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October 6, 2023

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Economics Weekly

What's Driving Today's Pressure in the Bond Market?

Please refer to important disclosures on pages 14 and 15. Analyst certification is on page 14.

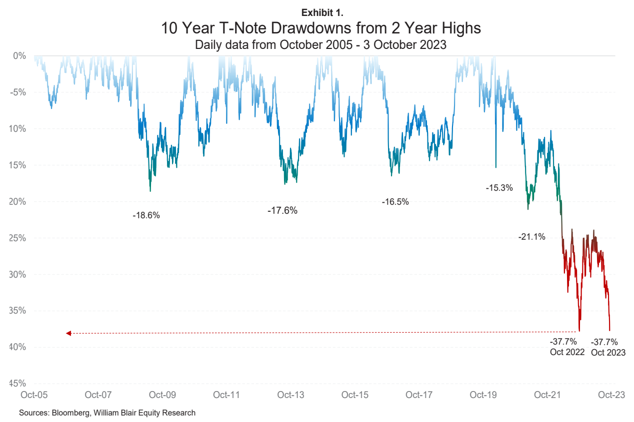
It's not the riskiest assets that get you into trouble, it's often the ones you think are the safest, but aren't.

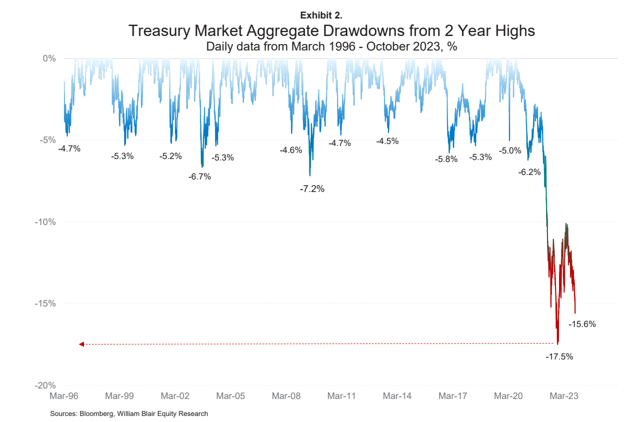
– Undoubtedly said by someone, somewhere, at some point in time, though we can't remember who or when

The speed of the ongoing sell-off at the long end of the U.S. Treasury bond market is alarming and will likely be concerning to the public, investors, and particularly to the Fed and fiscal policymakers. **However, the impact on the economy and the response from policymakers will also naturally depend on the components driving the rise in yield, which is what we discuss in this *Economics Weekly.***

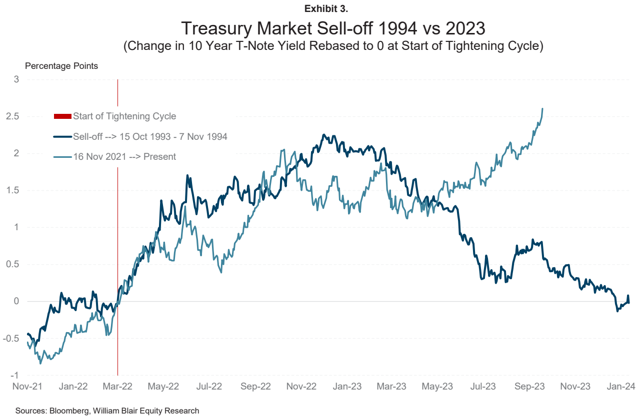
How Does This Rout Compare?

The current bond market rout has been uncomfortable. Judging by iBoxx daily 10-year+ T-Note Total Return Index data (for which we only have data back to 2005), the scale of negative return now matches last year's, which has been by far the largest 2-year drawdown over this 18-year period (exhibit 1). And looking across the Treasury yield curve using the Bloomberg Treasury Index shows this to be the worst 2-year drawdown since at least 1996 after last year's sell-off (exhibit 2).





How does this compare to the 1994 bond market massacre? Using the start of the tightening cycle as the base period for each (though yields normally start to rise 3-4 months ahead in anticipation of the Fed's actions) and looking at the subsequent increase in yield over the coming months, the correction then resulted in a rise in yield of 225 basis points from the start of the tightening (or 286.5 from the low several months prior). Today's change (but from a much lower base) has so far resulted in a rise of 261 basis points since Chair Powell first increased rates in 2022 (345 basis points from the December 2021 low in yields, exhibit 3).



What's Driving It This Time?

Of course, the severity of the impact from the current correction really depends on what is driving the movement in the first place. Hence, it is worth looking at a decomposition of the bond yield for answers.

The yield on a bond is normally viewed as being the sum of expected future real short rates (what you would get if, for example, you rolled over a series of shorter-term bills for the same duration), a risk premium for expected inflation over the period, and the term premium to account for the duration risk (extra volatility) associated with purchasing longer-duration assets.

Unfortunately, only two of these are observed variables—inflationary expectations and the real yield; the term premium component is an estimated residual. There are a number of estimates as to what this premium might be, though the most widely used is the New York Fed's [ACM term premia].

What are these components telling us?

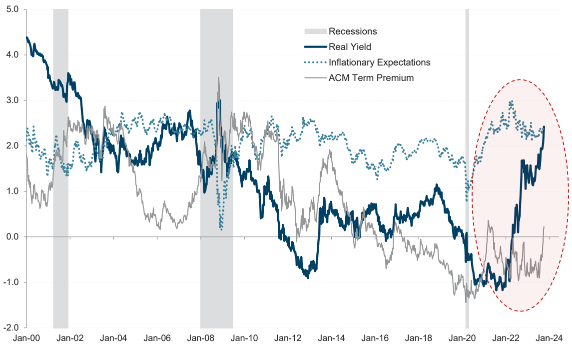
Inflationary Expectations Flattish

Exhibit 4 shows that the recent surge in yields is not because investors now anticipate inflation to be higher for longer. That is, there has been no tangible surge in the inflationary expectations component of the bond, which remains broadly level at 2.3% over the coming decade.

However, there has been a surge (and where things get more opaque) in both the real yield and the term premia.

Exhibit 4.

Components of 10-Year T-Note Yield, %



Sources: Federal Reserve Bank of New York, Bloomberg, William Blair Equity Research

Rising Real Yields, but for the Right Reasons?

Looking back to the July real yield low, this component has risen from 1.48% to 2.4% today (92 basis points).

The message from the rise in the real yield should be a good one. It suggests that investors may be upwardly reassessing the structural growth rate of the economy, which is the main driver of the real neutral short-term rate of interest (r-star).

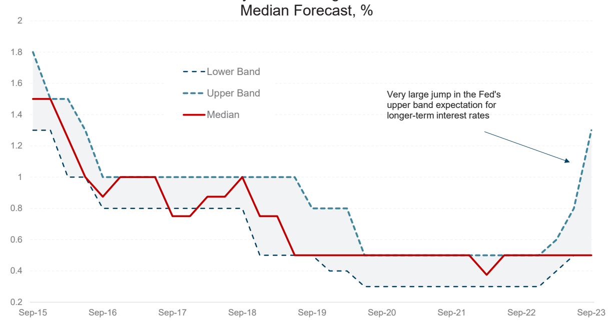
Real potential GDP growth is the sum of growth in the labor force, growth in the capital stock, and multifactor productivity. This would imply that investors now expect one or all of these components of growth to improve. Indeed, we continue to be bullish on capital investment and productivity growth on a structural basis going forward, given the current innovation boom and structural tightness of the labor market; hence, an increase in the real yield is not unfounded.

While some of this expected improvement will be offset by weaker growth in the labor force, which primarily reflects demographic shifts (e.g., as baby boomers increasingly move out of the labor market), the recent improvement in the labor force participation rate (particularly for prime aged women) has been encouraging. This development possibly suggests that the expected drag from this component might be less than anticipated.

Meanwhile, the Fed's latest Summary of Economic Projections, which includes participants' estimates of the longer-term trend for interest rates (a crude estimate of r-star), also suggests that at least some of the Fed members are starting to believe that this rate may be significantly higher (exhibit 5).

Exhibit 5.

FOMC's Central Tendency* for the Longer-run Real Fed Funds Rate & Median Forecast, %



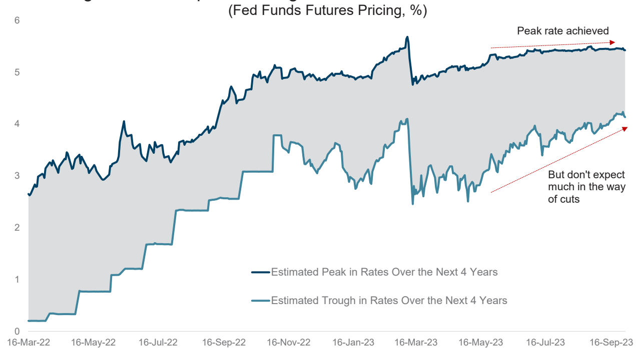
*The central tendency excludes the three highest and three lowest projections for each variable in each year.
Sources: Federal Reserve, William Blair Equity Research

To the extent that long-term interest rates are also the sum of expected future short rates—and from a more cyclical perspective—the move is a positive sign in that it shows investors no longer expect a hard landing.

As exhibit 6 shows, there has been a steady ratcheting up of the anticipated *low* in rates over the coming 4 years once the Fed finally starts to lower interest rates. It shows that market participants now believe that the fed funds rate is roughly at its peak, but in the coming years they only expect rates to fall by around 100 basis points. Given that historically the Fed has had to cut rates by an average of 500 basis points during recessions (and undertake QE when rates hit the zero lower bound), this would seem to be a very optimistic assumption that will likely be tested in the coming years.

Exhibit 6.

Progression of Expected Range for Fed Funds Rate in Next 4 Years,
(Fed Funds Futures Pricing, %)



Sources: Bloomberg, William Blair Equity Research

Hence, from this perspective, to the extent that this truly is a reflection of an expected faster real trend rate of growth—which is the prime goal for any policymaker—this increase in yield could be lauded as a positive development. It suggests that the market is telling us that in order to be able to maintain inflation at 2%, a high trend real yield would be a necessary neutralizing prerequisite.

But Don't Forget the Term Premium…

Unfortunately, over this same period (from the July low in yields), the estimated term premium has risen from -0.95% to 0.22% (117 basis points), or slightly more than the rise in real yields. Yet, this is still lower than the pre-pandemic historical average of 1%.

It is worth remembering that the term premium is a reflection of the perceived risk of taking on duration, the risk that unforeseen events happen in the coming 10 years. This component therefore tends to rise during recessions when both uncertainty and volatility increase. It also reflects changes in the supply and demand for those securities; hence, this is where the Fed believes the impact from QE and QT will show up, in addition to changes in fiscal policy through increased issuance and/or changes in demand.

As shown in exhibit 4 above, the premium has been weirdly negative for most of the last 7 years—meaning that investors have been willing to give up any extra yield in order to hold longer-term debt. We see at least three reasons this might have been the case.

The first is the proliferation of the 60-40 investment portfolios, whereby the act of holding negatively correlated debt to equities helped provide a ballast for investors; and as a result, they may have been prepared to pay for that portfolio insurance with a negative yield. Second, they were possibly prepared to give up some yield to help protect against the threat of deflation. Last, there was strong demand from price-insensitive buyers.

This latter demand has come in four different forms. The first, as Greenspan pointed out with his famous "conundrum," was the rise of Bretton Woods II, whereby many foreign central banks were actively purchasing Treasurys not for yield, but for both reserve management and currency manipulation purposes. Second, following the GFC most financial institutions became much more heavily regulated and have been forced to hold these high-quality liquid assets. Third is the proliferation of higher frequency trading and hedge funds that purchase Treasurys purely for collateral purposes to leverage positions. Last has been the Fed and its many rounds of QE.

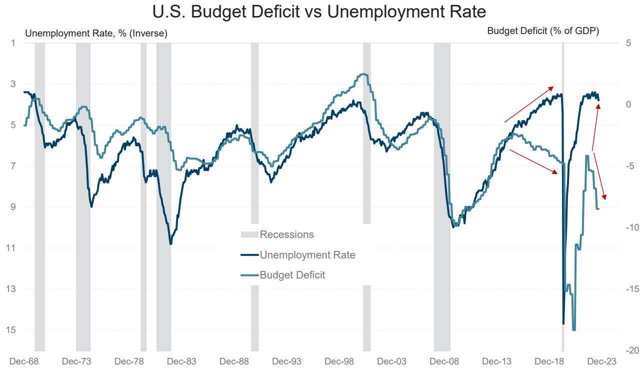
Today, at least two of these factors are reversing—the Fed is undertaking QT and foreign official institutions are purchasing fewer Treasurys as they move away from previous growth models that required such holdings. Meanwhile, the return of the 60-40 portfolio is still an open question whose answer relies heavily on the new trend growth in inflation. Hence, there is a fear that we are at an inflection point in the demand component: with fewer price-insensitive buyers, more price-sensitive buyers—i.e., the private domestic and foreign sectors—will need to step in to fill the void.

On the supply side, investors are similarly starting to worry about renewed fiscal dominance (see for example this very timely note from the St. Louis Fed this week).

As exhibit 7 highlights, there has seemingly been a break with the Keynesian economics of supporting growth through government spending during recessions, and instead moving back toward austerity during the expansions. This is being seen as a move away from the invisible hand and back toward the visible fist of government, as the public sector politicians try to address the rise in household sector inequality and increase spending to improve aging infrastructure and compete with the State capitalism from nations such as China, as well as secure defenses against other foreign threats. With the added costs associated with demographic shifts thrown on top, many believe that interest costs will stay much higher for longer.

Exhibit 7.

U.S. Budget Deficit vs Unemployment Rate



Sources: CBO, BLS, William Blair Equity Research

Data from the CBO shows that net interest as a share of GDP has increased from an average of 1.9% between 1962 and 2022 to an estimated 2.5% in 2023. Looking further out and assuming no changes to current legislation, the CBO then forecasts it to rise to 3.6% by 2033 and 6.7% in 2053—this forecast is not likely to be achieved, simply because a debt crisis would emerge long before.

In short, what we are seeing play out with the term premium is, at the very least, some kind of normalization from an unsustainable negative premium to a positive one. Yet, how much further this goes will in part depend on the response from policymakers to these pressures.

Where to Next?

In terms of scenarios, perhaps the two worst would be stagflation—whereby improved growth does not materialize, but inflation remains high; this would be similar to the 1970s under the Arthur Burns and G. William Miller Feds. The other would be where growth stalls, but fears about the sustainability of government debt keep rates higher for longer.

Fortunately, as the above suggests, the market does not seem to be anticipating a stagflationary environment and nor do we, given the continued improvements in inflation (albeit with a few expected bumps in the road). Meanwhile, we believe that a slightly higher trend rate of economic growth is possible and indeed likely.

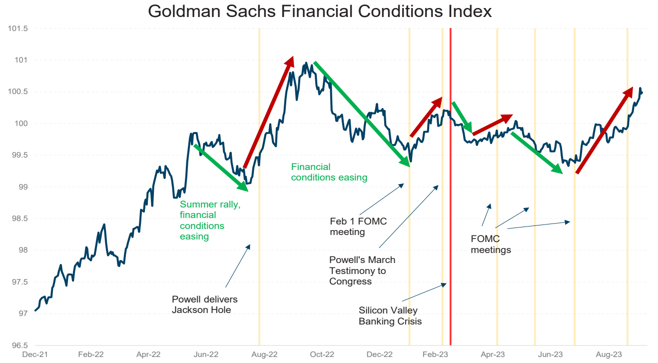
However, the math around the deterioration in the budget and future increases in the debt are also difficult to get around. For market participants, these projections may have started to look all the more plausible, in light of the lack of any sentiment toward fiscal conservatism being expressed by either party, a rolling series of debt ceiling standoffs and government shutdowns, very public displays of internecine party politics, and a U.S. president manning the barricades and rallying the troops in a fight against corporate America.

While high interest rates do offer some benefits, particularly to savers and some portions of pension fund holdings, they will also lower the net present values of expected future cash flows for asset prices, put greater pressure on corporate profit margins for the already heavily indebted corporate sector, and generate greater losses on the balance sheet of the Fed with its Treasury holdings. In addition, higher rates deepen the amount of unrealized losses on banks' balance sheets who similarly hold these HQLA; worsen the already terrible affordability situation in the housing market; and invoke a stronger dollar, which could pose difficulties for many foreigners with dollar-denominated debt and inflation problems.

The Fed has so far been relatively tight-lipped during this episode, though the increase is resulting in a significant tightening of financial conditions and is de facto doing the Fed's work for it (exhibit 8). In the coming days, we should therefore expect the Fed to acknowledge this and duly react by reducing expectations for any further rate increases.

Exhibit 8.

Goldman Sachs Financial Conditions Index



Sources: Bloomberg, William Blair Equity Research

To the extent that this is the result of market concerns about fiscal dominance and a return of the bond market vigilante in the absence of any consensus in Washington, the Fed might also want to take a leaf out Chairman Greenspan's book, who for all his faults was an acknowledged fiscal hawk who actively lobbied both the George H. Bush and Bill Clinton administrations on the benefits of fiscal conservatism (fortunately, he found he was already pushing on an open door with the Clinton administration).

Conclusion

The decrease in prices for longer-term Treasury notes and bonds should be concerning for not just financial market participants, but also fiscal and monetary policymakers and the public as a whole. Not only do these represent the world's benchmark risk-free asset, but such shifts tighten financial conditions and increase the already significant risk of a hard landing.

Treasuries can be broken down into three component parts: inflationary expectations, a real yield, and a term premium. A normalized 10-year yield on this basis should be somewhere around 4%—comprising 2% inflation, 1% real yield, and 1% term premium.

A look at the behavior of each today encouragingly suggests that the jump in yields is not the result of rising inflationary expectations nor of fears that the economy is returning to the stagflationary 1970s. Rather, the increase looks to be the result of a combination of a rising real yield and a rising term premium.

The increase in the real yield seems to be the result of the growing belief that the economy could sustain a stronger secular trend rate of growth, whereby a higher growth rate would neutralize the impact of the higher rate, against a normalization taking place with regard to the term premium—an argument we have some sympathy with. However, part of this change might also reflect a more decided shift in investor sentiment back toward the achievement of a near-term cyclical soft landing—something we have less sympathy with.

Given its more obscure and unobservable nature, it is difficult to know exactly what accounts for this rise in the premium; however, in light of ongoing developments in Washington, it seems quite plausible that it is being driven by a combination of fears about the current and expected future state of government finances and observable shifts in the supply and demand for how that activity is financed, i.e., the U.S. Treasury market.

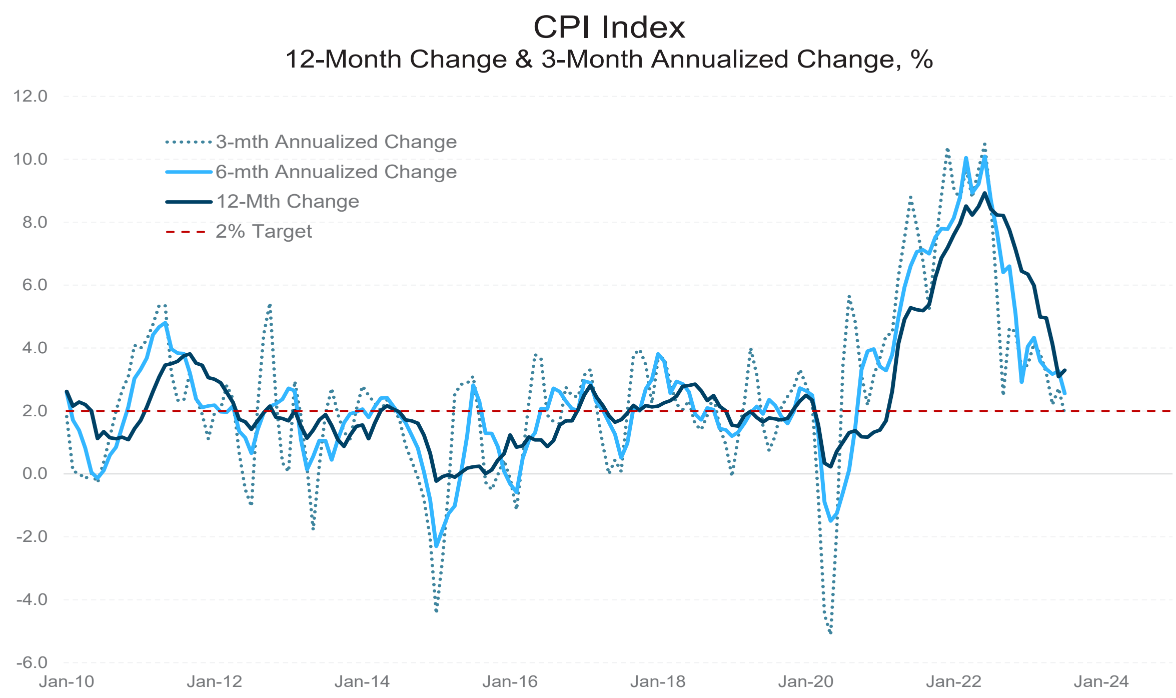
Over the medium term, to the extent that this is being driven by expectations for higher real growth, the Fed will view this as potentially limiting the amount by which it can eventually cut rates in the future. In the very near term, given the tightening in financial conditions, we should also expect the Fed to acknowledge the significant risks this poses to the economic outlook and in turn remove the probability of further rate increases going forward. To the extent that the threat of fiscal dominance is also playing a role here and in the absence of any changes in the beltway, some sort of tacit acknowledgement that there was an adult in the room watching over these developments—a la Greenspan in the 1990s—might also help to ease the growing concerns of the suddenly reappeared bond market vigilante.

Highlights in the Week Ahead

Date	Time (EDT)	Indicator	Last	Consensus	WB Estimate	Actual
10 Oct	6:00 a.m.	NFIB Small Business Optimism (Sep)	91.3	NA	NA	
11 Oct	8:30 a.m.	Producer Price Index (Sep)	0.7%	0.3%	0.3%	
		PPI Less-food & energy	0.2%	0.2%	0.2%	
12 Oct	8:30 a.m.	Consumer Price Index (Sep)	0.6%	0.3%	0.3%	
		CPI Less-food & energy	0.3%	0.3%	0.3%	

Sources: Bloomberg, William Blair Equity Research

Indicator of the Week: Consumer Price Index



Sources: Bureau of Labor Statistics, William Blair Equity Research

Economic Scorecard

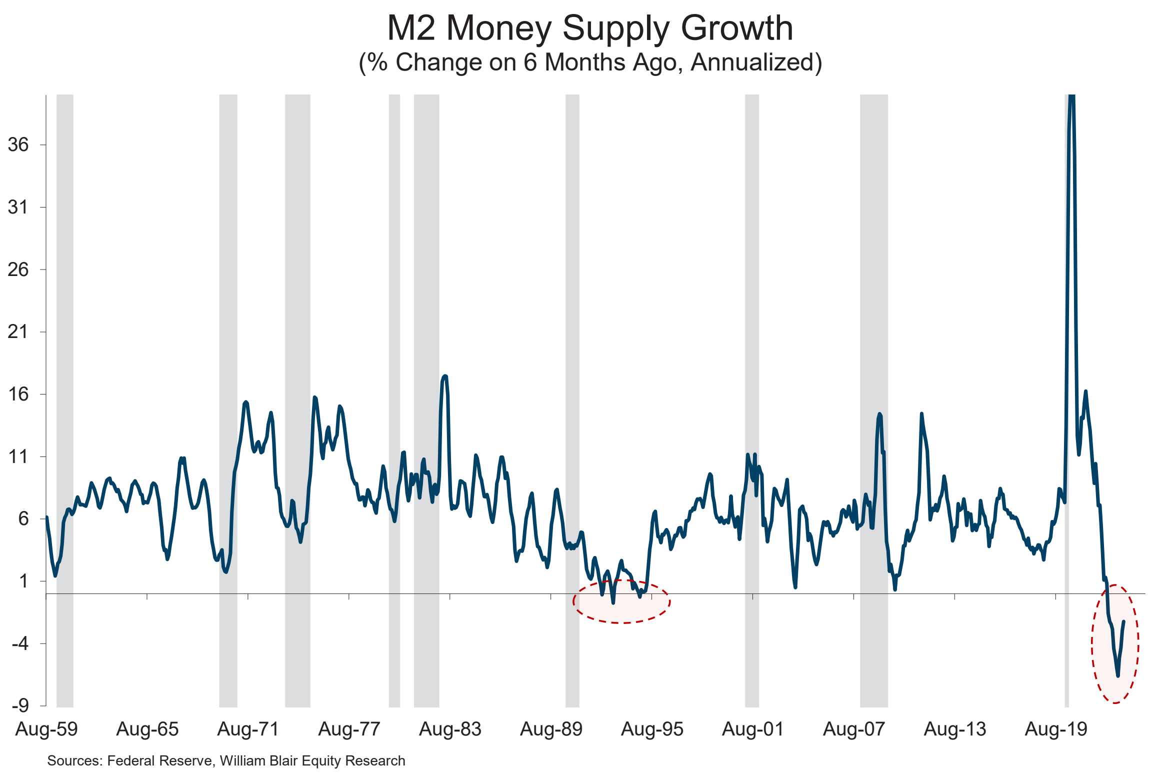
Rolling monthly heat map, % Change on Year Ago (unless otherwise noted)

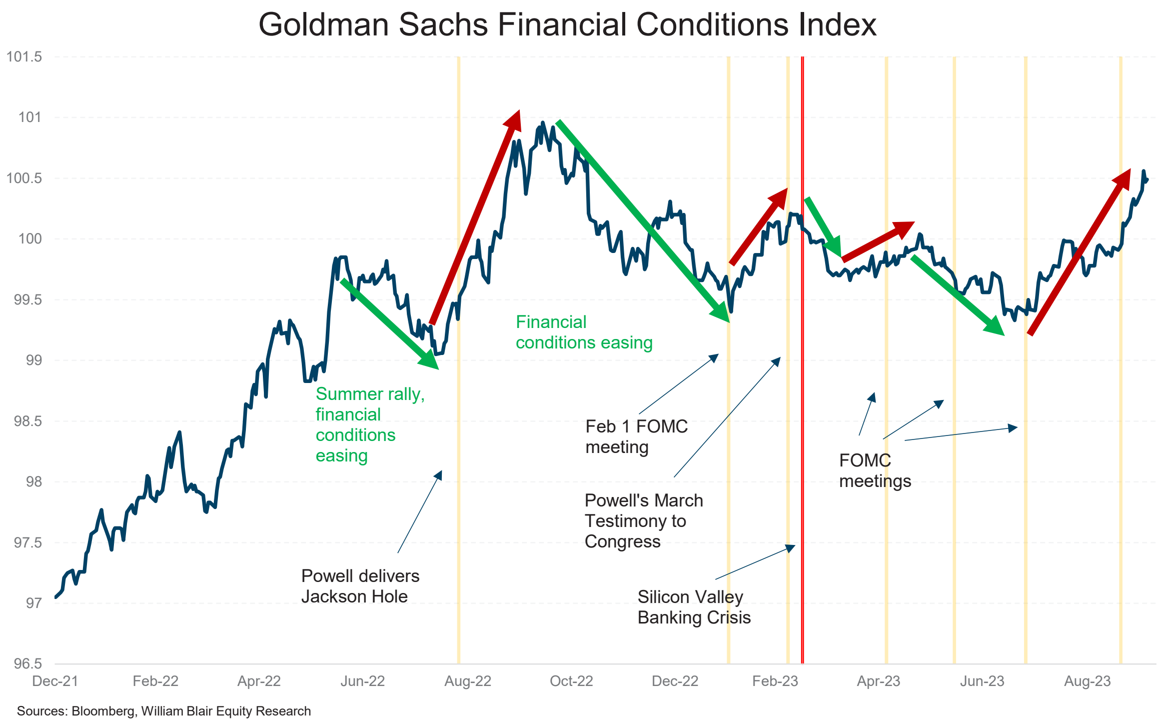
	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23
Growth																			
US Leading Indicators	4.4	2.8	1.3	-0.3	-1.1	-1.6	-3.2	-4.6	-6.0	-6.0	-6.8	-7.9	-8.1	-7.9	-7.8	-7.5	-7.6		
US Coincident Indicators	2.6	2.4	1.8	2.0	2.2	2.4	1.9	1.4	1.5	1.5	1.3	1.4	1.3	1.7	1.9	1.6	1.4		
US Lagging Indicators	4.8	5.5	6.7	6.6	7.4	7.5	7.4	7.6	7.5	6.7	6.7	5.6	5.0	3.9	2.9	2.6	2.1		
Consumer																			
Total Retail Sales	8.9	9.7	9.5	10.4	10.2	9.4	8.8	6.1	6	7.4	5.3	2.2	1.3	2.1	1.5	2.6	2.5		
Personal Income	1.3	3.6	3.9	3.6	3.9	5.1	4.9	4.6	4.5	5.8	5.7	5.8	5.7	5.7	5.5	5	4.8		
Real Disposable Personal Income	-7.4	-4.7	-4.6	-4.3	-3.8	-2.3	-2	-1.6	-0.9	3.2	3.5	4.4	4.5	5	5.4	4.2	3.7		
Real Personal Consumption	2.4	2.5	1.7	1.9	1.8	1.9	1.4	0.9	1.3	2.3	2.3	1.7	1.6	1.8	2.1	2.7	2.3		
Personal Saving Rate (%)	3.1	3.1	2.7	3.5	3.2	3	3	3.3	3.4	4.4	4.7	5.2	5.2	5.3	4.9	4.1	3.9		
Consumer Confidence (Conference Board)**	108.6	103.2	98.4	95.3	103.6	107.8	102.2	101.4	109	106	103.4	104	103.7	102.5	110.1	114	108.7	103	
Employment																			
Employment Growth	4.9	4.8	4.5	4.4	4.2	4.0	3.7	3.4	3.2	3.3	2.8	2.7	2.6	2.6	2.4	2.1	2.0		
ASA Temporary Staffing Index	11.6	11.2	9.2	9.3	9.3	5.4	1.1	0.2	1.0	-2.1	-6.1	-6.5	-6.8	-5.9	-6.6	-4.7	-4.8		
ISM Employment Index Manufacturing*	51.2	50.2	48.1	49.8	54.2	49.3	49.9	48.9	50.8	50.6	49.1	46.9	50.2	51.4	48.1	44.4	48.5		
ISM Employment Index Services*	49.7	50.3	48.7	49.5	50.2	52.3	49.2	50.6	49.4	50	54	51.3	50.8	49.2	53.1	50.7	54.7		
Unemployment Rate, %	3.6	3.6	3.6	3.5	3.7	3.5	3.7	3.6	3.5	3.4	3.6	3.5	3.4	3.7	3.6	3.5	3.8		
Average Hourly Earnings	5.8	5.5	5.4	5.4	5.4	5.1	4.9	5	4.8	4.4	4.7	4.3	4.4	4.3	4.4	4.4	4.3		
Initial Jobless Claims (avg. wkly. chg. '000s)	216	212	217	216	210	191	202	213	209	200	219	238	239	230	254	228	238	209	
Jop Openings	26.6	16.3	8.9	4.6	-7.0	-0.3	-7.9	-4.3	-5.0	-8.0	-14.0	-19.0	-12.2	-16.0	-16.4	-21.6	-5.8		
Layoff Announcements	6	-15.8	58.8	36.3	30.3	67.6	48.3	416.5	129.1	440	410.1	319.4	175.9	286.7	25.2	-8.2	266.9		
Housing Market																			
Housing Starts	21.5	-3.6	-6	-13.9	-4.5	-6.2	-8.9	-16.6	-24.1	-19.7	-18.9	-19.4	-25.2	2.6	-9.2	5.5	-14.8		
New Home Sales	-24.6	-11	-21.4	-28.6	-7.5	-23.6	-15.1	-24.6	-23.4	-19.9	-19.1	-9.5	11.1	11.6	21.5	36.1	5.8		
Existing Home Sales	-6.5	-8.9	-14.8	-19.9	-20.2	-24.0	-28.2	-35.2	-34.0	-36.9	-23.1	-22.1	-23.0	-20.4	-18.9	-16.6	-15.3		
Median House Price (Existing Homes)	21.7	15.4	15.5	17.8	8.9	15.6	16.3	7.4	17	0.4	1.4	0.7	-8.9	-6.5	-3.7	-8.7	-2.3		
Existing Homes Inventory (Mths' supply)	2.2	2.4	2.7	2.9	3	3	3.2	3.4	3.5	3.4	2.9	2.8	2.8	2.8	2.8	2.9	3		
New Homes Inventory (Mths' supply)	8.5	8.3	9.5	10.1	8.7	9.7	9.7	9.4	8.5	8.1	8.4	8.1	7.6	7.2	7.5	7	7.8		
NAHB Homebuilder Sentiment*	77	69	67	55	49	46	38	33	31	35	42	44	45	50	55	56	50	45	
Inflation																			
Consumer Price Index	8.3	8.6	9.1	8.5	8.3	8.2	7.7	7.1	6.5	6.4	6	5	4.9	4	3	3.2	3.7		
CPI Less-food & energy	6.2	6	5.9	5.9	6.3	6.6	6.3	6	5.7	5.6	5.5	5.6	5.5	5.3	4.8	4.7	4.3		
Producer Price Index	11.2	11.1	11.2	9.7	8.7	8.5	8.2	7.4	6.4	5.7	4.7	2.7	2.3	1.1	0.1	0.8	1.6		
PPI Less-food & energy	9	8.6	8.3	7.6	7.2	7.2	6.9	6.3	5.7	5	4.6	3.3	3.1	2.8	2.3	2.4	2.2		
PCE Price Index	6.6	6.7	7.1	6.6	6.5	6.6	6.3	5.9	5.4	5.5	5.2	4.4	4.4	4	3.2	3.4	3.5		
PCE Prices Less-food & energy	5.3	5.1	5.2	5.0	5.2	5.5	5.3	5.1	4.9	4.9	4.8	4.8	4.8	4.7	4.3	4.3	3.9		
Business Activity - US																			
Industrial Production	4.6	3.7	3.2	3.0	3.1	4.5	3.1	1.9	0.6	1.5	0.9	0.2	0.3	0.0	-0.3	0.0	0.3		
New Cap Gds Orders less-aircraft & parts	4.8	9.5	7.6	6.3	8.2	5.6	5	3.2	1	5.6	2.7	1.9	1	3.2	1.4	0.4	0.6		
Business Inventories	15.4	17.9	19	20.1	20.6	19.8	19.4	18.3	16.8	15.1	12.6	10.7	8.8	6.2	5.2	3.3	1.8		
ISM Manufacturing PMI*	55.9	56.1	53.1	52.7	52.9	51	50	49	48.4	47.4	47.7	46.3	47.1	46.9	46	46.4	47.6		
Markit US Manufacturing PMI*	59.2	57	52.7	52.2	51.5	52	50.4	47.7	46.2	46.9	47.3	49.2	50.2	48.4	46.3	49	47.9		
ISM Services Index*	57.5	56.4	56	56.4	56.1	55.9	54.5	55.5	49.2	55.2	55.1	51.2	51.9	50.3	53.9	52.7	54.5		
Markit US Services PMI*	55.6	53.4	52.7	47.3	43.7	49.3	47.8	46.2	44.7	46.8	50.6	52.6	53.6	54.9	54.4	52.3	50.5		
Business Activity - International																			
Germany Manufacturing PMI Markit/BME*	54.6	54.8	52	49.3	49.1	47.8	45.1	46.2	47.1	47.3	46.3	44.7	44.5	43.2	40.6	38.8	39.1	39.6	
Japan Manufacturing PMI Jibun Bank*	53.5	53.3	52.7	52.1	51.5	50.8	50.7	49	48.9	48.9	47.7	49.2	49.5	50.6	49.8	49.6	49.6	48.5	
Caixin China Manufacturing PMI*	46	48.1	51.7	50.4	49.5	48.1	49.2	49.4	49	49.2	51.6	50	49.5	50.9	50.5	49.2	51	50.6	
China Manufacturing PMI*	47.4	49.6	50.2	49	49.4	50.1	49.2	48	47	50.1	52.6	51.9	49.2	48.8	49	49.3	49.7	50.2	
UK Manufacturing PMI Markit/CIPS*	55.8	54.6	52.8	52.1	47.3	48.4	46.2	46.5	45.3	47	49.3	47.9	47.8	47.1	46.5	45.3	43	44.3	
France Manufacturing PMI Markit*	55.7	54.6	51.4	49.5	50.6	47.7	47.2	48.3	49.2	50.5	47.4	47.3	45.6	45.7	46	45.1	46	44.2	
Currencies*																			
Euro (EUR/USD)	-12.3	-12.2	-11.6	-13.9	-14.9	-15.4	-14.5	-8.2	-5.8	-3.3	-5.7	-2.1	4.5	-0.4	4.1	7.6	7.8	7.9	
Renmimbi (USD/CNY)	2.1	4.7	3.8	4.4	6.7	10.4	14.0	11.4	8.5	6.2	9.9	8.4	4.7	6.5	8.3	5.9	5.3	2.6	
Yen (USD/Yen)	18.7	17.4	22.1	21.5	26.3	30.1	30.5	22.0	13.9	13.0	18.4	9.2	5.1	8.3	6.3	6.8	4.7	3.2	
Sterling (GBP/USD)	-9.0	-11.3	-12.0	-12.5	-15.5	-17.1	-16.2	-9.3	-10.7	-8.4	-10.4	-6.1	-0.1	-1.3	4.3	5.5	9.0	9.2	
Canadian $ (USD/CAD)	4.6	4.8	3.8	2.6	4.1	9.1	10.0	5.0	7.3	4.7	7.7	8.1	5.5	7.3	2.9	3.1	2.9	-1.8	
Mexican Peso (USD/MXN)	0.9	-1.5	0.9	2.5	0.3	-2.4	-3.7	-10.2	-5.0	-8.7	-10.6	-9.2	-11.9	-10.0	-14.9	-17.8	-15.4	-13.5	
US Equities																			
S&P 500	-1.2	-1.7	-11.9	-6.0	-12.6	-16.8	-15.9	-10.7	-19.4	-9.7	-9.2	-9.3	0.9	1.2	17.6	11.1	14.0	19.6	
S&P 400 Midcap	-8.3	-7.8	-15.8	-7.1	-11.7	-16.6	-12.9	-4.8	-14.5	0.7	-2.3	-6.7	-0.4	-4.3	15.6	8.6	8.8	13.6	
S&P 600 Smallcap	-9.7	-9.9	-18.0	-7.6	-13.4	-20.0	-13.1	-7.4	-17.4	-2.5	-5.1	-10.4	-5.5	-8.9	7.8	3.4	3.6	8.1	
Russell 2000	-17.8	-17.8	-26.1	-15.3	-18.9	-24.5	-19.6	-14.2	-21.6	-4.8	-7.4	-12.9	-5.1	-6.1	10.6	6.3	3.0	7.2	

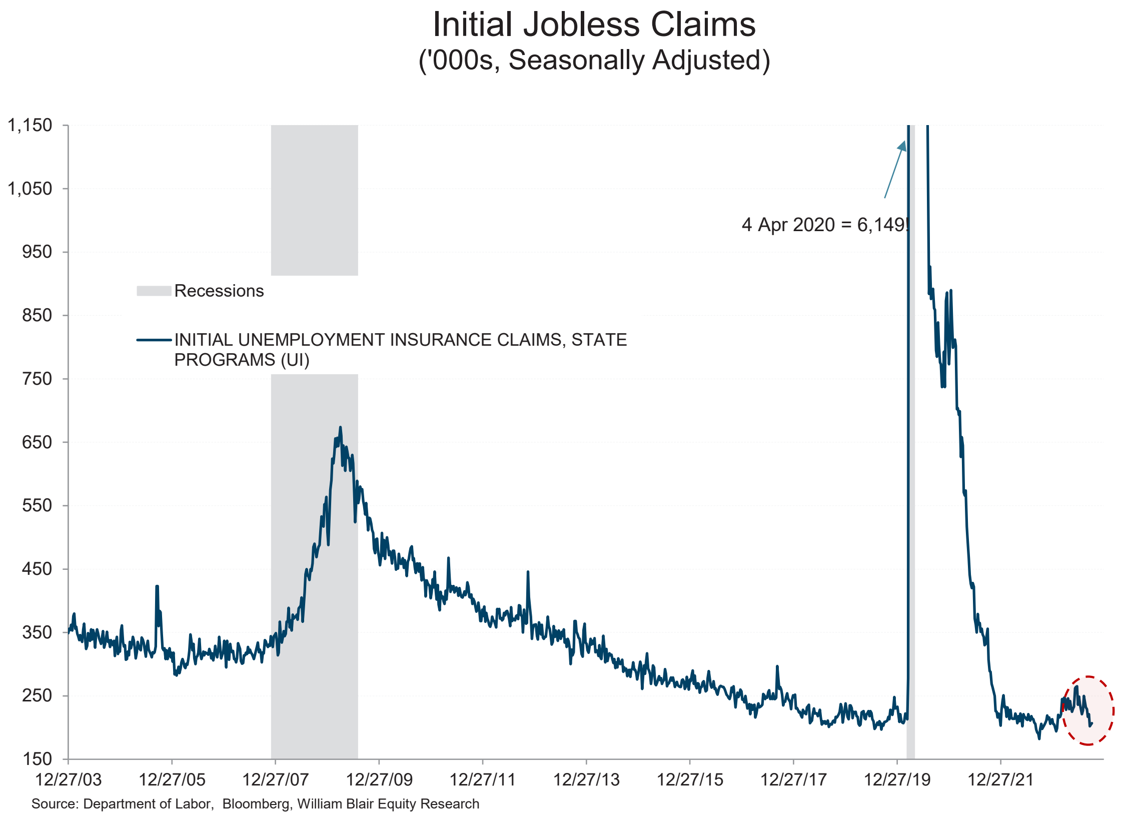
* Diffusion Index, **1985=100, ***Currencies - green/red = strengthening/weakening foreign currency vs dollar

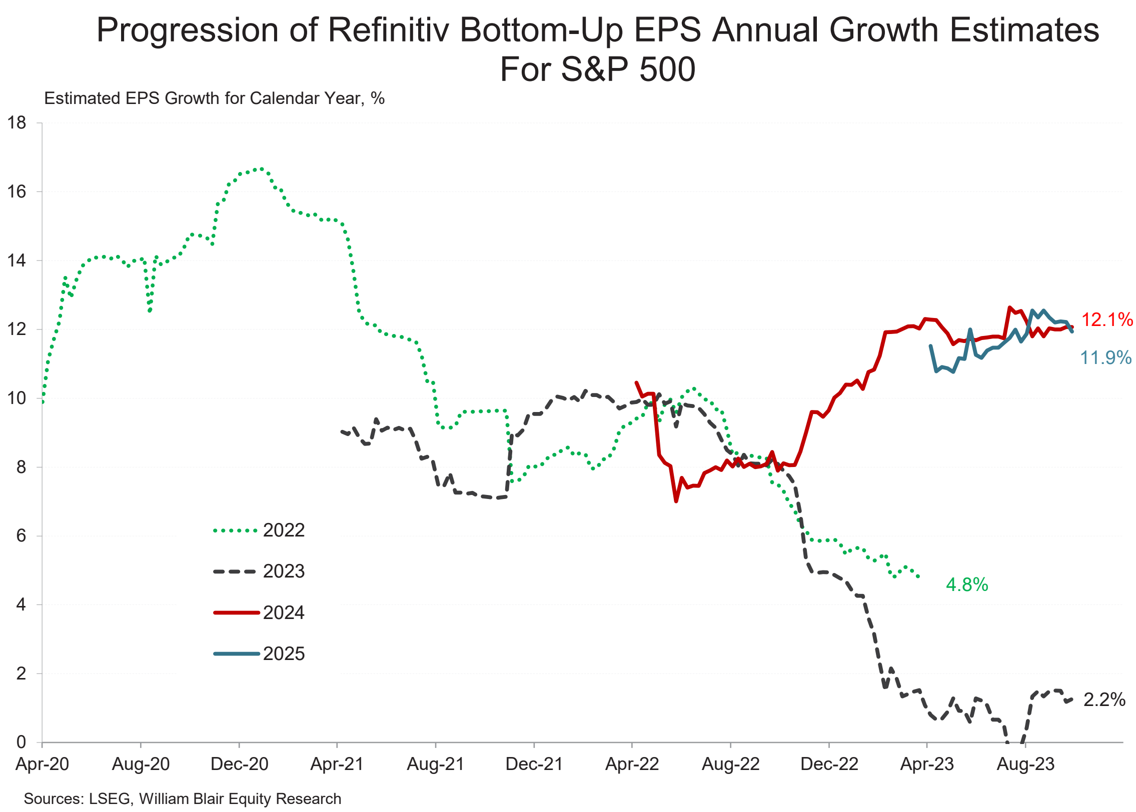
Source: ISM, Federal Reserve, Census Bureau, Bureau of Labor Statistics, Conference Board, Bloomberg, William Blair

Other Economic Indicators

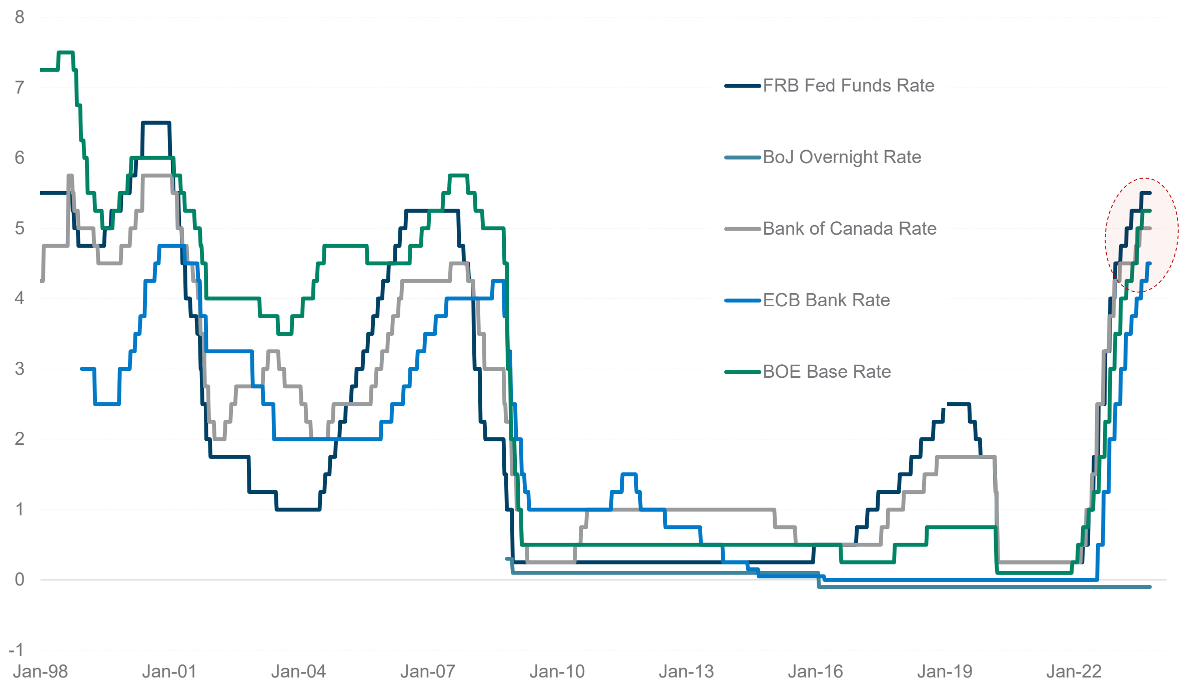





Initial Jobless Claims
('000s, Seasonally Adjusted)
1,150
1,050
950
850
750
650
550
450
350
250
150
4 Apr 2020 = 6,149
Recessions
INITIAL UNEMPLOYMENT INSURANCE CLAIMS, STATE PROGRAMS (UI)
12/27/03
12/27/05
12/27/07
12/27/09
12/27/11
12/27/13
12/27/15
12/27/17
12/27/19
12/27/21
Source: Department of Labor, Bloomberg, William Blair Equity Research

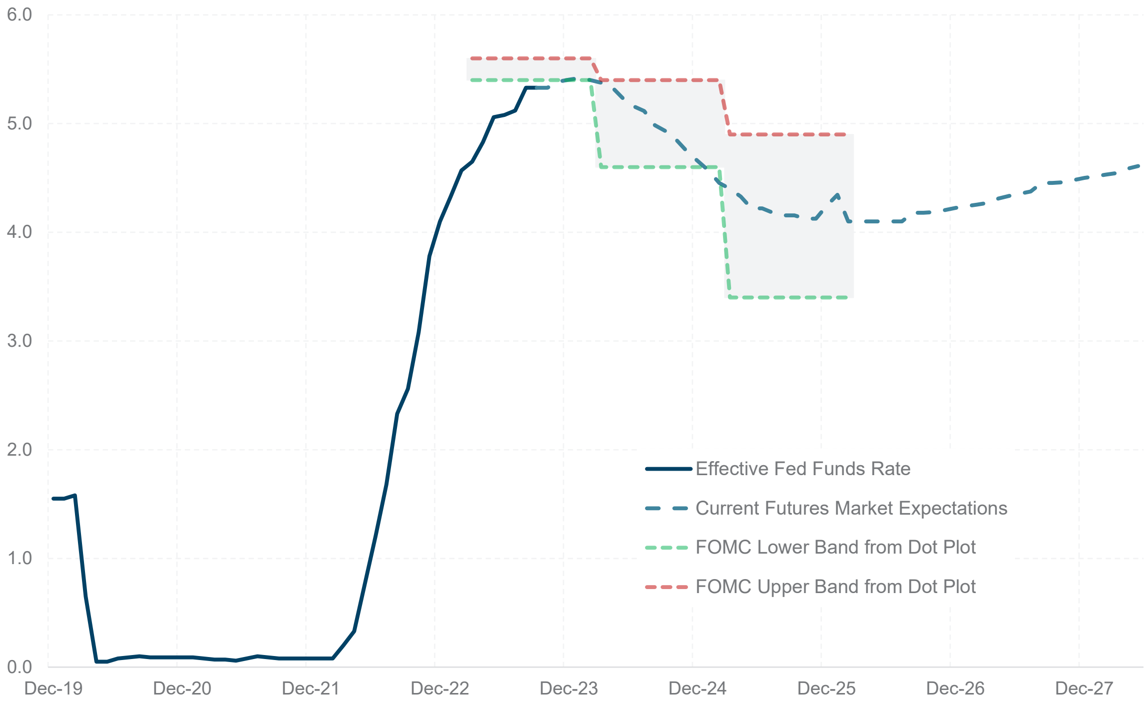

Progression of Refinitiv Bottom-Up EPS Annual Growth Estimates For S&P 500
Estimated EPS Growth for Calendar Year, %
18
16
14
12
10
8
6
4
2
0
12.1%
11.9%
4.8%
2.2%
2022
2023
2024
2025
Apr-20
Aug-20
Dec-20
Apr-21
Aug-21
Dec-21
Apr-22
Aug-22
Dec-22
Apr-23
Aug-23
Sources: LSEG, William Blair Equity Research

Central Bank Target Short-term Interest Rates, %



Sources: Bloomberg, William Blair Equity Research

Fed Funds Rate, Futures Market Expectations & FOMC Projections, %



Sources: Bloomberg, William Blair Equity Research

S&P 500 Sector Performance

Global Industry Classification System	Current Weight* 05-Oct-23	Week Ago 28-Sep-23	Month Ago 05-Sep-23	Qtr-to-Date 29-Sep-23	Year-to-Date 30-Dec-22
S&P 500 Index	**100.00**	**-0.97**	**-5.31**	**-0.70**	**10.90**
S&P400 MidCap Index		**-2.99**	**-6.63**	**-2.65**	**0.23**
S&P600 SmallCap Index		**-3.57**	**-7.06**	**-2.92**	**-3.44**
Dow Jones Industrials		**-1.62**	**-4.39**	**-1.16**	**-0.08**
Nasdaq Composite		**0.14**	**-5.71**	**0.00**	**26.31**
Communication Services	**9.49**	**0.47**	**-1.61**	**1.21**	**41.11**
Advertising	0.07	-1.77	-9.99	-1.67	-12.51
Broadcasting	0.06	-5.08	-7.66	-5.38	-13.16
Cable & Satellite	0.66	-3.86	-1.78	-2.75	22.47
Integrated Telecommunication Services	0.66	-1.78	-3.20	-1.58	-19.33
Interactive Home Entertainment	0.36	0.41	0.70	0.08	17.06
Interactive Media & Services	6.23	1.49	0.00	2.62	73.78
Movies & Entertainment	0.98	-0.44	-9.76	-1.16	8.43
Publishing & Printing	0.03	-1.43	-6.72	-1.84	8.89
Wireless Telecommunication Svcs	0.44	-1.62	0.39	-1.87	-1.83
Consumer Discretionary	**11.23**	**-0.43**	**-6.32**	**-0.95**	**24.51**
Apparel Retail	0.38	-1.45	-5.05	-1.16	6.07
Apparel & Accessories & Luxury Goods	0.05	-1.62	-12.89	-4.61	-25.93
Auto Parts & Equipment	0.10	-5.09	-7.78	-4.50	4.13
Automobile Manufacturers	2.50	4.03	0.62	2.73	85.86
Automobile Retail	0.30	-1.91	-5.06	-1.38	0.47
Broadline Retail	3.64	-0.07	-8.20	-0.97	21.93
Casinos & Gaming	0.18	-4.18	-16.14	-4.47	0.62
Computer & Electronics Retail	0.04	-1.84	-8.55	-2.65	-15.68
Consumer Electronics	0.05	-0.53	-0.31	-0.58	13.33
Distributors	0.13	-1.96	-5.93	-2.52	-8.38
Footwear	0.32	6.87	-4.52	0.18	-18.14
Home Furnishings	0.01	-4.51	-16.20	-4.94	-20.20
Home Improvement Retail	1.11	-3.87	-11.68	-3.58	-5.45
Homebuilding	0.27	-4.03	-6.73	-2.63	25.64
Hotels, Resorts & Cruise Lines	0.87	-4.15	-5.84	-3.11	37.37
Household Appliances	0.02	-5.54	-8.64	-5.93	-11.09
Housewares & Specialties	0.01	-12.76	-25.51	-15.94	-41.98
Leisure Products	0.02	-8.65	-17.53	-9.42	-1.80
Restaurants	1.11	-2.21	-7.16	-1.88	-0.93
Other Specialty Retail	0.13	-1.02	-7.43	-1.27	-14.57
Consumer Staples	**7.12**	**-2.92**	**-5.78**	**-2.67**	**-9.14**
Agricultural Products	0.15	-4.49	-7.54	-3.33	-19.72
Brewers	0.03	-5.67	-5.17	-7.12	14.63
Hypermarkets	2.12	-1.11	-1.15	-0.28	4.37
Distillers & Vintners	0.17	-3.32	-7.66	-3.44	-0.12
Drug Retail	0.05	6.12	-2.42	-0.27	-40.63
Food Distributors	0.09	-4.31	-7.30	-3.63	-16.74
Food Retail	0.09	-2.08	-1.93	-1.34	-0.96
Household Products	1.30	-1.98	-6.12	-1.72	-6.25
Packaged Foods & Meats	0.85	-4.91	-7.25	-4.88	-16.32
Personal Products	0.19	-1.09	-12.42	-1.88	-46.38
Soft Drinks	1.48	-5.72	-9.50	-5.81	-13.64
Tobacco	0.59	-0.88	-3.41	-0.47	-8.78
Energy	**4.48**	**-7.64**	**-5.85**	**-5.78**	**-2.71**
Integrated Oil & Gas	2.18	-7.05	-3.43	-5.70	-4.32
Oil & Gas Equipment & Services	0.49	-9.00	-8.12	-5.36	3.82
Oil & Gas Exploration & Production	1.14	-8.14	-10.07	-6.17	-6.05
Oil & Gas Refining & Marketing & Transportation	0.41	-10.68	-4.52	-8.17	9.60
Oil & Gas Storage & Transportation	0.36	-4.05	-5.02	-2.35	-2.76
Financials	**12.46**	**-2.18**	**-4.36**	**-1.31**	**-4.36**
Asset Management & Custody Banks	0.85	-2.52	-8.19	-2.33	-9.87
Consumer Finance	0.49	-2.77	-8.11	-2.37	-3.27
Diversified Banks	2.66	-3.58	-4.70	-2.83	-6.85
Financial Exchanges & Data	1.15	-0.54	-4.32	0.25	9.29
Insurance Brokers	0.69	-0.83	-0.24	0.67	11.89
Investment Banking & Brokerage	0.94	-4.61	-8.00	-4.38	-18.53

Life & Health Insurance	0.41	-2.98	-2.57	-2.47	-8.49
Multi-line Insurance	0.20	-1.59	1.62	-0.38	-3.61
Multi-Sector Holdings	1.24	-3.36	-4.27	-1.49	11.71
Property & Casualty Insurance	0.86	-0.33	4.83	1.30	-0.68
Regional Banks	0.28	-2.65	-8.20	-3.81	-40.79
Reinsurance	0.05	1.47	7.03	4.15	16.85
Health Care	**13.49**	**-0.84**	**-2.48**	**-0.08**	**-5.39**
Biotechnology	2.09	-1.42	0.86	-0.24	-5.09
Health Care Distributors	0.35	1.07	6.77	2.50	14.05
Health Care Equipment	2.43	-2.49	-5.99	-1.49	-4.47
Health Care Facilities	0.20	-1.94	-9.51	-0.21	0.30
Health Care Services	0.59	-1.11	3.02	-0.18	-17.84
Health Care Supplies	0.12	-6.12	-18.01	-5.66	10.81
Life Sciences Tools & Services	1.51	-0.91	-7.75	-1.25	-10.93
Managed Health Care	1.92	0.54	5.82	1.98	-5.32
Pharmaceuticals	4.28	-0.08	-4.12	0.33	-3.64
Industrials	**8.38**	**-2.48**	**-6.74**	**-1.90**	**1.19**
Aerospace & Defense	1.56	-3.08	-10.86	-3.08	-14.74
Agricultural & Farm Machinery	0.30	-2.35	-9.35	-0.45	-12.38
Air Freight & Logistics	0.55	-1.77	-3.78	-1.69	3.10
Building Products	0.42	-2.97	-5.94	-2.27	7.79
Construction & Engineering	0.07	-10.95	-19.43	-10.07	18.06
Construction Machinery & Heavy Trucks	0.62	-3.95	-4.39	-2.88	9.30
Data Processing & Outsourced Services	0.06	-0.93	-4.46	0.15	32.56
Diversified Support Svcs	0.25	0.44	-2.77	1.14	21.94
Electrical Components & Equipment	0.57	-3.48	-8.15	-2.82	11.89
Environmental & Facilities Services	0.39	-2.99	-4.01	-1.64	-0.21
Human Resource & Employment Services	0.48	0.05	-4.44	0.99	9.22
Industrial Conglomerates	0.78	-3.91	-6.16	-2.82	2.86
Industrial Machinery	0.85	-1.38	-6.26	-0.83	7.94
Passenger Airlines	0.18	-1.17	-12.39	-1.03	-1.68
Railroads	0.62	-1.72	-4.45	-1.70	-7.21
Research & Consulting Svcs	0.24	-1.12	-4.32	-0.52	8.91
Trading Companies & Distributors	0.26	-2.27	-3.84	-1.07	20.15
Information Technology	**28.13**	**1.38**	**-6.57**	**0.98**	**35.08**
Application Software	2.42	0.34	-6.35	0.30	38.98
Communications Equipment	0.92	-1.01	-6.33	-0.72	14.05
Electronic Components	0.20	-1.84	-6.62	-1.92	3.06
Electronic Equipment & Instruments	0.18	-3.17	-6.72	-3.46	-12.08
Electronic Manufacturing Services	0.10	-2.33	-7.69	-2.10	5.34
Internet Software & Services	0.10	0.04	0.18	0.28	10.25
IT Consulting & Services	1.09	1.20	-4.53	0.60	7.39
Semiconductor Equipment	0.82	-0.02	-10.16	-0.10	18.46
Semiconductors	6.51	1.27	-7.03	0.70	72.64
Systems Software	7.97	1.62	-5.03	1.02	32.99
Technology Distributors	0.07	0.08	-4.51	0.64	13.70
Technology Hardware, Storage & Peripherals	7.73	2.37	-7.76	2.08	33.85
Materials	**2.42**	**-1.90**	**-5.88**	**-1.68**	**-0.68**
Commodity Chemicals	0.18	-2.89	-8.05	-3.67	2.77
Construction Materials	0.15	1.15	-4.57	2.41	21.11
Copper	0.14	-5.25	-13.31	-5.15	-6.92
Diversified Chemicals	0.02	-4.27	-10.08	-4.05	-9.62
Fertilizers & Agricultural Chemicals	0.19	-3.61	-7.00	-3.85	-20.42
Gold	0.08	-1.84	-6.41	-1.63	-22.99
Industrial Gases	0.66	-1.35	-3.42	-0.82	6.65
Metal & Glass Containers	0.04	-0.93	-11.12	-4.14	-6.69
Paper Packaging	0.18	-1.49	0.16	-1.32	-6.21
Specialty Chemicals	0.64	-2.19	-7.38	-1.85	-1.53
Steel	0.15	-0.31	-5.47	-0.03	15.63
Real Estate	**2.32**	**-1.53**	**-8.61**	**-1.87**	**-9.70**
Health Care REITs	0.19	0.54	-1.63	-0.75	4.09
Hotel & Resort REITs	0.03	-2.07	1.13	0.06	0.19
Industrial REITs	0.28	-2.77	-10.67	-2.83	-3.28
Office REITs	0.07	-3.60	-16.68	-4.26	-28.68
Real Estate Service	0.15	1.45	-9.38	1.06	-5.13
Residential REITs	0.32	-0.27	-8.08	-0.31	-3.36
Retail REITs	0.27	-2.16	-8.92	-1.95	-15.72
Specialized REITs	0.12	-4.07	-8.63	-3.05	-2.93

Utilities	**2.28**	**-4.02**	**-7.91**	**-4.21**	**-20.05**
Electric Utilities	1.50	-4.65	-8.40	-4.67	-20.44
Gas Utilities	0.04	1.44	-4.26	1.42	-4.14
Independent Power Producers & Energy Traders	0.02	-15.26	-27.70	-17.05	-56.16
Water Utilities	0.06	-3.92	-12.94	-4.12	-22.10
Multi-Utilities	0.65	-2.43	-5.55	-2.99	-17.41

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

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DOW JONES: 33119.60
S&P 500: 4258.19
NASDAQ: 13219.80

Additional information is available upon request.

Current Rating Distribution (as of October 5, 2023):

Coverage Universe	Percent	Inv. Banking Relationships *	Percent
Outperform (Buy)	72	Outperform (Buy)	7
Market Perform (Hold)	28	Market Perform (Hold)	2
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.

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