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# Economics Weekly

## Making Friends With the Taylor Rule



In a speech this past Tuesday, Fed Chair Powell reinforced market expectations for an October 29 rate cut. Futures market participants were already attaching a 94% probability to such an outcome last week, and this probability increased further to 96% following the speech. Powell stated that little had changed since September, employment growth continues to soften, and the estimated risks around tariff-related inflation have lessened. He also noted that the Fed's goal would be to continue to return the policy rate to a more neutral setting. The question is, what interest rate would be consistent with that neutral setting?

The reality is that neither the Fed nor any of us knows for certain, though there are guideposts that can provide some direction. The Taylor rule is one such guidepost, and it is used to assess where the current policy rate should be relative to both inflation and economic growth. **In this *Economics Weekly*, we discuss why the Fed may have been right to keep rates below the Taylor rule's policy prescription for the last two decades, and why a structural change in the inflation regime means it may no longer have that luxury.**

## A Model of Deceptive Simplicity

*Everything should be made as simple as possible, but not simpler.*

– Attributed to Albert Einstein

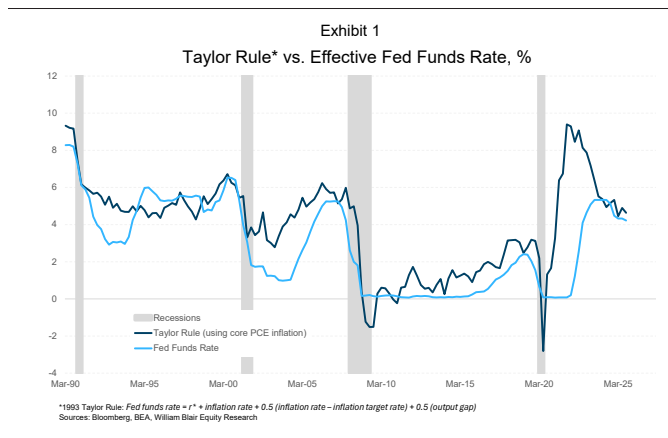
Named after Stanford's professor of economics, John Taylor, the Taylor rule is a seemingly simple and clear equation that links interest rates to inflation and economic growth targets.

The formula states that:

$$\text{Fed funds rate} = r^* + \text{inflation rate} + 0.5 (\text{inflation rate} - \text{inflation target rate}) + 0.5 (\text{output gap})$$

In this formula,  $r^*$  is the estimated real neutral rate of interest, and the output gap is the difference between current actual GDP growth and real potential GDP growth. The weights of 0.5 imply that the Fed will need to raise the federal funds rate by 50 basis points for every percentage point that inflation rises relative to the 2% target rate, or for each percentage point that output rises above its potential rate of growth.

The rule is plotted in exhibit 1, which uses current data (as opposed to real time) as well as the GDP price index for inflation, and the Laubach-Williams measure of  $r^*$ .



Under these conditions, the rule suggests that the current policy setting is about right, and there is little need for further rate cuts. In fact, the rule shows the fed funds rate increasing from 4.38% in the second quarter to 4.89% in the third quarter, reflecting the consensus estimated increase in the inflation rate due to the tariffs.

In 1999, Taylor adjusted this rule by attaching a higher weight of 1.5 for the inflation component, arguing that the stronger inflation response better captured successful Fed policy during the late 1990s, and it would be wise to take a tougher stance on inflation. Using that weight, the rule would now point to a significantly higher 5.67% fed funds rate.

This change highlights one of the key pitfalls of the rule (its deceptive beauty), which is that it is easily susceptible to tinkering. Different inflation indices can yield significantly different results, and small changes in the weightings also will result in markedly different results. Furthermore, as many know, estimates of  $r^*$  (dubbed the phantom menace by former Fed President Bullard) can be even more ethereal and can vary in the face of structural changes in factors such as population growth and technological innovation.

Former Fed Chairs Bernanke and Yellen have in the past provided their own tweaked versions of the rule. Bernanke, for example, suggested that a better inflation input would be to use the core PCE price index, given that the GDP price index includes prices for consumer goods and services as well as those for capital goods and government spending, and it excludes prices on imported goods. As a result, the GDP deflator tends to be less representative of the prices that actual consumers are paying—something that would be more relevant given today's tariff situation. Chair Bernanke has also noted that the Fed, under both his and Yellen's leadership, tended to pay closer attention to a

Taylor rule that favors leaving the inflation weighting at 0.5 but increasing the output gap weight to 1.0.

If we swap the GDP deflator for the core PCE index using the 1993 Taylor rule, the equation yields a current fed funds rate of 4.64%. Swapping both the GDP deflator and the weight on the output gap component increases that implied funds rate to 5.51%.

## Let's Just Be Friends

Based on either measure of the Taylor rule, the Fed's policy rate has been overly accommodative for most of the last 25 years, as shown in exhibit 1. The exception was during the global financial crisis period, when the Fed was forced to undertake QE to effectively push the rate through the lower rate bound.

In addition, had the rule been followed to a T, the funds rate should have been lifted as high as 9.4% by the end of 2021, when the core PCE index was over 5%. Such a move would undoubtedly have helped to bring inflation down more quickly, but would also almost certainly have triggered a recession in the process.

The reality is that a rigid and mechanistic marriage to a policy rule—especially one whose input components are themselves not always perfectly measurable and which can often be slow to reflect underlying shifts in the economy and financial markets (e.g., there is no financial conditions input component)—can often be overly restrictive or accommodative, and therefore detrimental to growth and inflation.

However, this relationship should not be jettisoned altogether. The rule is still useful as a policy guideline, a baseline against which policy decisions can be compared and contrasted, but not wed to as Professor Taylor would prefer. Its relevance might also increase in a world where the inflation regime is now changing.

## Fed Should Acknowledge the Inflation Regime Has Changed

Today, it is important for policymakers to recognize that the inflation regime has structurally shifted.

As we have noted in prior weeklies (e.g., [here](#) and [here](#)) we are no longer in a pre-COVID world where the supplies of labor and materials are plentiful and seemingly capable of satiating any given level of demand.

In that world, there was effectively no upside risk to inflation, though there were still significant downside risks should consumption hit any unfortunate and/or unexpected air pockets (e.g., a wobble in the financial markets).

This 25-year period of asymmetric inflation risk allowed the Fed to consistently diverge from a Taylor rule, keeping rates lower for longer and lower than Taylor would subscribe. The Fed's stance, however, helped ensure that demand remained buoyant and simultaneously limited the potential for any deflationary shortfalls in consumption.

What has changed is that since COVID, the supply side of the economy has reasserted itself with a vengeance, and this shift is expected to be sustained.

On the labor side, not only is the supply of workers increasingly being constrained by an aging workforce and low birth rates, it is also being hit with stringent new immigration restrictions.

Meanwhile, with regard to materials, access to "stuff" is increasingly being adversely impacted by pandemics; geopolitical woes; deglobalization policies, including trade wars and tariffs; more frequent weather events; disrupted supply chains; labor strikes; and increasingly high government debt levels. In addition, it seems likely that there will be more variability in energy supply as AI-related data centers compete with a still limited available supply of energy.

The Fed may have correctly gauged its ability to keep rates persistently lower than prescribed by the Taylor rule in that old asymmetric inflation regime; however, in the new, more symmetric one—personified by more frequent supply-side shocks to inflation and a slightly higher mean rate of inflation—the Fed may no longer have that luxury. It may now be less able to always "look through" supply shocks and perhaps even have to pay a little more attention to what Dr. Taylor's rule might be saying.

## Conclusion

As beguilingly simple as the Taylor rule is, the Fed is right not to be rigidly married to a rule that at times has proved to be less flexible or responsive in adjusting to downside demand shortfalls in the economy or sharp declines in financial markets.

In the old inflation regime—personified by seemingly unlimited supply capacity against more variable demand—inflation risks were asymmetrically skewed to the downside. There was also seemingly little downside risk to paying

less attention to the rule and pursuing a “let’s just be friends” arm’s-length attachment to its prescriptions.

In the new inflation regime world—personified by re-introduced supply-side constraints against still variable demand, where inflation risks are more symmetric to the upside and downside—sticking a little more closely to the Taylor rule might offer the Fed some added benefits. The rule might be particularly helpful when it comes to dealing with any supply-driven inflation shocks that are likely to increasingly manifest going forward, bringing with them more persistent upside risks to inflation.

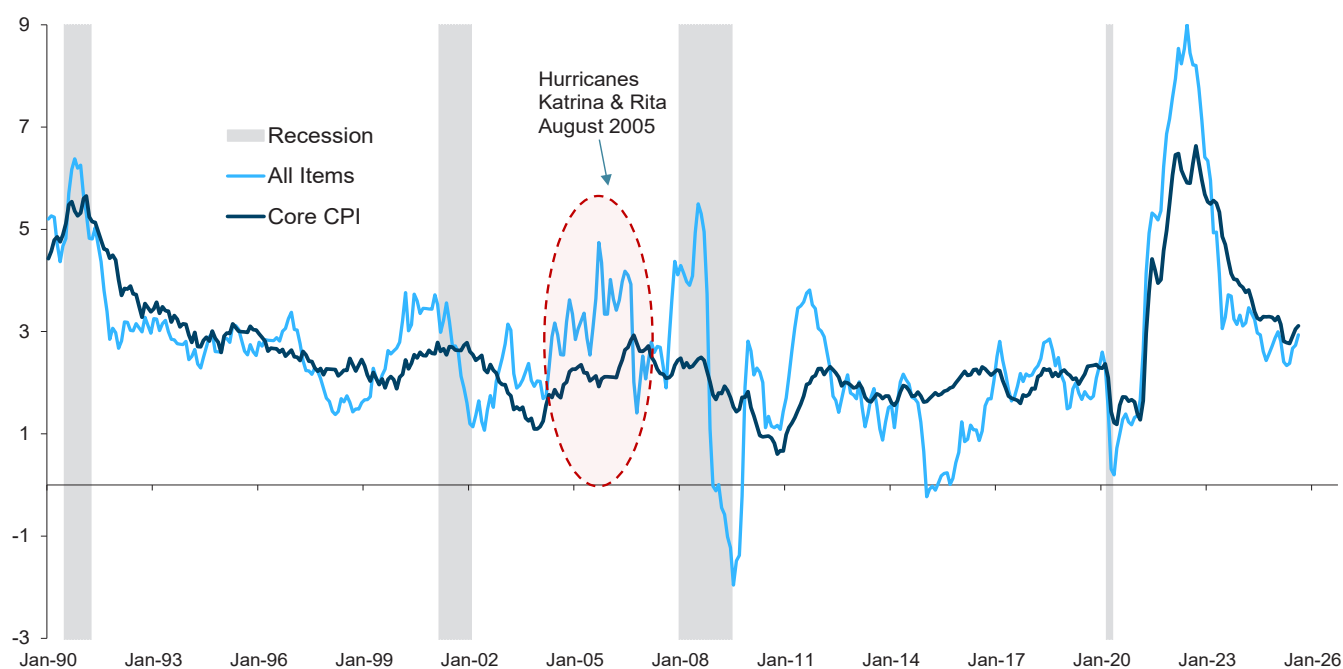
## Highlights in the Week Ahead

| Date   | Time (ET)  | Indicator                         | Last  | Consensus | WB Estimate | Actual |
|--------|------------|-----------------------------------|-------|-----------|-------------|--------|
| 20 Oct | 10:00 a.m. | Leading Economic Indicators (Sep) | -0.5% | -0.3%     | NA          |        |
| 24 Oct | 8:30 a.m.  | CPI (Sep)                         | 0.4%  | 0.4%      | 0.3%        |        |
|        |            | CPI Less-Food & Energy            | 0.3%  | 0.3%      | 0.3%        |        |
| 24 Oct | 10:00 a.m. | New Home Sales (Sep)              | 20.5% | -11.3%    | -8.0%       |        |

Sources: Bloomberg, William Blair Equity Research

## Indicator of the Week: Consumer Price Index

### CPI All Items & Core CPI - % Change on Year Ago



Source: Bureau of Labor Statistics, William Blair Equity Research

## Economic Scorecard

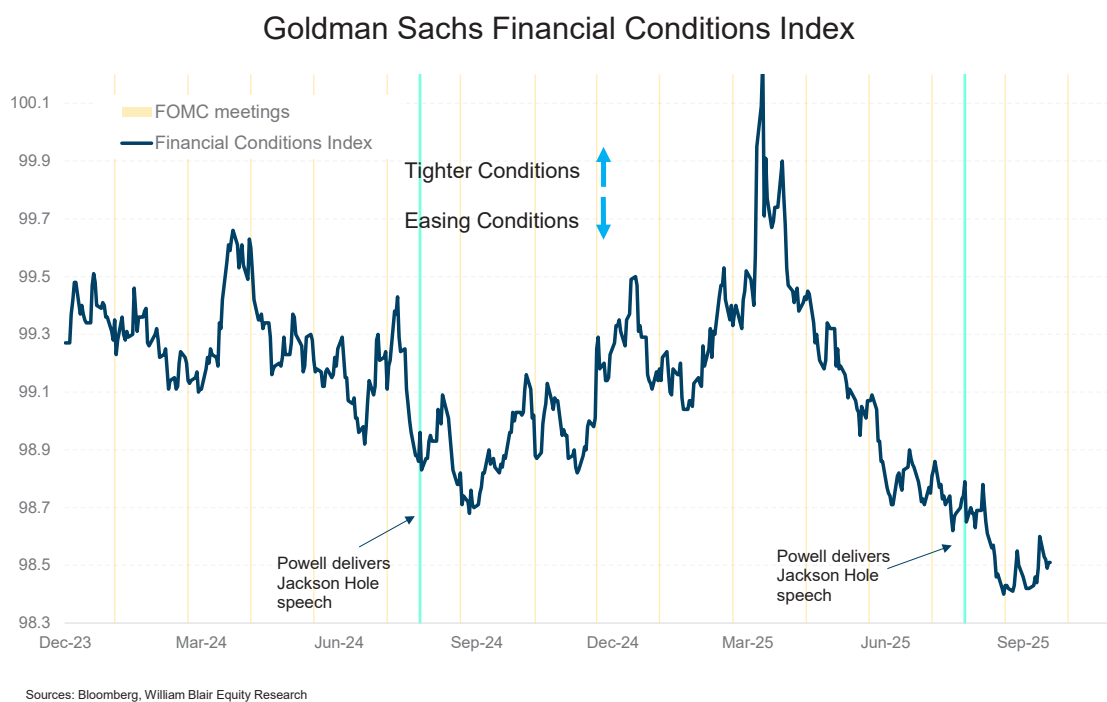
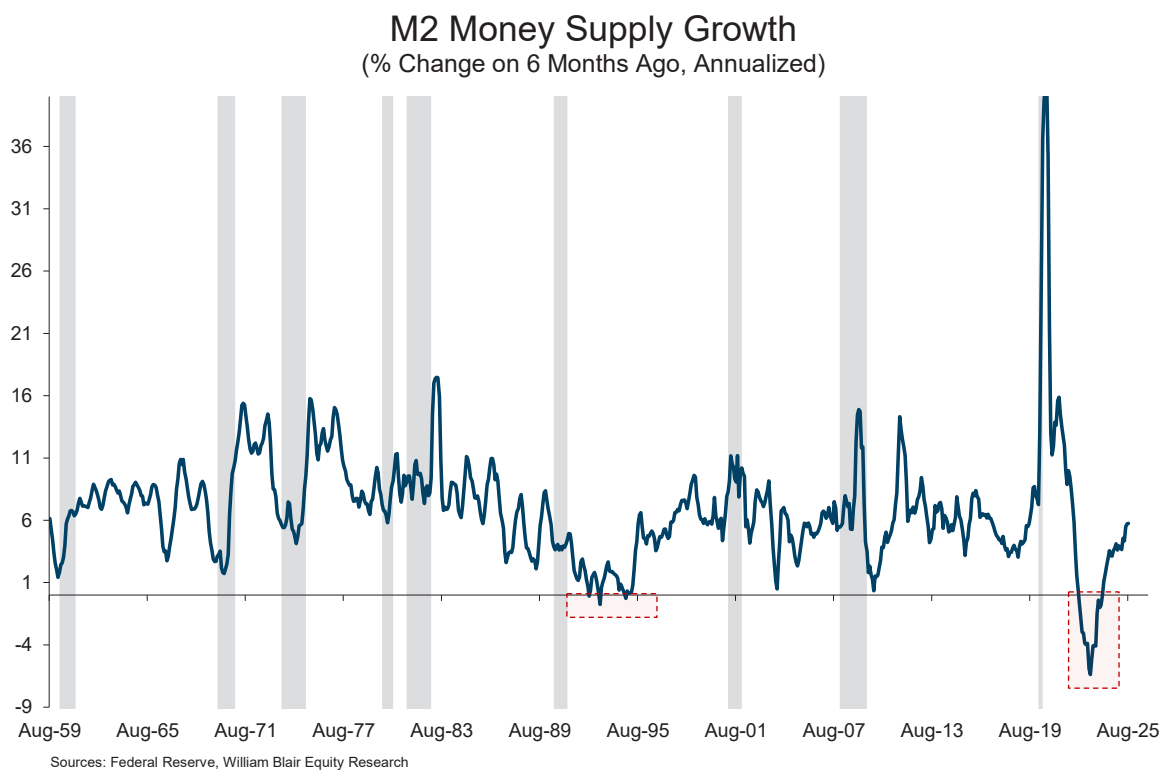
Rolling monthly heat map, % Change on Year Ago (unless otherwise noted)

|                                                | Apr-24 | May-24 | Jun-24 | Jul-24 | Aug-24 | Sep-24 | Oct-24 | Nov-24 | Dec-24 | Jan-25 | Feb-25 | Mar-25 | Apr-25 | May-25 | Jun-25 | Jul-25 | Aug-25 | Sep-25 | Oct-25 |
|------------------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| <b>Growth</b>                                  |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| US Leading Indicators                          | -5.4   | -5.0   | -4.5   | -4.7   | -4.6   | -4.3   | -3.7   | -3.0   | -3.0   | -2.7   | -3.0   | -3.6   | -4.3   | -3.9   | -4.0   | -3.4   | -3.6   |        |        |
| US Coincident Indicators                       | 1.7    | 1.9    | 2.1    | 1.7    | 1.7    | 1.6    | 1.6    | 1.3    | 1.7    | 1.5    | 1.5    | 1.8    | 2.0    | 1.4    | 1.4    | 1.4    | 1.5    |        |        |
| US Lagging Indicators                          | 1.4    | 1.2    | 1.1    | 1.0    | 0.8    | 0.3    | 0.1    | 0.0    | 0.1    | -0.1   | 0.1    | -0.1   | 0.0    | 0.8    | 0.7    | 0.8    | 0.9    |        |        |
| <b>Consumer</b>                                |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Total Retail Sales                             | 2.6    | 2.8    | 2.3    | 3      | 1.8    | 2      | 3.1    | 3.9    | 4.6    | 4.6    | 3.9    | 5.1    | 5      | 3.4    | 4.4    | 4.1    | 5.0    |        |        |
| Personal Income                                | 5.7    | 5.7    | 5.7    | 5.6    | 5.4    | 5.3    | 5.5    | 5.3    | 5.3    | 5      | 5      | 5.2    | 5.8    | 4.9    | 4.7    | 4.9    | 5.1    |        |        |
| Real Disposable Personal Income                | 2.9    | 3      | 3.1    | 2.9    | 2.8    | 2.8    | 2.7    | 2.4    | 2.2    | 1.8    | 1.8    | 2.3    | 3      | 1.9    | 1.6    | 1.9    | 1.9    |        |        |
| Real Personal Consumption                      | 2.6    | 3.1    | 3.1    | 3      | 3      | 3.4    | 3.3    | 3.2    | 3.6    | 3.3    | 2.7    | 3.2    | 3.1    | 2.5    | 2.5    | 2.5    | 2.7    |        |        |
| Personal Saving Rate (%)                       | 5.8    | 5.8    | 5.7    | 5.3    | 5.2    | 4.8    | 5      | 4.9    | 4.3    | 5.1    | 5.2    | 5.1    | 5.7    | 5.2    | 5      | 4.8    | 4.6    |        |        |
| Consumer Confidence (Conference Board)**       | 97.5   | 101.3  | 97.8   | 101.9  | 105.6  | 99.2   | 109.6  | 112.8  | 109.5  | 105.3  | 100.1  | 93.9   | 85.7   | 98.4   | 95.2   | 98.7   | 97.8   | 94.2   |        |
| <b>Employment</b>                              |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Employment Growth                              | 1.5    | 1.4    | 1.3    | 1.3    | 1.2    | 1.3    | 1.2    | 1.3    | 1.3    | 1.3    | 1.2    | 1.1    | 1.1    | 1.0    | 1.0    | 1.0    | 0.9    |        |        |
| ASA Temporary Staffing Index                   | -9.3   | -10.2  | -9.9   | -12.5  | -12.2  | -12.0  | -9.5   | -6.6   | -21.0  | -8.2   | -7.5   | -8.7   | -6.4   | -5.8   | -5.3   | -0.8   | -0.9   | 0.8    |        |
| ISM Employment Index Manufacturing*            | 48.2   | 50.4   | 48.4   | 43.6   | 45.8   | 44.6   | 44.8   | 48.1   | 45.4   | 50.3   | 47.6   | 44.7   | 46.5   | 46.8   | 45     | 43.4   | 43.8   | 45.3   |        |
| ISM Employment Index Services*                 | 46.6   | 47.5   | 46.7   | 51     | 49.6   | 48.2   | 52.2   | 50.9   | 51.3   | 52.3   | 53.9   | 46.2   | 49     | 50.7   | 47.2   | 46.4   | 46.5   | 47.2   |        |
| Unemployment Rate, %                           | 3.9    | 4      | 4.1    | 4.2    | 4.2    | 4.1    | 4.1    | 4.2    | 4.1    | 4      | 4.1    | 4.2    | 4.2    | 4.2    | 4.1    | 4.2    | 4.3    |        |        |
| Average Hourly Earnings                        | 4      | 4.1    | 3.9    | 3.6    | 4      | 3.9    | 4.1    | 4.2    | 4      | 3.9    | 3.9    | 3.9    | 3.8    | 3.8    | 3.7    | 3.9    | 3.7    |        |        |
| Initial Jobless Claims (avg. wkly. chg. '000s) | 210    | 222    | 237    | 237    | 230    | 225    | 236    | 219    | 222    | 218    | 227    | 223    | 226    | 235    | 241    | 221    | 231    | 238    |        |
| Jop Openings                                   | -23.7  | -15.1  | -19.4  | -12.8  | -17.6  | -23.5  | -10.9  | -7.3   | -12.5  | -8.3   | -11.4  | -11.0  | -2.9   | -2.4   | -0.7   | -3.9   | -5.5   | 1.7    |        |
| Layoff Announcements                           | -3.3   | -20.3  | 19.8   | 9.2    | 1      | 53.4   | 50.9   | 26.8   | 11.4   | -39.5  | 103.2  | 204.8  | 62.7   | 47     | -1.6   | 139.8  | 13.3   | -25.8  |        |
| <b>Housing Market</b>                          |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Housing Starts                                 | 2.3    | -16.9  | -6.6   | -13.4  | 5.6    | -1     | -1.2   | -14.5  | -0.5   | -1.7   | -4     | 3.3    | 0.9    | -2.6   | 4.1    | 13     | -6     |        |        |
| New Home Sales                                 | 8.1    | -10    | -0.4   | 1.1    | 7.4    | 5.3    | -8.8   | 10.7   | 11.7   | -2.8   | -2.4   | -4.6   | -1.8   | -5.7   | 0.7    | -6.5   | 15.4   |        |        |
| Existing Home Sales                            | -2.6   | -3.1   | -5.1   | -2.5   | -3.7   | -3.0   | 3.1    | 6.7    | 9.7    | 2.3    | -0.9   | -2.4   | -2.0   | -0.5   | 0.0    | 0.8    | 1.8    |        |        |
| Median House Price (Existing Homes)            | -0.5   | -1.6   | -0.9   | -1.6   | -8     | -1.2   | 2.1    | -7.4   | 1.1    | -0.2   | -1.4   | -5.4   | -0.4   | 2.5    | -2.5   | -7.9   | 1.9    |        |        |
| Existing Homes Inventory (Mths' supply)        | 3.5    | 3.5    | 3.8    | 3.7    | 3.9    | 4      | 3.9    | 3.8    | 3.7    | 3.9    | 3.8    | 4.2    | 4.3    | 4.3    | 4.4    | 4.3    | 4.3    |        |        |
| New Homes Inventory (Mths' supply)             | 7.7    | 8.5    | 8.4    | 7.9    | 8.2    | 7.9    | 9.3    | 8.7    | 8.2    | 9      | 9.3    | 9.2    | 8.5    | 9.6    | 8.9    | 9      | 7.4    |        |        |
| NAHB Homebuilder Sentiment*                    | 51     | 45     | 43     | 41     | 39     | 41     | 43     | 46     | 46     | 47     | 42     | 39     | 40     | 34     | 32     | 33     | 32     | 32     | 37     |
| <b>Inflation</b>                               |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Consumer Price Index                           | 3.4    | 3.3    | 3      | 2.9    | 2.5    | 2.4    | 2.6    | 2.7    | 2.9    | 3      | 2.8    | 2.4    | 2.3    | 2.4    | 2.7    | 2.7    | 2.9    |        |        |
| CPI Less-food & energy                         | 3.6    | 3.4    | 3.3    | 3.2    | 3.2    | 3.3    | 3.3    | 3.3    | 3.2    | 3.3    | 3.1    | 2.8    | 2.8    | 2.8    | 2.9    | 3.1    | 3.1    |        |        |
| Producer Price Index                           | 2.3    | 2.5    | 2.9    | 2.4    | 2.1    | 2.1    | 2.8    | 2.9    | 3.5    | 3.8    | 3.4    | 3.2    | 2.4    | 2.7    | 2.4    | 3.1    | 2.6    |        |        |
| PPI Less-food & energy                         | 2.5    | 2.7    | 3.3    | 2.6    | 2.8    | 3.3    | 3.6    | 3.4    | 3.7    | 3.9    | 3.7    | 3.8    | 3.1    | 3.2    | 2.6    | 3.4    | 2.8    |        |        |
| PCE Price Index                                | 2.8    | 2.7    | 2.5    | 2.6    | 2.4    | 2.3    | 2.5    | 2.6    | 2.7    | 2.6    | 2.7    | 2.4    | 2.3    | 2.5    | 2.6    | 2.6    | 2.7    |        |        |
| PCE Prices Less-food & energy                  | 3.0    | 2.8    | 2.8    | 2.8    | 2.9    | 2.8    | 3.0    | 3.0    | 3.0    | 2.8    | 3.0    | 2.7    | 2.6    | 2.8    | 2.8    | 2.9    | 2.9    |        |        |
| <b>Business Activity - US</b>                  |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Industrial Production                          | -0.8   | 0.0    | 0.9    | -0.5   | -0.1   | -0.7   | -0.4   | -0.9   | 0.4    | 1.4    | 1.1    | 1.0    | 1.2    | 0.7    | 0.9    | 1.3    | 0.9    |        |        |
| New Cap Gds Orders less-aircraft & parts       | 2.1    | -2.8   | -4     | -0.6   | -1.8   | 0.5    | 0.2    | -1.1   | 1.9    | 3.3    | -0.9   | 2.2    | 0.5    | 2.2    | 4.5    | 4.5    | 2.9    |        |        |
| Business Inventories                           | 0.2    | 0.6    | 1.2    | 1.6    | 2.1    | 2.1    | 1.9    | 2.2    | 2.6    | 1.9    | 2.5    | 2.3    | 2.5    | 2.2    | 1.7    | 1.6    | 1.5    |        |        |
| ISM Manufacturing PMI*                         | 48.8   | 48.5   | 48.3   | 47     | 47.5   | 47.5   | 46.9   | 48.4   | 49.2   | 50.9   | 50.3   | 49     | 48.7   | 48.5   | 49     | 48     | 48.7   | 49.1   |        |
| Markit US Manufacturing PMI*                   | 50     | 51.3   | 51.6   | 49.6   | 47.9   | 47.3   | 48.5   | 49.7   | 49.4   | 51.2   | 52.7   | 50.2   | 50.2   | 52     | 52.9   | 49.8   | 53     | 52     |        |
| ISM Services Index*                            | 49.6   | 53.5   | 49.2   | 51.4   | 51.6   | 54.5   | 55.8   | 52.5   | 54     | 52.8   | 53.5   | 50.8   | 51.6   | 49.9   | 50.8   | 50.1   | 52     | 50     |        |
| Markit US Services PMI*                        | 51.3   | 54.8   | 55.3   | 55     | 55.7   | 55.2   | 55     | 56.1   | 56.8   | 52.9   | 51     | 54.4   | 50.8   | 53.7   | 52.9   | 55.7   | 54.5   | 54.2   |        |
| <b>Business Activity - International</b>       |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Germany Manufacturing PMI Markit/BME*          | 42.5   | 45.4   | 43.5   | 43.2   | 42.4   | 40.6   | 43     | 43     | 42.5   | 45     | 46.5   | 48.3   | 48.4   | 48.3   | 49     | 49.1   | 49.8   | 49.5   |        |
| Japan Manufacturing PMI Jibun Bank*            | 49.6   | 50.4   | 50     | 49.1   | 49.8   | 49.7   | 49.2   | 49     | 49.6   | 48.7   | 49     | 48.4   | 48.7   | 49.4   | 50.1   | 48.9   | 49.7   | 48.5   |        |
| Caixin China Manufacturing PMI*                | 51.4   | 51.7   | 51.8   | 49.8   | 50.4   | 49.3   | 50.3   | 51.5   | 50.5   | 50.1   | 50.8   | 51.2   | 50.4   | 48.3   | 50.4   | 49.5   | 50.5   | 51.2   |        |
| China Manufacturing PMI*                       | 50.4   | 49.5   | 49.5   | 49.4   | 49.1   | 49.8   | 50.1   | 50.3   | 50.1   | 49.1   | 50.2   | 50.5   | 49     | 49.5   | 49.7   | 49.3   | 49.4   | 49.8   |        |
| UK Manufacturing PMI Markit/CIPS*              | 49.1   | 51.2   | 50.9   | 52.1   | 52.5   | 51.5   | 49.9   | 48     | 47     | 48.3   | 46.9   | 44.9   | 45.4   | 46.4   | 47.7   | 48     | 47     | 46.2   |        |
| France Manufacturing PMI Markit*               | 45.3   | 46.4   | 45.4   | 44     | 43.9   | 44.6   | 44.5   | 43.1   | 41.9   | 45     | 45.8   | 46.5   | 48.7   | 49.8   | 48.1   | 48.2   | 50.4   | 48.2   |        |
| <b>Currencies***</b>                           |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Euro (EUR/USD)                                 | -3.2   | 1.5    | -1.8   | -1.6   | 1.9    | 5.3    | 2.9    | -2.9   | -6.2   | -4.2   | -4.0   | 0.2    | 6.2    | 4.6    | 10.0   | 5.4    | 5.8    | 5.4    |        |
| Renminbi (USD/CNY)                             | 4.7    | 1.9    | 0.2    | 1.2    | -2.3   | -3.8   | -2.7   | 1.6    | 2.8    | 1.1    | 1.2    | 0.5    | 0.4    | -0.6   | -1.4   | -0.4   | 0.6    | 1.5    |        |
| Yen (USD/Yen)                                  | 15.8   | 12.9   | 11.5   | 5.4    | 0.4    | -3.8   | 0.2    | 1.1    | 11.5   | 5.6    | 0.4    | -0.9   | -9.3   | -8.4   | -10.5  | 0.5    | 0.6    | 3.0    |        |
| Sterling (GBP/USD)                             | -0.6   | 2.4    | -0.5   | 0.2    | 3.6    | 9.6    | 6.1    | 0.9    | -1.7   | -2.3   | -0.4   | 2.3    | 6.7    | 5.6    | 8.6    | 2.7    | 2.9    | 0.5    |        |
| Canadian \$ (USD/CAD)                          | 1.7    | 0.4    | 3.3    | 4.7    | -0.1   | -0.4   | 0.4    | 3.3    | 8.6    | 8.2    | 6.5    | 6.3    | 0.2    | 0.8    | -0.5   | 0.3    | 1.8    | 2.9    |        |
| Mexican Peso (USD/MXN)                         | -4.8   | -3.8   | 7.0    | 11.2   | 15.8   | 13.0   | 11.0   | 17.2   | 22.7   | 20.1   | 20.5   | 23.6   | 14.4   | 14.3   | 2.3    | 1.4    | -5.4   | -7.0   |        |
| <b>US Equities</b>                             |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| S&P 500                                        | 20.8   | 26.3   | 22.7   | 20.3   | 25.3   | 34.4   | 36.0   | 32.1   | 23.3   | 24.7   | 16.8   | 6.8    | 10.6   | 12.0   | 13.6   | 14.8   | 14.4   | 16.1   |        |
| S&P 400 Midcap                                 | 14.9   | 23.9   | 11.7   | 13.5   | 16.9   | 24.8   | 30.9   | 31.3   | 12.2   | 18.6   | 7.1    | -4.2   | -0.3   | 0.6    | 5.9    | 1.7    | 5.3    | 4.5    |        |
| S&P 600 Smallcap                               | 10.4   | 18.1   | 6.6    | 12.0   | 15.1   | 23.5   | 27.6   | 30.9   | 6.8    | 14.5   | 4.5    | -5.0   | -3.6   | -3.4   | 2.8    | -6.3   | 1.8    | 1.9    |        |
| Russell 2000                                   | 11.6   | 18.3   | 8.4    | 12.5   | 16.7   | 24.9   | 32.1   | 34.6   | 10.0   | 17.5   | 5.3    | -5.3   | -0.5   | -0.2   | 6.2    | -1.9   | 6.7    | 9.3    |        |

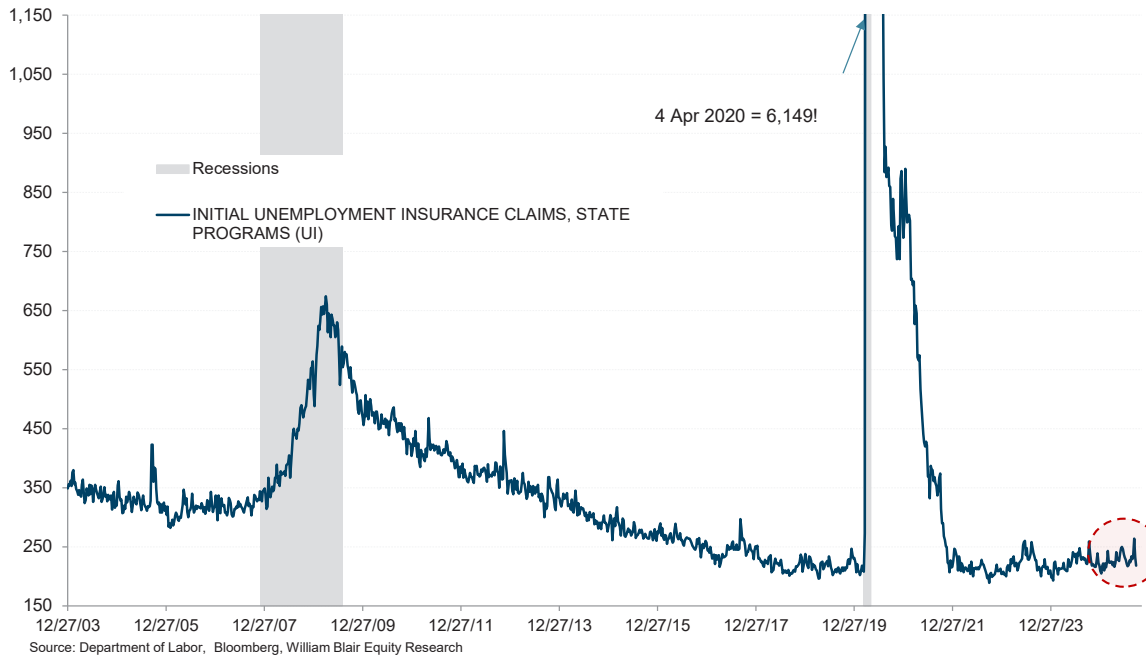
\* Diffusion Index, \*\*1985=100, \*\*\*Currencies - green/red = strengthening/weakening foreign currency vs dollar

Source: ISM, Federal Reserve, Census Bureau, Bureau of Labor Statistics, Conference Board, Bloomberg, William Blair

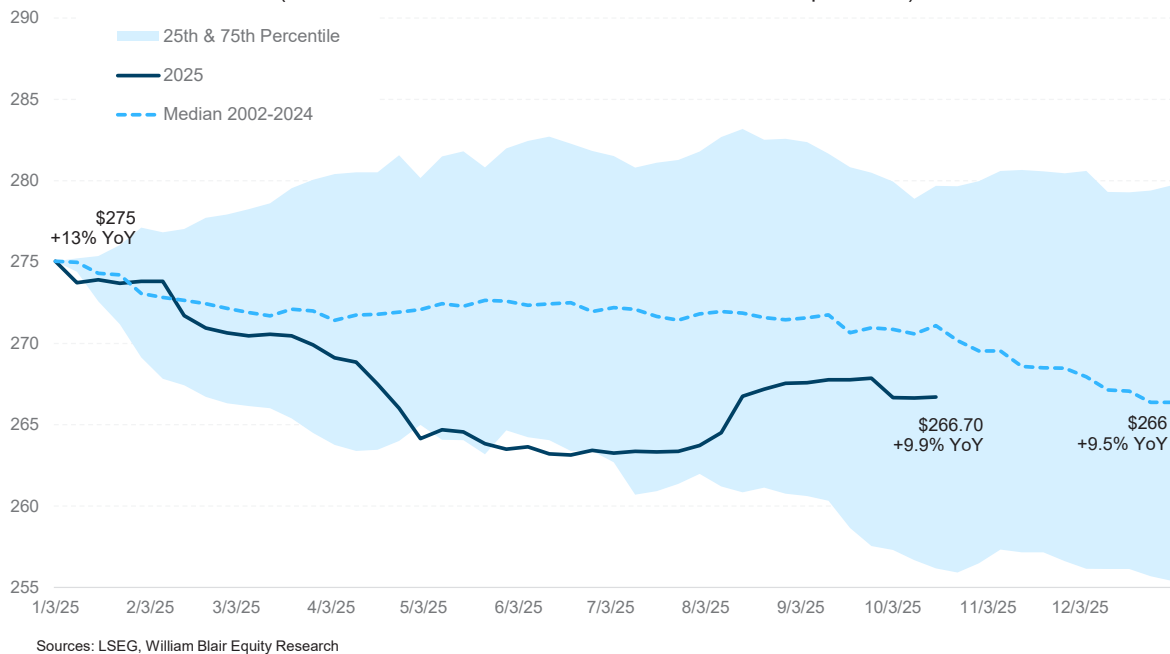
## Other Economic Indicators



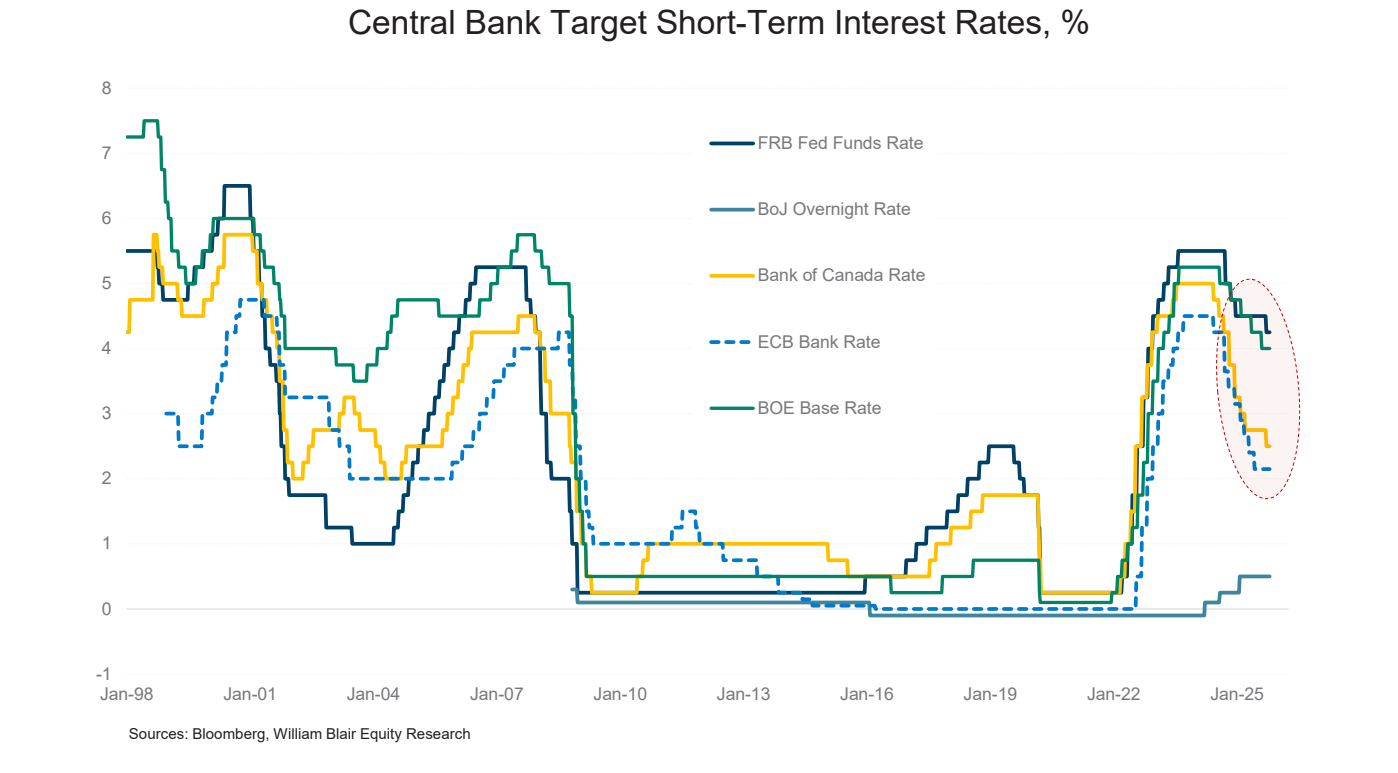
## Initial Jobless Claims (‘000s, Seasonally Adjusted)



## Progression of S&P 500 2025 EPS Estimates, 2025 vs Median 2002-2024 (Rebased to Estimate at End of Q4 2024 of \$275.05 per share)

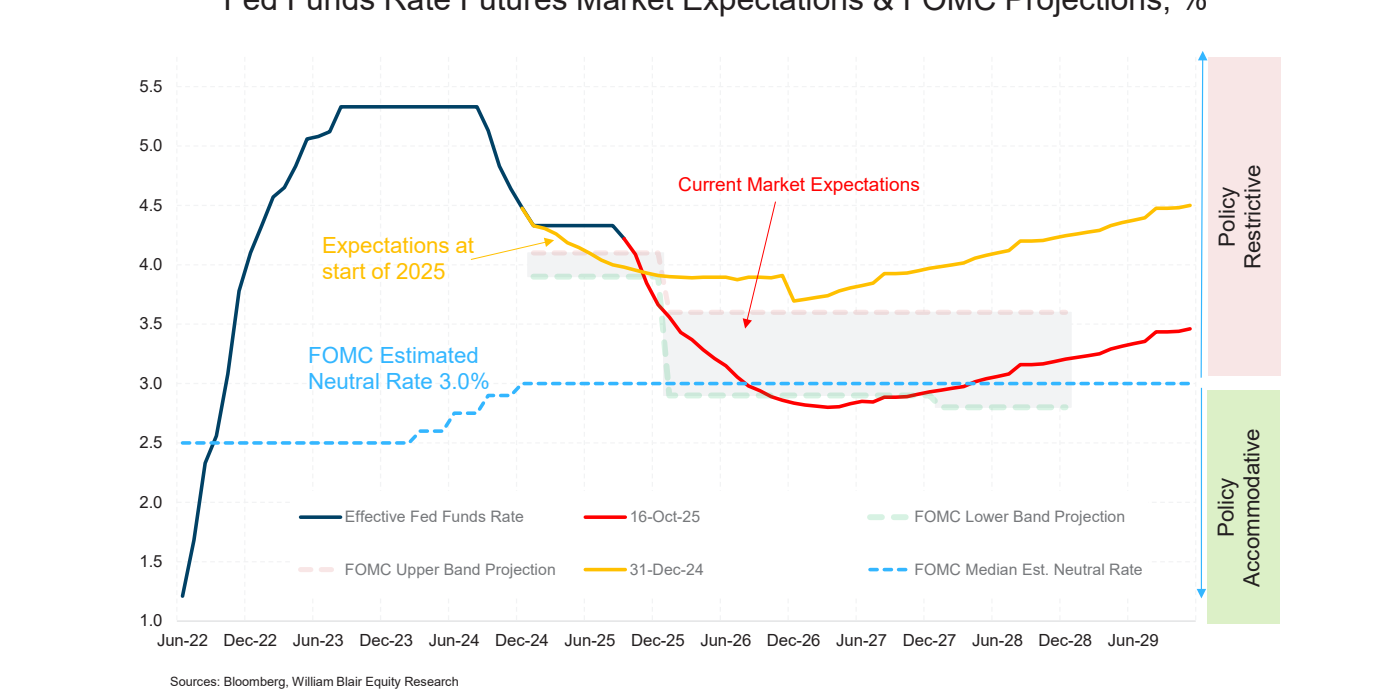


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## Fed Funds Rate Futures Market Expectations &amp; FOMC Projections %



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## S&P 500 Sector Performance

| Global Industry Classification System           | Current Weight*<br>16-Oct-25 | Week Ago<br>09-Oct-25 | Month Ago<br>16-Sep-25 | Qtr-to-Date<br>30-Sep-25 | Year-to-Date<br>31-Dec-24 |
|-------------------------------------------------|------------------------------|-----------------------|------------------------|--------------------------|---------------------------|
| <b>S&amp;P 500 Index</b>                        | <b>100.00</b>                | <b>-1.57</b>          | <b>0.34</b>            | <b>-0.89</b>             | <b>12.71</b>              |
| <b>S&amp;P 400 MidCap Index</b>                 |                              | <b>-1.15</b>          | <b>-1.70</b>           | <b>-1.44</b>             | <b>3.07</b>               |
| <b>S&amp;P 600 SmallCap Index</b>               |                              | <b>-0.17</b>          | <b>-0.32</b>           | <b>-0.91</b>             | <b>1.98</b>               |
| <b>Dow Jones Industrials</b>                    |                              | <b>-0.88</b>          | <b>0.42</b>            | <b>-0.96</b>             | <b>8.01</b>               |
| <b>Nasdaq Composite</b>                         |                              | <b>-2.01</b>          | <b>1.02</b>            | <b>-0.43</b>             | <b>16.84</b>              |
| <b>Communication Services</b>                   | <b>10.16</b>                 | <b>0.49</b>           | <b>-3.50</b>           | <b>-0.60</b>             | <b>22.95</b>              |
| Advertising                                     | 0.08                         | -4.14                 | 5.12                   | -2.12                    | -33.29                    |
| Broadcasting                                    | 0.07                         | -3.61                 | -1.59                  | -10.11                   | 22.41                     |
| Cable & Satellite                               | 0.24                         | -2.89                 | -8.16                  | -6.93                    | -22.72                    |
| Integrated Telecommunication Services           | 0.59                         | -0.35                 | -9.30                  | -7.68                    | 7.90                      |
| Interactive Home Entertainment                  | 0.16                         | 0.57                  | 10.23                  | -0.17                    | 38.09                     |
| Interactive Media & Services                    | 7.26                         | 1.36                  | -3.29                  | 0.92                     | 28.23                     |
| Movies & Entertainment                          | 1.32                         | -2.58                 | -2.58                  | -2.58                    | 22.92                     |
| Publishing & Printing                           | 0.03                         | -1.73                 | -12.12                 | -15.37                   | -5.17                     |
| Wireless Telecommunication Svcs                 | 0.42                         | 0.11                  | -4.70                  | -5.40                    | 2.59                      |
| <b>Consumer Discretionary</b>                   | <b>10.48</b>                 | <b>-2.10</b>          | <b>-4.56</b>           | <b>-2.92</b>             | <b>1.68</b>               |
| Apparel Retail                                  | 0.35                         | 3.03                  | 3.05                   | -0.61                    | 13.85                     |
| Apparel & Accessories & Luxury Goods            | 0.09                         | -0.59                 | 3.85                   | -0.71                    | -14.81                    |
| Auto Parts & Equipment                          | 0.03                         | 0.94                  | 0.45                   | -3.17                    | 32.34                     |
| Automobile Manufacturers                        | 2.53                         | -1.27                 | 1.52                   | -3.63                    | 6.88                      |
| Automobile Retail                               | 0.26                         | 1.13                  | -5.77                  | -6.23                    | 19.85                     |
| Broadline Retail                                | 3.86                         | -5.70                 | -8.17                  | -2.27                    | -1.56                     |
| Casinos & Gaming                                | 0.09                         | -4.96                 | -6.47                  | -8.94                    | -2.18                     |
| Computer & Electronics Retail                   | 0.03                         | 4.40                  | 6.08                   | 3.86                     | -8.46                     |
| Consumer Electronics                            | 0.08                         | -3.81                 | 4.25                   | 0.21                     | 19.62                     |
| Distributors                                    | 0.06                         | 0.69                  | -6.57                  | -4.05                    | -3.33                     |
| Footwear                                        | 0.16                         | -1.48                 | -9.55                  | -3.86                    | -21.75                    |
| Home Furnishings                                | 0.01                         | 6.21                  | -7.15                  | -1.50                    | 6.60                      |
| Home Improvement Retail                         | 0.86                         | 2.83                  | -8.63                  | -4.10                    | -0.70                     |
| Homebuilding                                    | 0.20                         | 1.75                  | -8.91                  | -6.55                    | 4.47                      |
| Hotels, Resorts & Cruise Lines                  | 0.82                         | -2.43                 | -6.69                  | -4.54                    | 3.50                      |
| Leisure Products                                | 0.02                         | -0.32                 | -0.39                  | -1.92                    | 33.06                     |
| Restaurants                                     | 0.91                         | 2.25                  | 0.22                   | -0.18                    | 1.52                      |
| Other Specialty Retail                          | 0.09                         | -1.06                 | -2.71                  | -2.43                    | 11.95                     |
| <b>Consumer Staples</b>                         | <b>5.44</b>                  | <b>0.96</b>           | <b>-0.61</b>           | <b>0.49</b>              | <b>2.55</b>               |
| Agricultural Products                           | 0.08                         | 6.69                  | 4.58                   | 8.71                     | 24.14                     |
| Brewers                                         | 0.01                         | 2.24                  | -0.82                  | 3.95                     | -17.93                    |
| Distillers & Vintners                           | 0.05                         | -1.44                 | 3.45                   | 3.65                     | -35.02                    |
| Drug Retail                                     | 0.02                         | 0.00                  | 0.00                   | 0.00                     | 28.40                     |
| Food Distributors                               | 0.06                         | 1.01                  | -3.31                  | -4.26                    | 3.10                      |
| Food Retail                                     | 0.08                         | 1.95                  | 3.19                   | 2.18                     | 12.64                     |
| Household Products                              | 0.81                         | -0.49                 | -5.09                  | -2.65                    | -11.92                    |
| Packaged Foods & Meats                          | 0.45                         | -0.21                 | -1.65                  | -1.52                    | -7.99                     |
| Personal Care Products                          | 0.08                         | -8.42                 | -10.40                 | -3.93                    | -15.00                    |
| Soft Drinks                                     | 1.00                         | 3.52                  | 4.97                   | 5.02                     | 5.23                      |
| Tobacco                                         | 0.58                         | -1.07                 | -3.25                  | -3.50                    | 27.40                     |
| <b>Energy</b>                                   | <b>2.70</b>                  | <b>-2.67</b>          | <b>-4.12</b>           | <b>-4.24</b>             | <b>-0.15</b>              |
| Integrated Oil & Gas                            | 1.36                         | -1.50                 | -4.47                  | -2.50                    | 2.51                      |
| Oil & Gas Equipment & Services                  | 0.19                         | -4.17                 | -5.52                  | -7.11                    | -7.58                     |
| Oil & Gas Exploration & Production              | 0.55                         | -4.41                 | -5.53                  | -5.60                    | -7.06                     |
| Oil & Gas Refining & Marketing & Transportation | 0.26                         | -2.99                 | -2.75                  | -6.57                    | 22.95                     |
| Oil & Gas Storage & Transportation              | 0.35                         | -3.36                 | -0.66                  | -5.29                    | -7.98                     |

|                                            |              |              |              |              |              |
|--------------------------------------------|--------------|--------------|--------------|--------------|--------------|
| <b>Financials</b>                          | <b>12.43</b> | <b>-2.96</b> | <b>-3.17</b> | <b>-4.03</b> | <b>7.00</b>  |
| Asset Management & Custody Banks           | 1.03         | -2.03        | -5.13        | -3.98        | 2.54         |
| Consumer Finance                           | 0.63         | -1.73        | -4.96        | -3.28        | 11.34        |
| Diversified Banks                          | 3.03         | -0.65        | -2.63        | -4.32        | 19.12        |
| Diversified Financial Services             | 7.45         | -3.01        | -3.19        | -3.17        | 5.24         |
| Financial Exchanges & Data                 | 1.02         | -5.01        | -6.89        | -3.74        | 2.76         |
| Insurance Brokers                          | 0.49         | -7.02        | -3.96        | -6.78        | -6.40        |
| Investment Banking & Brokerage             | 1.36         | -2.86        | 1.34         | -3.28        | 29.26        |
| Life & Health Insurance                    | 0.29         | -3.99        | -1.68        | -4.84        | -3.18        |
| Multi-Sector Holdings                      | 1.12         | -1.60        | -0.45        | -2.77        | 7.84         |
| Property & Casualty Insurance              | 0.92         | -6.38        | -3.41        | -6.56        | -0.26        |
| Regional Banks                             | 0.24         | -6.58        | -8.87        | -10.20       | -2.61        |
| Reinsurance                                | 0.02         | -3.10        | 3.09         | -2.68        | -5.96        |
| Transaction & Payment Processing           | 2.18         | -3.91        | -3.80        | -2.43        | -2.90        |
| <b>Health Care</b>                         | <b>8.88</b>  | <b>-1.39</b> | <b>4.30</b>  | <b>2.14</b>  | <b>3.36</b>  |
| Biotechnology                              | 1.52         | -0.83        | 5.13         | 1.54         | 15.17        |
| Health Care Distributors                   | 0.34         | 1.00         | 8.88         | 0.18         | 33.99        |
| Health Care Equipment                      | 1.86         | -1.62        | -1.92        | -1.82        | 3.15         |
| Health Care Facilities                     | 0.18         | 0.34         | 5.61         | -1.34        | 35.61        |
| Health Care Services                       | 0.39         | 1.28         | 4.80         | 3.31         | 33.09        |
| Health Care Supplies                       | 0.06         | 0.51         | 2.27         | 2.07         | -20.77       |
| Life Sciences Tools & Services             | 0.87         | 1.58         | 10.74        | 8.92         | -1.96        |
| Managed Health Care                        | 0.76         | -3.50        | 5.92         | 3.75         | -25.25       |
| Pharmaceuticals                            | 2.90         | -2.60        | 5.38         | 3.12         | 3.92         |
| <b>Industrials</b>                         | <b>7.90</b>  | <b>-1.11</b> | <b>0.24</b>  | <b>-1.74</b> | <b>15.03</b> |
| Aerospace & Defense                        | 2.08         | -2.41        | 0.21         | -3.03        | 34.21        |
| Agricultural & Farm Machinery              | 0.20         | 0.21         | -2.46        | -0.02        | 7.90         |
| Air Freight & Logistics                    | 0.25         | 0.12         | 0.37         | 0.31         | -19.65       |
| Building Products                          | 0.47         | -0.44        | -0.77        | -1.78        | 7.49         |
| Cargo Ground Transportation                | 0.08         | 3.98         | 2.07         | 6.09         | -15.71       |
| Construction & Engineering                 | 0.16         | 1.50         | 14.37        | 5.65         | 36.88        |
| Construction Machinery & Heavy Trucks      | 0.65         | 4.80         | 12.86        | 7.37         | 29.48        |
| Data Processing & Outsourced Services      | 0.04         | -3.31        | -7.83        | -4.95        | 0.13         |
| Diversified Support Svcs                   | 0.19         | -2.40        | -6.70        | -7.23        | -9.83        |
| Electrical Components & Equipment          | 0.55         | 0.15         | 0.55         | -0.10        | 10.04        |
| Environmental & Facilities Services        | 0.34         | -1.73        | -1.68        | -4.22        | 6.67         |
| Heavy Electrical Equipment                 | 0.27         | -5.09        | -2.57        | -2.10        | 83.02        |
| Human Resource & Employment Services       | 0.30         | -1.15        | -3.24        | -3.29        | -5.61        |
| Industrial Conglomerates                   | 0.35         | -0.69        | -3.52        | -3.08        | -1.20        |
| Industrial Machinery                       | 0.62         | -0.73        | -2.23        | -3.26        | 0.39         |
| Passenger Airlines                         | 0.15         | 0.41         | 0.69         | 4.29         | 0.26         |
| Passenger Ground Transportation            | 0.32         | -3.63        | -5.43        | -5.56        | 53.38        |
| Railroads                                  | 0.44         | -2.21        | 5.44         | -3.32        | 6.69         |
| Research & Consulting Svcs                 | 0.17         | -3.41        | -5.44        | -6.06        | -1.84        |
| Trading Companies & Distributors           | 0.26         | -2.79        | -2.99        | -2.99        | 16.52        |
| <b>Information Technology</b>              | <b>33.61</b> | <b>-2.33</b> | <b>3.54</b>  | <b>0.00</b>  | <b>21.75</b> |
| Application Software                       | 2.67         | -3.03        | 0.49         | -4.26        | 5.03         |
| Communications Equipment                   | 0.90         | -4.13        | 0.84         | -0.38        | 16.85        |
| Electronic Components                      | 0.38         | 0.45         | 7.94         | 3.75         | 83.14        |
| Electronic Equipment & Instruments         | 0.15         | -3.05        | -3.64        | -4.74        | 2.16         |
| Electronic Manufacturing Services          | 0.15         | 1.20         | 3.56         | 0.66         | 53.94        |
| Internet Software & Services               | 0.09         | -2.63        | -9.16        | -6.17        | -14.95       |
| IT Consulting & Services                   | 0.76         | -5.20        | 2.63         | -3.54        | -10.06       |
| Semiconductor Equipment                    | 0.87         | 2.46         | 20.22        | 6.44         | 60.26        |
| Semiconductors                             | 12.46        | -2.71        | 5.18         | 2.22         | 40.44        |
| Systems Software                           | 8.64         | -1.51        | 0.73         | -0.05        | 23.45        |
| Technology Distributors                    | 0.03         | -0.45        | -9.06        | -5.14        | -13.18       |
| Technology Hardware, Storage & Peripherals | 6.50         | -2.57        | 4.17         | -2.57        | 0.87         |
| <b>Materials</b>                           | <b>1.68</b>  | <b>-0.46</b> | <b>-2.28</b> | <b>-1.66</b> | <b>5.94</b>  |
| Commodity Chemicals                        | 0.05         | -2.13        | -11.58       | -5.37        | -42.51       |
| Construction Materials                     | 0.13         | -1.87        | 1.90         | -2.38        | 17.90        |
| Copper                                     | 0.10         | -3.72        | -7.95        | 6.32         | 9.51         |

## William Blair

|                                              |             |             |              |              |              |
|----------------------------------------------|-------------|-------------|--------------|--------------|--------------|
| Fertilizers & Agricultural Chemicals         | 0.11        | -4.98       | -10.75       | -10.15       | 4.60         |
| Gold                                         | 0.18        | 15.33       | 24.36        | 16.56        | 164.02       |
| Industrial Gases                             | 0.44        | -3.16       | -6.97        | -6.62        | 1.50         |
| Metal & Glass Containers                     | 0.02        | 0.61        | -3.36        | -4.68        | -12.83       |
| Paper Packaging                              | 0.16        | -0.64       | -3.03        | -2.01        | -16.08       |
| Specialty Chemicals                          | 0.41        | -0.03       | -1.71        | -1.45        | -2.31        |
| Steel                                        | 0.09        | -3.79       | -3.74        | -0.38        | 17.88        |
| <b>Real Estate</b>                           | <b>1.85</b> | <b>1.61</b> | <b>-0.01</b> | <b>-0.85</b> | <b>2.59</b>  |
| Data Center REITs                            | 0.23        | 0.02        | 2.51         | 2.45         | -9.29        |
| Health Care REITs                            | 0.29        | 2.51        | 2.25         | -3.39        | 21.25        |
| Hotel & Resort REITs                         | 0.02        | 0.00        | -8.32        | -4.88        | -7.59        |
| Industrial REITs                             | 0.19        | 5.88        | 6.26         | 5.81         | 14.64        |
| Multi-Family Residential REITs               | 0.00        | -0.82       | -4.40        | -4.63        | -14.29       |
| Office REITs                                 | 0.02        | -1.48       | -10.82       | -5.31        | -5.34        |
| Other Specialized REITs                      | 0.11        | -0.03       | -0.66        | -1.34        | 2.91         |
| Real Estate Service                          | 0.13        | -0.62       | -9.42        | -5.95        | 11.93        |
| Retail REITs                                 | 0.25        | 0.19        | -1.67        | -3.67        | 2.79         |
| Self-Storage REITs                           | 0.14        | 5.08        | 7.01         | 6.85         | 2.09         |
| Single-Family Residential REITs              | 0.14        | 5.08        | 7.01         | 6.85         | 2.09         |
| Telecom Tower REITs                          | 0.25        | 3.07        | 0.16         | 0.48         | 4.25         |
| Timber REITs                                 | 0.03        | -3.23       | -5.17        | -4.60        | -15.98       |
| <b>Utilities</b>                             | <b>2.35</b> | <b>1.47</b> | <b>9.91</b>  | <b>5.30</b>  | <b>21.23</b> |
| Electric Utilities                           | 1.53        | 1.69        | 12.34        | 7.06         | 23.06        |
| Gas Utilities                                | 0.05        | 0.83        | 8.07         | 3.29         | 26.65        |
| Independent Power Producers & Energy Traders | 0.14        | 0.40        | 2.39         | 8.07         | 46.64        |
| Water Utilities                              | 0.05        | 1.53        | 5.11         | 2.89         | 15.04        |
| Multi-Utilities                              | 0.59        | 1.18        | 6.13         | 0.76         | 12.30        |

\*Current Weight is market cap based, based on calculations by William Blair Intl. Ltd.

## **IMPORTANT DISCLOSURES**

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DOW JONES: 45952.20

S&P 500: 6629.07

NASDAQ: 22670.10

Additional information is available upon request.

### **Current Rating Distribution (as of October 16, 2025):**

| <b>Coverage Universe</b> | <b>Percent</b> | <b>Inv. Banking Relationships *</b> | <b>Percent</b> |
|--------------------------|----------------|-------------------------------------|----------------|
| Outperform (Buy)         | 73             | Outperform (Buy)                    | 10             |
| Market Perform (Hold)    | 27             | Market Perform (Hold)               | 3              |
| Underperform (Sell)      | 1              | Underperform (Sell)                 | 0              |

\*Percentage of companies in each rating category that are investment banking clients, defined as companies for which William Blair has received compensation for investment banking services within the past 12 months.

The compensation of the research analyst is based on a variety of factors, including performance of his or her stock recommendations; contributions to all of the firm's departments, including asset management, corporate finance, institutional sales, and retail brokerage; firm profitability; and competitive factors.

## **OTHER IMPORTANT DISCLOSURES**

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