On the Impact of the Pandemic-Driven Fiscal Stimulus and Monetary Policy on Inflation and Bond-Stock Comovement [1]

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[1]This document is based on a research project I carried out for an investment management firm in early 2021 on inflation outlook and the subsequent asset allocation implications.

- ▶ The Federal Open Market Committee (FOMC) approved a revised framework for monetary policy (MP) in August 2020.

- ▶ The Biden administration's $1.9 trillion coronavirus relief plan was passed in March 2021, this came on top of the $900 billion program passed in December 2020.

- ▶ The benchmark 10-year Treasury note traded as high as 1.78 per cent in March 2021, up from 0.9 per cent at the start of the year. The positive US economic data led to an increase in government bond prices in April 2021!

- ▶ I will first highlight the impact of the $2.8 trillion fiscal stimulus on the output gap. Next, I will discuss the implications of the Phillips curve for inflation. Monetary policy comes into play in part as it can impact inflation expectations. At the end, potential implications for asset allocation will be discussed.

Output Gap

▶ Drawing on Blanchard (2021), it is not difficult to arrive at an upper bound for the size of the output gap:

▶ The real GDP in 2020 Q4 was 2.5 percent below its level in 2019 Q4. Prior to the pandemic, the potential real growth had been estimated at around 1.7 percent by the Congressional Budget Office (CBO). This implies an output gap in 2020 Q4 of 4.2% or about $\$900$ billion in nominal terms.

▶ We need an estimate of the multipliers to translate the stimulus into aggregate demand. Blanchard (2021) estimated the mean overall multiplier to be 1.2, with a low and hight estimate of $.4$ and 2, respectively (very high degree of uncertainty).

▶ It seems plausible to think of an overall multiplier of .7 leading to a positive output gap of roughly 5 percent.

▶ The Phillips curve shows the inverse relation between rates of inflation and unemployment. Using Okun's law, the 5 percent output gap would imply an unemployment rate about 2.5 percentage below the natural rate. What would then it imply for changes in the rate of inflation?

▶ There has been a strong consensus view among policymakers, practitioners, and academics that the robust relationship between output and inflation in the 1960s and 70s became much weaker over time, (Powell (2018)).

▶ The perceived flattening of the Phillips curve could be due to: (i) too little variability in macroeconomic data in the past few decades prior to the pandemic as economic up-cycles had become muted over time; and (ii) the impact of monetary policy on the anchoring of inflation expectations.

▶ Consider a well-known formulation of the Phillips curve (Hazell, Herreno, Nakamura, and Steinsson (2022)):

$$\pi_t = \beta E_t[\pi_{t+1}] - \kappa(u_t - u_t^n) + \nu_t,$$

that is, inflation is determined by expected inflation, output gap, and cost-push shocks.

▶ Unlike the Volcker disinflation in the early 1980s, the "missing disinflation" during and after the Great Recession and the "missing reinflation" in the late 2010s led to the view that the Phillips curve had disappeared.

▶ An alternative interpretation emphasizes the anchoring of inflation expectations in the U.S. (Bernanke (2007) and Hazell et al. (2022)).
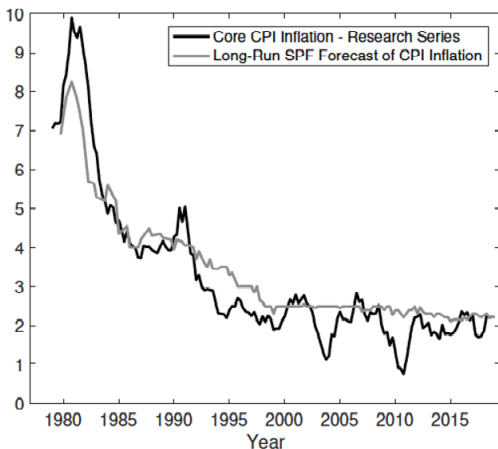
Figure: The grey line plots 10-year-ahead inflation expectation for the CPI. The black line plots 12-month core CPI inflation using the Bureau of Labor Statistics research series. Source: Hazell et al. (2022).

- *Beliefs about monetary policy can feed strongly into inflation expectations.* The Phillips curve model can also be written as:

$$\pi_t = E_t[\pi_{t+\infty}] - \psi \tilde{u}_t + \omega_t,$$

  $\tilde{u}_t$ denotes the deviation of unemployment from its long-run expected value, $E_t[\pi_{t+\infty}]$ represents long-term inflation expectations, ψ is proportional to κ, and ω_t is a function of the long-run natural rate of unemployment and the cost-push shocks.

- In the presence of substantial variation in inflation expectations, the relationship between actual inflation and unemployment becomes uninformative about the slope of the Phillips curve.

- *In the absence of persistent supply shocks, if inflation expectations remain stable and anchored, the estimate of κ is roughly $.6$ percent, the $\$2.8$ trillion could lead to a $.6 \times 2.5 = 1.5$ percent increase in inflation.*

THE REVISED MP FRAMEWORK

- ▶ The main motivation for the revised framework has been low inflation, low real interest rates, and slow economic growth, particularly during the 2000-2020 period.

- ▶ Low inflation and low nominal interest rates pose a challenge for traditional monetary policy, Kiley and Roberts (2017) estimate that the use of traditional policy rules can lead to short-term rates being constrained by zero as much as one-third of the time with adverse impact on economic performance.

- ▶ The two main elements of the revised framework are: (i) MP decision will be informed by the Fed's "assessments of the *shortfalls* of employment from its maximum level" rather than by "*deviation* from its maximum level"; and (ii) the Fed will seek to achieve inflation that average 2 percent over time (Powell 2020). This approach can be viewed as a flexible form of average inflation targeting (AIT).

▶ From the Q1-2021 Inflation Outlook:
The fiscal stimulus coincided with the transition to the new MP regime. Imperfect credibility could become problematic for the new framework: (i) inflation expectations may not respond to the Fed's announcements over a period of time; and (ii) an inflation overshoot could deanchor long-term inflation expectations, particularly in the presence of persistent supply shocks.

▶ Q1-2023 observations after the high inflation of 2021-22:
After the pandemic shock of 2020, the Fed interpreted the global supply chain shock of 2021 and the Russia-Ukraine energy price shock of 2022 as temporary cost-push (markup) shocks. It also relied on inflation expectations being anchored and on the revised framework to keep MP loose for an overly long period of time. In April of 2022, the 1-year inflation rate was 6.3% in the US.

INFLATION EXPECTATIONS

The Distribution of U.S Household Survey Inflation Expectations Through 2021–22
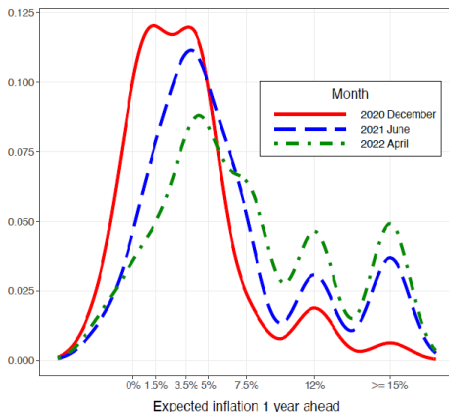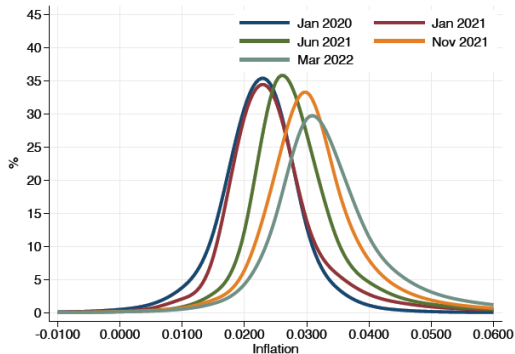
Data from the University of Michigan Surveys of Consumers household expectations for 1-year ahead expected inflation.

FIGURE: 2021 and 2022 data showed a large change in 1-year ahead inflation expectations. Source: Reis (2022).

# 10-Year Horizon Risk-Adjusted Distributions of U.S. Inflation

The 2021-22 drift

FIGURE: Measuring credibility of the Federal Reserve from options markets; long term inflation distributions shift to the right from the second half of 2021. Source: Hilscher, Raviv, and Reis (2022).

Asset Allocation Implications

► An important input to asset allocation decisions is the correlation between bond and stock returns. It is well-known that the bond-stock return correlation switched from positive to negative in 2001.

► It will be insightful to view the correlation between inflation and the output gap as one of the *macro drivers* of the bond-stock return correlation, (Campbell, Pflueger, and Viceira (2020)):

► Consider two time periods: 1979Q3-2001Q1 and 2001Q2-2011Q4. The correlation between inflation and the output gap switched from negative in the first period to positive in the second period. The Fed's strong focus in period 1 was on stabilizing inflation while its interest was more in stabilizing output in the second period. Higher inflation lowers real bond returns, and higher output raises stock returns.

Inflation-Output Gap Correlation & Bond-Stock Correlation
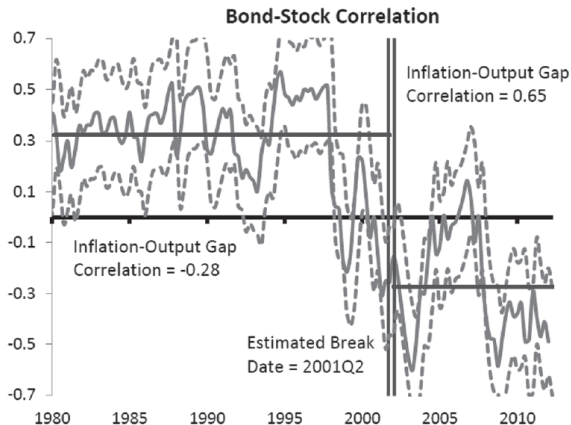
FIGURE: Rolling nominal bond-stock correlations use daily log returns on 5-year nominal Treasury bonds and daily log CRSP value-weighted stock market returns. Source: Campbell et al. (2020).

▶ If the potential inflation overshoot increases inflation volatility and inflation expectations, we could move to a period (12-18 months) where the bond-stock return correlation would switch from negative to positive. This would be in part due to the correlation between inflation and output gap switching from positive to negative, as the Fed would aim to stabilize inflation.

▶ In the long run, under the revised MP framework, the strongly negative bond-stock correlation experienced between 2001 and 2015 could disappear. The emphasis on *shortfall from maximum employment* and the AIT strategy could increase the persistently low inflation experienced during 2000-2020 above the 2 percent target.

▶ Similar to the original framework, the Fed's revised MP regime aims to achieve $\pi^* = .02$ in the long-run. If long-term inflation expectations remain anchored, the 2.8 trillion fiscal stimulus might lead to a manageable and transitory increase in inflation, (perhaps around 1.5 percent in the absence of persistent supply shocks).

▶ Under imperfect credibility, however, the revised monetary regime combined with the fiscal stimulus could deanchor long-term inflation expectations and lead to substantial inflation overshoots.

▶ In the short-run, beliefs about monetary regime changes and fiscal policy can rapidly feed into short-run inflation expectations and subsequently current inflation. The dynamics of the U.S. Treasury securities market in Q1-2021 can be viewed as a function of highly volatile investor beliefs about monetary and fiscal policy.

Q1-2023 Concluding Remarks

- It is unlikely that inflation returns to its 2% target in 2023. Optimistic forecasts remain above target, Goldman Sachs' forecast of 12/2023 core PCE inflation and core CPI inflation are 2.9% and 3.2%, (GS US Economic Outlook).

- A soft landing in 2023 would be feasible if (i) inflation expectations become stable and anchored; (ii) recovery from the supply chain shock and the war-driven energy price shock continues; (iii) the reduction in labor demand does not take the form of spikes in unemployment rate; and (iv) the Fed continues the rate hikes but with a slower pace of around 25bp. Otherwise, in response to a full recession, we will see rate cuts in 2023.

- In the first scenario, bond-stock return correlation could remain positive in 2023 (but weaker than last year). However, under a full recession, the correlation could turn negative, but it would not be as strong as the one experienced from 2001 to 2014.

- Clarida (2020): flexible AIT can be viewed as temporary price-level targeting (TPLT) with one-year memory (Bernanke, Kiley, and Roberts (2019)):

$$i_t^{TPLT} = \rho i_{-1} + (1-\rho)[r^* + \pi_t + .5(\pi_t - \pi^*) + \hat{y}_t + TP_t],$$

where $TP_t = \sum_{j=t_1}^{m}(\pi_j - \pi^*)$; i_{-1} is the realized nominal interest rate; $\hat{y}$ is output gap; $\pi^* = .02$; and $\rho = .85$. The price-level gap starts to accumulate in the first quarter of the effective lower bound (ELB) period and stops accumulating and remains zero when the inflation shortfall is made up at m.

Bonds and Stocks

	79:Q3–01:Q1		01:Q2–11:Q4	
	Empirical	Model	Empirical	Model
Bond-stock comovement:				
Correlation bond and stock returns	.21	.50	−.64	−.66
Beta bond returns on stock returns	.11	.14	−.19	−.16
Nominal-real comovement:				
Correlation quarterly inflation and output gap	−.28	−.37	.65	.35
Correlation 5-year average inflation and				
output gap	−.15	−.05	.20	.14

NOTE.—The bond-stock correlation is the correlation of quarterly log bond excess returns with log stock excess returns. The bond-stock beta is the slope coefficient from regressing quarterly log bond excess returns onto log stock excess returns: $xr^{\$}_{n,t+1} = b_0 + b_1 xr^{\text{stock}}_{t+1} + \varepsilon_{t+1}$. "Correlation 5-year average inflation and output gap" reports the empirical correlation between x_t and $(\pi_t + \pi_{t+1} + \ldots + \pi_{t+20})/20$, where t ranges from the first quarter in the subperiod to the last. We compare this to the analytical model correlation between innovations to expected inflation over the next 5 years with output gap innovations.