Managed Futures and Emerging Markets

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INTRODUCTION

Managed Derivatives have certain asset class-specific characteristics that make them a unique diversifier for a global equity portfolio: expectation of high return combined with low negative covariability.

DESCRIPTION OF INVESTMENT VEHICLES

The returns used for Managed Derivatives are based on the monthly net asset values of a Cayman Island exempt corporation, limited by shares that commenced trading in March 1987. The corporation was sponsored by one of the leading derivatives companies in the United States. Shareholder equity has grown exclusively through retained profits. The returns are considered to be representative of the Managed Derivatives asset class. They are based on "real" returns after transaction costs, management and incentive fees, adjusted for the current cost structure of the product, which was changed in 1993. The investment vehicles include leveraged trading of cash, futures, and forward markets worldwide.[1]

The returns shown for passive global equities (major markets) are based on monthly total returns of the Morgan Stanley Capital International (MSCI) World Index with net dividends reinvested.[2] No deductions were made for transaction costs or management and incentive fees.

Passive emerging markets equities returns are based on monthly total returns of the International Finance Corporation's Composite Investable Index of emerging markets equities.[3] This index takes into account liquidity and foreign ownership constraints. No deductions were made for transaction costs or management and incentive fees.

The active global and active emerging markets equities returns used for this study are based on the "Top Value" investment strategies developed by Keppler Asset Management Inc., New York. While actively managed public mutual funds following these strategies are available to non-U.S. investors, the history of these funds is not long enough to be considered for purposes of this chapter.[4] Therefore, the returns shown are pro forma returns after transaction costs and

management and incentive fees–estimated at 2 percent annually for the major equity markets and 5 percent annually for the emerging markets equities.

CORRELATION MATRIX

One characteristic that makes Managed Derivatives so attractive as diversifiers for global equity portfolios is their low to negative correlation with alternative investments. During the 4 3/4-period ending September 1993 (see Table 1), total returns of Managed Derivatives had correlation coefficients of -0.21, 0.17, -019, and -0.30, with the total returns of the MSCI World Index, the Major Markets Top Value Strategy, the IFCI Composite Index, and the Emerging Markets Top Value Strategy, respectively. The 4 3/4-year period covers the entire history of the IFCI-Composite Index, which goes back to the end of 1998. Before that time, no representative global index was available for investable emerging markets equities.

Table 1. Correlation Coefficients of Total Returns in U.S. Dollars
December 1988-September 1993

|	MSCI World Index	Major Markets Top Value Strategy	IFCI Composite Index	Emerging Markets Top Value Strategy	Managed Derivatives Portfolio
MSCI World Index	1.00				
Major Markets Top Value Strategy	0.41	1.00			
IFCI Composite Index	0.48	0.11	1.00		
Emerging Markets Top Value Strategy	0.54	0.21	0.78	1.00	
Managed Derivatives Portfolio	-0.21	0.17	-0.19	-0.30	1.00

Note: All active strategies are after transaction costs and management and incentive fees.

MANAGED DERIVATIVES COMBINED WITH MAJOR MARKETS EQUITIES

The 4 3/4-year study period ending September 1993 was characterized by below-average returns for both Managed Derivatives and major markets equities. While the former have expected long-term annual rates of return exceeding 20 percent, the pro forma compound annual returns of our Managed Derivatives portfolio reached 19.05 percent. This compares with a total compound annual return of only 5.81 percent for the MSCI World Index, which fell well below the long-term average return of global equities. An investment of $100 in Managed Derivatives grew to $229 during the 4 3/4-year test period. During the same time, $100 invested in the MSCI World Index grew $131 with net dividends reinvested (see Exhibit 1 and Table 2).

The standard deviation of monthly returns of 4.77 percent for the Managed Derivatives (standard deviation of the MSCI Word Index: 4.38 percent) may lead to the assumption that Managed Derivatives were riskier than major markets equities. This is confirmed by a slightly higher average loss during losing months (3.21 percent versus 3.15 percent) and a longest losing streak of five months, compared with only four months for the major equity markets. However, other important risk measures–such as the number of losing months and the probability of a monthly loss, the expectation of a monthly loss, and the largest drawdown from a previous high –favor the Managed Derivatives portfolio as the less risky one.

Exhibit 1.   MSCI World Index and Managed Derivatives Portfolio
(in U.S. Dollars) December 1988-September 1993

Managed Derivatives   229

40% MSCI World Index +
60% Managed Derivatives   189

MSCI World Index   131
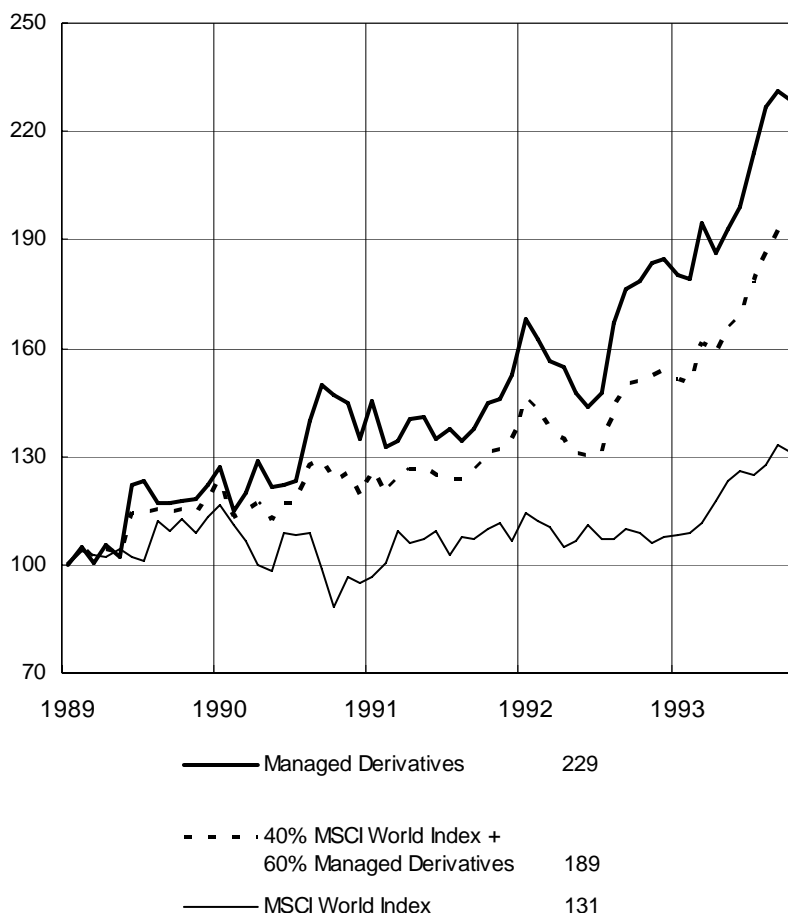
Note: All active strategies are after transaction costs and management and incentive fees.

The expectation of a monthly loss was significantly lower for the Managed Derivatives (1.18 percent) than for the MSCI World Index (1.44 percent), while the relationship of the standard deviations of returns of both investments was exactly the opposite: standard deviation was higher for the Managed Derivatives. This indicates that the return distribution of the Managed Derivatives may be skewed positively. Volatility risk measures, such as the standard

deviation of returns, become irrelevant for nonsymmetrical return distributions. The Sharpe ratio, which indicates the return per unit of standard deviation, cannot be used in these cases. The other risk measures shown in Table 2–i.e. the probability of a monthly loss, the average loss in losing months, the expectation of a monthly loss, the longest losing streak, and the largest drawdown from a previous high–can be applied to both parametric and nonparametric return distributions, regardless of their shape. In the author's opinion, the expectation of a monthly loss, which combines both the magnitude and the probability of investment losses, is the most reliable statistical risk measure for performance measurement purposes.

Table 2. Asset Allocation between MSCI World Index and Managed Derivatives Portfolio December 1988-September 1993 (in U.S. Dollars)

MSCI World Index	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%	0%
Managed Derivatives Portfolio	**0%**	**10%**	**20%**	**30%**	**40%**	**50%**	**60%**	**70%**	**80%**	**90%**	**100%**
Compound Annual Return (%)	5.81	7.36	8.86	10.31	11.71	13.07	14.37	15.62	16.82	17.96	19.05
Average Monthly Return (%)	0.57	0.67	0.77	0.87	0.97	1.07	1.17	1.27	1.37	1.47	1.57
Highest Monthly Return (%)	11.30	10.19	9.09	8.06	8.34	8.61	8.88	9.33	10.63	11.94	13.24
Lowest Monthly Return (%)	-10.57	-8.95	-7.33	-5.71	-4.33	-4.66	-5.26	-5.85	-6.45	-7.46	-8.69
Probability of Gain (%)	54.39	54.39	63.16	57.89	54.39	64.91	63.16	63.16	64.91	63.16	63.16
Average Gain in Winning Months (%)	3.68	3.45	2.84	3.02	3.20	2.75	3.01	3.27	3.49	3.96	4.37
Expectation of Monthly Gain (%)	2.00	1.87	1.79	1.75	1.74	1.78	1.90	2.07	2.27	2.50	2.76
Standard Deviation of Monthly Returns (%)	4.38	3.89	3.46	3.13	2.95	2.92	3.06	3.35	3.75	4.23	4.77
Probability of Monthly Loss (%)	45.61	45.61	36.84	42.11	45.61	35.09	36.84	36.84	35.09	36.84	36.84
Average Loss in Losing Months (%)	3.15	2.65	2.78	2.09	1.68	2.03	1.97	2.16	2.55	2.80	3.21
Expectation of Monthly Loss (%)	1.44	1.21	1.03	0.88	0.77	0.71	0.73	0.79	0.89	1.03	1.18
Longest Losing Streak (# Months)	4	4	4	4	4	4	5	5	5	5	5
Largest Drawdown from Previous High (%)	24.34	20.41	16.38	12.25	8.96	9.47	10.10	11.23	12.35	13.46	14.57
Risk Adjusted Return (Keppler Ratio):											
— Return per Unit of Expectation of Loss	0.40	0.55	0.75	0.99	1.26	1.50	1.61	1.60	1.54	1.43	1.33
Volatility-Adjusted Return (Sharpe Ratio):											
— Return per Unit of Standard Deviation	0.13	0.17	0.22	0.28	0.33	0.37	0.38	0.38	0.37	0.35	0.33
Number of Periods (Months)	57	57	57	57	57	57	57	57	57	57	57
Number of Losing Months	26	26	21	24	26	20	21	21	20	21	21
Number of Winning Months	31	31	36	33	31	37	36	36	37	36	36

Note: All active strategies are after transaction costs and management and incentive fees.

During the 4 3/4-year test period, the highest risk-adjusted return was achieved with a 60/40 mix in favor of Managed Derivatives. This 60/40 combination would have resulted in a 2.5 times higher compound annual return (14.37 percent) with half the risk (as measured by the expectation of a monthly loss) compared to an investment in the MSCI World Index (see Exhibit 2 and Table 2).

A combination of Managed Derivatives with an active global equity strategy–e.g., the Major Markets Top Value Strategy–yields even higher performance advantages. As shown in Table 3, a 50/50 mix results in a maximum drawdown reduction to 26.8 percent of the maximum drawdown of a global equity portfolio invested exclusively according to the Major Markets Top Value Strategy. In addition, all other risk measures shown are significantly lower for the 50/50 mix. At the same time, the return for the combined portfolio was 16.87 percent, compared to 12.97 percent for the Major Markets Top Value Strategy (see Table 3 and Exhibits 3 and 4).

MANAGED DERIVATIVES COMBINED WITH EMERGING MARKETS EQUITIES

As indicated by the negative correlation coefficient of -0.19, Managed Derivatives are also an excellent diversification tool for emerging markets equities, as measured by the IFCI Composite Index. Both the volatility- and risk-adjusted returns suggest that a 50/50 mix offers the most attractive returns for risk-averse investors. The 50/50 portfolio shows a striking reduction of the average loss in losing months to 44 percent, compared with an investment in the IFCI Composite Index. Since there also is one less losing month in the 50/50 mix, the expectation of a monthly loss was even further reduced to 42 percent of the expectation of a loss for the IFCI Composite Index. The largest drawdown in the 50/50 mix amounts to only 38 percent of the drawdown for the emerging markets equity-only portfolio (see Table 4 and Exhibits 5 and 6).

Finally, the author analyzed the diversification benefits of combining Managed Derivatives and Emerging Markets Top Value Strategy, an active emerging markets strategy. Based on the negative correlation coefficient of -0.30, the expectation for risk reduction and return enhancement are again very high–and rightly so. A 30 percent Managed Derivatives component cuts the drawdown almost in half and, at the same time, considerably reduces volatility, magnitude of losses, and expectation of losses. The risk-adjusted return rises from 5.92 for the portfolio consisting of the active emerging markets equities to 6.84 for the 30/70 mix–an extremely high reward-to-risk ratio compared to alternative investments (see Table 5 and Exhibits 7 and 8).

Exhibit 2.   Asset Allocation between MSCI World Index and Managed Derivatives Portfolio (in U.S. Dollars), December 1988-September 1993
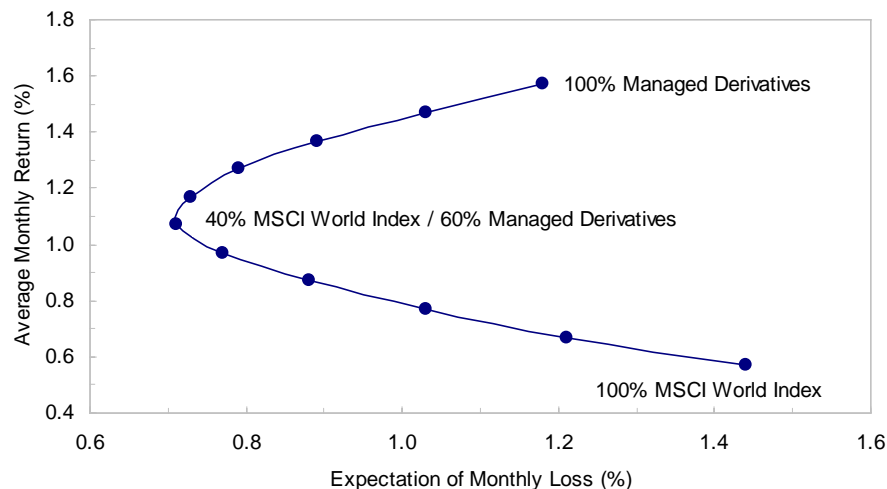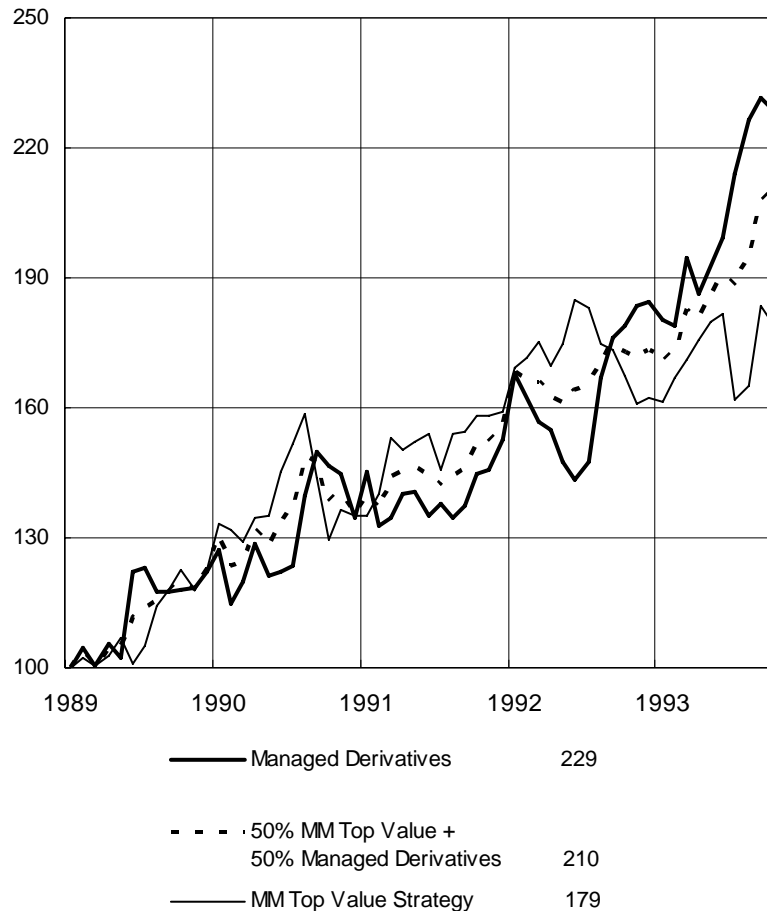
Note: All active strategies are after transaction costs and management and incentive fees.

SUMMARY AND PRACTICAL IMPLICATIONS

The 4 3/4-year test period from the end of 1988 through September 1993 is not long enough to confirm statistically significant relationships between the returns of the presented asset classes: Managed Derivatives, passive/active global equities, and passive/active emerging markets equities. This was a difficult period for many derivatives managers. Further, the period is characterized by below-average returns for the major markets equities, as measured by the MSCI World Index and above-average returns for the emerging markets equities, as measured by the IFCI Composite Index. Therefore, the relationship described in this chapter can be classified as time-specific only. More research on future returns of the various asset classes is required.

Table 3. Asset Allocation between Major Markets Top Value Strategy and Managed
Derivatives Portfolio, December 1988-September 1993 (in U.S. Dollars)

Major Markets Top Value Strategy	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%	0%
Managed Derivatives Portfolio	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Compound Annual Return (%)	12.97	13.89	14.74	15.52	16.23	16.87	17.44	17.95	18.38	18.75	19.05
Average Monthly Return (%)	1.11	1.16	1.20	1.25	1.30	1.34	1.39	1.44	1.48	1.53	1.57
Highest Monthly Return (%)	10.88	10.01	9.13	8.26	7.69	8.07	8.45	8.83	9.65	11.44	13.24
Lowest Monthly Return (%)	-10.16	-8.58	-7.00	-5.43	-3.85	-4.36	-5.02	-5.68	-6.33	-7.46	-8.69
Probability of Gain (%)	61.40	66.67	68.42	68.42	64.91	66.67	66.67	64.91	63.16	63.16	63.16
Average Gain in Winning Months (%)	3.72	3.18	2.88	2.71	2.85	2.88	3.00	3.25	3.64	4.00	4.37
Expectation of Monthly Gain (%)	2.29	2.12	1.97	1.85	1.85	1.92	2.00	2.11	2.30	2.52	2.76
Standard Deviation of Monthly Returns (%)	4.23	3.70	3.23	2.88	2.68	2.68	2.86	3.20	3.66	4.19	4.77
Probability of Monthly Loss (%)	38.60	33.33	31.58	31.58	35.09	33.33	33.33	35.09	36.84	36.84	36.84
Average Loss in Losing Months (%)	3.04	2.89	2.42	1.91	1.59	1.73	1.83	1.92	2.22	2.70	3.21
Expectation of Monthly Loss (%)	1.17	0.96	0.76	0.60	0.56	0.58	0.61	0.67	0.82	1.00	1.18
Longest Losing Streak (# Months)	5	5	2	2	4	4	4	5	5	5	5
Largest Drawdown from Previous High (%)	18.54	15.12	11.64	8.19	5.85	4.97	6.34	8.06	10.26	12.44	14.57
Risk Adjusted Return (Keppler Ratio):											
— Return per Unit of Expectation of Loss	0.95	1.20	1.58	2.07	2.33	2.33	2.28	2.13	1.81	1.53	1.33
Volatility-Adjusted Return (Sharpe Ratio):											
— Return per Unit of Standard Deviation	0.26	0.31	0.37	0.43	0.48	0.50	0.49	0.45	0.41	0.36	0.33
Number of Periods (Months)	57	57	57	57	57	57	57	57	57	57	57
Number of Losing Months	22	19	18	18	20	19	19	20	21	21	21
Number of Winning Months	35	38	39	39	37	38	38	37	36	36	36

Note: All active strategies are after transaction costs and management and incentive fees.

Exhibit 4. Asset Allocation between Major Markets Top Value Strategy and Managed
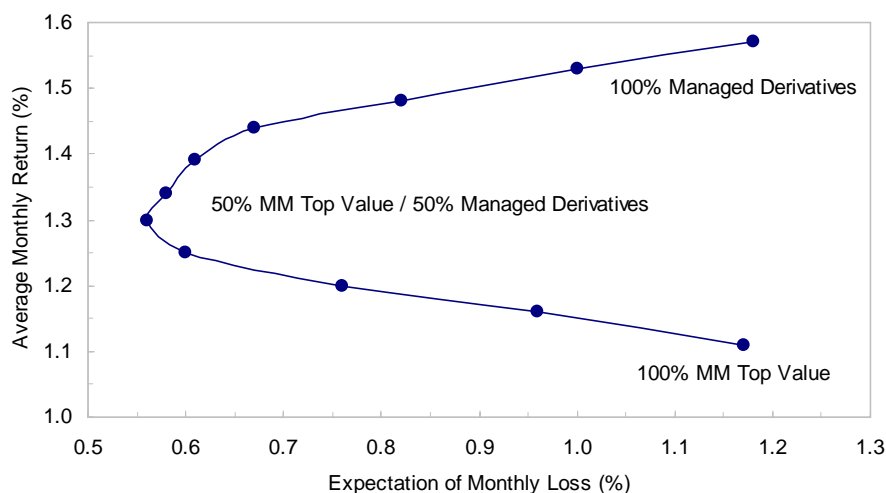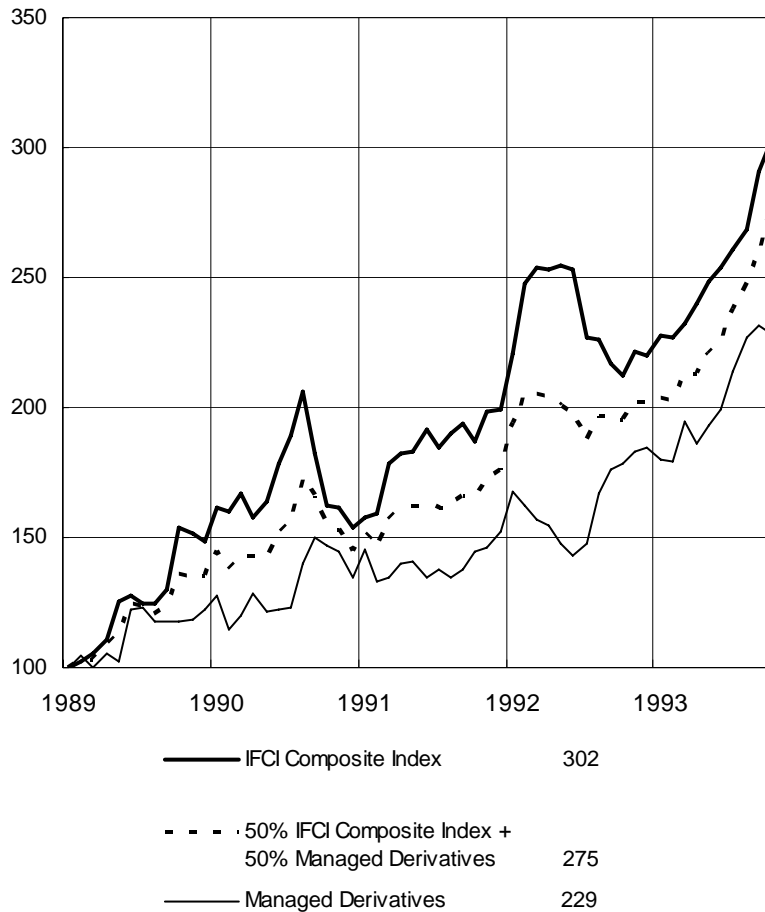Derivatives Portfolio (in U.S. Dollars), December 1988-September 1993

Exhibit 5. Emerging Markets and Managed Derivatives Portfolio (in U.S. Dollars) December 1988-September 1993

——— IFCI Composite Index	302
- - - 50% IFCI Composite Index + 50% Managed Derivatives	275
——— Managed Derivatives	229

Note: All active strategies are after transaction costs and management and incentive fees.

Nevertheless, and on a more optimistic note, it is possible to make a projection based on the long-term consistent and excellent real-time results of the manager of the Managed Derivatives portfolio and on the author's own experience in the global major and emerging equity markets. That projection leads to the conclusion that the basic results–in terms of risk-return relationships, not absolute returns–of a similar five-year ex-post facto study, undertaken in 1998 and using currently available real-time portfolios, may not be substantially different from the results presented here.

Table 4. Asset Allocation between IFCI Composite and Managed Derivatives Portfolio
December 1988-September 1993 (in U.S. Dollars)

IFCI Composite Index	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%	0%
Managed Derivatives Portfolio	**0%**	**10%**	**20%**	**30%**	**40%**	**50%**	**60%**	**70%**	**80%**	**90%**	**100%**
Compound Annual Return (%)	26.22	25.92	25.52	25.02	24.43	23.74	22.97	22.12	21.17	20.15	19.05
Average Monthly Return (%)	2.11	2.06	2.01	1.95	1.90	1.84	1.79	1.74	1.68	1.63	1.57
Highest Monthly Return (%)	18.26	16.54	14.83	13.12	11.40	10.31	10.24	10.17	10.76	11.90	13.24
Lowest Monthly Return (%)	-11.64	-9.49	-7.81	-6.34	-5.91	-6.20	-6.49	-6.78	-7.07	-7.75	-8.69
Probability of Gain (%)	64.91	64.91	63.16	64.91	64.91	66.67	66.67	70.18	68.42	63.16	63.16
Average Gain in Winning Months (%)	5.04	4.69	4.49	4.08	3.79	3.50	3.47	3.35	3.54	4.08	4.37
Expectation of Monthly Gain (%)	3.27	3.04	2.84	2.65	2.46	2.33	2.32	2.35	2.42	2.58	2.76
Standard Deviation of Monthly Returns (%)	5.60	4.97	4.39	3.89	3.51	3.28	3.25	3.42	3.75	4.21	4.77
Probability of Monthly Loss (%)	35.09	35.09	36.84	35.09	35.09	33.33	33.33	29.82	31.58	36.84	36.84
Average Loss in Losing Months (%)	3.30	2.80	2.25	1.98	1.60	1.46	1.58	2.05	2.34	2.57	3.21
Expectation of Monthly Loss (%)	1.16	0.98	0.83	0.69	0.56	0.49	0.53	0.61	0.74	0.95	1.18
Longest Losing Streak (# Months)	5	4	4	4	4	5	5	5	5	5	5
Largest Drawdown from Previous High (%)	25.31	22.20	19.04	15.85	12.61	9.64	8.92	8.93	9.95	11.90	14.57
Risk Adjusted Return (Keppler Ratio):											
— Return per Unit of Expectation of Loss	1.82	2.10	2.42	2.81	3.38	3.79	3.40	2.83	2.28	1.72	1.33
Volatility-Adjusted Return (Sharpe Ratio):											
— Return per Unit of Standard Deviation	0.38	0.41	0.46	0.50	0.54	0.56	0.55	0.51	0.45	0.39	0.33
Number of Periods (Months)	57	57	57	57	57	57	57	57	57	57	57
Number of Losing Months	20	20	21	20	20	19	19	17	18	21	21
Number of Winning Months	37	37	36	37	37	38	38	40	39	36	36

Note: All active strategies are after transaction costs and management and incentive fees.

Exhibit 6. Asset Allocation between IFCI Composite Index and Managed Derivatives Portfolio
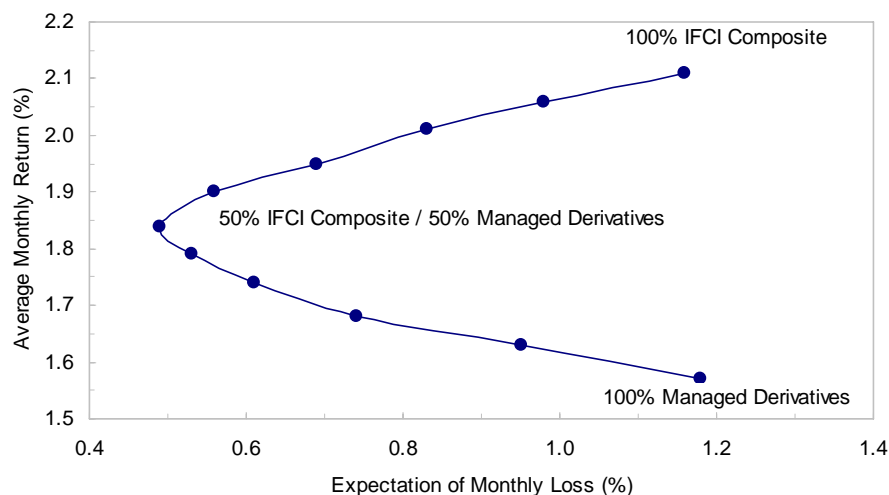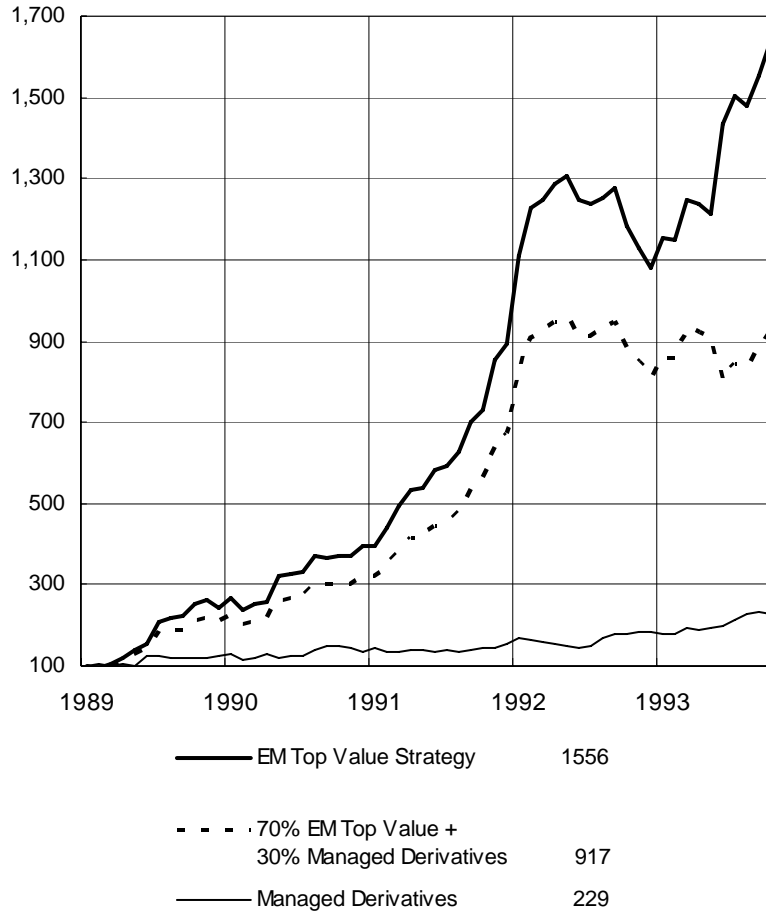(in U.S. Dollars) December 1988-September 1993

Exhibit 7. Emerging Markets Top Value and Managed Derivatives Portfolio (in U.S. Dollars) December 1988-September 1993

|	
——— EM Top Value Strategy	1556
– – – 70% EM Top Value + 30% Managed Derivatives	917
——— Managed Derivatives	229

Note: All active strategies are after transaction costs and management and incentive fees.

Table 5.   Asset Allocation between Emerging Markets Top Value Strategy and Managed
Derivatives Portfolio, December 1988-September 1993 (in U.S. Dollars)

Emerging Markets Top Value Strategy	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%	0%
Managed Derivatives Portfolio	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Compound Annual Return (%)	78.23	71.88	65.61	59.44	53.35	47.37	41.48	35.71	30.04	24.48	19.05
Average Monthly Return (%)	5.23	4.87	4.50	4.13	3.77	3.40	3.04	2.67	2.31	1.94	1.57
Highest Monthly Return (%)	32.42	29.96	27.51	25.05	22.60	20.15	17.69	15.24	13.07	13.06	13.24
Lowest Monthly Return (%)	-10.38	-9.72	-9.06	-8.40	-7.75	-7.09	-6.43	-5.77	-5.11	-6.71	-8.69
Probability of Gain (%)	78.95	78.95	77.19	77.19	77.19	71.93	70.18	70.18	63.16	63.16	63.16
Average Gain in Winning Months (%)	7.74	7.13	6.70	6.14	5.61	5.48	5.10	4.66	4.80	4.54	4.37
Expectation of Monthly Gain (%)	6.11	5.63	5.17	4.74	4.33	3.94	3.58	3.27	3.03	2.87	2.76
Standard Deviation of Monthly Returns (%)	8.07	7.36	6.68	6.06	5.50	5.02	4.66	4.45	4.39	4.50	4.77
Probability of Monthly Loss (%)	21.05	21.05	22.81	22.81	22.81	28.07	29.82	29.82	36.84	36.84	36.84
Average Loss in Losing Months (%)	4.20	3.64	2.96	2.65	2.46	1.92	1.83	2.01	1.97	2.53	3.21
Expectation of Monthly Loss (%)	0.88	0.77	0.67	0.60	0.56	0.54	0.54	0.60	0.73	0.93	1.18
Longest Losing Streak (# Months)	3	3	3	3	3	3	3	3	5	5	5
Largest Drawdown from Previous High (%)	19.18	15.45	12.55	10.52	8.46	7.09	6.52	7.83	9.62	12.12	14.57
Risk Adjusted Return (Keppler Ratio):											
— Return per Unit of Expectation of Loss	5.92	6.35	6.67	6.84	6.73	6.30	5.58	4.46	3.18	2.08	1.33
Volatility-Adjusted Return (Sharpe Ratio):											
— Return per Unit of Standard Deviation	0.65	0.66	0.67	0.68	0.69	0.68	0.65	0.60	0.53	0.43	0.33
Number of Periods (Months)	57	57	57	57	57	57	57	57	57	57	57
Number of Losing Months	12	12	13	13	13	18	17	17	21	21	21
Number of Winning Months	45	45	44	44	44	39	40	40	36	36	36

Note: All active strategies are after transaction costs and management and incentive fees.

Exhibit 8.   Asset Allocation between Emerging Markets Top Value Strategy and Managed
Derivatives Portfolio (in U.S. Dollars), December 1988-September 1993
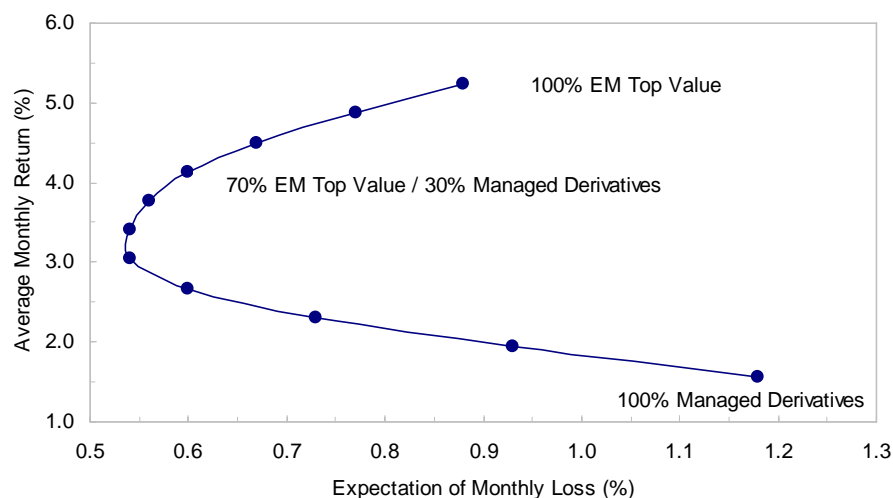
NOTES

[1] For regulatory reasons, the name of the product and the sponsor cannot be disclosed.

[2] See monthly editions of the *Morgan Stanley Capital International Perspective,* published by Morgan Stanley, New York 10020.

[3] See *Monthly Update on Emerging Markets,* International Finance Corporation, Central Capital Markets Department, Washington, DC 20433.

[4] During 1993, State Street Bank and Trust Co., Boston, under the Global Advantage Funds umbrella, has launched both a Major Markets High Value Subfund and an Emerging Markets High Value Subfund in Luxembourg for European investors. The investment strategies implemented in those funds are developed in cooperation with Keppler Asset Management Inc., New York.