Are We Entering a New Era of Higher Inflation?

An Analysis of the Rising Entrenchment of Inflationary Shocks

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Summary

A key question facing central banks today is whether the observed inflationary shocks are cyclical versus structural in nature; that is, will they revert over time, or do they reflect fundamental and permanent shifts in inflation pathways?

Today's high inflation is the result of a complex combination of demand drivers, such as expansionary fiscal and monetary stimuli, as well as cost drivers, such as high energy costs, supply chain disruptions and tight labor markets. Some of these drivers may create structural shifts in a post-COVID world with altered consumer and labor preferences, but such shifts are hard to assess ex ante given the complex relationship amongst the drivers of inflation.

In this article, we use an econometric research design to decompose inflation into permanent and transitory components, based on an intuitive model outlined by Stock and Watson (2007). By estimating both the time-varying unobserved persistent and transitory components of inflation, we show that inflationary shocks have become more permanent in recent months. This result is robust to model specification. These results strengthen the argument supporting structural shifts in inflationary impulses.

Importantly, these results signal that the forces that have held down inflation for decades may be abating due to shifts in globalization, protectionist and friend-shoring policies, and wage rigidities post-COVID. While we recognize that the observed shifts have a short history, this trend, if persistent, will mean a tectonic change to a global economy accustomed to low inflation and low inflation volatility. Importantly, this expected trend will impact how economic growth, consumer behavior and monetary policy are shaped in important ways in the years ahead.

Introduction

In much of 2021, a parade of top Fed officials, including Jerome Powell, Richard Clarida and Lael Brainard, reiterated the transient nature of inflationary impulses, calling for "patience through the transitory surge."[1]

In fact, in June 2021, Federal Chair Powell said that "the incoming data are very much consistent with the view that these are factors that will wane over time and then inflation will then move down toward our goals."[2] This rhetoric changed in November 2021 when Powell proclaimed "It's probably a good time to retire that word [transitory] and try to explain more clearly what we mean" when talking about inflation."[3] Effectively, the Fed conceded that Fed officials "widely underestimated" how long the pressures would last.[4]

Are the inflationary shocks observed today likely to dissipate, and is inflation likely to return to normal levels (two to three percent)? Or are these shocks likely to exhibit some permanence, reflecting structural shifts in a world transformed after the pandemic and the outbreak of the war in Ukraine? These are key questions facing central bankers today, and have been at the forefront of much of the Federal Reserve's agenda for the last several months.[5] The possibility of a "new normal" was floated in March 2022, with Powell saying that it "continues to seem likely that hoped-for supply-side healing will come over time as the world ultimately settles into some new normal."[6]

In this article, we first explore the drivers of today's high inflation in the United States and evaluate, holistically, whether these drivers are likely to have a transitory or persistent impact on the economy. Importantly, we examine the critical question of whether inflationary

1 Speech by Governor Brainard on patience and progress as the economy reopens and recovers – Federal Reserve Board

2 "Fed's Powell says high inflation temporary, will 'wane'", AP News, June 22, 2021. https://apnews.com/article/inflation-health-coronavirus-pandemic-business-6e7c813472a3eb706e0cdafe305c1477

3 https://www.marketwatch.com/story/powell-says-time-to-retire-transitory-when-talking-about-inflationand-stock-markets-tank-11638305094

4 "Powell says, 'inflation is much too high' and the Fed will take 'necessary steps' to address", CNBC, March 21, 2022. https://www.cnbc.com/2022/03/21/powell-says-inflation-is-much-too-high-and-the-fed-will-take-necessary-steps-to-address.html

5 "'Team Persistent' Wins This Week's U.S. Inflation Debate", Bloomberg, October 15, 2021. https://www.bloomberg.com/news/articles/2021-10-15/team-persistent-tops-team-transitory-in-latest-inflation-debate

6 https://www.federalreserve.gov/newsevents/speech/powell20220321a.htm#:~:text=It%20continues%20to%20seem%20likely,that%20relief%20are%20highly%20uncertain.

shocks are permanent or temporary, using an econometric approach. To evaluate this question, we use the intuitive model of Stock and Watson (2007), which decomposes inflation into the unobserved permanent and transitory components while allowing for those to change over time. We believe that this model fits the needs of the active debate on hand; to wit, the extent to which there are structural shifts in inflation underway (mapping onto the permanent component), and the degree to which the current inflationary impulses represent cyclical shifts that wane over time (mapping onto the transitory component).

The results of our tests show clearly that inflationary shocks have become more permanent in recent months. While this shift in behavior, though robust, is relatively recent, these results strengthen the argument supporting structural shifts in inflationary impulses. Driving this change are many forces, including higher wages and the increasing covariance of price impulse with wage increases. Our results show that the sensitivity of inflation to wage change has increased substantially in recent months. Broadly speaking, as stickier portions of inflation (such as rent) become less sensitive to growth dynamics and get more entrenched, they can begin to covary with other portions of inflation, and the spillover can increase.

This self-reinforcing mechanism is likely to result in a structural shift higher in inflation. Our results collectively suggest that the forces that have held down inflation for decades may be changing due to shifts in globalization, protectionist and friend-shoring policies, and wage rigidities post-COVID. These forces, if persistent, will mean a tectonic shift to a global economy that has grown accustomed to low inflation and muted volatilities. Hard-wiring the economy to a low inflation and low inflationary regime will take assertive monetary policy action. This, in turn, will critically impact how economic growth, consumer behavior and monetary policy are shaped in the years ahead.

Our results collectively suggest that the forces that have held down inflation for decades may be changing due to shifts in globalization, protectionist and friend-shoring policies, and wage rigidities post-COVID.

Drivers of Inflationary Impulses Today

As is well known, the United States economy is experiencing the highest inflation since the Great Inflation era in 1970s, with a 9.0% year-over-year change (seasonally adjusted) in headline Consumer Price Index (CPI) in June 2022.[7]

As can be seen in Figure 1, both headline and core inflation metrics (CPI and PCE) began increasing from early 2021. Setting aside the impact of base effects on these readings, it became evident in the third quarter of 2021 that inflation impulses had become more broad-based, thereby fueling concerns that they could be non-transitory.[8]

As discussed widely in economic circles, the rebound in economic activity following the abatement of mask mandates resulted in a robust revival of demand-pull inflationary impulses. The monetary stimulus during the height of the pandemic[9] provided plentiful spending power, which resulted in persistence of this robust demand. The demand-pull from the economic revival and the drive to build inventories to cater to this demand resulted in cost-push effects and supply chain strains.

The chain reaction of demand acceleration — and the race to accommodate them in a post-COVID market — intensified in the fourth quarter of 2021, worsened supply chain strains and moved inflationary expectations for 2022 and beyond. While longer-term market inflationary expectations remained well-anchored,[10] a complex combination of demand-pull and cost-push forces moved survey-based (Michigan Survey) inflation expectations higher, resulting in the abandonment of the "transient" narrative by central bankers.

US Treasury Secretary Janet Yellen admitted that she made a mistake, saying, "I think I was wrong then about the path that inflation would take."[11] These effects are outlined in Table 1.

[7] Personal Consumption Expenditures price index (PCE) hit 6.3% year-over-year in May 2022, and the core PCE measure that excludes food and energy hit 4.7%. CPI and PCE data are from FRED.

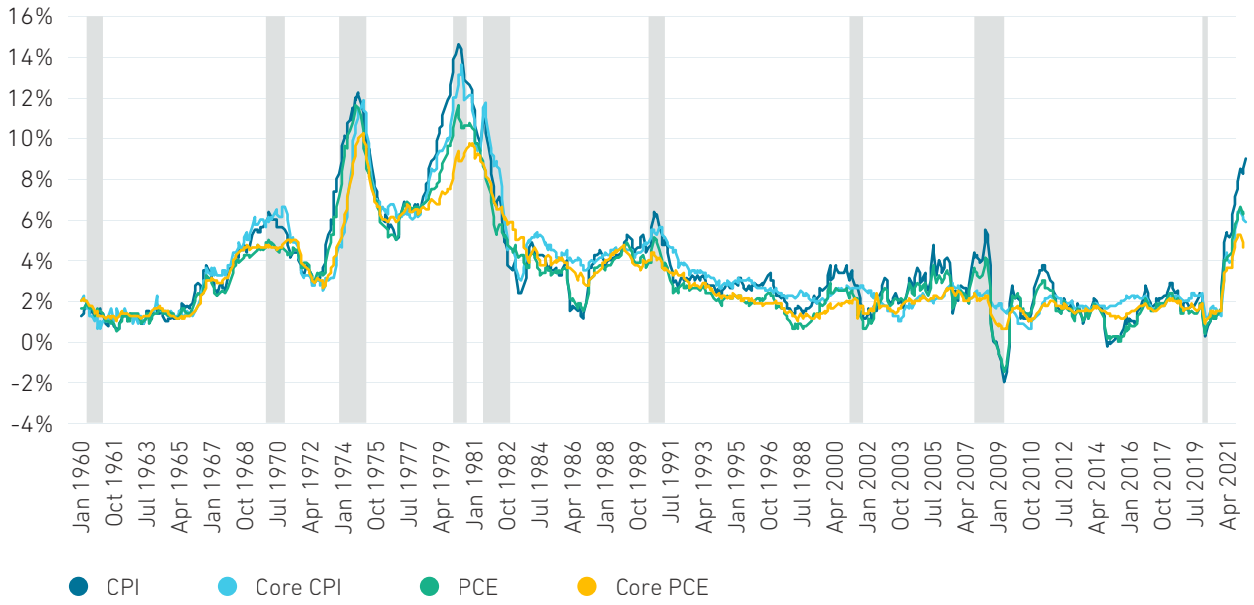
[8] From April 2021, both core goods and core services CPI inflation have exceeded the Fed's target of 2% annual inflation rate.

[9] From March 2020 to March 2021, the US government passed a series of stimulus packages totaling $5.8 trillion. https://www.imf.org/en/Topics/imf-and-covid19/Policy-Responses-to-COVID-19#U

[10] As of June 2022, the 5-year, 5-year forward inflation expectation rate is at 2.08% (long-term inflation expectation), while the University of Michigan inflation expectation has been increasing and reached 5.3% as of May 2022 (inflation expectation over the next 12 months).

[11] "Treasury Secretary Janet Yellen admits she was 'wrong' about inflation," June 1, 2022. https://www.nbcnews.com/business/economy/treasury-secretary-janet-yellen-admits-was-wrong-inflation-rcna31416

Figure 1. Today's Inflation



Gray shaded areas represent periods of US recession. Source: NBER.

Source: FRED. NBER. As of June 2022

Table 1. Drivers of Today's Inflation

Category	Driver	Cause
Demand Pull	Increase in Money Supply	• COVID-19 stimulus checks
	Ease of Credit	• Dovish monetary policy accompanied by ultra-low federal fund rates and quantitative easing
	Increase in Propensity to Consume	• Increased propensity to consume due to COVID-19 induced changes in living pattern
Cost Push	Increase in Prices of Raw Materials and Intermediate Goods	• Supply chain disruptions • Limited supply (partly due to Russian Invasion of Ukraine)
	Increase in Prices of Energy for Production and Transportation	• Limited supply (partly due to Russian Invasion of Ukraine)
	Increase in Wages	• Reduction of Labor Force due to COVID-19 induced changes in perspective on jobs • Higher inflation expectations
Expectation	Increase in Inflation Expectations	• Market's assessment on the Fed's actions and current conditions

Permanent or Transitory?

The past is a prologue for the key question currently facing central bankers: Will the drivers of today's inflation persist or subside in the future? Put differently, are these effects cyclical, and hence, likely to be transitory and mean-revert, or are they structural and likely to be more permanent? There are robust arguments for both sides.

On the one hand, the transitory camp believes that the triggers for inflation drivers — such as expansionary fiscal and monetary policy and labor market shortages — will abate with the Fed's current push to raise rates. For example, Barnichon et al (2021) note that the impact from the monetary stimulus results in a meaningful shift in PCE inflation in 2022 and likely in 2023,[12] but abates after that. This camp also believes that the labor participation rate will increase in the period following the pandemic as savings from monetary and fiscal stimuli dwindle. While this should relieve wage pressures, the longer-term impact is unclear due to the post-pandemic shift in work preferences.

On the other hand, the permanent camp believes it is difficult to assess the impact of the inflation triggers, as the pandemic may have engendered structural shifts to consumer behavior or to factor input costs. In turn, these shifts may result in a new normal for the global economy. McKinsey Global Institute (2021) reports that consumer behavior has indeed changed during the pandemic, and some of those changes will remain even after the recovery.[13] Such a shift can result in structural changes in aggregate demand and productivity. Domash and Summers (2022) examine different labor market indicators and argue that "even under optimistic COVID-19 outcomes, the majority of the employment shortfall will likely persist moving forward." If the shortfall were to persist, wages could remain elevated well past rate-hiking cycles until economic slowdown creates slack in the labor market. Re-evaluation of work preferences post-COVID and reduced flows of migrant workers may lead to permanently lower effective labor supply (Celasun et al, 2022).

[12] Barnichon et al (2021) assess the degree of economic overheating through the ratio of job vacancies to unemployment, and show the impact of the American Rescue Plan (ARP) is projected to result in 0.3 percent higher core inflation through 2022 via a transitory increase in the vacancy-to-unemployment ratio. In turn, this may result in higher future inflation expectations by businesses that will increase longer-run inflation expectations.

[13] McKinsey Global Institute (2021) shows that consumer spending in categories such as e-grocery, virtual healthcare and home nesting will likely remain at the pandemic-levels after the recovery, while consumer spending in categories such as entertainment, leisure air travel and remote education will reverse to pre-pandemic levels. Accordingly, sectors with increased demand will maintain their demand levels, and sectors with decreased demand during the pandemic (such as leisure air travel) will increase their demand levels in the future.

Limitation of Monetary Policy

The Fed's rate hike path and quantitative tightening are designed to reduce inflation by limiting aggregate demand, resulting in slack and excess capacity.

However, monetary policy has limited impact on the supply side, and if some of the strains don't abate, we may not see inflation decrease from the demand channel alone. As a consequence, inflation may not come down the normal glide path post-rate hikes. Given the complexity of the current geopolitical climate and life post-COVID, it is difficult to conclude whether the current inflationary impulses are transitory (with a long abatement period) or whether there are likely to be permanent structural shifts in inflation.

Part of the reason for this dilemma is the shift in the supply chain ecosystem and energy infrastructure following the onset of the war in Ukraine, post-pandemic shifts in work preferences, and adherence to net zero transition pathways. To help understand the tension between the transitory and permanent components of these inflationary shocks, we use an econometric model-based approach as outlined below.

Quantitative Assessment of Inflation: Decomposition of Permanent vs. Transitory Components

Inflation is often modeled as having a permanent component and a transitory component. The permanent component is driven by key forces such as wage costs, productivity gains and demographics, whereas the transitory component can be driven by surges in energy costs, weather-related shortages or one-time effects resulting from fiscal measures, such as tax holidays. To model these two components, it is important to create a structure for articulating the relationship between them.

Permanent vs. Transitory Components of Inflation

The time series model proposed by Stock and Watson (2007) provides a convenient and parsimonious way to model these two components.[14] The model is widely regarded as a pragmatic workhorse benchmark model to model inflation (Li and Koopman, 2018; Banbura et al, 2021; Clark et al, 2022).[15] Stock and Watson (2007) model inflation as a linear combination of trend inflation and transitory shocks where trend inflation follows its own stochastic process.[16] Volatility of persistent shocks (that affect trend inflation) and transitory shocks are time varying.

Through this model, we can measure the current level of the permanent component of inflation (also called "trend" inflation) as well as evaluate how much of the transitory shocks are passed through to this permanent component based on the volatilities of the persistent and transitory shocks.[17] This modeling structure enables one to assess time series trends in both the permanent and transitory components of inflation. Since core PCE is the preferred metric for monetary policy, we run the model on seasonally adjusted monthly core PCE inflation data from March 1959 to May 2022.

Figure 2 shows the permanent and transitory components of core PCE inflation, as well as a measure of persistence, "theta."[18]

A high theta value means that transitory shocks remain transitory and have no effect on the long-run level (permanent component) of inflation.

Conversely, a lower theta value signifies that the transitory shocks impact the long-run level of inflation and, as a result, have attained "permanence" status.

As can be seen in Figure 2, the 1970s were a period with low theta values; thus, as is now well known, inflationary shocks became permanent and needed strong monetary action.[19] It took several quarters before inflation began to abate, and several years before the permanent component receded to prior levels.

[14] Stock and Watson (2007) assume that the transitory component is not serially correlated. This is a reasonable assumption as the drivers of the transitory component (such as tax effects, etc.) are inherently treated as not having any memory or longer-term effects.

[15] The model is not without its weakness, however. Stock and Watson (2016) note that Stock and Watson (2007) made preliminary judgmental adjustments for outliers prior to model estimation, which may lead to suboptimal estimation compared to model-based treatment of outliers.

[16] Throughout the paper, we use the term 'trend' and 'permanent' interchangeably. We also use 'cyclical' and 'transitory' interchangeably.

[17] Stock and Watson (2007) model is an Unobserved Components with Stochastic Volatility (UC-SV) model with the following specifications:

$\pi_t=T_t+\eta_t$, where $\eta_t=\sigma_{\eta,t}\zeta_{\eta,t}$

$T_t=T_{t-1}+\varepsilon_t$, where $\varepsilon_t=\sigma_{\varepsilon,t}\zeta_{\varepsilon,t}$

$\ln(\sigma^2_{\eta,t})=\ln(\sigma^2_{\eta,t-1})+U_{\eta,t}$

$\ln(\sigma^2_{\varepsilon,t})=\ln(\sigma^2_{\varepsilon,t-1})+U_{\varepsilon,t}$

where $\zeta_t=(\zeta_{\eta,t},\zeta_{\varepsilon,t})$ is i.i.d. $N(0, I_2)$, $U_t=(U_{\eta,t},U_{\varepsilon},t)$ is i.i.d. $N(0, \gamma I_2)$, ζ_t and U_t are independently distributed, and γ is a scalar parameter. π_t is inflation at time t, T_t is a trend component of inflation, and η_t is a transitory component of inflation. Correspondingly, $\sigma_{\eta,t}$ is volatility of a transitory component of inflation and $\sigma_{\varepsilon,t}$ is volatility of a trend component of inflation.

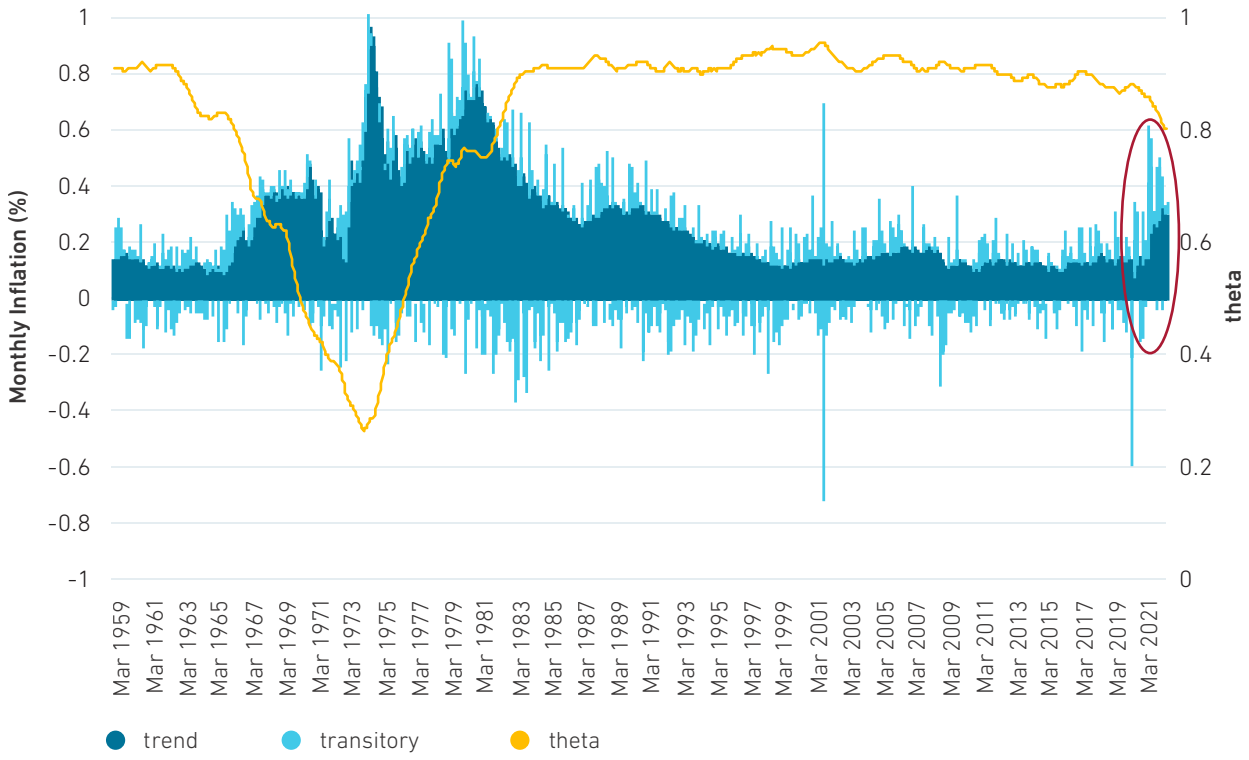
[18] $\theta_t=-(1-\sqrt{(1-4\rho^2_t)}/2\rho_t$, where $\rho_t=-\sigma_{\eta,t}/\sigma_{\varepsilon,t}+2\sigma_{\eta,t}$, and $\sigma_{\eta,t}$ and $\sigma_{\varepsilon,t}$ are as defined in footnote 17.

[19] Paul Volker, former chair of the Federal Reserve, rolled out policies that pushed a short-term interest rate to nearly 20% percent and sent unemployment to nearly 11% in 1981. https://www.nytimes.com/2022/03/14/business/economy/powell-fed-inflation-volcker.html

Even since the late '90s, the long-run level of inflation has been relatively stable with high theta values. We can conclude, therefore, that these inflation shocks were largely transitory and did not impact long-run levels over the past two decades.

This was later labeled as the era of the "Great Moderation," a period with subdued growth and inflation volatilities. This behavior did not change much until recently, despite large transitory shocks in the Great Recession and the onset of the COVID-19 pandemic. Put differently, trend inflation was well-anchored until recently.

Figure 2. Decomposition of Core PCE Inflation from March 1959 to May 2022



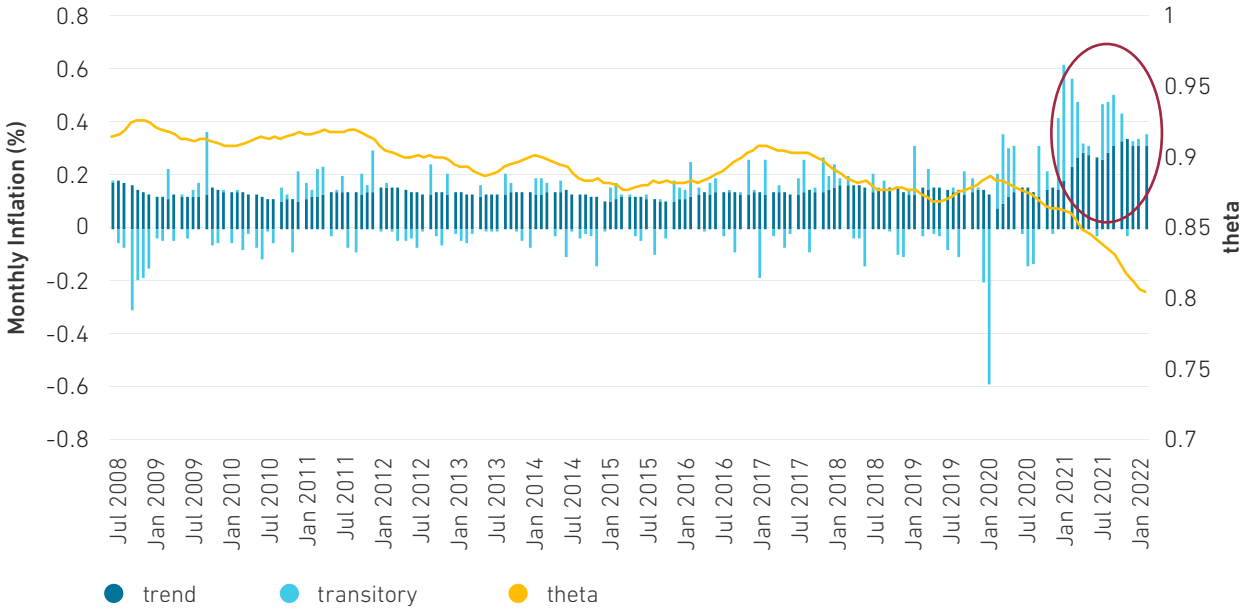
Source: FRED. Authors' calculations. As of May 2022

Recent Shifts in the Permanent Component of Inflation

Inflation behavior in recent months, however, presents a very different picture. As shown in Figure 3 below, the long-run level of inflation has been rising over the last few months while the measure of persistence, theta, has been slowly decreasing. This implies that the recent rise in inflation is due not only to transitory shocks, but also to a shift in the degree to which the transitory shocks are getting incorporated into the permanent component of inflation, thus causing a structural shift in the long-run level of inflation.

This is an important shift as it counters the view that transitory inflationary shocks dissipate, and certainly differs from the behavior of prior transitory shocks. These findings confirm the fears of economists like Larry Summers,[20] Oliver Blanchard,[21] and Goodhart and Pradhan (2020) who have been warning about persistence in inflationary impulses. If some of the forces that keep inflation high persist, longer term inflation expectations can get de-anchored, and thus challenge the assumptions that underlie central bank policies. We caveat these results with the fact these changes, while meaningful, are relatively recent and could reverse. These changes warrant additional scrutiny and further debate.

Figure 3. Decomposition of Core PCE Inflation from July 2008 to May 2022[22]



Source: FRED. Authors' calculations. As of May 2022

[20] Bolhuis, Cramer, and Summers (2022) "Past and present inflation are more similar than you think". World Economic Forum

[21] Blanchard (2022) "Why I worry about inflation, interest rates, and unemployment". Peterson Institute for International Economics

[22] We ran the Stock and Watson (2016) model, which is an extension of Stock and Watson (2007), on monthly OECD Core CPI data and found similar behavior of the permanent component of inflation.

What may be driving this shift in the permanent component of inflation?

First, wage markets are extraordinarily tight. Domash and Summers (2022) note that the ratio of job openings to unemployment is at historic levels.[23] Such a tight labor market, combined with sharply accelerating inflation, have made real wages actually suffer declines, as shown in Figure 4. Given the decline in real wages, Blanchard (2022) notes a shift in sentiment that is encapsulated as "salience." When price movements are modest and nominal wages don't move with inflation, then changes in real wages are not noticed and workers ignore them. But when inflation is higher, changes in nominal and real wages become salient, as workers seek to be compensated at higher nominal levels given the reduction in their real wages. Thus, as a feedback cycle of higher wages, higher inflation, higher wages, etc. is created, some of the wage hikes are likely to become entrenched. The cognitive cost of inflation can be high and cause the shift to be permanent as it feeds into inflation expectations.

Portions of inflation that are stickier (such as rent) are experiencing inflation. If inflation shocks in the stickier parts of inflation remain persistent, then the probability of the spillover to the other components of inflation increases and can create a structural shift upward.

Research has shown that in high inflation regimes, it is not the volatility of the individual components, but the covariance of these with others that results in the persistence of high inflation.[24] To check this using wages as a component, we show that core PCE inflation has become more sensitive to wage growth in recent years, as can be seen in Figure 5. Even allowing for lagged response of wages to changes in inflation, if wages remain high, inflation can stay elevated for longer periods.

Third, in higher inflation regimes, spillover across price components remain elevated. These can be driven by inflation in "salient" consumption baskets such as food. Such spillovers can be driven by things like energy prices remaining elevated and rigidity in wages in salient sectors. Anecdotal evidence suggests that inflation in the food basket is spilling over to other baskets. The transmission of disaggregated sectoral price changes to other sectors bears monitoring.

Fourth, inflation expectations are currently well-anchored, but can de-anchor rapidly as documented by Gordon (1970, 1977) after the spike in inflation in the '70s. One of the factors contributing to the de-anchoring of inflation expectations can be the shift in psychology of how firms set prices. During stable inflation environments, firms are hesitant to raise prices for fear of alienating customers and losing market share.

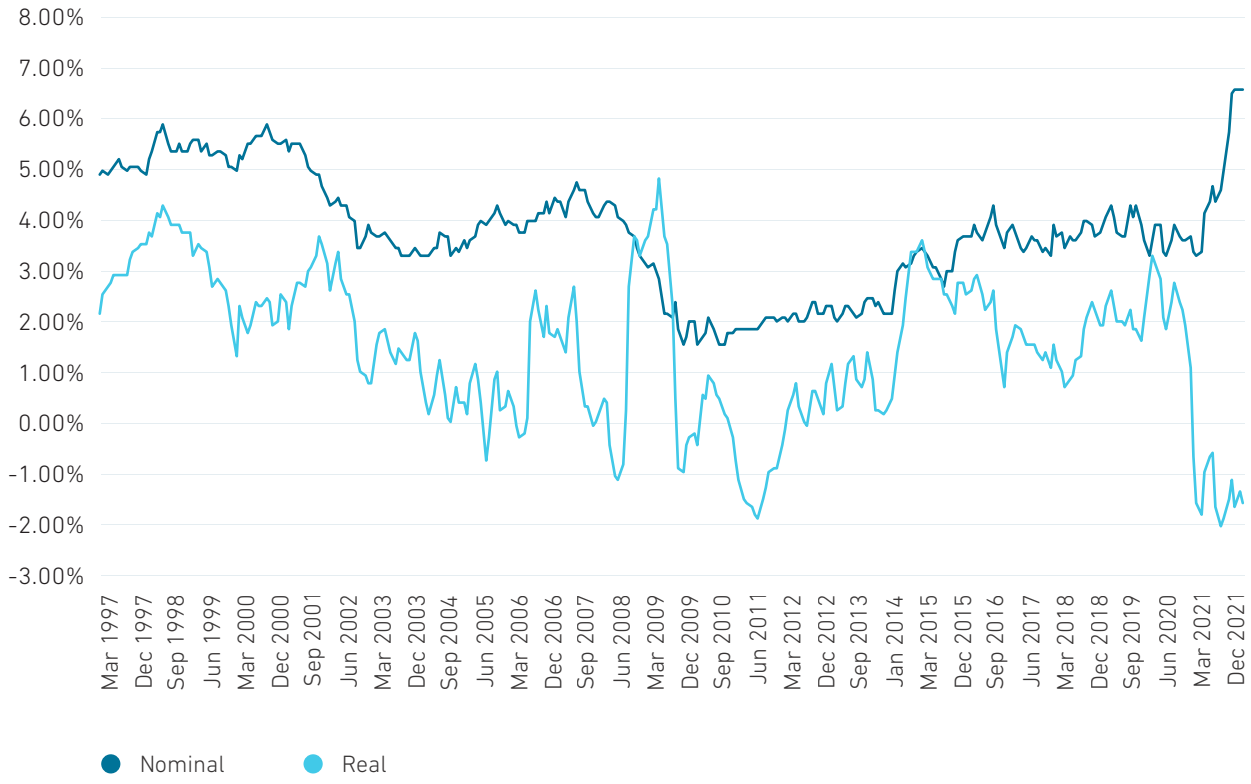
[23] The latest FRED data for the job openings to unemployment ratio suggests that the labor market is getting even tighter since December 2021 (that is, the cut-off date for data studied by Domash and Summers (2022)).

[24] BIS Annual Economic Report 2022

However, in an inflationary environment, firms can simply raise prices in an attempt to recover some of their higher input costs. Such behavior can impact inflation expectations, leading to de-anchoring from the current long-run trend. If inflation expectations get de-anchored, then this can lead to higher inflation and to an increase in the permanent component of inflation, thereby causing a structural shift.

Finally, the green transition is likely to result in higher inflation. This was highlighted by European Central Bank member Isabel Schnabel under the moniker "greenflation."[25] An accelerated timeline for the transition[26] can result in an increase in the permanent component of inflation.

Figure 4. Nominal and Real Wage Growth

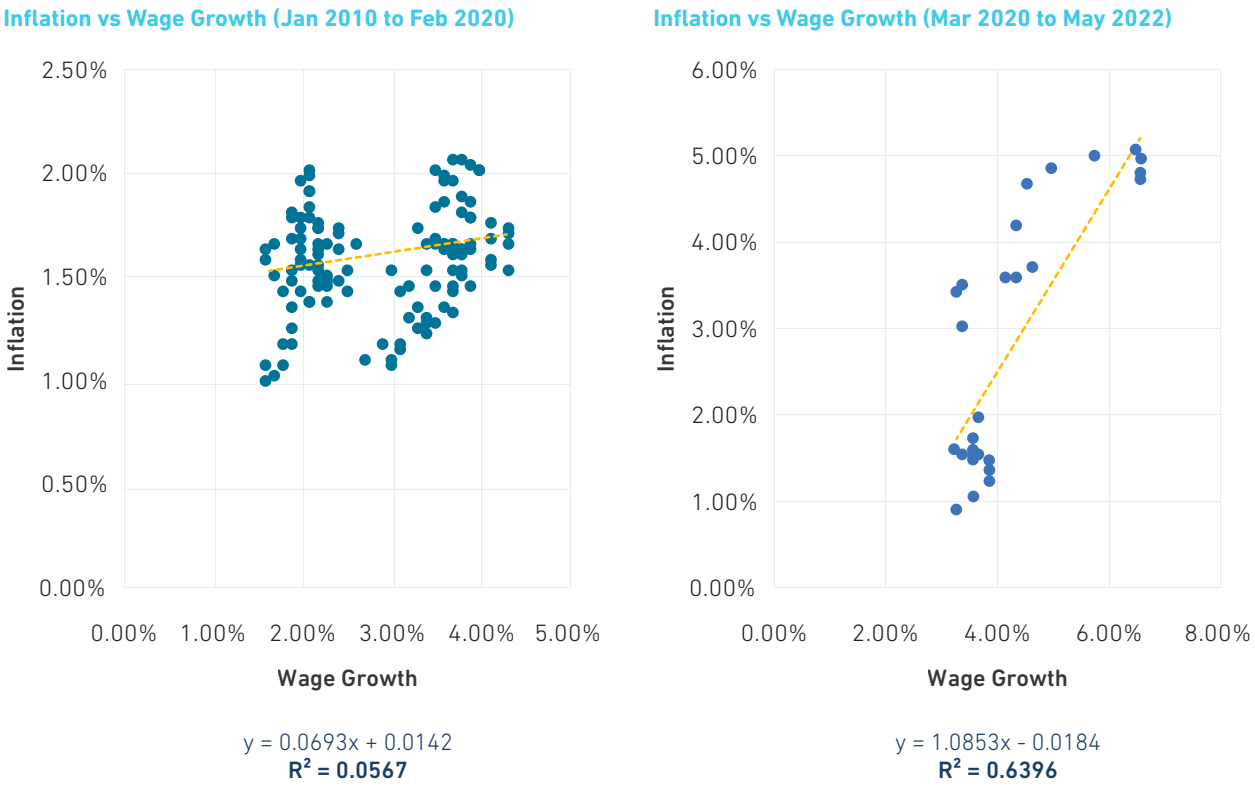


Source: FRED. FRB Atlanta. Authors' calculations. As of May 2022

[25] https://www.ecb.europa.eu/press/key/date/2022/html/ecb.sp220317_2~dbb3582f0a.en.html

[26] The European Commission presented the "Fit for 55" package in 2021, which aims to reduce net greenhouse gas emissions by at least 55% by 2030 compared to 1990 levels.

Figure 5. Core PCE vs. Wage Growth



Source: FRED. FRB Atlanta. Authors' calculations. As of May 2022.

Robustness Checks

To triangulate the results of our econometric estimation outlined above and to evaluate its robustness, as suggested by Lansing (2022), we looked at the correlation between consecutive changes of inflation.

Large negative correlation means a high tendency to revert to the mean, while small negative correlation means that inflation is behaving more like a random walk. Figure 6 shows the correlation between consecutive changes of core PCE inflation.

As can be seen in Figure 6, the correlation of consecutive inflation changes has been approaching 0 in recent months, [27] a level not seen since the late '70s. This result clearly shows that inflationary shocks are not mean-reverting as they were in prior periods, but are likely getting incorporated into the permanent (trend) component of inflation, causing long-run inflation to rise. This result aligns with the reduction in our measure of persistence, theta (Figure 3), further confirming the shift in inflation behavior.[28]

Figure 6. Correlation Between Consecutive Changes of Core PCE Inflation

Source: FRED. Authors' calculation. As of May 2022

[27] We use a 10-year rolling window to calculate autocorrelation. One can also use the variance ratio (VR) test by Lo and MacKinlay (1988) to ascertain whether the time series data is behaving like a random walk.

[28] Kinlaw et al. (2022) use a Hidden Markov model to identify different inflation regimes (Steady, Rising Stable, Rising Volatile, and Disinflation) and find that we are currently in a "Rising Volatile" regime since the middle of 2020.

Era of Higher Inflation? What Can Central Banks Do?

Today's US inflation level — a level not seen for four decades — is the result of unprecedented monetary and fiscal accommodation by the Fed and the US government, combined with supply chain disruptions, changes in living patterns, and tight labor markets following the pandemic.

There are concerns about permanent disruption to supply chains in the wake of Russia's invasion of Ukraine. Korn et al (2022) find that disruptions after wars don't last long, and chains heal and adapt quickly.[29] However, these studies do not assess invasions involving major suppliers of global energy[30] and food,[31] and substitutions for such volumes of global trade are hard to fathom.

Our quantitative assessment of inflation trends shows the recent rise in inflation has been driven not just by transitory shocks, but by a steady rise in the spillover of these transitory shocks into the permanent component of inflation. This suggests that long-run inflation is likely to be higher.

An open question for central bankers is whether the reaction function to monetary policy tools has changed post-COVID. If indeed the reaction function has changed, a meaningful reassessment of monetary policy tools will be required.

Monetary authorities can help reverse the rapid escalation of costs by rising rates in large increments, and frequently. There is a view that, based on the current dot plots, central banks may be behind the curve in what is required to lower inflation. According to the IMF, standard Taylor rule calculations suggest that rates may need to go as high as seven percent in several countries to bring down inflation.[32]

[29] Russia's war against Ukraine might persistently shift global supply chains | VOX, CEPR Policy Portal (voxe.org)

[30] Russia supplies the European Union with 40% of the natural gas it imports and is also a major supplier of oil to a lot of European nations. https://www.bbc.com/news/58888451

[31] Ukraine and Russia account for about a third of the world's wheat and a quarter of barley production, as well as three-quarters of the sunflower oil supply. Ripple effects from Russia-Ukraine war test global economies | MIT Sloan

[32] The Future of Inflation Part I: Will Inflation Remain High? (imf.org)

An aggressive path of hikes will inevitably slow down aggregate demand and create slack. This process of demand destruction will likely mean a recession that may last longer than desired.

Alternatively, central bankers and the global economy must wake up to the reality that we are in a new normal of higher inflation, where equilibrium levels of stable prices and full employment are redefined. The "new normal" will require a significant adjustment for not only central bank monetary policy frameworks, but also for market participants amidst a world governed by friend-shoring and protectionism. The new normal is also a world with an elevated spillover of the effects of labor and fiscal policies to the domain of monetary policy.

We believe that restrictive immigration policy is a major reason for the tight labor force in the US and United Kingdom since 2016. While an accommodative immigration policy can help alleviate tight labor conditions, an increasingly protectionist environment has limited this option since 2016. Similarly accommodative fiscal policy has resulted in high sovereign debt levels[33] that potentially limit the extent to which monetary authorities can raise rates. Collectively, these facts imply that we will continue to see a bumpy adjustment in the rates and currency markets, and sustained market volatility across all asset classes at levels higher than we've seen in a long time.

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[33] IMF reports that global debt rose by 28% to 256% of GDP in 2020 (equivalent to $226 trillion). https://blogs.imf.org/2021/12/15/global-debt-reaches-a-record-226-trillion/

References

Agarwal, Ruchir and Miles Kimball. 2022.
"Will Inflation Remain High?" IMF. The Future of Inflation Part I: Will Inflation Remain High? (imf.org)

Banbura, Marta, Danilo Leiva-Leon, Jan-Oliver Menz. 2021.
"Do inflation expectations improve model-based inflation forecasts?" ECB Working Paper No. 2604

Barnichon, Regis, Luiz E. Oliveira, and Adam H. Shapiro. 2021.
"Is the American Rescue Plan Taking Us Back to the '60s?" FRB San Francisco Economic Letter 2021-27

BIS Annual Economic Report 2022.
https://www.bis.org/publ/arpdf/ar2022e.htm

Blanchard, Olivier. 2022.
"Why I worry about Inflation, Interest Rates, and Unemployment". Peterson Institute for International Economics

Bolhuis, Marijn A., Judd N. L. Cramer, and L. H. Summers. 2022.
"Past and Present Inflation are More Similar than You Think" World Economic Forum. https://www.weforum.org/agenda/2022/06/past-and-present-inflation-similarities/

Celasun, Oya, Niels-Jakob Hansen, Aiko Mineshima, Mariano Spector, and Jing Zhou. 2022.
"Supply Bottlenecks: Where, Why, How Much, and What Next?" IMF Working Paper WP/22/31

Clark, Todd E., Florian Huber, Gary Koop, Massimilano Marcellino. 2022.
"Forecasting US Inflation Using Bayesian Nonparametric Models" FRB Cleveland Working Paper No. 22-05

Domash, A., and L. H. Summers. 2022.
"How Tight Are US Labor Markets? NBER Working Paper 29739, National Bureau of Economic Research, Cambridge, MA.

Faccini, Renato, Leonardo Melosi, Russell Miles. 2022.
"The Effects of the "Great Resignation" on Labor Market Slack and Inflation" Chicago Fed Letter, No. 465

Gordon, Robert. 1970.
"The Recent Acceleration of Inflation and Its Lessons for the Future" Brookings Papers on Economic Activity 1, No.1: 8-41

Gordon, Robert. 1977.
"Can the Inflation of the 1970s Be Explained?" Brookings Papers on Economic Activity 8, No. 1: 253-77

Goodhart, C.A.E., and Manoj Pradhan. 2020.
"The Great Demographic Reversal: ageing Societies, Waning Inequality, and an Inflation Revival" SUERF Policy Note, Issue No. 197

Kinlaw, William, Mark Kritzman, Michael Metcalfe, and David Turkington. 2022.
"The Determinants of Inflation" State Street Working Paper. https://globalmarkets.statestreet.com/research/portal/insights/article/5c5bc63c-d8d8-4309-bdf5-715096d493d8

Korn, Tobias and Henry Stemmler. 2022.
"Russia's war against Ukraine might persistently shift global supply chains" VOX. https://voxeu.org/article/russias-war-against-ukraine-might-persistently-shift-global-supply-chains

Lansing, Kevin J. 2022.
"Untangling Persistent versus Transitory Shocks to Inflation" FRB San Francisco Economic Letter 2022-13.

Li, Menghang and Siem Jan Koopman. 2018.
"Unobserved Components with Stochastic Volatility in U.S. Inflation: Estimation and Signal Extraction" Tinbergen Institute Discussion Paper TI 2018-027/III

Lo, Andrew W. and A. Craig MacKinlay. 1988.
"Stock Market Prices Do Not Follow Random Walks: Evidence from a Simple Specification Test" Review of Financial Studies 1, 41-66.

McKinsey Global Institute. 2021.
"The consumer demand recovery and lasting effects of COVID-19"
McKinsey Global Institute Special Report

Jorgensen, Peter Lihn, and Kevin J. Lansing. 2022.
"Anchored Inflation Expectations and the Slope of the Phillips Curve", FRB San Francisco Working Paper 2019-27.

Santacreu, Ana Maria, and Jesse LaBelle. 2022.
"Global Supply Chain Disruptions and Inflation During the COVID-19 Pandemic"
FRB St. Louis Review, forthcoming 2022

Stock, James H. and Mark W. Watson. 2007.
"Why Has Inflation Become Harder to Forecast?"
Journal of Money, Credit, and Banking 39, pp. 3-34.

Stock, James H. and Mark W. Watson. 2016.
"Core Inflation and Trend Inflation"
The Review of Economics and Statistics 98 (4): 770-784

Tauber, Kristen and Willem Van Zandweghe. 2021.
"Why Has Durable Goods Spending Been So Strong during the COVID-19 Pandemic?"
Federal Reserve Bank of Cleveland Economic Commentary 2021-16

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