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How Do Macro-Financial Factors Influence Asset Classes' Performance? An Empirical Analysis.

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Abstract

Asset class returns are strongly influenced by macro-financial factors such as economic growth, inflation, and market volatility. This study empirically examines these relationships by analyzing monthly data from January 1979 to August 2024 across four major asset classes and six composite indicators derived from fifteen macro-financial variables. We calculate the average excess return of each asset class first by conditioning solely on the direction of macro-factor changes, and subsequently by considering both the direction and initial levels of these factors. Two main findings emerge. First, variations in the six macro-financial factors are statistically significant drivers of the excess returns across the four major asset classes analyzed. Second, these relationships are state-dependent, as they vary with the initial conditions of the factors. These results have relevant implications for macro-based tactical asset allocation, as they demonstrate that relying solely on changes in macro-financial factors without accounting for the levels from which these changes originate may lead to misleading conclusions. For example, both equities and high yield bonds tend to underperform their unconditional historical average annualized return when inflation increases from high levels, while they generate positive excess returns when inflation rises from low levels, which do not necessitate anti-inflationary measures from central banks. Our findings underscore the importance of incorporating initial macro-financial conditions to bolster the effectiveness of macro-based tactical asset allocation strategies.

Keywords: Tactical asset allocation, Portfolio management, Macro-financial factors, Asset class sensitivities.

JEL Codes: E44, G10, G11.

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1 Introduction

Macro-financial factors are among the main drivers of performance across various asset classes in financial markets. From a theoretical standpoint, the value of a financial instrument equates to the present value of its expected cash flows. Financial shocks, for instance, exert a positive impact on the value of *risk-free* government bonds while negatively affecting riskier asset classes such as equities and high-yield bonds. This phenomenon arises due to the uncertainty these shocks generate among market participants, leading to a *flight to quality* phenomenon. Consequently, financial shocks tend to reduce the *bond risk premium* and increase both the *equity* and *credit risk premium*. Another example of the importance of macro factors in shaping asset classes' performance is the effect of positive surprises on economic growth. Strong economic growth generally leads to higher corporate profits and cash flows (in the form of dividends and/or buybacks) for shareholders, benefiting equities. However, fixed-income instruments, which generate constant cash flows over their tenor, do not benefit from higher economic growth. Moreover, the impact of economic growth on the performance of these two asset classes is often non-linear. Indeed, if economic growth increases within an already high growth environment, both equities and government bonds may be adversely affected by the higher inflation arising from an overheating economy. In this scenario, investors typically anticipate *hawkish* responses from central banks, which increase both the *bond risk premium* and the *equity risk premium*.

The examples above demonstrate how variations in macro-financial factors can drive the performance of different asset classes. Consequently, it is essential to empirically verify the relationships between the movements of various asset classes and those of key macro-financial factors. Indeed, portfolio managers able to foresee future trends in macro-risk drivers may capitalize on these relationships to boost portfolio performance. Specifically, they can overweight asset classes positively correlated with a rising macro-factor and underweight those positively correlated with a falling macro-factor. Similarly, they can underweight asset classes negatively correlated with an increasing macro-factor and overweight those negatively correlated with a decreasing macro-factor. This approach

enables portfolio managers to implement *macro-based* tactical asset allocation strategies by deviating from the target portfolio weights specified in the strategic asset allocation, while remaining within the weight ranges defined by the investment policy. The goal is to improve portfolio performance compared to a more static approach.

In this study, we aim to investigate how asset classes typically respond to changes in macro-financial factors and to determine whether these dynamics vary depending on the initial conditions of these factors. To this end, we collect macroeconomic and financial data from Bloomberg and FRED databases, consisting of monthly observations from January 1979 to August 2024. This dataset includes four major asset classes (U.S. Equities, U.S. Government bonds, U.S. High-Yield bonds, Commodities), along with six macro-financial composite indicators derived from fifteen U.S. macro-financial variables. Our empirical analysis builds upon the framework established by Clewell et al. (2018), who calculate the average relative annual return between pairs of asset classes, conditioned on both the direction of macro-factors fluctuations and their initial levels. However, we introduce three significant modifications to their methodology. First, rather than examining relative returns between pairs of asset classes, we focus on each asset class's annualized excess return relative to its historical average, enabling us to directly assess its performance across various macro-financial environments. Second, instead of analyzing individual macro-financial variables, we construct composite indicators to provide a more comprehensive assessment of each underlying factor. Finally, our method identifies initial conditions based on data available up to each point in time, ensuring that our analysis reflects real-time information rather than relying on historical quartiles from the full sample, which could introduce issues related to real-time data availability.

The paper is structured as follows. Section 2 reviews the literature on the links between macro factors and asset class returns. Section 3 describes the dataset and outlines the methodology we employ to offer an original contribution. Section 4 discusses the empirical results. Finally, Section 5 concludes.

2 Literature Review

An extensive body of research has established a relationship between macroeconomic news announcements and short-term asset class returns, including bonds (see *e.g.*, Becker et al., 1996; Fleming and Remolona, 1999; Balduzzi et al., 2001), equities (see *e.g.*, McQueen and Roley, 1993; Flannery and Protopapadakis, 2002; Boyd et al., 2005), commodities (see *e.g.*, Hess et al., 2008; Roache and Rossi, 2010), and exchange rates (see *e.g.*, Andersen et al., 2003; Galati and Ho, 2003). Although these studies each identify different macroeconomic indicators as statistically significant, they collectively point to a consistent link between macroeconomic news and the intraday or daily returns of various asset classes. Furthermore, some studies suggest that the impact of macroeconomic news on asset class short-term returns is state-dependent. For example, McQueen and Roley (1993) find stronger-than-expected economic activity has a positive effect on stock market returns during periods of economic weakness but a negative effect when the economy is strong. Similarly, Boyd et al. (2005) observe that stock market reactions to rising unemployment are positive during economic expansions but negative during recessions. Hess et al. (2008) also note that commodity returns respond positively to inflation and real activity news during recessions, while the relationship is statistically insignificant during periods of economic growth. Nonetheless, while these findings may be leveraged for short-term trading strategies, they are less applicable within tactical asset allocation frameworks, which typically require a longer investment horizon (see *e.g.*, Anson, 2004).

Several macro-financial factors are shown to be relevant in explaining a wide range of asset class returns within tactical asset allocation frameworks. Among these, economic growth and inflation emerge as two key drivers of traditional fixed income, equity and commodities returns or risk premia. For example, Sheikh and Sun (2012), analyzing returns across different economic growth-inflation regimes, find that equities generally outperform during periods of accelerating growth and falling inflation. Conversely, bonds achieve the best returns when both economic growth and inflation are falling, while commodities perform best in phases marked by simultaneous increases in inflation and economic growth. These results are also confirmed by Ilmanen et al. (2014). Using the

same methodology but focusing specifically on the *credit risk premium*, Asvanunt and Richardson (2017) show that corporate bonds achieve the highest returns during periods of positive economic growth, with negative returns observed only in scenarios where economic growth is negative and inflation is rising.

Beyond the growth-inflation dynamic, other macro-financial factors demonstrate additional explanatory power for asset classes performance. These include monetary policy stance, volatility, illiquidity, and real yields. For example, Booth and Booth (1997) show that tightening (easing) monetary policy stance leads to decreases (increases) of stocks and corporate bonds returns. Similarly, Ilmanen (2003), analyzing stock-bond correlation across different macro-financial environments, finds that both asset classes exhibit the same sensitivity to the monetary policy factor; furthermore, this study provides evidence that increased market volatility has a positive impact on bonds while adversely affects stocks. The positive relationship between the *equity risk premium* and market volatility is further confirmed by Bansal et al. (2014). Additionally, Ilmanen et al. (2014) outline how bond performance is particularly sensitive to fluctuations in real yields, with which it exhibits an inverse relationship. Their analysis also reveals that all examined asset classes (global stocks, global bonds and commodities) perform better in periods of high market liquidity and tend to underperform in volatile times. Lastly, Clewell et al. (2018) explore how asset class returns are influenced by macro-financial factors' current conditions and their future development. They find that when considering only the current conditions of macro factors, the performance of asset classes does not significantly differ from their unconditional returns. However, when macro factors' future developments are also considered, results change and become more significant.

Many studies have also tested the performance of systematic tactical asset allocation strategies based on macro-financial factors (see *e.g.*, Van Vliet and Blitz, 2011; Kritzman et al., 2012; Chong and Phillips, 2014; Schnetzer, 2020; de Longis and Ellis, 2023). These studies, employing distinct methodologies, identify prevailing macroeconomic regimes and assess the performance of various asset classes or risk premia within these regimes. By analyzing regime-specific risk and return characteristics, they construct portfolios that

align with the identified macroeconomic environment. Collectively, these studies demonstrate that dynamic, regime-based tactical asset allocation strategies have the potential to yield superior risk-adjusted returns compared to static-weights strategic asset allocation strategies.

3 Data and Methodologies

We collect macroeconomic and financial data from Bloomberg and FRED databases. Our dataset consists of monthly observations spanning the period from January 1979 to August 2024. We focus on four major macro asset classes: U.S. Equities, U.S. Government Bonds, U.S. High-Yield Bonds, and Commodities. Additionally, we collect data for fifteen macro-financial variables, from which we construct six macro-financial composite indicators: economic growth, inflation, volatility, real yields, monetary policy stance and the U.S. Dollar [1].

Exhibit 1 lists the asset classes and the macro-financial factors included in our dataset. To evaluate the influence of changes in macro factors on asset class returns, we build on the methodology of Clewell et al. (2018), who calculate the average relative annual return between pairs of asset classes, conditioned on both the direction of macro-factors fluctuations and their initial levels. However, we implement several key modifications to their approach.

First, we consider asset class annualized excess returns relative to their annualized historical average return for the entire sample period (1979-2024). This approach enables us to evaluate the extent to which an asset class can either outperform or underperform

[1] We use both macroeconomic and financial variables to build our macro-financial factors indicators. While financial data are always in real time, macroeconomic variables are typically released by statistical agencies with a delay relative to the month they pertain to (*e.g.* the U.S. CPI for a given month is released by the Bureau of Labor Statistics in the second or third week of the following month), and the first release is often revised in subsequent months for many of these indicators. However, regardless of the period to which the macroeconomic data refer, the first release affects the performance of various asset classes in the month the data are released, while subsequent revisions usually have less significant impacts. For example, the U.S. CPI for December 2023, published on January 11, 2024, impacted the January 2024 performance of various asset classes, not the December 2023 performance. Consequently, in the empirical analysis of this study, macroeconomic data are associated with the returns of the asset classes realized in the month of the data's publication, rather than the month to which they refer. This approach allows us to use the data that impacts the performance of the various asset classes in each month.

Exhibit 1: List of Asset Classes and Macro-Financial Factors.

Asset class	Benchmark	Ticker
U.S. Equities	Russell 3000 Total Return Index	RU30INTR
U.S. Government Bonds	Bloomberg Barclays U.S. Treasury Total Return Index	LUATTRUU
U.S. High-Yield Bonds	Bloomberg Barclays U.S. Corporate HY Total Return Index	LF98TRUU
Commodities	S&P GSCI Total Return CME USD	SPGSCITR

Macro Factor	Benchmark	Ticker
Economic Growth	U.S. Industrial Production y/y SA ISM New Orders SA / ISM Inventories Conference Board Ratio Coincidental Lagging Index NSA U.S. Unemployment rate SA * (-1)	IP YOY NAPMNEWO / NAPDMINV RTCL USURTOT * (-1)
Inflation	U.S. CPI Urban Consumers y/y NSA Spot Crude Oil Price, WTI ISM Manufacturing Report on Business Prices Index NSA	CPI YOY WTISPLC NAPMPRIC
Volatility	VIX Index ICE BofA MOVE Index Difference between BAA and AAA us corporate Moody's ratings	VIX MOVE MOODCBAA - MOODCAAA
Real yield	Generic 10y U.S. Treasury yield minus U.S. Core CPI y/y Generic 10y U.S. Treasury yield minus UMich Inflation expectations 1Y	RR10CUS GT10 - CONSPXMD
Monetary Policy stance	U.S. Federal Funds Effective Rate GS U.S. Financial Conditions Index	FEDL01 GSUSFCI
U.S. Dollar	U.S. Dollar Index	DXY

Notes: All series are retrieved from Bloomberg Finance L.P., except for WTI Spot Crude Oil Prices, which is retrieved from FRED (Federal Reserve Economic Data). Historical analysis data end in August 2024 and start in January 1979, except for GSUSFCI Index (9/1982), LF98TRUU Index (7/1983), MOVE Index (4/1988) and VIX Index (1/1990). All data are sourced at the monthly frequency.

its unconditional historical average performance across various macro-financial environments. Thus, we provide a direct assessment of each asset class's ability to excel in various macroeconomic scenarios. This differs from the approach of Clewell et al. (2018), who examine the relative returns between pairs of asset classes, potentially introducing interdependencies that might complicate the interpretation of specific macro-financial factor impacts.

Second, instead of examining the impact of each individual macro financial variable on asset class returns, we construct composite indicators representing each macro-financial factor. By considering a broader set of variables collectively, this approach enables a more robust and comprehensive assessment of each factor, thereby enhancing the accuracy and reliability of our analysis.

Finally, the most significant difference between our method and that employed by Clewell et al. (2018) lies in the procedure for identifying initial conditions and changes in macro factors. Specifically, the authors determine the initial conditions of macro factors

by comparing their values to the quartiles of their distribution over their entire sample period. However, this method often relies on data unavailable *ex ante*, as they pertain to future periods. For example, in their study, the initial condition of the VIX Index in January 2004 is computed by comparing its value in January 2004 to the quartiles of its distribution over the full sample period (1990-2016), thereby using data that were not available in January 2004. To address this issue, we develop a methodology that determines the initial condition of macro factors using data available up to each point in time within our sample. Our approach is described by the following steps: [2]

1. We use six-year rolling subsets. [3] Within each subset, we create composite indicators for the macro factors by standardizing their constituent variables and combining them through the simple average of the resulting Z-scores.

2. For each macro driver in each subset, we compute the first (f_{Q1}) and third quartiles (f_{Q3}). Initial conditions (IC_t) are defined as follows:

$$IC_t = \begin{cases} \text{"low"}, & \text{if } f_t < f_{Q1} \\ \text{"medium"}, & \text{if } f_{Q1} \leq f_t \leq f_{Q3} \\ \text{"high"}, & \text{if } f_t > f_{Q3} \end{cases}$$

   Where f_t is the macro indicator at time t (last observation of each subset created). This formulation, pretending to be at time t, enables us to answer the question: "Compared to the last six years, is the macro factor currently at a high, medium, or low level?"

3. Subsequently, we aim to evaluate the potential evolution of the factors over the

[2] These four steps detail the methodology for conducting the empirical analysis of the impact of macro factor fluctuations on asset class returns, accounting for the initial levels of macro-financial factors. Additionally, we conduct a separate analysis that examines the impact of macro factor fluctuations on asset class returns without considering initial conditions. For this analysis, we employ only steps 3 and 4, computing the conditional (based only on the scenario) excess returns for each asset class as follows: $R^C_{t_{1-t}} = \mathbb{E}\left(R_{t_1-t} \mid S_{t_1-t}\right)$.

[3] We use six-year subsets because, according to Lumholdt et al. (2018), *"The NBER has dated cycles back to the mid-nineteenth century. For the period since the end of WWII, it has identified 11 full cycles [...], the average cycle has lasted about six years".*

next nine months from a tactical perspective. [4] To this end, we create an additional subset that includes the six years used to compute the initial conditions, plus the subsequent nine months. Using the same methodology, we compute the composite indicators and assess three scenarios:

$$S_{t_1-t} = \begin{cases} \text{"increase"}, & \text{if } f_{t_1} - f_t > \theta \\ \text{"stable"}, & \text{if } -\theta \leq f_{t_1} - f_t \leq \theta \\ \text{"decrease"}, & \text{if } f_{t_1} - f_t < -\theta \end{cases}$$

Where t_1 represents the last observation of this subset (*i.e.* nine months after t). To determine the threshold θ , for each macro-financial factor we compute the absolute difference between each observation and the corresponding observation from nine months earlier. The threshold for each indicator is established as the twenty-fifth percentile of the distribution of these computed differences. Pretending to be at time t_1, this enables us to answer the question: "Given that at time t the macro-financial factor was at a certain level (low, medium or high), did the factor increase or decrease from t to t_1?". [5]

4. Then, we compute the conditional excess returns for each asset class as follows:

$$R^C_{t_1-t} = \mathbb{E}\left(R_{t_1-t} \mid IC_t, S_{t_1-t}\right)$$

Where $R^C_{t_1-t}$ is the average annualized nine-month excess return of the asset class, when a macro factor held an initial condition IC_t and evolved according to the scenario S_{t_1-t} in the next nine months. Together with excess returns, we compute the 10th to 90th percentile range and the "hit rate", which represents the percentage in which the sign of the excess returns matched the sign of their mean.

We assess the statistical significance of the results using two Welch's t-tests:

[4] We choose a nine-month time interval to align with a tactical asset allocation time frame. We also compute results using six and twelve-month time intervals, which yield similar outcomes.

[5] Using the procedure just described and pretending to be at time t_1, we are able to estimate both the rolling initial conditions and the rolling scenarios using only past data and, therefore, known values.

- To verify that conditional excess returns based solely on the scenario are statistically different from each other (increase vs decrease).

- To verify that conditional excess returns based on both the initial condition and the scenario are statistically different from conditional excess returns based only on the scenario (e.g. increase from low initial condition vs increase).

4 Empirical findings

In this section, we present the findings of our empirical analysis, which is conducted in two steps. In the first step, we calculate the average annualized excess returns of each asset class, conditioned solely on the direction of fluctuations in macro-factors (*i.e.*, increase vs decrease). In the second step, we calculate the average annualized excess return of each asset class, further conditioned on the initial levels of the macro-factors (*i.e.*, low, medium, or high). Exhibit 2 summarizes the results of the initial analysis, which focuses on the impact of fluctuations in macro factors on asset class returns, without accounting for their initial conditions.

As shown in Exhibit 2, changes in macro factors have a significant impact on asset class returns. Periods of increasing economic growth benefit equities, high-yield bonds, and commodities. Conversely, government bonds, which tend to underperform during such times, are the only asset class to achieve positive excess returns during phases of declining economic growth. This dichotomy reveals a divergent sensitivity to the "economic growth" factor between Treasury bonds and the other three riskier asset classes. Furthermore, changes in the economic growth factor are statistically significant drivers of excess returns for all asset classes considered.

Inflation fluctuations have a statistically significant impact exclusively on government bonds and commodities, which exhibit opposing sensitivities to this factor. Specifically, when inflation rises over a nine-month period, government bonds underperform their unconditional average annualized return 70% of the time, with an average underperformance of -2.99%. Conversely, commodities exceed their unconditional average annualized return

Exhibit 2: Nine-Months Annualized Excess Returns Based on Scenarios (increase vs decrease) for the macro-financial factors.

	Growth Indicator		Inflation Indicator		Volatility Indicator	
	Increase	**Decrease**	**Increase**	**Decrease**	**Increase**	**Decrease**
Equities	5.24*** [-13.88 ; 27.43] 68% 160	-8.92*** [-34.59 ; 16.38] 70% 164	0.62 [-27.50 ; 26.34] 54% 184	-1,00 [-28.86 ; 24.12] 46% 166	-14.33*** [-38.99 ; 5.25] 76% 145	9.58*** [-6.31 ; 31.23] 73% 193
Treasuries	-2.33*** [-8.9 ; 6,73] 64% 160	1.44*** [-6.72 ; 9.12] 65% 164	-2.99*** [-9.58 ; 5.46] 70% 184	3.00*** [-4.32 ; 11.40] 66% 166	1.10*** [-7.55 ; 8.20] 62% 145	-1.12*** [-8.34 ; 7.01] 0,60 193
High-Yield Bonds	3.91*** [-9.48 ; 19.33] 61% 160	-5.58*** [-18.57 ; 7.53] 66% 164	-0.94 [-13.59 ; 9.28] 57% 184	0.23 [-14.97 ; 18.89] 52% 166	-9.68*** [-20.89 ; 3.35] 86% 145	7.00*** [-5.68 ; 22.42] 75% 193
Commodities	6.36*** [-15.04 ; 34.76] 50% 160	-5.07*** [-47.97 ; 38.09] 56% 164	19.03*** [-11.66 ; 48.57] 73% 184	-21.33*** [-51.57 ; 6.01] 85% 166	-4.64*** [-51.42 ; 40.84] 55% 145	5.00*** [-17.94 ; 37.98] 49% 193

	Real Yields Indicator		Monetary Policy Stance Indicator		U.S Dollar Indicator	
	Increase	**Decrease**	**Increase**	**Decrease**	**Increase**	**Decrease**
Equities	1.23 [-27.86 ; 26.05] 60% 152	-1.77 [-28.24 ; 23.31] 52% 198	-10.56*** [-36.39 ; 5.72] 70% 147	7.36*** [-16.74 ; 29.85] 69% 192	-3.10*** [-30.50 ; 20.77] 48% 157	3.28*** [-22.21 ; 28.87] 55% 173
Treasuries	-5.52*** [-10.58 ; 0.49] 88% 152	4.31*** [-2.41 ; 11.50] 76% 198	-3.83*** [-10.68 ; 5.86] 70% 147	2.25*** [-5.87 ; 10.44] 63% 192	-1.08*** [-9.07 ; 7.22] 51% 157	0.97*** [-7.21 ; 11.41] 49% 173
High-Yield Bonds	0.37 [-15.97 ; 21.87] 43% 152	-1.29 [-13.43 ; 10.23] 55% 198	-8.37*** [-20.15 ; 1.07] 70% 147	6.13*** [-10.56 ; 22.46] 62% 192	-3.41*** [-18.36 ; 7.24] 57% 157	3.26*** [-13.16 ; 20.03] 49% 173
Commodities	-0.27 [-28.03 ; 34.45] 57% 152	0.89 [-39.39 ; 43.19] 45% 198	-1.76*** [-49.40 ; 42.02] 54% 147	1.25*** [-31.51 ; 36.45] 47% 192	-5.28*** [-47.12 ; 40.58] 64% 157	6.82*** [-24.33 ; 38.65] 57% 173

Notes: For each asset class and macro-financial factor, the table presents two columns. The first column analyzes the scenario in which there is an increase in the macro factor over the next nine months, while the second addresses the scenario in which there is a decrease in the macro factor during the same period. In this context, we provide: the conditional (based on the scenario) average excess return of the asset class with respect to its unconditional historical average; the p-value from the Welch's t-test (* < 0.1; ** < 0.05, *** < 0.01), indicating whether the conditional average excess return in the "increase" scenario is statistically distinct from that in the "decrease" scenario; the 10th and 90th percentile range of the conditional excess return; the "hit rate"; and the number of observation within each scenario. All returns are expressed in percentage terms.

73% of the time, with an average outperformance of 19.03%. However, during periods of declining inflation, Treasury bonds outperform their unconditional average annualized return 66% of the time, with an average overperformance of 3%, while commodities fall below their unconditional average annualized return 85% of the time, with an average underperformance of -21.33%.

Examining the volatility factor, we find it statistically significant across all asset classes. Notably, each of the four asset classes shows an inverse sensitivity to the volatility factor compared to their sensitivity to the growth factor. Specifically, while equities, high-yield bonds and commodities underperform during periods of rising volatility, government bonds act as a portfolio hedge and outperform. Conversely, when market volatility decreases, the three riskier asset classes outperform, whereas the *safe-haven* asset underperforms.

Real yields have the greatest impact on U.S. government bonds, which, as expected, perform negatively with yield increases and positively with yield declines. Finally, the four asset classes exhibit similar sensitivities to the monetary policy stance and the U.S. Dollar, which are inherently related. Specifically, during monetary tightening, excess returns across all asset classes slow, whereas they experience positive excess returns during periods of monetary easing. Similarly, U.S. Dollar strength negatively impacts all asset classes, while a weakening U.S. currency benefits their performance.

Exhibit 3 illustrates the results of the second step of out empirical analysis, which examines the impact of macro factor's fluctuations on asset class returns, also accounting for the initial level of the macro-financial factors.

Drawing on our previous analysis, we observe that the three riskier asset classes tend to outperform during periods of increasing economic growth and, conversely, underperform when economic growth is declining. Exhibit 3 reveals that this effect is critically contingent upon on the initial conditions from which the increase or decrease in economic growth originates. Specifically, the lower the starting point from which the economic growth increase takes place, the greater the overperformance of the three riskier asset classes. Notably, high-yield bonds even achieve a negative excess return when economic growth increases from already high levels. Conversely, the more economic growth decreases from lower levels, the higher the underperformance of the three riskier asset classes. In their worst-case scenario (*i.e.* when growth declines from already low levels), government bonds exhibit the highest outperformance, thus serving as an effective portfolio hedge in this environment.

Exhibit 3: Nine-Months Annualized Excess Returns Based on both Scenarios (increase vs decrease) and Initial Conditions (low, medium, high) for the macro-financial factors.

	IC: Low		IC: Medium		IC: High	
	Increase	Decrease	Increase	Decrease	Increase	Decrease
Equities	8.19 [-14.46; 32.3] 75% 65	-24.12*** [-55.29; 4.28] 86% 28	3.36 [-9.51; 15.74] 63% 65	-8.82 [-32.1; 18.4] 70% 73	2.90 [-26.89; 28.75] 60% 30	-2.27*** [-22.24; 21.23] 62% 63
Treasuries	-2.69 [-10.00; 7.03] 69% 65	3.06* [-1.72; 6.77] 79% 28	-2.07 [-8.43; 5.96] 63% 65	0.76 [-8.53; 8.23] 64% 73	-2.10 [-9.96; 3.12] 53% 30	1.50 [-6.7; 10.78] 59% 63
High-Yield Bonds	9.98** [-8.1; 35.51] 77% 65	-12.66* [-38.87; 4.77] 75% 28	0.26** [-8.35; 10.92] 51% 65	-4.61 [-18.53; 6.76] 64% 73	-1.36*** [-12.42; 6.84] 53% 30	-3.56 [-13.33; 7.55] 65% 63
Commodities	10.90 [-13.37; 47.24] 54% 65	-44.98*** [-78.57; -4.56] 89% 28	3.41 [-17.83; 31.88] 46% 65	4.36** [-26.11; 37.44] 49% 73	2.92 [-13.99; 27.92] 50% 30	1.74 [-42.53; 46.92] 52% 63

(a) Growth Indicator

	IC: Low		IC: Medium		IC: High	
	Increase	Decrease	Increase	Decrease	Increase	Decrease
Equities	4.81 [-17.99; 32.42] 60% 78	5.10* [-16.28; 25.37] 61% 36	0.66 [-25.51; 17.11] 62% 73	2.80 [-15.62; 21.54] 62% 52	-9.36*** [-28.89; 4.74] 79% 33	-6.35 [-45.35; 24.16] 55% 78
Treasuries	-4.18 [-9.96; 3.58] 76% 78	6.55** [-3.78; 18.46] 78% 36	-1.32** [-7.95; 7.22] 63% 73	2.04 [-4.20; 8.10] 58% 52	-3.86 [-14.95; 6.11] 70% 33	2.00 [-5.93; 9.97] 67% 78
High-Yield Bonds	3.46** [-11.61; 22.24] 55% 78	4.03 [-12.91; 19.95] 61% 36	-2.19 [-12.74; 6.65] 55% 73	0.37 [-10.48; 15.11] 52% 52	-8.59*** [-18.44; -1.19] 91% 33	-1.62 [-19.33; 14.28] 53% 78
Commodities	13.89* [-13.18; 41.64] 62% 78	-26.72 [-50.96; -8.69] 94% 36	21.39 [-7.99; 48.34] 78% 73	-19.35 [-50.75; 5.23] 83% 52	25.95 [-3.41; 52.48] 88% 33	-20.15 [-60.28; 14.23] 82% 78

(b) Inflation Indicator

	IC: Low		IC: Medium		IC: High	
	Increase	Decrease	Increase	Decrease	Increase	Decrease
Equities	-3.66*** [-21.35; 7.64] 60% 57	2.29*** [-9.11; 11.37] 59% 51	-14.11 [-30.96; 3.98] 81% 59	10.45 [-6.31; 32.31] 74% 73	-35.78*** [-54.75; -14.80] 97% 29	14.05* [-3.69; 35.53] 83% 69
Treasuries	0.19 [-7.92; 8.93] 46% 57	0.68* [-7.80; 9.03] 49% 51	2.25 [-3.94; 8.16] 75% 59	-0.95 [-7.94; 6.90] 58% 73	0.55 [-15.91; 7.90] 69% 29	-2.63** [-8.70; 3.88] 70% 69
High-Yield Bonds	-6.09*** [-15.92; 3.25] 81% 57	0.95*** [-6.97; 8.65] 59% 51	-8.30 [-18.83; 4.80] 83% 59	6.41 [-1.57; 19.71] 84% 73	-19.55*** [-38.81; -8.24] 100% 29	12.1** [-7.89; 41.63] 77% 69
Commodities	5.60* [-46.14; 42.89] 61% 57	1.33 [-14.80; 27.25] 43% 51	-8.93 [-47.84; 40.56] 69% 59	5.05 [-18.13; 40.99] 47% 73	-16.07 [-78.28; 32.59] 59% 29	7.65 [-19.55; 42.63] 55% 69

(c) Volatility Indicator

	IC: Low		IC: Medium		IC: High	
	Increase	Decrease	Increase	Decrease	Increase	Decrease
Equities	-0.88 [-32.36; 30.21] 49% 108	-5.39 [-31.70; 20.10] 61% 64	7.19** [-6.43; 19.50] 85% 40	-1.07 [-25.94; 22.91] 50% 111	-1.27 [-11.88; 8.19] 50% 4	4.94* [-10.69; 24.57] 65% 23
Treasuries	-5.62 [-11.74; 2.35] 84% 108	2.25** [-7.65; 8.67] 69% 64	-5.13 [-8.36; -1.17] 98% 40	4.86 [-1.72; 12.10] 76% 111	-6.60 [-7.94; -4.67] 100% 4	7.40** [0.70; 12.13] 96% 23
High-Yield Bonds	0.22 [-18.21; 27.65] 38% 108	-2.22 [-13.06; 8.60] 59% 64	1.28 [-8.43; 9.73] 60% 40	-1.59 [-14.16; 10.02] 52% 111	-4.92* [-8.08; -0.60] 75% 4	2.73** [-8.84; 11.89] 65% 23
Commodities	-1.57 [-35.95; 34.14] 56% 108	2.38 [-40.32; 47.30] 44% 64	2.81 [-13.91; 38.98] 38% 40	0.63 [-40.06; 38.13] 49% 111	4.20 [-5.83; 16.78] 50% 4	-1.98 [-23.34; 29.21] 65% 23

(d) Real Yields Indicator

	IC: Low		IC: Medium		IC: High	
	Increase	Decrease	Increase	Decrease	Increase	Decrease
Equities	-12.98 [-39.07; 5.49] 75% 72	9.20 [-2.76; 31.42] 83% 77	-11.49 [-38.89; 5.86] 74% 47	7.11 [-17.31; 29.76] 58% 74	-2.78*** [-13.49; 6.09] 50% 28	4.36 [-28.19; 27.3] 63% 41
Treasuries	-4.12 [-15.48; 5.49] 71% 72	1.74 [-7.86; 11.39] 52% 77	-1.38** [-7.45; 6.78] 62% 47	3.44 [-3.34; 11.03] 73% 74	-4.83 [-8.90; 0.82] 82% 28	1.08 [-5.93; 5.61] 66% 41
High-Yield Bonds	-10.77* [-21.30; -0.39] 90% 72	7.59 [-4.12; 19.92] 79% 77	-8.36 [-20.99; 0.99] 77% 47	1.69** [-14.14; 20.24] 50% 74	-2.23*** [-7.84; 5.28] 68% 28	11.42 [-10.18; 52.4] 63% 41
Commodities	6.42 [-50.60; 49.84] 60% 72	3.81 [-17.78; 43.73] 44% 77	-10.49 [-52.67; 36.71] 62% 47	4.34 [-38.81; 37.18] 55% 74	-8.14 [-25.74; 20.75] 75% 28	-9.11** [-37.94; 16.54] 63% 41

(e) Monetary Policy Stance Indicator

	IC: Low		IC: Medium		IC: High	
	Increase	Decrease	Increase	Decrease	Increase	Decrease
Equities	-3.57 [-50.27; 22.65] 49% 55	-0.14 [-28.89; 27.89] 53% 55	-0.53 [-27.54; 18.10] 42% 52	7.04 [-8.61; 29.81] 61% 61	-5.25 [-31.92; 18.21] 54% 50	2.55 [-29.50; 25.53] 58% 57
Treasuries	0.97** [-7.33; 7.77] 64% 55	0.04 [-7.14; 8.92] 45% 55	-3.55** [-14.94; 2.70] 65% 52	1.39 [-6.17; 11.76] 54% 61	-0.76 [-9.26; 7.46] 52% 50	1.43 [-8.19; 16.03] 47% 57
High-Yield Bonds	-0.82 [-29.98; 18.43] 53% 55	-0.06 [-15.17; 11.32] 45% 55	-4.32 [-19.62; 6.54] 65% 52	9.64** [-8.80; 27.94] 70% 61	-5.31 [-13.78; 5.73] 70% 50	-0.36* [-12.52; 16.09] 54% 57
Commodities	-2.20 [-54.81; 45.15] 56% 55	22.46*** [-8.68; 52.04] 82% 55	-7.44 [-47.39; 31.92] 69% 52	4.03 [-17.49; 29.30] 57% 61	-6.43 [-45.49; 39.82] 66% 50	-5.3*** [-40.11; 26.13] 67% 57

(f) U.S Dollar Indicator

Notes: For each asset class, macro-financial factor, and initial conditions, the table presents two columns. The first column examines the scenario where the macro factor increases over the next nine months, while the second considers the scenario it decreases, both evaluated based on the initial condition. In this context, we provide: the conditional average excess return of the asset class with respect to its unconditional historical average; the p-value from Welch's t-test (* < 0.1; ** < 0.05; *** < 0.01), indicating if this conditional average excess return is statistically distinct from the conditional average excess return determined solely by the scenario; the 10th and 90th percentile range; the "hit rate"; and the number of observations within each cluster (identified by the two conditions). All returns are expressed in percentage terms.

The initial conditions from which changes in the inflation factor originate strongly influence the effect on commodities' performance. The higher the starting point from which the increase in inflation takes place, the greater the commodities' overperformance. In contrast, when inflation is already at low levels and decreases further, commodities experience the most significant underperformance (-26.72% on average), while, considering the same scenario starting from medium or high levels, the excess returns do not change particularly (respectively -19.35% and -20.15% on average).

Furthermore, it is noteworthy that both equities and high-yield bonds perform particularly poorly when inflation increases from already elevated levels.This contrasts with the scenario where the inflation factor rises from a low initial level; indeed, in those instances, both equities and high yield bonds' excess returns are positive. The fact that rising inflation negatively impacts these two risky asset classes only when the increase originates from already elevated levels is likely to reflect the *forward-looking* nature of financial markets. In this scenario, investors typically sell risky assets in anticipation of anti-inflationary *hawkish* responses from central banks. Naturally, this scenario is also unfavorable for government bonds (which register a negative average excess return of -3.86%), and therefore they fail to provide diversification for the other two asset classes.

Turning to the volatility factor, it has the most pronounced impact on asset class returns when it increases or decreases from high levels. Specifically, all asset classes, except for U.S. Treasuries, experience the largest losses when volatility increases from high levels, and the greatest gains when volatility decreases from similar conditions. These relationships are monotonic, meaning that as the initial condition of volatility decreases, losses become less severe, and gains diminish. Contrarily, U.S. Treasuries, which outperform in scenarios characterized by increasing volatility, exhibit consistent performance across different initial conditions.

U.S Treasuries benefit from declines in real yields, with the effect becoming more pronounced as the initial level of the real yields increases. In contrast, commodities respond more positively to rising real yields, particularly when starting from medium or high lev-

els. When starting from low levels, however, commodities achieve negative excess returns. Furthermore, it is noteworthy that both equities and high-yield bonds show particularly positive excess returns when real yields decrease from already elevated levels. This contrasts with the scenario where the real yield factor decreases from either a medium or low initial level; indeed, in those instances, both equities and high yield bonds' excess returns are negative. These findings underscore the importance of the market's perception of economic health and growth prospects: when real yields decrease from elevated levels, borrowing costs drop, stimulating investment and economic activity, thereby boosting both equities and high yield bonds. Conversely, when real yields decrease from lower levels, this further reduction often signals economic weakness or low growth potential, making risky asset classes less attractive. Therefore, this is another example demonstrating that relying solely on changes in macro-financial factors, without considering the levels from which these changes originate, could produce misleading results.

Tightening periods lead to negative excess returns across all asset classes, particularly starting from a low baseline; however, during these periods, commodities achieve positive excess returns. A similar phenomenon occurs in easing monetary policy stance periods starting from high initial conditions, where commodities are the only asset class that, on average, performs negatively.

Finally, all asset classes are adversely affected by U.S. Dollar strength, with high yield bonds consistently exhibiting declining performance as the initial value of U.S. Dollar increases, while commodities experience severe losses when the dollar appreciates from medium or high levels. Instead, when the U.S. currency weakens, asset classes typically achieve positive returns, especially when the decline occurs from medium or high levels. However, commodities tend to outperform in periods when the U.S. Dollar depreciates from low levels, while they experience negative returns when the depreciation occurs from high levels.

5 Conclusion

This study provides an empirical analysis aimed to investigate how asset classes typically respond to changes in macro-financial factors. First, we focus solely on the impact of fluctuations in macro factors on asset class returns, without accounting for the factors' initial conditions. This analysis shows that variations in the six macro-financial factors we develop are statistically significant drivers of the excess returns across the four major asset classes considered. Second, we examine the impact of fluctuations in macro factors on asset class returns, considering also the initial level of the macro-financial factors. We show that these relationships are state-dependent, as they vary with the initial conditions of the factors. Consequently, relying solely on changes in macro-financial factors without considering the levels from which these changes originate may lead to misleading results. These findings are valuable from a *macro-based* tactical asset allocation perspective, providing insights that can inform trade ideas. Indeed, given the current level of the macro-factor, portfolio managers could leverage their directional forecast of the macro-financial factor by overweighting asset classes positively correlated with a rising macro-factor and underweighting those positively correlated with a falling macro-factor. Similarly, they can underweight asset classes negatively correlated with an increasing macro-factor and overweight those negatively correlated with a decreasing macro-factor.

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