ONLINE APPENDIX

"Understanding U.S. Inflation During the COVID Era"

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**Alternative Measures of Core Inflation**

Here we examine the robustness of our results to two alternative measures of core inflation, median PCE Inflation (from the Federal Reserve Bank of Cleveland) and trimmed mean PCE inflation (from the Federal Reserve Bank of Dallas). We find that the results are similar to those obtained with median CPI inflation.

Table 1A. Phillips Curve Estimates: Median PCE Inflation

|	(1) Quarterly 1985-2019	(2) Quarterly 1985-2022	(3) Monthly 1985-2019	(4) Monthly 1985-2022
V/U	6.966**	6.598***	5.530	6.931***
	(3.472)	(1.867)	(3.918)	(1.924)
(V/U)-squared	-7.852	-7.540***	-5.719	-8.208***
	(5.420)	(2.308)	(6.010)	(2.362)
(V/U)-cubed	3.137	3.132***	2.192	3.559***
	(2.538)	(0.837)	(2.789)	(0.843)
H	0.128	0.122	0.090	0.158
	(0.113)	(0.097)	(0.127)	(0.114)
H-squared	0.144	0.166***	0.145*	0.171***
	(0.099)	(0.027)	(0.084)	(0.024)
H-cubed	0.035	0.045**	0.049	0.048*
	(0.034)	(0.020)	(0.033)	(0.024)
Constant	-1.858***	-1.782***	-1.590**	-1.827***
	(0.617)	(0.420)	(0.715)	(0.439)
Observations	140	150	420	452
R-squared	0.312	0.596	0.162	0.435
Rbar-squared	0.281	0.580	0.149	0.428

Notes: V/U denotes ratio of vacancies to unemployed (4-quarter or 12-month average). H denotes headline-inflation shock (4-quarter or 12-month average). Newey-West standard errors with 4 lags (quarterly data) and 12 lags (monthly data) in parentheses. ***, **, and * denote statistical significance at the 1,5, and 10 percent level, respectively.

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

A. Estimated Inflation Gap vs. V/U

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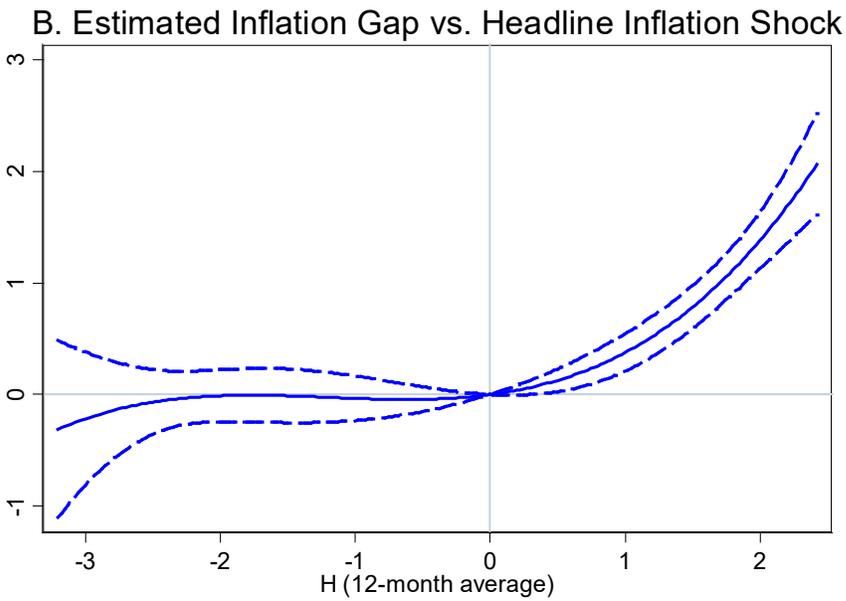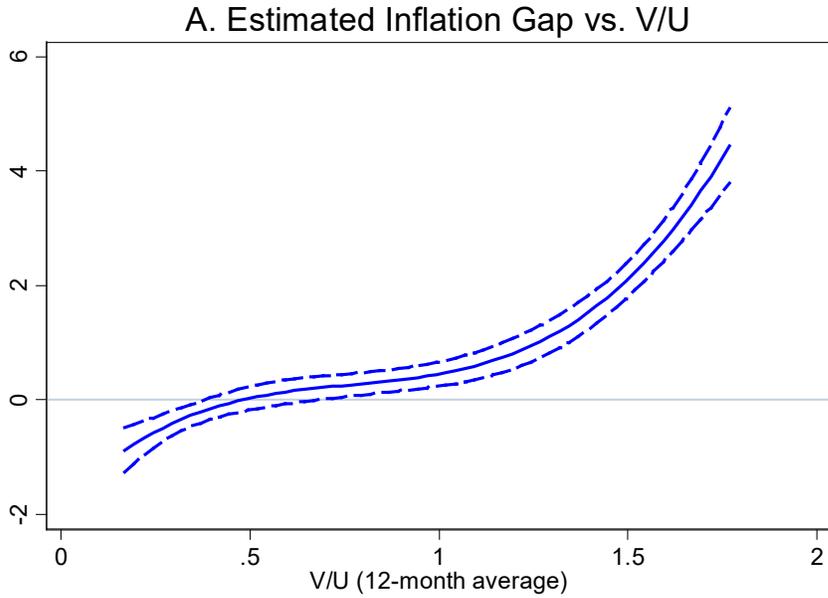
Note: Panel A reports fitted values for constant term and V/U terms from equation estimates reported in Table 1A (column 4). Panel B reports fitted values for headline-inflation shock (H) terms. Bands report 95 percent confidence interval. Inflation gap denotes monthly annualized median PCE inflation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

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

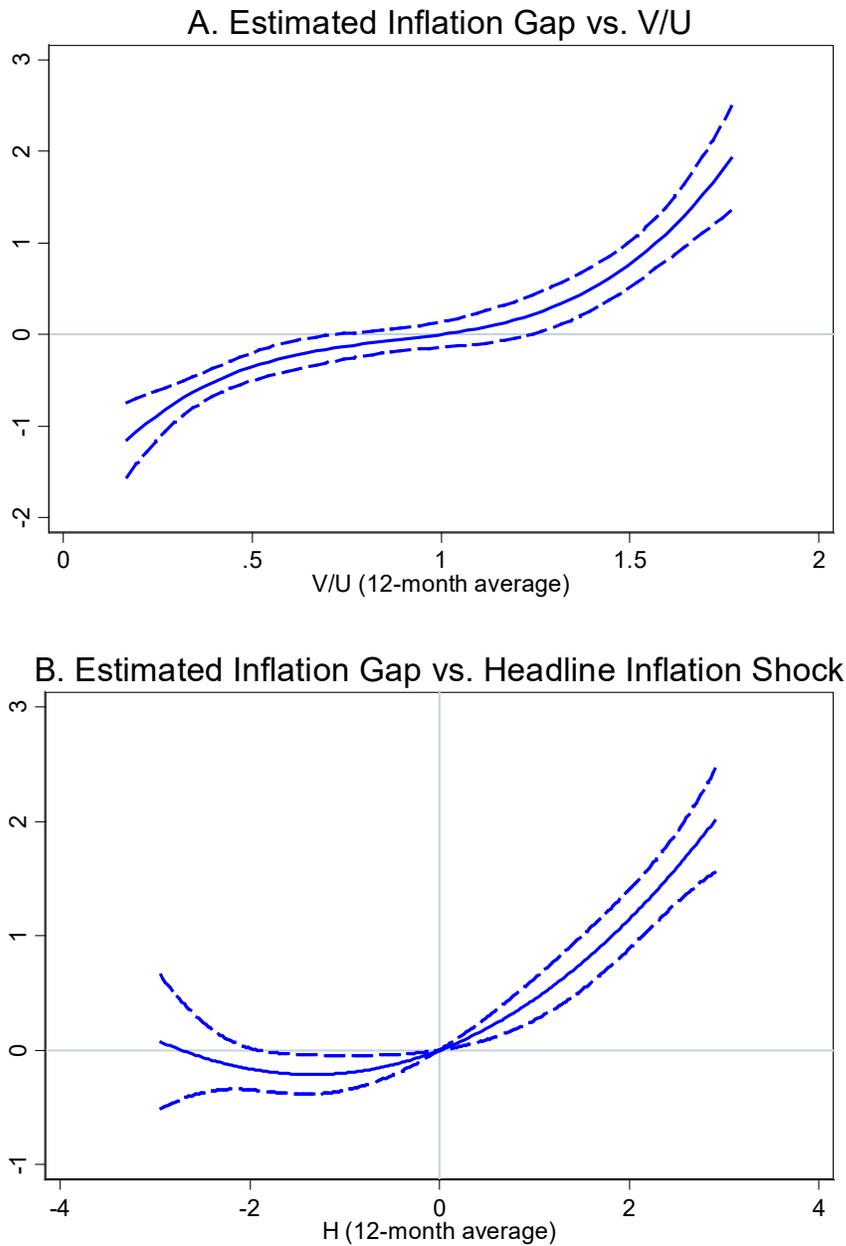A. Sample: 1985-2022

B. Sample: 1985-2019
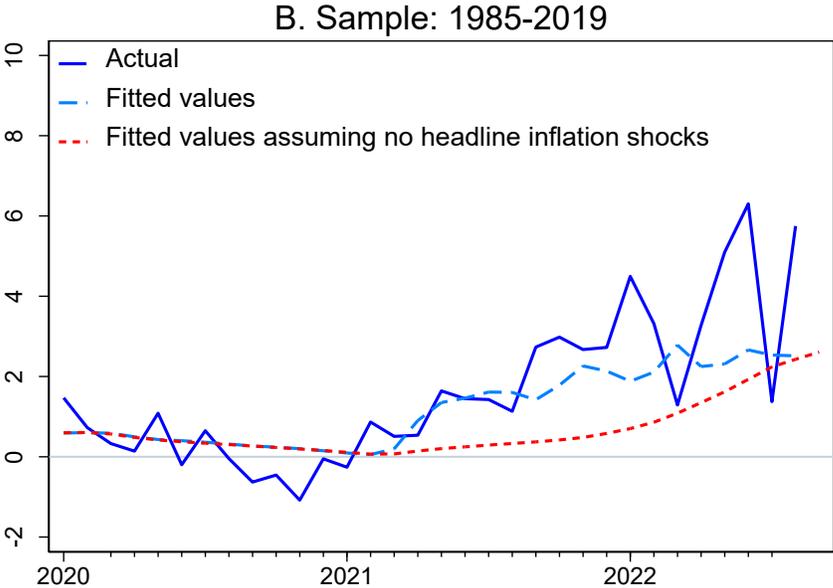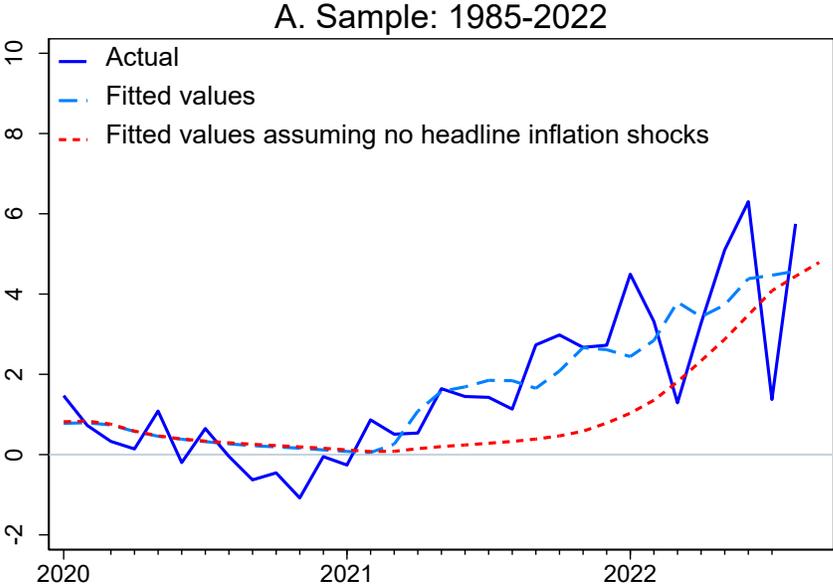
Note: Figure reports fitted values from Phillips Curve model with PCE Median estimated for the full sample (Table 1A column 4) and for the pre-pandemic sample (Table 1A column 3).

Table 1B. Phillips Curve Estimates: Trimmed Mean PCE Inflation

|	(1) Quarterly 1985-2019	(2) Quarterly 1985-2022	(3) Monthly 1985-2019	(4) Monthly 1985-2022
V/U	6.504*	4.417**	5.367	5.396***
	(3.426)	(2.120)	(3.774)	(1.903)
(V/U)-squared	-7.422	-4.086	-5.696	-5.659**
	(5.218)	(2.649)	(5.674)	(2.273)
(V/U)-cubed	2.964	1.379	2.183	2.167***
	(2.400)	(0.997)	(2.596)	(0.796)
Headline-inflation shock	0.333***	0.279***	0.307***	0.320***
	(0.099)	(0.093)	(0.110)	(0.100)
Headline-inflation shock-squared	0.088	0.126***	0.094	0.122***
	(0.102)	(0.021)	(0.095)	(0.020)
Headline-inflation shock-cubed	-0.021	0.006	-0.006	0.002
	(0.038)	(0.018)	(0.036)	(0.018)
Constant	-2.086***	-1.722***	-1.878**	-1.907***
	(0.651)	(0.489)	(0.738)	(0.456)
Observations	140	150	420	452
R-squared	0.305	0.548	0.155	0.388
Rbar-squared	0.274	0.529	0.143	0.379

Notes: "V/U" denotes ratio of vacancies to unemployed (4-quarter or 12-month average). "H" denotes headline-inflation shock (4-quarter or 12-month average). Newey-West standard errors with 4 lags (quarterly data) and 12 lags (monthly data) in parentheses. ***, **, and * denote statistical significance at the 1,5, and 10 percent level, respectively.

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

A. Estimated Inflation Gap vs. V/U

B. Estimated Inflation Gap vs. Headline Inflation Shock

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

Figure 7B. Predictions for Trimmed Mean PCE Inflation Gap During 2020-2022
(Percentage points)

A. Sample: 1985-2022

B. Sample: 1985-2019
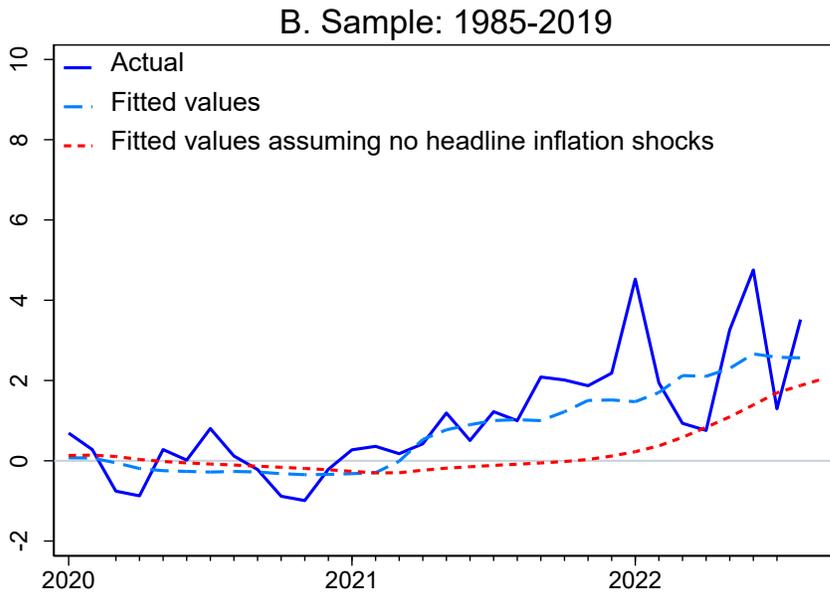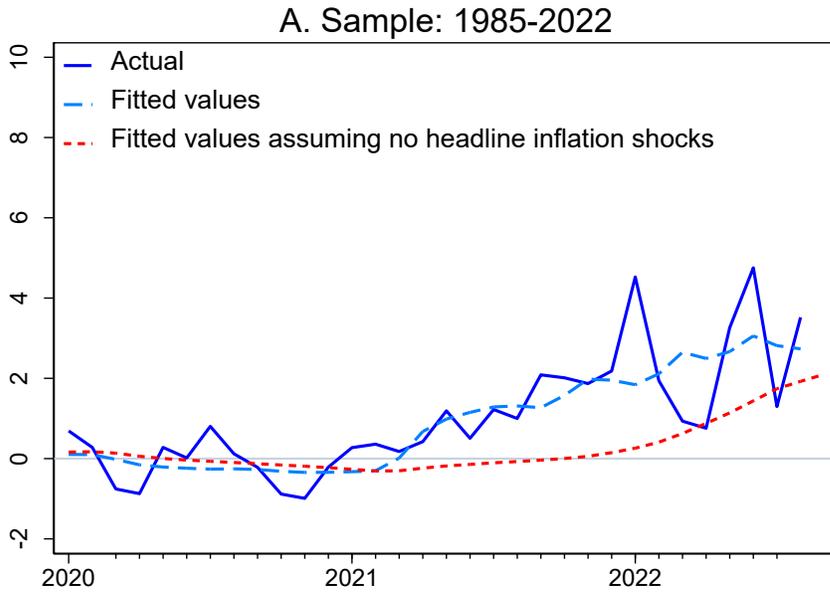
Note: Figure reports fitted values from Phillips Curve model with trimmed mean PCE estimated for the full sample (Table 1B column 4) and for the pre-pandemic sample (Table 1B column 3).

Measuring Inflation Expectations with University of Michigan Five-year-ahead CPI Inflation Expectations

Here we examine another common measure of inflation expectations, the five-year-ahead forecast from the Michigan Survey of Consumers. We find that the results are similar to those for the 10-year-ahead expectations from the Survey of Professional Forecasters.

Figure 2C. 5-year-ahead CPI Inflation Expectations and Median CPI Inflation, 2000-2022
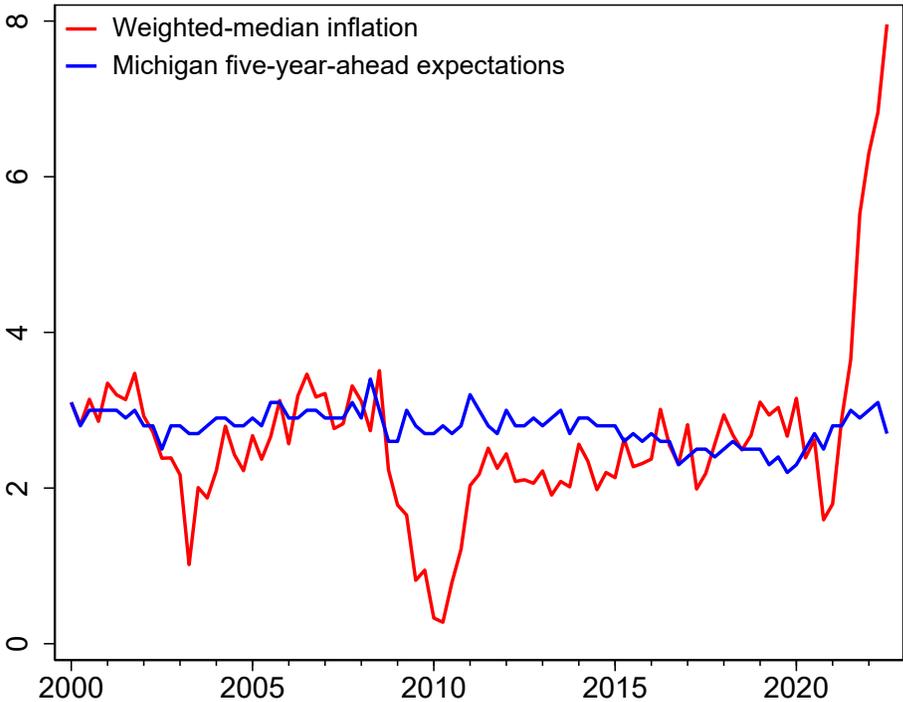
Note: Figure reports five-year-ahead CPI inflation forecasts from the University of Michigan Survey of Consumers.

Table 1C. Phillips Curve Estimates: Median CPI Inflation. Michigan 5-year-ahead Instead of SPF 10-year-ahead Inflation Expectations

	(1) Quarterly 1985-2019	(2) Quarterly 1985-2022	(3) Monthly 1985-2019	(4) Monthly 1985-2022
V/U	14.082***	10.305***	12.358***	10.806***
	(3.287)	(1.919)	(4.056)	(2.064)
(V/U)-squared	-17.830***	-11.792***	-14.792**	-12.428***
	(5.085)	(2.261)	(6.163)	(2.414)
(V/U)-cubed	7.606***	4.728***	6.094**	5.048***
	(2.373)	(0.773)	(2.850)	(0.835)
H	0.018	-0.013	0.037	0.033
	(0.055)	(0.059)	(0.064)	(0.061)
H-squared	0.075**	0.052***	0.054*	0.061***
	(0.038)	(0.013)	(0.033)	(0.019)
H-cubed	0.030*	0.027***	0.027	0.031***
	(0.016)	(0.008)	(0.018)	(0.010)
Constant	-3.819***	-3.139***	-3.553***	-3.282***
	(0.649)	(0.483)	(0.813)	(0.527)
Observations	140	151	420	453

Notes: "V/U" denotes ratio of vacancies to unemployed (4-quarter or 12-month average). "H" denotes headline-inflation shock (4-quarter or 12-month average). Newey-West standard errors with 4 lags (quarterly data) and 12 lags (monthly data) in parentheses. ***, **, and * denote statistical significance at the 1,5, and 10 percent level, respectively.

Figure 6C. Estimated Inflation Gap as a Function of Slack and Headline-inflation Shocks, 1985-2022. Michigan 5-year-ahead expectations (instead of SPF 10-year)
(Percentage points; monthly data)
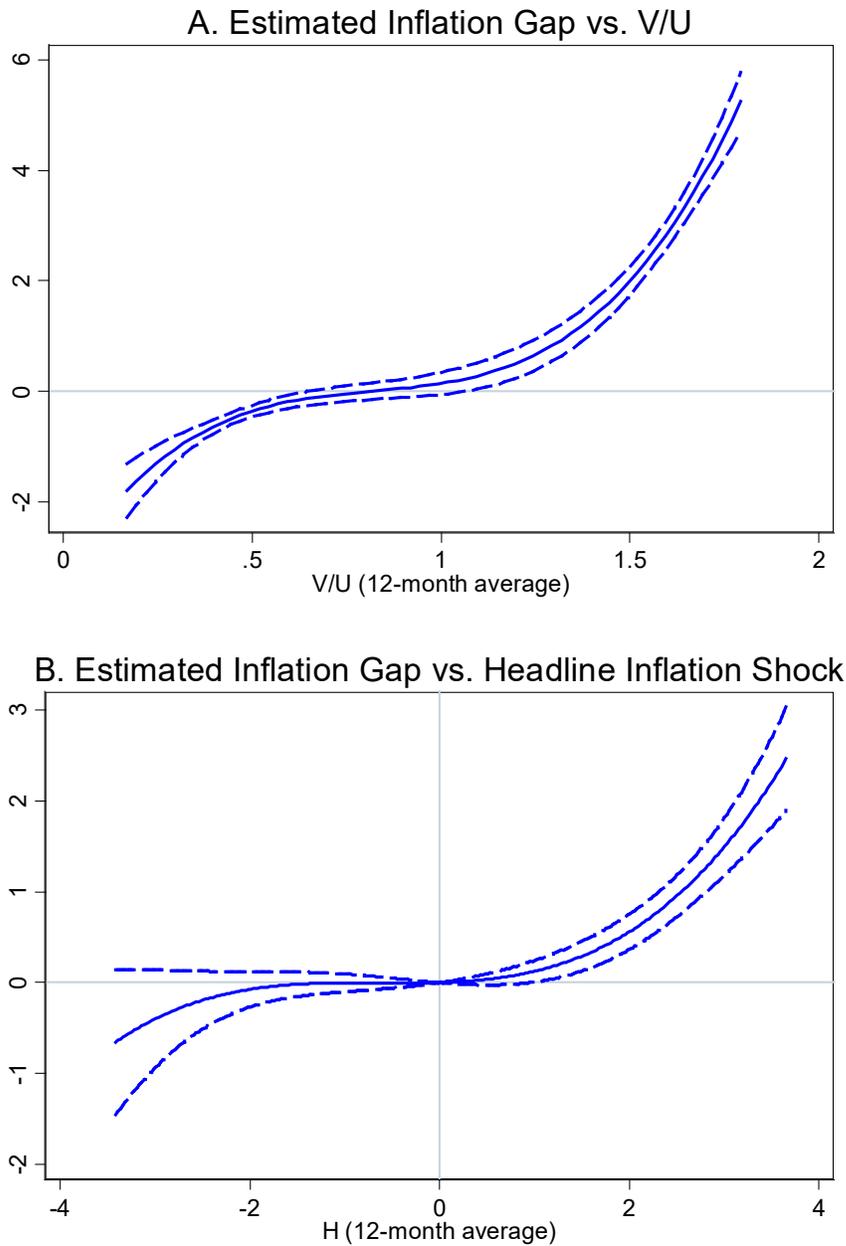
A. Estimated Inflation Gap vs. V/U

B. Estimated Inflation Gap vs. Headline Inflation Shock

Note: Panel A reports fitted values for constant term and V/U terms from equation estimates reported in Table 1C (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 5-year ahead inflation expectations from the Michigan Survey of Consumers.

Figure 7C. Predictions for Median Inflation Gap During 2020-2022. Michigan 5-year-ahead (instead of SPF 10-year)
(Percentage points)
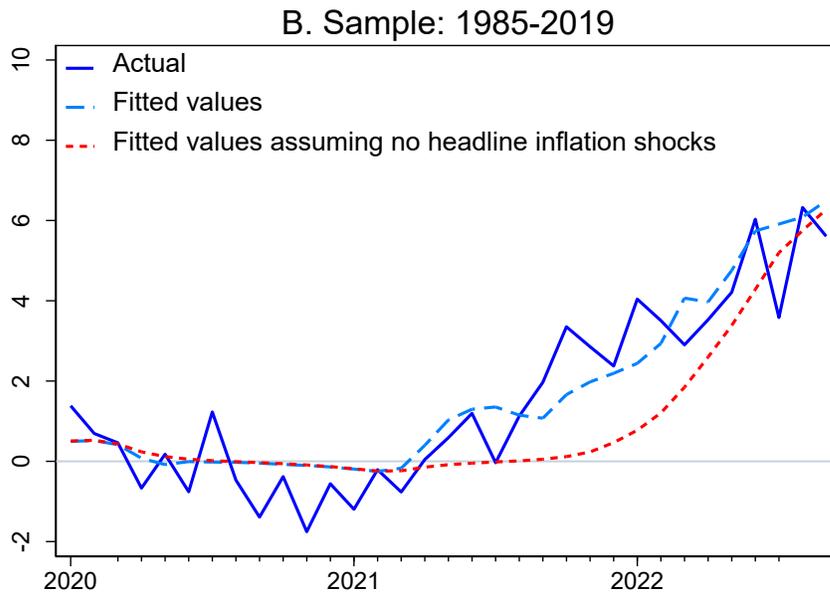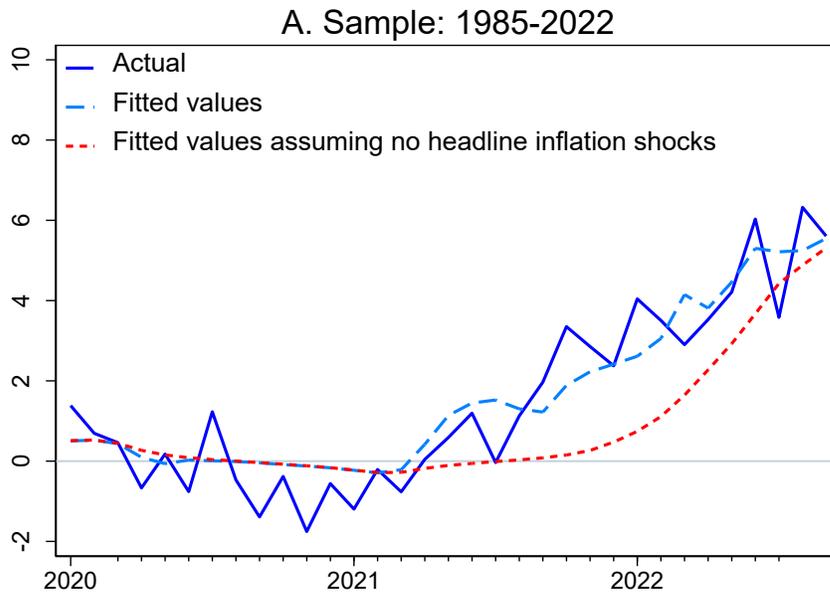
Note: Figure reports fitted values from Phillips Curve model with five-year-ahead inflation expectations from the Michigan Survey of Consumers estimated for the full sample (Table 1C column 4) and for the pre-pandemic sample (Table 1C column 3).

Measuring Labor Markets Conditions with the Unemployment Gap

Here we measure labor market conditions with the difference between the unemployment rate and its natural rate as estimated by the CBO. With the unemployment gap, the fit of our Phillips curve is somewhat worse. For example, with monthly pre-pandemic data, the Rbar-squared is 0.27 and 0.25 for V/U and the U gap respectively. For the full sample through 2022, the corresponding numbers are 0.51 and 0.46 respectively. In a horse race with both measures of labor market conditions, both are statistically significant. However, once V/U is included, the increase in Rbar-squared from including the U gap is small. For example, for monthly data, for the full sample, the increase is only 0.005. In contrast, when the U gap is included, adding V/U increases Rbar-squared by 0.055.

Table 1D. Phillips Curve Estimates with Quarterly Data: U-U* vs. V/U

	(1)	(2)	(3)	(4)	(5)	(6)
	1985-2019	1985-2022	1985-2019	1985-2022	1985-2019	1985-2022
U-U*	-0.381***	-0.455***			-0.378*	-0.302*
	(0.103)	(0.128)			(0.213)	(0.158)
(U-U*)-squared	0.154*	0.168*			0.279***	0.161*
	(0.083)	(0.095)			(0.096)	(0.094)
(U-U*)-cubed	-0.027	-0.027			-0.032**	-0.022
	(0.017)	(0.019)			(0.014)	(0.016)
H	-0.130*	-0.050	0.021	0.031	0.021	-0.039
	(0.075)	(0.123)	(0.068)	(0.074)	(0.075)	(0.077)
H-squared	0.192***	0.158***	0.155***	0.081***	0.132***	0.106***
	(0.033)	(0.033)	(0.041)	(0.016)	(0.038)	(0.020)
H-cubed	0.091***	0.061***	0.054***	0.026**	0.041**	0.042***
	(0.018)	(0.015)	(0.019)	(0.010)	(0.020)	(0.012)
V/U			11.039***	9.024***	28.194***	10.287***
			(3.645)	(2.120)	(7.461)	(2.725)
(V/U)-squared			-13.261**	-10.083***	-38.038***	-12.714***
			(5.485)	(2.383)	(11.034)	(3.173)
(V/U)-cubed			5.541**	4.032***	16.101***	5.061***
			(2.530)	(0.789)	(4.882)	(1.057)
Constant	-0.074	-0.007	-3.026***	-2.616***	-6.598***	-2.654***
	(0.081)	(0.075)	(0.747)	(0.557)	(1.559)	(0.733)
Observations	140	151	140	151	140	151
R-squared	0.489	0.595	0.512	0.761	0.586	0.777
Rbar-squared	0.466	0.578	0.490	0.751	0.558	0.762

Notes: "U-U*" denotes gap between unemployment rate and Congressional Budget Office estimate of natural rate (4-quarter or 12-month average). "V/U" denotes ratio of vacancies to unemployed (4-quarter or 12-month average). "H" denotes headline-inflation shock (4-quarter or 12-month average). Newey-West standard errors with 4 lags (quarterly data) and 12 lags (monthly data) in parentheses. ***, **, and * denote statistical significance at the 1,5, and 10 percent level, respectively.

**Table 1D (Continued). Phillips Curve Estimates with Monthly Data: U-U* vs. V/U**

	(1)	(2)	(3)	(4)	(5)	(6)
	1985-2019	1985-2022	1985-2019	1985-2022	1985-2019	1985-2022
U-U*	-0.402***	-0.457***			-0.318	-0.225
	(0.095)	(0.113)			(0.195)	(0.141)
(U-U*)-squared	0.145**	0.154*			0.279***	0.133
	(0.073)	(0.082)			(0.089)	(0.088)
(U-U*)-cubed	-0.023	-0.024			-0.030**	-0.017
	(0.015)	(0.016)			(0.013)	(0.015)
H	-0.131	-0.036	0.010	0.058	0.041	0.005
	(0.080)	(0.117)	(0.075)	(0.068)	(0.076)	(0.073)
H-squared	0.142***	0.159***	0.128***	0.089***	0.107***	0.104***
	(0.031)	(0.037)	(0.033)	(0.019)	(0.030)	(0.021)
H-cubed	0.079***	0.065***	0.053***	0.031***	0.037**	0.041***
	(0.019)	(0.017)	(0.019)	(0.011)	(0.018)	(0.013)
V/U			9.553**	9.140***	29.920***	11.307***
			(3.791)	(1.809)	(7.301)	(2.989)
(V/U)-squared			-10.879*	-10.328***	-39.540***	-13.617***
			(5.743)	(2.096)	(10.612)	(3.412)
(V/U)-cubed			4.439*	4.241***	16.571***	5.460***
			(2.666)	(0.727)	(4.689)	(1.147)
Constant	-0.047	0.000	-2.759***	-2.654***	-7.194***	-3.039***
	(0.072)	(0.073)	(0.760)	(0.467)	(1.589)	(0.822)
Observations	420	453	420	453	420	453
R-squared	0.259	0.442	0.284	0.575	0.329	0.582
Rbar-squared	0.248	0.435	0.274	0.569	0.315	0.574

Notes: "U-U*" denotes gap between unemployment rate and Congressional Budget Office estimate of natural rate (4-quarter or 12-month average). "V/U" denotes ratio of vacancies to unemployed (4-quarter or 12-month average). "H" denotes headline-inflation shock (4-quarter or 12-month average). Newey-West standard errors with 4 lags (quarterly data) and 12 lags (monthly data) in parentheses. ***, **, and * denote statistical significance at the 1,5, and 10 percent level, respectively.

Contemporaneous V/U Instead of 4-quarter or 12-month Average

Here we consider the relation between the median CPI inflation gap and the current level of V/U instead of the 4-quarter or 12-month average reported in the text. In the scatter plot, we see a strong positive relationship with the inflation gap, but the recent observations are more of an outlier compared to the past. For the Phillips curve equations, the coefficient estimates are similar but the R-bar-squared statistic is lower. For monthly data with the full sample, the R-bar-squared is 0.473, compared with 0.514 reported in Table 1 Column 4 of the text.

Figure 3A. Inflation Gap vs. Ratio of *Contemporaneous* Vacancies to Unemployed (V/U)
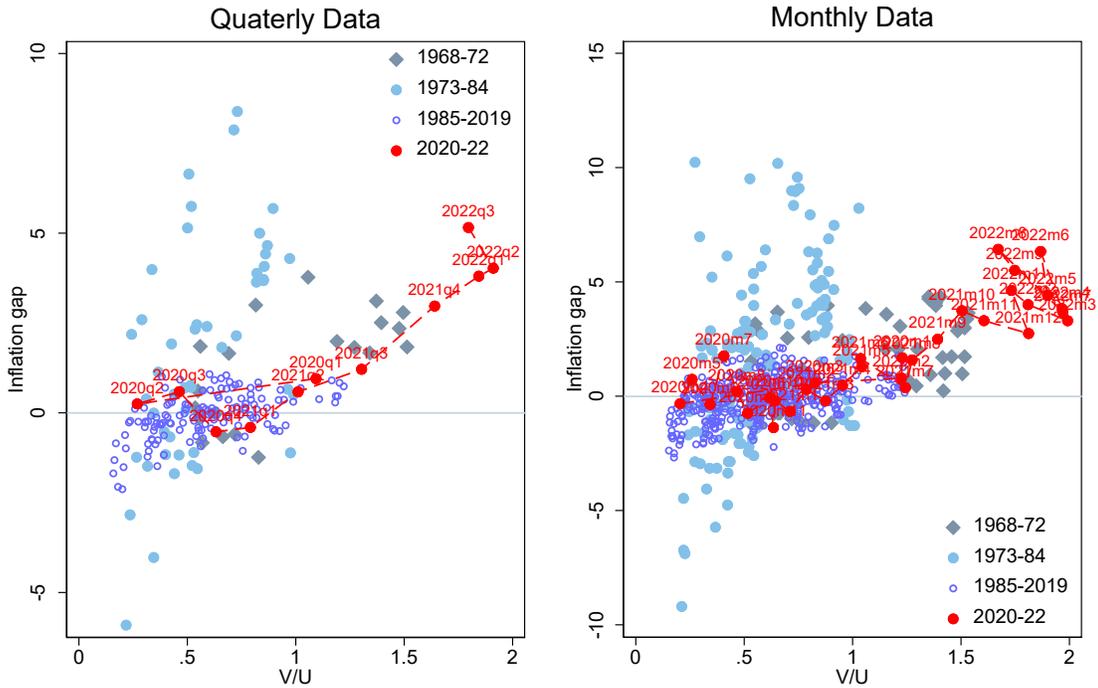
Note: Figure reports quarterly and monthly scatter plots of the inflation gap against the current level of V/U. Inflation gap is the difference between median and long-term expected inflation. Long-term expected inflation 10-year-ahead CPI inflation forecasts from the Survey of Professional Forecasters (SPF). "V/U" denotes contemporaneous (instead of 4-quarter or 12-month average) ratio of vacancies to unemployed.

Table 1E. Phillips Curve Estimates: Median CPI Inflation. Contemporaneous V/U

	(1) Quarterly 1985-2019	(2) Quarterly 1985-2022	(3) Monthly 1985-2019	(4) Monthly 1985-2022
V/U	13.506***	8.332***	13.225***	6.434***
	(3.251)	(2.120)	(3.362)	(2.383)
(V/U)-squared	-17.292***	-9.038***	-16.678***	-6.181**
	(4.899)	(2.380)	(5.038)	(2.758)
(V/U)-cubed	7.379***	3.455***	7.046***	2.306***
	(2.234)	(0.770)	(2.291)	(0.881)
H	0.045	0.100	0.049	0.135
	(0.070)	(0.095)	(0.077)	(0.107)
H-squared	0.177***	0.052*	0.158***	0.080***
	(0.044)	(0.029)	(0.034)	(0.028)
H-cubed	0.041**	-0.012	0.038**	-0.006
	(0.020)	(0.019)	(0.018)	(0.022)
Constant	-3.453***	-2.433***	-3.430***	-2.130***
	(0.649)	(0.548)	(0.681)	(0.597)
Observations	140	151	420	453
R-squared	0.483	0.695	0.279	0.500
Rbar-squared	0.459	0.683	0.268	0.493

Notes: "V/U" denotes contemporaneous ratios of vacancies to unemployed. "H" denotes headline-inflation shock (4-quarter or 12-month average). Newey-West standard errors with 4 lags (quarterly data) and 12 lags (monthly data) in parentheses. ***, **, and * denote statistical significance at the 1,5, and 10 percent level, respectively.

Headline Shocks Averaged over Shorter Periods

Here we experiment with headline inflation shocks averaged over shorter periods (one, three, and six months) instead of 12 months as in Text Table 1. We find that these shorter averages explain core (median) inflation less well.

Table 1F. Phillips Curve Estimates: Median CPI Inflation. Headline-inflation Shocks Over Different Horizons

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	1985-2019	1985-2022	1985-2019	1985-2022	1985-2019	1985-2022	1985-2019	1985-2022
	1 month	1 month	3 months	3 months	6 months	6 months	12 months	12 months
V/U	7.967*	7.494**	8.105*	7.470**	9.265**	7.825***	9.553**	9.140***
	(4.677)	(3.084)	(4.624)	(3.067)	(4.465)	(2.912)	(4.297)	(2.234)
(V/U)-squared	-8.586	-8.449**	-8.833	-8.406**	-10.555	-8.747**	-10.879*	-10.328***
	(6.860)	(3.833)	(6.781)	(3.809)	(6.569)	(3.534)	(6.435)	(2.545)
(V/U)-cubed	3.410	3.852***	3.539	3.821***	4.343	3.856***	4.439	4.241***
	(3.107)	(1.340)	(3.071)	(1.334)	(2.985)	(1.230)	(2.958)	(0.863)
H	0.013	0.038*	0.026	0.172	0.069	0.125	0.010	0.058
	(0.016)	(0.019)	(0.105)	(0.117)	(0.080)	(0.092)	(0.073)	(0.075)
H-squared	0.005**	0.005**	0.236***	0.243***	0.215***	0.181***	0.128***	0.089***
	(0.002)	(0.002)	(0.066)	(0.059)	(0.070)	(0.040)	(0.035)	(0.019)
H-cubed	0.000**	0.000	0.099***	0.087***	0.059***	0.044***	0.053***	0.031**
	(0.000)	(0.000)	(0.021)	(0.023)	(0.021)	(0.016)	(0.017)	(0.012)
Constant	-2.377**	-2.260***	-2.404**	-2.266***	-2.674***	-2.384***	-2.759***	-2.654***
	(0.985)	(0.741)	(0.976)	(0.738)	(0.941)	(0.722)	(0.879)	(0.586)
Observations	420	453	420	453	420	453	420	453
R-squared	0.255	0.505	0.271	0.515	0.269	0.529	0.284	0.575
Rbar-squared	0.244	0.498	0.260	0.509	0.258	0.522	0.274	0.569

Notes: "V/U" denotes ratio of vacancies to unemployed (12-month average). "H" denotes headline-inflation shock (12-month average). Newey-West standard errors with 12 lags in parentheses. ***, **, and * denote statistical significance at the 1,5, and 10 percent level, respectively.

**Core Inflation Measured by CPI Inflation Excluding Food and Energy**

Here we report a version of the regressions in Table 1 and Figure 7 in the text with core inflation measured by CPI inflation excluding food and energy (XFE). Headline shocks are the deviations of headline inflation from XFE inflation, which are determined by changes in the relative price of food and energy. We find no evidence of a pass-through from past headline-inflation shocks into core inflation—a result that we attribute to the flawed measure of core—we find headline-inflation shocks to be jointly insignificant in all specifications in contrast to the strong joint significance when we use median CPI inflation. In addition, our core-inflation equation fails to predict any rise in inflation during the pandemic era, in contrast to the equation's good performance when core is measured by weighted median inflation.

Table 1G. Phillips Curve Estimates: CPI Inflation Excluding Food and Energy

	(1) Quarterly 1985-2019	(2) Quarterly 1985-2022	(3) Monthly 1985-2019	(4) Monthly 1985-2022
V/U	3.855	6.563*	2.520	7.946**
	(4.091)	(3.407)	(4.515)	(3.876)
(V/U)-squared	-2.690	-7.142	-0.413	-9.000*
	(6.349)	(4.688)	(6.981)	(5.191)
(V/U)-cubed	0.467	2.952*	-0.667	3.680*
	(2.983)	(1.747)	(3.288)	(1.888)
H	-0.064	0.177	-0.074	0.229
	(0.090)	(0.191)	(0.100)	(0.213)
H-squared	0.026	0.073	0.009	0.059
	(0.030)	(0.053)	(0.026)	(0.049)
H-cubed	0.026	-0.001	0.025	-0.010
	(0.018)	(0.032)	(0.016)	(0.032)
Constant	-1.600**	-2.147***	-1.372	-2.415***
	(0.778)	(0.684)	(0.879)	(0.789)
Observations	140	151	420	453
R-squared	0.216	0.361	0.077	0.180
Rbar-squared	0.180	0.334	0.0632	0.169

Notes: "V/U" denotes ratio of vacancies to unemployed (4-quarter or 12-month average). "H" denotes headline-inflation shock (4-quarter or 12-month average). Newey-West standard errors with 4 lags (quarterly data) and 12 lags (monthly data) in parentheses. ***, **, and * denote statistical significance at the 1,5, and 10 percent level, respectively.

Figure 7D. Predictions for Median Inflation Gap During 2020-2022. CPI Inflation Excluding Food and Energy (Percentage points)

A. Sample: 1985-2022

B. Sample: 1985-2019
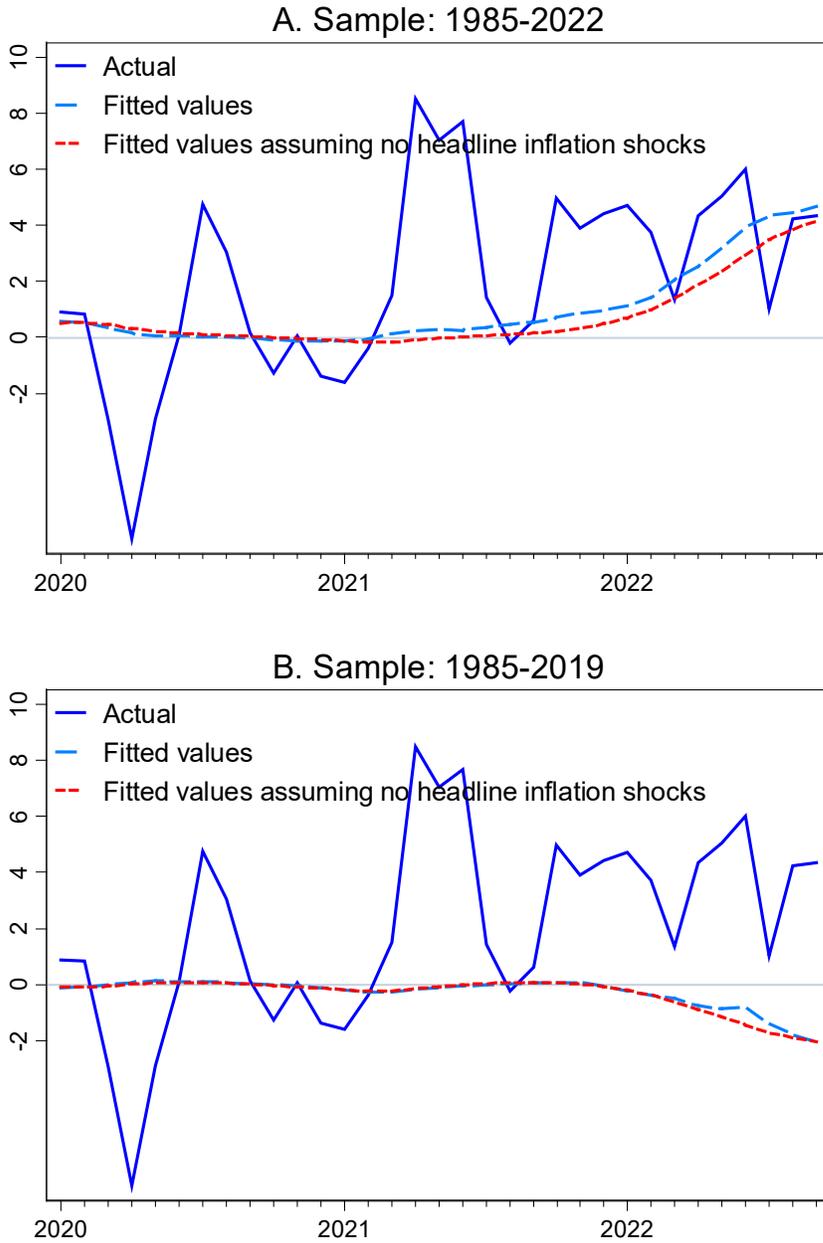
Note: Figure reports fitted values from Phillips Curve model estimated for the full sample (Table 1G column 4) and for the pre-pandemic sample (Table 1G column 3). Inflation gap denotes monthly annualized CPI inflation excluding food and energy minus long-term Survey of Professional Forecasters inflation expectations.

Wage Phillips Curve

Here we show estimates of the wage Phillips curve equation which are used to generate Figure 10 reported in the text. Given the lack of evidence of non-linearity in V/U in this case, we also consider a specification in which the effect of V/U is assumed to be linear.

Table 10. Wage Phillips Curve Estimates

	(1) 1985-2019	(2) 1985-2022	(3) 1985-2019	(4) 1985-2022
V/U	-4.346	1.653	2.016***	2.067***
	(3.200)	(2.736)	(0.241)	(0.224)
(V/U)-squared	9.861*	0.764		
	(5.058)	(3.364)		
(V/U)-cubed	-4.578*	-0.392		
	(2.405)	(1.214)		
H	-0.149	-0.085	-0.082	-0.081
	(0.125)	(0.130)	(0.120)	(0.119)
H-squared	-0.030	0.031	-0.031	0.027
	(0.059)	(0.032)	(0.061)	(0.028)
H-cubed	0.037	0.056***	0.026	0.053***
	(0.027)	(0.020)	(0.027)	(0.018)
Trend pty growth, 4-quarter avg.	0.527***	0.366**	0.507***	0.367***
	(0.115)	(0.162)	(0.101)	(0.137)
Constant	-0.910*	-1.738***	-2.055***	-1.796***
	(0.511)	(0.442)	(0.289)	(0.357)
Observations	140	150	140	150
R-squared	0.403	0.442	0.394	0.441
Rbar-squared	0.372	0.414	0.371	0.422

Notes: "V/U" denotes ratio of vacancies to unemployed (4-quarter average). "H" denotes headline-inflation shock (4-quarter average). Trend productivity growth measured using output per hour in the non-farm business sector smoothed with the Hodrick-Prescott filter with $\lambda = 16,000$. Newey-West standard errors with 4 lags in parentheses. ***, **, and * denote statistical significance at the 1,5, and 10 percent level, respectively.

Predictions for Median CPI Inflation Gap During the Pandemic: Comparison Across Models

Here we report the regressions underlying Figure 13. Our preferred core-inflation equation performs well in this exercise, as shown by the highest adjusted R-squared. We also see that the equation with only a linear unemployment term performs quite poorly, with 8 percentage points lower adjusted R-squared compared to our preferred model. The other columns in the table show that each of our modifications of the traditional specification—the measure of slack, non-linearity, and the pass-through variable—contributes materially to the good fit of our final equation.

Table 13A. Predictions for Median CPI Inflation Gap During the Pandemic: Comparison Across Models

	(1)	(2)	(3)	(4)	(5)
U-U*	-0.249***				
	(0.066)				
V/U		1.669***	7.966*	9.747**	9.553**
		(0.316)	(4.616)	(4.293)	(4.297)
V/U-squared			-8.572	-11.324*	-10.879*
			(6.795)	(6.409)	(6.435)
V/U-cubed			3.382	4.683	4.439
			(3.089)	(2.945)	(2.958)
H				0.105*	0.010
				(0.053)	(0.073)
H-squared					0.128***
					(0.035)
H-cubed					0.053***
					(0.017)
Constant	0.122*	-1.045***	-2.346**	-2.667***	-2.759***
	(0.067)	(0.218)	(0.972)	(0.889)	(0.879)
Observations	420	420	420	420	420
R-squared	0.193	0.211	0.239	0.253	0.284
Rbar-squared	0.191	0.209	0.233	0.246	0.274

Note: Table reports predicted values based on monthly equations estimated for 1985-2019. "U-U*" denotes gap between unemployment rate and Congressional Budget Office estimate of natural rate (4-quarter or 12-month average). "V/U" denotes ratio of vacancies to unemployed (12-month average). "H" denotes headline-inflation shock (12-month average). Newey-West standard errors with 12 lags in parentheses. ***, **, and * denote statistical significance at the 1,5, and 10 percent level, respectively.

Predictions for Median PCE Inflation Gap During the Pandemic: Comparison Across Models

Here we repeat Table 13A reported above and Figure 13 in the text with same comparison of specifications but with core inflation measured by median PCE inflation. The results are similar to those for median CPI: the traditional equation fails to predict a significant rise in inflation; our preferred specification predicts most of the observed rise (although there is some under-prediction since May 2022); and the measure of slack, non-linearity, and the pass-through variable are all important.

Table 13B. Predictions for Median PCE Inflation Gap During the Pandemic: Comparison Across Models

	(1)	(2)	(3)	(4)	(5)
U-U*	-0.187***				
	(0.043)				
V/U		1.190***	4.373	5.113	5.530
		(0.234)	(3.687)	(3.833)	(3.918)
V/U-squared			-4.006	-5.079	-5.719
			(5.669)	(5.896)	(6.010)
V/U-cubed			1.402	1.886	2.192
			(2.634)	(2.732)	(2.789)
H				0.059	0.090
				(0.065)	(0.127)
H-squared					0.145*
					(0.084)
H-cubed					0.049
					(0.033)
Constant	0.198***	-0.641***	-1.336*	-1.458**	-1.590**
	(0.067)	(0.169)	(0.701)	(0.708)	(0.715)
Observations	420	420	420	420	420
R-squared	0.139	0.136	0.150	0.154	0.162
Rbar-squared	0.137	0.134	0.144	0.145	0.149

Note: Table reports predicted values based on monthly equations estimated for 1985-2019. "V/U" denotes ratio of vacancies to unemployed (12-month average). "H" denotes headline-inflation shock (12-month average). Newey-West standard errors with 12 lags in parentheses. ***, **, and * denote statistical significance at the 1,5, and 10 percent level, respectively.

Figure 13B. Predictions for Median PCE Inflation Gap During the Pandemic: Comparison Across Models
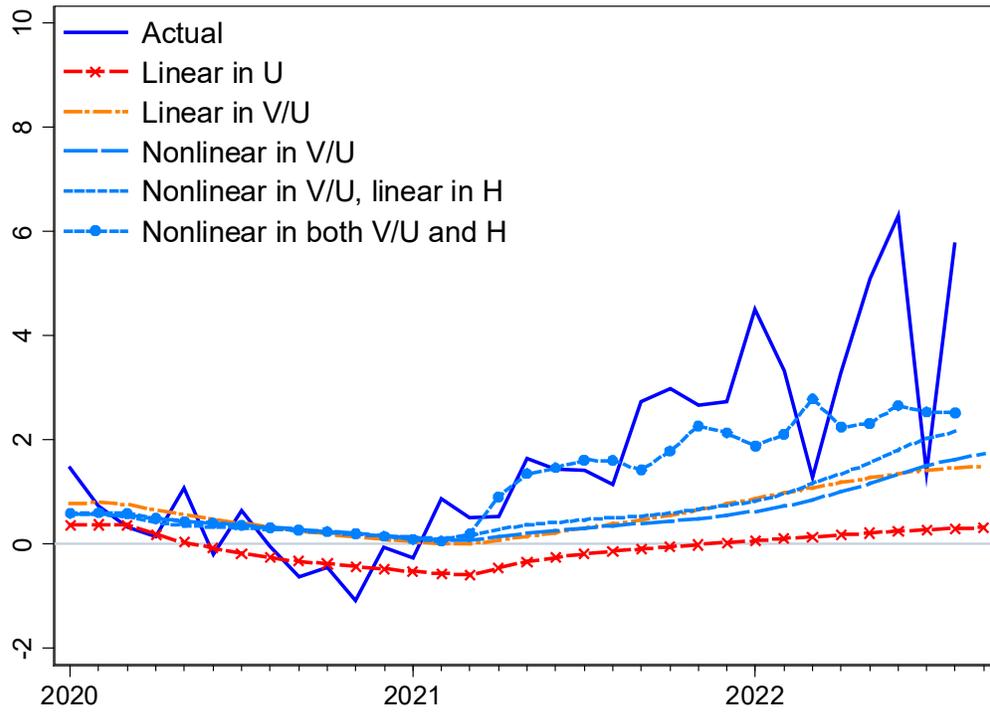
Note: Figure reports predicted values based on monthly equations estimated for 1985-2019 in Table 13B. U denotes unemployment rate, V/U denotes vacancy to unemployed ratio, H denotes headline-inflation shocks.

Table 2A.

Here we estimate the drivers of headline-inflation shocks in the pre-pandemic period, with the start date of the sample in each column depending on availability of data. The energy-price and auto-price variables also help explain headline shocks before the pandemic, but backlogs do not. Food-price inflation is significant before the pandemic but not during the pandemic

Table 2A. Explaining Headline-inflation Shocks Before 2020
(Dependent variable: Headline – Median CPI monthly annualized inflation)

A. Bivariate Regressions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
								Durable goods share	Weighted average of
	Energy price inflation	Food price inflation	Harper Charter Rate	Baltic Dry	Supplier delivery times	FRBNY Supply Chain Index	Backlogs of work	of real consumption	car inflation rates
	0.068***	0.189***	0.001**	0.000***	-0.151*	1.603***	0.061	0.159***	0.104**
	(0.007)	(0.011)	(0.001)	(0.000)	(0.091)	(0.510)	(0.121)	(0.041)	(0.042)
Observations	720	720	228	410	152	264	123	720	263
Start of sample	1960m1	1960m1	2001m1	1985m1	2007m5	1998m1	2009m10	1960m1	1998m2
R-squared	0.503	0.170	0.026	0.041	0.020	0.061	0.001	0.014	0.021
Rbar-squared	0.502	0.169	0.0221	0.0391	0.0134	0.0571	-0.00694	0.0131	0.0171

B. Selected Multivariate Regressions

	(1)	(2)
Food price inflation	0.186***	0.131***
	(0.009)	(0.027)
Energy price inflation	0.068***	0.069***
	(0.007)	(0.009)
Weighted average of car inflation rates		0.089***
		(0.020)
Constant	-0.151**	-0.807***
	(0.063)	(0.123)
Observations	720	263
Start of sample	1960m1	1998m2
R-squared	0.667	0.794
Rbar-squared	0.666	0.792

Note: Relative energy, food, and auto-related price inflation variables are created by subtracting median inflation from energy, food, and auto-related price inflation respectively, and these are in monthly annualized terms. Backlogs of work variable is taken from IHS Markit Economics. Robust standard errors in parentheses. ***, **, and * denote statistical significance at the 1,5, and 10 percent level, respectively.
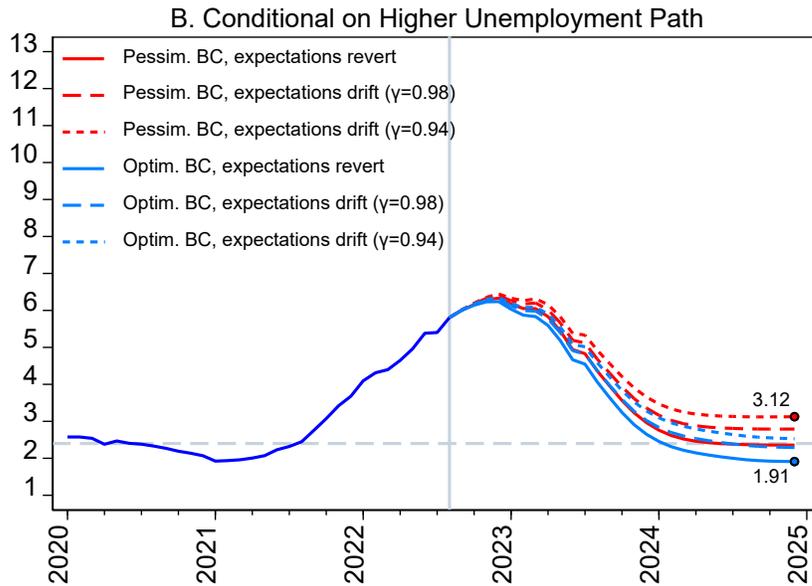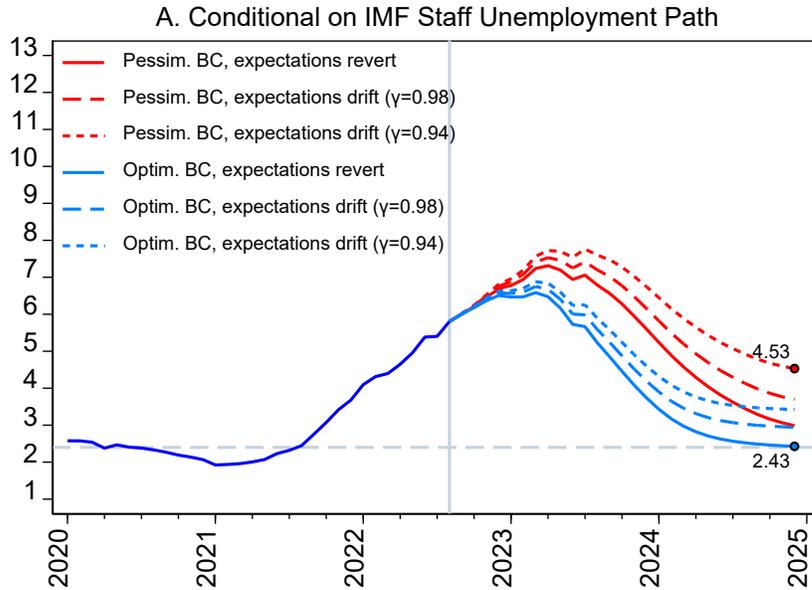
Simulations of Core (Median) PCE Inflation

Here we report simulations of future core inflation as measured by median PCE inflation as the measure of core inflation, instead of median CPI inflation. These simulations use the Phillips curve for median PCE inflation in Table 1A column 4 and the same equations for the Beveridge curve and inflation expectations as in the text. The results, reported in Figures 17A and 19A correspond to and are similar to those obtained for median CPI inflation in Figures 17 and 19 in the main text.

Figure 17A. Scenarios for Core (Median) PCE Inflation Conditional on September 2022 FOMC Unemployment Forecasts
(12-month; percent)
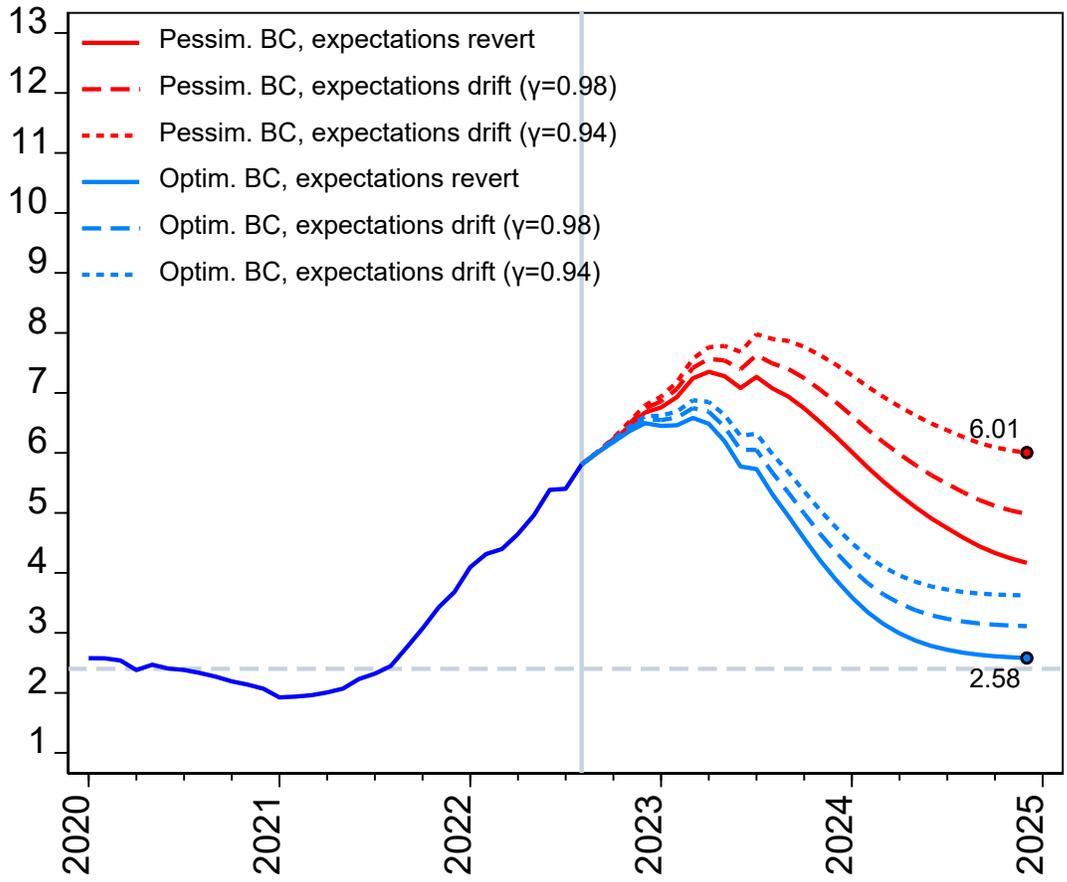
Note: Unemployment forecast from the Summary of Economic Projections of the Federal Open Market Committee (FOMC) published in September 2022 which provides numbers for the fourth quarters of 2022, 2023, 2024, and 2025. We assign those forecasts to November of each year and interpolate a monthly unemployment series starting from the actual value of 3.5 percent in September 2022. Vertical line indicates September 2022. Core inflation denotes PCE median inflation. Horizontal dashes indicate assumed 2.4 percent target for median PCE inflation based on 2 percent PCE target and 0.4 percentage point gap between the median PCE inflation and PCE inflation excluding food and energy following approach on Federal Reserve Bank of Atlanta Underlying Inflation Dashboard.

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

A. Conditional on IMF Staff Unemployment Path

Legend:
- Pessim. BC, expectations revert
- Pessim. BC, expectations drift (γ=0.98)
- Pessim. BC, expectations drift (γ=0.94)
- Optim. BC, expectations revert
- Optim. BC, expectations drift (γ=0.98)
- Optim. BC, expectations drift (γ=0.94)

4.53
2.43

B. Conditional on Higher Unemployment Path

Legend:
- Pessim. BC, expectations revert
- Pessim. BC, expectations drift (γ=0.98)
- Pessim. BC, expectations drift (γ=0.94)
- Optim. BC, expectations revert
- Optim. BC, expectations drift (γ=0.98)
- Optim. BC, expectations drift (γ=0.94)

3.12
1.91

Note: Vertical line indicates September 2022. 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 indicate assumed 2.4 percent target for median PCE inflation based on 2 percent PCE target and 0.4 percentage point gap between the median PCE inflation and PCE inflation excluding food and energy following approach on Federal Reserve Bank of Atlanta Underlying Inflation Dashboard.