

# Round Trippin'

Report for the week ending April 18th, 2026

Dylan Smith

## Key Takeaways

- **MONOLOGUE:** We're still not sure whether the Strait is open, but the direction of travel is positive. The war's main legacy for the US will be a non-fatal but painfully avoidable degree of economic self-harm: higher inflation (core will rise above 5%) and higher interest rates.
- **MACRO:** Our updated PPI wedge model shows margins flipping from compression to expansion as firms use the oil price spike as cover to raise prices. The April Beige Book confirms a smaller hit to growth than many feared.
- **MARKETS:** Markets closed when the Strait was hailed as "completely open," so price action looks euphoric this week. Stocks surged, and financial conditions eased. Most assets have round-tripped their war moves and then some; only gold and government bonds remain meaningfully lower than where they started.
- **MEMO:** Gross Output (GO) gives us better insight into the business cycle than GDP. The latest data show that the intermediate economy is slowing down on aggregate, partially offset by strong intermediate growth in some industries, validating the major investor themes of 2025.

## Monologue

This is a week of round-tripping. US and Iranian officials announced on Friday that the Strait of Hormuz was open, but Iran declared on Saturday that "open" meant "under full Iranian control" after the US announced it would maintain its blockade. Back to square one, it seems.

Reports indicate that tanker traffic did pick up a little, though nowhere close to normal. The signal this week has been more important than the immediate outcome: that any progress toward opening the Strait has been made confirms that the US blockade of Iran's financial lifeline (their crude exports to China) is having a bigger impact than escalating bombardments. **Leverage is more balanced, making a lasting deal to open the Strait more likely.**

The direction of travel is positive, and it looks like we're moving toward a phase of hostilities and negotiations that does not involve both sides holding a gun to the head of the entire global economy. At the very least, enough oil and byproducts look set to escape the Gulf just in time to avoid serious regional shortages and keep commodity prices from going exponential.

Our Market Monitor covers the wild round trip that investors have been unnecessarily subjected to over the course of the War. Here, I'll make a few observations on the broader economic picture to complement the ["what's changed"](#) list from last week.

Assuming open and tariff-free Gulf transit from this point on, the main effect of the War from a US economy perspective is a non-fatal but still painful degree of self-harm.

**This will show up mostly via higher consumer price inflation.** In [the first week](#) after the bombardments began, I looked at the historical relationship between oil prices and US inflation. The rule of thumb I quoted was that a 10% increase in the price of oil lasting for three months would add a third of a percentage point to CPI inflation at its peak. The same exercise puts the projected impact of the ~50% average price increase over the past six weeks at around one percentage point, which would imply US inflation peaking just below 4%.

That estimate is based on the historical average impact of different types of oil shocks. When assessing an individual shock, context matters. This six-week oil price increase will prove far more inflationary than your average shock. I can see core inflation peaking easily above 5%.

One reason is that the shock is not over yet; this is more than a six-week story. Even with ships transiting the Gulf, physical supplies need to find their way to buyers, with those most in need still willing to pay a premium.

Also, this is not merely an oil and gas price shock, making it very different from prior episodes. Gulf refiners produce a host of critical hydrocarbon byproducts that are not easily replaceable from other sources. Shortages of inputs into fertilizers, plastic products, and a host of other industrial materials will take some time to clear and be replenished, and a share of the costs will be passed on to consumers in the meantime.

**Most important, to my mind, is the behavioral dimension of the price spike.** As we show in our analysis of the March Producer Price Index (published this week), **businesses are using the rise in consumer inflation expectations to increase margins.** If you're a business struggling to pass on tariff costs, or rising energy costs, or higher insurance costs, what better excuse than a global oil price shock to raise prices? We think we'll see a lot more margin recovery in Q2, which will amplify the overall inflation shock from the War.

**Aside from inflation, the main macroeconomic consequence of the War is higher interest rates.** The 50 basis points of Federal Funds Rate easing that was the consensus this year (unwarranted at the time, in my view, against a backdrop of stabilizing labor markets and rising inflationary pressure) has been priced out of forward markets. Two-year Treasury Note yields (a proxy for interest rate expectations) are now exactly level with the one-month rate of 3.7%. According to CME, futures markets now imply a 25% probability of a rate cut by the end of 2026, compared to a near lock before the War.

While we're on the subject, President Trump's Fed Chair nominee, Kevin Warsh, is due to appear before the Senate on Tuesday for a pre-confirmation grilling. While we were watching the Gulf, the stand-off between the White House and the Senate over the administration's criminal investigation into outgoing Chair Jay Powell has

intensified. This risks delaying Warsh's confirmation, creating legal ambiguity over who will chair the rate-setting committee (probably Powell, but maybe a vice chair?).

Get the popcorn in the microwave – there will be a show. But if you're only interested in the implications for interest rate policy, feel free to ignore the spectacle. **The institutional quality of the Fed is high enough for economic developments to remain the basis for policy decisions, whether it's Powell, Warsh, or a Vice Chair that occupies the top seat** (more on this if the distraction does start to move markets).

Don't miss this week's Memo, which goes deep on my favorite data set to show that the macro/market disconnect is not as bad as often assumed.

With that, enjoy this week's note.

## Dylan Smith

*Founder and Chief Economist*

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## Marginal Movers

### Rising 🙌

- **AI economic impact:** [Forecasting the Economic Effects of AI](#) — "The median respondent in each group expects substantial advances in AI capabilities by 2030, small declines in labor force participation consistent with demographic shifts, and an annual GDP growth rate of 2.5%, which exceeds both the typical medium-run (2.0%) and long-run (1.7%) baseline forecasts from government agencies and private-sector forecasters."
- **Integrators:** [Why 'glue work' can finally shine in the age of AI](#) — "Automating technical skills will transform the value of those who can build relationships and hold projects together."

### Falling 🙇

- **The depth of the coming recession(?):** [A Model of Leveraged Bubbles](#) — "Recessions that follow asset price booms accompanied by high credit growth are deeper and longer-lasting than those following asset price booms without

strong debt accumulation". Note: We have not been in a major economy-wide debt-accumulation cycle.

- **Compute:** [Satellite and drone images reveal big delays in US data center construction](#) — "Now satellite imagery is showing that nearly 40 percent of US data center projects may fail to be completed this year as scheduled."
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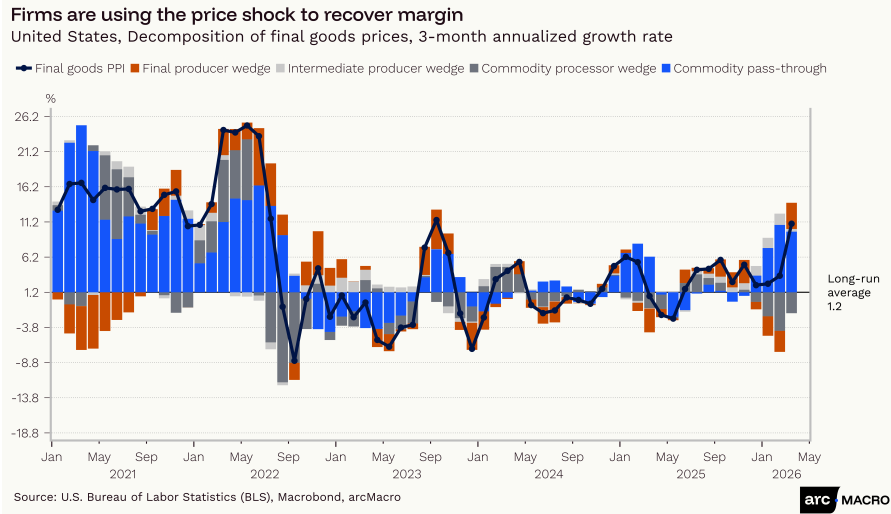
## Macro Monitor

### PPI and the double inflation shock

The March Producer Price Index report was hailed as a positive. The headline index rose by 0.5%, the same as it did in February, and well below the 1.1% growth that forecasters expected.

We see less to be cheerful about. For one thing, the PPI report is only showing a 16% increase in fuel prices, whereas actual pump prices are up by more than 40% year-to-date. A combination of volatility, the sample window skewing toward the beginning of the month, and companies drawing down their fuel inventory means that the price shock for businesses will be spread over 2-3 months.

Meanwhile, the PPI report contains evidence that firms are using the global inflation shock as cover to recoup the margin lost to tariffs over the past year. Our "PPI wedge" model, which is a proxy for margins at different stages of the goods production chain, indicates that margins flipped from compressing to expanding. I.e., delayed tariff pass-through is coinciding with the energy price shock, which could prove far more inflationary than anyone anticipates over the next several months, even with the Strait of Hormuz reopening.



## Beige Book Provides some Timely Insight

There was only one other major release of note this week.

The Beige Book is one of the most important regular data releases on the calendar, and certainly the most overlooked. It's a summary of conversations between regional Federal Reserve Bank officials and their extensive network of business, community, and market contacts. This gives us a narrative snapshot of the economy in the weeks leading up to each rate-setting meeting.

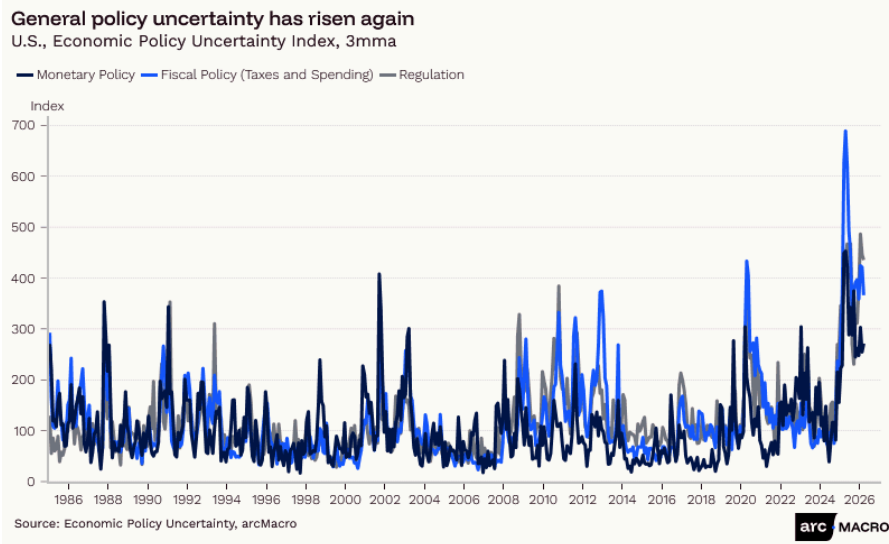
The April edition has helped provide some context for the mixed signals we're seeing in the quantifiable data. We've pulled together an annotated version of the key insights from the Beige Book, accompanied by the relevant charts.

First up, we're not seeing the Iran War put much of a dent in growth:

*Overall economic activity increased at a slight to modest pace in eight of the twelve Federal Reserve Districts, while two Districts reported little change and two Districts reported slight to modest declines.*

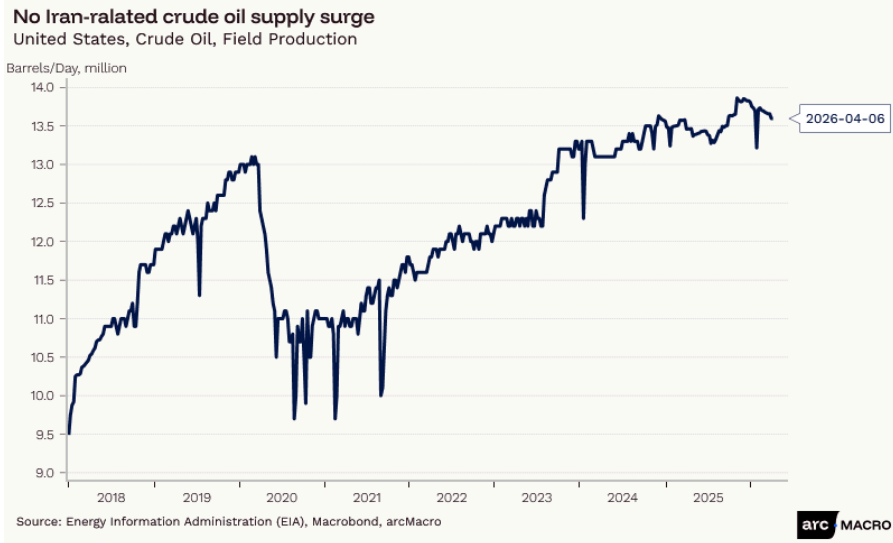
That's compared to seven regions growing and five flat or declining in the prior Beige Book. The good news is that there is an appetite for far higher economic activity:

*The conflict in the Middle East was cited as a major source of uncertainty that complicated decision-making around hiring, pricing, and capital investment, with many firms adopting a wait-and-see posture.*



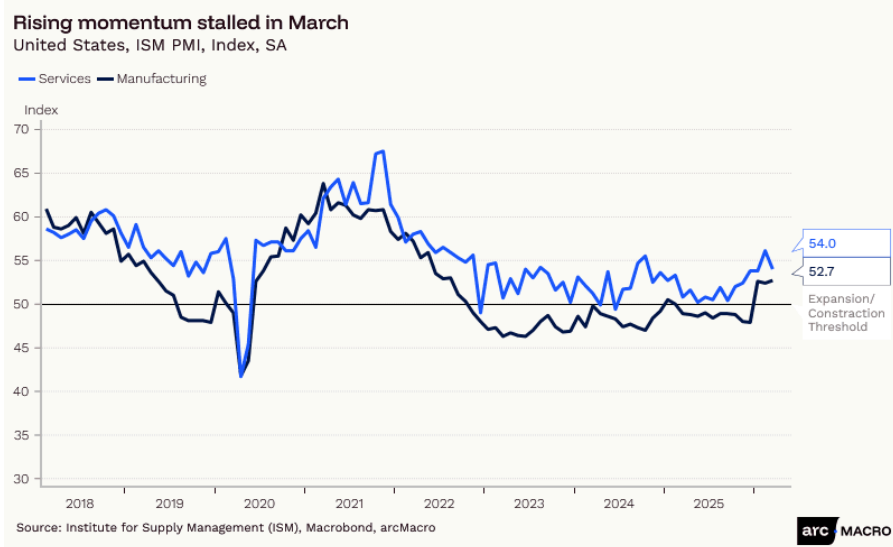
That uncertainty extends to the energy industry, which has not, as of yet, been willing to take advantage of higher prices by boosting production:

*Energy activity was up slightly as oil prices rose, though many producers remained cautious about increasing drilling due to uncertainty about the persistence of higher prices.*



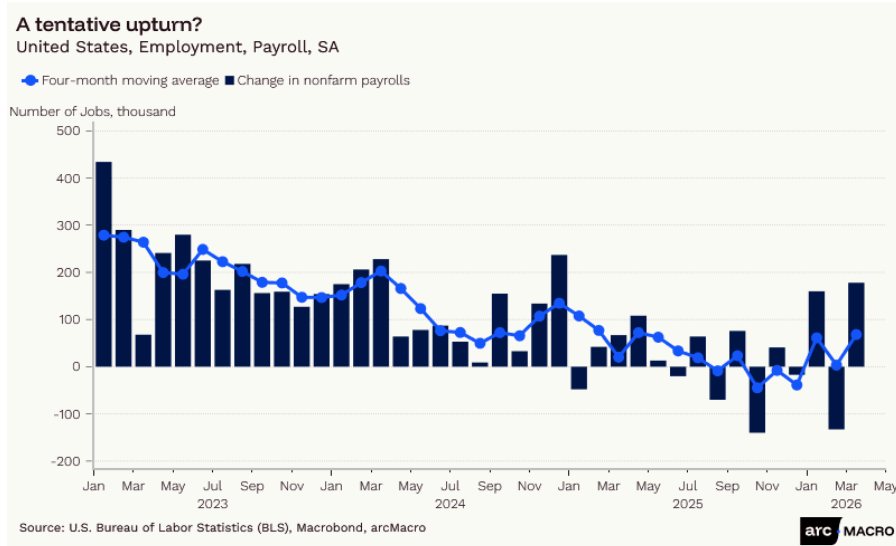
And despite rising energy costs, the production side of the economy actually improved, in line with what the PMI surveys are telling us:

*Manufacturing activity rose slightly to moderately in most Districts.*



The Beige Book confirmed the underlying trend that's detectable in the noisy employment data: the labor market is thawing ever so slightly:

*On balance, employment was steady to up slightly during this reporting period, though one District noted a slight decline. Most Districts described labor demand as stable, with low turnover, minimal layoffs, and hiring mostly for replacement.*



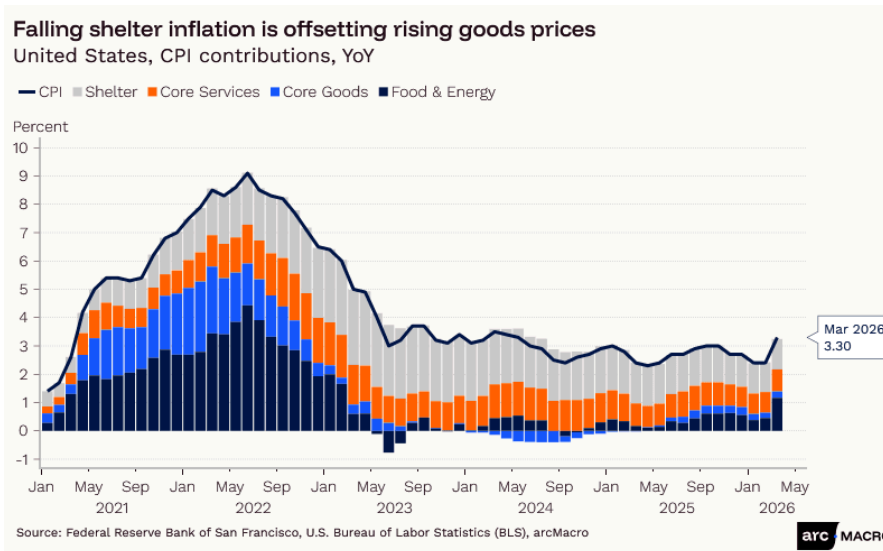
There was a fascinating comment on the impact of AI, which is very much in line with my experience starting a small firm:

*While most Districts indicated that AI had not yet significantly impacted overall staffing levels, some noted that AI-driven productivity improvements had enabled many firms to delay or reduce hiring.*

Finally, the Beige Book has helped us understand why core inflation moderated in March despite the oil price shocks. Firms have not passed their fuel and tariff costs on to consumers just yet, but there is every reason to believe that they will in the coming months.

*Energy and fuel costs rose sharply in all Districts, attributed to the Middle East conflict, leading to higher freight and shipping costs and higher prices for plastics, fertilizers, and other petroleum-based products. Input cost pressures beyond energy-related increases were also widespread. Several Districts reported rising prices for metals due to tariffs, such as steel, copper, and*

aluminum. Technology costs rose for both hardware and software. Insurance premiums and health care costs continued to climb.



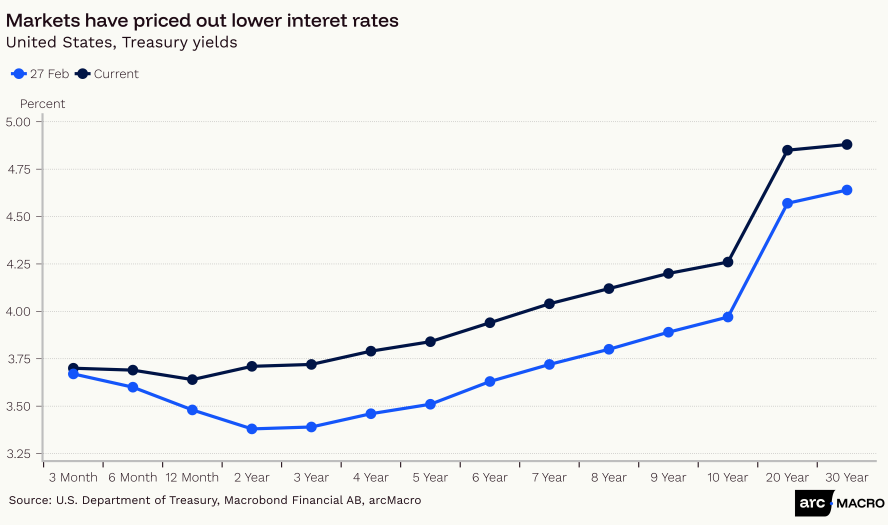
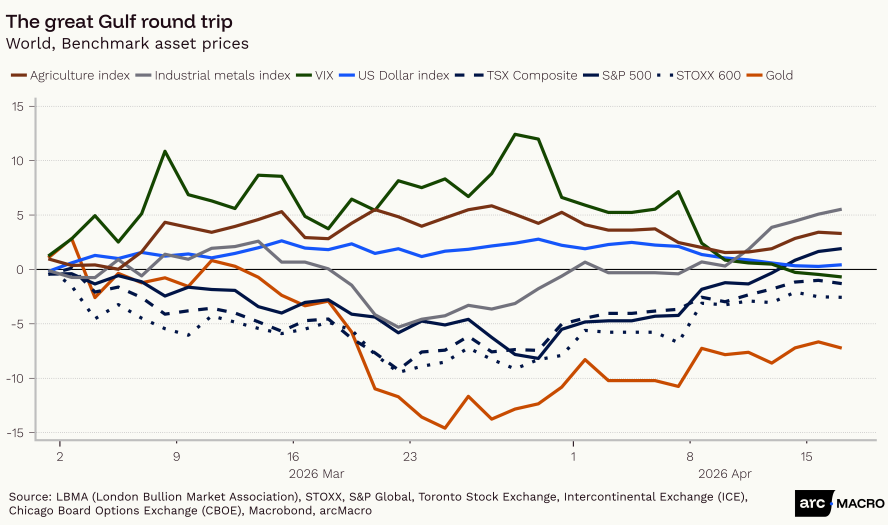
See the appendix for arcMacro proprietary Factors and the Key Macroeconomic Indicators tracking chart.

## Market Monitor

Markets closed this week before Iran's insistence that, far from "completely open," the Strait of Hormuz is actually under its "strict control." That means the partial collapse of the deal to open the Strait is not reflected in prices, which look euphoric.

As the price of WTI crude oil closed \$12 per barrel lower, at \$83.9 per barrel, the S&P 500 surged 4.5% higher on the week, the Nasdaq Composite index 6.8%, and the Russell 2000 small-cap index 5.6%. Cyclical and rate-sensitive stocks performed best, and US indices outperformed global benchmarks (which were also in the green). In a broad easing of US financial conditions, the stock market moves were complemented by a modest drop in rates and spreads and a weaker dollar (-0.6%). Gold prices remain positively correlated to risk sentiment, rising by 2% and back above \$4,800 per ounce.

The three charts below summarize what's changed in markets so far over the course of the war. Most asset classes have round-tripped and then some. Only gold and government bond prices are meaningfully lower than they were at the start of the War (Gold emphatically not behaving as an inflation hedge). As near-term interest rate cuts have been priced out of markets, the Treasury curve has shifted up by 30 basis points.



See the appendix for the market monitor table

# Memo

## GOing Concerns

**Bottom line:** *By expanding the definition of "the economy" beyond the "value added" captured in GDP, Gross Output (GO) gives us better insight into the business cycle. The latest GO data show that the intermediate economy is slowing down on aggregate, an underlying fragility not captured by strong GDP numbers — although it is partially offset by strong intermediate growth in some industries.*

**What it means for investors:** *The GO data validate several major investor themes that are not evident in GDP, notably the broad-based, rapid growth in the tech sector, the significant uplift in utility-sector activity, and the weak state of the construction and manufacturing industries. This connects market trends with the macro picture.*

Regular followers of arcMacro will know by now that we're huge proponents of a fairly obscure corner of the national accounts data called Gross Output, or GO.

Whereas Gross Domestic Product (GDP) reports the "value added" along the production chain, netting out intermediate transactions, GO captures everything. To take a frightening example, if a financial advisor cut a research subscription without altering the cost or quality of service they provided to their client, GDP would not budge, but GO would fall.

The way to think about GO and GDP (crudely) is as an economy-wide income statement. GO is the top line — how much total economic activity is happening. GDP is the bottom line, measuring how much value that activity ultimately delivers to consumers once inputs are netted out.

**GO has its problems.** It's released with a long lag as part of the third estimate of quarterly GDP, so it's often stale from a fast-moving public market perspective (on the surface). Also, some of the most useful industry-level details are only available on an annual frequency.

**But it has one major benefit: in our view, GO is the only official data on economic activity and growth that coherently connects the macro picture to what's happening on a granular level in markets.**

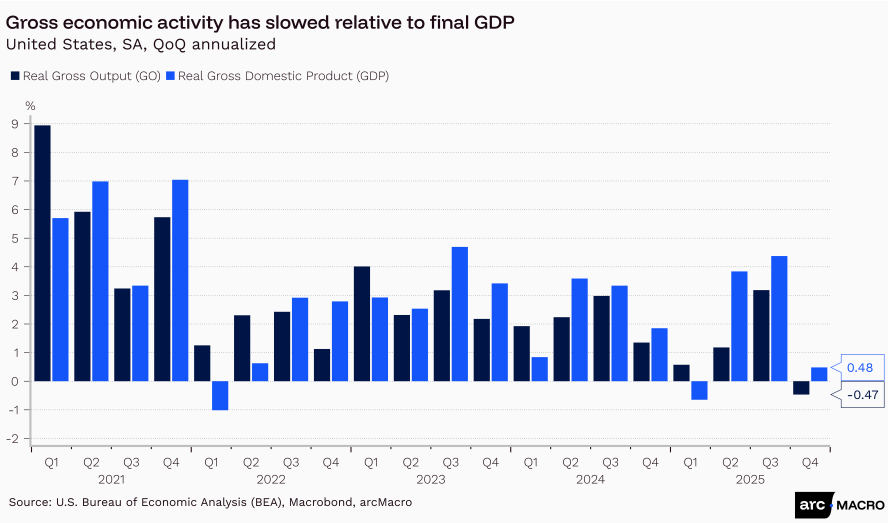
Why? Because a lot of traded businesses operate in the "intermediate" B2B economy. Their performance and valuations depend on how in-demand their services are to other businesses, not just final consumers. GO can capture macroeconomic trends relevant to these businesses that GDP misses.

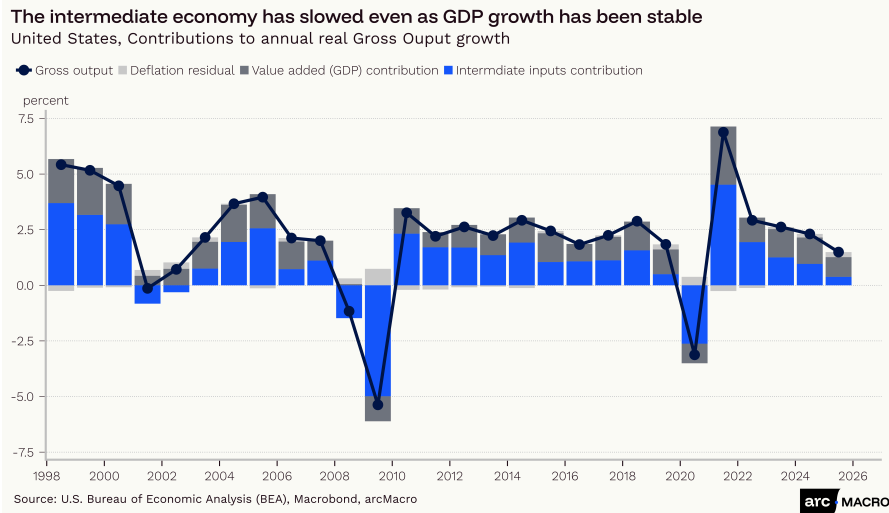
If you plot the last few years of GO and GDP data side-by-side, a clear trend emerges. GO is expanding at a slower rate than GDP, and was actually negative in the final quarter of 2025. This is a reversal of the trend in 2021/22, when GO outgrew GDP.

There is an important insight here that would be difficult to glean from any other official data: more value is being produced for consumers with less intermediate activity. **The economy is becoming more efficient, but in a sense it's also becoming thinner.**

The GO data fit much more intuitively with the conflicting narratives in the press, or with the more pessimistic conversations you might overhear in public.

In one chart, it also explains how consumption can appear so strong when a host of other indicators (not least sentiment) point to a tepid economy. Both are true. Good for consumers, bad for intermediate businesses.



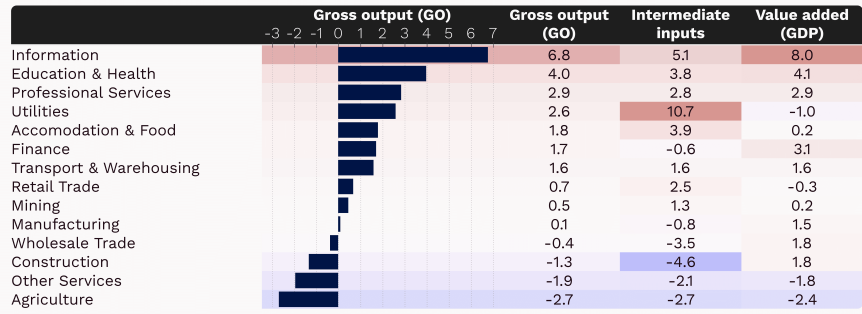


The latest GO release gives us the full industry-level breakdown for 2025, which gives a much more nuanced picture than the aggregate number. Breaking down Gross Output into intermediate inputs and value added by industry reveals important economic nuance:

- The information technology sector is expanding in both senses, with total activity rising at a solid clip in 2025, and value-added rising even faster. We think it likely that AI is at least part of the story here.
- Utilities look underwhelming from a value-added perspective, but the impulse of the AI infrastructure buildout on energy, water, and other utilities is clear in the intermediate inputs column. Businesses increased their spending on utilities by more than 10% in real terms in 2025.
- A less pronounced trend is evident in the leisure industry and retail trade, where intermediate activity growth is relatively strong despite stagnant value-added.
- In three industries – manufacturing, wholesale trade, and construction – intermediate activity contracted in 2025 while value-added rose. These industries are highly exposed to the two defining economic shocks of 2025: tariffs and immigration suppression. Steady value-added contributions from businesses in these industries have masked lower spending on non-essential inputs and a scaling down of their operations in aggregate.

### GO and GDP tell different stories on the industry level

United States, Annual change in real Gross Output (GO) and components, 2025



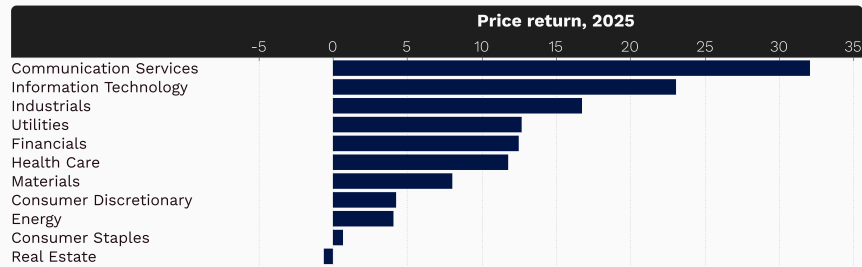
Source: U.S. Bureau of Economic Analysis (BEA), Macrobond, arcMacro



The macroeconomic nuance provided by the Gross Output data can help us make sense of the broad shape of market activity in 2025. The best-performing sectors were also the ones that performed best from a gross output perspective, and the worst performers were highly geared to the slowdown in intermediate activity.

### Market returns mostly matched gross output trends

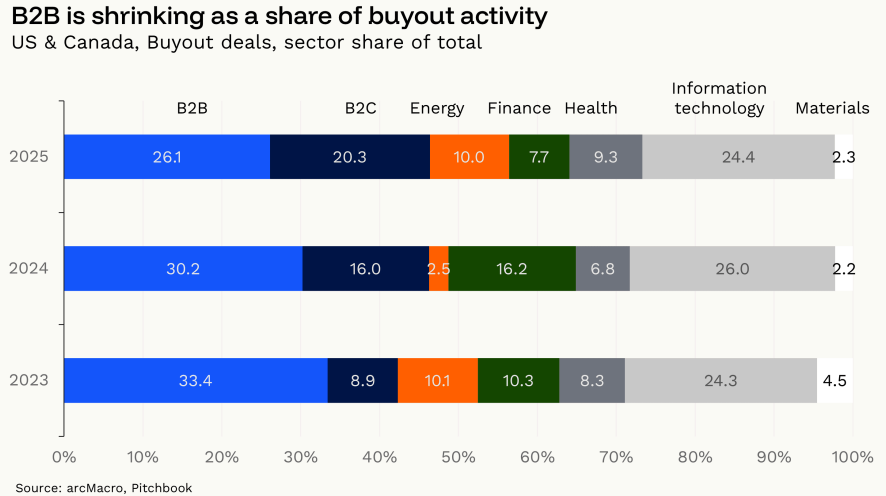
United States, S&P 1500, Annual Performance, 2025



S&P Global, Macrobond, arcMacro



In private markets, deal flow trends show a similar correlation between GO and investment sentiment. For the past two years, private equity firms have been steadily withdrawing from businesses defined as "B2B" by PitchBook, and reorienting to consumer-focused companies. The technology sector's share of total deals has been stable.



## Conclusion

Can we say anything usefully forward-looking based on these slightly stale GO data? Not directly, but we see evidence that the combination of elevated inflation pressure and AI-related disruption will impel consumer-focused businesses to slim down their intermediate inputs to meet consumer demand efficiently. This validates some of the major themes driving markets.

The intermediate economy is in a highly dynamic state. Service providers that do not keep up with AI will lose contracts and could be replaced altogether. Those that can harness it to help their clients meet consumer demand will see fresh growth. And those in the AI "enabling" industries – utilities, technology, and even some segments of construction and manufacturing – will outgrow the rest of the economy.

There is value to be found if one can pick the winners, but the overall trend to keep in mind is that productivity enhancements are top of mind for consumer-facing businesses. Other expenses will be re-evaluated.

Meanwhile, bets against the mighty US consumer remain difficult to justify.

# Appendix

## Proprietary Factor and Regime Model and Key Indicators

### The Week in Markets

	Latest*	Change since last week (units)	Change since last week (%)	3-month change (units)	3-month change (%)	Year-to-date change (units)	Year-to-date change (%)
<b>US Equities</b>							
S&P 500	7126	309	4.5	182	2.6	281	4.1
Information Technology			8.1		5.4		4.7
Financials			3.3		-3.4		-4.3
Consumer Discretionary			6.6		-1.0		1.7
Communication Services			6.3		4.8		6.0
Health Care			0.9		-5.3		-4.0
Industrials			1.2		4.6		11.9
Consumer Staples			0.0		1.8		7.6
Energy			-3.5		15.1		22.6
Utilities			-1.7		5.8		8.1
Real Estate			3.8		7.5		11.0
Materials			-0.4		5.9		14.0
Nasdaq Composite			6.8		4.0		5.3
Dow Jones Industrial Average			3.2		0.0		2.9
Russell 2000			5.6		3.8		11.9
<b>Global Equities</b>							
DM: MSCI World index			3.9		4.0		6.5
EM: MSCI EM Index			3.2		8.6		14.3
CAN: TSX Composite			1.9		4.0		8.3
EUR: STOXX 600			1.9		2.0		5.8
HK: Hang Seng			1.0		-2.8		2.1
JPN: TOPIX			0.6		2.5		10.3
UK: FTSE 100			0.6		4.2		7.4
<b>Sovereign Fixed Income</b>							
US: 2-year Treasury	3.71	-0.10		0.15		0.24	
US: 5-year Treasury	3.84	-0.10		0.070		0.11	
US: 10-year Treasury	4.26	-0.05		0.090		0.080	
CAN: 2-year GoC	2.79	0.010		0.26		0.21	
CAN: 10-year GoC	3.47	0.00		0.11		0.050	
UK: 10-year Gilt	4.78	-0.060		0.33		0.24	
GER: 10-year Bund	3.03	0.00		0.21		0.18	
CHN: 10-year CGB	1.76	-0.05		-0.0921		-0.0850	
JPN: 10-year JGB	2.4	0.0100		0.23		0.34	
<b>Corporate Bond Spreads</b>							
US: A-rated	72.3	-0.1		5.8		2.5	
US: BBB-rated	107	-3.1		7.6		2.0	
<b>Foreign Exchange Rates</b>							
DXY US Dollar Index	98.1		-0.6		-1.2		-0.2
EUR/USD	1.18		0.6		1.4		0.3
USD/CAD	1.37		-0.8		-1.4		0.0
USD/CNY	6.82		-0.3		-2.2		-2.5
USD/JPY	159		-0.3		0.2		1.6
GBP/USD	1.35		0.8		0.9		0.7
USD/CHF	0.781		-1.1		-2.6		-1.5
<b>Commodities</b>							
WTI Crude	87.3	-8.56	-8.9	28.2	47.7	29.9	52.2
Gold	4871	96.8	2.0	260	5.6	503	11.5
S&P GSCI Commodities			-3.6		20.5		23.8
S&P GSCI Industrial Metals			3.1		4.9		11.0
S&P GSCI Agriculture			1.1		3.0		1.1

\* Weekly closing value. Color indicates positive (green) or negative (red) change since prior week.

Source: S&P Global, Russell Investment Group, Nasdaq, U.S. Department of Treasury, Macrobond Financial AB, Central Bank of Germany (Deutsche Bundesbank), Bank of Canada, Intercontinental Exchange (ICE), International Monetary Fund (IMF), LBMA (London Bullion Market Association), Robert Shiller, Chicago Board Options Exchange (CBOE), U.S. Department of Labor, U.S. Bureau of Labor Statistics (BLS), Federal Reserve Bank of Atlanta, Citi, Federal Reserve Bank of St. Louis, Energy Information Administration (EIA), MSCI, STOXX, Tokyo Stock Exchange, Toronto Stock Exchange, FTSE Russell, Hang Seng Indexes Company, Pitchbook | LCD, arcMacro

arc MACRO

**arcMacro Real Time Factors**

United States, z-score



Source: arcMacro

**arcMacro Factor Input Monitor**

Top 10 inputs by factor loading

Indicator	Unit	Latest*	Three months prior	One year prior	Normalized Level (Standard Deviations from Historical Mean)
<b>arcMacro Real Factor</b>	<b>Standard deviations</b>	<b>-0.1</b>	<b>0.4</b>	<b>-0.1</b>	
Underemployment (U-6)	%	8.0	8.4	7.9	
Capacity Utilization	%	78	75.7	76.1	
Industrial Production (IP)	%, YoY	1.5	2.1	0.8	
Employment-to-Population Ratio	%	59.2	59.7	59.9	
Dallas Fed Services Index	%, YoY	-13.3	-5.0	-13.0	
Unemployment Rate	%	4.3	4.4	4.2	
Transportation Services Index	%, YoY	1.6	0.0	0.7	
Employment	Thousands, MoM	-64.0	232.0	171.0	
Construction Employment	Thousands, MoM	26.0	-7.0	6.0	
Philadelphia Fed Manufacturing Index	%, YoY	26.7	12.6	-12.9	
<b>arcMacro Price Factor</b>	<b>Standard deviations</b>	<b>0.3</b>	<b>0.4</b>	<b>-0.2</b>	
Trimmed CPI	%, MoM, SA	0.2	0.3	0.2	
"Sticky" CPI	%, MoM, SA	0.2	0.3	0.2	
PCE	%, MoM, SA	0.4	0.2	0.4	
Inflation Expectations (NY Fed)	%, Annual	3.4	3.4	3.6	
Inflation Expectations (U-Mich)	%, Annual	4.8	4.0	6.5	
Core CPI	%, MoM, SA	0.2	0.2	0.1	
Services PCE	%, MoM, SA	0.2	0.3	0.5	
Market-based PCE	%, MoM, SA	0.4	0.2	0.3	
Richmond Fed Services Price Index	%, Annual	4.8	6.1	5.2	
5 Year Break-Even Inflation Rate	%, Annual	2.6	2.3	2.5	
<b>arcMacro Financial Factor</b>	<b>Standard deviations</b>	<b>0.6</b>	<b>0.6</b>	<b>0.6</b>	
Financial Stress Index (KC Fed)	Index (>0: higher stress)	-0.6	-0.7	-0.6	
Financial Stress Index (OFR)	Index (>0: higher stress)	-0.8	-2.6	-1.3	
Gold Volatility Index	%	35.9	22.2	16.7	
Bank Lending Standards	% (>0: net tightening)	-8.5	-7.1	-0.2	
Anxious Index (SPF)	% (Probability of recession)	20.9	24.0	15.4	
Dividend growth	%, YoY	7.9	8.4	6.2	
Bank Loan Demand	% (>0: net increase)	12.0	18.0	8.7	
Household Debt-to-Income Ratio	Ratio	8.4	8.5	8.7	
IPO Underwriting Activity	US\$ Billions	2.8	8.7	2.0	
Household Debt Growth	%, QoQ, Annualized	3.3	4.3	3.3	
<b>arcMacro Sentiment Factor</b>	<b>Standard deviations</b>	<b>-1.8</b>	<b>0.1</b>	<b>-1.6</b>	
Cyclically-Adjusted PE Ratio (S&P 500)	Ratio	36.5	39.6	32.6	
Dividend Yield (S&P 500)	Ratio	1.2	1.2	1.2	
12-month Forward PE Ratio (S&P 500)	Ratio	19.9	21.8	20.5	
Price/Book Ratio (S&P 500)	Ratio	5.3	5.0	4.9	
Crude Oil Volatility Index	%	99.8	33.9	34.7	
Economic Policy Uncertainty Index	Index	388.7	359.2	494.2	
MOVE Index	Index	89.4	65.7	100.9	
VIX	%	25.6	15.5	21.8	
Bull-Bear Spread (AAII)	% (>0: net bullish)	-14.8	11.2	-35.9	
Equity Risk Premium (NYU Stern)	%	1.1	1.2	1.0	

■ 10th-90th Percentile ■ 25th to 75th Percentile ● Mean of past 5 years ◆ Latest Value

Source: arcMacro, BLS, Fed, Dallas Fed, DOT, Philadelphia Fed, Cleveland Fed, Atlanta Fed, BEA, New York Fed, University of Michigan, Richmond Fed, Macrobond, Kansas City Fed, The Office of Financial Research (OFR), CBQE, S&P Global SPINA, Robert Shiller Economic Policy Uncertainty, ICE BofAML, Lixenta, Axi

\*Most recent published data point. Time period and frequency do not necessarily align.

## ***Disclosures***

### ***AI Declaration***

*All written content, analysis, and opinions are original and ascribed to the author. AI tools were used for proofreading and summarization purposes only. AI tools may also have been used in the development (codebase) of the analytical models reported in this document.*

### ***Disclaimer***

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