Prospects for CTAs in a Rising Interest Rate Environment

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EXECUTIVE SUMMARY

- Since 1972, the S&P 500 Index, US Treasuries and traditional 60/40 portfolios have each underperformed (on average) in Rising Rate periods relative to Declining Rate periods (as defined by changes to the Fed Funds target rate). Performance of the CTA industry in relation to the direction of interest rates has exhibited a distinctly different pattern.
- A quantitative evaluation of CTA performance in relation to the direction of rates suggests that the strategy has *not* historically been rate regime-dependent. This is based on an analysis of the Barclay CTA Index (since inception in 1980) and a proprietary trend following benchmark (since 1972). Results were independent of trading time horizon.
- The multi-dimensional approach to portfolio diversification employed by many CTAs may lessen the effect, positive or negative, of any single risk factor (including the monetary policy environment) on performance.
- A decomposition of CTA performance into its underlying sources of return -- the spot price change, the roll yield and the return on cash -- can provide additional insight.

INTRODUCTION

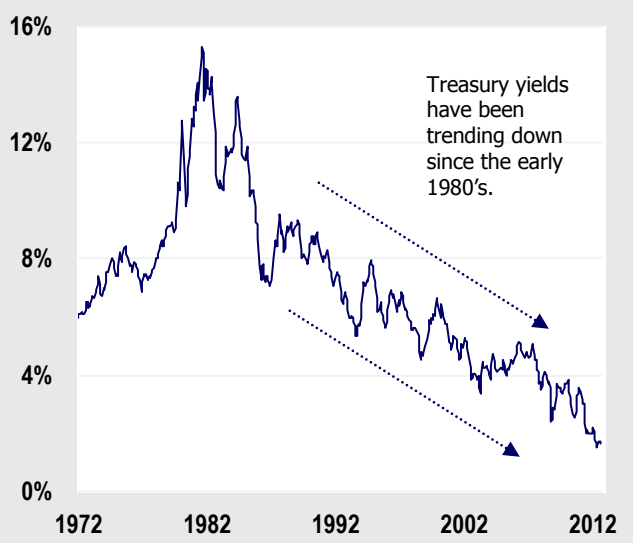
The last sustained rise in interest rates, as defined by the direction of the Fed Funds rate, ended in 1982. Since then, with the exception of just a few years in each of the last three decades, the US Federal Reserve has proffered an easy money policy, gradually guiding interest rates down from the Volker-era stratosphere.

During this period, the alternative investment industry evolved dramatically from its nascent stages in the 1970s, when it consisted of a handful of funds managing a relatively small pool of assets. Consequently, the majority of active hedge funds and CTAs have spent their entire existence operating in a bull market for fixed income, and have yet to experience a secular uptrend in rates. This lack of experience and corresponding lack of performance data can make it somewhat challenging for investors to set appropriate expectations for such an environment.

Many pundits began predicting an imminent turning point in interest rates several years ago, as the Fed Funds target rate sat dormant at 0%-0.25% and yields on long-dated government securities seemingly bottomed out. Since then, however, deterioration in the Eurozone, an uncertain climate in the Middle East, and fiscal concerns in the US have caused rates to decline even further; as we now know, one of the best trades in 2011 was simply to be long Treasuries.

As of this writing (December 2012), Treasury yields remain near their historical lows. The purpose of this paper is not to predict when interest rates will begin to trend upwards, how high they will go, or what the catalyst will be for such a change. This paper will instead evaluate the possible implications to the CTA industry of a shift to a rising interest rate environment in the US.

EXHIBIT 1: 10-Year Treasury Yield



Source: PerTrac; average monthly yield from Jan-72 to Nov-12.

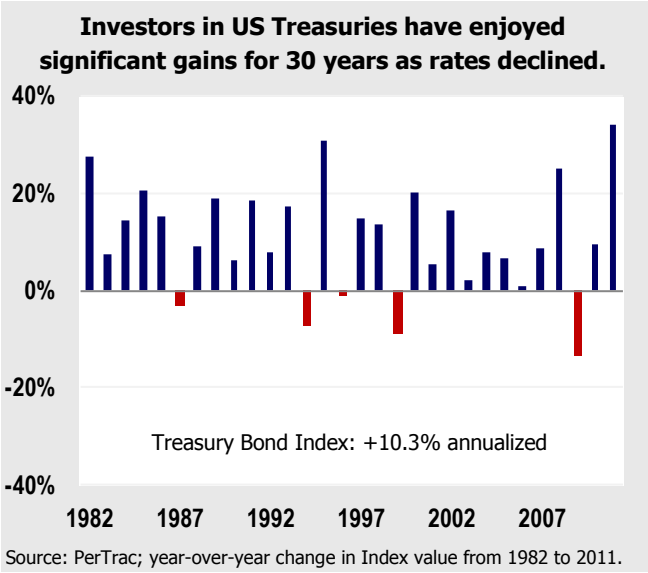
HISTORICAL PERSPECTIVE

The Fed's expansionary bias since the early 1980s created a powerful tailwind for US fixed income and equity markets, which both enjoyed significant growth from 1982 to 2007.

Using the Barclays Capital Long-Term Treasury Bond Index as a proxy for performance, Exhibit 2 (below left) shows the annual return for a static long position in a portfolio of long-dated US Treasury securities since rates began to decline in 1982. During this 30-year period (through 2011), there have been only 5 losing years for such a portfolio, most recently in 2009 following an outsized 25% gain in 2008. A buy-and-hold strategy would have produced compound annual returns of approximately 10.3%, with relatively low volatility (9.3% annualized, based on monthly data).

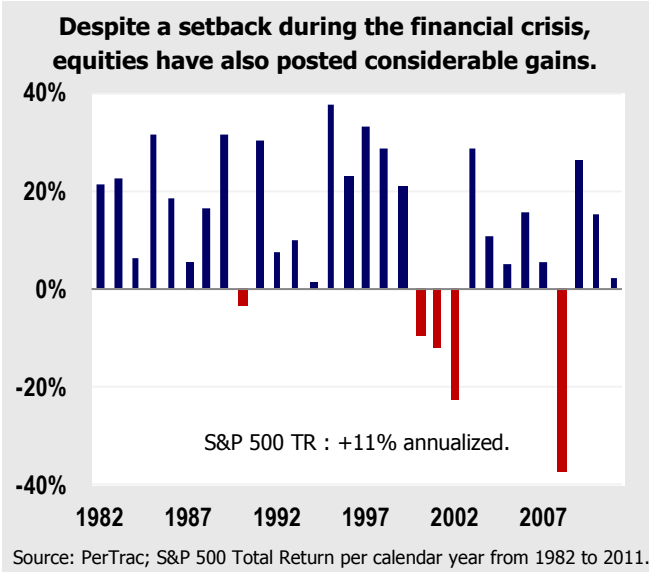
Exhibit 3 (below right) shows the annual performance of US equities during the same period (using the S&P 500 Total Return as a proxy). As with fixed income, there were just 5 losing years from 1982 to 2011. Overall performance in the equity sector was higher, however, with compound returns of 11.0% per annum for the last 30 years. Realized volatility was significantly higher as well (15.6% annualized).

EXHIBIT 2 – Annual Returns:
Barclays Capital Long-Term Treasury Bond Index



Source: PerTrac; year-over-year change in Index value from 1982 to 2011.

EXHIBIT 3 – Annual Returns:
S&P 500 Index (with dividends reinvested)



Source: PerTrac; S&P 500 Total Return per calendar year from 1982 to 2011.

Let's now consider the performance differential between equities and bonds in rising and declining interest rate environments. For this analysis, we will define the interest rate environment using the Fed Funds target rate (monthly, based on average daily value). To capture the results from the last sustained rise in interest rates, we used the entire track record of the Barclays Long-Term Treasury Bond Index, which launched in January 1972.

Each month in our sample was considered to be part of either a 'Rising Rate' or a 'Declining Rate' period, based on the following rules:

For each month t:

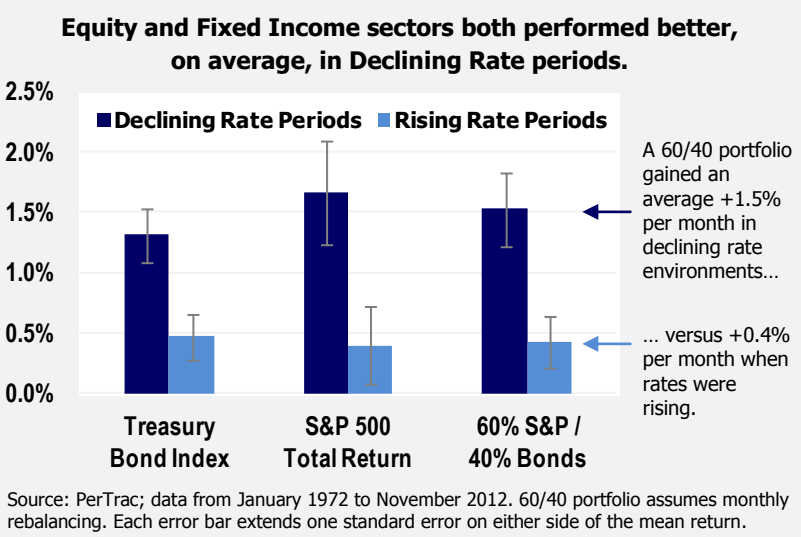
- If $Rate_t > Rate_{t-1}$, month t is in a Rising Rate period.
- If $Rate_t < Rate_{t-1}$, month t is in a Declining Rate period.
- If $Rate_t = Rate_{t-1}$, month t is in the same period as month t-1.

Using this mechanical approach, the data was parsed into 37 distinct periods of varying length, alternating between Declining Rate and Rising Rate. For each period, the average monthly return was calculated for US Treasuries (Barclays

Capital Long-Term Treasury Bond Index), US Equities (S&P 500 Index Total Return) and a traditional 60/40 portfolio (rebalanced monthly). The results were then averaged to determine the overall monthly return for Rising Rate and Declining Rate periods. In order to minimize the impact of several extended periods (such as the current Declining Rate period, which is now 63 months long and counting, through November 2012), each of the 37 periods was given an equal weight regardless of its duration.[1]

The results are summarized in Exhibit 4 (further detail is included in Exhibit A of the Appendix). As expected, US Treasuries performed significantly better in Declining Rate periods, gaining an average +1.3% per month versus +0.5% per month in Rising Rate periods. More interesting, however, is the significant difference in performance in the Equity sector in the two rate environments. During this 40+ year period, the S&P 500 gained an average +1.7% per month in Declining Rate periods and just +0.4% per month in Rising Rate periods, suggesting that equity returns may be as sensitive to the interest rate environment as fixed income returns (and possibly more so).

EXHIBIT 4 – Average Monthly Return since 1972



Source: PerTrac; data from January 1972 to November 2012. 60/40 portfolio assumes monthly rebalancing. Each error bar extends one standard error on either side of the mean return.

The historical underperformance (on average) of US equities and fixed income in Rising Rate periods (since 1972) underscores the importance of portfolio diversification in such an environment. Based on past results, it is quite possible that when restrictive policies are eventually implemented by the Federal Reserve, traditional investment portfolios may face an uphill battle, particularly when considering the fact that any rate hike initiative is likely to be triggered by a rise in inflation expectations, which in itself will have a punitive effect on fixed income.

With that in mind, it may be a critical time for investors to fortify their portfolios. CTAs have historically been a powerful diversification tool, particularly in bear markets for equities, when beta-oriented portfolios tend to sustain large losses (i.e. 1990, 2000-2002, 2008) and CTAs are typically able to profit from the presence of market trends. However, there has been some discussion recently about whether the CTA industry will be able to provide the same level of diversification in the future.

How will a rising interest rate environment impact CTA performance?

To address this question, let's first take a look at the historical performance of the industry in relation to the direction of interest rates.

The Barclay CTA Index tracks the performance of a large group of established trading programs, with monthly data available since January 1980. The average monthly performance of the CTA Index in Rising Rate and Declining Rate periods (as defined earlier) is shown on the next page in Exhibit 5 (further detail in Exhibit A of the Appendix).

With just a quick glance at the chart, it is evident that the historical performance of the CTA Index (circled in red) has exhibited a distinctly different pattern than treasuries and equities in relation to changes in the Fed Funds target rate.

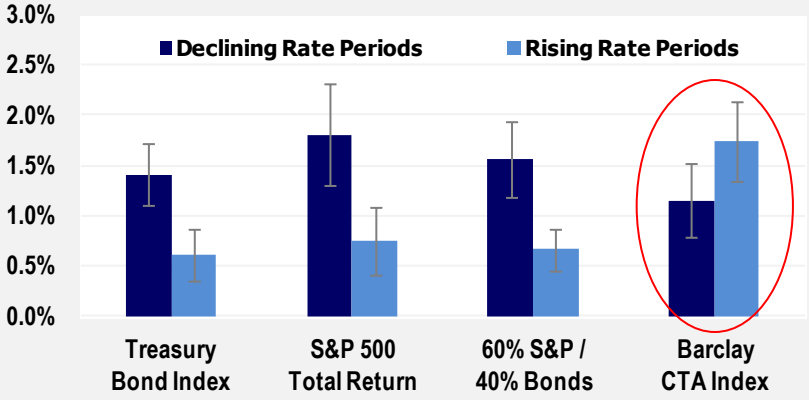
[1] We considered using an alternative approach that included a 'Neutral' category. However, because this required a number of assumptions (i.e., How many consecutive months without a rate change signal the beginning of a Neutral period? How should periods like the current one be categorized, when the target rate has not changed in several years but the Fed is using other tools to create an accommodative monetary environment? How should months with no rate change be classified if they occur in the midst of a clear tightening/easing initiative?), we opted for the simpler binary methodology.

Since 1980, the Barclay CTA Index had *higher* average monthly performance in Rising Rate periods (though this was not a statistically significant finding, indicated in the chart by the overlapping error bars). From a statistical standpoint, the average returns of the CTA Index in Declining Rate and Rising Rate periods are indistinguishable.

Though this excludes data from the inflationary 1970s (unlike the prior chart, which includes data since 1972) the same relative underperformance is observed for Treasury Bonds, the S&P 500 Total Return and 60/40 portfolios in Rising Rate periods.

EXHIBIT 5 – Average Monthly Return since 1980

Performance of the CTA Index in relation to the direction of rates has had a distinctly different pattern than Treasuries and Equities.

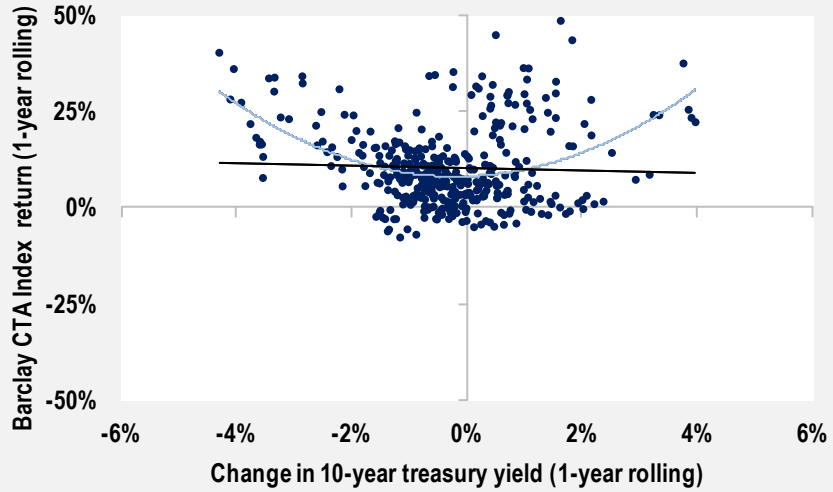


Source: PerTrac; data from Jan-80 to Nov-12. 60/40 portfolio assumes monthly rebalancing. Each error bar extends one standard error on either side of the mean return.

Another way to measure the sensitivity of CTA strategies to the interest rate environment is through a regression of historical performance on changes in treasury yields. Using 1-year rolling results (based on monthly data), we found that a simple regression of CTA Index returns on changes in the 10-year treasury yield showed no linear relationship (R^2 = 0.002; this measures the variance in performance attributable to changes in the underlying variable, with values ranging from 0 to 1). This suggests that the direction of treasury yield changes has historically had no adverse impact on CTA Index returns. The scatter plot below (Exhibit 6) shows the results for each point in the regression, as well as the trendline (in black).[2]

EXHIBIT 6 – CTA Index Return vs. 10Y Treasury Yield Change

A regression of CTA Index returns on 10Y treasury yield changes shows no linear relationship between the two variables (R^2=0.002).



Source: PerTrac.; data from Jan-80 to Nov-12. Scatter plot shows 1-year return of Barclay CTA Index vs. 1-year change in 10-year treasury yields for each month in the sample.

The regression results are consistent with our previous findings (in relation to the Fed Funds target rate). Specifically, we found no apparent relationship between the direction of treasury yields and the historical performance of the Barclay CTA Index. This may surprise those readers that attribute CTA profits mostly to holding static long positions in fixed income during the 30-year rally in Treasuries.

Ideally, it would be useful to see how the CTA industry fared during the 1970s, but there is very limited index data going back that far. Even the indices going back to 1980 (like Barclay CTA) are suboptimal due to a lack of continuity in index constituency. The

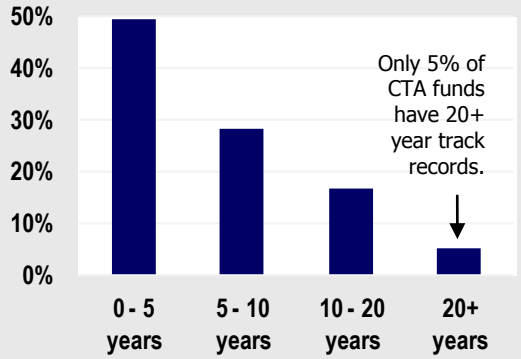
[2] The second order regression line (the "smile") is shown in blue. This shows that while there was no material *linear* relationship between the two variables, there was some evidence that larger yield changes (either positive or negative) have historically coincided with above average CTA Index returns. Of course, this is based on relatively few observations for yield changes of 2% or more.

composition of the indices has changed dramatically as the industry has grown. For instance, Barclay CTA included 15 programs at its inception in 1980; now it includes 602 (as of Nov-12).

While a steady influx of new funds has fueled growth in the number of index constituents, the short lifespan of many programs has simultaneously caused a high attrition rate. According to the Stark CTA database (as of Oct-12), just 22% of active CTA funds have a 10-year track record, and only 5% have been around for 20 years or more. As shown in Exhibit 7, nearly *half* of all active funds have yet to achieve a 5-year track record.

EXHIBIT 7 –Track Record of Active CTAs

Most CTA funds have existed for <10 years, making a long-term analysis difficult.



Source: Stark CTA database updated through Oct-12.

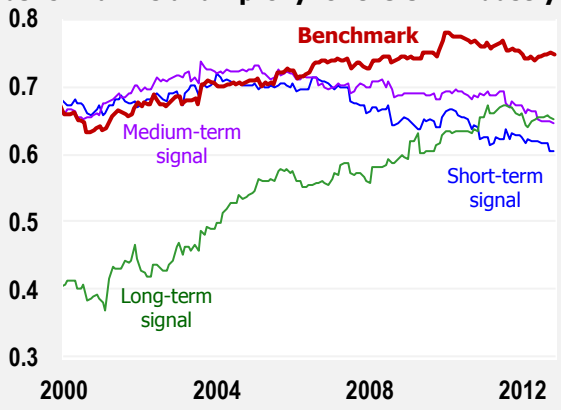
Instead of using a manager-based index, a second option is to use a rules-based benchmark, which tracks the performance of a simple trend following system (or group of systems) applied to a portfolio of futures markets. Though trend following is just one of several strategies used by CTAs (others include pattern recognition, macro, counter-trend, arbitrage and short-term trading), it is the most widely used. It is estimated that more than 70% of managed futures funds rely on trend following strategies (Preqin Hedge Fund Spotlight, November 2012), suggesting it may be a reasonable proxy for the industry at large.

Several different "off the shelf" indices were considered for this analysis (i.e., S&P Diversified Trend Indicator, Newedge Trend Indicator, etc.), but each was ruled out due to either limited historical data or a lack of diversification by sector or time horizon. Consequently, we constructed our own trend following benchmark.

Our benchmark was created using actual futures data from Jan-72 to Nov-12. A selection of equity, fixed income, foreign exchange and commodity markets are included, based on data availability (for example, only commodity futures data is available from 1972 to 1974; please see Appendix Exhibit B for market and sector detail). Trend signals are based on the sign of cumulative returns for a short-term (1-month), medium-term (3-month) and long-term (12-month) lookback period; the composite trend signal reflects a simple average of all 3. Other assumptions include equal risk weighting by sector, constant capital, and a 2 and 20 fee structure. Slippage costs of 1-tick per contract traded are uniformly applied, and cash returns are calculated based on the T-bill rate. Portfolio volatility is normalized to approximately 15% annualized, based on monthly performance.[3]

EXHIBIT 8 – Correl. to Barclay CTA Index

The +0.7 correlation to the Index suggests the benchmark is a fair proxy for the CTA industry.



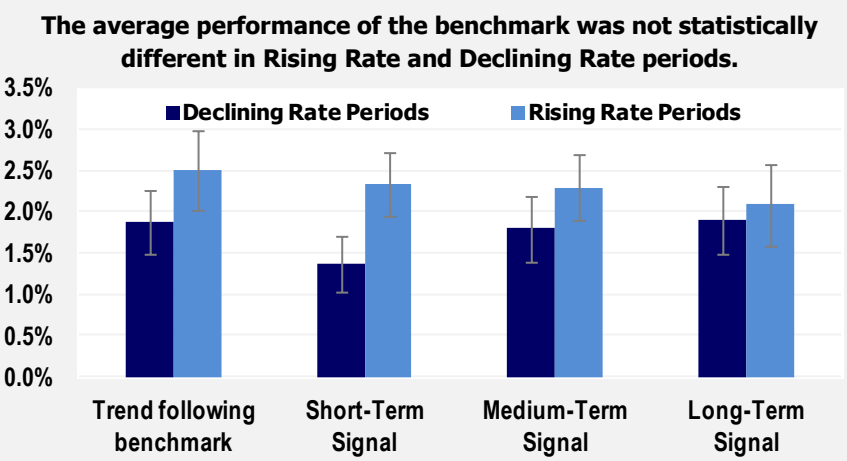
Source: Campbell & Co.; 120-month correlation through Nov-12.

Please note that benchmark construction was intended to be as generic as possible, and does not rely on proprietary methodologies used by Campbell.

To evaluate whether our benchmark is representative of CTA industry performance, we calculated its rolling correlation to the Barclay CTA Index. The results, shown in Exhibit 8 (in red), suggest that our benchmark is reasonably similar to the Index. Since 2000 (through Nov-12), the rolling correlation between the two has ranged from +0.63 to +0.78 and generally trended higher. The monthly correlation over this entire period was +0.74. This is higher than the correlation of either the Newedge Trend Indicator (+0.70) or the S&P Diversified Trend Indicator

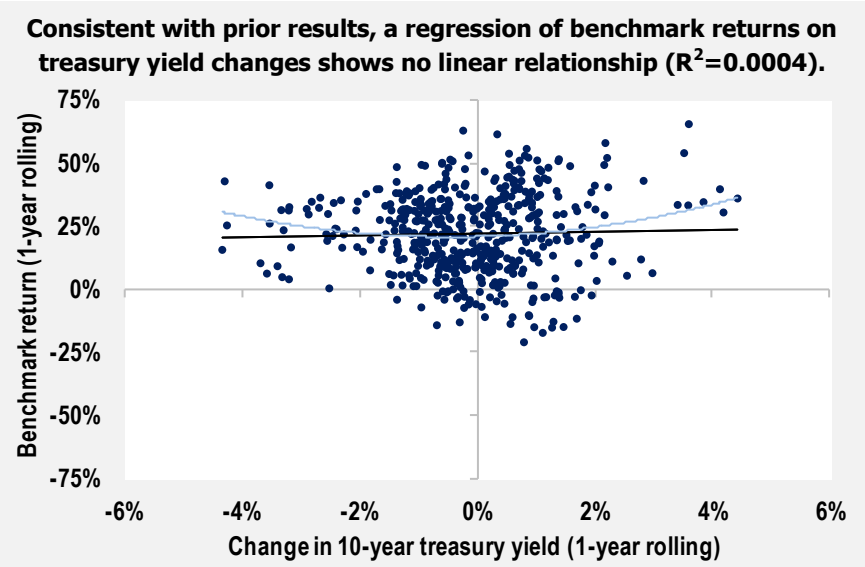
[3] A leverage adjustment was made to the benchmark (prior to the inclusion of interest income) to bring its realized volatility more in line with that of the Barclay CTA Index and the S&P 500 Total Return (14.9% and 15.5% annualized, respectively). Volatility calculations are based on monthly returns from 1972 (or 1980 for the CTA Index) through Nov-12.

EXHIBIT 9 – Average Monthly Benchmark Return



Source: Campbell & Co.; data from Jan-72 to Nov-12. Each error bar extends one standard error on either side of the mean return.

EXHIBIT 10 – Benchmark Return vs. 10Y Treasury Yield Change



Source: Campbell & Co.; data from Jan-72 to Nov-12. Scatter plot shows 1-year benchmark return vs. 1-year change in 10-year treasury yields for each day in the sample (every 20th data point shown).

(+0.57) to the CTA Index over the same period.[4]

As before, we calculated the average monthly return in Rising Rate and Declining Rate periods, this time for our benchmark and its underlying signals. The results, shown at left in Exhibit 9, indicate that the average monthly performance of the benchmark was not statistically different in the two interest rate environments. This was true for all three lookback periods as well.

We also performed a regression of benchmark performance on the change in 10-year treasury yields (1-year rolling, based on daily data from Jan-72 to Nov-12). The R^2 of this regression, like the previous one, is approximately 0 (0.0004). A scatter plot of the 1-year benchmark return versus the 1-year change in treasury yields (daily, with every 20th data point shown) is provided in Exhibit 10, with the trendline shown in black.[5]

These results are entirely consistent with the results from our prior analysis of the Barclay CTA Index. To summarize, an evaluation of CTA performance in relation to the direction of rates suggests that returns have not historically been rate regime-dependent.

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[4] As an additional exercise, we also evaluated the correlation to the CTA Index of the short-term signal only (in blue), medium-term signal only (in purple) and long-term signal only (in green). The correlation to the Index of these underlying signals varied considerably during the period. In 2000, the short-term and medium-term signals were much more correlated to the Index than the long-term signal. Since then, however, the correlation of the long-term signal to the CTA Index has steadily climbed, rising from approximately +0.4 to +0.65. It is now as correlated to the Index as the medium-term signal, and *more* correlated to the Index than the short-term signal. This suggests that the industry may now be more sensitive to longer-term (12-month) trends, and less sensitive to shorter-term (1-month) trends, than in the past.

[5] The second order regression line, shown in blue, indicates that there was some evidence that larger yield changes (either positive or negative) historically coincided with above average benchmark performance, though the effect was not as strong as with the CTA Index.

DIVERSIFICATION PERSPECTIVE

Our quantitative assessment of CTA performance suggests that industry returns have historically been invariant to the interest rate environment. Now let's consider why this should be the case.

Perhaps the most critical consideration when evaluating the impact of *anything* on portfolio performance is the level of underlying diversification, which can either moderate or magnify aggregate factor exposure. Though there are exceptions, most CTAs take a multi-dimensional approach to diversification: portfolios tend to include a wide range of strategies exploiting multiple alpha sources and trading across different markets, sectors, regions and time horizons, to name a few. This approach to portfolio construction will tend to offer a measure of protection from any single external risk factor. For example, a shift in the monetary policy environment in any one region should have a limited impact on a CTA with global exposure (though there can certainly be a spillover effect from policy shifts in the larger global economies).

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Market and sector diversification is customary, with many CTAs trading in 60 different markets or more. It is common for trading programs to include exposure to commodities, foreign exchange, fixed income and equity index futures, limiting the effect of any one sector on overall performance (though some specialist funds do target opportunities in one sector only, most commonly foreign exchange).

Historically, it has been unusual for all four sectors to be profitable or unprofitable in any one year – typically two or three sectors have provided the best opportunities. As an example, the chart on the right (Exhibit 11) shows sector performance (positive or negative) for the CTA benchmark in each of the last 20 years. While there were four instances (most recently in 2008) when returns were positive in all sectors, you'll notice that in most years sector returns were mixed. In the 20-year sample, the only year in which all sectors were negative was 2009 - perhaps explaining why this was such a difficult year for the industry.

Strategy diversification can also be helpful. Though many trading programs rely solely on trend-based strategies, some CTAs also use non-trend strategies, which may provide profitable opportunities unrelated to the "trendiness" of markets. These strategies can include Relative Value, Carry and Mean Reversion (among others).

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Though there are a number of CTA programs that do employ non-trend strategies (including Campbell), for the remainder of our discussion we will focus solely on trend following. As we demonstrated earlier, a simple trend following benchmark has

EXHIBIT 11 – Benchmark P&L by Sector

Sector diversification has been very effective; historically, CTA performance by sector (positive or negative) has varied over time.

	Fixed Inc.	FX	Equity	Commod.
1992	+	-	+	+
1993	+	-	+	+
1994	-	+	-	+
1995	+	+	+	-
1996	+	-	+	+
1997	+	+	+	+
1998	+	+	+	+
1999	-	-	+	+
2000	+	+	-	+
2001	+	+	+	+
2002	+	+	-	-
2003	-	+	+	+
2004	-	-	-	+
2005	+	-	+	-
2006	-	-	+	+
2007	+	+	-	+
2008	+	+	+	+
2009	-	-	-	-
2010	+	+	-	+
2011	+	-	-	-

Source: Campbell & Co. Calendar year returns from 1992 to 2011.

historically been highly correlated to the CTA Index, so may be a reasonable proxy for the CTA industry overall.

A valuable source of diversification for trend following strategies is embedded within the strategy itself. There are two different underlying drivers of futures return: (i) spot price change, and (ii) roll yield. In addition, as with all futures-based strategies, an incremental return will be generated from the interest on margin collateral and excess capital.

Day by day, changing spot prices (representing the value of the underlying asset) are the most visible driver of CTA performance; a rising spot price usually leads to profits for longs and losses for shorts (and vice versa). Over the life of the contract, however, the cumulative return on the futures contract will diverge from the underlying asset return. The difference between the spot return and futures return is called the roll yield.

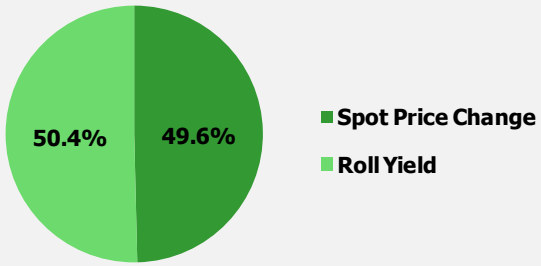
The roll yield is somewhat less intuitive than the spot return. The futures contract will tend to trade at a premium or discount to the spot price, and converge to (or roll towards) the spot price as expiration approaches. For example, an investor buying a futures contract at a discount to the spot price will, if the contract is held to expiration, realize a profit equal to the discount if the spot price remains unchanged.[6]

Though spot return tends to be the primary focal point for those evaluating performance, the roll yield is also an important contributor to total returns.

The chart on the right (Exhibit 12) shows the percentage of cumulative benchmark performance (excluding interest income) due to changing spot prices (dark green) and roll yield (light green) – it turns out that each contributed approximately 50% of the total return since 1972 (50.4% and 49.6% for roll yield and spot return, respectively).[7]

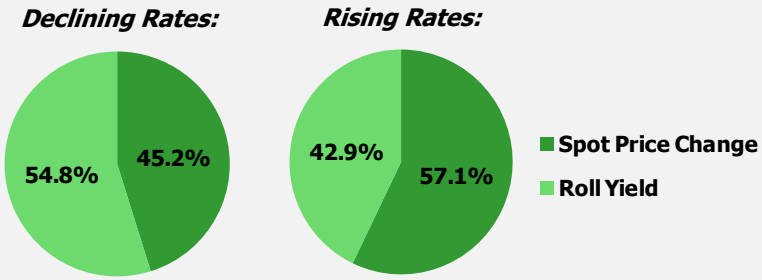
EXHIBIT 12 – Contribution to Benchmark Return

Approximately half of cumulative performance was from spot return; the other half was from roll yield.



Source: Campbell & Co. Breakdown of cumulative benchmark performance from Jan-72 to Nov-12. Excludes the impact of interest income.

EXHIBIT 13 – Contribution to Cumulative Benchmark Return in Rising Rate and Declining Rate periods.



Source: Campbell & Co. Contribution to cumulative return (excluding interest income) in months when the Fed Funds target rate declined (left) and rose (right) based on average daily value.

These distinct sources of return provide an important layer of diversification; for a given position, losses incurred due to a price reversal may be partially offset by gains from a favorable roll yield.

Historically, diversification from these two return drivers has been relatively consistent regardless of the rate environment. Exhibit 13 shows the contribution to benchmark returns in Declining Rate (left) and Rising Rate periods (right). While there was some variation in relative contribution in the two environments, it was minimal.

[6] In practice, a contract is rolled before the date of expiry, and the roll return differs from the spot/futures discount or premium observed at the time a position was taken. In our study, in computing the roll yield, we use the contract nearest to expiry as a proxy for the spot market and the next deferred futures contract as the futures price on the day the contract is rolled.

[7] Since both return components are significant, it is important to note that trend signals are not based solely on the expected spot return: trend models implicitly account for the expected roll yield in the total return used to define a trend. Thus, if the expected return from roll yield is negative (even in an upwardly trending spot environment), it may result in a much smaller trend signal, or it may negate it altogether. Or, if the expected return from roll yield is extremely negative, it may cause the signal to flip to the opposite direction of the spot trend.

One way to evaluate the potential effect of rising interest rates on trend following strategies is to consider the impact of the rate environment on the underlying return drivers. For example, it is rather straightforward to forecast the impact of rising rates on interest income. One of the benefits of investing via futures is the relatively small amount of capital required to maintain positions. As much as 75%-85% of fund assets are typically available to be invested elsewhere. In practice, this capital tends to be invested in short-term US Treasuries (or securities with a similar risk profile) and held to maturity. In addition, margin accounts may be funded with Treasuries. Therefore, rising rates should be a positive development for the return on margin collateral and excess capital, which will increase in tandem with interest rates[8].

The impact of the rate environment on roll yield is a bit less clear. Expected roll yield, or the gain/loss from the difference between the futures price and the spot price, will equal the investment yield (or convenience yield for commodity futures) net of carrying costs. With that in mind, is there a structural reason why expected roll yield should be positive/negative if rates are rising/falling? While roll yield is an important component of performance in all sectors, let's consider this question by looking at one specific example.

Case Study: Fixed Income

For 10-year treasury futures, the expected roll yield is roughly equal to the difference between the investment yield (i.e., coupon) and the financing rate (i.e., 3-month T-Bill rate). The yield curve dictates the difference between 10-year and 3-month rates, so it's the *slope* of the yield curve which indicates whether the expected roll yield for 10-year treasuries is positive or negative. It will increase or decrease as the shape of the yield curve changes, and not because of a change in the absolute level of rates. Therefore, there is no way to accurately predict the impact of a rise in interest rates. The two charts on the next page illustrate this point.

Exhibit 14 shows the estimated roll yield for 10-year treasury futures (annualized) since 1972, approximated by the difference between the 10-year yield and 3-month rate (for simplicity, our estimate excludes the impact of cheapest-to-deliver provisions). During this 40-year period, the estimated roll yield for the 10-year contract ranged from -2.6% to 4.4% annualized. You'll notice that it has been mostly positive since the early 1990s, with the exception of late-2000 to early-2001 and mid-2006 to mid-2007, when an inverted yield curve caused the roll yield to become negative.

Exhibit 15 shows the Fed Funds target rate during the same period. As in Exhibit 14, all periods in which the roll yield was negative are highlighted in red, allowing us to directly view the roll yield in the context of interest rates.

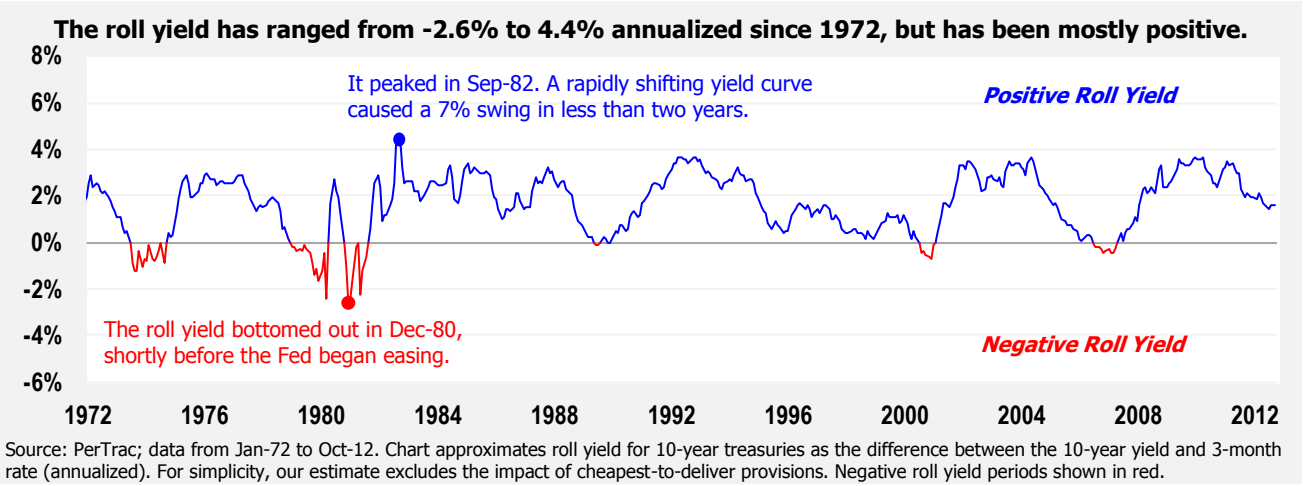
This chart clearly demonstrates that there is no consistent relationship between the roll yield and the direction of rates. There were instances (as in 1974, 1979) when it was negative as rates were rising, while in other cases (as in 1988, 1994, 2005-2006) roll yield was positive while rates rose. Similar inconsistencies can be observed relative to the level of rates. Though negative roll yields seemed to occur when rates were near the high (as in 1981, 2000, 2007), there were other cases when rates were peaking and the roll yield stayed positive (1984, 1994). The magnitude, either positive or negative, of the roll yield reflects the expectation for future rate moves, manifested in the shape of the yield curve.

The magnitude, either positive or negative, of the roll yield reflects the expectation for future rate moves, manifested in the shape of the yield curve.

Since we do not know with any certainty how the yield curve will behave in a rising rate environment, we cannot determine the impact on roll yield and CTA performance in the fixed income sector. Looking backwards, however, we do know that the positive roll yield for US Treasuries for most of the last 30 years has been generally accretive to CTA performance in the sector. Looking forward, there is certainly no guarantee that this will continue to be the case.

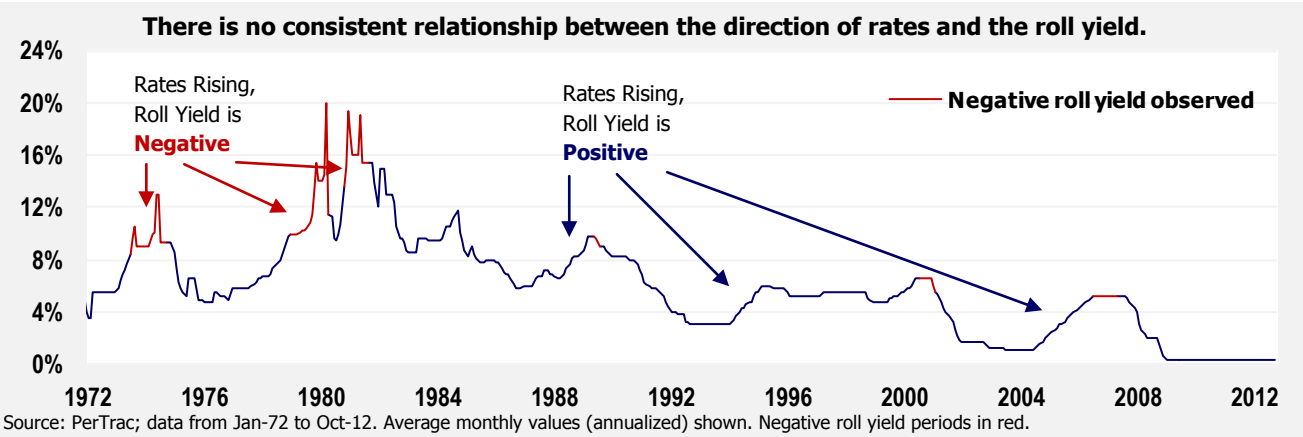
[8] Those that invest through a managed account rather than a fund will not receive the return on cash. However, since the account holder must keep only enough cash available to meet margin requirements, excess capital may be invested elsewhere.

EXHIBIT 14 – Roll Yield: 10-Year Treasuries (proxied by the 10-year yield less the 3-month rate)



Source: PerTrac; data from Jan-72 to Oct-12. Chart approximates roll yield for 10-year treasuries as the difference between the 10-year yield and 3-month rate (annualized). For simplicity, our estimate excludes the impact of cheapest-to-deliver provisions. Negative roll yield periods shown in red.

EXHIBIT 15 – Fed Funds Target Rate



Source: PerTrac; data from Jan-72 to Oct-12. Average monthly values (annualized) shown. Negative roll yield periods in red.

CONCLUSION

An analysis of CTA performance in relation to the direction of interest rates (as defined by changes to the Fed Funds target rate) suggests that the strategy has *not* historically been rate regime-dependent. Using both the Barclay CTA Index and a proprietary trend following benchmark as proxies for the industry, we observed no difference between average monthly performance in rising and falling rate environments (if anything, the strategy tended to do somewhat better when rates were rising, though this result was not statistically significant). The same results were observed for short-term, medium-term and long-term trend signals. In addition, a simple regression of CTA returns on changes in the 10-year treasury yield indicated that there has, historically, been no linear relationship between industry performance and the direction of treasury yield changes. The multi-dimensional approach to portfolio diversification employed by many CTAs may be one reason why the monetary policy environment has historically had a minimal impact on performance.

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APPENDIX:

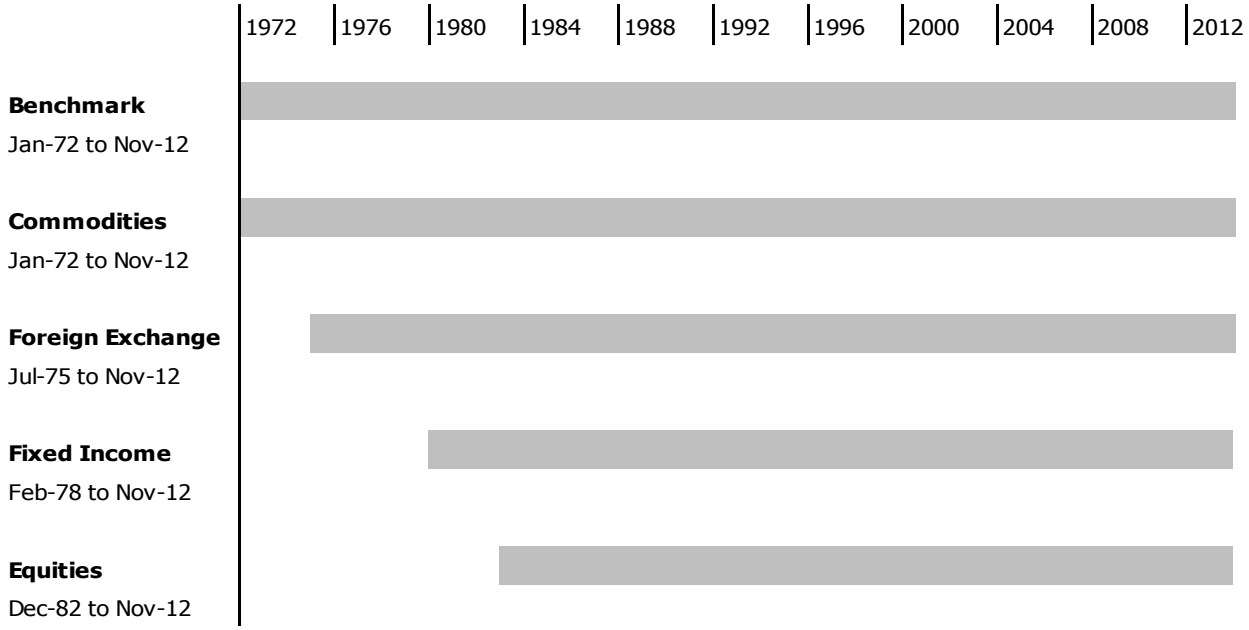
EXHIBIT A – Average monthly return in each Rising Rate and Declining Rate period for the Fed Funds Target Rate since 1972.

			Average Monthly Return:				
Start	**End**	**Direction of Rates**	**Treasury Bond Index**	**S&P 500 Total Return**	**60/40 Portfolio**	**Barclay CTA Index**	**Trendfollowing Benchmark**
Jan-72	Feb-72	Declining	0.7%	2.4%	1.3%		1.6%
Mar-72	Aug-73	Rising	0.4%	0.1%	0.2%		4.5%
Sep-73	Feb-74	Declining	0.8%	-1.0%	-0.3%		5.9%
Mar-74	Jun-74	Rising	-0.5%	-2.4%	-1.6%		-2.0%
Jul-74	May-75	Declining	1.0%	1.0%	1.0%		3.0%
Jun-75	Sep-75	Rising	0.1%	-1.7%	-1.0%		2.2%
Oct-75	Mar-76	Declining	1.3%	4.2%	3.0%		1.1%
Apr-76	Jun-76	Rising	0.4%	0.8%	0.7%		5.9%
Jul-76	Nov-76	Declining	1.4%	-0.1%	0.5%		4.6%
Dec-76	Mar-80	Rising	0.1%	0.5%	0.3%		5.8%
Apr-80	Jul-80	Declining	3.6%	5.3%	4.6%	4.1%	-0.6%
Aug-80	Dec-80	Rising	-0.4%	2.8%	1.5%	0.6%	2.4%
Jan-81	Apr-81	Declining	-0.3%	-0.1%	-0.2%	0.8%	2.6%
May-81	May-81	Rising	2.6%	0.3%	1.2%	3.6%	1.7%
Jun-81	Dec-81	Declining	1.1%	-0.7%	0.0%	2.3%	2.9%
Jan-82	Mar-82	Rising	1.1%	-2.4%	-1.0%	4.2%	3.3%
Apr-82	Apr-83	Declining	2.2%	4.3%	3.5%	1.0%	0.6%
May-83	Jul-83	Rising	-0.8%	-0.0%	-0.3%	1.2%	0.3%
Aug-83	Feb-84	Declining	0.9%	-0.1%	0.3%	1.5%	-0.2%
Mar-84	Aug-84	Rising	0.6%	1.4%	1.1%	0.7%	3.0%
Sep-84	Jan-85	Declining	2.3%	2.0%	2.1%	1.3%	2.2%
Feb-85	Mar-85	Rising	0.1%	0.7%	0.4%	1.8%	1.1%
Apr-85	Jun-85	Declining	2.6%	2.4%	2.5%	-1.8%	2.3%
Jul-85	Nov-85	Rising	1.2%	1.4%	1.4%	3.1%	3.8%
Dec-85	Nov-86	Declining	1.5%	2.3%	2.0%	1.1%	1.6%
Dec-86	Oct-87	Rising	-0.4%	0.4%	0.0%	3.4%	1.7%
Nov-87	Feb-88	Declining	2.4%	1.9%	2.1%	3.0%	1.9%
Mar-88	May-89	Rising	0.6%	1.7%	1.3%	2.4%	4.5%
Jun-89	Jan-94	Declining	1.4%	1.3%	1.4%	0.4%	3.4%
Feb-94	Jun-95	Rising	0.4%	1.0%	0.8%	0.7%	1.7%
Jul-95	Feb-97	Declining	0.5%	2.5%	1.7%	1.1%	2.0%
Mar-97	Aug-98	Rising	1.6%	1.3%	1.4%	0.4%	3.3%
Sep-98	May-99	Declining	-0.4%	4.2%	2.3%	0.4%	-0.6%
Jun-99	Dec-00	Rising	0.9%	0.2%	0.5%	0.3%	0.8%
Jan-01	Jun-04	Declining	0.6%	-0.2%	0.1%	0.5%	1.1%
Jul-04	Aug-07	Rising	0.5%	1.0%	0.8%	0.3%	0.9%
Sep-07	Nov-12	Declining	1.1%	0.1%	0.5%	0.4%	0.3%

Source: PerTrac. Data from Jan-72 to Nov-12.

EXHIBIT B – Trend Following Benchmark Composition

Sectors included, by date (based on availability of actual futures data):



Markets included:

10Y Japanese Govt Bond	Crude Oil	Long Gilt	South African Rand Synthetic
10Y Treasury Notes	Euribor	Mexican Peso	Soybeans
5Y Treasury Notes	Euro	Mini SP 500 Index	SPI200 Index
Amsterdam Exchange Index	Euro-BOBL	NASDAQ 100 E-MINI Index	Sugar #11 (World)
Australian 10Y 6% Bond	Euro-Bund	Natural Gas	Swedish Krona
Australian 3Y 6% Bond	Eurodollar	New Zealand Dollar	Swiss Franc
Australian Bank Bills	FTSE Index	Norwegian Krona	Synthetic Aluminum
Australian Dollar	DAX Index	NY Gasoline RBOB	Synthetic Copper
British Pound	Gold	OMX Stock Index	Synthetic Nickel
CAC 40 Stock Index	Hang Seng Index	S&P Canada 60 Index	Synthetic Zinc
Canadian 10Y Govt Bond	Japanese Yen	Short Sterling	US Bond
Canadian Dollar	Lean Hogs	Silver	Wheat
Coffee	Live Cattle	SIMEX MSCI Taiwan Index	
Corn	London Brent Crude	Simex Nikkei	
Cotton	London Gas Oil	Singapore Dollar Synthetic	

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