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Lessons from the Inflation of 2021-2022(?)

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Lessons from the inflation of 2021-202(?)

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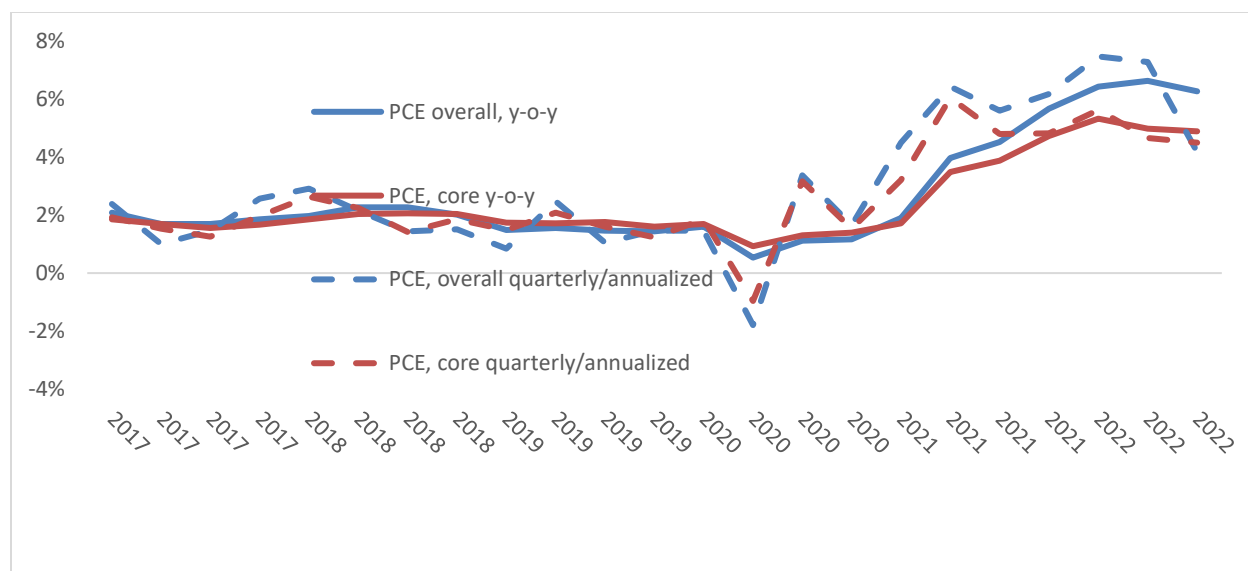
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This is a working draft – please do not quote without permission. Excellent comments provided by participants in a workshop at the Political Economic Research Institute at the University of Massachusetts, Amherst have not yet been fully incorporated.

Starting in mid-2021, inflation in the United States rose to levels not seen since the early 1980s. This inflation followed on the heels of the economic shock imposed by the global COVID-19 pandemic and the significant fiscal policy interventions meant to smooth the fallout of this shock. As of October 2022, inflation – both headline and core measures stripping out food and energy prices – remained at historically high levels, though there are significant signs of softening in the near-future (evidenced in part by the bending down of the quarterly data series displayed below).

Figure A here: Inflation’s 2021 rise and potential 2023 fall
Overall and core (excluding food and energy) inflation, year-over-year and quarterly at an annualized rate

Note: Changes in the price deflator for personal consumption expenditures (PCEPI), taken from the Bureau of Economic Analysis (BEA) National Income and Product Accounts (NIPA).



This episode has sparked furious debate over the proper policy response, and has exposed how little innovative thinking has been done on inflation by either macroeconomists or policy analysts since the 1980s price acceleration was ended by the Volcker shock. This paper identifies a number of key questions raised by the inflationary outbreak of the past 18 months and offers some answers. An extremely brief summary of these questions and answers is provided below, with the rest of the paper expanding on these points.

Why did inflation surge in 2021 and remain high throughout 2022?

The evidence that the simplest stories of macroeconomic “overheating” adequately explain the inflation of the past 18 months is *extremely* mixed. The evidence is more-consistent with a story of extreme shocks causing *sectoral* demand and supply imbalances, and these sectoral shocks causing unexpectedly large ripple effects in the wider economy through distributional conflict over which groups would absorb the economic losses from higher prices.

What was the role of the COVID-pandemic and the Russian invasion of Ukraine in driving this inflationary surge?

The pandemic led to a historically sharp reallocation of consumer spending away from face-to-face services and towards goods consumption and residential investment. Simultaneously, the pandemic introduced huge snarls in global supply chains that need to function smoothly to meet demand for goods and materials used in residential investment. These extreme shocks to both sectoral demand and supply was the spark to inflation in 2021. In 2022, the Russian invasion of Ukraine added another more-familiar shock to energy and food prices. Both the direct effects of the invasion and the international response of sanctions reduced supply in energy and food, sending inflation in these sectors historically high. Many of these shocks were far more-persistent than is commonly recognized.

Would a looser labor market and higher unemployment have allowed us to have seen a much-subdued path of inflation over the past 18 months?

These largely-sectoral shocks bled over into wider macroeconomic effects in part due to labor markets – nominal wage growth accelerated noticeably in late 2021 and early 2022 even when the odd compositional effects of the pandemic on the labor market are accounted for. However, this effect of labor market tightness is often overstated as a primary *driver* of inflation – most of the initial rise in prices did not come from wage-push factors, and the amount of reduced inflation that could have been “bought” by keeping unemployment higher and nominal wage growth more-tame would’ve been relatively small – and the price of this slightly slower inflation would’ve been even larger declines in real wages for working families.

What was the role of mark-ups in the rise of inflation?

The growth of profit margins contributed a historically large amount to inflationary pressures over the past 18 months. Despite profit margins constituting roughly 11% of overall output costs in normal times, growth in these margins contributed well over half of the rise in prices in the non-financial corporate sector through the end of 2021. The fact of this large spike in profit margins, and the distribution of the rise in these margins across sectors, more-strongly supports a view that recent inflation has been caused by the “shocks and ripples” view rather than a simple imbalance between aggregate demand and potential output (ie, macroeconomic overheating).

With the virtue of hindsight, what policy decisions should have been made differently?

Some of the tools that would have matched up tightly with the inflation we saw in 2021 and 2022 would have needed to have been quite heterodox. For example, policies that deferred consumer demand on goods could have greatly lessened inflationary pressures. Or an explicitly temporary excess profits tax implemented quickly and early in 2021 might have restrained margin growth. In terms of interest rate increases (the most-traditional anti-inflationary tool, for good or bad), the most-compelling case that the Federal Reserve should have started raising rates sooner comes from the effect of rate increases on housing, and the evidence supporting this housing-based case is mixed.

What was the role of housing in the inflation and how should it affect policymaking going forward?

Housing is by far the largest single component of consumption spending (and accounts for nearly 40% of core spending in the consumer price index (CPI)), and, it is also the component whose price measurement is most backwards looking – actual increases in rental inflation, for example, only start to reliably push up housing costs as measured in the CPI over the next 6-12 months. Given that

COVID-19 and the rise of remote work led to a large positive shock to housing demand in 2021, failure to appreciate these backwards-looking dynamics of housing price changes led many to be behind the curve on both the rise and fall of prices. Further, housing prices (including rents) have more-complicated responses to interest rate increases than other components of price indices. For these and other reasons, policymakers should think hard about housing markets specifically in the context of debates about inflation-control and macroeconomic slack moving forward.

What insights from previous historical debates about inflation have been missed in this episode, and why?

In the debate over inflations of the 1960s and 1970s, much-greater attention was paid to issues like the inertia of inflation and how distributional conflict over resources could lead to inflation propagation. Further, the role of sectoral, not macroeconomic, imbalances of supply and demand were taken seriously in previous inflation debates. It has been striking in the current debate how confidently many have proclaimed that the mere existence of inflation provides *ipso facto* evidence that the economy has run into a macroeconomic imbalance of aggregate demand exceeding potential output. This conflation of any inflation with macroeconomic imbalances has been a real loss of knowledge that should be reclaimed.

I. Macroeconomic overheating is not necessarily the culprit for the inflationary surge of 2021 and 2022

In early 2021, debate raged about the potential economic effects of the American Rescue Plan (ARP). The ARP, passed in early 2021, was explicitly designed as fiscal stimulus, with large and front-loaded transfers to households as its center-piece, along with substantial aid to state and local governments.

Some critics of the ARP worried about its potential effect on inflation. The most famous of these worriers was Larry Summers. Summers explicitly framed his concerns as centered around estimates of potential output, and how excess fiscal stimulus would push gross domestic product (GDP) well over the economy's long-run potential to deliver, hence causing inflation. As he put it:

“I agree with the general consensus of progressive economists that it would have been much better if the Obama administration had been able to legislate a much larger fiscal stimulus in early 2009, in response to the Great Recession. Yet a comparison of the 2009 stimulus and what is now being proposed is instructive. In 2009, the gap between actual and estimated potential output was about \$80 billion a month and increasing. The 2009 stimulus measures provided an incremental \$30 billion to \$40 billion a month during 2009 — an amount equal to about half the output shortfall.

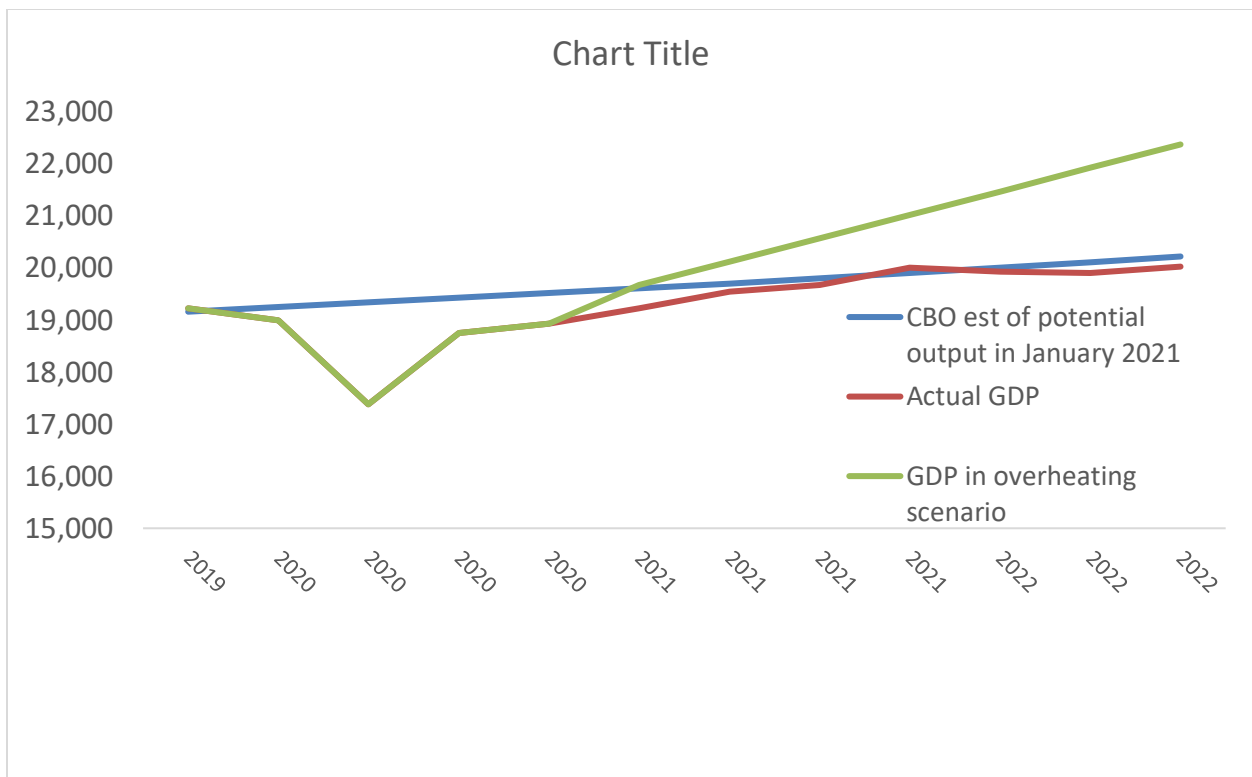
In contrast, recent Congressional Budget Office estimates suggest that with the [already enacted \\$900 billion package](#) — but without any new stimulus — the gap between actual and potential output will decline from about \$50 billion a month at the beginning of the year to \$20 billion a month at its end. The proposed stimulus will total in the neighborhood of \$150 billion a month, even before consideration of any follow-on measures. That is at least three times the size of the output shortfall.”

This argument might benefit from an illustrative figure. **Figure B** below shows the estimates of potential output referenced by Summers, along with CBO's predictions of GDP growth without the ARP through the end of 2020, and actual GDP growth since that date. We then add in a line showing the path GDP would have taken had the ARP pushed up actual GDP 1-for-1 with spending, leading real GDP to exceed potential in the manner described by Summers. On this

figure, one can see the still-considerable *negative* output gap (shortfall of actual GDP relative to potential) that persisted at the end of 2020, as well as the very large *positive* output gap that was projected by reasoning like Summers' after ARP's passage by the end of 2022.

Figure B: What fears of ARP-led overheating would have looked like
CBO projections of potential GDP pre-pandemic, actual GDP since then, and CBO's forecast of GDP supplemented by ARP spending if it had translated one-for-one into higher GDP

Note: Data taken from CBO (2021) and BEA NIPAs. The green line takes CBO (2021) forecast of actual GDP and assumes ARP fiscal impulse translated 1:1 into higher GDP, per concerns of some at time.



The emergence of higher levels of inflation by mid-2021 has led many to assume this output gap-based reasoning had turned out to be true, and that the inflation was clearly the result of macroeconomic overheating (with the level of actual GDP far exceeding the level of potential GDP). But it is far from obvious this is the correct interpretation. For one (as we will show later), even with the ARP real GDP growth (the red line) has barely beaten pre-pandemic projections of what it would be by mid-2022. Below we highlight the evidence further complicating this story of simple macroeconomic imbalances well-explaining inflation.

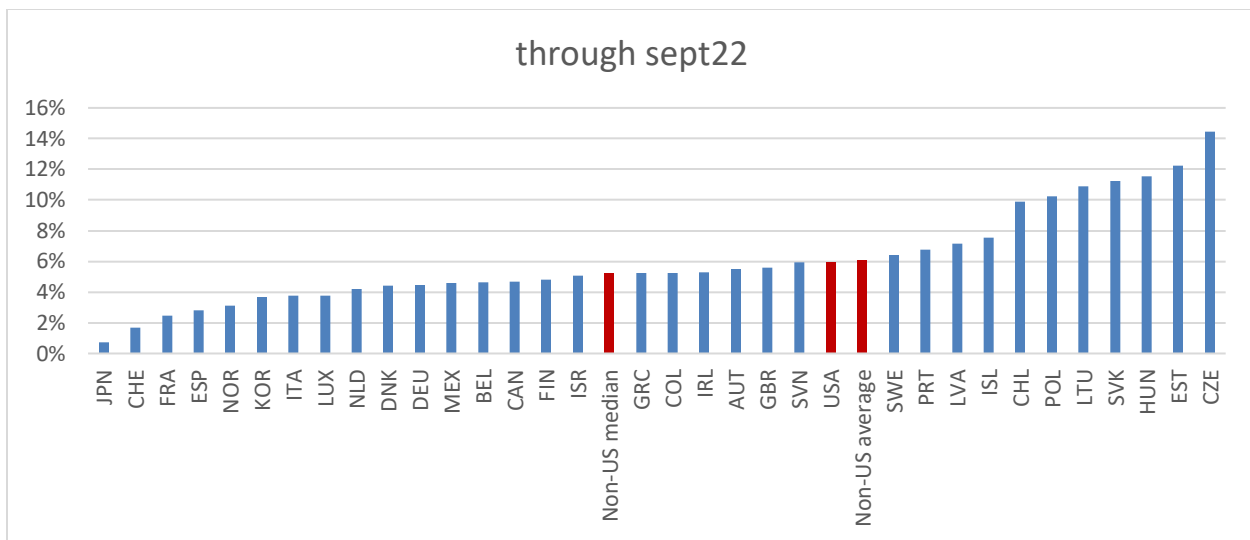
I.1 International evidence complicates the domestic overheating story

The simplest reason to doubt that macroeconomic overheating driven by a too-generous ARP is at the root of the rise in inflation over the last 18 months comes from a look at the international experience of inflation.

A look across OECD countries shows that rising inflation was *not* unique to the U.S. and was in fact a global phenomenon throughout 2021 and 2022. **Figure C** shows the acceleration in core inflation from December 2020 through September 2022, compared with two years of pre-pandemic “normal inflation” (2018-2019) for 35 OECD countries. We use core inflation, which strips out food and energy prices, to better represent broad inflationary pressures in each economy. Using core inflation also allows for a better comparison between the U.S. and Europe given the volatility in food and energy prices affecting Europe due to the war in Ukraine.

Figure C here: The rise of inflation was global
Acceleration of core inflation through September 2022

Note: Data from the Organization of Economic Cooperation and Development (OECD 2022). The acceleration of core inflation is measured as the annualized rate of inflation from May 2021 to September 2022 minus the average rate of inflation that prevailed in 2018-2019.



As Figure C shows, *all* 35 OECD nations we examined experienced an acceleration in core inflation throughout 2021 and 2022 compared to the pre-pandemic period. While above the median, and on the higher side of inflation experiences, the U.S. is by no means an outlier globally and is just below the average for all other OECD countries. This very global phenomenon of rising inflation casts doubt on the claim that purely domestic policy decisions in the US led to macroeconomic overheating and hence inflation.

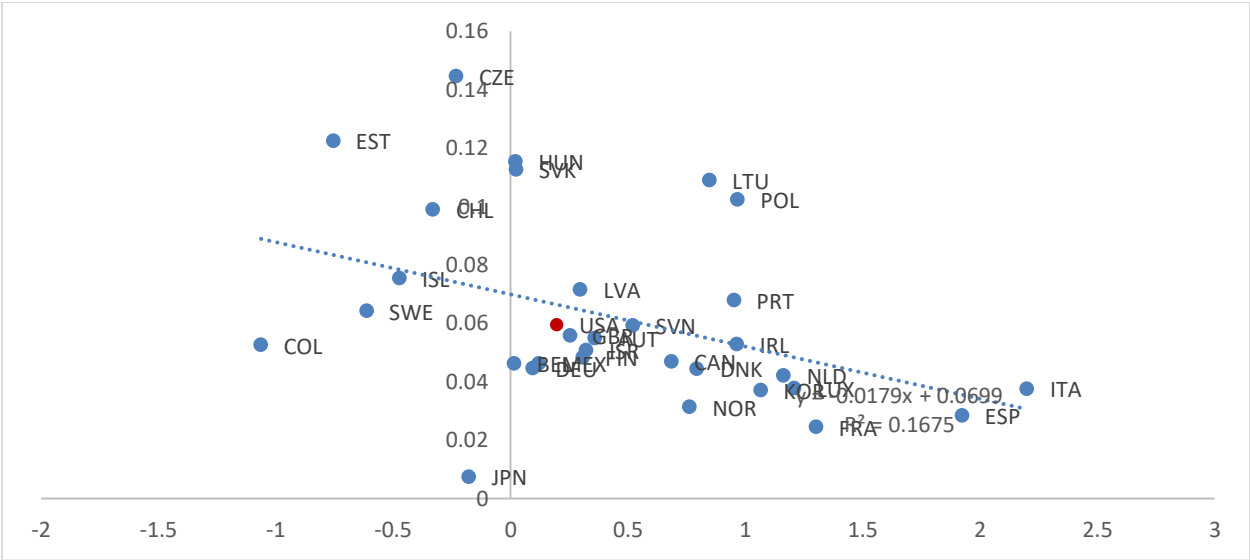
One could argue that the global acceleration in inflation simply meant that many countries overheated their economies and generated excess demand through too much fiscal spending. However, the data do not support this argument either. For one, Figure C above showed OECD

nations with a wide range of fiscal responses, from aggressive relief spending to little intervention. Despite the varying responses, all countries experienced some level of acceleration.

Figure D examines the argument that global inflation is simply a reflection of global excess demand more closely. We examine core inflation acceleration on the vertical axis (as shown in Figure B above). On the horizontal axis, we show unemployment rate change between March-September 2022 and the pre-pandemic 2018-2019 unemployment. This measure indicates how much unemployment has *improved* recently compared to the pre-pandemic period (with a fall in the unemployment rate of 2 percent shown on the graph as a positive 2 percent, for example). For one to argue that inflation is caused by excess demand growth (proxied by lower unemployment rates today), one would expect to see a positive relationship between unemployment improvement and acceleration of inflation. The data do not support this argument, however.

Figure D: Very hard to see global overheating
Unemployment improvement and inflation acceleration across countries

Note: Inflation acceleration as defined in the previous graph. The improvement in unemployment is average unemployment in 2019 minus unemployment rate that prevailed as of September 2022. Data from OECD (2022).



As Figure D depicts, there is no significant positive relationship between unemployment improvement and inflation acceleration. If anything, there appears to be a slightly weak relationship in the opposite direction where countries with higher unemployment (or lower improvement) relative to pre-pandemic times, experienced higher inflation levels. The fact that countries with larger decreases in unemployment (perhaps brought about by more expansive fiscal policy and economic stimulus) do not show larger spikes in inflation strongly complicates the claim that macroeconomic overheating applies globally.

Overall, the shared 2021-2 international experience of high core inflation strongly counters the argument that fiscal relief in the U.S. – such as the American Rescue Plan – either drove up inflation or contributed significantly to its unusual persistence.

I.2 Domestic evidence also underwhelming for simple overheating explanations

Turning to the domestic US evidence, the case for recent inflation being sparked by a simple macroeconomic imbalance of aggregate demand and potential output is also weak. Many have presented the steepening trend in *nominal* spending over the past year and a half as evidence for the overheating view. This is tautological. Faster nominal spending growth could simply be a *reflection* of faster inflation, it is not evidence of its cause. Take a totally trivial example: imagine there was a rapid consolidation of market concentration across the economy. Firms with greater market power would likely raise prices. If the price elasticity of demand was relatively low in the short-run (which seems like a safe bet), this would in turn would make nominal spending rise more rapidly (even while real spending would actually fall). This could happen with no implication at all for the state of macroeconomic balance.

More realistically, one could imagine a scenario – like what happened following the pandemic shock -wherein the *allocation* of demand across spending categories rotated sharply into sectors with either impaired supply or a higher elasticity of prices with respect to demand. As this happened, there would be an increase in prices even without the *level of aggregate demand* being particularly high relative to the economy’s potential output. In the long-run, the inflationary effect of very large relative price changes set off by such a process could be muffled by macroeconomic policy, but claims that over a 1-2 year period such relative price changes cannot be major drivers of inflation seem obviously wrong.

I.2.a Decomposition of inflation into “demand” and “supply” driven

One method some have used to assess the role of the ARP and excess stimulus in generating inflation is to decompose the recent acceleration of inflation into “demand” versus “supply” factors. Probably the most well-done and transparent version of this exercise has been done by Shapiro (2018). The categorization of price changes in a given economic sector as being driven by demand or supply is done by estimating the price and quantity levels of an industry in each month. Then, the “unexpected” components of monthly changes (basically those that exceed or lag a running trend) in both prices and quantities are extracted. If a sector sees both price and quantity growth above trend, price increases in that sector are categorized as demand-driven. If price growth is above trend but quantity growth is below trend, then price increases are characterized as supply-driven. If either price or quantity growth is near-trend, then the industry’s price growth is labeled ambiguous.

The Shapiro (2018) decomposition is certainly clever. Based on these results, the rise of core inflation over the past year can essentially be attributed equally to demand and supply-side measures. However, this technique and how its results are interpreted have a couple of potential shortcomings.

**Figure E here: Inflation both a demand and supply phenomenon
Decomposition of demand- and supply-driven contributions to core inflation**

Note: Figure taken directly from San Francisco Federal Reserve Bank (2022), based on work of Shapiro (2018).

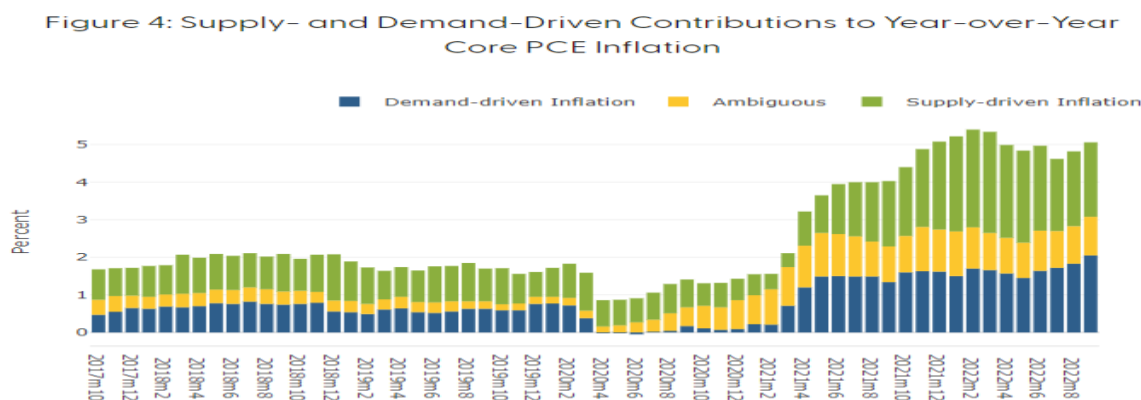


Figure 4 divides year-over-year changes in core PCE inflation into contributions that can be determined as driven by supply and demand, with the remainder marked as ambiguous.

In regards to Shapiro’s technique for decomposing demand versus supply drivers of inflation, there is one potentially important issue that it might stumble on – changes in the elasticity of price changes with respect to demand shocks. Take the example of an industry that has seen a very large price increase relative to trend, but has seen steady growth in output. Under the Shapiro (2018) decomposition, this would qualify as the source of inflation in the sector being “ambiguous”. But, this could easily be a supply issue. If during normal times a mild uptick in demand (a percentage point or two above trend) led to tame price growth, but since the pandemic this mild uptick was associated with very large price increases, this could well actually be a signal that it is supply-side factors that are binding. Further, even for sectors that are characterized as “demand” or “supply” driven, if the price change associated with any demand or supply mismatch (regardless of which side initially caused it) is greater than the past, this could signal that it is sectoral frictions and not just macroeconomic factors causing the rise of inflation.

On the issue of the interpretation of the results, identifying a given inflationary episode of being driven by “demand” or “supply” can sometimes be akin to asking which blade of the scissors cuts the paper. As Larry Summer put it (fairly enough):

“I think it restates what I think is a bit of a popular confusion in the following sense — supply is what it is. Monetary policy can’t change it. Fiscal policy can’t change it, except in the long-run. And so given what supply is, it’s the task of demand to balance supply. And if demand is greater than supply, then you’re going to have excess inflation and you’re going to have the problems of financial excess.

So the job of the demand managers, principally the Fed, is to judge what supply is and calibrate appropriately. It’s not an excuse for inflation to blame it on supply. It’s a reality in the environment that you have to deal with. And so the job is to look for measures of overheating, and when you see measures of overheating, to apply restraint.”

1.2.b Real-time estimates of actual and potential GDP don't look particularly inflationary

Summers' point that attributing the recent rise in inflation to "demand" or "supply" does not end the debate about the role of excess macroeconomic stimulus in driving today's inflation is well-taken. However, his claim that "supply is what it is" simplifies far too much. The most obvious disruption to potential output (or aggregate supply) in the wake of the COVID-19 shock was the 2.5% decline in labor force participation between February 2020 and the end of 2020. But should policymakers really have looked at this decline and just thought "it is what it is" and pulled back demand-growth to match this? Or, instead, was the decline in labor force participation (which fell 3.5% in a single month in April 2020) better seen as mostly-temporary economic casualty of the pandemic which would eventually heal?

So, in some sense it is true that categorizing some inflationary shocks as "supply-driven" does not map perfectly onto a recommendation to keep demand policy stable. But, the larger claim that inflation is *ipso facto* evidence of aggregate demand overshooting supply and hence requires contractionary macroeconomic policy does not follow.

We can get some sense of how much the aggregate levels of demand and supply have shifted relative to pre-pandemic trends using data on GDP and potential output. At the end of 2019, the Congressional Budget Office made projections of both of these variables for the coming years while forecasting little to no change in inflation (or interest rates). The Summers argument above is that either GDP began rising faster than forecast in 2019 (due to excessively expansionary fiscal policy) or that potential output shrank, with either (or both) influence leading to a positive "output gap" that drove up inflationary pressures.

Figure F below shows real GDP and potential output, both as ratios to what the CBO projected they would be before pandemic. For the measure of potential output, we allow developments since the pandemic to affect the CBO projection. Specifically, we reduce the labor input into potential output by assuming that the decline in the labor force participation rate is driven solely by supply-side factors.¹

We also account for changing capital services input and total factor productivity growth relative to CBO projections. For capital services, we construct a measure of growth of the aggregate capital stock that accounts for the non-residential fixed investment (NRFI) that has occurred since the pandemic and compare this to CBO projections of capital services input growth. For total factor productivity, we use the utilization-adjusted measure of total factor productivity growth compiled by John Fernald and compare that to the CBO forecast.

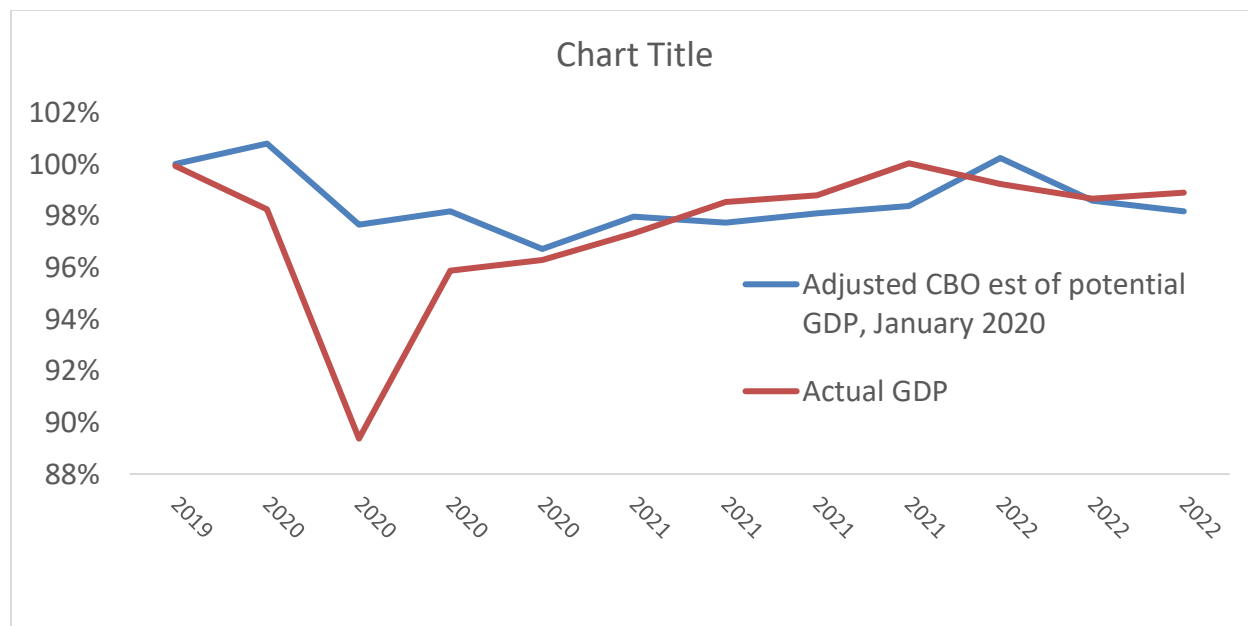
As can be seen in **Figure F**, potential output fell sharply (not as sharply as GDP, but still noticeably) in the immediate post-pandemic period. As of the third quarter of 2022, it still remained a bit under 2% below what CBO forecast it would be in that quarter. GDP fell very sharply in the pandemic

¹ The decline in labor force participation likely slightly overstates the size of the supply shock hitting the labor market in recent years. Much of the decline in this measure is driven by older workers who did not work full-time before the pandemic. Hence, the decline in potential output driven by a given percentage point decline in labor force participation among this workforce is likely less than if it was driven by reduced participation among full-time and younger workers.

recession, but by the third quarter of 2022 now sat roughly 1% beneath what the CBO forecast it would be before the pandemic struck.

Figure F: Output has likely not surged above potential level post-pandemic
Adjusted measures of potential GDP and actual GDP, both relative to pre-pandemic CBO forecasts

Note: The potential GDP baseline and GDP forecasts are taken from CBO (2021). Actual GDP taken from BEA NIPAs. Adjustments to potential GDP as described in text.



During 2021, if one squints at this figure it is possible to see a period of time when GDP rose above our adjusted measures of potential output for a stretch. Over the 5 quarters from the end of 2020 to the end of 2021, the cumulative positive output gap (GDP exceeding potential output) was 5.8%, with the gap averaging around 1.2% in each quarter.

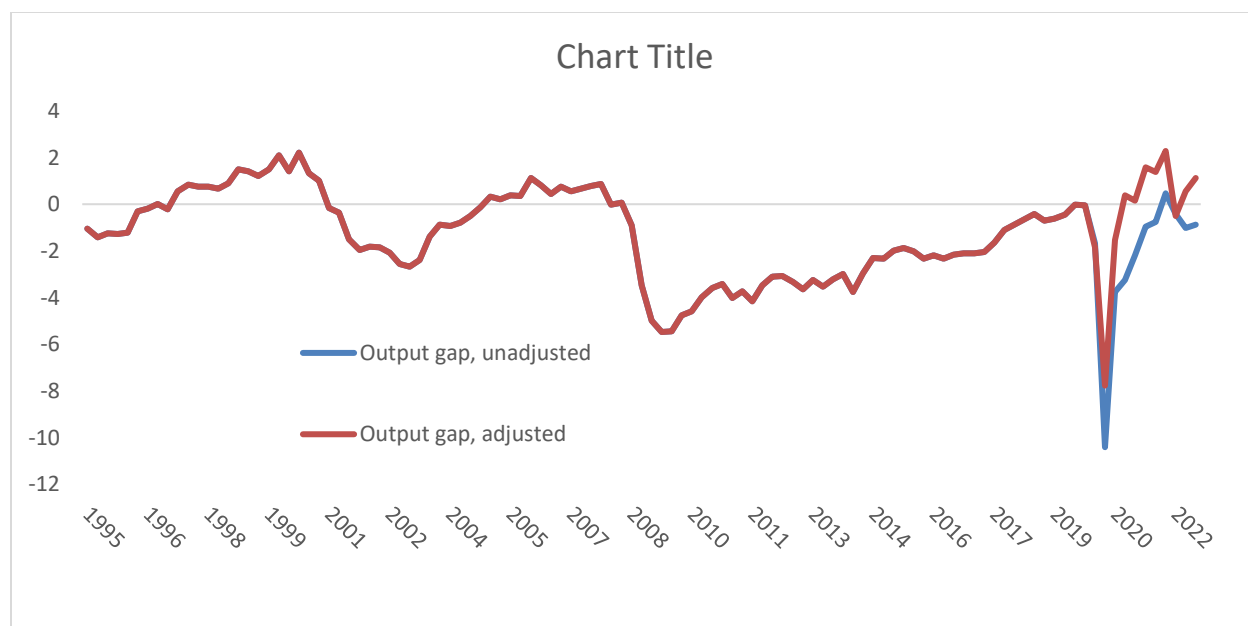
The fact that GDP exceeded potential output as inflation rose gives some plausibility to claims that macroeconomic overheating contributed to the recent inflationary spike, but the magnitudes make it highly unlikely that this overheating played a starring role. There is a very well-established literature on how much a positive output gap should be expected to push up inflation. These estimates do not exceed 0.5 and cluster more-tightly around 0.3 or even lower. This implies that the 1.2% average output gap in that 5-quarter stretch should be expected to raise subsequent inflation by roughly 0.4-0.6%, or by about a tenth of its actual acceleration over this period.

A historical example might help make this clearer. According to the CBO estimates the US economy ran a cumulative positive output gap of over 17% of potential output, with an average gap of 1.2%, over the period from 1997-2000. So, the same average gap as we saw in 2021, but sustained for 4 times as long. Yet there was no inflationary increase at all in this period of time. In short, running the economy this “hot” for a year is just not supposed to yield anywhere near as much inflation as we have actually witnessed since the middle of 2021.

Figure G below shows the history of output gaps since 1995. For the last 2 years, we show the gap with an unadjusted measure of potential output from CBO’s last pre-pandemic projection, plus the gap with our adjusted measure of potential output. Even with our adjusted measure which accounts for pandemic damage to the economy’s aggregate potential output, the positive output gaps of the past 18 months are utterly unremarkable relative to recent US economic history – a history that saw no similar inflationary spike.

Figure G here: Positive 2021 output gap unremarkable in recent history
Output gaps (% of GDP) since 1995, including adjusted output gap for 2021–2022

Note: Data from CBO (2021) and BEA NIPAs.



1.2.c Tight labor markets usually boost, not reduce, labor’s relative bargaining power

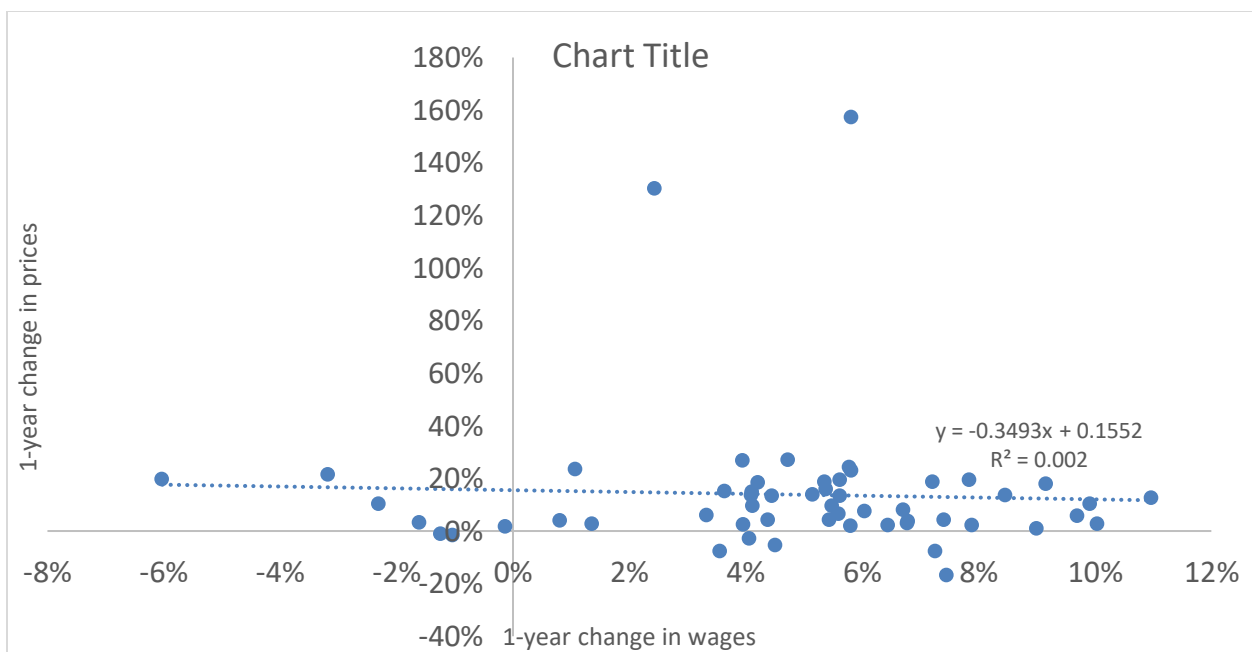
Finally, we highlight some evidence from the labor market to assess the claim that a straight-forward story of macroeconomic overheating is at the core of recent inflation. Generally, claims that inflation accelerations are driven by an excess of aggregate demand over potential output rest on theories of labor market overheating. As aggregate demand exceeds potential output, unemployment falls. In turn, this boosts workers’ bargaining position with employers and pushes up wage growth. If nominal wage growth begins exceeding price inflation, this leads to a rise in labor’s share of income.

The general logic that lower rates of unemployment more-strongly boost nominal wage growth than price inflation is sound and supported by lots of empirical evidence. As the recent inflationary episode began in 2021, it was often accompanied by stories of labor shortages in many sectors. This led far too many to assume that it was wage pressures pushing up price growth, and the simple story of the labor market overheating due to a macroeconomic excess of aggregate demand over potential output gained credence.

The first bit of evidence against the claim that rolling labor shortages across sectors led to prices rising can be seen in **Figure H** below. This graph shows the acceleration in price inflation and the acceleration in nominal wage growth across 61 industries. It measures acceleration of prices and wages as their annualized growth rate between the second quarter of 2020 and the third quarter of 2022 relative to the annualized growth rate that prevailed on average between 2018 and 2019. There is no discernible correlation at all between these measures.

Figure H: Industry price inflation not driven by rolling labor shortages
1-year acceleration of inflation and nominal wage growth by industry in September 2022

Note: Both inflation and wage acceleration defined as year-over-year change in September 2022, minus average rates in 2018-2019. Data from BEA GDP-by-Industry series and Bureau of Labor Statistics Current Employment Statistics (CES).



Moreover, while nominal wage growth did accelerate in 2021, it never exceeded price inflation. This in turn meant that real (inflation-adjusted) wages have been *falling* since early 2021. This also led to a pronounced fall in the labor share of income in the corporate sector, which has largely not-recovered at all from its post-pandemic nadir. It seems odd that a labor shortage could somehow be the source of inflation given this data – it is rare for services in short supply to command less and less income growth on a per unit basis.

This fall in real wages and the labor share of income is absolutely not the norm for the US economy as it “heats up” in recoveries. This fact has been missed by far too many commenters. Many have made implicit claims that a sharp fall in the labor share of income and real wages is the norm for an economy with positive output gaps. Rampell (2022) for example writes:

“The greedflationists argue that something fishy is afoot because companies are not merely ‘passing along’ their higher costs; their profit margins are expanding, too. But this is exactly what you’d expect when flush customers are buying more stuff and willing to pay whatever’s necessary to get what they want. Prices and profits rise.”

Read “flush customers willing to pay whatever’s necessary to get what they want” as “high levels of aggregate demand relative to potential output”. Is it really true that historical experience would lead one to expect that high levels of aggregate demand lead to prices *and profits* rising?

Not really. **Figure I** below shows the labor share of income in the corporate sector since 1949. The cyclical dynamics of the labor share are slightly complicated, but just a bit. The labor share is not “counter-cyclical” as it is sometimes described. It does rise sharply during outright recessions, as more-volatile profits decline sharply during economic downturns. But, in early recoveries with unemployment still high, the labor share universally falls sharply. Then, in mid-recovery, as unemployment starts to approach (or fall beneath) pre-recession lows, the labor share begins rising as unemployment falls – or, as the economy “heats up”.

Figure I also shows lots of variability and potential decade-specific trends in labor’s share. This explains why a simple scatterplot of the relationship between the change in labor’s share of income and the unemployment gap is very noisy, with only a mild (if statistically significant) downward correlation, indicating that low unemployment gaps (signifying tight labor markets) are weakly associated with an increased labor share. Once decade-specific dummy variables and decade-specific trends are controlled for, however, this relationship dramatically strengthens, as shown in **Figure J**. The figure shows the coefficient on the unemployment gap from a regression of the change in the labor share on the unemployment gap, plus decade-specific dummy variables, decade-specific trends, and productivity growth. It shows this regression for all periods in our data (quarterly data from 1949 to 2018), as well as periods when the unemployment gap is greater than 1, less than or equal to 1, greater than 0, and less than or equal to 0. An unemployment gap of 0 or below indicates a tight labor market with actual unemployment either matching or below estimates of the natural rate. An unemployment gap of 1 or below indicates an economy operating below full employment, but at least within shouting distance of it. An unemployment gap of above 1 indicates an unhealthy labor market.

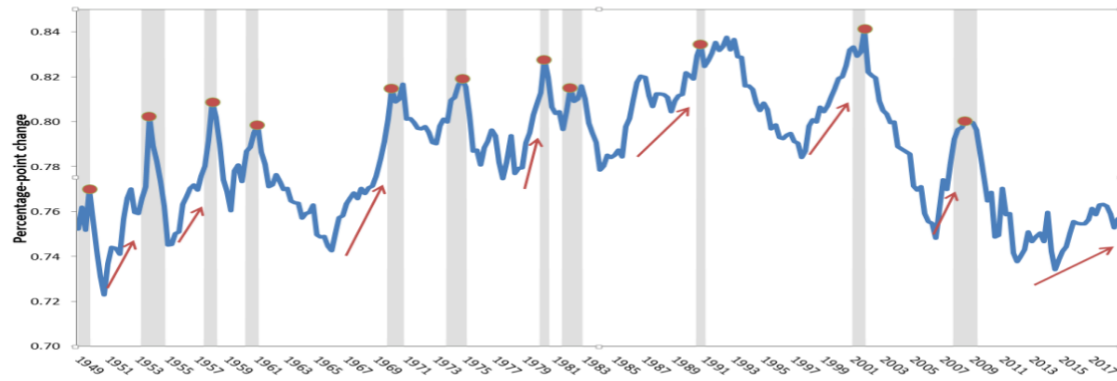
What does this tell us? That it is extremely unusual for labor’s share of income to fall (or even stagnate) even as unemployment falls beneath 5%: higher profits are not the expected signature of an overheating economy. In this sense, the recent low levels of labor’s share and the poor performance of real wages are signs that this does not look anything like a typically overheating economy.

Figure I: Labor share behavior in 2022 doesn't look like "overheating"
 Labor's share of income in the corporate sector, 1949-2018

Note: Author's analysis of BEA NIPA data.

Labor's share of income spikes in recessions, plummets in early recoveries, and ascends in late recoveries

Labor's share of income in the corporate sector, 1949–2018



Note: Shaded areas denote recessions.

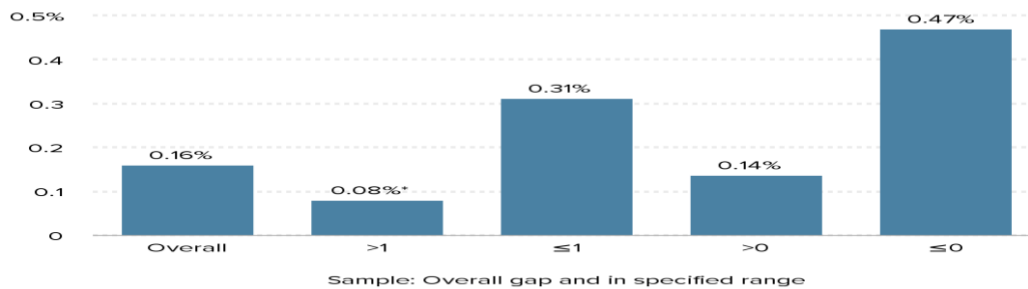
Source: Author's analysis of Bureau of Economic Analysis *National Income and Product Accounts* (Table 1.14)

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Figure J: In tight labor markets, the labor share of income rises, not falls
 Same subtitle as in figure image

In tight labor markets, the labor share of income rises

Change in labor's share of income per a 1 percentage-point decline in the unemployment gap, overall and by periods when the unemployment gap falls within the specified range



Notes: The unemployment gap is the actual unemployment rate minus the estimate of the natural rate of unemployment. Bars represent the regression coefficient on the unemployment gap from a regression, with the change in the labor share of income as the dependent variable. Controls include productivity growth and the four-quarter change in the unemployment rate; dummy variables for the business cycles of the 1950s, 1960s, 1970s, 1980s, and 1990s, and for the 2001–2007 business cycle; and business cycle-specific trends for each of those time periods. An asterisk indicates the coefficient is not statistically significant at conventional levels.

Source: Author's analysis of data from the Bureau of Economic Analysis *National Income and Product Accounts*, unemployment rates from the Bureau of Labor Statistics, and estimates of the natural rate of unemployment from the Congressional Budget Office (2019)

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II. If not macroeconomic imbalances then what? Sectoral shocks and their ripples

If the driver of recent inflation was not large macroeconomic imbalances, then what was it? Put simply, it was extraordinarily sharp *sectoral* shocks and the large ripples these shocks generated. Tobin (1972) provides probably the best description of how large sectoral shocks can cause persistent inflation. Key to his reasoning is the empirical finding that nominal wages are extremely rigid downwards. Given this downward nominal wage rigidity, this implies that adjusting to sectoral shocks to demand and supply will always require inflation (rising nominal wages in expanding sectors) rather than deflation or neutral aggregate wage and price growth (ie, rising or flat nominal wages in expanding sectors matched by falling nominal wages in contracting sectors). These insights are profound enough to quote at length:

“The overlap of vacancies and unemployment--say, the sum of the two for any given difference between them--is a measure of the heterogeneity or dispersion of individual markets. The amount of dispersion depends directly on the size of those shocks of demand and technology that keep markets in perpetual disequilibrium, and inversely on the responsive mobility of labor. The one increases, the other diminishes the frictional component of unemployment, that is, the number of un-filled vacancies coexisting with any given unemployment rate. A central assumption of the theory is that the functions relating wage change to excess demand or supply are non-linear, specifically that unemployment retards money wages less than vacancies accelerate them. Non-linearity in the response of wages to excess demand has several important implications.

First, it helps to explain the characteristic observed curvature of the Phillips curve. Each successive increment of unemployment has less effect in reducing the rate of inflation. Linear wage response, on the other hand, would mean a linear Phillips relation. Second, given the overall state of aggregate demand, economy-wide vacancies less unemployment, wage inflation will be greater the larger the variance among markets in excess demand and supply. As a number of recent empirical studies, have confirmed (see George Perry and Charles Schultze), dispersion is inflationary. Of course, the rate of wage inflation will depend not only on the overall dispersion of excess demands and supplies across markets but also on the particular markets where the excess supplies and demands happen to fall. An unlucky random drawing might put the excess demands in highly responsive markets and the excess supplies in especially unresponsive ones. Third, the nonlinearity is an explanation of inflationary bias, in the following sense. Even when aggregate vacancies are at most equal to unemployment, the average disequilibrium component will be positive. Full employment in the sense of equality of vacancies and unemployment is not compatible with price stability. Zero inflation requires unemployment in excess of vacancies.”

If this Tobin view is right that “dispersion [of sectoral shocks] is inflationary”, then the mammoth response of inflation to the COVID-19 shock becomes very easy to understand – this pandemic effect was the mother of all shocks to sectoral dispersion. Further, specific features of the 2021 economy meant that any shock to sectoral imbalances would have led to large ripple effects, mostly through their effect on the labor market, which saw nominal wages respond to non-labor costs shocks and support inflation to an unexpected degree.

These “ripple” effects stem from the distributional conflict resulting from inflationary shocks, as various economic groups try to protect their real incomes. As Ros (1989) usefully puts it: “A common form of [conflict inflation] arises when the real wage reflecting the balance of power in the labour market, and expressing the expectations created in wage bargains, is not validated by the real wage implied by price formation in other markets”. So, if a shock to the cost of non-labor inputs (say lumber used in home building and chips used in automobile production) pushes up prices, workers might respond by bargaining for higher nominal wages to protect their living standards. In

turn, firms may accommodate their own workers' nominal wage demands (or at least some of them) yet maintain or even expand profit margins to protect their own incomes.

This conflicting claims view of U.S. inflation is not well-known or often wrestled with in most macroeconomic commentary. There's one pretty good reason for this – it has largely not been an issue for decades, as a number of policy changes have so disempowered U.S. workers that their efforts to protect real incomes from any shocks have been so limited as to leave almost no mark on inflationary dynamics. Ratner and Sim (2022) provide compelling evidence that the extremely low inflation that characterized the 30 years before COVID-19 is likely explained largely by a pronounced shift in bargaining power from workers and to firms. And yet in 2021 these conflicting claims on real output following large exogenous shocks led to the large and persistent ripple effects in inflation.

What are the analytical and policy stakes in distinguishing between inflation driven by macroeconomic overheating (imbalances in the level of aggregate demand and potential output) versus a “shocks and ripples” theory? Even if they are large, so long as the ripple effects following inflationary shocks *dampen* rather than *amplify* the initial inflationary shock, then macroeconomic policymakers should not have to pursue aggressively contractionary policies to rein inflation back in. This is not simply tautological – sometimes shocks really do set off ripple effects that amplify the initial impulse and need some external force (looser labor markets in the current context) to provide dampening. But so long as wage growth lags price inflation, the ripple effects – large as they might be – will steadily dampen the initial shocks and return inflation to more-normal levels over time, even absent any effort to engineer looser labor markets.

Below we more-sharply distinguish just what the economic shocks caused by COVID-19 and the Russian invasion of Ukraine were, and how the ripple effects kept inflation more-persistent than many forecast going into this episode, but which still look set to fade so long as the shocks stop coming.

II.1 What were the shocks?

The main shocks to the U.S. economy from the pandemic and war were the economic distortions they created in both demand and supply patterns. On demand, the composition of GDP shifted with a historically rapid reallocation in spending and demand into durable goods consumption and residential investment, and away from services and government. On the supply side, the pandemic and war contributed to massive supply chain snarls, further heightened by port shutdowns, the global spike in raw material, energy, and commodities prices.

II.1.a Demand shocks: consumption patterns and underappreciated role of housing

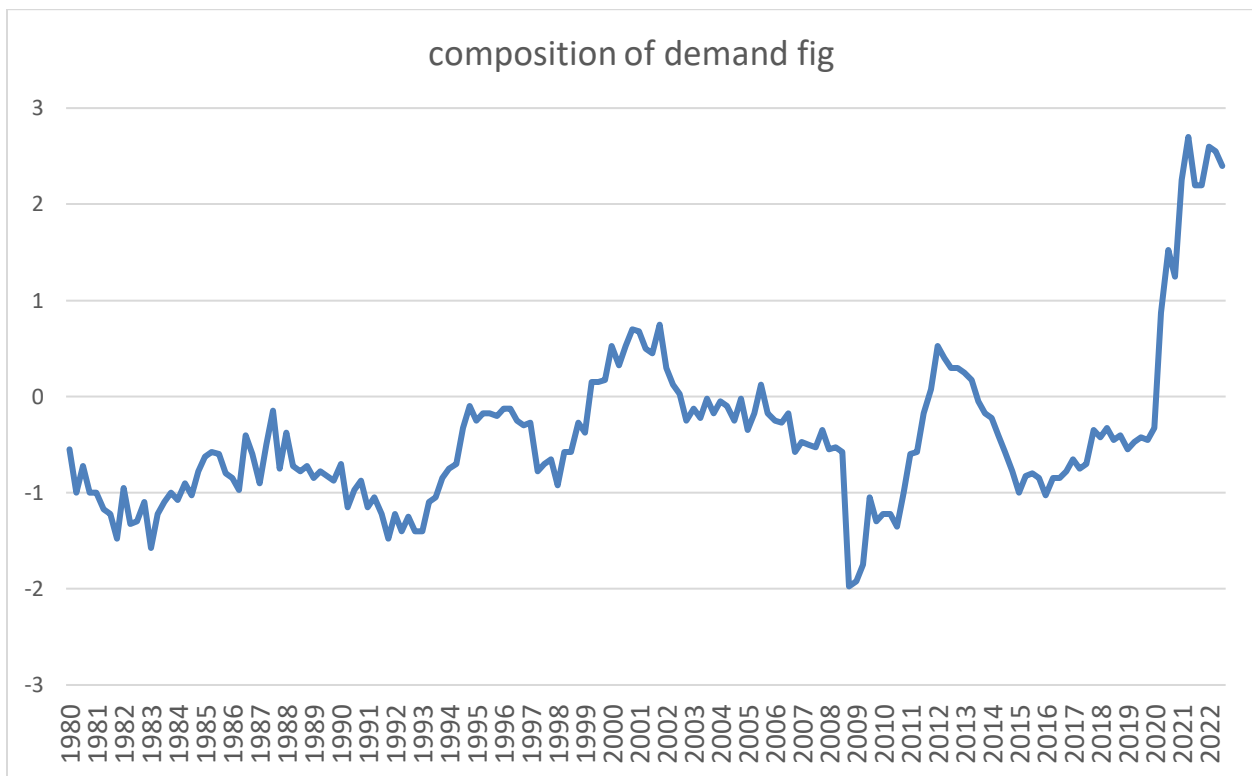
The shift in demand patterns away from face-to-face, high contact services (such as gyms, movie theaters, travel) and towards durable goods and residences (cars and houses) was clearly a consequence of the pandemic, and it has shown remarkable persistence. **Figure K** displays the shock to the composition of demand in historical context from 1980 through the present. We examine the share of GDP made up of durables and residential investment and demonstrate how it has changed relative to the average of the previous two years. Clearly, the onset of the pandemic led to a historically unprecedented jump in the share of durable goods consumption and residential investment (the last rise though at a much slower rate can be seen in the early 2000s). In recent

years, the share of durables consumption and residential investment has moved a bit closer to normal, but it remains at a high level relative to historical averages (in Figure K, one can see that the level of demand as of 2002q3 was roughly in line with what it has been for the past two years (ie, the line hovers near zero)— and these past 2 years have been dominated by the COVID-19 patterns of spending). This historically sharp swing in demand *across* sectors is certainly a large-enough shock to explain the beginning of the recent inflationary episode.

The swing towards durable goods consumption and away from face-to-face services is quite intuitive to understand (the classic example being the substitution of Peloton purchases for gym memberships). However, the boost to housing demand driven by the pandemic is perhaps even better-documented by the data. Apparently, the prevalence of remote work led to a large positive shock in housing demand as more people worked from home, first out of necessity of social distancing as public health, but then (for many) out of choice. Working from home in turn inspired demand for more space and smaller households, leading to a large surge in new purchases and household formation running far ahead of population growth for 2021.

Figure K: Pandemic leads to sharp sectoral swings in demand
Change in share of GDP accounted for by durable goods and residential investment, 1980-2022

Note: Authors’ analysis of data from BEA NIPAs. The average annual share of GDP accounted for by durable goods consumption and residential investment lagged 30 months is subtracted from the current quarter.



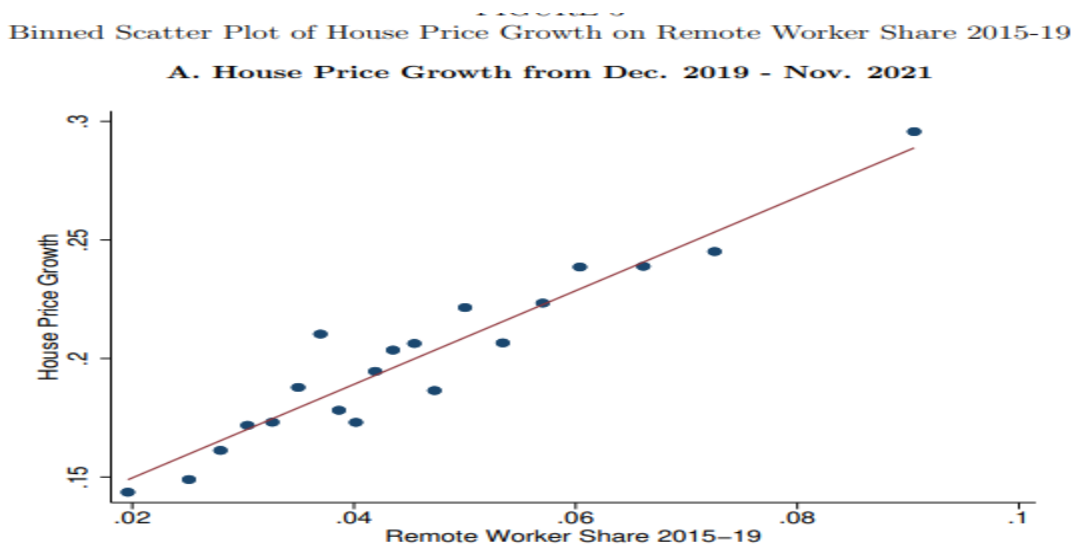
This pandemic shock to housing demand had profound implications for subsequent inflation. Housing is a key component of inflation, making up 40% of core consumption spending in the CPI. Housing prices (including rents) have also increased dramatically since 2019. **Figure L** shows the tight relationship between remote work and the growth in house prices, as shown in Mondragon and Wieland (2022).

Figure L (taken directly from Mondragon and Wieland (2022)) shows a strong positive relationship between house price growth and exposure to remote work, meaning that areas most exposed to working remotely had house price growth twice as high as areas least exposed. Their model further estimates that remote work raised aggregate house prices by 15.1 percent, accounting for well over half of the rise in housing prices over that time. Clearly the pandemic shock to housing demand and thus price growth is a crucial component of the 2021 inflation story.

Though housing prices have been high through the pandemic, they seem to have been assigned less blame in the recent inflation episode, versus the overheating or fiscal over-stimulus arguments. Why has housing been such an underrated contributor to high inflation in economic policymaking discussions? Mostly because official measures of housing costs were one of the last components of inflation to noticeably accelerate. The measurement of housing prices is one of the most backwards-looking price indicators, with increases in new rents and house prices in many industry data sources only visibly pushing up costs in the CPI 6-12 months later.

**Figure L: Pandemic leads to large positive shock to housing demand
Change in house prices and exposure to remote work**

Note: Figure taken directly from Mondragon and Wieland (2022).

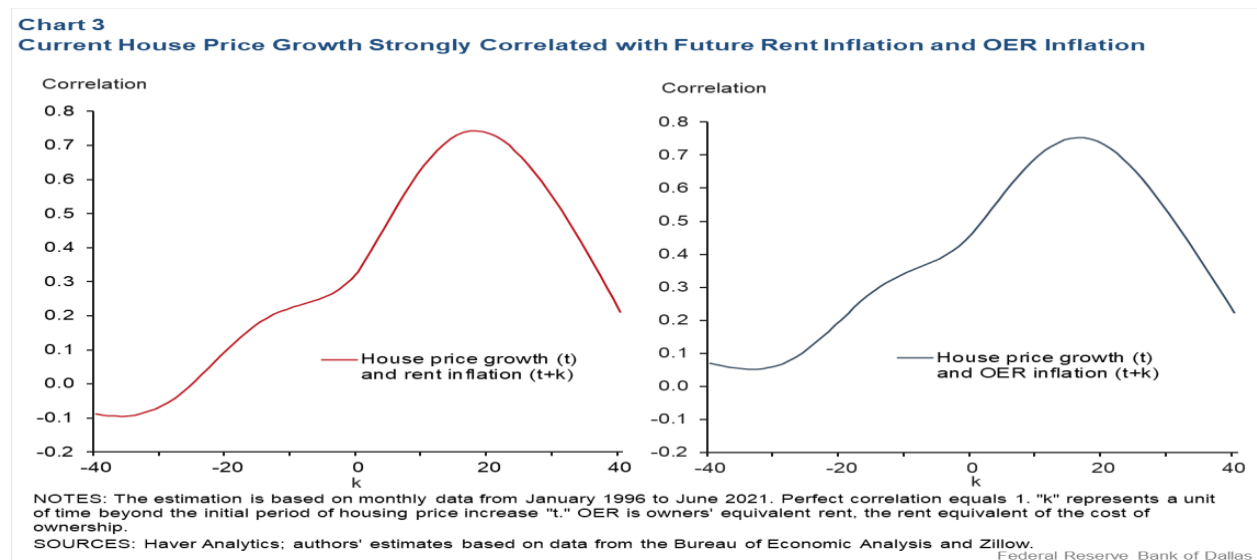


Given this lag and the backwards looking nature of housing measurement, a shock to housing demand generally does not manifest in an increase in housing prices and rents until the following

year. This meant that many policymakers and economic commentators were unable to track the extent of price changes as they occurred. **Figure M** shows the correlation between home price changes and PCE measures of rental price inflation over various lag structures. The highest correlations (greater than 0.8) occur between real-time PCE rent inflation and home price inflation from 16-20 months in the past. This lagged effect has made the 2021 positive shock to housing demand stemming from the pandemic really start to push up official measures of inflation only relatively deep into 2022. However, it is also important to note that the reverse dynamic is likely to characterize rental prices going forward – substantial weakness in early-warning measures of rental prices will only show up in a slower rate of CPI growth with a significant lag. On the figure, this can be seen in the July 2021 forecast projecting increases throughout 2023, while more-recent forecasts (incorporating sharp downward pressure on housing prices in real-time data) instead show steadily dropping housing inflation over that year.

Figure M: CPI reflects changes in housing market dynamics with a considerable lag
Actual CPI rent inflation and inflation forecasts

Note: Forecasts of future CPI inflation based on Zillow home price index data.



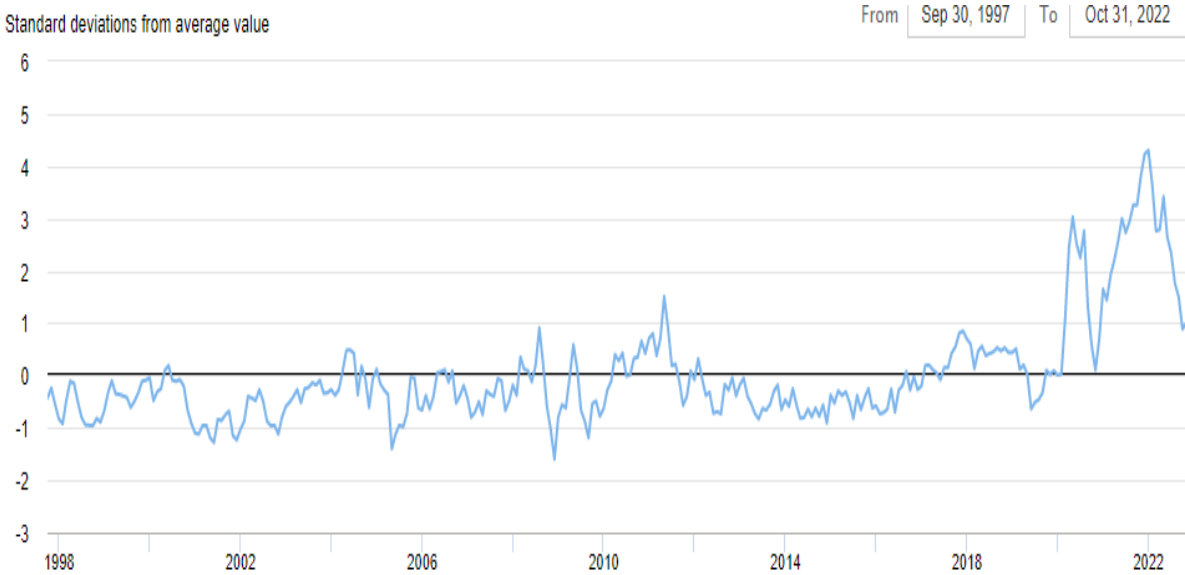
II.1.b Supply shocks: supply chains and much spikier effects on labor supply than appreciated

While the pandemic shocks to the demand side are quite evident, the pandemic created important supply shocks as well.

The most well-known shocks were pandemic-driven snarls in global supply chains of durable goods and materials for construction. These supply-chain snarls were largely due to rolling port shutdowns throughout East Asia in key manufacturing hubs. The Federal Reserve Bank of New York maintains an index of global supply chain pressure. In 2021 it hit its highest points on record, and only by late 2022 had the index begun showing real signs of normalizing. The pandemic supply-chain shock was quite persistent.

Figure N: Pandemic led to historic stress on global supply chains
Global supply chain pressure index, 1997–2022

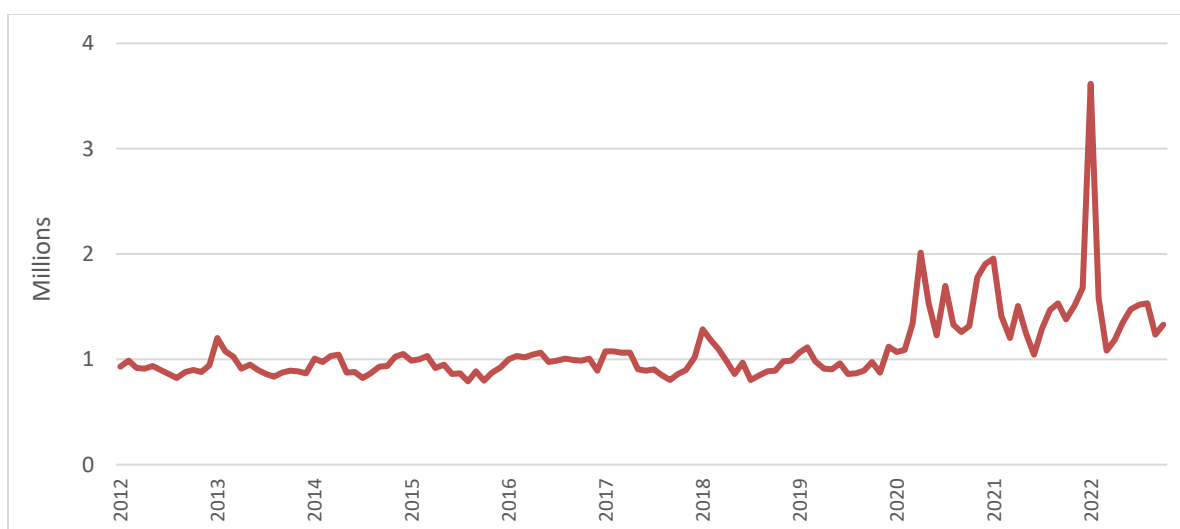
Note: Data from the Federal Reserve Bank of New York.



Another under-appreciated part of the pandemic’s effect on the US economy’s supply-side was its effect in temporarily sidelining millions of employed workers each month. This effect became historically pronounced during the Omicron wave in January 2022. **Figure O** below shows the number of people who are employed with a job, but were not at work due to illness or medical problems in the reference week of the Current Population Survey (the survey used to calculate the unemployment rate and other key labor market indicators). While there are spikes in this series in 2020 and the delta-variant in summer 2021, the number skyrockets to over 3.5 million people in January 2022 during the Omicron wave. This rolling shock in labor supply very likely disrupted the labor market and economic system as well, but shows some hopeful signs of normalizing in recent months.

Figure O: Disguised impairment of labor supply another pandemic shock
Share of employed workers reporting they missed work in past week due to own illness, 2012–2022

Note: Data from the Current Population Survey (CPS)



II.2 Large – but dampening – labor market “ripples”

Perhaps one of the most notable elements of the 2021 labor market was the growth in nominal wages. Nominal wage growth in 2021 was extraordinarily fast relative to recent history, and is even turning out to have been fast relative to what has prevailed in 2022, even as other measures of the labor market have seemingly tightened. Many policymakers have claimed that increased nominal wage growth was a key driver of inflation since early 2021. This claim is not totally implausible - historical episodes of price-wage spirals really have occurred and required some exogenous forcing mechanism to bring down wage growth as part of the anti-inflationary strategy. However, a close look at the evidence indicates that the focus on wage growth as a key *driver* of inflation in the past 18 months seems misplaced. Further, it seems quite likely that the abnormally fast wage growth of the past 18 months can be normalized without a significant forcing mechanism (like substantially higher unemployment rates engineered by Fed interest rate hikes). Indeed, it already seems to be normalizing pretty quickly.

In short, the rapid nominal wage growth of 2021 should not be understood as a major *cause* of the inflation of 2021 and should not be expected to continue (even if the unemployment rate remains low) going forward. To support these claims, we highlight a number of features of the 2021 labor market which allowed for this nominal wage growth in the first place and argue that they are largely *sui generis* to that year.

Put simply, workers had high degrees of bargaining power in 2021 relative to what the overall unemployment rate might have indicated. Well before the unemployment rate approached its pre-pandemic levels, employers were pushed to raise wages in order to attract and retain workers. Most notably, this wage growth occurred in industries where workers often have the least bargaining power and face the lowest pay, in retail, services, food, and accommodations.

There were likely two major changes to labor markets in 2021 that provided temporary boosts to workers' bargaining power. First, the massive level of layoffs and business closures that accompanied the pandemic meant that labor market frictions that gave employers a degree of monopsony power over their workforce were dissolved in one fell swoop. These frictions are highly powerful in keeping workers from even obtaining information about jobs with higher wages in their immediate area (Jager et al. 2022). By the end of 2020, tens of millions of employee-employer ties had been severed by the pandemic, but then at the beginning of 2021 the extremely large fiscal relief convinced employers to staff up quickly. This rapid staffing-up happened in the context of workers facing far fewer frictions keeping them tied to their current employer (and muting upward wage pressure) than is the norm. As more and more new employee-employer matches were cemented as 2021 turned into 2022, the same forces that introduce frictions into workers' job-search and competitive searching seem highly likely to re-assert themselves.

The second major component of workers' empowerment in 2021 was the role of pandemic aid in providing a wealth buffer. This buffer bought workers time to find employment that suited them while still covering their costs, rather than being forced back into the first available job regardless of its fit for them. Economic impact payments (EIPs, often called simply stimulus checks), expanded unemployment insurance, and the monthly Child Tax Credit gave workers the ability to build up savings and accumulate a level of financial security that had been largely unavailable any time before the pandemic for tens of millions of workers. This translated into significant bargaining power in the labor market. However, while this support was unprecedented, it was also short-lived, and both employers and workers knew with a high degree of certainty when this aid would turn off. The last stimulus check was mailed in January 2021. Enhanced unemployment insurance and the CTC phased out in fall and winter 2021 respectively. Chetty (2007) has identified the powerful role that having some liquid wealth buffer has in allowing workers to be choosier in their job-search. This role of a wealth buffer-for-all made job-search and wage offers in 2021 far different than they were during normal times.

One could imagine how policy efforts to restrain employers' monopsony power and to give workers a better fallback position in the face of job-loss could have permanent effects. If, for example, a major change to labor law allowed workers to unionize even in the face of today's hostile employer class, then this could easily provide a permanent source of countervailing power to monopsony (see, for example, Benmelech, Bergman, and Kim (2021)). And aspects of the pandemic relief (particularly the enhanced child tax credit and an increase in the protectiveness of the UI system) could have also been made permanent. But, the simple fact is that none of the underlying boosts to workers' bargaining power that characterized the 2021 labor market continue to exist today. This fact strongly suggests that any unique labor market worker power experienced in 2021 is likely to be temporary, rather than permanent.

II.2.1 Why were the large wage ripples such a surprise – and why are we sure they'll dampen?

We noted before the primary policy-relevant distinction between a view that sees recent inflation as the result of macroeconomic overheating versus a view that sees it as a series of shocks and ripples concerns the role of demand management. If inflation is the result of aggregate demand exceeding potential output (and if one imagines potential output is fixed – “it is what it is”) then the only remedy is to slow demand growth, even if that leads to higher unemployment. If inflation instead has been driven by shocks and ripples, and if the ripples eventually dampen, then inflation can normalize without engineering higher unemployment.

We also noted that wage growth in 2021 and early 2022 was quite rapid in historical terms, and the ability of US workers to shield their real incomes from inflationary shocks was unexpectedly robust. This raises a couple of questions: (1) if the ripple effects of higher wage growth following inflationary shocks was so large, why can we be sure that they will eventually dampen themselves? (2) Was the inflation of the past 18 months driven by wage growth or not?

On the first question, the simplest answer is that for decades wages for American workers have responded only weakly to price shocks in the short run. **Figure P** below highlights two separate time-periods – 1949-1988 and 1989-2019. In each period, the growth of wages and growth in prices lagged just two quarters is shown. In the earlier period, wage growth was tightly linked to price inflation even in the short-run. In the latter period, there is essentially no durable relationship at all. In sum, recent decades had seemed to break any quick link between price spikes leading to immediate changes in wages. It's certainly possible that the pattern that held between 1989 and 2019 was somehow completely overturned in the post-pandemic period and we are headed back to an era where wages will respond quickly to price shocks. But there needs to be a long period of quite-compelling evidence on this before we should assume this tight link has been re-established. If instead the non-relationship that has prevailed for the last 30 years is the better predictor of future wage-price dynamics – particularly once the temporary sources of bargaining power we highlighted previously are behind us – then it seems a safe bet that the wage ripples from recent price shocks will dampen soon.

Further, so long as nominal wage growth adjust only partially to price shocks and lags at all behind inflation, then wages are providing a dampening effect on inflation. This has clearly been the case in the recent period. Since May 2021, for example, CPI inflation has risen at an average annualized rate of 6.8%, while average hourly earnings have risen at a 5.0% rate.

Even more compelling, the ripple effect of faster wage growth clearly seems to be abating now that large shocks have stopped coming (and temporary labor market supports have ended). This is true even as quantity side measures of the labor market (like the unemployment rate) remain quite strong. **Figure Q** below shows the growth of average hourly earnings and unemployment over the past 2 years (note that we suppress the very large wage jump accompanying the pandemic-driven layoffs of mostly low-wage workers in mid-2020). Besides showing a pronounced non-relationship between unemployment and wage growth in recent times (casting some doubt on a simple story of labor market overheating), this graph also shows a pretty clear recent deceleration of wage growth.

On the second question (“was the inflation of the past 18 months driven by wage growth or not”), the answer is nearly as simple: largely not. It is true that if nominal wage growth had not budged from the 3% pace that persisted pre-pandemic, then inflation would have been slower over the past 18 months. But it still would have been a historically large inflationary spike.

Further, given that most of the price pressure started from outside labor markets and would have happened anyway, the ability of nominal wage growth to accelerate over this period really did protect workers' real incomes. If all policymakers cared about was keeping inflation as close to the Federal Reserve's 2% inflation target as possible, then the nominal wage growth acceleration of the past 18 months was a problem. If one instead also cared about protecting the living standards of U.S. workers in the context of non-explosive inflation, this wage growth was clearly beneficial.

Figure P: Recent decades have seen erosion of wage response to inflation shocks
Wage growth and lagged (2-quarter) inflation in two periods, 1954–1988 and 1989–2019

Note: Author’s analysis of data from the BLS CES and BEA NIPAs.

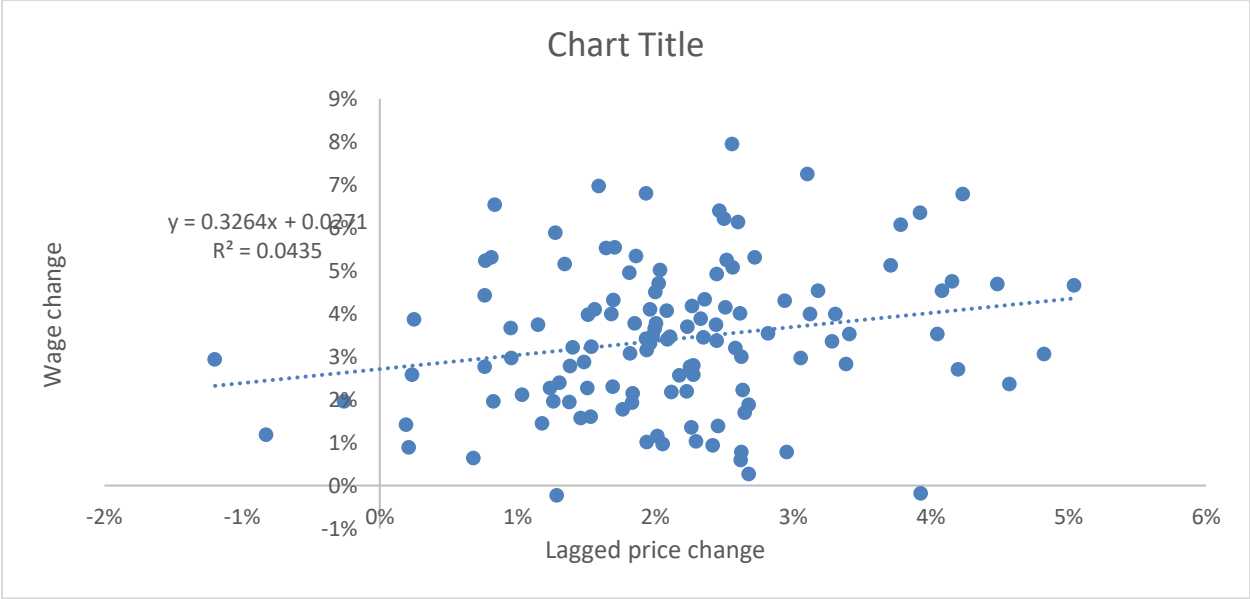
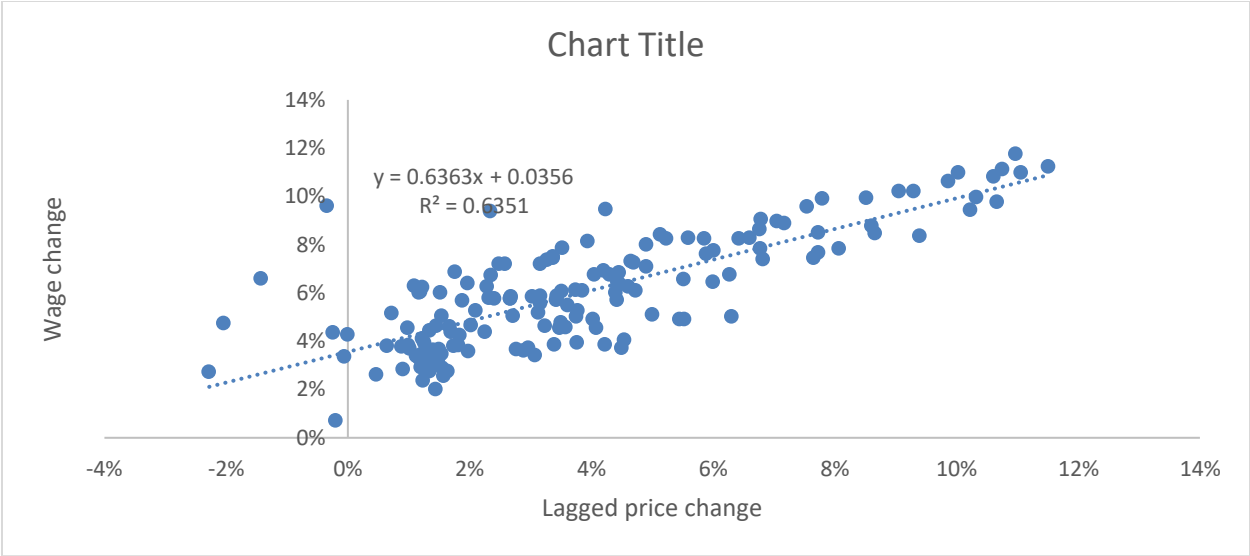


Figure Q: Wage growth looks set to normalize even with low unemployment
Quarterly wage growth (at an annualized rate) and unemployment

Note: Data from BLS CES and CPS.

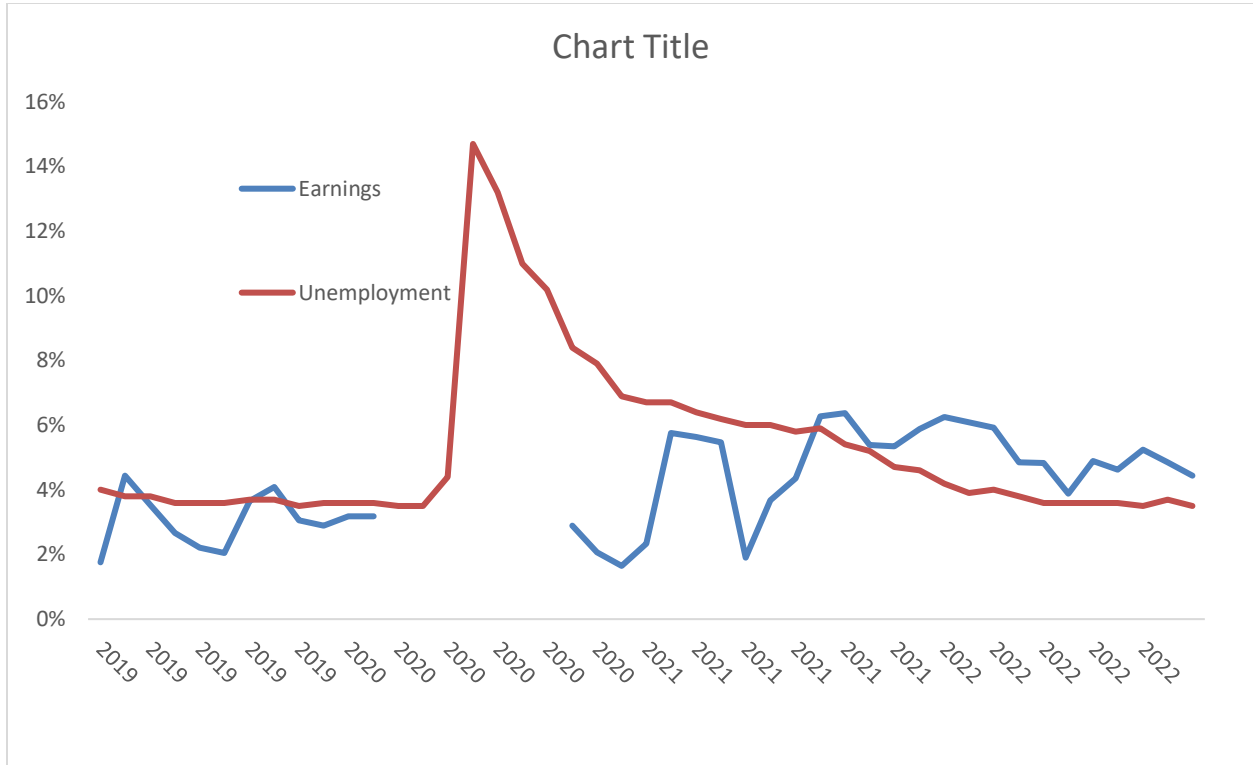
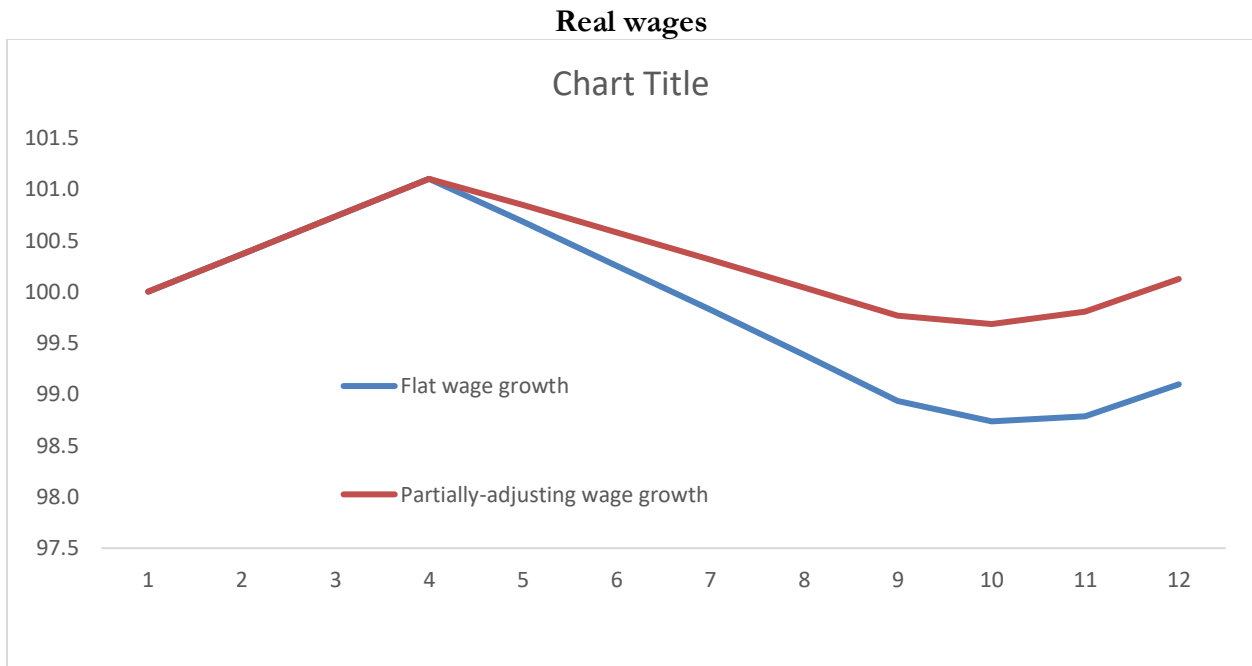
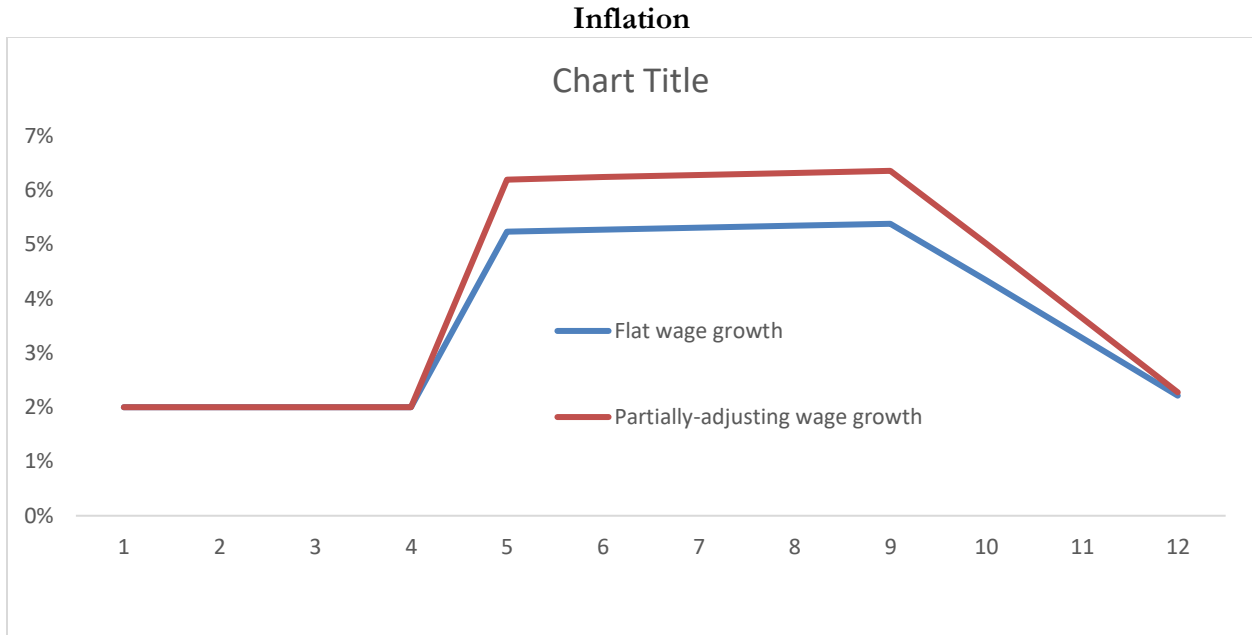


Figure R below provides some very rough simulations showing the inflationary effect of various paces of nominal wage growth. It essentially uses real data on wage growth and then infers what portion of overall inflation was driven by other factors over the past 18 months. It then subtracts out the influence of the faster wage growth seen over the pandemic recovery while allowing these other factors' contribution to inflation to persist. The top-panel compares the resulting evolution of actual inflation versus the counter-factual where nominal wage growth does not accelerate past its pre-pandemic pace. Flat wage growth would have indeed lowered inflation, but a historically notable spike still would have occurred. Finally, the bottom panel highlights how much lower inflation-adjusted wages would be today had nominal wage growth not accelerated but other inflationary forces were felt over the past 18 months. Even with the higher inflation rates prevailing in the model where nominal wages partially-adjust to price shocks, real (inflation-adjusted) wages fall less in the scenario with partial wage adjustment relative to the one where wage growth remains flat in the face of price shocks.

Figure R: The large wage ripples were good, not bad for the U.S. economy
Simulated inflation and real wage paths for flat and partially-adjusting nominal wage growth



Note: Nominal wage growth in the “flat wage growth” scenario is set at 3.5% and does not change over the course of the inflationary shock. Under the “partially-adjusting” path, wage growth increases 0.5% for every 1% acceleration in overall inflation in the simulation. For the first 4 periods, wage growth is 3.5%, non-labor input cost growth is 3.5%, productivity growth is 1.5%, and inflation is 2%. Then we shock non-labor input cost growth and have it rise to 11.5% for 4 periods and then fall by 2.5% each quarter thereafter until it normalizes.

III. The Role of Mark-Ups

The price of just about everything in the U.S. economy can be broken down into the three main components of cost. These include labor costs, nonlabor inputs, and the “mark-up” of profits over the first two components. Good data on these separate cost components exist for the nonfinancial corporate (NFC) sector, which accounts for roughly 60% of the entire private sector (and likely has strong effects on price-setting even throughout the non-corporate sector).

Since the trough of the COVID-19 recession in the second quarter of 2020, overall prices in the NFC sector have risen at an annualized rate of 7.3%—a pronounced acceleration over the 1.8% price growth that characterized the pre-pandemic business cycle of 2007–2019. As **Figure S** below shows, 40.8% of the increase in the former period (since the recession’s trough in 2020q2) can be attributed to fatter profit margins, with labor costs contributing less than a quarter of this increase. Some have argued that starting this measurement from 2020q2 could represent cherry-picking that overstates this effect. Measuring from the previous business cycle peak of 2019q4 still sees fatter profit margins accounting for a third of the rise in prices in the current business cycle. This is a very high share. From 1979 to 2019, profits only contributed about 11% to price growth (and - not shown in this figure - labor costs over 60%). Through the end of 2021 – the period of greatest price acceleration – profits contributed well over half of the entire increase in prices.

III.1 Do fatter profit margins imply *more* corporate power—or just power channeled differently?

The rise in profit margins that account for a disproportionate share of price growth in the current recovery have led to speculation that increased corporate power has been a key driver of recent inflation. Corporate power is clearly playing a role, but an *increase* in corporate power likely has not happened recently enough to make it a root cause of the inflation of 2021–2022. In fact, the rapid rise in profit margins and the decline in labor shares of income during the first six quarters of the current recovery is not that different from the rise in the first few years following the Great Recession and financial crisis of 2008. **Figure T** below shows that starting from the trough of the recession (zero on the horizontal axis), the fall in the labor share of income was actually more pronounced during the early recovery from the Great Recession than it has been so far in the recovery from the COVID-19 recession.

In the recovery from the Great Recession, increased corporate power did not manifest in faster price growth that made room for fatter profit margins—price growth was actually quite subdued over the first few years of that recovery. Instead, corporate power manifested itself in extreme wage suppression (aided by high and persistent levels of unemployment). Unit labor costs actually *declined* over a three year stretch from the recession’s trough in the second quarter of 2009 to the middle of 2012. The general pattern of the labor share of income falling during the early phase of recoveries characterized most of the post–World War II recoveries, though it has become more extreme in recent business cycles (see Figures G and H in [this report](#)).

Figure S: Profits make large contribution to price-growth
 Contribution to price growth in non-financial corporate sector (NFC), various time-periods

Data: Authors' analysis based on data from BEA NIPAs.

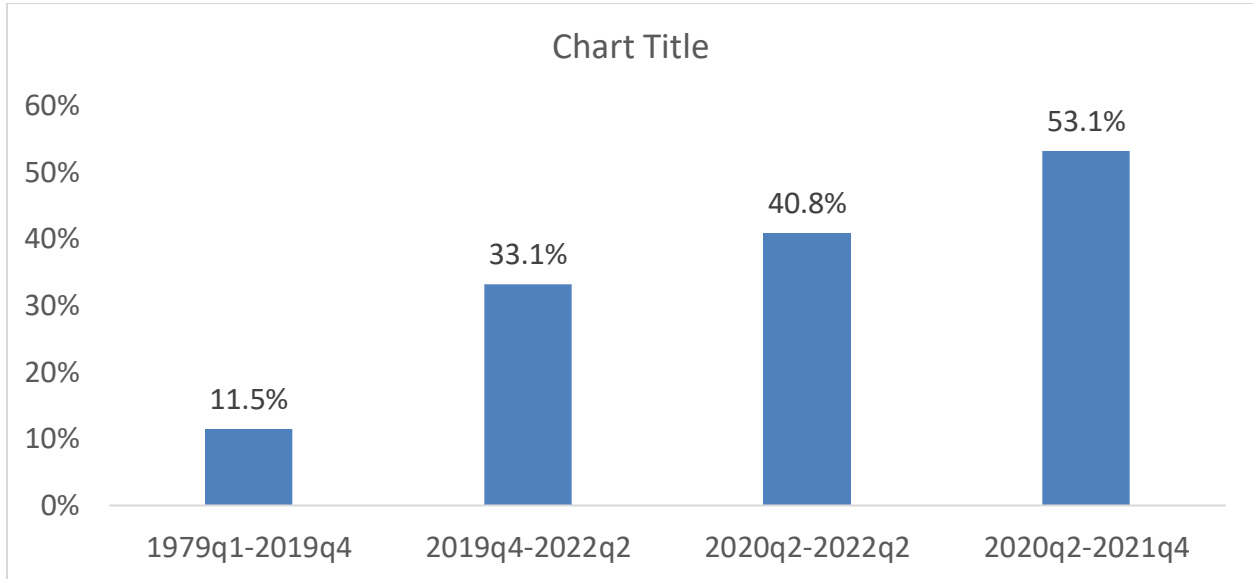
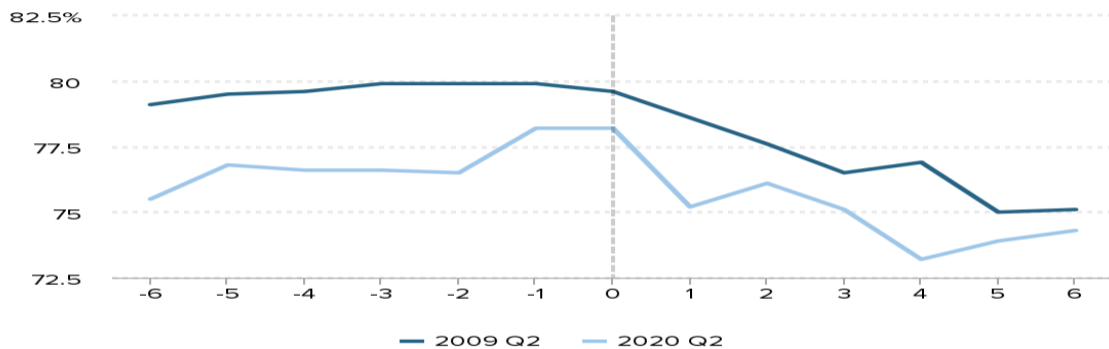


Figure T: Corporate power present – but channeled differently – in last 2 recoveries
 Labor share of income in first 6 quarters of recoveries, last 2 business cycles

Note: Author's analysis of data from BEA NIPAs.

Labor share of income in first six quarters of recoveries, current and previous recession



Notes: Labor share for the fourth quarter of 2008 was smoothed to remove a large spike in the data stemming from large write-offs of underperforming assets in the financial sector during the financial crisis of that year. The vertical line at zero on the horizontal axis denotes the recession's trough.

Source: Underlying data from Tables 1.14 and 6.16D of the BEA NIPA. More detailed methodology can be found [here](#).

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Given that the rise in profit margins was similar in the 2008 recovery and the current one, it's hard to say that some *recent* rise in corporate power is the key driver of current inflation. Rather, a chronic excess of corporate power has built up over a long period of time, and it manifested in the current recovery as an inflationary surge in prices rather than successful wage suppression. What was different this time that channeled this power into higher prices rather than slower wage growth? Put simply, the main influence conditioning the recovery from the Great Recession was anemic growth in aggregate demand, whereas the main influences conditioning recovery post-2020 are the pandemic and the Russian invasion of Ukraine.

In previous recoveries – like during the one following the Great Recession, domestic demand growth was slow and unemployment was high in the early phases of recovery. This led firms to become desperate for more customers but also gave them the upper hand in negotiating with potential employees, which led to subdued price growth and wage suppression.

This time around, the pandemic drove demand through the roof in durable sectors and employment has rebounded rapidly, but the bottleneck in meeting this demand on the supply side was largely not labor. Instead, it was shipping capacity and other nonlabor shortages. Firms that did happen to have supply on hand as the pandemic-driven demand surge hit had enormous pricing power vis-à-vis their customers.

IV. Policy in hindsight

Inflation has reached higher peaks and been more persistent than many would have predicted in early 2021. Given this, it is natural to ask what (if anything) should have been done differently by policymakers over this time. If one restricts this policy revisionism to, say, things that could have been done differently only since the end of 2020, obvious answers like “invest more in pandemic preparedness or more-resilient supply chains” are off the table.

The most-pressing policy debate obviously concerns the actions of the Federal Reserve. Many inflation hawks would claim that the Fed has been far “behind the curve” on inflation. It's not always entirely clear just what this means, however. Almost by definition, if the Fed had raised interest rates far enough and fast enough inflation could have been significantly reduced. But the collateral damage of simply raising rates until inflation returns to 2% no matter the broader consequences could have been immense and made this approach easily not worth pursuing.

It's crucial to remember that inflation – particularly a short-run inflation that does not persist for years – generally has no aggregate cost. Instead, it is a purely distributional event. One actor's cost is another actor's income, so as some group (workers, say) must pay more at stores for their consumption goods, the higher nominal prices feed directly into higher nominal incomes for somebody else. We may not like the pattern of redistribution caused by the current inflation (I certainly don't) but it does not follow from this that it carried large aggregate costs.

Unemployment, conversely, really does carry high aggregate costs. By definition an increase in unemployment caused by insufficient demand is economic waste – useful resources that could be deployed to produce more goods and services instead sit idle.

IV.1. Costless rate hikes through expectations management?

A serious case that the Fed had gotten too far “behind the curve” on inflation would wrestle much harder with this potential trade-off. If the claim was that raising interest rates sooner would have

squelched inflation while not requiring much increase in unemployment, this would be a compelling argument. This case is theoretically possible. If one believed that inflation expectations were the driver of nominal wage growth and subsequent price increases in 2021, these expectations (or at least expectations of inflation over the next year) really did move up sharply and efforts – like starting rate increases sooner – that could have kept expectations in check might have helped.

But this assumes both that expectations strongly condition subsequent inflation and that interest rate increases – even if they do not materially affect unemployment – have strong effects on these expectations. Neither of these propositions are super well-supported by the data.

IV.2 The role of interest rates and housing

Outside of expectations, the one area where arguments about quicker rate hikes taking out some inflationary steam without harming the economic recovery more-generally have some potential validity is housing. As we noted earlier, private industry data indicated a very sharp bounceback of both rent inflation and housing prices by early 2021. Subsequent research by Mondragon and Wieland (2022) has shown that the shift to remote work constituted a large positive shock to housing demand in 2020 and 2021.

Housing is by-far the largest single component of price indices, and an acceleration of housing costs in mid-2022 was a key reason why core inflation remained substantially above the 2% target over most of this year. All of this provides some support for claims that the Fed should have raised rates more quickly on the heels of the passage of the ARP.

In real-time, however, it's not a complete slam-dunk that this should have happened. The Mondragon and Wieland (2022) results clearly imply that the housing price increase have a strong transitory element - unless a growing share of the population switched to remote work steadily over time, there was little reason to think the upward price pressure imposed by this boost to housing demand would be sustained.

Further, if one thought that the shock to housing demand was transitory, then raising interest rates in response has potentially mixed effects. In the longer-run, higher interest rates are clearly associated with reduced housing construction, limiting supply and actually exacerbating any excess demand. But even in the short-run, Dias and Duarte (2019) have found evidence that interest rate increases can actually increase rent inflation. The mechanism is through tenure choice – as interest rate increases boost the user cost of home ownership, prospective buyers switch into the rental market. In time, if the higher user cost pushes down purchase prices of homes enough, home owners may choose to rent out rather than sell their homes when they wish to move, hence boosting rental supply. But if in the short-run the effect of interest rate increases on housing prices is ambiguous, and in the longer-run potentially inflationary, it becomes less clear that the housing channel provides strong evidence that the Fed should have raised rates sooner in the current inflationary episode.

That said, the recent Fed rate hikes do seem to have relatively quickly released much inflationary pressure in housing markets, first in home prices and then (relatively quickly) in rental markets. As of October 2022, a few months of actual rent declines had occurred in many cities and forecasters were predicting sharp rental price declines in 2023.

IV.3 Was ARP the original sin of today's inflation

Previously we highlighted evidence casting doubt on the claim that the ARP was a primary contributor to the 2021-2022 inflation episode. Among other issues, the decomposition of inflation into “demand” and “supply” factors by Shapiro (2022) indicates that above-trend demand can account for just about 1 percentage points of core inflation acceleration by August 2022. One would have to attribute the entirety of this above-trend demand influence on inflation to ARP to use this evidence to indict ARP as more than a bit-player in the inflation acceleration. But, ARP's spending impulse into the economy had largely petered out by the last quarter of 2021. Since the beginning of 2022, the federal fiscal impulse had actually turned historically contractionary. **Figure U** below shows the change in federal net borrowing (-) or lending (+) over the year.

What it shows is that net borrowing by the federal government declined by an average of 10% of GDP over the first three quarters of 2022 (see the large upward spikes at the right edge of **Figure U**). This is roughly *three times more* than the largest pre-pandemic reduction of borrowing (3.4%), which occurred in 2013 when fiscal austerity was widely acknowledged to be dragging heavily on growth from the Great Recession. Before 2007, the largest change in year-over-year borrowing was just 2.0%, a fiscal contraction less than a fifth as intense as the one in 2022.

For further perspective, note that the swing in net borrowing by the household sector that caused the Great Recession and financial crisis of 2008 was roughly 9% of GDP, but spread over more than two years. In that episode, the deflating housing bubble led families to reduce spending to make up for lost wealth driven by falling home prices. This bursting of the housing market bubble is why the Great Recession began and why it was so damaging. Further, this private-sector contraction in borrowing in 2006–2009 was even larger than the one that led to the Great Depression in the 1930s. In short, this evidence should make it a hard to blame fiscal policy *writ large* for an inflation that has persisted (and even accelerated) after this policy swung hard from expansionary to historically contractionary.

One possibility for ARP's effects to spill over well into 2022 is the ability of households to spend down the “excess savings” made possible by the fiscal aid in 2021. This is certainly plausible. The fiscal aid was almost surely significantly saved (which is why actual GDP did not spiral rapidly above potential GDP in 2021 and early 2022). **Figure V** below shows the increase in net worth of the bottom 50% of households and the size of pandemic fiscal relief – this relief can easily explain the rise in net worth, and this in turn can explain a potential “long fuse” of ARP as the aid initially boosted personal savings rates and then was spent out over time.

Figure U: Fiscal policy became historically contractionary in 2022
 Change in net borrowing (-) and lending (+) by federal government

Note: Data from BEA NIPAs

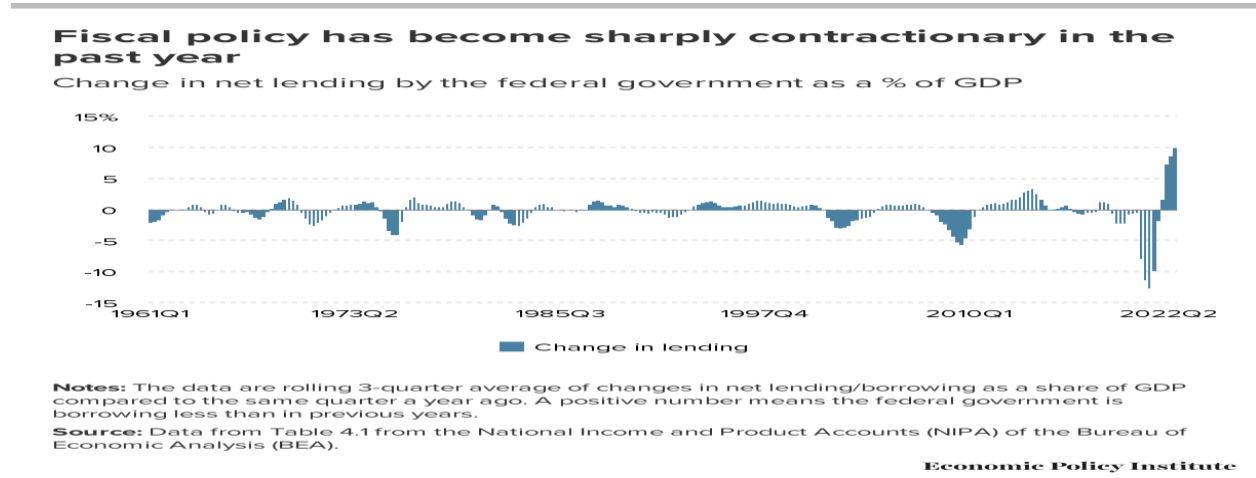
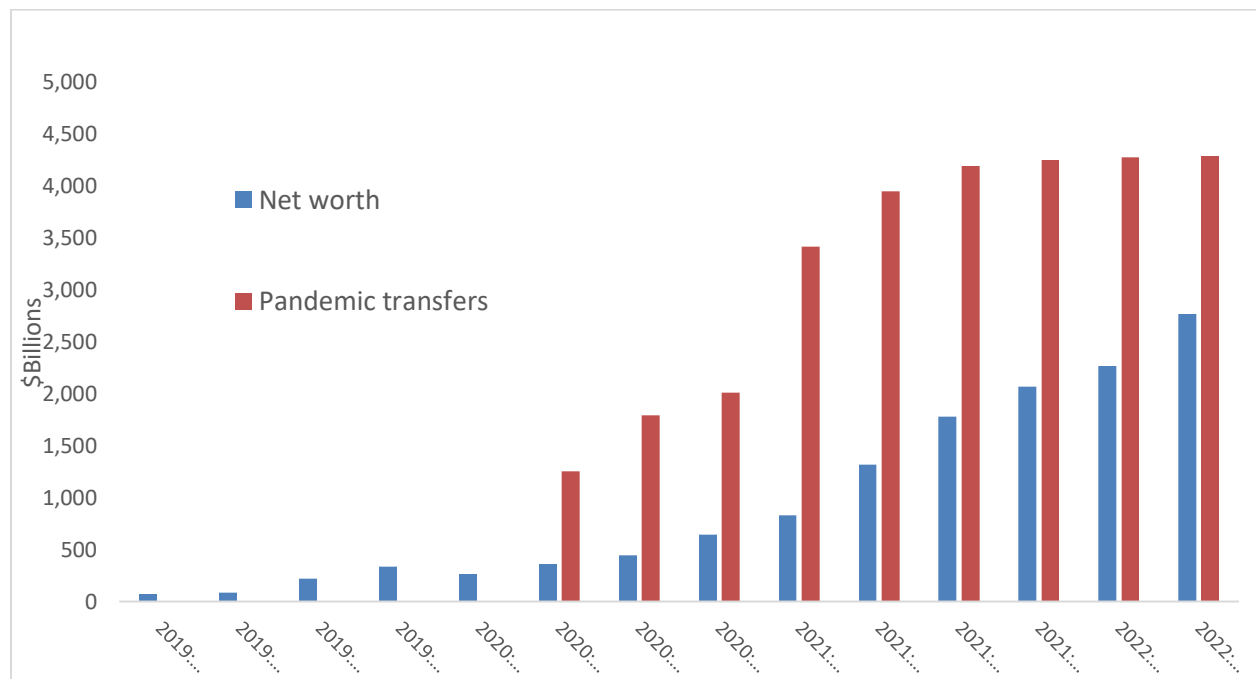


Figure V here: Pandemic aid and excess savings

Net worth of bottom 50% of households and cumulative pandemic fiscal aid for bottom 50%

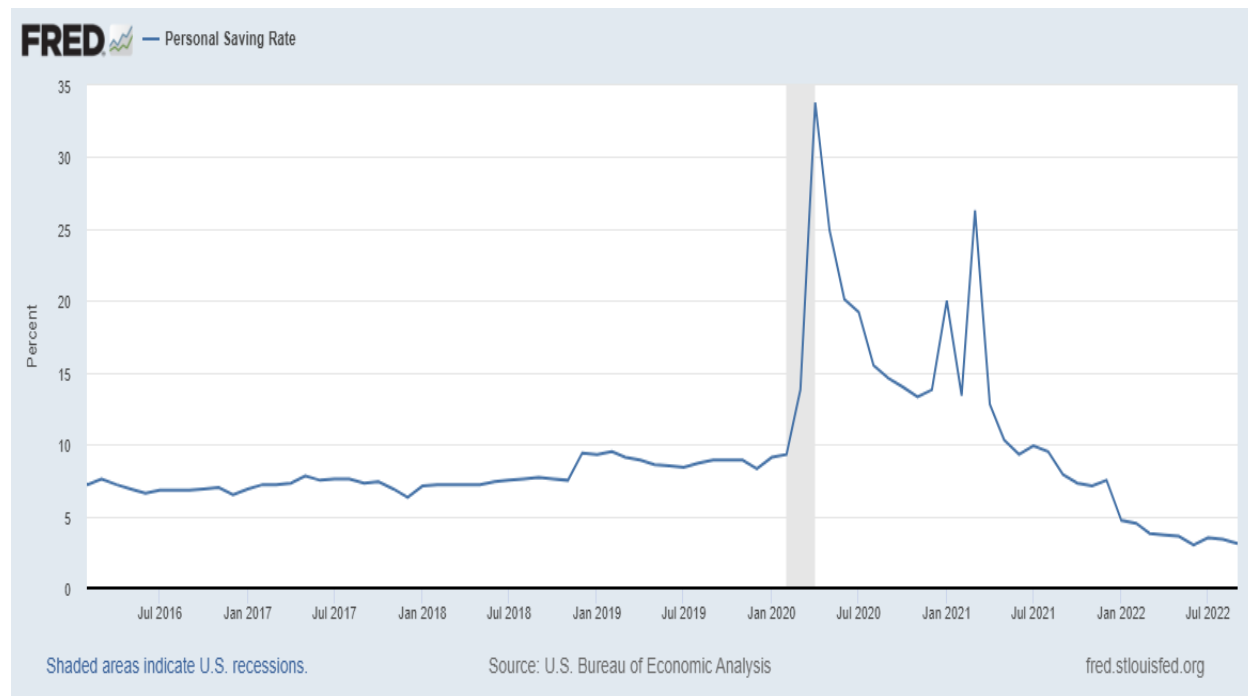
Note: Net worth data from the Federal Reserve’s distributional financial accounts. Data on pandemic fiscal aid from the BEA special release on the effect of pandemic relief on personal income. Distribution of this aid taken from the Tax Policy Center (TPC) analysis of pandemic aid packages.



Some have pointed to the recent rapid falls in personal savings rates as evidence that this built-up excess savings from ARP was being rapidly spent-down in 2022 and fueling too-fast demand growth (see **Figure W** below for recent fall in savings rate).

Figure W: Personal savings surged then declined quickly post-pandemic
Personal savings rate (savings as % of disposable personal income), 2015-2022

Note: Data from BEA NIPAs



However, much of the rapid decline in personal savings above might be mostly a statistical quirk unrelated to households spending down their pandemic assistance. This savings rate is measured as one minus the ratio of personal outlays divided by disposable personal income. As disposable personal income falls, the ratio of outlays to income rises and the measured savings rate falls. A very rapid increase in tax collections in 2022 led to a sharp fall in personal disposable income. Further, this increase can be near-fully explained by “non-withheld” income taxes – which largely consist of capital gains taxes. Crucially, capital gains *taxes* push down measures of disposable personal income, but capital gains themselves are not included in measures of income. So as these collections rise, the savings rate is pushed down mechanically. **Figure X** below shows the very sharp rise in federal income taxes as a share of personal income in recent quarters, and shows that nearly all of this rise is accounted for by non-withheld personal income taxes.

IV.3.1 Could ARP have been structured differently to have caused less inflation?

With the benefit of hindsight, there are some changes to ARP one could have imagined. One reasonable-sounding change that was discussed in real-time – spreading the disbursement of funds over a longer time-span – actually would likely not have made much difference. As Figure W above shows, the large rise in pandemic aid was associated not with a huge wave of new spending, but instead a large rise in savings (and net worth). Almost by definition, the large spike in savings kept

much of the pandemic aid from translating quickly into new demand. Over time the excess savings has been run-down, but in a sense households' own decisions smoothed out the spend-out of pandemic aid by itself; a legislated "longer fuse" on this spending would not have slowed the spending much relative to what actually occurred.

The highest value of this pandemic aid – even when not spent – may have been the potential boost it gave to jobseekers' fallback position when searching for jobs, and the resulting acceleration of nominal wage growth. This wage growth is often seen solely as a contributor to inflation. But as we showed in Figure R, most of the inflation seen over the past 18 months would have occurred even if nominal wage growth had not accelerated at all. Given this, the nominal wage acceleration was valuable in protecting workers' real incomes against the inflationary spike.

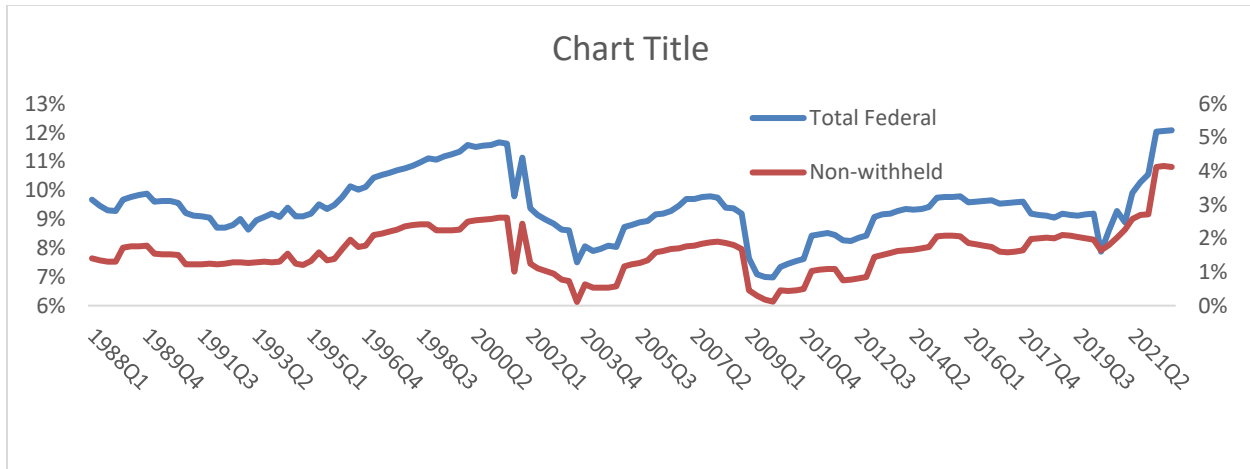
The changes to ARP that could have potentially blunted inflation in 2021 and early 2022 instead would have been either simply a significantly lower level of spending, or changes that would have been seen as extremely heterodox. On simple levels of spending, reductions of more than 20% in the total size of the fiscal impulse in 2021 would have almost surely seen higher unemployment and lower nominal wage growth throughout the year.

In terms of heterodox changes, one could imagine making some of the fiscal relief come in the form of vouchers that could only be spent on goods with a substantial lag. This would have given supply chains time to heal and provided an incentive to firms to invest heavily in repairing these distribution networks, knowing that customers would be waiting.

Another heterodox policy that could have blunted some of the major drivers of inflation was a temporary excess profits tax. We pointed out before the very large role of fatter profit margins in driving price increases. Putting a large windfall tax on profits over and above pre-pandemic margins could have blunted the incentive for firms to respond opportunistically to pandemic distortions (like impaired supply chains) that had temporarily reduced competitive pressures to keep prices low. There were some sectors where the pros and cons of such a tax would have to have been carefully weighed. Oil drilling and refining, for example, has been plagued for years with depressed investment, and this investment has responded sluggishly even to the extraordinary profits of recent years. This investment dearth has made the energy price spike in the U.S. historically large. An excess profits tax could have hence even further reduced this type of investment and made the energy price spike even worse. Then again, if investment in oil drilling and refining did not respond robustly to the highest profit margins in history for the sector, maybe relying on high after-tax profit margins to relieve price pressure in this sector was never going to work?

**Figure X: Capital gains taxes likely depressing personal savings rate
Tax rate on personal income (including non-withheld taxes), 1988–2022**

Note: Data from BEA NIPAs



V: What do macroeconomists and policy analysts need to know about inflation going forward

There is a lot of truth to claims by macroeconomists that monetary policy can eventually neutralize the effect of relative price changes and restore inflation to a target level. And it is also true that looking at the contributions to overall inflation in a given month made by specific sectors, and then just pulling those sectors out and finding reassurance that what is left over is not-that-fast inflation is a bad way to do policy analysis.

But, throughout the current inflationary episode a stronger claim has been often made: relative price changes (and the sectoral shocks that caused them) are irrelevant to inflation even in the short-run. Inflation is, in this view of the world, by definition evidence of a *macroeconomic* imbalance that needs rectified by changing macroeconomic aggregates.

This absolutely does not follow. The initial surge of inflation in 2021 occurred with unemployment still substantially higher than it was in the 2 years before the pandemic. As unemployment fell and other measures of macroeconomic tightness surged in late 2021 and early 2022, core inflation largely stabilized, and key measures like nominal wage growth began falling.

Restoring intellectual respectability in policy debates to explanations that hinge on key sectoral imbalances is a key task for inflation analysis moving forward. It really should not be that hard. Analyses that highlight the crucial importance of particular sectors and (shocks to them) loom large in macroeconomic theories of long-run growth (see Blanchard and Kremer (1997) and Jones (2006)). It hardly seems like a huge stretch to go from sectoral shocks causing long-run collapse in aggregate output to sectoral shocks causing an increase in medium-run (say 3-5 years) inflation dynamics.

Another crucial task for making inflation analyses smarter going forward will be returning conflicting claims explanations of inflation's persistence to prominence. Again, Tobin (1981), writing about the last large American inflation, expressed much wisdom that has seemingly been lost:

“[I]nflation is the symptom of deep-rooted social and economic contradiction and conflict. There is no real equilibrium path. The major economic groups are claiming pieces of pie that together exceed the whole pie. Inflation is the way that their claims, so far as they are expressed in nominal terms, are temporarily reconciled. But it will continue and indeed accelerate so long as the basic conflicts of real claims and real power continue”

This will become especially important in any happy scenario where the decade-long effort to shift bargaining power away from workers and towards workers is overturned. Distributional conflict – and nearly every other determinant of inflation's persistence – has been easy to ignore for decades, simply because this conflict was well and truly settled in capital's favor and inflation remained entirely quiescent. This settlement on capital's terms was a disaster for the living standards of the vast majority, and it should be a progressive priority to overturn it and restore some bargaining power back to typical workers. But doing this – as 2021 demonstrated – will require keeping a close eye on inflationary dynamics.

Finally, today's inflationary episode raised many questions about housing. The most-obvious one is whether or not more-timely measures of rent inflation can be used in analysis of macroeconomic stabilization policy. The backwards-looking nature of housing prices in official indices really did leave many of us a bit behind the curve on both the upslope and downslope of price changes. Adams et al. (2022) seem to have done much of the work in demonstrating that more-timely measures of building inflationary pressure in housing can be constructed – these more-timely measures should be a bigger part of the monetary policy “dashboard”.

Another obvious issue in regards to housing is how it responds to interest rate hikes. There are potentially cross-cutting effects. Higher interest rates that slow growth of labor income will reduce demand for all types of housing. But if higher interest rates increase monthly costs of homeownership more rapidly than the price declines they spur lower these monthly costs, there can be a period of time where these rate increases reduce the demand for homeownership, but this in turn increases the demand for rental housing. Because inflation as measured in the CPI or PCEPI is rent inflation, this means that interest rate hikes could actually raise housing inflation. Dias and Duarte (2019) provide evidence that this effect could be relevant empirically. All in all, the evidence of the current episode supports a view that interest rate increases reduce housing and rental prices, but the issues of tenure choice highlighted by analyses like Dias and Duarte (2019) should at least make policymakers think hard over the time-horizon they are hoping prices will respond to rate increases.

Another issue, however, regards the treatment of housing in macroeconomic models. Rognile (2015) has demonstrated that much of the rise in wealth documented by Piketty (2014) was mostly driven by the rising price of housing. A number of analyses of the current inflationary period (and not just journalistic accounts) have argued that a very “hot” economy should naturally lead to rising profit shares and margins (ie, debates over whether or not mark-ups were pro-cyclical). Earlier in this paper, we showed this really did not seem to be the case for the corporate sector. But the corporate sector does not include housing. If housing is in quasi-fixed supply over the short-run then it really could be the case that hot economies start directing more and more income to landlords (and home owners) than either workers or capital-owners.

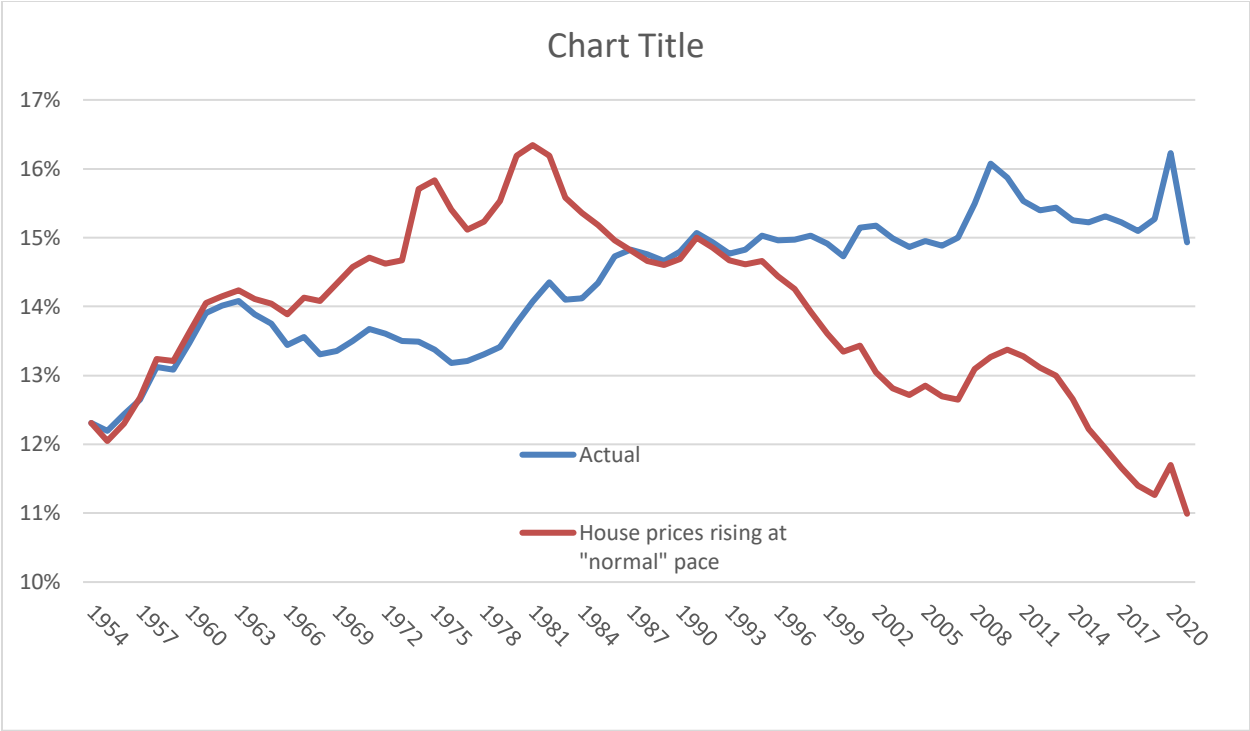
There is some real reason to think this dynamic is getting more likely over time. **Figure Y** below shows the share of personal consumption expenditures going to housing (either tenant-occupied rent or owners'-equivalent rent). It shows the actual share, but then also the share that would have prevailed had the *price* of housing risen at the same rate as non-housing consumption expenditures. Before 1979, this counter-factual actually shows the share of housing rising more quickly than it actually did – meaning that housing prices rose consistently *more slowly* than non-housing prices. Since the early 1980s, there is a steady upward trend (punctuated by up and down spikes driven by the early 2000s housing bubble and the pandemic) in the actual housing share and a steady downward trend in the counter-factual, meaning that housing prices are rising substantially faster than non-housing prices.

In short, if there was some wealth class in the economy that threatened to generate “forced savings” away from workers as the economy heats up over the course of a business cycle, it seems like housing might be it. The policy agenda to combat this is a whole new topic, but, incorporating the dynamics of housing prices in a wider macroeconomic model could be a fruitful range of research spurred by the current inflationary episode.

Figuring out the impact of a global pandemic and war on inflation dynamics was always going to be challenging. Even worse, smart analyses of inflation, its causes and proper remedies atrophied over recent decades as inflation seemed near-permanently tamed. It is highly likely that in a few years inflation will have returned to near-irrelevance once the pandemic shock is past. But we should realize now that shocks happen, and if smart analysis is not in the economists' mental toolkit, less-smart reflexes will dominate policy discussion.

Figure Y: Housing prices steadily rising and crowding out other consumption
Housing’s share of total consumption expenditures, actual and simulated under assumption of no excess housing price growth, 1954–2022

Note: Author’s analysis of data from the BEA NIPAs. We back out an implied non-housing price deflator for the PCE by using expenditure shares. We then only allow housing expenditures to grow at the rate of real growth plus the non-housing price increases to get a counter-factual housing share.



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