

RISK MANAGEMENT IN LEVERAGED FUTURES TRADING



**100 women in
hedge funds™**

**Second Annual Panel on
Risk Management in Hedge
Fund Investing**

**Ms. Hilary Till
Premia Capital Management**

Wednesday, July 9, 2003



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PRESENTATION OUTLINE

- I. Risk is the Flipside of Return**
- II. Risk Management May Be the Most Important Element of an Investment Process**
- III. Risk Management Policies are a Product Design Issue**
- IV. Risk Management Policies Determine Whether a Program will be Viable**



PRESENTATION OUTLINE

(Continued)

- V. Standard Risk Management Methodology from Conventional Asset Managers is a Useful Starting Point**
- VI. Risk Management Rules Flow from an Understanding of Price Behavior**
- VII. Useful Risk Management Reports in Futures Trading**



I. Risk is the Flipside of Return

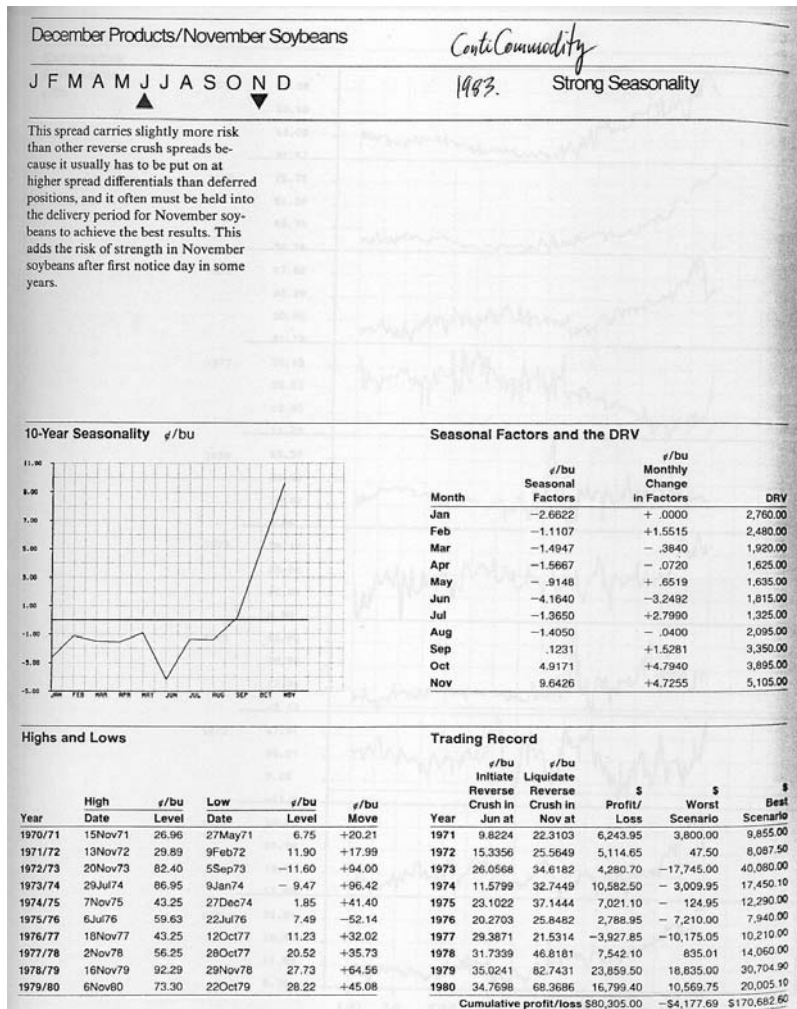
- **In a number of trading strategies, an investor is paid to bear risks.**
- **Trading strategies can be well known and publicized.**
- **This does not prevent them from continuing to exist.**



I. Risk is the Flipside of Return (Continued)

Soybean Crush Spread Example

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



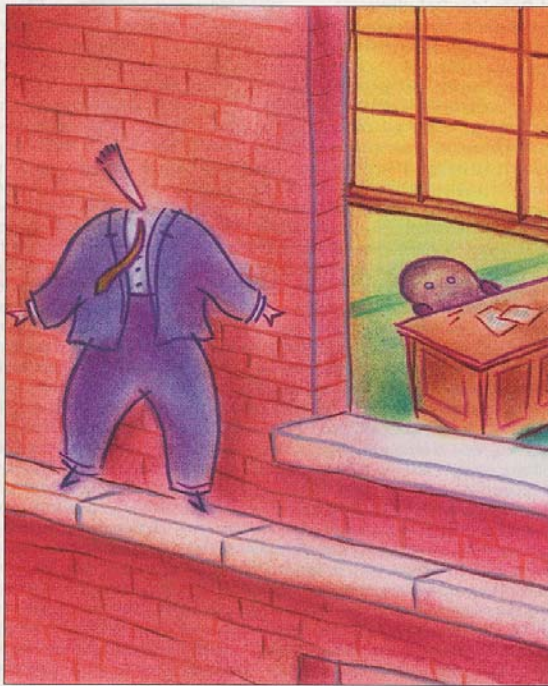
I. Risk is the Flipside of Return

(Continued)

The Not So Perfect Index

The Impact Of Russell 2000
Rebalancing On Small-Cap Performance

By Peter Jankovskis



Impact of Russell 2000

Rebalance Example

Average Monthly Excess Return (S&P 600 - Russell 2000)					
1994/01 - 2001/12					
Month	Average	Minimum	Maximum	Stddev	T-signif.
January	-0.79	-2.59	0.33	0.91	96.1%
February	-0.16	-3.12	1.71	1.40	60.9%
March	0.09	-1.91	2.89	1.34	56.2%
April	0.51	-2.35	4.30	1.85	73.6%
May	0.33	-0.85	2.87	1.19	73.7%
June	-0.13	-2.81	1.17	1.16	60.6%
July	1.47	-0.40	3.74	1.24	98.7%
August	0.44	-0.70	1.24	0.67	91.9%
September	-0.10	-1.70	0.77	0.79	61.3%
October	0.54	-0.66	5.09	1.92	74.3%
November	-0.12	-1.79	1.07	0.82	63.9%
December	-0.12	-3.10	3.73	1.96	55.9%



I. Risk is the Flipside of Return (Continued)

Impact of Russell 2000 Rebalance Example (continued)

- This phenomenon has been published in the *Journal of Indexes* by Dr. Peter Jankovskis of OakBrook Investments.
- It has also been well covered by Wall Street quantitative researchers.



I. Risk is the Flipside of Return

(Continued)

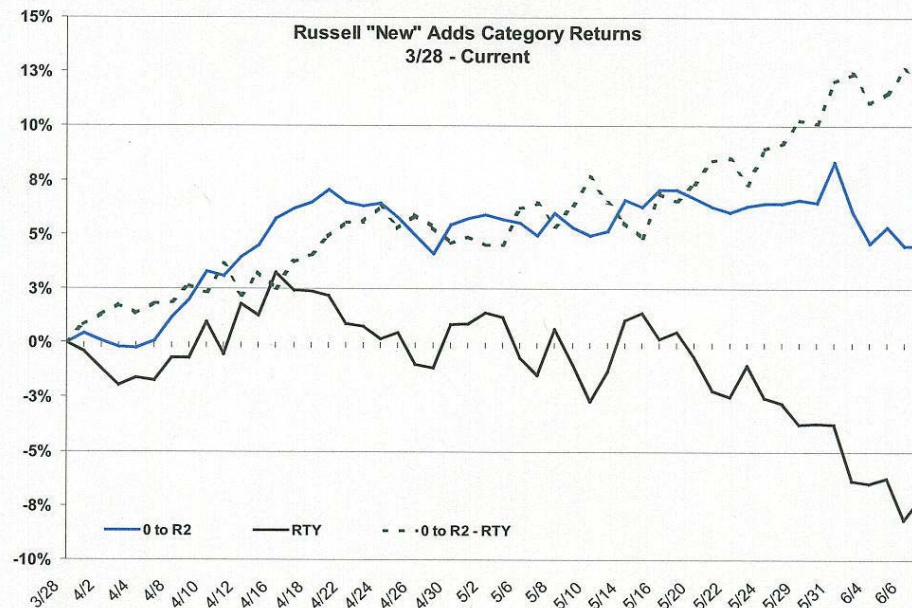
Global Portfolio Trading Strategies

gpts@ssmb.com

RUSSELL 2002 RECONSTITUTION PREVIEW

Monday, 10 June 2002

Figure 12 - Russell 2000 "New" Additions



Source: Salomon Smith Barney

Impact of Russell 2000

Rebalance Example

(continued)



I. Risk is the Flipside of Return

(Continued)

Impact of Russell 2000 Rebalance Example (continued)

- **One can set up a trade where one is long the S&P 600 Small Cap Index and short the Russell 2000.**
- **Putting on this spread from late-June until mid-August has not lost money since the launch of the S&P 600 Small Cap Index.**
- **And yet, there is considerable risk to this trade.**

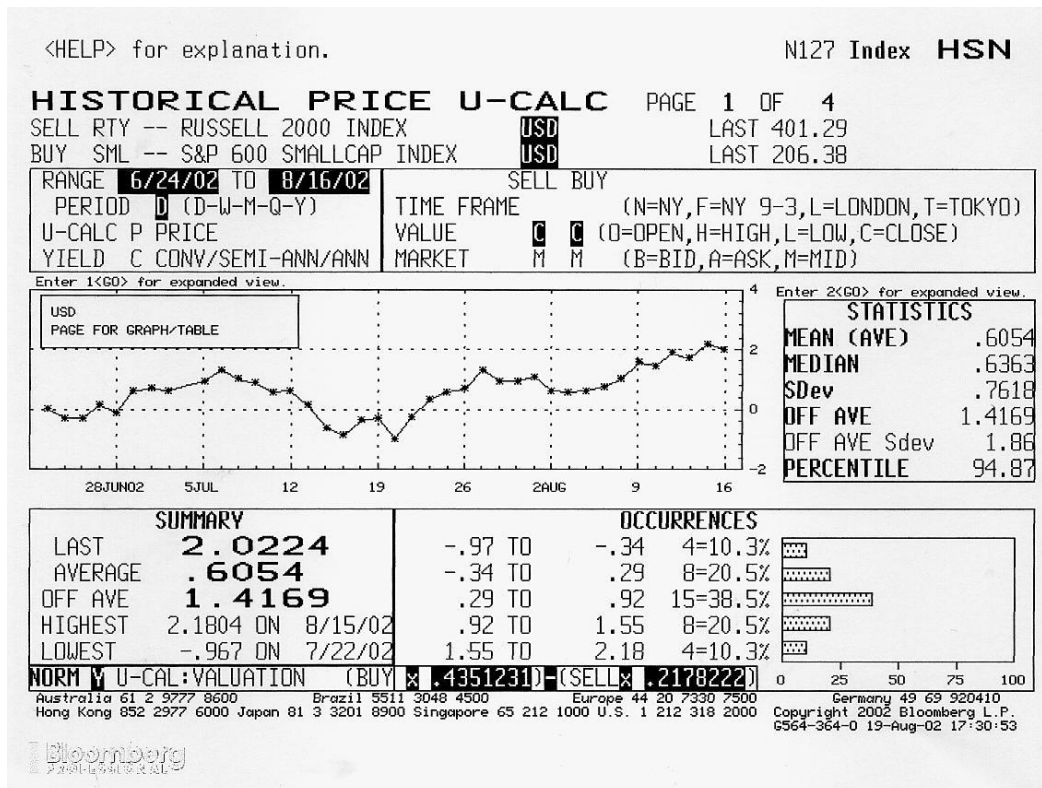


I. Risk is the Flipside of Return (Continued)

Impact of Russell 2000 Rebalance Example

(continued)

Last year, for example, the since-inception worst loss of the trade nearly matched the worst case since 1989.



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 with currently over \$4 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

- **In derivatives 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.**

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 **REFCO**

ACCOUNT NO. [REDACTED] DATE 20-NOV-01 PAGE 1 OF 1

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PREVIOUS	NEW	MARGIN DUE
MARGIN CALL		



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**

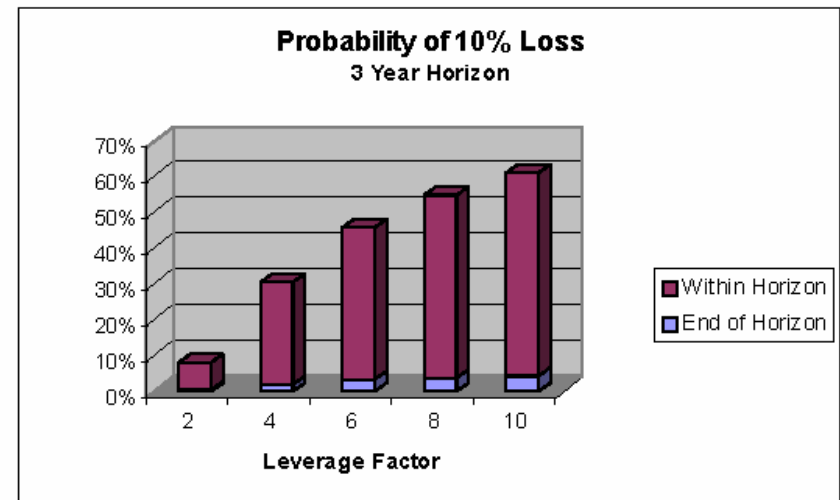
Style	Average Levered Return (%)*	Average Delevered Return (%)*	Historical Financial Leverage*
Short Biased	13.7	9.3	0.3
Global Macro	16.8	8.9	2.0
Emerging Markets	16.9	8.8	1.0
Event Driven	14.7	8.3	1.1
Merger Arbitrage	14.7	7.0	1.8
Long/Short Equity	14.0	6.3	1.3
Fixed Income	9.6	4.8	1.5
Convertible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

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 QWAFEFW, 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

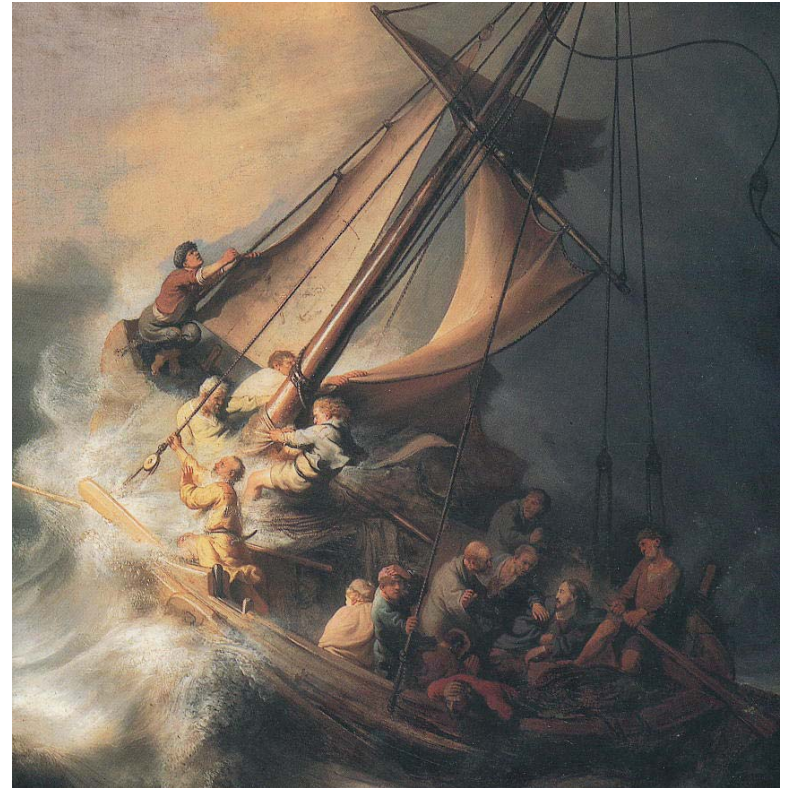
clients since these programs sometimes return in excess of 100% annually.

Top 20 CTA Performers Past Five Years <small>For the period 1/1/96 to 12/31/00. Includes only CTAs managing at least \$10 million as of 12/31/00</small>							
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



IV. Risk Management Policies Determine Whether a Program will be Viable

- **Our belief is that a number of statistically significant investment opportunities exist because of the possibility of large losses.**



V. Standard Risk Management Methodology is a Useful Starting Point

- **The conventional asset manager approach is a useful first step.**
- **One still needs to add several layers to this approach because of:**
 - **the unique statistical properties of commodity futures contracts, and**
 - **the different way futures products are marketed.**



VI. 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.**



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

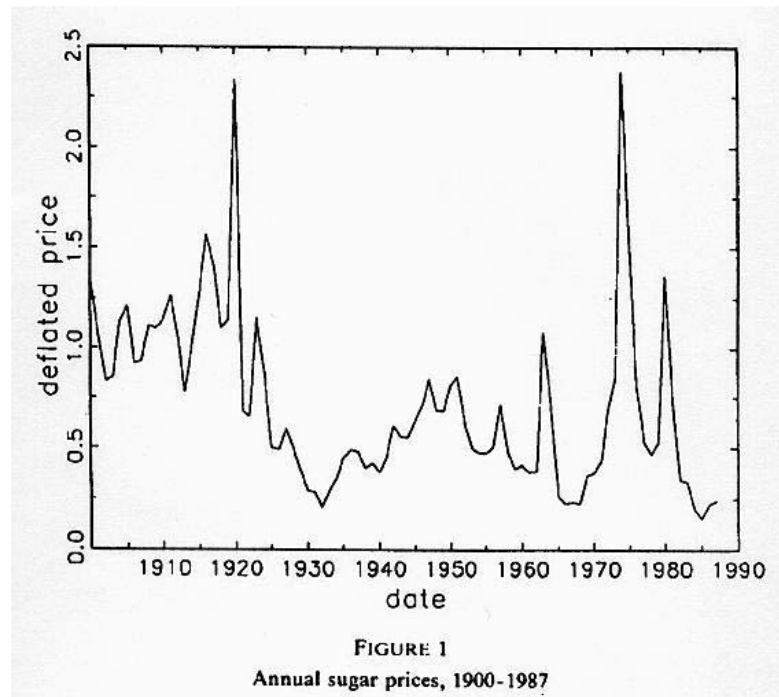
- **The empirical behavior of commodity prices can be described as follows:**
 - **Commodity prices are *extremely* volatile;**
 - **There exist rare but violent explosions in prices; and**
 - **There is substantial positive skewness in the price distributions.**



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

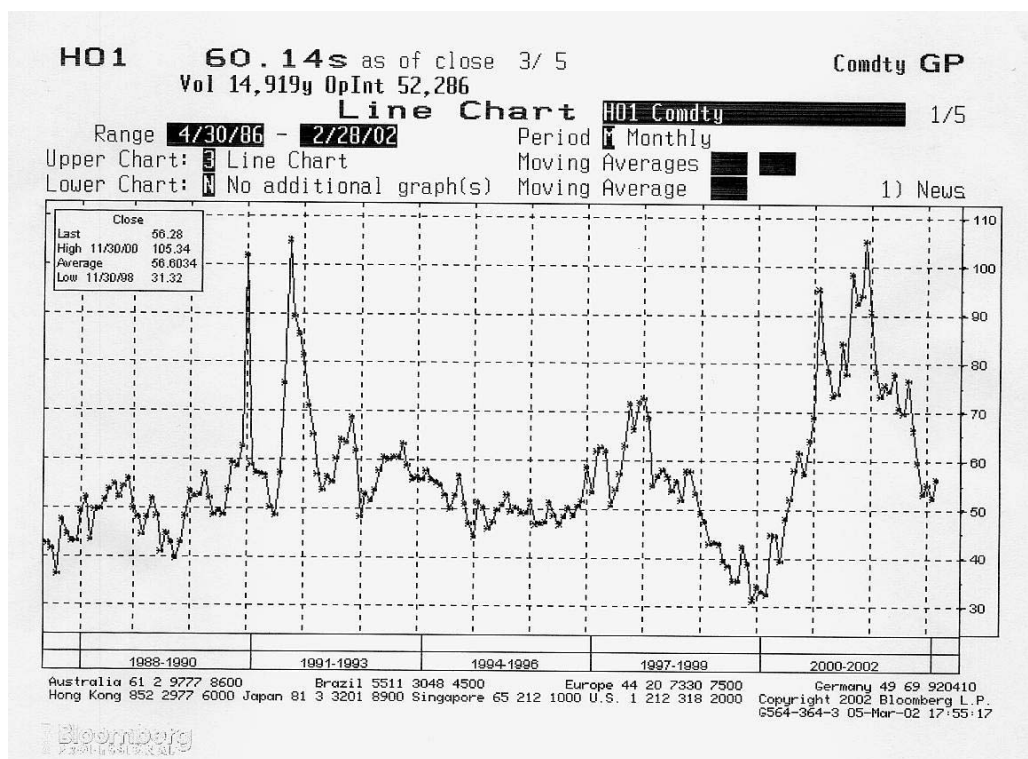
(Continued)

- These observations are illustrated with a long-term chart of sugar prices:



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

- Another example can be found in heating oil:

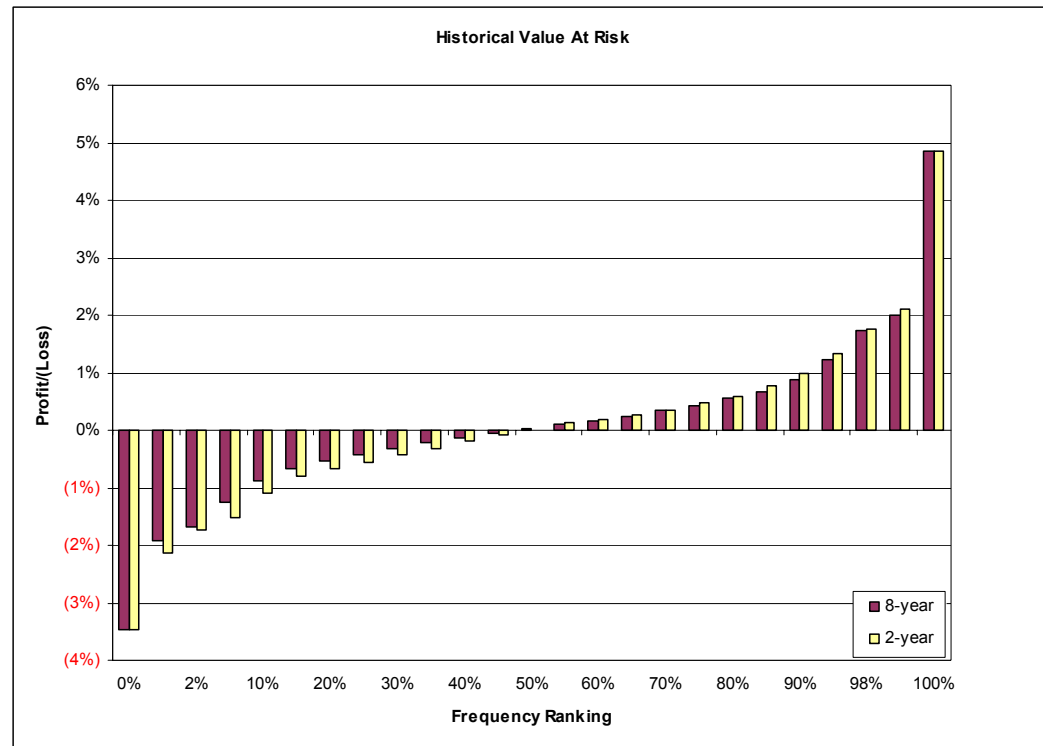


VI. Risk Management Rules Flow from an Understanding of Price Behavior

(Continued)

Value-at-Risk

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



VI. 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.**



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

Scenario Testing

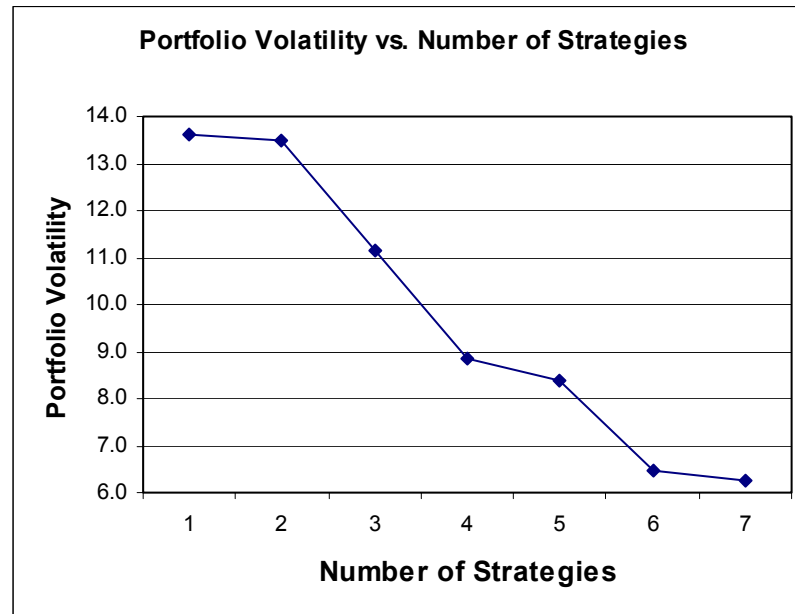
- **Using long-term data, an investor can directly examine the worst performance of a commodity trade under similar circumstances.**
- **This measure will sometimes be larger than the Value-at-Risk measure based on recent volatility.**



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

Diversification and Concentration Risk

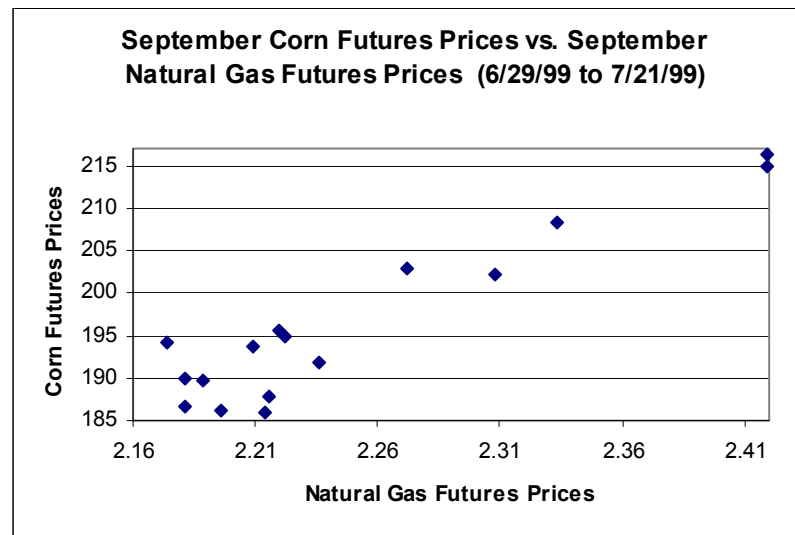
Example of Portfolio Effect When Combining Independent Strategies



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

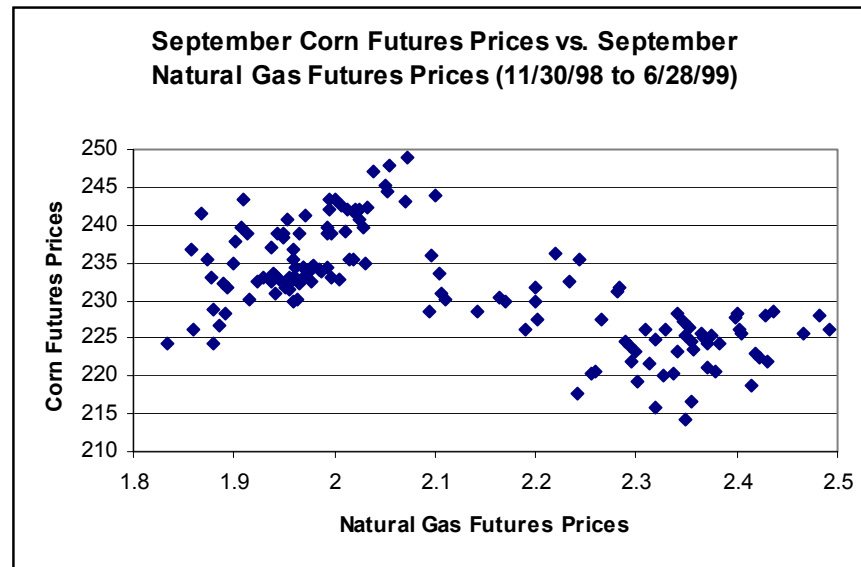
Understanding the Fundamental Drivers of a Strategy

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



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

Understanding the Fundamental Drivers of a Strategy (Continued)



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

Understanding the Fundamental Drivers of a Strategy **(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.



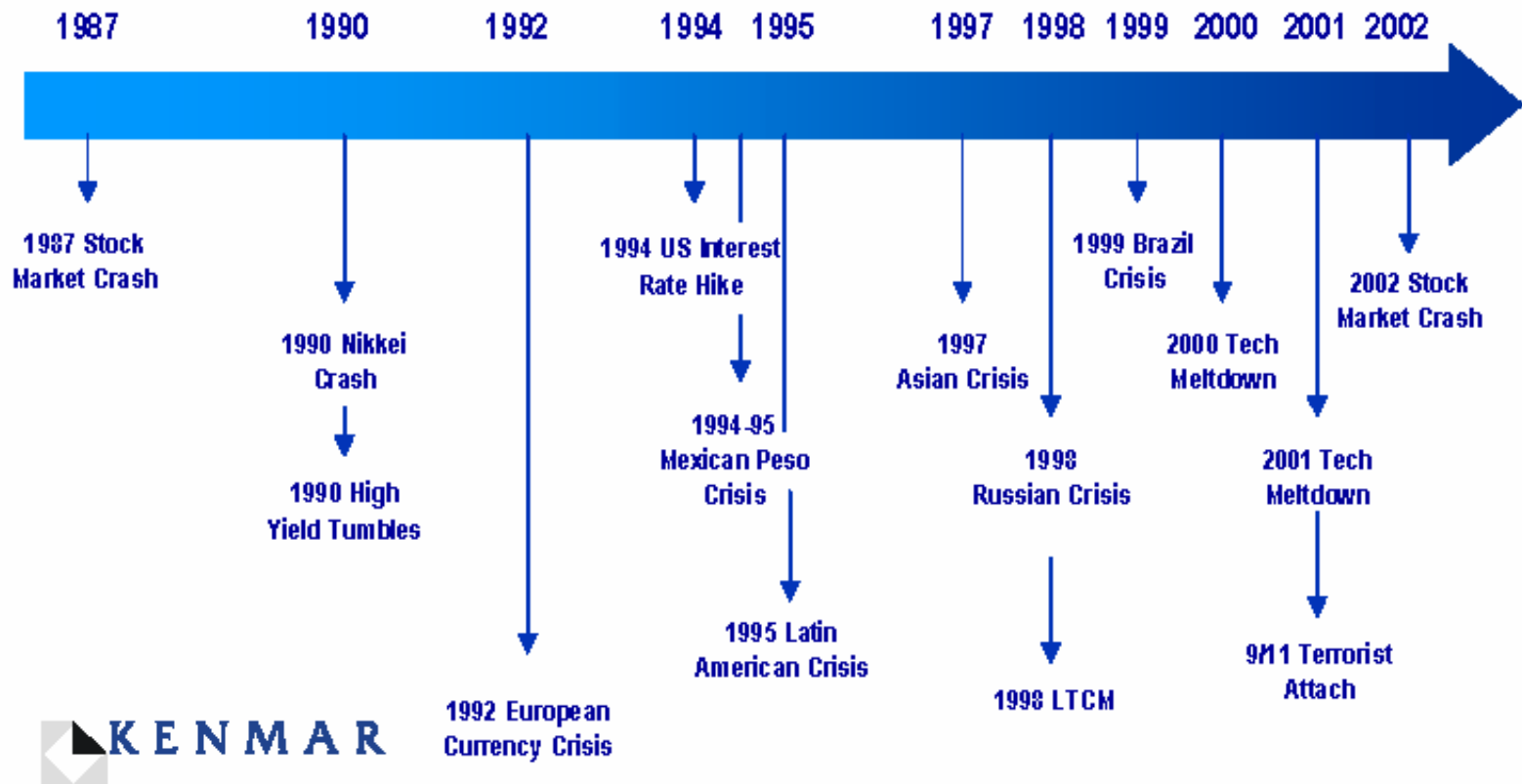
VI. Risk Management Rules Flow from an Understanding of Price Behavior (Continued)

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.**



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



VII. 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;**



VII. 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.**



VII. 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.**



VII. 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.**



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

Commodity Risk Reports

<u>Strategy</u>	<u>Value-At-Risk</u>	<u>Worst-Case Loss During Normal Times</u>	<u>Worst-Case Loss During Eventful Period</u>
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%



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

Commodity Risk Reports (Continued)

<u>Strategy</u>	<u>Incremental Contribution to Portfolio Value-At-Risk*</u>	<u>Incremental Contribution to Worst-Case Portfolio Event Risk*</u>
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.



VII. 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.**

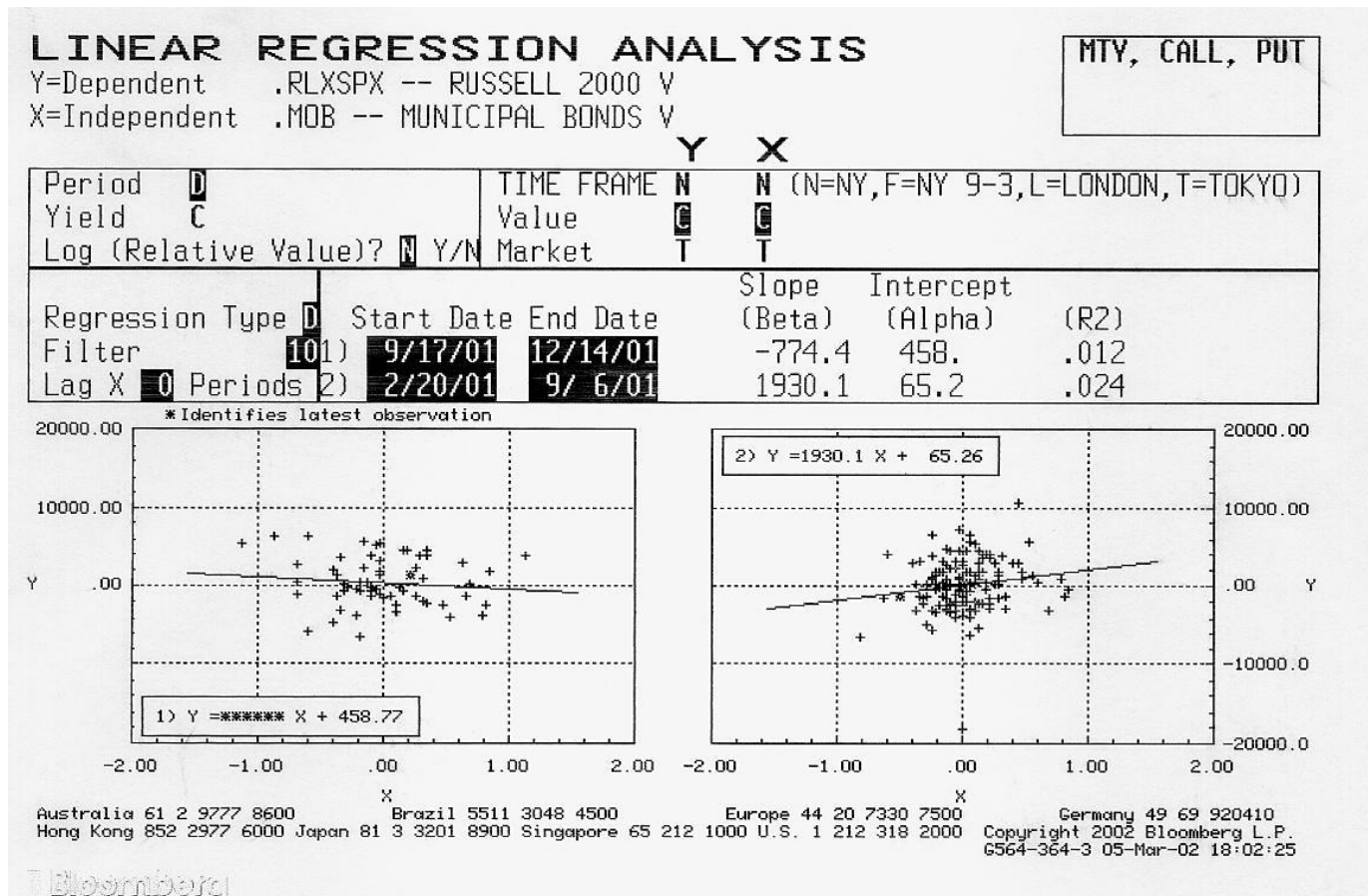


VII. Useful Risk Management Reports in Futures Trading (Continued)

- **Another example concerns financial futures trades.**
- **This example portfolio consists of a long Russell 2000 vs. a short S&P 500 futures trade and a long Municipal Bond vs. a short U.S. Bond futures trade.**
- **These trades are normally unrelated as illustrated in the graphs on the next slide.**



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



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

- **But during a scenario test of the portfolio's sensitivity to event risk, we find that the combination of the two trades results in an exposure to a liquidity shock.**



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

<u>Event</u>	<u>Maximum Loss</u>
October 1987 stock market crash	-4.11%
Gulf War in 1990	-4.12%
<i>Fall 1998 bond market debacle</i>	-6.42%
Aftermath of 9/11 attacks	-3.95%



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

- | <u>Worst-Case Event</u> | <u>Maximum Loss</u> |
|---|----------------------------|
| Fall 1998 bond market debacle | -6.42% |
| <u>Value-at-Risk based on recent volatilities and correlations</u> | 3.67% |



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

- **The short legs of each spread are the more liquid of the pair.**
- **So both of these trades are at risk to a flight-to-quality event as happened during the Fall of 1998.**
- **Our response to a concentrated risk to a liquidity shock has been to purchase OTM fixed-income calls.**



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

- **Purchasing OTM fixed-income call options is not always the best economic choice.**
- **Last fall a futures portfolio consisted of the following positions: outright long wheat, a long gasoline calendar spread, short outright silver.**
- **When carrying out an event-risk analysis on the portfolio, the worst case was a 9/11 scenario.**



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

- **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 was short-term gasoline puts.**



Conclusion

- **Our view is that there are a number of derivatives 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 an investment program that earns a return due to bearing risk.**



Conclusion (Continued)

- **It is the investment program's risk management methodology.**
- **An investment manager must decide:**
 - **How much to leverage the strategy, 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 9a, “The Not So Perfect Index: The Impact of Russell 2000 Rebalancing on Small-Cap Performance,” article by Peter Jankovskis and illustration by Craig Smallish, Journal of Indexes, Second Quarter 2002, p. 38.**
- **Slide 9b, chart of monthly Russell rebalancing impact from slide 5 of “Chicago QWAFEFW Discussion of Small Cap Investing,” by Peter Jankovskis, July 18, 2002.**
- **Slide 11, graph of performance of expected Russell 2000 new additions from Salomon Smith Barney, Global Portfolio Trading Strategies, June 10, 2002, p. 8.**



Source of Graphics (Continued)

- Slide 13, graph of normalized performance of S&P 600 Small Cap Index vs. the Russell 2000 Index from 6/24/02 to 8/16/02, The Bloomberg.
- Slide 15, sample Refco futures statement, 11/20/01.
- Slide 17, 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 19, “Top 20 CTA Performers Past Five Years,” *Barclay Managed Funds Report*, 1st Quarter 2001, p. 6.
- Slide 20, cover of Against the Gods: The Remarkable Story of Risk by Peter Bernstein, John Wiley & Sons, Inc., 1996.
- Slide 24, 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 25, graph of monthly heating oil prices from 4/30/86 through 2/28/02, The Bloomberg.
- Slide 26, graph of historical Value-at-Risk for a commodity portfolio from “The Energy Market” presentation by Global Advisors Limited, Slide 22.
- Slide 29, 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 30 and 31, graphs of Natural Gas vs. Corn prices from Till, Hilary, “Taking Full Advantage of the Statistical Properties of Commodity Investments.” *The Journal of Alternative Investments*, Summer 2001, p. 65.
- Slide 34, excerpt from presentation by Richard Horwitz of Kenmar, “Constructing a ‘Risk-Efficient’ Portfolio of Hedge Funds,” Slide 26, RiskInvest 2002, Boston, 12/11/02.

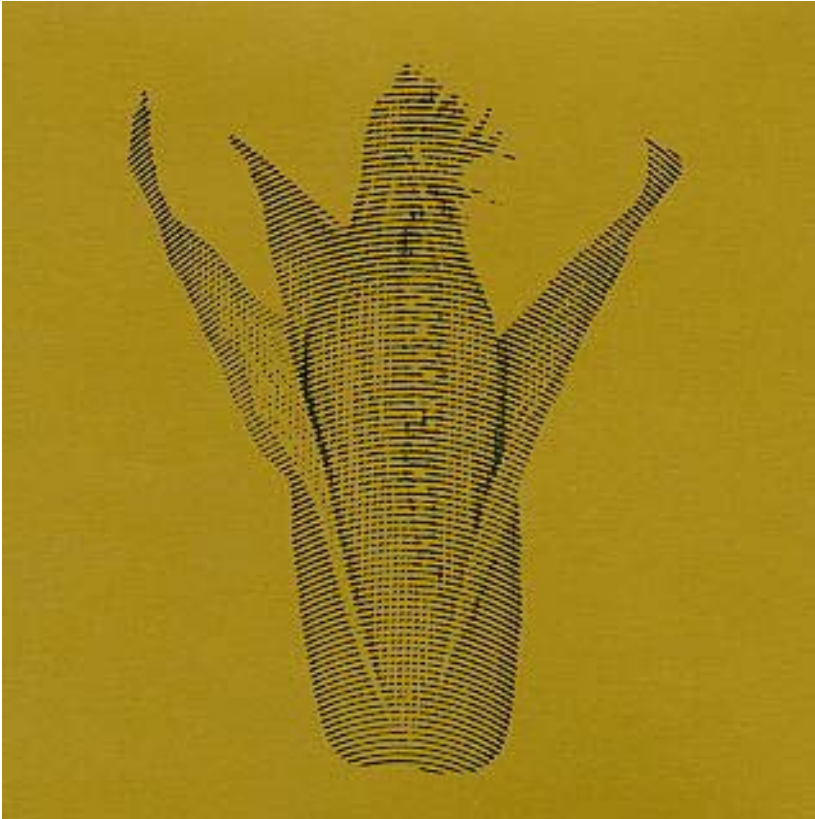


Source of Graphics (Continued)

- **Slides 39 and 40, commodity portfolio risk measures, Premia Capital Management, March 2002.**
- **Slide 43, graphs of RLX-SPX vs. MOB futures spreads, The Bloomberg.**



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