US Economics Analyst

The Fed's New Framework

- The Federal Reserve concluded its framework review last Thursday at the annual Jackson Hole Symposium with the adoption of flexible average inflation targeting (AIT). Going forward, the FOMC will aim for inflation moderately above 2 percent following periods when inflation has run persistently below 2 percent in order to average 2 percent over time.
- We see two straightforward interpretations of AIT as a modification to a standard Taylor rule reaction function. The first would temporarily raise the inflation target in the policy rule, say to 2¼-2½%, when average inflation over some trailing window falls short of 2%. The second would add the cumulative inflation shortfall over some trailing window, perhaps starting in a recession, as an additional term in the reaction function.
- To explore what the new framework means for monetary policy and the economy, we use the Fed's macroeconomic model, FRB/US, to run simulations that compare AIT policies with the old framework. We simulate these policies under current conditions using the baseline economic trajectory in FRB/US, which initially follows the FOMC's June Summary of Economics Projections.
- We draw three main conclusions. First, AIT rules appear roughly consistent with our forecast of liftoff around early 2025. Second, moderate AIT policies generate a moderately lower funds rate path and slightly higher inflation and lower unemployment than the old framework, but return average inflation to 2% very slowly. Third, an aggressive AIT policy with a 10-year lookback window generates a much lower funds rate path and somewhat larger economic effects, and returns average inflation to 2% in a little over a decade. These conclusions are sensitive to the baseline economic trajectory and the model's assumptions.
- Our analysis also highlights some limitations of the new framework. Realistic macroeconomic models like FRB/US imply that when the policy rate is at the effective lower bound, lower-for-longer policies like AIT make only a limited incremental contribution to fighting recessions. Even with respect to their more limited ambition of stabilizing average inflation, AIT rules would likely require a quite long expansion to return average inflation to 2%, at least if the Phillips curve remains fairly flat.

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The Fed's New Framework

The FOMC concluded its framework review last Thursday at the annual Jackson Hole Economic Policy Symposium with a speech from Chair Powell and a revised Statement on Longer-Run Goals and Monetary Policy Strategy. The main outcome was the adoption of average inflation targeting.

Specifically, the FOMC now "seeks to achieve inflation that averages 2 percent over time, and therefore judges that, following periods when inflation has been running persistently below 2 percent, appropriate monetary policy will likely aim to achieve inflation moderately above 2 percent for some time." This is a departure from the previous "let bygones be bygones" approach, though Powell emphasized that the FOMC will remain "flexible" and will not be tied to a particular mathematical formula.

The FOMC also noted that it will now respond only to "shortfalls" of employment from its maximum level, rather than to all "deviations" above or below the maximum level. This asymmetric approach to the employment side of the mandate means that an unemployment rate below the estimated longer-run rate is not a sufficient reason to tighten policy. This is a departure from the previous approach of sometimes tightening preemptively in response to concern about potential labor market overheating.

The framework review process had two additional sections, monetary policy tools and monetary policy communication practices, but neither Powell's speech nor the revised statement noted meaningful changes in these areas. We take this to mean that there has been no official upgrade to the status of yield caps and targets (YCT), leaving that potential new tool neither rejected nor formally adopted for the time being. The September minutes might shed further light on the FOMC's latest thinking.

Wrapping up the framework review opens the door to eventually changing the forward guidance and asset purchase program. We continue to expect the FOMC to adopt outcome-based forward guidance that delays liftoff until the economy achieves both full employment and 2% inflation. We also continue to expect the FOMC to transition to a traditional asset purchase program by guiding toward an expectation that tapering will not begin until roughly a year before liftoff, describing the purpose of asset purchases as easing financial conditions and supporting the recovery rather than supporting market function, and tilting the composition of purchases toward longer maturities.

Two Interpretations of Flexible Average Inflation Targeting

What will the changes to the Fed's framework mean in practice for monetary policy? It is helpful to think of the changes as modifications to an inertial "balanced approach" Taylor rule reaction function,

$$i = b * i_{-1} + (1-b) * [r^* + pi + 0.5 * (pi - pi^*) - 2 * (u - u^*)],$$

where i is the nominal policy rate, i_{-1} is the lagged policy rate, b is the degree of inertia between 0 and 1, r* is the real neutral rate, pi is the current year-on-year inflation rate, pi* is the inflation target, u is the unemployment rate, and u* is the longer-run unemployment rate.

We first address the new asymmetric approach to the employment side of the mandate by modifying the rule so that it does not call for tighter policy in response to a low unemployment rate:

$i = b * i_{-1} + (1-b) * [r^* + pi + 0.5 * (pi - pi^*) - 2 * \max(0, u - u^*)]$

We next consider two possible interpretations of average inflation targeting. We consider only asymmetric AIT policies that ease policy in response to past low inflation but do not tighten policy in response to past high inflation because this seems most consistent with policymakers' intentions.

The first AIT rule raises the inflation target temporarily when inflation has persistently run below 2%. For example, the target might rise to, say, 2.375%—the middle of the 2.25-2.5% range that Fed officials appear comfortable with—when the trailing 5-year average inflation rate is below 2%:

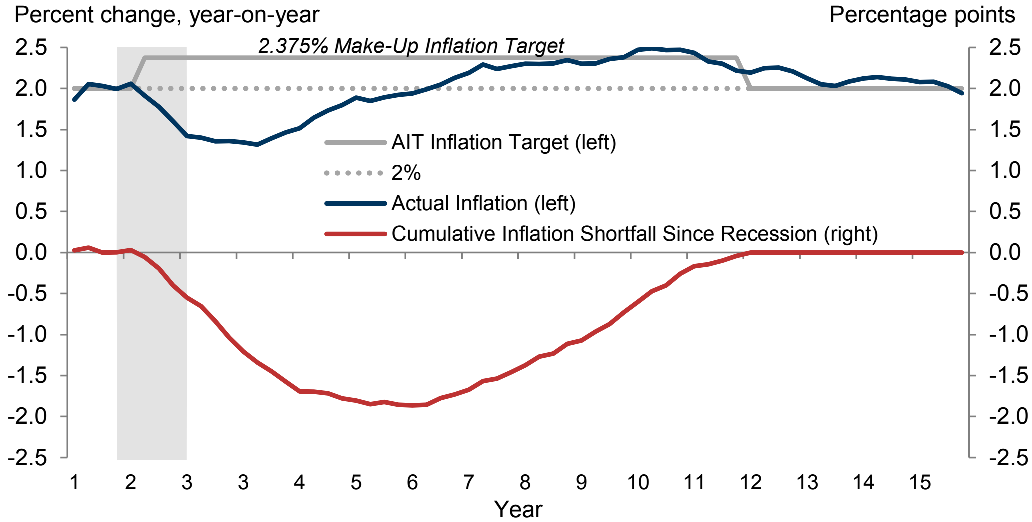
AIT Rule #1

$i = b * i_{-1} + (1-b) * [r^* + pi + 0.5 * (pi - 2) - 2 * \max(0, u - u^*)]$ if 5-year average inflation $\geq 2\%$

$i = b * i_{-1} + (1-b) * [r^* + pi + 0.5 * (pi - 2.375) - 2 * \max(0, u - u^*)]$ if 5-year average inflation $< 2\%$

Exhibit 1 illustrates this approach graphically. In this example, when a recession hits, inflation (the blue line) begins to decline and remains low for several years, resulting in a growing cumulative inflation shortfall (the red line). This triggers a temporary increase in the inflation target from 2% to 2.375% (the solid grey line), resulting in easier monetary policy as shown above. The cumulative shortfall begins to shrink when inflation rises above 2%, and once it returns to zero, the inflation target resets to 2%.

Exhibit 1: One Interpretation of AIT Would Temporarily Set a Higher Make-Up Target When Inflation Has Run Below 2% on Average



Source: Goldman Sachs Global Investment Research

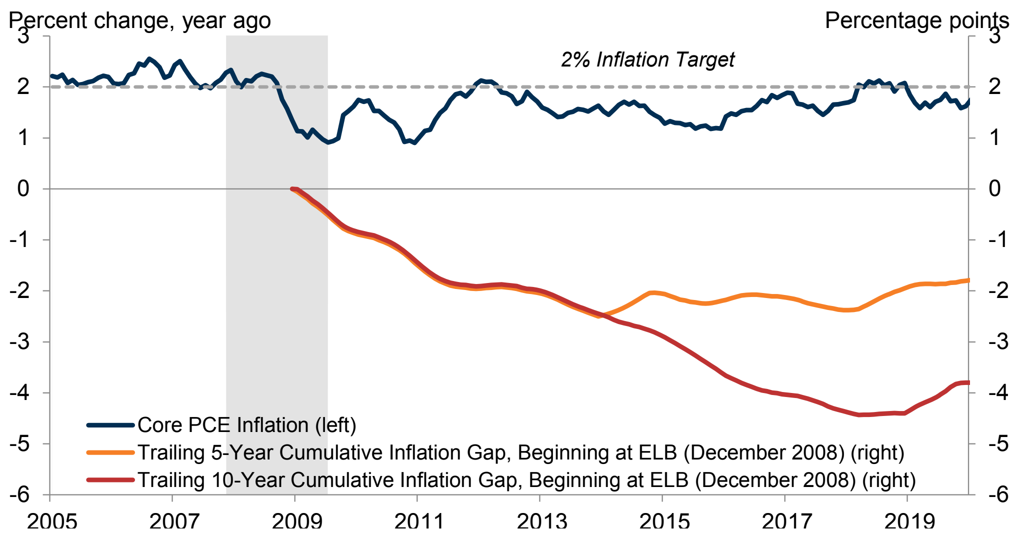
The second AIT rule instead adds the cumulative inflation shortfall, perhaps since the start of the recession, as an additional term to the policy rule:

AIT Rule #2

i = b * i_{-1} + (1-b) * [r* + pi + 0.5 * (pi – 2) – 2 * max(0, u – u*) + w * max(0, cumulative pi gap over last T years)],

where w is the weight on the cumulative inflation gap over a lookback window of T years. A larger cumulative inflation gap, a larger weight on the gap, and a longer lookback window would mean easier policy. The cumulative inflation shortfall was substantial in the last cycle, as shown in Exhibit 2.

Exhibit 2: Another Interpretation of AIT Would Add the Cumulative Inflation Shortfall to the Policy Rule



Source: Department of Commerce, Goldman Sachs Global Investment Research

What Average Inflation Targeting Means for Monetary Policy and the Economy

To explore what AIT will mean for monetary policy and the economy in the current cycle, we use the Fed's FRB/US model to simulate AIT policies.[1] We use the most recent update of FRB/US, in which the baseline trajectory of the economy follows the FOMC's June Summary of Economics Projections—which are close to our forecasts—through 2022 and then evolves according to the model's logic thereafter.[2]

Our simulations compare a baseline policy meant to capture the old framework—the inertial balanced approach rule discussed at the start of the last section—with three AIT policies. AIT 1 (the green line in the charts below) uses a 2.375% make-up target when 5-year average inflation is below 2%, AIT 2 (orange) responds to the cumulative inflation shortfall over the last 5 years with a weight of 0.5, and AIT 3 (red) responds to the cumulative inflation shortfall over the last 10 years with a weight of 0.5.

In the AIT simulations, we assume that the cumulative inflation gap only looks back to the start of the recession in 2020Q1. We also impose dual liftoff thresholds of 2% inflation and full employment in the AIT simulations, a policy proposed in a recent paper by former top Fed economists David Reifschneider and David Wilcox that is consistent

[1] We thank David Reifschneider and David Wilcox for sharing the materials behind their papers, "Average Inflation Targeting Would Be a Weak Tool for the Fed to Deal with Recession and Chronic Low Inflation," November 2019, and "A Program for Strengthening the Federal Reserve's Ability to Fight the Next Recession," March 2020.

[2] The latest update of FRB/US has inflation returning to target more quickly than usual and somewhat ahead of the unemployment rate reaching its longer-run level. This likely explains why similar Fed staff analyses of AIT in the aftermath of a generic moderate recession, rather than in the current cycle specifically, have generally found that the funds rate would remain at the effective lower bound for even longer than in our results. In addition to the Reifschneider and Wilcox papers cited above, see Jonas Arias, Martin Bodenstein, Hess Chung, Thorsten Drautzburg, and Andrea Ra, "Alternative Strategies: How Do They Work? How Might They Help?" 2020.

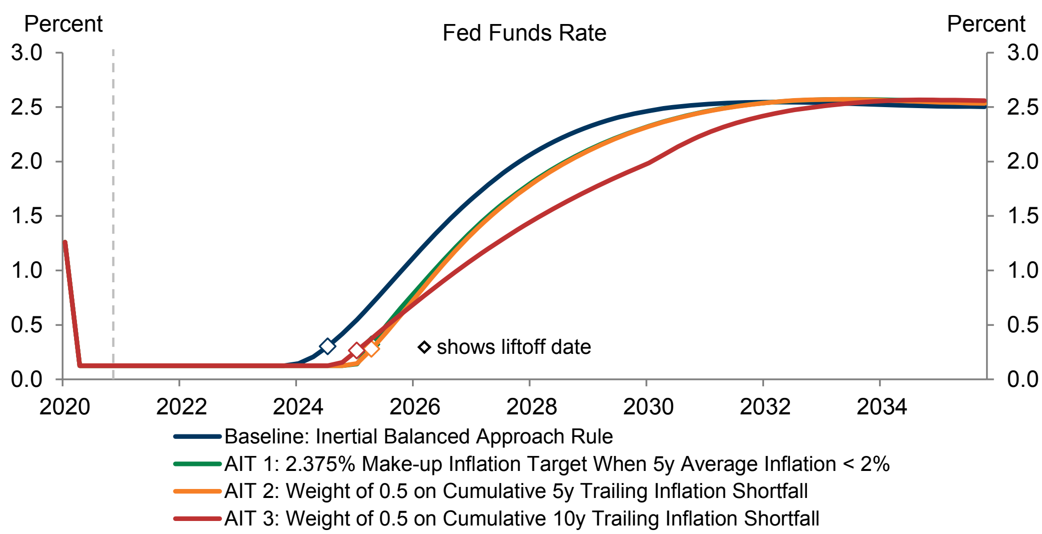
with our forecast for the forward guidance.

Exhibit 3 shows what the AIT rules mean for monetary policy. The AIT rules imply liftoff around early 2025, a few quarters later than the old framework baseline but consistent with our Fed forecast.

AIT 1, the 2.375% make-up target, and AIT 2, which responds to the 5-year gap, are moderately more dovish than the baseline policy in the first few years after liftoff. The two rules produce very similar funds rate paths in this analysis because the FRB/US baseline inflation path reaches 2% fairly quickly, resulting in only a modest 5-year cumulative inflation shortfall after liftoff. If the inflation shortfall were instead larger and more persistent, AIT 2 would call for noticeably more dovish policy than AIT 1.

AIT 3, which responds to the 10-year gap, calls for liftoff one quarter earlier than the other two AIT policies because the expectation of higher future inflation lowers real rates and accelerates the early recovery. But in the years that follow it is more dovish than the other rules because the longer lookback window still includes the inflation dip during the recessionary start of the cycle. This translates to a slower peak pace of tightening of just under 50bp per year, versus 50-75bp in the other three rules.

Exhibit 3: Under the FOMC's Latest Economic Forecasts, AIT Policies Would Imply Liftoff Around Early 2025

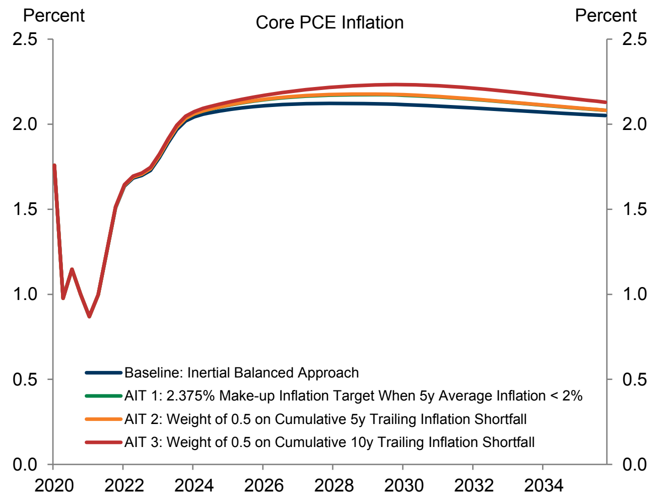


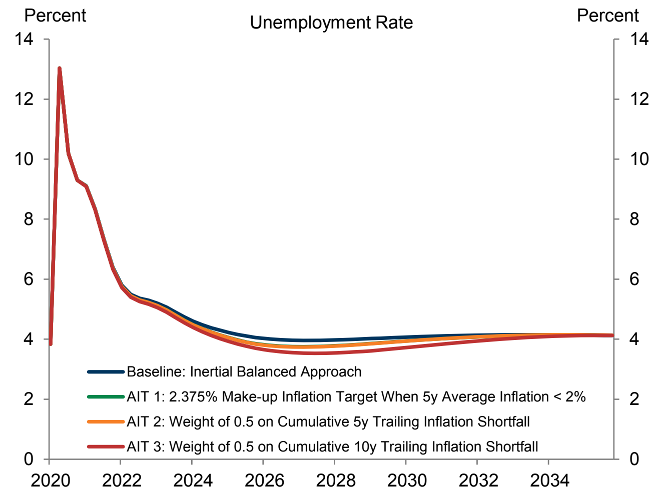
Source: Goldman Sachs Global Investment Research

Exhibit 4 shows what the AIT rules mean for the economy. AIT 1 and 2 generate slightly higher inflation and lower unemployment than the old framework baseline, and AIT 3 has somewhat larger effects. We note, however, that realistically-calibrated models like FRB/US imply that the incremental impact of lower-for-longer policies on the economy is fairly small during the initial recession period, a point we and others have made before.[3]

[3] See David Mericle, "A New Challenge to Average Inflation Targeting," US Daily, November 8, 2019, which discusses Reifschneider and Wilcox 2019, and "Fighting the Next Recession," US Economics Analyst, September 29, 2019.

Exhibit 4: AIT Rules Generate Higher but Still Moderate Inflation and a Modest Labor Market Overshoot

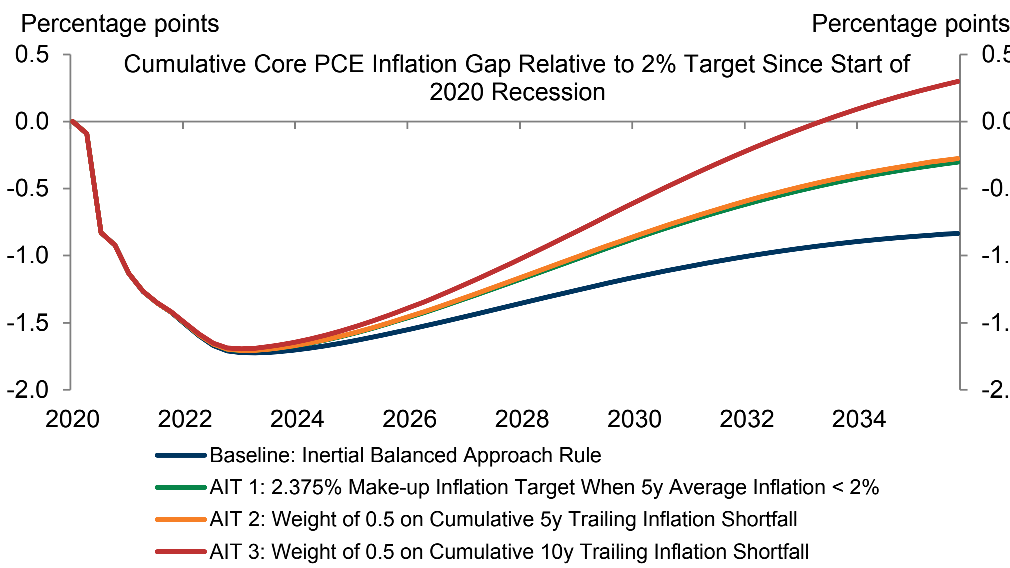




Source: Goldman Sachs Global Investment Research

Exhibit 5 shows the cumulative inflation gap since the start of the recession in 2020Q1. Only AIT 3, the most aggressive policy with a 10-year lookback window, brings average inflation since the start of the recession back to 2% on a reasonable timeline, and it still takes 12 years. This is in part a reflection of the Phillips curve built into FRB/US, which is fairly flat though not unrealistic.

Exhibit 5: Only the AIT Rule with a 10-Year Lookback Window Closes the Cumulative Inflation Gap on a Reasonable Timeline

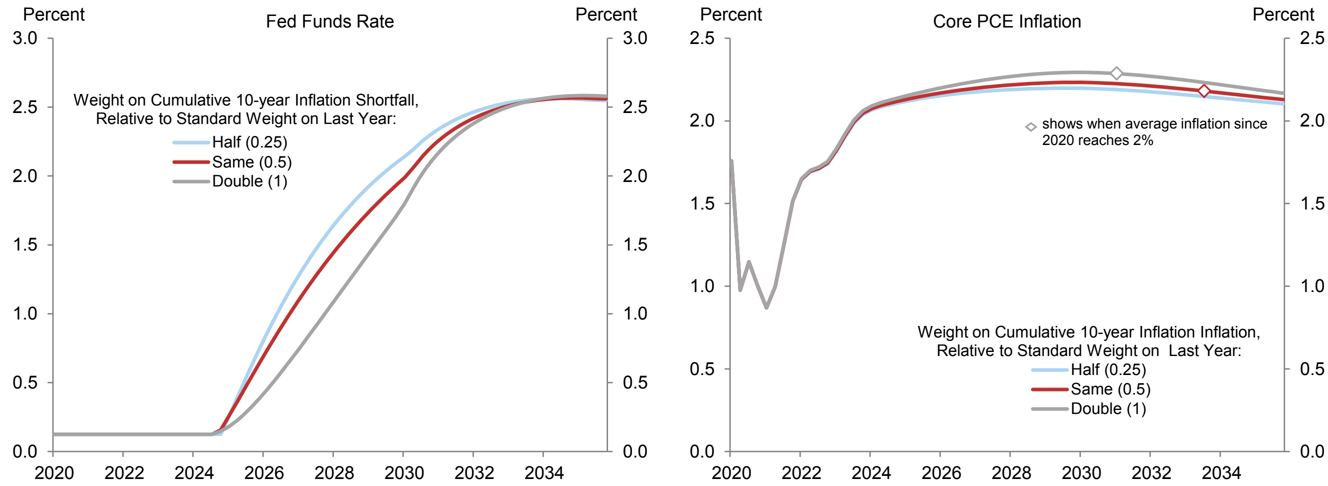


Source: Goldman Sachs Global Investment Research

How could policymakers bring average inflation since the start of the recession back to 2% more quickly? One approach is to simply put more weight on the cumulative inflation gap in the policy rule. Exhibit 6 shows that doubling the weight on the cumulative gap brings average inflation back to 2% somewhat earlier. But it still takes

10 years, and as Reifschneider and Wilcox emphasize, this would imply quite an extreme response to past inflation misses. After all, AIT 3 already puts as much weight on inflation misses a decade ago as standard policy rules put on the inflation miss over the last year.

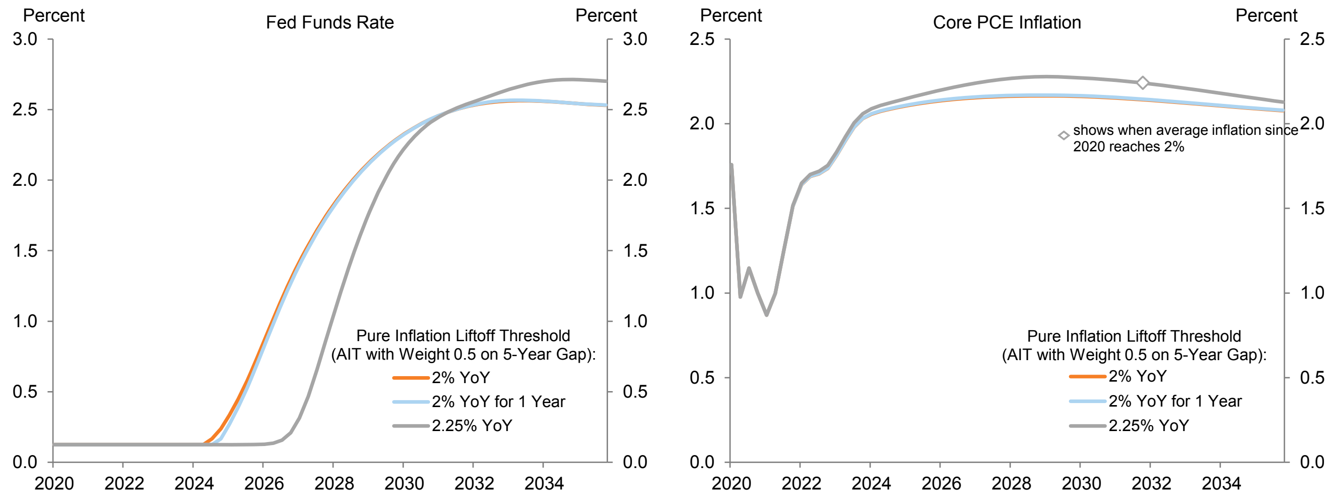
Exhibit 6: Closing the Cumulative Inflation Gap by 2030 Requires Responding to It Twice as Strongly as Usual



Source: Goldman Sachs Global Investment Research

Another approach to accelerating the recovery of average inflation is to delay liftoff with a more aggressive inflation threshold. We compare pure inflation thresholds (dropping the unemployment threshold) that require reaching 2% year-on-year, sustaining 2% year-on-year for a full year, or reaching 2.25% year-on-year. We assume that a delayed liftoff policy would be paired with AIT 2's more moderate 5-year lookback window after liftoff. Exhibit 7 shows that switching from a threshold of 2% year-on-year to 2% year-on-year for a full year has a very small impact, partly because the trailing inflation gap still restrains the policy rate at the start and partly because of the smooth inflation dynamics assumed in FRB/US. Using a 2.25% threshold has a larger impact, leading to a later liftoff followed by a faster pace of tightening.

Exhibit 7: A Pure Inflation Liftoff Threshold of 2.25% Would Generate a Later Liftoff but Faster Tightening



Source: Goldman Sachs Global Investment Research

We draw three conclusions about the implications of AIT for monetary policy and the economy in the years ahead. First, AIT rules appear roughly consistent with our forecast of liftoff around early 2025. Second, moderate AIT policies generate a moderately lower funds rate path and slightly higher inflation and lower unemployment than the old framework, but return average inflation to 2% very slowly. Third, a quite aggressive AIT policy generates a much lower funds rate path, somewhat larger economic effects, and a return of average inflation to 2% on a lengthy but achievable timeline. These conclusions are sensitive to the baseline trajectory of the economy and other assumptions built into the FRB/US model.

Our analysis also highlights some limitations of the Fed's new strategy. Realistic macroeconomic models like FRB/US generally imply that when the policy rate is at the effective lower bound, lower-for-longer policies like AIT make only a limited incremental contribution to fighting recessions and boosting the economy when it is most depressed. And even in terms of its more limited ambition of stabilizing average inflation, AIT raises some doubts. Under realistic parametrizations, AIT rules would likely require a quite long expansion to return average inflation to 2%, at least if the Phillips curve remains fairly flat.

Policymakers could seek to return average inflation to 2% more quickly by using more aggressive inflation thresholds for liftoff or putting much more weight on inflation misses in the distant past than they usually put even on current inflation. But this might create upside inflation risks that are difficult to capture in our FRB/US-based analysis. We will return to this question of the robustness of more aggressive liftoff thresholds and AIT policies to alternative inflation dynamics in the future.

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The US Economic and Financial Outlook

Forecast Changes

Reflecting strong mid-year consumer momentum and the much-better-than-expected July inventory data, we raised our Q3 GDP tracking estimate by 3.5pp to +30% (qoq ar). We believe some of this upgrade represents a pull-forward of output growth relative to our previous expectations, and we lowered our Q4 and Q1 GDP forecasts by 1.0pp and 1.5pp respectively (to +6.0% and +8.0%).

THE US ECONOMIC AND FINANCIAL OUTLOOK
(% change on previous period, annualized, except where noted)

	2018	2019	2020 (f)	2021 (f)	2022 (f)	2023 (f)	2020 Q1	2020 Q2	2020 Q3	2020 Q4	2021 Q1	2021 Q2	2021 Q3	2021 Q4
OUTPUT AND SPENDING														
Real GDP	**3.0**	**2.2**	*-3.8*	*6.1*	*3.3*	*2.2*	**-5.0**	**-31.7**	*30.0*	*6.0*	*8.0*	*7.5*	*4.0*	*3.0*
Real GDP (annual=Q4/Q4, quarterly=yoy)	**2.5**	**2.3**	*-2.7*	*5.6*	*2.7*	*2.0*	**0.3**	**-9.1**	*-3.6*	*-2.7*	*0.4*	*12.5*	*6.4*	*5.6*
Consumer Expenditure	**2.7**	**2.4**	*-4.6*	*5.7*	*3.7*	*2.3*	**-6.9**	**-34.1**	*35.0*	*4.0*	*7.0*	*8.0*	*3.6*	*2.6*
Residential Fixed Investment	**-0.6**	**-1.7**	*2.6*	*8.8*	*5.1*	*2.3*	**19.0**	**-37.9**	*46.6*	*12.0*	*8.0*	*8.0*	*8.0*	*5.0*
Business Fixed Investment	**6.9**	**2.9**	*-4.5*	*7.7*	*5.2*	*3.8*	**-6.7**	**-26.0**	*16.2*	*11.3*	*11.3*	*9.4*	*6.3*	*5.8*
Structures	**3.7**	**-0.6**	*-6.6*	*5.8*	*4.0*	*2.7*	**-3.7**	**-33.4**	*15.1*	*7.0*	*12.0*	*7.5*	*5.7*	*5.3*
Equipment	**8.0**	**2.1**	*-8.5*	*9.0*	*4.5*	*2.7*	**-15.2**	**-35.9**	*30.8*	*15.0*	*12.0*	*10.0*	*5.0*	*5.0*
Intellectual Property Products	**7.8**	**6.4**	*1.8*	*7.5*	*6.7*	*5.7*	**2.4**	**-7.7**	*3.0*	*10.0*	*10.0*	*10.0*	*8.0*	*7.0*
Federal Government	**2.8**	**4.0**	*4.4*	*1.3*	*0.1*	*0.0*	**1.5**	**17.6**	*-9.0*	*3.0*	*3.0*	*1.0*	*0.0*	*0.0*
State & Local Government	**1.2**	**1.3**	*-0.2*	*1.8*	*1.6*	*1.0*	**1.1**	**-5.5**	*0.0*	*2.0*	*3.0*	*3.0*	*3.0*	*2.0*
Net Exports ($bn, '09)	**-878**	**-918**	*-837*	*-936*	*-928*	*-941*	**-788**	**-761**	*-892*	*-909*	*-927*	*-945*	*-940*	*-934*
Inventory Investment ($bn, '09)	**53**	**49**	*-85*	*119*	*65*	*60*	**-81**	**-286**	*-24*	*50*	*100*	*125*	*125*	*125*
Industrial Production, Mfg.	**2.3**	**-0.2**	*-8.9*	*6.6*	*3.6*	*1.4*	**-5.4**	**-47.0**	*29.2*	*13.1*	*10.2*	*9.1*	*5.4*	*3.9*
HOUSING MARKET														
Housing Starts (units, thous)	**1,248**	**1,295**	*1,277*	*1,500*	*1,578*	--	**1,484**	**1,064**	*1,218*	*1,344*	*1,477*	*1,420*	*1,492*	*1,610*
New Home Sales (units, thous)	**614**	**685**	*673*	*770*	*832*	--	**701**	**683**	*626*	*683*	*752*	*739*	*763*	*825*
Existing Home Sales (units, thous)	**5,334**	**5,330**	*4,516*	*4,358*	*4,408*	--	**5,483**	**4,313**	*3,952*	*4,316*	*4,335*	*4,354*	*4,365*	*4,377*
Case-Shiller Home Prices (%yoy)*	**4.1**	**3.2**	*1.5*	*2.3*	*1.9*	*2.0*	**4.1**	*3.4*	*2.8*	*1.5*	*-1.0*	*0.1*	*1.2*	*2.3*
INFLATION (% ch, yr/yr)														
Consumer Price Index (CPI)	**2.4**	**1.8**	*1.3*	*1.8*	*1.7*	*1.8*	**2.1**	**0.4**	*1.3*	*1.3*	*1.4*	*2.7*	*1.7*	*1.6*
Core CPI	**2.1**	**2.2**	*1.6*	*1.6*	*1.8*	*1.9*	**2.2**	**1.3**	*1.5*	*1.3*	*1.2*	*2.0*	*1.5*	*1.7*
Core PCE**	**2.0**	**1.7**	*1.3*	*1.5*	*1.7*	*1.7*	**1.8**	**1.0**	*1.3*	*1.3*	*1.2*	*1.8*	*1.5*	*1.5*
LABOR MARKET														
Unemployment Rate (%)^	**3.9**	**3.5**	*9.0*	*6.5*	*5.7*	*5.2*	**4.4**	**11.1**	*10.1*	*9.0*	*8.0*	*7.2*	*6.8*	*6.5*
U6 Underemployment Rate (%)^	**7.6**	**6.7**	*15.0*	*12.0*	*10.5*	*9.7*	**8.7**	**18.0**	*16.3*	*15.0*	*14.0*	*13.1*	*12.7*	*12.0*
Payrolls (thous, monthly rate)	**193**	**178**	*-568*	*550*	*222*	*180*	**-303**	**-4,424**	*1,255*	*1,200*	*950*	*685*	*320*	*246*
GOVERNMENT FINANCE														
Federal Budget (FY, $bn)	**-779**	**-984**	*-4,200*	*-2,700*	*-1,650*	*-1,600*	--	--	--	--	--	--	--	--
FINANCIAL INDICATORS														
FF Target Range (Bottom-Top, %)^	**2.25-2.5**	**1.5-1.75**	*0-0.25*	*0-0.25*	*0-0.25*	*0-0.25*	**0-0.25**	**0-0.25**	*0-0.25*	*0-0.25*	*0-0.25*	*0-0.25*	*0-0.25*	*0-0.25*
10-Year Treasury Note^	**2.69**	**1.92**	*1.05*	*1.45*	*1.65*	*1.85*	**0.70**	**0.66**	*0.95*	*1.05*	*1.15*	*1.25*	*1.35*	*1.45*
Euro (€/$)^	**1.15**	**1.12**	*1.17*	*1.27*	*1.28*	*1.30*	**1.10**	**1.12**	*1.18*	*1.17*	*1.19*	*1.22*	*1.24*	*1.27*
Yen ($/¥)^	**110**	**109**	*106*	*104*	*102*	*101*	**108**	**108**	*106*	*106*	*106*	*105*	*105*	*104*

* Weighted average of metro-level HPIs for 381 metro cities where the weights are dollar values of housing stock reported in the American Community Survey.
** PCE = Personal consumption expenditures. ^ Denotes end of period.
Note: Annual, Q4/Q4, and Quarterly YoY GDP growth estimates embed our assumption of an upward revision in Q2 2020 (from -32.9% to -31.6%, qoq ar). Published figures in bold.
Source: Goldman Sachs Global Investment Research.

Source: Goldman Sachs Global Investment Research

Economic Releases

Date		Time (ET)	Indicator	Estimate GS	Estimate Consensus	Last Report
Tue	**Sep 01**	9:45	Markit US Manufacturing PMI (August final)	n.a.	53.6	53.6
		10:00	**ISM Manufacturing (August)**	**55.0**	**54.5**	**54.2**
		10:00	**Construction Spending (July)**	**+0.9%**	**+1.1%**	**-0.7%**
		17:00	**Lightweight Motor Vehicle Sales (August)**	**+15.0M**	**+14.5M**	**+14.5M**
Wed	**Sep 02**	**8:15**	**ADP Employment Change (August)**	**+1,600k**	**+950k**	**+167k**
		10:00	**Factory Orders (July)**	**+6.1%**	**+6.0%**	**+6.2%**
		14:00	Federal Reserve Beige Book	n.a.	n.a.	n.a.
Thu	**Sep 03**	**8:30**	**Initial Jobless Claims**	**930k**	**950k**	**1,006k**
		8:30	Continuing Claims	n.a.	14,000k	14,535k
		8:30	**Nonfarm Productivity (Q2 final)**	**+7.4%**	**+7.4%**	**+7.3%**
		8:30	**Unit Labor Costs (Q2 final)**	**+12.0%**	**+12.1%**	**+12.2%**
		8:30	**Trade Balance (July)**	**-$58.0bn**	**-$57.0bn**	**-$50.7bn**
		10:00	**ISM Non-Manufacturing (August)**	**56.5**	**57.0**	**58.1**
Fri	**Sep 04**	**8:30**	**Nonfarm Payrolls (August)**	**+1,900k**	**+1,400k**	**+1,763k**
		8:30	**Private Payrolls (August)**	**+1,650k**	**+1,275k**	**+1,462k**
		8:30	**Unemployment Rate (August)**	**9.8%**	**9.8%**	**10.2%**
		8:30	**Average Hourly Earnings (August)**	**-0.1%**	**+0.0%**	**+0.2%**
		8:30	Labor Force Participation Rate	n.a.	61.7%	61.4%

Source: Goldman Sachs Global Investment Research

Disclosure Appendix

Reg AC

We, Jan Hatzius, Alec Phillips, David Mericle, Spencer Hill, CFA, Daan Struyven, David Choi, Joseph Briggs, Blake Taylor, Ronnie Walker and Laura Nicolae, hereby certify that all of the views expressed in this report accurately reflect our personal views, which have not been influenced by considerations of the firm's business or client relationships.

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