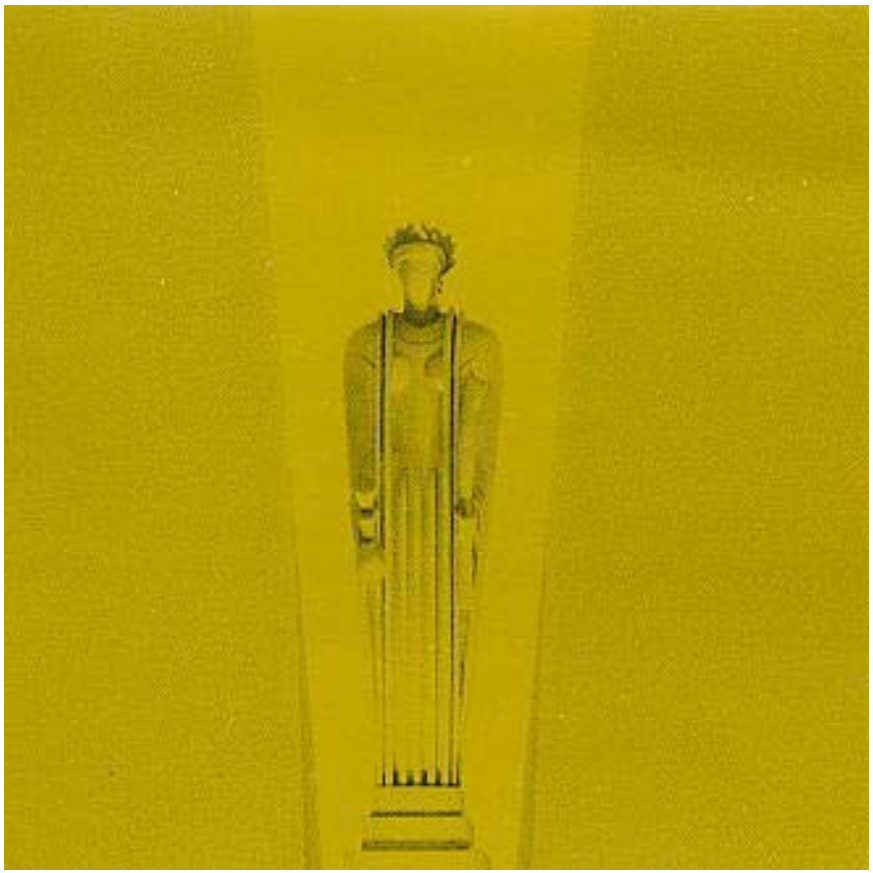
PRACTICAL RISK MANAGEMENT METHODOLOGIES FOR LEVERAGED COMMODITY FUTURES TRADING



Portfolio Diversification with Commodity Assets

November 16, 2004

New York City

Hilary Till

Premia Capital Management

Chicago

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PRESENTATION OUTLINE

I. An Investor is Paid to Bear Risks

II. Risk Management May Be the Most Important Element of an Investment Process

III. Risk Management Policies are a Product Design Issue

PRESENTATION OUTLINE
(Continued)

IV. Risk Management Rules Flow from an Understanding of Price Behavior

V. Useful Risk Management Reports in Futures Trading

I. An Investor is Paid to Bear Risks

- **Trading strategies can be well known and publicized.**
- **This does not prevent them from continuing to exist.**

I. An Investor is Paid to Bear Risks (Continued)

December Products/November Soybeans

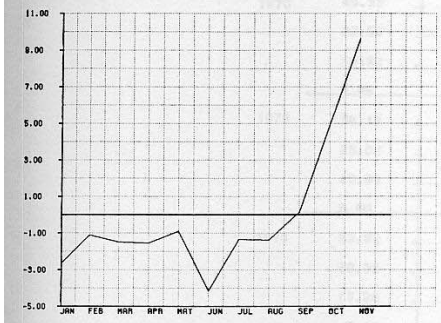
ContiCommodity

J F M A M J J A S O N D

1983. Strong Seasonality

This spread carries slightly more risk than other reverse crush spreads because it usually has to be put on at higher spread differentials than deferred positions, and it often must be held into the delivery period for November soybeans to achieve the best results. This adds the risk of strength in November soybeans after first notice day in some years.

10-Year Seasonality ¢/bu



Seasonal Factors and the DRV

Month	¢/bu Seasonal Factors	¢/bu Monthly Change in Factors	DRV
Jan	−2.6622	+ .0000	2,760.00
Feb	−1.1107	+1.5515	2,480.00
Mar	−1.4947	− .3840	1,920.00
Apr	−1.5667	− .0720	1,625.00
May	− .9148	+ .6519	1,635.00
Jun	−4.1640	−3.2492	1,815.00
Jul	−1.3650	+2.7990	1,325.00
Aug	−1.4050	− .0400	2,095.00
Sep	.1231	+1.5281	3,350.00
Oct	4.9171	+4.7940	3,895.00
Nov	9.6426	+4.7255	5,105.00

Highs and Lows

Year	High Date	¢/bu Level	Low Date	¢/bu Level	¢/bu Move
1970/71	15Nov71	26.96	27May71	6.75	+20.21
1971/72	13Nov72	29.89	9Feb72	11.90	+17.99
1972/73	20Nov73	82.40	5Sep73	−11.60	+94.00
1973/74	29Jul74	86.95	9Jan74	− 9.47	+96.42
1974/75	7Nov75	43.25	27Dec74	1.85	+41.40
1975/76	6Jul76	59.63	22Jul76	7.49	−52.14
1976/77	18Nov77	43.25	12Oct77	11.23	+32.02
1977/78	2Nov78	56.25	28Oct77	20.52	+35.73
1978/79	16Nov79	92.29	29Nov78	27.73	+64.56
1979/80	6Nov80	73.30	22Oct79	28.22	+45.08

Trading Record

Year	¢/bu Initiate Reverse Crush in Jun at	¢/bu Liquidate Reverse Crush in Nov at	$ Profit/ Loss	$ Worst Scenario	$ Best Scenario
1971	9.8224	22.3103	6,243.95	3,800.00	9,855.00
1972	15.3356	25.5649	5,114.65	47.50	8,087.50
1973	26.0568	34.6182	4,280.70	−17,745.00	40,080.00
1974	11.5799	32.7449	10,582.50	− 3,009.95	17,450.10
1975	23.1022	37.1444	7,021.10	− 124.95	12,290.00
1976	20.2703	25.8482	2,788.95	− 7,210.00	7,940.00
1977	29.3871	21.5314	−3,927.85	−10,175.05	10,210.00
1978	31.7339	46.8181	7,542.10	835.01	14,060.00
1979	35.0241	82.7431	23,859.50	18,835.00	30,704.90
1980	34.7698	68.3686	16,799.40	10,569.75	20,005.10
		Cumulative profit/loss	$80,305.00	−$4,177.69	$170,682.60

Soybean Crush Spread Example

A trade that was recommended in a 1983 commodity futures brokerage report is still relevant nearly 20 years later.

I. An Investor is Paid to Bear Risks
(Continued)

Deferred Heating Oil Crack Spread Example

- **Example from the winter of 1999.**

- **Hedging requirements of the airlines caused deferred heating oil futures contracts to be bid up relative to other petroleum complex products.**

- **Marginal liquidity providers entered the market, selling deferred heating oil and buying crude oil against this sale.**

I. An Investor is Paid to Bear Risks
(Continued)

Deferred Heating Oil Crack Spread Example (Continued)

- **By holding this spread at levels beyond what one would expect it to converge to, given refinery economics, the spread traders earned a liquidity premium.**

II. Risk Management and the Investment Process

- **The key to a successful investment program is not in finding strategies that have a statistical edge.**

- **A prominent hedge fund manager who currently has $5 billion under management told me in 1993:**

  "Other people have the same information as I do; other people put on the same trades on as I do. I make money; they don't."

III. Risk Management Policies are a Product Design Issue

Leverage

- **In futures trading, an investment manager has a lot of flexibility in designing an investment program.**

- **Futures trading requires a relatively small amount of margin.**

- **For example, some programs only require $7 for each $100 of exposure.**

III. Risk Management Policies are a Product Design Issue
(Continued)

- **The result is that a futures trader can easily adjust their leverage level to magnify gains (and losses.)**

- **Trade sizing is a matter of determining how much risk one wants to assume.**

- **A trader is not very constrained by the amount of initial capital committed to trading.**

III. Risk Management Policies are a Product Design Issue

(Continued)

Delevered Returns by Strategy

1997-2001 Analysis

Style	Average Levered Return (%)*	Average Delevered Return (%)*	Historical Financial Leverage*
Short Biased	13.7	9.3	0.3
Global Macro	16.8	8.9	2.0
Emerging Markets	16.9	8.8	1.0
Event Driven	14.7	8.3	1.1
Merger Arbitrage	14.7	7.0	1.8
Long/Short Equity	14.0	6.3	1.3
Fixed Income	9.6	4.8	1.5
Convertible Arbitrage	10.6	4.2	2.6
Managed Futures	10.5	4.2	2.8
Distressed Securities	n/a	n/a	1.2

* Leverage analysis was done for funds with 5 year Historical Leverage and performance data

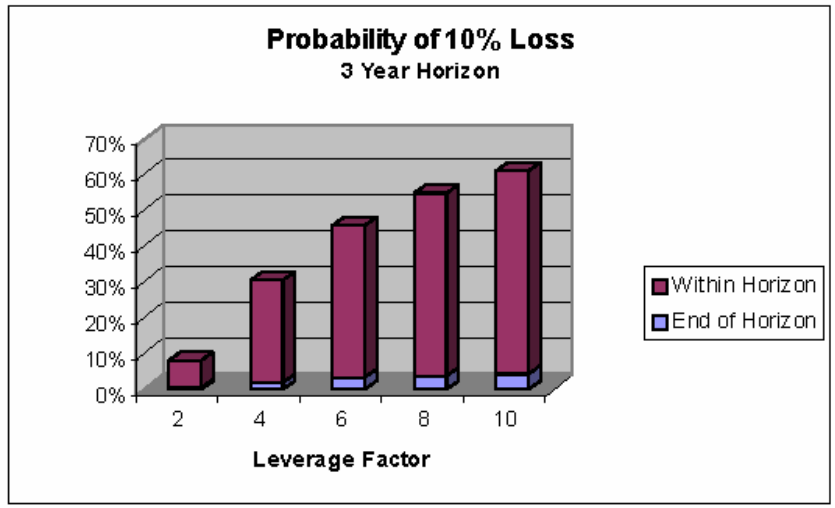
Source: Altvest, CSFB/Tremont, EACM, HFR, Tuna, Institutional Investor (June 2002), CMRA Analysis

CAPITAL MARKET RISK ADVISORS

III. Risk Management Policies are a Product Design Issue

(Continued)

- **With the ability to leverage, one must ensure that investors can tolerate the potential within-period losses.**



- **From Mark Kritzman, "Hidden Risks of Hedge Funds, and Asset Allocation versus Security Selection," Presentation to QWAFAFEW, 2/12/02.**

III. Risk Management Policies are a Product Design Issue

(Continued)

- **A number of top Commodity Trading Advisors (CTA's) have had losses in excess of -40%.**

- **These losses seem to have been acceptable to clients since these programs sometimes return in excess of 100% annually.**

Top 20 CTA Performers Past Five Years

For the period 1/1/96 to 12/31/00. Includes only CTAs managing at least $10 million as of 12/31/00

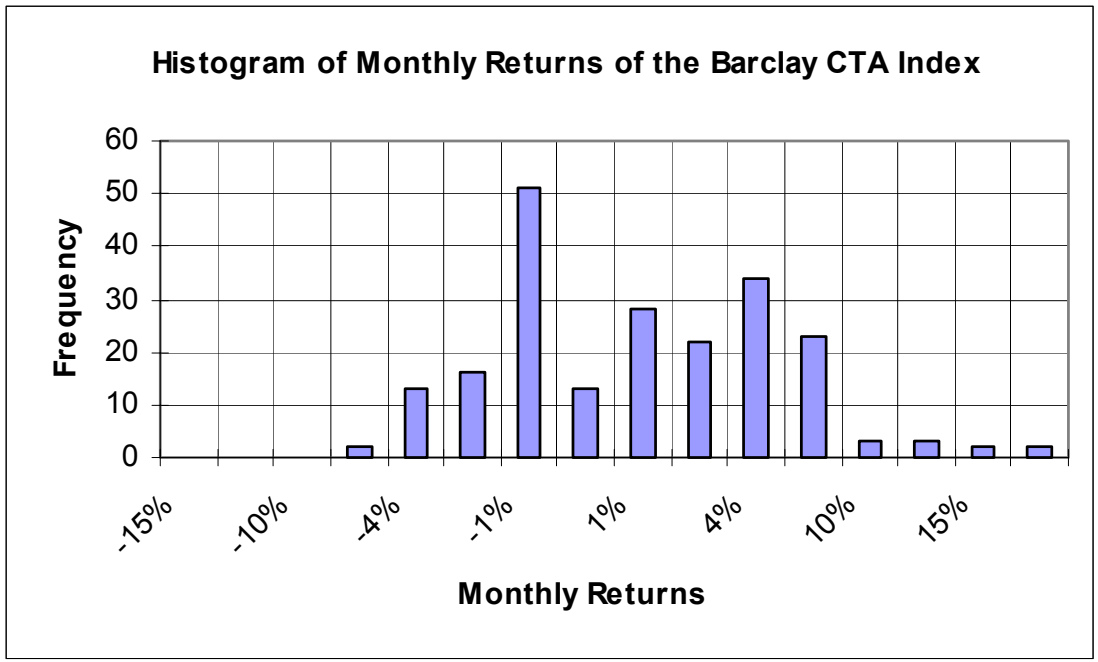
TRADING ADVISORS	5-YR COMP. ANNUAL RETURN	SHARPE RATIO	LARGEST DRAW-DOWN	% WINNING MONTHS	BEST 12-MO. PERIOD	WORST 12-MO. PERIOD	FUNDS UNDER MGMT
1. SoundView Capital Mgmt. (MAP)	57.88%	1.68	17.94%	63.33%	+252%	-13%	$10M
2. Tucson Asset Mgmt. (Domestic 2X)	48.58%	1.42	41.18%	68.33%	+176%	-38%	$31M
3. Hathersage (Accelerated Appreciation)	40.07%	1.15	26.43%	65.00%	+132%	-16%	$71M
4. Gollyhott Trading (Discret.)	35.62%	1.32	7.85%	63.33%	+241%	+1%	$102M
5. Eckhardt Trading Co. (Higher Leverage)	34.48%	0.92	28.42%	56.67%	+185%	-13%	$20M
6. Johnson Management	32.96%	2.38	2.70%	70.00%	+68%	+12%	$15M
7. Beacon Management Corp. (Meka)	32.35%	0.79	46.48%	60.00%	+119%	-36%	$131M
8. Cipher Investment Management Co.	32.25%	1.32	12.90%	61.67%	+133%	-4%	$365M
9. Quicksilver Trading, Inc.	29.57%	1.17	17.14%	63.33%	+106%	-0%	$24M
10. Ansbacher Invest. Mgmt. (Opt. Writing)	27.34%	0.83	26.89%	65.00%	+113%	-17%	$30M
11. Dunn Capital Mgmt. (WMA)	27.23%	0.58	44.16%	58.33%	+106%	-44%	$1,066M
12. DigiLog LLC	26.83%	0.82	19.63%	56.67%	+104%	-8%	$103M
13. Clarke Capital Mgmt. (Worldwide)	26.08%	0.98	8.48%	61.67%	+73%	+1%	$87M
14. Eckhardt Trading Co. (Standard)	25.25%	0.88	17.05%	56.67%	+117%	-13%	$269M
15. Bell Fundamental Futures (Standard)	24.97%	0.87	21.37%	60.00%	+100%	+2%	$37M
16. Capital Fund Mgmt.	24.86%	1.40	8.01%	63.33%	+54%	-5%	$47M
17. Analytic Investment Mgmt. (3R Strat)	24.73%	1.73	6.69%	75.00%	+44%	+7%	$299M
18. Hathersage (Long Term Growth)	24.48%	1.37	7.94%	68.33%	+50%	-6%	$14M
19. Jacobson Fund Managers (Curr.)	23.99%	0.94	19.07%	65.00%	+84%	-9%	$188M
20. Macquarie Treasury (Diversified)	23.27%	1.36	8.96%	66.67%	+79%	-7%	$28M

III. Risk Management Policies are a Product Design Issue

(Continued)

Payoff Profile

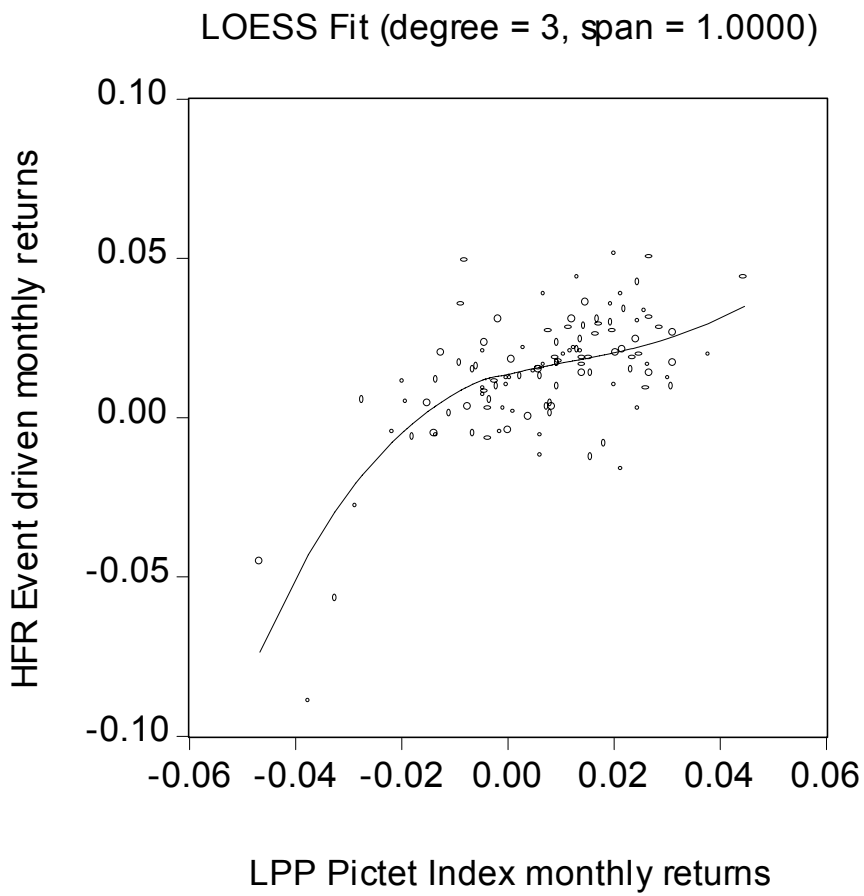
Investors expect long-options-like profiles from CTA's and global macro hedge fund managers.



III. Risk Management Policies are a Product Design Issue

(Continued)

- **If investors want short-options-like profiles, they can already source that return profile from arbitrage strategies.**

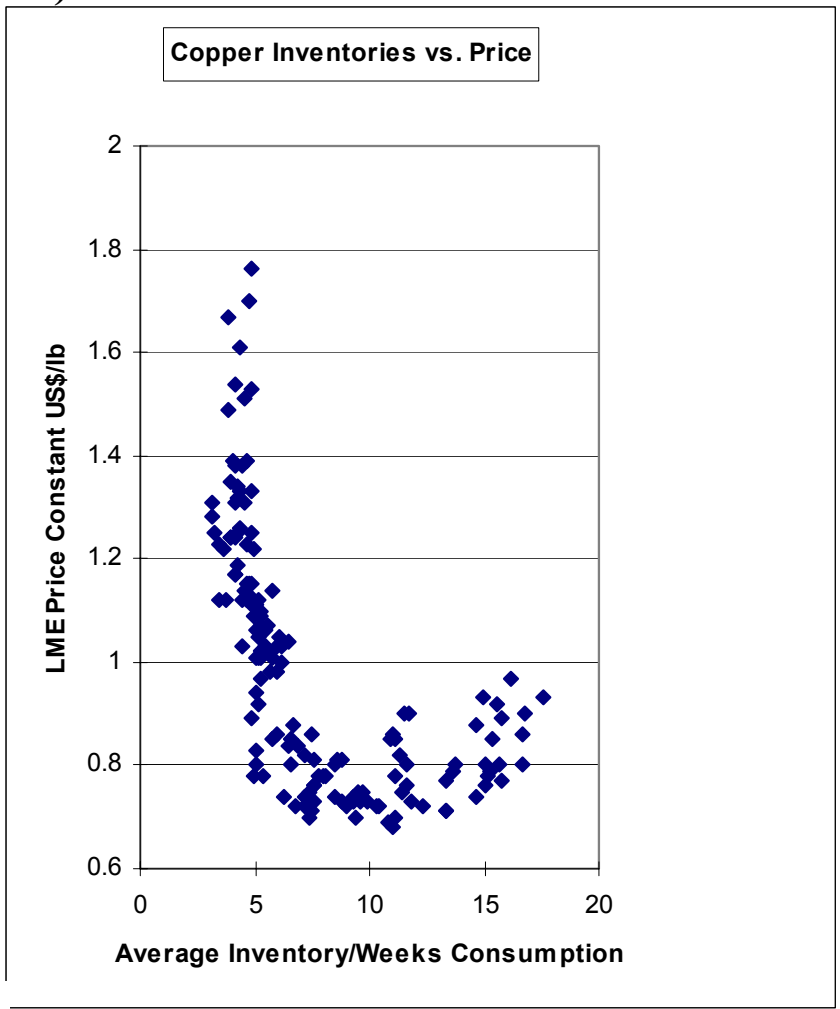


III. Risk Management Policies are a Product Design Issue

(Continued)

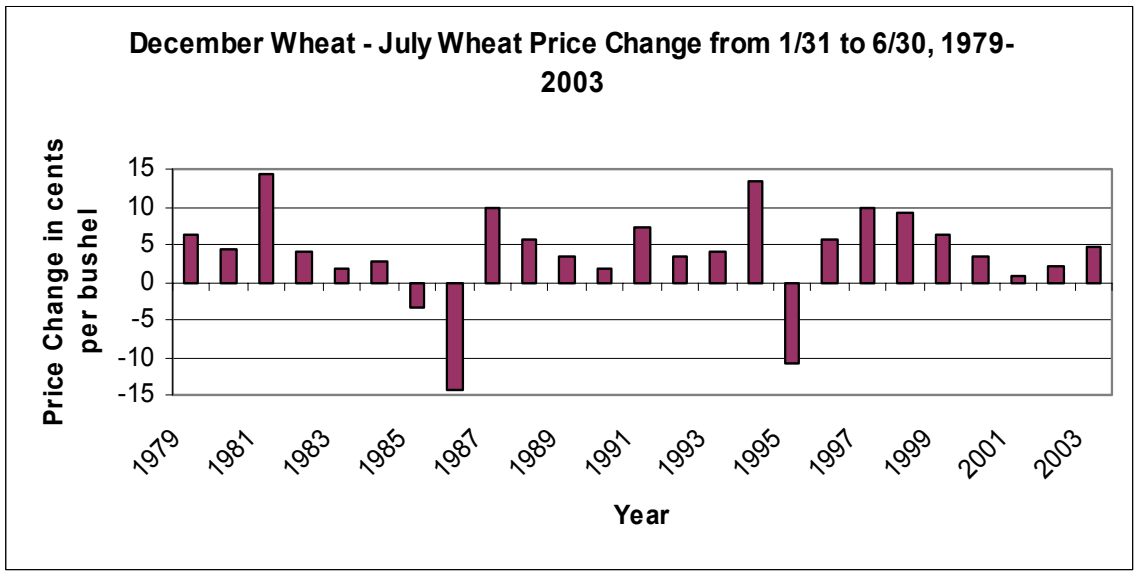
- **Therefore, the core of a commodity futures program needs to consist of trades with *long-options-like profiles* …**

- **… as when scarcity is indicated in a commodity market.**



III. Risk Management Policies are a Product Design Issue
(Continued)

- **The sizing of trades with *short-options-like profiles* needs to be kept modest and be constrained to a satellite ring of the portfolio so as to increase the likelihood of delivering the payoff profile desired by CTA investors.**



IV. Risk Management Rules Flow from an Understanding of Price Behavior

- **Diversified portfolios of equities have returns that appear to be symmetrically distributed.**

- **It is a different matter for commodity prices.**

IV. Risk Management Rules Flow from an Understanding of Price Behavior
(Continued)

- **The empirical behavior of commodity prices can be described as follows:**
  - **Commodity prices are *extremely* volatile;**
  - **There exist rare but violent explosions in prices; and**
  - **There is substantial positive skewness in the price distributions.**

IV. Risk Management Rules Flow from an Understanding of Price Behavior

(Continued)

- **These observations can be illustrated with a long-term chart of sugar prices:**

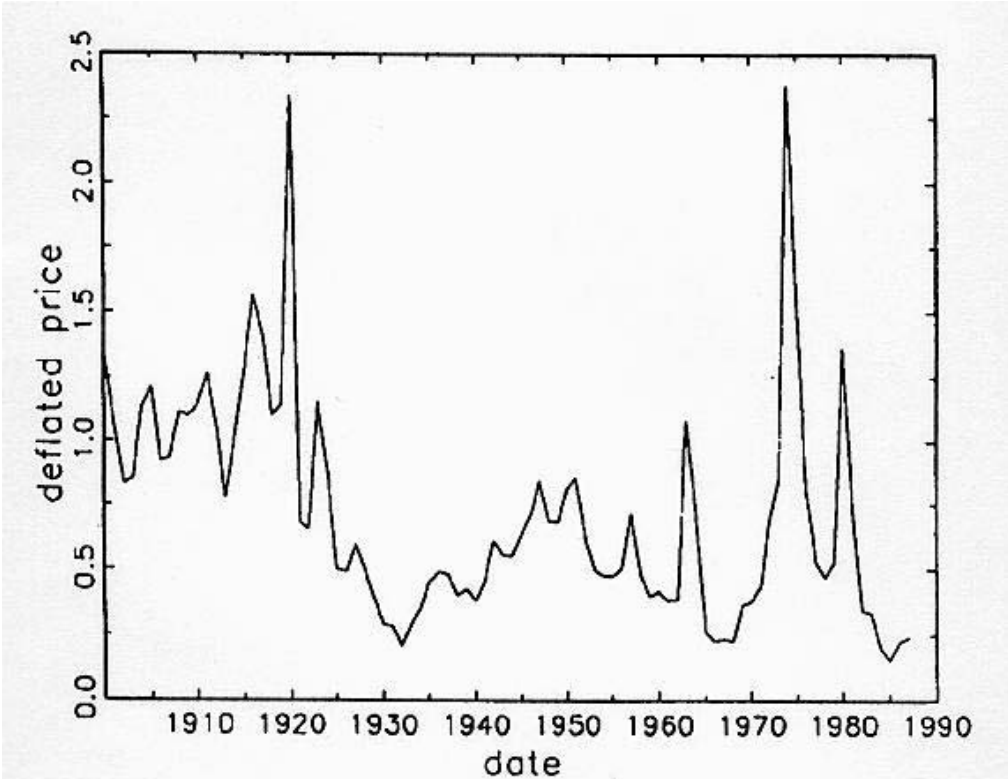
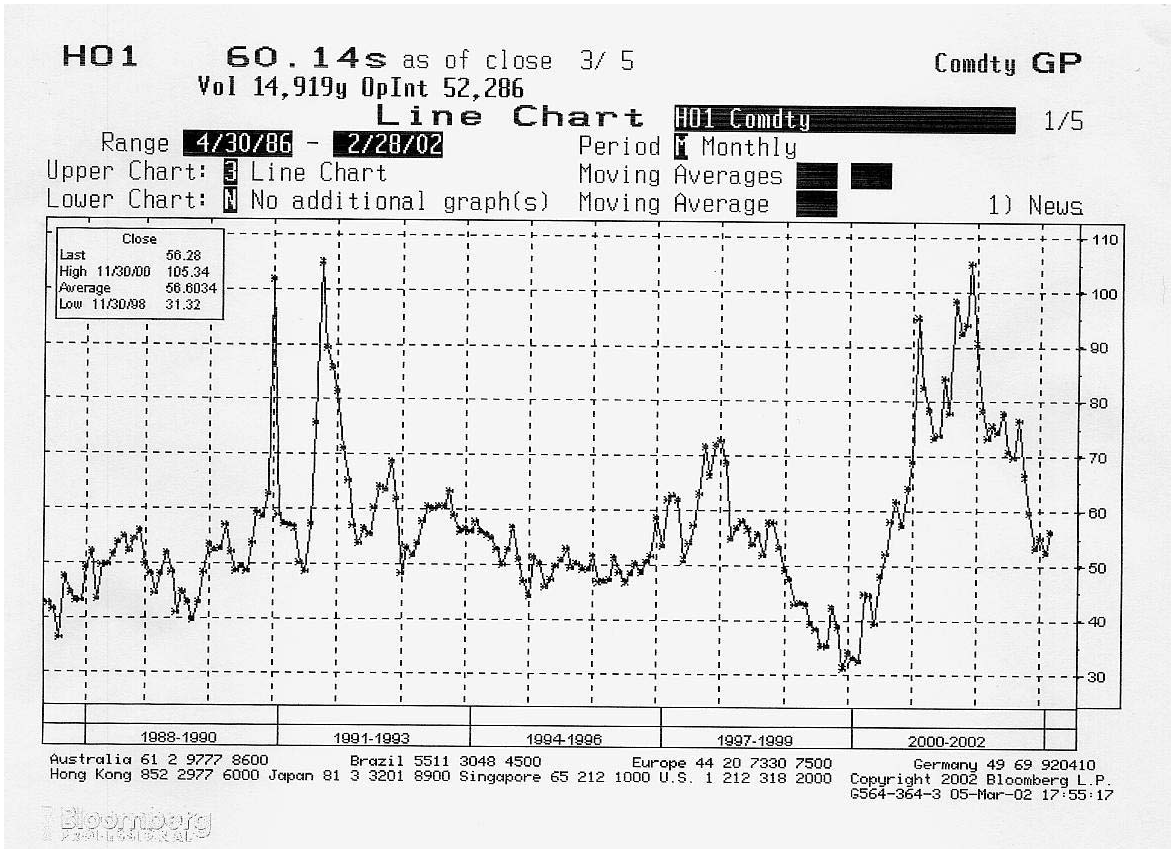


FIGURE 1
Annual sugar prices, 1900-1987

IV. Risk Management Rules Flow from an Understanding of Price Behavior

(Continued)

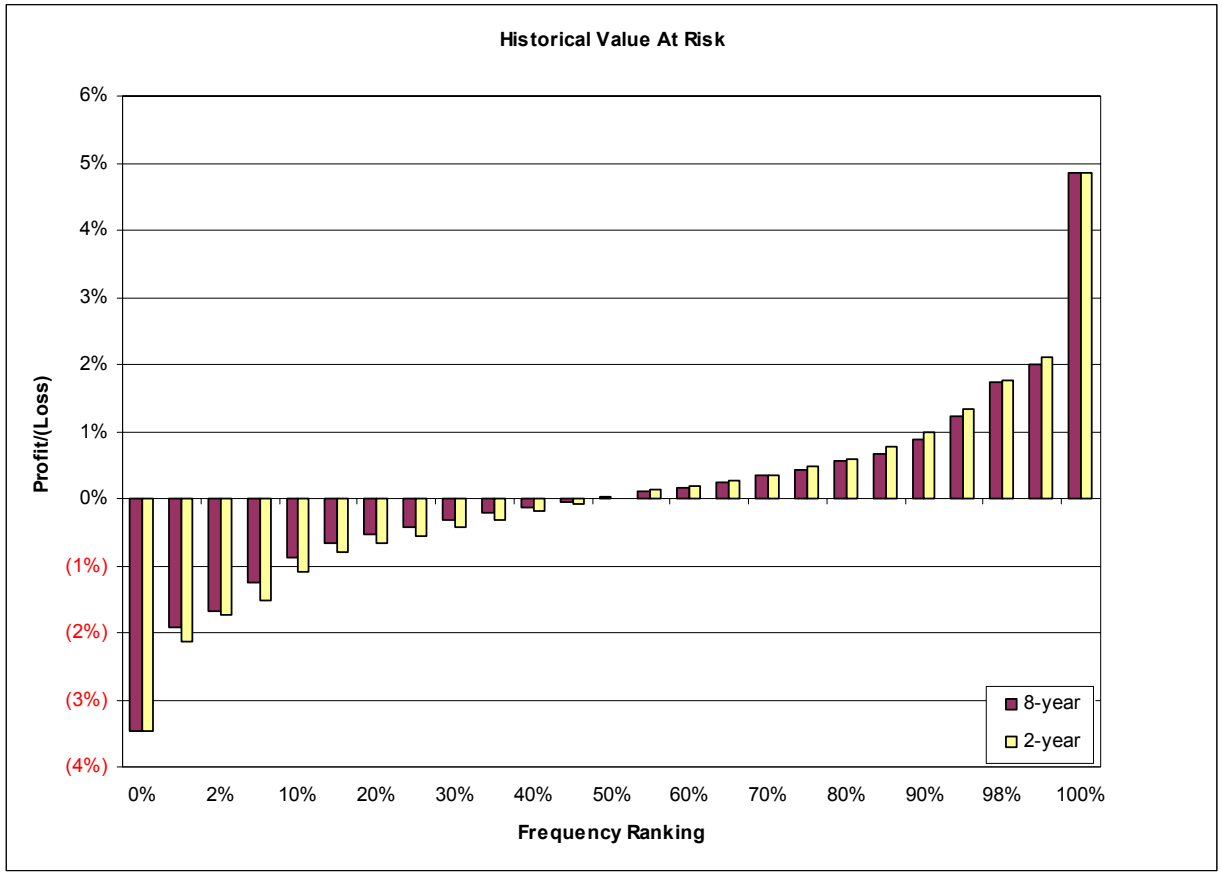
- **Another example can be found in heating oil:**



IV. Risk Management Rules Flow from an Understanding of Price Behavior
(Continued)

Value-at-Risk

- The portfolio's volatility is calculated using the recent volatilities and correlations of the portfolio's instruments.



IV. Risk Management Rules Flow from an Understanding of Price Behavior
(Continued)

Value-at-Risk (Continued)

- **The standard Value-at-Risk approach alone is inadequate for a commodity portfolio.**

- **A commodity portfolio consists of instruments that have a tendency toward extreme positive skewness in returns.**

- **This measure, though, is still useful when it is twinned with other measures.**

IV. Risk Management Rules Flow from an Understanding of Price Behavior
(Continued)

Scenario Testing

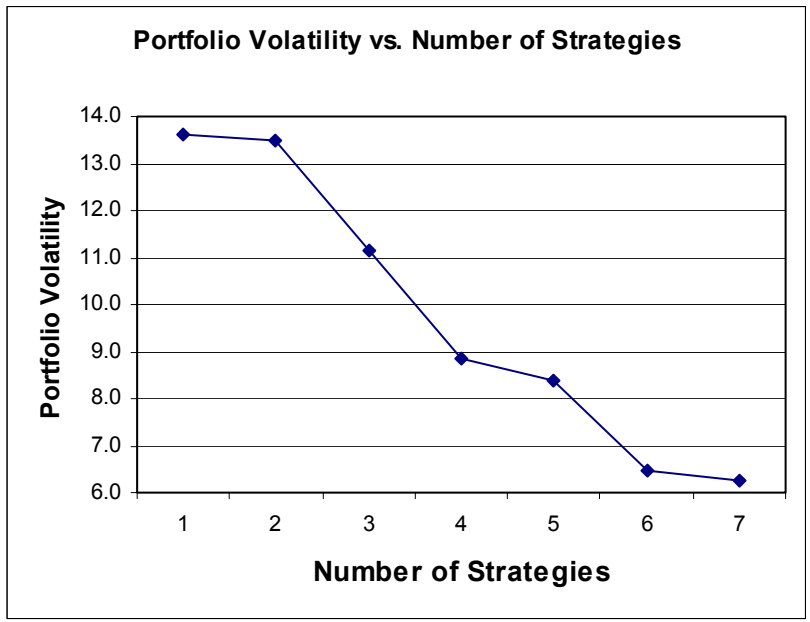
- **Using long-term data, an investor can directly examine the worst performance of a commodity trade under similar circumstances.**

- **This measure will sometimes be larger than the Value-at-Risk measure based on recent volatility.**

IV. Risk Management Rules Flow from an Understanding of Price Behavior
(Continued)

Diversification and Concentration Risk

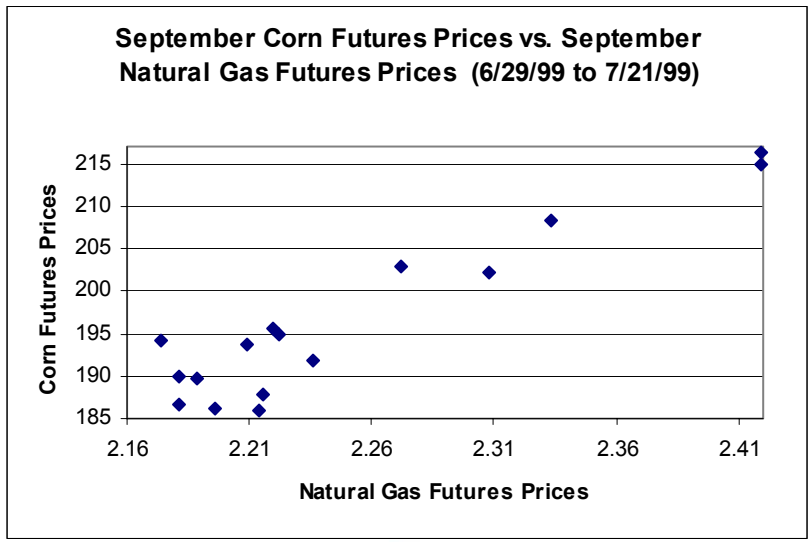
Example of Portfolio Effect When Combining Independent Strategies



IV. Risk Management Rules Flow from an Understanding of Price Behavior
(Continued)

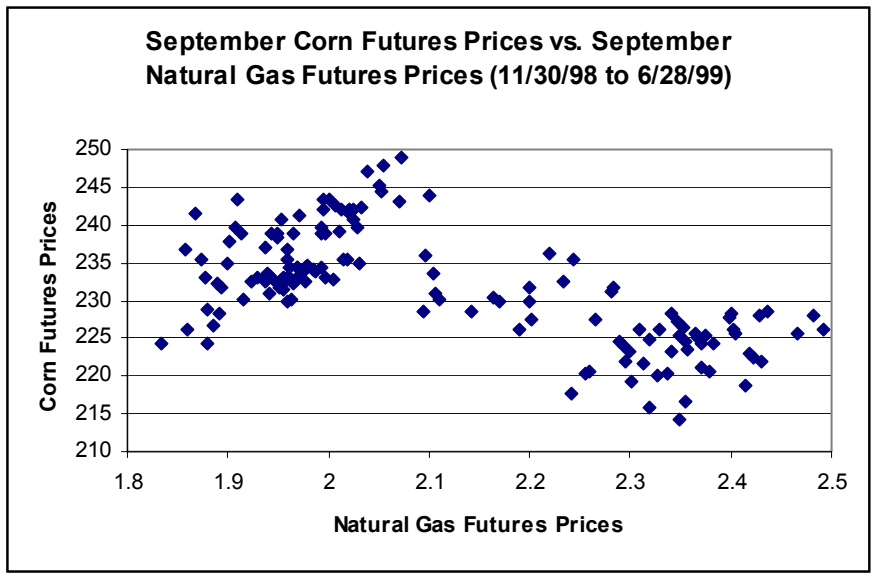
Understanding the Fundamental Drivers of a Strategy

- **The following graphs illustrate how two normally unrelated markets can become temporarily very related:**



IV. Risk Management Rules Flow from an Understanding of Price Behavior
(Continued)

Understanding the Fundamental Drivers of a Strategy (Continued)



IV. Risk Management Rules Flow from an Understanding of Price Behavior
(Continued)

- **In July, both corn and natural gas prices are heavily dependent on the outcome of weather in the U.S. Midwest.**

- **And in July 1999, the Midwest experienced blistering temperatures.**

IV. Risk Management Rules Flow from an Understanding of Price Behavior
(Continued)

- **Obviously weather is different in different parts of the world …**

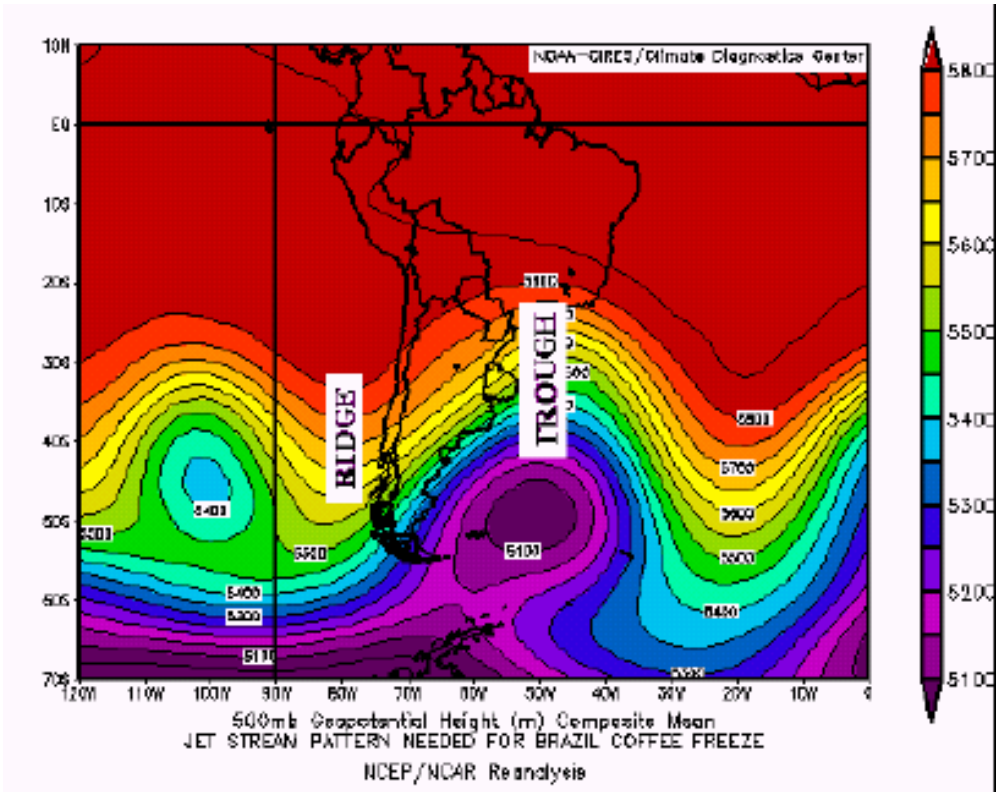
- **… so one can easily have simultaneous (uncorrelated) weather-fear premium trades in a commodity portfolio.**

- **In June, for example, one can have U.S. grain trades *and* coffee trades that rely on the washing out of the weather premium in their respective markets.**

IV. Risk Management Rules Flow from an Understanding of Price Behavior

(Continued)

- **The grain trades are driven by summer weather in the U.S. while the coffee trades are driven by winter weather in Brazil.**



IV. Risk Management Rules Flow from an Understanding of Price Behavior
(Continued)

Extraordinary Stress Testing

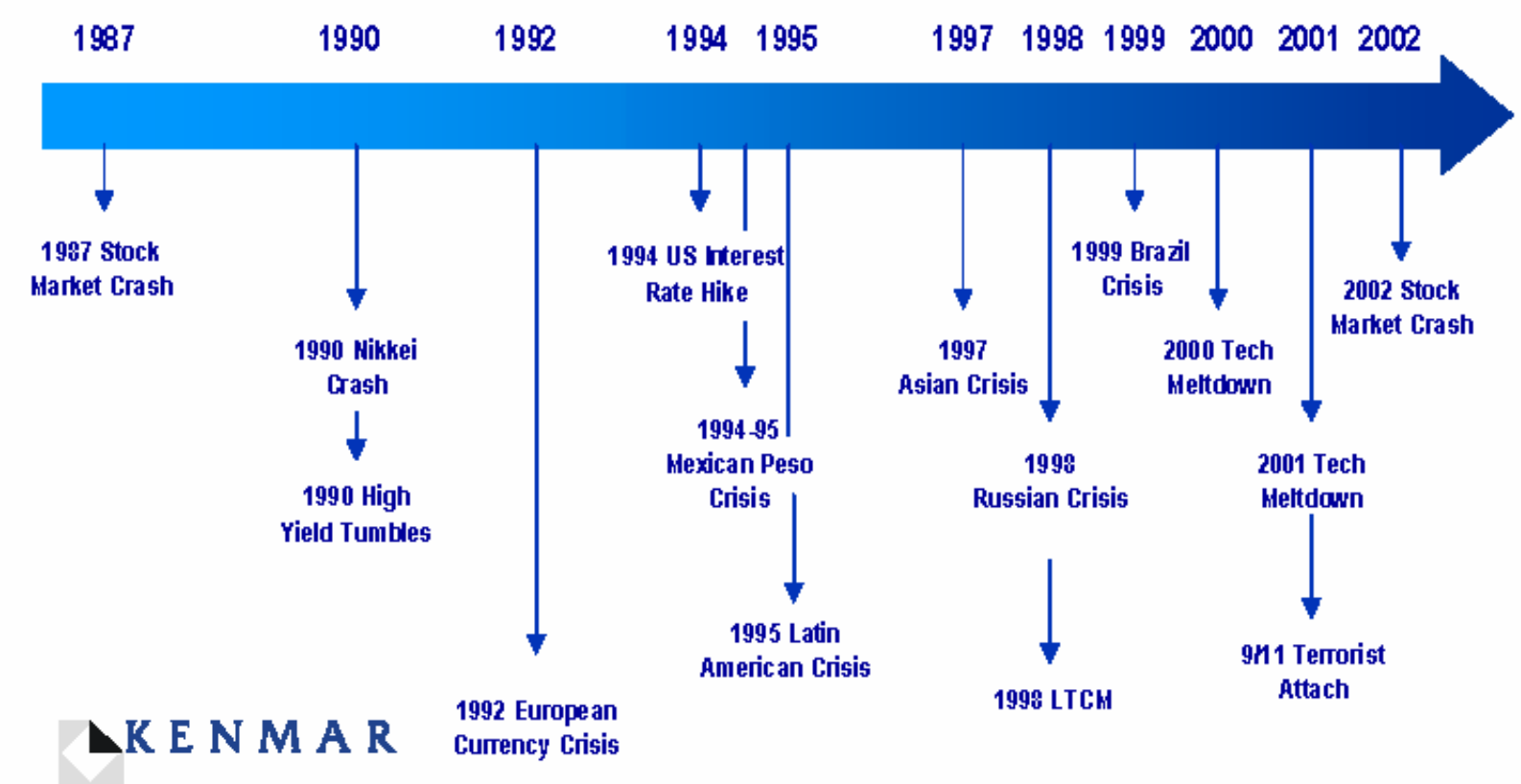
- **Futures products are marketed as equity diversifiers.**

- **Therefore, one job of risk management is to attempt to ensure that a futures investment will not be correlated to stocks during dramatic equity declines.**

- **For a futures portfolio, it is prudent to examine how the portfolio would have performed during various well-defined stock market declines.**

IV. Risk Management Rules Flow from an Understanding of Price Behavior

(Continued)



V. Useful Risk Management Reports in Futures Trading

- **On a per-strategy basis, it is useful to examine each strategy's:**
  - **Value-at-Risk based on recent volatilities and correlations;**
  - **Worst-case loss during normal times;**
  - **Worst-case loss during well-defined eventful periods;**

V. Useful Risk Management Reports in Futures Trading
(Continued)

- **Incremental contribution to Portfolio Value-at-Risk; and**

- **Incremental contribution to Worst-Case Portfolio Event Risk.**

- **The latter two measures give indications on whether the strategy is a risk reducer or risk enhancer.**

V. Useful Risk Management Reports in Futures Trading
(Continued)

- **On a portfolio-wide basis, it is useful to examine:**
  - **Value-at-Risk based on recent volatilities and correlations;**
  - **Worst-case loss during normal times; and**
  - **Worst-case loss during eventful periods.**

V. Useful Risk Management Reports in Futures Trading
(Continued)

- **The spreadsheets on the next two slides give examples of a futures portfolio with the recommended measures displayed.**

- **Note the properties of the soybean crush spread.**

- **It is a portfolio event-risk reducer, but it also adds to the volatility of the portfolio.**

V. Useful Risk Management Reports in Futures Trading
(Continued)

Commodity Risk Reports

Strategy	Value-At-Risk	Worst-Case Loss During Normal Times	Worst-Case Loss During Eventful Period
Deferred Reverse Soybean Crush Spread	2.78%	-1.09%	-1.42%
Long Deferred Natural Gas Outright	0.66%	-0.18%	-0.39%
Short Deferred Wheat Spread	0.56%	-0.80%	-0.19%
Long Deferred Gasoline Outright	2.16%	-0.94%	-0.95%
Long Deferred Gasoline vs. Heating Oil Spread	2.15%	-1.04%	-2.22%
Long Deferred Hog Spread	0.90%	-1.21%	-0.65%
Portfolio	3.01%	-2.05%	-2.90%

V. Useful Risk Management Reports in Futures Trading
(Continued)

Commodity Risk Reports (Continued)

Strategy	Incremental Contribution to Portfolio Value-At-Risk*	Incremental Contribution to Worst-Case Portfolio Event Risk*
Deferred Reverse Soybean Crush Spread	0.08%	-0.24%
Long Deferred Natural Gas Outright	0.17%	0.19%
Short Deferred Wheat Spread	0.04%	0.02%
Long Deferred Gasoline Outright	0.33%	0.81%
Long Deferred Gasoline vs. Heating Oil Spread	0.93%	2.04%
Long Deferred Hog Spread	0.07%	-0.19%

* A positive contribution means that the strategy adds to risk while a negative contributions means the strategy reduces risk.

V. Useful Risk Management Reports in Futures Trading
(Continued)

- **So an incremental contribution to risk measure based solely on recent volatilities and correlations does not give complete information about whether a trade is a diversifier or not.**

V. Useful Risk Management Reports in Futures Trading
(Continued)

- **For the purposes of extraordinary stress testing, we would recommend examining how a portfolio would have performed during the following four eventful periods:**

Meaningful Eventful Periods

October 1987 stock market crash

Gulf War in 1990

Fall 1998 bond market debacle

Aftermath of 9/11/01 attacks

V. Useful Risk Management Reports in Futures Trading
(Continued)

- **If one's commodity portfolio would do poorly during these events …**

- **… this may be unacceptable to clients who are investing in a non-traditional investment for their diversification benefits.**

V. Useful Risk Management Reports in Futures Trading
(Continued)

- **Therefore, in addition to examining a portfolio's risk based on recent fluctuations using Value-at-Risk measures …**

- **… one should also examine how the portfolio would have performed during eventful times.**

V. Useful Risk Management Reports in Futures Trading
(Continued)

- **Understanding a portfolio's exposure to certain financial or economic shocks can help in designing macro portfolio hedges that would limit exposure to these events.**

V. Useful Risk Management Reports in Futures Trading
(Continued)

- **For example, a commodity portfolio from the summer of 2002 consisted of the following positions: outright long wheat, a long gasoline calendar spread, and short outright silver.**

- **When carrying out an event-risk analysis on the portfolio, the worst case was a 9/11 scenario.**

V. Useful Risk Management Reports in Futures Trading
(Continued)

- **This is because the portfolio was long economically sensitive commodities and short an instrument that does well during time of "flights-to-quality."**

- **Normally, though, these positions are unrelated to each other.**

V. Useful Risk Management Reports in Futures Trading

- **With implied volatilities of short-term interest-rate options at 50%, these options would have been quite expensive macro portfolio insurance.**

- **Given that the scenario that would most negatively impact the portfolio was a sharp shock to business confidence, the least expensive macro portfolio insurance at the time was short-term gasoline puts.**

Conclusion

- **Our view is that there are a number of futures strategies that earn their returns due to taking on risky positions in a risk-averse world.**

- **The returns are not due to inefficiencies in the marketplace.**

- **There is a very important active component to a futures program that earns a return due to bearing risk.**

Conclusion (Continued)

- **It is the program's risk management methodology.**

- **An investment manager must decide:**

  - **How much to leverage the strategy;**
  - **How to balance long-options-like trades with short-options-like trades; and**
  - **Whether to give up any of its returns to hedge out the strategy's extreme risks.**

Source of Graphics

(not directly credited in presentation)

- **Slide 8, "December Products/November Soybeans," *Seasonality in Agricultural Futures Markets*, ContiCommodity, 1983, p. 346.**

- **Slide 12, sample Refco futures statement, 11/20/01.**

- **Slide 14, excerpt from presentation by Leslie Rahl of CMRA, "Hedge Fund Transparency: Unravelling the Complex and Controversial Debate," Slide 52, RiskInvest 2002, Boston, 12/10/02.**

- **Slide 16, "Top 20 CTA Performers Past Five Years," *Barclay Managed Funds Report*, 1st Quarter 2001, p. 6.**

- **Slide 17, "Histogram of Monthly Returns of the Barclay CTA Index," Lungarella, Gildo, Harcourt AG, "Managed Futures: A Real Alternative," *swissHEDGE*, 4th Quarter 2002, Figure 1.**

Source of Graphics (Continued)

- **Slide 18, a graph of the Hedge Fund Research (HFR) Event Driven Index's Monthly Returns vs. a Swiss equity-and-bond benchmark from Favre, Laurent and Jose-Antonio Galeano, "An Analysis of Hedge Fund Performance Using Loess Fit Regression, "** ***Journal of Alternative Investments*****, Spring 2002, Exhibit 8.**

- **Slide 19, "Copper Inventories vs. Price," RBC Dominion Securities.**

- **Slide 20, "December Wheat – July Wheat Price Changes from 1/31 to 6/30, 1979-2003" is based on an exhibit in Till, Hilary and Joseph Eagleeye, "How to Design a Commodity Futures Trading Program," a chapter in the forthcoming book,** ***Commodity Trading Advisors: Risk, Performance, Analysis and Selection*****, edited by Gregoriou, Greg, Vassilios N. Karavas, Francois-Serge Lhabitant and Fabrice Rouah, John Wiley and Sons, New York, September 2004.**

- **Slide 23, graph of deflated sugar prices from 1900 to 1987 from Deaton, Angus and Guy LaRoque, "On the Behavior of Commodity Prices."** ***Review of Economic Studies*** **(1992) 59, p 2.**

Source of Graphics (Continued)

- **Slide 24, graph of monthly heating oil prices from 4/30/86 through 2/28/02, The Bloomberg.**
- **Slide 25, graph of historical Value-at-Risk for a commodity portfolio from "The Energy Market" presentation by Global Advisors Limited, Slide 22.**
- **Slide 28, graph of portfolio volatility vs. number of strategies from Till, Hilary, "Passive Strategies in the Commodity Futures Markets." *Derivatives Quarterly*, Fall 2000, p 54.**
- **Slides 29 and 30, graphs of Natural Gas vs. Corn prices from Till, Hilary, "Taking Full Advantage of the Statistical Properties of Commodity Investments." *Journal of Alternative Investments*, Summer 2001, p. 65.**
- **Slide 33, "Jet Stream Needed for Brazil Coffee Freeze," Russo, Mark and Jon Davis, Salomon Smith Barney, *Foreign Weather*, 7/2/02, p. 3.**

Source of Graphics (Continued)

- **Slide 35, excerpt from presentation by Richard Horwitz of Kenmar, "Constructing a 'Risk-Efficient' Portfolio of Hedge Funds," Slide 26, RiskInvest 2002, Boston, 12/11/02.**

- **Slide 36, Degas, Edgar, "The Cotton Exchange at New Orleans," 1873, Musée Municipal, Pau, France.**

- **Slides 40 and 41, commodity portfolio risk measures from Till, Hilary, "Risk Management Lessons in Leveraged Commodity Futures Trading," *Commodities Now*, http://www.commodities-now.com, September 2002, p. 87.**

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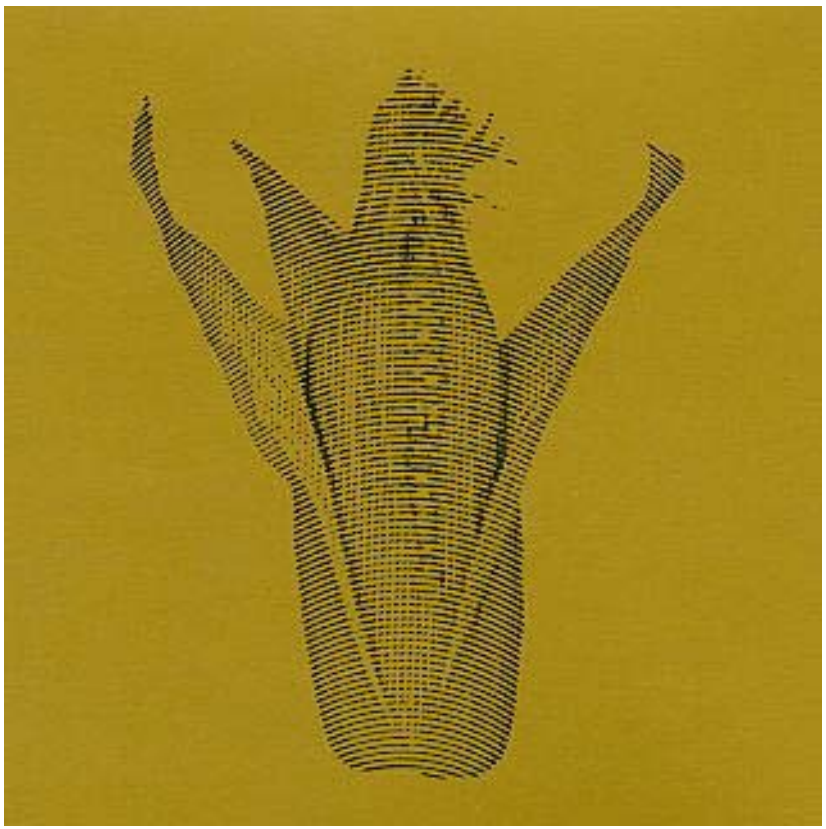

Ms. Hilary Till
Premia Capital Management, LLC
53 W. Jackson Blvd.
Suite 724
Chicago, IL 60604 USA

Phone: 312-583-1137
Fax: 312-873-3914

E-mail: info@premiacap.com

http://www.premiacap.com