

Dorsey Wright Money Management

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Factors Drive Returns

Big investors are taking heed. In 2009, researchers assigned to analyze the Norwegian Government Pension Fund recommended it reorient its portfolio around risk factors. And the California Public Employees' Retirement System underwent a similar change in approach in 2010. Other big institutions, such as part of the government pension fund for Sweden, also are exploring how to balance risk factors.

"Pre-Lehman, the focus was on asset allocation" and a diversified approach to active management, says London Business School professor Elroy Dimson, who is also head of the Strategy Council for the Norway fund. "During the post-Lehman meltdown, Norwegians had factor exposures that they didn't know they had."

Source: "Here's What's Really Driving Your Returns" WSJ 12/24/2011

Partners



- Domestic Equity
- International Equities (ADR)
- Global Tactical Asset Allocation



- Domestic Equity (Large & Small)
- International Developed Equity
- International Emerging Markets Equity
- Commodity Rotation



- Global Balanced Tactical Asset Allocation
- Global Flexible Tactical Asset Allocation



- Domestic Equity UIT
- Domestic Equity Income UIT



- Sector Rotation Variable Insurance Trust
- Flexible Allocation Variable Insurance Trust



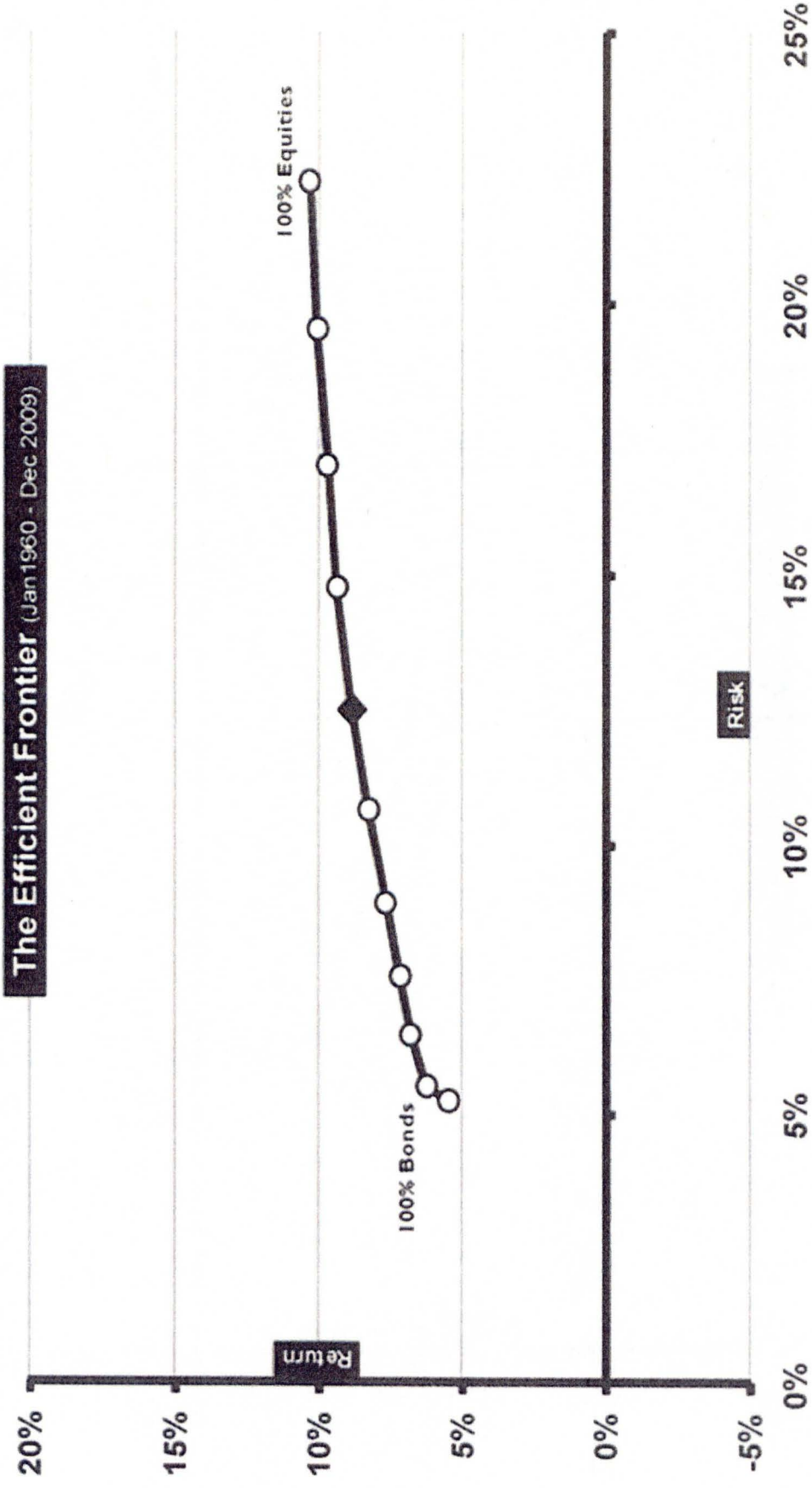
- Malaysian Equities
- Shariah Compliant Malaysian Equities

Tactical Allocation

Tactical Allocation actively changes portfolio allocations to capitalize on market anomalies

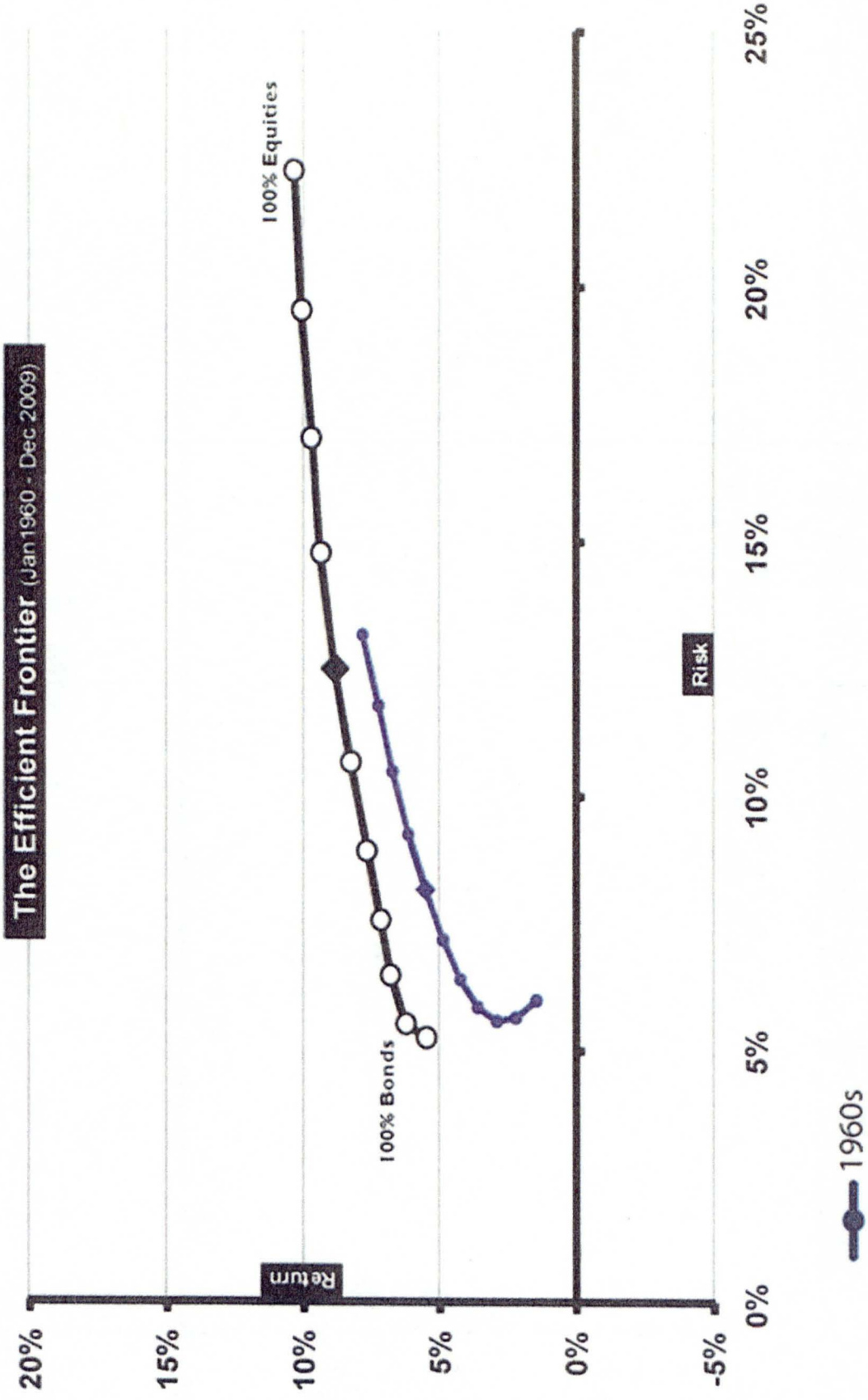
- Portfolios adapt as market conditions change
- Does not attempt to forecast the direction of the market
- Doesn't require Returns, Standard Deviations, & Correlations to remain constant over time
- Reduces the potential for investment manager bias

Strategic Asset Allocation



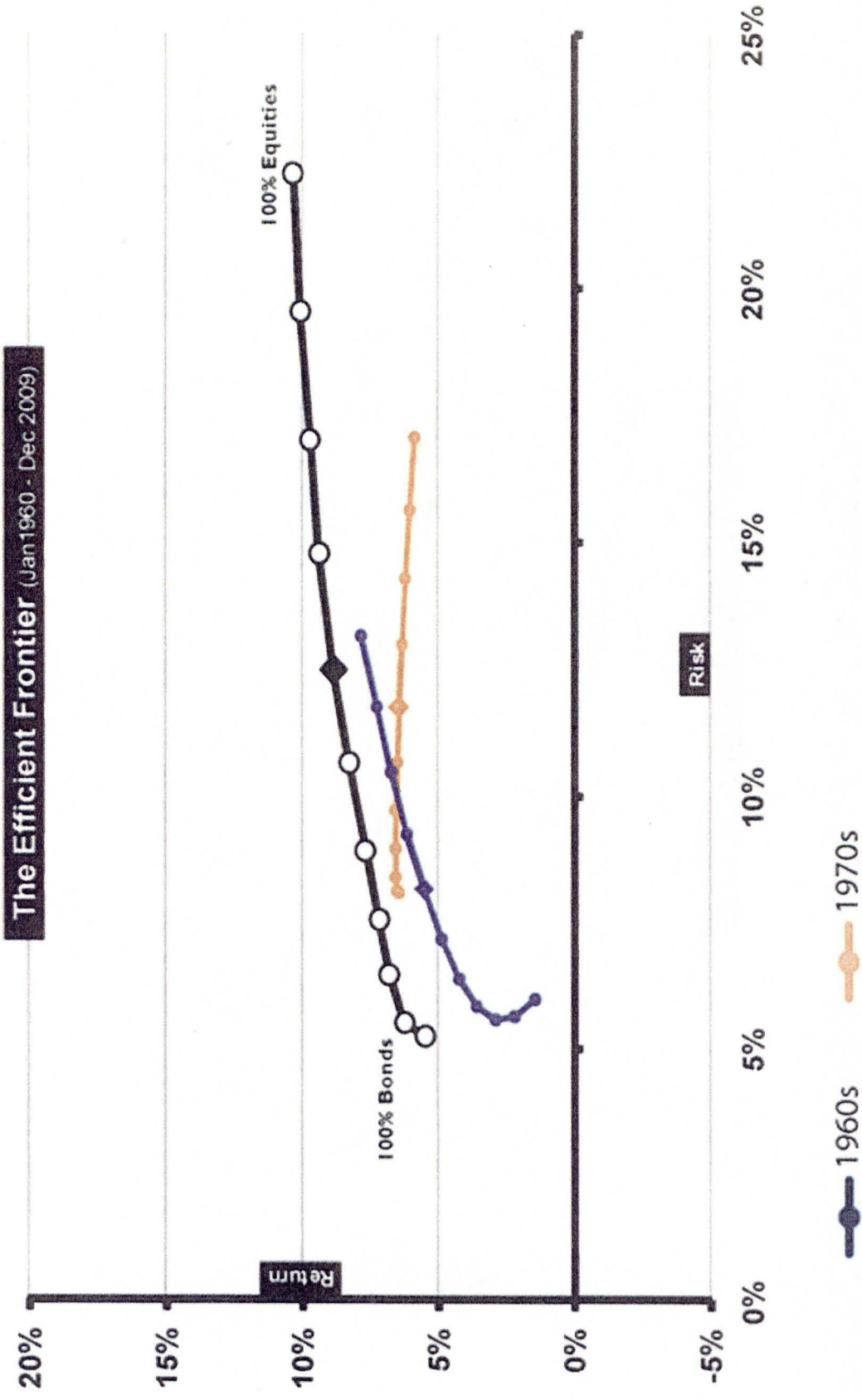
Source: Arrow Funds

Strategic Asset Allocation



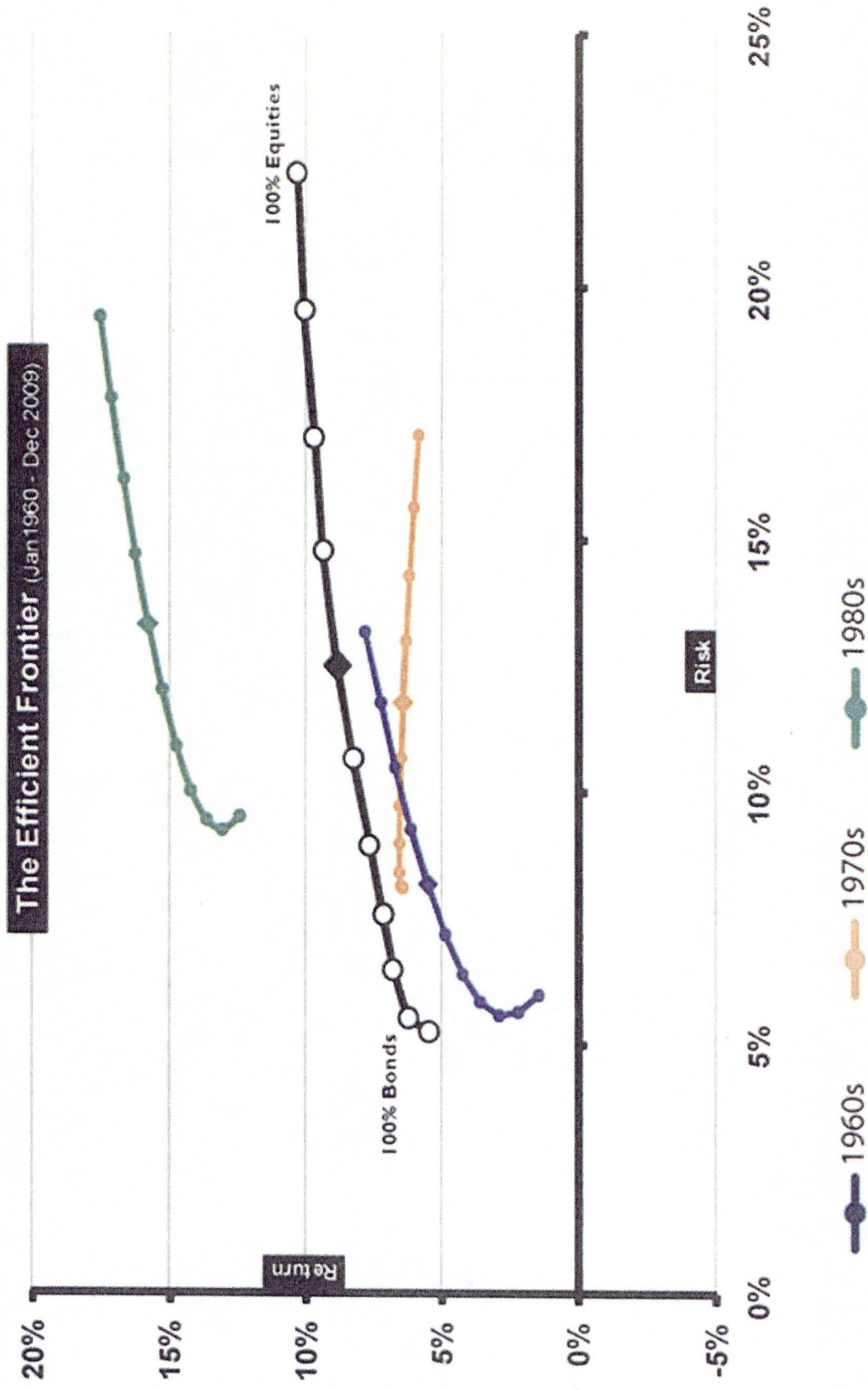
Source: Arrow Funds

Strategic Asset Allocation



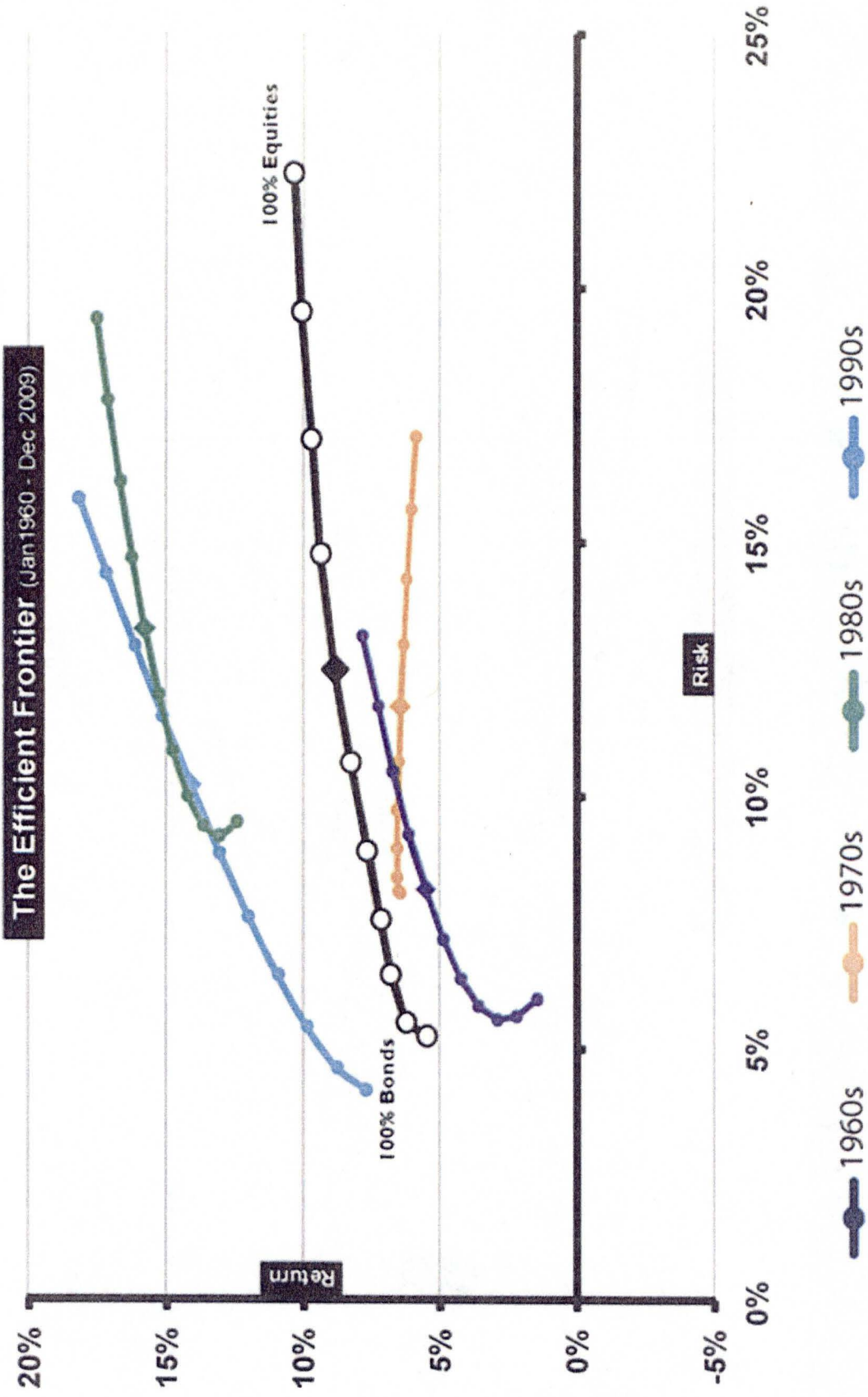
Source: Arrow Funds

Strategic Asset Allocation



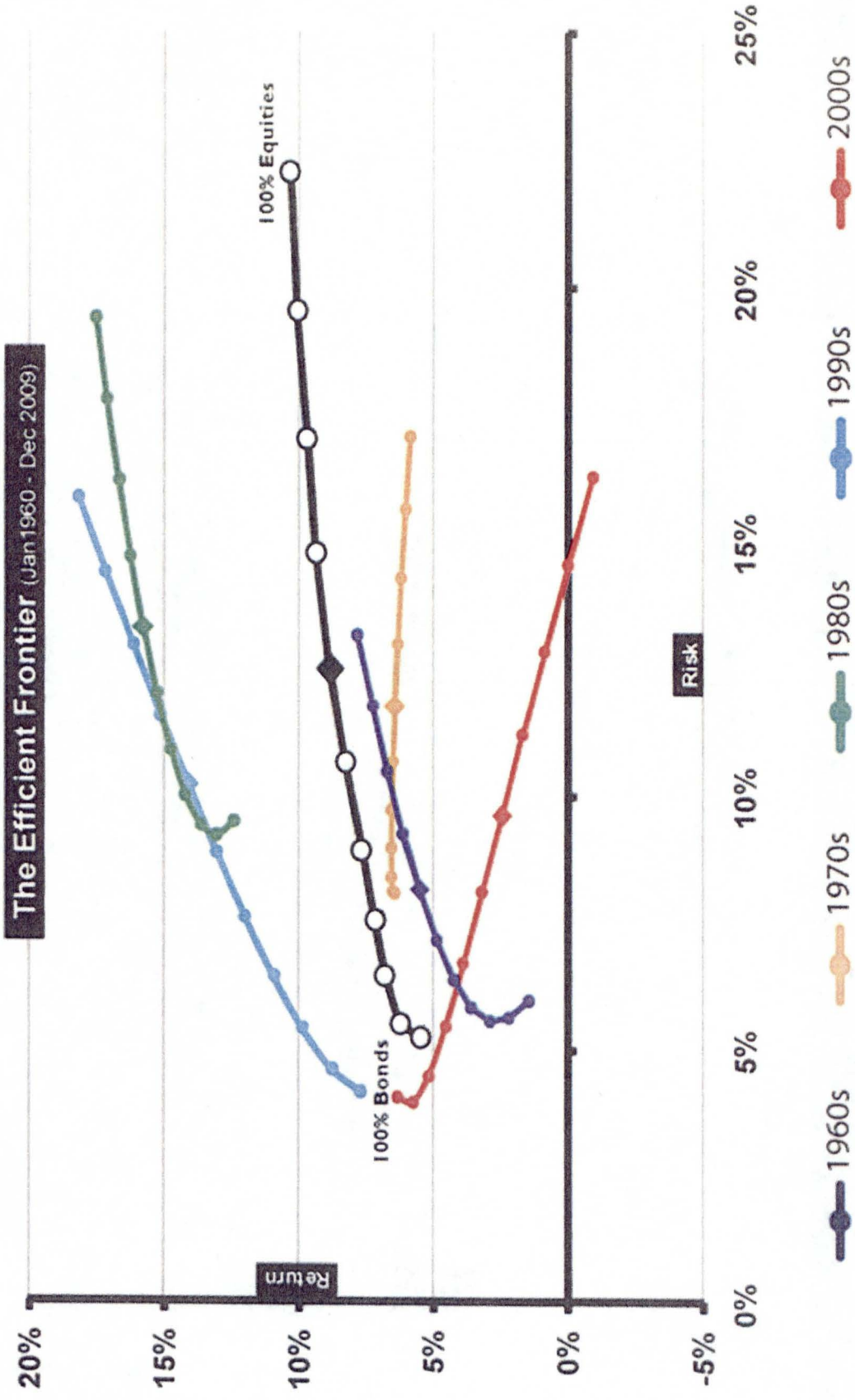
Source: Arrow Funds

Strategic Asset Allocation



Source: Arrow Funds

Strategic Asset Allocation



Source: Arrow Funds

Supply and Demand

- We all understand the basic forces of supply and demand.
- The same forces that affect prices in the supermarket also affect prices in the stock market.
- Stocks, sectors, countries and asset classes move in and out of favor just like produce in the supermarket.



Relative Strength

Daily Calculation:

$$\frac{\text{Stock or ETF}}{\text{Index}} \times 100 = \text{Relative Strength Reading}$$

This reading is plotted on a Point & Figure chart which then tells us whether we can expect that stock or ETF to outperform or underperform the base index.

Plotting the daily readings on a Point & Figure chart helps eliminate the short-term noise

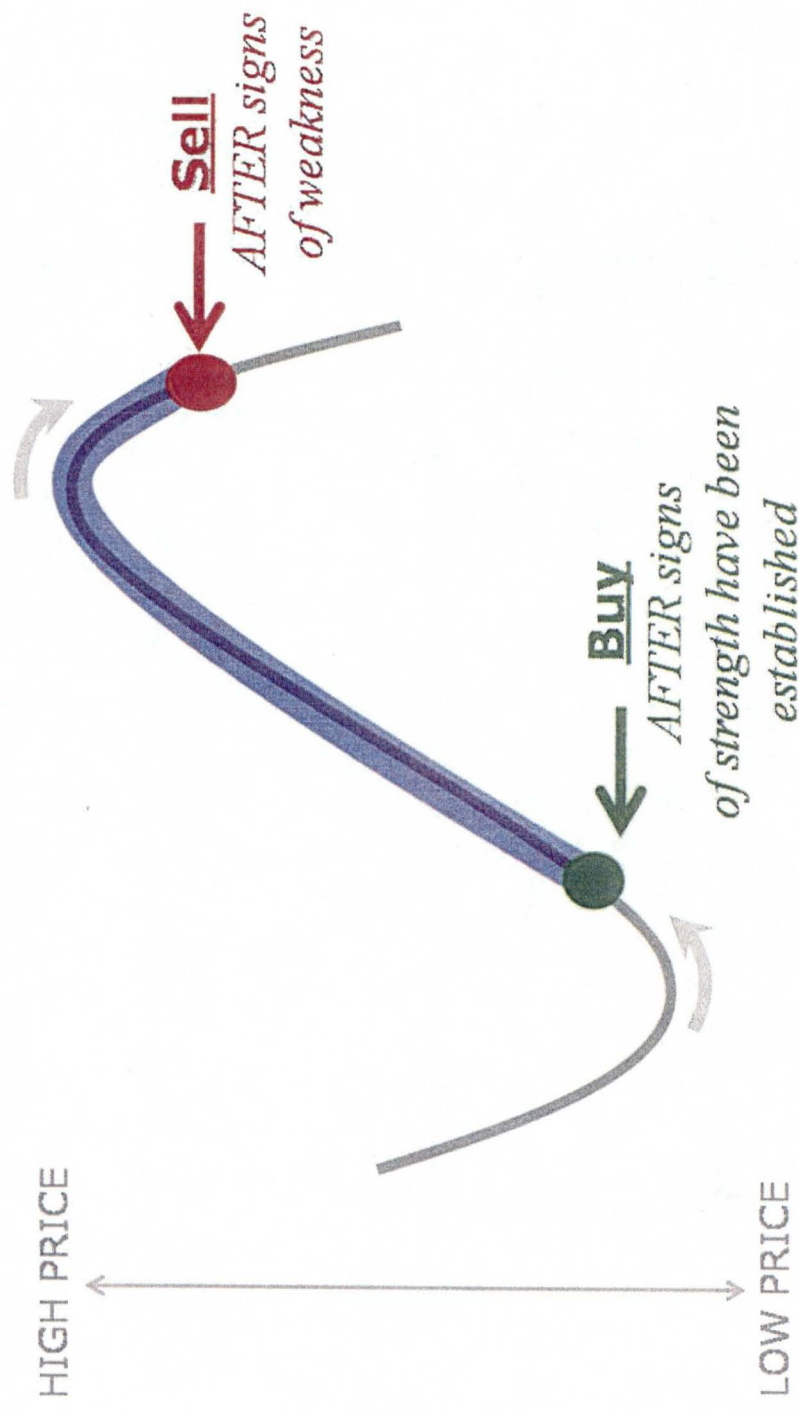
Relative Strength Rankings

Ticker	Description	Date	Rank
dbb	PowerShares DB Silver	12/31/2010	100
dbp	PowerShares DB Precious Metals	12/31/2010	96
iyb	iShares Trust-US Basic	12/31/2010	94
ewl	iShares MSCI Switzerland	12/31/2010	61
iyf	iShares DJ U.S. Real Estate	12/31/2010	61
dbc	PowerShares DB Commodity Index	12/31/2010	60
divx	SPDR S&P Intl Dividend	12/31/2010	8
ewp	iShares MSCI Spain	12/31/2010	7
tlf	iShares Lehman 20+ Year Tres. Bond Fund	12/31/2010	5

Dec 31, 2010 : ■ DBS 54.51 ■ IYR 55.96 ■ TLT 94.12



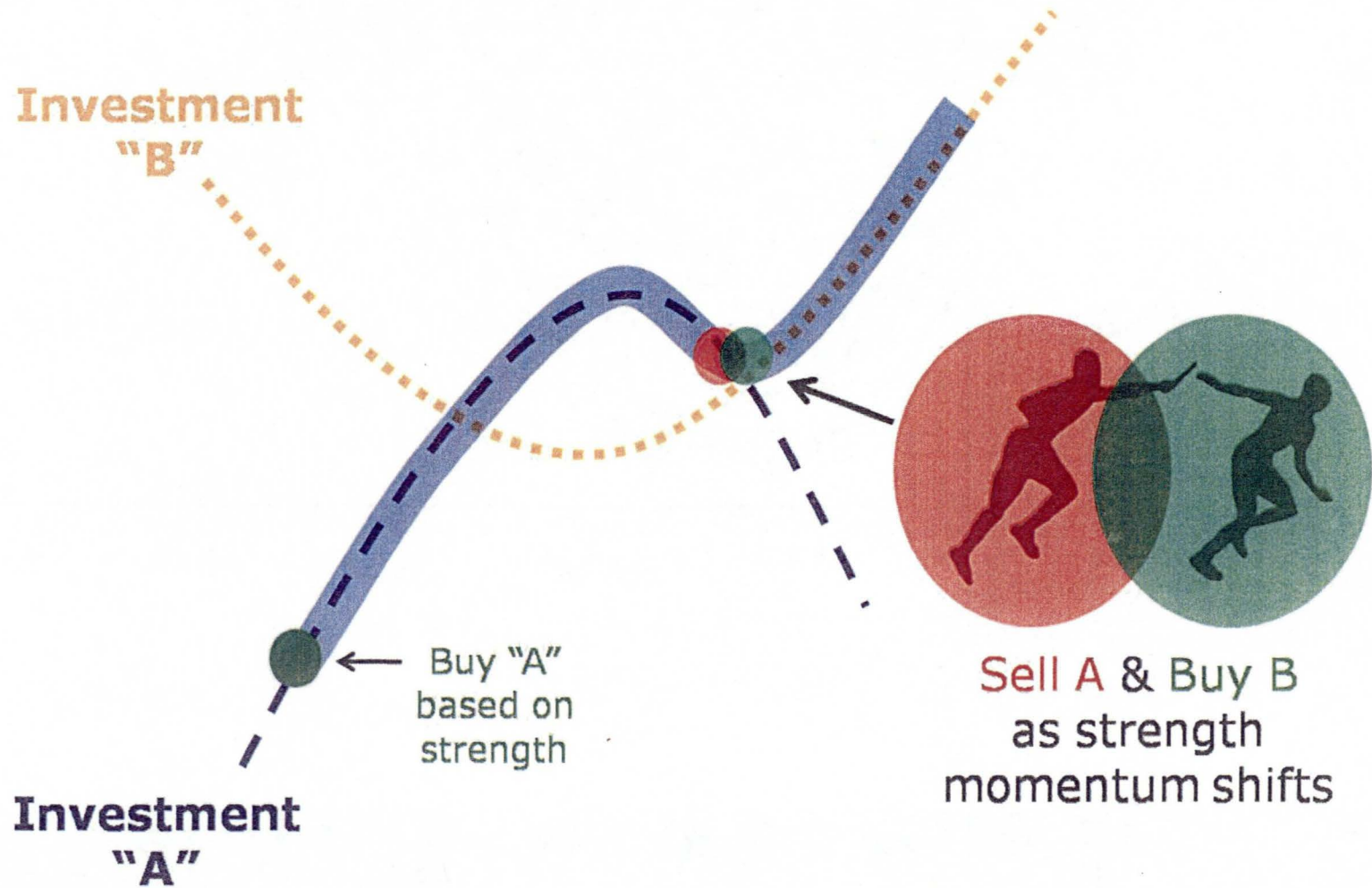
Trend Following



Trend following does NOT attempt to predict exact Highs & Lows.
Instead, it attempts to identify shifts in the markets.

Trend Following

Relative Strength Passes The Baton

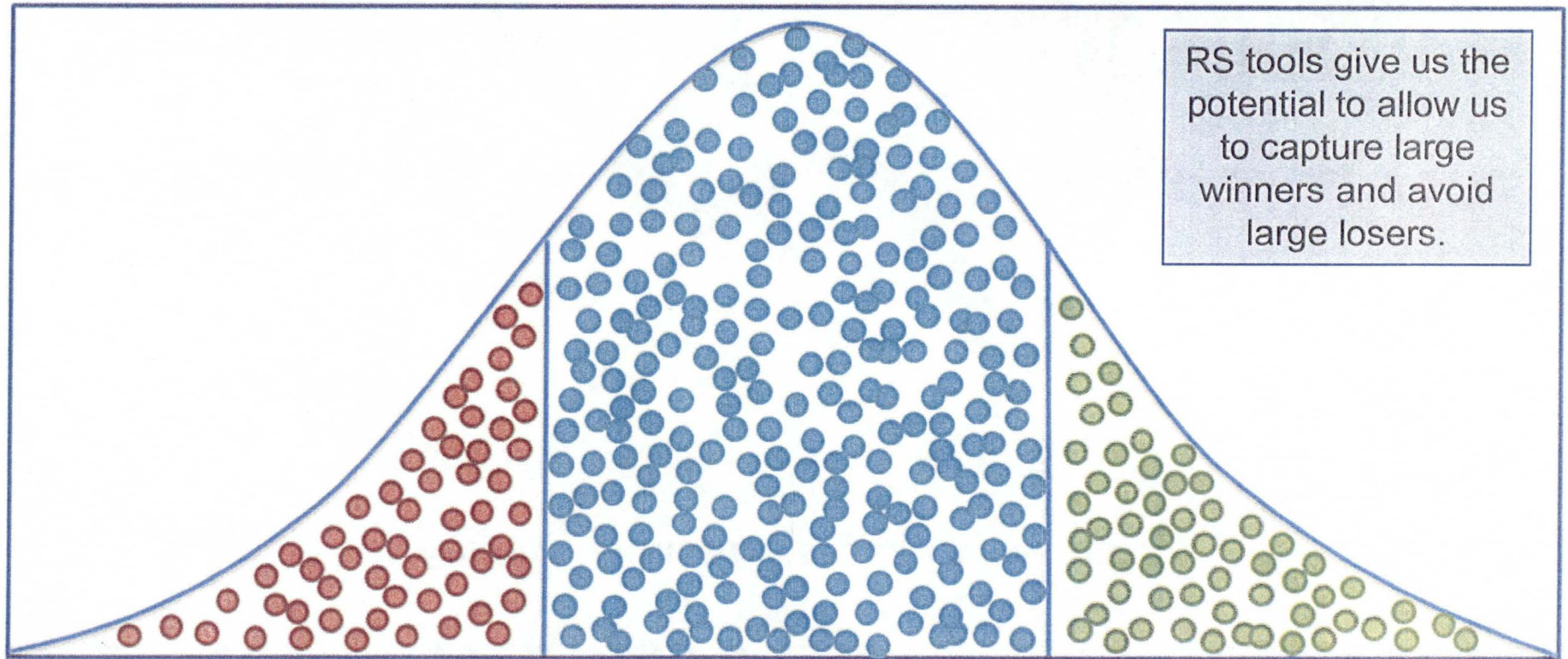


Finding The Leadership: 80/20 Rule

Large Losers

Most Trades

Large Winners

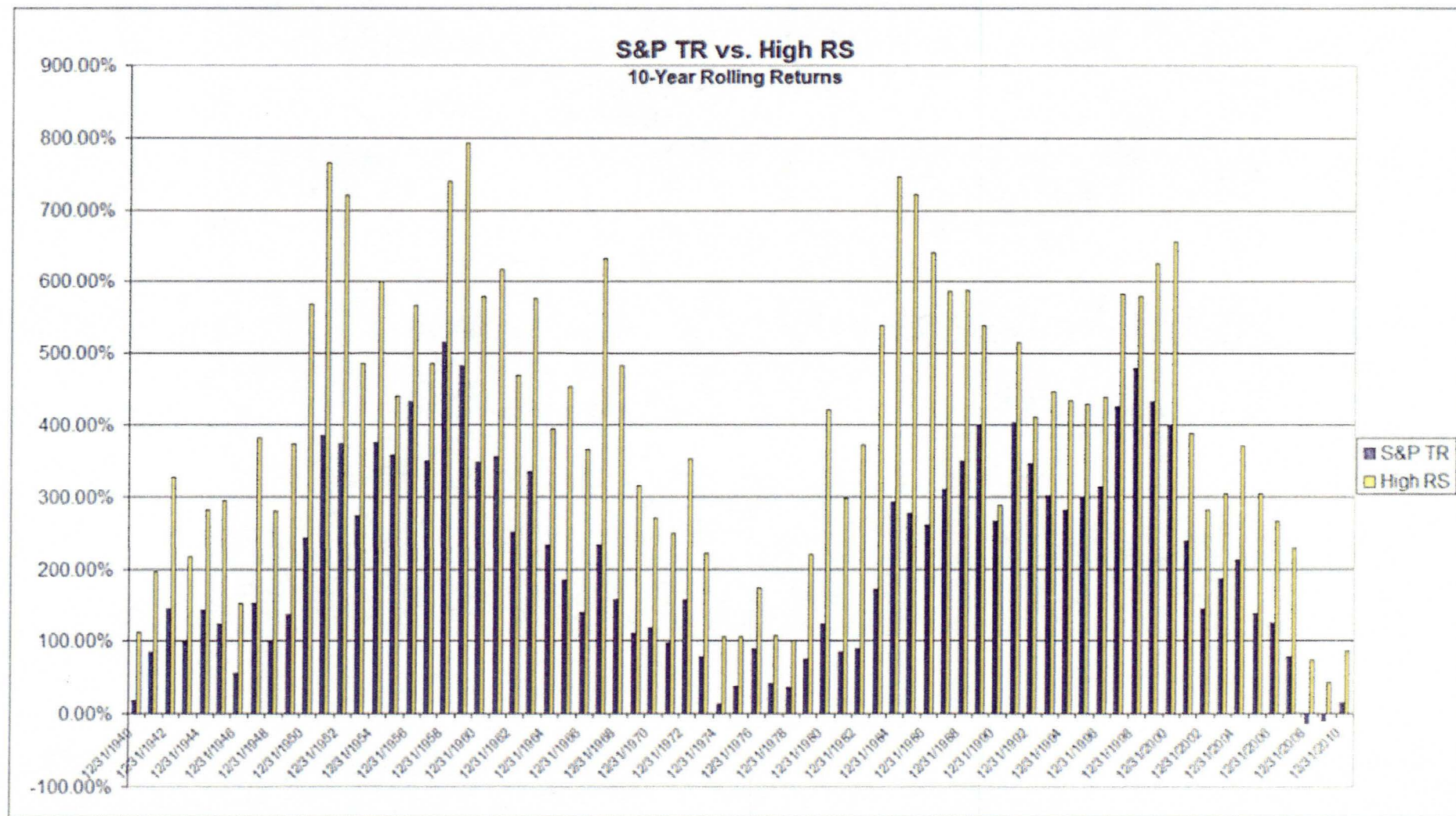


Relative Strength



Don't Shoot The Fast Horses!

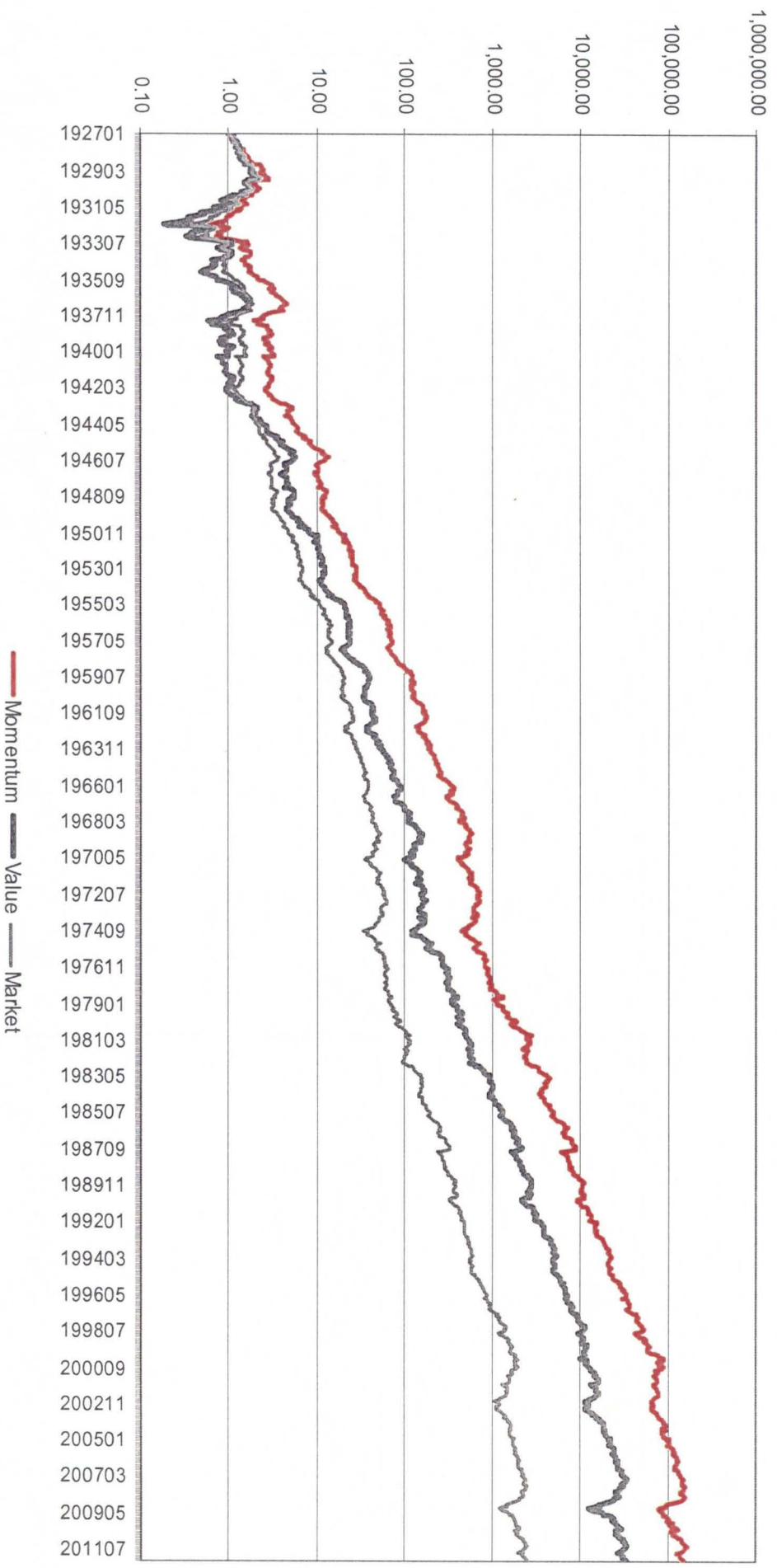
Rolling Returns



Source: Dorsey Wright, Ken French Data Library.

Momentum & Value Performance

Large Cap Value vs. Large Cap Momentum



Source: Ken French Data Library

Integrating RS Into The Total Portfolio

Correlations Of Excess Returns

	<i>PDP</i>	<i>High Momentum</i>	<i>Russell 1000G</i>	<i>Russell 1000V</i>	<i>Equity Income</i>	<i>Low P/E</i>	<i>Contrarian</i>	<i>Low Volatility</i>
PDP	1.00							
High Momentum	0.78	1.00						
Russell 1000G	0.26	0.12	1.00					
Russell 1000V	-0.36	-0.25	-0.98	1.00				
Equity Income	-0.40	-0.32	-0.90	0.94	1.00			
Low P/E	-0.43	-0.43	-0.81	0.86	0.82	1.00		
Contrarian	-0.38	-0.47	-0.69	0.72	0.75	0.82	1.00	
Low Volatility	-0.23	0.04	-0.65	0.65	0.68	0.38	0.24	1.00

Sources: Russell Investments, Dorsey Wright & Associates

- High RS (Momentum) is negatively correlated with many value factors

Integrating RS Into The Total Portfolio

PDP has outperformed all other quantitative based ETFs on a YTD, 3 Yr and 5 Yr Roll basis

<i>Return Data thru 6/30/12</i>	Inception Date	1 Yr Roll	3 Yr Roll	5 Yr Roll	YTD
PowerShares DWA Technical Leaders Index (PDP)	3/1/2007	1.23%	81.94%	1.54%	10.78%
S&P 500 Index (SPX)	1/22/1993	3.14%	48.17%	-9.39%	8.31%
iShares Russell 1000 Index (IWB)	5/15/2000	1.79%	48.46%	-7.89%	8.42%
WisdomTree Total Earnings Fund (EXT)	2/23/2007	2.47%	48.23%	-6.83%	7.10%
Rydex S&P 500 Equal Weighted Index (RSP)	4/24/2003	-2.17%	60.73%	-3.28%	7.00%
Russell 2000 High Momentum ETF (SHMO)	5/25/2011	-0.69%	71.85%	-4.45%	9.37%
Russell 1000 High Momentum ETF (HMTM)	5/25/2011	2.68%	52.79%	-12.44%	10.26%
RevenueShares Large Cap ETF (RWL)	2/22/2008	0.64%	51.20%	-8.52%	8.12%
PowerShares S&P 500 High Beta Portfolio (SPHB)	5/5/2011	-18.26%	35.33%	-44.12%	1.65%
PowerShares FTSE RAFI US 1000 Portfolio (PRF)	12/19/2005	-0.58%	56.20%	-6.37%	6.58%
PowerShares Dynamic OTC Portfolio (PWO)	5/1/2003	-7.97%	42.69%	-13.45%	6.73%
PowerShares Dynamic MagniQuant Portfolio (PIQ)	10/12/2006	-4.05%	46.17%	-10.64%	7.00%
Flexshares Morningstar US Market Factor Tilt Index Fund (TILT)	9/22/2011	0.86%	59.20%	-1.18%	8.54%
First Trust Large Cap Core AlphaDEX Fund (FEX)	5/8/2007	-3.42%	55.97%	-4.65%	4.82%

Integrating RS Into The Total Portfolio

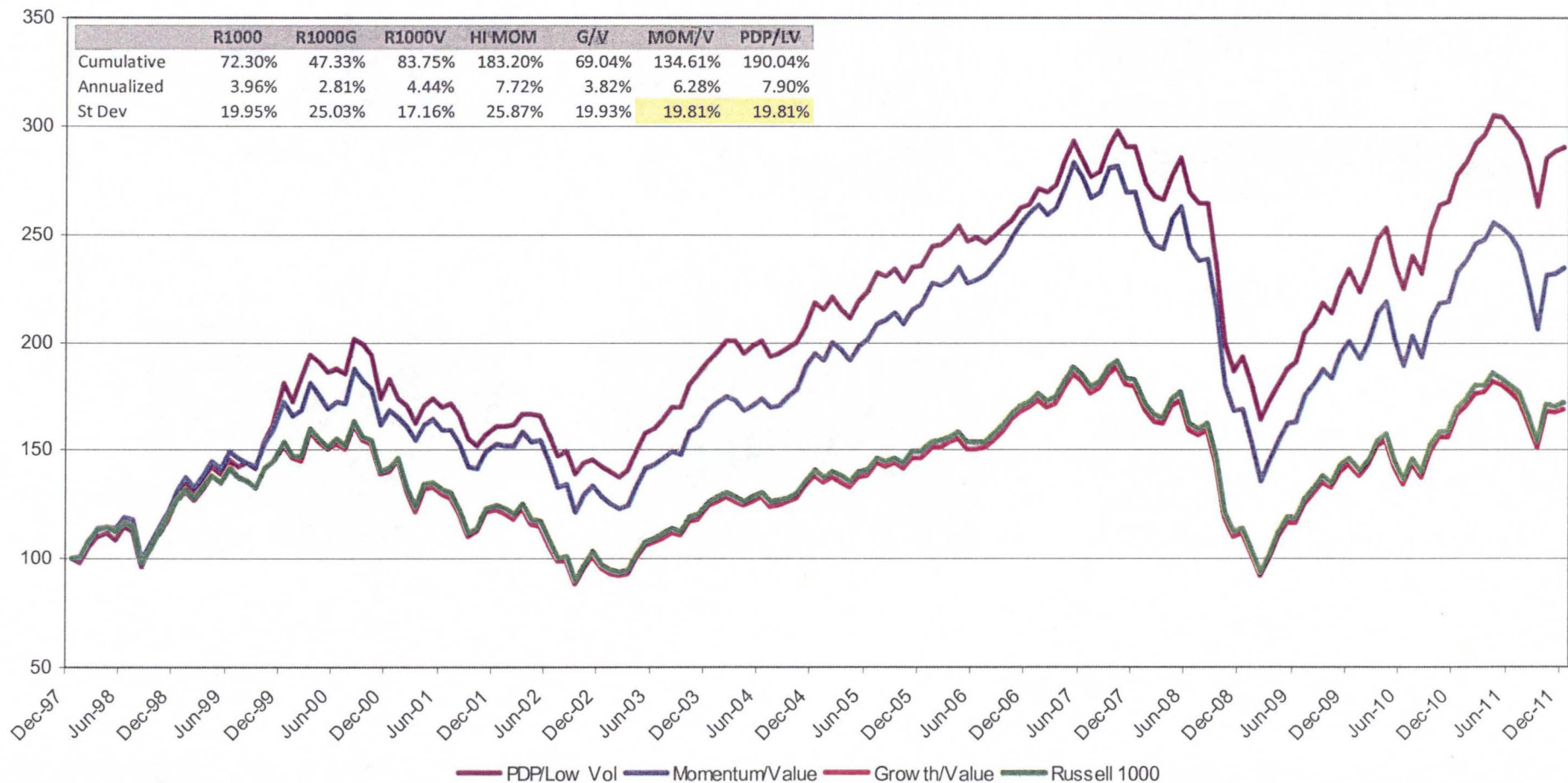
Relative Strength + Value vs. Growth + Value



Sources: Russell Investments, Dorsey Wright & Associates

Integrating RS Into The Total Portfolio

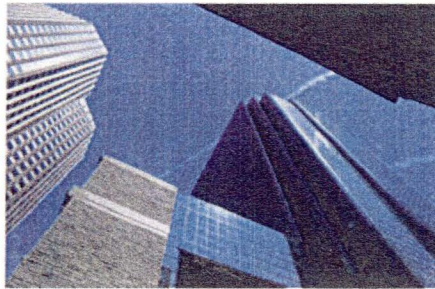
Relative Strength + Value + Low Vol vs. Growth + Value



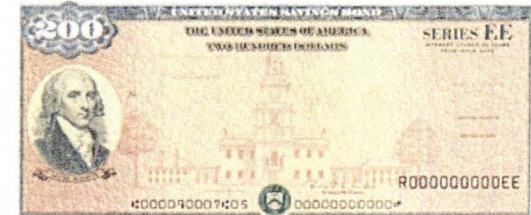
Global Tactical Asset Allocation



US Stocks



Real Estate



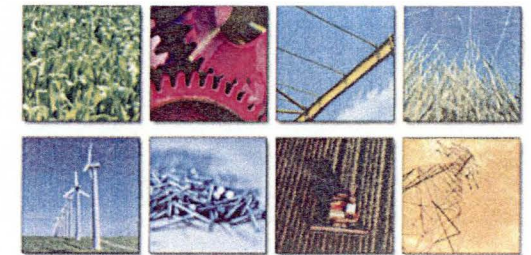
Fixed Income



Int'l Stocks



Foreign Currencies



Commodities

The Key To Preserving and Building Wealth In Global Financial Markets: Adapt

Global Tactical Asset Allocation

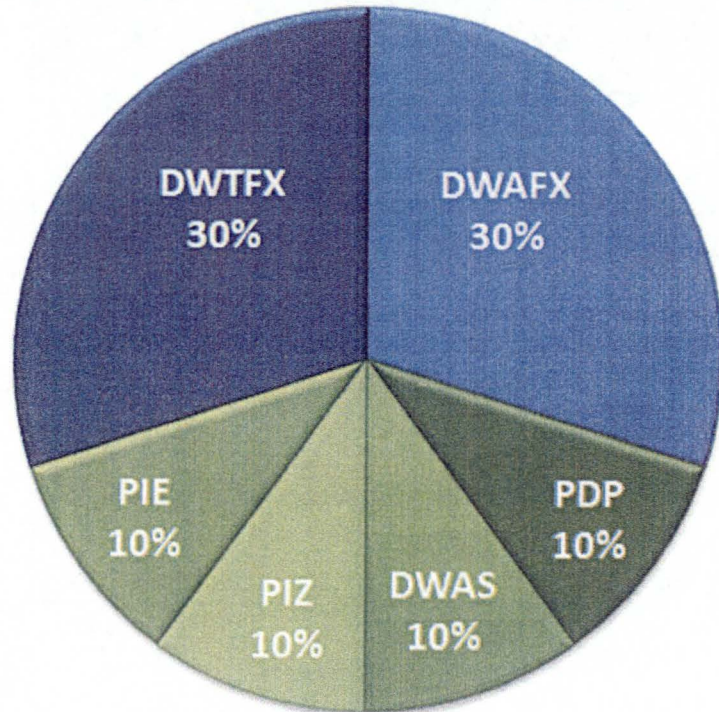
1999 ¹	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012 ²	1999 ¹ - 2012 ²
MSCI EAFE 22.27%	Real Estate 27.65%	Real Estate 11.69%	Commodity 23.04%	MSCI EAFE 39.17%	Real Estate 31.22%	Commodity 22.54%	Real Estate 35.50%	Commodity 20.56%	Bond 5.24%	Commodity 33.43%	Commodity 29.96%	Bond 7.86%	Real Estate 8.91%	Global Macro 268.00%
Global Macro 1.55%	Bond 11.63%	Bond 8.44%	Bond 10.25%	Real Estate 36.89%	Global Macro 22.18%	Global Macro 17.95%	Global Macro 28.38%	Global Macro 16.27%	Global Macro -8.99%	MSCI EAFE 32.46%	Real Estate 26.94%	Real Estate 6.03%	S&P 500 5.15%	Real Estate 230.20%
S&P 500 7.71%	Commodity 11.06%	Global Macro -8.13%	Global Macro 4.71%	S&P 500 28.69%	MSCI EAFE 20.70%	MSCI EAFE 14.02%	MSCI EAFE 26.86%	MSCI EAFE 11.63%	Commodity -23.74%	Real Estate 30.82%	S&P 500 15.06%	S&P 500 2.12%	Bond 0.59%	Commodity 165.67%
Commodity 7.10%	Global Macro 9.97%	S&P 500 -11.89%	Real Estate 3.63%	Global Macro 27.79%	Commodity 11.21%	Real Estate 9.63%	S&P 500 15.80%	Bond 6.97%	S&P 500 -37.00%	S&P 500 26.45%	Global Macro 14.01%	Global Macro -5.36%	Global Macro 0.03%	Bond 114.80%
Bond 0.56%	S&P 500 -9.10%	Commodity -16.34%	MSCI EAFE -15.66%	Commodity 8.86%	S&P 500 10.88%	S&P 500 4.91%	Commodity 13.51%	S&P 500 5.50%	Real Estate -40.07%	Global Macro 11.50%	MSCI EAFE 8.21%	Commodity -10.56%	MSCI EAFE -3.42%	MSCI EAFE 31.90%
Real Estate -10.97%	MSCI EAFE -13.96%	MSCI EAFE -21.21%	S&P 500 -22.10%	Bond 4.10%	Bond 4.34%	Bond 2.43%	Bond 4.33%	Real Estate -18.15%	MSCI EAFE -43.06%	Bond 5.53%	Bond 6.56%	MSCI EAFE -11.75%	Commodity -9.63%	S&P 500 20.95%

¹Strategy Inception 6/30/1999. ²Updated through 5/31/2012.

Real Estate = Dow Jones U.S. Real Estate Total Return Index
 Bond = Barclays Aggregate Bond Total Return Index
 Commodity = Reuters Continuous Commodity Index
 Global Macro = Dorsey Wright's Systematic RS Global Macro Strategy (Gross)
 S&P 500 = S&P 500 Total Return Index
 MSCI EAFE = MSCI EAFE Total Return Index

Using Multiple RS Strategies

DWA Buy & Hold Model Allocation



Year	DWA Products Model (BUYANDHOLD)	S&P 500 Index (SPX)	iShares MSCI ACWI Index Fund (ACWI)
2001	-7.31%	-13.05%	-17.26%
2002	-0.02%	-23.37%	-20.51%
2003	34.13%	26.38%	31.62%
2004	19.31%	8.99%	13.30%
2005	16.82%	3.00%	8.83%
2006	23.04%	13.62%	18.78%
2007	19.25%	3.53%	9.64%
2008	-30.10%	-38.49%	-41.61%
2009	21.83%	23.45%	30.44%
2010	19.24%	12.78%	10.69%
2011	-6.81%	0.00%	-9.91%
2012*	6.02%	11.50%	7.73%
Cumulative Return:	155.00%	6.19%	13.74%
Avg. Ann. Comp. Return:	8.11%	0.50%	1.08%

Returns thru 8/8/12, excluding all dividends & distributions

DWA Products Model Definition:

30% in DWAFX
30% in DWTFX
10% each PDP, DWAS, PIE, PIZ
Rebalanced each year

Inception Dates

DWAFX: 08/09/06
DWTFX: 05/30/08
PDP: 03/01/07
PIE: 12/27/07
PIZ: 12/27/07
DWAS: 07/19/12

Prior to Inception Dates, Returns based upon strategy backtest.

Other Resources



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January 2012

(Original January 2010, Updated January 2011)

Relative Strength and Portfolio Management

Numerous academic and practitioner studies have shown relative strength—also known in academia as “momentum”—to be a robust factor that

in the 1968 book, The Relative Strength Concept of Common Stock Forecasting. Levy’s work was incredible for its time considering the amount of com-



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March 2012

(Updated: February 2011)
(Original: March 2010)

Tactical Asset Allocation Using Relative Strength

Numerous academic and practitioner studies have shown relative strength—also known in academia as

tum in the early 1990’s. They have continued to research the topic over the years, and have found

Process



Looking at portfolios, think deeply about process over outcome. If you do something the right way enough times, you'll win.

--Dan Loeb, founder of Third Point hedge fund

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Past performance, hypothetical or actual, does not guarantee future results. In all securities trading, there is potential for loss as well as profit. It should not be assumed that recommendations made in the future will be profitable or will equal the performance as shown. Investors should have long-term financial objectives when working with DWAMM.

Model performance is shown for illustrative purposes only. You can't invest directly in the models shown. An actual portfolio's holdings may differ from the securities shown in the models. Actual portfolios may also use methodologies that differ from those shown in the models.

The returns of the models do not reflect the reinvestment of dividends. To be consistent, the returns in the Index (S&P 500) do not reflect the reinvestment of dividends. The returns of the models do not reflect any management fees, transaction costs, or other expenses that would reduce the returns of an actual portfolio.

The models shown were not calculated in real time and represent hypothetical back tested data for the time periods shown. Hypothetical back tested performance has inherent limitations.

The back tested results were not audited by a third party. The models use some data provided by third parties and are not warranted or represented to be complete or accurate.

Index data was used for some indexes before ETF price data was available. The index data may come from either a public source or directly from the ETF Sponsor.

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For the time periods when hypothetical returns were used, the returns are that of the PowerShares Dorsey Wright Technical Leaders Index. The hypothetical returns have been developed and tested by the Dorsey Wright, but have not been verified by any third party and are unaudited. The performance information is based on data supplied by the Dorsey Wright or from statistical services, reports, or other sources which Dorsey Wright believes are reliable. The performance of the Index, prior to the inception of actual management, was achieved by means of retroactive application of a model designed with hindsight. For the hypothetical portfolios, returns do not represent actual trading or reflect the impact that material economic and market factors might have had on the Manager's decision-making under actual circumstances. Actual performance of PDP began March 1, 2007. See PowerShares.com for more information.

For the Systematic Relative Strength Global Macro Model the performance is that of a hypothetical portfolio managed in accordance with the dictates of its strategy for the historical periods indicated and the actual performance of actual Accounts since their inception. Net returns assume the deduction of 0.75% per quarter (3.00% per annum) from the Gross Return to account for management fees for periods when the returns are hypothetical. Actual net returns are used where possible. The performance represented in this fact sheet is based on monthly performance of the Systematic Relative Strength Global Macro Model. The first full quarter of actual returns of the Model is the second quarter of 2009. Monthly returns of the Model are estimates and are adjusted in order for the geometrically linked estimated monthly returns of the Model to equal the calculated quarterly composite returns. The hypothetical returns have been developed and tested by the Manager, but have not been verified by any third party and are unaudited. The performance information is based on data supplied by the Manager or from statistical services, reports, or other sources which the Manager believes are reliable. Index data was used for some indexes before ETF price data was available. The performance of the Models, prior to the inception of actual accounts, was achieved by means of retroactive application of a model designed with hindsight. For the hypothetical portfolios, returns do not represent actual trading or reflect the impact that material economic and market factors might have had on the Manager's decision-making under actual circumstances.

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January 2012

(Original January 2010, Updated January 2011)

Relative Strength and Portfolio Management

Numerous academic and practitioner studies have shown relative strength—also known in academia as “momentum”—to be a robust factor that leads to outperformance. However, much of the academic research has been handicapped by testing methodologies that are not at all similar to the way that portfolios are managed in the real world. This white paper discusses our improved testing process, which incorporates two elements that are unique: 1) a continuous portfolio testing protocol that manages portfolios the way they are managed in the real world, and 2) a Monte Carlo process overlaid on the continuous portfolio testing to insure robustness.

Part I: Background

Relative Strength and momentum strategies have been used by market technicians for stock selection for many years. All the way back in the 1950's, George Chestnutt was publishing market letters with stocks and industry groups ranked based on relative strength. Chestnutt also used his research to manage the very successful no-load mutual fund, American Investors Fund.

In the 1960's, computing power became more readily available and Robert Levy published what would be one of, if not the first, tests of using relative strength as a stock selection strategy. His work was published

in the 1968 book, The Relative Strength Concept of Common Stock Forecasting. Levy's work was incredible for its time considering the amount of computing available to him. He tested not only relative strength as an investment factor, but also two different portfolio management strategies. His research into “upgrading” versus “replacement” as a portfolio management strategy was well ahead of its time and certainly holds true today. Levy's relative strength calculations were fully disclosed in his research. He compared the current price versus an intermediate-term moving average. This same relative strength formulation is still used by Charlie Kirkpatrick who wrote Beat The Market: Invest by Knowing What Stocks To Buy and What Stocks to Sell in 2008. After almost 50 years, Levy's fully disclosed factor continues to deliver market-beating performance.

Academics began to heavily research the topic of momentum in the early 1990's. In 1993, Jegadeesh and Titman published the paper, “Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency.” Their research showed that momentum strategies based solely on historical pricing data outperformed over time. This was a serious blow to the Efficient Market Hypothesis because it had been commonly assumed no investment strategy based solely on publicly available data could

outperform the market over time. Their work has spawned scores of research papers on the topic of momentum and relative strength. Over time, research has shown that momentum exists over intermediate time horizons. Momentum also exists across asset classes, countries, and in many other areas. There has been so much research showing that momentum works that academics no longer dispute its value as an investment factor.

Part II: Traditional Testing Methods

Relative strength and momentum strategies have traditionally been tested in one of three ways. The first method is to take a predetermined number of securities and hold them in a portfolio for a predetermined time period. The top 50 high relative strength stocks, for example, might be held in a portfolio for 12 months. At the end of the 12 month period, all 50 stocks are sold, and the new 50 highest relative strength stocks are purchased. One of the biggest drawbacks to this strategy is the sensitivity to the start date of the portfolio. Very different results can be achieved if you form your portfolio at the end of June instead of at the end of December. Another major drawback to this method is the very small sample of securities that is included in the portfolio. It is difficult to determine the robustness of the strategy when dealing with such a small sample.

In order to increase sample size, many academic papers separate a large universe into deciles or quartiles. Instead of looking at how a small sample of securities performs, they are looking at how a

selection of several hundred securities, for example, is performing. This is a dramatic improvement over looking at a very small sample size. This method, however, suffers from some of the same problems as the previous model. When the portfolio is formed, several hundred securities are purchased and held until a pre-determined sale date. Sometimes portfolios are held 12 months, and some research shows portfolios being rebalanced at more frequent intervals. The tradeoff is a difficult one. Rebalancing on a more frequent schedule reduces the effects of the calendar, but also increases the turnover in the portfolio.

A third testing method used involves buying large numbers of securities in multiple portfolios for a pre-determined time period. The goal of this method is to reduce the effect of the formation date, while attempting to limit turnover. Each month, for example, the top decile of securities is purchased and held for 12 months. Because a new portfolio is formed each month, at any given time there are 12 portfolios open. Each month the maturing portfolio is sold and a new one is created. The other 11 portfolios remain untouched. This process can be run over any time period. Another way to run the test would be to run 6 portfolios and hold each one 6 months. As you can imagine, the number of securities held at any given time is quite large. While this method does limit the effects of the calendar, it also involves quite a bit of turnover and operational overhead.

It is also important to note that most academic studies (methods 2 and 3) focus on the spread between

Disadvantages Of Current Methods		
Top X Securities	Top Decile	Top Decile / Multi-Port
• Sensitive To Start Date • Small Sample Of Securities • Pre-Defined Rebalance	• Sensitive To Start Date • Large Number Of Holdings • Pre-Defined Rebalance	• Huge Number Of Holdings • Large Number Of Transactions • Pre-Defined Rebalance

high relative strength securities and low relative strength securities. When portfolios are formed, a low RS portfolio is formed and sold short, while the high RS portfolio is held long. These two portfolios form a “zero cost” long/short portfolio. This method does a good job testing whether ranking securities by relative strength provides a performance edge between the high- and low-ranked securities. However, in practice, most portfolios are not run in this fashion. The short side of the market has operational difficulties and is much less efficient to trade than the long side. In addition, many portfolios don’t even attempt to participate on the short side; they have long-only mandates.

Part III: Improved Testing Process

In order to account for many of the deficiencies we have identified in existing testing protocols, we developed a unique testing process to quantify the impact of implementing different relative strength factors in real-world portfolio situations. We developed our continuous,

Monte Carlo-based testing process from the ground up, and no part of it is commercially available. It is truly unique to us. When we developed the process, we wanted to move our testing from the realm of

factor testing to real-world implementation. While no testing process is perfect, we feel our unique method allows us to get a better view of how different portfolios and factors perform over time in different markets than many of the more widely used processes.

Our testing methodology allows us to do continuous portfolio testing rather than being limited to the fixed holding period testing used in other protocols. Actively managed portfolios are not necessarily rebalanced on a fixed schedule. We designed our process to trade the portfolios on an “as needed” basis. Each holding’s relative strength rank is examined weekly (or whatever time period we specify – it can be as frequently as daily), and if it needs to be sold, just that one holding is sold. Everything that still qualifies for inclusion remains in the portfolio. Sometimes a test will go weeks (and occasionally, months) without a trade. Other weeks, there will be a flurry of trades. But the main thing to remember is that the portfolios are being traded exactly like an actual account would be traded. We feel this is a dramatic improvement on the fixed holding period models that are used in almost all of the research we have seen. Our continuous process allows us to eliminate the calendar problems associated with fixed time period rebalancing, while also allowing turnover to remain at an acceptable level.

Advantages Of Our Testing Methods

- Not sensitive to start date or calendar effects
- Continuous portfolio testing
- Realistic number of holdings
- More optimal holding periods
- Monte Carlo process to ensure robustness

The second testing deficiency we wanted to improve on was the large number of holdings that result from many testing methodologies, particularly those favored in the academic commu-

nity. The universe of eligible securities can often number several thousand. If you are looking at the top decile of relative strength ranks, for example, you can easily wind up with several hundred securities in the portfolio. This can be implemented in an institutional setting, but is very cumbersome. Research also shows that concentrated portfolios,

while often more volatile, deliver better performance over time. Our Monte Carlo process restricts the portfolio to a smaller number of securities (usually 25 or 50) that is more easily implemented in real life, and that has the potential to overweight the real winners.

Because we don't hold every highly ranked security, and we trade on an "as needed" basis, we designed our testing process to determine if our tests were robust over time. Normally when you take a sub-set of highly ranked securities you just take, for example, the top 25 out of the top 100. The problem with this is that you never know if your back-tested results are the result of luck. What if just a handful of securities are driving the return? Going forward, what if you don't select one of those securities? Your actual results will never match the historical results. You can't be sure if your historical results are the result of a superior investment process or simply the good luck of picking a couple of stocks that are substantial winners.

Our Monte Carlo process was developed to answer all of these questions and solve the problems we identified in traditional testing methods. The goal of the process is simple: to create multiple portfolios and run them through time to identify superior RS factors and also to test the robustness of those factors. The process is very simple in theory (not so simple to program and implement however!). We define portfolio parameters before the test is run. These parameters include: the RS calculation method, number of holdings in the portfolio, buy rank threshold, and sell rank threshold. For this example, assume the number of portfolio holdings is 25, the buy threshold is the top decile of our ranks, and securities are sold when they fall out of the top half of our ranks. On the first day, there might be

100 securities in the top decile of ranks, but we only need 25. Our process selects 25 securities at random from the top decile and adds them to the portfolio. As the program moves to the next trading day it looks to see if any of the stocks in the portfolio has a rank below the top half. If so, that one security is sold, and another security is drawn at random from the top decile of ranks. This process is repeated on each trading day through the end of the test. Once we reach the end of the test, we archive all of the portfolio information and run another test with the exact same parameters. We generally run 100 simulations over the entire test period.

What we wind up with are 100 different return streams using the exact same parameters. Some of the portfolios perform better than others—that is simply the luck of the draw. What we can determine is the probability of outperforming a benchmark over time. Over short time periods such as a quarter or even a year, the returns can exhibit large variation. But after a 16-year simulation we can see how many of the 100 trials outperform. If 100% of the trials outperform, we know we have a robust process that isn't reliant on just a small number of lucky trades. It really speaks to the power of relative strength when we can draw stocks at random for a portfolio and have 100% of the trials outperform over time.

Part IV: Example Of The Process

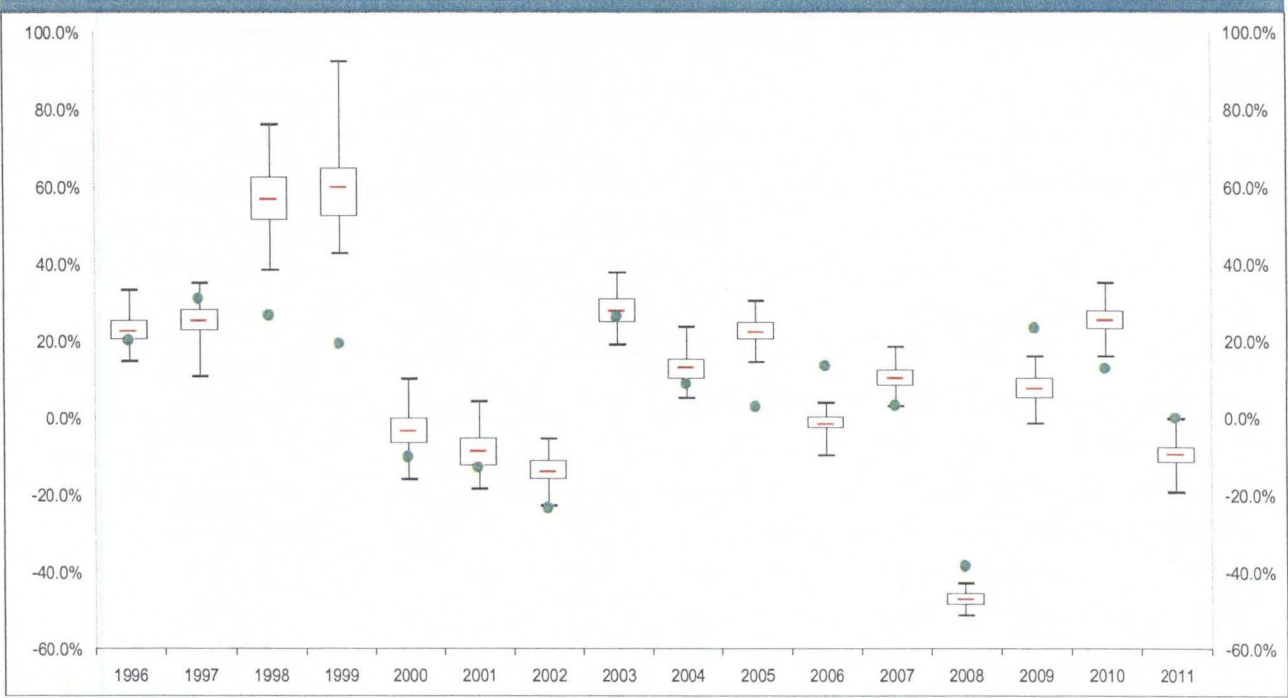
Table 1: Summary Data (Cumulative Returns)	
12/29/95—12/31/11	
# of Trials	100
Average Return	270.9%
Median Return	257.4%
Max Return	518.4%
Top Quartile	317.0%
Bottom Quartile	217.7%
Min Return	125.9%
S&P 500 Return	104.2%
% Trials Outperform	100%

The following example uses a simple 12-month price return to rank securities over the period 12/29/95-12/31/11. The investment universe is the S&P 900, which includes domestic large cap stocks (S&P 500) and domestic mid-cap stocks (S&P 400). To be eligible for inclusion in the portfolio, a stock's rank must be in top decile. Stocks are sold when their rank falls out of the top quartile of ranks. Fifty

securities are held in the portfolio. Table 1 shows a summary of the total returns for all 100 trials. Over the test period the lowest return of the 100 trials was 125.9% versus the return of the broad market (S&P 500) of 104.2%. So even drawing securities at random out of the top decile produces outperformance in 100% of the trials over the entire test period. Many of the trials are significantly above the return of the broad market.

Figure 1 shows a breakdown of returns year-by-year over the test period. The green dot represents the return of the benchmark, and the red line represents the average return of all 100 trials. Some years, such as 1998, 1999, 2005, and 2010, relative strength performs so well that all of the trials perform better than the market. Other years, such as 2006, 2008, and 2009, relative strength performs poorly and all 100 trials underperform the market. The most common scenario is to have some trials performing better than the market and some trials performing below the market. The large dispersion

Figure 1: Trial Returns By Year (12 Month Price Return Factor)



in returns within each individual year is also evident. Each of the 100 trials uses the same investment factor applied exactly the same way, but there is random chance involved when each security is selected. That element of chance can result in some trials outperforming and some trials underperforming over short time periods. We have found this is very common when testing relative strength strategies.

Even with all of the short-term variation, it's important not to lose sight of the big picture. Looking back to Table 1, all 100 trials outperformed over the entire 16-year period. This illustrates the need for patience when using relative strength. Investors are generally their own worst enemies. Research has shown that when choosing investments investors place too much emphasis on recent performance and actually wind up performing, in aggregate, worse than inflation (not just worse than a benchmark).

Relative strength is an intermediate-term factor. Most research has found that relative strength is a viable strategy over a 3-to 12-month formation period. At shorter and longer formation periods there is significant mean reversion. Our testing process is

also flexible enough to test random portfolios using different relative strength factors. Table 2 shows a summary of returns using different lookback periods for various relative strength ranking factors. Once again, the robust nature of relative strength is shown by the ability of multiple random trials to outperform using a variety of factors. Some of the intermediate-term factors work better than others, but they all exhibit a significant ability to outperform over time.

When portfolios are formed using a short lookback window (1 Month Lookback), or a very long lookback window (3 Year & 5 Year Lookbacks) the portfolios don't perform as well because there is significant mean reversion at these intervals. *(Note: This refers to the lookback window for calculating the RS factor, not the performance of the portfolio over a given time period.)*

Relative strength and momentum strategies have delivered market-beating returns for many years. There has been a great deal of research in this area by both practitioners and academics. However, despite this public disclosure of information, these strategies continue to outperform over time. Many of the testing methodologies used over the years are not consistent with real-world

Table 2: Factor Summary (Annualized Returns From 12/29/1995-12/31/2011)

RS Lookback Period	Hldgs	Avg *	Max *	Min *	Index *	% Outperf	Est Turn
1 Mo Price Lookback	50	3.3%	5.9%	0.3%	4.6%	10%	1385.4%
3 Mo Price Lookback	50	7.5%	10.3%	5.0%	4.6%	100%	564.0%
6 Mo Price Lookback	50	11.3%	14.9%	8.6%	4.6%	100%	302.0%
9 Mo Price Lookback	50	10.8%	12.6%	8.5%	4.6%	100%	210.7%
12 Mo Price Lookback	50	8.5%	12.1%	5.2%	4.6%	100%	157.8%
18 Mo Price Lookback	50	6.2%	10.2%	3.1%	4.6%	85%	111.8%
2 Year Price Lookback	50	6.0%	8.7%	3.1%	4.6%	89%	88.5%
3 Year Price Lookback	50	5.5%	8.2%	2.6%	4.6%	76%	59.6%
5 Year Price Lookback	50	5.0%	7.0%	1.9%	4.6%	53%	40.6%

* Annualized Returns

portfolio construction and do not address the possible range of outcomes when implementing a relative strength strategy. Our continuous, Monte Carlo testing process corrects for both of these deficiencies. Similar to other research, our process shows simple relative strength factors to be extremely robust over intermediate horizon formation periods,

and weak over very short-term and long-term horizons. We also find there can be great variation in portfolio returns over short time periods, but over long holding periods the portfolios perform exceptionally well.

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Model performance is shown for illustrative purposes only. You can't invest directly in the models shown. An actual portfolio's holdings may differ from the securities shown in the models. Actual portfolios may also use methodologies that differ from those shown in the models.

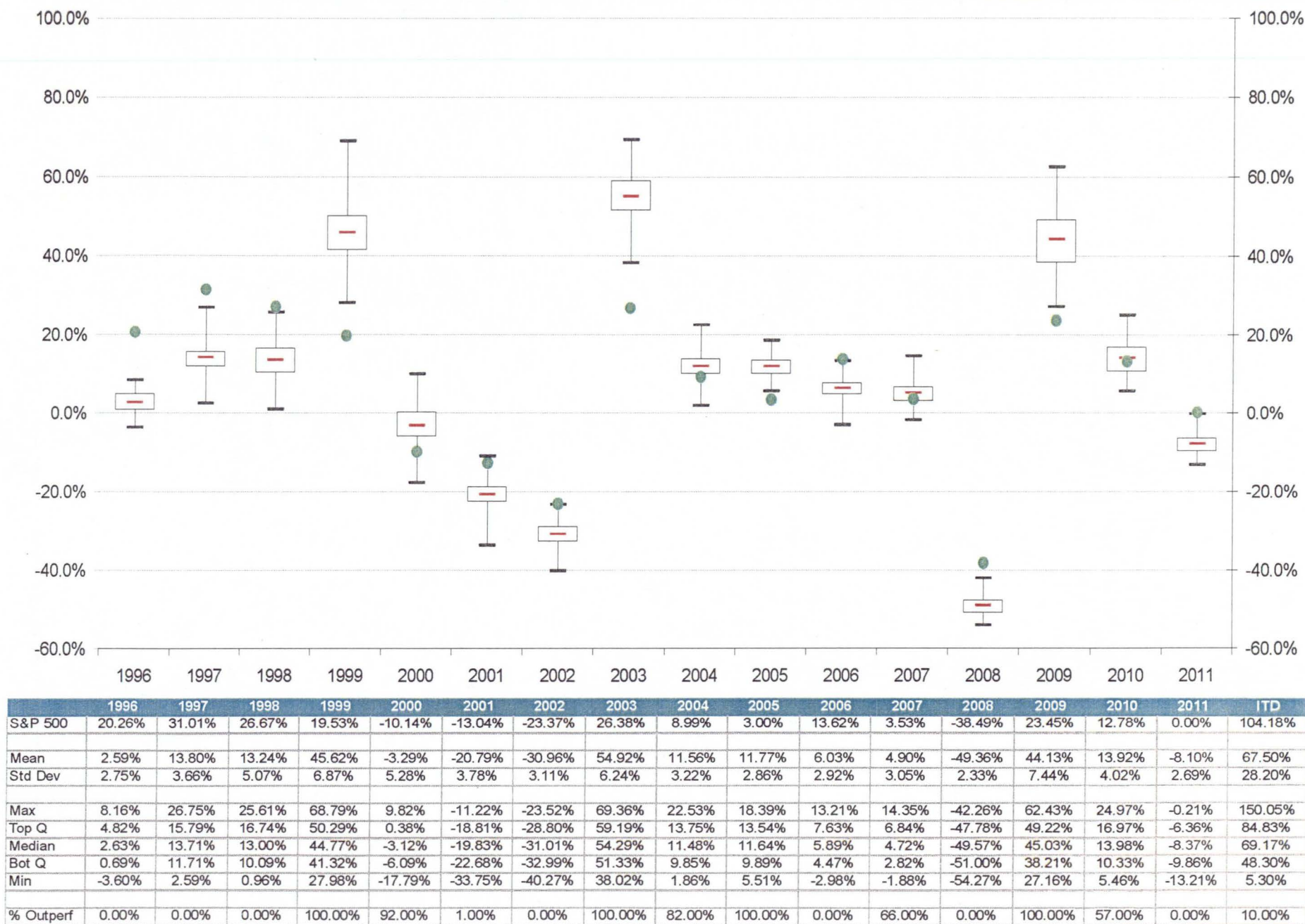
The returns of the models do not reflect the reinvestment of dividends. To be consistent, the returns in the Index (S&P 500) do not reflect the reinvestment of dividends. The returns of the models do not reflect any management fees, transaction costs, or other expenses that would reduce the returns of an actual portfolio.

The models shown were not calculated in real time and represent hypothetical back tested data for the time periods shown. Hypothetical back tested performance has inherent limitations.

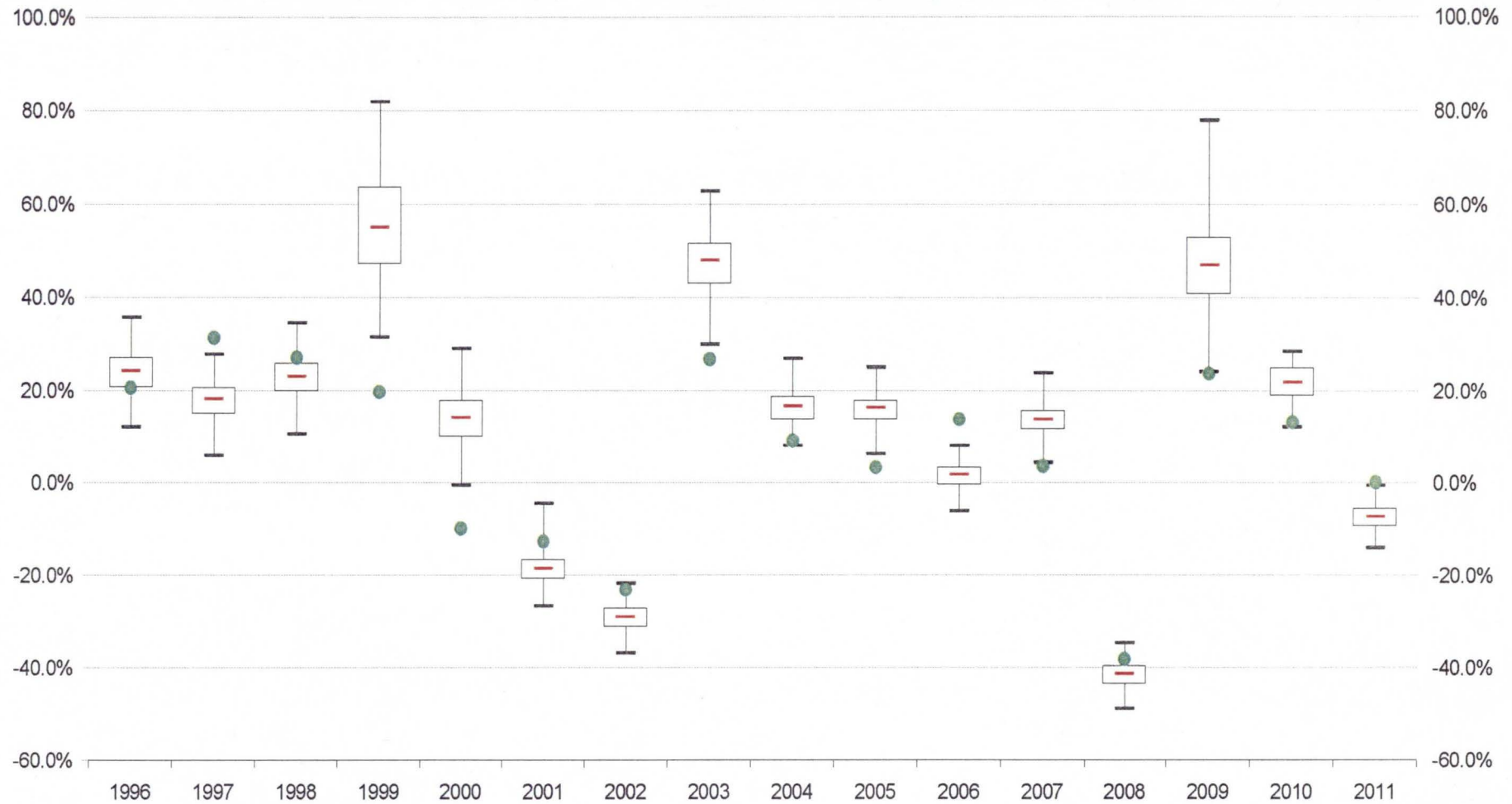
The back tested results were not audited by a third party. The models use some data provided by third parties and are not warranted or represented to be complete or accurate.

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Appendix 1: 1 Month Return Factor

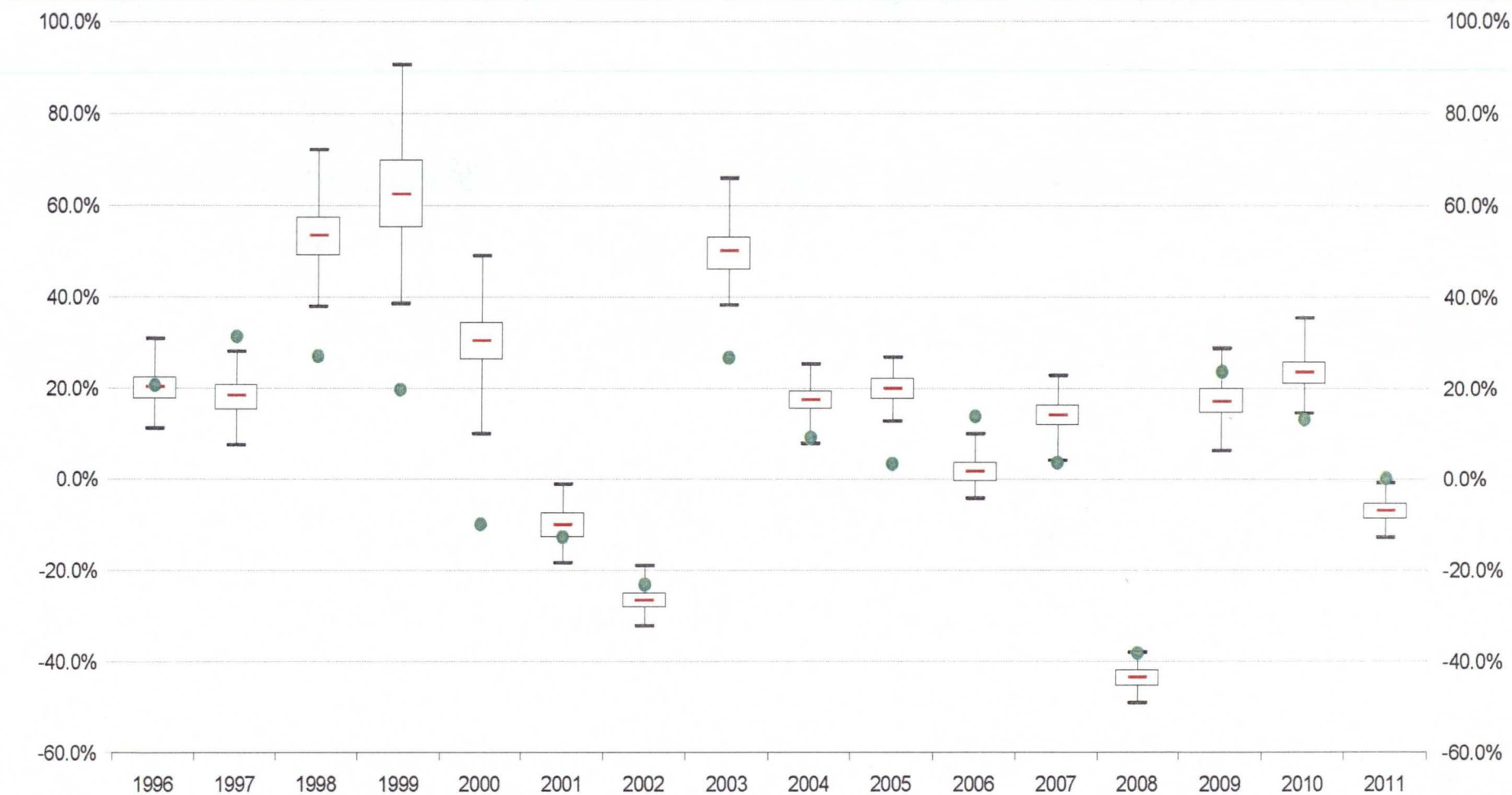


Appendix 2: 3 Month Return Factor



	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	ITD
S&P 500	20.26%	31.01%	26.67%	19.53%	-10.14%	-13.04%	-23.37%	26.38%	8.99%	3.00%	13.62%	3.53%	-38.49%	23.45%	12.78%	0.00%	104.18%
Mean	18.34%	20.93%	17.08%	57.44%	4.41%	-22.01%	-22.88%	42.47%	15.85%	8.14%	3.76%	21.84%	-44.51%	38.49%	20.44%	-7.78%	219.43%
Std Dev	3.80%	4.32%	4.85%	9.73%	6.20%	3.34%	2.45%	6.47%	3.79%	2.59%	3.11%	4.66%	2.66%	6.98%	3.38%	2.76%	55.41%
Max	27.11%	31.91%	30.45%	80.94%	20.23%	-15.35%	-16.71%	59.30%	26.13%	15.21%	10.41%	34.98%	-36.52%	56.82%	29.15%	-0.15%	381.76%
Top Q	20.68%	23.55%	20.26%	63.94%	8.28%	-19.36%	-21.02%	46.54%	18.06%	9.69%	5.99%	24.43%	-42.47%	42.99%	22.94%	-5.77%	252.67%
Median	18.29%	20.51%	17.50%	57.13%	4.76%	-22.02%	-22.96%	42.49%	15.39%	7.76%	3.99%	21.84%	-44.68%	37.97%	20.66%	-7.75%	214.64%
Bot Q	15.62%	17.86%	13.25%	50.15%	-0.78%	-23.95%	-24.40%	37.44%	13.03%	6.23%	1.82%	18.06%	-46.48%	33.51%	17.59%	-9.62%	177.99%
Min	10.03%	10.87%	6.81%	36.52%	-7.58%	-30.24%	-28.07%	29.29%	8.11%	2.30%	-4.76%	11.38%	-49.86%	21.32%	13.20%	-15.25%	117.75%
% Outperf	30.00%	1.00%	2.00%	100.00%	100.00%	0.00%	54.00%	100.00%	98.00%	98.00%	0.00%	100.00%	1.00%	99.00%	100.00%	0.00%	100.00%

Appendix 3: 6 Month Return Factor



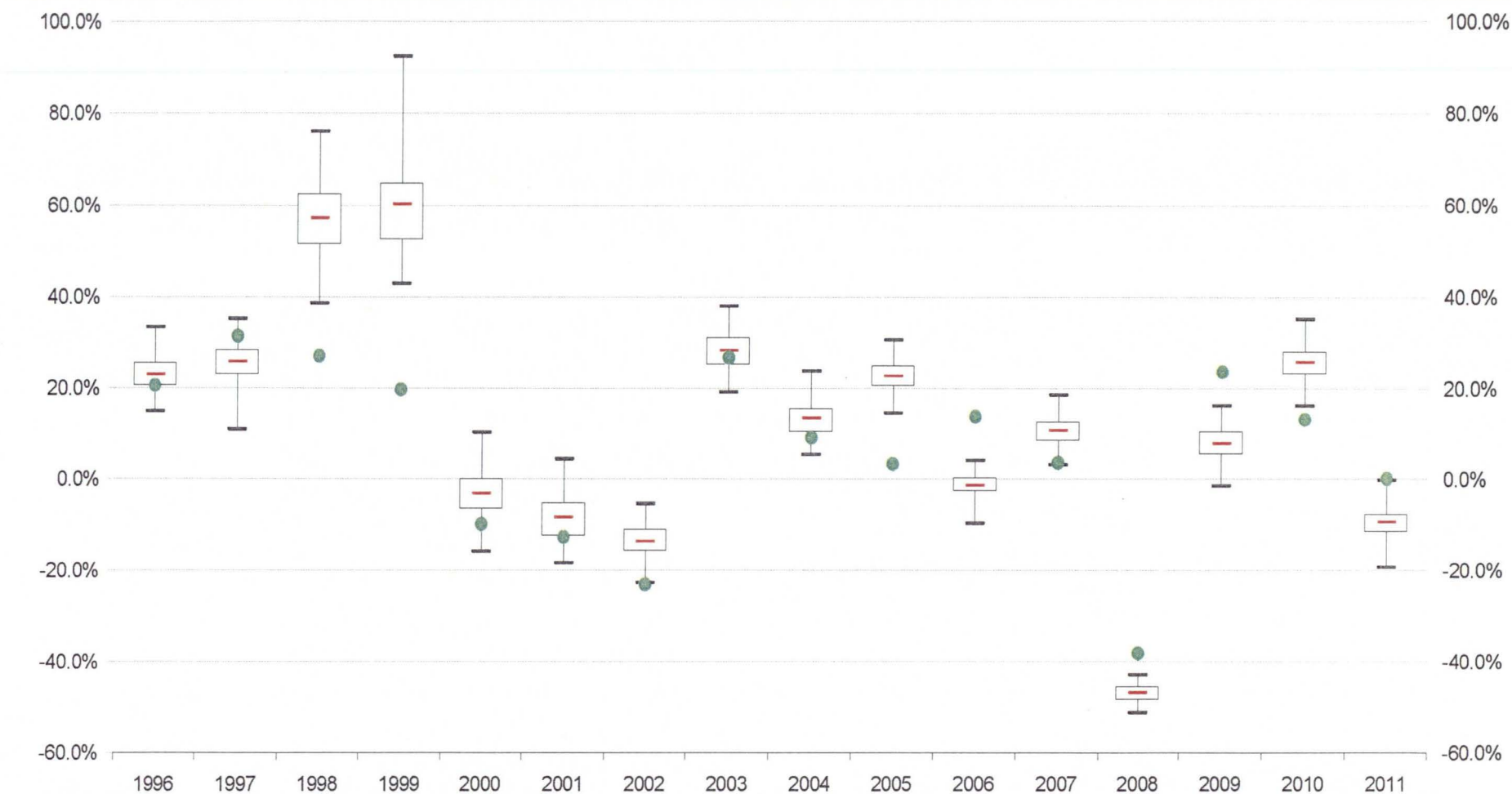
	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	ITD
S&P 500	20.26%	31.01%	26.67%	19.53%	-10.14%	-13.04%	-23.37%	26.38%	8.99%	3.00%	13.62%	3.53%	-38.49%	23.45%	12.78%	0.00%	104.18%
Mean	20.03%	18.09%	53.25%	62.06%	30.24%	-10.21%	-26.67%	49.89%	17.28%	19.54%	1.68%	13.91%	-43.78%	16.96%	23.54%	-6.96%	457.27%
Std Dev	3.93%	4.31%	7.03%	10.92%	7.15%	3.69%	2.51%	5.63%	3.28%	3.24%	3.03%	3.32%	2.48%	4.44%	3.96%	2.65%	102.78%
Max	30.68%	28.01%	71.91%	90.46%	48.85%	-1.15%	-18.93%	65.78%	25.28%	26.62%	9.91%	22.88%	-38.08%	28.67%	35.28%	-0.89%	826.90%
Top Q	22.41%	20.81%	57.46%	69.71%	34.49%	-7.50%	-25.07%	53.27%	19.25%	22.06%	3.61%	16.46%	-41.98%	20.03%	25.77%	-5.36%	523.48%
Median	20.21%	18.40%	53.77%	61.00%	30.36%	-10.42%	-26.68%	49.29%	17.41%	19.81%	1.75%	13.70%	-43.74%	16.78%	23.71%	-6.56%	443.63%
Bot Q	17.62%	14.99%	48.78%	55.09%	26.11%	-12.83%	-28.34%	45.98%	15.42%	17.39%	-0.55%	11.80%	-45.53%	14.60%	20.84%	-9.04%	380.35%
Min	11.16%	7.33%	37.78%	38.46%	9.80%	-18.41%	-32.26%	38.24%	7.74%	12.59%	-4.40%	4.12%	-49.11%	6.05%	14.56%	-12.97%	272.00%
% Outperf	48.00%	0.00%	100.00%	100.00%	100.00%	75.00%	8.00%	100.00%	98.00%	100.00%	0.00%	100.00%	3.00%	7.00%	100.00%	0.00%	100.00%

Appendix 4: 9 Month Return Factor



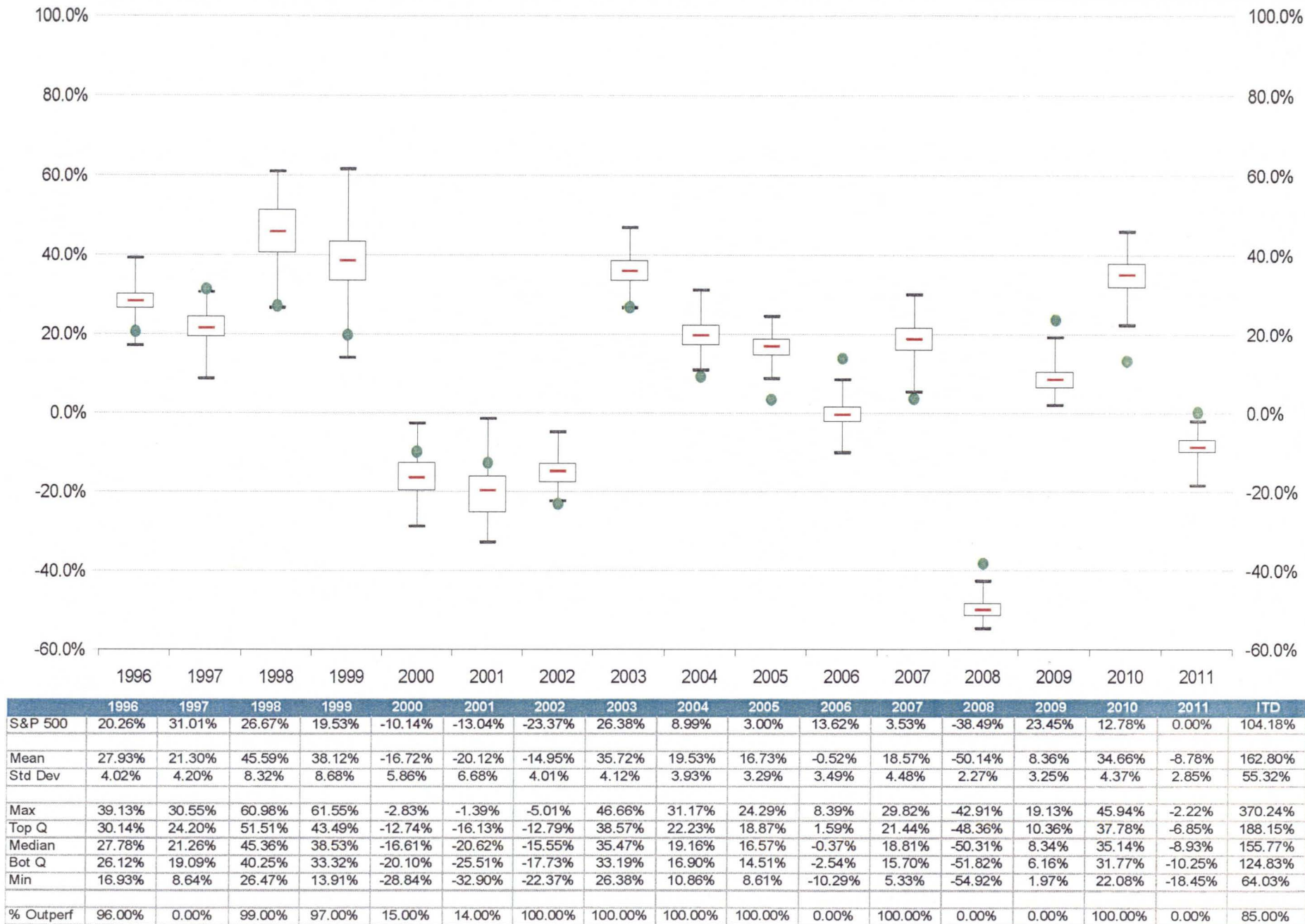
	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	ITD
S&P 500	20.26%	31.01%	26.67%	19.53%	-10.14%	-13.04%	-23.37%	26.38%	8.99%	3.00%	13.62%	3.53%	-38.49%	23.45%	12.78%	0.00%	104.18%
Mean	23.77%	23.87%	60.35%	58.64%	17.32%	-9.34%	-22.56%	40.09%	20.48%	26.53%	-0.29%	8.69%	-44.98%	14.21%	25.14%	-11.06%	418.46%
Std Dev	4.14%	4.07%	7.80%	10.34%	7.12%	3.18%	2.73%	4.53%	3.62%	3.70%	3.10%	3.34%	2.62%	3.72%	3.60%	2.38%	70.88%
Max	33.02%	33.20%	75.18%	91.43%	31.09%	-2.72%	-17.56%	49.27%	28.42%	37.38%	6.86%	17.28%	-39.17%	23.10%	37.31%	-5.79%	570.75%
Top Q	27.18%	26.82%	65.92%	66.02%	22.90%	-7.50%	-20.45%	43.66%	22.91%	28.84%	1.78%	10.87%	-43.08%	16.47%	27.56%	-9.39%	464.54%
Median	23.82%	23.95%	59.92%	57.32%	17.20%	-9.29%	-22.41%	39.59%	20.85%	26.30%	-0.15%	8.50%	-45.42%	14.02%	25.00%	-10.82%	416.23%
Bot Q	20.97%	20.82%	54.31%	52.95%	12.04%	-11.88%	-24.57%	37.17%	17.65%	24.47%	-2.45%	6.50%	-46.82%	11.08%	22.98%	-12.58%	367.45%
Min	13.75%	14.22%	40.94%	33.98%	1.93%	-16.43%	-32.75%	30.17%	10.80%	15.45%	-8.41%	0.48%	-50.23%	6.41%	16.30%	-18.00%	268.29%
% Outperf	80.00%	2.00%	100.00%	100.00%	100.00%	87.00%	62.00%	100.00%	100.00%	100.00%	0.00%	93.00%	0.00%	0.00%	100.00%	0.00%	100.00%

Appendix 5: 12 Month Return Factor

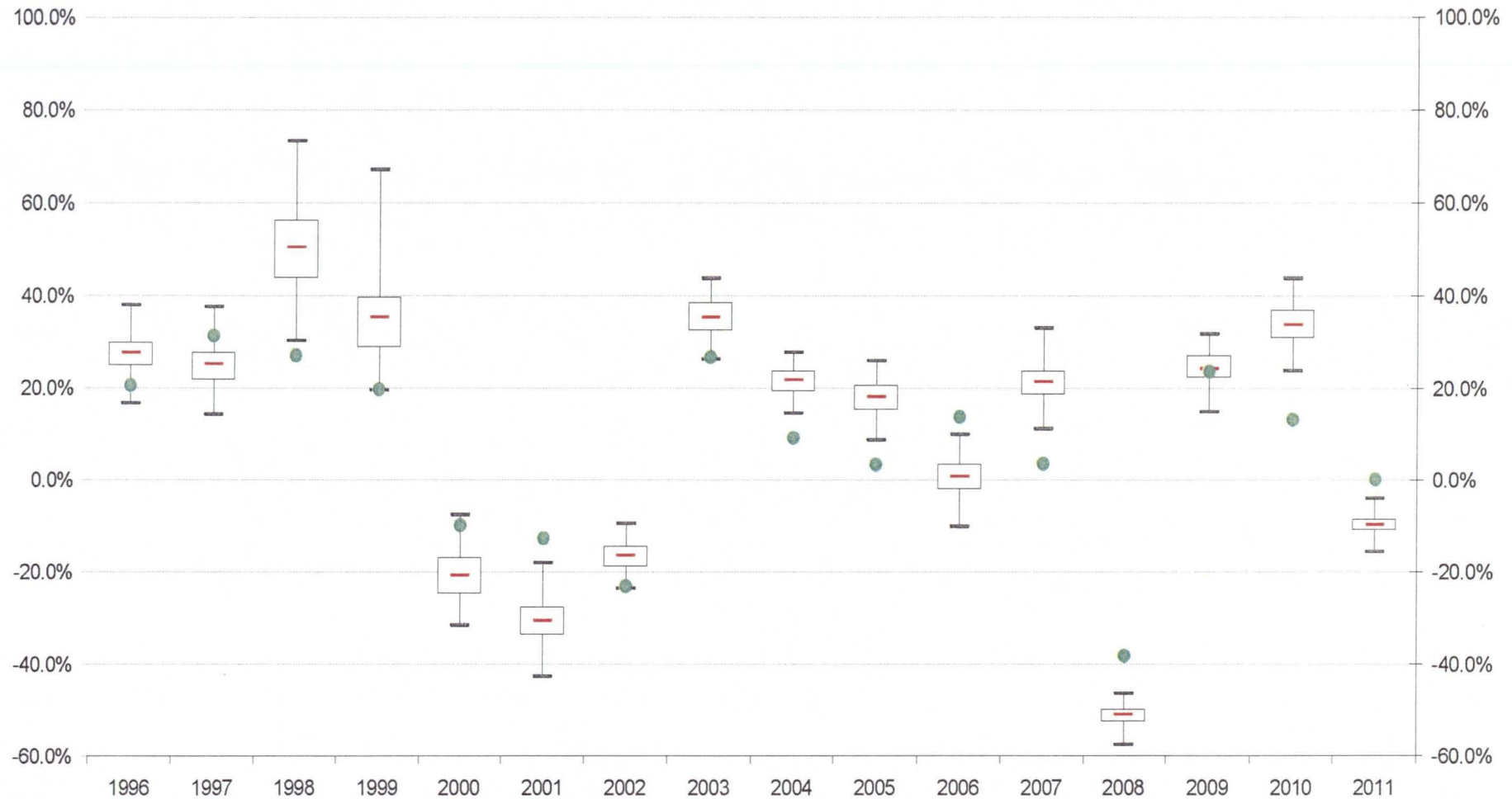


	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	ITD
S&P 500	20.26%	31.01%	26.67%	19.53%	-10.14%	-13.04%	-23.37%	26.38%	8.99%	3.00%	13.62%	3.53%	-38.49%	23.45%	12.78%	0.00%	104.18%
Mean	22.85%	25.48%	56.87%	60.12%	-3.28%	-8.67%	-13.77%	28.04%	13.13%	22.43%	-1.46%	10.43%	-46.94%	7.63%	25.48%	-9.62%	270.86%
Std Dev	3.66%	4.68%	8.68%	9.92%	5.64%	5.07%	3.68%	4.48%	3.86%	3.69%	2.69%	3.22%	1.95%	3.51%	3.70%	2.94%	74.14%
Max	33.30%	35.00%	75.85%	92.18%	10.16%	4.45%	-5.57%	37.87%	23.81%	30.53%	4.09%	18.45%	-43.11%	16.13%	34.95%	-0.31%	518.35%
Top Q	25.63%	28.19%	62.60%	65.05%	0.05%	-5.14%	-10.97%	31.06%	15.51%	25.05%	0.34%	12.72%	-45.50%	10.32%	27.95%	-7.79%	317.01%
Median	22.59%	25.57%	56.48%	58.62%	-2.96%	-9.29%	-13.88%	28.01%	13.39%	22.35%	-1.29%	10.56%	-46.57%	7.88%	25.49%	-9.80%	257.38%
Bot Q	20.35%	22.81%	51.30%	52.40%	-6.69%	-12.61%	-16.14%	24.95%	10.18%	20.41%	-2.82%	8.37%	-48.50%	5.37%	23.04%	-11.74%	217.69%
Min	14.87%	10.81%	38.54%	42.84%	-15.92%	-18.52%	-22.75%	18.93%	5.28%	14.31%	-9.77%	2.97%	-51.31%	-1.56%	15.92%	-19.39%	125.94%
% Outperf	76.00%	13.00%	100.00%	100.00%	88.00%	80.00%	100.00%	61.00%	85.00%	100.00%	0.00%	98.00%	0.00%	0.00%	100.00%	0.00%	100.00%

Appendix 6: 18 Month Return Factor

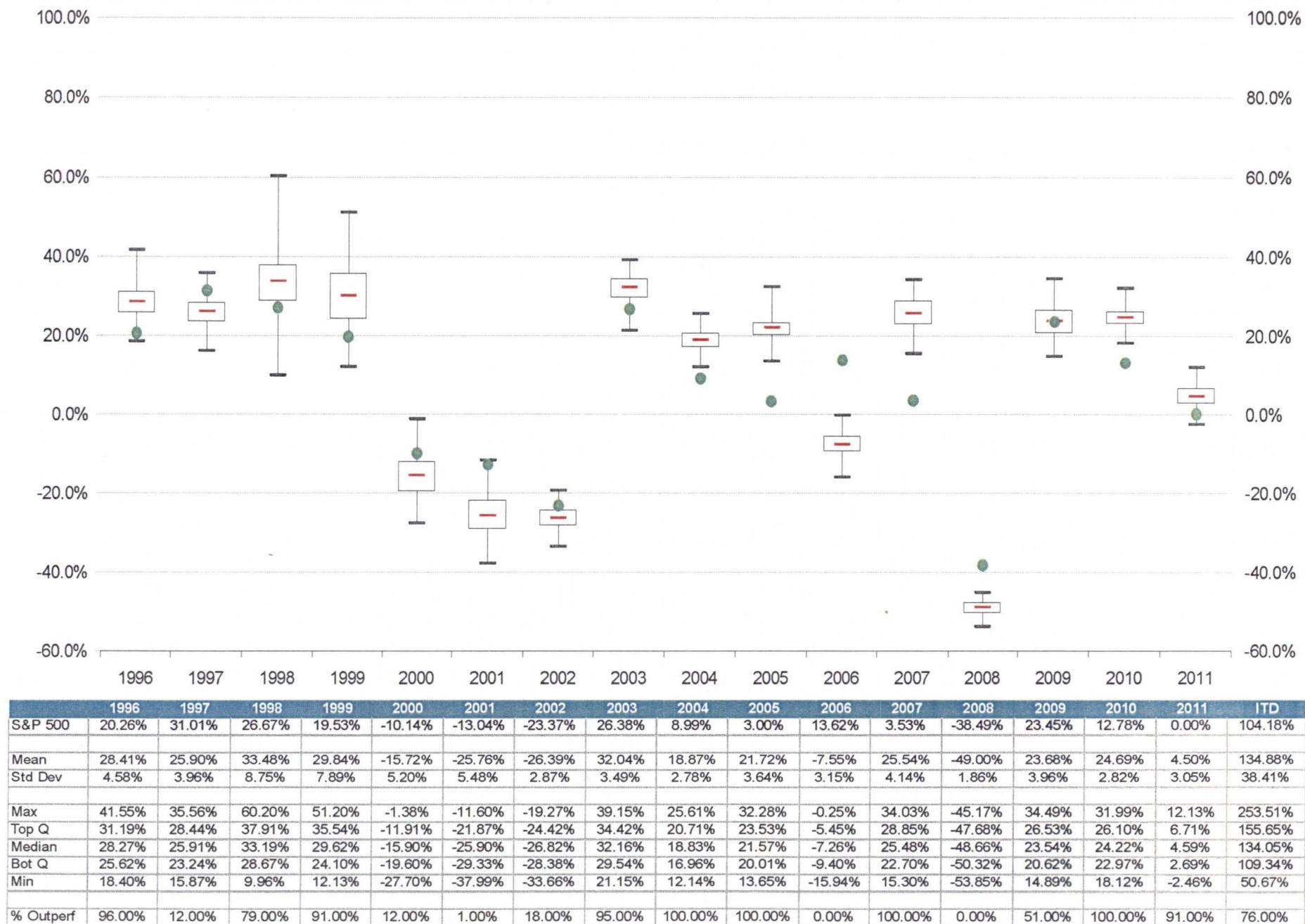


Appendix 7: 24 Month Return Factor



	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	ITD
S&P 500	20.26%	31.01%	26.67%	19.53%	-10.14%	-13.04%	-23.37%	26.38%	8.99%	3.00%	13.62%	3.53%	-38.49%	23.45%	12.78%	0.00%	104.18%
Mean	27.52%	24.85%	50.18%	35.01%	-21.03%	-30.64%	-16.51%	35.09%	21.40%	17.89%	0.76%	21.36%	-51.21%	23.98%	33.59%	-9.79%	153.88%
Std Dev	4.22%	4.30%	9.56%	8.50%	5.53%	4.97%	3.27%	3.73%	3.07%	3.56%	3.92%	3.96%	2.11%	3.91%	4.06%	2.17%	41.63%
Max	37.77%	37.59%	73.22%	66.95%	-7.82%	-18.24%	-9.65%	43.74%	27.68%	25.87%	9.95%	32.98%	-46.54%	31.65%	43.68%	-4.10%	280.73%
Top Q	29.89%	27.77%	56.16%	39.56%	-16.95%	-27.70%	-14.34%	38.36%	23.64%	20.73%	3.27%	23.82%	-49.77%	27.19%	36.94%	-8.68%	180.05%
Median	27.68%	25.25%	51.02%	34.07%	-20.86%	-30.76%	-16.26%	35.03%	21.40%	17.75%	1.06%	21.13%	-51.33%	23.82%	33.36%	-9.70%	152.05%
Bot Q	24.68%	21.69%	43.62%	28.76%	-25.05%	-33.82%	-18.96%	32.26%	19.08%	14.97%	-2.18%	18.45%	-52.74%	22.08%	30.76%	-11.00%	131.20%
Min	16.71%	14.21%	30.01%	19.24%	-31.81%	-42.63%	-23.81%	26.24%	14.46%	8.63%	-10.02%	11.14%	-57.54%	14.79%	23.78%	-15.78%	64.02%
% Outperf	96.00%	7.00%	100.00%	99.00%	4.00%	0.00%	98.00%	99.00%	100.00%	100.00%	0.00%	100.00%	0.00%	53.00%	100.00%	0.00%	89.00%

Appendix 8: 36 Month Return Factor



Appendix 9: 60 Month Return Factor



	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	ITD
S&P 500	20.26%	31.01%	26.67%	19.53%	-10.14%	-13.04%	-23.37%	26.38%	8.99%	3.00%	13.62%	3.53%	-38.49%	23.45%	12.78%	0.00%	104.18%
Mean	27.64%	25.80%	35.76%	28.96%	-6.50%	-19.89%	-31.91%	33.81%	17.42%	14.12%	-8.09%	14.66%	-49.62%	27.65%	20.58%	3.34%	117.63%
Std Dev	3.36%	4.12%	10.33%	8.92%	5.18%	4.98%	3.01%	3.72%	3.47%	2.96%	3.20%	4.68%	2.15%	3.77%	2.84%	2.55%	41.47%
Max	36.41%	38.37%	60.83%	56.94%	7.97%	-3.65%	-25.27%	44.98%	25.35%	22.97%	-0.84%	24.14%	-43.59%	39.30%	27.31%	11.13%	226.24%
Top Q	29.98%	28.64%	43.01%	34.13%	-3.04%	-16.56%	-29.43%	35.85%	19.48%	16.26%	-6.12%	18.06%	-48.20%	30.33%	22.43%	5.13%	146.34%
Median	27.56%	25.17%	35.50%	28.98%	-7.04%	-20.16%	-32.06%	33.64%	17.43%	14.00%	-8.09%	14.43%	-49.54%	27.83%	20.84%	3.38%	111.15%
Bot Q	25.36%	22.95%	28.48%	23.36%	-10.01%	-23.68%	-34.33%	31.25%	14.96%	11.76%	-10.40%	11.51%	-50.84%	25.25%	18.61%	1.54%	86.08%
Min	20.33%	17.04%	10.74%	9.54%	-16.54%	-30.56%	-38.26%	25.70%	9.53%	7.52%	-15.73%	1.93%	-55.47%	19.25%	13.93%	-3.33%	35.83%
% Outperf	100.00%	13.00%	79.00%	87.00%	77.00%	7.00%	0.00%	98.00%	100.00%	100.00%	0.00%	98.00%	0.00%	85.00%	100.00%	92.00%	53.00%

John Lewis, CMT

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Tactical Asset Allocation Using Relative Strength

Numerous academic and practitioner studies have shown relative strength—also known in academia as “momentum”—to be a robust factor that leads to outperformance. However, much of the academic research has been handicapped by testing methodologies that are not at all similar to the way that portfolios are managed in the real world. In a recent white paper, “Relative Strength and Portfolio Management,” we outlined our relative strength testing protocol using a universe of mid and large-cap U.S. securities. In this paper we expand the concept by using the same testing process on an entirely different universe composed of Exchange Traded Funds (ETF’s) representing global asset classes.

Part I: Background

Relative Strength and momentum strategies have been used by market technicians for stock selection for many years. All the way back in the 1950’s, George Chestnutt was publishing market letters with stocks and industry groups ranked based on relative strength. Chestnutt also used his research to manage the very successful no-load mutual fund, American Investors Fund.

In the 1960’s, Robert Levy published a book devoted to using relative strength in the investment process. Academics began to heavily research the topic of momen-

tum in the early 1990’s. They have continued to research the topic over the years, and have found momentum to hold up under many different conditions.

The majority of research has focused on U.S. common stocks. As more research has been done, it has expanded to include other asset classes. As with U.S. equities, relative strength is an effective factor at intermediate-term time horizons.

Part II: Universe Construction

The proliferation of ETF’s has opened access to a number of asset classes. Retail investors can now access commodity markets, for example, without the added complexity of investing in futures markets. International markets can also be accessed without having to trade on international exchanges. Most major asset classes, some which were only available to large institutional investors, are now available to retail investors.

In an asset allocation strategy, construction of the universe is extremely important. You need to make sure there is enough variation in assets to be able to allocate wherever the strength is around the globe. You also need to be able to concentrate the portfolio in certain areas during narrow markets.

Universe Composition

- | | | |
|--------------------|------------------------|--------------------------|
| • Domestic Sectors | • International Equity | • Currency |
| • Domestic Style | • Inverse Equity | • Government Bonds |
| • Alpha Generating | • Real Estate | • Specialty Fixed Income |
| • Global Equity | • Commodities | • Inverse |

The universe we have constructed spans a number of different asset classes (see Table). It contains nearly 100 ETF's from a variety of ETF sponsors. The portfolio can invest both domestically and abroad. The asset classes range from traditional assets, such as equities and fixed income, to alternative assets like commodities, currencies, and real estate. We have also included several inverse ETF's that are designed to go up when the markets they track decline. The universe we have constructed allows the portfolio to be a go-anywhere tactical asset allocation portfolio that can thrive under a number of different market conditions.

classes are included in the portfolio and then held until a pre-determined sale date. Sometimes portfolios are held 12 months, while other researchers rebalance more frequently. One problem with this method is that you don't know in advance what the optimal holding period should be. There are times when it would be advantageous to hold the asset class much longer than 12 months, while under different conditions it would be best to hold it well under 12 months. Another problem with a fixed rebalance schedule is sensitivity to calendar effects. Depending on the month the portfolios are rebalanced you can have a large variation in results. These effects are also magnified when a very small number of securities are included in the portfolio.

Part II: Traditional Testing Methods

Testing relative strength and momentum strategies on asset class rotation models has traditionally involved holding a small number of securities in a portfolio. Very broad indexes are normally used as representatives of a market or asset class. This small sample size increases the risk of data-snooping bias. Under these conditions, a large percentage of the test's return can come from a very small number of securities. You can never be sure if that will continue in the future. If the same global dynamics that existed in the past cease to exist in the future, your model may or may not continue to deliver superior performance.

Another drawback of traditional testing methods is that they often rely on a fixed rebalance period. When the portfolio is formed, qualifying asset

Part III: Improved Testing Process

In order to account for many of the deficiencies we have identified in existing testing protocols, we developed a unique testing process to quantify the impact of implementing different relative strength factors in real-world portfolio situations. We developed our continuous, Monte Carlo-based testing process from the ground up, and no part of it is commercially available. It is truly unique to us. When we developed the process, we wanted to move our testing from the realm of factor testing to real-world implementation. While no testing process is perfect, we feel our unique method allows us to get a better view of how different portfolios and factors perform over time in different markets than many of the more widely used processes.

Our testing methodology allows us to do continuous portfolio testing rather than being limited to the fixed holding periods used in other protocols. Actively managed portfolios are not necessarily rebalanced on a fixed schedule. We designed our process to trade the portfolios on an “as needed” basis. Each holding’s relative strength rank is examined weekly (or whatever time period we specify – it can be as frequently as daily), and if it needs to be sold, just that one holding is sold. Everything that still qualifies for inclusion remains in the portfolio. Sometimes a test will go weeks (and occasionally months) without a trade. Other weeks, there will be a flurry of trades. But the main thing to remember is that the portfolios are being traded exactly like an actual account would be traded. We feel this is a dramatic improvement on the fixed holding period models that are used in almost all of the research we have seen. Our continuous process allows us to eliminate the calendar problems associated with fixed time period rebalancing, while also allowing turnover to remain at an acceptable level.

The portfolios in these tests are designed to own 10 ETF’s. Because we don’t hold every highly ranked security, and because we trade on an “as needed” basis, we designed our testing process to determine if our models were robust over time. Normally when you take a sub-set of highly ranked securities you just take, for example, the top 10 out of the top 75. The problem with this is that you never know if your back-tested results are the result of luck. What if just a

handful of securities are driving the return? Going forward, what if you don’t select one of those securities? Your actual results will never match the historical results. You can’t be sure if your historical results are the result of a superior investment process or simply the good luck of picking a couple of stocks that are substantial winners.

Our Monte Carlo process was developed to answer all of these questions and solve the problems we identified in traditional testing methods. The goal of the process is simple: to create multiple portfolios and run them through time to identify superior RS factors and also test the robustness of those factors. The process is very simple in theory (not so

simple to program and implement however!). We define portfolio parameters before the test is run. These parameters include: the RS calculation method, number of holdings in the portfolio, buy rank threshold, and sell rank threshold. For this ex-

ample, assume the number of portfolio holdings is 10, the buy threshold is the top quartile of our ranks, and securities are sold when they fall out of the top quartile of our ranks. On the first day, there might be 15-20 securities in the top quartile of ranks, but we only need 10. Our process selects 10 ETF’s at random from the top quartile and adds them to the portfolio. As the program moves to the next trading day it looks to see if any of the asset classes in the portfolio has a rank below the top quartile. If so, that one ETF is sold, and another one is drawn at random from the top quartile of ranks. This process is

Advantages Of Our Testing Methods

- Not sensitive to start date or calendar effects
- Continuous portfolio testing
- Realistic number of holdings
- More optimal holding periods
- Monte Carlo process to ensure robustness

repeated on each trading day through the end of the test. Once we reach the end of the test, we archive all of the portfolio information and run another test with the exact same parameters. We generally run 100 simulations over the entire test period.

What we wind up with are 100 different return streams using the exact same parameters. Some of the portfolios perform better than others—that is simply the luck of the draw. What we can determine is the probability of outperforming a benchmark over time. Over short time periods such as a quarter or even a year, the returns can exhibit large variation. But after a 12-year simulation we can see how many of the 100 trials outperform. If 100% of the trials outperform, we know we have a robust process that isn't reliant on just a small number of lucky trades. It really speaks to the power of relative strength when we can draw ETF's at random for a portfolio and have 100% of the trials outperform over time.

Part IV: Example Of The Process

The following example uses a simple 6-month price return to rank securities over the period 12/31/99-12/31/11. The investment universe is the global asset class universe discussed in Section II. To be eligible for inclusion in the portfolio, an ETF's rank must be in top quartile. Securities are sold when their rank falls out of the top quartile of ranks. Ten ETF's are held in the portfolio. A summary of the return data for all 100 trials is shown in Table 1. Over the test period the lowest return of the 100 trials was 121.6% versus the return of the broad equity market (S&P 500) of -14.1%, the broad fixed income market (Barclays Aggregate) of 112.4%, and a 60/40 mix of stocks and bonds of 74.0%. So even drawing securities at random out of the top quartile produces outperformance in 100% of the trials over the entire test period versus several major asset class benchmarks.

Table 1: Summary Data (Cumulative Returns)	
12/31/99—12/31/11	
# of Trials	100
Average Return	198.8%
Median Return	197.4%
Max Return	294.0%
Top Quartile	211.2%
Bottom Quartile	178.0%
Min Return	121.6%
S&P 500 Return	-14.1%
% Trials Outperforming S&P 500	100%
60/40 Balanced Index Return	74.0%
% Trials Outperform 60/40 Balanced Index	100%
Barclays Aggregate Bond Return	112.4%
% Trials Outperform Barclays Agg Bond	100%

Figure 1: Trial Returns By Year (6 Month Lookback For Ranking RS)

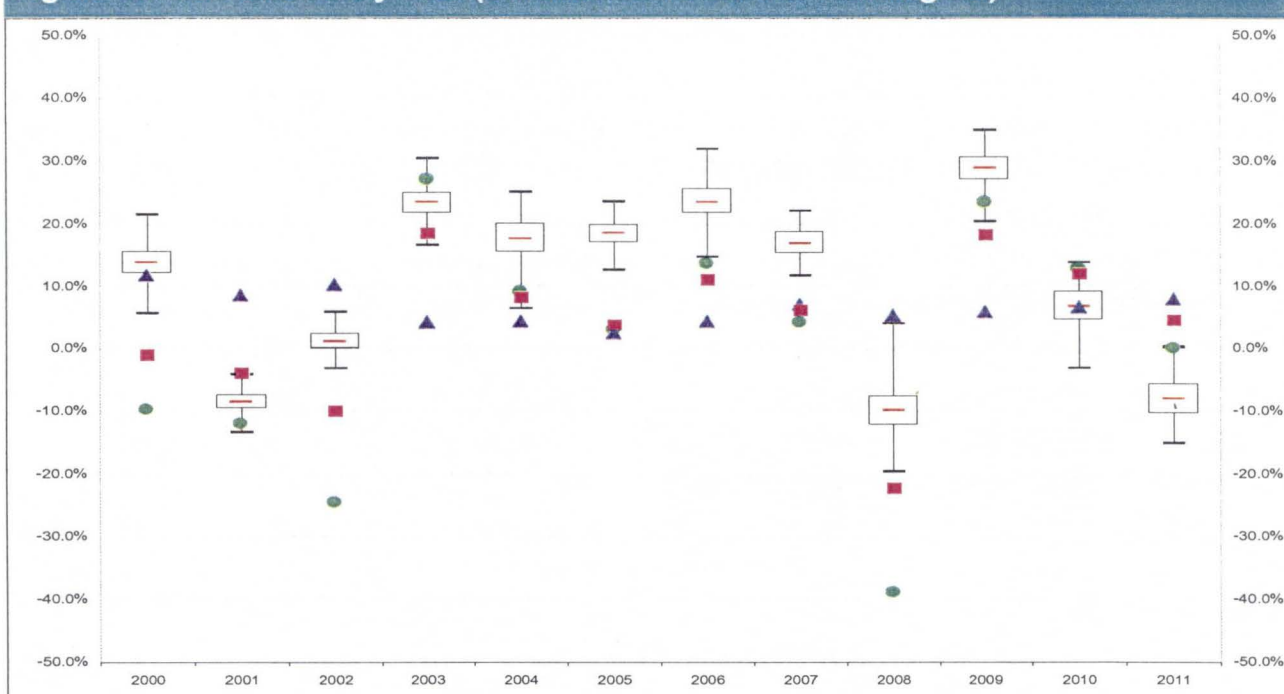


Figure 1 shows a breakdown of returns year by year over the test period. The green dot represents the return of the S&P 500, the blue triangle represents the return of the Barclays Aggregate Bond index, the pink square is a 60/40 mix of equities and bonds, and the red line represents the average return of all 100 trials. Some years, such as 2005 and 2006, relative strength performs so well that all of the trials perform better than all of the benchmarks. Other years, such as 2011, relative strength performs poorly and most or all of the 100 trials under-

perform all the benchmarks except bonds. The most common scenario is to have some trials performing better than the market and some trials performing below the market. The large dispersion in returns within each individual year is also evident. Each of the 100 trials uses the same investment factor applied exactly the same way, but there is random chance involved when each security is selected. That element of chance can result in some trials outperforming and some trials underperforming over short time periods. We have found this is very

Table 2: Factor Summary (Returns From 12/31/99-12/31/11)

RS Window	Hldgs	Avg*	Max*	Min*	% Trials Outperf Stocks	% Trials Outperf 60/40	% Trials Outperf Bonds	Est Annual Turnover
1 Mo Lookback	10	3.6%	6.6%	1.0%	100%	12%	1%	1680.6%
3 Mo Lookback	10	6.6%	9.4%	3.8%	100%	94%	49%	824.0%
6 Mo Lookback	10	9.6%	12.1%	6.9%	100%	100%	100%	452.6%
9 Mo Lookback	10	7.9%	10.2%	5.5%	100%	100%	94%	332.1%
12 Mo Lookback	10	7.4%	9.6%	5.7%	100%	100%	82%	268.4%
18 Mo Lookback	10	5.2%	7.1%	3.0%	100%	72%	7%	176.6%
2 Year Lookback	10	5.6%	7.7%	2.8%	100%	81%	14%	138.0%

* Annualized Returns

common when testing relative strength strategies.

Even with all of the short-term variation, it's important not to lose sight of the big picture. Looking back to Table 1, all 100 trials outperformed the major asset class benchmarks over the entire 11-year period. This illustrates the need for patience when using relative strength. Investors are generally their own worst enemies. Research has shown that when choosing investments, investors place too much emphasis on recent performance and often wind up performing, in aggregate, worse than inflation (not just worse than a benchmark).

Relative strength is an intermediate-term factor. Most research has found that relative strength is a viable strategy over a 3-to 12-month formation period. (*Note: This refers to the window used for RS Factor formulation, not the performance of the overall portfolio over certain time periods.*) Our testing process is also flexible enough to test random portfolios using different relative strength factors. Table 2 shows a summary of returns using different lookback periods for various relative strength ranking factors. Once again, the robust nature of relative

strength is shown by the ability of multiple random trials to outperform using a variety of factors. Some of the intermediate-term factors work better than others, but they all exhibit a significant ability to outperform over time. At very short lookback periods, such as 1 month, the performance is not as good as at longer periods. Relative strength models are not designed to catch every small wiggle, and investors need to allow positions to ebb and flow over time. It is also clear from Table 2 that as you begin to lengthen your lookback period, returns begin to degrade. While a long-term buy and hold approach to a relative strength strategy is necessary, the investments *within* the strategy are best rotated on an intermediate-term time horizon.

Part V: Changing Volatility

One interesting benefit of an asset class rotation strategy based on relative strength is how it manages volatility. As investment themes come in and out of favor, an RS strategy rotates to the themes that are currently in favor. When volatile assets, such as stocks, are declining, an RS strategy might rotate into a much less volatile asset

Figure 2: Trailing 12 Month Betas vs. S&P 500



class, like bonds or currencies, that is holding up better. This rotation helps make the portfolio more volatile when volatile assets are performing well, and less volatile when risky assets are out of favor.

Figure 2 shows the trailing 12-month beta of a relative strength strategy and a 60/40 equity/bond portfolio compared to the S&P 500. In order to calculate the beta for the RS strategy we selected the one portfolio's return stream out of the 100 trials that was closest to the average return. We then calculated the beta versus the S&P 500 over rolling 12 month periods.

The beta of a 60/40 strategy remains very stable over the testing period. The beta of an RS strategy, however, changes dramatically. In the equity bear market of 2001-2002, the portfolio had very little correlation with the S&P 500, and even dipped to a negative beta near the end. As markets improved in 2003, the RS rotation strategy increased its correlation to the S&P 500. Looking back to Figure 1 shows why the portfolio had such a high beta from 2004-2007. The strategy dramatically outperformed the benchmarks during these years. When the strategy is outperforming, it finds the most volatile assets that are appreciating more than the broad benchmarks. As the markets began to favor less risky assets in late 2007 and 2008, the relative strength process began to cut back the volatility of the overall portfolio and the correlation to equities.

Managing the overall volatility of the portfolio was not considered in our testing process. The adaptive nature of a relative strength ranking system forces the portfolio to hold assets that are holding up well relative to other assets. During periods when risky assets are rewarded, the portfolio will be more vola-

tile. When risky assets falter, a relative strength process forces them out of the portfolio in favor of less volatile assets.

Part V: Conclusion

Relative strength strategies have a long history of delivering market-beating returns. A great deal of research in this area has been devoted to models using common stocks. While some studies show that RS works well using asset class data, the body of research is not as large.

Our research shows that relative strength is a very valuable factor for selecting asset classes. When looking at the relative performance of various asset classes over an intermediate-term time horizon it is certainly possible to achieve returns better than standard, broad-based benchmarks. Achieving these returns often requires patience because relative strength strategies can get out of synch with the market. However, the adaptive nature of relative strength allows the process to adapt to the changing leadership over time.

Our Monte Carlo testing process also shows that the disciplined application of the relative strength process is more important than actual security selection. We were able to draw ETF's at random out of a sub-set of highly ranked securities. Over time it was not important which ETF's were actually selected. When using a proper time horizon to measure relative strength, all 100 trials outperformed the broad-based benchmarks, even picking securities at random. This indicates that investors would be wise to focus on a disciplined application of the process rather than spending all of their time on individual asset class selection.

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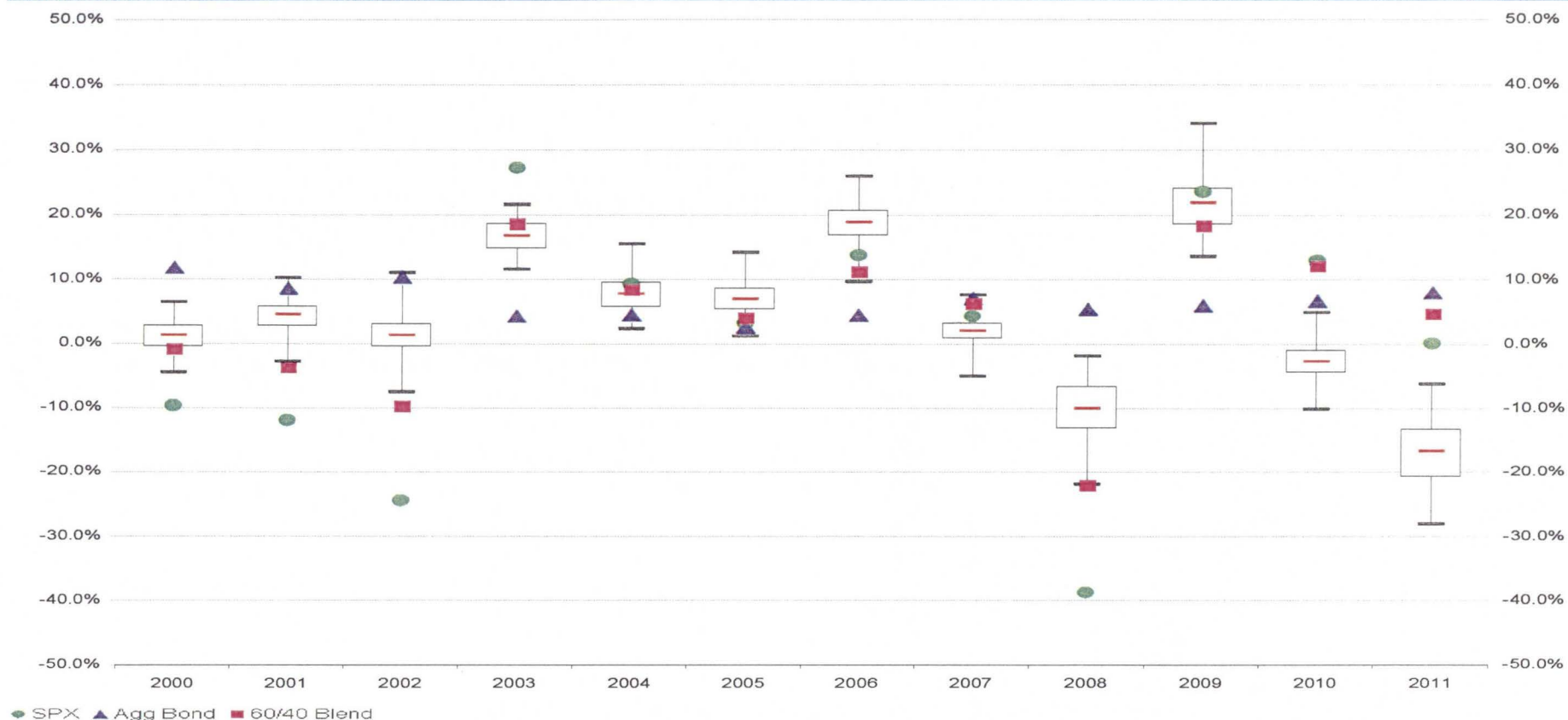
The models shown were not calculated in real time and represent hypothetical back tested data for the time periods shown. Hypothetical back tested performance has inherent limitations.

The back tested results were not audited by a third party. The models use some data provided by third parties and are not warranted or represented to be complete or accurate.

Index data was used for some indexes before ETF price data was available. The index data may come from either a public source or directly from the ETF Sponsor.

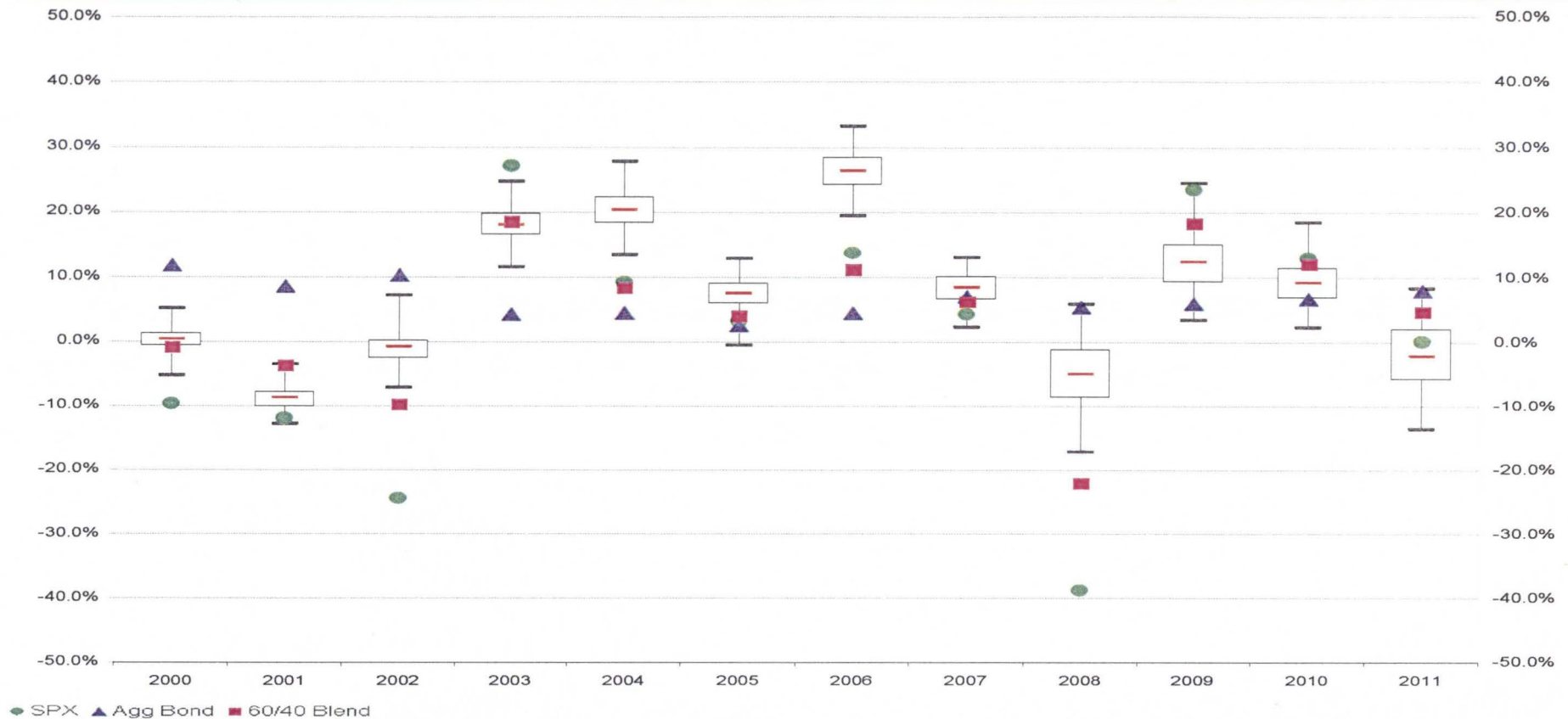
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Appendix 1: 1 Month Return Factor



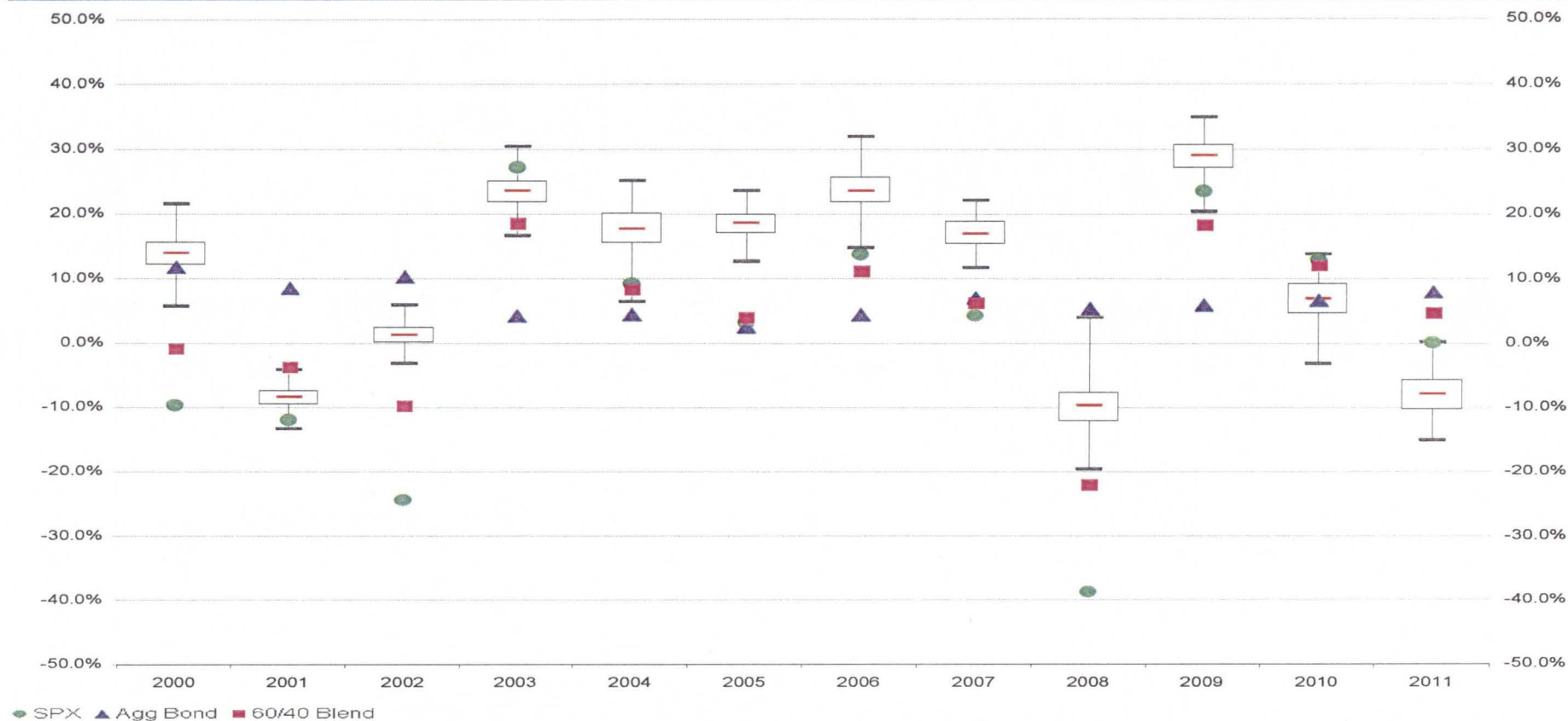
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	ITD
S&P 500	-9.85%	-12.06%	-24.60%	27.02%	8.99%	3.00%	13.62%	4.24%	-38.91%	23.45%	12.78%	0.00%	-14.13%
Agg Bond	11.62%	8.45%	10.25%	4.10%	4.34%	2.43%	4.33%	6.97%	5.24%	5.93%	6.56%	7.86%	112.36%
60/40 Blend	-1.00%	-3.71%	-9.82%	18.48%	8.30%	4.00%	11.12%	6.22%	-22.06%	18.39%	12.13%	4.70%	73.99%
Mean	1.15%	4.25%	1.22%	16.64%	7.62%	6.86%	18.66%	1.89%	-10.23%	21.77%	-2.81%	-16.84%	53.01%
Std Dev	2.45%	2.63%	2.79%	2.54%	2.74%	2.37%	3.29%	2.09%	4.47%	4.12%	2.96%	4.89%	17.90%
Max	6.36%	10.26%	10.91%	21.42%	15.47%	14.17%	25.76%	7.51%	-1.82%	33.99%	4.99%	-6.32%	114.33%
Top Q	2.88%	5.86%	3.06%	18.66%	9.59%	8.60%	20.79%	3.11%	-6.66%	24.07%	-0.90%	-13.26%	64.24%
Median	0.79%	4.31%	1.37%	16.65%	7.29%	7.08%	18.76%	1.92%	-10.20%	21.85%	-2.46%	-17.29%	54.41%
Bot Q	-0.55%	2.64%	-0.65%	14.74%	5.59%	5.23%	16.72%	0.69%	-13.27%	18.49%	-4.48%	-20.78%	41.30%
Min	-4.55%	-2.90%	-7.63%	11.56%	2.22%	1.13%	9.66%	-5.08%	-21.88%	13.61%	-10.22%	-28.08%	12.46%
% Outperf S&P	100.00%	100.00%	100.00%	0.00%	32.00%	94.00%	94.00%	12.00%	100.00%	32.00%	0.00%	0.00%	100.00%
% Outperf Bonds	0.00%	6.00%	1.00%	100.00%	88.00%	97.00%	100.00%	1.00%	0.00%	100.00%	0.00%	0.00%	1.00%
% Outperf 60/40	83.00%	100.00%	100.00%	32.00%	41.00%	89.00%	99.00%	1.00%	100.00%	76.00%	0.00%	0.00%	12.00%

Appendix 2: 3 Month Return Factor



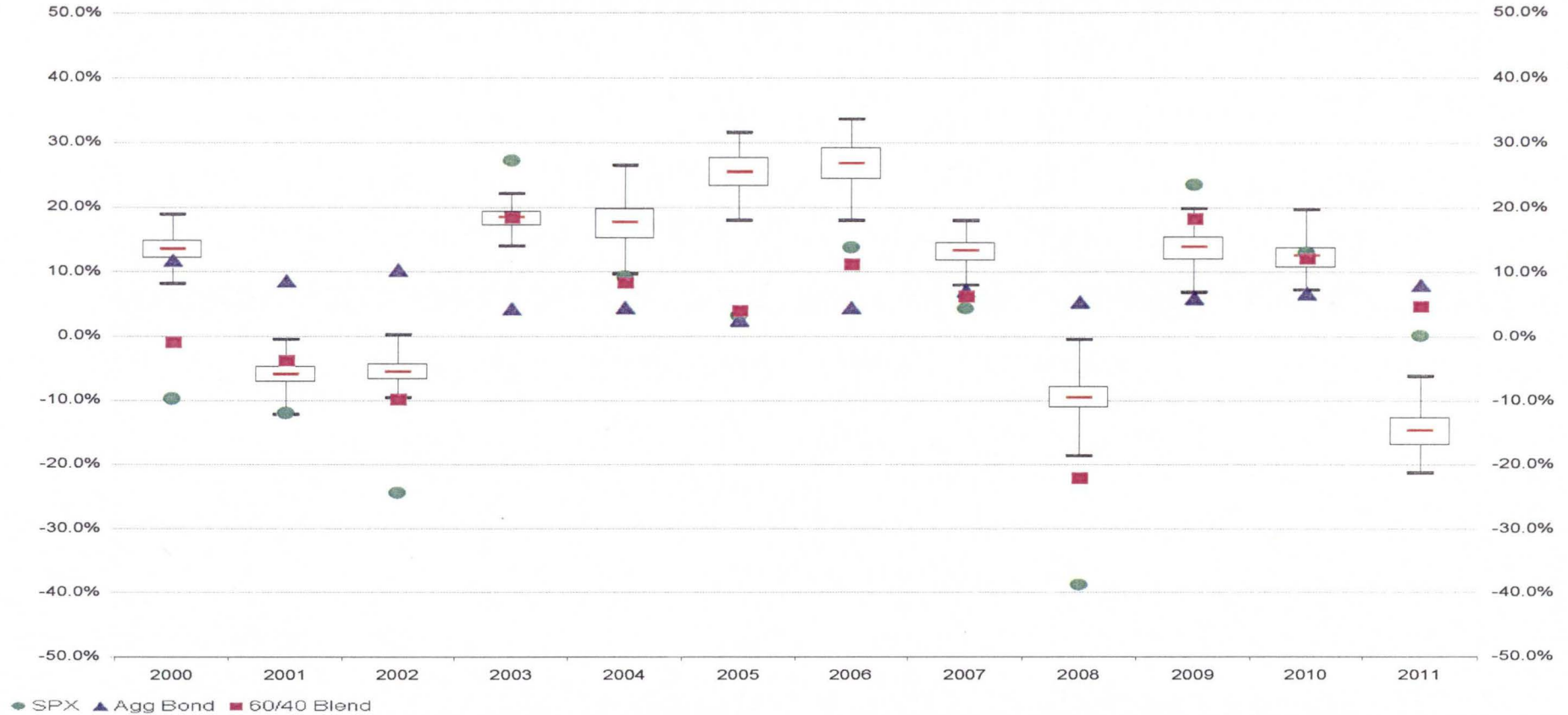
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	ITD
S&P 500	-9.85%	-12.06%	-24.60%	27.02%	8.99%	3.00%	13.62%	4.24%	-38.91%	23.45%	12.78%	0.00%	-14.13%
Agg Bond	11.62%	8.45%	10.25%	4.10%	4.34%	2.43%	4.33%	6.97%	5.24%	5.93%	6.56%	7.86%	112.36%
60/40 Blend	-1.00%	-3.71%	-9.82%	18.48%	8.30%	4.00%	11.12%	6.22%	-22.06%	18.39%	12.13%	4.70%	73.99%
Mean	0.12%	-8.81%	-0.93%	17.90%	20.19%	7.40%	26.31%	8.34%	-5.15%	12.22%	9.14%	-2.18%	114.32%
Std Dev	1.81%	1.77%	2.31%	2.62%	3.15%	2.52%	2.92%	2.27%	5.14%	4.16%	3.35%	5.06%	25.75%
Max	5.07%	-3.63%	7.08%	24.64%	27.78%	12.92%	33.23%	13.06%	5.78%	24.47%	18.57%	8.36%	193.88%
Top Q	1.32%	-7.74%	0.28%	19.74%	22.36%	9.08%	28.40%	10.12%	-1.20%	15.10%	11.57%	2.05%	131.23%
Median	0.07%	-8.81%	-0.94%	17.85%	19.91%	7.60%	26.34%	8.80%	-5.24%	12.17%	9.10%	-2.56%	111.08%
Bot Q	-0.84%	-10.21%	-2.62%	16.33%	18.25%	5.92%	24.17%	6.62%	-8.74%	9.30%	6.88%	-5.81%	96.49%
Min	-5.21%	-12.78%	-7.25%	11.47%	13.43%	-0.56%	19.42%	2.33%	-17.15%	3.41%	2.29%	-13.67%	56.66%
% Outperf S&P	100.00%	99.00%	100.00%	0.00%	100.00%	96.00%	100.00%	95.00%	100.00%	2.00%	13.00%	40.00%	100.00%
% Outperf Bonds	0.00%	0.00%	0.00%	100.00%	100.00%	96.00%	100.00%	70.00%	1.00%	94.00%	78.00%	1.00%	49.00%
% Outperf 60/40	78.00%	1.00%	100.00%	41.00%	100.00%	88.00%	100.00%	82.00%	100.00%	9.00%	17.00%	7.00%	94.00%

Appendix 3: 6 Month Return Factor



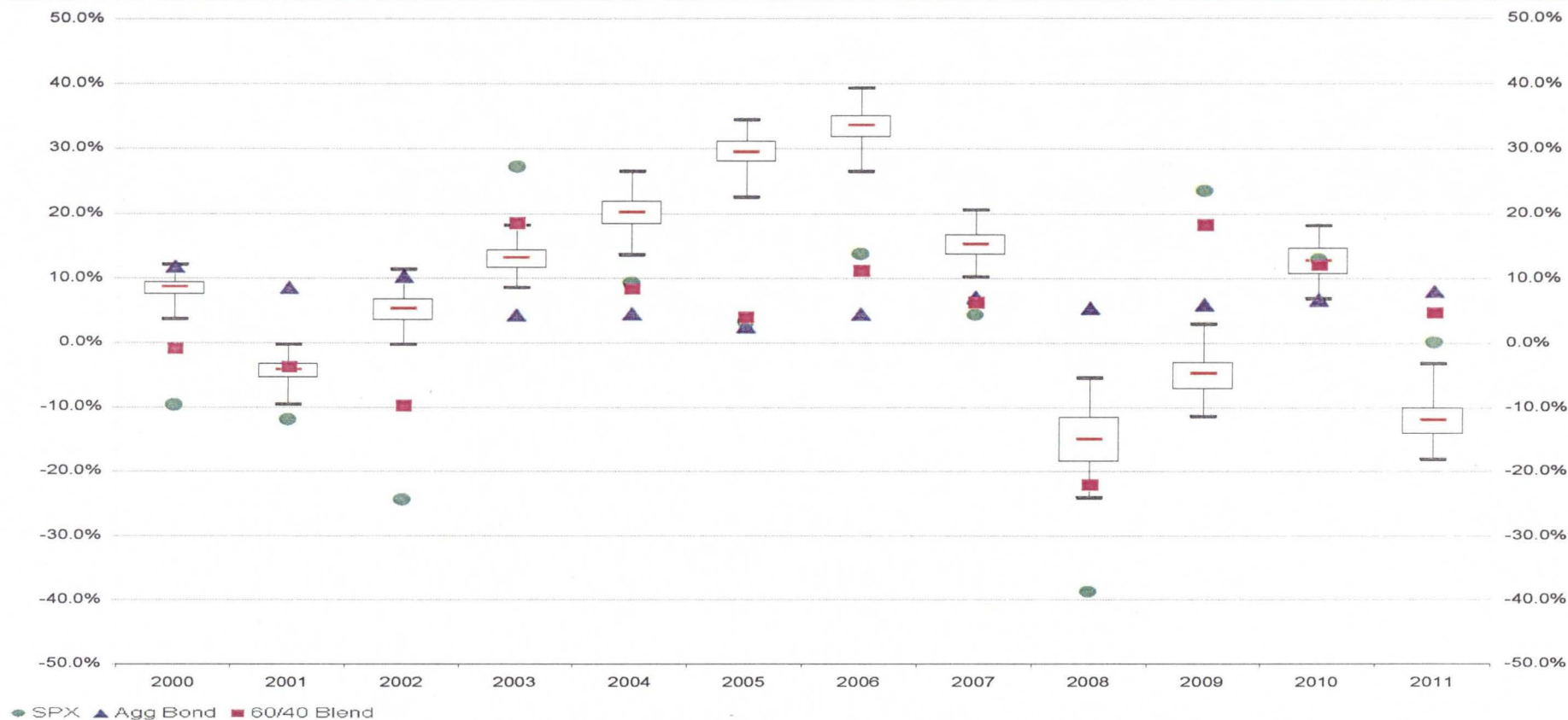
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	ITD
S&P 500	-9.85%	-12.06%	-24.60%	27.02%	8.99%	3.00%	13.62%	4.24%	-38.91%	23.45%	12.78%	0.00%	-14.13%
Agg Bond	11.62%	8.45%	10.25%	4.10%	4.34%	2.43%	4.33%	6.97%	5.24%	5.93%	6.56%	7.86%	112.36%
60/40 Blend	-1.00%	-3.71%	-9.82%	18.48%	8.30%	4.00%	11.12%	6.22%	-22.06%	18.39%	12.13%	4.70%	73.99%
Mean	13.69%	-8.41%	1.15%	23.34%	17.62%	18.53%	23.40%	16.83%	-9.83%	28.91%	6.71%	-7.87%	198.84%
Std Dev	2.82%	1.89%	1.85%	2.59%	3.48%	2.23%	3.50%	2.26%	4.12%	2.96%	3.55%	3.27%	33.62%
Max	21.46%	-4.16%	5.83%	30.30%	25.18%	23.61%	31.85%	22.10%	3.98%	34.88%	13.76%	0.27%	294.02%
Top Q	15.63%	-7.30%	2.43%	25.13%	20.15%	20.02%	25.65%	18.83%	-7.64%	30.76%	9.17%	-5.62%	211.24%
Median	13.67%	-8.44%	1.25%	23.64%	17.27%	18.38%	23.79%	16.95%	-9.69%	28.79%	6.89%	-8.01%	197.35%
Bot Q	12.06%	-9.66%	-0.07%	21.62%	15.43%	17.05%	21.68%	15.33%	-12.32%	26.91%	4.61%	-10.45%	178.01%
Min	5.71%	-13.41%	-3.24%	16.51%	6.35%	12.59%	14.63%	11.73%	-19.54%	20.28%	-3.20%	-15.04%	121.63%
% Outperf S&P	100.00%	97.00%	100.00%	4.00%	99.00%	100.00%	100.00%	100.00%	100.00%	94.00%	3.00%	1.00%	100.00%
% Outperf Bonds	79.00%	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	0.00%	100.00%	53.00%	0.00%	100.00%
% Outperf 60/40	100.00%	0.00%	100.00%	96.00%	99.00%	100.00%	100.00%	100.00%	100.00%	100.00%	3.00%	0.00%	100.00%

Appendix 4: 9 Month Return Factor



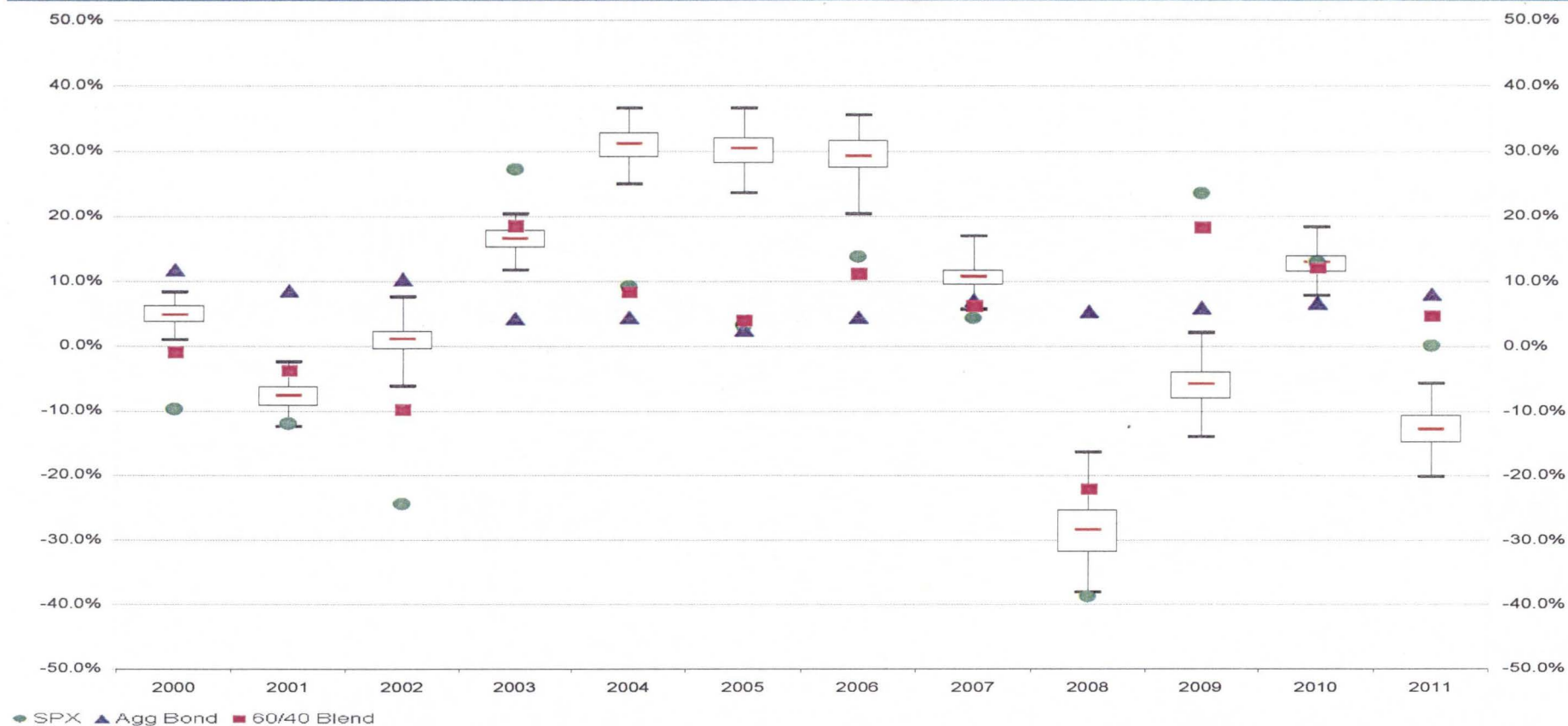
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	ITD
S&P 500	-9.85%	-12.06%	-24.60%	27.02%	8.99%	3.00%	13.62%	4.24%	-38.91%	23.45%	12.78%	0.00%	-14.13%
Agg Bond	11.62%	8.45%	10.25%	4.10%	4.34%	2.43%	4.33%	6.97%	5.24%	5.93%	6.56%	7.86%	112.36%
60/40 Blend	-1.00%	-3.71%	-9.82%	18.48%	8.30%	4.00%	11.12%	6.22%	-22.06%	18.39%	12.13%	4.70%	73.99%
Mean	13.36%	-5.95%	-5.62%	18.21%	17.56%	25.22%	26.68%	13.18%	-9.59%	13.73%	12.44%	-14.75%	147.53%
Std Dev	2.12%	2.10%	1.92%	1.70%	3.47%	2.90%	3.55%	2.23%	3.43%	2.70%	2.59%	3.53%	23.40%
Max	18.90%	-0.50%	0.18%	22.00%	26.38%	31.43%	33.60%	17.96%	-0.48%	19.72%	19.60%	-6.15%	219.51%
Top Q	14.94%	-4.67%	-4.25%	19.35%	19.83%	27.67%	29.16%	14.56%	-7.77%	15.54%	13.84%	-12.67%	163.76%
Median	13.57%	-5.88%	-5.88%	18.18%	17.58%	25.45%	26.96%	13.48%	-10.25%	13.57%	12.29%	-14.74%	146.66%
Bot Q	11.99%	-7.17%	-6.74%	17.25%	15.03%	23.16%	24.27%	11.75%	-11.18%	11.94%	10.57%	-17.05%	128.95%
Min	8.11%	-12.26%	-9.59%	13.98%	9.63%	17.96%	17.96%	7.94%	-18.74%	6.77%	7.11%	-21.26%	90.56%
% Outperf S&P	100.00%	99.00%	100.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	0.00%	40.00%	0.00%	100.00%
% Outperf Bonds	81.00%	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	0.00%	100.00%	100.00%	0.00%	94.00%
% Outperf 60/40	100.00%	12.00%	100.00%	44.00%	100.00%	100.00%	100.00%	100.00%	100.00%	4.00%	53.00%	0.00%	100.00%

Appendix 5: 12 Month Return Factor



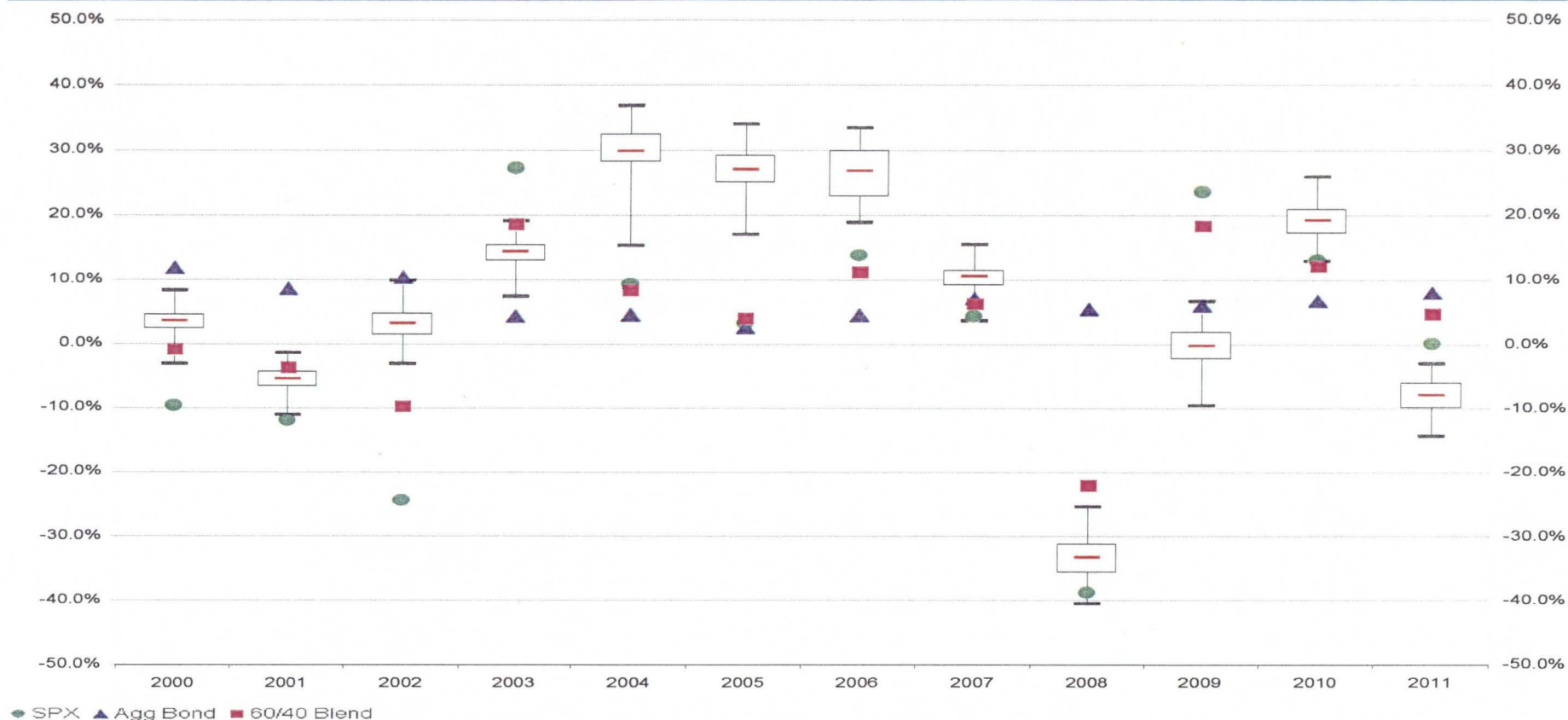
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	ITD
S&P 500	-9.85%	-12.06%	-24.60%	27.02%	8.99%	3.00%	13.62%	4.24%	-38.91%	23.45%	12.78%	0.00%	-14.13%
Agg Bond	11.62%	8.45%	10.25%	4.10%	4.34%	2.43%	4.33%	6.97%	5.24%	5.93%	6.56%	7.86%	112.36%
60/40 Blend	-1.00%	-3.71%	-9.82%	18.48%	8.30%	4.00%	11.12%	6.22%	-22.06%	18.39%	12.13%	4.70%	73.99%
Mean	8.46%	-4.25%	5.14%	12.99%	20.01%	29.25%	33.38%	15.03%	-15.15%	-4.93%	12.62%	-12.03%	134.75%
Std Dev	1.78%	1.85%	2.37%	1.98%	2.55%	2.30%	2.64%	2.31%	4.26%	3.17%	2.44%	3.06%	22.57%
Max	12.08%	-0.42%	11.38%	18.09%	26.46%	34.30%	39.23%	20.58%	-5.53%	2.87%	18.17%	-3.23%	199.76%
Top Q	9.45%	-3.18%	6.76%	14.31%	21.96%	31.05%	35.18%	16.73%	-11.44%	-2.95%	14.64%	-10.01%	152.67%
Median	8.62%	-4.43%	5.19%	12.95%	20.08%	29.53%	33.40%	14.81%	-15.35%	-5.19%	12.95%	-12.46%	134.67%
Bot Q	7.41%	-5.51%	3.37%	11.52%	18.27%	27.86%	31.70%	13.55%	-18.53%	-7.16%	10.61%	-14.14%	115.39%
Min	3.49%	-9.59%	-0.39%	8.50%	13.58%	22.44%	26.47%	10.26%	-24.13%	-11.44%	6.81%	-18.19%	93.48%
% Outperf S&P	100.00%	100.00%	100.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	0.00%	51.00%	0.00%	100.00%
% Outperf Bonds	4.00%	0.00%	3.00%	100.00%	100.00%	100.00%	100.00%	100.00%	0.00%	0.00%	100.00%	0.00%	82.00%
% Outperf 60/40	100.00%	36.00%	100.00%	0.00%	100.00%	100.00%	100.00%	100.00%	97.00%	0.00%	58.00%	0.00%	100.00%

Appendix 6: 18 Month Return Factor



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	ITD
S&P 500	-9.85%	-12.06%	-24.60%	27.02%	8.99%	3.00%	13.62%	4.24%	-38.91%	23.45%	12.78%	0.00%	-14.13%
Agg Bond	11.62%	8.45%	10.25%	4.10%	4.34%	2.43%	4.33%	6.97%	5.24%	5.93%	6.56%	7.86%	112.36%
60/40 Blend	-1.00%	-3.71%	-9.82%	18.48%	8.30%	4.00%	11.12%	6.22%	-22.06%	18.39%	12.13%	4.70%	73.99%
Mean	4.77%	-7.70%	0.88%	16.43%	30.86%	30.15%	29.15%	10.58%	-28.53%	-5.86%	12.79%	-12.86%	82.60%
Std Dev	1.71%	2.03%	2.45%	1.84%	2.60%	2.71%	3.37%	1.88%	4.40%	3.11%	2.03%	3.00%	17.25%
Max	8.21%	-2.38%	7.48%	20.40%	36.56%	36.58%	35.54%	17.01%	-16.34%	2.12%	18.34%	-5.72%	127.00%
Top Q	6.15%	-6.18%	2.32%	18.01%	32.87%	32.09%	31.62%	11.64%	-25.37%	-3.91%	13.93%	-10.63%	92.58%
Median	4.75%	-7.73%	0.62%	16.28%	30.91%	30.03%	29.55%	10.47%	-28.63%	-5.55%	12.87%	-13.08%	80.99%
Bot Q	3.58%	-9.25%	-0.64%	15.06%	29.06%	28.07%	27.44%	9.39%	-31.85%	-8.11%	11.40%	-14.96%	70.36%
Min	0.99%	-12.46%	-6.29%	11.77%	24.93%	23.56%	20.39%	5.59%	-38.05%	-13.95%	7.81%	-20.23%	41.84%
% Outperf S&P	100.00%	98.00%	100.00%	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%	0.00%	53.00%	0.00%	100.00%
% Outperf Bonds	0.00%	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	97.00%	0.00%	0.00%	100.00%	0.00%	7.00%
% Outperf 60/40	100.00%	2.00%	100.00%	16.00%	100.00%	100.00%	100.00%	98.00%	8.00%	0.00%	67.00%	0.00%	72.00%

Appendix 7: 24 Month Return Factor



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	ITD
S&P 500	-9.85%	-12.06%	-24.60%	27.02%	8.99%	3.00%	13.62%	4.24%	-38.91%	23.45%	12.78%	0.00%	-14.13%
Agg Bond	11.62%	8.45%	10.25%	4.10%	4.34%	2.43%	4.33%	6.97%	5.24%	5.93%	6.56%	7.86%	112.36%
60/40 Blend	-1.00%	-3.71%	-9.82%	18.48%	8.30%	4.00%	11.12%	6.22%	-22.06%	18.39%	12.13%	4.70%	73.99%
Mean	3.41%	-5.60%	2.93%	14.07%	29.64%	26.88%	26.57%	10.36%	-33.32%	-0.40%	19.10%	-8.00%	91.73%
Std Dev	1.85%	1.82%	2.53%	2.14%	4.06%	3.38%	3.99%	2.35%	3.13%	2.96%	2.73%	2.58%	19.68%
Max	8.35%	-1.53%	9.74%	19.05%	36.82%	34.00%	33.38%	15.43%	-25.56%	6.67%	25.86%	-3.09%	142.18%
Top Q	4.47%	-4.43%	4.77%	15.55%	32.37%	29.31%	30.00%	11.59%	-31.10%	1.92%	20.95%	-5.97%	105.27%
Median	3.51%	-5.41%	2.61%	13.93%	30.10%	27.00%	27.02%	10.64%	-33.18%	-0.16%	18.90%	-7.96%	89.19%
Bot Q	2.33%	-6.80%	1.27%	12.83%	28.05%	24.83%	22.88%	9.09%	-35.60%	-2.37%	17.21%	-10.01%	78.37%
Min	-3.18%	-11.06%	-3.25%	7.27%	15.27%	17.05%	18.88%	3.57%	-40.62%	-9.58%	12.82%	-14.38%	38.98%
% Outperf S&P	100.00%	100.00%	100.00%	0.00%	100.00%	100.00%	100.00%	97.00%	96.00%	0.00%	100.00%	0.00%	100.00%
% Outperf Bonds	0.00%	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	92.00%	0.00%	1.00%	100.00%	0.00%	14.00%
% Outperf 60/40	99.00%	16.00%	100.00%	2.00%	100.00%	100.00%	100.00%	95.00%	0.00%	0.00%	100.00%	0.00%	81.00%