

Trend-Following Through the Rates Cycle

Some investors have been concerned that the historical success of trend-following – a quantitative strategy that seeks positive returns by capturing momentum across major asset classes – would unravel in a period of range-bound or rising interest rates. PIMCO's New Neutral thesis anticipates that interest rates will remain lower for longer. Eventually, however, rates are likely to rise from today's rock-bottom levels. Even so, history shows that trend-following strategies have the potential to generate positive returns amid rising rates – and indeed, across all interest rate environments.

Most asset classes have benefited from 30 years of falling interest rates, as future cash flows have been discounted at steadily lower rates, boosting present values. Accordingly, passive long-only strategies now face a challenge in generating positive returns in a period of range-bound – or worse, rising – rates, which could partially reverse this discounting windfall.

Trend-following strategies, which take long or short positions across equity, bond, currency and commodity futures markets consistent with trends in these markets, rode the long downward trend in rates and often profited. However, unlike most passive strategies (and many active ones), trend-followers have no fixed directional bias and can short any and all markets that are falling. By their nature, trend-followers will often miss turning points. But whether markets are rising or falling, if trends are persistent and strong, trend-following strategies are designed to seek profits.



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FIGURE 1: AVERAGE ANNUAL EXCESS RETURNS OF EQUITIES, FIVE-YEAR TREASURIES AND THE SIMPLE TREND-FOLLOWER MODEL (BROKEN OUT BY ANNUAL CHANGE IN INTEREST RATES – 1962 TO 2013)

Change in 5-year yield over year	Number of years in Sample	Excess returns over "risk-free" rate		
		U.S. equity market*	5-year Treasury note future	Simple trend-follower
Rise 100 bps or more	12	6.1%	-4.9%	4.5%
Fall 100 bps or more	14	5.9%	8.9%	10.3%
Range-bound +/- 100 bps	26	6.2%	0.8%	6.4%

*U.S. equity market returns are calculated as S&P 500 total return minus the T-bill return from 1988 onward, and broad U.S. equity market return minus the T-bill return using the Ken French database prior to 1988.

¹ This simple trend-follower model is scaled to achieve 10% annual volatility over our sample, with roughly one quarter of the risk coming from each asset class. We use carefully extended data sets for S&P 500 futures, five-year note futures and certain currency futures to cover the required period. See appendix for details.

² We use five-year yields as the benchmark because these have the longest available daily data history (from 1962) using the Gurkaynak, Sack, Wright database from the Federal Reserve website.

³ Note that actual total returns on five-year Treasury notes were much higher in some of the years in which risk-free rates were high.

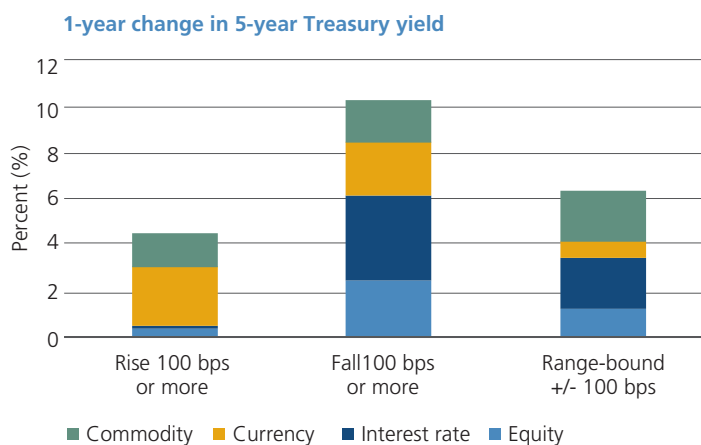
Hypothetical example for illustrative purposes only. In this analysis PIMCO has modeled how historical scenarios might have affected the index, Treasuries and the model. No representation is being made that any one of these indexes or portfolios is likely to achieve profits, losses or results similar to those shown. Figures are provided for illustrative purposes and are not indicative of the past or future performance of any PIMCO product. Transaction costs and management fees are not included; if fees were included results would be lower.

Source: PIMCO. Data is from 31 December 1961 through 31 December 2013.

Figure 1 illustrates the point. It compares hypothetical excess returns of a simple trend-following strategy model with those of U.S. equities and five-year note futures from 1962 to 2014. The 14 years in which rates fell 100 basis points (bps) or more had the strongest trend-following returns, averaging 10.3%. However, the 12 years in which rates rose 100 bps or more still had a positive average excess return of 4.5%. This should be compared with the -4.9% estimated excess return on Treasury futures during those years. Interestingly, equity markets had excess returns of about 6% in all three interest rate regimes.

Figure 2 shows the asset class breakdown. Contributions were well balanced, especially in the falling rate and range-bound years. This shows that hypothetical trend-following returns during the last 30 years were not driven solely by interest rate positions. In the rising rate years, the contributions from rates and equities were much smaller, but still positive. In the example, currency futures generated the largest returns.

FIGURE 2: CONTRIBUTIONS TO THE SIMPLE TREND-FOLLOWER MODEL BY ASSET CLASS (AVERAGE ANNUAL EXCESS RETURNS)



Source: PIMCO. Data is from 31 December 1961 through 31 December 2013.

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FIGURE 3: EXCESS RETURNS IN YEARS IN WHICH FIVE-YEAR TREASURY YIELDS INCREASED BY 100 BPS OR MORE (1960–2014)

Year	Change in 5-year yield over year	Excess returns over "risk-free" rate		
		U.S. equity market*	5-year Treasury note future	Simple trend-follower
1994	2.62%	-2.5%	-6.8%	-4.2%
1980	2.21%	19.9%	-8.9%	6.7%
1969	1.89%	-16.5%	-7.2%	8.4%
1977	1.85%	-7.9%	-3.9%	10.8%
1999	1.80%	15.7%	-6.1%	1.8%
1978	1.77%	0.9%	-6.6%	10.4%
1987	1.59%	-3.7%	-4.2%	2.8%
1983	1.44%	12.7%	-2.1%	3.6%
1981	1.38%	-16.0%	-6.2%	6.3%
2009	1.13%	26.4%	0.0%	-1.9%
1979	1.06%	12.0%	-4.7%	-0.1%
2013	1.02%	32.4%	-1.9%	9.3%
	Average	6.1%	-4.9%	4.5%

*U.S. equity market returns calculated as S&P 500 total return minus the T-bill return from 1988 onward, and broad U.S. equity market return minus the T-bill return using the Ken French database prior to 1988.

Source: PIMCO. Data is from 31 December 1961 through 31 December 2013.

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Rising rate years are the most informative to examine further, as these are when generating positive returns is generally most challenging. From 1962 to 2014 there were 12 years in which five-year Treasury yields increased 100 bps or more (see Figure 3). During those years, Treasury futures averaged an estimated -4.9% excess return, while U.S. equity market excess returns varied from -17% (1969) to +32% (2013), averaging 6.1%. Trend-following returns are typically back-loaded: The model tends to lose money initially upon entering a period of rising rates, but once a new trend is identified, positions switch and may profit. The years 1979, 1994 and 2009 were the exceptions over this sample. In each case, whipsaw in the equity market led to losses.

Three periods are worth examining closely. In the five-year period from 1977 to 1981, five-year yields rose 100 bps or more in each year. In 1977, the trend-follower initially lost

money, but then profited strongly as the trend persisted. In the second example, 1994, yields moved too fast for the trend-follower to profit, and whipsaws in equity markets led to negative returns. In the third example, 2013, yields again moved too fast for the trend-follower to catch the move and profit, but other asset classes, notably equities, did display significant trends, potentially delivering overall positive returns for the strategy.

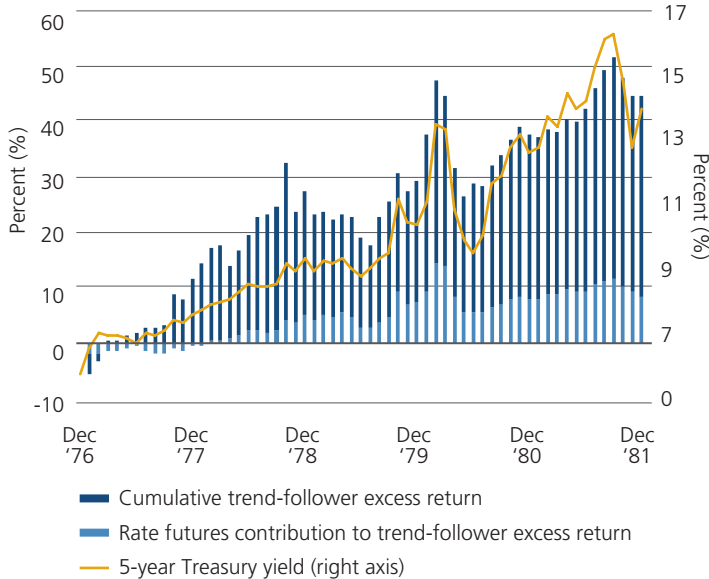
Example 1: 1977-1981

The high inflation era of the late 1970s generated significant interest rate volatility and a period of persistently rising rates. From 1977 to 1981, five-year Treasury yields rose a total of 827 bps, generating an estimated -30% excess return on five-year Treasury note futures. The S&P 500 returned a total 9% excess return over this period. Figure 4 shows the five-year yield path and cumulative monthly excess returns of

the simple trend-follower. The contribution to the trend-follower return coming from positions in note futures is also broken out. The hypothetical trend-follower initially lost money in 1977, caught on the wrong side as the prior trends reversed. As the year progressed, however, the interest rate trend persisted, and the trend-follower took short positions in five-year note futures and equities, and short dollar positions in the Japanese yen (JPY) and the British pound (GBP), delivering strong excess returns in the latter half of the year.

The next year, 1979, proved more difficult for the model, with high volatility in equity markets, but it again performed well in 1980 and 1981. Overall, the hypothetical trend-follower could have generated an approximate 34% excess return in total over the five-year period.

FIGURE 4: TREND-FOLLOWING EXCESS RETURNS OVER RISK-FREE RATES DURING THE 1977–1981 RATE RISES



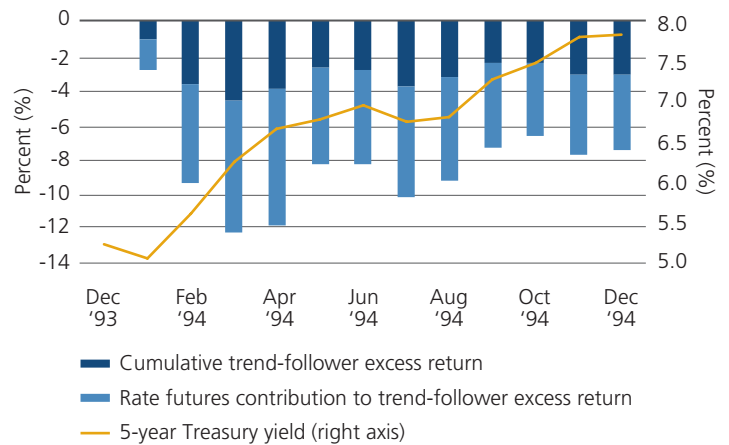
Source: PIMCO. Data is from 31 December 1976 to 31 December 1981.

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Example 2: 1994

The year 1994 witnessed the single-biggest one-year increase in five-year yields during the 1962 to 2014 period – from about 5% at the start of the year to nearly 8% at year-end. In this episode, the trend-follower model was caught off-guard at the beginning of the period, likely generating losses across asset classes. However, equity markets, after initially plunging, recovered strongly into the end of the year, whipsawing the trend-follower. Returns of the hypothetical trend-follower model for the full year were -4.2% (although it is worth noting that the model returned +17% in 1995 after the new trend became persistent).

FIGURE 5: SIMPLE TREND-FOLLOWER MODEL EXCESS RETURNS OVER RISK-FREE RATES DURING THE 1994 RATE RISES



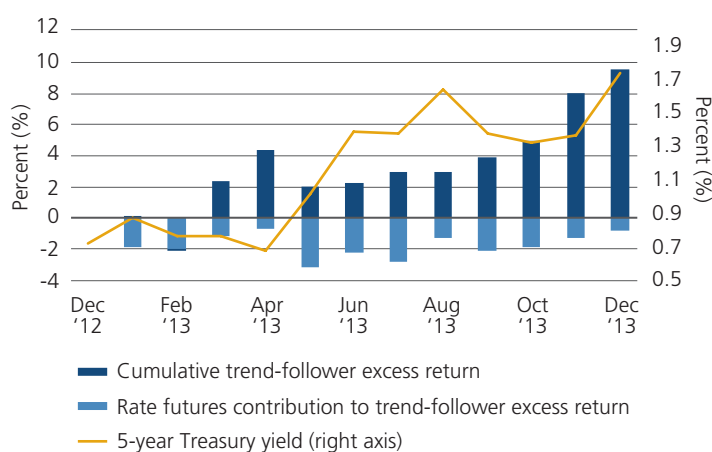
Source: PIMCO. Data is from 31 December 1993 to 31 December 1994.

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Example 3: 2013

The last example covers the taper-induced rate spikes of 2013. Over the calendar year the five-year yield increased around 100 bps, but the majority of this occurred between May and August. This is another good example of how the trend-follower can be caught positioned the opposite way when rate spikes are wholly unanticipated. The model was profitable up until May, then lost money during May and June before equity markets surged in the second half of the year; the trend-follower profited from this new trend, ending the year +9%. Rate futures trend-followers ended the year roughly flat.

FIGURE 6: SIMPLE TREND-FOLLOWER MODEL EXCESS RETURNS OVER RISK-FREE RATES DURING THE 2013 RATE RISES



Source: PIMCO. Data is from 31 December 2012 through 31 December 2013.

Hypothetical example for illustrative purposes only. In this analysis PIMCO has modeled how historical scenarios might have affected the index, Treasuries and the model. No representation is being made that any one of these indexes or portfolios is likely to achieve profits, losses or results similar to those shown. Figures are provided for illustrative purposes and are not indicative of the past or future performance of any PIMCO product. Transaction costs and management fees are not included; if fees were included results would be lower.

Conclusion

Unanticipated periods of rising rates may have unpredictable results on multi-asset portfolios and on some popular strategies. No strategy can fully mitigate this, but we find that trend-following strategies do have the potential to exhibit fairly robust returns during such episodes thanks to their ability to take short positions in markets that are falling. Trend-following, by its nature, tends to miss market turning points, and may lose money initially on spikes in rates or in periods of volatile but range-bound rate moves. However, our analysis shows that over extended periods, trend-following has the potential to perform strongly in all phases of the rates cycle, with contributions to that performance coming from all asset classes.

For investors, this property, combined with the strong performance of the simple trend-follower model in equity market drawdowns, should warrant consideration of these strategies in portfolio construction as a diversifier with the potential for positive returns.

Appendix: the simple trend-follower model

For the purposes of this analysis we set up a simple, transparent and hypothetical trend-following model. The model trades 20 markets: five each in equity index, bond, currency and commodity futures. The model trades once per week, taking a long position if the current futures price is above the one-year moving average price, and taking a short position if it is below. Each position is scaled inversely to the recent 3-month daily realized volatility of the contract, and the overall model is scaled to target 10% volatility, using trailing 10-year windows to estimate volatility. Some futures markets were unavailable in the early parts of the sample. In those periods, risk allocated to each asset class is kept roughly constant over long periods of time by scaling up the underrepresented sectors. Over short periods, risk can be skewed to some asset classes. Fixed transaction costs, estimated from available market data for each futures market of between 1 bp and 10 bps, are subtracted from returns.

Extended hypothetical futures time series are constructed for S&P 500 futures, five-year note futures and currency futures (JPY, DEM, AUD, GBP) before actual trading in those futures markets began. For S&P 500 futures we use daily excess return data from the Ken French database for the top 30% of U.S. stocks with reinvested dividends. For five-year note futures we use the Gurkaynak, Sack, Wright constant maturity Treasury yield data set to estimate daily returns, including roll down and carry. Delivery option effects are not included in the modelling but would not be expected to bias results. Proxy currency future returns are calculated using “risk-free” rate data from Dimson, Marsh and Staunton and Bloomberg spot rates starting in 1973.

The “risk-free” rate can be considered the return on an investment that, in theory, carries no risk. Therefore, it is implied that any additional risk should be rewarded with additional return. All investments contain risk and may lose value.

Past performance is not a guarantee or a reliable indicator of future results. Investing in the **bond market** is subject to risks, including market, interest rate, issuer, credit, inflation risk, and liquidity risk. The value of most bonds and bond strategies are impacted by changes in interest rates. Bonds and bond strategies with longer durations tend to be more sensitive and volatile than those with shorter durations; bond prices generally fall as interest rates rise, and the current low interest rate environment increases this risk. Current reductions in bond counterparty capacity may contribute to decreased market liquidity and increased price volatility. Bond investments may be worth more or less than the original cost when redeemed. Entering into **short sales** includes the potential for loss of more money than the actual cost of the investment, and the risk that the third party to the short sale may fail to honor its contract terms, causing a loss to the portfolio. **Equities** may decline in value due to both real and perceived general market, economic and industry conditions. **Managed futures** contain heightened risk, including wide price fluctuations and may not be suitable for all investors. **Commodities** contain heightened risk including market, political, regulatory, and natural conditions, and may not be suitable for all investors. **Derivatives and commodity-linked derivatives** may involve certain costs and risks such as liquidity, interest rate, market, credit, management and the risk that a position could not be closed when most advantageous. Commodity-linked derivative instruments may involve additional costs and risks such as changes in commodity index volatility or factors affecting a particular industry or commodity, such as drought, floods, weather, livestock disease, embargoes, tariffs and international economic, political and regulatory developments. Investing in derivatives could lose more than the amount invested. **High yield, lower-rated securities** involve greater risk than higher-rated securities; portfolios that invest in them may be subject to greater levels of credit and liquidity risk than portfolios that do not. **Mortgage and asset-backed securities** may be sensitive to changes in interest rates, subject to early repayment risk, and their value may fluctuate in response to the market’s perception of issuer creditworthiness; while generally supported by some form of government or private guarantee there is no assurance that private guarantors will meet their obligations. Investing in **foreign denominated and/or domiciled securities** may involve heightened risk due to currency fluctuations, and economic and political risks, which may be enhanced in emerging markets. The **models** evaluate securities or securities markets based on certain assumptions concerning the interplay of market factors. Models used may not adequately take into account certain factors, may not perform as intended, and may result in a decline in the value of your investment, which could be substantial.

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The S&P 500 Index is an unmanaged market index generally considered representative of the stock market as a whole. The index focuses on the Large-Cap segment of the U.S. equities market. It is not possible to invest directly in an unmanaged index.

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