PIMCO

Inflation Through the Lens of History

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EXECUTIVE SUMMARY

- The Taylor rule suggests that further monetary tightening is necessary to address the current bout of inflation. In addition, low unemployment gives the Federal Reserve scope to hike rates further.
- However, compared with other episodes of inflation since World War II, the sensitivity of the U.S. economy to higher interest rates is exceptionally high.
- Thus, the Fed faces a dilemma: If it is unflinching in stanching inflation, all risk assets could experience a brutal sell-off; if, as we believe, the cost of controlling inflation is too high, then inflation could remain elevated for longer, which could bolster real assets.

Bouts of inflation occur periodically in economic history. But each episode has unique macroeconomic contours. What does history tell us about today's inflationary flare-up and the Federal Reserve's ability to control it?

We answer these questions through the lens of three variables: 1) policy tightness, defined as the difference between the fed funds rate and the rate implied by the Taylor rule (the more positive the difference, the tighter the policy), 2) macroeconomic regime, defined by rates of unemployment and inflation (when inflation and unemployment are both high, monetary authorities will be conflicted and find it harder to tighten) and 3) wealth duration, defined as the sensitivity of wealth (and the resultant sensitivity of GDP) to moves in interest rates.

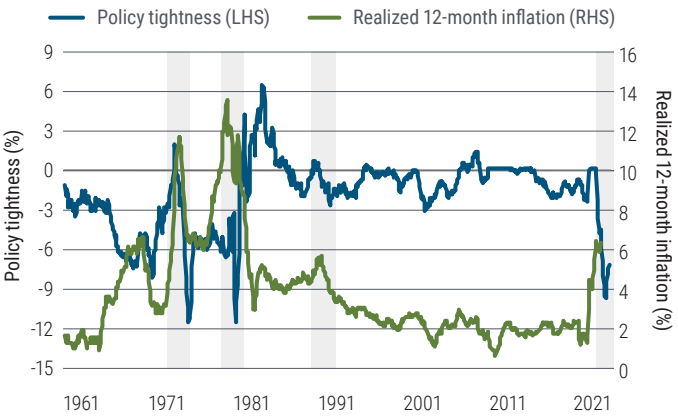
For this exercise, we compare the current episode, which began in May 2021, with past inflationary periods: post-World War II (July 1946–October 1948); the Korean War (December 1950–December 1951); the 1970s (April 1973–October 1982), including the first and second oil crises (1973–1974 and 1979–1980); and the Gulf War (April 1989–May 1991).[1]

First, we look at policy tightness.[2] Historically, realized inflation was higher when policy was loose. For example, the correlation between our policy tightness measure and one-year lagged inflation is -0.4. Exhibit 1 shows that monetary policy over the 2021–2022 period has been looser than during most inflationary crises. In fact, the current monetary posture is about 1 standard deviation looser than the 1973–1982 period and close to the extremes observed during that period.

1 The historical periods are defined in Rouse, Zhang and Tedeschi (2021).

2 The Taylor rule implied rate is defined as $i_t = \pi_t + r_t^* + 0.5(\pi_t - \pi^*) - (u_t - u^*)$, where inflation π_t is proxied using realized year-over year core CPI inflation. R-star (r_t^*) estimates come from Laubach andWilliams (2003). We assume a constant 2% inflation target to calculate the inflation gap, and $u_t - u^*$ isthe employment gap.

Exhibit 1: Policy tightness comparison

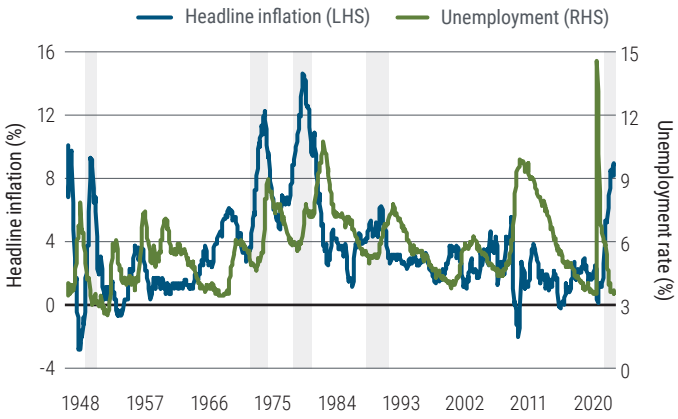


	Average tightness (%)	Distance from May 2021–August 2022 (standard deviation)
April 1973–October 1982	-4.07	-1.1
First oil crisis	-2.42	-1.7
Second oil crisis	-6.13	-0.3
Gulf War	-0.80	-2.3
May 2021–August 2022	-6.98	–

Source: Bloomberg and PIMCO as of 31 August 2022. Shaded regions indicate the first and second oil crises, the Gulf War and the events of 2021–2022.

Second, we contrast the macro regimes. As Exhibit 2 shows, unemployment tends to be high and increase in many inflationary periods. This is problematic for policymakers. To fight inflation, central banks need to raise rates to cool down the economy, inflicting collateral damage by boosting unemployment. Compared with prior inflationary periods, the U.S. economy today has relatively low unemployment, which gives the central bank some room to tighten policy. (Note, however, that there is some redundancy between this measure and the previous one, as the Taylor rule already accounts for unemployment gaps.)

Exhibit 2: Macro regime comparison



	Average unemployment conditional on inflation above 5(%)	Distance from May 2021–August 2022 (standard deviation)
Korean War	3.36	0.5
April 1973–October 1982	6.99	-1.6
First oil crisis	5.30	-0.6
Second oil crisis	6.51	-1.3
Gulf War	5.74	-0.9
May 2021–August 2022	4.22	–

Source: Bloomberg and PIMCO as of 31 August 2022. Shaded regions indicate the Korean War, the first and second oil crises, the Gulf War and the events of 2021–2022.

Finally, we compare asset valuation and the impact of higher real yields on the economy. Exhibit 3 shows the dividend yield of the S&P 500 (valuation), the market capitalization-to-GDP ratio, and the price-dividend (PD) ratio multiplied by the market capitalization-to-GDP ratio.[3] Notice that the PD ratio is approximately the duration of equity; therefore, the PD multiplied by the market cap-to-GDP ratio measure gives the impact of higher real rates on wealth in GDP terms, which we call the wealth duration (in GDP terms). We currently have both rich valuation (high equity duration) and a high market cap-to-GDP ratio. Therefore, the impact of higher real rates could be quite significant.

3 We adjust for stock buybacks for the sample after 30 November 1982. To do this, we calculate the payout ratio as the average dividend yield-to-earnings yield ratio between 30 November 1885 and 30 November 1982. We then calculate dividend yield as the earnings yield multiplied by the payout ratio for the post-November 1982 sample. Market capitalization is the sum of NYSE and Nasdaq market capitalizations (Nasdaq data is from 1985).

Exhibit 3: Valuation, market capitalization-to-GDP, and wealth-duration comparison

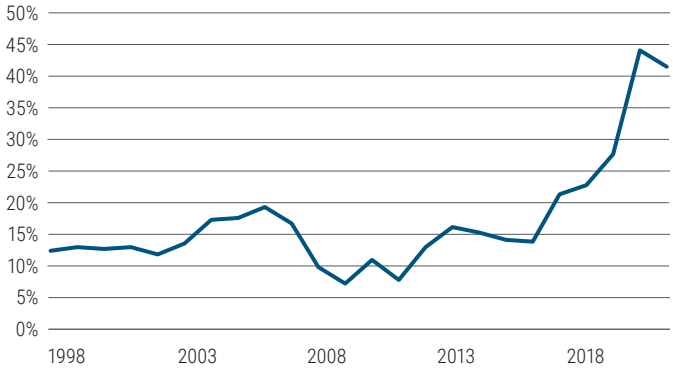
	Average dividend yield of S&P 500	Average market cap-to-GDP	Wealth duration (in GDP terms)	Distance from May 2021–August 2022 (standard deviation)
Post-World War II	5.1%	26.5%	5.07	4.2
Korean War	6.8%	29.5%	1.19	4.3
April 1973–October 1982	4.7%	38.7%	8.80	4.1
First oil crisis	3.7%	47.9%	14.14	3.9
Second oil crisis	5.2%	35.7%	6.92	4.2
Gulf War	4.1%	56.2%	13.94	3.9
May 2021–August 2022	2.1%	224.3%	122.21	–

Source: Global Financial Data, Haver Analytics and PIMCO as of 30 June 2022

How do we size the cost, expressed in GDP terms, of wealth depletion? The academic literature has long been interested in the impact of financial wealth on the macroeconomy, and many papers find a nontrivial effect of wealth on consumption. For example, Modigliani (1971) suggests that a dollar increase in wealth increases consumption by 5 cents per year, and Davis and Palumbo (2001) estimate a 3%–6.5% wealth effect. Using household-level data, Dynan and Maki (2001) and Di Maggio et al. (2020) estimate a wealth effect of 3%–5% per year; Chodorow-Reich et al. (2021) have a lower estimate of 3.2%. One exception is Lettau and Ludvigson (2004), who argue that stock wealth fluctuations are transitory and have little impact on consumption.

Here, we consider an example to show how much of the historical GDP growth resulted from changes in household net worth, assuming a more conservative wealth effect of 3%. In particular, the impact of net worth growth on GDP growth is the net worth-to-GDP ratio × 10-year growth rate in net worth × 3%. We then calculate the ratio between this measure and rolling 10-year real GDP growth rates, at an annual frequency. For example, the household net worth-to-GDP ratio at the end of 2011 was 4.0, and the real growth rate of household net worth during the 2011 to 2021 period was 81.1%; therefore, the wealth effect on GDP was 4 × 81.1% × 3% = 9.7%. The real GDP growth during this 10-year period was 23.4%; therefore, the wealth effect accounted for 42% of GDP growth. Exhibit 4 plots how much of the GDP growth can be accounted for by net worth growth. It shows the wealth effect has increased drastically in recent years, suggesting that a severe equity drawdown could have a large negative impact on growth.

Exhibit 4: Wealth effect as % of GDP growth



Source: FRED, Haver Analytics and PIMCO as of 31 December 2021

How should one assess this information? Exhibit 5 summarizes the distance between current and past events for all three metrics. In a nutshell, we can draw several conclusions in comparison with previous inflation episodes: 1) Today's rates are far below Taylor rule levels, 2) unemployment is low and 3) the sensitivity of the economy to real rates is extremely high. If the Fed focuses on conventional economic indicators (i.e., 1 and 2) without worrying about wealth sensitivity to real rates (i.e., 3), then disinflationary policy may turn out to be costly indeed.

Exhibit 5: All metrics

	Policy tightness	Macro regime	Wealth duration
Post-World War II	–	–	4.2
Korean War	–	0.5	4.3
April 1973–October 1982	-1.1	-1.6	4.1
First oil crisis	-1.7	-0.6	3.9
Second oil crisis	-0.3	-1.3	4.2
Gulf War	-2.3	-0.9	3.9

Source: Bloomberg, Global Financial Data, Haver Analytics and PIMCO as of 31 August 2022. Data for policy tightness and macro regime is not available during the post-World War II period, and data for policy tightness is not available during the Korean War.

As seen in Exhibit 5, the outlier compared with past inflationary episodes is wealth duration, which is 14 times higher than it was during the 1970s. This is the elephant in the room. If the Fed continues to tighten and supply disruptions persist, then real yields could increase further. In this case, wealth destruction and the impact on economic activity would likely be substantial. The converse is true if real yields fall. Current wealth duration indicators favor higher volatility and increase the risk of a Fed policy mistake.

Let us consider a concrete example: In a scenario in which long real rates increase by 100 basis points (bps), then, all else equal, the value of U.S. wealth could fall by a third. Assuming a wealth-to-GDP ratio of 6, the loss of wealth would be twice U.S. GDP. A 3% wealth effect would mean a loss of 6% of GDP – that is, an economy growing at 3% would instead shrink by 3% due to negative wealth effects. The wealth effect could flip the economy from healthy growth into a deep recession.

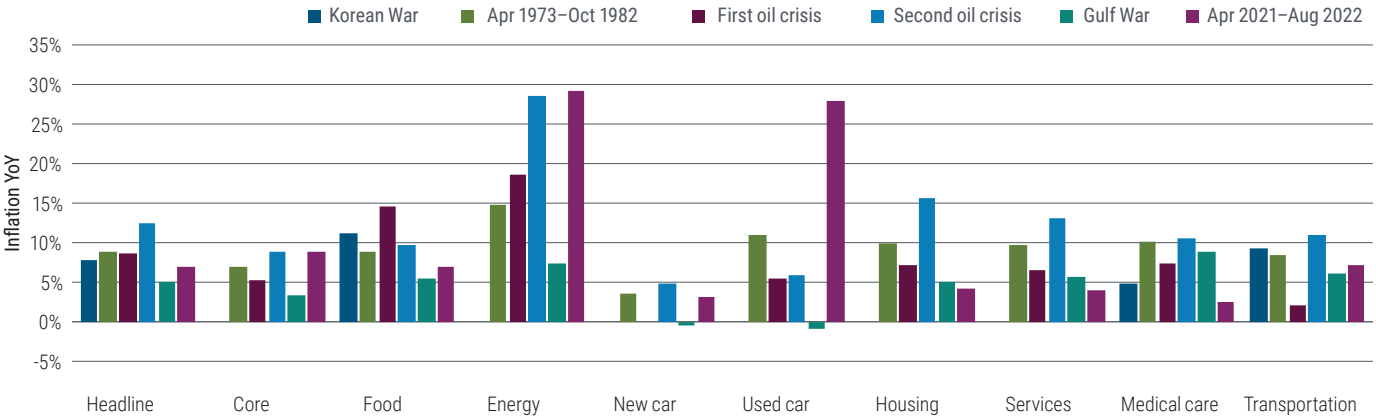
Although this is entirely conceivable, a 100 bps increase in long real rates is not a central scenario, for three reasons. First, the equity risk premium (calculated as the cyclically adjusted yield on the S&P minus the 30-year real yield) is low at about 2.25%. A 1% increase in long-term Treasury Inflation-Protected Securities (TIPS) yields would cut the equity risk premium to 1.25%. This would be close to unsustainable, and there would be pressure for an equity sell-off. Second, the bid from the pension sector for long TIPS would be substantial. Third, in a scenario in which the Fed needs to take short real yields substantially higher to control inflation, the TIPS curve would likely signal a reversion to lower inflation and invert substantially. Yet because the economy is so sensitive to the level of real yields, even a moderate sell-off in long TIPS of, say, 50 bps would be enough reason to worry.

In addition, understanding the sources of inflation could help us assess possible monetary policy and asset price responses. Exhibit 6 shows the average year-over-year (YoY) inflation in different sectors during past inflationary episodes. Energy and used vehicles currently stand out as the main drivers, while inflation for shelter and broader services remains low compared with previous episodes. Even though high inflation in energy and used cars seems to point to supply-driven inflation, substantial fiscal stimulus and the post-pandemic recovery in spending are demand-related. Therefore, unlike the two oil crises, when inflation was mainly supply driven, the source of the current episode is less clear.[4] To better understand today's price changes, Shapiro (2022) decomposes personal consumption expenditure (PCE) inflation into supply- and demand-driven inflation.[5] Exhibit 7 shows that under this decomposition about 50% of the PCE inflation comes from supply-driven sectors and about 30% comes from demand-driven sectors.

4 For example, Bourne (2022) discusses the rationale for both supply- and demand-driven inflation. Di Giovanni (2022) shows that about 60% of the inflation between 2020 and 2021 was driven by aggregate demand.

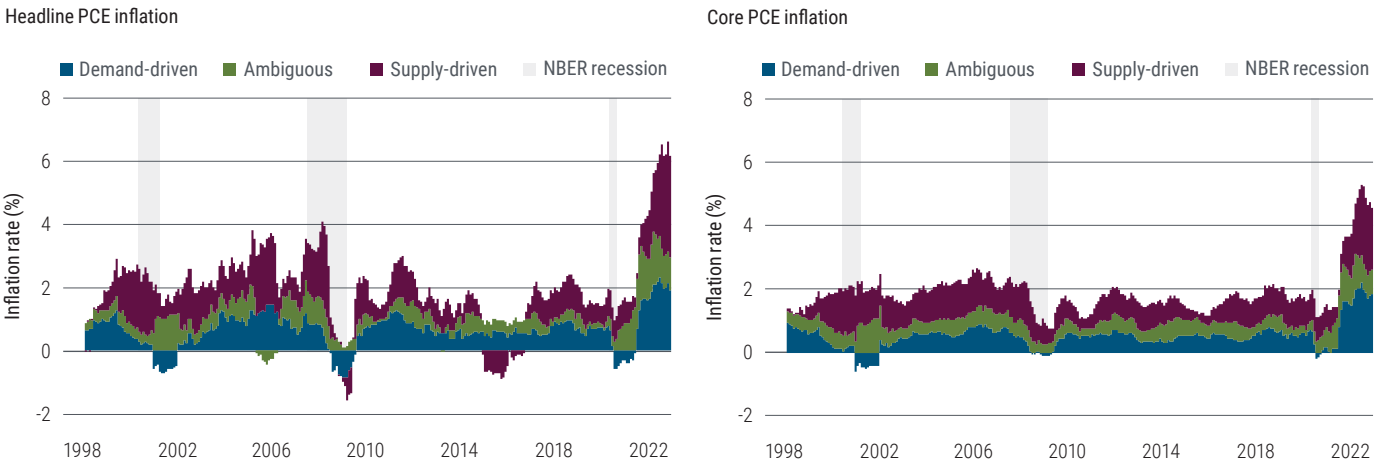
5 The author looks at shocks to prices and quantities for different sectors. Sectors with demand- (or supply-) driven inflation are those for which the shocks are in the same (or opposite) direction. A sector is labeled ambiguous if there is no clear quantity or price shock.

Exhibit 6: Average YoY inflation



Source: Haver Analytics and PIMCO as of 31 August 2022. Inflation data for core, energy, used car, housing, services and medical care are not available for the Korean War sample.

Exhibit 7: Decomposition of PCE inflation



Source: Federal Reserve Bank of San Francisco and PIMCO as of 31 July 2022

Why is the source of inflation important? On one hand, monetary policy works to suppress demand, so it is most effective in controlling demand-driven inflation. On the other hand, it has limited impact on cost-push inflation, so the central bank may overshoot on the demand side to offset the supply-side effect, leading potentially to more recessionary pressure in general.

What does this imply for portfolios? If the Fed is unflinching in its resolve to bring inflation back to target, all risk assets may experience a sell-off. If, as we believe, the cost of controlling inflation is higher (e.g., because monetary policy ends up causing a recession to control a supply-driven inflation), then the Fed is in a pickle.

In this scenario, if the Fed ultimately draws its legitimacy from the political process, then inflation could remain higher for longer. Assets related to the cost-push side (such as commodities) should then outperform assets affected by demand-pull forces (such as cyclical equity). In this scenario, investors would be too short inflation and too long stocks in their portfolios. They could likely benefit from higher allocations to real assets relative to growth assets.

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