arc MACRO

The Might of Macro

A Tailored Approach to Macro-Informed Strategy in Private Markets

Dylan Smith

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A message from the founder of arcMacro

Dylan Smith

FOUNDER AND
CHIEF ECONOMIST

The growth of the private funds model has brought the industry out of the lee that anonymity and specialization once provided, exposing it to the economic gales that buffet the broader financial system.

This is not a theory; it's a fact I observed first-hand working in diligence rooms, board meetings, and portfolio reviews at McKinsey & Co. As dealmaking and valuations peaked at the height of the post-COVID-19 rebound, my clients became preoccupied with inflation, interest rates, labor availability, and the sectoral impact of just-emerging GenAI.

Having recently moved from a role as VP and Economist at Goldman Sachs, it was obvious to me that professionals in private markets were struggling to find relevant, high-quality macroeconomic guidance. Bank economists were focused on fast-moving public markets. Consultants preferred a bottom-up approach.

I founded arcMacro on the belief that private markets require a new package of macroeconomic intelligence and specialist advice, tailored to their illiquid investing structure, unique value creation strategies, and need for rich granularity.

Our approach marries deep economic expertise with an understanding of how private markets operate. We provide **actionable advice** on valuation, financing, exits, and portfolio strategy. We match the lower **frequency** and longer-term **horizon** that illiquid investors work on, enabling us to separate signal from noise and clarify decision points. And we strive for **humility**, favoring probabilistic **scenarios** informed by a wide range of data over narrow point forecasts.

This White Paper showcases some of our tools and frameworks. It provides a taste of the powerful applications of well-designed macroeconomic analysis across all stages of the fund lifecycle and for all industry participants.

But it's only a taste. Our real value lies in our bespoke services and what we can do when the macro gets messy. We take care of the "beta," so that our clients are free to do what they do best — find alpha.

Our Services

Research Publications

arc_Trajectories.
Weekly: Our regular review of macro/market news and data. Filtering signal from noise.

arc_Projections.
Quarterly: Periodic assessments of the economic outlook, with updates to our scenarios and in-depth analysis of topical issues.

arc_Dissections.
Ad-hoc: Deep dives on critical subjects ranging from geostrategy and macroeconomics to mega themes, regulation, and policy.

Consulting

- **Macro guidance:** Your independent chief economist is on call to advise. For anything macro-related, we provide bespoke research, modeling, reporting, and thought partnership.
- **Due diligence:** Enhance the diligence process with a dedicated macro lens. We combine our in-house expertise and models with industry-specific knowledge.
- **Fund strategy:** Get the macro angle right at inception. We help develop resilient fund strategies that capitalize on the macro cycle by optimizing thematic priorities, industry focus, and value creation strategy.
- **LP macro stress test:** We'll estimate the true macro betas at play. Work with us to understand underlying macro exposures in illiquid portfolios. Define custom scenarios to stress test portfolio performance and refine allocation strategies.

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36 Toronto Street
Suite 850, Toronto
M5C 2C5

Email: info@arcmacro.com
www.arcmacro.com

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Executive Summary

Here's why **macro matters** for private markets:

- **Activity is cyclical** — capital raising, deal flow, multiples, and returns all depend on growth, price, and financial conditions in the broader economy.
- **Portfolio company performance varies widely depending on the macro situation** — different industries have different outcomes in different scenarios.
- **Macroeconomic conditions can be systematically monitored and planned for** — with the right tools, private portfolios can be made more robust.

This White Paper establishes these conclusions by combining and analyzing scores of time series from private equity databases, hundreds of macroeconomic variables, and over a million data points from company financials.

Combining advanced econometric and data science tools with human experience and judgement, **we've developed a system for tailoring macroeconomic insights to private markets** that can help funds and allocators navigate macro uncertainty.

The system has three parts:

1. **Macro:** Tracking the economy and generating probability-weighted scenarios for its evolution.
2. **Strategy:** Teasing out detailed strategic and tactical implications for investing and fund management.
3. **Asset performance:** Identifying which industries and types of companies are best suited to the evolving landscape.

We are not challenging the core value proposition of the private markets industry; the best funds will always be those with the strongest ability to identify underperforming assets, improve them, and unlock value for investors. Illiquid funds are not good vehicles for making bets on macro risk.

Instead, we argue that, like it or not, any investment carries macro risk from inception. The ability to identify and monitor macro exposures can help clarify value-creation strategies and free managers and investors to do what they do best — find alpha.

What does it mean to tailor macroeconomics to private markets? How can private market funds better understand the macro landscape?

The first section of this White Paper focuses on the "macro." We distill the information provided by 227 economic indicators into four monthly "factors" that track the real economy, prices, financial conditions, and sentiment — all in real time. Based on historical combinations of these factors, we define a set of **seven distinct economic regimes that characterize the state of the economy and act as shorthand for the conditions investors should expect to be operating in**.

Next, we introduce data on the various phases of the private equity **fund lifecycle** (fundraising, deal flow, valuations, and returns) and demonstrate how they co-move with the macro factors. **We define the typical conditions that the privates industry faces during each macro regime** and draw out the implications for investing strategy.

Then we zero in on the underlying assets, using quarterly data on revenue, profitability, and valuations from every company ever listed on U.S. exchanges. **We estimate the distribution of the sensitivity of these financial indicators to our macro factors (calculating so-called "betas") at the industry level.** This tells us the degree to which the performance of top, median, and bottom-quartile companies is influenced by the state of the broader economy.

Finally, and most importantly, we tie it all together. **We're firm subscribers to the philosophy that well-constructed scenarios are far more helpful in business and investment planning than point forecasts.**

We employ sophisticated statistical machinery to estimate the probability that the economy will transition into different macro regimes over the next 12-36 months and combine this with **professional judgement** to maintain a set of **arcMacro scenarios for the evolution of the U.S. economy. These can be tailored to any use case**.

In each scenario, **we detail the strategic implications for private markets** — for example, whether to exit an investment in a weak return environment or extend the hold period in the hope that things improve — and identify how companies in different industries are likely to be affected.

The tools we develop in this paper have widespread applications extending beyond the basic framework we've described. We conclude the paper by outlining three indicative use cases, all of which relate **to how investors might respond to the rising risk of an inflation surge**.

The value of our framework in practice is clear. Our approach provides clarity during the **diligence process**. Our tools can identify whether **an entire portfolio is over-leveraged to a certain macro factor**. We can help define the **thematic orientation** of a new investment fund (e.g., "we only pursue inflation-resilient businesses") or shape its approach to **fund strategy** (e.g., "high intervention in portfolio companies in pursuit of operational excellence"). And, on the other end of the fund lifecycle, we can inform critical decisions on **exit timing**.

Whatever the use case, private markets no longer have an excuse to ignore the macro.

arcMacro has the tools and insights to help navigate the uncertainty.

PART 1

Why Private Markets Need Good Macro

> "Ongoing macroeconomic uncertainty is creating unprecedented times in the PE buyout industry. Managers should use this as an opportunity..."
>
> MCKINSEY ON INVESTING, NOV. 2024

> "There are too many worries about the macro — all of these factors that are not meant for our industry..."
>
> ORLANDO BRAVO, JUNE 2025

It is an easily established fact that the cohort of private equity (PE) funds launched in 2017 has outperformed those launched in 2016 or 2019.

It is also undeniable that a far higher volume of leveraged buyout (LBO) deals was completed in 2021 — and at higher valuations — than in any other year on record.

Nor is it controversial to claim that it was much easier for a General Partner (GP) to raise capital commitments for new funds in 2007 than it was just one year later.

This should be all the evidence anyone needs to believe that the state of the economy matters to the private equity industry, and for private markets writ large.

Nobody who is even tangentially connected to alternative assets would deny that the long "easy money" decade that followed the financial crisis, the COVID-19 pandemic, and the resulting inflationary growth spurt has shaped decisions and outcomes in the sector.

They would also likely agree that the very best fund managers have anticipated macroeconomic conditions, recognized potential upside, and built downside resilience into their strategies.

At this juncture, private equity principals cannot afford to ignore the overlapping implications of higher U.S. and global tariff rates, the effects of a potentially unsustainable U.S. public debt burden, or the sectoral changes in productivity and labor market structure that will be wrought by General Artificial Intelligence (GenAI).

Corollary: One might expect — as is the case in public markets — a small army of economists, statisticians, and data scientists to offer specialized macro advice to private market participants, including GPs, Limited Partners (LPs, the investors in the funds managed by GPs), family offices, multi-asset managers, and their service providers.

And yet.

Not only is sound macroeconomic guidance hard to come by for the average middle-market GP, but the importance and relevance of that advice are often overlooked.

Private markets are, at best, working with incomplete and inferior macro intelligence. At worst, they're working in the dark, relying on faulty assumptions and blind luck to navigate an increasingly opaque economic outlook as they pursue their primary goal of generating alpha.

arcMacro bridges the gap. This paper marks our inaugural undertaking: to describe and quantify the exposure of the private markets industry to broader economic cycles, and to show how the standard macroeconomics toolkit can be adapted to the unique needs of an industry characterized by long horizons and low liquidity.

Specifically, we will outline our process for developing a system of tools and techniques to bring macro to private markets:

- Developing a system for tracking and anticipating macroeconomic fluctuations by using sophisticated statistical tools to derive a simple framework of the economy.
- Extending this framework into a scenario-based forecasting and planning system.
- Showing how macroeconomic cyclicality is inherent to both the private markets lifecycle and underlying asset performance.

Pulling these tools together, we demonstrate the value of a scenario-led macroeconomic perspective on fundraising, capital allocation, portfolio strategy, and asset diligence.

The Beta Myth

One prominent line of thinking in the industry — summarized in the quote at the top of this chapter — is that fund managers can safely ignore a top-down macro perspective because private markets are all about "pure alpha."

In this view, a successful fund is one based exclusively on long-term growth themes with managers who are equipped to identify and acquire target assets whose growth is fueled by such powerful secular tailwinds that their returns are insulated from broader economic conditions. The betas are irrelevant. Or so the thinking goes.

We call this "the Beta Myth"

arcMacro is founded on a competing claim: well-managed private funds can minimize macroeconomic risk and focus on strong alpha generation precisely because they carefully monitor the broader economy and are aware of where potential negative and positive exposures are piling up.

Success in illiquid investing comes from an understanding of macroeconomic forces, not ignorance of them.

If it's so important, why hasn't it been done?

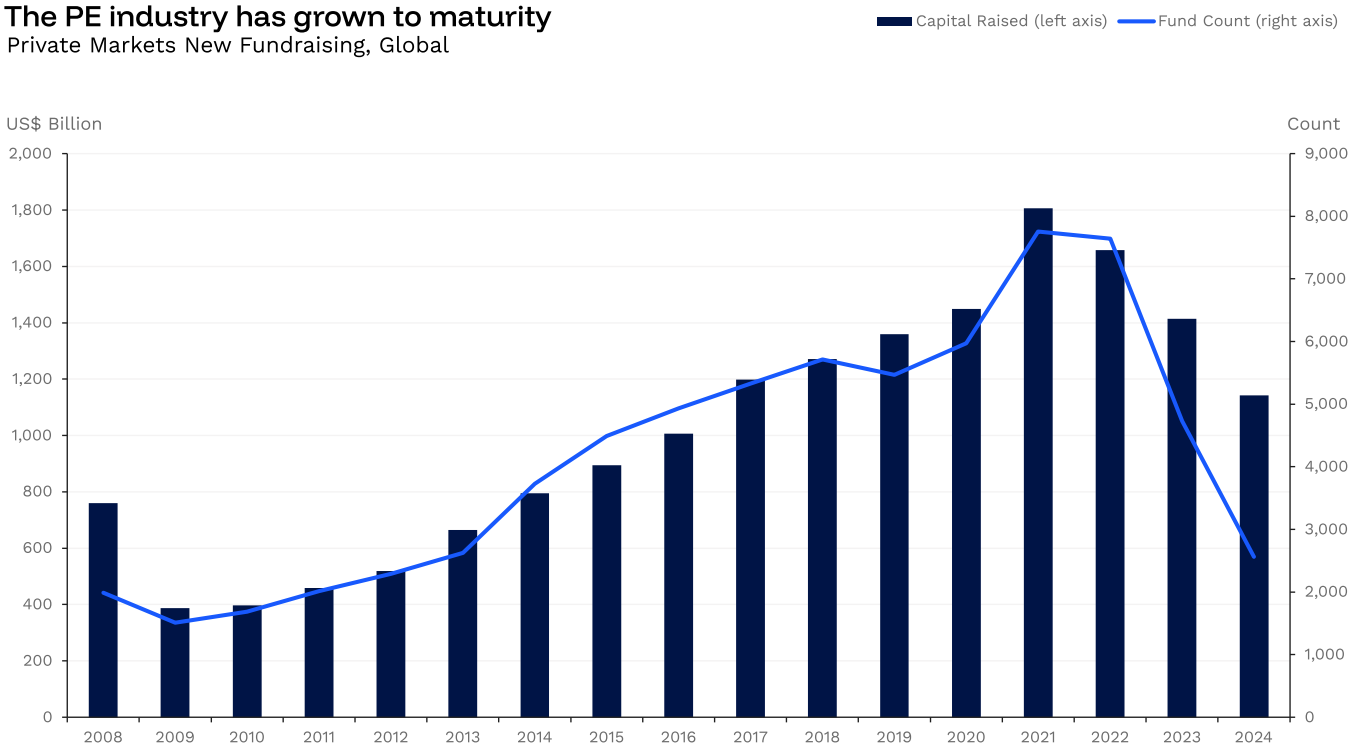
Why, if we're so sure that private markets would benefit from dedicated macro advice, isn't there a proliferation of specialized economics teams providing this service?

One reason is the growth and increasing maturity of private markets. Before the industry gained scale, early practitioners could focus on applying the buyout investing model to low-hanging fruit without worrying too much about exposure to broader business cycles.

As private equity has grown, it has become increasingly exposed to, and indeed a part of, the macro-financial cycle. More and larger allocations to more and larger funds, making more and larger deals, means higher macro exposure on aggregate and within the portfolios of GPs and funds.

There are simply not enough theoretically "zero-beta" deals to go around anymore. And, in any case, even industries like Software, Internet, and Healthcare, which are often assumed to be rocket-propelled by secular trends, in fact have substantive cyclical elements to their historical performance, especially in a more volatile macro environment (as we'll show in Chapter 4).

The PE industry has grown to maturity
Private Markets New Fundraising, Global



Source: arcMacro, Pitchbook

Perhaps the best proof for our claim regarding the might of macro is that the traditional tendency of GPs to overlook macroeconomic intelligence is starting to change. A handful of the largest multi-asset managers in private markets have now hired in-house economists. LPs are increasingly asking their own economics teams (usually at the service of public market-oriented areas of the organization) to lean in on the private side of the allocation process.

However, GPs in the middle-market bracket — who (rightly) can't justify hiring a full-time Chief Economist — remain out of the loop and badly underserved by advisors who only dabble part-time in either macroeconomics or private markets.

In our view, the primary reason that macroeconomics for private equity is not (yet) an industry is that private markets need a new and different type of macroeconomics.

Asset allocators and dealmakers alike think about the economy on a medium-to-long-term basis, mirroring the 3- to 10-year horizon of illiquid investments; they take the long view and focus on low-frequency trends. And, critically, they need to be able to bridge high-level macroeconomic analysis to tangible investment strategy at the granular industry and asset level.

To caricature only mildly, the extant crop of market economists (those closest to private markets), trained in investment banks and hedge funds to advise fast-moving public fixed-income and equity markets, are hyper-focused on short-term (one month to one year) forecasting accuracy. They tend to limit their analysis to the main economic indicators — growth, inflation, employment, and interest rates — and shift their attention with the daily news cycle.

A microeconomist might call the result a "matching problem" on top of a "market failure." On the supply side, those with a macroeconomics skillset that can be adapted to private markets lack the exposure to spot the emerging demand. On the supply side, P.E. professionals, seeing economists obsess over the second decimal of aggregate monthly headline inflation, don't recognise the potential value in seeking out dedicated macroeconomic advice, because it appears to lack relevance.

What's more, there's also what a microeconomist would identify as an "incentive misalignment" at play. Market economists are rewarded for point forecast accuracy, and many a career has been made on a single (lucky?) "big call," which has carried a reputation long past the sell-by date of the initial insight (oddly, few careers have been reversed by subsequent bad calls).

In a market saturated with many economists arguing for and against different viewpoints, investors can triangulate the underlying probabilities, and the system mostly works. And if their trades go wrong, investors can limit losses and reposition relatively easily.

By contrast, long-term investors in private markets are "locked in" and, by design, lack the liquidity to reverse a bad decision early. Scenario-based advice, ideally with a probability weighting, is far more helpful in this context than a dominant narrative or point forecast (however gutsy or out-of-consensus).

Private markets require a clear-headed and humble analysis of the various paths the economy could take, along with nuanced views on what this will mean for them. They need a plan A, B, and C.

Thus, in building our macroeconomic framework (Chapter 2) for private markets, we commit up-front to the following principles:

1. Long horizon: tools that facilitate lower frequency analysis in the medium and long term
2. Scenario-based: a framework designed to analyse and weight multiple potential paths
3. Granular: built to generate industry-level strategic intelligence covering both investing decisions and asset performance.

We then use this framework to quantify the cyclicality of the PE industry itself (Chapter 3) and the cyclicality of the underlying companies on which the industry is built (Chapter 4).

A note on limitations

Before we dive in, a note on some of the limitations of this paper.

First, our analysis is confined to the private equity (PE) industry only. This is due to data limitations; we believe our overall thesis applies equally to dedicated private credit, real estate, and infrastructure funds, as well as institutions such as family offices that mix public and private investment exposures.

Second, we've limited our analysis to the U.S. only, where historical data are the cleanest and most extensive. Other jurisdictions will be tackled in later research.

Third, because of the nature of private equity (it's in the name), we'll be working with datasets that are shorter than we'd like or not fully encompassing. We've mostly overcome this issue using proxy data and other techniques, but we will acknowledge this problem when it lingers.

PART 2

Macroeconomics for Private Markets

> "The master-economist must possess a rare combination of gifts... He must understand symbols and speak in words. He must contemplate the particular, in terms of the general, and touch abstract and concrete in the same flight of thought. He must study the present in the light of the past for the purposes of the future."
>
> —JOHN MAYNARD KEYNES

There are no off-the-shelf macro frameworks that meet our three criteria for a useful economics for private markets (long-horizon, scenario-based, and granular)

So, we've built our own.

The framework is developed using state-of-the-art econometrics techniques with a sprinkling of machine learning. We'll mostly keep that in the background and use it to boil the whole thing down to a simple set of distinct "regimes" that the economy transitions between.

Each regime has different implications for different stages of the PE fund lifecycle (fundraising, deal flow, valuations, returns) and company performance (growth, margins, valuation, etc.).

Importantly, we've left some room for human inputs to parameterize and adjust scenarios to capture new forces that (inevitably) will not have been captured in the historical data (e.g., a new tariff policy development that has not been seen in the past century).

The following section will go into some detail on how the framework is built, structured, and used. For a non-technical overview, read the summary in Box 1 and skip to the next section.

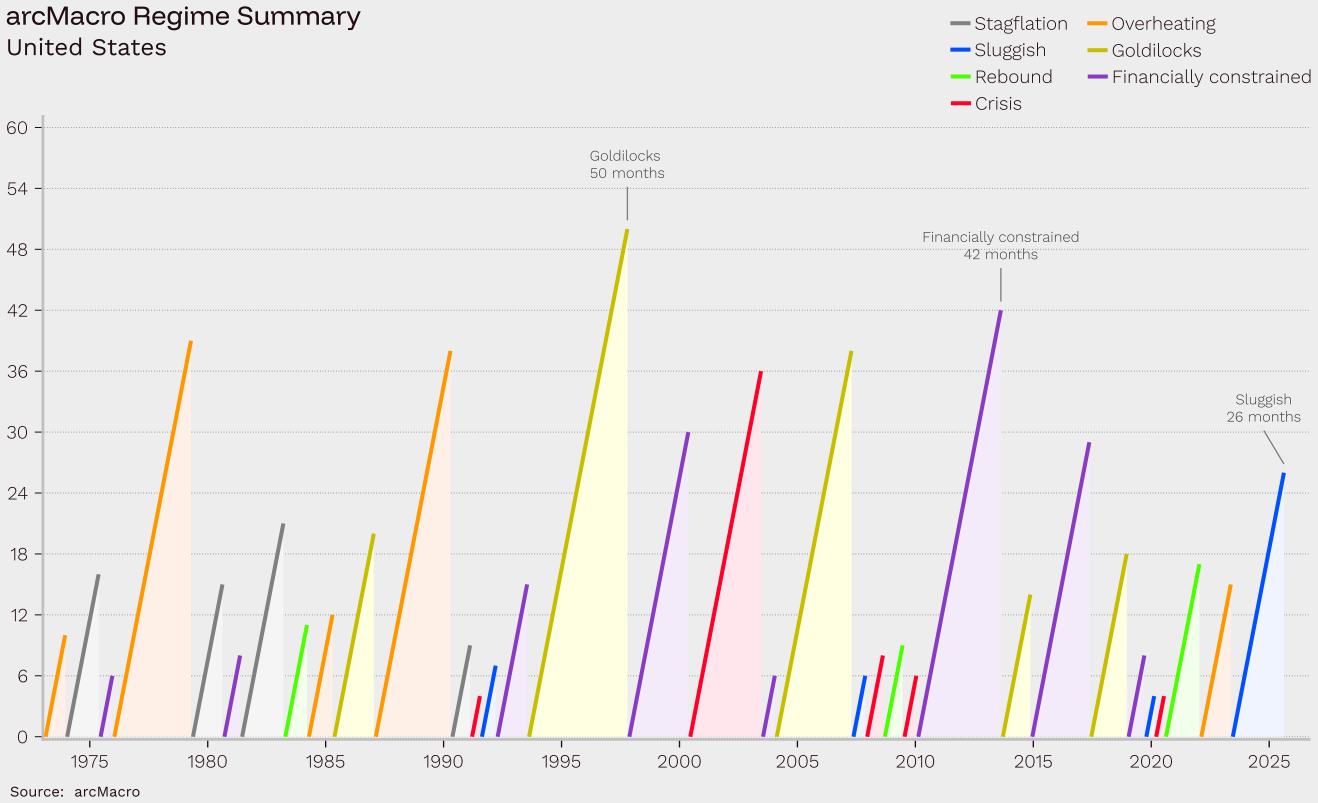
Box 1: arcMacro Regime Scenarios Overview

We start with 227 different data series covering a range of U.S. macroeconomic and financial indicators. We summarize all these indicators into four “Factors”, spanning from 1970 to the present at a monthly frequency:

1. Real Factor: Measures the state of economic activity (production, investment, trade, employment, etc.).
2. Price Factor: Tells us how inflationary current economic conditions are.
3. Financial Factor: Estimates how easily businesses can access capital for operations and growth (slow-moving)
4. Sentiment Factor: Assesses investors’ and businesses’ attitudes to the economy, whether “risk-on/bullish” or “risk-off/bearish” (fast-moving).

The arcMacro Factors incorporate, and are in some ways analogous to, traditional indicators like GDP (for the Real Factor) or CPI inflation (Price Factor). Still, they have several advantages over using a single series. They’re timelier, more reliable, and more encompassing.

The Factors also capture the idea that there is more than one “economic cycle” underway at any given time — at one extreme, Financial Factor cycles move slowly as leverage builds up and declines. At the other, the Sentiment Factor fluctuates with changes in economic policy and world events. The real and price cycles lie somewhere in between and can be independent or in sync with each other.



There is one downside to the factors: with four separate series potentially moving in different directions and at different scales, it can be challenging to read the state and direction of the economy.

To address this, we further simplify the framework by analysing the way the factors have historically combined and defining seven "regimes" that the economy can be in:

- Goldilocks
- Overheating
- Financially Constrained
- Sluggish
- Crisis
- Rebound
- Stagflation

Knowing the current Regime and how the Factors are moving, we can combine statistical techniques and professional judgment to map out the most likely next regime and the ones after that. This is how we develop the scenarios.

Later, we'll use our understanding of how PE activity and company performance move in relation to the Factors and Regimes to leverage the scenarios into actionable strategic advice and identify industries positioned to outperform.

Building the arcMacro Framework

The arcMacro Factors: Bigger Data, Better Picture

To build a simple framework of the macroeconomy, we need to start with complex raw data reflecting how it has fluctuated in the past.

There are serious problems with the standard reference indicators typically used to monitor the business cycle, of which Gross Domestic Product, as a measure of economic activity, is the most egregious example.[1]

These series are limited in coverage, delayed, and subject to massive revisions (the U.S. economy has been revised in and out of recession more than once). More recently, problems with survey response rates and political interference have further undermined the case for relying on a narrow set of indicators.[2]

In some cases, the official statistics don't even measure the right thing. Private equity practitioners should never rely on GDP, for instance, as it nets out all the transactions in the economy along the entire value chain leading up to final consumption. This intermediate activity, measured in a separate statistic called "Gross Output" (GO), can grow or shrink at a very different rate from GDP, especially when one starts to look at it on the industry level. B2B products and services are the top category of private equity dealmaking over the past decade, according to Pitchbook data, so GO is the more appropriate indicator.

1 See for instance S. Asimakopoulos et al., "GDP Revisions Are Not Cool: The Statistical Agencies' Trade-Off," Bank of Spain, October 19, 2023.
2 Sylvain Leduc, Luiz Edgard Oliveira, and Caroline Paulson, "Do Low Survey Response Rates Threaten Data Dependence?," FRBSF Economic Letter 2025-07, Federal Reserve Bank of San Francisco, March 31, 2025

INPUT DATA

Public and private institutions have developed a smorgasbord of alternative indicators for tracking the economy. But this creates another problem: which to choose? How do we assess which is "best"?

Luckily, we don't have to. We have at our disposal powerful econometric techniques for boiling down the information in a large set of indicators into a single summary statistic ("dimensionality reduction"). Simple products such as Goldman Sachs' Current Activity Indicator (CAI) and Financial Conditions Index (FCI)[3] first introduced the concept to investors. The Atlanta Fed's GDPNow[4] model is an example of a sophisticated application of dimensionality reduction.

We can utilize similar tools to develop our own set of cyclical indicators, which we can customize for our particular use case in illiquid markets.

Our starting point is to identify 227 indicators from public and private sources that cover the whole gamut of economic and financial information on the state of the economy. The inputs are summarized in the accompanying table.

Next, we group the inputs into three categories: the real economy, prices, and financial statistics. The latter two are self-explanatory; the first collects all series related to production, trade, and employment (we tested separating the labor market into its own category, but it did not improve the model).

Summary of Raw Data Inputs for Factor Estimation

Factor	Input series (#)	Broad data categories	
Real	138	• National accounts • Productivity • Employment & income • Business Surveys • Consumer Surveys	• Foreign & domestic trade • Business creation and destruction • Real estate • Public spending • Transport & tourism
Price	52	• Consumer price indices • Producer price indices • Personal Consumption Expenditures • Commodity indices • Real estate prices	• Inflation expectations • Breakevens • Business surveys • Consumer surveys
Financial*	37	• Public equity ratios • Security statistics • Risk premia • Positioning • Investor surveys	• Banking statistics • Flow of funds • Corporate and public yields • Volatility indices • Uncertainty indices
Sentiment*			

* Two factors were extracted from the same broad set of financial market indicators

Source: arcMacro

3 Jan Hatzius et al., "Financial Conditions Indexes: A Fresh Look after the Financial Crisis," NBER Working Paper No. 16150, National Bureau of Economic Research, July 2010.

4 Patrick C. Higgins, "GDPNow: A Model for GDP 'Nowcasting,'" Working Paper 2014-7, Federal Reserve Bank of Atlanta, July 2014.

ESTIMATING THE FACTORS

What we're after is a single line that summarizes the common movement in each set of data — the underlying "state" of the economy. To get it, we estimate a Dynamic Factor Model (DFM) for each category. This technique has the advantage of handling input data with different start and end dates, missing data, and mismatched frequencies.[5]

For the data in the "real economy" and "price" categories, a single common factor explained a significant proportion of the overall variation in the input data (roughly 40%), with a sharp drop-off to the next factor. This means that a single common underlying cycle drives the scores of the input indicators we used. We call these common indicators the arcMacro **Real Factor** and **Price Factor**.

For the financial data grouping, two distinct underlying trends emerged, and both are needed to explain a meaningful portion of the fluctuations of the input series. The first factor was slow-moving with low volatility, and the correlation of the factor with the input variables ("factor loadings") revealed that it responds to the demand for credit and the ease with which companies could access it. This reflects the fundamental role of the financial system in intermediating savings and investment, so we refer to it as the Financial Factor (it could also be thought of as the "Credit Factor").

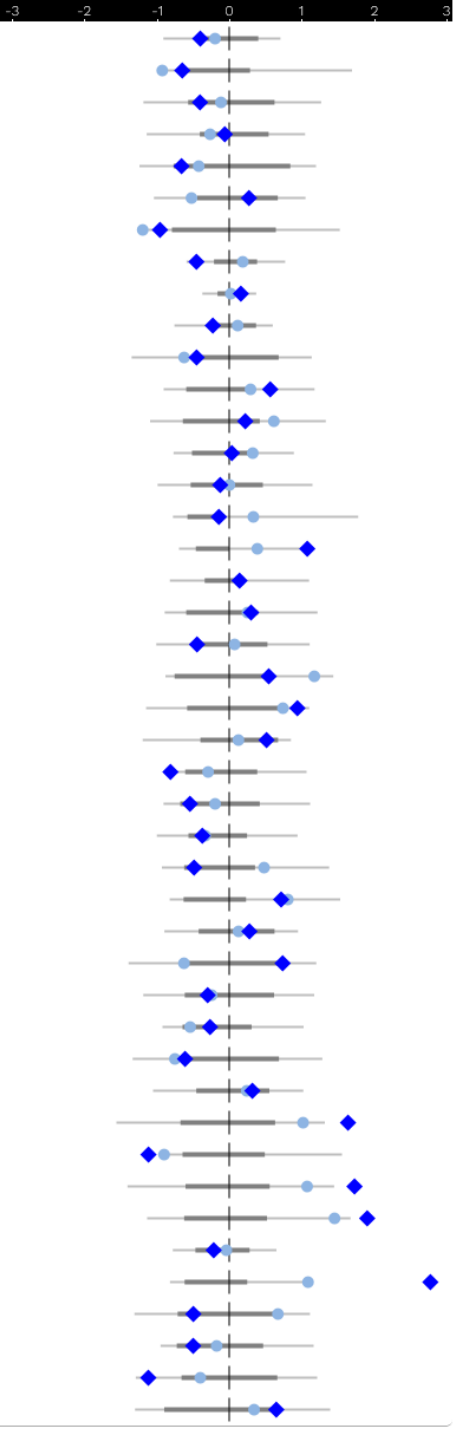
A separate, much faster-moving and more volatile factor clearly captured general perceptions about risk tolerance and the economic outlook. We call this the Sentiment Factor.

5 Marta Bańbura and Michele Modugno, "Maximum Likelihood Estimation of Factor Models on Data Sets with Arbitrary Pattern of Missing Data," ECB Working Paper Series No. 1189, European Central Bank, May 2010.

arcMacro Factors

Top 10 inputs by factor loading

Indicator	Unit	Latest*	Three months prior	One year prior	Normalized Level (Standard Deviations from Historical Mean)
arcMacro Real Factor		**-0.8**	**-1.9**	**-0.6**	
Underemployment (U-6)	%	8.1	7.8	7.8	
Capacity Utilization	%	78	77.6	77.6	
Industrial Production (IP)	%, YoY	1.5	1.3	-0.6	
Employment-to-Population Ratio	%	59.6	59.7	60.0	
Dallas Fed Services Index	%, YoY	6.8	-10.1	-7.7	
Unemployment Rate	%	4.3	4.2	4.2	
Transportation Services Index	%, YoY	-1.1	1.1	4.0	
Employment	Thousands, MoM	288.0	-696.0	206.0	
Construction Employment	Thousands, MoM	-7.0	2.0	23.0	
Philadelphia Fed Manufacturing Index	%, YoY	-0.3	-4.0	-3.3	
arcMacro Price Factor		**1.7**	**-0.1**	**-0.6**	
Trimmed CPI	%, MoM, SA	0.3	0.2	0.2	
"Sticky" CPI	%, MoM, SA	0.3	0.2	0.3	
PCE	%, MoM, SA	0.2	0.1	0.2	
Inflation Expecations (NY Fed)	%, Annual	3.2	3.2	3.0	
Inflation Expecations (U-Mich)	%, Annual	4.8	6.6	2.8	
Core CPI	%, MoM, SA	0.3	0.1	0.3	
Services PCE	%, MoM, SA	0.3	0.2	0.3	
Market-based PCE	%, MoM, SA	0.1	0.2	0.2	
Richmond Fed Services Price Index	%, Annual	5.1	5.0	5.3	
5 Year Break-Even Inflation Rate	%, Annual	2.4	2.4	2.0	
arcMacro Financial Factor		**1.2**	**0.2**	**0.6**	
Financial Stress Index (KC Fed)	Index (>0: higher stress)	-0.8	-0.5	-0.4	
Financial Stress Index (OFR)	Index (>0: higher stress)	-2.2	-1.2	-0.9	
Gold Volatility Index	%	16.0	21.5	18.5	
Bank Lending Standards	% (>0: net tightening)	-4.8	-3.7	10.3	
Anxious Index (SPF)	% (Probablity of recession)	29.6	36.1	21.0	
Dividend growth	%, YoY	8.3	7.0	3.4	
Bank Loan Demand	% (>0: net increase)	12.1	-2.5	-1.7	
Household Debt-to-Income Ratio	Ratio	8.6	8.9	8.7	
IPO Underwriting Activity	US$ Billions	3.3	2.1	0.1	
Household Debt Growth	%, QoQ, Annualized	3.8	1.8	2.8	
arcMacro Sentiment Factor		**0.7**	**3.3**	**0.1**	
Cyclically-Adjusted PE Ratio (S&P 500)	Ratio	38.0	35.1	34.9	
Dividend Yield (S&P 500)	Ratio	1.2	1.3	1.3	
12-month Forward PE Ratio (S&P 500)	Ratio	22.4	21.3	21.0	
Price/Book Ratio (S&P 500)	Ratio	4.7	5.0	4.7	
Crude Oil Volatility Index	%	35.6	42.5	34.6	
Economic Policy Uncertainty Index	Index	288.2	488.9	99.9	
MOVE Index	Index	80.4	100.0	110.1	
VIX	%	15.8	20.5	19.3	
Bull-Bear Spread (AAII)	% (>0: net bullish)	-10.9	-9.6	17.2	
Equity Risk Premium (NYU Stern)	%	1.2	1.1	1.1	



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

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), CBOE, S&P Global, SIFMA, Robert Shiller, Economic Policy Uncertainty, ICE BofAML, LJKmfa, AAII

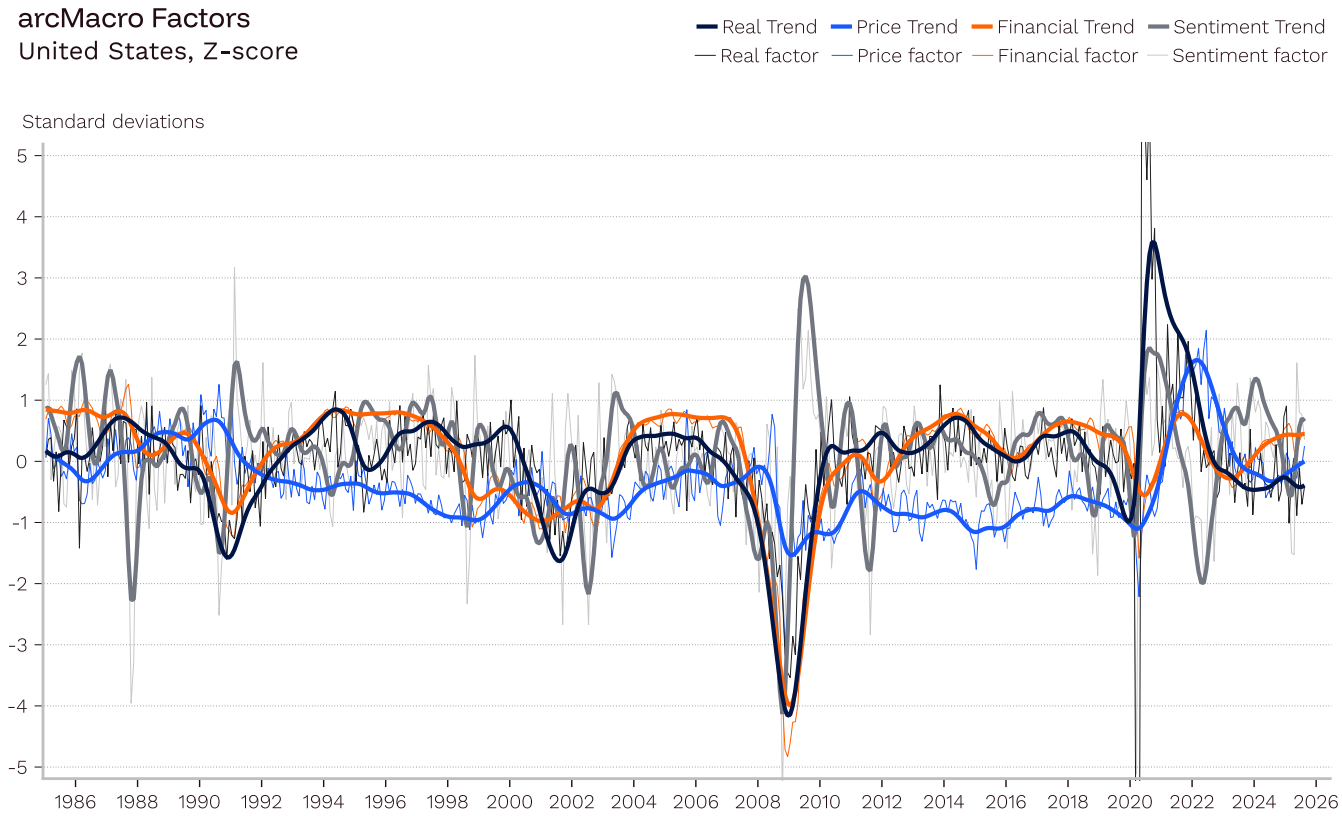
*Most recent published data point. Time period and frequency do not necesarily align.

INTERPRETING THE FACTORS

The four arcMacro Factors are shown together in the accompanying charts. We've added a smoothed trendline to each series to highlight the long-term movements over the sample period back to 1970.[6]

Perhaps the only drawback of using a DFM to extract a common trend is that the factor does not have a natural scale or unit. We therefore standardize each factor, so that a value of zero represents the long-run average, and a value of one represents a standard deviation move above that average. Any observations above/below +/-3 can be considered "extreme".

arcMacro Factors
United States, Z-score



Source: arcMacro

6 We used an HP filter with lambda values set to the standard score of 100 for seasonally adjusted monthly data for the Real, Price, and Financial Factors, and to 10 for the Sentiment Factor to capture faster-moving dynamics. To deal with well-known endpoint (current month) stability problems in the HP filter, we extended the series based on current data by two years using the DFM forecast before smoothing.

Before taking a deeper look at each Factor, it's worth pausing to emphasize the value of working with these composite indicators as opposed to a single series for each cycle.

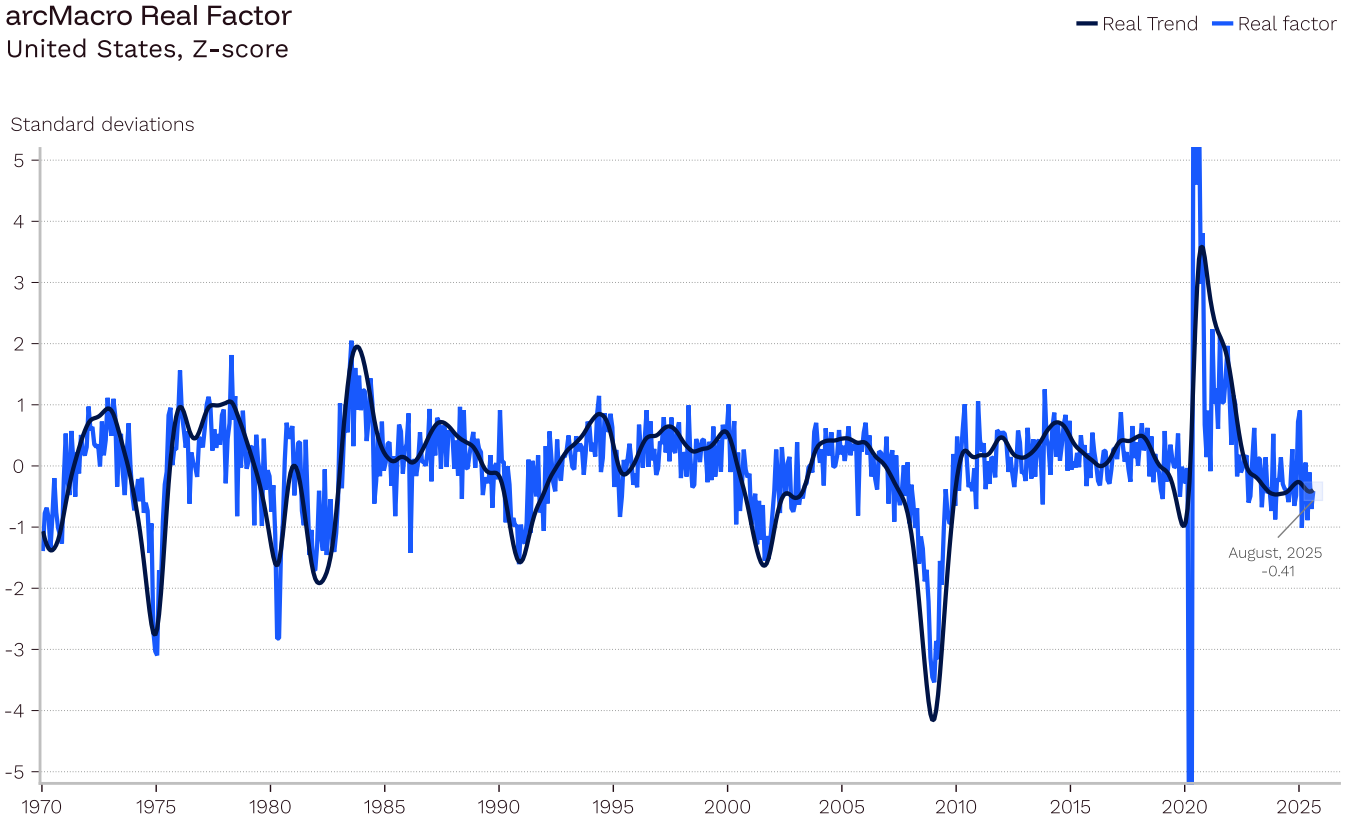
- Timeliness — Extracts real-time signals from multiple contemporaneous series, avoiding the publication lags and frequent revisions that plague individual indicators, in effect giving us a "nowcast" of the current state of the economy.
- Comprehensiveness — Synthesizes information across diverse data sources to deliver a stronger signal on the state of the economy than any single indicator.
- Reliability — Filters out idiosyncratic noise and measurement errors by focusing on common movements across multiple series, producing more stable signals than volatile individual reports.

Reliability is a particularly important characteristic at this juncture, and the model's ability to dynamically reduce the importance of certain series will help the framework automatically adjust to changes in data quality.

To cite one recent example, the Conference Board's Leading Economic Indicator has been incorrectly predicting a recession for several years,[7] despite an established record of historical accuracy. The model has downweighted this particular input series for the Real Factor in recent months.

7 https://www.conference-board.org/topics/us-leading-indicators/

arcMacro Real Factor
United States, Z-score



Source: arcMacro

REAL FACTOR

The input data with the highest factor loadings to the Real Factor reveal that the use of existing productive capacity is the most reliable indicator of the state of the business cycle. The two highest-weighted variables are underemployment (U6) and industrial capacity utilization.

This underscored our earlier finding that the labor market and other real variables (production, trade, etc.) are part of a joint cycle rather than separate ones. Indeed, the summary table shows the top cyclical indicators coming from a range of sectors and survey types — the notable missing indicator being GDP growth.

Looking at the historical fluctuations in the Real Factor, the major booms and busts are clearly captured by the factor. The long post-dotcom bubble slowdown, the Global Financial Crisis (GFC), and the COVID-19 shock are all there. Most other fluctuations are within one standard deviation of the long-run average while still capturing essential dynamics like the 2016 slowdown. COVID produced extreme moves as entire sectors were shut down and restarted, but smoothing reveals both how short the initial downturn was and the recovery's strength and surprising duration.

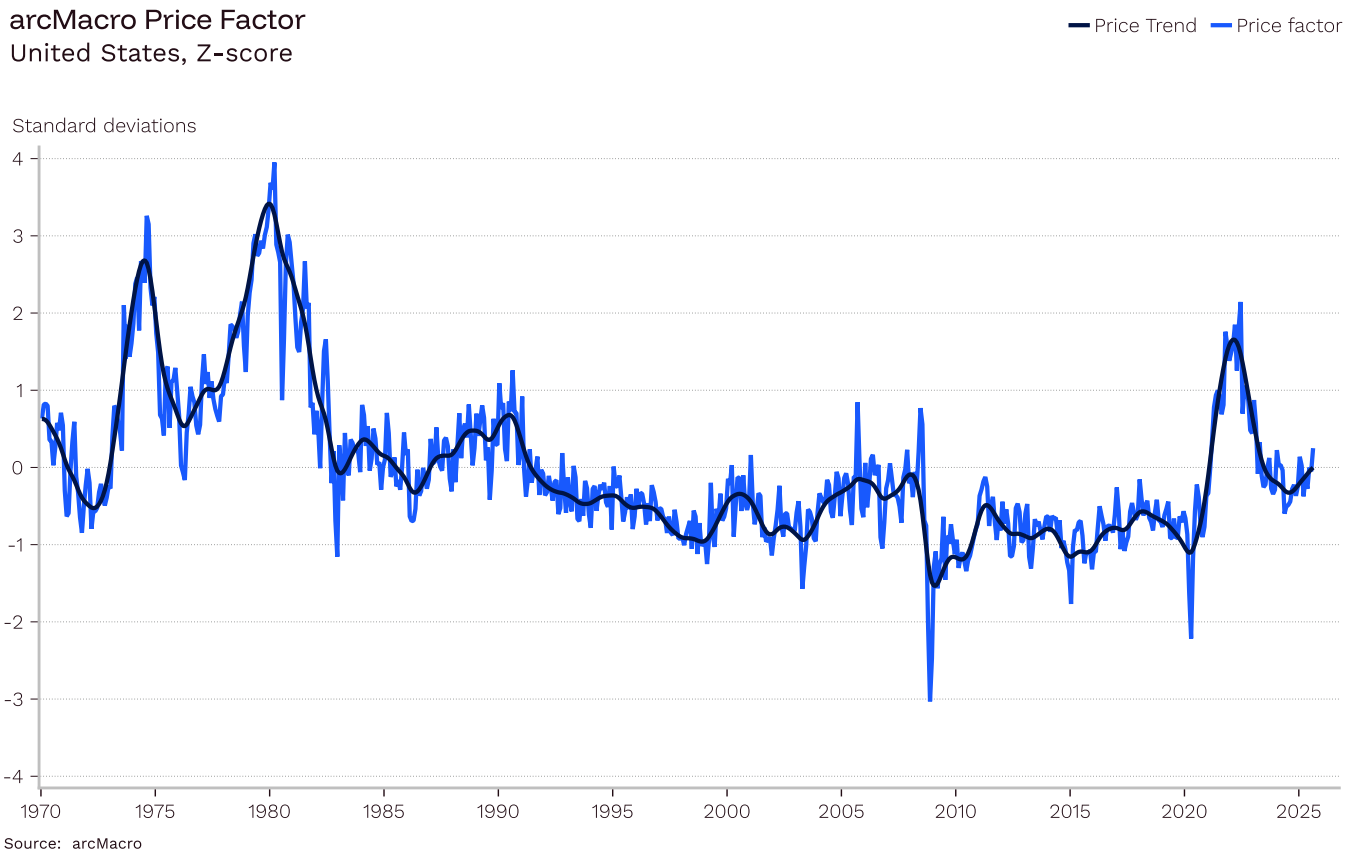
Perhaps the most interesting part of the chart is how starkly it reveals our current economic malaise. Economic activity has been below the long-run average for three-plus years without ever slipping into outright recession or staging a sustained recovery (there were signs of an upturn in late 2024, which rapidly reversed). This state of general economic ambiguity should be recognisable to Wall Street and Main Street alike. Early (and incomplete) data for August point to further loss of momentum.

PRICE FACTOR

The price factor emphasizes the importance of modern "core" CPI inflation measures, weighting "Trimmed" and "Sticky" core price indices most heavily.[8] The Factor weightings also validate the Fed's view of headline PCE as a more fundamental inflation gauge than headline CPI. Consumer expectations are tightly linked to the common inflation trend, confirming research showing that future expectations largely reflect current price dynamics.[9]

The Price Factor clearly identifies major "stagflation" episodes in the 1970s/80s, and the remarkably stable low-inflation period post-1990 that persisted until the post-COVID-19 inflation spike.

What's clear from the Price Factor is that we're not out of the woods yet. Currently, the price factor is above the stable trend at pre-1990s levels, indicating no return to the pre-COVID low-inflation regime. The Price Factor has been steadily increasing in 2025, with indications of an uptick in August.



Source: arcMacro

8 Trimmed: CPI with largest and smallest monthly price changes removed. Sticky: Subset of CPI including only items with historically stable prices.

9 Olivier J. Blanchard and Jordi Galí, "The Macroeconomic Effects of Oil Shocks: Why Are the 2000s So Different from the 1970s?," NBER Working Paper No. 13368, National Bureau of Economic Research, September 2007, revised November 2007

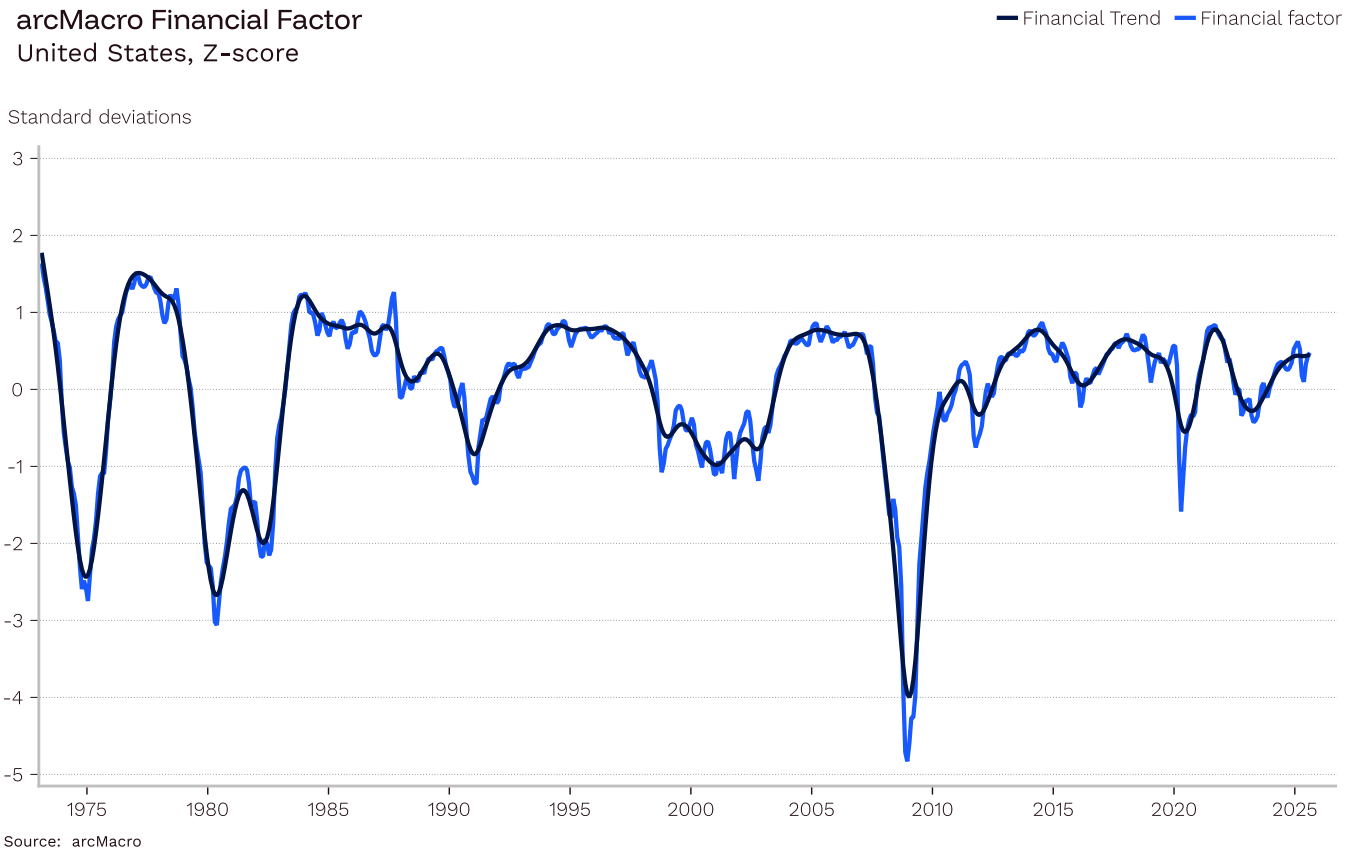
FINANCIAL FACTOR

The Financial Factor is remarkable mainly for its low volatility. The factor loadings emphasize credit stress indicators as the most critical input data, alongside broader measures of financing flows such as bank lending surveys (covering both the supply of and demand for credit), household debt accumulation, and even IPO activity.

While the federal funds rate is an input to the model, it carries far less weight than credit spreads, confirming that the market component of credit pricing and flow is the dominant indicator of conditions.

The Financial Factor correlates reasonably well with the Real Factor (with a raw coefficient of roughly 60%). This is unsurprising given how credit freezes collapse investment during downturns and unlock recoveries. But the Financial factor is generally more stable, reflecting a longer-term element of the economic cycle linked to leverage rates that the real economy moves around.

Current conditions appear to be moderately accommodative, contradicting both the “frozen credit markets” and “incipient boom” narratives that are being debated in the financial press. But we may be at a turning point.



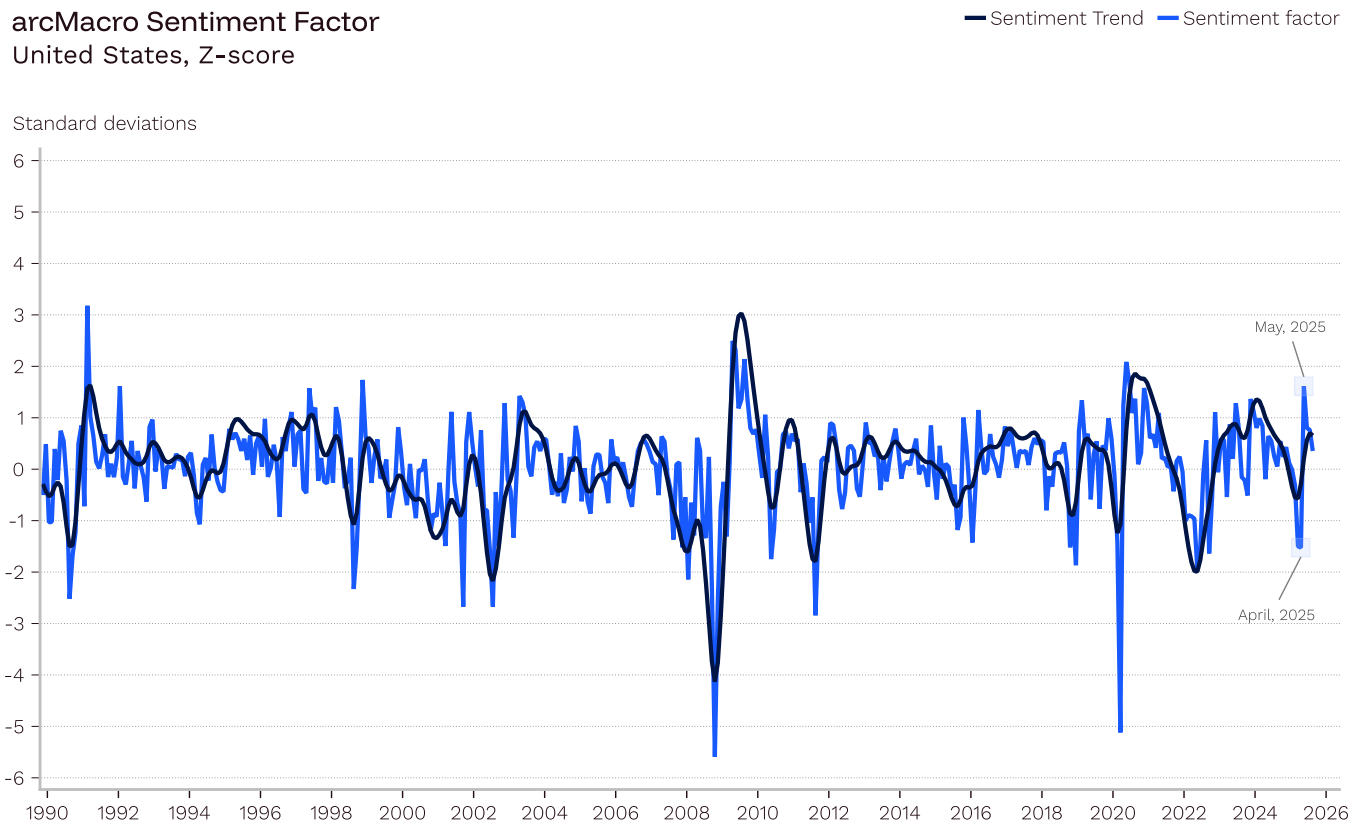
Source: arcMacro

SENTIMENT FACTOR

In contrast to the Financial Factor, the Sentiment Factor is highly volatile, driven by public equity valuations and measures of risk and uncertainty such as the VIX, MOVE and Economic Policy Uncertainty indices.

2025 has seen some huge swings in the Sentiment Factor, even for a volatile index, as policy has veered wildly under the Trump administration. This is one of the factors holding back an improvement in broader financing conditions.

Although the Sentiment Factor can provide useful sense-checks, and although we've found that it may have some predictive power regarding the Financial Factor, its volatility is also a drawback. We will make use of it when the state of "animal spirits" gains prominence. However, most of our analysis is focused on longer-term fluctuations, allowing us to ignore the Sentiment Factor and concentrate on the three "fundamental" factors.



Source: arcMacro

What the Factors are telling us

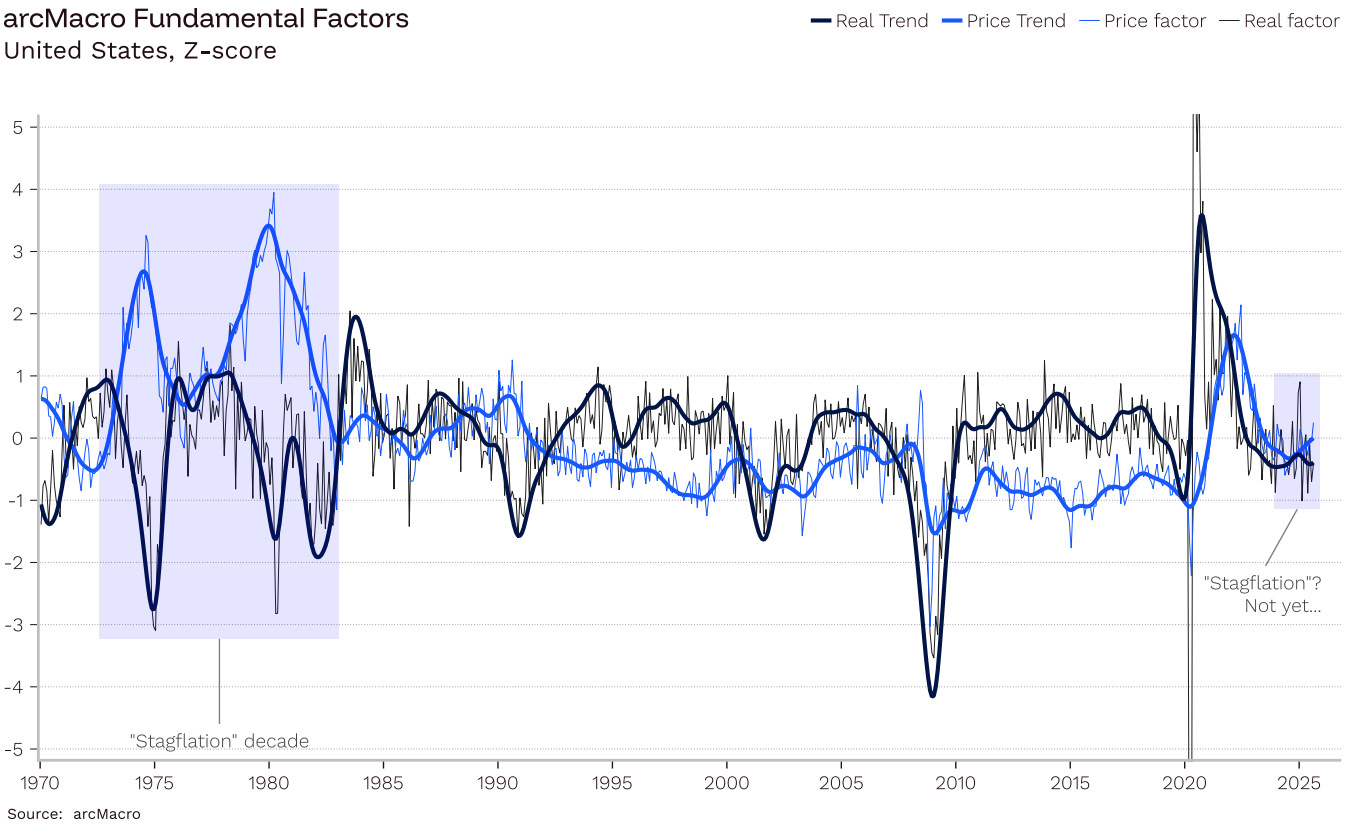
It's worth pausing at this point to test the usefulness of the Factors in relation to two current debates in financial circles.

Are tariffs pushing the U.S. into stagflation?

The Price and Real factors provide some useful color on this question. During the economic disruptions of the late 1970s and early 1980s, the Price factor rose to 2-3 standard deviations above its average over the period, while the Real Factor fell by a similar amount into deeply contractionary territory. The term "stagflation" was coined to describe this extreme set of circumstances.

Currently, the Real factor is hovering around half a standard deviation below its long-run average on a trend basis — not good, but hardly a crisis. The Price Factor has only managed to fall from its post-COVID-19 highs to pre-1990s levels, so it is certainly elevated, and has been trending up recently.

But the chart below reveals just how far we are from a true "Stagflation". While growth may be lower than desirable and inflation stubbornly above-target, the 1970s are not a helpful analogy. The next section will give us a better understanding of the unusual situation we're currently facing.



Is a macro-driven recovery in dealmaking and M&A activity around the corner?

Broad financial conditions are not particularly constrained at present, with the Financial Factor hovering around its long-run average. But it appears that something more powerful will be needed to kickstart stalled PE deal flow, where a decline in valuations relative to the bullish 2019-2022 environment has made exits challenging.

This is the Sentiment Factor, which (while volatile) sometimes leads the slower-moving Financial Factor comes in. 2025 has seen the sharpest post-COVID-19 Sentiment Factor whipsaws as the Trump administration's inconsistent policy has given financial markets a stop-start feel. For now, this volatility is holding back a surge in deal flow and constraining a recovery in deal flow.

THE ARCMACRO REGIMES: SIMPLIFYING THE FRAMEWORK

The Factors provide us with an excellent summary of U.S. economic and financial history. They also give us a rich read on the current economic environment.

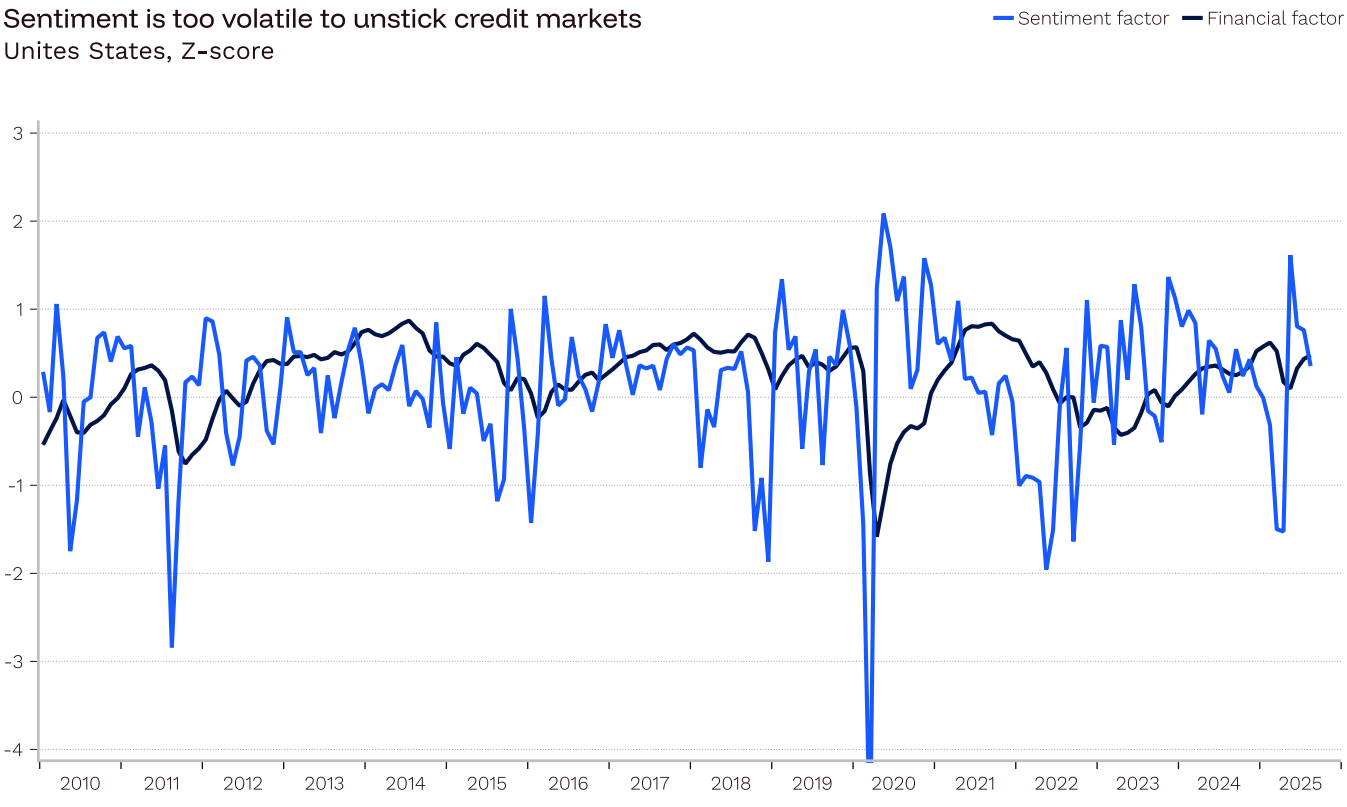
In their raw form, however, they don't provide much forward-looking information that could guide decision-making. With four different factors sitting at different levels and moving in different directions, it's hard to get a read on where things might be going.

To solve this challenge, we'll need to define certain combinations of ranges of the four Factors that characterize typical sets of economic conditions. We'll refer to these combinations of ranges as "Regimes".

Our aim is to identify a set of unique regimes large enough to adequately describe the most important phases of the economy without making the framework too complex; we're pursuing Occam's goal of sufficient simplicity.

Sentiment is too volatile to unstick credit markets

Unites States, Z-score



Source: arcMacro

Univariate Regimes

Our first step is to look at the arcMacro Factors individually and simplify them into different individual regimes. We use a Markov Switching Model which incorporates both the level of the Factors and their variance.

One advantage of models based on Markov chains over simpler threshold techniques is that they provide us with the probability, for a given state and value of the Factor, that it will remain in the current regime or switch to a higher/lower regime in the next period. We'll use this feature later.

How many regimes is the right number for each Factor? We can start with some natural economic intuition. For instance, we might expect the Sentiment factor to take on one of two states — "risk-on" or "risk-off." But should the real factor have two, three, or four states? That's less obvious *a priori*. So, we rely on a set of statistical tests to decide.[10]

We end up with three regimes for the Real Factor, which we interpret as "expansion" (normal growth), "rebound" (very rapid growth), and "downturn" (slow growth or contraction). The Financial Factor can also lie in one of three different states — "Leveraging" (high), "Consolidating" (average to low), or "Crunching" (very low).

Price and Sentiment are simpler. Prices can either "Spike" or remain "Stable." And as we expected, Sentiment is either "Risk-on" or "Risk-off."

With a time series of each factor's individual regime now in hand, we can formulate the set of overall or "joint" economic regimes.

10 AIC/BIC and Likelihood Ratio tests to optimize the number of univariate regimes and lag structure of the Markov Switching model.

Joint Regimes

A theoretical set of 3x3x2x2 = 36 potential regimes is clearly still too many. And not all these combinations of states occur frequently, or even at all.

Our next step in simplifying our framework is to weed out rare combinations of regimes and combine similar ones together. We can get rid of the Sentiment Factor regimes, as the Factor is too volatile to be helpful to us when classifying joint regimes that should persist for more than a quarter or two. That brings the possible set down to 18.

Next, we mapped out the remaining regime combinations by frequency, as shown in the Exhibit below. Here, we compare the different combinations of Real and Financial Factors under both “Stable” and “Spiking” Price regimes.

After some time alternating between scratching our heads and staring out of windows, we arrived at the combinations highlighted in the graphic. These are the seven unique arcMacro Regimes that define the U.S. economic cycle and will form the basis for our scenarios.

arcMacro Regime Mapping

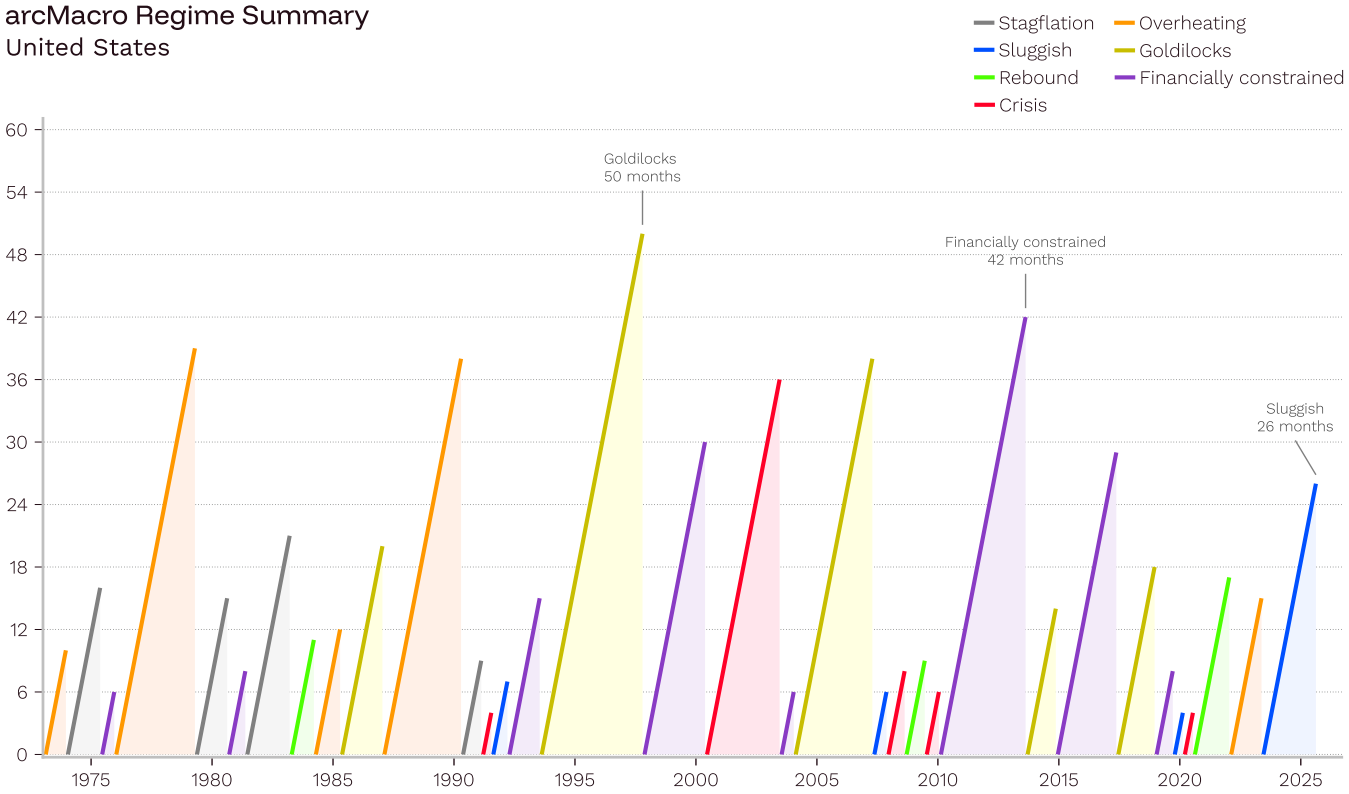
Share of months since 1973 spent in each combination of regimes

		Price Factor: Stable			Price Factor: Spiking		
		Expansion	Rebound	Downturn	Expansion	Rebound	Downturn
Financial Factor: Crunching		*Financially Constrained* 1.9%	*Rebound* 1.8%	*Crisis* 8.3%	*Financially Constrained* 2.4%	1.6%	*Stagflation* 6.9%
Financial Factor: Consolidating		12.8%	1.1%	*Sluggish* 5.9%	*Overheating* 6.7%	*Rebound* 0.2%	1.0%
Financial Factor: Leveraging		*Goldilocks* 30.8%	0.0%	2.2%	12.1%	4.3%	0.0%
		Real Factor			Real Factor		

Source: arcMacro

The Seven arcMacro Regimes

The arcMacro regimes are summarized in the chart and table below, and the regimes are superimposed on the factor data in the panel of charts that follows it. Despite arguing against an over-reliance on basic indicators, seeing how CPI inflation, GDP growth, and public equities typically behave during these regimes provides some useful color, which is why we've included them in the table.



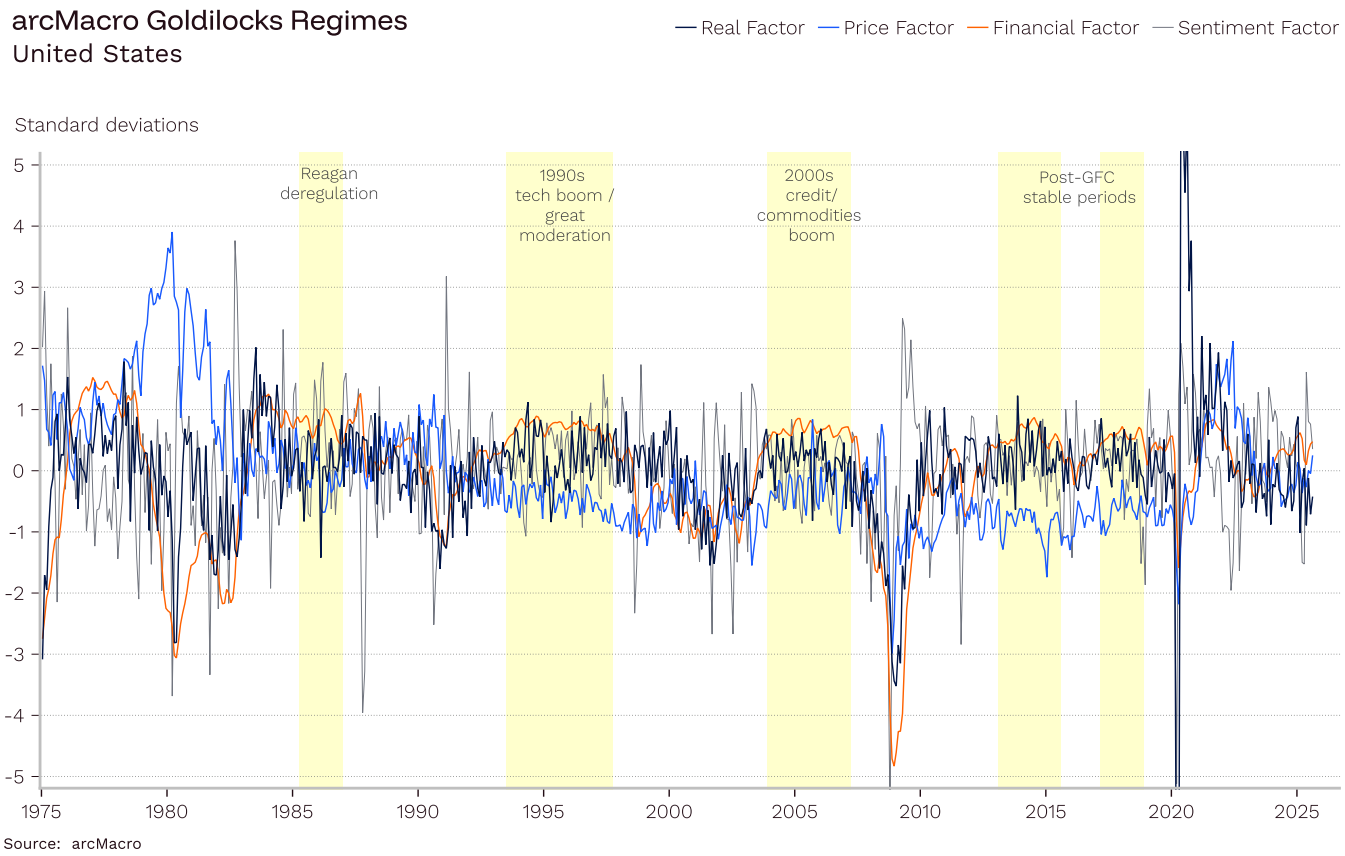
Source: arcMacro

arcMacro Regime Summary

Regime	Occurences	Historical share	Average duration	Average GDP growth		Average inflation	Average annual S&P 500 return	
	Count	Percent	Months	Percent	Std. dev	Percent	Percent	Std. dev
Goldilocks	5	27	32	3.2	0.4	2.5	14.5	10.8
Financially Constrained	8	21	16	3.4	0.4	2.9	14.7	15.8
Overheating	5	19	23	3.9	0.8	5.7	3.0	18.0
Crisis	5	10	11	0.0	0.6	2.0	8.5	17.8
Stagflation	4	10	15	-1.3	0.9	8.8	8.7	21.5
Rebound	3	7	13	5.5	1.5	4.0	10.6	23.2
Sluggish	4	7	11	1.8	0.4	3.0	18.5	14.9

Source: arcMacro

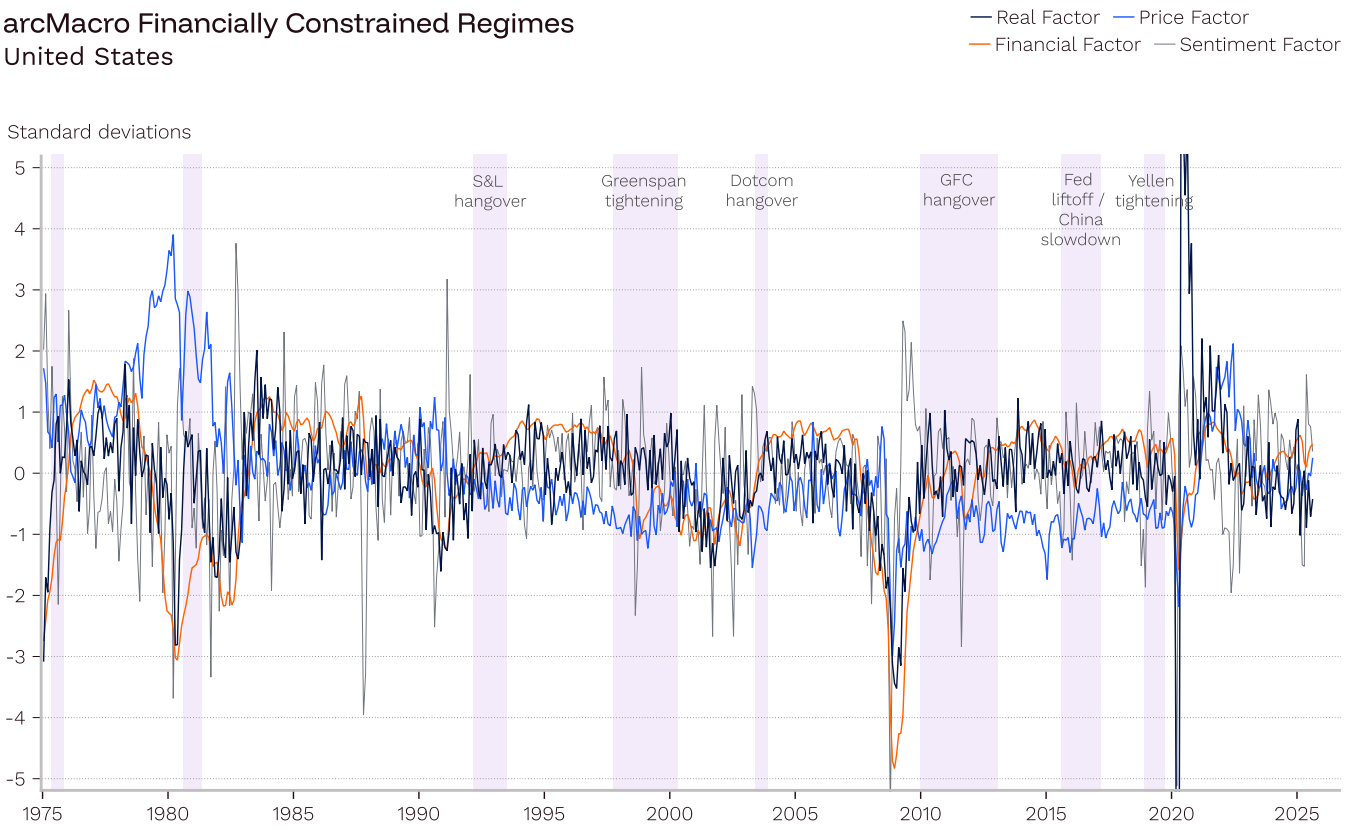
Goldilocks: This is the regime that policymakers are aiming for. The real economy is robust without being inflationary or creating financial imbalances. There is a general sense of equilibrium. Since 1970, the economy has spent more time in this Regime (27%) than any other, but we have not experienced a Goldilocks period since 2018.



Source: arcMacro

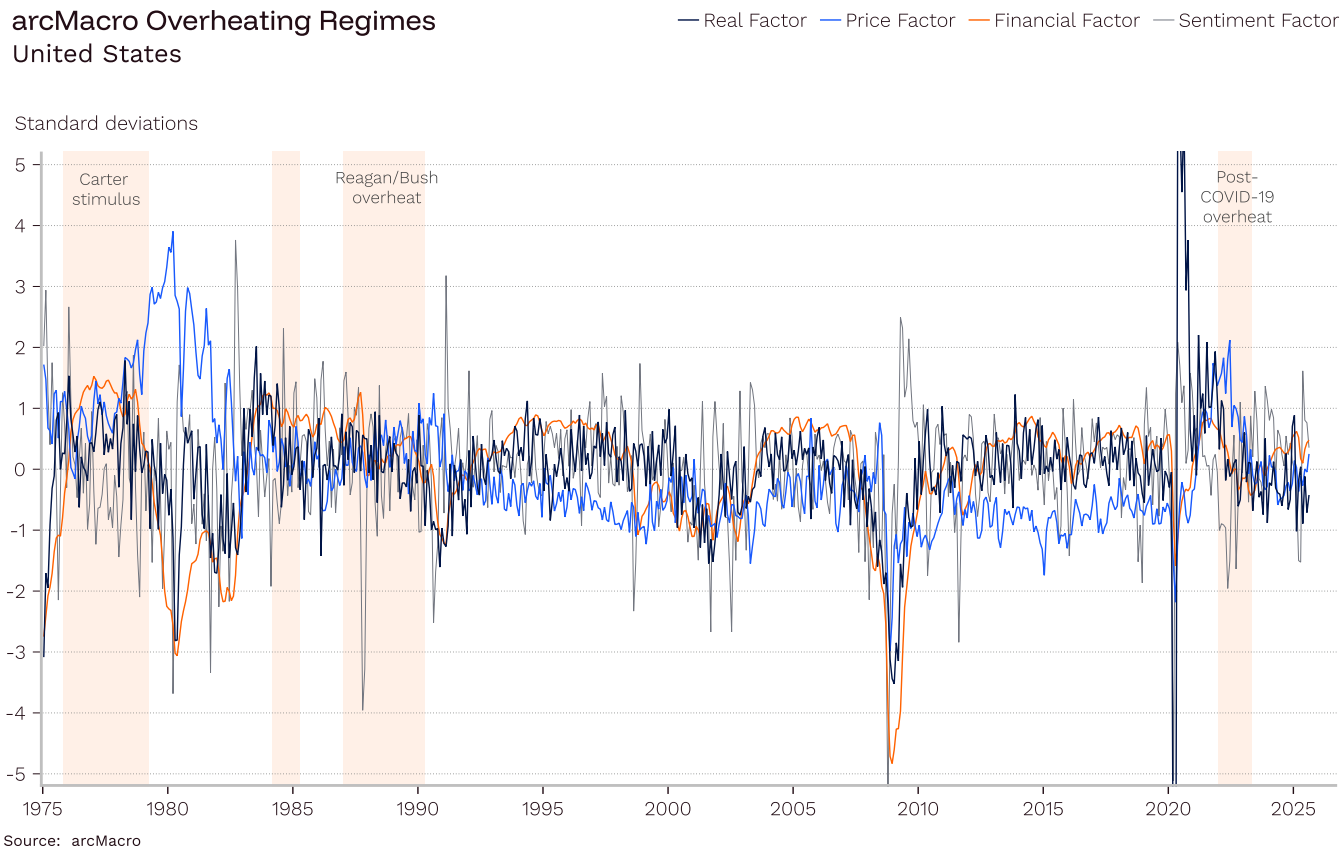
Financially Constrained: In this regime, financial conditions are tight and are gradually cooling the economy. At times, this regime has reflected a “hangover” from a prior crisis, where growth has rebounded but credit remains tight. It can also result from a traditional central bank tightening cycle. In both cases, growth is coming down from an unsustainably high level (Rebound or Overheating Regimes), which explains why average GDP growth is relatively high. These regimes are common and highly variable in length.

arcMacro Financially Constrained Regimes
United States



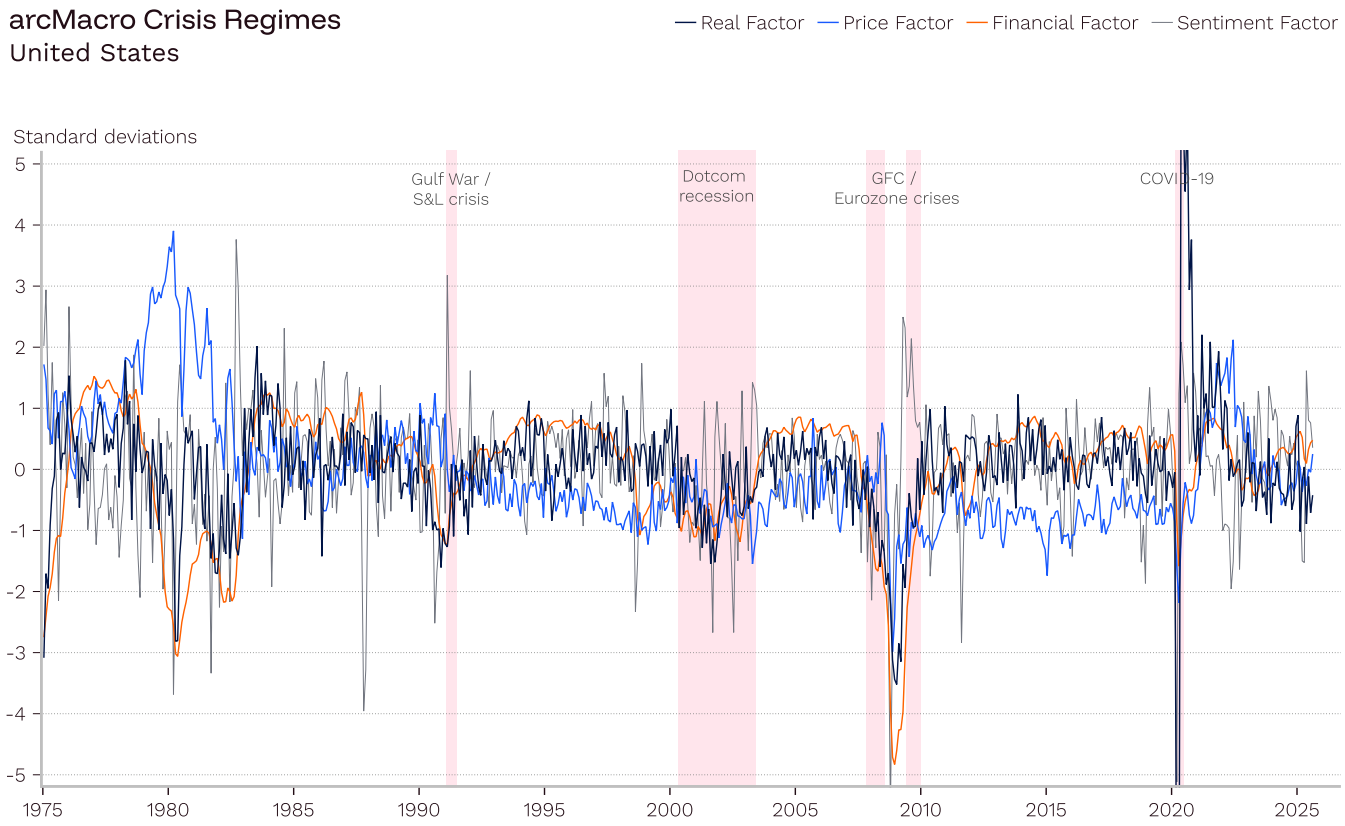
Source: arcMacro

Overheating: Easy credit conditions fuel unsustainable growth, pushing aggregate demand beyond supply and fueling inflation. The post-COVID-19 boom was a classic example. Creates the weakest return environment of all the Regimes as asset values become stretched.



Source: arcMacro

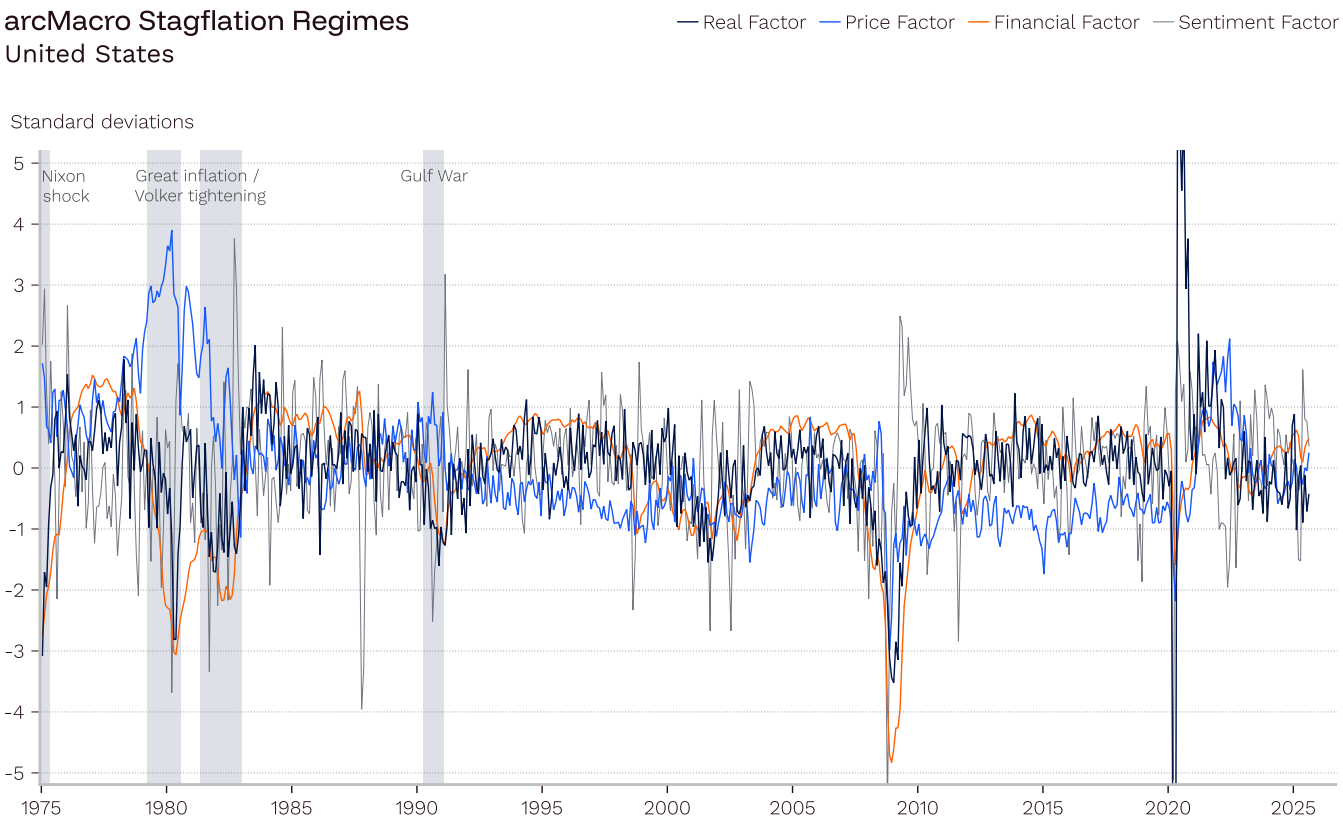
Crisis: Total collapse in growth and credit, accompanied by stable or falling inflation. Very weak aggregate demand, with low capacity utilization on the supply side. Extreme flight to safety behaviour. Usually short-lived, but can stretch several years (e.g., dotcom recession) or double-dip (GFC).



Source: arcMacro

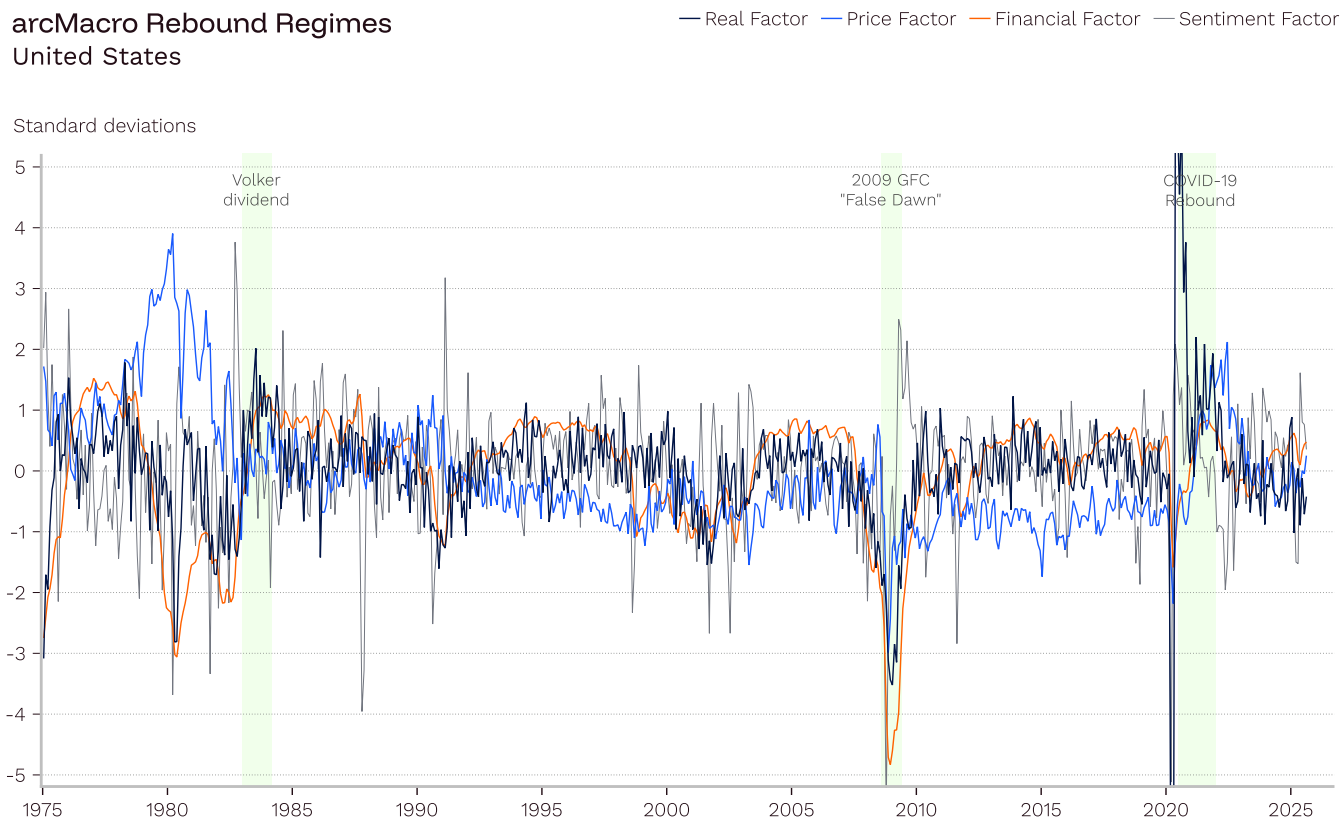
Stagflation: Simultaneous inflation spike and real economy collapse, usually accompanied by a credit crunch as monetary policy responds to inflation. Low (nominal) returns, but with very volatile markets. We have not experienced a Stagflation Regime since the First Gulf War, but we may be approaching one.

arcMacro Stagflation Regimes
United States



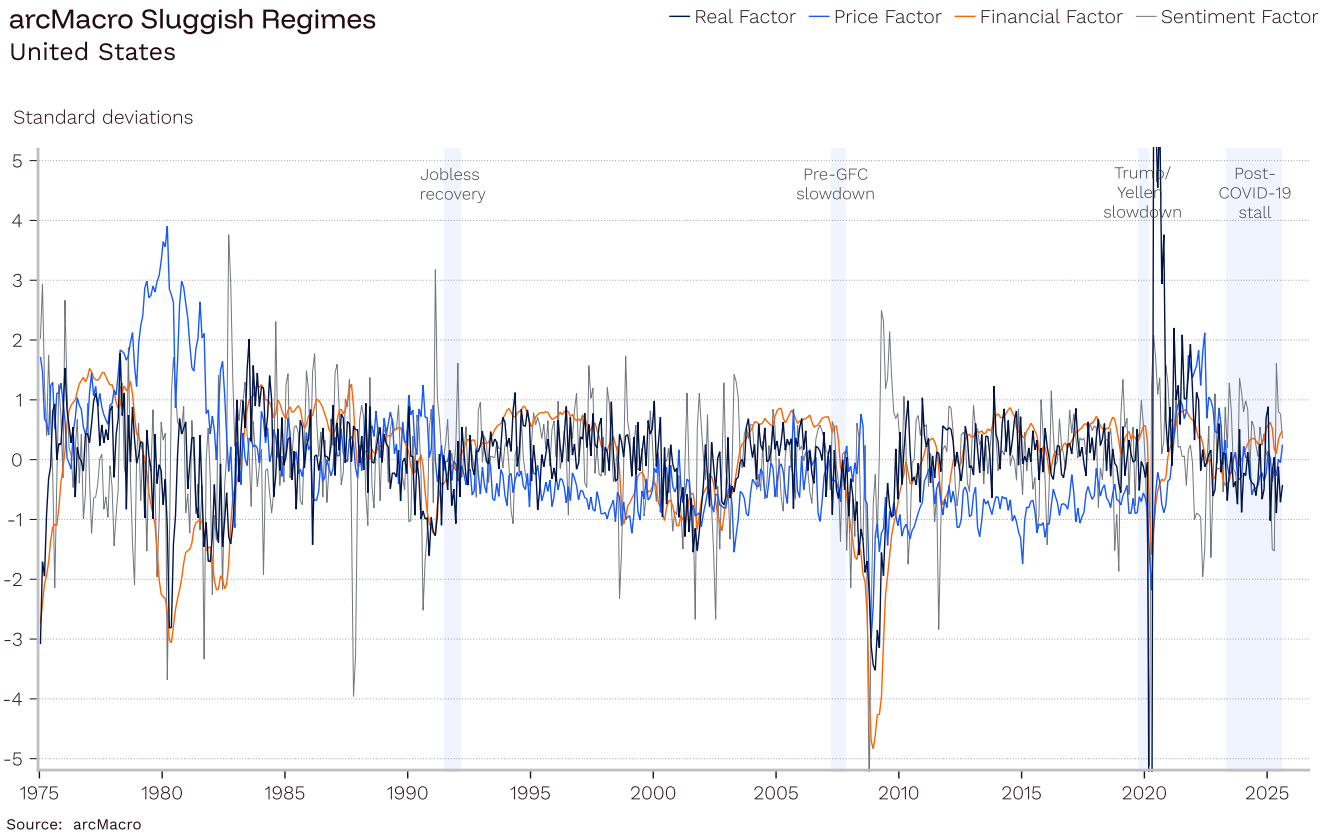
Source: arcMacro

Rebound: Any period of super-strong real activity, which can only be achieved when idle economic capacity is rapidly reactivated. Always follows Crisis or Stagflation Regimes. Strong (but volatile) return environment, usually sparked off by a sudden surge in the Sentiment Factor (“animal spirits”).



Source: arcMacro

Sluggish: Usually a transition Regime when entering or exiting a crisis. Real activity is below average, but not because of a lack of credit availability. Inflation is stable. The U.S. economy has been mired in a Sluggish Regime without entering a recession or recovery since 2023. This is an unprecedented state of affairs over the past half-decade of economic history.



Source: arcMacro

Deploying the arcMacro Framework

MOVING FROM MONITORING TO SCENARIOS AND FORECASTING

Classifying the regimes and forming a good understanding of the current macro environment is useful, but our real goal is to develop a robust scenario framework that we can use to link macro to investing strategy.

We believe that a combination of human analysis and data-driven modelling will produce the deepest insight into possible paths the macroeconomy can take. Bear with us for a few pages; this is where the analysis gets a bit technical as we develop the “modelling” part of that equation.

Generating Transition Probabilities

To build our scenario machinery for this approach, we employ a technique from the econometric and machine learning fields called multinomial logistic regression. We use it to quantify the likelihood of transitioning from a given Regime to another Regime over multiple time horizons, based on all the current available data.

The multinomial logit model predicts transition probabilities at 3-, 6-, 12-, and 36-month horizons. The model incorporates both the current regime state and the underlying Factor dynamics as predictors. Specifically, we use the current levels of our four macroeconomic factors, their recent momentum (3-month rate of change), and a measure of regime decay — the duration spent in the current regime.

This approach captures both the state-dependent nature of regime transitions and the continuous evolution of underlying economic conditions. For each forecast horizon, the model generates a complete probability distribution across all seven possible destination regimes. For instance, if the current regime is “Goldilocks,” the model might indicate a 65% probability of remaining in this favorable state after 6 months, a 20% chance of transitioning to “Overheating” as the economy accelerates, and a 15% probability distributed among other regimes.

These probabilities evolve with the forecast horizon—stability typically decreases as we look further ahead, with 36-month forecasts showing greater dispersion across potential outcomes.

Constructing Forward-Looking Scenarios

We could move through two or more different regimes over a 3-year period. So, our next step is to create probabilistic scenario paths using Monte Carlo simulation techniques. Rather than presenting a single point forecast, we generate thousands of potential regime paths, each representing a plausible economic trajectory weighted by the estimated transition probabilities.

The simulation process works sequentially: starting from the current regime, we draw the next period’s regime according to the predicted transition probabilities, then update the factor values based on historical patterns observed in that regime, and repeat the process. This generates a distribution of potential paths, capturing both the most likely central scenario and tail risk events. For example, while the modal path might show a gradual transition from “Goldilocks” to “Financially Constrained” over 12 months, the simulation also captures low-probability but high-impact paths leading to “Crisis” or “Stagflation.”

MODEL VALIDATION AND RELIABILITY

We validate the transition probability models through time-series cross-validation, using historical data to assess out-of-sample prediction accuracy. The models achieve area under the curve (AUC) scores ranging from 0.65 to 0.85, depending on the specific transition and forecast horizon, indicating meaningful predictive power beyond random chance. Confusion matrices reveal that the models are particularly accurate at identifying regime persistence (regimes tend to cluster) and major transitions like movements into "Crisis" or "Overheating" states.

The framework also quantifies prediction uncertainty. Transitions with limited historical precedent—such as direct moves from "Stagflation" to "Goldilocks"—show wider confidence intervals, appropriately reflecting the higher uncertainty in these predictions.

ARCMACRO SCENARIO OUTLOOK SUMMARY

Investment teams can plug our "raw" scenario probability distributions into portfolio evaluation or stress-testing exercises, and the data are available on request.

For our own standardized arcMacro Scenarios, we don't need to cover every possible future combination and set of probabilities. We therefore do some post-processing, pulling the three paths generated by the model that we think are most relevant, and collapsing scenarios with similar strategic implications together. Based on our judgmental assessment of off-model information, we make judgmental updates to the mechanical probabilities.

One differentiating feature of arcMacro is that, instead of maintaining point forecasts on standard economic indicators, we instead update the scenario framework every quarter, adjusting the probabilities and the scenarios themselves as the economy and the outlook evolves (we can always use the scenarios to produce weighted annual forecasts of any of the indicators that enter the model).

Because many valuation models use simple assumptions on inflation, GDP growth, and interest rates, we include forecasts for these under each scenario (based on their historical correlations with Regimes and Factors, as well as additional judgemental adjustments).

The table below summarizes our current scenario-based outlook.

We've described the odd, extended, sluggish period that forms our starting point. We think the two other scenarios that investors need to consider carefully are a crisis that takes the form of a sustained but shallow recession followed by a sharp rebound, and a return to outright stagflation.

A detailed analysis of current economic conditions, risk factors, and the underlying scenarios can be found in our forthcoming Q4 Outlook Report.

Eagle-eyed readers will have noticed that the Scenario summary table contains views on how each macro scenario affects conditions in the private equity industry and drives company performance.

The next two chapters detail how we derived this advice and document the relationship between private markets, the companies they invest in, and the business cycle framework we've developed.

arcMacro Scenario Outlook

Q3 2025

1. Dynamic stall		2. A recovery needs a crisis		3. Stagflation	
Probability Weights					
Augmented Weight	50%	Augmented Weight	35%	Augmented Weight	15%
Model only	65%	Model only	30%	Model only	5%
Subjective adjustment	-15%	Subjective adjustment	+5%	Subjective adjustment	+10%
Description					
A confluence of offsetting forces keep the economy in tension, preventing a crisis but not doing enough to spark stronger growth. Tariffs and fiscal stimulus lead to anchored above-target inflation expectations, but improving productivity from AI is a marginal offset. Finanical conditions remain range-bound as a politically influenced Fed cuts rates, but premia drift upward. Demand is weak but does not collapse (aided by tax stimulus). Firms absorb a considerable share of the tariff shock, compressing margins.		Waning demand in the form of frozen investment spending and a loss of consumer confidence cause growth to continue slow and then drop into a recession that lasts around 12-18 months. The demand effect outweighs upward pressure on prices and causes inflation to fall after the initial tariff impact as firms lose pricing power. Risk appetite dries up as public equities return to earth, slowing both consumer and institutional funding flows. The recession is shallow and a strong and sustained rebound takes hold after ~24 months, with an AI productivity bump.		Tariffs cause extreme pressure on prices, initially by raising import costs in conjunction with the weaker dollar, and then by disrupting broader supply chains as firms scramble to adjust. After an initially slow response weighed down by political pressure, the Fed hikes rates aggressively, tipping the economy into recession. A weak pace of growth eventually resumes, but financial conditions are highly constrained and inflation persists above target.	
Regime progression and major indicator forecasts					
1-12m	12-24m	24-36m	1-12m	12-24m	24-36m	1-12m	12-24m	24-36m
Sluggish	Sluggish	Sluggish	Crisis	Crisis	Rebound	Stagflation	Stagflation	Financially Constrained
GDP Growth (%)			*GDP Growth (%)*			*GDP Growth (%)*		
1.5	1.8	2.0	-0.5	-1.5	3.8	0.5	-1.0	0.8
CPI inflation (%)			*CPI inflation (%)*			*CPI inflation (%)*		
3.5	3.0	2.5	3.2	1.5	2.0	5.0	7.0	4.0
Fed Funds Rate (%)			*Fed Funds Rate (%)*			*Fed Funds Rate (%)*		
3.0	2.5	2.0	3.0	0.8	1.0	4.0	6.5	6.3
PE Market Outlook					
Fundraising	Challenged	Fundraising	Severely constrained	Fundraising	Challenged
Deal flow	Slow	Deal flow	Collapsing	Deal flow	Slow
Valuations	Neutral (from status quo)	Valuations	Declining sharply	Valuations	Uncertain
Returns	Mixed	Returns	Initial pain; long-run gain	Returns	Pressured
Focus on operational value creation and opportunistic sales; don't overpay for new assets		Dispose of cyclical assets ASAP, ensure dry powder is ready to deploy aggressively in undervalued market		Rapid operational adaptation and careful portfolio construction are critical. Lock in financing early while conditions allow.	
Top cyclically compatable industries					
Finance (all industries within Sector)		Educational services		Resources (sector)	
Appliances manufacturing		Clothing		Air transportation (top quartile)	
Machinery manufacturing		Telecoms		Accomodartion (top quartile)	
Admin services		Utilities		Utilities	
Software		Healthcare		Online retail	

Source: arcMacro

PART 3

The Cyclicality of Private Equity

> “Be fearful when others are greedy and greedy when others are fearful.”
>
> WARREN BUFFETT

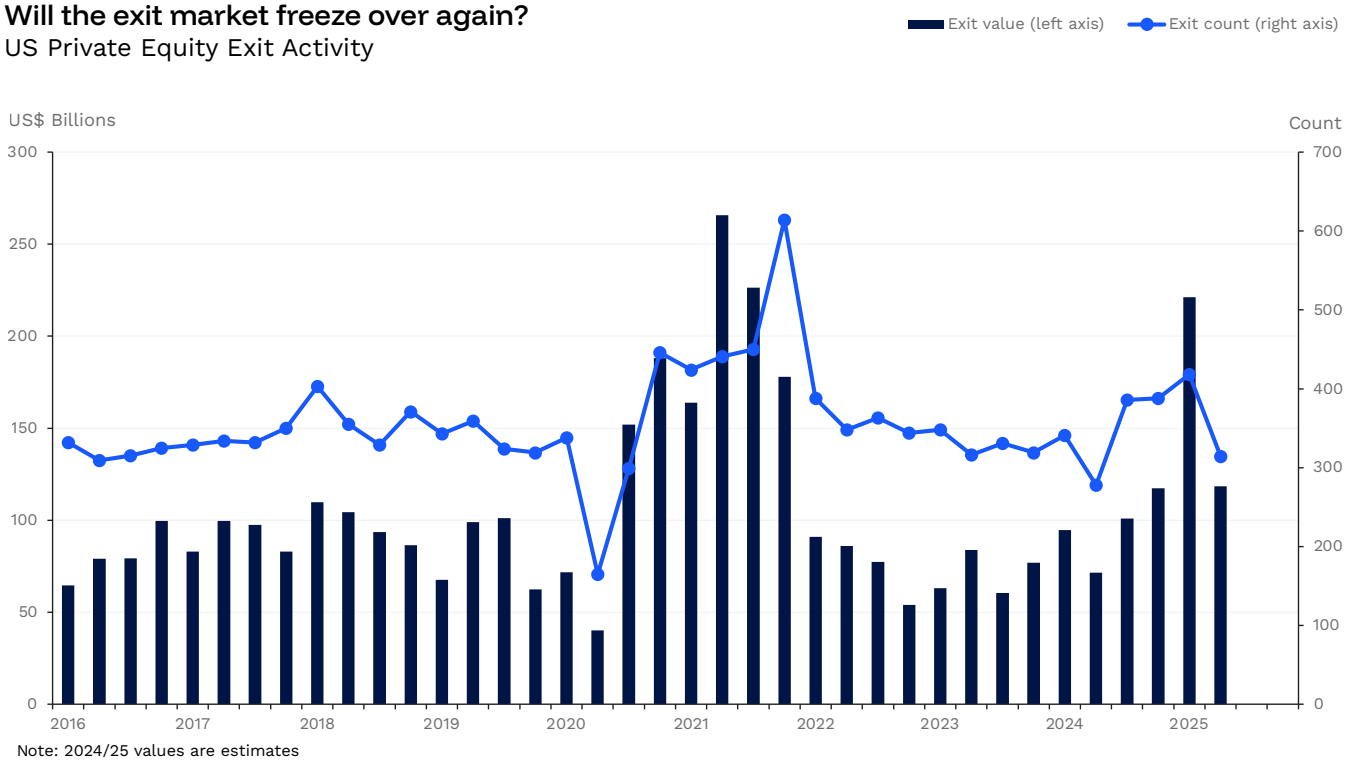
Maturing middle-market private equity funds face a difficult strategic dilemma in 2025. These funds deployed their capital during the 2019-2022 boom, when multiples hit record highs.

Valuations have not recovered since coming down to earth in 2022/23. Pressure from LPs for distributions is building, creating a catch-22 for GPs: fresh commitments can only be raised once existing funds have distributed their returns to investors, but follow-on funding is also contingent on the GP’s track record.

So, should GPs be holding out for a recovery in deal flow and valuations before exiting, or prioritizing distributions and renewal?

Of course, the answer will depend on the fund and the positions it needs to exit. Some portfolio companies will have performed well enough to command a premium from new funds in a market that is skewing heavily toward quality over risk.

Will the exit market freeze over again?
US Private Equity Exit Activity



Note: 2024/25 values are estimates
Source: arcMacro, Pitchbook

The bind is not entirely of the PE industry's own making — macroeconomic and financial conditions have played an important role in creating it. Thus, in a scenario where the economy trends back toward a "Goldilocks Regime" equilibrium, it might be worth extending timelines. Newer investment vehicles, like continuation funds and secondaries, offer a way to extract cash flow from assets with further upside without ceding control.

However, if policy mistakes are tipping the balance toward a looming economic crisis, having dry powder on hand is an overriding priority.

We can use our macroeconomic framework to put some meat on the bones of this strategic logic. We'll start by establishing some facts about precisely when and how different aspects of the private equity life cycle are (and aren't) cyclically exposed, which we'll use to incorporate a strategic angle into our scenarios.

It's worth noting we're breaking some new ground here. While the industry and its service providers are spending increasing amounts of time thinking about how macro issues are affecting them, the literature on the topic is not extensive. Most research on private equity is concerned with the debate about the relative merits of private equity versus public equities.

We know that leverage is an important component of the buyout model, so it's no surprise that researchers have found a relationship between debt market conditions (proxied by high-yield spreads) and buyout leverage,[11] or between market liquidity conditions and private equity returns.[12] One study of Swiss funds has even found inverse relationships between PE fund performance and GDP growth and public stock returns, suggesting investment timing relative to macro/market conditions is important.[13]

Several papers have looked at the issue of timing directly. One found that LPs can improve returns by factoring timing into their allocations (though fund selection is more important), but that it's actually GPs that control timing.[14] An important paper published in 2020 found evidence that fund managers do, in fact, try to time their deals (and especially exits) according to market conditions, and that this behavior could account for around 15% of IRR.[15]

While this research suggests that the PE industry cannot afford to ignore macroeconomic conditions, a systematic overview of the relationship between the components of the macroeconomic cycle and key elements of the private equity industry — including fundraising, deal-making, valuations, and returns — would be valuable.

What follows is a first foray into this fertile and underexplored territory.

11 Ulf Axelson, Tim Jenkinson, Per Strömberg, and Michael S. Weisbach, "Borrow Cheap, Buy High? The Determinants of Leverage and Pricing in Buyouts," Centre for Economic Policy Research, Discussion Paper No. 8914, March 2012.

12 Francesco Franzoni, Eric Nowak, and Ludovic Phalippou, "Private Equity Performance and Liquidity Risk," Review of Financial Studies 24, no. 12 (May 2011)

13 Kerstin Bernoth, Roberta Colavecchio, and Magdolna Sass, "Drivers of Private Equity Investment in CEE and Western European Countries," DIW Berlin Discussion Papers, April 28, 2010.

14 Gregory Brown, Robert Harris, Wendy Hu, Tim Jenkinson, Steve Kaplan, and David T. Robinson, "Can Investors Time Their Exposure to Private Equity?," Working Paper, SSRN, January 2020.

15 Tim Jenkinson, Stefan Morkoetter, Tobias Schori, and Thomas Wetzer, "Buy Low, Sell High? Do Private Equity Fund Managers Have Market Timing Abilities?," Working Paper, October 2020.

Identifying Cyclicality in PE activity

The basic idea is to use our arcMacro Factors and Regimes to analyse the macroeconomic sensitivity in available data on fundraising, deal flow valuations, and returns.

As private equity has moved from a niche investment vehicle to a major asset class, allocations from institutional investors and family offices have steadily increased. That creates a strong linear trend.[16] For all time series from private equity, we test for a persistent trend and remove them where necessary to ensure we're isolating the economically sensitive components.[17]

We should also be up-front about the data limitations in this section. Reliable data on private equity doesn't extend much further back than 20 years. That's enough to cover 2-3 economic cycles, but it's a smaller sample than we'd like (especially when compared to our 50+ year macro cycle). For instance, we have no direct evidence on how the industry performs in a Stagflation Regime and only one sample of a major Overheating Regime.

In this section, we will mostly rely on visual interpretation of the data. Where feasible, we'll use econometric tests to reinforce our observations.

The table below summarizes our findings. The numbers display the correlation coefficient between various measures of private equity performance and the arcMacro factors, measured at a quarterly frequency.

The shading and asterisks indicate whether the beta coefficient is significant when the PE variable is regressed on all four factors in one multinomial regression (i.e., controlling for any correlation between the Factors themselves).

16 We tested several specifications, including linear, exponential, and polynomial.
17 We leave the question of the structural long-term growth prospects for private markets to a separate Special Report due later this year.

Before analyzing each PE industry indicator in more detail, some broad observations emerge from the table.

- There is a significant element of macroeconomic cyclicality in Fundraising, Deal flow, Valuations, and Returns.
- Fundraising correlates tightly with the Price Factor, but less with the financial factor — largely because of an asymmetric tendency for LPs to continue allocating to PE even during credit crunches.
- Deal flow is also strongly influenced by the Price Factor. This is not a coincidence; deals flourish under generally inflationary conditions.
- Deal volume (in US$) is also strongly influenced by the Financial Factor because of the importance of leverage to the buyout model (particularly for large deals).
- In contrast, Deal count is driven by the Real Factor — more small deals are done when portfolio companies face favorable market conditions.
- Short-term absolute returns correlate predictably with all elements of the cycle, but relative returns do not (or are inversely correlated).
- Betas to the Sentiment Factor are insignificant or negative, confirming that private markets run on a different time horizon than macroeconomics.

Phases of the PE Fund Life Cycle Responds to Different Macro Factors

Correlation coefficient of detrended PE indicator series

PE industry indiactor		arcMacro Factor			
		Real	Price	Financial	Sentiment
Fundraising	Fund count	0.21	0.70 ***	0.13 *	-0.03
	Fundraising volume	0.14	0.60 ***	0.16	0.00
Deals	Deal count	0.45 ***	0.74 ***	0.25	-0.18
	Deal volume	0.40	0.45 ***	0.47 ***	-0.18 **
	LBO volume	0.35	0.34 **	0.51 ***	0.05
Valuation	EBITDA multiples	0.05	0.16	0.08	-0.24 **
Returns	Quarterly returns (absolute)	0.39 **	0.13	0.47 **	0.65 ***
	Quarterly returns (vs. small-cap benchmark)	0.03	0.16	0.00	-0.77 ***
	1-year IRR: all P.E. (absolute)	0.60 *	0.42 **	0.70 **	0.15
	1-year IRR: all P.E. (small-cap benchmark)	0.31	0.32	0.32	0.08 *
	1-year IRR: sub-100m P.E. (absolute)	-0.15	0.15	-0.18	-0.01
	1-year IRR: sub-100m P.E. (small-cap benchmark)	-0.30	0.03	-0.41	0.06

Asterisks represent the significance of the coefficient in a multivariate regression of the target indicator against the three arcMacro factors

**** = 1%; ** = 5%, * = 10%*

All indictor series seasonally adjusted at a quarterly frequenecy and detrended. The S&P600 is used as the small-cap benchmark.

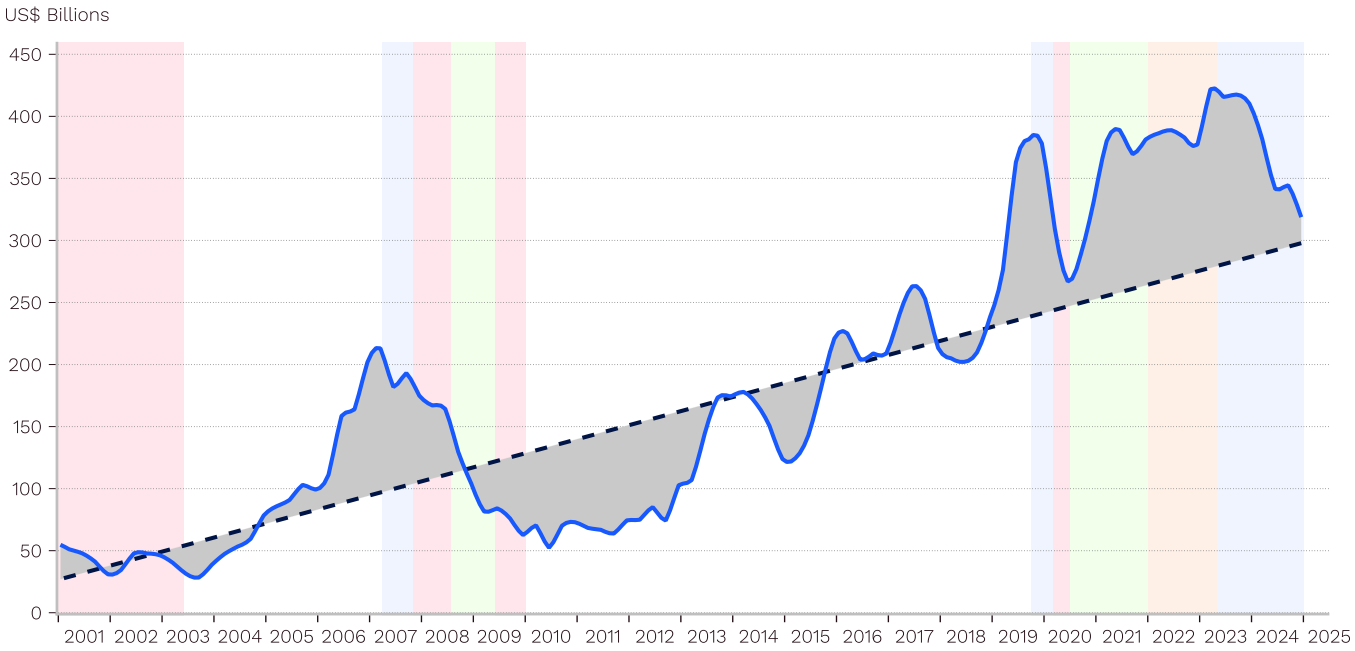
Source: arcMacro, Pitchbook

FUNDRAISING: SIZE MATTERS, CYCLICALITY IS SERIAL

In the charts that follow, we compare total funds raised (in US dollars) and the number of PE funds launched in the U.S. (highlighting the deviation from the trend). We also use background shading to signify the arcMacro Regimes associated with major turning points.

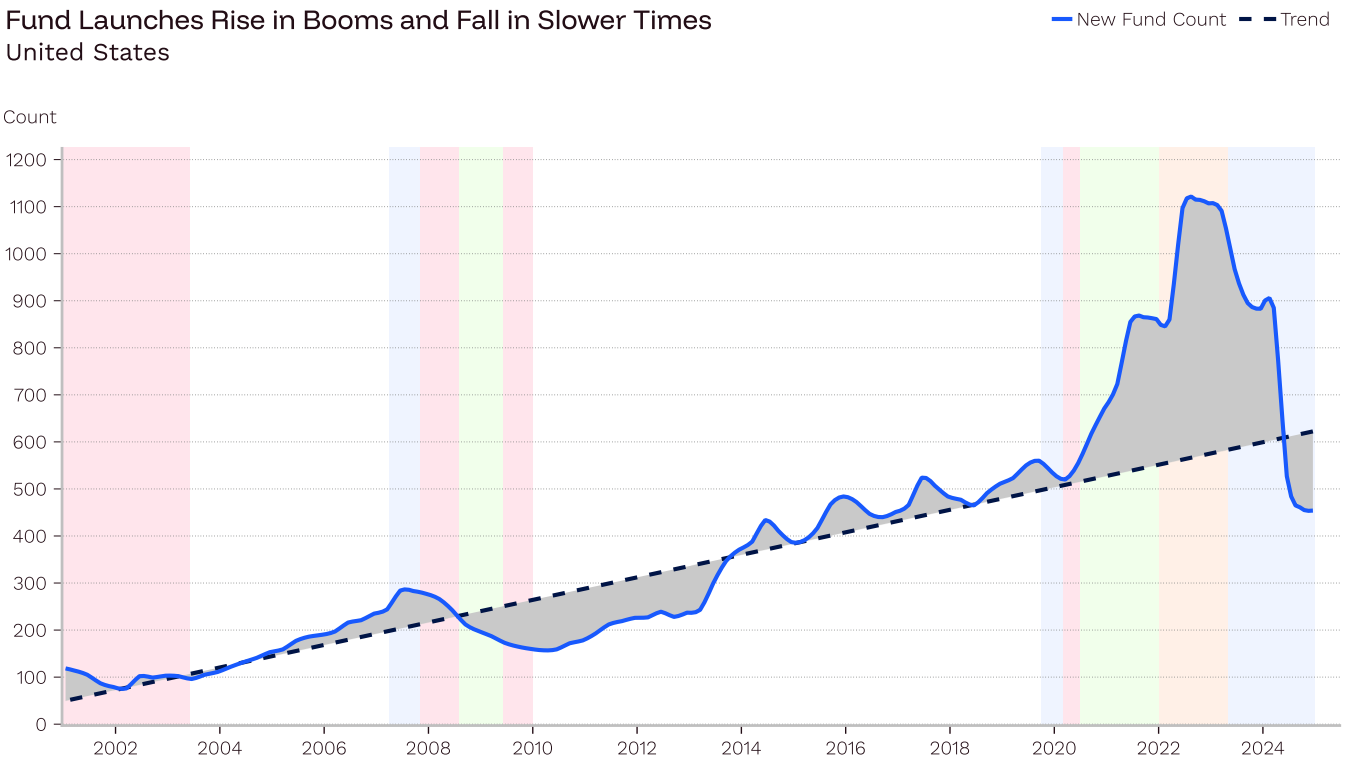
Perhaps the most obvious feature of the data on fundraising is the incredible scale of the fundraising surge that occurred during the COVID-19 Rebound and Overheating Regime sequence. It's not surprising that the industry has felt slow by comparison in recent years, despite total fundraising remaining at the pre-2020 trend.

Fundraising fluctuates significantly around its trend
United States



Source: arcMacro, Pitchbook
REGIME KEY
Yellow: Goldilocks | Purple: Financially constrained | Red: Crisis | Gray: Stagflation | Blue: Sluggish | Green: Rebound | Amber: Overheating

Fund Launches Rise in Booms and Fall in Slower Times
United States



Source: arcMacro, Pitchbook
REGIME KEY
Yellow: Goldilocks | Purple: Financially constrained | Red: Crisis | Gray: Stagflation | Blue: Sluggish | Green: Rebound | Amber: Overheating

The post-COVID-19 episode, while of its own scale, followed a similar pattern to the pre-2008 crisis, when both new fund formation and total fundraising dollars climbed well above trend in the year preceding the GFC, before falling below trend in the aftermath of the crisis.

These surges in fundraising explain the strong correlation with the Price Factor — allocations to private equity are at their most generous when the economy is already overheating and markets are generally strong.

It's also remarkable how perfectly every single turning point is timed with the onset of a "Sluggish" regime, whether in 2007, 2019, or 2023.

At present, total funds raised (In US$) in PE are a touch above the trend since 2001, but the number of new funds being raised has fallen well below the trend. In part, this reflects the fact that smaller GPs who sequence their fundraising rounds are now focused on running the funds they launched during the post-COVID-19 surge (and the challenges they're facing exiting their investments profitably).

There are also more fundamental forces at play. From the exhibit below, which compares fund counts and total funds raised, it's clear that overall dollars raised are more predictably cyclical than fund counts, rising and falling more sharply as the economy moves through different regimes.

Meanwhile, the number of funds launched appears to move substantially above-trend only during particularly favorable macroeconomic regimes.

This suggests that LP risk appetite and fund size preferences are key drivers of GP fundraising over the cycle. During times of strong growth and easy credit, allocators are more willing to bet on smaller funds or less experienced managers. At other times, the well-documented phenomenon of performance persistence seems to be topmost in LPs' minds,[18] and average fund size rises as capital becomes more concentrated. This despite the well-established finding of negative returns to scale in buyout private equity.[19]

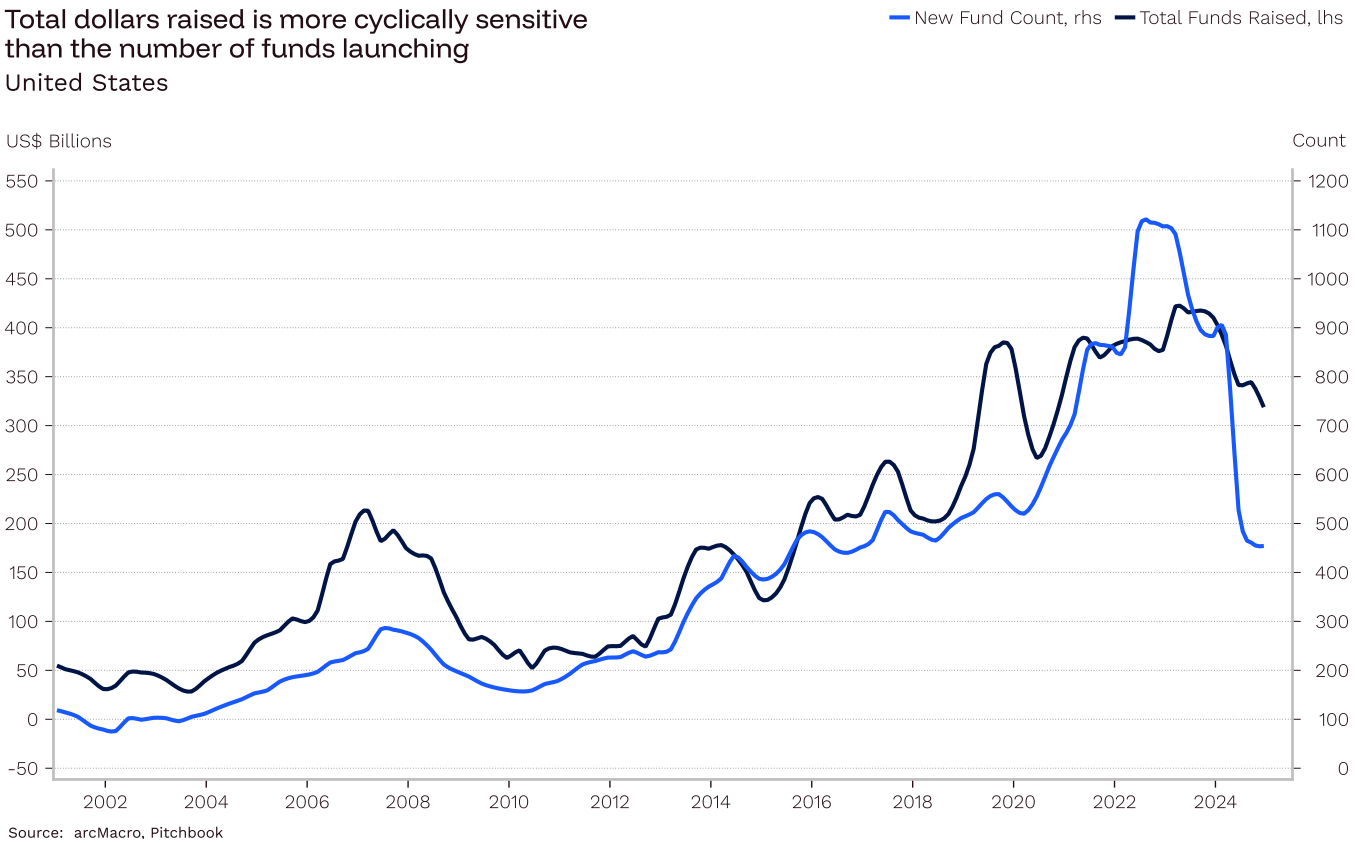
This implies that larger funds face less cyclical volatility in access to capital, while the PE middle market needs to be more aware of the strategic implications of fundraising timing.

A final important observation on the macro drivers of fundraising relates to what we might call serial cyclicality. Current fundraising conditions depend not only on current macroeconomic conditions, but also on the conditions over the past few years. This means our simple raw correlations understate the influence of macro conditions.

The current dilemma of mid-market funds attests to the strength of the serial cyclicality effect: the extremely favourable conditions for launching new funds between 2019 and 2022 crowded the market in those vintages. This drove up valuations as a large wave of capital had to be deployed. Now, finding exit valuations that provide good returns relative to the elevated purchase price is proving challenging. It's a buyer's market, exacerbated by the existing "Sluggish" macro regime.

Total dollars raised is more cyclically sensitive than the number of funds launching

United States



Source: arcMacro, Pitchbook

18 Steven N. Kaplan and Antoinette Schoar, "Private Equity Performance: Returns, Persistence, and Capital Flows," The Journal of Finance 60, no. 4 (August 2005)

19 Abhishek Bhardwaj, Abhinav Gupta, Sabrina T. Howell, and Kyle Zimmerschied, "Does Fund Size Affect Private Equity Performance? Evidence from Donation Inflows to Private Universities," NBER Working Paper No. 33596, March 2025.

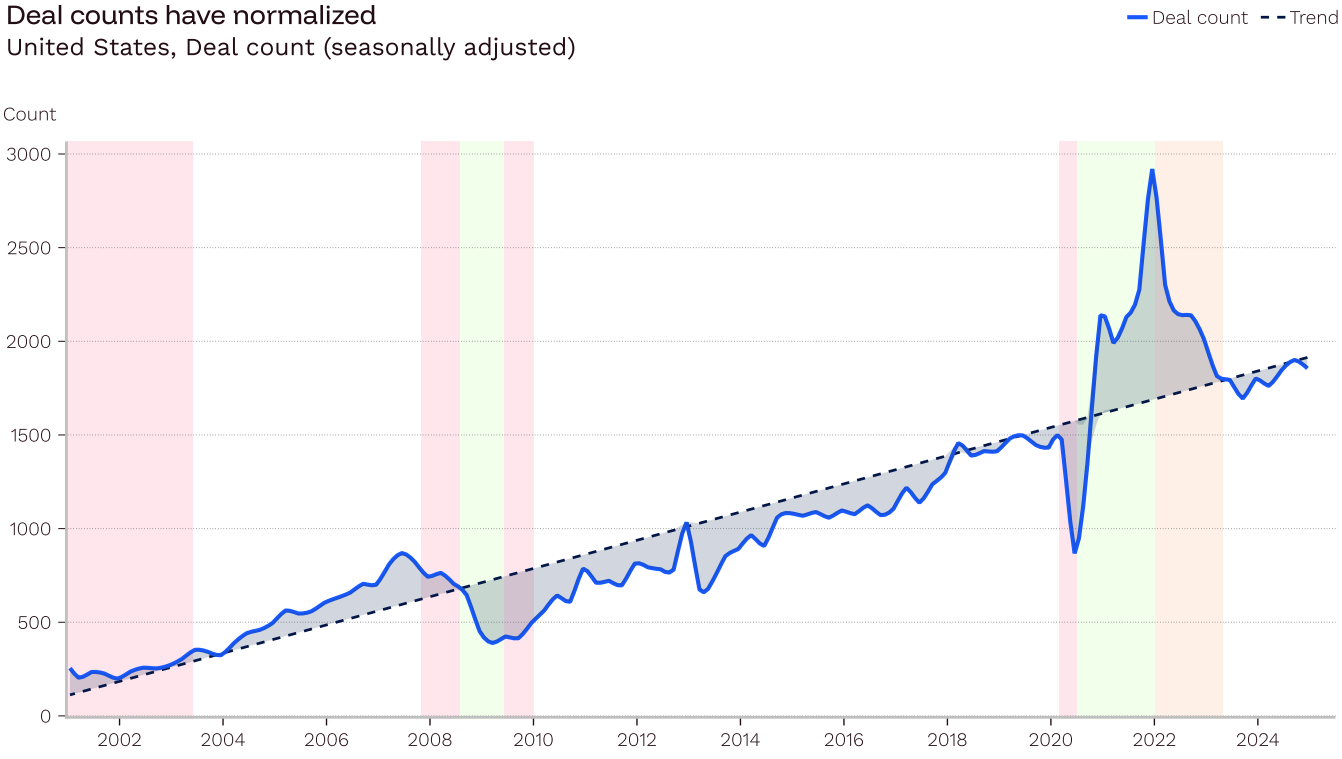
DEALMAKING: SUPER-SENSITIVE

Deal flow is the most sensitive element of the PE fund life cycle to current macro conditions, co-moving strongly with the Real, Financial, and Price cycles.

Similar to fundraising, there are essential differences in counts and volume—between total capital deployed and the number of deals transacted—that points to average deal size being connected to macro conditions and risk tolerance. When the macro environment deteriorates, the number of deals contracts by a higher proportion than total capital deployed, as larger deals still get done (and the reverse when the macro environment improves).[20]

Deal counts have normalized

United States, Deal count (seasonally adjusted)

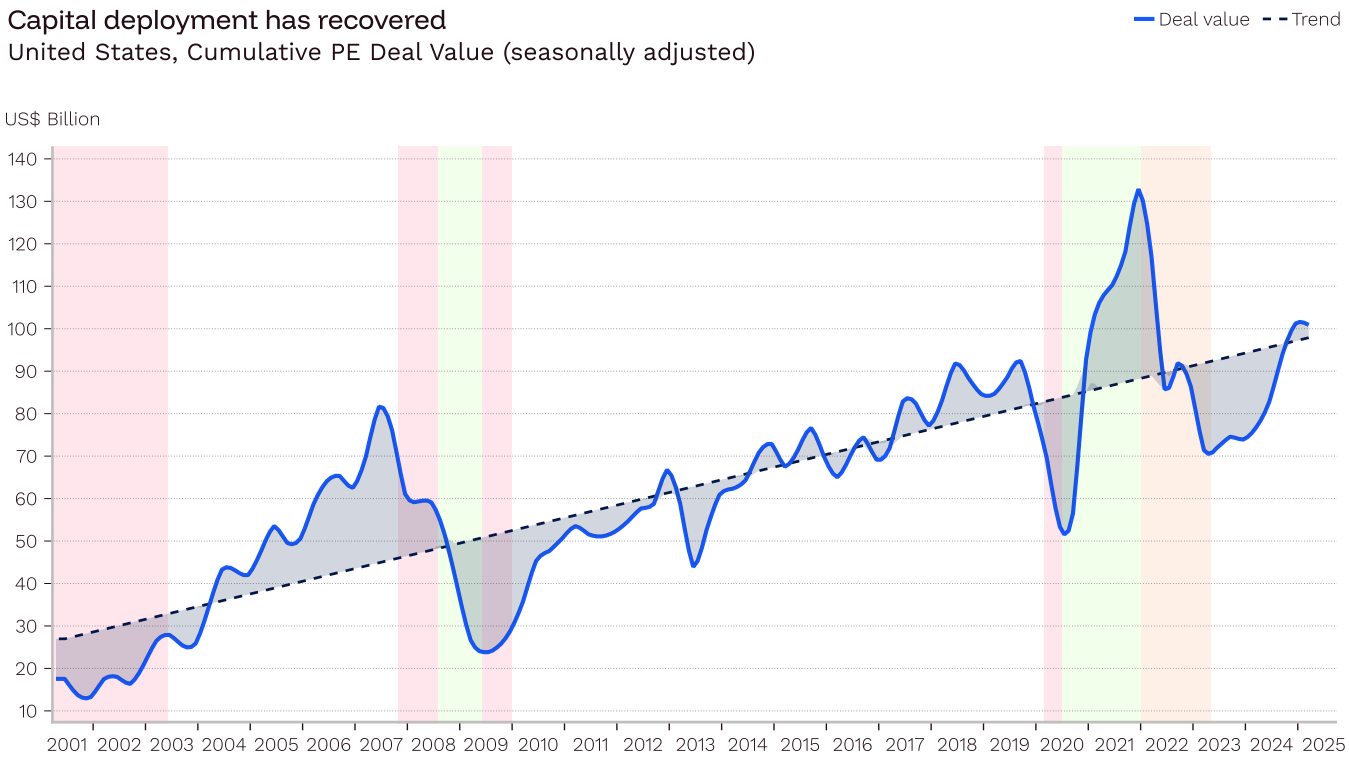


Source: arcMacro, Pitchbook
REGIME KEY
Yellow: Goldilocks | Purple: Financially constrained | Red: Crisis | Gray: Stagflation | Blue: Sluggish | Green: Rebound | Amber: Overheating

20 We did look at direct data on average deal size, but reporting is not reliable, and inference from counts and total volume is sufficient.

Capital deployment has recovered

United States, Cumulative PE Deal Value (seasonally adjusted)



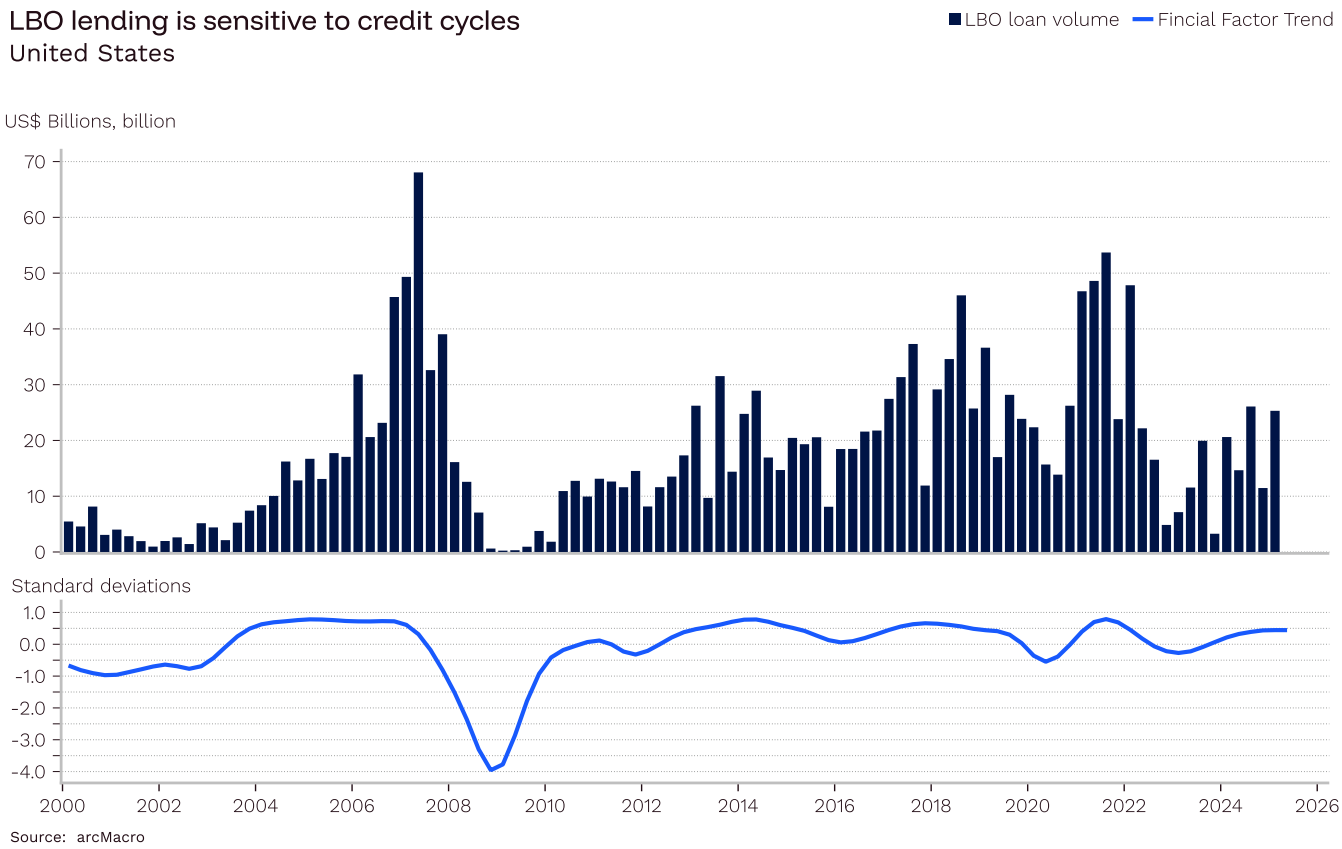
Source: arcMacro, Pitchbook
REGIME KEY
Yellow: Goldilocks | Purple: Financially constrained | Red: Crisis | Gray: Stagflation | Blue: Sluggish | Green: Rebound | Amber: Overheating

This observation is reinforced when we look at a different data source on deals: Pitchbook LCD's tracking of leveraged financing for LBO deals. As the chart shows, LBO lending is closely tied to the Financial Factor. When credit markets dry up, this translates into fewer deals being done (extensive margin) with only a small impact on the average debt vs. equity balance in the existing deal flow (which has almost no cyclicality).[21]

As for the current situation, despite the handwringing in the financial press, deal-making is now back at its long-run trend line in both count and dollar terms. The challenge is not transacting *per se*, but rather the large number of maturing acquisitions queuing up for exit, and the effect that's having on valuations and returns.

21 The equity share of LBO deals has been trending up steadily since 2013, with a minor reversal appearing to take hold in 2025, according to Pitchbook.

LBO lending is sensitive to credit cycles
United States



Source: arcMacro

VALUATIONS: LEVELLING OFF

The most notable feature of the accompanying chart on valuation is the strong trend in EBITDA multiples (EBITDA divided by Enterprise Value (EV)) this millennium.

Unlike fundraising or deal flow, multiples should not, *a priori*, rise on a trend as private markets grow. In a mature industry, valuations should reflect the fair price of the expected discounted cash flows flows of target companies. In terms of macro factors, the strongest link should be to the Financial Factor, which moves with the discount rate, and the Real Factor, which should reflect expected cash flows.

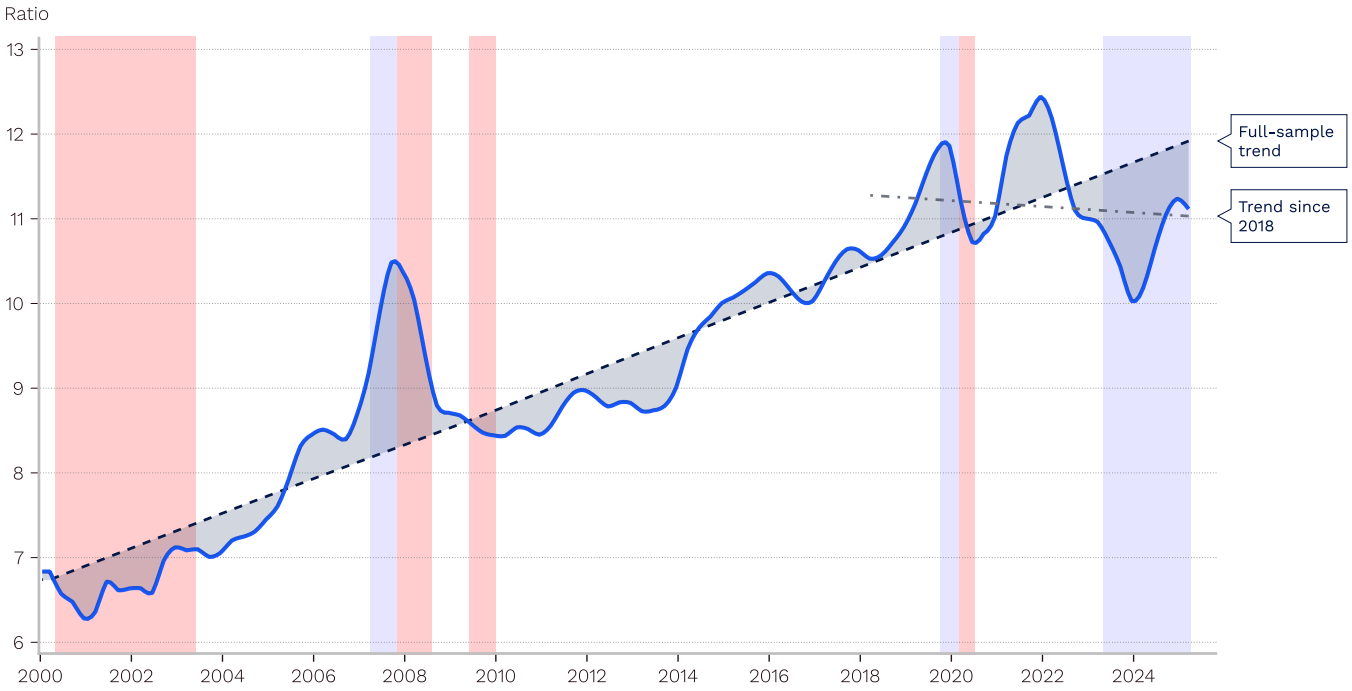
The strong trend in multiples indicates that private equity, since 2000, has been a story of a maturing industry. The implication is that at least a portion of the returns have been driven by an initially undervalued asset base. Multiples have risen in line with the overall size of the industry, from ~7x in 2000 to ~11x by 2019, as increasing demand for unlisted companies has pushed these target assets toward their fair value.

A composition effect — PE's ability to target larger, higher-quality companies as time went on — likely also played a role.

The data now suggests that this process has come to an end as the industry has reached a critical scale. Since 2017/18, valuations have fluctuated around an essentially flat trend of ~11x EBITDA multiples, peaking above 12x in 2022 and dipping to 10x in 2024 (at a time of highly extended public equity valuations).

Deal multiples are levelling off

United States, PE deal EBITDA multiples



Source: arcMacro, Pitchbook
REGIME KEY
Yellow: Goldilocks | Purple: Financially constrained | Red: Crisis | Gray: Stagflation | Blue: Sluggish | Green: Rebound | Amber: Overheating

PE firms need to adapt to this new reality. Multiples will exhibit weaker trend drift and stronger cyclicality to broader financial and macroeconomic conditions in the future. One important source of alpha—the growth of PE itself—has likely been exhausted. GPs will need to focus on purer forms of value generation, and it will be important to monitor the economic cycles that will influence increasingly important betas.

In terms of contemporaneous cyclicality, one clear feature of the valuation time series is the link between a sharp rise in multiples and the economy overheating.

RETURNS: IT'S COMPLICATED...

Assessing the performance of private equity is a complex and controversial topic. Indeed, as we discussed in the introduction to this section, most academic studies of private equity are attempts to gauge PE returns accurately and attribute the industry's outperformance relative to public equities.

We are firmly in the camp that prefers several measures of fund return (Public Market Equivalent, MOIC, DPI) over the simple internal rate of return (IRR).

Unfortunately, reliable data stretching back far enough to use any of the superior measures is not available. Luckily for us, our only interest is in the connection between returns and the macro cycle. All measures of PE returns are highly correlated; they'll reflect the same cyclicality patterns even if they disagree about the exact amount of alpha generated by PE funds.

One important factor we do take into account is to look at both absolute returns and excess returns over a public benchmark. We've chosen the S&P 600 small-cap index, as it has a long data history and contains companies closer in size to firms held by private equity funds than other options (such as the large-cap S&P 500 or Nasdaq composite.).

We'll study three different metrics, which capture slightly different things. First, we'll examine quarterly returns as reported by LPs to PitchBook. This will enable us to separate the distribution and net asset value (NAV — adjustments to the assessed value of the assets held by the fund) components of returns generated by active funds.

Then we'll look at 1-year horizon IRRs, which will give us a sense of how PE funds perform through the cycle against the public benchmark.

Finally, we'll study the overall performance of each vintage of PE fund over the past two decades to look for clues on how macro exposure has driven total return.

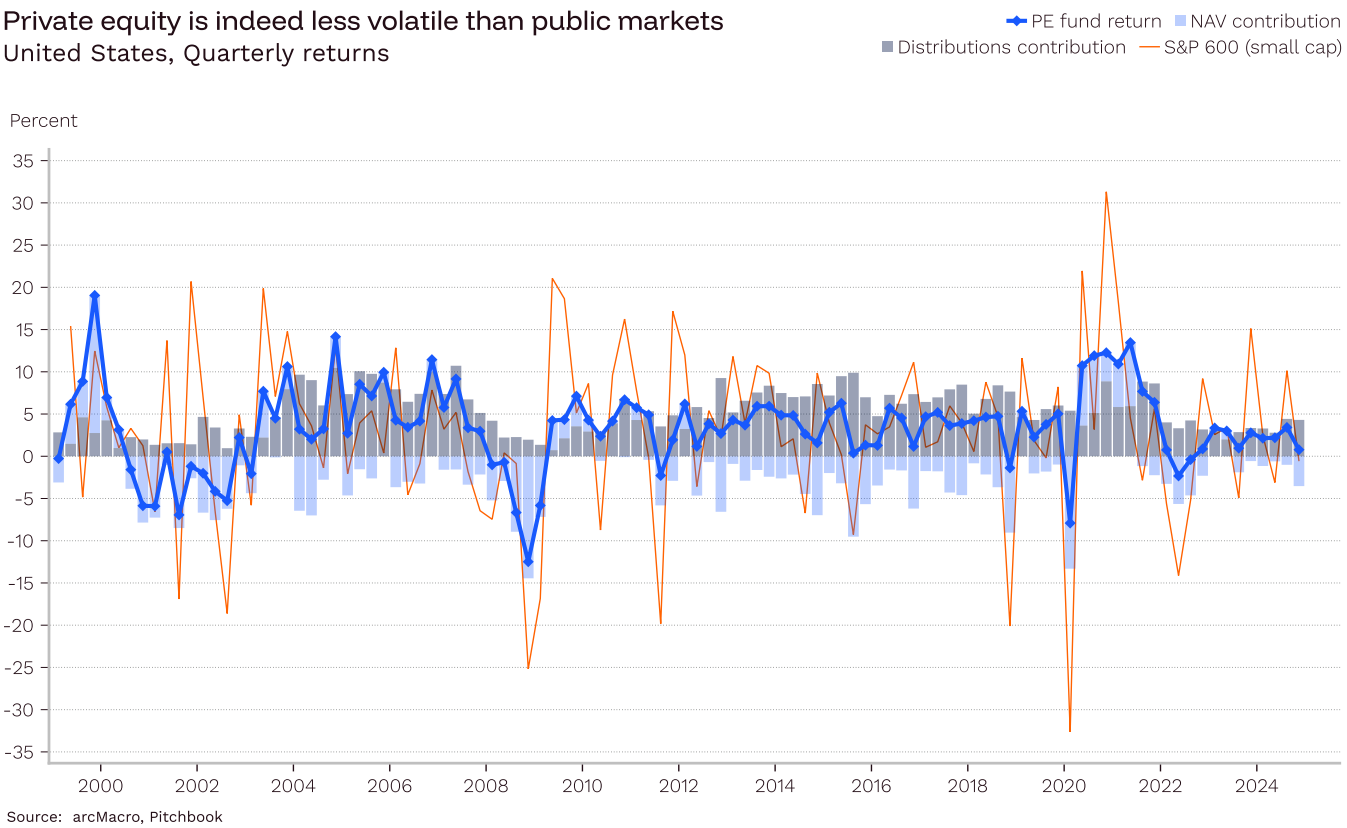
The results: First, it's clear from the time series of quarterly returns that near-term private equity returns are indeed less volatile than public markets — but not necessarily acyclical, as this comes largely from the smoothed NAVs.

Looking at the distributions component of quarterly returns (the cash that funds return to their LP investors), there is a strong connection to the state of the macroeconomy. Distributions are high during good times (especially during "Goldilocks" regimes) and fall during bad times. In other words, funds return cash to investors when conditions are good.

This perfectly explains why, in the current "Sluggish" regime, LPs are concerned about a drop in distribution flows. A further deterioration in the macroeconomic environment would lead to weaker distributions.

The slump in quarterly returns since 2022, stemming both from negative NAV contributions and weak distributions, is clear. Unlike fundraising and deal flow, we have not yet seen signs of improvement in 2025.

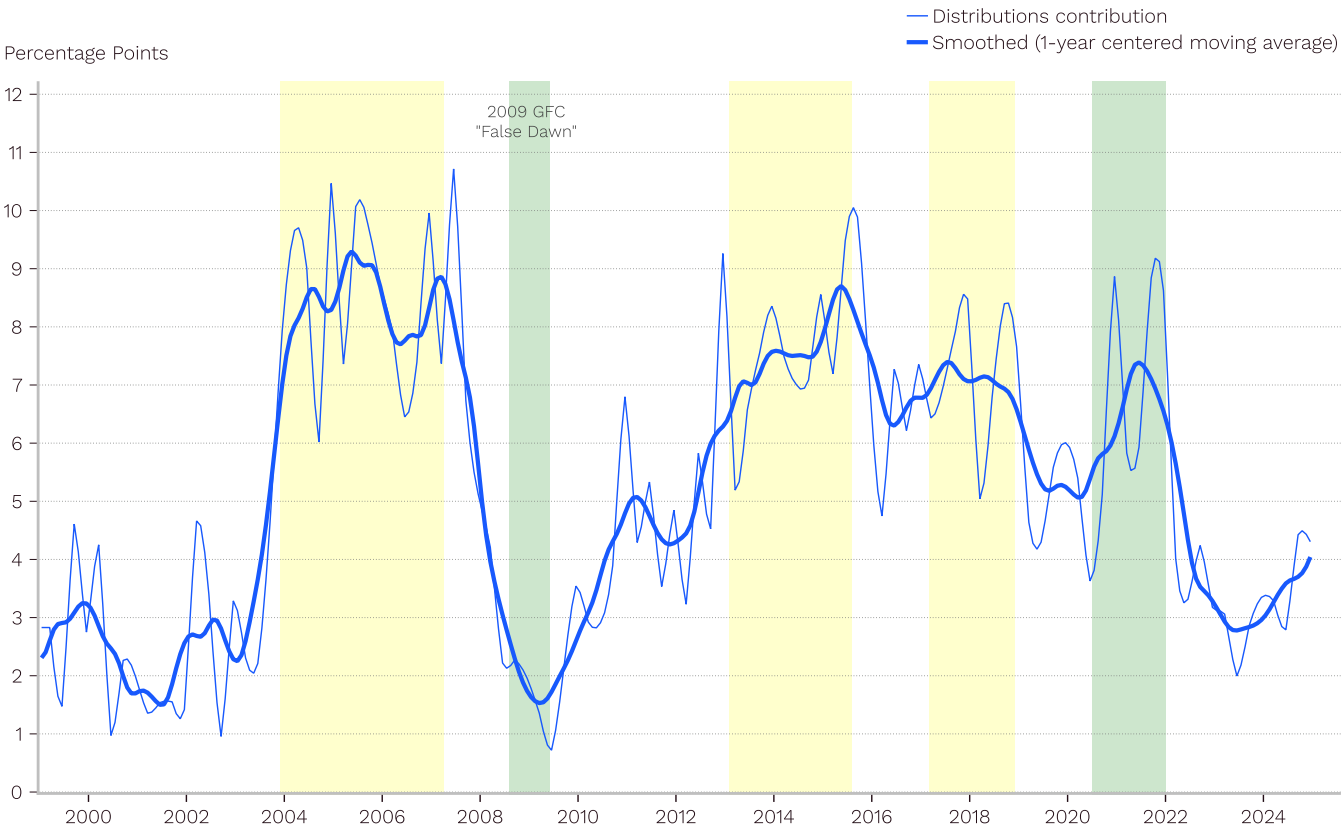
Private equity is indeed less volatile than public markets
United States, Quarterly returns



Source: arcMacro, Pitchbook

Distributions have a strongly cyclical element - funds are returned in good times

United States, Distributions contribution to quarterly PE fund returns



Source: arcMacro, Pitchbook
REGIME KEY:
Yellow: Goldilocks | Green: Rebound

Moving on to Horizon IRRs, we can compare the performance of PE funds to 1-year total returns of alternative public benchmarks. As the chart below shows, private market returns tend to be far more stable over this horizon than public markets, particularly the benchmark small-cap S&P 600. The downside protection that PE offers during bad times is strikingly evident (and is a large factor behind the long-run outperformance of private over public equities).

The chart also reveals another way that the current macro/market environment is atypical. During the average public bull market (we've been in one since 2023), public small-caps massively outperform both large-caps and PE funds. Currently, however, large caps are outperforming (particularly super-large-caps in the so-called "Magnificent 7"), with PE and small caps offering similar performance.

In our view, this is because the wider economy is weak (mired in a Sluggish Regime), but extremely powerful sectoral forces (led by the AI-related investment boom) are disproportionately influencing the performance of some large companies.

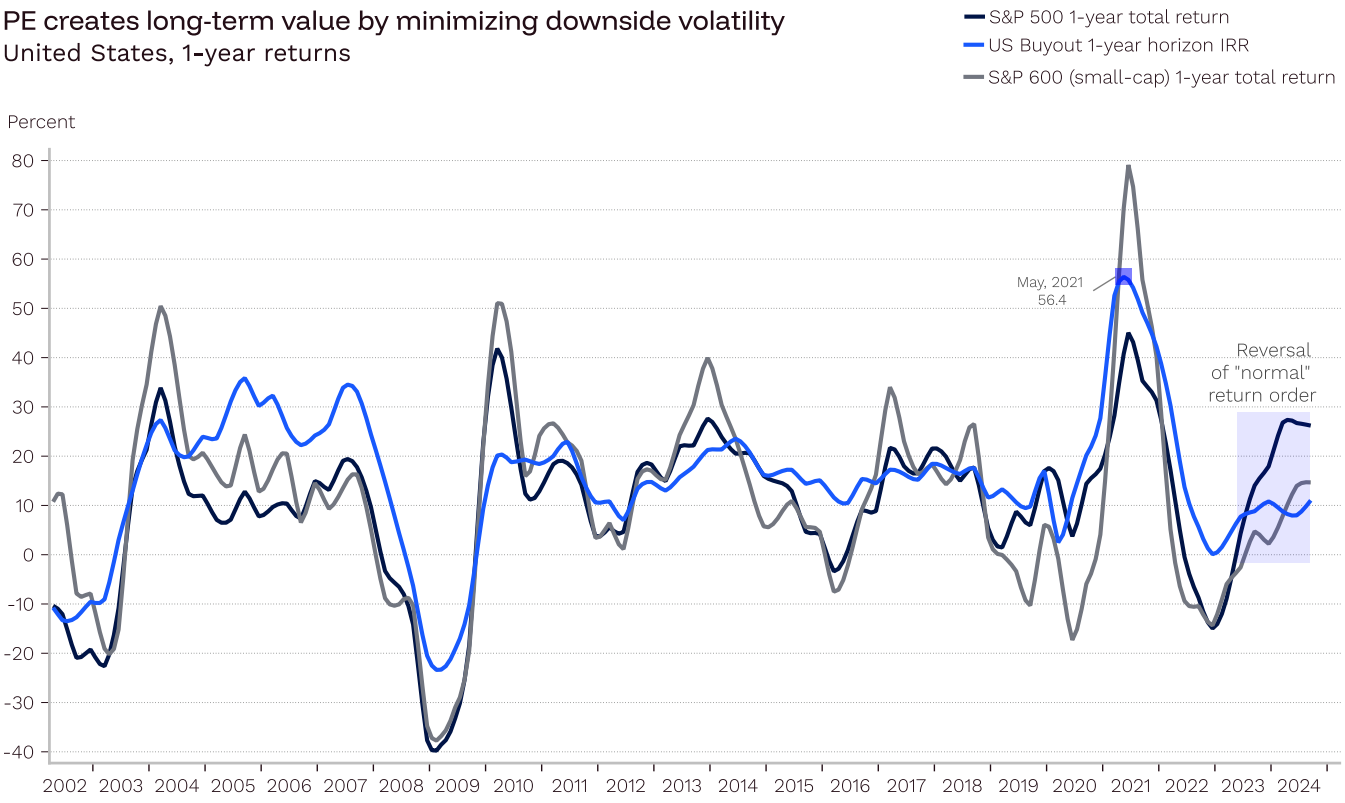
It should not be surprising that absolute 1-year IRRs are highly correlated with the Real, Price, and Financial Factors. But the significance of these correlations disappears when we look only at excess returns of PE over the small-cap public benchmark, which (on this horizon) varies seemingly randomly over a very wide range.

We also looked at the importance of size in private equities, and found that the excess performance of small PE funds (less than $100m AUM) is far more extreme and volatile than larger funds.

These short-term measures provide some useful insights, but to get a true sense of the macro drivers of PE returns, we need to look at the cash flows over the entire life of the fund.

PE creates long-term value by minimizing downside volatility

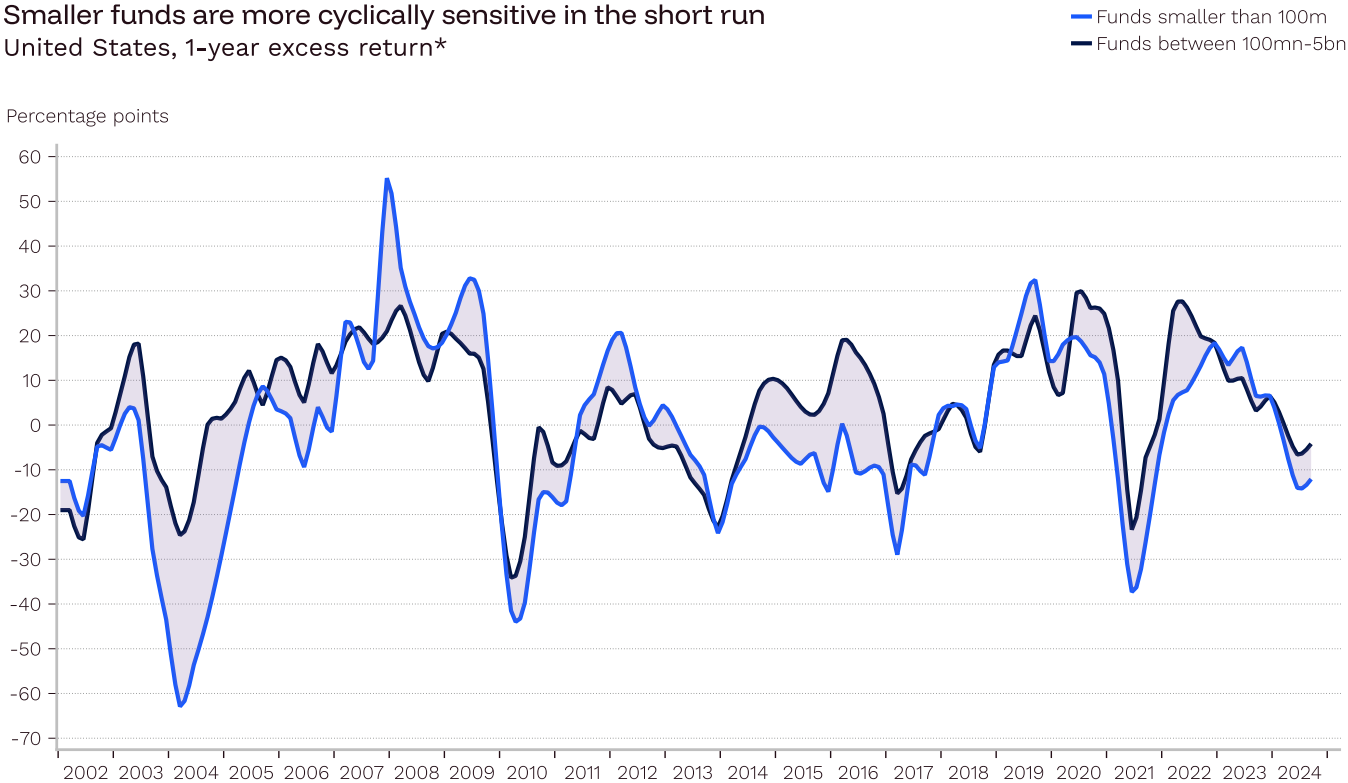
United States, 1-year returns



Source: arcMacro, Pitchbook

Smaller funds are more cyclically sensitive in the short run

United States, 1-year excess return*



Source: arcMacro, Pitchbook
*Excess return defined as 1-year horizon IRR less S&P 600 small-cap index return

To do this, we group PE funds by vintage year and look at their pooled IRR.[22] To calculate excess return over the public benchmark, we subtract from vintage the annualized total return of the S&P 600 over the seven years after the vintage year (when funds are in the midst of the "harvesting" phase). This is imprecise because fund lifetime also changes. But it at least gives us a sense of cyclicality.

The results are summarized in the chart below. The most important observation is that PE's best vintages were the funds launched in 2001 and those launched between 2014 and 2019.

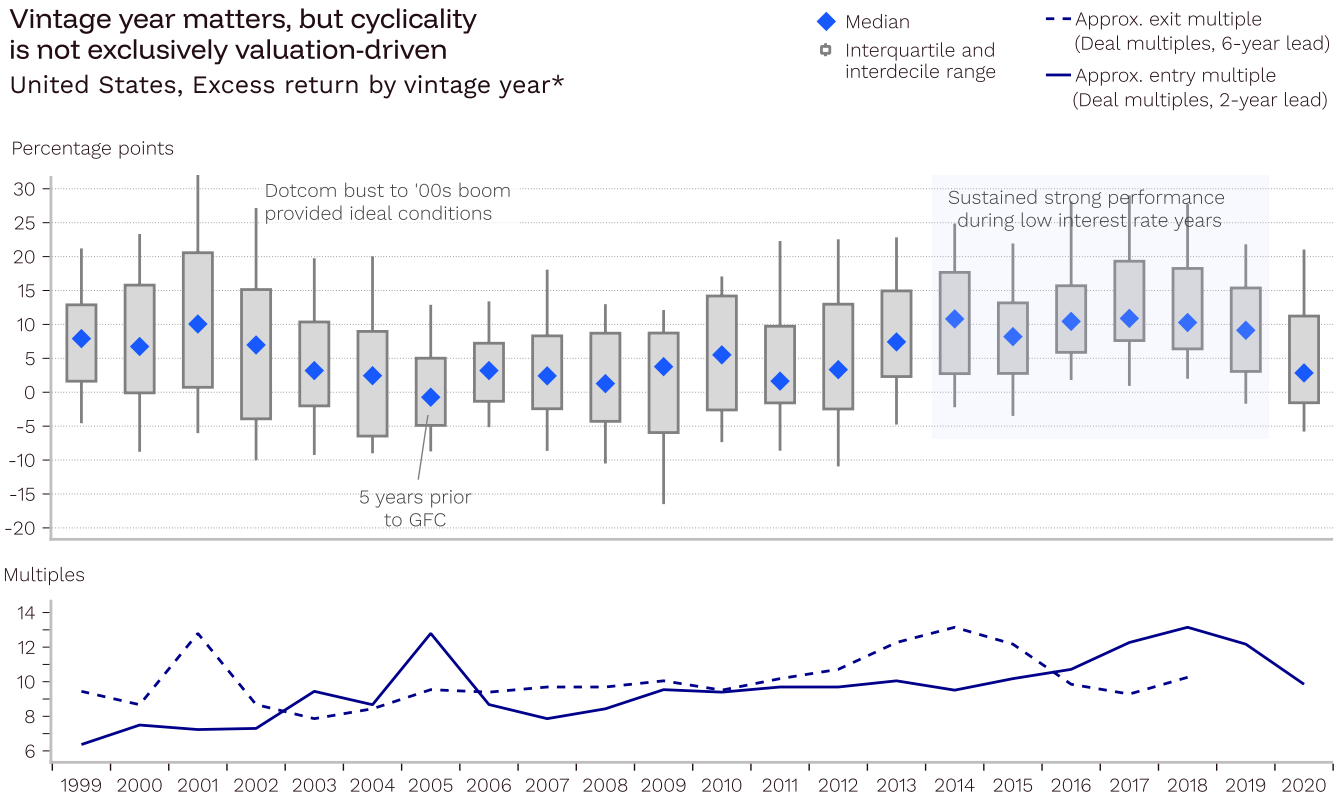
To link this to macro conditions, we need an additional step. We have added two lines to the chart, showing the cyclical component of EBITDA multiples (trend removed) two years after the vintage year (when capital is being most actively deployed) and five years later, when most funds enter exit mode.

This accounts for an important component of performance. We see that the best-performing vintages experienced low valuations when they were acquiring and high valuations at exit.

The wide interquartile range and difference between top and bottom deciles show that fund management and strategy are more important than macro. But the macro certainly matters via the timing component of both entry and exit.

Vintage year matters, but cyclicality is not exclusively valuation-driven

United States, Excess return by vintage year*



Source: arcMacro, Pitchbook
*Excess return defined as vintage IRR less S&P600 small-cap index total annualized return over 7-year period after vintage year
Note: Later vintages subject to change

22 Data from Pitchbook, with vintage year and pooling methodology detailed here.

Going From Macro Insight to Investment Strategy

At the start of this chapter, we posed the question “Should GPs be holding out for a recovery in valuations and deal flow, or prioritizing exit, distributions, and renewal?”

We now understand enough about the relationship between the macroeconomic cycle and the private equity industry to confirm that the answer depends, to some extent, on what GPs believe about the macro/financial outlook.

Let’s compare two of the current scenarios from the arcMacro Scenarios framework (as of the end of Q3 2025) from the perspective of a fund that launched around five years ago.

First, we’ll consider the “Dynamic stall” scenario, in which a confluence of offsetting forces keeps the economy in an extended slump, but not an all-out crisis. In this scenario, the strategy that many PE funds are currently pursuing makes a lot of sense. With valuations static and fundraising set to be challenging for some time to come, it pays to take your time. Funds can opportunistically look for strong exits while focusing on operational value creation. This buys time to wait for multiples to improve as newer funds are eventually forced to put dry powder to work at more favorable valuations. A proliferation of extension vehicles has emerged to support this approach.

By contrast, a fund manager who is planning primarily around the “Every recovery needs a crisis” scenario would pursue a completely different tactic.

We know that multiples and performance tank during a crisis, and fundraising dries up for some time afterwards. Meanwhile, new funds that can pick up quality assets at a discount during downturns tend to perform extremely well.

This manager’s optimal tactic would be to aggressively return cash to shareholders in the short term and look to raise new funding to position themselves to take advantage of favourable acquisitions.

Our third scenario, “Stagflation,” carries similar implications to the crisis/recovery scenario (though with less longer-term upside), so on balance our macroeconomic view should prompt funds toward more acceptance of current valuations and less “extend and pretend” than the industry is currently pursuing on the basis that conditions will improve.

HOW WE INTEGRATED PE STRATEGY INTO THE ARCMACRO SCENARIO FRAMEWORK.

The analysis above demonstrates the usefulness of incorporating a macro lens into fund strategy — enough for us to systematically integrate it into our scenario generation tools.

Ideally, we would simply summarize what happens to PE variables during any given regime. But we only have 100 quarters of overlap between the PE and macro datasets, meaning that several economic regimes (particularly Stagflation) had insufficient PE observations for empirical analysis.

To get around this, we leveraged our regression models of the relationship between PE industry metrics and our macro Factors. For regimes with adequate PE data, we calculated regime-specific summary statistics across key PE metrics. For data-sparse regimes, we employed Factor correlations. This approach leverages observed correlations between PE metrics and macro Factors from data-rich periods to estimate expected PE behavior during historically sparse regimes based on the Factor values we know occur during those regimes.

We translated the results into an ordinal set of measures that capture the general PE environment associated with each regime. Although the model incorporates some AI-supported advice, the strategic conclusion for each scenario is ultimately judgmental, based on an overall assessment of the combination of factors driving the Scenario, as well as off-model context and industry knowledge.

PART 4

The Cyclicality of Corporate Performance

"When you're in a major market downturn, the beta eats the alpha."

JEFFREY GUNDLACH

We have shown that macroeconomic conditions can influence fund-level strategy in private equity.

But ultimately, it's the selection and improvement of underlying assets — private companies — that separates funds in the top quartile of performance from those in the bottom.

Thus, our system for anticipating and planning for macroeconomic scenarios would be incomplete without reliable tools for understanding how the companies that PE funds invest in change in relation to the macro Factors and Regimes we have developed.

In this section, we describe how we have developed these tools and highlight four topical applications relating to macroeconomic dilemmas facing investors.

The Gaps in Our Knowledge of Corporate Cyclicality

It's a truism that companies drive the business cycle. The Firm is, after all, the basic productive unit of the economy. So when we're measuring the business cycle, we are in effect already measuring the cyclicality of corporate performance.

But it's more complicated than this. Firms of different sizes will behave differently. Different industries will have different (even opposite) behaviour over the cycle. Firms will have different cyclical performance drivers (growth, margins, financing structure, etc.) that affect their sensitivity to the cycle. And, as we've argued, there is no single "cycle', but rather different combinations of real, economic, and financial factors that can have highly divergent effects on different types of firms.

There is a deep and distinguished academic literature on the performance of public equities on aggregate, which has given us important insights like the CAPM and its extensions,[23] the Cyclically-Adjusted Forward Price/Earnings (CAPE) ratio,[24] and the equity risk premium (ERP).[25]

23 Eugene F. Fama and Kenneth R. French, "Business Conditions and Expected Returns on Stocks and Bonds," Journal of Financial Economics 25, no. 1 (1989)

24 John Y. Campbell and Robert J. Shiller, "Stock Prices, Earnings and Expected Dividends," NBER Working Paper Series, February 1988.

25 John H. Cochrane, "Discount Rates," NBER Working Paper No. 16972, April 2011.

The upshot is that we have a good understanding of how to assess the price of a stock in relation to the rest of the market, and we have some insight into how the market itself cycles in conjunction with the broader economy.

What we're lacking is a consistent, coherent one-stop shop that we can visit to learn how we should expect a given industry or company to perform under a given macro scenario, and, more importantly, why it will perform in this way.

Our task in this chapter is to build it.

Building Better Betas

As with our macro framework, our overall approach begins with a very large dataset, which we boil down to a level that we can use to inform our Scenarios.

We start by pulling quarterly financial records for every single U.S.-domiciled company listed on a major U.S. exchange going back to 1980.[26] We analyzed ten separate financial variables before settling on four that adequately summarize corporate cyclicality while also maximizing data availability:

1. Revenue growth (year-over-year, percent), to capture company growth
2. EBITDA margin (EBITDA divided by revenue), to adjust for (non-idiosyncratic) costs and capture profitability
3. Price-to-book ratio (P/B), to capture a measure of valuation that is a standard in the PE industry
4. Interest coverage ratio (EBIT/Interest expense) to capture the effects of balance sheet structure

This gives us a truly large panel of 180 quarters of information on ~5,000 companies. Given that entities entered and exited the sample and may have had missing data, we were left with a sample size ranging from 126,000 (interest coverage) to 256,000 (revenue growth) observations to work with.

For each of the four financial variables we selected, our goal was to estimate the industry "beta" to each of our four Macro Factors. The betas tell us how companies' performance in each industry changes over time as the macroeconomic environment fluctuates (the "leftover" performance by company is their individual "alpha").

An unavoidable constraint is that we have to rely on data from public companies. Private companies are not required to report their quarterly financial results publicly, and the data for this exercise simply does not exist. The challenge is that public companies tend to be larger than private ones, face different incentives, and have higher-quality management. We can account for this to some degree in our choice of estimation technique, but not fully.

Nonetheless, we are confident that the overall patterns of industry cyclicality in the public and private sectors are consistent.

There are three other challenges to our methodology — industry classification, data cleaning, and unbiased estimation — that we were able to overcome with smart research design and liberal application of elbow grease.

26 Data from Morningstar. We exclude "pink sheets" and other penny stock exchanges.

DESIGNING A NEW INDUSTRY CLASSIFICATION

To estimate our macro betas, we first need to group companies into similar industries. The industry classification system we opt for needs to have certain properties.

First, the number of industries needs to be small enough to have enough data for a reliable estimation, but large enough to meaningfully reflect the typical structure and cyclicality of the underlying companies (we think between 35 and 55 industries).

Second, the classifications should be contemporary. For instance, they should capture the critical distinction between software and internet companies, or telecoms and media concerns.

Third, each company should map to one, and only one, industry.

And finally, given our overall aims, it should be easy to map from the NAICS standard favored by U.S. statistical agencies for disaggregated economic data directly to our industries.

The last criterion is important not only for estimating our betas in this exercise, but also because it will allow us to answer questions such as how wages are changing for a given company or its exposure to sectoral cost spikes in the future.

There are several industry classification systems we could use, ranging from the NAICS and SIC standards used by public agencies to the Fama-French classification common in the finance literature — alongside as many private options as there are index providers (S&P's GICS being the best-known).

None of the available indices matched all of our criteria (NAICS fails the first, GICS the third), meaning we've had to develop our own industry classification. We built it using the following steps.

Our system is essentially an aggregation of the highly refined NAICS level 3 industry codes (83 sub-industries), which results in 50 arcMacro Industries. We can further aggregate into 14 Sectors. We excluded the public sector and agriculture.

The complete set of industries, along with summary data and an overview of their cyclicality properties, can be found in Appendix A.

CLEANING A UNIVERSE OF DATA

If you think the entire universe of data on individual equity financial reports is somewhat messy, you would be right. Some of this messiness creates bias and inaccuracy in the estimation phase and needs to be addressed upfront.

For any individual company to be included in the analysis, it needs a minimum of 12 continuous quarters of reported data for each variable. This avoids data pollution arising from short-term tactical listings or corporate finance arbitrage. We confirmed that all industries had enough companies reporting at any given time in the sample to reliably cover all seven arcMacro Regimes.

We remove obvious outliers and artifacts in the data arising from listings and delistings, mergers, bankruptcies, etc. Since we were working with such a large sample, we used statistical thresholds rather than matching historical event dates, which would have been too cumbersome.

We also identify and adjust for persistent structural breaks in each company's performance relating to one-off factors like M&A activity.

Lastly, we log-transform the PB and interest margin data, so that the betas are interpreted as the percent change relative to the arcMacro factor (logged data yielded a better distribution for accurate estimation).

SELECTING THE ESTIMATION TECHNIQUE

To estimate our betas, we use a single-panel model with industry fixed effects rather than individual regressions for each industry. This maximizes sample size and improves consistency, ensuring we benefit from the largeness of our dataset.

After testing multiple specifications, the final model is a regression of the financial variable for each firm (revenue growth, etc.) in each quarter on each of the four macro factors in that quarter, interacted with the industry to which the company is assigned. We include quarterly dummies to control for seasonal effects.

We employed clustered standard errors to deal with potential within-industry correlation.[27] We tested and ruled out adding lags for the macro variables.

Despite the parsimonious specification, the model still contains a large number of coefficients. The general standard is that the ratio of parameters to data points is above 30. In our specification, despite the large number of coefficients, this ratio was well above 100, so we're not concerned about overfitting.

Our most important decision was to use Least Absolute Deviations (LAD) rather than the standard least squares approach.

LAD enables us to run quantile regressions to estimate not only the median beta for each industry, but also the 25th and 75th percentile betas for each variable. This has several advantages:

- Far less sensitive to outliers, which is important in light of the famous volatility of equity data.
- We gain insight into the distribution of cyclicality within each industry.
- Each observation gets equal weight — larger companies don't drive the results
- Does not require additional potentially information-destroying data cleaning like trimming or winsorization.

27 We estimated confidence intervals based on a conservative approximation technique, which is computationally efficient but may have overstated the error bands.

SUMMARIZING 2,400 BETAS FOR CORPORATE CYCLICALITY

Our choice of estimation technique leaves us with three betas (one for each quartile) for each of four financial variables relative to four factors, across fifty industries. That's a total of 2,400 betas to summarize.

The table below shows how we've done it. This version of the summary table covers revenue growth, showing the betas for the Real, Price, and Financial factor for each quartile and each industry (we've dropped the sentiment factor, as we're only interested in the slower-moving macro variables).

The grey bar represents the 90% confidence interval for the median beta. We've also provided a summary for each industry. The scales are set so that the betas within each column are comparable in scale.

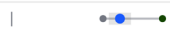
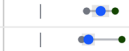
A few observations stand out from the revenue cyclicality table:

- All industries have positive and significant betas to economic activity and price inflation...
- ... but the degree of sensitivity to the cycle differs substantially across industries.
- In some industries, cyclicality also differs widely between companies, notably in Accommodation and Primary goods.
- Industry exposure to the Financial Factor is less consistent both between and within industries — customers' differing credit sensitivities likely explain this.

The equivalent tables for the other three variables are summarized in Appendix B, and we leave it to the reader to peruse them. We will surface some of the most important features of the different betas at the industry level in the next section.

Corporate Revenue Sensitivity to Economic Cycles

Quantile regression coefficients of quarterly revenue growth on arcMacro factors

Industry	Quantile Regression Coefficients (β)			Cyclicality Summary
	Real	Price	Financial	
Accommodation				High variation within industry
Administrative services				Broadly cyclical
Air Transportation				High variation within industry, primarily real factor sensitive
Appliance Manufacturing				Credit sensitive with some inflation protection
Banks				Stable revenue, low inflation pass-through
Building Construction				Limited price pass-through, highly credit/real sensitivity
Chemical Manufacturing				Broadly cyclical
Clothing Manufacturing				Not credit sensitive
Clothing Retailing				Not credit sensitive
Conglomerates & Holding Companies				Broadly cyclical
Consumables Wholesaling				Stable through-cycle revenue - low real/credit cyclicality with inflation pass-through
Durables Wholesaling				Broadly cyclical
Educational services				Stable through-cycle revenue - low real/credit cyclicality with inflation pass-through
Electronics Manufacturing				Broadly cyclical
Entertainment				Broadly cyclical
Food & Beverage Manufacturing				Relatively stable through-cycle revenue
Food Services				Not credit sensitive, offers inflation protection
Funds & Trusts				Low real cyclicality
Furniture Manufacturing				Limited price pass-through
General Merchandise Retailing				Not credit sensitive
Healthcare Services				Stable through-cycle revenue
Insurance				Low real cyclicality, broadly stable through cycle
Internet				Real-cycle sensitive, with limited price pass-through, low credit sensitivity
Investments				Credit sensitive
Leasing				Low real cyclicality
Lumber processing				Broadly cyclical
Machinery Manufacturing				Broadly cyclical
Medical Manufacturing				Not credit sensitive
Metal Product Manufacturing				Broadly cyclical
Mining				Highly credit/price sensitive
Mining Services				Highly price sensitive with variation on credit exposure
Oil and Gas				Highly price/real sensitive with variation on credit exposure
Online Retailing				Not credit sensitive
Other Construction				Broadly cyclical
Other Transportation				Broadly cyclical
Personal and Social Services				Stable through-cycle revenue
Petroleum products manufacturing				No credit sensitive, strongly price/real cyclical
Primary Metal Manufacturing				Highly cyclical
Printing and publishing				Limited price pass-through
Professional Services				Broadly cyclical
Real Estate				Stable through-cycle revenue, with significant but low cyclicality
Software				Broadly cyclical
Specialty Materials Manufacturing				Broadly cyclical
Specialty Retailing				Broadly cyclical
Telecommunications				Stable through-cycle revenue with some price pass-through
Textiles Manufacturing				Broadly cyclical
Trucking				Broadly cyclical
Utilities				Low credit/real sensitivity, but with price pass-through
Vehicle Manufacturing				Broadly cyclical
Vehicle Retailing				High real sensitivity with limited price pass-through, wide variation in credit sensitivity

Legend: Bottom quartile · Median · Top Quartile · 90% Confidence Interval for Median · Zero

Source: arcMacro

A Note on Company Size

We did investigate the significance of company size on the betas, specifically the effect of a company being below the 50th, 25th, or 10th percentile in total revenue in each quarter.

Only for the smallest companies was there any significant effect, and it was minor — slightly reducing the betas, particularly in EBITDA. Given that data for smaller companies is generally less reliable, we were unable to push this research much further. But we were satisfied that our results do not break down for companies of the size that private equity typically invests in.

Some Simple Applications of the Betas

Rather than listing all the findings by variable and industry, we pose four topical questions and answer them using the betas. This gives a taste for the richness of the information they contain and the many different questions they can be put to bear on.

DOES MID-MARKET PE MINIMIZE CYCLICALITY?

According to data from Pitchbook, private equity portfolios are heavily skewed toward companies in Commercial Services (including Healthcare), Software, and Commercial Products.

We can use our betas and the PE industry weightings provided by Pitchbook to test how cyclical the "representative" PE fund would be.[28] As the table shows, top-line cyclicality is essentially perfectly in line with the entire market. Profitability is less cyclical in relation to the Finance Factor (perhaps justifying the higher level of leverage employed by PE firms), but far more cyclical in relation to the Price factor.

If private equity firms do insulate their portfolios from macro beta, it's not through industry selection and weighting, but at the company level.

This analysis could be applied to any fund or portfolio of PE holdings.

28 Weightings are based on the past 10 years of PE fund acquisitions.

The representative PE portfolio is not less cyclical than the market average

Industry	Share of middle market PE	Median Beta of EBITDA Margin to arcMacro Factors (Basis points)			Median Beta of Revenue growth to arcMacro Factors (Percentage points)		
		Financial	Price	Real	Financial	Price	Real
Commercial Services	15%	-3.9	-28.8	30.3	0.8	2.2	1.2
Software	13%	-14.3	-103.4	30.8	1.3	1.9	1.1
Commercial Products	9%	23.4	27.9	22.9	1.8	2.3	1.8
Healthcare Services	6%	-31.7	-35.4	56.4	0.7	1.2	1.0
Restaurants, Hotels and Leisure	4%	87.1	-21.4	-33.9	-0.1	3.3	3.3
IT Services	3%	-6.6	-18.6	32.4	0.7	0.8	1.4
Consumer Non-Durables	3%	8.5	-20.8	30.6	0.5	2.0	0.9
Consumer Durables	2%	24.9	-7.5	42.2	1.6	1.7	2.2
	Total	Weighted PE beta			Weighted PE beta		
	55%	2.3	-36.3	28.5	1.0	2.0	1.4
		Median industry beta			Median industry beta		
		11.2	-2.3	33.9	0.9	2.0	1.6

Source: arcMacro, Pitchbook
Note: Excludes real estate and utilities to avoid pooling PE and specialist real estate and infrastructure funds

WHICH INDUSTRIES HAVE PROVEN MOST INFLATION-ROBUST?

With the Trump administration's tariff policy now beginning to transmit into consumer goods prices, investors are once again reviewing the sensitivity of their investments' performance to inflation. The table below uses median betas to categorize industries by their typical response to inflation, as reflected in both the sales performance and margins.

Using this table, we can understand the interplay of demand elasticity, pricing power, and cost adjustment by industry to plan for a potential period of elevated inflation.

Gearing to the price factor helps assess which industries would be exposed to an inflation surge

Industry class	Price beta of revenue	of EBITDA margin	Description	Industries		
Inflation winners	High	Positive	Costs are fixed or adjustable, and demand is inelastic or correlated with sources of inflation, raising margins. These are the industries that generate inflation for the rest of the economy	•Oil and Gas •Mining •Durables Wholesaling •Utilities	•Trucking •Lumber processing •Specialty Materials Manufacturing	•Vehicle Retailing •Petroleum products •Primary Metal Manufacturing
Passers-through	High	~0 (insignificant)	Cost increases are approximately offset by pricing pass-through	•Leasing •Administrative services •Mining Services •Electronics Manufacturing •Metal Product Manufacturing	•Chemical Manufacturing •Accommodation •Machinery Manufacturing •Appliance Manufacturing •Clothing Retailing	•Consumables Wholesaling •Medical Manufacturing •Clothing Manufacturing •Conglomerates & Holding Companies
Cost-base runaways	High	Negative	Industry structure means high exposure to rising costs (via input costs or a correlated demand decline from consumer switching), which can only be partially offset via pricing adjustments	•Food & Beverage Manufacturing •Food Services •Entertainment	•Professional Services •Other Transportation •Online Retailing •Air Transportation	
Cycle leaders	Low	Positive	Industry demand and pricing power leads the broader price cycle (e.g., pre-GFC or COVID construction boom), but may be hardest hit in next phase	•Building Construction •Other Construction		
Bullet-dodgers	Low	~0 (insignificant)	Not exposed to inflationary forces, or costs can be adjusted to approximately offset inflation	•Telecommunications •Educational services •Specialty Retailing	•Investments •Banks	
Inflation losers	Low	Negative	Can't claw back cost increases due to fixed contracts or low pricing power	•Vehicle Manufacturing •General Merchandise Retailing •Insurance •Textiles Manufacturing	•Furniture Manufacturing •Healthcare Services •Printing and publishing •Personal and Social Services	•Internet •Funds & Trusts •Real Estate •Software

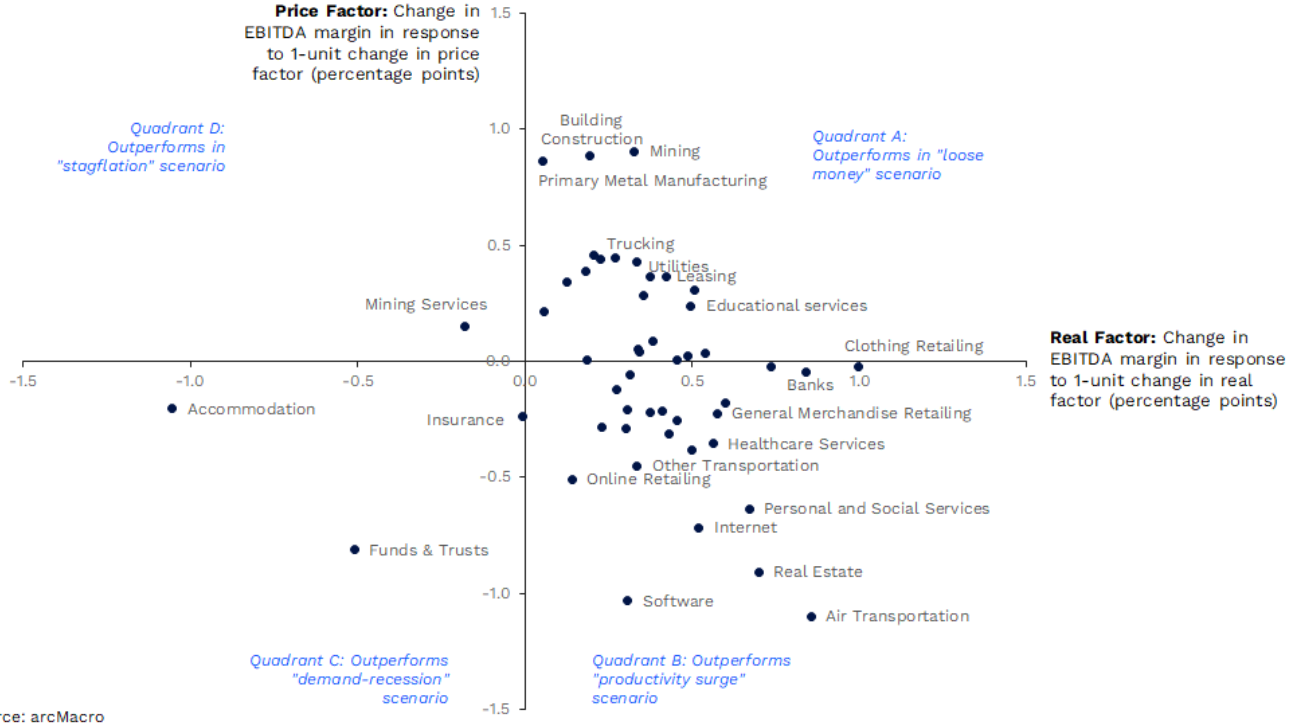
Note: Based on median beta
Source: arcMacro

WHAT IF WE'RE FACING STAGFLATION?

This is a question of increasing salience. The scatter plot below suggests that there aren't any industries that would see results improve in a stagflation, based on their profitability sensitivities to the Price and Real Factors.

However, we can spot industries that would be more insulated from the fallout.

Understanding cyclicality can help scenario planning
Median beta of EBITDA margin to real and price factors



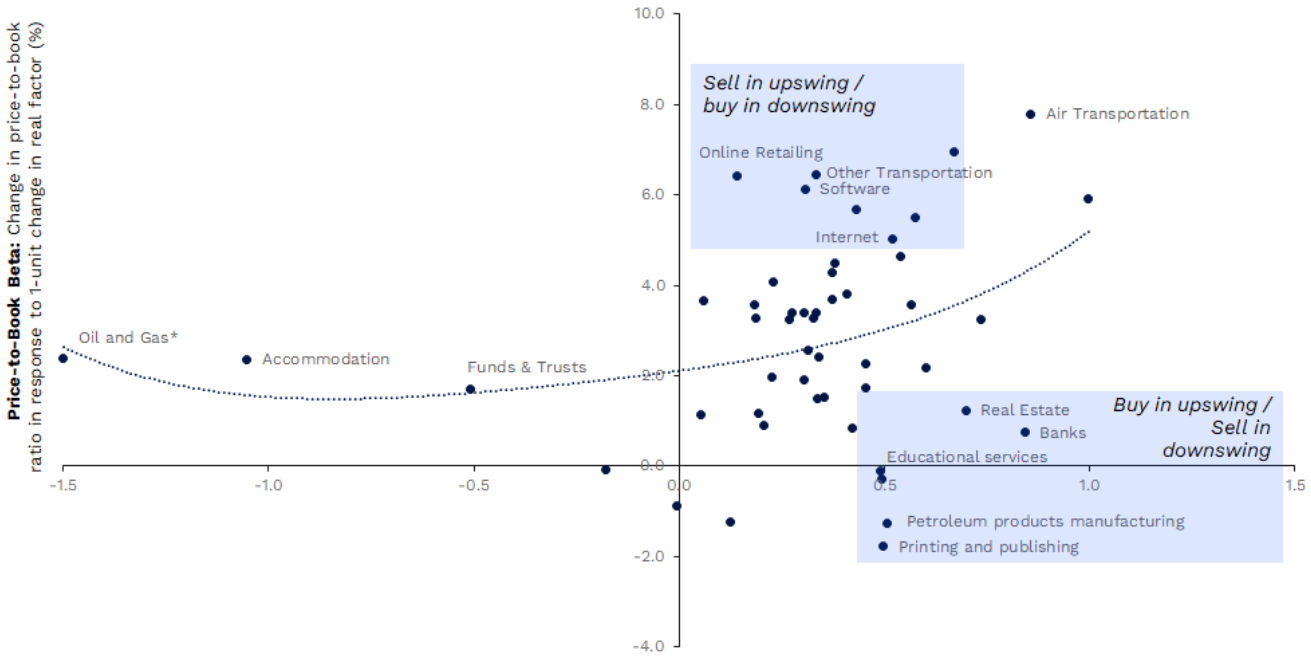
Source: arcMacro
Note: Excludes Oil and Gas

CAN PE INVESTMENTS BE TIMED?

Abstracting from our advice in prior sections to use macroeconomic factors more as an input into decision-making and risk-assessment rather than a core revenue driver, it's clear from the betas that an investor with very strong beliefs about the economy could select investments to maximise their returns based on their macro profile.

In the chart below, we use median betas of profitability and P/B relative to the Real Factor to identify optimal transact/hold phases for more sensitive industries.

Beta profiles create strategic opportunities across industries
Median real cycle beta



Source: arcMacro

The Final Piece of the arcMacro Scenario Framework

The final step in our research is to consolidate our findings by incorporating industry recommendations into our scenarios, based on the betas' insights into their exposure to the projected economic path.

Specifically, each Regime in the scenario path has associated expected Factor values. By multiplying the betas by these values, we can calculate the distribution of performance in terms of growth, profitability, valuations, and risk of debt distress for each industry.

We can combine this automated model output with our professional judgment to surface and further analyze the industries we think deserve extra consideration.

arcMacro Scenario Outlook

Q3 2025

1. Dynamic stall		2. A recovery needs a crisis		3. Stagflation	
Probability Weights					
Augmented Weight	50%	Augmented Weight	35%	Augmented Weight	15%
Model only	65%	Model only	30%	Model only	5%
Subjective adjustment	-15%	Subjective adjustment	+5%	Subjective adjustment	+10%
Description					
A confluence of offsetting forces keep the economy in tension, preventing a crisis but not doing enough to spark stronger growth. Tariffs and fiscal stimulus lead to anchored above-target inflation expectations, but improving productivity from AI is a marginal offset. Finanical conditions remain range-bound as a politically influenced Fed cuts rates, but premia drift upward. Demand is weak but does not collapse (aided by tax stimulus). Firms absorb a considerable share of the tariff shock, compressing margins.		Waning demand in the form of frozen investment spending and a loss of consumer confidence cause growth to continue slow and then drop into a recession that lasts around 12-18 months. The demand effect outweighs upward pressure on prices and causes inflation to fall after the initial tariff impact as firms lose pricing power. Risk appetite dries up as public equities return to earth, slowing both consumer and institutional funding flows. The recession is shallow and a strong and sustained rebound takes hold after ~24 months, with an AI productivity bump.		Tariffs cause extreme pressure on prices, initially by raising import costs in conjunction with the weaker dollar, and then by disrupting broader supply chains as firms scramble to adjust. After an initially slow response weighed down by political pressure, the Fed hikes rates aggressively, tipping the economy into recession. A weak pace of growth eventually resumes, but financial conditions are highly constrained and inflation persists above target.	
Regime progression and major indicator forecasts					
1-12m	12-24m	24-36m	1-12m	12-24m	24-36m	1-12m	12-24m	24-36m
Sluggish	Sluggish	Sluggish	Crisis	Crisis	Rebound	Stagflation	Stagflation	Financially Constrained
GDP Growth (%)			*GDP Growth (%)*			*GDP Growth (%)*		
1.5	1.8	2.0	-0.5	-1.5	3.8	0.5	-1.0	0.8
CPI inflation (%)			*CPI inflation (%)*			*CPI inflation (%)*		
3.5	3.0	2.5	3.2	1.5	2.0	5.0	7.0	4.0
Fed Funds Rate (%)			*Fed Funds Rate (%)*			*Fed Funds Rate (%)*		
3.0	2.5	2.0	3.0	0.8	1.0	4.0	6.5	6.3
PE Market Outlook					
Fundraising	Challenged	Fundraising	Severely constrained	Fundraising	Challenged
Deal flow	Slow	Deal flow	Collapsing	Deal flow	Slow
Valuations	Neutral (from status quo)	Valuations	Declining sharply	Valuations	Uncertain
Returns	Mixed	Returns	Initial pain; long-run gain	Returns	Pressured
Focus on operational value creation and opportunistic sales; don't overpay for new assets		Dispose of cyclical assets ASAP, ensure dry powder is ready to deploy aggressively in undervalued market		Rapid operational adaptation and careful portfolio construction are critical. Lock in financing early while conditions allow.	
Top cyclically compatable industries					
Finance (all industries within Sector)		Educational services		Resources (sector)	
Appliances manufacturing		Clothing		Air transportation (top quartile)	
Machinery manufacturing		Telecoms		Accomodartion (top quartile)	
Admin services		Utilities		Utilities	
Software		Healthcare		Online retail	

Source: arcMacro

Applying the Framework

"In theory there is no difference between theory and practice. But in practice there is"

YOGI BERRA

This White Paper has covered a lot of ground — each chapter could easily have been a separate paper.

But it's important to see the different strands of research together to understand how they interconnect to synthesize usable information from vast data sets.

A natural question at this point might be how the macro scenario framework and insights on the cyclicality of private equity and company performance can be practically applied in industry.

The glib answer is that, because the tools are so rich and granular, they can enhance analysis along the investment cycle for any organization touching private markets. The applications will differ in each specific scenario.

Nonetheless, it's easy to outline a few simple use cases to highlight the value of the framework. We'll stick with a common theme — rising inflation rates and the potential for a further and lasting acceleration in prices — and walk through three potential applications.

Use case 1: Macro Diligence

Scenario: *A private equity fund has identified an attractive target in the online retailing sector. The diligence process has flagged poor performance during the 2021-2023 inflation spike, raising concerns about future inflation.*

Our starting point would be to look at the betas for companies in the online retailing industry. We observe that revenue growth responds robustly to inflation, but weaker companies in the industry would be harmed if high inflation led to a slowdown in real activity.

The EBITDA margin betas tell us conclusively that the industry is unable to fully pass through costs, and margins are squeezed when prices rise, although the distribution of the betas is relatively wide. Interestingly, valuations don't decline as much as might be expected, likely because the online retail sector is not as badly affected by inflation as traditional retail, and may benefit in

the long run as consumer preferences for online shopping become more entrenched. Nonetheless, its clear that cash flows would be impacted even if the company's NAV can be argued to hold up.

This provides a good starting point for assessing the company's general sensitivity to an inflation episode. Using specific details about the firm, we might adjust the industry betas to more closely match its operational or strategic profile, or decide to use the 25th or 75th quantile betas instead of the industry median.

Next, we would move to macro scenarios. We can use the Regimes to create special scenarios for this use case, looking at two alternatives: an extended period of high inflation combined with weak growth (a multi-year Stagflation Regime), and a temporary inflation spike (Overheating regime fueled by Fed easing in the near term) followed by a long Financially Constrained regime as the Fed acts (late) to quash the inflation. We could benchmark performance against a baseline scenario without high inflation (Goldilocks regime, or extension of the current sluggish regime).

This puts us in a position to use the betas in combination with company data (if available) to quantify the potential performance of key metrics under each scenario.

This exercise might trigger further bespoke work on macroeconomic performance drivers, including the company's specific cost structure, how it's affected by likely price drivers such as tariffs, how a cooling labor market might offset these effects, or how shifting consumer demand could drive growth.

To illustrate how the analysis might fit into the broader diligence process, the fund managers might conclude in a downside case in the valuation model that if the risk of stagflation is seen as material, the current negotiating price overstates the company's value, but that the company's performance would hold up well under a temporary inflation spike that does not coincide with lower growth.

Use case 2: Portfolio Risk Assessment

Scenario: *A multi-asset manager is concerned about rising inflation and wants to understand the degree of inflation exposure in their private equity allocations.*

In this case, we would start by working with the manager to develop a set of scenarios that capture the inflation risks they've identified, including an assessment of the likelihood of these outcomes based on current data. As before, we might end up with an extended Stagflation vs. temporary Overheating followed by a Financially Constrained Economy.

We would then look at the information we have on the cyclicality of distributions and returns in the private equity industry at large to get a sense of how distributions and returns are typically affected under these scenarios.

But this would only be a qualitative starting point, since each portfolio is different. The fund has information on the portfolio holdings of each of its private equity fund investments, as well as information on the age of each portfolio company. This is sufficient information to utilize the industry betas to calculate the weighted sensitivity of the fund's overall exposure to inflation.

Depending on the needs of the manager, this could be a qualitative assessment ("high risk due to exposure to inflation-sensitive underlying assets requiring hedging activity elsewhere in the portfolio") or a quantitative exercise modeling the impact on distributions relative to the manager's base case.

This could easily be extended to public investment holdings, and the option for more detailed downside and upside modelling is available using custom factor values or quartile betas, and incorporated into other stress-testing and risk management procedures.

Use case 3: Fund Investment Strategy

Scenario: *A newly launched private equity fund is developing its investment strategy and considering including "inflation resilience" as a key theme.*

This is where the betas shine. Not only can we easily identify industries that continue to generate growth during inflation spikes, but also the industries with the most consistent ability to protect or even enhance margins when prices rise. We would also know where valuations hold up best, and where leverage tends to become problematic as inflation rises.

The quintile betas enable us to drill down on the distributions. We could use them to filter out industries with strong median performance on inflation but high risk in the tails. Conversely, we might identify industries with weak median performers but where some companies perform strongly and might be undervalued (e.g., travel and accommodation)

A second stage of the analysis might drill down into the data set behind the betas to examine case studies of specific companies that have demonstrated particularly strong performance during inflationary episodes, to understand the performance drivers and refine targeting.

APPENDIX A: Industry Classification

arcMacro Industry Classification

Sector	Industry	Companies in Sample	Industry Description	Cyclicality Summary
Commercial services	1 Professional Services	427	Consultancy, legal, accounting, engineering, and specialized advisory services	Growth-sensitive with persistent inflation-related margin pressure
	2 Administrative services	73	Business support including staffing, facilities management, security, and administrative outsourcing	Highly defensive industry across performance metrics and macro factors
Construction	3 Other Construction	29	Infrastructure construction including roads, bridges, utilities, and heavy civil engineering	Extremely sensitive to growth and inflation
	4 Building Construction	25	Residential, commercial, and industrial building construction and related contracting services	Margins love inflation, valuations are sensitive to growth and credit availability
Consumer Services	5 Healthcare Services	72	Hospitals, clinics, medical laboratories, healthcare technology, and specialized medical service providers	Margins grow and shrink with the real economy
	6 Entertainment	70	Media production, broadcasting, gaming, sports, music, and entertainment content companies	Margins track growth, while stock valuations are credit-sensitive
	7 Food Services	45	Restaurant chains, food service management, catering, and hospitality dining operations	Inflation hurts across the board as costs can't easily be passed on
	8 Accommodation	24	Hotels, resorts, lodging facilities, and hospitality accommodation service providers	High variability in macro sensitivity within the industry
	9 Educational services	16	Private educational institutions, training providers, and educational technology companies	Stable revenue model, high interest rate sensitivity
	10 Personal and Social Services	13	Personal care, social services, business services, and community-based service organizations	Growth-driven, with inflation creating margin pressure
Light intermediate manufacturing	11 Medical Manufacturing	126	Manufacturers of medical/diagnostic devices and equipment	Recession-resistant across all measures
	12 Lumber processing	22	Forest products, lumber, paper, packaging materials, and wood product manufacturers	Cyclical exposure to all economic factors
	13 Printing and publishing	10	Publishing houses, printing services, media companies, and digital content producers	Margins track credit/pricing cycles, limited revenue pass-through
	14 Textiles Manufacturing	7	Textile production, fabric manufacturing, and fiber processing for industrial and consumer use	Inflation squeezes margins, moderate cyclicality otherwise
Heavy intermediate manufacturing	15 Chemical Manufacturing	486	Producers of basic or specialty chemicals, petrochemicals, fertilizers	Mild economic sensitivity across most metrics
	16 Machinery Manufacturing	108	Industrial machinery, construction equipment, and manufacturing systems	Credit-driven margins, broad economic sensitivity elsewhere
	17 Metal Product Manufacturing	47	Fabricated metal products, tools, structural components, and specialty metal manufacturing	Modest economic sensitivity across the board
	18 Primary Metal Manufacturing	20	Steel, aluminum, copper, and primary metal production from raw materials and recycling	Commodity-linked cyclicality across growth and inflation
	19 Specialty Materials Manufacturing	14	Advanced materials, composites, plastics, chemicals, and engineered specialty products	Inflation margin pressure, moderate cyclicality elsewhere
Final manufacturing	20 Electronics Manufacturing	235	Semiconductor, computer, telecommunications equipment, and consumer electronics manufacturers	Classicly cyclical - everything moves with the economy
	21 Vehicle Manufacturing	101	Automotive, truck, motorcycle, aerospace, and transportation equipment manufacturers	Growth-driven, with inflation creating margin pressure
	22 Food & Beverage Manufacturing	79	Food processing, beverage production, packaged goods, and agricultural product manufacturers	Inflation squeezes margins despite stable demand
	23 Appliance Manufacturing	43	Household appliances, consumer durables, and home improvement product manufacturers	More credit sensitive than other manufacturing industries
	24 Clothing Manufacturing	27	Apparel, footwear, textiles, and fashion accessory manufacturers for consumer markets	Growth tracks the broader economy
	25 Furniture Manufacturing	17	Furniture, fixtures, home furnishings, and interior design product manufacturers	Growth-driven, with inflation creating margin pressure
Finance	26 Investments	475	Investment management, asset management, securities trading, and capital markets services	Profitability track financial conditions, while valuations are hit by all factors
	27 Conglomerates & Holding Companies	150	Diversified corporations with subsidiaries across multiple unrelated industries and business segments	Diversified stability with some credit market exposure in valuations
	28 Banks	361	Commercial banks, regional banks, and financial institutions providing lending and deposit services	Largely cyclically stable, but inflation harms valuation as tighter credit gets priced
	29 Funds & Trusts	133	Investment funds, mutual funds, ETFs, trusts, and institutional asset management services	Highly leveraged financial conditions
	30 Insurance	89	Life, property, casualty, health, and specialty insurance providers and insurance brokers	Defensive operations, valuations swing with financial markets
	31 Leasing	18	Equipment leasing, vehicle leasing, real estate leasing, and asset financing services	Broadly defensive
Real Estate	32 Real Estate	181	Property development, investment, management, and real estate services including REITs	Highly leveraged to growth and credit, inflation has a mixed impact across the industry
Resources	33 Mining Services	74	Support services for mining operations including drilling, equipment, logistics, and technical services	Stable margins, revenues swing wildly with commodity prices
	34 Oil and Gas	63	Upstream and downstream oil companies including exploration, production, refining, and distribution	Extreme inflation/credit sensitivity, revenues highly commodity price dependent
	35 Mining	38	Extraction of minerals, metals, coal, and raw materials through surface and underground operations	Credit-sensitive margins, revenues highly volatile to commodity cycles
	36 Petroleum products manufacturing	16	Oil refining, petrochemical processing, and petroleum product distribution companies	Rides the commodity price wave across all metrics
Retail	37 Specialty Retailing	56	Focused retail chains serving specific product categories or consumer demographics	High grwoth cyclicality - consumer discretionary dynamics
	38 Clothing Retailing	28	Apparel retailers, fashion chains, footwear, and clothing accessory retail operations	Similar to as clothing manufacturing, growth drives sales and margins
	39 Vehicle Retailing	25	New and used vehicle dealerships, automotive retail, and vehicle financing services	High cyclicality across all metrics (discretionary purchase timing)
	40 Online Retailing	22	E-commerce platforms, direct-to-consumer brands, and digital retail operations	Inflation pressure on margins, but otherwise stable
	41 General Merchandise Retailing	13	Department stores, big box retailers, and general merchandise chains	Growth-dependent with inflation headwinds
Technology	42 Software	155	Software development, enterprise applications, operating systems, and technology platform providers	Inflation hurts margins, valuations extremely growth-sensitive
	43 Internet	51	Internet services, e-commerce platforms, digital content, and web-based technology companies	Highly cyclical across all metrics and economic factors
	44 Telecommunications	32	Wireless, broadband, fiber optic, and telecommunications infrastructure service providers	Mostly defensive, with some mild inflation sensitivity in valuations (future interest cost risks)
Transport	45 Other Transportation	37	Rail, maritime, pipeline, logistics, and specialized freight transportation services	Inflation headwind for margins, moderate cyclicality elsewhere
	46 Trucking	16	Freight trucking, logistics, delivery services, and ground transportation companies	Inflation actually helps margins, moderate cyclicality elsewhere
	47 Air Transportation	13	Passenger airlines, cargo carriers, and aviation services including aircraft leasing	Highly sensitive to eocnomic growth, but inflation actually helps margins
Utilities	48 Utilities	98	Electric, gas, water, waste management utilities and renewable energy infrastructure providers	Generally low cyclicality, indexing creates relatively strong performance when inflation rises
Wholesale	49 Durables Wholesaling	82	Wholesale distribution of industrial and consumer durable manufactured goods	Inflation is friendly to margins, growth/credit drives valuations
	50 Consumables Wholesaling	33	Wholesale distribution of food, beverages, consumer products, and non-durable goods	Margins follow economic growth, revenues surprisingly stable

APPENDIX B:
Corporate Beta Summaries

Corporate Revenue Sensitivity to Economic Cycles

Quantile regression coefficients of quarterly revenue growth on arcMacro factors

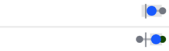
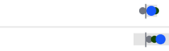
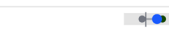
Industry	Quantile Regression Coefficients (β)			Cyclicality Summary
	Real	Price	Financial	
Accommodation				High variation within industry
Administrative services				Broadly cyclical
Air Transportation				High variation within industry, primarily real factor sensitive
Appliance Manufacturing				Credit sensitive with some inflation protection
Banks				Stable revenue, low inflation pass-through
Building Construction				Limited price pass-through, highly credit/real sensitivity
Chemical Manufacturing				Broadly cyclical
Clothing Manufacturing				Not credit sensitive
Clothing Retailing				Not credit sensitive
Conglomerates & Holding Companies				Broadly cyclical
Consumables Wholesaling				Stable through-cycle revenue - low real/credit cyclicality with inflation pass-through
Durables Wholesaling				Broadly cyclical
Educational services				Stable through-cycle revenue - low real/credit cyclicality with inflation pass-through
Electronics Manufacturing				Broadly cyclical
Entertainment				Broadly cyclical
Food & Beverage Manufacturing				Relatively stable through-cycle revenue
Food Services				Not credit sensitive, offers inflation protection
Funds & Trusts				Low real cyclicality
Furniture Manufacturing				Limited price pass-through
General Merchandise Retailing				Not credit sensitive
Healthcare Services				Stable through-cycle revenue
Insurance				Low real cyclicality, broadly stable through cycle
Internet				Real-cycle sensitive, with limited price pass-through, low credit sensitivity
Investments				Credit sensitive
Leasing				Low real cyclicality
Lumber processing				Broadly cyclical
Machinery Manufacturing				Broadly cyclical
Medical Manufacturing				Not credit sensitive
Metal Product Manufacturing				Broadly cyclical
Mining				Highly credit/price sensitive
Mining Services				Highly price sensitive with variation on credit exposure
Oil and Gas				Highly price/real sensitive with variation on credit exposure
Online Retailing				Not credit sensitive
Other Construction				Broadly cyclical
Other Transportation				Broadly cyclical
Personal and Social Services				Stable through-cycle revenue
Petroleum products manufacturing				No credit sensitive, strongly price/real cyclical
Primary Metal Manufacturing				Highly cyclical
Printing and publishing				Limited price pass-through
Professional Services				Broadly cyclical
Real Estate				Stable through-cycle revenue, with significant but low cyclicality
Software				Broadly cyclical
Specialty Materials Manufacturing				Broadly cyclical
Specialty Retailing				Broadly cyclical
Telecommunications				Stable through-cycle revenue with some price pass-through
Textiles Manufacturing				Broadly cyclical
Trucking				Broadly cyclical
Utilities				Low credit/real sensitivity, but with price pass-through
Vehicle Manufacturing				Broadly cyclical
Vehicle Retailing				High real sensitivity with limited price pass-through, wide variation in credit sensitivity

Legend: Bottom quartile · Median · Top Quartile · 90% Confidence Interval for Median · | Zero

Source: arcMacro

Corporate EBITDA Margin Sensitivity to Economic Cycles

Quantile regression coefficients of quarterly ebitda margin on arcMacro factors

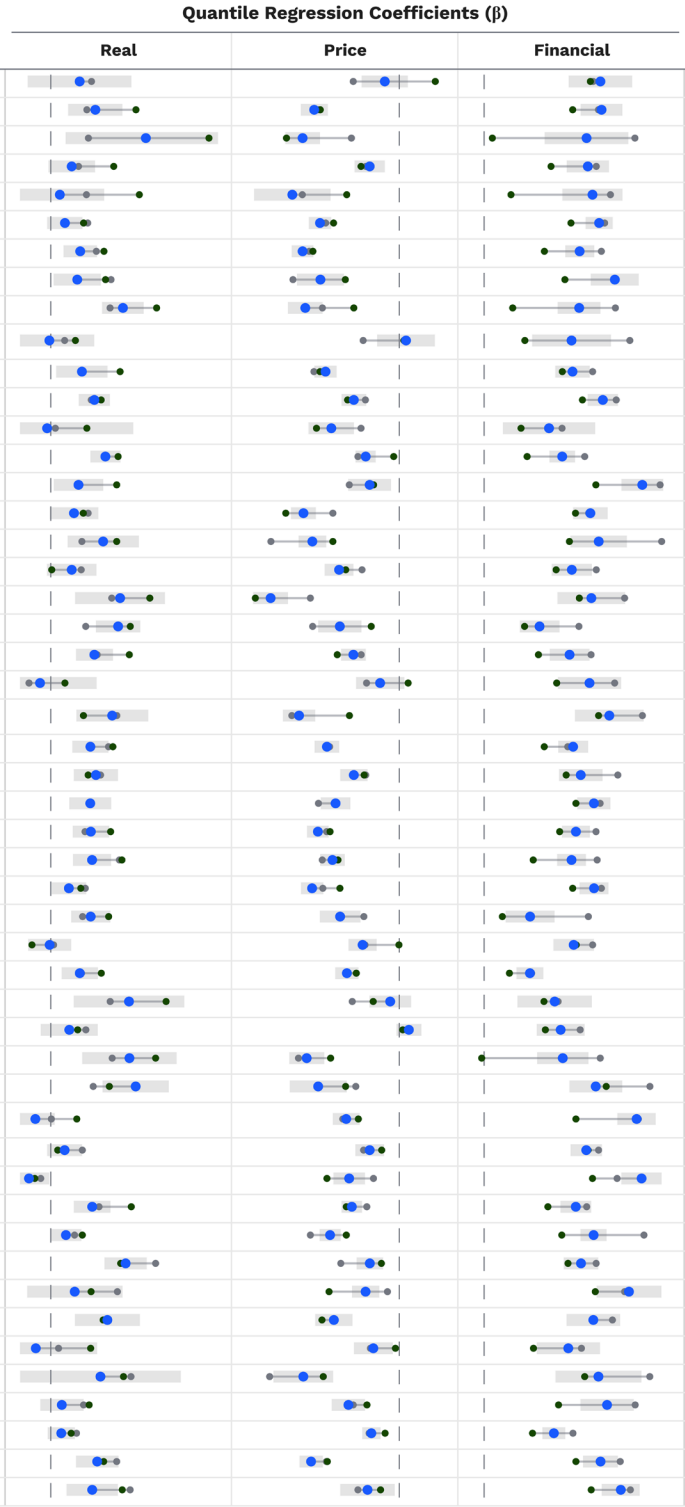
Industry	Quantile Regression Coefficients (β)			Cyclicality Summary
	Real	Price	Financial	
Accommodation				No real or price cyclicality
Administrative services				Defensive
Air Transportation				Hurt by inflation
Appliance Manufacturing				Geared to financial conditions only
Banks				Geared to real growth
Building Construction				Geared to inflation and financial conditions
Chemical Manufacturing				Mildly real-economy cyclical
Clothing Manufacturing				Geared to real growth, hurt by inflation
Clothing Retailing				Geared to real growth
Conglomerates & Holding Companies				Defensive
Consumables Wholesaling				Geared to real growth
Durables Wholesaling				Benefits from inflation
Educational services				Defensive, offers inflation compensation
Electronics Manufacturing				Broadly cyclical
Entertainment				Geared to real growth, hurt by inflation
Food & Beverage Manufacturing				Low cyclicality, hurt by inflation
Food Services				Low cyclicality, hurt by inflation
Funds & Trusts				Highly geared to inflation/credit cycle
Furniture Manufacturing				Geared to growth, hurt by inflation
General Merchandise Retailing				Geared to growth, hurt by inflation
Healthcare Services				Geared to growth, hurt by inflation
Insurance				Defensive
Internet				Geared to growth, hurt by inflation
Investments				Geared to financial conditions
Leasing				Defensive
Lumber processing				Mild cyclicality, offers inflation protection
Machinery Manufacturing				Geared to credit cycle
Medical Manufacturing				Defensive
Metal Product Manufacturing				Mildly real-economy cyclical
Mining				Geared to price cycle
Mining Services				Defensive
Oil and Gas				Extremely geared to inflation/credit cycle, anti-cyclical in growth
Online Retailing				Hurt by inflation
Other Construction				Geared to growth and inflation
Other Transportation				Hurt by inflation
Personal and Social Services				Geared to growth, hurt by inflation
Petroleum products manufacturing				Geared to growth and inflation
Primary Metal Manufacturing				Geared to growth and inflation
Printing and publishing				Geared to price/credit cycle
Professional Services				Geared to growth, hurt by inflation
Real Estate				Highly geared to growth/credit cycle, hurt by inflation
Software				Hurt by inflation
Specialty Materials Manufacturing				Hurt by inflation
Specialty Retailing				Geared to growth
Telecommunications				Defensive
Textiles Manufacturing				Hurt by inflation
Trucking				Benefits from inflation
Utilities				Broadly cyclical, (mostly) benefits from inflation
Vehicle Manufacturing				Geared to growth, hurt by inflation
Vehicle Retailing				Broadly cyclical, benefits from inflation

Legend: Bottom quartile · Median · Top Quartile · 90% Confidence Interval for Median · Zero

Source: arcMacro

Corporate Price-to-Book Sensitivity to Economic Cycles

Quantile regression coefficients of quarterly price-to-book ratio on arcMacro factors



Industry	Real	Price	Financial	Cyclicality Summary
Accommodation				Financial gearing only
Administrative services				Highly geared to all three factors
Air Transportation				Highly variable within industry
Appliance Manufacturing				Mild but significant inflation exposure
Banks				Exposed to inflation (future financial conditions?)
Building Construction				Tails more growth-geared, hurt by inflation
Chemical Manufacturing				High gearing to all three factors
Clothing Manufacturing				High gearing to all three factors
Clothing Retailing				High gearing to all three factors
Conglomerates & Holding Companies				Financial gearing only, good inflation protection
Consumables Wholesaling				Geared to all three factorss
Durables Wholesaling				High growth/financial gearing
Educational services				Low growth/financial gearing
Electronics Manufacturing				Geared to all three factorss
Entertainment				High financial gearing
Food & Beverage Manufacturing				Highly exposed to inflation
Food Services				Highly geared to all three factors
Funds & Trusts				Not geared to growth
Furniture Manufacturing				Highly geared to all three factors
General Merchandise Retailing				Geared to all three factors
Healthcare Services				Geared to all three factors
Insurance				Financial gearing only
Internet				High gearing to all three factors (overall most cyclical median)
Investments				Geared to all three factors
Leasing				Geared to all three factors
Lumber processing				Geared to all three factors
Machinery Manufacturing				Geared to all three factors
Medical Manufacturing				Geared to all three factors
Metal Product Manufacturing				Geared to all three factors
Mining				Relatively low price gearing
Mining Services				Relatively low price gearing
Oil and Gas				Relatively low price gearing
Online Retailing				Relatively low price gearing (substitution?)
Other Construction				Financial gearing only
Other Transportation				Geared to all three factors
Personal and Social Services				Tails are less growth/inflation exposed
Petroleum products manufacturing				Not geared to growth
Primary Metal Manufacturing				Not geared to growth
Printing and publishing				Countercyclical in growth (subscriptions?)
Professional Services				Geared to all three factors
Real Estate				Not geared to growth, high financial gearing
Software				Very high growth gearing
Specialty Materials Manufacturing				Tails more growth-geared
Specialty Retailing				Highly geared to all three factors
Telecommunications				Not geared to growth, low inflation gearing
Textiles Manufacturing				Tails more growth-geared
Trucking				Tails more growth-geared
Utilities				Low gearing across factors
Vehicle Manufacturing				Highly geared to all three factors
Vehicle Retailing				Highly geared to all three factors

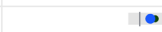
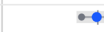
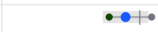
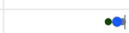
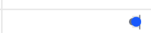
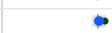
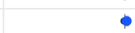
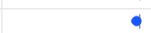
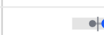
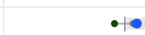
Quantile Regression Coefficients (β)

Legend: Bottom quartile · Median · Top Quartile · 90% Confidence Interval for Median · Zero

Source: arcMacro

Corporate Interest Coverage Sensitivity to Economic Cycles

Quantile regression coefficients of quarterly interest coverage ratio on arcMacro factors

Industry	Quantile Regression Coefficients (β)			Cyclicality Summary
	Real	Price	Financial	
Accommodation				Small but significant in all three factors
Administrative services				No significant relationships
Air Transportation				Significant in all three factors, inflation decreases interest coverage
Appliance Manufacturing				No significant relationships
Banks				No significant relationships
Building Construction				Interest coverage improves significantly with inflation and financial conditions
Chemical Manufacturing				Mildly sensitive to financial conditions
Clothing Manufacturing				Inflation reduces interest coverage
Clothing Retailing				Wide dispersion in exposures
Conglomerates & Holding Companies				Significant in growth and inflation
Consumables Wholesaling				Mildly sensitive to inflation
Durables Wholesaling				No significant relationships
Educational services				High variation, interest costs accrue when finacncing is easy
Electronics Manufacturing				No significant relationships
Entertainment				Small but significant in price and real factors
Food & Beverage Manufacturing				Mildly sensitive to financial conditions
Food Services				Mildly sensitive to inflation
Funds & Trusts				No significant relationships
Furniture Manufacturing				No significant relationships
General Merchandise Retailing				No significant relationships
Healthcare Services				No significant relationships
Insurance				Mildly inflation sensitive
Internet				Mildly sensitive to financial conditions
Investments				No significant relationships
Leasing				No significant relationships
Lumber processing				Mildly inflation sensitive
Machinery Manufacturing				Mildly inflation sensitive
Medical Manufacturing				Mildly inflation sensitive
Metal Product Manufacturing				Mildly inflation sensitive
Mining				Mildly inflation sensitive
Mining Services				No significant relationships
Oil and Gas				Interest costs accrue when the economy is growing
Online Retailing				Procyclical in real factor
Other Construction				No significant relationships
Other Transportation				No significant relationships
Personal and Social Services				No significant relationships
Petroleum products manufacturing				Significant in all three factors
Primary Metal Manufacturing				Inflation improves interest coverage
Printing and publishing				No significant relationships
Professional Services				No significant relationships
Real Estate				No significant relationships
Software				Inflation reduces interest coverage
Specialty Materials Manufacturing				Inflation improves interest coverage
Specialty Retailing				No significant relationships
Telecommunications				Inflation mildly reduces interest coverage
Textiles Manufacturing				Coverage improves with financial conditions
Trucking				Inflation improves interest coverage
Utilities				No significant relationships
Vehicle Manufacturing				Mildly cyclical in all three factors
Vehicle Retailing				No significant relationships

Legend: Bottom quartile · Median · Top Quartile · 90% Confidence Interval for Median · Zero

Source: arcMacro

arc MACRO