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Demand versus Supply: Which is More Important for Inflation?*

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Abstract

I use Phillips curve type regressions to assess the relative contributions of demand and supply forces to U.S. inflation during the pandemic era from February 2020 onward and the decade following the end of the Great Recession. In the first specification (Model 1), demand and supply forces are measured using the vacancy-unemployment ratio and the New York Fed's Global Supply Chain Pressure Index, respectively. In the second specification (Model 2), demand and supply forces are measured using the demand-driven and supply-driven components of PCE inflation from Shapiro (2025). The results derived from the two models are largely in agreement. For both models, variance decompositions imply that demand forces became more important for inflation during the pandemic era and dominated the influence of supply forces. In counterfactual simulations, both models imply that supply forces, together with the endogenous response of expected inflation, were the primary drivers of persistently low inflation after the Great Recession. Given that monetary policy operates to influence demand-driven inflation, this result helps to account for the Fed's difficulty in achieving its 2% inflation goal during these years.

Keywords: *Phillips curve, Demand, Supply, Expected inflation.*
JEL Classification: E31, E32, E37

*The views in this paper are my own and not necessarily those of the Federal Reserve Bank of San Francisco or of the Federal Reserve System.

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1 Introduction

The 12-month change in the headline personal consumption expenditures (PCE) price index rose from 1.66% in February 2020 at the start of the pandemic to a 40-year high of 7.25% in June 2022. Since then, headline PCE inflation has declined to 2.54% in February 2025. The typical hybrid New Keynesian Phillips curve (NKPC) implies that inflation is driven by: (1) demand forces, (2) supply forces, (3) short-run expected inflation, and (4) lagged inflation. The relative importance of expected versus lagged inflation captures the degree of anchoring for short-run expected inflation. Shifts in the values of NKPC parameters can affect the relative contribution of these sources to movements in inflation.

This paper uses Phillips curve type regressions to assess the relative contributions of demand and supply forces to U.S. inflation during the pandemic era (defined as the period from February 2020 onward) and the decade following the end of the Great Recession. In the first specification (Model 1), demand and supply forces are measured using the vacancy-unemployment ratio and the New York Fed's Global Supply Chain Pressure Index, respectively. In the second specification (Model 2), demand and supply forces are measured using the demand-driven and supply-driven components of PCE inflation constructed by Shapiro (2025). In both specifications, expected inflation is measured using the median 1-year ahead forecast from the Survey of Professional Forecasters. Broadly similar results are obtained using 1-year ahead household inflation expectations from the University of Michigan Survey.

The results derived from the two models are largely in agreement. For both models, variance decompositions imply that demand forces became more important for inflation during the pandemic era and dominated the influence of supply forces. For Model 1, the variance contribution of demand goes from almost zero to 43%. For Model 2, the variance contribution of demand goes from 25% to 58%. The variance contribution of supply during the pandemic era is much lower: 13% for Model 1 and 27% for Model 2. Demand forces become even more important if the variance decomposition starts one year later in February 2021, thereby focusing on the rise of PCE inflation above 2% and its subsequent decline. The variance contribution of demand is now 62% for Model 1 and 67% for Model 2. These results are broadly consistent with those obtained by Giannone and Primiceri (2024) and Bergholt, et al. (2025) who identify demand and supply shocks using Bayesian structural vector autoregressions with sign restrictions. Both studies find that demand shocks account for more than 50% of fluctuations in U.S. inflation during the pandemic era.

Models 1 and 2 both imply that the variance contribution of expected inflation remained similar across the two sample periods. But in numerical terms, the contribution of expected inflation is much higher in Model 1 than in Model 2. This is because Model 2 uses actual components of headline PCE inflation as driver variables, leaving much less variation for other sources to explain. The higher variance contribution of expected inflation in Model 1 implies that the endogenous response of expected inflation to actual inflation is an important complementary inflation driver.

Counterfactual simulations provide another way of assessing the relative importance of demand versus supply variables as drivers of inflation over different sample periods. The exercise can be viewed as a type of level decomposition, in contrast to a variance decomposition. For these simulations, I allow only the demand variable, or only the supply variable, to evolve along the path observed in the data while holding the counterpart variable constant. The simulations allow expected inflation to respond endogenously to the counterfactual path of inflation using laws of motion that are estimated over the full sample. Specifically, I regress 1-year ahead expected inflation in the data on its own lagged value and the lagged value of either headline or core PCE inflation. The R^2 statistics from these regressions are 97%. For each counterfactual simulation, expected inflation evolves according to the path determined by the estimated law of motion while lagged inflation evolves along the counterfactual path.

Based on counterfactual simulations starting in February 2020, both models imply that movements in demand and supply variables contributed to the rise and fall of pandemic-era inflation, together with the endogenous response of expected inflation. But the "demand only" simulations provide a better fit of the U.S. inflation paths in three out of four cases, as measured by the mean absolute gap between counterfactual inflation and U.S. inflation. The demand variables remain above their pre-pandemic averages in February 2025 while supply variables have returned to their pre-pandemic averages. All else equal, further declines in the demand variables are needed to achieve 2% inflation.

Based on counterfactual simulations starting in December 2007, both models imply that movements in supply variables, together with the endogenous response of expected inflation, were the primary drivers of persistently low inflation during the decade following the end of the Great Recession in June 2009. In all cases, the "supply only" simulations provide a better fit of the U.S. inflation paths from December 2007 to January 2020. Given that monetary policy operates to influence demand-driven inflation, the presence of supply-driven low inflation after the Great Recession helps to account for the Fed's difficulty in achieving its 2% inflation goal during these years, despite holding the federal funds rate close to zero for seven consecutive years from December 2008 to December 2015. Indeed, from June 2009 through February 2020, the 12-month headline PCE inflation rate was below the Fed's 2% goal for 101 out of 129 months, or 78% of the time.[1]

Related literature. Numerous studies have sought to identify the most important drivers of U.S. inflation during the pandemic era. A consensus view has not emerged in the literature.[2] Rather, the various studies emphasize different combinations of demand forces, supply forces, energy prices, or monetary policy accommodation. Table 1 provides a sampling of results in the literature.[3]

Table 1: Studies of pandemic-era inflation

Study	Primary driver	Methodology/mechanism
Jordà, et al. (2022) de Soyres, et al. (2022)	Demand	Cross-country fiscal stimulus
Giannone & Primaceri (2023) Bergholt, et al. (2025)	Demand	Structural VAR
Faria-e-Castro (2025)	Monetary policy	Estimated DSGE model
Levy (2024)	Demand	U.S. imports of goods
Bianchi, et al. (2023)	Demand	Estimated DSGE model
Smets and Wouters(2024)	Supply	Estimated DSGE model
Harding, et al. (2023) Benigno & Eggertsson (2023) Crust, et al. (2023), Hobijn, et al. (2023)	Demand	Nonlinear Phillips curve
Guerrieri, et al. (2023) Bernanke & Blanchard (2025)	Supply	Structural VAR
Beaudry, et al. (2024b)	Supply & Expectations	New Keynesian model
Gagliardone & Gertler (2023)	Oil prices	Calibrated DSGE model
Shapiro (2022, 2025), Ball, et al. (2022) Koch & Noureldin (2023) Di Giovanni, et al. (2023) Liu & Nguyen (2023) Amiti, et al. (2024), Bai, et al. (2024)	Demand & Supply	Various

Blanchard (2021) and Summers (2021) warned of the upside risks to inflation coming from excessive pandemic-era fiscal stimulus. Along these lines, cross-country studies by Jordà, et

[1] Alternative hypotheses for persistently low inflation during these years have invoked the role played by the zero lower bound (ZLB) on nominal interest rates. See, for example, Hills, Nakata, and Schmidt (2019), Mertens and Williams (2019), and Lansing (2021).

[2] Similarly, there are many competing views about the main drivers of the Great Inflation that took place in the 1970s and early 1980s. See, for example, Nelson (2022), Bryan (2013), and Lansing (2000).

[3] See also the January 4, 2025 webcast of the AEA panel discussion on "Inflation and the Macroeconomy," with Ben Bernanke, John Cochrane, Jason Furman and Christina Romer, available at www.aeaweb.org/webcasts/2025/inflation-macroeconomy.

al. (2022) and de Soyres, Santacreu, and Young (2022) find that fiscal stimulus was larger and subsequent inflation was higher in the United States relative to other countries. This evidence supports a demand-driven view of pandemic-era inflation.

Using an estimated structural vector autoregression (SVAR) with sign restrictions, Giannone and Primaceri (2024) conclude that pandemic-era inflation was driven mainly by demand shocks as expansive fiscal policy shifted up aggregate demand. The relatively flat slope of the aggregate demand curve (a result of successful inflation targeting by central banks) implies that adverse supply shocks have relatively small impacts on inflation. Faria-e-Castro (2025) reaches a similar conclusion using an estimated DSGE model, but he identifies expansionary monetary policy as the largest component of "demand forces."

Bergholt, et al. (2025) demonstrate that the use of estimated SVARs to decompose inflation into demand-driven and supply-driven components is subject to considerable modeling uncertainty regarding prior assumptions about the deterministic versus stochastic forces that govern the size of the constant terms in the SVAR. They propose a solution to this problem that involves imposing a "single-unit-root prior." After doing so, they find that demand shocks account for 56% of fluctuations in U.S. GDP price inflation in 2021 and 77% in 2022.

Levy (2024) argues that the observed supply chain bottlenecks were endogenous, i.e., the bottlenecks were caused by an extraordinary demand surge caused by: (1) excessive fiscal stimulus, (2) accommodative monetary policy, and (3) pandemic lockdowns that shifted consumption towards goods versus services. Using data on U.S. imports of containerized goods, he shows that the *quantities* of goods delivered to consumers *increased* substantially during the months following the onset of the pandemic, favoring a demand-driven explanation of the inflation surge.

Bianchi, Faccini and Melosi (2023) develop an estimated DSGE model with "unfunded fiscal shocks," defined as fiscal shocks that do not trigger an offsetting adjustment to future fiscal policy.[4] They show that fiscal stimulus in the form of the Coronavirus Aid, Relief, and Economic Security (CARES) Act and the American Rescue Plan Act (ARPA) can account for most of the rise inflation during 2021 and 2022.

Smets and Wouters (2024) extend the Bianchi, Faccini, and Melosi (2023) model to allow for "partially unfunded" versions of all shocks. This feature lessens the inflationary impact of demand shocks while enhancing the inflationary impact of supply shocks. They conclude that most of the rise and fall of pandemic-era inflation was due to supply disturbances in the

[4] The model can be viewed as one that allows for an endogenous inflation target that evolves so as to finance any unfunded government debt. The basic mechanism is the "fiscal theory of the price level," as explained by Cochrane (2023).

form of price mark-up shocks.

Using SVARs and New Keynesian type models, Guerrieri, et al. (2023) and Bernanke and Blanchard (2025) emphasize the role of higher energy prices linked to the Ukraine war and disruptions of global supply chains as the primary drivers of pandemic-era inflation. Beaudry, Hou, and Portier (2024b) argue that pandemic-era inflation was driven mainly by the interaction of broad-based supply shocks with households' boundedly rational inflation expectations in an environment with a relatively flat Phillips curve.

Studies by Harding, Lindé, and Trabandt (2023), Benigno and Eggertsson (2023), and Crust, Lansing, and Petrosky-Nadeau (2023) find that elevated inflation levels since early 2021 are consistent with a non-linear Phillips curve that becomes steeper at lower levels of economic slack. Hobijn, et al. (2023) present evidence of non-linear Phillips curve relationships in a variety of countries. These results lend support to the importance of demand forces that reduced economic slack.[5]

Using a calibrated DSGE model, Gagliardone and Gertler (2023) conclude that oil price shocks together with "easy" monetary policy was the main driver of pandemic-era inflation. Using various methods, Shapiro (2022, 2025), Ball, Leigh, and Mishra (2022), Koch and Noureldin (2023), Liu and Nguyen (2023), Amiti, et al. (2024), and Bai, et al. (2024) all conclude that pandemic-era inflation was driven by a combination of demand and supply forces.

2 Candidate drivers of inflation

Furman (2022) discusses the potential sources of pandemic-era inflation from the perspective of terms that appear in the Phillips curve. The typical New Keynesian Phillips curve (NKPC) implies that inflation movements are driven by (1) demand forces, (2) supply forces, (3) expected inflation, and (4) lagged inflation. A typical formulation of the NKPC is

$$\begin{aligned}
\pi_t - \pi^* &= \kappa\, mc_t + u_t + \frac{\beta}{1+\beta(1-\mu_\pi)}\left(E_t\pi_{t+1} - \pi^*\right) + \frac{1-\mu_\pi}{1+\beta(1-\mu_\pi)}\left(\pi_{t-1} - \pi^*\right), \\
mc_t &= \text{firms' real marginal cost, deviation from mean (demand variable)}, \qquad (1) \\
u_t &= \text{cost push shock (supply variable)}, \\
E_t\pi_{t+1} &= \text{short-run expected inflation}, \\
\pi_{t-1} &= \text{lagged inflation},
\end{aligned}$$

[5] Ball, Leigh, and Mishra (2022) also allow for a nonlinear Phillips curve but their explanation for pandemic-era inflation includes an important role for energy prices and supply chain disruptions.

where π^* is the central bank's inflation target, κ is the structural slope parameter, β is the firm's discount factor, and μ_π is the fraction of non-reoptimizing firms that index prices to the inflation target, rather than lagged inflation.[6]

Equation (1) states that inflation is partly driven by movements in short-run expected inflation. If the value of the slope parameter κ is small, as suggested by many empirical estimates, then expected inflation becomes more important for determining movements in actual inflation. At the height of the Great Inflation in October 1979, Fed Chair Paul Volcker (1979) famously observed, "Inflation feeds in part on itself, so part of the job of returning to a more stable and more productive economy must be to break the grip of inflationary expectations."[7]

Jørgensen and Lansing (2025) show that the value of μ_π is a simple measure of anchoring for short-run expected inflation, with higher values of μ_π implying stronger mean reversion to the inflation target in response to shocks.[8] Survey-based anchoring measures for short-run expected inflation show a modest decline in the sample period from early 2020 onward.[9]

From a theoretical perspective, the relative importance of inflation drivers can be influenced by shifts in the values of the NKPC parameters μ_π and κ, or shifts in the relative volatilities of demand versus supply shocks.[10]

3 Data

Figure 1 shows the data used in the analysis. The sample period runs from 2000.m1 to 2025.m2, representing an era of consistent U.S. monetary policy and stable long-run inflation

[6] Equation (1) is a version of the NKPC specification derived by Cogley and Sbordonne (2008) which allows for drifting trend inflation. For the analysis here, I impose constant trend inflation equal to $\pi^* = 2\%$ as in the version described by Mavroeidis, Plagborg-Møller, and Stock (2014, p. 131).

[7] More recently, Fed Vice Chair Clarida (2020) has stated: "With regard to inflation expectations, there is a broad agreement among academics and policymakers that achieving price stability on a sustained basis requires that inflationary expectations be well anchored...This is especially true in the world that prevails today, with flat Phillips curves in which the primary determinant of actual inflation is expected inflation."

[8] Using a three equation New Keynesian model, they show that higher values of μ_π, driven plausibly by a shift to a more vigilant monetary policy regime, allow the model to account for numerous features of evolving U.S. inflation behavior since 1960. These features include lower inflation persistence and volatility, the shifting pattern of slope coefficients in reduced-form Phillips curve regressions (see also Jørgensen and Lansing 2021), and the decreased sensitivity of survey-based inflation forecasts to movements in actual inflation.

[9] See Lansing and Nucera (2023), Guerrieri, et al. (2023, p. 48), and Jørgensen and Lansing (2025, p. 6).

[10] For empirical evidence of such shifts, see Lubik and Schorfheide (2004), Cogley and Sbordonne (2008), Galí and Gambetti (2009), Del Negro, et al. (2020), Hadjani (2023), Inoue, Rossi and Wang (2024), Bergholt, Furlanetto, and Vaccaro-Grange (2025), and Jørgensen and Lansing (2024, 2025).

expectations.[11]

In Figure 1, I interpret the ratio of the number of job vacancies to the number of unemployed workers (vu_t) as a demand variable.[12] I interpret the New York Fed's Global Supply Chain Pressure Index ($gscpi_t$) as a supply variable. The value of the index represents how many standard deviations supply chain conditions are above or below the sample average.[13] Shapiro (2025) performs a level decomposition of PCE inflation into demand-driven (π_t^d) and supply-driven components (π_t^s).[14] Expected inflation ($F_t\pi_{t+12}$) is the median 1-year ahead forecast for CPI inflation from the Philadelphia Fed's quarterly Survey of Professional Forecasters, interpolated to obtain monthly values.[15] Appendix B shows that broadly similar results are obtained using 1-year ahead household inflation expectations from the University of Michigan Survey.

Figure 1 shows that the demand and supply variables can often move in opposite directions. This occurs in the months immediately following the start of the Great Recession in December 2007 and the start of the pandemic recession in February 2020. In these examples, the demand variable is moving down while the supply variable is moving up. But in both cases, the pattern subsequently changes so that the demand and supply variables are either both moving down (after the Great Recession) or both moving up (after the pandemic recession). The impact on overall inflation is strengthened when the demand and supply variables are both moving in the same direction.[16] The comovement of each variable with overall inflation influences the variance decomposition results.

[11] I also use data from 1999.m1 to 1999.m12 to construct 12-month changes in the variables starting in 2000.m1.

[12] The correlation coefficient between vu_t and the negative of unemployment gap computed using the noncyclical unemployment rate from the Congressional Budget Office is 0.68 from 2000.m1 to 2025.m1. Barnichon and Shapiro (2022, 2024) find that vu_t outperforms other measures of labor market slack when forecasting 1-year ahead inflation. Data on vacancies prior to 2000.m12 are from Barnichon (2010).

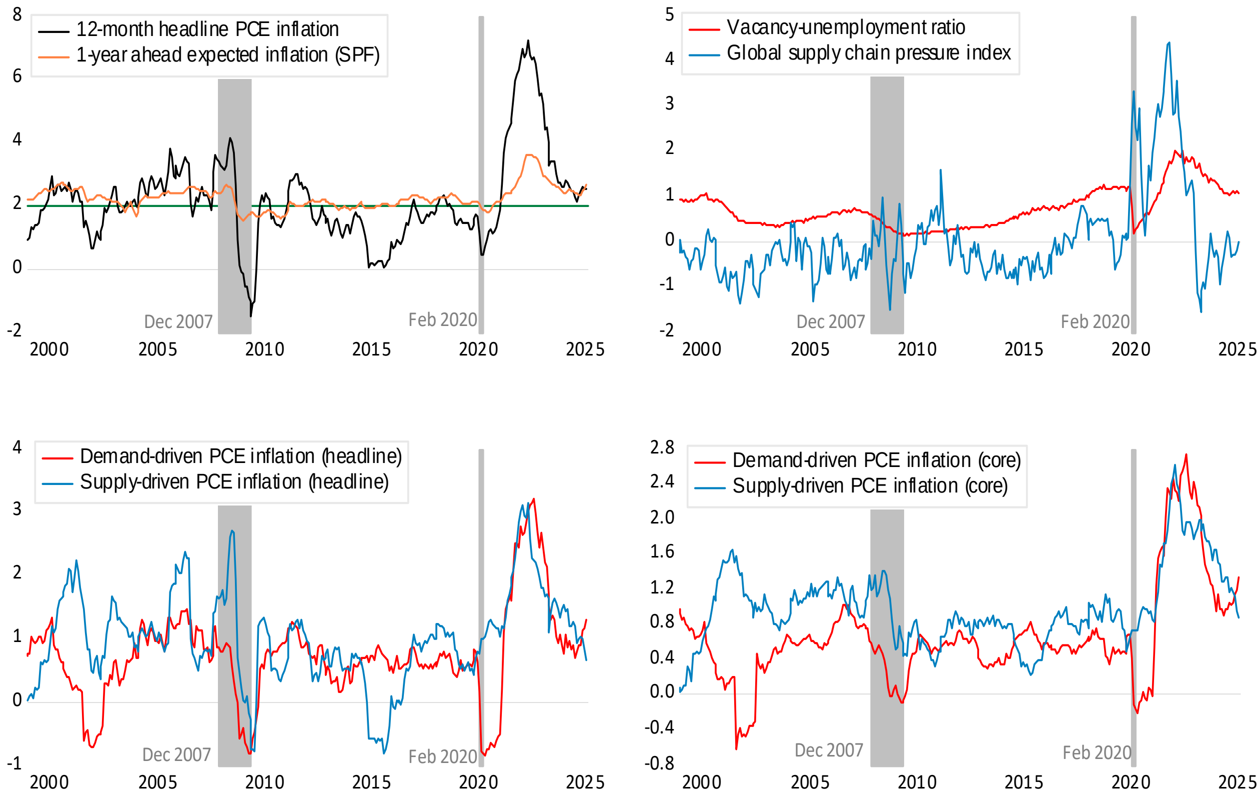
[13] Liu and Nguyen (2023) employ $gscpi_t$ in a study of supply-driven PCE inflation while controlling for movements in the unemployment gap and the yield on a two-year Treasury bond.

[14] The demand (supply) driven component is measured using categories of the PCE basket of goods and services for which the unexpected change in price moves in the same (opposite) direction as the unexpected change in quantity during a given month.

[15] Specifically, I assign the quarterly survey reading to the middle month of each quarter and then use log-linear interpolation to connect the middle month reading to previous and subsequent middle month readings. The survey data runs through 2025.q1 which yields monthly data through February 2025.

[16] The demand- and supply-driven components of PCE inflation from Shapiro (2025) comove strongly during the Great Inflation era of the late 1970s and early 1980s.

Figure 1: Headline PCE inflation and candidate drivers of inflation



Note: Data used to examine the drivers of PCE inflation from 2000.m1 to 2025.m2.

Table 2 shows the correlation coefficients between 12-month changes in headline PCE inflation and 12-month changes in the driver variables. I use 12-month changes here to capture near-term comovements. But later in Section 6, I use regressions with variables expressed in levels for counterfactual simulations. In almost all cases, the correlation coefficient in Table 2 increases when going from the first sample period to the pandemic-era sample period. This result is particularly true for the demand variable vu_t where the correlation coefficient goes from 0.33 to 0.86.[17]

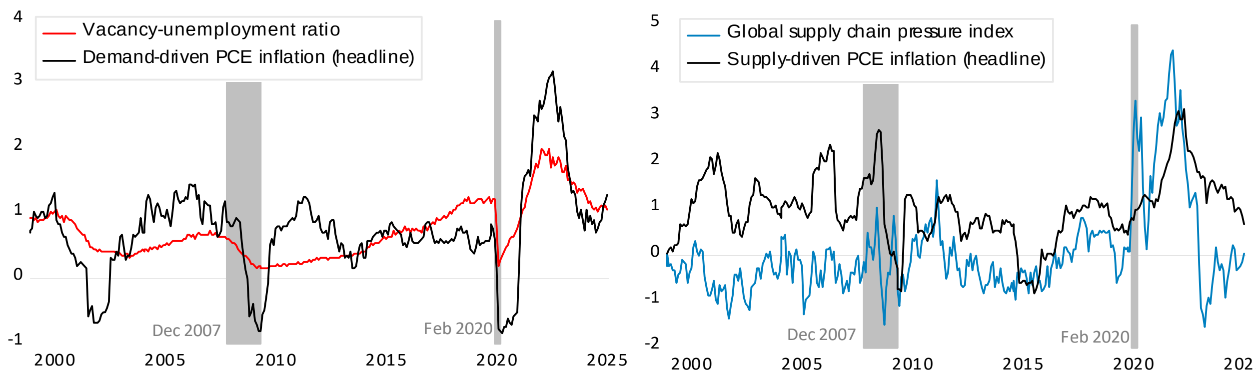
[17] Similar correlation patterns are obtained using core PCE inflation. Appendix A provides all numerical results using core PCE inflation in place of headline PCE inflation.

Table 2: Correlation coefficients with $\pi_t - \pi_{t-12}$, headline PCE inflation

Variable	2000.m1 to 2020.m1	2020.m2 to 2025.m2
$vu_t - vu_{t-12}$	0.33	0.86
$gscpi_t - gscpi_{t-12}$	0.31	0.46
$\pi_t^d - \pi_{t-12}^d$	0.73	0.93
$\pi_t^s - \pi_{t-12}^s$	0.87	0.80
$F_t\pi_{t+12} - F_{t-12}\pi_t$	0.64	0.85
$\pi_{t-12} - \pi_{t-24}$	-0.49	0.03

Comparing across the two sample periods, the correlation coefficient between $\pi_t - \pi_{t-12}$ and its 12-month lagged value $\pi_{t-12} - \pi_{t-24}$ goes from -0.49 to 0.03. This result indicates lower mean reversion in the 12-month inflation change during the pandemic era, i.e., higher inflation persistence (Lansing 2022).

Figure 2: Demand and supply variables



Notes: The vacancy-unemployment ratio comoves with demand-driven PCE inflation. The global supply chain pressure index comoves with supply-driven PCE inflation. In both panels, the comovement is stronger during the pandemic era from February 2020 onward.

Figure 2 shows that the vacancy-unemployment ratio comoves with demand-driven PCE inflation. The global supply chain pressure index comoves with supply-driven PCE inflation. The correlation coefficient between 12-month changes in the two demand variables vu_t and π_t^d increases from 0.47 to 0.94 when going from the first sample period to the pandemic-era sample period. The correlation coefficient between 12-month changes in the two supply variables $gscpi_t$ and π_t^s increases from 0.27 to 0.63.

4 Phillips curve type regressions

Tables 3 and 4 show the results of regressing 12-month changes in headline PCE inflation on contemporaneous 12-month changes in: (1) a demand variable, (2) a supply variable, (3) expected inflation, and (4) lagged inflation. Model 1 uses vu_t and $gscpi_t$ as the demand and supply variables, respectively. Model 2 uses π_t^d and π_t^s as the demand and supply variables.

The estimated coefficients for Model 1 (shown in Table 3) are almost always statistically significant. The one exception is the coefficient on vu_t in the first sample period.[18] The R^2 statistic increases from 64.2% to 94.2% when going from the first sample period to the second sample period. Below, I will decompose these R^2 statistics into the percentage variation in $\pi_t - \pi_{t-12}$ that is attributable to each explanatory variable and the residual.

The non-significant regression coefficient on vu_t in the first sample period, together with the observation of persistently low inflation over much of the same time frame, provides insight into why many policymakers came to view the relationship between inflation and labor market slack (a demand variable) to be very weak or nonexistent during the years preceding the pandemic. Indeed, many empirical studies employing pre-pandemic inflation data estimate NKPC slope parameters that are small or not significantly different from zero.[19] According to former Fed Chair Yellen (2019): "The slope of the Phillips curve—a measure of the responsiveness of inflation to a decline in labor market slack—has declined very significantly since the 1960s. In other words, the Phillips curve appears to have become quite flat."[20]

The estimated coefficients for Model 2 (shown in Table 4) are all statistically significant. The R^2 statistics exceed 90% in both sample periods. This is because π_t^d and π_t^s are actual components of headline PCE inflation π_t which appears on the left side of the regression equation. Nevertheless, the estimated coefficients on the other two explanatory variables (expected inflation and lagged inflation) remain statistically significant.

Shapiro (2025) identifies a third "ambiguous" component of headline PCE inflation defined as $\pi_t - \pi_t^d - \pi_t^s$. The explanatory power of expected inflation and lagged inflation in Table 4 derives from a positive correlation of these variables with the ambiguous component.

[18] This result foreshadows one of the findings of the counterfactual simulations in Section 6: The episode of low inflation in the pre-pandemic sample period was driven mainly by supply forces, together with the endogenous response of expected inflation.

[19] See, for example, Hazell, et al. (2022), Beaudry, Hou, and Portier (2024a), and Inoue, Rossi, and Wang (2024).

[20] See also the quote from Clarida (2020) in footnote 7 and the two New York Times articles: "*Biden and the Fed Leave 1970s Inflation Fears Behind*" (February 15, 2021) and "*Larry Summers Warned About Inflation. Fed Officials Push Back*" (March 25, 2021).

Table 3: Model 1 regressions, headline PCE inflation

Variable	2000.m1 to 2020.m1	2020.m2 to 2025.m2
$vu_t - vu_{t-12}$	-0.23	**2.01**
	(0.40)	(0.21)
$gscpi_t - gscpi_{t-12}$	**0.41**	**0.32**
	(0.09)	(0.06)
$F_t\pi_{t+12} - F_{t-12}\pi_t$	**3.12**	**1.80**
	(0.24)	(0.23)
$\pi_{t-12} - \pi_{t-24}$	**−0.41**	**−0.11**
	(0.04)	(0.05)
R^2	64.2%	94.2%

Notes: Dependent variable is $\pi_t - \pi_{t-12}$, where π_t is 12-month headline PCE inflation. All regressions include a constant term. Standard errors in parentheses. Boldface indicates significant at the 5% level.

Table 4: Model 2 regressions, headline PCE inflation

Variable	2000.m1 to 2020.m1	2020.m2 to 2025.m2
$\pi^d_t - \pi^d_{t-12}$	**0.75**	**0.98**
	(0.05)	(0.06)
$\pi^s_t - \pi^s_{t-12}$	**0.83**	**0.96**
	(0.03)	(0.09)
$F_t\pi_{t+12} - F_{t-12}\pi_t$	**0.85**	**0.55**
	(0.12)	(0.20)
$\pi_{t-12} - \pi_{t-24}$	**−0.12**	**−0.09**
	(0.02)	(0.03)
R^2	92.6%	97.3%

Notes: Dependent variable is $\pi_t - \pi_{t-12}$, where π_t is 12-month headline PCE inflation. All regressions include a constant term. Standard errors in parentheses. Boldface indicates significant at the 5% level.

5 Variance decompositions

I use the regression results in Tables 3 and 4 to perform variance decompositions. First, I add a residual term $resid_t$ to the estimated regression equation, creating an identity. The variables in the identity can be expressed as deviations from their sample means while the means are consolidated into the constant term. Multiplying both sides of the resulting expression by $\Delta_{12}\pi_t - E(\Delta_{12}\pi_t)$ where $\Delta_{12}\pi_t \equiv \pi_t - \pi_{t-12}$ and then taking the unconditional expectation of both sides yields an expression of the following form:

$$
\begin{aligned}
Var(\Delta_{12}\pi_t) \;\; \equiv \;\; & c_1\, Cov(\Delta_{12}\pi_t,\, \Delta_{12}vu_t) \; + \; c_2\, Cov(\Delta_{12}\pi_t,\, \Delta_{12}gscpi_t) \\
& + c_3\, Cov(\Delta_{12}\pi_t,\, \Delta_{12}F_t\pi_{t+12}) \; + \; c_4\, Cov(\Delta_{12}\pi_t,\, \Delta_{12}\pi_{t-12}) \\
& + Cov(\Delta_{12}\pi_t,\, resid_t),
\end{aligned} \tag{2}
$$

where c_1 through c_4 are the estimated regression coefficients in Tables 3 or 4 and the covariance terms are computed using the data within the sample. The above equation states that movements in $\pi_t - \pi_{t-12}$ must be accounted for by movements in either the demand variable, the supply variable, expected inflation, lagged inflation, or the residual. Dividing both sides of the equation by $Var(\Delta_{12}\pi_t)$ and then multiplying by 100 yields the percentage variation assigned to each source.[21]

Table 5 shows the percentage variation in $\pi_t - \pi_{t-12}$ attributable to each source, depending on the sample period and the regression model.[22] The residual (or unexplained) variation is equal to $100 - R^2$, where R^2 is the statistic from the regression results in Tables 3 or 4. The various sources of variation are not orthogonal to each other, so the percentage assigned to each source can fall outside the range of 0% to 100%.

Comparing across the two sample periods, both models imply that demand forces became more important for inflation during the pandemic era and dominated the influence of supply forces. For Model 1, the variance contribution of demand goes from almost zero to 43.3%. For Model 2, the variance contribution of demand goes from 24.9% to 58.5%.

Table 5: Variance decompositions, headline PCE inflation

	2000.m1 to 2020.m1		2020.m2 to 2025.m2	
Source	Model 1	Model 2	Model 1	Model 2
Demand	−0.89%	24.9%	43.3%	58.5%
Supply	5.80%	51.4%	12.6%	27.4%
Expected π	39.3%	10.7%	38.5%	11.7%
Lagged π	20.0%	5.65%	−0.30%	−0.24%
Residual	35.8%	7.44%	5.83%	2.68%

Notes: Numbers show the percentage variation in $\pi_t - \pi_{t-12}$ attributable to each source. Residual $= 100 - R^2$ where R^2 is the statistic from the regression results in Tables 3 and 4. The percentage can fall outside 0-100% because the sources of variation are not orthogonal to each other.

[21] The procedure is analogous to studies that use a log-linear approximation of the equity return identity (dividend yield plus capital gain) to decompose the variance of the log price-dividend ratio into percentages attributable to: (1) future dividend growth rates, (2) future risk-free rates of return, or (3) future excess returns on equity. See, for example, Cochrane (1992).

[22] The results for core PCE inflation, shown in Appendix A, are broadly similar.

Model 1 implies that supply forces became slightly more important during the pandemic-era relative to the earlier sample period, but the variance contribution remains relatively low at 12.6%. Model 2 implies that the variance contribution of supply forces declined substantially from 51.4% to 27.4%. Both models imply that supply forces were more important than demand forces in the first sample period that includes the decade after the Great Recession when headline PCE inflation was persistently below 2%. I will come back to this point in the next section, where I perform counterfactual simulations that allow only the demand variable, or only the supply variable, to evolve according to the data while expected inflation responds endogenously to the counterfactual path of inflation.

Both models imply that the variance contribution of expected inflation remains similar across the two sample periods. But in numerical terms, the contribution of expected inflation is much higher in Model 1 than in Model 2. This is because Model 2 uses actual components of headline PCE inflation as driver variables (π_t^d and π_t^s), leaving much less variation for other sources to explain. Both models also imply that the variance contributions of lagged inflation and the residual have become smaller during the pandemic-era relative to the earlier sample period.

Table 6 shows that demand forces become even more important if the variance decomposition for the pandemic-era starts one year later in February 2021, thereby focusing on the rise of PCE inflation above 2% and its subsequent decline. The variance contribution of demand is now 61.9% for Model 1 and 67.0% for Model 2. Overall, the variance decompositions indicate that demand forces were more important than supply forces in shaping the path of pandemic era inflation.

Table 6: Variance decompositions, Alternate sample period

	2021.m2 to 2025.m2	
Source	Model 1	Model 2
Demand	61.9%	67.0%
Supply	3.54%	21.5%
Expected π	31.4%	9.72%
Lagged π	−0.18%	−0.06%
Residual	3.32%	1.80%

Notes: Numbers show the percentage variation in $\pi_t - \pi_{t-12}$ assigned to each source, where π_t is 12-month headline PCE inflation. The percentage can fall outside 0-100% because sources of variation are not orthogonal to each other.

6 Counterfactual simulations

Counterfactual simulations provide another way of assessing the relative importance of demand versus supply variables as drivers of inflation over different sample periods. The exercise can be viewed as a type of level decomposition of inflation in contrast to the previous variance decomposition. To perform these simulations, I first estimate full-sample versions of Model 1 and Model 2, but with explanatory variables now expressed in level terms rather than 12-month changes. The results of the full-sample regressions are shown in Tables 7 and 8.

For the Model 1 regressions in Table 7, I include the nonlinear demand variable $|vu_t - 1|$ which allows for asymmetry in the response of inflation to movements in vu_t, depending on whether vu_t is above or below 1.[23] This variable captures the idea that the Phillips curve becomes steeper when the labor market is very tight, i.e., when $vu_t > 1$, along the lines of the nonlinear Phillips curves estimated by Ball, Leigh, and Mishra (2022), Benigno and Eggertsson (2023), and Crust, Lansing, and Petrosky-Nadeau (2023). The nonlinear demand variable is highly significant for both headline and core PCE inflation.

Model 1 also includes the nonlinear supply variable $|gscpi_t - 2|$ which captures the idea that cost push shocks have a larger impact on inflation when supply chains are severely disrupted, i.e., when $gscpi_t > 2$. The nonlinear supply variable is not significant for headline PCE inflation but highly significant for core PCE inflation. The linear Model 2 regressions in Table 8 exhibit R^2 statistics in excess of 95%, so nonlinear variables are not needed to fit the data.

The counterfactual simulations allow expected inflation to respond endogenously to the counterfactual path of inflation. The endogenous response of $F_t\pi_{t+12}$ is governed by the laws of motion (3) and (4) which are estimated over the full sample from 2000.m1 to 2025.m2. Bernanke and Blanchard (2025) employ a similar specification but they allow short-run expected inflation to also respond to movements in long-run expected inflation. Here I assume that long-run expected remains constant. Pfäuti (2025) develops a model that allows expected inflation to become more sensitive to lagged values of inflation when inflation rises above 4%. Including such a feature in equations (3) and (4) does not change the basic nature of the results regarding the relative importance of demand versus supply forces for inflation.[24]

[23] For example, if the Phillips curve relationship is $\pi_t = c_0 + c_1 \left[vu_t - 1 + |vu_t - 1|\right]$, then π_t will respond only when $vu_t > 1$.

[24] Pfäuti (2025, footnote 3) makes a similar point.

Table 7: Model 1 regressions, 2000.m1 to 2025.m2

Variable	Headline PCE inflation	Core PCE inflation
vu_t	0.35	**0.83**
	(0.18)	(0.10)
$\lvert vu_t - 1\rvert$	**1.54**	**1.06**
	(0.21)	(0.10)
$gscpi_t$	**0.34**	**0.35**
	(0.08)	(0.04)
$\lvert gscpi_t - 2\rvert$	0.14	**0.37**
	(0.10)	(0.05)
$F_t\pi_{t+12}$	**3.02**	**1.26**
	(0.18)	(0.08)
π_{t-12}	**−0.14**	**0.16**
	(0.04)	(0.03)
R^2	77.3%	89.3%

Notes: Dependent variable is π_t where π_t is 12-month headline or core PCE inflation. All regressions include a constant term. Standard errors in parenthesis. Boldface indicates significant at the 5% level.

Table 8: Model 2 regressions, 2000.m1 to 2025.m1

Variable	Headline PCE inflation	Core PCE inflation
${\pi^d}_t$	**0.97**	**0.99**
	(0.03)	(0.02)
${\pi^s}_t$	**1.05**	**1.19**
	(0.03)	(0.04)
$F_t\pi_{t+12}$	**0.42**	**0.14**
	(0.08)	(0.04)
π_{t-12}	−0.01	−0.02
	(0.01)	(0.01)
R^2	95.7%	97.9%

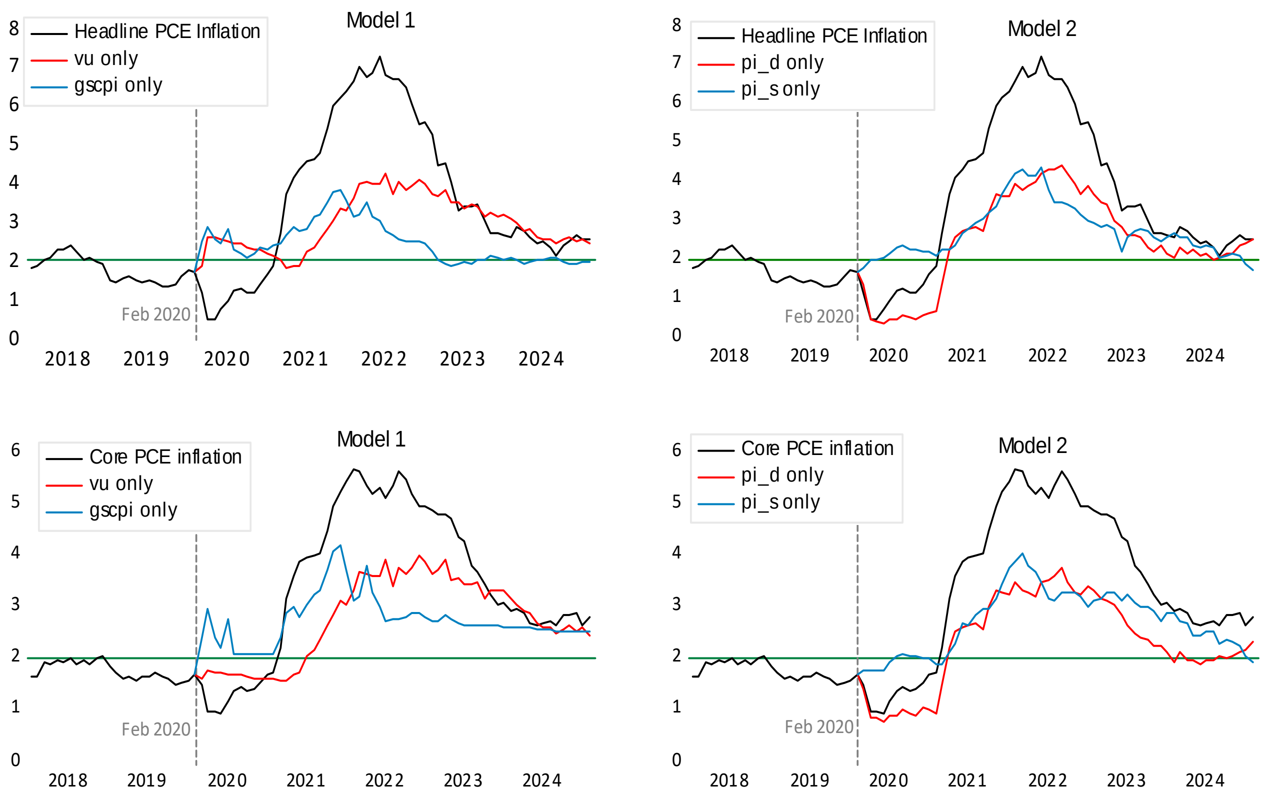
Notes: Dependent variable is π_t where π_t is 12-month headline or core PCE inflation. All regressions include a constant term. Standard errors in parenthesis. Boldface indicates significant at the 5% level.

$$F_t\pi_{t+12} = \underset{(0.03)}{\mathbf{0.11}} + \underset{(0.02)}{\mathbf{0.93}}\ F_{t-1}\pi_{t+11} + \underset{(0.004)}{\mathbf{0.02}}\ \pi_{t-1}^{head}, \quad R^2 = 96.9\%, \tag{3}$$

$$F_t\pi_{t+12} = \underset{(0.03)}{\mathbf{0.12}} + \underset{(0.02)}{\mathbf{0.92}}\ F_{t-1}\pi_{t+11} + \underset{(0.007)}{\mathbf{0.03}}\ \pi_{t-1}^{core}, \quad R^2 = 96.9\%. \tag{4}$$

Using the full-sample regression equations in Tables 7 and 8, I allow only the demand variable (vu_t or π_t^d) or only the supply variable ($gscpi_t$ or π_t^s) to evolve along the path observed in the data while holding the counterpart variable constant at its starting value for the simulation. Expected inflation $F_t\pi_{t+12}$ evolves according to the path determined by the estimated laws of motion (3) or (4). Lagged inflation π_{t-12} evolves along the counterfactual path of the simulation. The residual term that is implied by the regression equations in Tables 7 and 8 is set to zero each period.[25]

Figure 3: Counterfactual simulations starting in February 2020



Notes: In the left panels, Model 1 implies that movements in vu_t and $gscpi_t$ both contributed to the rise and fall of pandemic-era inflation, together with the endogenous response of expected inflation. The contribution from vu_t is somewhat larger than the contribution from $gscpi_t$. In the right panels, Model 2 implies that movements in π_t^d and π_t^s both contributed to the rise and fall of pandemic-era inflation. But movements in π_t^d account for the initial decline of inflation immediately following the start of the pandemic recession in February 2020.

[25]Beaudry, Hou, and Portier (2024b) perform somewhat similar counterfactual inflation simulations using a linear estimated Phillips curve. However, they do not allow expected inflation to respond endogenously to the counterfactual path of inflation when only the demand variable evolves along the path observed in the data.

Figure 3 shows the results of counterfactual simulations starting in February 2020. In the left panels, Model 1 implies that movements in vu_t and $gscpi_t$ both contributed to the rise and fall of pandemic-era inflation, together with the endogenous response of expected inflation. The contribution from vu_t is somewhat larger than the contribution from $gscpi_t$ for both headline and core PCE inflation. Nevertheless, the contribution of $gscpi_t$ to inflation during the pandemic era is sizable.

In the right panels of Figure 3, Model 2 implies that movements in π_t^d and π_t^s both contributed to the rise and fall of pandemic-era inflation.[26] But movements in π_t^d account for the initial decline of inflation during the months immediately following the start of the pandemic recession in February 2020.[27] This result is consistent with the higher variance contribution of π_t^d versus π_t^s for the pandemic-era, as shown earlier in Table 5.

Table 9: Mean absolute gaps, 2020.m2 to 2025.m2

Simulation	Model 1	Model 2
Headline PCE inflation		
Demand only	1.29	1.15
Supply only	1.70	1.30
Core PCE inflation		
Demand only	0.88	1.12
Supply only	1.09	0.98

Notes: Numbers show the mean absolute gaps between the counterfactual inflation paths in Figure 3 and the corresponding U.S. inflation paths. A lower number implies a better fit of the U.S. inflation path.

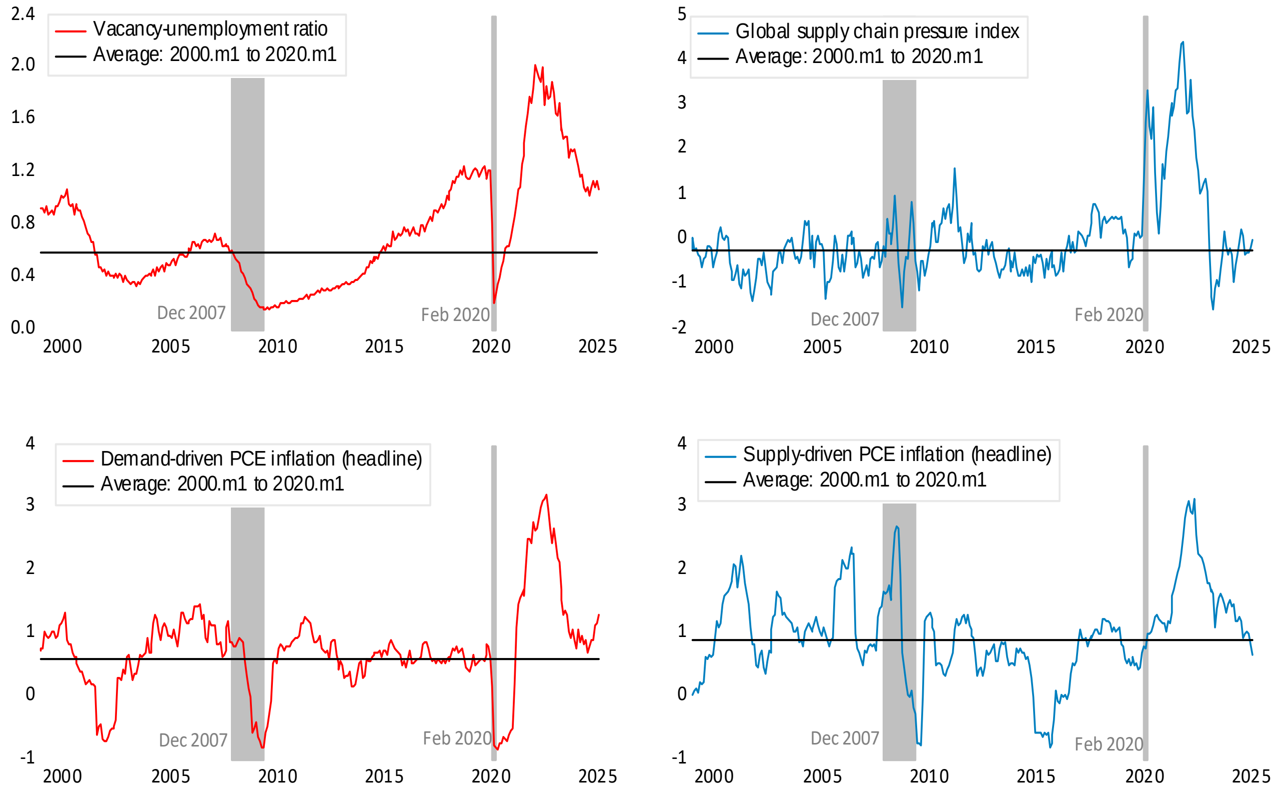
Table 9 shows the mean absolute gaps between the counterfactual inflations paths in Figure 3 and the corresponding U.S. inflation paths. A lower number implies a better fit of the U.S. inflation path. The "demand only" gaps are lower than the "supply only" gaps for three out of the four panels of Figure 3, with the bottom right panel as the only exception.

The counterfactual simulations in Figure 3 show that demand forces continue to push PCE inflation above 2% by varying degrees at the end of the data sample in February 2025. Confirming this idea, Figure 4 shows that the two demand variables (vu_t and π_t^d) remain above their pre-pandemic averages in February 2025. In contrast, the two supply variables ($gscpi_t$ and π_t^s) have returned to their pre-pandemic averages.

[26] Shapiro (2022) obtains a similar result by comparing the paths of π_t^d and π_t^s to their pre-pandemic averages.

[27] Similarly, Bai, et al. (2024) conclude that demand shocks drove the initial decline in PCE goods inflation during this period.

Figure 4: Comparing demand and supply variables to pre-pandemic averages



Notes: At the end of the data sample, variables that measure demand forces (left panels) remain above their pre-pandemic averages from 2000.m1 to 2020.m1. In contrast, variables that measure supply forces (right panels) have returned to their pre-pandemic averages.

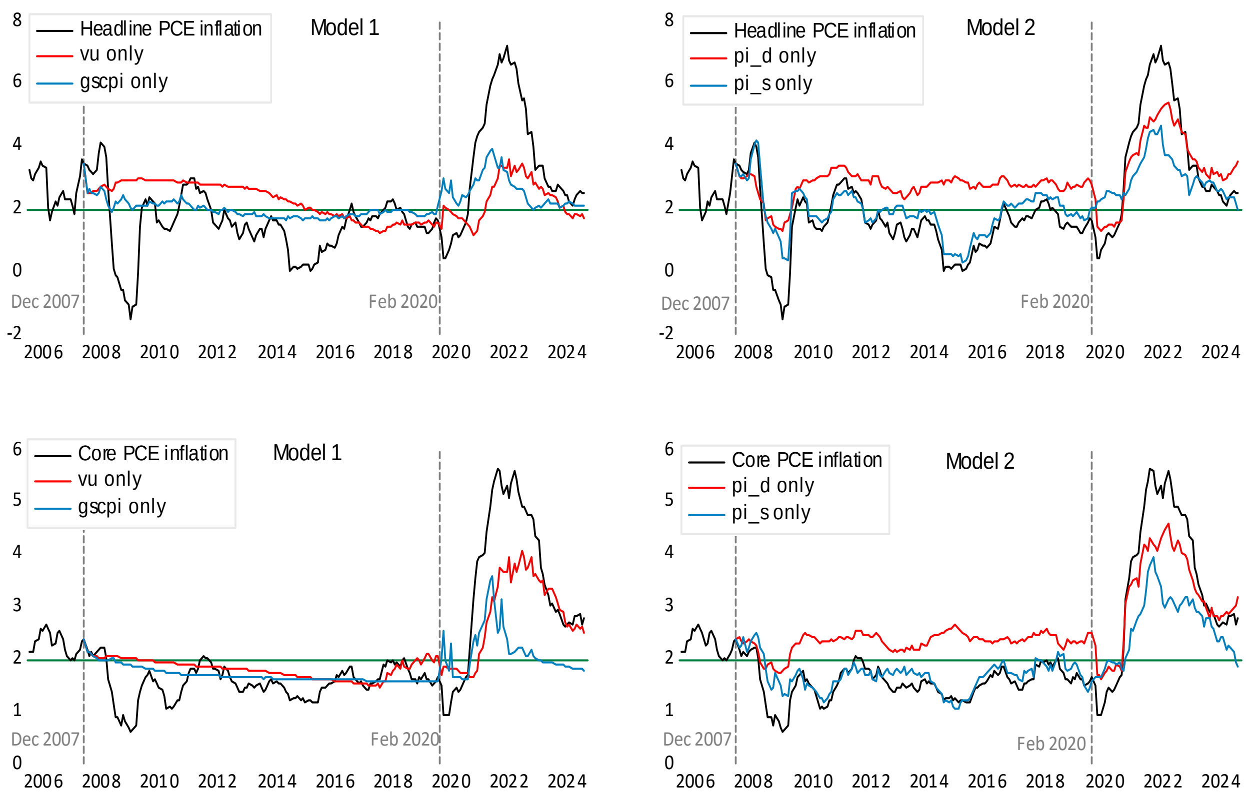
Using the regression equations in Tables 7 and 8, we can solve for the required values of the demand variables to achieve the Fed's goal of 2% headline PCE inflation. For this calculation, other variables and the residual term are set to their end-of-sample values in February 2025. The required values are shown in Table 10. All else equal, both models imply that further declines in the demand variables are needed to achieve 2% inflation, but the variables do not need to go all the way back to their pre-pandemic averages.

Table 10: Required demand values to achieve 2% headline PCE inflation

Variable	February 2025 value	Required value	Average: 2000.m1 to 2020.m1
vu_t	1.07	0.79	0.58
π_t^d	1.29	0.74	0.61

Note: The required value is computed using the regression equations in Tables 7 and 8, with other variables and the residual term set to their end-of-sample values in February 2025.

Figure 5: Counterfactual simulations starting in December 2007



Notes: Both models imply that the supply variable ($gscpi_t$ or π_t^s), together with the endogenous response of expected inflation, are the primary drivers of persistently low inflation in the decade following the end of the Great Recession.

Figure 5 shows counterfactual simulations starting in December 2007, the start of the Great Recession. Both Model 1 (left panels) and Model 2 (right panels) imply that the supply variable ($gscpi_t$ or π_t^s) is the primary driver of persistently low inflation in the decade following the end of the Great Recession in June 2009. Specifically, the simulations labeled "*gscpi* only" or "π^s only" (blue lines) deliver inflation paths that are mostly below 2% for both headline and core PCE inflation from June 2009 onward. As confirmation, Figure 1 shows that $gscpi_t$ is mostly in negative territory during the low inflation episode while Figure 4 shows that π_t^s is mostly below its pre-pandemic average over the same time frame.

Table 11: Mean absolute gaps, 2007.m12 to 2020.m1

Simulation	Model 1	Model 2
Headline PCE inflation		
Demand only	1.05	1.31
Supply only	0.73	0.46
Core PCE inflation		
Demand only	0.33	0.78
Supply only	0.27	0.19

Notes: Numbers show the mean absolute gaps between the counterfactual inflation paths in Figure 5 and the corresponding U.S. inflation paths. A lower number implies a better fit of the U.S. inflation path.

Table 11 shows the mean absolute gaps between the counterfactual inflations paths in Figure 5 and the corresponding U.S. inflation paths. Reversing the general pattern in Table 9, the "supply only" gaps are now lower than the "demand only" gaps in all four panels of Figure 5. Shapiro (2025) shows that a monetary policy shock that tightens policy acts to reduce demand-driven inflation but has no significant effect on supply-driven inflation. Oil-supply shocks act to increase supply-driven inflation, but decrease demand-driven inflation. The supply-driven episode of low inflation after the Great Recession helps to account for the Fed's difficulty in achieving its 2% inflation goal during these years, despite holding the federal funds rate close to zero for seven consecutive years from December 2008 to December 2015.

In the left panels of Figure 5, the endogenous response of expected inflation to movements in counterfactual inflation is important in allowing Model 1 to approximate the low inflation episode. In the right panels, the endogenous response of expected inflation is much less important. This is because the Model 2 regression equations in Table 8 exhibit much smaller estimated coefficients on expected inflation.

Figure 5 also shows that both demand and supply forces contributed to the rise and fall of inflation during the pandemic era. But the contribution coming from demand is mostly larger, particularly for core PCE inflation. Using a different starting date for the simulation can influence the results because the endogenous response of expected inflation to counterfactual inflation creates history dependence.

Neither model can account for the sharp declines in both headline and core PCE inflation that took place from July 2008 to July 2009, coinciding with a sharp drop in oil prices. Headline PCE inflation declined from 4.1% to −1.5%. Around this time, the price per barrel of West Texas Intermediate crude oil went from a peak of \$134 to a low of \$39.[28] Table 12 shows the R^2 statistics obtained from regressing the full-sample Phillips curve residuals (computed using the regression equations in Tables 7 and 8) on a constant and 12-month oil price inflation. Oil prices have clearly been an important driver of inflation at times, particularly for headline inflation.

Table 12: R^2 from regressing Phillips curve residuals on oil price inflation

Inflation measure	Model 1	Model 2
Headline PCE inflation	24.2%	3.95%
Core PCE inflation	10.4%	0.23%

Note: Numbers are the R^2 statistics from regressing the full-sample Phillips curve residuals (computed using the regression equations in Tables 7 and 8) on a constant and 12-month oil price inflation computed using the price per barrel of West Texas Intermediate crude.

7 Conclusion

Numerous studies have sought to identify the most important drivers of U.S. inflation during the pandemic era, defined here as the sample period from February 2020 onward. A consensus view has not emerged in the literature. I use Phillips curve type regressions to perform variance decompositions and counterfactual simulations of inflation over different sample periods. The exercises allow us examine the relative importance of inflation drivers during the pandemic-era when inflation surged to 40-year highs, but also during the years after the Great Recession when inflation remained stubbornly below 2%, despite highly accommodative monetary policy.

The Phillips curve regression coefficient on the vacancy-unemployment ratio is not significant in the pre-pandemic sample period from January 2000 to January 2020. This result, together with the observation of persistently low inflation over much of the same time frame, provides insight into why many policymakers came to view the relationship between inflation and labor market slack (a demand variable) to be very weak or nonexistent during the years preceding the pandemic.

The results presented here indicate that demand forces, together with the endogenous response of expected inflation, were the most important drivers of inflation during the pandemic era. But the contribution of supply forces to inflation during the pandemic era was sizable.

[28] Oil price data are from the Federal Reserve Bank of St Louis' FRED database, labeled DCOILWTICO.

At the end of the data sample in February 2025, variables that measure demand forces remain above their pre-pandemic averages while variables that measure supply forces have returned to their pre-pandemic averages.

Counterfactual simulations imply that supply forces, together with the endogenous response of expected inflation, were the primary drivers of persistently low inflation in the decade following the end of the Great Recession. This result helps to account for the Fed's difficulty in achieving its 2% inflation goal during these years.

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A Appendix: Results for core PCE inflation

Tables A1 through A5 show results using 12-month core PCE inflation. The results are broadly similar to those in Tables 2 through 6 using 12-month headline PCE inflation.

Table A1: Correlation coefficients with $\pi_t - \pi_{t-12}$, core PCE inflation

Variable	2000.m1 to 2020.m1	2020.m2 to 2025.m2
$vu_t - vu_{t-12}$	0.38	0.88
$gscpi_t - gscpi_{t-12}$	0.06	0.33
$\pi^d_t - \pi^d_{t-12}$	0.43	0.97
$\pi^s_t - \pi^s_{t-12}$	0.69	0.85
$F_t\pi_{t+12} - F_{t-12}\pi_t$	0.74	0.80
$\pi_{t-12} - \pi_{t-24}$	-0.42	0.08

Table A2: Model 1 regressions, core PCE inflation

Variable	2000.m1 to 2020.m1	2020.m2 to 2025.m2
$vu_t - vu_{t-12}$	-0.05	**1.85**
	(0.13)	(0.23)
$gscpi_t - gscpi_{t-12}$	-0.04	0.15
	(0.03)	(0.05)
$F_t\pi_{t+12} - F_{t-12}\pi_t$	**1.31**	**0.73**
	(0.08)	(0.26)
$\pi_{t-12} - \pi_{t-24}$	$\mathbf{-0.38}$	-0.05
	(0.04)	(0.09)
R^2	69.3%	85.2%

Notes: Dependent variable is $\pi_t - \pi_{t-12}$, where π_t is 12-month headline PCE inflation. All regressions include a constant term. Standard errors in parentheses. Boldface indicates significant at the 5% level.

Table A3: Model 2 regressions, core PCE inflation

Variable	2000.m1 to 2020.m1	2020.m2 to 2025.m2
$\pi^d_t - \pi^d_{t-12}$	**0.58**	**1.12**
	(0.04)	(0.05)
$\pi^s_t - \pi^s_{t-12}$	**0.80**	**0.83**
	(0.04)	0.07)
$F_t\pi_{t+12} - F_{t-12}\pi_t$	**0.49**	**0.20**
	(0.06	(0.09)
$\pi_{t-12} - \pi_{t-24}$	$\mathbf{-0.17}$	$\mathbf{-0.06}$
	(0.03)	(0.02)
R^2	88.1%	98.3%

Notes: Dependent variable is $\pi_t - \pi_{t-12}$, where π_t is 12-month core PCE inflation. All regressions include a constant term. Standard errors in parentheses. Boldface indicates significant at the 5% level.

Table A4: Variance decompositions, core PCE inflation

	2000.m1 to 2020.m1		2020.m2 to 2025.m2	
Source	Model 1	Model 2	Model 1	Model 2
Demand	−0.62%	18.5%	58.7%	67.8%
Supply	−0.27%	42.0%	5.93%	25.2%
Expected π	54.3%	20.5%	21.0%	5.63%
Lagged π	15.9%	7.12%	−0.40%	−0.42%
Residual	30.7%	11.9%	14.8%	1.75%

Notes: Numbers show the percentage variation in $\pi_t - \pi_{t-12}$ attributable to each source. Residual $= 100 - R^2$ where R^2 is the statistic from the regression results in Tables 3 and 4. The percentage can fall outside 0-100% because the sources of variation are not orthogonal to each other.

Table A5: Variance decompositions, Alternate sample period

	2021.m2 to 2025.m2	
Source	Model 1	Model 2
Demand	92.8%	73.2%
Supply	−7.58%	21.8%
Expected π	8.46%	3.85%
Lagged π	−1.18%	−0.16%
Residual	7.51%	1.33%

Notes: Numbers show the percentage variation in $\pi_t - \pi_{t-12}$ assigned to each source, where π_t is 12-month core PCE inflation. The percentage can fall outside 0-100% because the sources of variation are not orthogonal to each other.

B Appendix: Results for household inflation expectations

Tables B1 and B2 show variance decomposition results for headline PCE inflation using 1-year ahead household inflation expectations from the University of Michigan Survey. The results are broadly similar to those in Tables 5 and 6 using 1-year ahead inflation expectations from the Survey of Professional Forecasters

Table B1: Variance decompositions, headline PCE inflation

	2000.m1 to 2020.m1		2020.m2 to 2025.m2	
Source	Model 1	Model 2	Model 1	Model 2
Demand	5.24%	24.2%	47.5%	58.0%
Supply	0.15%	51.5%	7.98%	23.7%
Expected π	40.3%	10.6%	36.2%	16.1%
Lagged π	21.6%	5.85%	−0.05%	−0.10%
Residual	32.6%	7.84%	8.40%	2.33%

Notes: Numbers show the percentage variation in $\pi_t - \pi_{t-12}$ attributable to each source. Residual $= 100 - R^2$ where R^2 is the statistic from the regression results in Table A3 and Table A4. The percentage can fall outside 0-100% because the sources of variation are not orthogonal to each other.

Table B2: Variance decompositions, Alternate sample period

	2021.m2 to 2025.m2	
Source	Model 1	Model 2
Demand	69.8%	65.9%
Supply	−0.26%	20.1%
Expected π	24.6%	12.4%
Lagged π	−0.13%	−0.03%
Residual	5.99%	1.69%

Notes: Numbers show the percentage variation in $\pi_t - \pi_{t-12}$ assigned to each source, where π_t is 12-month headline PCE inflation. The percentage can fall outside 0-100% because the sources of variation are not orthogonal to each other.