

**Managed Futures and Hedge Fund Investment for
Downside Equity Risk Management**

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Abstract

During the past decades, the investment management industry has undergone numerous changes. New forms of investment products have come into existence to meet the needs of changing financial regulation, information technology, and investor demands. Today, most investors concentrate on traditional investment vehicles such as stocks, bonds, and currencies. However, an increasing number of investors use alternative investment vehicles such as managed futures and hedge funds. Managed futures products use global futures and options markets as their investment universe. Hedge funds trade in these markets as well as the underlying security markets. While academic and practitioner literature has shown that investment in managed futures\hedge funds offers benefits (e.g., increased Sharpe ratio) both as stand-alone investments and as additions to existing traditional assets or asset portfolios, managed futures and hedge funds investment may also offer unique ‘downside’ risk and return opportunities. Specifically, in contrast to passive equity index investment, the differing managed futures\hedge fund investment styles enable investors to create managed futures\hedge fund and equity portfolios which offer positive returns in upside as well as downside equity markets.

It is shown that, for the period studied, a portfolio comprised of equal investment in a managed futures index and the SP500 outperformed a protective put strategy consisting of the SP500 index plus a simulated at-the-money put. These results indicate that managed futures may offer some of the hedging properties of a put option at a lower cost. Similar tests are conducted for managed futures and hedge funds which specialize in equity futures and/or short-selling. Results indicate similar downside risk protection, however, at the cost of upside returns. Analysis of hedge fund short-sellers, however, indicates that the loss of upside returns to hedge fund short-seller investment is a function of manager selection; that is, both downside and upside return performance would have been obtained only with advance knowledge that the fund would be one of the better performing funds during the period studied.

Managed Futures and Hedge Fund Investment for Downside Equity Risk Management

I. Introduction

During the past decades, the investment management industry has undergone numerous changes. New forms of investment products have come into existence to meet the needs of changing financial regulation, information technology, and investor demands. Today, most investors concentrate on traditional investment vehicles such as stocks, bonds, and currencies. However, an increasing number of investors use managed futures¹ investment vehicles such as direct investment with commodity trading advisors (CTAs), or purchase of commodity funds and pools² and hedge funds. Commodity trading advisors use global futures and options markets as their investment universe. Hedge funds trade in these markets as well as the underlying security and physical commodity markets.

While academic and practitioner literature has shown that investment in managed futures\hedge funds offers investment benefits (e.g., increased Sharpe ratio) both as stand-alone investments and as additions to existing traditional assets or asset portfolios, managed futures and hedge funds investment may also offer unique risk and return opportunities in ‘downside’ risk control.³ Specifically, in contrast to passive equity index investment, the differing managed futures\hedge fund investment styles enable investors to create managed futures\hedge fund and equity portfolios which offer positive returns in upside equity market cycles while offering positive returns or limiting losses in downside equity markets. Results presented in this paper indicate that, while managed futures returns are uncorrelated with the equity market on an overall basis, they are negatively correlated when the stock market posts their largest declines and

positively correlated when equities have their largest gains. Since this pattern is similar to the payoff of many equity risk management strategies, the return of a mixed equity and managed futures portfolio is compared to a traditional protective put equity strategy. Results show that, for the period studied, an equity/CTA portfolio outperforms an equity/at-the-money put portfolio, such that a CTA investment may offer downside equity protection at lower cost than a protective put.⁴

II. Economic Basis for Managed Futures Returns

While futures and options markets provide economic benefits to the underlying users of their markets, traders in futures and options markets are often viewed as operating in a zero sum game; that is, where investor losses equal investor gains on any given day and the long term return to a managed futures position is simply the risk-free return on invested capital. However, the existence of a zero sum game does not restrict commodity trading advisors from obtaining superior risk and return tradeoffs relative to the assets which underlying the traded futures and options markets. First, cost of carry and put/call parity models insure that CTAs can create futures and options positions similar if not identical investment positions to the deliverable cash instruments. Given the lower transaction costs of trading in futures and options markets, these ‘synthetic’ cash position returns may be superior to the returns of underlying cash markets for comparable long (short) positions. Secondly, institutional characteristics and differential carry costs among investors may permit CTAs to take advantage of short-term pricing differences between theoretically identical futures, options and cash market positions. Thus, for CTAs, in

contrast to a large number of traditional security traders, opportunities exist for arbitrage profits to be made under varying market conditions.

Arbitrage profits and risk/return positions which replicate the underlying cash markets, however, are not the only potential benefits of managed futures. Speculative positions are often required as a means of meeting the hedging demands of cash market participants. This hedging demand may create investment situations where hedgers are required to offer speculators a 'risk' premia for holding open long(short) positions even in a world of arbitrage traders. This positive return to holding open futures positions which are opposite that of the desired hedgers may result in positive rates of return in the underlying futures and options markets. This return to traders for offering liquidity to hedgers desiring to limit losses may exist not only in futures markets but may exist in a wide range of derivative products. Lastly evidence exists in academic literature [Chan et al. 1996; Jagadeesh, 1990] that due to institutional factors (e.g., end of month window dressing, portfolio rebalancing, specialist risk positions, government actions), markets may trend for varying time periods in various markets. Low transaction costs combined with the ability to go short may permit the use of technical trading rules by managed futures to obtain positive returns in markets which, for short time periods, may be overvalued. In fact, these market cycles, embedded in cash market trading styles, has been used to explain some portion of the return to a technically based commodity futures trading system (BARRA/MLM reports).

III. Pattern of Managed Futures Returns

Academic and practitioner literature [Schneeweis, 1996] has shown that investment in managed futures may offer investment benefits both as stand-alone investments and as additions

to existing traditional assets or asset portfolios. Traditional analysis of managed futures performance, however, is concentrated in comparing managed futures in terms of return and standard deviation⁵, and measuring the risk/return contribution of managed futures indices to a portfolio of traditional assets. Table 1 shows the relative performance of Managed Accounts Reports dollar-weighted CTA index, the S&P 500, the Morgan Stanley Capital International equity index (MSCI), and Fidelity Magellan fund for the period 1985-1995. Managed futures, represented by a dollar weighted portfolio of commodity trading advisors compiled by Managed Accounts Reports (MAR\$CTA index), has a stand-alone performance similar to that of traditional equity investment vehicles (SP500, MSCI, and the Fidelity Magellan fund) while having less negative minimum and higher maximum returns. For the period 1985-1995 MAR\$CTA had an annualized Sharpe ratio of 1.08 while the Sharpe ratios for the SP500, MSCI, and Magellan fund were 1.00, 1.00 and 1.04 respectively. The minimum (maximum) monthly return for the MAR\$CTA was -6.37% (17.83%) while the minimum (maximum) returns were more negative and less positive for the SP500 (-24.31% and 12.66%), the MSCI (-18.59% and 11.13%), and Magellan fund (-29.85% and 12.22%).

Insert Table 1 about Here

In addition, using traditional excess break-even analysis, results in Table 1 also show that the MAR\$CTA increases the Sharpe ratio of comparison stand-alone investments when considered as an as addition to existing equity portfolios.⁶ In all cases, the excess annualized break-even rate was greater than 8%. This is greater than the cost generally charged by multi-

advisor CTA portfolio managers for creating a multi-advisor CTA portfolio (i.e., 1-2%). As mentioned previously, a reason for the diversification benefits of managed futures is the low correlation of managed futures products with many traditional asset vehicles. This is also supported in Table 1, where the correlation of MAR\$CTA with the comparison assets is approximately zero (SP500 (.12), MSCI (.08), and Magellan fund (.10)). This low correlation is due in part to the diversity of markets which managed futures can trade as well as the variety of trades available (e.g., short positions and option positions). The wide variety of markets and styles is indicated by the number of indices compiled by Managed Accounts Reports (MAR). MAR classifies CTAs into a number of different subclasses. These groups are currency, energy, financial, diversified, stock, and trend-following. For hedge funds, firms such as Managed Accounts Reports and Hedge Fund Advisors also produce performance indices for hedge funds specializing in financial, diversified, discretionary, and short-selling investments or trading styles.⁷

IV. Commodity Trading Advisors as Downside Risk Protection

While the correlation between managed account performance and traditional asset classes is low when measured over the entire periods, the greatest investor benefit to managed account investment may be their ability in unique investment periods to offer positive returns when the underlying cash markets experience negative returns. In Table 2, for instance, results for the period 1985-1995 show that the MAR\$CTA index outperformed the SP500 index in each of the 12 worst SP500 return months.⁸ Moreover, the negative correlation (-.12) in Group 1, which contains the 12

Insert Table 2 about Here

lowest equity return months, indicates that lower returns in this group for the SP500 are offset by higher returns for the MAR\$CTA index. In contrast, the positive correlation (.46) in Group 11, the highest 12 return months, means the higher the SP500 return in the group, the higher the MAR\$CTA index return. This result, which covers the period 1985-1995, indicates that a diversified portfolio of managed futures traders who trade over a large range of alternative styles and products may provide potential for downside risk protection for equity products such as the SP500 while offering upside potential in months with high SP500 returns.⁹ Results in Table 2 also indicate that managed futures provide returns similar to those obtained through traditional downside risk protection strategies such as purchasing put options. Specifically, the performance of a combination SP500 (50%) and MAR\$CTA (50%) portfolio is similar to that of an SP500 at-the-money protective put strategy. For the protective put strategy, an at-the-money put value was derived with a rolling 35 day maturity using implied volatility estimates from Salomon Brothers. The pricing model used is the Black-Scholes dividend-adjusted option pricing model.¹⁰

Results in Table 2 show the number and percentage of months in each group that the MAR\$CTA (MAR), the SP500 plus MAR\$CTA portfolio (SP/MAR), and the protective put strategy (SP/Put) outperform the SP500 index. As expected, the SP/Put portfolio strictly dominates the SP500 in the lowest return group while it fails to outperform in any months in the high return group. Similarly, the SP/MAR portfolio dominates the SP500 in the lowest SP500 return group and, in contrast to the SP/Put portfolio, also provides higher returns than the SP500 in some of the months when SP500 posts its highest returns. Thus the SP/MAR portfolio may provide both downside protection as well as upside return potential during periods in which the

SP500 performs well. Of special note is that the SP/MAR portfolio strictly dominates the SP/Put portfolio in group 5 for which the return for the S&P500 reflects its average monthly return. If, as reported in Table 1, the mean return of the SP500 is similar to the mean return of the MAR\$CTA index, then a portfolio comprised of the SP500 and the MAR\$CTA will have a similar return to an all-equity portfolio. Moreover, this portfolio will always dominate a SP/Put portfolio, whose expected return is about half the expected return of the SP500 (because the put delta of $-1/2$ means the instantaneous rate of return of the portfolio is $1/2$ the return of the underlying security). For the entire period, the Sharpe ratio of the SP/MAR strategy was the highest (1.39) of any of the comparison benchmarks (SP500, 1.00; MAR\$CTA, 1.08; SP/Put, .47).¹¹

Insert Figure 1 about Here

The pattern of relative return dominance is shown in Figure 1. After ranking on SP500 returns in ascending order and separating the data into eleven 12 month periods, average returns in each group for the SP500, the MAR\$CTA, the SP/Put and the SP/MAR portfolio are illustrated. For the period, 1985-1995, the SP/MAR portfolio dominates the returns the SP/Put strategy except marginally for the lowest return group. It is of course important to point out that the performance of the equity/ protective put position and the equity/managed futures position are not strictly comparable since the performance of the managed futures position is stochastic. The individual investor must determine whether the potential relative return compensates for the expected risk.

The recent performance for the period 1994-1995 is also consistent with performance over the longer 1985-1995 period. For the period 1994-1995, tests similar to those presented in Table 2 are conducted for MAR\$CTA. In Table 3 SP500 returns are ranked from low to high and divided into four six month subperiods.

Insert Table 3 about Here

The number of months in which the MAR\$CTA provide returns superior to the comparative asset or portfolio is given. As in Table 2, in the low SP500 return group the CTA and hedge fund vehicles outperformed the SP500 at least 50% of the time. In contrast to Table 2, however, for the high return groups, the MAR\$ had negative average returns and rarely outperformed the SP500. One reason for this differential performance is that over the 1994-1995 period the SP500 performed exceptionally well. For instance, in 1995 the annual return of the SP500 was 37.11% in contrast to its average annualized return from 1985 through 1995 of only 15%. In contrast the 1995 annual return for the MAR\$CTA was 16% which is in line with its annual average since 1985 (15.5%).

V. Equity Based Commodity Trading Advisors /Hedge funds as Downside Risk Protection

The MAR\$CTA index reflects the returns of numerous CTAs whose trading area (e.g., metals, commodities) does not correspond directly to the comparison equity benchmarks. For the period 1994-1995 tests, similar to those presented in Table 3 for the MAR\$CTA index, are conducted for the MAR stock index trading advisors (MARSTK) index and the Hedge Fund

Research Short-Sellers index (HFRSTK). In Table 3, SP500 returns are ranked from low to high and divided into four six month subperiods. The number of months in which the MARSTK (Table 3B) and HFRSTK (Table 3C) provide returns superior to the comparative index or portfolio is given.

Consistent with the MAR\$CTA index in Table 3, both the MARSTK and HFRSTK have negative Pearson correlations with the SP500 in the low return groups (MAR\$CTA, -.14; MARSTK, -.68; HFRSTK, -.40). In the SP500 high return months there is little evidence of correlation with the SP500 for any of the comparison CTA or hedge fund indices (MAR\$CTA, -.08; MARSTK, -.05; HFRSTK, .19). However, the two largest negative correlations (MARSTK and HFRSTK) are observed in the CTA and hedge fund indices with investment styles which are expected to provide returns based on equity performance. This is expected, since the MARSTK and HFRSTK represents traders who specialize in taking positions in corresponding equity markets while the MAR\$CTA index is a broad index of all CTAs. Table 3 also provides a comparison of equity CTA and hedge funds with the MAR\$CTA as alternatives to a protective equity put strategy. The relative performance of a 50% investment in the SP500 and 50% investment in each of MAR\$CTA, MARSTK, and HFRSTK is contrasted with the return to an at-the-money protective put strategy. Average returns to the SP/MAR portfolio exceed the SP/Put portfolio in three of the four periods, while the SP/MARSTK and SP/HFRSTK outperform this portfolio in only the two worst groups.

In Figures 2A-2C, the performance of the SP500, SP/Put, and combined SP/(managed futures or hedge fund) indices is plotted. Total return is not calculated sequentially, but in order of lowest to highest SP500 return. As returns for the SP500 grow increasingly positive, the

returns on MARSTK and HFRSTK grow increasingly negative.. In contrast, as the returns for the SP500 grown increasingly positive, the returns on the MAR\$CTA also experience positive returns such that when SP500 has its highest return, the final return of SP/MAR exceeds that of the SP/Put.

Insert Figures 2A-2C about Here

VI. Manager Selection

Empirical results for the eleven year period studied support the use of managed futures, as represented by the MAR\$CTA, as a means of controlling downside equity risk while offering reasonable return potential in equity markets experiencing positive returns. Results for the most recent two year period indicate that, while various CTA and hedge fund products offered protection against equity losses, they often failed to offer comparable returns during stock market rallies. The fact that SP500 performance was abnormally high during this period clearly contributed to the poor performance of CTAs and hedge funds that specialize in equity short sales (MARSTK and HFRSKT). However, not all of these funds performed poorly. For instance, many managers of short selling hedge funds posted positive or small negative returns despite the performance of the equity market in the past two years.

Insert Table 4 about Here

Table 4 reports the performance of MAR hedge fund short-sellers divided into the high quartile (HFHQ), median (HFMED), and bottom quartile (HFBQ) index performance for the 20 months beginning June, 1994 and ending December 1995. Results indicate that during the 10 worst months for the SP500 months there is a negative correlation between hedge fund returns and SP500 returns (HFHQ, -.60; HFMED, -.46; HFBQ, -.47) and there is a positive correlation for the 10 best months (HFHQ, .12; HFMED, .04; HFBQ, .11).

In contrast to the HFRSTK results in Table 3, as shown in Table 4, the returns to high quartile hedge funds dominate the SP500 index in both high and low return months. However, the HFMED outperforms the SP500 only for the 10 months with the lowest SP500 returns. The HFBQ underperforms the SP500 in both up and down markets. Thus as for many other alternative investment choices such as mutual funds, the ability to obtain superior risk/return tradeoffs over all investment scenarios may be manager dependent.

VII. Conclusions:

Correlation tests comparing managed futures indices with traditional assets reveal an interesting property of the relationship between managed account returns and returns to traditional asset classes such as the SP500. Overall, the correlation between managed asset returns and the SP500 is approximately zero. However, when the data are segmented according to whether the stock market rose or fell, results indicate that managed futures and hedge funds were negatively correlated when the SP500 posted significant negative returns and were positively correlated when the SP500 reported significant positive returns. Thus managed futures may offer unique asset allocation properties.

Results also show that managed futures offer risk/return benefits when compared to a partially hedged position in the stock market. For instance, it is shown that an equal weighted investment in the MAR\$CTA index and the SP500 outperformed investment in the SP500 plus a simulated at-the-money put under most market conditions. These results indicate that managed futures may offer some of the hedging properties of a put option at a lower cost. However, analysis of recent data on short-selling hedge funds indicates that earning positive returns in upmarkets requires the ability to select superior managers, and that the typical manager produces zero returns in this environment.

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**Table 1: Performance Measures for Managed Futures and Other U.S. Assets
January, 1985 to December, 1995**

1/85 to 12/95	MAR\$CTA	SP500	MSCI	Fidelity Magellan
Average Annual Return	15.81	15.11	14.86	17.96
Annual Standard Deviation	14.58	15.06	14.85	17.20
Sharpe Ratio	1.08	1.00	1.00	1.04
Minimum Monthly Return	-6.37	-24.31	-18.59	-29.85
Maximum Monthly Return	17.83	12.66	11.13	12.22
Correlation with MAR	1.00	0.12	0.08	0.10
Excess Annual Breakeven	0.00	8.79	9.14	8.75

Table 2. Performance of Managed Futures Relative to Protective Put Strategy

<i>Portfolio Performance by Group</i>					<i>Relative Portfolio Performance by Group</i>							
Group	SP500	MAR	SP/MAR	SP/Put	MAR > SP500		SP/MAR > SP/Put		SP/Put > SP		SP/MAR > SP500	
					Months	%	Months	%	Months	%	Months	%
1	-7.46	2.57	-2.45	-2.23	12	100	8	67	12	100	12	100
2	-2.57	-0.40	-1.49	-1.62	8	67	7	58	11	92	8	67
3	-1.20	0.70	-0.25	-1.71	9	75	10	83	4	33	9	75
4	-0.10	1.04	0.47	-1.64	7	58	11	92	0	0	7	58
5	0.91	1.31	1.11	-1.23	7	58	12	100	0	0	7	58
6	1.58	0.01	0.79	-0.25	4	33	9	75	0	0	4	33
7	2.37	0.66	1.52	0.52	3	25	9	75	0	0	3	25
8	3.16	0.31	1.74	1.38	1	8	6	50	0	0	1	8
9	4.04	1.33	2.69	1.85	3	25	8	67	0	0	3	25
10	5.00	2.39	3.69	2.78	3	25	7	58	0	0	3	25
11	8.11	4.58	6.34	5.64	1	8	9	75	0	0	1	8

Correlation between SP500 and MAR

Group 1	-0.12
Group 11	0.46

Group: Group of 12 months ranked by SP500 Return. Group 1 contains lowest returns, Group 11 the highest
SP500: Standard and Poors 500 Total Return Index

MAR: MAR Dollar-Weighted CTA Index

SP/Put: SP500 Index combined with 1-month at-the money put option on index

SP/MAR: Portfolio with equal weights in SP500 and MAR

Table 3A. Performance of Managed Futures Relative to Protective Put Strategy, 1994-1995

<i>Portfolio Performance by Group</i>					<i>Relative Portfolio Performance by Group</i>							
Group	SP500	MAR	SP/MAR	SP/Put	MAR > SP500		SP/MAR > SP/Put		SP/Put > SP		SP/MAR > SP500	
					Months	%	Months	%	Months	%	Months	%
1	-2.72	1.25	-0.73	-1.23	6	100	5	83	5	83	6	100
2	1.45	0.95	1.20	-0.26	3	50	6	100	0	0	3	50
3	2.92	0.34	1.63	1.37	1	17	2	33	0	0	1	17
4	3.88	-0.35	1.76	2.46	1	17	2	33	0	0	1	17

Correlation between SP500 and MAR

Group 1	-0.14
Group 4	-0.08

Table 3B. Performance of MAR Stock Subindex Relative to Protective Put Strategy, 1994-1995

<i>Portfolio Performance by Group</i>					<i>Relative Portfolio Performance by Group</i>							
Group	SP500	MSTK	SP/MSK	SP/Put	MSTK > SP500		SP/MSK > SP/Put		SP/Put > SP		SP/MSK > SP500	
					Months	%	Months	%	Months	%	Months	%
1	-2.72	4.19	0.73	-1.23	6	100	6	100	5	83	6	100
2	1.45	1.32	1.39	-0.26	4	67	6	100	0	0	4	67
3	2.92	-2.81	0.06	1.37	0	0	1	17	0	0	0	0
4	3.88	-3.62	0.13	2.46	0	0	1	17	0	0	0	0

<u>Correlation between SP500 and MSTK</u>		
Group 1		-0.68
Group 4		-0.05

Table 3C. Performance of HFR Short Sellers Index and Protective Put Strategy, 1994-1995

<i>Portfolio Performance by Group</i>					<i>Relative Portfolio Performance by Group</i>							
Group	SP500	HDG	SP/HDG	SP/Put	HDG > SP500		SP/HDG > SP/Put		SP/Put > SP		SP/HDG > SP500	
					Months	%	Months	%	Months	%	Months	%
1	-2.72	6.58	1.93	-1.23	5	83	5	83	5	83	5	83
2	1.45	1.67	1.56	-0.26	4	67	5	83	0	0	4	67
3	2.92	-5.66	-1.37	1.37	1	17	1	17	0	0	1	17
4	3.88	-4.43	-0.27	2.46	0	0	0	0	0	0	0	0

<u>Correlation between SP500 and HDG</u>		
Group 1		-0.40
Group 4		0.19

Group: Group of 6 mos. ranked by SP500 Return. Group 1 contains lowest returns, Group 4
 SP500: Standard and Poors 500 Total Return Index
 MAR: MAR Dollar-Weighted CTA Index
 STK: MAR Hedge Fund Short Sellers Index
 HDG: Hedge Fund Research (HFR) Short Sellers Index
 SP/Put: SP500 Index combined with 1-month at-the money put option on
 SP/(MAR/STK/HDG): Portfolio with equal weights in SP500 and comparison

Table 4. Performance of High Quartile, Median, Bottom Quartile Short-Selling Hedge Funds, June 1994-Dec 1995

<i>Portfolio Performance by Group</i>					<i>Relative Portfolio Performance by Group</i>					
Group	SP500	HQ	Med	BQ	HQ > SP500		Med > SP500		BQ > SP500	
					Months	%	Months	%	Months	%
1	0.08	7.40	0.34	-6.03	9	90	5	50	1	10
2	3.57	7.77	0.01	-0.19	6	60	0	0	0	0

SP500 Correlation	HQ	Med	BQ
Group 1	-0.60	-0.46	-0.47
Group 2	0.12	0.04	0.11

Group: Group of 10 mos. ranked by SP500 Return. Group 1 contains lowest returns, Group 2

SP500: Standard and Poors 500 Total Return Index

HQ: Average of top quartile of short-selling hedge funds reported by

Med: Performance of the median short-selling hedge fund reported by

BQ: Average of bottom quartile of short-selling hedge funds reported by

Figure 1. Comparison of Managed Futures and Protective Put Strategies

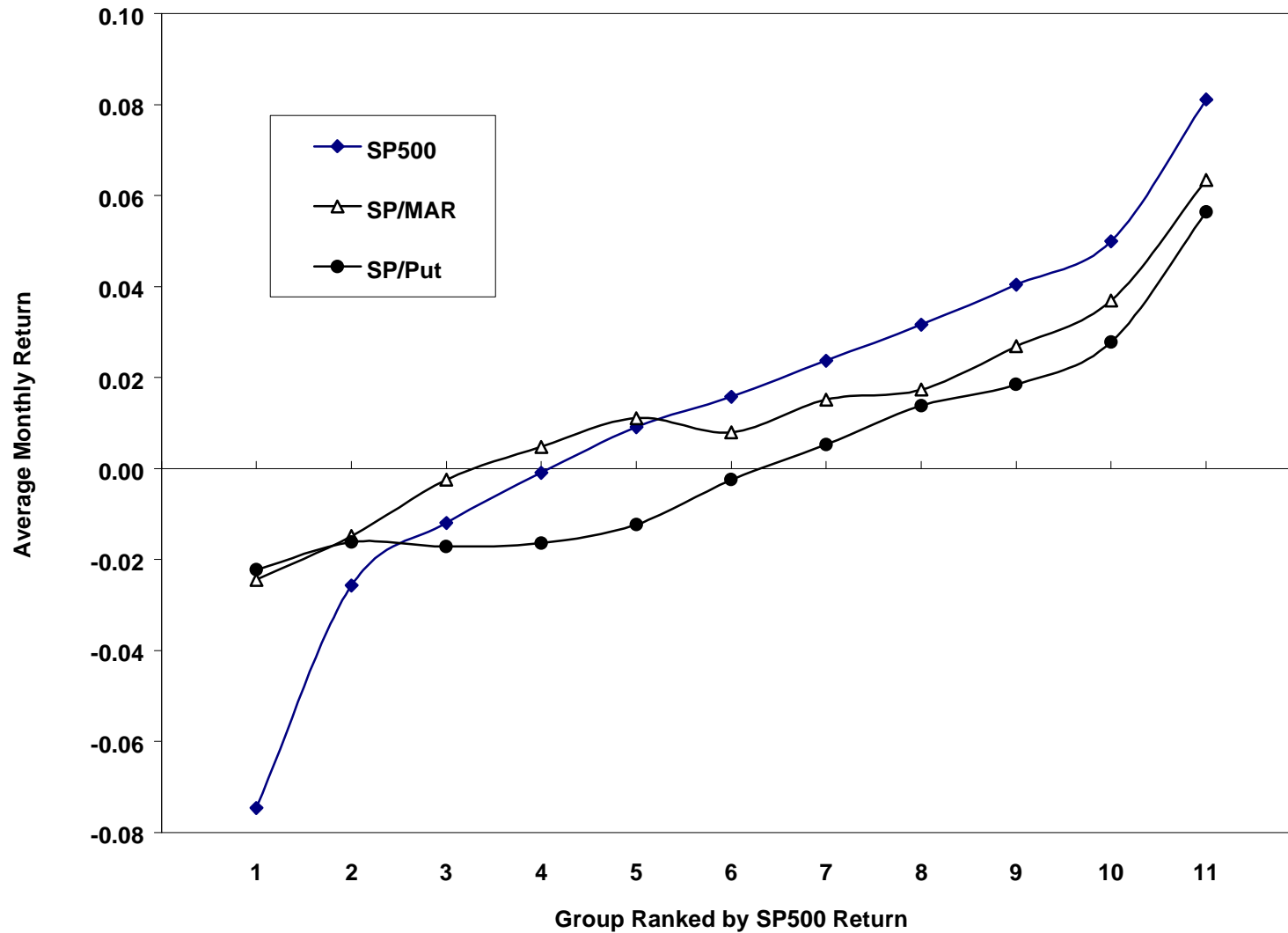


Figure 2A. Total Return of SP/MAR Portfolio and Protective Put Strategies, 1994-1995

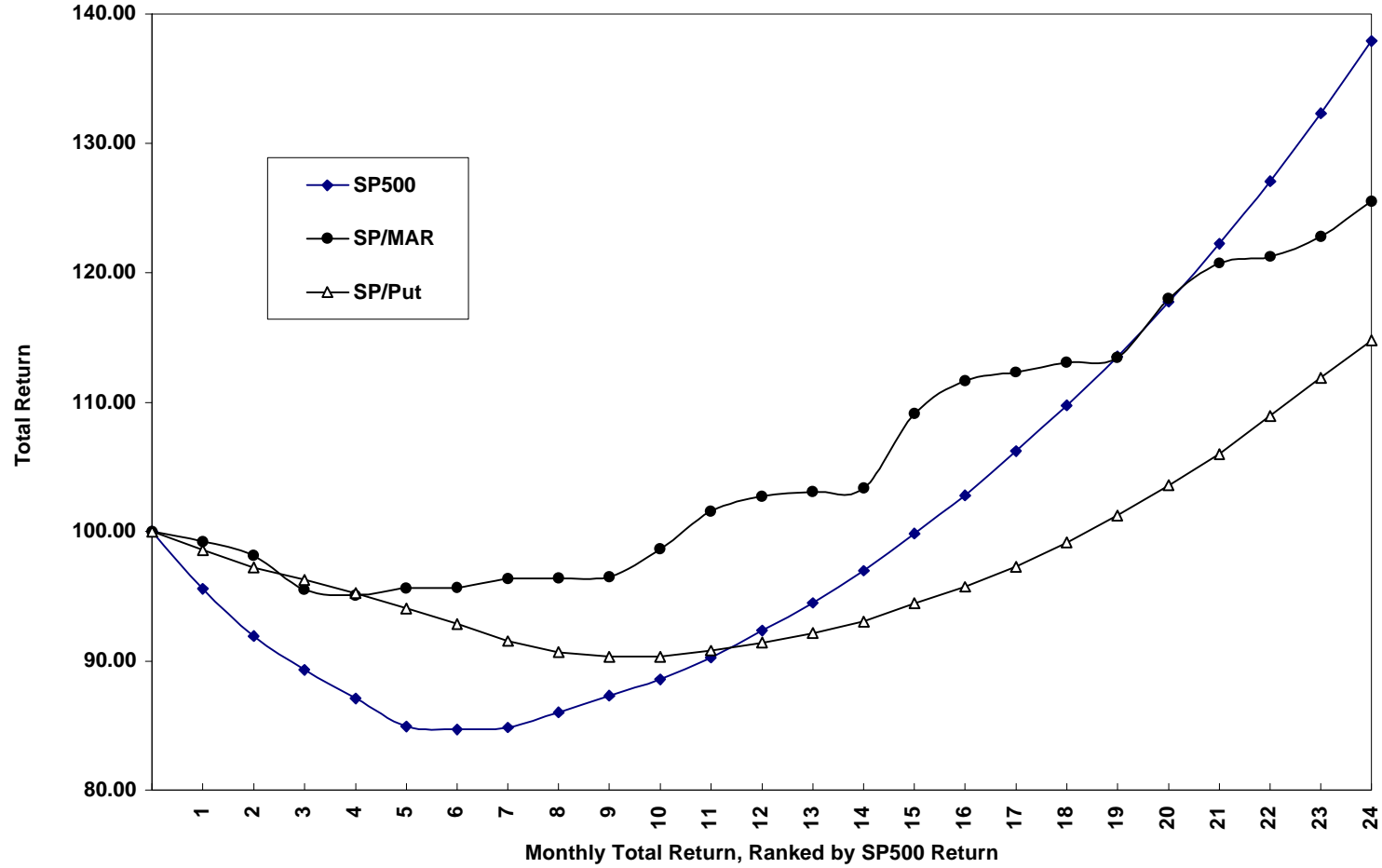


Figure 2B. Total Return of MAR Stock Subindex and Protective Put Strategies, 1994-1995

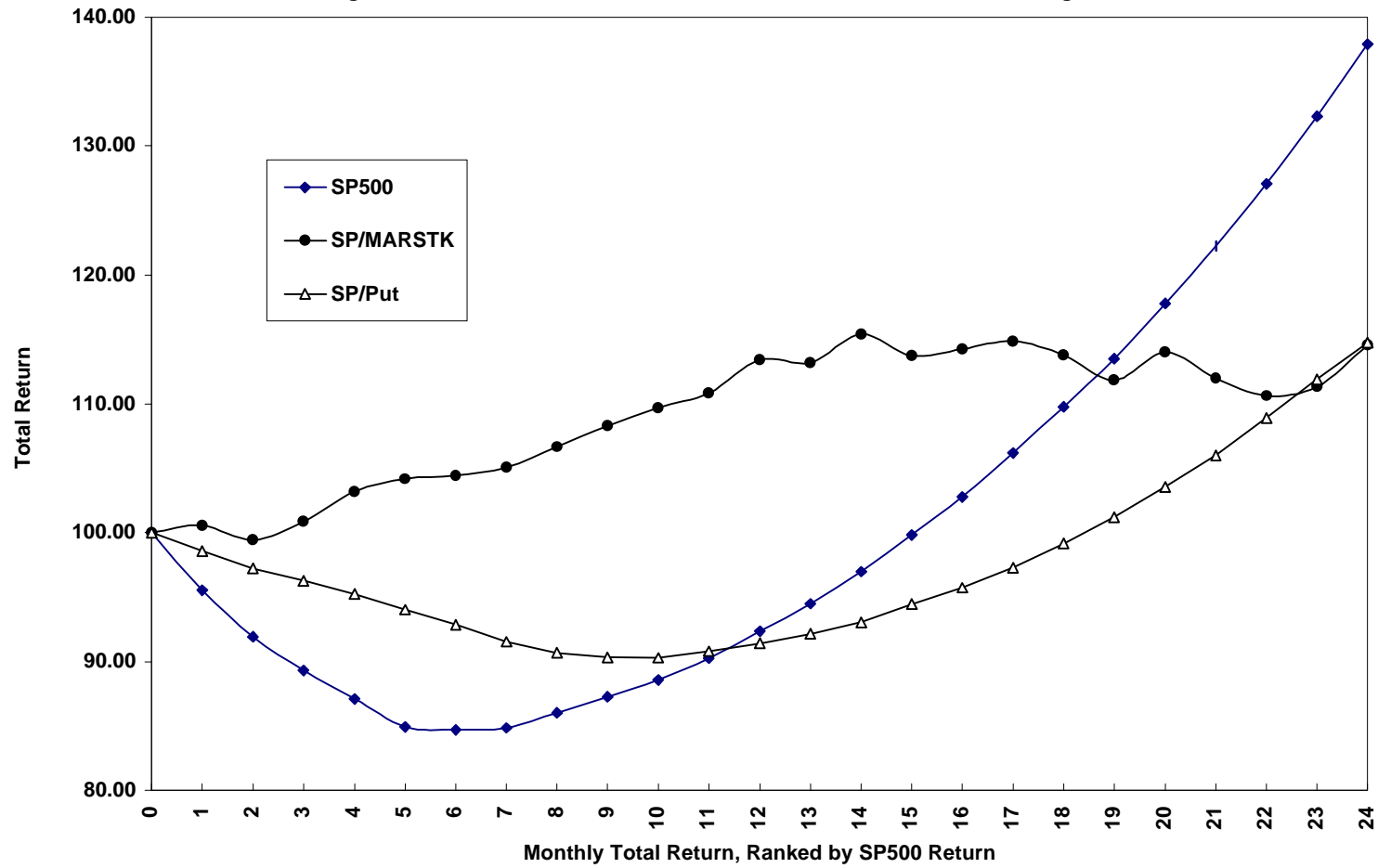
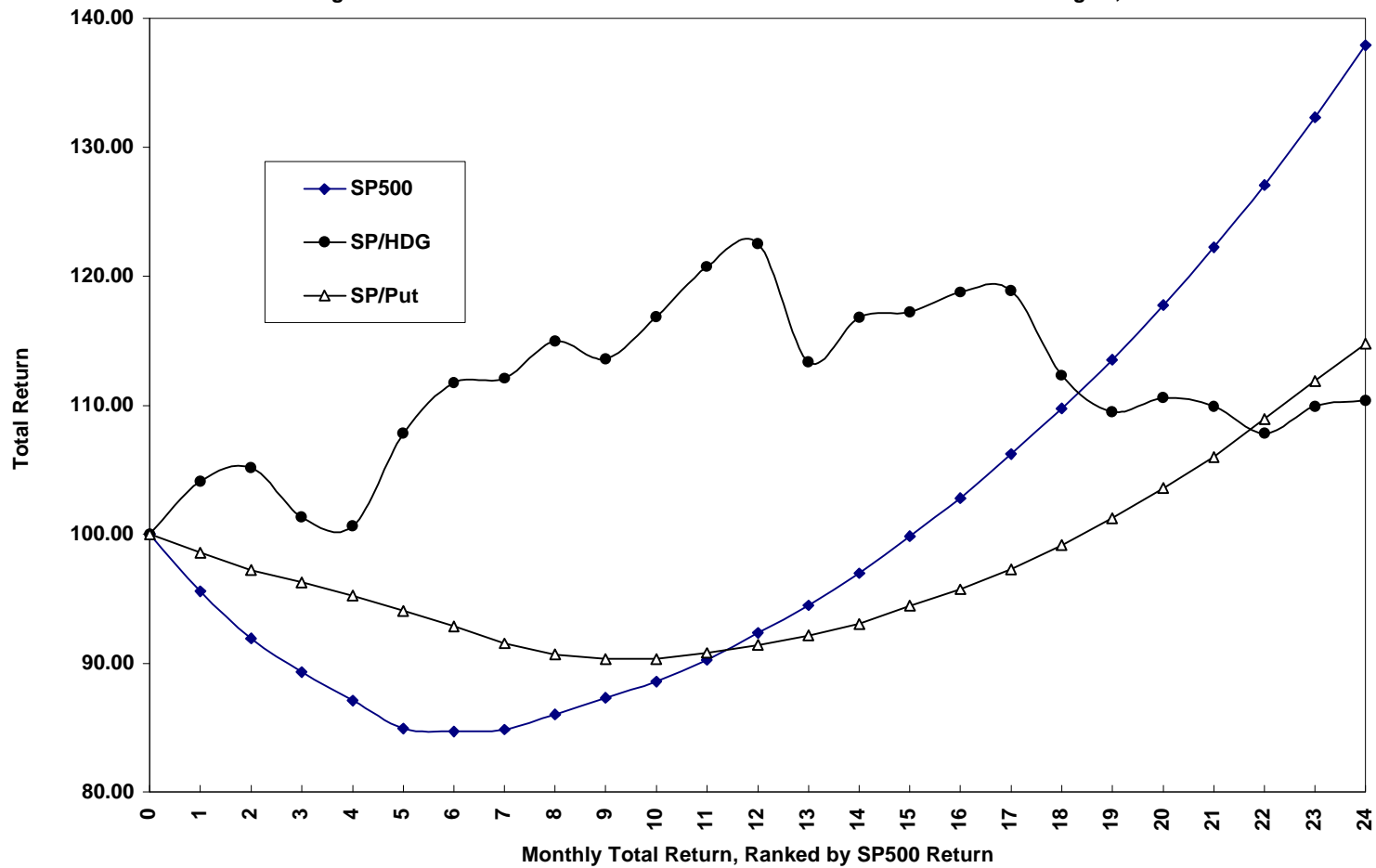


Figure 2C. Total Return of HFR Short Sellers Index and Protective Put Strategies, 1994-1995



Endnotes

¹ The term “managed futures” generally refers to investment vehicles based on returns to due direct investment in commodity trading advisors and/or commodity funds/pools. However, hedge funds are also often included under the term.

² On a relative basis, the performance of lower-cost direct investment in CTA products generally outperform the higher cost retail managed futures products such as commodity pools and funds. For studies analyzing the benefits of these products see Chance [1994] and Schneeweis [1996].

³Books which include information on the history of managed futures and hedge funds include Chandler [1994], Lederman and Klein [1995], and Fox-Andrews and Meaden [1995]. Books which include discussions on the history of futures and options markets and the economic benefits of derivative products include Peck [1985, Vols. 1-5].

⁴ It is of course important to point out that the performance of the equity/ protective put position and the equity/managed futures position are not strictly comparable since the performance of the managed futures position is stochastic. The individual investor must determine whether the potential relative return compensates for the expected risk.

⁵ The use of the Sharpe ratio as a measure of relative performance may be suboptimal to other measures of relative performance, such as semivariance, for investment strategies which are designed to truncate returns below a specified threshold level. While this study does not test for performance using alternative ‘semivariance’ performance measures, it should be noted that using mean-variance analysis to evaluate investment portfolios with skewed return distributions can lead to suboptimal portfolios (Bookstaber and Clarke [1985]; Marmar and Ng [1993]).

⁶ As in previous analysis (Elton, Gruber, and Rentzler [1987, 1990], Irwin, Krukemyer, and Zulauf [1992], Schneeweis, Savanayana, and McCarthy [1992]), excess break-even analysis is used to test for the contribution of CTAs to the risk/return profile of stocks, bonds, and other asset classes such as real estate. As in earlier studies, the excess break-even rate of return necessary for a security to enter a

portfolio is computed as follows: $EBV = R_c - \frac{R_p - R_f}{s_p} s_{cp} s_c + R_f$, where R_c = Return for CTA;

R_f = Riskless rate of return; R_p = Rate of return on index p; s_{cp} = Correlation coefficient between CTA c and index p; s_c = Standard deviation of CTA c; s_p = Standard deviation of index p.

⁷ For a complete discussion of Managed Accounts Reports CTA and Hedge Fund indices, call MAR on the World Wide Web. For instance, the MAR Hedge Fund short-sellers indices track hedge fund managers who take positions that stock prices will go down. A hedge fund borrows stock and sells it, hoping to buy it back at a lower price. A hedge is for long-only portfolios and those who feel market is approaching a bearish trend. Similarly, the Hedge Fund Research indices for short-sellers simply defines the index and managers who go short securities.

⁸Other studies analyzing the downside risk potential of managed futures include Peters [1992] and Schneeweis [1996]. Peters [1992] argues that portfolio diversification with managed futures provides partial stochastic dominance in the lower return ranges and produces long term effects similar to insurance; that is, reduction to upside performance (cost) with protection in down markets. As the use of alternative risk measures capturing semi-variance gain popularity, these benefits of managed futures may become more apparent.

⁹ Similar tests were conducted for world, regional, and country-specific equity and bond markets, as well as various portfolios of these assets, including and excluding commodities. Results are similar to those presented here (See Schneeweis [1996]).

¹⁰ For individual managers, results may differ from indices used. For a study on the stability of CTA equity managers, see Potter and Schneeweis [1996].

¹¹ For a parallel discussion on the benefits of managed futures as portfolio insurance see Peters [1992]. Preliminary results indicate that a greater positive correlation exists between the performance of the CTA equity traders and a straddle position than between CTA equity traders and the SP500. This is consistent with CTA equity traders who take short positions in down markets and long positions in up markets [Schneeweis and Spurgin 1995].