Is Now the Time to Add Commodities to Your Portfolio?

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Abstract

With the recent increase in equity volatility, commodity investments have garnered significant attention from investors. Previous research has found substantial benefits associated with commodity investments, but there remains considerable uncertainty regarding the consistency and general applicability of those benefits for equity investors. We provide evidence that helps to resolve some of the uncertainty with regard to commodity investments. Specifically, based on a sample period of 36 years, we show substantial benefits to commodity investments regardless of the equity style an investor pursues. To obtain a significant benefit, however, requires a commodity allocation greater than 5%. Interestingly, adding a commodity exposure enhances an equity portfolio's return only during periods when the Federal Reserve is increasing interest rates, which is consistent with the belief that a major attraction of commodities is that they serve as an inflation hedge. Furthermore, an allocation to commodities in a tactical asset allocation using monetary conditions consistently outperforms both a strategic commodities allocation and an all equity portfolio.

Commodity futures have increasingly garnered interest as a viable component of individual investors' portfolios. Much of the interest is attributable to research espousing the benefits of adding commodity exposure to equity portfolios. Jensen, Johnson and Mercer (2000, 2002) and Gorton and Rouwenhorst (2006), for example, show that commodity futures returns are comparable to equity returns over long periods of time, and confirm that the contracts offer considerable diversification benefits due to their low (or even negative) correlation with equities. The low correlation appears to be driven by the unique performance of the contracts during inflationary periods. Since increasing commodity prices are typically one element of heightened inflation and higher interest rates, both of which tend to negatively affect equities, long positions in commodity futures are found to provide an inflation hedge for equity portfolios.[1] Gorton and Rouwenhorst suggest that the atypical exposure of commodity futures to unexpected inflation provides a potential explanation for their effectiveness in diversifying stock and bond portfolios.

Recent developments in the securities markets further support the viability of commodity futures exposure for individual investors. Widespread interest in commodity price movements has spurred the development of investment vehicles that offer individual investors a low cost, simplified approach for gaining direct exposure to commodity futures, and hence commodity prices. Historically, obtaining exposure to commodity futures required an investor to open their own futures trading account or to invest through a commodity trading advisor (CTA) or a commodity pool operator (CPO). The costs and complexities involved discouraged most individual investors from pursuing these alternatives.[2]

In recent years, however, the introduction of commodity-based exchange traded funds (ETFs) and mutual funds have made access to commodity futures practical for most individual investors. One example is the iShares S&P GSCI Commodity-Indexed Trust (ticker GSG), which trades as an ETF based on an index of commodity futures. Its performance (before expenses) is designed to correspond with the returns to the S&P Goldman Sachs Commodity Index (GSCI),

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[1] See, for example Greer (1978), Bodie (1983), Irwin and Landa (1987), Edwards and Park (1996) and Greer (2007) for studies that discuss the view that, when included in a portfolio, commodity futures offer an inflation hedge.
[2] See Edwards and Park (1996) for a discussion of CTA and CPO investment vehicles and their costs.

which is comprised of 24 different commodity futures contracts. Similarly, mutual funds have been introduced in recent years that provide a low cost, convenient vehicle to achieve exposure to commodity futures. For example, Oppenheimer offers the Commodity Strategy Total Return Fund (ticker QRAAX), which tracks the performance of the GSCI, and Pimco's Commodity Real Return Strategy Fund (ticker PCRAX) tracks the Dow Jones AIG Commodity Index.

Jensen, Johnson and Mercer (2002) also provide evidence that commodity futures exposure is beneficial in tactical asset allocation strategies. Motivated by the expected linkage between commodity prices, inflationary developments, and the Federal Reserve's monetary policy stance, the authors find significant risk and return benefits from increasing commodity exposure during periods of Fed tightening, but virtually no benefit during periods of Fed easing.

Much of the previous research evidence indicates that sizable investment benefits are possible with an investment in commodity futures, and furthermore that low cost, widely-available investment vehicles exist for investors to gain exposure to commodity futures. This combination of characteristics suggests that commodity futures represent an ideal addition to most equity portfolios. Recent evidence, however, suggests that the benefits ascribed to commodity futures may have been exaggerated. In particular, Erb and Harvey (2006) raise issues that suggest that investors should apply considerable skepticism when projecting the historical performance of futures contracts into future periods. The authors suggest that the performance of futures has deviated dramatically throughout history, and furthermore, the performance has diminished over time. Erb and Harvey's research provides additional motivation to explore the practical benefits that investors can expect from adding commodity futures to equity portfolios.

Given the evidence of these earlier studies and the interest in commodities investing, we reexamine the benefits of adding commodity futures exposure to equity portfolios by extending

the literature along four dimensions. First, we evaluate the consistency of the contribution across alternative equity styles by examining equity portfolios oriented along value, growth, small-cap, large-cap, and momentum styles. To date, researchers in this area have generally used only broad equity indexes in their work. It is well known that the assets managed according to style guidelines are substantial.[3] Therefore, by considering alternative equity strategies we provide a broader view of the potential benefits that can be achieved by incorporating commodity futures into equity portfolios managed along alternative style guidelines.

Second, we supplement the analysis by considering alternative weights for the commodity allocation. Greer (2007) observes that a typical client allocation to commodity futures is about five percent, but notes that the case can easily be made for a fifteen percent allocation based on desired risk and return parameters. Little evidence exists as to the importance of weighting across equity style dimensions. Thus, our research provides equity investors a means to gauge the benefits of commodity futures for their investment style, and assesses the influence of the weight allocated to commodities.

Third, we examine the contribution of commodity futures over time to determine the temporal consistency of any benefits the contracts provide. Erb and Harvey (2006) find little evidence of consistency in the returns to commodity futures.[4] To provide additional evidence regarding the consistency of the benefits futures have provided, we plot returns for each month over the entire sample period.

Fourth, we explore the benefits of applying both strategic and tactical approaches in establishing an allocation to commodity futures. Recent evidence suggests that the Federal

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[3] For example, much of the mutual fund industry in the U.S. is "classified" along the nine dimensions of Morningstar's style box in order to help investors in their asset allocation decisions.

[4] The inconsistency in the performance of commodity futures contracts corresponds with previous evidence reported by Irwin, Krukemeyer and Zulauf (1993) and Edwards and Park (1996). Furthermore, Chance (1994) noted that the correlation of commodity futures with equities has deviated substantially over time.

Reserve's monetary policy stance, as gauged by changes in its policy rates, provides useful information that can be effectively used to improve the allocation decision. Given the differences in the covariance structure of returns across alternative equity styles, it is reasonable to question whether tactical allocation strategies are effective across alternative equity styles.

Our findings indicate that commodity futures offer considerable benefits to equity investors regardless of the targeted equity strategy. Surprisingly, significant and comparable benefits accrue for investors choosing to follow investment strategies that are both relatively conservative and aggressive. Furthermore, the benefits of adding commodity futures to an equity strategy are enhanced dramatically by using a tactical strategy that relies on policy rate shifts by the Federal Reserve. Specifically, adding a modest exposure to commodity futures when the Fed is raising policy rates (i.e., a restrictive policy stance) significantly increases portfolio returns and significantly decreases portfolio risk. In contrast, when the Fed is decreasing policy rates (i.e., an expansive policy stance), supplementing a portfolio with a modest exposure to commodity futures results in a significant risk reduction; however, portfolio returns *fall* significantly. A temporal evaluation of the investment benefits of commodity futures indicates that, after controlling for changes in the Fed's policy rates, the benefits have remained fairly consistent over time.

Sample and Methodology

Using monthly return observations over the sample period December 1970 through August 2007, we evaluate the performance of five alternative equity style portfolios, value, growth, small-cap, large-cap, and momentum, both with and without allocations to commodity

futures.[5] For the five different style portfolios, we use returns from the Fama and French (1992) portfolios formed on size, book-to-market (equity), and momentum.[6]

Yau, Schneeweis, Robinson and Weiss (2007) note that the three most widely used contracts on commodity futures indexes are the S&P Goldman Sachs Commodity Index, Dow Jones-UBS Commodity Index (formerly branded as the Dow-Jones AIG Commodity Index), and the Reuters/Jefferies CRB Index. The authors confirm the dominant position held by the GSCI, noting that it represents 85% of the combined open interest of the three alternative contracts. Therefore, like numerous prior studies we use the S&P Goldman Sachs Commodity Index (GSCI) to evaluate the investment benefits of commodity futures. We consider three alternative futures allocations including: a limited allocation (5%), a modest allocation (10%), and a prominent allocation (15%). Greer (2007) contends that investors generally maintain a very conservative allocation of 5% to commodity futures, with allocations of 10% to 15% being more appropriate for the average risk tolerance of investors.[7] The allocations in our paper allow an examination of his contention.

We begin our analysis by considering the benefits of a simple strategic allocation to commodity futures of 5%, 10%, or 15% (i.e., constant mix portfolios over the entire sample period). We then extend the research by evaluating the risk and return of commodities over expansive and restrictive Federal Reserve monetary environments. Jensen, Johnson and Mercer (2000, 2002) find that the benefits of including commodity futures in investment portfolios accrue mostly during periods of Fed tightening. Given the Fed's focus on maintaining price

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[5] Our data begins with the start of a Federal Reserve monetary environment and ends with the end of a Federal Reserve monetary environment. A discussion of the delineation of monetary environments follows in the results section of the paper.

[6] We thank Kenneth French for making return data available on his website http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html. The use of these return data for style proxies is quite common in the literature, and largely based upon the pioneering work of Fama and French (1992).

[7] Yau, Schneeweis, Robinson and Weiss (2007) also note that the typical allocation to commodity futures has been under 5%.

stability, it is reasonable to expect that Fed tightening corresponds with periods of heightened inflationary concern. During inflationary periods and periods of high nominal interest rates, equities tend to languish, while commodity futures prosper. To investigate the investment implications of this view, we examine a tactical strategy that supplants a portion of the equity portfolio with commodity futures during periods of Fed tightening, while no futures position is taken during periods of Fed easing.

Results

Table 1 reports monthly portfolio returns for the five alternative equity style portfolios. Returns are reported for each portfolio without commodity futures (i.e., a benchmark return) and with commodity exposures of five percent, ten percent, and fifteen percent. We calculate the incremental return associated with replacing a portion of the equity portfolio with commodity futures as the portfolio return minus the all-equity return, and refer to it as the return difference.

Absent commodities, a momentum strategy generated the highest return and growth stocks generated the lowest return. When we add commodities, the return difference is small in most cases, and it is never significantly different from zero. As expected, the largest changes occurred with a fifteen percent allocation to commodity futures. While not statistically significant, the momentum portfolio's return was reduced by 5.6 basis points per month, while the growth portfolio added 2.4 basis points per month.

To assess the diversification benefits associated with commodity futures, Table 2 presents the standard deviation of monthly portfolio returns with and without commodity exposure. The first row of the table presents the standard deviations with zero commodity exposure (the benchmark portfolio) and illustrates the differences in risk across the equity styles. We also

calculate and present the differences in the standard deviations between the portfolios with zero commodity exposure and the portfolios that include commodity exposure.

Absent commodities, large-cap stocks had the lowest dispersion in returns and small-cap stocks had the highest dispersion in returns. Once commodities are added to the equity positions, the standard deviation of each equity portfolio is reduced substantially. The reduction in standard deviation is statistically significant when the commodities allocation is ten percent or greater. For a 10% allocation, the standard deviation of the monthly returns for the small-cap portfolio decrease by over 58 basis points (over two hundred basis points annualized). Even for the large-cap portfolio, which is least benefited by the addition of a commodity exposure, standard deviation falls by nearly 42 basis points. With a fifteen percent allocation to futures, the incremental risk reduction is magnified to almost 85 basis points for the small-cap portfolio (almost 300 basis points annualized) and over 59 basis points for the large-cap portfolio.

The results in Table 1 and 2 indicate that the investment benefits of commodity futures are attributable to their diversification benefits, not their ability to enhance portfolio returns. The findings suggest that a futures allocation allows investors to achieve a considerable level of risk reduction. Return increased slightly for growth and large-cap portfolios, whereas value, small-cap, and momentum portfolios had slight reductions in return. Interestingly, however, we show that the allocation has to be somewhat prominent (greater than five percent) to achieve a statistically significant reduction in portfolio risk. This finding is consistent with Greer's (2007) contention that the appropriate allocation to commodity futures should be as high as ten to fifteen percent. The findings also show that benefits accrue regardless of the equity style employed. Specifically, adding commodity futures reduced portfolio risk significantly for all five styles, while returns were not significantly impacted for any of the five styles. Thus, whether investors

follow a relatively conservative strategy targeting large-cap stocks or a more aggressive strategy

targeting small-cap stocks, a significant net benefit is achieved by adding an exposure to

commodity futures.

Tactical Allocations. Given the evidence in Jensen, Johnson and Mercer (2000, 2002)

that the return and risk of commodity futures appear to be related to the Federal Reserve's

manipulation of policy rates, we extend the investigation by examining a tactical allocation

scheme linked to changes in policy rates.

Following prior studies, we use reversals in directional changes in Federal Reserve policy

rates to identify shifts in monetary policy.[8] Specifically, months following rate increases fall in

periods classified as restrictive monetary environment, and months following rate decreases fall

in periods classified as expansive monetary environment. To avoid any look-ahead bias, any

month that includes a rate shift that is in the opposite direction from the prior rate change is

classified as the then-existing policy, and the change in asset allocation takes place in the

subsequent month. We form the portfolios and measure returns in this manner in order to reflect

an "investable" strategy for investors.

As our Federal Reserve policy rate we use the (bank) discount rate.[9] The efficacy of

directional changes in the Fed discount rate is supported by four considerations. First, the

discount rate has had an official role in monetary policy since the Fed's creation, whereas the

Fed has targeted the fed funds rate only intermittently throughout history. Second, directional

changes in the Fed discount rate and the Fed's fed funds target rate generally align with one

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[8] As examples of studies that have used this approach see Booth and Booth (1997), Jensen, Mercer and Johnson (1996), Fujimoto (2003) and Conover, Jensen, Johnson and Mercer (2005). The Fed indicates its view of Fed discount rate changes in the 1961 edition of The Federal Reserve System: Purposes and Functions as follows: ". . . it is only natural that the business and financial community should commonly interpret a change in the level of Reserve Bank discount rates as an important indication of the trend in Federal Reserve Policy." (See page 46.)
[9] The 442 month sample period is distributed nearly equally between expansive and restrictive monetary periods with 246 months classified as expansive policy months and 196 classified as restrictive months.

another (see Thornton (1998)). Third, there is strong empirical evidence confirming that directional changes in the discount rate identify periods of dramatically different growth rates in monetary and reserve aggregates (see Jensen, Mercer and Johnson (1996) and Jensen and Mercer (2006)). Thus, there is strong empirical support for the effectiveness of this approach, whereas empirical support for other methods is less robust. Finally, as stated by Thornton , "Because discount rate changes are made infrequently, by sizable amounts, and are formally announced, they are newsworthy events that attract considerable attention." Thus, the information relayed by a discount rate change is objective and made widely available to investors on a timely basis.[10]

Table 3 reports monthly return differences for each of the five equity style portfolios, in both expansive (E) policy periods and restrictive (R) policy periods. The return difference is calculated as the portfolio return with x% commodity exposure less the all-equity benchmark portfolio return. Without a commodity investment, the returns for each of the five equity portfolios are higher during expansive monetary environments than during restrictive monetary environments. This is consistent with previous research of Conover, Jensen, Johnson and Mercer (2005).

Adding commodity futures when monetary policy is expansive results in a statistically significant (at the 10% significance level or better) "reduction" in returns for each of the five investment strategies. The impact is especially detrimental for value, small-cap, and momentum investors. In particular, adding a fifteen percent exposure to commodity futures results in a reduction of approximately 20 basis points per month in the returns to the value, small-cap, and momentum portfolios. Likewise, the growth and large-cap portfolios experience return

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[10] Furthermore, based on Choleski variance decompositions, a recent study by Becher, Jensen and Mercer (2008), supported the robustness of the relationship between monetary policy shifts and stock returns to potential endogeneity problems.

reductions of close to 12 basis points per month. In addition to being statistically significant, these losses in returns are clearly economically significant.

In stark contrast to these results, the addition of commodity futures in restrictive policy periods increases returns, with significant increases for the growth, small-cap, and large-cap equity style portfolios. With a fifteen percent commodity exposure, the return enhancement for these three portfolios is approximately 20 basis points per month, which is highly significant (both economically and statistically).

The results in Table 3 clearly demonstrate an association between the return attributes of commodity futures and Federal Reserve policy rates. A commodity exposure significantly enhances growth, small-cap, and large-cap returns when the Fed is increasing rates, which is likely when the Federal Reserve has concerns regarding future inflation. The same exposure significantly reduces the returns for all five equity portfolios when the Fed is lowering rates. This observation is consistent with the view that the performance of commodity futures is aligned with inflationary concerns, and indicates that commodity futures can be effective in hedging the adverse influence that inflationary pressures exert on certain equity styles.

Following the format of Table 3, Table 4 reports differences in portfolio standard deviations across expansive and restrictive policy periods. The standard deviation difference equals the standard deviation of the portfolio with x% commodity exposure less the standard deviation of the all-equity benchmark portfolio. It is clear that for each of the five equity styles, in both expansive and restrictive policy periods, there is a reduction in risk when a commodities exposure is added to the portfolios. Furthermore, there do not appear to be sizable differences in risk reduction across the styles. However, an exposure greater than 5% is required to produce a statistically significant reduction in risk regardless of monetary conditions.

Overall, the results in Tables 3 and 4 indicate that commodity futures provide diversification benefits for investors during both expansive and restrictive monetary policy periods. Interestingly, during periods of expansive policy, investors sacrifice portfolio return to attain the diversification benefits of commodity futures, while during periods of restrictive policy, the diversification benefits are achieved at the same time returns are being significantly enhanced. During periods of expansive policy, most investors would likely deem the sacrificed returns to be too large relative to the diversification benefits. In contrast, during periods of restrictive policy, all investors should view the diversification benefits of commodity futures as desirable, since the benefits are not accompanied by a loss of return.

Tactical Allocation vs. Strategic Allocation. In Figure 1 we provide a temporal view of the investment benefits of an incremental exposure to commodity futures. For purposes of illustration, we examine the small-cap portfolio with a fifteen percent commodity exposure. The figure plots wealth accumulation over the full sample period for the following three investment strategies: (1) 100% in the small-cap portfolio; (2) a strategic allocation of 85% in the small-cap portfolio and 15% in commodities; and (3) a tactical allocation of 85% in the small-cap portfolio and 15% in commodities during restrictive policy periods, and 100% in the small-cap portfolio during expansive policy periods. It is clear that both the strategic allocation approach and the tactical allocation approach dominate the all-equity portfolio over the entire sample period. Furthermore, tactically allocating the commodities exposure dramatically outperforms strategic (i.e. constant) allocation. Remarkably, the return enhancement is consistent throughout the entire sample period.

Summary and Conclusions

Proponents have long argued that commodity futures offer substantial portfolio diversification benefits. These benefits, along with the development of readily available investment vehicles, have generated considerable recent interest in commodity futures as a viable investment alternative. The objective of this analysis was to consider several dimensions of a commodity futures investment. We evaluated the benefits, to equity investors, associated with commodity exposures that ranged from limited (five percent) to prominent (fifteen percent). We also considered the consistency of the investment benefits across investment style and monetary environment. Finally, based on previous research, we evaluated the benefits of both strategic and tactical allocations to commodity futures over time.

Our findings showed strong support for the contention that commodity futures offer equity investors considerable benefits as a diversification tool. Surprisingly, the benefit of supplementing a portfolio with a commodity exposure was relatively invariant to the equity investors' investment style. Investors choosing a relatively conservative approach of targeting large-cap stocks achieved very comparable benefits to more aggressive investors that followed momentum and small-cap strategies. For each of the five most common investment styles, portfolio risk was reduced significantly when ten percent or more of the portfolio was allocated to commodity futures. Interestingly, a five percent allocation to commodity futures was not sufficient to produce a significant reduction in risk for any of the five investment strategies.

We evaluated the benefits of a tactical allocation to commodity futures relative to a strategic allocation approach. Our findings indicated that the benefits of commodity futures could be greatly enhanced by utilizing a tactical allocation approach that was guided by shifts in Federal Reserve policy rates. Specifically, a tactical approach that established a commodity

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exposure only during periods when the Fed was increasing rates (during a restrictive monetary policy) produced a significant increase in portfolio returns, while reducing portfolio risk significantly.

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Table 1. Mean Monthly Returns and Differences in Returns over Full Sample Period

	Equity Style Portfolios				
	Value	*Growth*	*Small*	*Large*	*Momentum*
Portfolio with 0% Commodity Exposure	1.389%	0.926%	1.224%	0.987%	1.463%
Portfolio with 5% Commodity Exposure	1.374	0.934	1.218	0.992	1.445
Return Difference	-0.015	0.008	-0.007	0.005	-0.019
P-value	0.385	0.654	0.725	0.767	0.290
Portfolio with 10% Commodity Exposure	1.359	0.942	1.211	0.997	1.426
Return Difference	-0.030	0.016	-0.014	0.010	-0.038
P-value	0.385	0.654	0.725	0.767	0.290
Portfolio with 15% Commodity Exposure	1.344	0.950	1.204	1.002	1.407
Return Difference	-0.045	0.024	-0.020	0.015	-0.056
P-value	0.385	0.654	0.725	0.767	0.290

P-values were determined based on a t-test on the paired differences between the portfolio and benchmark returns.

Table 2. Standard Deviation of Monthly Returns and Differences in Standard Deviation over Full Sample Period

	Equity Style Portfolios				
	Value	*Growth*	*Small*	*Large*	*Momentum*
Portfolio with 0% Commodity Exposure	4.742%	4.993%	6.185%	4.322%	5.344%
Portfolio with 5% Commodity Exposure	4.509	4.737	5.887	4.103	5.098
Std. Dev. Difference	-0.233	-0.257	-0.298	-0.220	-0.247
P-value	0.145	0.134	0.150	0.137	0.160
Portfolio with 10% Commodity Exposure	4.294	4.497	5.603	3.903	4.867
Std. Dev. Difference	-0.448	-0.496	-0.582	-0.419	-0.478
P-value	0.019	0.014	0.019	0.016	0.025
Portfolio with 15% Commodity Exposure	4.100	4.278	5.336	3.727	4.655
Std. Dev. Difference	-0.642	-0.715	-0.849	-0.595	-0.690
P-value	0.001	0.001	0.001	0.001	0.002

"Standard Deviation Difference" is the standard deviation of the portfolio with 0% commodity exposure less the standard deviation of the portfolio with x% commodity exposure. P-values were determined by applying an F-test to the ratio of the variances.

Table 3. Differences in Mean Monthly Returns (in %): Portfolio Return less Benchmark Return[1]

Equity Portfolio Style	Benchmark Return	Return Difference for Portfolios with Commodities Allocation		
		5 Percent Commodity Allocation	10 Percent Commodity Allocation	15 Percent Commodity Allocation
Value: Expansive	1.797	-0.063***	-0.125***	-0.188***
Value: Restrictive	0.878	0.045	0.089	0.134
Growth: Expansive	1.309	-0.038*	-0.077*	-0.115*
Growth: Restrictive	0.445	0.066**	0.133**	0.199**
Small: Expansive	1.897	-0.068***	-0.136***	-0.203***
Small: Restrictive	0.380	0.070**	0.139**	0.209**
Large: Expansive	1.332	-0.039*	-0.079*	-0.118*
Large: Restrictive	0.555	0.061**	0.122**	0.183**
Momentum: Expansive	1.843	-0.065***	-0.130***	-0.195***
Momentum: Restrictive	0.987	0.039	0.079	0.118

[1] The benchmark portfolio is the all-equity portfolio with no weight allocated to commodities.
"Expansive" indicates expansive monetary policy period; "Restrictive" indicates restrictive monetary policy period.
*** indicates significance at 1%; ** indicates significance at 5%; * indicates significance at 10%.

Table 4. Differences in Standard Deviation of Monthly Returns (in %): Portfolio Standard Deviation less Benchmark Standard Deviation[1]

Equity Portfolio Style	Benchmark Standard Deviation	Return Difference for Portfolios with Commodities Allocation		
		5 Percent Commodity Allocation	*10 Percent Commodity Allocation*	*15 Percent Commodity Allocation*
Value: Expansive	4.788	-0.233	-0.466*	-0.676***
Value: Restrictive	4.645	-0.216	-0.408*	-0.573**
Growth: Expansive	4.800	-0.242	-0.471*	-0.684***
Growth: Restrictive	5.199	-0.267	-0.512*	-0.733**
Small: Expansive	5.628	-0.279	-0.547*	-0.801***
Small: Restrictive	6.740	-0.308	-0.600*	-0.873**
Large: Expansive	4.181	-0.207	-0.398*	-0.571**
Large: Restrictive	4.467	-0.228	-0.431*	-0.605**
Momentum: Expansive	4.560	-0.215	-0.416*	-0.601**
Momentum: Restrictive	6.169	-0.276	-0.534	-0.771**

[1] The benchmark portfolio is the all-equity portfolio with no weight allocated to commodities.
"Expansive" indicates expansive monetary policy period; "Restrictive" indicates restrictive monetary policy period.
*** indicates significance at 1%; ** indicates significance at 5%; * indicates significance at 10%.

Figure 1: Value of Dollar Invested in Alternative Strategies