PIMCO

Viewpoints
December 2010

Asset Allocation: Does Macro Matter?

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Asset allocators often focus on valuation levels to determine which asset class is "cheap" or "overvalued" without consideration for where global or regional economies might be heading. If an asset class's valuation looks attractive relative to historical levels, then now must be a good time to buy, they reason. This approach might work in normal markets, but such a focus on the rearview mirror can lead to disastrous investment outcomes when important macroeconomic shifts take place. In asset allocation, "macro matters," and thorough, insightful forecasting of future macroeconomic conditions in key global asset markets is crucial. Careful analysis can then translate macroeconomic views into capital market expectations. As our colleague Vineer Bhansali argues in his recent book, *Bond Portfolio Investing and Risk Management* (2010),

> *"Incorporating the economic environment can only add to the accuracy of pricing models.… This direction of research is bringing to the forefront of our profession what we already know intuitively: The economic state of the world does matter."*

A close look at the relationships between macroeconomic conditions and risk factor performance helps explain just why macro matters so much. Risk factors are the primary drivers of returns across asset classes and they include, for example, equity risk, interest rate risk, commodity price risk, credit risk and liquidity risk. By combining this quantitative relationship model with top-down qualitative views, we can estimate forward-looking risk factor performance. It's a three-step process:

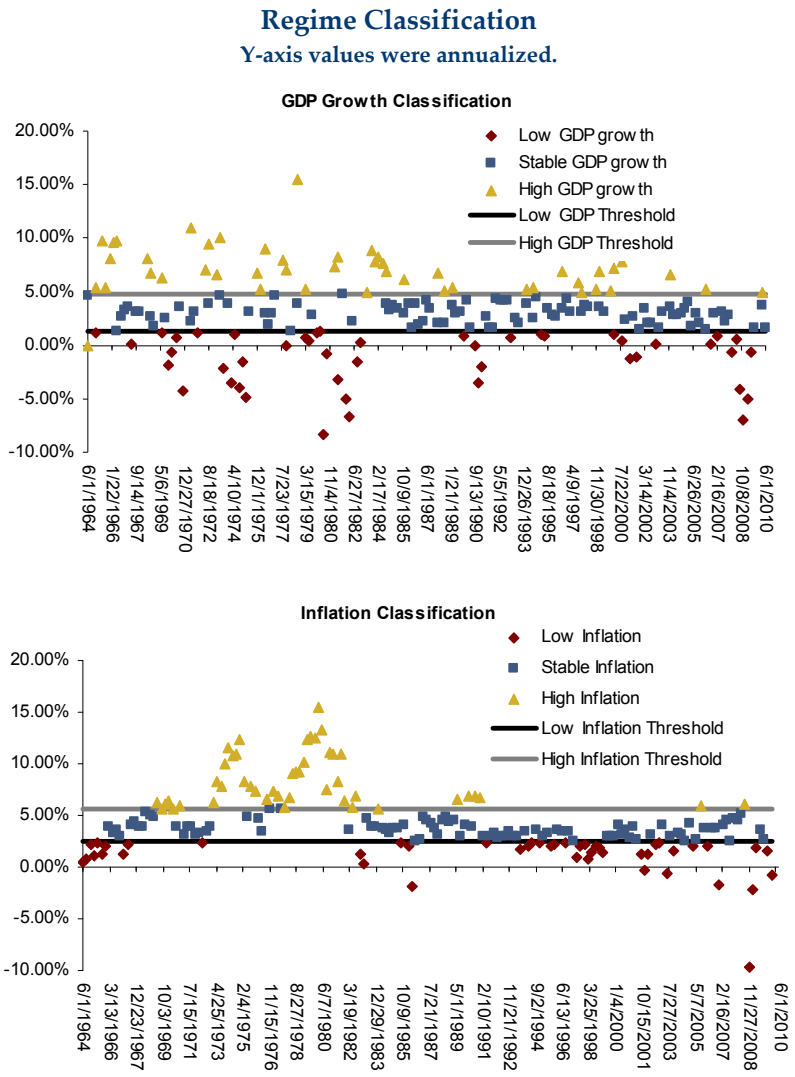
1. Start from the top: Forecast regional GDP growth and inflation.
2. Create a base case: Map these forecasts to a collection of similar historical periods (a "regime") and calculate average risk factor performance during this regime.
3. Formulate views around a base case: Blend regime-specific historical averages with views on expected risk factor performance.

Macroeconomic Regimes

Our model defines the economic state of the world as a function (that is, a mathematical relationship) of expected GDP growth and expected inflation. We start by partitioning quarterly time periods from June 1964 to June 2010 into nine macroeconomic regimes, building a 3×3 grid with cells that correspond to the intersections between

- Low, stable, and high GDP growth; and
- Low, stable, and high inflation.

We calibrate the nine regimes such that each category of "low," "stable" and "high" contains one-third of the observations. Figure 1 shows the resulting levels of GDP and inflation in annualized terms. This definition of regimes is, of course, arbitrary; it is meant for illustrative purposes. However, to partition the data differently shouldn't meaningfully change our conclusions.



Source: Haver Economics
Y-axis values were annualized.
GDP is Real Gross Domestic Product (SAAR, Bil.Chn.2005$)
Inflation is CPI: All Items (SA, Dec-77=100)
Data series from 6/1/1964 to 6/1/2010. Frequency is quarterly.

Figure 1

To model the regime-specific performance of risk factors, we must recognize that risk factor performance *anticipates* the macroeconomic environment. For example, equity returns are

considered a leading indicator of GDP growth. We must, therefore, model the relationships between risk factor performance and *subsequent* GDP growth and inflation. Figure 2 shows the performance of key risk factors in anticipation of the next quarter's macroeconomic regime. Results are shown in nominal terms, but real return results can be inferred by subtracting the reported average inflation in each cell.

Annualized Risk Factor Performance as a Function of Next Quarter's Economic Conditions

Inflation	Factors	GDP growth: Low	GDP growth: Stable	GDP growth: High
Low	Eq. beta	-14.4%	15.8%	17.3%
	Corp. spread	-1.1%	-0.4%	0.2%
	Duration	4.7%	4.5%	1.7%
	Real duration	-5.5%	-5.4%	-3.5%
	Slope	0.4%	0.2%	0.1%
	Cmdty beta	-6.1%	-3.7%	4.3%
	Gold beta	9.9%	1.6%	5.3%
	Avg. Inflation	0.6%	1.7%	1.9%
Stable	Eq. beta	5.8%	8.2%	9.4%
	Corp. spread	-0.3%	0.4%	0.5%
	Duration	1.0%	0.0%	-2.3%
	Real duration	-2.6%	-3.2%	4.6%
	Slope	0.4%	-0.1%	0.1%
	Cmdty beta	4.4%	-1.3%	5.0%
	Gold beta	8.7%	2.9%	1.7%
	Avg. Inflation	3.6%	3.6%	3.6%
High	Eq. beta	-10.9%	7.8%	14.1%
	Corp. spread	-0.8%	0.0%	1.0%
	Duration	-3.1%	-1.9%	-3.4%
	Real duration	2.3%	2.6%	10.0%
	Slope	0.3%	-0.2%	-0.6%
	Cmdty beta	7.2%	11.5%	9.2%
	Gold beta	20.3%	3.0%	9.1%
	Avg. Inflation	8.2%	6.3%	7.3%

Figure 2

Hypothetical example for illustrative purposes only. Macroeconomic Variables and Risk Factor Definitions:
GDP: Real Gross Domestic Product (SAAR, Bil.Chn.2005$)
Inflation: CPI: All Items (SA, Dec-77=100)
Equity Beta: S&P 500
Corp. Spread: Moody's Seasoned Aaa Corporate Bond Yield minus 10-Year Treasury Note Yield at Constant Maturity; and Moody's Seasoned Baa Corporate Bond Yield minus 10-Year Treasury Note Yield at Constant Maturity.
Duration: 10-Year Treasury Note Yield at Constant Maturity
Real Duration: Treasury Inflation Protected Securities (TIPS) return data
Slope: 10-Year Treasury Note Yield at Constant Maturity - 1-Year Treasury Bill Yield at Constant Maturity
Commodity beta: KR-CRB Spot Commodity Price Index: All Commodities
Gold beta: U.K.: Commodity Price Index: Gold {London}
Dataset from 6/1/1964 to 6/1/2010. Each cell contains at least 13 quarters of data and as much as 66 quarters.

Sources: Haver Economics. Treasury Inflation-Protected Securities (TIPS) data is from Bloomberg and PIMCO, and includes a proprietary backfilling model.

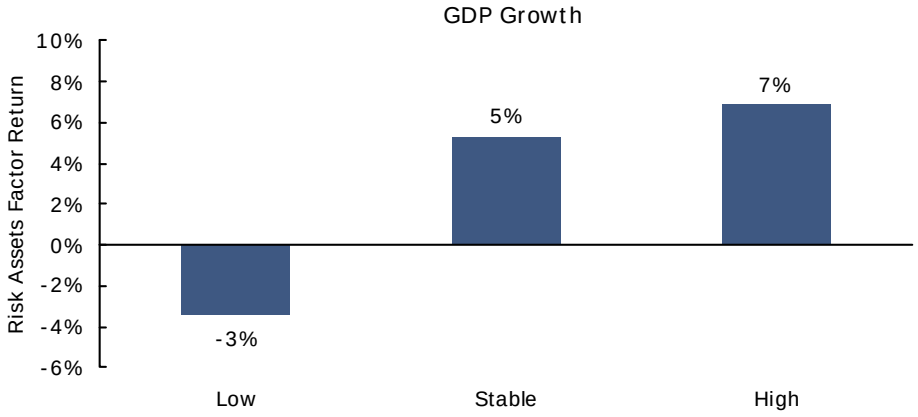
We calibrate the such that each category of "low," "stable" and "high" contains one-third of the observations, as shown in Figure 1. Nine regimes are then created from the intersection of these regimes. Risk Factor Performance ("factor return") represents an annualized average of the historical factor change during each regime multiplied by assumed factor duration ("factor loading"). Performance for corporate spread is an average of investment grade spread and high yield spread performance. Assumed factor loadings are as follows: equity beta: 1.0, corporate spread: 2.0 (for both investment grade and high yield), duration: 5.0, real duration: 10.0, slope duration: 1.0, commodity beta: 1.0, gold beta: 1.0.

The characteristics of regimes change over time, and the correlations between macroeconomic variables and risk factor performance may breakdown during stress periods.

This risk factor breakdown reveals the following empirical findings:

1. GDP growth expectations drive the performance of risk assets (equities and corporate spreads). Stocks and spreads underperform in anticipation of bad economic news, and they outperform in anticipation of economic growth. This relationship is highlighted in Figure 3.

Risk Assets Factor Returns (Annualized) as a Function of Anticipated GDP Growth
(Chart shows the average of corporate spreads and equities, which is then averaged across inflation regimes.)



Sources: Haver Economics, PIMCO

Hypothetical example for illustrative purposes only. Annualized, simple averages across risk asset factors (equity and corporate spreads). See Figure 2 and its footnote for source data.

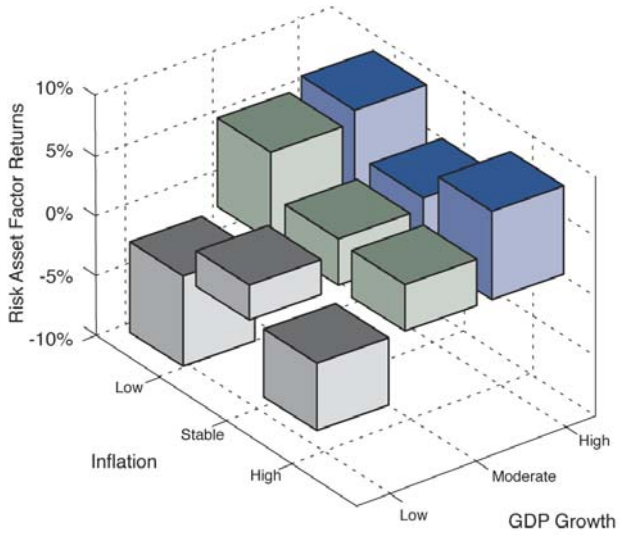
Regime partitions ("low", "stable", and "high") are the same as shown in Figure 1.

Figure 3

Figure 4 further dissects the results shown in Figure 3 by showing risk assets factor returns conditioned on both GDP growth and inflation. This breakdown reveals inflation isn't a main driver of returns for risk assets, although stable inflation cushions the negative impact of recessions. High inflation is not as negative for risk assets as one might expect because equities may provide an inflation hedge when companies pass price increases to customers (for more on this topic, see *Barra Research Bulletin: Hedging Inflation with Equities*, July 2008).

Risk Assets Factor Returns Conditioned on Anticipated GDP Growth and Inflation

(Chart shows the average of corporate spreads and equities – full breakdown is shown in Figure 2.)



Sources: Haver Economics, PIMCO

Hypothetical example for illustrative purposes only. Annualized, simple averages across risk asset factors (equity and corporate spreads). See Figure 2 and its footnote for source data.

Regime partitions ("low", "stable", and "high") are the same as shown in Figures 1 and 2.

Figure 4

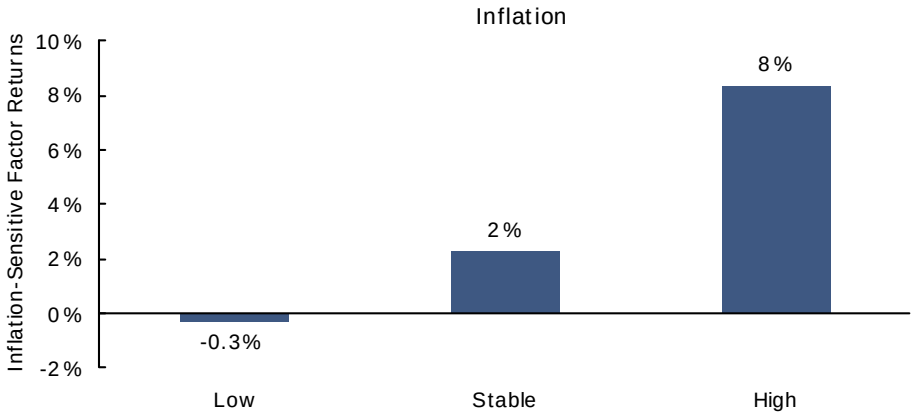
2. Looking back at the grid in Figure 2, the duration factor, defined as the total return on a five-year duration long position in the 10-year Treasury yield, suffers in the high inflation / high growth cell. In such an environment, investors expect the Fed to increase rates to cool off an overheating economy. By the same logic, the low inflation / low growth environment is a positive for duration as investors expect rates to decrease as stimulus for a moribund economy.

3. The slope factor, defined as the total return from being long 10-year and short 2-year Treasury yields, performs well in anticipation of low growth environments and performs badly in anticipation of high growth environments. This result is well known and explains why the yield curve is often used as a recession crystal ball. From *The Wall Street Journal* (August 16, 2010):

   "Nearly every time the yield on short-term debt has surpassed the yield on long-term debt, a recession has followed. Meanwhile, a 'steep' yield curve, when long-term rates are much higher than short-term ones, usually augurs strong economic growth."

4. Inflation-sensitive factors (TIPS spreads, gold and commodities) are clearly, well, inflation sensitive. This result is highlighted in Figure 5, which shows the performance of inflation-sensitive factors as a function of anticipated inflation.

Inflation-Sensitive Factor Returns as a Function of Anticipated Inflation
(Chart shows the average across TIPS (Real Return), Gold, and Commodities, which is then averaged across GDP regimes – full breakdown is shown in Figure 2.)



Sources: Haver Economics, PIMCO

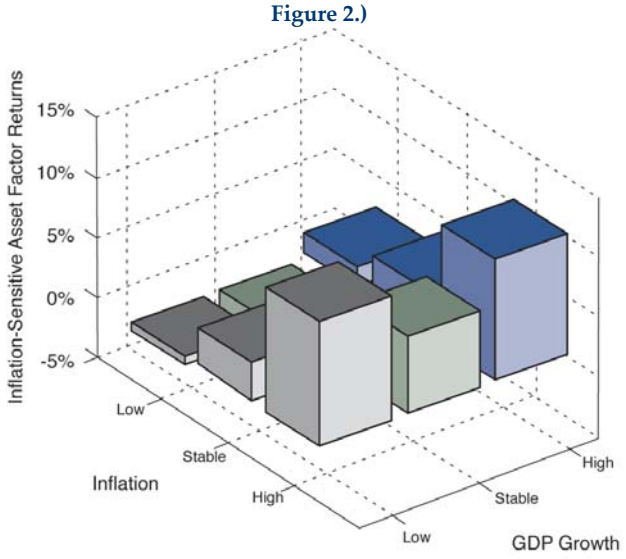
Hypothetical example for illustrative purposes only. Annualized, simple averages across inflation sensitive factors (TIPS (Real Return factor), Gold, and Commodities). See Figure 2 and its footnote for source data.

Regime partitions ("low", "stable", and "high") are the same as shown in Figure 1.

Figure 5

Figure 6 further dissects this result as a function of both GDP growth and inflation. Inflation-sensitive factors appear somewhat insensitive to GDP growth. However, notice the u-shaped effect created by the lower performance of inflation-sensitive assets during stable GDP growth, compared to low or high GDP growth. This result suggests stable GDP growth alleviates inflation concerns. The high performance of inflation-sensitive factors in low GDP growth environments is primarily driven by gold's performance as a last-refuge asset.

Inflation-Sensitive Factor Returns Conditioned on Anticipated GDP Growth and Inflation
(Chart shows the average across TIPS, Gold, and Commodities – full breakdown is shown in Figure 2.)



Sources: Haver Economics, PIMCO

Hypothetical example for illustrative purposes only. Annualized, simple averages across inflation sensitive factors (TIPS (Real Return factor), Gold, and Commodities). See Figure 2 and its footnote for source data.

Regime partitions ("low", "stable", and "high") are the same as shown in Figures 1 and 2.

Figure 6

If Only It Were This Simple

Overall, this model helps explain how *anticipated* macroeconomic conditions drive risk factor returns. In turn, risk factor returns drive asset class performance. Figure 7 summarizes our findings in terms of asset class performance.

In theory, we could map a qualitative forecast of GDP growth and inflation into one of the nine regime cells *et voilà,* we would have our expected risk factor (and thus asset class) returns. Unfortunately, successful investment management is not that simple. While the nine cells provide a good base case to formulate our views, we must consider the possibility that the relationships between macroeconomic expectations and risk factor returns might change going forward. Moreover, we must determine whether our expectations have already been priced into the markets. In other words, we must combine base case information from the nine cells with valuation considerations.

For example, currently PIMCO's New Normal secular (three- to five-year) view attaches a higher than average probability to the Low/Stable GDP Growth / High Inflation cells. Commodities and TIPS would be expected to do well, but nominal bonds likely would not. However, PIMCO's cyclical (six- to 12-month) view attaches a higher than average probability to the Low/Stable GDP Growth / Low Inflation cells – which argues for nominal bonds and against commodities and TIPS. Equities could go either way depending on growth. At some point, the economy will reach a tipping point as cyclical forces of disinflation are overwhelmed by secular forces of inflation. When this shift happens, TIPS

and commodities will be the assets of choice vs. nominal bonds, and the attractiveness of equities will depend on expectations of economic growth. (The higher, the better for equities and other risk assets.) In the current environment, it is more important than ever to "get macro right." Investors must anticipate the switch from lower growth to higher growth, and from lower inflation to higher inflation. Our analysis also speaks to the importance of being tactical in asset allocation and anticipating these market migrations. The markets cannot be expected to wait for investors to hold their scheduled annual asset allocation reviews, although that would be nice.

Asset Class Performance as a Function of Anticipated Macroeconomic Conditions

Inflation \ GDP Growth	Low	Stable	High
Low	Outperform: Nominal Bonds, Gold Underperform: Equities, TIPS, Corporate Bonds, Commodities	Outperform: Equities, Nominal Bonds Underperform: TIPS, Corporate Bonds, Commodities	Outperform: Equities, Corporate Bonds, Commodities Underperform: TIPS
Stable	Outperform: Commodities, Nominal Bonds, Gold Underperform: TIPS, Corporate Bonds	Outperform: Equities, Corporate Bonds Underperform: TIPS, Commodities	Outperform: Equities, Corporate Bonds, Commodities Underperform: Nominal Bonds
High	Outperform: TIPS, Commodities, Gold Underperform: Equities, Corporate Bonds, Nominal Bonds	Outperform: Equities, TIPS, Commodites Underperform: Nominal Bonds	Outperform: Equities, TIPS, Commodities Underperform: Nominal Bonds

Source: PIMCO

This exhibit merely demonstrates how various asset classes have behaved under various economic conditions and is not representative of future outcomes. Asset classes were classified under outperform or underperform in each cell based on a qualitative assessment of the risk factors constituting each class.

Figure 7

In Summary

Investors have long recognized that naïve extrapolation of past data can lead to disastrous investment outcomes. But unfortunately, data about the future is hard to find (we looked on Bloomberg and couldn't find any). Past data is all we have, and we should use it *to the extent it helps formulate forward-looking views,* such as modeling the historical relationships between macroeconomic conditions and risk factor performance (recognizing that the characteristics of regimes change over time, and the correlations between macroeconomic variables and risk factor performance may break down during stress periods).

In summary, does macro matter? Absolutely. But to determine whether an asset allocator can generate alpha based on macroeconomic forecasting is a complex question. In an efficient market, prices instantaneously incorporate new information about the economy. This new information may become available through scheduled economic data releases, or it may occur randomly in the form of unexpected specific company performance, policy decisions, natural disasters, geopolitical events, consumer behavior, investor behavior and a plethora of other factors. Alpha is generated only when the asset allocator anticipates macroeconomic conditions better than the market.

Hence, while our model's results suggest the importance of forecasting future macroeconomic conditions, they merely suggest *opportunities,* which may or may not be captured depending on the investor's ability to "out-anticipate" the market.

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This article was originally published in December 2010.

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