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Economic Trend

Executive Summary

In this paper we present a novel approach to investing across equity, bond, currency and commodity markets. “Economic trend” capitalizes on the tendency for new information to have a persistent impact on asset prices by positioning in each market on the basis of trends in macroeconomic fundamentals. The strategy has realized consistently attractive risk-adjusted returns over a 50+ year sample, and performance is pervasive across both markets and measures. It exhibits low correlation to traditional risk premia on average and tends to perform exceptionally well during drawdown periods for traditional asset classes. While economic trend is a close relative of price trend-following—both approaches aim to capitalize on the tendency of markets to systematically under-react to news—the two strategies are highly complementary. Combining the two leads to improved risk-adjusted performance and more robust drawdown protection than price trend-following alone.

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Introduction

Trend-following is one of the oldest, most studied, and most broadly used alternative investment strategies. In the early nineteenth century, the classical economist David Ricardo advised investors to “cut short your losses” and “let your profits run”—an early endorsement of a price trend-following approach to investing. Two centuries later, trend-following remains the core investment style for the managed futures industry, which had \$198 billion in aggregate assets at the end of 2022.¹ Trend-following is based on time series momentum—going long assets with recent positive returns and short assets with recent negative returns—and has been documented to generate consistent positive returns across a wide range of assets over more than 120 years.² Its persistent profitability stems from the tendency of asset prices to systematically underreact to new information.³ Positioning based on recent price trends, therefore, tends to profit as asset prices gradually incorporate economically impactful news.

The tendency of asset prices to underreact to new information suggests an alternative approach to trend-following: investing on the basis of trends in fundamentals directly, as opposed to using price trends as

a proxy for new information. Brooks (2017) describes a broad approach to fundamental trend investing, called “macro momentum,” and presents evidence of its efficacy from 1970 through 2016. In this paper, we extend the original strategy described in Brooks (2017) and focus solely on its directional implementation. We refer to the resulting strategy as “economic trend,” an acknowledgement of the similar underlying economic mechanism and attractive performance characteristics it shares with price trend-following.

Economic trend and price trend stem from the same premise: asset prices tend to underreact to new information, which, for macro assets, typically takes the form of news about economic fundamentals.⁴ In other words, when fundamentals shift, markets adjust gradually. This gradual incorporation of news creates trends in asset prices. A price trend strategy uses recent asset returns as inputs, wagering that price action will continue. Returns are a convenient indicator. They’re continuous, readily available, and require little by way of modeling beyond specifying a horizon. However, asset returns are merely an

1 Source: eVestment.

2 See Moskowitz, Ooi, and Pedersen (2012), Lemperiere, Deremble, Seager, Potters, and Bouchaud (2014), and Hurst, Ooi, and Pedersen (2017).

3 For detail and theoretical explanations on why investors systematically underreact to news, see Barberis, Shleifer, and Vishny (1998), Daniel, Hirshleifer, and Subrahmanyam (1998), Hong and Stein (1999), and Frazzini (2006). Possible explanations of market reactions include herding and extrapolation of recent market movements.

4 This tendency has been documented empirically across a variety of asset classes. Many studies focus on underreaction in single-name equities - see Chan-Jegadeesh-Lakonishok (1996), Chan (2003), Frazzini (2006), and Sinha (2016). There have been fewer studies on macro asset underreaction - but two noteworthy ones are Bhojraj and Swaminathan (2006), which extends the empirical evidence to international equity indices, and Brooks, Katz, and Lustig (2018), which documents persistent underreaction of fixed income markets to monetary policy surprises.

indirect reflection of fundamental news—one that can at times be misleading.

Economic trend, meanwhile, seeks to model economically impactful news directly. Doing so in real-time is ambitious. It requires identifying the relevant fundamental variables that drive each asset's price (e.g., inflation expectations impact bond prices), modeling trends in these fundamental variables in real-time (e.g., measuring real-time trends in inflation expectations for each market), and a structural mapping from fundamental trends to asset prices (e.g., increasing inflation expectations in a country is bad news for its stock and bond markets, good news for its currency, etc.). Unlike price trend, economic trend will not invest where price action isn't supported by underlying fundamental news. The strategy will suffer when returns are disconnected from changes in fundamentals (as can happen) but will generate profits when asset prices begin to cue off fundamental news again.

Our stylized economic trend strategy uses a similar set of signals to capture macroeconomic state variables as Brooks (2017) but extends the strategy to incorporate a broad set of commodity markets and covers the 2017 to 2022 period, a rich out-of-sample period that featured significant macroeconomic volatility—the equity market sell-off of 2018, the global pandemic, and the subsequent emergence of global inflation and associated monetary policy response.⁵

Economic trend generates attractive risk-adjusted returns across asset classes from 1970 to 2022, with low correlation to traditional markets and strong performance during equity and bond market drawdowns. It continued to perform exceptionally well in the out-of-sample period from 2017 onward and delivered exceptional returns during the stock and bond bear market of 2022.

We discuss how economic trend may be used as an innovative complement to classic price trend. Because they share a common mechanism, economic trend and price trend tend to be positively, though modestly, correlated. A comprehensive trend-following strategy that combines price and economic trends thus outperforms either approach standalone.

The appeal of trend-following strategies largely stems from their tendency to provide positive returns during market drawdowns. Here too we show tangible benefits of combining price trends with economic trends: a comprehensive trend strategy produces higher average returns and more robust performance during drawdown periods for equities and bonds than either approach standalone. The source of improvement is straightforward. Price trend tends to perform well in drawdowns that are persistent. Economic trend tends to perform well in drawdowns that have economic catalysts. Combining the two approaches to trend-following captures a wider variety of market stress scenarios.

5 Brooks (2017) excludes commodities in part because relative-value view construction in commodities is less intuitive than it is in other asset classes, where changes in country-level economic variables can be more straightforwardly mapped to assets and compared cross-sectionally. Since the strategy in this paper uses only directional views, which compare each asset's mapped economic changes only to its own timeseries, we believe adding commodities to the universe is warranted.

Methodology

Our economic trend backtest uses simple 12-month trailing indicators, similar to Brooks (2017), as summarized in **Exhibit 1**. For both growth and inflation, we use 12-month changes in GDP growth forecasts and CPI inflation forecasts.⁶ For international trade, we use 12-month changes in the local spot FX rate against an export-weighted basket. We measure monetary policy trends using 12-month changes in short term bond yields.⁷ And we measure risk aversion trends using an equal weighted combination of 12-month trailing equity market returns and 12-month changes in credit spreads.⁸

For each theme, we assert a relationship with returns in each asset class. For example, increasing growth is good news for equity markets. Likewise, strong equity market

performance is associated with declining inflation, expansionary monetary policy trends, improving trade competitiveness, and declining risk aversion. The signs of these relationships are based on theoretically motivated and empirically verified “other things equal” contemporaneous relationships between returns and news about each theme. Economic trend is built on the premise that news tends to have a persistent impact on asset prices, which implies that contemporaneous and predictive relationships between returns and news must have the same sign. This restriction reduces the scope for data mining in a real-world setting; to trade on economic trends, you must demonstrate that news about the state variable has a contemporaneous impact on returns of the same sign.

Exhibit 1: Summary of Economic Trend Signals

Theme	Signal Example	Direction			
		Equities	Fixed Income	Currencies	Commodities
Growth	<i>Increasing GDP growth forecasts</i>	+	–	+	+
Inflation	<i>Increasing CPI inflation forecasts</i>	–	–	+	+
International Trade	<i>Export-weighted FX depreciation</i>	+	–	–	–
Monetary Policy	<i>Increasing 2-year bond yield</i>	–	–	+	–
Risk Aversion	<i>Strong equity market return and narrowing credit spreads</i>	+	–	+	+

Source: AQR.

Note: in commodities we use consumption-weighted signals across all themes (i.e., the signals apply to consuming countries of that commodity).

6 From 1970 through 1990 forecast data is not available for many countries. Therefore, in this period we use 12-month changes in GDP growth and CPI inflation instead. Using 12-month changes bypasses any seasonality issues and implies lower turnover and trading costs than in faster variants.

7 From 1970 through 1991 we use changes in IBOR rates instead of two-year bond yields. This is due to data availability.

8 From 1970 through November 1987 risk aversion is represented entirely by 12-month equity market momentum. From December 1987 onward, risk aversion is represented by an equal weighted combination of 12-month equity market momentum and 12-month changes in credit spreads. Prior to December 2001, changes in credit spreads are represented by Moody’s Seasoned Baa Corporate Yield Relative to the yield on 10Y constant maturity treasuries. From December 2001 onward, changes in credit spreads are represented by Bloomberg Global High Yield Corporate Stats Index Unhedged. It is possible to extract more theoretically appealing measures of risk aversion using asset prices (e.g. options) but there is insufficient asset coverage and history to utilize this data here. Campbell (1991) shows that approximately 50% of the variation in equity returns is driven by discount rates which motivates the inclusion of equity market momentum within the risk aversion theme.

Our asset universe includes 15 global equity futures, 9 bond futures, 7 interest rate futures, 8 currency forwards, and 20 commodity futures. For each of the five economic themes we create a portfolio for each of the four asset classes, leaving us with 20 asset class-theme portfolios (e.g., growth within equities).⁹

We aggregate these asset class-theme portfolios into equal risk-weighted composite portfolios. We form three types of composite portfolios:

1. Asset class composite portfolios—these combine all theme views at equal risk-weight within a given asset class. For example, the equity asset class composite portfolio invests in equity index futures using growth, inflation, international trade, monetary policy, and risk aversion as inputs.
2. Theme composite portfolios—these trade a single theme across all asset classes. For example, the growth theme composite

portfolio invests in equity index futures, bond futures, interest rate futures, currency forwards, and commodity futures, using views based *solely* on growth.

3. Aggregate economic trend composite portfolio—this is an equal risk-weighted composite across all asset class-theme portfolios. It represents the full economic trend strategy, implemented using all themes and assets.¹⁰

For each asset class we form analogous portfolios for price trend, using an equal-weighted combination of 1-month, 3-month, and 12-month trailing asset returns as factors.¹¹ The price trend asset class and aggregate composite portfolios use the same universe and portfolio construction as described above. All composite portfolios (both economic trend and price trend) target 10% constant volatility at each point in time using a trailing 3-year covariance matrix.

9 These asset class-theme portfolios allocate equal risk to individual asset views (within an asset class) and are scaled to constant volatility at each point in time using a 3-year trailing covariance matrix. Bond futures and interest rate futures are combined into fixed income-theme portfolios.

10 In **Exhibit 1** we visually consolidate Fixed Income across 10-year bond futures and short-term interest rate futures. However, for the purposes of the aggregate portfolios, we treat bond futures and short-term interest rate futures as separate asset classes (i.e., the economic trend-following composite uses 25 asset class-theme portfolios).

11 Methodology is same as in Hurst, Ooi, and Pedersen (2017). Using only 12-month trailing asset returns would give directionally similar results as shown below.

Performance of Economic Trend

The economic trend composite has exhibited consistently high risk-adjusted returns over the past 50+ years, a period that includes a broad set of macroeconomic regimes. As

shown in **Exhibit 2**, the strategy's return has been positive in every decade, with consistently low correlation to both equities and government bonds.¹²

Exhibit 2: Hypothetical Economic Trend Shows Consistent Positive Performance Over Time January 1970 - December 2022

	Excess of Cash Return (Ann.)	Volatility	Sharpe Ratio	Correlation to S&P 500	Correlation to U.S. 10-year Bonds
Full Period	13.3%	12.2%	1.1	-0.2	0.0
By Decade					
Jan. 1970 - Dec. 1979	14.3%	13.5%	1.1	-0.2	-0.1
Jan. 1980 - Dec. 1989	19.7%	12.0%	1.6	0.0	0.0
Jan. 1990 - Dec. 1999	14.2%	11.8%	1.2	0.0	0.1
Jan. 2000 - Dec. 2009	13.8%	12.9%	1.1	-0.4	0.3
Jan. 2010 - Dec. 2019	4.1%	9.9%	0.4	-0.1	0.0
Jan. 2020 - Dec. 2022	15.2%	13.1%	1.2	-0.4	-0.5
Since Brooks (2017)					
Jan. 2017 - Dec. 2022	8.4%	11.8%	0.7	-0.4	-0.3

Source: AQR, Bloomberg. Returns are monthly, gross of fees and transaction costs. Hypothetical data has inherent limitations, some of which are disclosed herein.

The strong performance of the economic trend composite stems from consistent performance across individual assets. **Exhibit 3** shows full period performance for each asset traded.¹³ Economic Trend generated a positive Sharpe

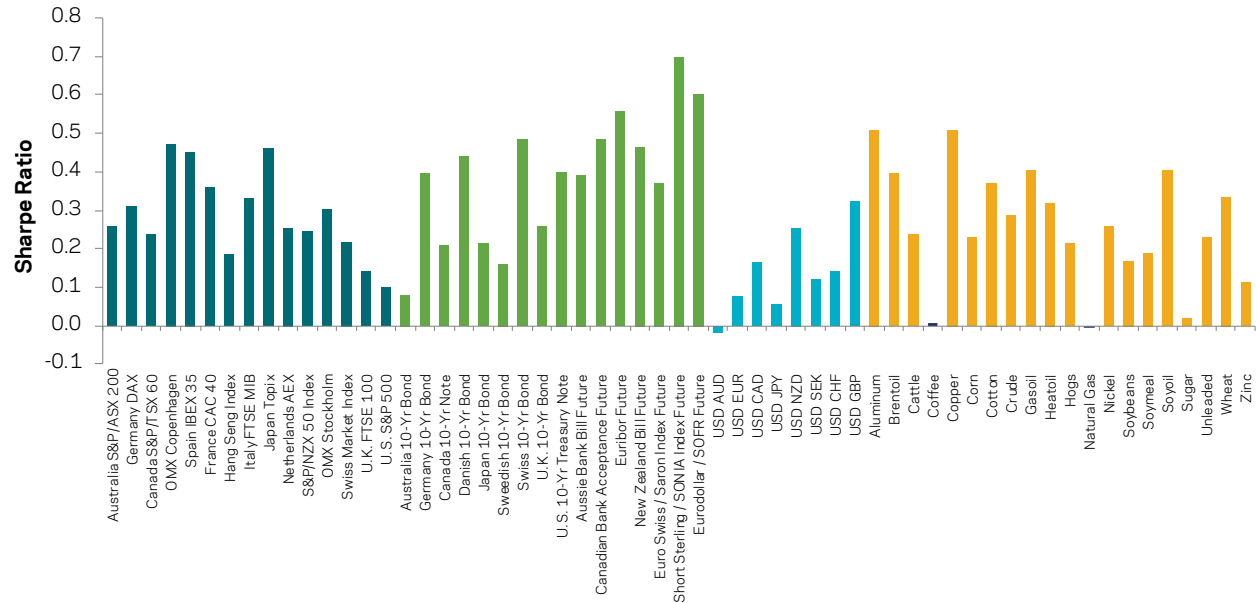
ratio in nearly every asset in our universe, strong evidence of the pervasiveness of underreactions to changes in economic fundamentals.

12 Over short periods of time, we expect economic trend to have a conditional correlation to asset classes if they are trending. For instance, short positions in equities and fixed income drove economic trend profitability from 2020 - 2022.

13 For interest rate futures we trade the second, third, and fourth contracts from expiration. We aggregate returns across these contracts in **Exhibit 3**.

Exhibit 3: Hypothetical Economic Trend Shows Consistent Positive Sharpe Ratios Across Assets

January 1970 - December 2022



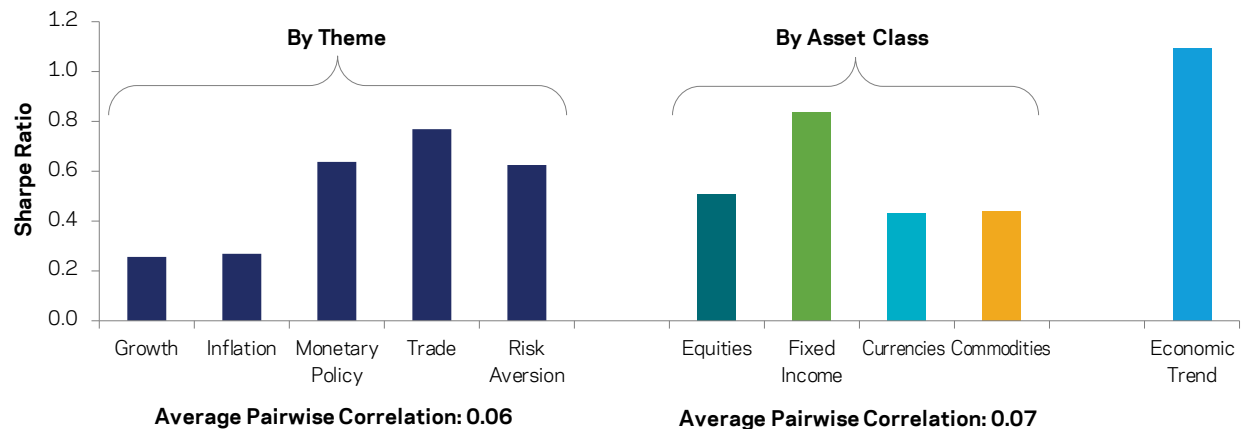
Source: AQR, Bloomberg. Returns are monthly, gross of fees and transaction costs. Hypothetical data has inherent limitations, some of which are disclosed herein.

Aggregating performance one level higher, economic trend’s performance is not driven by any one asset class or theme. As shown in Exhibit 4, each standalone asset class and theme portfolio has delivered a positive Sharpe ratio, contributing to the overall performance

of the composite. Importantly, both theme and asset class composite portfolios are lowly correlated with one another. As a result, the aggregate composite outperforms any standalone asset class or theme.

Exhibit 4: Hypothetical Economic Trend Shows Consistent Positive Sharpe Ratios Across Asset Classes and Themes

January 1970 - December 2022

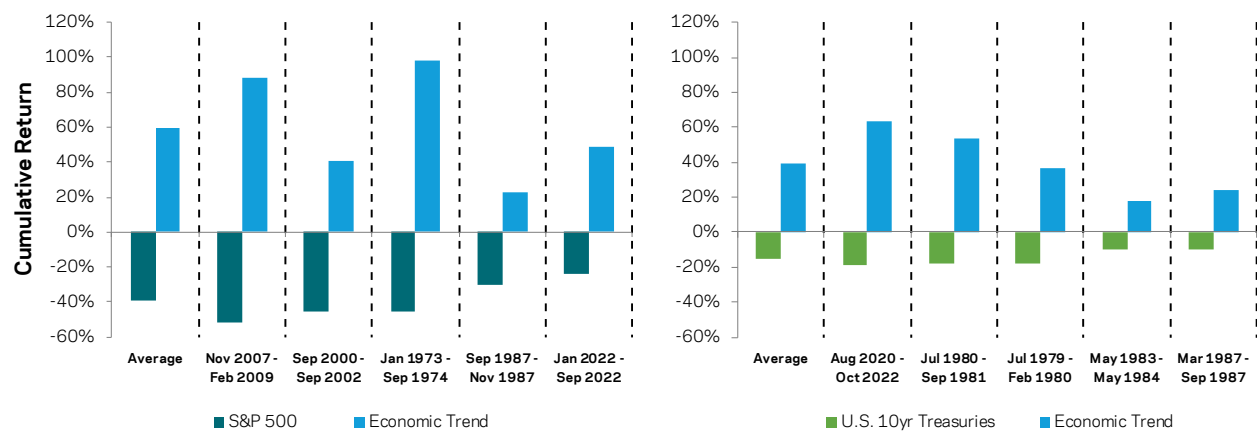


Source: AQR, Bloomberg. Returns are monthly, gross of fees and transaction costs. Hypothetical data has inherent limitations, some of which are disclosed herein.

Economic trend, like price trend, tends to perform well during drawdown periods for traditional asset classes. The reason is conceptually simple: large drawdowns usually don't occur out of the blue, but tend to be preceded by changes in economic fundamentals. Equity drawdowns, for example, have often been precipitated by

deteriorating growth expectations (e.g., GFC), or increasingly hawkish central bank policy (e.g., 2018 and 2022, to name two recent data points). As **Exhibit 5** shows, economic trend has performed well in each of the five worst drawdown periods for both U.S. equities and U.S. bonds since 1970.

Exhibit 5: Hypothetical Economic Trend Does Well in Drawdowns for Equities and Bonds
January 1970 - December 2022



Source: AQR, Bloomberg. Returns are monthly, gross of fees and transaction costs. Hypothetical data has inherent limitations, some of which are disclosed herein.

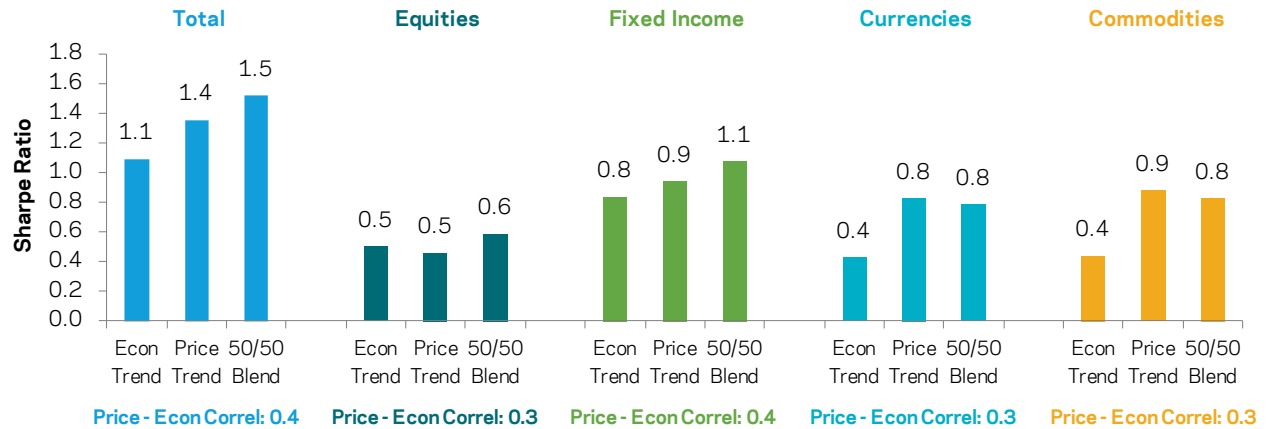
Economic Trend and Price Trend

As related but distinct ways to capitalize on the systematic tendency of asset prices to underreact to new information, we expect price and economic trend-following to be positively, but far from perfectly, correlated. If fundamentals are improving (i.e., an asset has had “good news”), we expect returns to be positive on average. Consistent with this intuition, we find a positive but moderate full-sample correlation

between price and economic trend-following strategies (around 0.3 at the asset level and 0.4 for the aggregate composites). Combining the two approaches into a comprehensive trend strategy (equal risk-weighted across price and economic trends) results in a better risk-adjusted performance than either strategy standalone, as shown in **Exhibit 6**.

Exhibit 6: A Diversified Approach to Trend-Following Outperforms Either Standalone Approach

January 1970 – December 2022



Source: AQR, Bloomberg. Returns are monthly, gross of fees and transaction costs. Hypothetical data has inherent limitations, some of which are disclosed herein.

While we expect a moderate long-term diversification benefit, in certain environments performance across the two strategies may not only be diversifying but *divergent*. For example, during market reversals price trend is (almost by construction) likely to have negative returns. However, economic trend can have positive returns and negative correlated positions if the reversal is preceded by an economic catalyst. Meanwhile, when prices become disconnected from changes in economic fundamentals for a prolonged period (e.g., the Tech Bubble), economic trend is likely to suffer, but price trend may not.

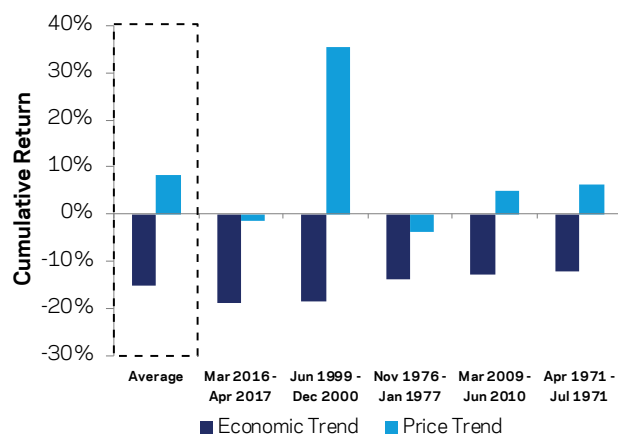
Exhibit 7 shows the performance of price and economic trend in each other’s five worst drawdown periods since 1970. Price trends and economic trends have historically experienced drawdowns at different times. In fact, price trend delivers positive returns on average in the five largest economic trend drawdowns,

and economic trend has been essentially flat on average in the five largest price trend drawdowns. Some of these periods conform to our intuition about how price and economic trend should behave in different states of the world. For example, economic trend suffers one of its worse drawdowns between June 1999 and December 2000, during the heart of the Tech Bubble. This is a period during which prices persistently diverged from fundamentals. Inflation, monetary policy, and growth trends tended to be bearish bonds during this period, yet the market continued its ascent unabated. And economic trend losses were not limited to equities. Inflation, monetary policy, growth, and risk aversion trends were bearish the dollar which rapidly appreciated over the period. While the disconnect between fundamentals and prices led economic trend to underperform, the strong sustained bull market run led price trends to perform exceptionally well.

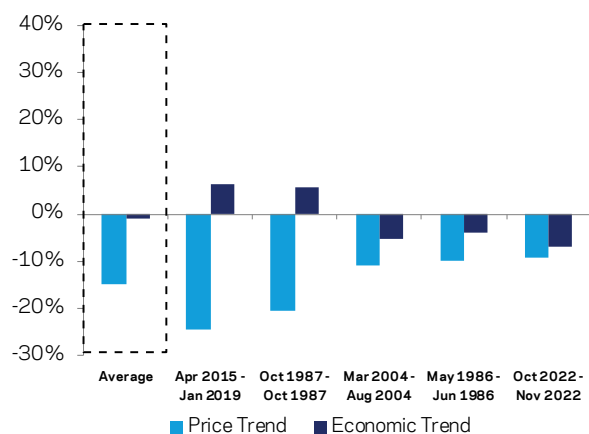
Exhibit 7: Price and Economic Trend Have Diversifying Returns During Each Other's Worst Drawdown Periods

January 1970 - December 2022

Economic Trend Drawdowns



Price Trend Drawdowns



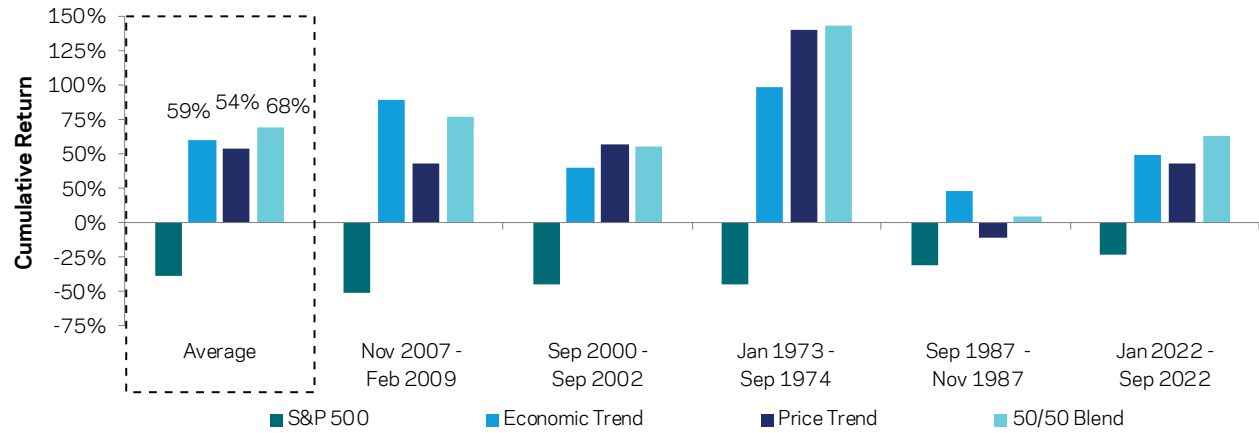
Source: AQR, Bloomberg. Returns are monthly, gross of fees and transaction costs. Hypothetical data has inherent limitations, some of which are disclosed herein.

Both price trend and economic trend tend to perform well during drawdown for traditional asset classes. A diversified blend of the two approaches, however, has historically provided more robust protection. In **Exhibit 8** and **Exhibit 9** we repeat our analysis of performance during U.S. equity and bond drawdowns (from Exhibit 5); however, we now add price trend and a 50/50 blend of the two approaches. On average the 50/50 blend delivers better performance during both equity

and bond drawdowns than either approach standalone. The combination of price and economic trend picks up on drawdowns that are persistent (price trend) and those that have a fundamental catalyst (economic trend), capturing a wider set of bear markets than either strategy in isolation. The ability to outperform in a diverse variety of drawdown environments makes price and economic trends a particularly attractive complement to risk mitigation strategies.

Exhibit 8: A Diversified Trend-following Approach Does Best in Equity Drawdowns

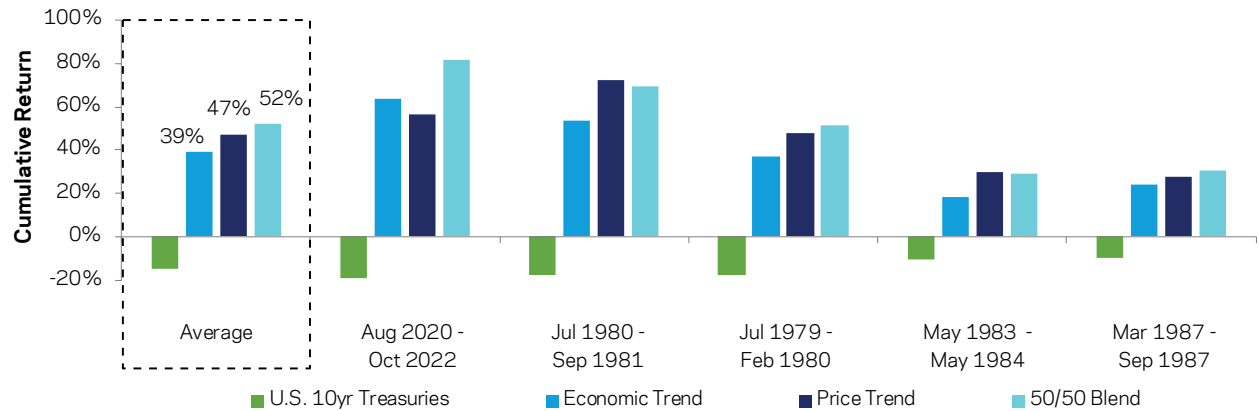
January 1970 - December 2022



Source: AQR, Bloomberg. Returns are monthly, gross of fees and transaction costs. Hypothetical data has inherent limitations, some of which are disclosed herein.

Exhibit 9: A Diversified Trend-following Approach Does Best in Bond Drawdowns

January 1970 - December 2022



Source: AQR, Bloomberg. Returns are monthly, gross of fees and transaction costs. Hypothetical data has inherent limitations, some of which are disclosed herein.

Conclusion

Economic trend is a new take on an old classic. As such, it's grounded in well-established theory, yet constitutes a distinct and innovative approach. The strategy rests on the same premise as price trend—markets tend to incorporate new information gradually—but it captures the phenomenon very differently, using a broad set of real-time measures of economic news. While the economic trend backtest shown in this paper uses one simple signal per economic theme (in order to cover as long a period as possible), comprehensively capturing and processing economic news in real-time and extending the set of signals to

capture a broader set of economic indicators is a complex and highly ambitious endeavor—one which requires significant investment in data and long-term research.

By exploiting the same mechanism differently, economic trend is highly complementary to price trend. Pairing the two approaches more fully captures the underreaction phenomenon than either approach does standalone, improving both average long-term returns and returns during market stress environments.

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Disclosures

Limitations of Backtested Performance. The returns presented reflect hypothetical performance an investor would have obtained had it invested in the manner shown and does not represent returns that any investor actually attained. The information presented is based upon the following hypothetical assumptions.

Economic Trend Backtest Construction

The Economic Trend Backtest builds asset class theme portfolios across the universe outlined below. The model employs relatively simple measures as they afford long data availability and are less susceptible to concerns about data mining. The strategy is therefore intended as a proof of concept and can potentially be enhanced by employing additional and improved measures of economic trends. The backtest combines each asset class theme portfolio at equal risk and targets 10% forecasted annual volatility. Within each asset class theme portfolio, each individual position is sized to target the same amount of volatility. The backtest takes long positions in assets in which economic trends are improving and short positions in assets in which economic trends are deteriorating.

Asset Classes: Equity indices, fixed income (combining government bonds and short-term interest rates at equal risk), currencies, and commodities.

Themes: Growth, inflation, international trade, monetary policy, and risk aversion.

Growth: Growth trends are captured using one-year changes in forecasts of real GDP growth. From 1991 onward forecast data is from Consensus Economics. Prior to 1991, we use one-year changes in realized year-on-year real GDP growth, lagged one quarter (this definition is equivalent to changes in forecasts assuming that real GDP growth follows a random walk). The series is from the OECD. Increasing growth is assumed to be bullish for equities (cash-flow impact), commodities (increasing demand), and currencies (Balassa-Samuelson hypothesis), and bearish for fixed income via both inflationary pressures and upward pressures on real interest rates.

Inflation: Inflation trends are captured using one-year changes in forecasts of CPI inflation. From 1991 onward forecast data is from Consensus Economics. Prior to 1991, we use one-year changes in realized year-on-year CPI inflation, lagged one quarter (this definition is equivalent to changes in forecasts assuming that CPI inflation follows a random walk). The series is from the OECD. Increasing inflation is assumed to be bearish for equities (see Katz and Lustig (2017)), bullish for currencies (see Clarida and Waldman (2008)), and bearish for fixed income.

International Trade: International trade trends are captured using one-year changes in spot exchange rates against an export-weighted basket. Data is from DataStream. A depreciating currency is bullish for equities (exports become more competitive), bearish for currencies (very similar to price momentum), bearish for fixed income (other things equal, a depreciating currency reduces the pressure on a central bank to reduce interest rates), and bearish for commodities (depreciation of the currencies of commodity consumers means commodities, which are generally priced in USD, are effectively more expensive).

Monetary Policy: Monetary policy trends are captured using one-year changes in the front end of the yield curve. From 1992 onwards, we use two-year yields, while prior to 1992 we use Libor and its international equivalents. Both data series are from Bloomberg. Expansionary monetary policy is bullish for equities (see Bernanke and Kuttner (2005)), bullish for currencies (see Eichenbaum and Evans (1995)), bullish for commodities, and bearish for fixed income.

Risk Aversion: Changes in risk aversion are captured using an equally weighted combination of two metrics. The first is one-year equity market excess returns. Data is from DataStream. The second is one-year changes in credit spreads. Changes in credit spreads are computed using Moody's Corporate Yields relative to U.S. treasuries until 2001 and then Bloomberg Global High Yield Corporate OAS. Increasing risk sentiment — i.e., strong equity market returns — is bullish for equities, commodities, and currencies, and bearish for fixed income.

Price Trend Backtest Construction

The Price Trend Backtest builds asset class price trend horizon portfolios across the universe outlined below. The backtest combines each asset class price trend horizon portfolio at equal risk and targets 10% forecasted annual volatility. Within each asset class price trend horizon portfolio, each individual position is sized to target the same amount of volatility. The backtest takes long positions in assets in which prices are appreciating and short positions in assets in which prices are depreciating.

Asset Classes: Equity indices, fixed income (combining government bonds and short-term interest rates at equal risk), currencies, and commodities.

Price Trend Horizons: 1-month, 3-month, 12-month. The price trend signal reflects the return in excess of cash for each asset over the past 1, 3, or 12-month period.

Economic Trend and Price Trend Backtest Universe:

Equity index return data is from Bloomberg. Start dates are the earliest available date of the series:

- 1970: Australia, Germany, Canada, Spain, France, Italy, Japan, Netherlands, U.K., U.S.
- 1975: Switzerland
- 1980: Denmark, Hong Kong, Sweden
- 1988: New Zealand

Government bond return data is from Bloomberg and DataStream. Start dates are

- 1970: Germany, Canada, U.K., U.S.
- 1980: Japan
- 1981: Switzerland
- 1985: Denmark
- 1986: Australia
- 1987: Sweden

Currency return data is from Citi and Reuters. Start dates are

- 1971: Germany, Japan, Switzerland, U.K.
- 1972: Australia, Canada
- 1978: New Zealand, Sweden

Interest rate futures return data is from IFS. Start dates are

- 1987: U.S.
- 1988: U.K.
- 1989: Australia, Europe (Euribor)
- 1991: Canada, New Zealand, Switzerland

Commodity futures return data is from Bloomberg. Start dates are

- 1970: Cattle, Corn Cotton, Hogs, Soybeans, Soymeal, Soyoil, Sugar, Wheat
- 1974: Coffee
- 1979: Heat Oil
- 1983: Crude Oil
- 1984: Gas Oil
- 1985: Unleaded
- 1989: Brent Oil
- 1990: Natural Gas
- 1991: Zinc
- 1993: Nickel

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