Taylor (Still) Rules:

Revisiting Monetary Policy Rules And Their Usefulness

"I know the secret to the Federal Reserve and interest rates," my mom concluded confidently, looking up from her "For You" page on TikTok.

"Did you know," she continued in awe, "that it is *not* the Fed that controls interest rates, but an organization called the Federal Open Market Committee (FOMC)*?*"

We were discussing the need for a savings account that earns yields near the overnight interest rate to protect oneself from inflation.

"But it's an election year, so it's *all* about politics now," she ranted. "And who knows what this *Committee* will do with rates?"

"I do," I responded.

To her surprise, and perhaps to many investors, there *is* a way to see where rates might go in 2024 *without* solving complex equations or resorting to complicated conspiracy theories. In fact, it's a simple enough formula that an elementary school kid can solve it by hand.

Below, we'll tell you how this simple rule was born and how it dominates policymakers' thinking. Despite its renown, the 30-year-old Taylor Rule may still give you an edge in rates markets in 2024.

TAYLOR TURNS THIRTY: RULES VERSUS DISCRETION

Finding a simple rule for the complex economic world has been a multi-century holy grail search. In the early 1800s, David Ricardo and Henry Thornton argued about how monetary policy should respond to the economic shocks engendered by the Napoleonic Wars—"with accommodative monetary expansion, or with a constant money-stock policy."[1]

Over a century later, after the hyperinflation of World War I, economists Irving Fisher and Knut Wicksell were *still* discussing rules to guide monetary policy.[2] Then Henry Simons in the 1930s and Milton Friedman, a couple of decades later, continued "in that tradition recognizing monetary policy rules—such as a constant growth rate rule for the money supply—would avoid such mistakes in contrast with discretion."[3]

The hope was to find a simple rule to help policymakers offset "monetary excesses whether due to government deficits, commodity discoveries, or mistakes by the government." Find simple rules or face the "chaotic policy" discretion due to changing events.[4]

Interestingly, the solution may have been lurking in plain sight for centuries. In practice, more than in theory, the Bank of England had been raising and lowering its bank rate depending on the banking system and economic conditions.

And that brings us right to Taylor.

"TAYLOR'S RULE" OR "THE TAYLOR RULE"?

The "Taylor Rule" idea was first presented during a discussion in November 1992 at the Carnegie-Rochester Conference Series on Public Policy in Pittsburgh by Stanford economist John Taylor and published as a paper in 1993.[5]

Up until John Taylor arrived on the scene, the accepted doctrine was that central banks could not and should not target interest rates. Economists needed a coherent theory for formulating interest rate targets. Without such a theory, it would be like a plane flying without a solid concept of aerodynamics. Stanford Economist John Taylor changed that.

But what *is* the Taylor Rule? Put simply, in the words of Taylor himself, the original Taylor Rule says that "policy interest rates should rise about 1.5 percentage points with inflation and about 0.5 percentage points with the output gap."

Using numbers, the rule technically is:

$$r = p + 0.5y + 0.5(p - 2) + 2$$

Where

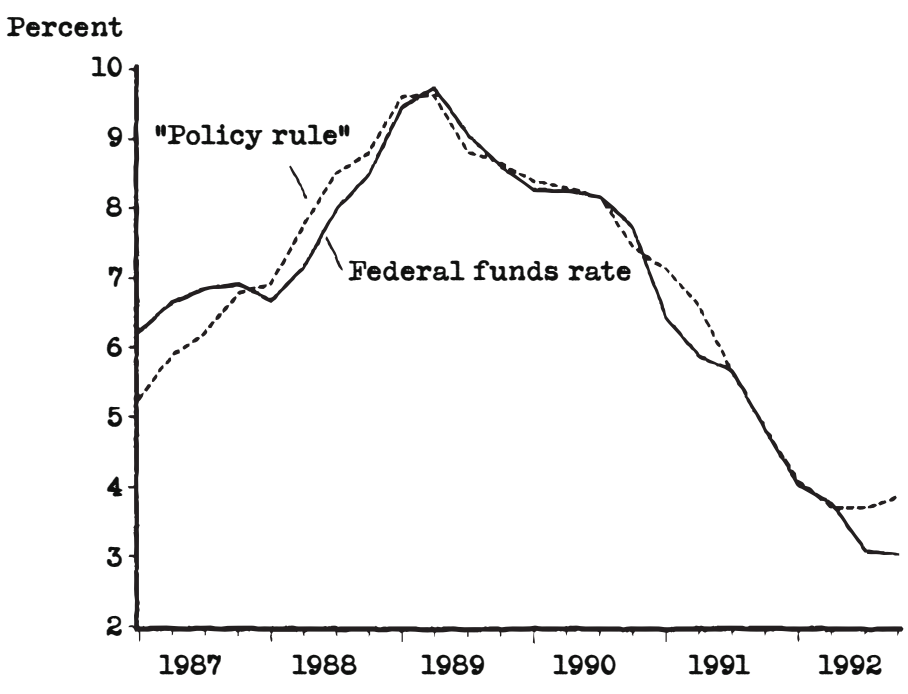
- r = fed funds rate
- p = inflation rate over the previous four quarters
- y = percent deviation of real GDP from the target ("output gap")

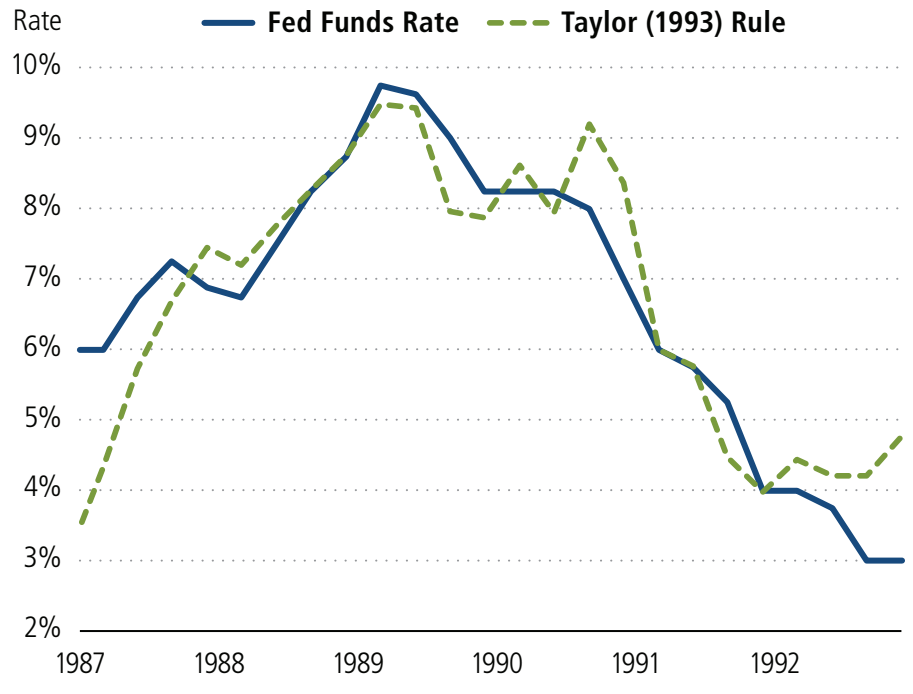
This formula assumes both the neutral interest rate, or r*, and long-run inflation rate are fixed at 2%. Taylor used r* as a baseline for policy restrictiveness.[6]

This is a simple mathematical formula that anyone with elementary school math know-how could solve. There aren't even any exponents or square roots!

For example, if the current inflation rate is 3%, and the current GDP is growing 2% higher

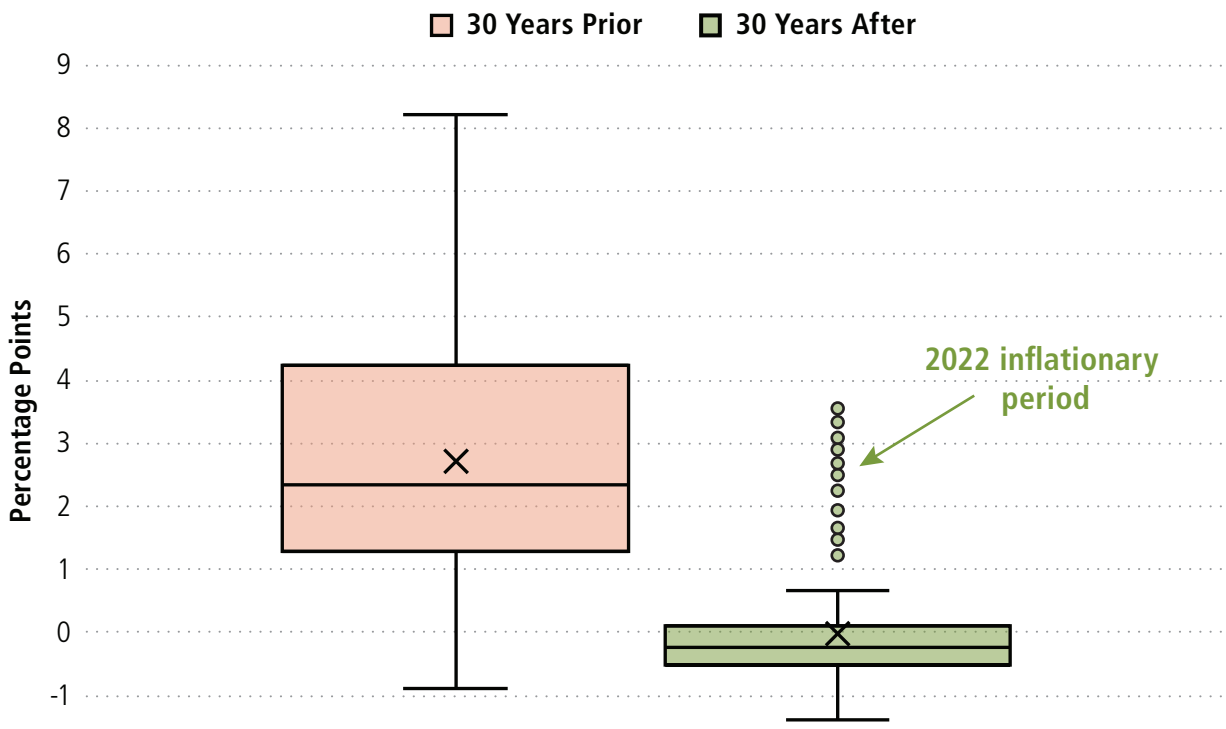
fig 1. CHEERS TO 30 YEARS:
RECREATING THE ORIGINAL TAYLOR RULE WITH DATA AVAILABLE TODAY





Source: Taylor (1993), Federal Reserve, Bureau of Economic Analysis

fig 2. A MONUMENTAL BIRTH:
DEVIATION OF CORE INFLATION FROM 2% TARGET BEFORE AND AFTER THE CREATION OF TAYLOR RULE IN 1993



Source: Bureau of Economic Analysis

than the trend, then our equation becomes $r = 3 + 0.5(2) + 0.5(3 - 2) + 2 = 6.5$. The rule tells policymakers that the fed funds rate needs to be 6.5% in order to bring down inflation and slow down the economy that is growing above potential. Easy, right?

«THE TAYLOR RULE WAS MENTIONED FOR THE FIRST TIME IN THE JANUARY 1995 FOMC MEETING BY NONE OTHER THAN THE CURRENT U.S. TREASURY SECRETARY AND THEN-FED BOARD GOVERNOR JANET YELLEN.»

So, let's run the numbers to get a policy rate prescription as of 1993. To do so, we recreated the original chart from Taylor's 1993 paper based on the first formulation of the rule and the data available today (*See Figure 1 on page 1*).

Two things stand out from *Figure 1*. First, the rules-based policy prescription already closely follows the actual policy rate! Second, there is a notable divergence toward the end of the series, as the Fed cut rates too much in the early 1990s—a policy decision that was later abruptly reversed.

IT'S A RULE—AND NOT A RULE

It did not take long for some savvy investors to realize that policymakers *might* use a rule to guide policy rates—a rule that investors could *also* follow. In a report published in December 1993, "Keeping Inflation Low in the 1990s," Salomon Brothers advised their clients that "a hypothetical rule…indicated that the fed funds rate is now too low."[7] Salomon Brothers dubbed it, "Taylor's Rule."[8]

Beyond Wall Street, the Taylor Rule was mentioned for the first time in the January 1995 FOMC meeting by none other than the current U.S. Treasury Secretary and then-Fed Board Governor Janet Yellen. Chair Alan Greenspan said in 1997, "As Taylor himself has pointed out, these formulations are at best guide-posts to help central banks, not inflexible rules that eliminate discretion."[9]

The beauty, then, is that the Taylor Rule is sort of a rule but not a rule. It's a strategy for policymakers, and it helps communicate that strategy to the markets and the public—when people know what to expect, it provides guidance.

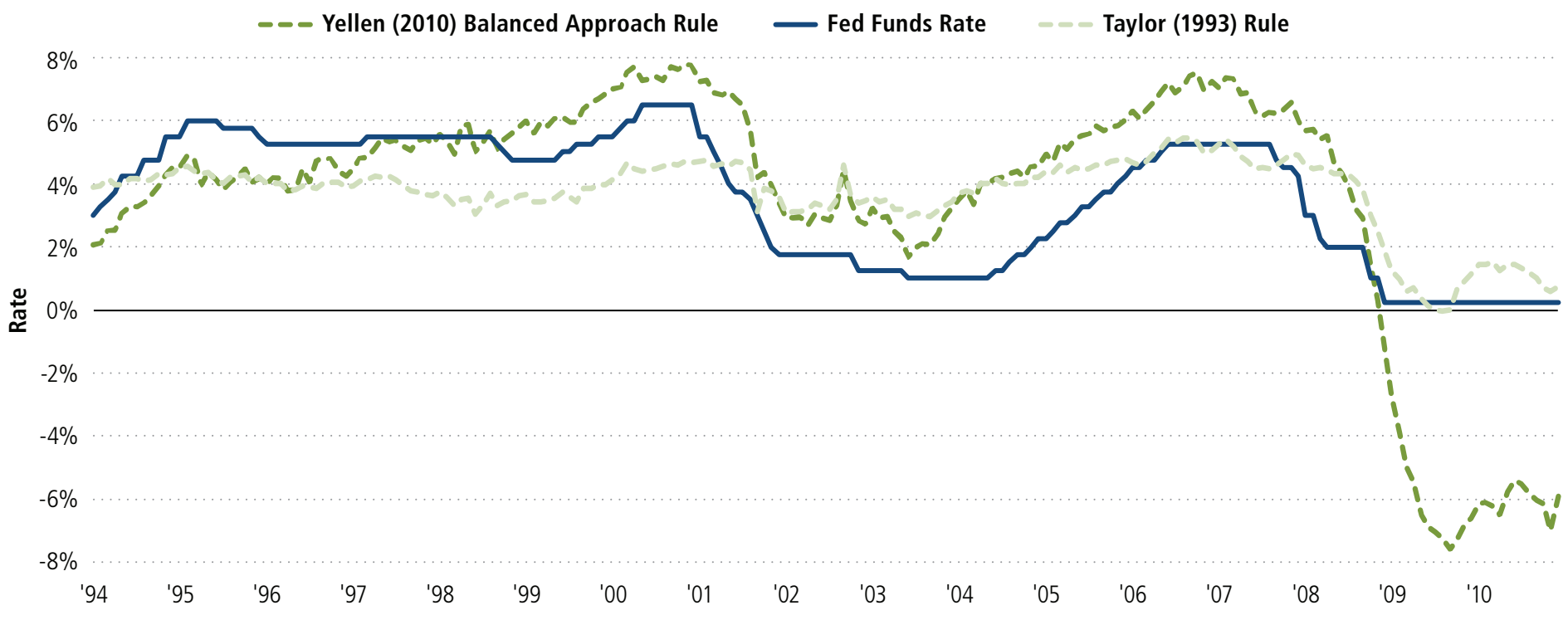
«THE BEAUTY, THEN, IS THAT THE TAYLOR RULE IS SORT OF A RULE BUT NOT A RULE.»

Rather than policymakers "making it up" as they go, pre-committing to behave in a certain, explainable way can yield better results. Also, amid a constant stream of data and noise, the Rule helps investors know what to pay attention to (inflation deviations and output gaps) and what to ignore (e.g., politics).

Academia, policy, and markets had found their rule.

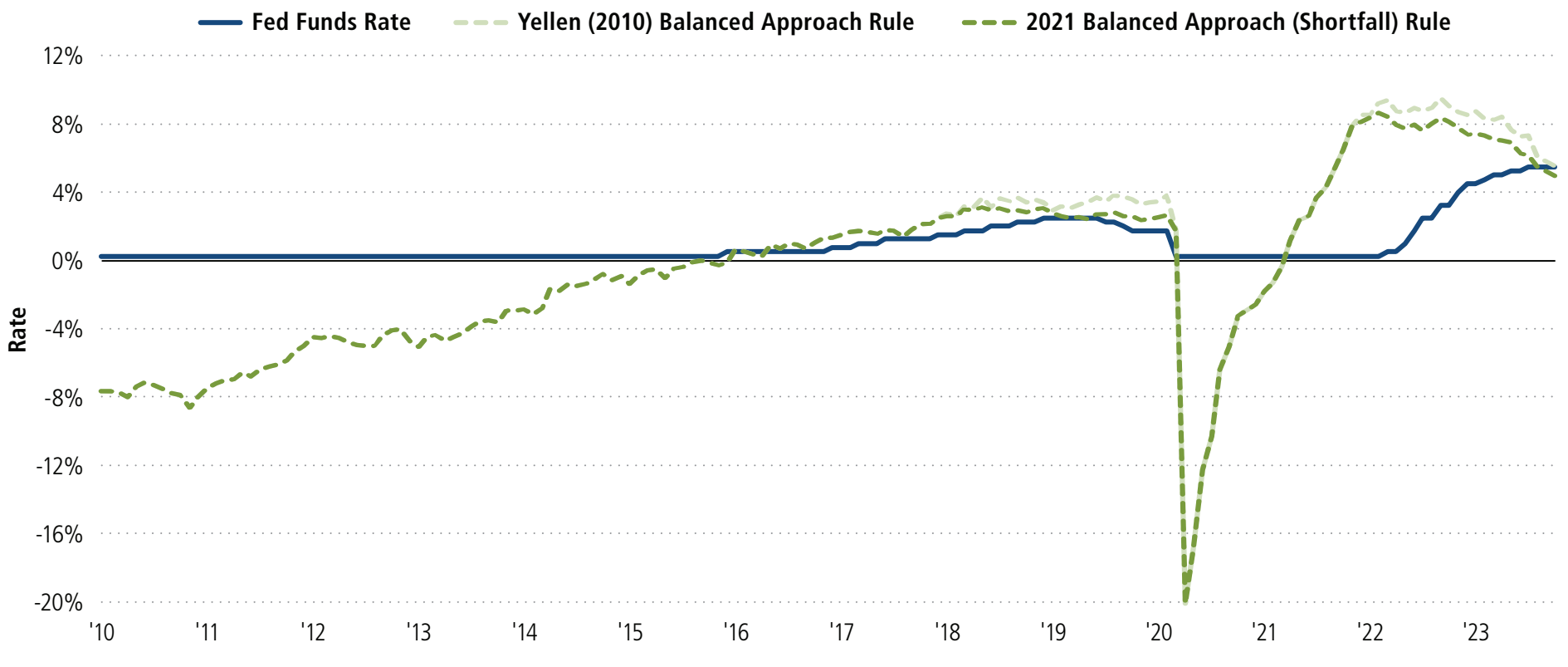
And perhaps most importantly, it worked! Before the advent of the policy rule, inflation was higher on average and far more variable. After Taylor? Inflation is much more stable and closer to the central bank's target (*See Figure 2*)—with the notable exception of the most recent bout of post-Covid inflation.

fig 3. FINDING A NEW BALANCE:
FED FUNDS RATE VERSUS BALANCED APPROACH TAYLOR RULE



Source: Federal Reserve, Bureau of Economic Analysis, Bureau of Labor Statistics

fig 4. OFFICIALLY APPROVED, UNOFFICIALLY IGNORED:
FED FUNDS RATE VERSUS 2021 BALANCED APPROACH (SHORTFALL) TAYLOR RULE



Source: Federal Reserve, Bureau of Economic Analysis, Bureau of Labor Statistics

Was it all due to Taylor? No, but adopting policy rules for interest rate targets was a watershed monetary moment that continues to affect decisions and markets today. According to Google Scholar, the original paper continues to reverberate, with over 13,000 citations—a testament to its popularity and importance across the profession.[10]

«BE MORE RESPONSIVE TO A CHANGE IN THE UNEMPLOYMENT RATE TO BETTER ALIGN WITH THE FED'S MANDATE OF ACHIEVING MAXIMUM EMPLOYMENT.»

TAILORED TAYLOR

Still, as the Fed's approach to achieving its "dual mandate" evolves, it becomes clearer that the rule also needs to evolve, meaning Taylor needs to become more tailored.

For example, the initial Taylor Rule you see above used the deviation of core inflation from long-run inflation and the output gap to determine the policy rate. Later, economists began using the employment gap instead of the output gap, where the employment gap is the difference between the current unemployment rate and its natural long-run rate.

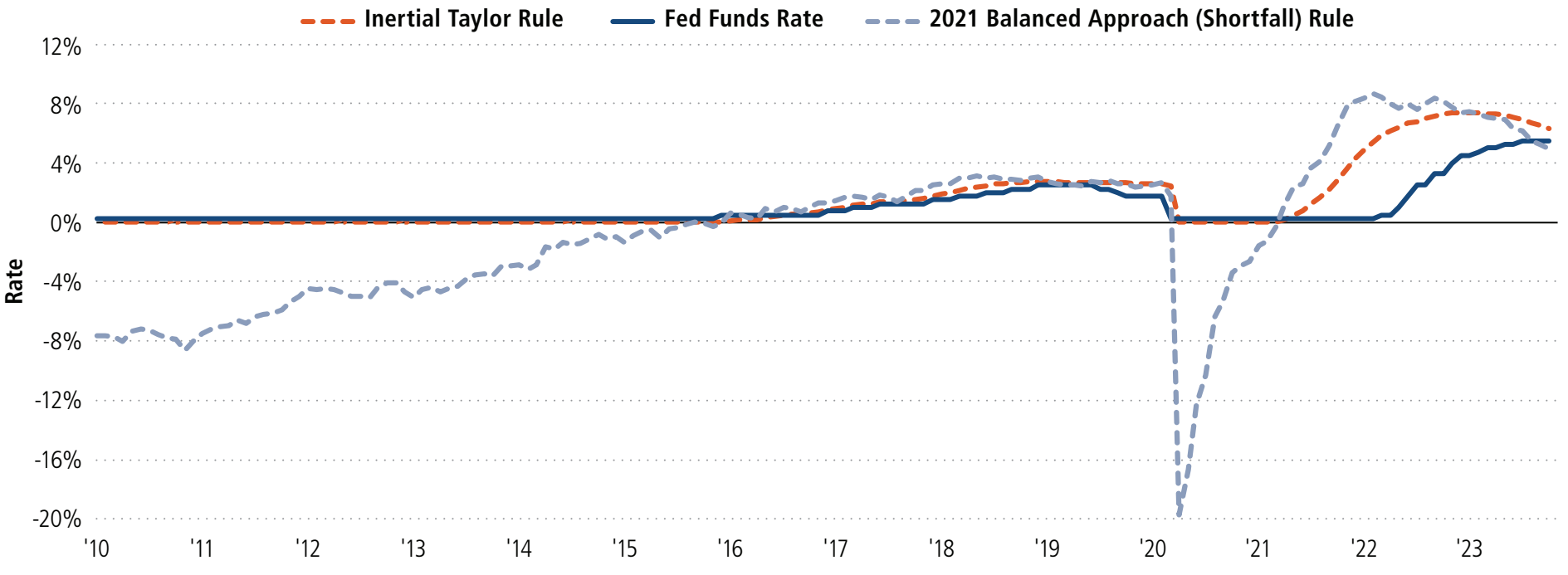
Then, in 2012, former Fed Governor Janet Yellen, now U.S. Treasury Secretary, proposed a "balanced approach rule" that builds on top of the original Taylor rule.[11]

What was novel about Yellen's approach? Yellen simply raised the output gap coefficient to "2" compared to 0.5 in the original rule. In practical terms, if the economy is working below potential (e.g., the output gap is negative), meaning the unemployment rate is above the natural rate, the new rule will suggest a much lower policy rate than before (*See Figure 3 on page 2*).[12]

«POLICYMAKERS' INERTIA MAY DISAPPOINT BOND INVESTORS NOW EXPECTING A RAPID RETURN TO THE ZERO LOWER BOUND.»

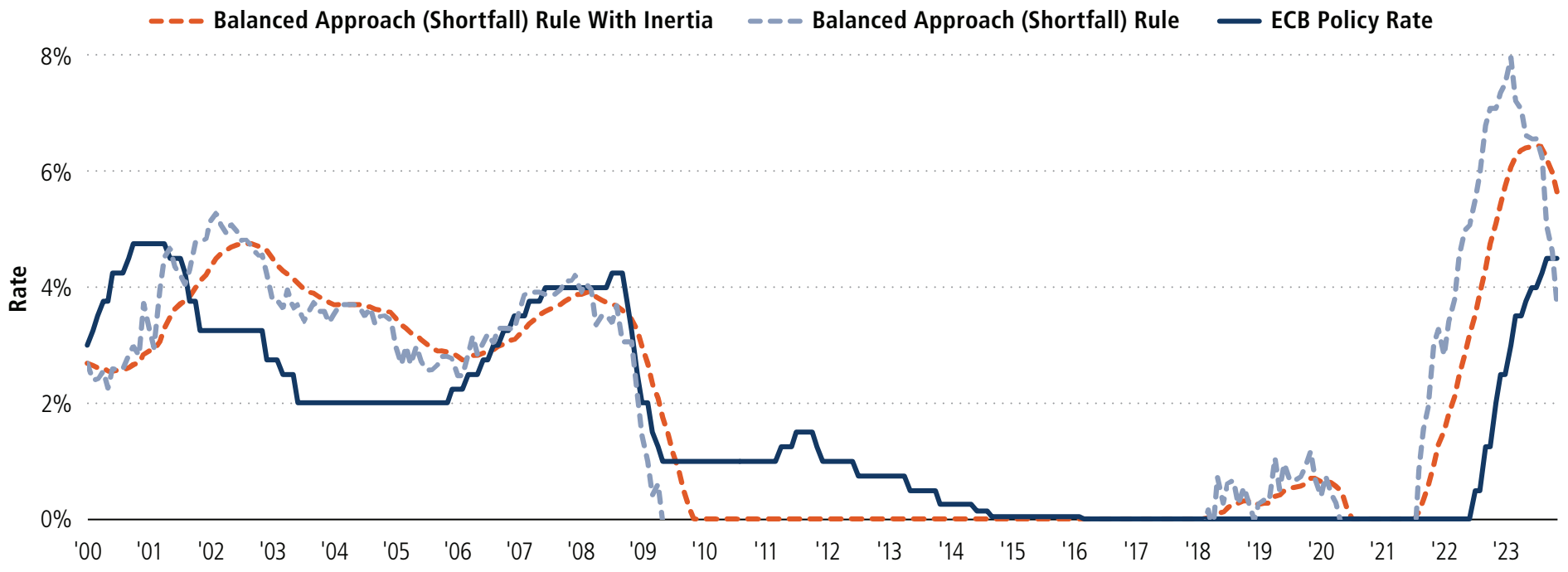
So why the big fuss over this seemingly minimal change, you wonder? Well, Yellen's magical "2" prescribed the central bank to be more responsive to a change in the unemployment rate to better align with the Fed's mandate of achieving maximum employment. After all, inflation had

fig 5. INERTIA 101:
FED FUNDS RATE VERSUS INERTIAL BALANCED APPROACH (SHORTFALL) TAYLOR RULE



Source: Federal Reserve, Bureau of Economic Analysis, Bureau of Labor Statistics

fig 6. AROUND THE WORLD WITH TAYLOR:
ECB POLICY RATE VERSUS BALANCED APPROACH (SHORTFALL) TAYLOR RULE



Source: Bloomberg, European Central Bank, OECD, Federal Reserve Bank of New York, Eurostat

been low for the better part of two decades, so achieving the inflation mandate was not an issue. Yellen's revised rule is a key reason rates remained low throughout her Fed tenure.

After a long period of sub-target core inflation, in 2021, the FOMC proposed a new version of Yellen's rule with a balanced approach (shortfall) rule in its *Monetary Policy Report*. The new rule is an even simpler change — it doesn't allow the unemployment gap to fall below zero!

Policymakers reflected that it was perfectly fine for the economy to run "beyond its potential" as long as inflation was under control. This "shortfall rule" means the Fed doesn't need to raise rates only because too many people are employed (*See Figure 4 on page 3*)! [13]

«FOR INVESTORS, FOLLOWING THE RULE MAY YIELD INSIGHTS INTO THE DIRECTION OF RATES.»

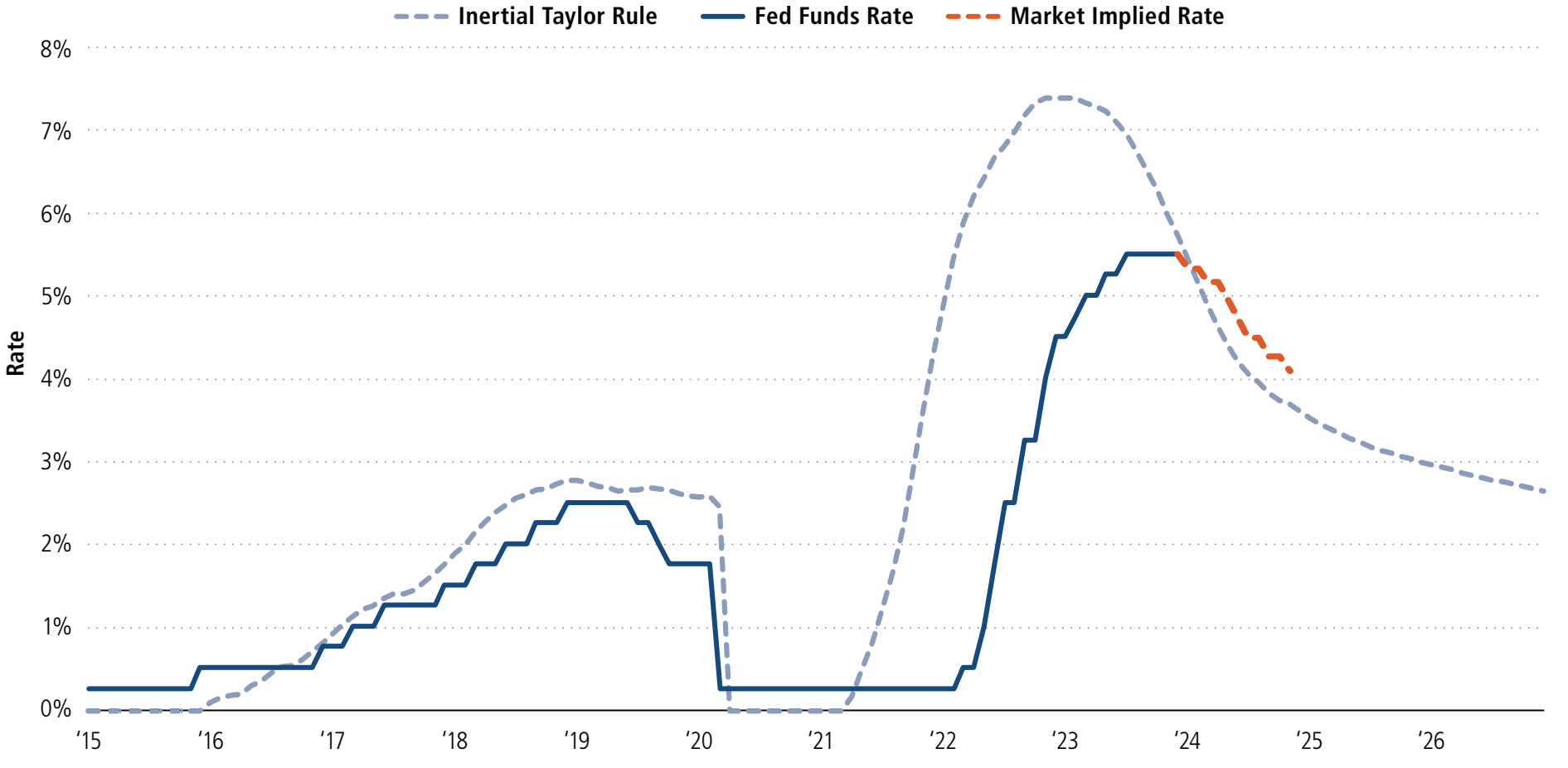
POLICYMAKING "INERTIA"

One final tweak to the rule brings us to the present moment. Inertia is a fundamental concept in physics that refers to an object's tendency to resist changes in its state of motion. For policymakers, inertia is the fact that the policy rate rarely changes as rapidly as the Taylor rule might suggest.

The various iterations of the Taylor Rule discussed above are "non-inertial," where policymakers would move rates immediately. Apart from the fact that the Federal Reserve does not meet every single time there is an unemployment rate or inflation report, the "non-inertial" rules "are not appropriate for policy rule forward guidance when inflation is rising because the prescribed fed funds rate increases much too quickly to be in accord with FOMC practice."[14]

Pappell (2022) applied an "inertia" factor where the fed funds rate slowly (say, 15% of the way) moves to the non-inertial rule, which would "avoid falling 'behind the curve' without resorting to unrealistically large jumps in the FFR."[15] For bond investors who witnessed 25, then 50, then

fig 7. TAYLOR TELLS TOMORROW?
INERTIAL TAYLOR RULE FORECASTED FED FUNDS RATE VERSUS MARKET CONSENSUS*



Source: Federal Reserve, Bureau of Economic Analysis, Bureau of Labor Statistics, Payden Calculations, Bloomberg
*Overnight Index Swap (OIS) Market, as of 1/8/2024

75 basis point rate hikes, we sure would have preferred the Fed to have started incrementally hiking as early as 2021 instead of buying mortgages up until March 2022 (*see Figure 5 on page 3*). Equally, policymakers' inertia may disappoint bond investors now expecting a rapid return to the zero lower bound.

GOING GLOBAL

As far as a guidepost goes, the Taylor Rule can be slightly less effective in other countries but still works broadly in guiding where policy rates should be and, in turn, for investors, where they might go.

For example, in the euro area, the Taylor Rule was a helpful barometer until 2008 (*see Figure 6 on page 4*). What changed? Like the Federal Reserve, the ECB had its policy rate stuck at the zero lower bound even as the Taylor Rule kept seeking a return to a pre-2008 level of rates.

However, similar to the Fed, the ECB found itself behind the curve in 2021. Hiking sooner would have been better, which the rule told policymakers to do.

TAYLOR STILL RULES

For policymakers, the lessons are clear and abundant: Following policy rules, even if not precisely like a rocket scientist might insist, yields better results. Too much discretion creates problems, like in 2021–22. We hope policymakers have learned their lesson. As economist Pappell said in the aftermath of the Covid inflation and sluggish Fed reaction: "Stick to the Rule" (*see again Figures 5 and 6*)!

For investors, following the rule may yield insights into the direction of rates. For instance, the early Taylor Rule warned that 1994 policy tightening was warranted. Similarly, as inflation increased in 2021-2022, the Taylor Rule pointed to a higher policy rate, yet the fed funds rate remained unchanged. Today, the Taylor Rule suggests that if inflation continues to subside, a rules-based policy rate would be reduced so as not to "over tighten." However, the inertial factor may suggest the future rate path implied by policymakers' forecasts is close to what market participants already expect (*see Figure 7 on page 4*)![16]

Ultimately, a straightforward rule yields more optimal monetary policy and helps investors foresee the future of interest rates. Where will interest rates be from 2024 to 2026? Well, based on the "median" policymakers' expectations for unemployment, inflation, the natural rate of unemployment, r*, and the latest Taylor Rule, *Figure 7* presents a plausible path. If rates do deviate from the path, it'll be because inflation or unemployment wanders.

Now my mother knows the secret to interest rates—and so do you.

ENDNOTES

1. Humphrey, T. (1990). Ricardo Versus Thornton on the Appropriate Monetary Response to Supply Shocks. *Economic Review, Richmond Fed*, *76*, 23. https://fraser.stlouisfed.org/files/docs/publications/frbrichreview/rev_frbrich199011.pdf?utm_source=direct_download
2. Friedman, B. M., & Hahn, F. H. (1990). Chapter 15. In *Handbook of Monetary Economics* (p. 829). Essay, North Holland.
3. Taylor, J. B. (2021). Simple monetary rules: Many strengths and few weaknesses. European Journal of Law and Economics, 52(2–3), 267–283. https://doi.org/10.1007/s10657-020-09683-1
4. ibid
5. Taylor, J. B. (1993). Discretion versus policy rules in practice. *Carnegie-Rochester Conference Series on Public Policy*, *39*, 195–214. https://doi.org/10.1016/0167-2231(93)90009-l
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7. ibid
8. Hoover Institution. (2023). *How To Get Back On Track: 30 Year Anniversary of the Taylor Rule*. *YouTube*. Retrieved January 4, 2024, from https://www.youtube.com/watch?v=j6pXDg2KEHk.
9. Orphanides, A. (2003). Historical monetary policy analysis and the Taylor rule. *Journal of Monetary Economics*, *50*(5), 983–1022. https://doi.org/10.1016/s0304-3932(03)00065-5
10. Google scholar citations - John B. Taylor. (n.d.). https://scholar.google.com/citations?hl=en&user=HURCElMAAAAJ&view_op=list_works
11. Yellen, J.L. (2012, June 6). *Perspectives on Monetary Policy*[Speech Transcript]. Federal Reserve Bank of Boston. yellen20120606a.pdf (federalreserve.gov)
12. In her formal presentation to the FOMC, Yellen proposed the equation r = 2 + p + 0.5(p-2) + 2.3(5.6-ur). For simplicity, r* is assumed to be fixed at 2, and NAIRU is assumed to be fixed at 5.6.
13. The balanced approach (shortfalls) rule is outlined as r = r* + p + 0.5(p-2) + 2min[NAIRU - ur, 0]. Instead of fixing r* and NAIRU(natural unemployment rate) like Yellen (2012), we allow them to be dynamic. We use the equilibrium unemployment rate provided by the OECD economic outlook for NAIRU. As for r*, we use the natural rate from the Laubach Williams Model, a standard r* model adopted by Federal Reserve researchers.
14. Papell, D. H., & Prodan, R. (2022). Policy rules and forward guidance following the COVID-19 recession. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.4083466
15. Ibid, the idea of applying inertia to the Taylor rule was first introduced in 1999 by Clarida, Gali, and Gertler. In 2019, Bernake, Kiley, and Roberts presented a paper that set the inertia ratio at 85%—the level that Pappell (2022) employed.
16. The Taylor Rule forecast is based on the December Summary of Economic Projections. The model assumes that the natural rate of unemployment and r* remains the same at the median FOMC projection (NAIRU=4.1, r*=0.5). The forecast also assumes that the future path of inflation and unemployment rates follows the median FOMC projected unemployment and inflation.