Ratio of Vacancies to Unemployed (V/U), 1968-2022



Note: Figure reports quarterly and monthly scatter plots of the inflation gap against the averages of V/U. Inflation gap is the difference between median and long-term expected inflation. Long-term expected inflation is the ten-year-ahead CPI inflation forecast from the Survey of Professional Forecasters (SPF). “V/U” denotes ratio of vacancies to unemployed (4-quarter or 12-month average).

Figure 5. CPI Inflation Excluding Food and Energy vs. V/U, 1968-2022



Note. Figure 5 repeats Figure 2, the scatterplots of the inflation gap against V/U, but with core inflation measured in the traditional way with inflation excluding food and energy prices (XFE). Inflation gap is the difference between XFE inflation and long-term expected inflation. Long-term expected inflation is the is the ten-year-ahead CPI inflation forecast from the Survey of Professional Forecasters (SPF). “V/U” denotes ratio of vacancies to unemployed (4-quarter or 12-month average).

Allowing for Non-linearities

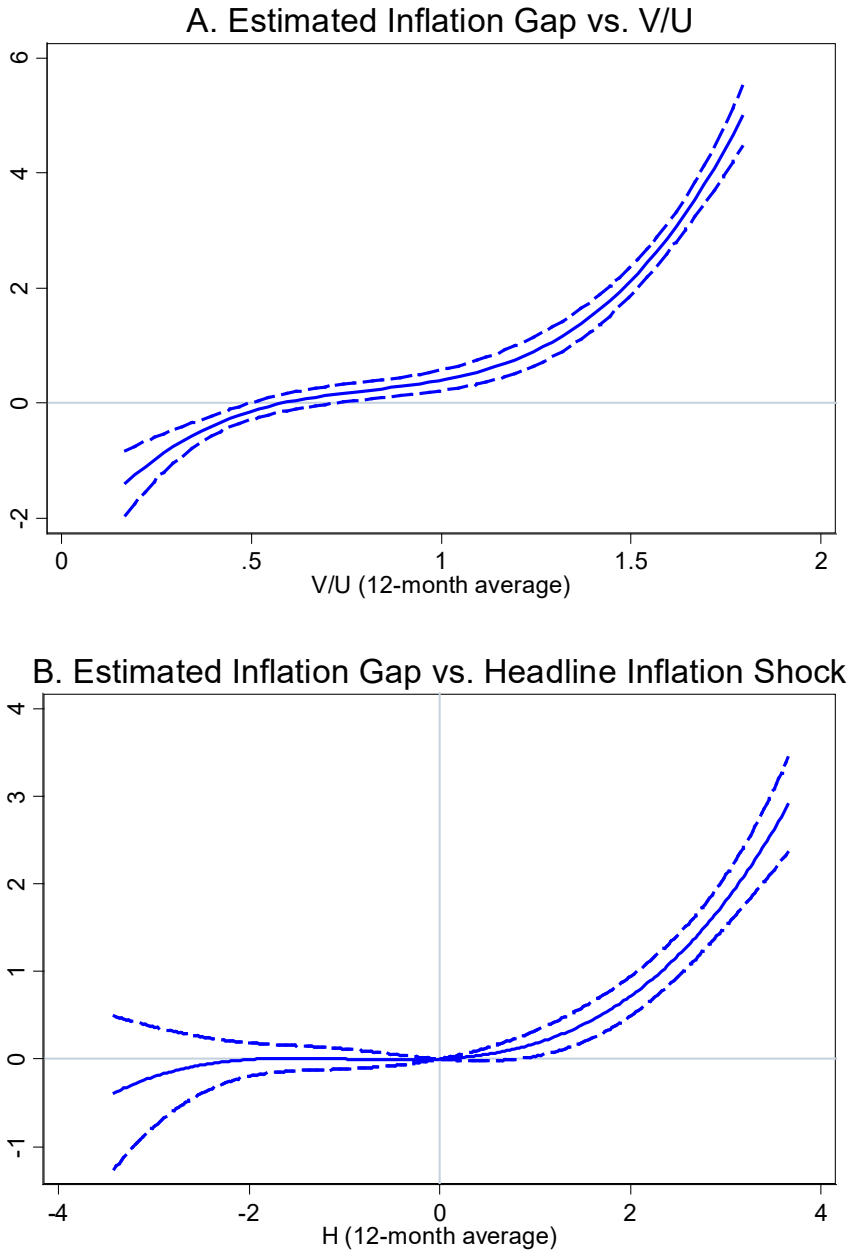
Motivation:

- Gagnon and Collins (2019): U-inflation tradeoff steeper at low U.
- Blanchard (2022): salience of large shocks.
- Ball and Mankiw (1994): asymmetric effects in presence of menu costs, trend inflation.
- Owyang and Vermann (2014): “rockets and feathers.”

Application:

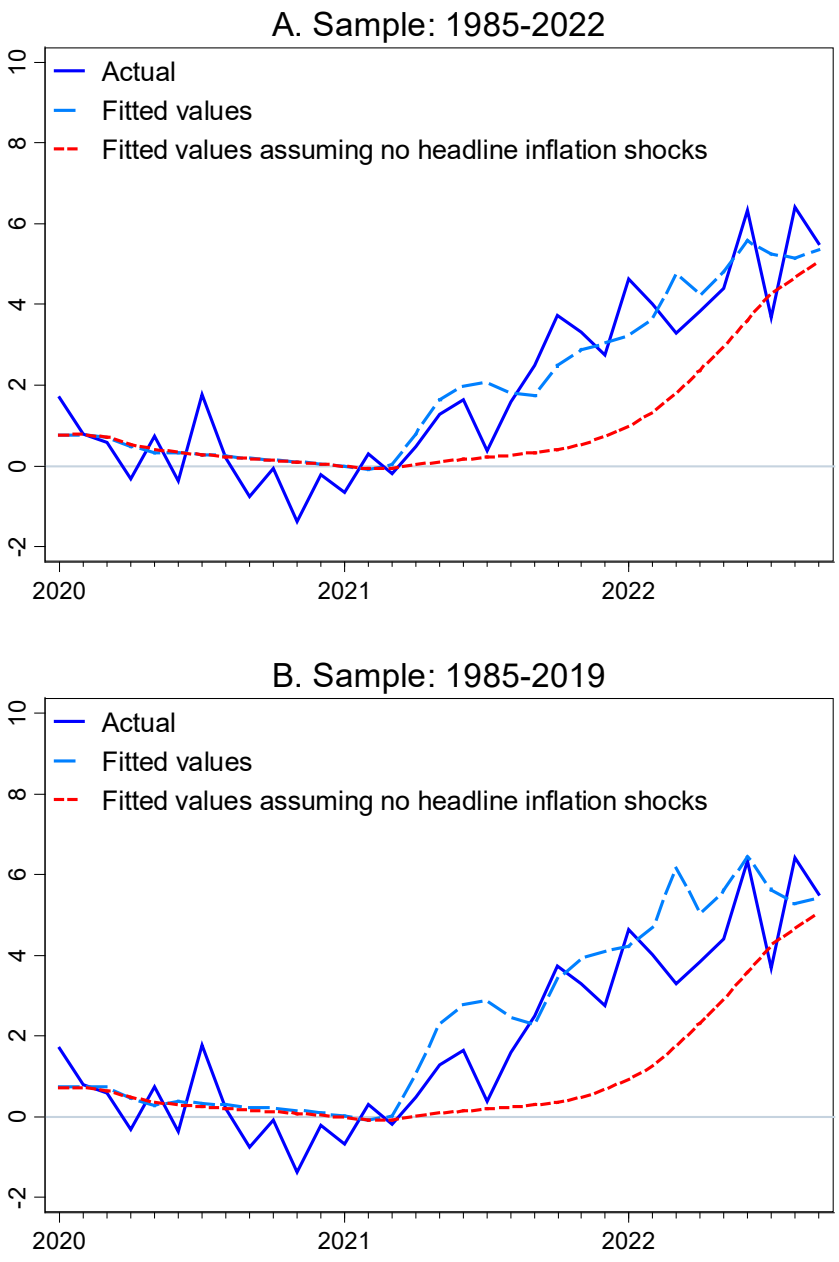
- Specify core inflation gap as cubic function of V/U and of past headline-inflation shocks.
- Also consider locally weighted scatter-plot smoothing (lowess).

Figure 6. Estimated Inflation Gap as a Function of Slack and Headline-inflation Shocks, 1985-2022
(Percentage points; monthly data)



Note: Panel A reports fitted values for constant term and V/U terms from equation estimates reported in Table 1 (column 4). Panel B reports fitted values for headline-inflation shock (H) terms. Bands report 95 percent confidence interval. Inflation gap denotes monthly annualized median CPI inflation minus long-term Survey of Professional Forecasters inflation expectations.

Figure 7. Predictions for Median Inflation Gap During, 2020-2022
(Percentage points)



Note: Figure reports fitted values from Phillips Curve model estimated for the full sample (Table 1 column 4) and for the pre-pandemic sample (Table 1 column 3). Inflation gap denotes monthly annualized median CPI inflation minus long-term Survey of Professional Forecasters inflation expectations.

Three Factors Drive Headline Shocks: Energy, Backlogs, Autos

1. Energy price inflation minus median.
2. Firms' backlogs of work (IHS Markit).
3. Auto-related inflation minus median.

Strong fit.

Other factors investigated: less relevant (COVID lockdowns affecting multiple sectors).

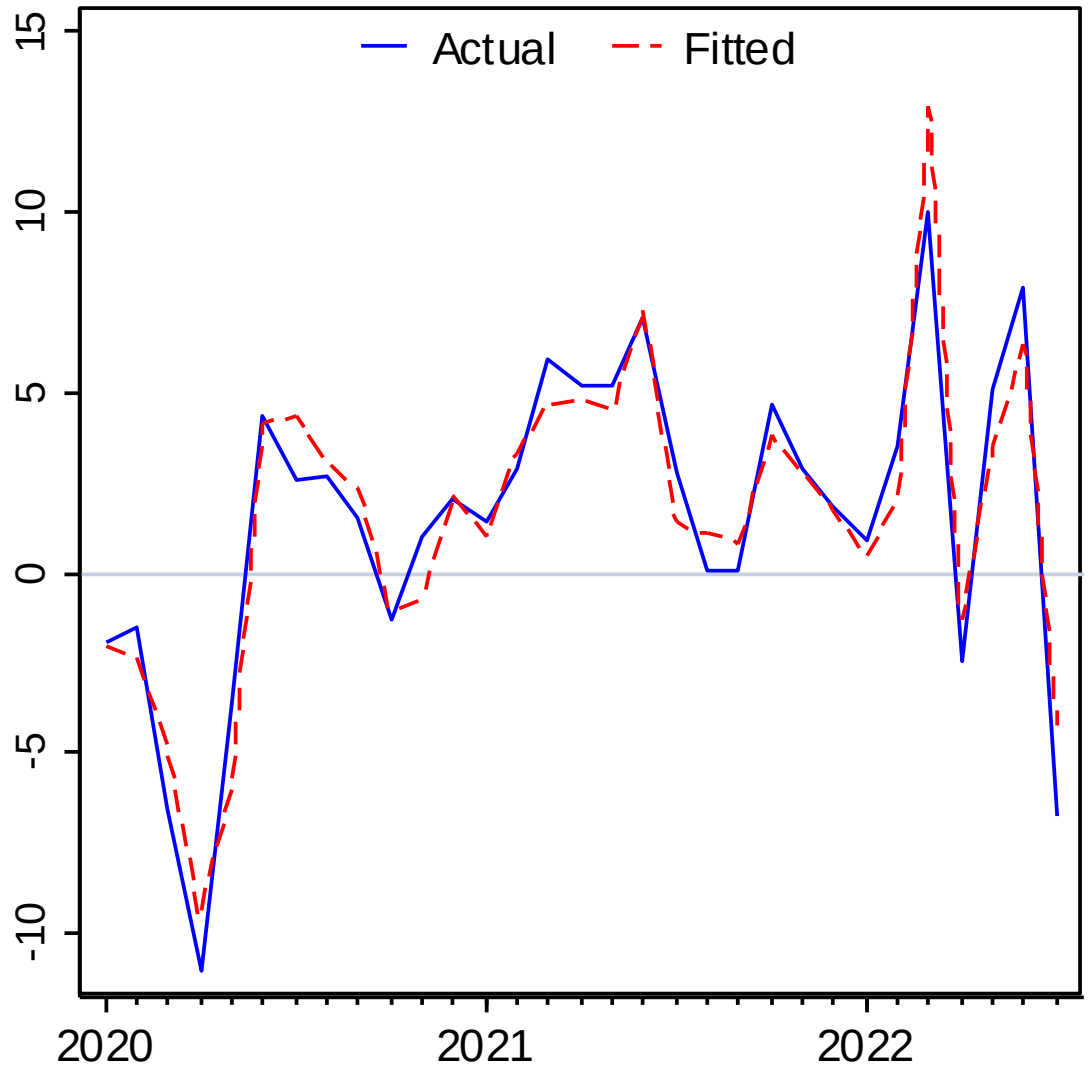
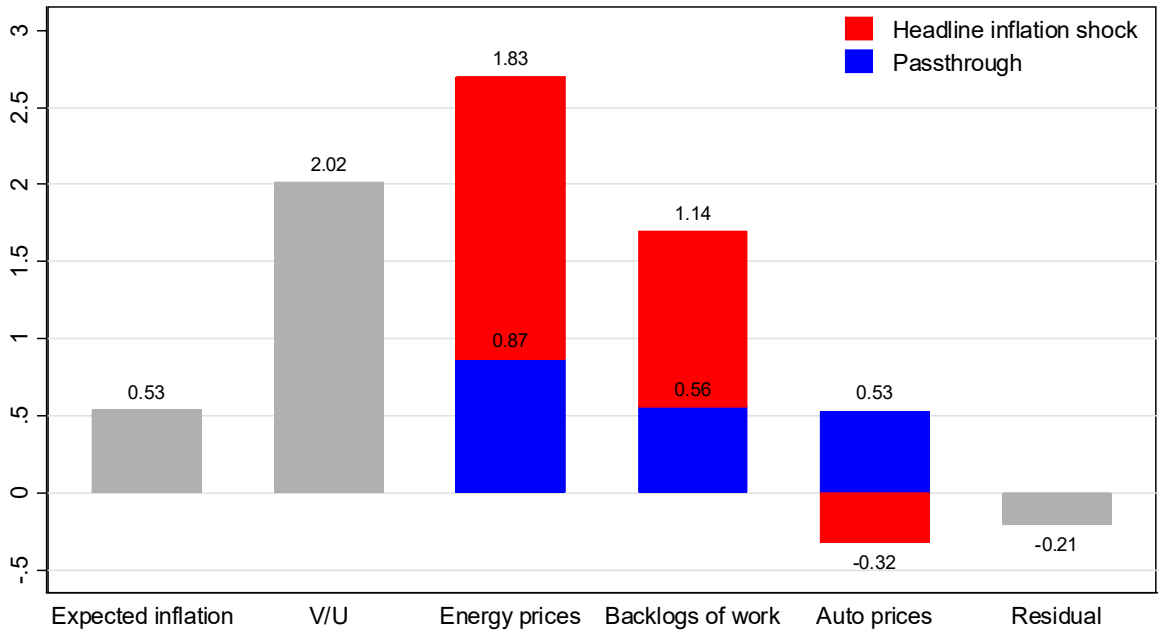


Figure 12. Accounting for the Rise in Headline Inflation
(Decomposition of change in 12-month headline CPI inflation from December 2020 to September 2022; percentage points)



Note: Total rise in 12-month headline inflation is 6.94 percentage points (from 1.28 percent to 8.22 percent). The total rise in 12-month core (median) CPI inflation over this period is 4.63 percentage points (from 2.34 percent to 6.98 percent). “Expected inflation" denotes contribution of change in long-term (SPF) inflation expectations to change in headline CPI inflation. V/U denotes contribution of change in ratio of vacancies to unemployed. “Energy prices” denotes contribution of relative energy prices. “Backlogs of work” denotes contribution of change in index from IHS Markit Economics. “Auto prices” denotes contribution of weighted average of auto-related prices. Based on estimates in Table 1 (column 4) and Table 2B (column 3).

The Future: Two Big Questions

Focus on two factors that will shape how much U needs to rise to contain inflation:

Question 1

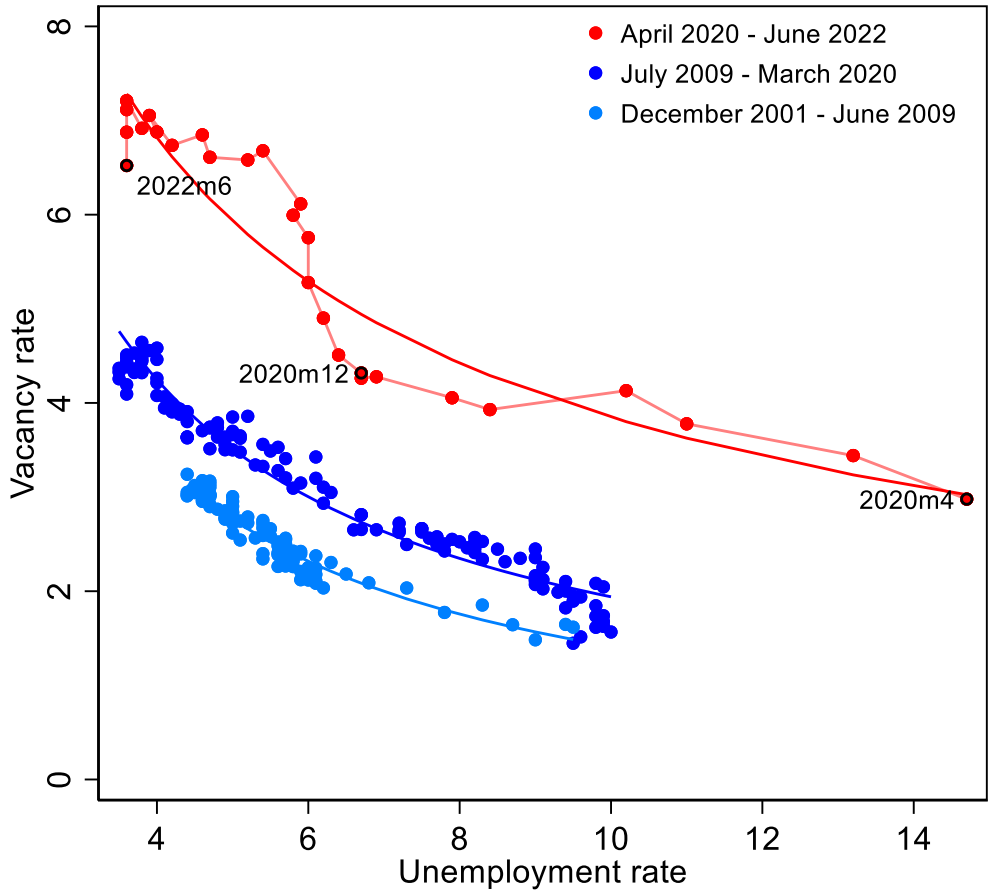
Beveridge Curve. Shifted out during the pandemic. Will the curve shift back?

Optimistic case: Move to pre-COVID (blue).

Pessimistic case: Stay on COVID (red).

Relates to debate between Figura and Waller (2022) and Blanchard, Domash and Summers (2022) about whether V can fall without a large rise in U.

Beveridge Curve



Note: Lines indicate log-linear relationship for each period.

The Future: Two Big Questions

Question 2

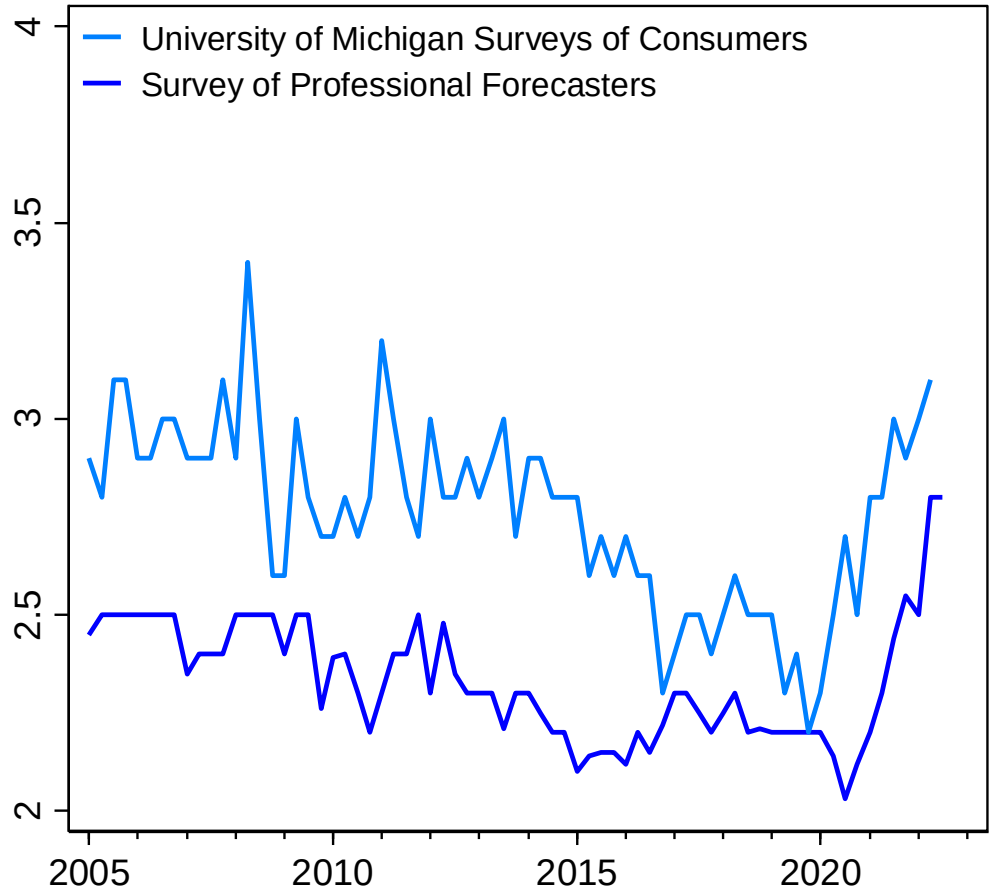
Inflation expectations. Will they remain anchored? SPF and Michigan have drifted up slightly.

Optimistic case: revert to 2019 level.

Pessimistic cases:

1. Expectations drift as during COVID.
2. Drift as in 1985-1998 (pre-“anchoring”).

Long-term Inflation Expectations



Where is Inflation Heading?

Derive core inflation paths conditional on paths for unemployment. Focus on three paths:

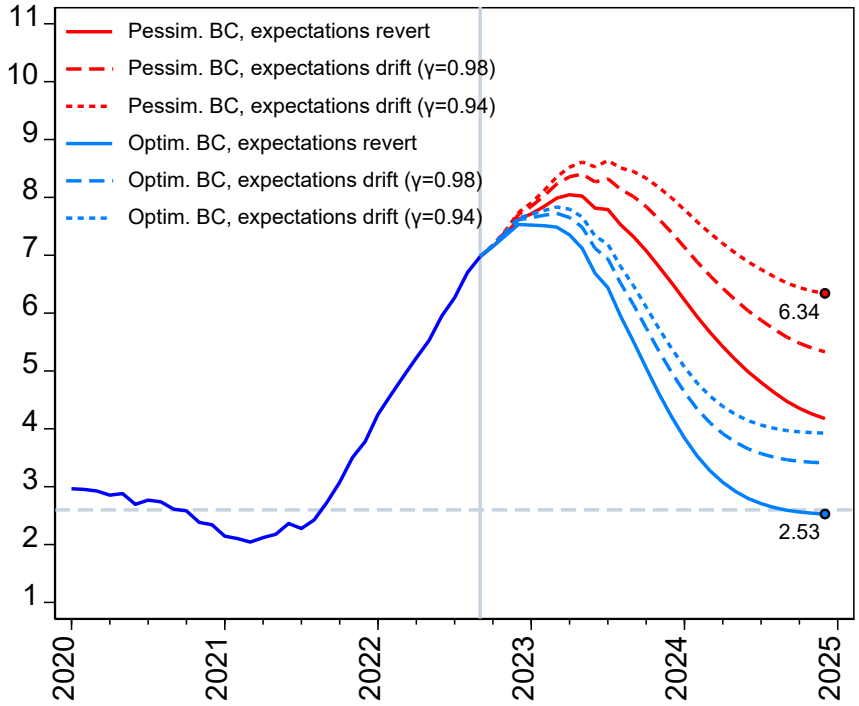
1. FOMC Sept 2022 Summary of Economic Projections. U peaks at 4.4%.
2. IMF 2022 Article IV Consultation Staff Report. U peaks at 5.6%.
3. High U scenario (Summers 2022). U rises to 7.5% for two years.

For each path, consider alternative Beveridge Curve and inflation expectations assumptions.

In all cases, set future headline-inflation shocks to zero. Low serial correlation. Caveat.

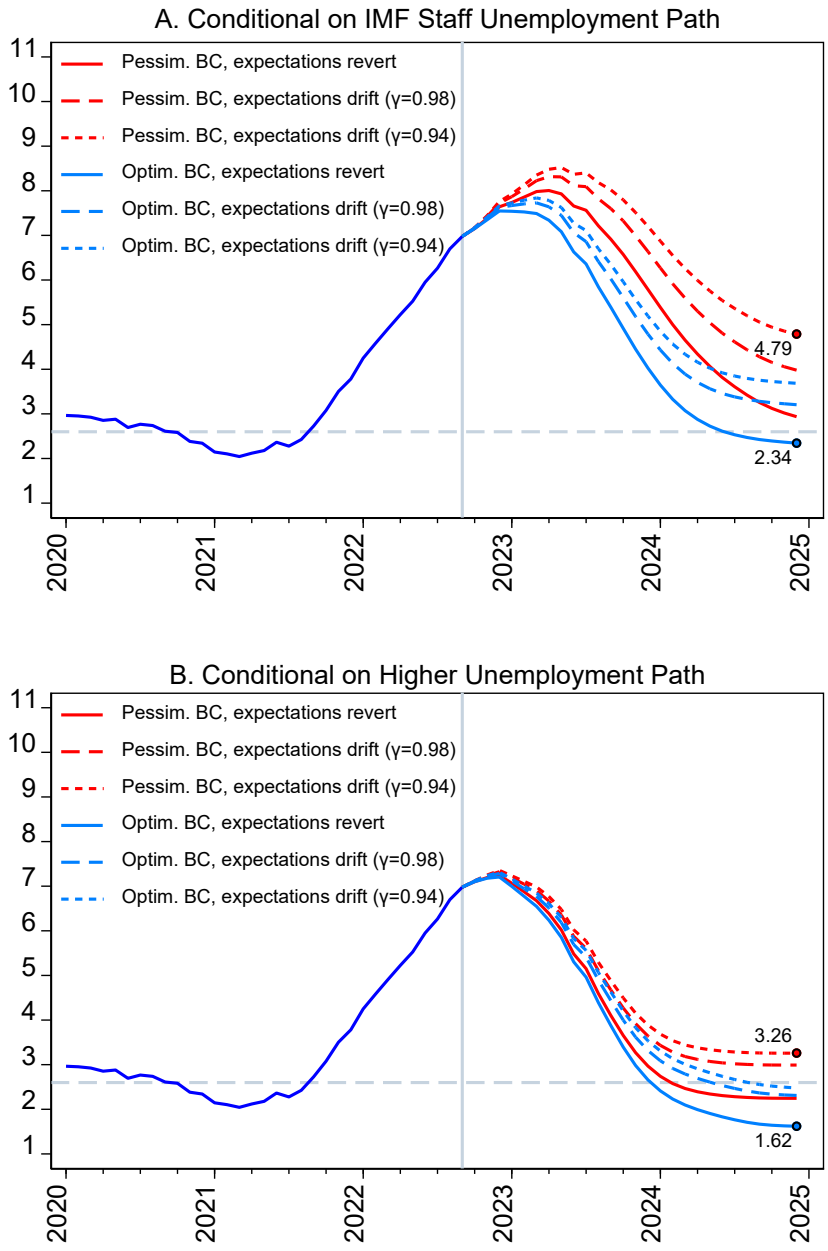
Derive paths for 12-month CPI median inflation using equations (PC, BC, inflation expectations process) estimated in the paper.

Figure 17. Scenarios for Core CPI Inflation Conditional on September 2022 FOMC Unemployment Forecasts
(12-month; percent)



Note: Unemployment forecast from the Summary of Economic Projections of the Federal Open Market Committee (FOMC) published in September 2022 which provides numbers for the fourth quarters of 2022, 2023, 2024, and 2025. We assign those forecasts to November of each year and interpolate a monthly unemployment series starting from the actual value of 3.5 percent in September 2022. Vertical line indicates September 2022. Core inflation denotes CPI median inflation. Horizontal dashes show 2.6 percent target for median CPI based on 2 percent PCE target as reported on Federal Reserve Bank of Atlanta Underlying Inflation Dashboard.

Figure 19. Scenarios for Core CPI Inflation Conditional on Alternative Unemployment Paths
(12-month; percent)



Note: Vertical line indicates September 2022. Core inflation denotes CPI median inflation. IMF staff forecast for the quarterly path of unemployment underlying the October 2022 IMF *World Economic Outlook* Report. Quarterly forecasts are allocated to the second month of each quarter and a monthly path is obtained via interpolation. "Higher unemployment" path assumes 7.5 percent unemployment during 2023 and 2024 as suggested by Summers (2022b). In this scenario, the unemployment rate rises linearly from its September 2022 level to 7.5 percent in January 2023 and remains at that level through December 2024. Horizontal dashes show 2.6 percent target for median CPI based on 2 percent PCE target reported on Federal Reserve Bank of Atlanta Underlying Inflation Dashboard.