

# Dynamic Risk Management

## Managing Beta to Improve Alpha



Werner E Keller, CFA  
CFALA June 9, 2009



# The Bad News

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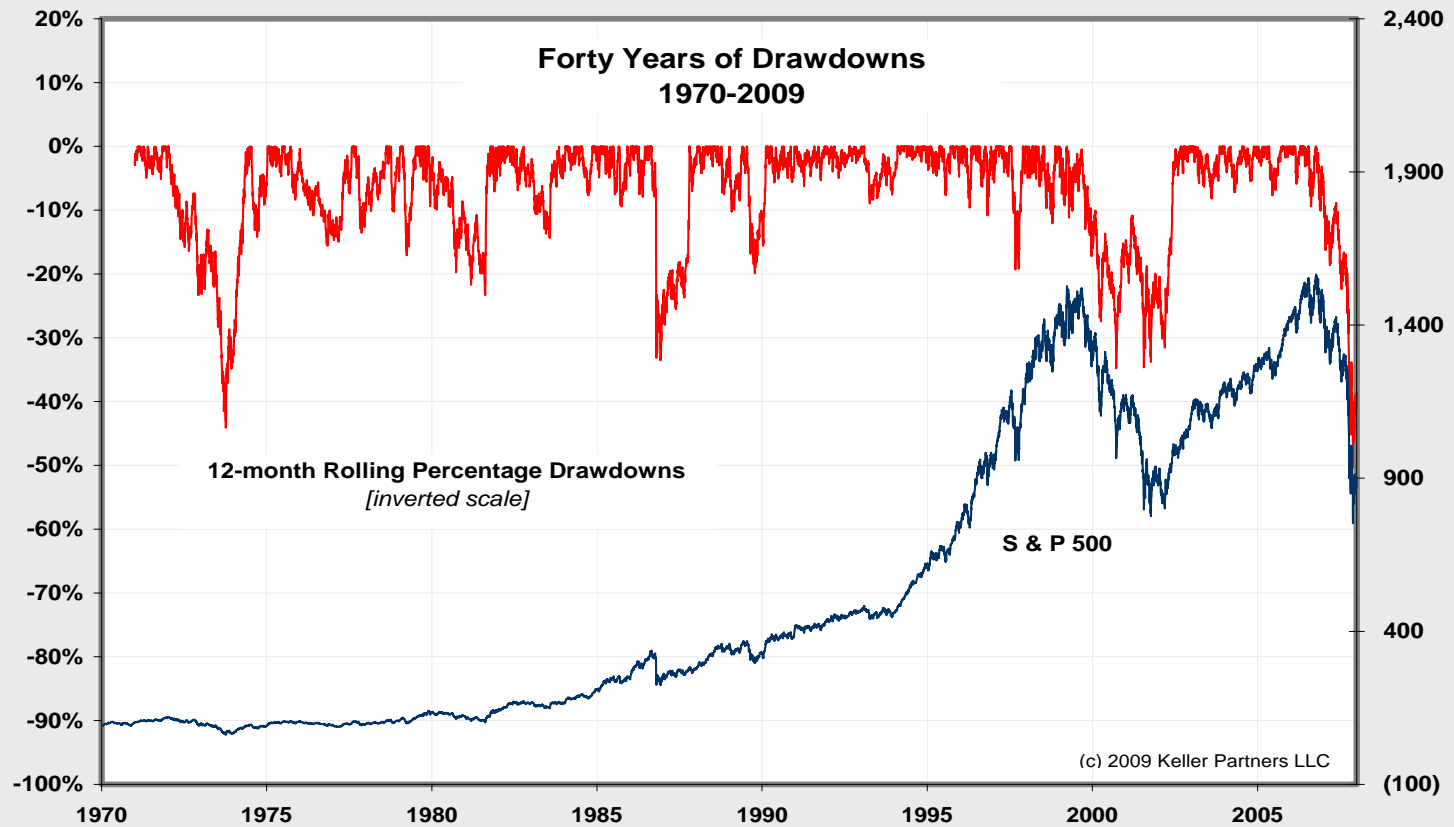
Our Industry  
lives under an  
active volcano

*Antigua Guatemala  
with Volcan de Agua*





# Drawdown is Very Disruptive To Us and our Clients



(c) 2009 Keller Partners LLC



# Elephant in the Room

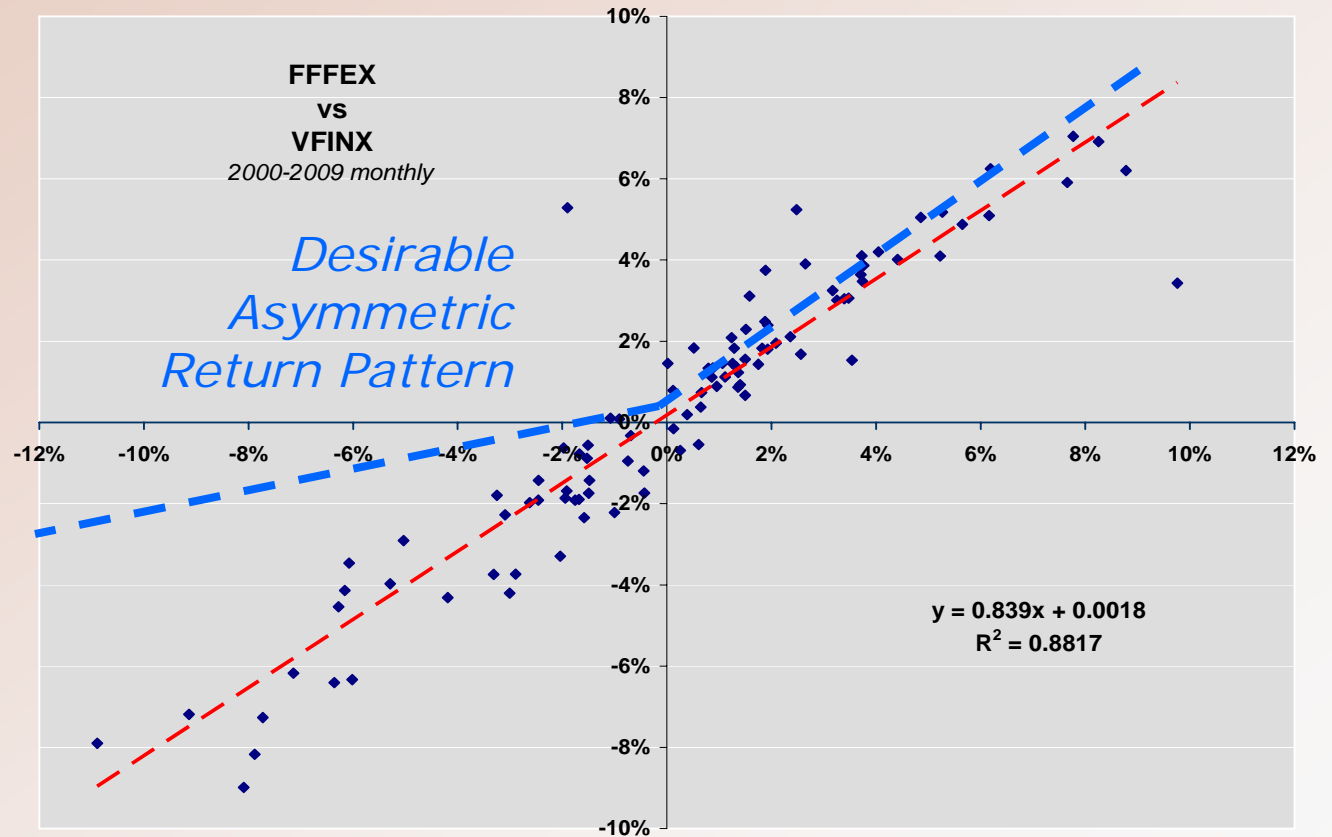
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## If we Don't Attack the Problem of Systematic Risk —

- Our clients will fail to achieve their objectives
- We will not be able to charge a premium price for what we do
- Our businesses will command a low multiple when we retire



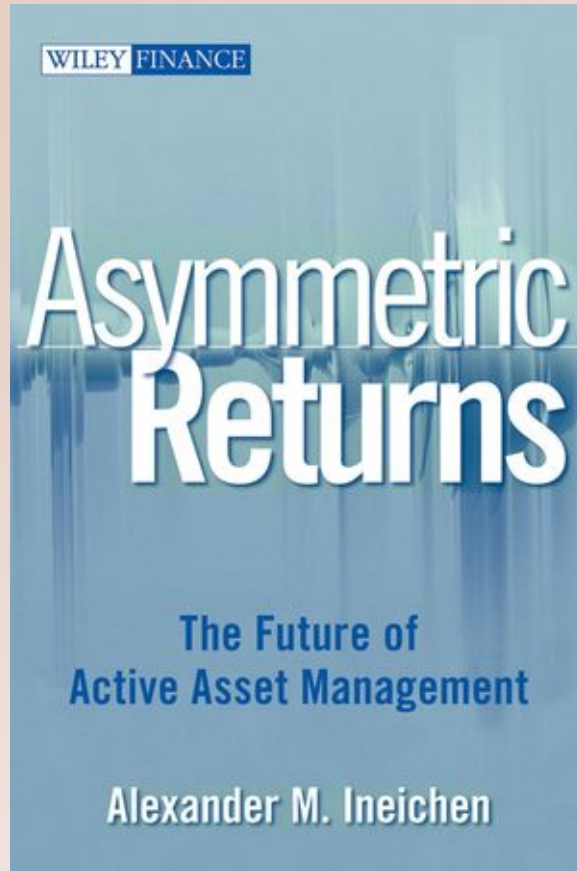
# Linear Return Patterns: No Longer Good Enough





# Asymmetric Returns

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... you cannot get this asymmetric risk-return profile in a passive way. I claim it is possible, through active risk management — by caring about downside volatility and correlations in a portfolio context — to construct portfolios that have this asymmetric risk profile.

*Alexander Ineichen, CFA,  
CFA Magazine, Sep-Oct 2006*



## The Good News

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- ❑ **Market efficiency as a core concept is in retreat**
- ❑ **Subtle market inefficiencies have been shown to exist**
- ❑ **Many of these inefficiencies can be exploited in an effort to manage systematic risk**



# Interesting Inefficiencies

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## Recurring statistical phenomena in financial markets —

- Tendency of markets to trend
- Tendency of financial time series to revert to the mean
- The persistence of relative strength



# Two Challenges

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- ❑ **Developing a Set of Decision Rules, and . . . .**
- ❑ **Embracing those Decision Rules**  
Changing Your Culture – Radically

(The first one is the easy one)



## What We Set Out to Do

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- ❑ **Monitor market trends analytically**
- ❑ **Identify these trends correctly — perhaps 60%-65% of the time**
- ❑ **Articulate and implement a portfolio risk management approach**



## Analysis Tools: Technical vs. Fundamental?

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- ❑ **Not aware of an economic data-based model that has worked over time**
- ❑ **Technical (market data-based) algorithms have the advantage of being intrinsically connected to the thing that determines our success: the S&P 500.**



## Initial Survey: Naive Trend Tools That Work

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- ❑ **200-Day Moving Average**
- ❑ **Sell in May and Go Away**
- ❑ **The Presidential Cycle**
- ❑ **January Effect**

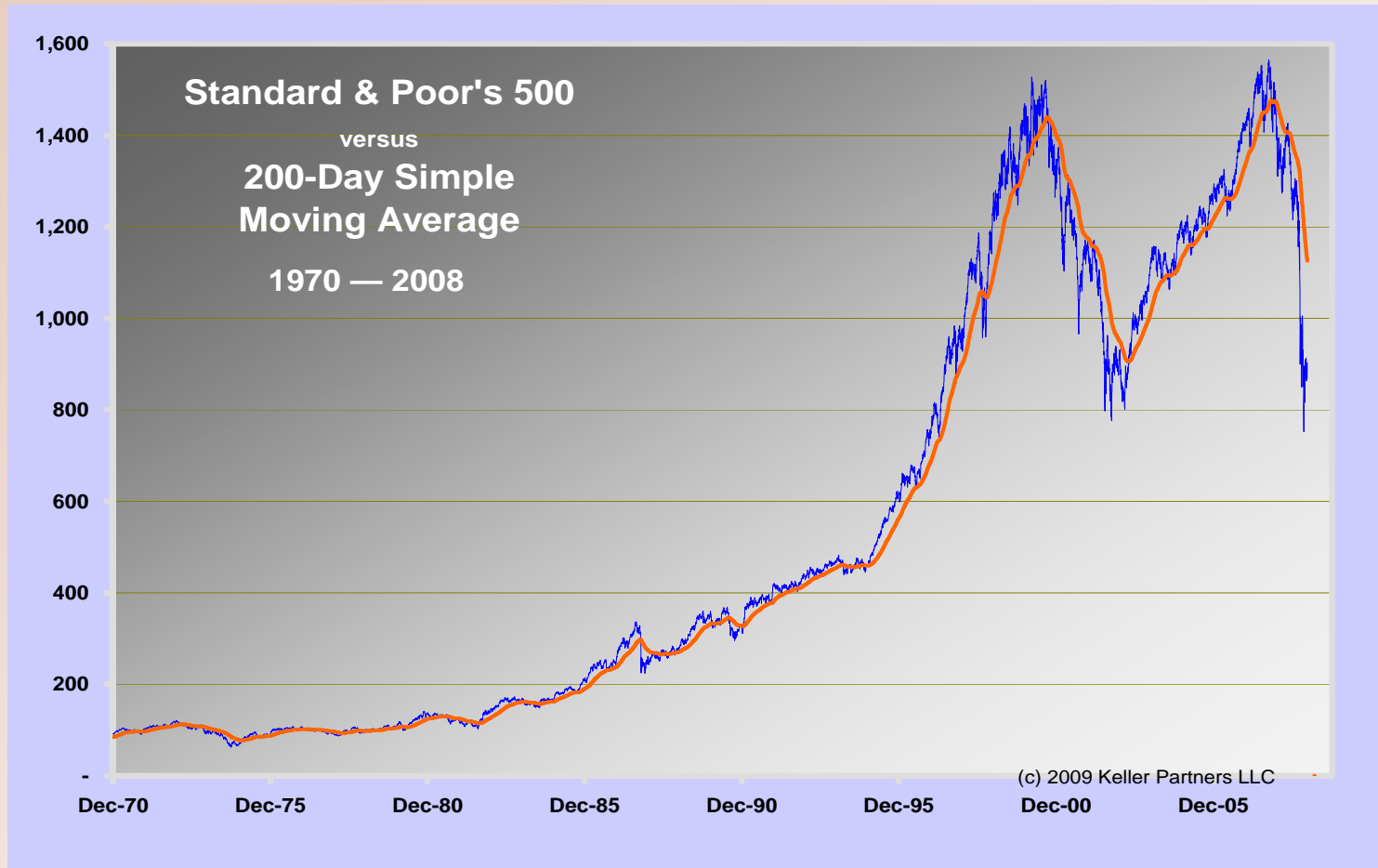


# 40 Years of the S&P 500



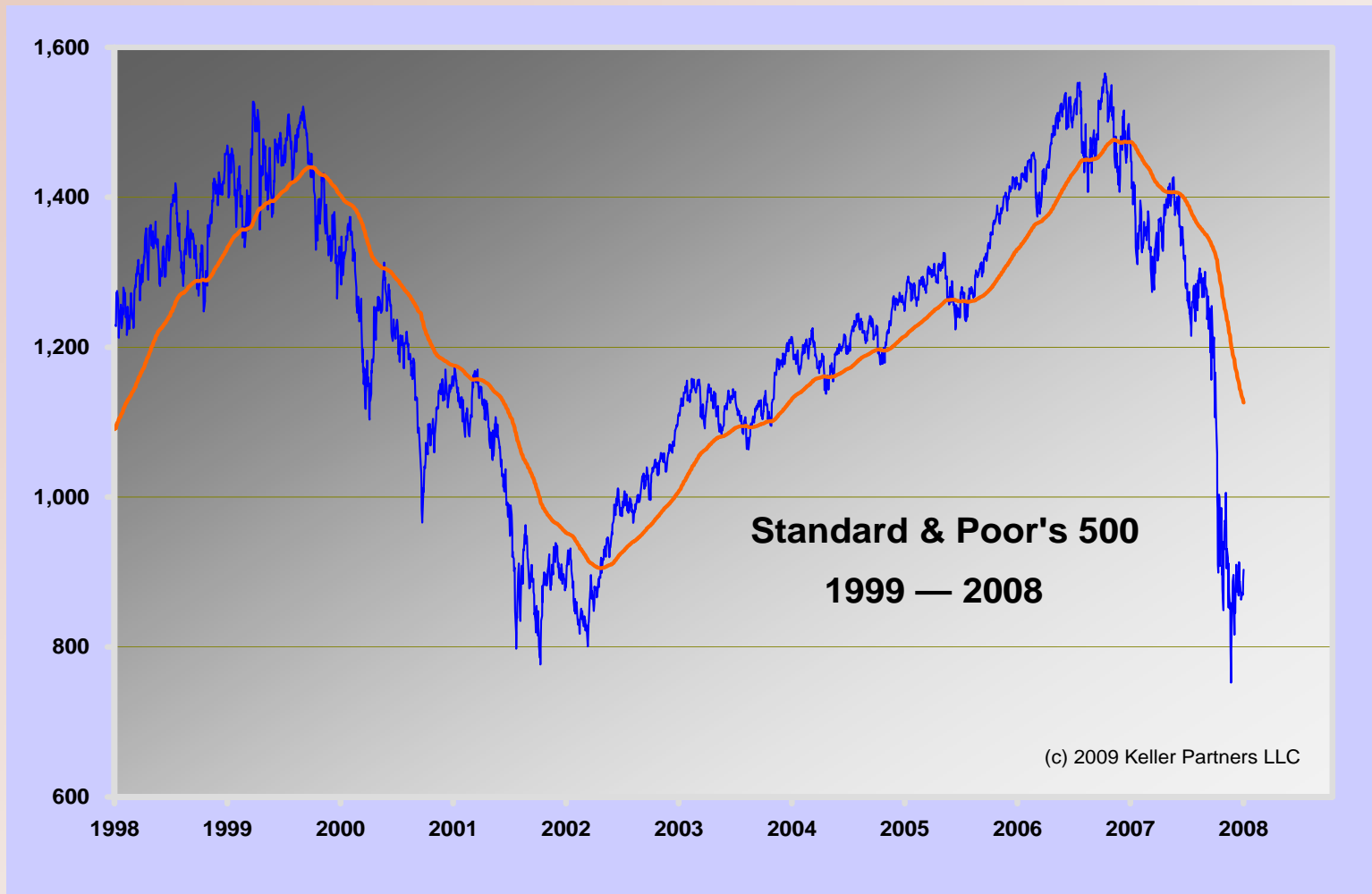


# . . . . and with a 200-Day Moving Average





# A Closer Look: Last Ten Years





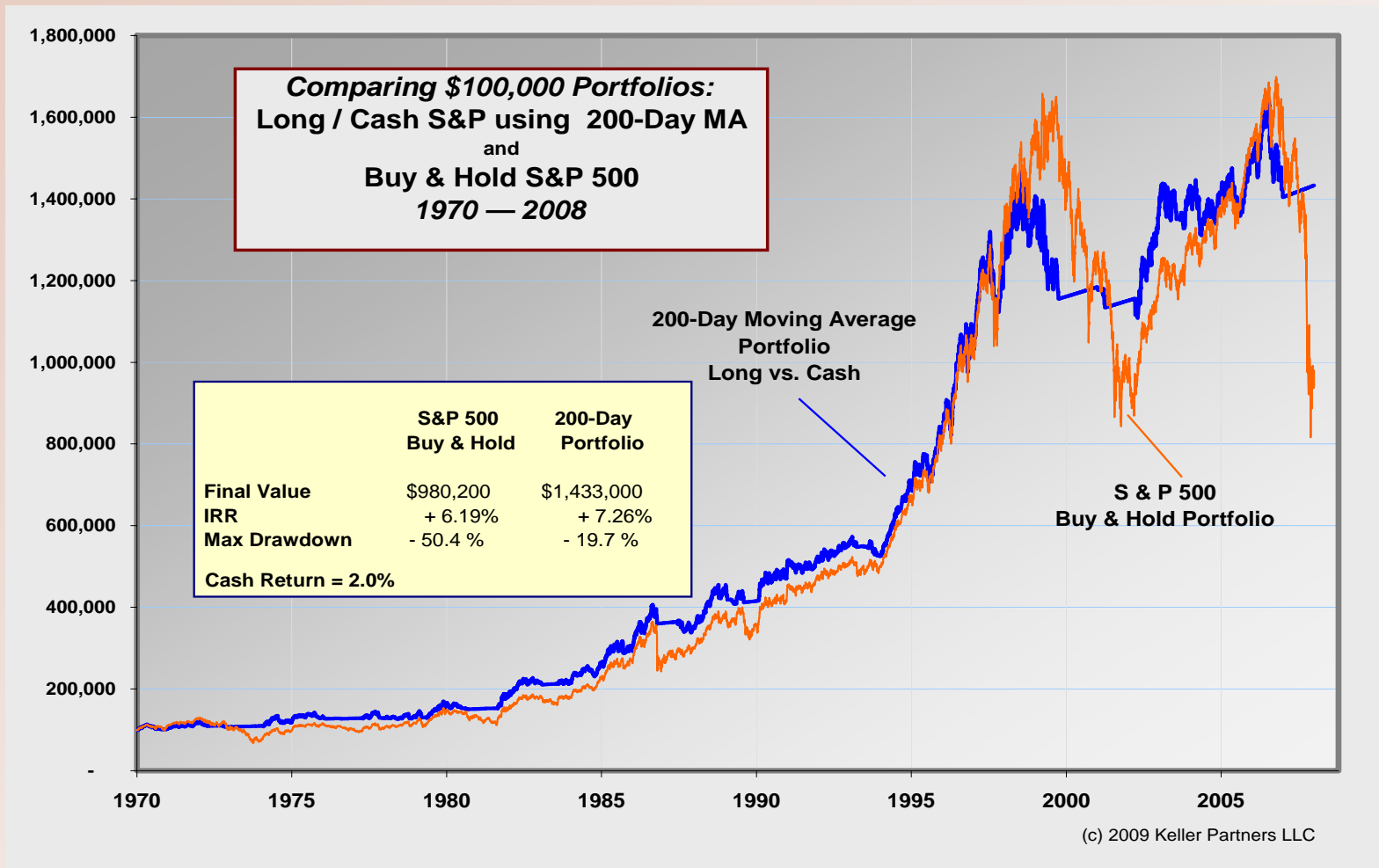
## Implementing the 200 Day MA

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- ❑ **Hold the S&P when the index value is greater than the MA**
- ❑ **Go to cash while the index value is less than the MA**
- ❑ **Earn interest at [2]% on cash**
- ❑ **Many variations on this theme**



# A Simple 200-Day MA Portfolio





# 1970 – 2008: Quick Metrics

	<b>S&amp;P 500 Buy &amp; Hold</b>	<b>200-Day Portfolio</b>
<b>Final Value</b>	<b>\$980,200</b>	<b>\$1,433,000</b>
<b>IRR</b>	<b>+ 6.19%</b>	<b>+ 7.26%</b>
<b>Max Drawdown</b>	<b>- 50.4 %</b>	<b>- 19.7 %</b>
<b>Cash Return = 2.0%</b>		



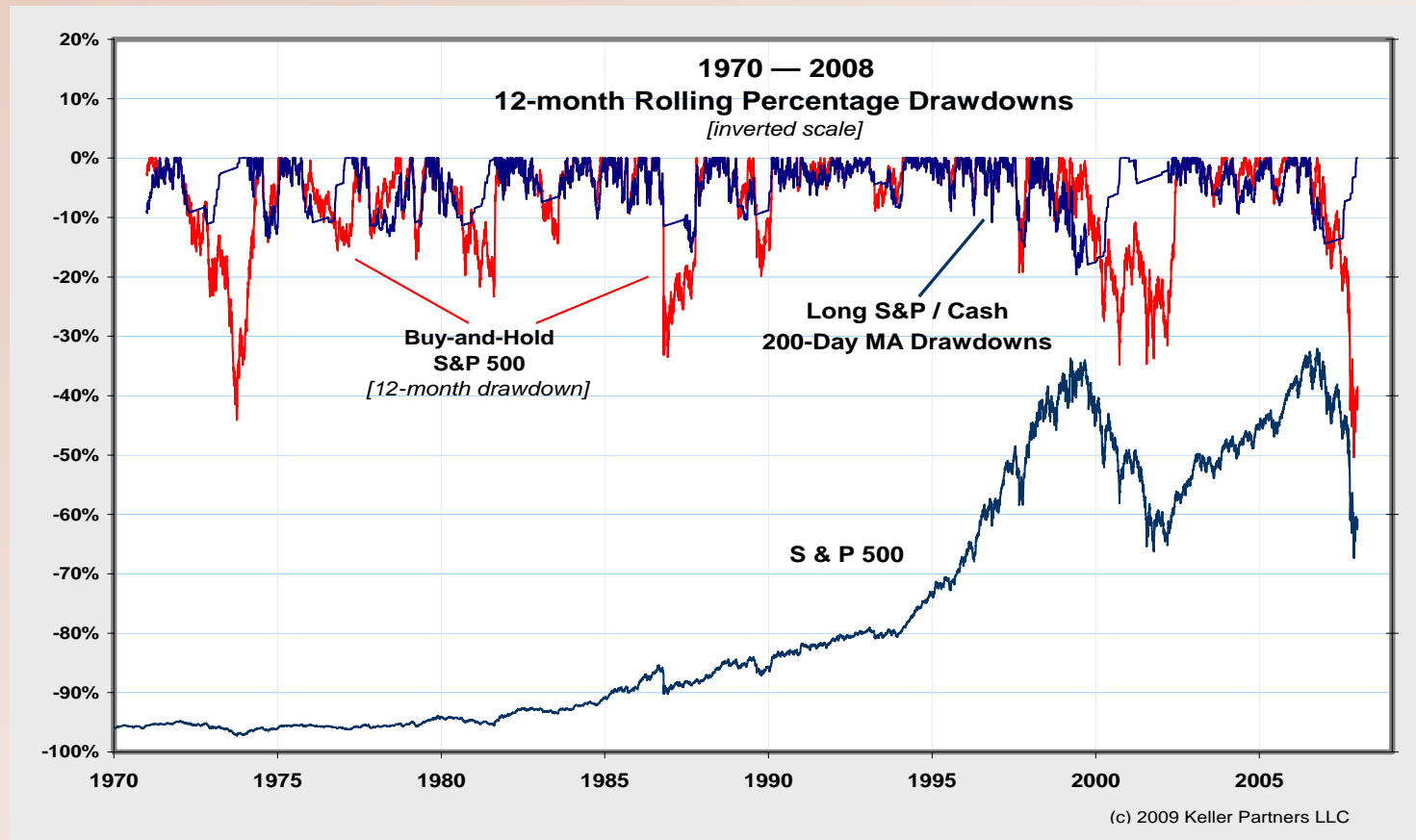
## More History: 1930 – 1970

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	<b>S&amp;P 500 Buy &amp; Hold</b>	<b>200-Day MA Portfolio</b>
<b>Initial Value</b>	<i>\$100,000</i>	<i>\$100,000</i>
<b>Final Value</b>	<b>\$436,000</b>	<b>\$1,345,000</b>
<b>IRR</b>	<b>+ 3.75%</b>	<b>+ 7.51%</b>
<b>Max Drawdown</b>	<b>- 71.6 %</b>	<b>- 35.1 %</b>



# 200-Day MA Discipline: Huge Impact on Drawdown





# Designing A Market Trend Model

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## □ Market Data Sources —

- Yahoo Finance
- Pinnacle Data (*www.pinnacledata.com*)

## □ Basic Toolkit: MS Excel

- Smoothing (Filtering the Data)
  - Exponential Smoothing
- Fluent with Logical Functions
  - =IF(AX13 > AN13, . . . . .
  - =IF(AND(AB23 >0, AB23>AB22), . . . . .



# What Time Frame Do We Care About ?



**In Our Universe:  
8 Weeks or More**



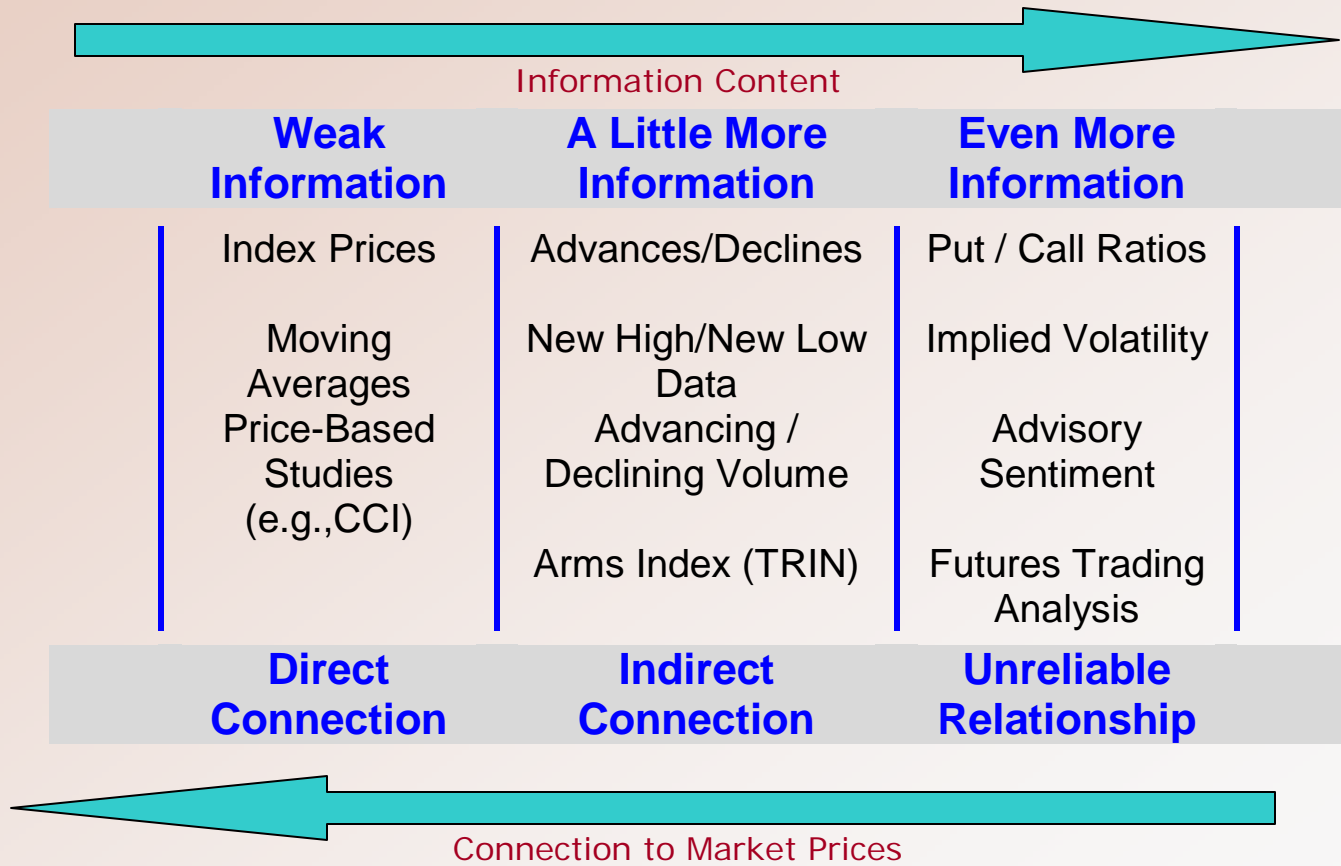
# Best Practices

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- ❑ **Label Everything Clearly**
- ❑ **Make All Parameters Variable**
- ❑ **Inputs and Outputs at the Top**
- ❑ **Keep it Simple**
  - Simple Rules / Parameters Avoid Data Fitting Traps
  - Success will be Immediately Obvious
    - IRR versus Maximum Drawdown
    - IRR versus No. of Changes of Direction



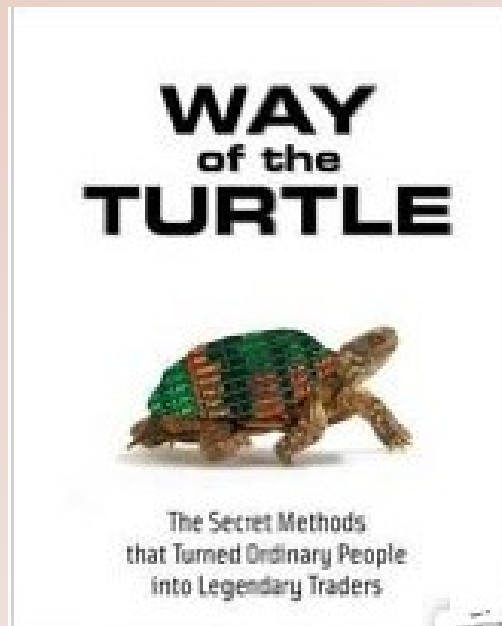
# Selecting Input Data Series





# Optimization vs. Data Fitting

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The Optimization Paradox states that parameter optimization results in a system that is *more likely* to perform well in the future but *less likely* to perform as well as the simulation indicates. . . . However, I contend that proper optimization is always desirable.

*Curtis Faith, Way of the Turtle,  
November 2007*



# KP Model Design Elements

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- ❑ **Uses Internal Data, not Price**
- ❑ **Adaptive Boundaries and Parameters**
- ❑ **Analyzes Tops Differently than Bottoms**
- ❑ **Rules Make Conceptual Sense**
- ❑ **Design Objective: Five Changes / Year**

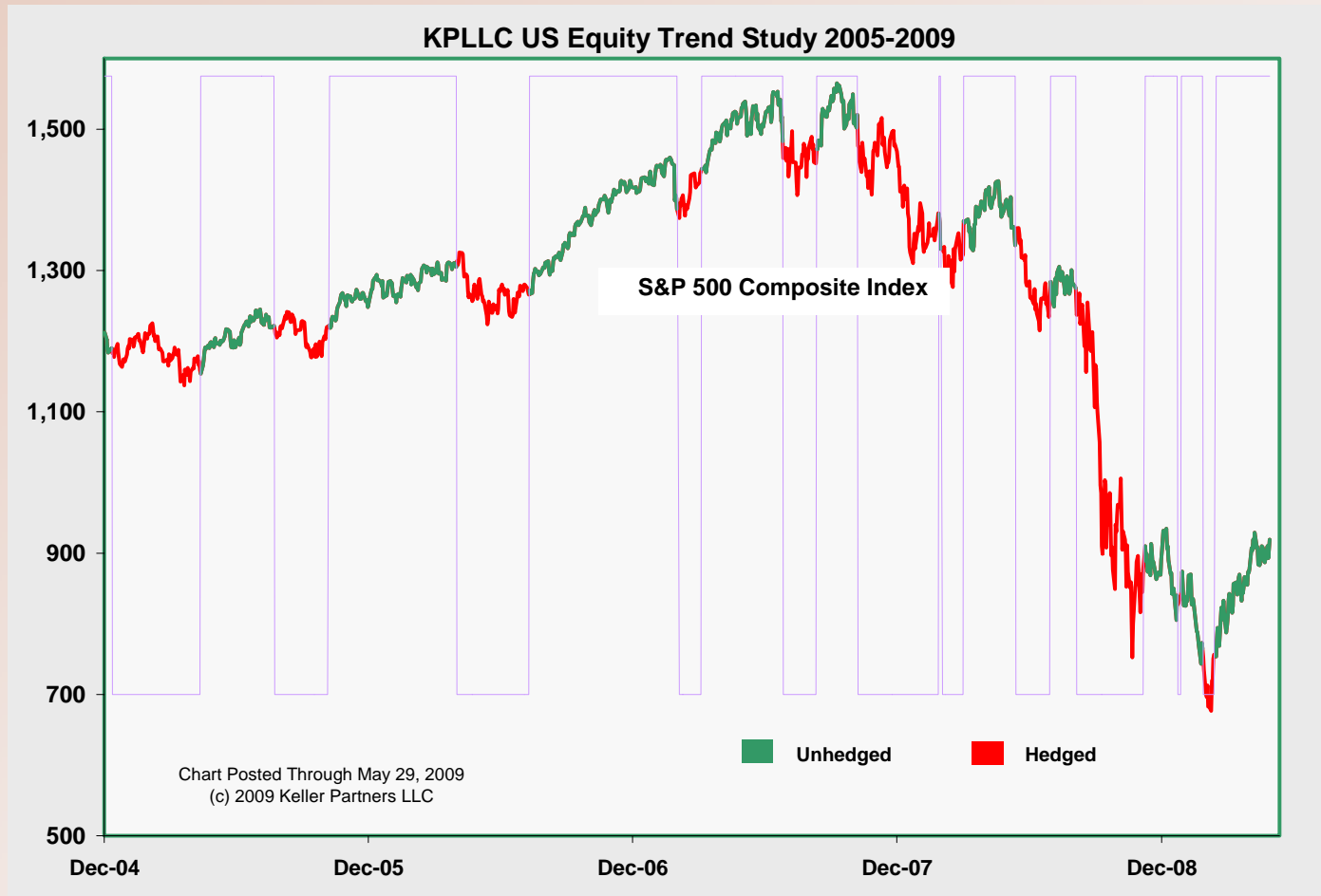


# A Quick Trip to Our Engine Room

KELLER PARTNERS	Annual Return on Cash		2.036%		IRRs		20.8%	
Level II	Daily Compounding Factor		0.00008		MDDs		-40.2%	
Master Spreadsheet								Column
1-Jun-09	Basic Assumptions					103,762.08		
				Final	KPLLC	KPLLC	Maximum	
			KPLLC	Smoothing	Model	Model	Drawdown	Model
	EMA @	EMA @	Oscillator	EMA @	Line	Nasdaq 100	Rolling	Status
Date	8.0%	2.0%		50.0%		L/S Portfolio	12 Months	Col B
	0	0		0				AH
22-Aug-01	(180.65)	(86.94)	(93.70)	(101.75)	(919.53)	20,461.14	-29.52%	Short
23-Aug-01	(196.26)	(92.72)	(103.54)	(102.65)	(990.67)	20,709.98	-28.67%	Short
24-Aug-01	(97.59)	(70.12)	(27.47)	(65.06)	(953.53)	19,566.70	-32.61%	Short
27-Aug-01	(98.06)	(70.79)	(27.27)	(46.17)	(922.44)	19,582.68	-32.55%	Short
28-Aug-01	(156.75)	(86.01)	(70.74)	(58.45)	(954.71)	20,228.22	-30.33%	Short
29-Aug-01	(186.68)	(94.90)	(91.77)	(75.11)	(1012.66)	20,579.96	-29.12%	Short
30-Aug-01	(254.69)	(113.74)	(140.95)	(108.03)	(1130.78)	21,209.26	-26.95%	Short
31-Aug-01	(211.55)	(105.78)	(105.77)	(106.90)	(1189.52)	20,978.77	-27.74%	Short
4-Sep-01	(261.37)	(120.35)	(141.03)	(123.96)	(1290.21)	21,629.39	-25.50%	Short
5-Sep-01	(294.25)	(131.39)	(162.86)	(143.41)	(1410.05)	21,763.36	-25.04%	Short
6-Sep-01	(381.33)	(156.41)	(224.92)	(184.16)	(1600.60)	22,587.72	-22.20%	Short
7-Sep-01	(376.88)	(159.80)	(217.08)	(200.62)	(1760.47)	22,710.80	-21.78%	Short
10-Sep-01	(346.15)	(156.46)	(189.69)	(195.15)	(1867.78)	22,524.32	-22.42%	Short
17-Sep-01	(450.79)	(186.41)	(264.37)	(229.76)	(2065.34)	24,383.33	-16.02%	Short
18-Sep-01	(469.96)	(196.49)	(273.46)	(251.61)	(2255.05)	24,929.50	-14.13%	Short
19-Sep-01	(512.70)	(212.65)	(300.05)	(275.83)	(2461.67)	25,263.56	-12.98%	Short
20-Sep-01	(542.72)	(226.15)	(316.57)	(296.20)	(2670.20)	26,140.92	-9.96%	Short
21-Sep-01	(621.46)	(252.17)	(369.29)	(332.75)	(2929.17)	27,022.24	-6.93%	Short
24-Sep-01	(454.69)	(217.86)	(236.83)	(284.79)	(2986.07)	25,485.96	-12.22%	Short



# Product Example — The KP Directional Trend Model





# Implementation: What Do We do With the Signals?

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- ❑ **Hedge Overlay Strategy**
  1. Reduce Beta in Policy Portfolio
  2. Introduce Index Shorts
    - Total Return Swaps
    - Inverse Index ETFs
    - Leveraged Inverse Index ETFs
- ❑ **Long/Short Strategy**



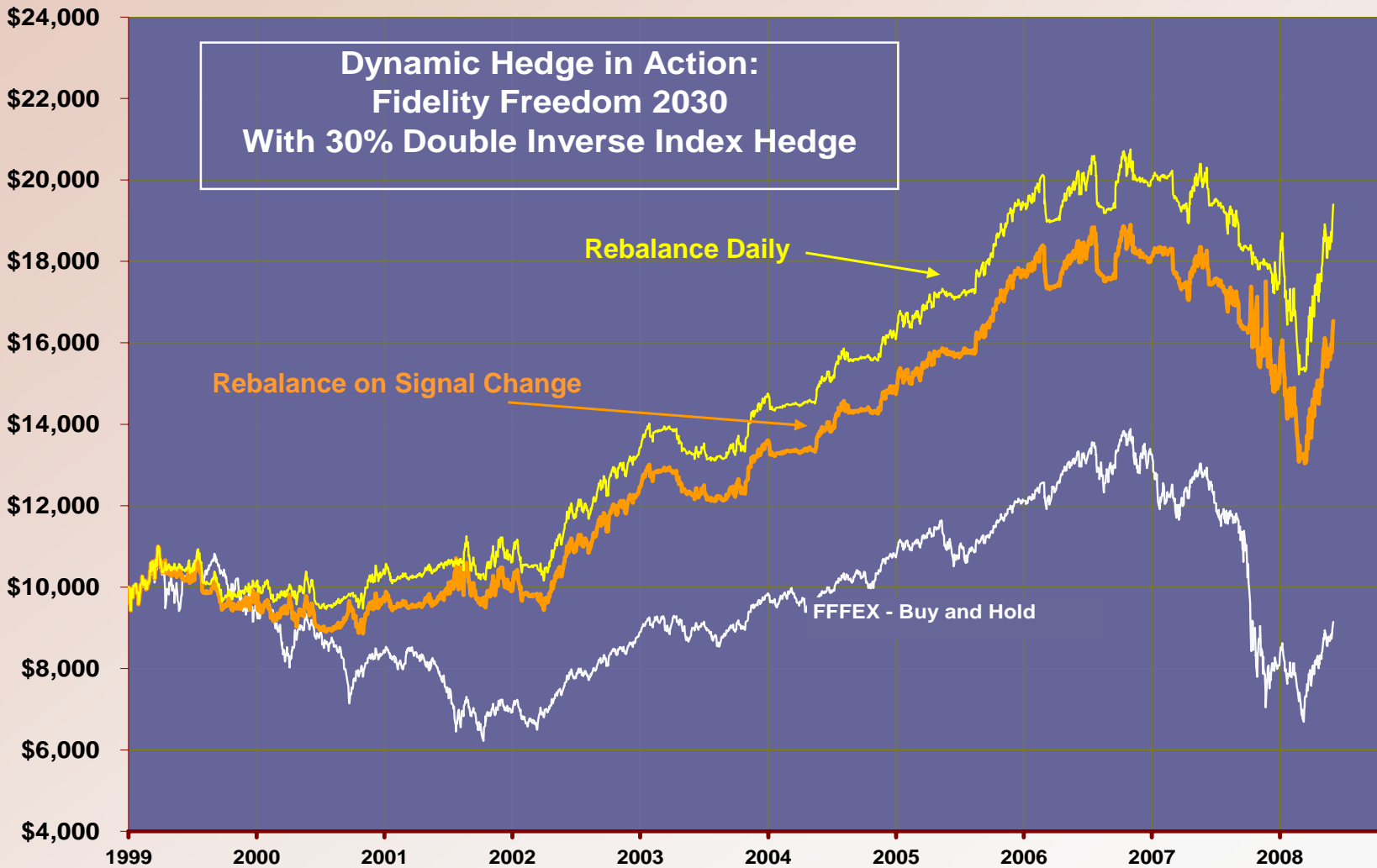
## Example: Fidelity Freedom 2030 With a Hedge Overlay Approach

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- ❑ **Divide portfolio into two sub-portfolios:**
  - 70% Always Long FFFEX
  - 30% to ETF Long / Short Portfolio
- ❑ **Set aside 30% of portfolio for hedge activity**
  - When model is “Long,” ETF portfolio is long an index blend that corresponds to the policy portfolio exposure
  - When model is “Hedged,” ETF portfolio is short the same index blend, but leveraged 2:1, i.e., with double inverse index ETFs
- ❑ **Rebalance only when model shifts**



# Applying Leveraged Inverse Funds





# Reflections on Leveraged Inverse ETFs

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- ❑ **Important to get direction right, most of the time (i.e., to have a good model)**
- ❑ **One should rebalance more frequently (monthly, e.g.)**
- ❑ **“Performance Drift” tradeoff seems well worth it**



# Analyzing Performance Drift with Double Inverse ETFs

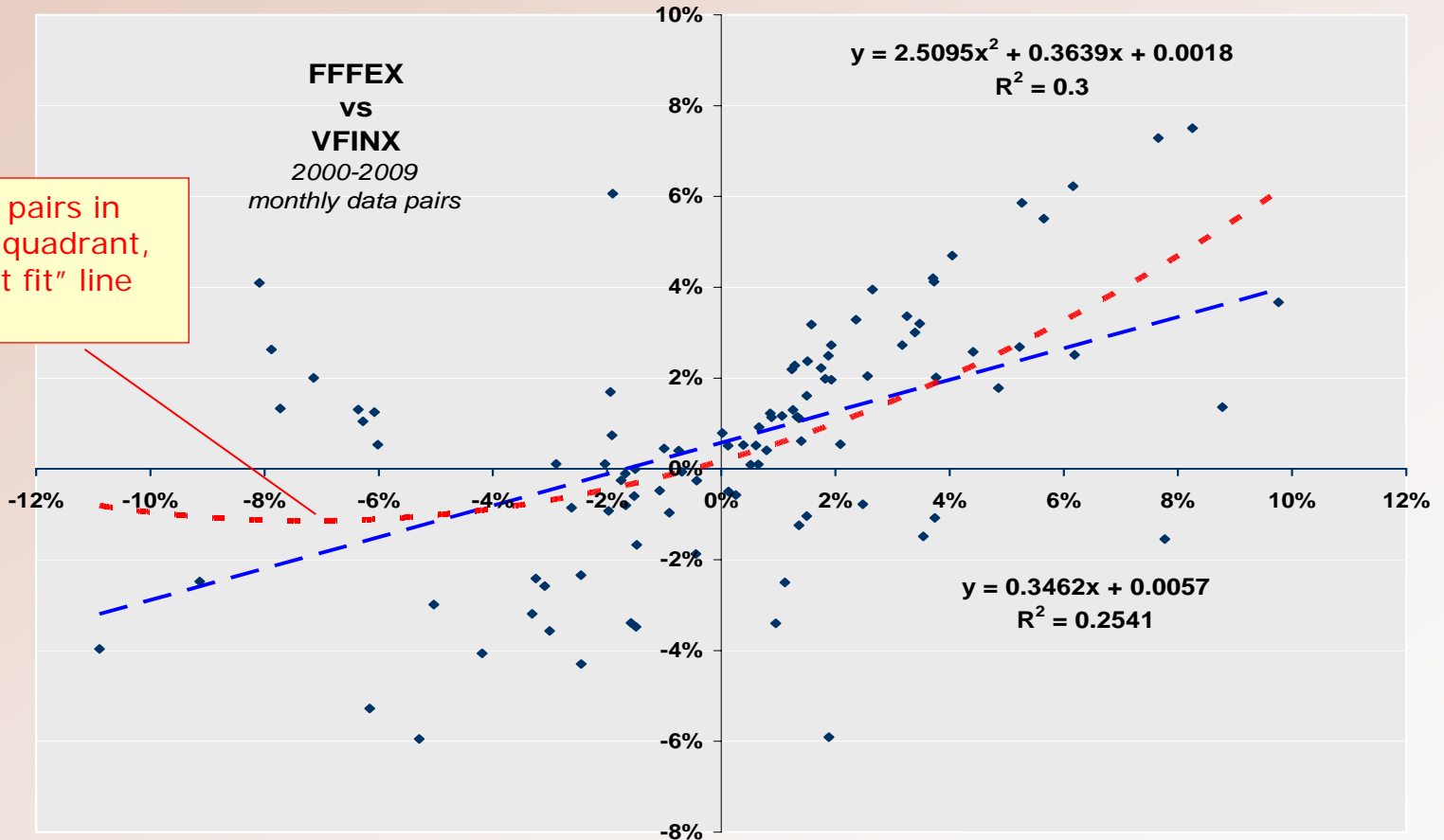
## Retirement Portfolio with 30% Dynamic ETF Hedge December 1999 — May 2009

	VFINX Benchmark S&P 500	FFEX Fund Portfolio	FFEX	
			Daily Realloc with - 2 beta	Signal Chg. Realloc with - 2 beta
IRR	-2.97%	-0.95%	7.29%	5.49%
MDD	-51.50%	-48.69%	-25.39%	-28.99%



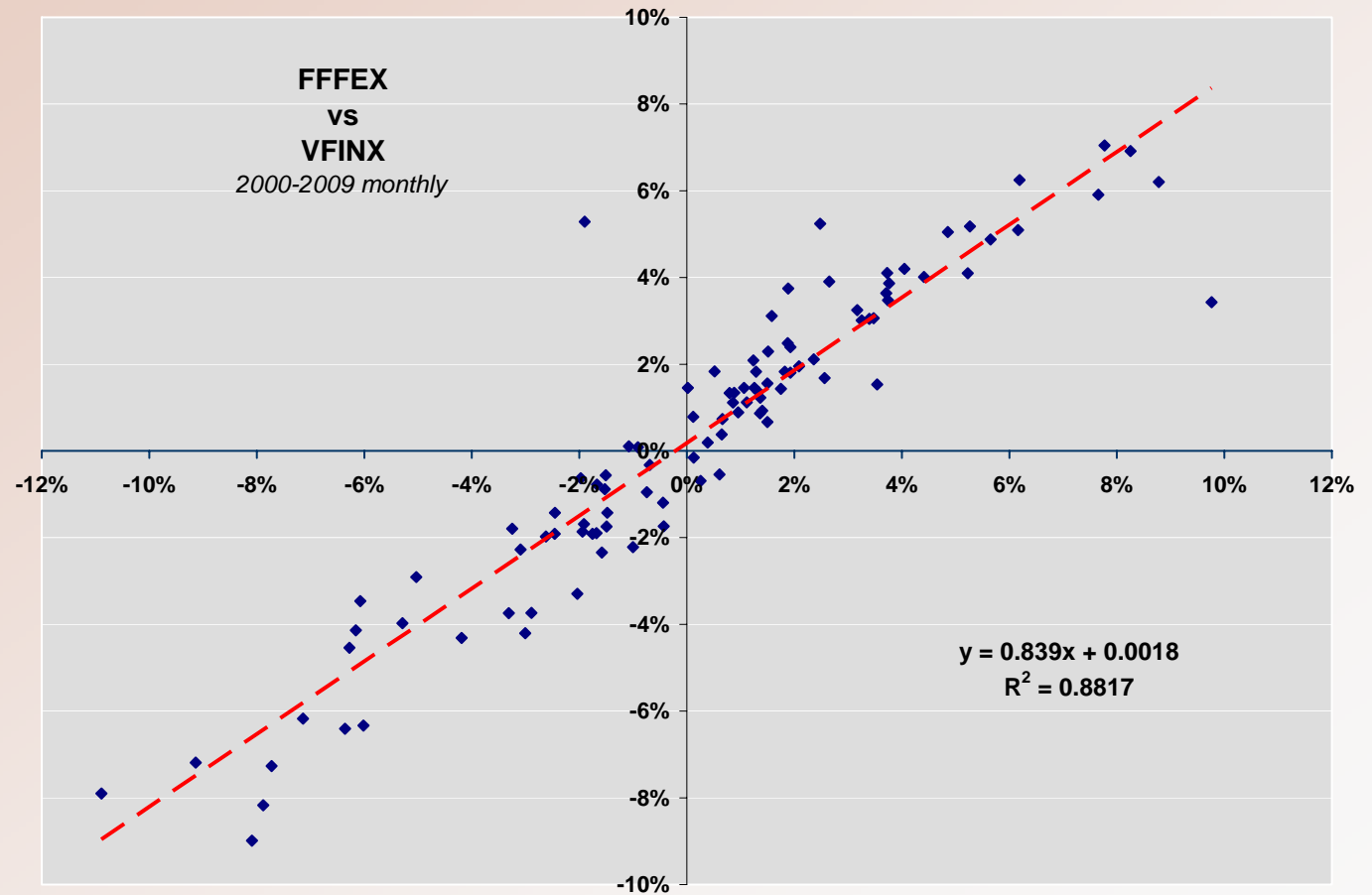
# The Result of a Hedge Overlay: an Asymmetric Return Pattern

Sufficient data pairs in the Northwest quadrant, cause the "best fit" line to curve





# Much Better Than The Linear Original





## In Conclusion . . . .

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- ❑ **Investors will pay a premium for an asymmetric return pattern**
- ❑ **The key, as Warren Buffett reminds us, is not to lose money; that's not always easy**
- ❑ **Dynamic risk control models can help get us there**



# Final Words

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**Keep it Simple**

**Less is More**



# Additional Information — Papers

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Keller, Werner E, CFA

**Dynamic Risk Control for Equity Portfolios**

White Paper, April 2008

<http://www.kellerpartnersllc.com/documents/1.3WhitePaper.pdf>

Faber, Mebane T.

**A Quantitative Approach to Tactical Asset Allocation**

White Paper, February 2009 (update)

[http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=962461](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=962461)

Minder, Cheng and Madhavan, Ananth

**The Dynamics of Leveraged and Inverse Exchange-Traded Funds**

White Paper, April 8, 2009

[http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1393995](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1393995)

Ineichen, Alexander

**Absolutely, Relatively, Asymmetrical**

CFA Magazine, Sep-Oct 2006



## Additional Information — Books

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Ineichen, Alexander, CFA

**Asymmetrical Returns**

John Wiley & Sons, 2006

Mandelbrot, Benoit and Hudson, Richard L.

**The (Mis)behavior of Markets**

Basic Books, 2006

Faith, Curtis M.

**The Way of Turtle**

McGraw-Hill Books, 2007



# APPENDIX

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## Related Thoughts and Sources . . . .



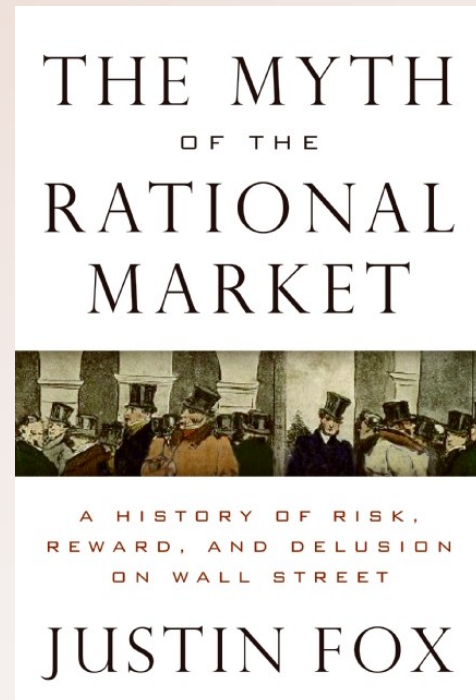
# Goodbye Efficient Markets

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“I believe there is no other proposition in economics which has more solid empirical evidence supporting it than the Efficient Market Hypothesis.”

*Michael Jensen, 1978*

**1978**

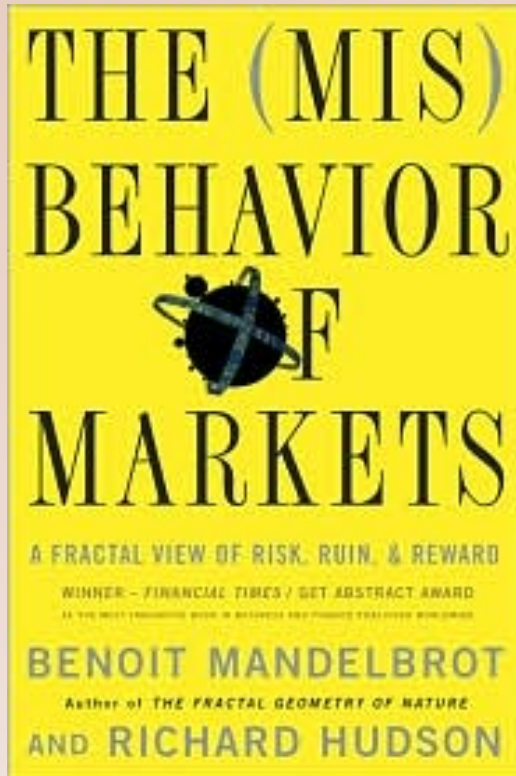


**2009**



# “Patterns in the Formless”

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More specifically, I developed a geometry that deals with roughness: the mathematical toolkit with which genuine irregularity that goes beyond the fuzziness of a peach can be understood, and now, in due time, managed. The key is spotting the regularity inside the irregular, the pattern in the formless.

*Benoit Mandelbrot*  
*The Misbehavior of Markets, 2006*



# Naive Quantitative Strategy: “Sell in May and Go Away”

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## Sell in May and Go Away

*Long S&P 500 May 1 to Oct 31*

**Good Six Months** **6.62%**

**Bad Six Months** **1.12%**

Data: Keller Partners LLC



# Naive Quantitative Strategy: The Presidential Cycle

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## The Presidential Cycle

*versus the S&P 500*

<b>Year 1</b>	<b>3.40%</b>	2005
<b>Year 2</b>	<b>4.00%</b>	2006
<b>Year 3</b>	<b>11.30%</b>	2007
<b>Year 4</b>	<b>9.50%</b>	2008

*Averages since 1900*

*Source: Ned Davis Research*



# Jeremy Grantham on Market Inefficiency

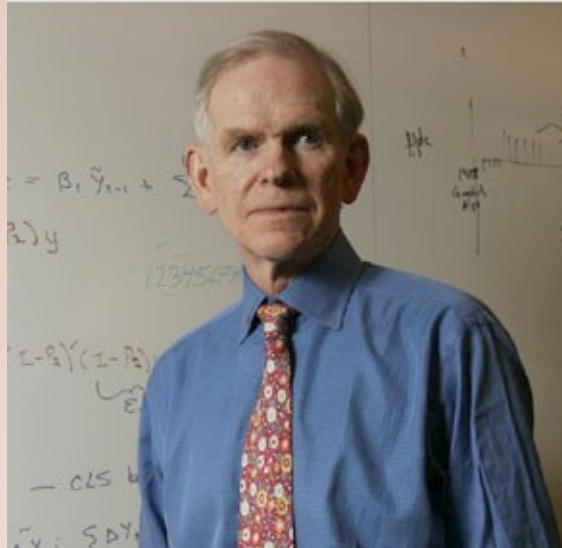


Photo: New York Times

The Presidential Cycle effect is dismissed as an artifact by the great majority of financial academics, but they have a stalwart record of dismissing any data that implies even modest market inefficiency, and this effect implies great dollops of inefficiency.

*Jeremy Grantham, GMO Quarterly Letter,  
May 2009*