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Testing Mechanical Moving Average Trading Systems

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science in Finance

by

Denis DelGrosso

Dr. Rahul Bhargava, Ph.D, CFA/Thesis Advisor

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Rahul Bhargava, Ph.D, Cfa, Advisor

Gregory Stone, Ph.D,CFA , Committee Member

Mark Nichols, Ph.D, Graduate School Representative

Marsha H. Read, Ph. D., Associate Dean, Graduate School

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Abstract

Using daily stock price data for stocks listed on the New York Stock Exchange, the S&P 500, and the Goldman Sachs Commodity Index, this study examines whether or not there exists evidence of violations of weak form market efficiency. If markets are efficient in the weak form, timing systems should not produce annualized returns that are greater than the annualized returns of a buy and hold system. This study tests timing systems utilizing mechanical simple moving average systems. The moving averages tested are the 50-day, 200-day, and a combination 50/200-day crossover. As a result this study finds that in at least some cases there appears to be violations of weak form market efficiency. Additionally the results show that utilizing a moving average system reduces risk to a degree when compared with a buy and hold strategy.

Table of Contents

1. Introduction

When an individual studies capital markets a great amount of time is spent studying the theory of efficient markets. In simple terms an efficient capital market " is one in which security prices adjust rapidly to the arrival of new information and therefore, the current prices of securities reflect all information about the security" (Reilly and Brown, 2009). Generally speaking when efficient market hypothesis (EMH) is referenced, the term is usually understood to be further divided into three separate tenets, namely weak-form, semi strong-form, and strong-form EMH.

Weak-form EMH "asserts that stock prices already reflect all information that can be derived by examining market trading data such as the history of past prices, trading volume, or short interest" (Bodie, Kane, and Marcus 2009). If weak-form EMH is correct an investor could not earn abnormal returns[1] simply by examining past market data and creating a set of trading rules based upon this data. While the general consensus amongst most proponents of market efficiency is that by and large weak-form EMH is indeed true and verifiable, several studies have found that there are at the very least significant anomalies that would seemingly contradict this.

One well known study that indicated a potential anomaly in weak-form market efficiency was Frank Cross' 1973 paper *"The Behavior of Stock Prices on Fridays and Mondays"*. In it Cross examines potentially non-random movements in the prices of stocks of the Standard & Poor's Composite Stock Index. Cross acknowledges that "other researchers have found little or no evidence of dependence in successive daily price changes. Apparently, however, these

[1] For the purpose of this paper, abnormal returns are defined as the difference in returns between a stock or portfolio of stocks and the return of the market.

researchers have not investigated the possibility that dependence might occur on some days of the week but not others" (Cross 1973). Cross examined a set of 844 Fridays and following Mondays from 1953 through 1970. What Cross found was that on 523 (62%) of the Fridays, the index advanced compared to only 333 (39.5%) of Mondays. He also found that when the index advanced on Friday there was a 49% chance that there would be a further advance on the following Monday. However, when the index declined on Friday there was only a 24% chance the index would rise on the following Monday. Cross also investigated the relationship of price patterns between other successive days of the trading week and found that no other pairs displayed the same anomalous price patterns as Friday and Monday.

In their 1985 study, *"Does the Stock Market Overreact"*, Bondt and Thaler investigated whether or not investors tended to overreact to unexpected news. Stocks in the study were grouped into two portfolios, a winner's portfolio and a loser's portfolio, based upon past excess returns in the 5 years prior to portfolio formation. This was opposed to grouping the stocks according to some firm specific piece of information, such as earnings announcements. What Bondt and Thaler found was that the loser portfolio tended to "outperform the market by, on average, 19.6%, thirty-six months after portfolio formation" (Bondt and Thaler 1985). While the winners portfolio earned "about 5.0% less than the market" (Bondt and Thaler 1985). The conclusion that they drew from these findings was that there was indeed what appeared to be overreaction effect in the market and that this overreaction was asymmetric, that is to say it is much larger for losers than winners. Bondt and Thaler's study was significant in that while it did not fully disprove weak-form market efficiency, it did bring to light a significant anomaly.

These are just two examples of the many studies that have found flaws in weak-form market efficiency. It therefore stands to reason that the notion of being able to predict future

price movements by examining past movements would be of great interest to an investor. The study of past price movements is known as technical analysis. Technical analysis can be formally defined as "the study of market action, primarily through the use of charts, for the purpose of forecasting future price trends. The term market action includes the three principal sources of information available to the technician - price, volume, and open interest" (Murphy 1999).

Each year countless books are published on the subject of technical analysis. It is easy to become lost amongst the numerous indicators, chart patterns, and technical trading methodologies that these books advocate. One such subarea of technical analysis that has received substantial attention is the notion of trend following and market timing. It can be said that "trend following trading seeks to capture the majority of the market trend, up or down, for profit" (Covel 2009). However, this raises several questions. How does an investor define the current trend of the market? Also is it really possible to time entries and exits in the market such that one could earn an abnormal return compared to a benchmark[2]?

One of the simplest means of determining a market trend that is presented frequently in technical trading books is the moving average. The moving average is widely known and used in trend following systems "because of the way it is constructed and the fact that it can be so easily quantified and tested" (Murphy 2009). Moving averages come in various forms; the most basic variety is the simple moving average. The simple moving average is the average of closing prices taken over some period of time. Simple moving averages can be computed over any number of closing prices as well as in a multitude of time frames.

[2] For the remainder of this paper it should be noted that the benchmark is the S&P 500 index.

This paper attempts to investigate whether or not anomalies exist in weak-form market efficiency by utilizing several mechanical trend following systems using simple moving averages. The paper is divided into the following sections. Section 2 examines past research done in the area of trend following and moving average trading systems. Section 3 presents the data used in the study. Section 4 presents the methodology employed in testing. Section 5 presents the results of the tests. Finally, section 6 presents the conclusions drawn from the results.

2. Literature Review

In the 2005 study, *"Does Trend Following Work on Stocks"* Cole Wilcox and Eric Crittenden investigated whether or not it was possible to employ trend following strategies that had been successful on futures to the realm of stocks. Wilcox and Crittenden used a universe of over 24,000 stocks spanning a time frame of 22 years. The data was adjusted for corporate actions, such as dividend payments and stock splits. The data also included delisted companies to account for survivorship bias. To avoid stocks that would be illiquid, they applied a minimum daily liquidity filter.

Using this data Wilcox and Crittenden applied a mechanical set of trading rules to investigate whether or not there was evidence that trend following earned abnormal returns. They decided to allow long only trades. The buy rule that they employed was to buy a stock at the opening price tomorrow if today's closing price was greater than or equal to the highest historical price of the stock. The rationale behind this was "a stock that is at an all time high

must be in an uptrend by any reasonable person's definition" (Crittenden and Wilcox 2005). To exit a position they decided to use a 10 unit average true range trailing (ATR) stop.[3]

When applied to the data set, these rules generated in the vicinity of 18,000 trades over the 22 years. The results were further adjusted by adding in transaction costs of .5% on each round trip trade to account for commission costs and slippage. The results showed that while the winning trade percentage was only 49.3%, there was an expectancy of 15.2%[4]. Additionally 17% of trades would have gained 50% or more while less than 3% of trades would have lost 50% or more. Wilcox and Crittenden also found that while the average holding time per trade was shorter than the 12 months required to qualify for long term capital gains tax rates, winning trades tended to have a holding period greater than 12 months. The conclusion that they reached was that while their research was only small step in investigating whether or not trend following worked on stocks, there was strong evidence that it does work.

In 1992 William Brock, Josef Lakonishok, and Blake LeBaron authored the paper *"Simple Technical Trading Rules and the Stochastic Properties of Stock Returns".* In it they tested what they considered two of the simplest and most popular technical trading rules: moving average and trading range breaks. The data series they used was the Dow Jones Industrial Average from the first day of trading in 1897 to the last trading day in 1986. First they tested this series as a whole before breaking it into smaller sub time frames. These smaller time frames spanned 1/1/1897 - 7/30/1914, 1/1/1915 - 12/31/1938, 1/1/1939 - 6/30/1962, and 7/1/1962-

[3] The average true range is found by calculating the greater of 1. Today's high minus today's low 2. Todays high minus yesterday's close 3. Yesterday's close minus today's low and averaging it over the number of periods.

[4] The weighted average of a probability distribution. Also known as the mean value (Crittenden and Wilcox 2005)

12/31/1986. Each of these time frames was chosen because it corresponds with important events in United States and stock market history[5] that could have potential implications.

In order to setup their trading rules using a moving average system, Brock, Lakonishok, and LeBaron, used what they called a moving average oscillator. This oscillator used two moving averages, a short period and a long period, to generate signals. They tested several permutations of this oscillator using various short periods and long periods including 1-50, 1-150, 5-150, 1-200, and 2-200. Additionally, they decided to reduce "whiplash" by adding a percentage band around the moving averages. Using this oscillator they came up with two rules for initiating trades. The first rule they called the variable length moving average (VMA). This rule generated a buy signal when the shorter moving average crossed above the longer moving average by an amount larger than the enveloping band. Sell signals were generated when the opposite happened, the shorter period moving average crossed below the longer period moving average by an amount greater than the band. The second moving average oscillator rule that they tested was called a fixed length moving average (FMA). This system ignored the bands and simply generated a buy signal when the shorter moving average crossed above the longer moving average. When a buy signal was generated returns for the next ten days were recorded at which time they considered the position closed. Similarly, a sell signal was generated when the shorter period moving average crossed below the longer period and again the returns for the next ten days were recorded.

Brock, Lakonishok, and LeBaron also tested a final rule that did not utilize the moving average oscillator but instead dealt with trading range break-outs (TBA). This system generated

[5] World War I, Roaring twenties and the Great Depression, World War II, formation of the Center for Research in Securities Prices (CRSP)

buy signals when prices penetrated the resistance level. They defined the resistance level as the local maximum of prices. This system also generated sell signals when prices violated support levels, or the local minimum price. These local maximum and minimums were determined based on 50, 150, and 200 days. Like the moving average oscillator system, they also introduced bands in an attempt to once again eliminate "whiplash".

Under the VMA system the difference in returns between the buy and sell trades showed that in six of the ten tests the null hypothesis[6] should be rejected at the 5% confidence level. The remaining four results were considered marginally significant. For the FMA system the difference in returns between the buy and sell signals showed that 7 of the 10 tests were highly significant at the 5% confidence level, while the remaining 3 were marginally significant. For the 6 tests that were run using buy and sell signals generated by the TBA system, the differences in returns between buys and sells were all found to be statistical significant at the 5% confidence level and as such the null hypothesis was rejected.

The authors felt that these results were an interesting find but still had some missing components. In an attempt to further refine their results they used a bootstrap methodology. Under this methodology the returns conditional on buy and sell signals using the Dow Jones data were compared to conditional returns generated from a simulated series. These simulated series were generated using several methodologies including: random walk with a drift, auto-regressive process of order one (AR(1)), generalized autoregressive conditional heteroskedasticity in-mean model (GARCH-M), and exponential GARCH (EGARCH). The results showed that the returns generated were not likely to be seen in these four generated null

[6] The difference in returns is equal to 0

models. The conclusion reached by Brock, Lakonishok, and LeBaron was that their results were strong evidence in support of the technical strategies that they explored.

In the book "Stocks for the Long Run" by Jeremy Siegel, the author advocates that "successful technical trading requires not only identifying the trend but more importantly, indentifying when the trend is about to reverse" (Siegel 2008). Siegel postulates that using a moving average in relation to current prices might allow an investor to identify potential changes in the current trend. Siegel notes that of the moving averages the 200-day moving average is one of the most widely used in the investment community.

Siegel uses the 200-day moving average to create a series of trading rules in order to test whether or not using a simple moving average strategy would outperform a buy and hold strategy. Siegel used daily data from the Dow Jones Industrial Average (DJIA) over the period of 1886 until 2006. Siegel's buy rule is triggered when the daily closing price closed at least 1% above the 200-day moving average. It is noted that the order is executed at this closing price. Like the Brock, Lakonishok, and LeBaron study, this 1% band around the moving average is used in order to eliminate any potential "whiplash". On the opposite side, a sell rule was triggered when the index closed at least 1% below its 200-day moving average. Again, the rule executed at the closing price on the day of the signal. When a sell rule is executed the portfolio is moved to Treasury bills in order to generate interest income.

What Siegel found was the moving average system generated excess annual returns before trading costs were taken into account. However, when a .5% transaction costs was applied to each entry and exit, Siegel found that the buy and hold outperformed the moving average system. Additionally, Siegel found that the greatest advantage of the moving average

system was a reduction in risk when compared to buy and hold. He notes that the biggest "win" for the moving average system was the fact that it avoided several market crashes. For example the moving average system would have had an investor out of the market on October 19, 1929, 10 days before the market crash. Again a sell signal was generated on October 16, 1987 just prior to the October 19, 1987 crash. It also became noteworthy that when Siegel looked at the results spanning from 1990 through 2006 the moving average system no longer appeared to work, returning -28% in 2000 alone compared to -5% for the buy and hold strategy.

In his conclusions Siegel acknowledges that while most academics don't believe that using a technical trading system works, his research along with other research has shown that returns can indeed be improved by using even a system as simple as a 200-day moving average.

In his 2001 paper *"All About Market Timing"*, Paul Merriman investigates how using a moving average system as a means of timing the market would have performed when compared to a buy and hold strategy. Merriman investigates the results using the S&P 500 and NASDAQ Composite Index. The data for the S&P 500 runs from 1942 through 2000 while the data for the NASDAQ runs from 1972 through 2000.

Like Siegel's study, Merriman used a single moving average as a means of generating buy and sell signals; in this case he used the 100-day moving average. When prices closed above the 100-day moving average a buy signal was issued. Similarly, when prices closed below the 100-day moving average a sell signal was issued. For the entire study period of 1942-2000 Merriman found that a buy and hold strategy on the S&P 500 would have produced an annualized return of 13.3% while the timing strategy would have produced an annualized return of 12.7%. While the timing strategy did not have as great an annualized return as the buy and

hold strategy, the risk[7] was lower than buy and hold, 12.4% versus 16.2%. Additionally, on average the timing strategy also produced smaller drawdown's compared with buy and hold.

Applying the same rules to a shorter time period for the NASDAQ, Merriman had results that were both different and similar to those he received for the S&P 500. The annualized return for the timing strategy on the NASDAQ was 19.6% versus 13.7% for the buy and hold strategy, a stark contrast to the results obtained for the S&P 500. Similarly however, the standard deviation for the timing strategy was 19.6% versus 26.4% for buy and hold. Merriman attributes the difference in returns between the two indices as a matter of volatility. He concludes that if an investor wishes to earn higher returns perhaps a timing strategy on a volatile asset would be appropriate.

In the 2006[8] paper *"A Quantitative Approach to Tactical Asset Allocation"*, Mebane Faber investigates using a simple moving average timing system on variety of asset class indices. Included in the study, Faber looks at using the timing system on the S&P 500, Morgan Stanley Capital International EAFE Index (MSCI EAFE), Goldman Sachs Commodity Index (GSCI), National Association of Real Estate Investment Trusts Index (NAREIT), and the United States government 10-year Treasury bond. Faber chose to use a 10-month moving average as his signal line. Again, like the previous studies investigated, Faber issues a buy when prices move above the 10-month moving average and a sell when prices move below it.

The fist index that Faber uses in his study is the S&P 500 with data ranging from 1900 through 2008. The results he achieved were fairly consistent with previous studies. The timing

[7] In this situation Merriman used the standard deviation as his measure of risk,
[8] Initially published in 2006, Faber updated the paper in February 2009 to include the market crash of 2008.

strategy improved compound returns while reducing risk[9]. The annualized returns for the timing system were 10.45% compared with 9.21% for buy and hold. One of the most important discoveries that Faber found was that the timing strategy reduced drawdown's that occurred during notable market crashes and bear markets. Timing however also underperformed buy and hold during bull markets. Faber concluded that in order to get the full picture of benefits offered by using a timing strategy, one has to look at a long period of time that includes both bull and bear markets. In order to make a fair comparison between timing the S&P 500 and timing the other indices, Faber looked at the sub period of 1973 through 2008. Again the results were similar to the entire period. The S&P 500 had an annualized return of 9.26% for this sub period while the timing strategy had an annualized return of 10.60%.

Faber went on to investigate the timing strategy on a variety of other asset class indices. The first one he tested his timing strategy on was the MSCI EAFE with data from 1973 through 2008. Just like the S&P 500, timing the MSCI EAFE provided to superior annualized returns with lower volatility. Timing had an annualized return of 11.10% compared with the buy and hold return of 9.04%. For 10 year US Government bonds the annualized return with timing was 8.79% versus 8.69% for buy and hold. For GSCI the annualized return with timing was 11.16% versus 8.73% for buy and hold. Finally for NAREIT, timing had an annualized return of 11.74% versus 8.54% for buy and hold.

When Faber averaged the results across all 5 of the asset classes tested he found that he the timing model increased returns by approximately 20%, decreased volatility by 20%, improved the Sharpe Ratio by .20, and reduced the maximum drawdown by 50%. Faber's study however does not take into consideration trading costs, taxes, and slippage. He addresses this

[9] Faber measured volatility as the annualized standard deviation of monthly returns.

shortcoming by noting that his system did not produce a very large number of trades, averaging only three to four per year, therefore trading costs would be kept to a minimum and should not have a significant effect on the returns. However, he does say that taxes would be a "very real consideration". To combat taxes he proposes trading this system in a tax deferred account, such as a 401(k). Additionally, for the majority of the winning trades, the holding period was longer than 12 months therefore qualifying for long term capital gains tax rates.

3. Data

The data used in this research consisted of daily prices[10] for all trading days over which the study spanned. The data covers normal trading hours of 9:30 AM through 4:00 PM EST and does not include any premarket or after hours data. The data was obtained through Commodity Systems Incorporated.

The data for stocks listed on the New York Stock Exchange (NYSE) began on January 1, 1962 and ran through December 31, 2010 and consisted of approximately 4158 symbols. The data for the S&P 500 began on January 1, 1950 and ran through December 31, 2010. The common sub period of January 1, 1962 through December 31, 2010 was used for tests involving comparisons between the S&P 500 and NYSE universe of stocks. This time frame covers approximately 12,337 daily observations. Data for the Goldman Sachs Commodity Index (GSCI) began on February 17, 1998 and ran through December 31,2010. This time frame covers approximately 3248 daily observations.

[10] Daily price data included the open, high, low, close, and volume

All price data was adjusted for corporate actions[11]. The price data did not include stocks that had been delisted. Due to this lack of data on delisted stocks there exists a survivorship bias. This survivorship bias can cause a skewing of results and may present more optimistic results than might otherwise be the case.

4. Methodology

4.1 Overview

The research in this study is a combination of ideas from several of the past studies examined in the literature review. The primary focus of this study was to examine whether or not a long only, simple moving average timing system could generate excess returns. The results received utilizing this timing system are then compared to a buy and hold strategy employed on a benchmark index, in this case the S&P 500 and GSCI. If weak-form market efficiency is shown to hold, the moving average systems should not be able to generate an excess return over the study period. Data in this study was tested and analyzed using Amibroker.

Several concepts are borrowed from Siegel. First, all tests assume a transaction[12] cost of .5%. This .5% per transaction is to account for such things as commissions, capital gains taxes, and slippage. Just as in Siegel's research, this .5% is probably an underestimation of costs, particularly in the earlier years of the study period. With the proliferation of discount brokerages, particularly in the last 15 years, transaction costs have steadily declined for the retail investor. However, it is hard to get an accurate average transaction cost over such a long period. Secondly, this research employs two simple moving averages, a 50-day and a 200-day. The rationale behind using a 50-day moving average is that it is a popular and widely accepted

[11] Splits, dividends, and capital gains
[12] For the purpose of this research a transaction is either a buy or sell order.

gauge of medium term market trends. The 200-day is also a popular and widely accepted gauge of medium term market trends.

For calculations such as the Sharpe ratio where a risk free rate is required as an input, a value of 6% was used. This is another difficult value to get an accurate estimate for. In the early years covered in this research the risk free rate was relatively high. However, interest rates have generally fallen through much of the 1990s into the 2000s.

In order to simulate the returns a real investor might have received utilizing the strategies in this study an initial portfolio equity of US $1,000,000 was used. Testing did not allow for fractional share purchases and assumed the minimum share purchase size to be a single share. For studies involving more than one stock or index 5% of portfolio equity was allocated to each trade. This has several implications for trade selection. If a buy signal was issued and there is no available equity than the trade was skipped. No special rules were implemented for trade selection; it was simply a matter of available equity at the time the signal was issued. While this methodology more closely mirrors real world scenarios it could have an impact on the returns generated.

Tests for the timing strategies assumed that the investor bought at the closing price on the day that the buy signal was generated and again sold at the closing price on the day the sell signal was generated. The timing strategy tests also forced closed any open trades at the end of the study period. The returns for such trades were measured on that closure date. While this was generally a small number of trades it does have an impact on the returns generated by the timing system.

4.2 Buy and Hold of the S&P 500

The buy and hold strategy test had a few specific nuances that differentiated it from other tests run. In order to simulate a true buy and hold methodology the test was run assuming that an investor bought on January 2, 1962 at the opening price and sold on December 31, 2010 at the closing price. Using the default portfolio equity of $1,000,000, this entire amount was invested, meaning the investor had 100% exposure. It should be noted that this test was run on the S&P 500 index and not an exchange traded fund tracking the S&P 500.

4.3 Timing the S&P 500 Utilizing a 50-day Simple Moving Average

For this test a buy signal was generated when the S&P 500 index closed above the 50-day simple moving average. When a buy signal was issued 100% of the portfolio equity was invested. A sell signal was issued when the S&P 500 closed below the 50-day simple moving average. The entire position was converted back into cash and did not earn any interest during these time periods.

4.4 Timing the S&P Utilizing a 200-day Simple Moving Average

For this test a buy signal was generated when the S&P 500 index closed above the 200-day simple moving average. A sell signal was generated when the S&P 500 closed below the 200-day simple moving average. The remaining parameters were the same as the above tests for the 50-day simple moving average system.

4.5 Timing the S&P Utilizing a 50/200-day Simple Moving Average Crossover

For this test a buy signal was generated when the 50-day simple moving average closed above the 200-day simple moving average for the S&P 500 index. A sell signal was generated when the 50-day simple moving average closed below the 200-day simple moving average for

the S&P 500 index. The remaining parameters were the same as the above tests utilizing single moving averages.

4.6 Timing NYSE Stocks Utilizing a 50-day Simple Moving Average

For this test a timing strategy utilizing the 50-day simple moving average was utilized on the entire universe of NYSE stocks. A buy signal was generated on a particular stock when the closing price was greater than the 50-day simple moving average. If there was available portfolio equity available, the stock was purchased an added to the portfolio. A sell signal was generated for a particular stock when the closing price was less than the 50-day simple moving average. The position was closed and the resulting cash was added back to the available equity pool.

4.7 Timing NYSE Stocks Utilizing a 200-day Simple Moving Average

Similar to the above test utilizing the 50-day simple moving average, this test was run across stocks of the NYSE utilizing the 200-day simple moving average. When a stock's closing price was greater than its 200-day simple moving average a buy signal was generated. If equity was available the stock was purchased and added to the portfolio. A sell signal was generated when the closing price of the stock was less than its 200-day simple moving average.

4.8 Timing NYSE Stocks Utilizing a 50/200-day Simple Moving Average Crossover

This test used a simple moving average crossover system run against the NYSE universe of stocks. A buy signal was generated when the 50-day simple moving average crossed above the 200-day simple moving average for a particular stock. If equity was available the stock was purchased and added to the portfolio. A sell signal was generated when the 50-day simple moving average crossed below the 200-day simple moving average.

4.9 Buy and Hold of the GSCI

The purpose of testing a buy and hold strategy on the GSCI was to create a benchmark for a different class of assets to provide an opposing view to just equities. This test was run using similar parameters to that of the buy and hold of the S&P 500. The GSCI was bought at the opening price on February 17, 1998 and sold at the closing price on December 31, 2010. The entire portfolio was invested in this position.

4.10 Timing the GSCI Utilizing a 50-day Simple Moving Average

For this test a buy signal was generated when the GSCI closed above the 50-day simple moving average. When a buy signal was issued 100% of the portfolio equity was invested. A sell signal was issued when the GSCI closed below the 50-day simple moving average. The entire position was converted back into cash and did not earn any interest during these time periods.

4.11 Timing the GSCI Utilizing a 200-day Simple Moving Average

For this test a buy signal was generated when the GSCI closed above the 200-day simple moving average. A sell signal was generated when the GSCI closed below the 200-day simple moving average. The remaining parameters were the same as the above tests for the 50-day simple moving average system.

4.12 Timing the GSCI Utilizing a 50/200-day Simple Moving Average Crossover

For this test a buy signal was generated when the 50-day simple moving average closed above the 200-day simple moving average for the GSCI. A sell signal was generated when the 50-day simple moving average closed below the 200-day simple moving average for the GSCI. The remaining parameters were the same as the above tests utilizing single moving averages.

5. Results

The summary findings for each test are discussed in the following sections. A complete listing of the results can be found in Appendix 8.2

5.1 Buy and Hold - S&P 500 - 1/1/1962 - 12/31/2010

Figure 1 summarizes the results obtained from the buy and hold strategy when applied to the S&P 500. Since buy and hold is often touted as a "lower risk" trading strategy, it seems in stark contrast to this statement that the max drawdown was -56.78, meaning that at one point the portfolio lost over half of its value from peak to trough.

Figure 1 - Buy and Hold - S&P 500 - 1/1/1962 - 12/31/2010

	Buy And Hold S&P 500
Annualized Return	6.04%
Annualized Return / Exposure	6.04%
Maximum Drawdown (%)	-56.78
Best Year Profit (%)	35.20%
Worst Year Profit (%)	-35.60%

5.2 Timing System 50-Day Moving Average - S&P500 - 1/1/1962 - 12/31/2010

Figure 2 compares the results obtained from 50-day simple moving average timing strategy utilized on the S&P 500 with the buy and hold results outlined in section 5.1. The annualized return is lower than the buy and hold strategy before risk is taken into account. On a risk adjusted basis the returns are greater for the timing strategy. This is to be expected since an investor should be compensated for taking on more risk. When compared to buy and hold, it appears timing does help to limit both drawdown and downside.

Figure 2 - Timing System 50-Day Moving Average - S&P500 - 1/1/1962 - 12/31/2010

	Buy And Hold S&P 500	Timing S&P 500 - 50 Day SMA
Annualized Return	6.04%	5.00%
Annualized Return / Exposure	6.04%	8.12%
Total Number of Trades	1	380
Number of Trades With Profit < -25%	0	0
Number of Trades With Profit >= -25% and < -10%	0	0
Number of Trades With Profit >= -10% and < 0%	0	270
Number of Trades With Profit >= 0% and < 10%	0	88
Number of Trades With Profit >= 10% and < 25%	0	21
Number of Trades With Profit > 25%	1	1
Number of Trades Profit > Annualized Return	N/A	40
Number of Trades Profit < Annualized Return	N/A	340
Maximum Drawdown (%)	-56.78	-44.88%
Best Year Profit (%)	35.20%	34.60%
Worst Year Profit (%)	-35.60%	-22.50%

5.3 Timing System 200-Day Moving Average - S&P500 - 1/1/1962 - 12/31/2010

Figure 3 compares the results obtained from the 200-day simple moving average timing strategy utilized on the S&P 500 with the buy and hold results outlined in section 5.1. In this test the annualized return was greater than the buy and hold strategy even before adjusting for risk. When compared with the results outlined in section 5.2, it is interesting to note that using the longer period simple moving average further reduced the maximum drawdown, produced a higher bester year profit percentage, and produced a higher worst year profit percentage.

Figure 3 - Timing System 200-Day Moving Average - S&P500 - 1/1/1962 - 12/31/2010

	Buy And Hold S&P 500	Timing S&P 500 - 200 Day SMA
Annualized Return	6.04%	6.28%
Annualized Return / Exposure	6.04%	9.43%
Total Number of Trades	1	154
Number of Trades With Profit < -25%	0	0
Number of Trades With Profit >= -25% and < -10%	0	0
Number of Trades With Profit >= -10% and < 0%	0	113
Number of Trades With Profit >= 0% and < 10%	0	22
Number of Trades With Profit >= 10% and < 25%	0	15
Number of Trades With Profit > 25%	1	4
Number of Trades Profit > Annualized Return	N/A	22
Number of Trades Profit < Annualized Return	N/A	132
Maximum Drawdown (%)	-56.78	-29.63
Best Year Profit (%)	35.20%	35.20%
Worst Year Profit (%)	-35.60%	-18.10%

5.4 Timing System 50/200 SMA Cross - S&P500 - 1/1/1962 - 12/31/2010

Figure 4 compares the results obtained from the 50/200-day simple moving average crossover system utilized on the S&P 500 with the buy and hold results outlined in section 5.1. On an annualized basis the returns for this timing system were slightly greater than the buy and hold strategy. Again, like all the previous tests when adjusting for risk, the returns were again greater than buy and hold. It is interesting to note that this timing system produced the best annualized and risk adjusted returns of the three timing systems tested.

Figure 4 - Timing System 50/200 SMA Cross - S&P500 - 1/1/1962 - 12/31/2010

	Buy And Hold S&P 500	Timing S&P 500 - 50/200 SMA Cross
Annualized Return	6.04%	6.66%
Annualized Return / Exposure	6.04%	9.95%
Total Number of Trades	1	26
Number of Trades With Profit < -25%	0	0
Number of Trades With Profit >= -25% and < -10%	0	0
Number of Trades With Profit >= -10% and < 0%	0	4
Number of Trades With Profit >= 0% and < 10%	0	9
Number of Trades With Profit >= 10% and < 25%	0	9
Number of Trades With Profit > 25%	1	4
Number of Trades Profit > Annualized Return	N/A	15
Number of Trades Profit < Annualized Return	N/A	11
Maximum Drawdown (%)	-56.78%	-33.24
Best Year Profit (%)	35.20%	35.20%
Worst Year Profit (%)	-35.60%	-16.70%

5.5 Timing System 50-Day Moving Average - NYSE - 1/1/1962 - 12/31/2010

Figure 5 compares the results obtained from the 50-day simple moving average system utilized on the NYSE universe of stocks with the buy and hold results outlined in section 5.1. Here the annualized return is over 2% greater than the buy and hold strategy utilized on the benchmark. However, the drawdown for this strategy is much greater than the buy and hold drawdown. Also when compared with the same timing strategy utilized on the benchmark index this system again produces greater annualized returns but at a much higher degree of risk.

Figure 5 - Timing System 50-Day Moving Average - NYSE - 1/1/1962 - 12/31/2010

	Buy And Hold S&P 500	Timing NYSE - 50 Day SMA
Annualized Return	6.04%	8.07%
Annualized Return / Exposure	6.04%	10.11%
Total Number of Trades	1	12335
Number of Trades With Profit < -25%	0	18
Number of Trades With Profit >= -25% and < -10%	0	149
Number of Trades With Profit >= -10% and < 0%	0	9605
Number of Trades With Profit >= 0% and < 10%	0	1624
Number of Trades With Profit >= 10% and < 25%	0	608
Number of Trades With Profit > 25%	1	331
Number of Trades Profit > Annualized Return	N/A	1083
Number of Trades Profit < Annualized Return	N/A	11252
Maximum Drawdown (%)	-56.78	-69.19
Best Year Profit (%)	35.20%	77.70%
Worst Year Profit (%)	-35.60%	-57.40%

5.6 Timing System 200-Day Moving Average -NYSE - 1/1/1962 - 12/31/2010

Figure 6 compares the results obtained from the 200-day simple moving average system utilized on the NYSE universe of stocks with the buy and hold results outlined in section 5.1. Here the annualized return in slightly better than the annualized return for buy and hold. Interestingly, utilizing the 200-day simple moving average on the NYSE actually produced lower results than the 50-day. This contrasts with the results for the same strategies on just the S&P 500.

Figure 6 - Timing System 200-Day Moving Average -NYSE - 1/1/1962 - 12/31/2010

	Buy And Hold S&P 500	Timing NYSE - 200 Day SMA
Annualized Return	6.04%	6.80%
Annualized Return / Exposure	6.04%	8.32%
Total Number of Trades	1	5088
Number of Trades With Profit < -25%	0	10
Number of Trades With Profit >= -25% and < -10%	0	97
Number of Trades With Profit >= -10% and < 0%	0	4198
Number of Trades With Profit >= 0% and < 10%	0	410
Number of Trades With Profit >= 10% and < 25%	0	145
Number of Trades With Profit > 25%	1	228
Number of Trades Profit > Annualized Return	N/A	440
Number of Trades Profit < Annualized Return	N/A	4648
Maximum Drawdown (%)	-56.78	-76.91
Best Year Profit (%)	35.20%	76.20%
Worst Year Profit (%)	-35.60%	-64.50%

5.7 Timing System 50/200 SMA Cross - NYSE - 1/1/1962 - 12/31/2010

Figure 7 compares the results obtained from the 50/200-day simple moving average crossover system utilized on the NYSE universe of stocks with the buy and hold results outlined in section 5.1. Here again both the annualized and risk adjusted annualized returns are greater than the buy and hold strategy.

Figure 7 - Timing System 50/200 SMA Cross - NYSE - 1/1/1962 - 12/31/2010

	Buy And Hold S&P 500	Timing NYSE - 50/200 SMA Cross
Annualized Return	6.04%	9.75%
Annualized Return / Exposure	6.04%	12.16%
Total Number of Trades	1	830
Number of Trades With Profit < -25%	0	39
Number of Trades With Profit >= -25% and < -10%	0	189
Number of Trades With Profit >= -10% and < 0%	0	259
Number of Trades With Profit >= 0% and < 10%	0	97
Number of Trades With Profit >= 10% and < 25%	0	77
Number of Trades With Profit > 25%	1	169
Number of Trades Profit > Annualized Return	N/A	247
Number of Trades Profit < Annualized Return	N/A	583
Maximum Drawdown (%)	-56.78%	-62.42
Best Year Profit (%)	35.20%	142.20%
Worst Year Profit (%)	-35.60%	-44.50%

5.8 Buy and Hold - GSCI - 2/17/1998 - 12/31/2010

Figure 8 summarizes the results obtained from the buy and hold strategy when applied to the GSCI. Even though these results cover a much shorter time frame than the results for the S&P 500 there is again a considerable drawdown utilizing what many would advocate as a lower risk system.

Figure 8 - Buy and Hold - GSCI - 2/17/1998 - 12/31/2010

	Buy And Hold GSCI
Annualized Return	10.86%
Annualized Return / Exposure	10.86%
Maximum Drawdown (%)	-65.54%
Best Year Profit (%)	50.70%
Worst Year Profit (%)	-43.00%

5.9 Timing System 50-Day Moving Average - GSCI - 2/17/1998 - 12/31/2010

Figure 9 compares the results obtained in section 5.8 with the 50-day simple moving average timing system utilized on the GSCI. Both the annualized returns and risk adjusted annualized returns are lower than the buy and hold strategy. This strategy does appear to limit both the drawdown, worst year profits, and best year profits.

Figure 9 - Timing System 50-Day Moving Average - GSCI - 2/17/1998 - 12/31/2010

	Buy And Hold GSCI	Timing GSCI - 50 Day SMA
Annualized Return	10.86%	6.34%
Annualized Return / Exposure	10.86%	10.35%
Total Number of Trades	1	113
Number of Trades With Profit < -25%	0	0
Number of Trades With Profit >= -25% and < -10%	0	0
Number of Trades With Profit >= -10% and < 0%	0	85
Number of Trades With Profit >= 0% and < 10%	0	18
Number of Trades With Profit >= 10% and < 25%	0	9
Number of Trades With Profit > 25%	1	1
Number of Trades Profit > Annualized Return	N/A	18
Number of Trades Profit < Annualized Return	N/A	95
Maximum Drawdown (%)	-65.54%	-35.23
Best Year Profit (%)	50.70%	28.90%
Worst Year Profit (%)	-43.00%	-16.00%

5.10 Timing System 200-Day Moving Average - GSCI - 2/17/1998 - 12/31/2010

Figure 10 compares the results obtained in section 5.8 with the 200-day simple moving average system utilized on the GSCI. Here the annualized return is still less than the buy and hold annualized return. However, when adjusted for risk this system produces a greater return. Like the results in section 5.9 it also appears that this system limits the drawdown, best year profit, and worst year profit when compared to buy and hold.

Figure 10 - Timing System 200-Day Moving Average - GSCI - 2/17/1998 - 12/31/2010

	Buy And Hold GSCI	Timing GSCI - 200 Day SMA
Annualized Return	10.86%	9.60%
Annualized Return / Exposure	10.86%	14.01%
Total Number of Trades	1	42
Number of Trades With Profit < -25%	0	0
Number of Trades With Profit >= -25% and < -10%	0	0
Number of Trades With Profit >= -10% and < 0%	0	34
Number of Trades With Profit >= 0% and < 10%	0	1
Number of Trades With Profit >= 10% and < 25%	0	4
Number of Trades With Profit > 25%	1	3
Number of Trades Profit > Annualized Return	N/A	7
Number of Trades Profit < Annualized Return	N/A	35
Maximum Drawdown (%)	-65.54%	-38.85
Best Year Profit (%)	50.70%	39.70%
Worst Year Profit (%)	-43.00%	-23.30%

5.11 Timing System 50/200 SMA Cross - GSCI - 2/17/1998 - 12/31/2010

Figure 11 compares the results obtained in section 5.8 with the 50/200-day simple moving average crossover system utilized on the GSCI. Unlike the previous 2 timing systems, this test generated greater annualized and risk adjusted returns when compared with the buy and hold system. Like the previous timing systems on the GSCI, this system also appears to limit the drawdown, best year profit, and worst year loss.

Figure 11 - Timing System 50/200 SMA Cross - GSCI - 2/17/1998 - 12/31/2010

	Buy And Hold GSCI	Timing GSCI - 50/200 SMA Cross
Annualized Return	10.86%	12.78%
Annualized Return / Exposure	10.86%	18.98%
Total Number of Trades	1	9
Number of Trades With Profit < -25%	0	0
Number of Trades With Profit >= -25% and < -10%	0	1
Number of Trades With Profit >= -10% and < 0%	0	1
Number of Trades With Profit >= 0% and < 10%	0	1
Number of Trades With Profit >= 10% and < 25%	0	3
Number of Trades With Profit > 25%	1	3
Number of Trades With Profit > Annualized Return	N/A	5
Number of Trades With Profit < Annualized Return	N/A	4
Maximum Drawdown (%)	-65.54%	-33.62
Best Year Profit (%)	50.70%	44.00%
Worst Year Profit (%)	-43.00%	-12.10%

6. Conclusions

The results shown in section 5 paint a somewhat murky picture about whether or not the tested timing systems work on the S&P 500, NYSE stocks, and the GSCI. When examining the results of timing the S&P 500 versus just buying and holding the index, the annualized returns for timing are either slightly lower than buy and hold or marginally better. Being as it is hard to get an extremely accurate idea of what trading costs would really be, it would appear that in the situations where timing outperformed buy and hold, this marginal improvement could be potentially eaten up by higher trading costs. Additionally, since these tests were run directly on the index itself, it ignores the real costs of investing in the S&P 500 index via an exchange traded fund or similar vehicle.

When applying the timing systems to the NYSE stocks the results are very different to the results for timing the S&P 500 index. In all the tests the annualized returns are better than buying and holding the S&P 500 index. Again one has to wonder how accurate the trading costs simulated are and whether or not these would have an even more adverse effect in real world usage. However, the 50-day simple moving average system appears to generate almost a 2% better annualized return than the buy and hold strategy while the 50/200-day SMA crossover generates almost a 3% better annualized return. This is an interesting find and because the difference is so great that it could be argued that there is some sort of market inefficiency present.

When the same tests were run on the GSCI the results again were very similar to both the S&P 500 and NYSE tests. With the exception of the 50/200 SMA crossover system the annualized returns for timing were generally all lower than buying and holding the GSCI.

However, in the case of the 50/200 SMA crossover, the annualized return was almost 2% greater than the buy and hold system.

So what do these results mean in relation to weak- form efficient market hypothesis? If weak- form was to strictly hold, none of the timing strategies should have been able to generate a better annualized return than the buy and hold system. It is interesting to note that in two of the tests, timing did indeed generate a better annualized return. However this could be indicative of pockets of inefficiency in the weak- form hypothesis.

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8. Appendix

8.1 Formulas[13] and Definitions

Exposure % - Market exposure of the trading system. Sum of the bar exposures divided by the number of bars. Single bar exposure is the value of open positions divided by portfolio equity.

Net Risk Adjusted Return % - Net profit % divided by exposure %

Annual Return % - Compounded annual return %

Compounded Annual Return % - 100% * ((final value/initial value) ^ (365/ days in test) - 1)

Risk Adjusted Return % - Annual return % divided by exposure %

Average Profit/Loss - (Profit of winners + Loss of losers) / number of trades

Average Profit/Loss % - (% Profit of winners + % Loss of losers) / number of trades

Average Profit % - % Profit of winners / number of winning trades

Average Loss % - % Loss of losers / number of losing trades

Maximum Trade Drawdown - The largest peak to valley decline experienced in any single trade

Maximum Trade % Drawdown - The largest peak to valley percentage decline experienced in any single trade

Maximum System Drawdown - The largest peak to valley decline experienced in portfolio equity

Maximum System % Drawdown - The largest peak to valley percentage decline experienced in portfolio equity

Recovery Factor - Net profit divided by max system drawdown

Profit Factor - Profit of winners divided by loss of losers

Payoff Ratio - Average win divided by average loss

Risk-Reward Ratio - Expected annual return divided by standard error

Ulcer Index - Square root of sum of squared drawdowns divided by the number of bars

[13] As defined by the Amibroker program/help manual

Ulcer Performance Index - Annual profit minus treasure notes profit divided by ulcer index

Sharpe Ratio of Trades - First average percentage return and standard deviation of returns is calculated. Then these two figures are annualized by multiplying them by the ratio number of bars per year divided by average number of bars per trade. Then the risk free rate of return is subtracted[14] from annualized average return and then divided by annualized standard deviation of returns.

K-Ratio - Linear regression slope of equity line multiplied by square root of sum of squared deviations of bar number divided by standard error of equity line multiplied by square root of number of bars

[14] 6% was used

8.2 Full System Testing Results and Charts

8.2.1 Buy and Hold - S&P 500 - 1/1/1962 - 12/31/2010

Figure 12 - Buy and Hold - S&P 500 - 1/1/1962 - 12/31/2010 - Back Test Report

Statistics			
	All trades	**Long trades**	**Short trades**
Initial capital	1000000.00	1000000.00	1000000.00
Ending capital	17705031.13	17705031.13	1000000.00
Net Profit	16705031.13	16705031.13	0.00
Net Profit %	1670.50 %	1670.50 %	0.00 %
Exposure %	100.00 %	100.00 %	0.00 %
Net Risk Adjusted Return %	1670.52 %	1670.52 %	N/A
Annual Return %	6.04 %	6.04 %	0.00 %
Risk Adjusted Return %	6.04 %	6.04 %	N/A
All trades	1	1 (100.00 %)	0 (0.00 %)
Avg. Profit/Loss	16705031.13	16705031.13	N/A
Avg. Profit/Loss %	1671.39 %	1671.39 %	N/A
Avg. Bars Held	12337.00	12337.00	N/A
Winners	1 (100.00 %)	1 (100.00 %)	0 (0.00 %)
Total Profit	16705031.13	16705031.13	0.00
Avg. Profit	16705031.13	16705031.13	N/A
Avg. Profit %	1671.39 %	1671.39 %	N/A
Avg. Bars Held	12337.00	12337.00	N/A
Max. Consecutive	1	1	0
Largest win	16705031.13	16705031.13	0.00
# bars in largest win	12337	12337	0
Losers	0 (0.00 %)	0 (0.00 %)	0 (0.00 %)
Total Loss	0.00	0.00	0.00
Avg. Loss	N/A	N/A	N/A
Avg. Loss %	N/A	N/A	N/A
Avg. Bars Held	N/A	N/A	N/A
Max. Consecutive	0	0	0
Largest loss	0.00	0.00	0.00
# bars in largest loss	0	0	0
Max. trade drawdown	-12509954.59	-12509954.59	0.00
Max. trade % drawdown	-56.78 %	-56.78 %	0.00 %
Max. system drawdown	-12509954.59	-12509954.59	0.00
Max. system % drawdown	-56.78 %	-56.78 %	0.00 %
Recovery Factor	1.34	1.34	N/A
CAR/MaxDD	0.11	0.11	N/A

RAR/MaxDD	0.11	0.11	N/A
Profit Factor	N/A	N/A	N/A
Payoff Ratio	N/A	N/A	N/A
Standard Error	3138704.05	3138704.05	0.00
Risk-Reward Ratio	0.13	0.13	N/A
Ulcer Index	16.58	16.58	0.00
Ulcer Performance Index	0.04	0.04	N/A
Sharpe Ratio of trades	N/A	N/A	0.00
K-Ratio	0.0166	0.0166	-1.#IND

Figure 13 - Buy and Hold - S&P 500 - 1/1/1962 - 12/31/2010 - Monthly Profit Report

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr%
1962	-2.4%	1.4%	-1.2%	-5.3%	-9.6%	-5.9%	3.4%	1.4%	-5.2%	2.9%	8.4%	1.2%	-11.7%
1963	5.8%	-3.3%	4.3%	4.7%	1.0%	-2.6%	0.3%	5.2%	-0.6%	2.2%	-0.2%	2.4%	20.3%
1964	2.0%	1.3%	1.6%	1.2%	-0.1%	2.7%	0.9%	-1.0%	2.3%	1.3%	-1.9%	0.8%	11.7%
1965	4.0%	-0.4%	-1.1%	3.4%	-0.6%	-4.8%	1.1%	2.0%	3.1%	2.6%	-0.8%	0.7%	9.4%
1966	-0.0%	-2.3%	-0.1%	1.1%	-5.3%	-0.6%	-3.9%	-5.6%	-3.6%	7.9%	-0.9%	0.4%	-12.8%
1967	7.5%	1.4%	1.8%	5.2%	-3.8%	0.8%	4.9%	-1.8%	2.8%	-3.7%	1.9%	1.7%	19.6%
1968	-3.7%	-3.7%	3.8%	5.9%	2.1%	-0.6%	-2.1%	2.1%	3.6%	0.2%	4.9%	-3.9%	8.1%
1969	-1.0%	-4.4%	3.1%	2.1%	-0.6%	-4.7%	-4.7%	2.2%	-3.2%	5.0%	-4.0%	-0.2%	-10.5%
1970	-7.8%	4.6%	0.4%	-9.6%	-4.4%	-6.3%	5.6%	5.1%	4.2%	-1.0%	4.7%	4.2%	-2.0%
1971	5.8%	0.6%	3.5%	2.9%	-3.0%	-0.4%	-3.8%	3.2%	-0.1%	-6.2%	2.8%	6.5%	11.5%
1972	2.3%	3.2%	0.1%	-0.7%	2.8%	-2.0%	0.8%	2.9%	-1.2%	2.3%	4.2%	1.5%	17.1%
1973	-3.6%	-3.2%	-0.8%	-2.8%	-3.0%	-1.0%	3.8%	-2.2%	3.5%	-0.5%	-12.8%	4.0%	-18.0%
1974	-2.4%	0.2%	-2.4%	-1.1%	-3.4%	-3.5%	-8.5%	-10.5%	-10.1%	16.5%	-7.8%	3.1%	-28.1%
1975	10.8%	6.7%	-0.5%	6.6%	5.1%	2.5%	-7.2%	-2.9%	-3.0%	6.2%	2.9%	0.3%	29.4%
1976	11.0%	-0.8%	2.2%	-1.3%	-1.1%	3.7%	-0.4%	0.8%	0.1%	-1.0%	-0.6%	4.4%	17.7%
1977	-4.2%	-1.8%	-1.4%	-0.3%	-2.0%	3.3%	-1.0%	-2.3%	-0.1%	-5.6%	3.7%	-0.9%	-12.3%
1978	-4.1%	-3.0%	1.5%	10.4%	-0.3%	-2.3%	5.9%	3.0%	-0.7%	-5.9%	-0.6%	0.5%	3.1%
1979	3.3%	-3.1%	4.1%	0.8%	-2.5%	2.8%	2.1%	3.1%	1.0%	-5.5%	3.2%	-0.1%	9.3%
1980	8.9%	-2.3%	-9.2%	3.2%	5.0%	3.8%	5.5%	2.1%	2.7%	1.5%	6.3%	-0.6%	28.9%
1981	-6.9%	4.0%	3.5%	-2.8%	-0.2%	-2.0%	0.5%	-5.7%	-4.8%	6.1%	1.5%	-2.7%	-10.0%
1982	-4.0%	-3.8%	0.4%	2.7%	-4.4%	-2.7%	0.2%	8.5%	3.1%	11.1%	2.4%	-0.3%	12.7%
1983	3.3%	5.5%	1.4%	5.9%	0.3%	3.7%	-3.9%	1.4%	1.0%	-1.3%	1.7%	-1.5%	18.6%
1984	-0.8%	-2.8%	-0.1%	2.3%	-5.2%	-0.0%	0.6%	7.0%	-0.2%	1.7%	-2.8%	1.6%	0.8%
1985	8.0%	2.6%	-1.1%	-1.6%	6.1%	1.6%	-0.2%	-2.2%	-1.5%	3.5%	4.7%	4.6%	26.7%
1986	2.1%	5.4%	4.3%	0.0%	4.2%	2.9%	-6.8%	5.8%	-6.0%	5.2%	1.3%	-1.0%	17.6%
1987	12.2%	2.4%	3.3%	-1.5%	0.6%	4.5%	4.8%	1.8%	1.2%	-21.9%	-9.3%	10.3%	3.9%
1988	-0.4%	4.8%	-4.2%	2.1%	2.0%	1.9%	0.2%	-5.1%	5.0%	2.8%	-2.4%	1.0%	7.6%
1989	7.9%	-3.4%	3.2%	4.3%	4.2%	-0.9%	7.7%	2.9%	-0.8%	-2.8%	2.8%	2.6%	30.6%
1990	-8.6%	1.2%	1.8%	-1.9%	9.3%	-1.0%	-1.1%	-9.1%	-2.5%	-2.5%	5.6%	0.7%	-9.2%
1991	5.1%	8.0%	0.2%	2.4%	2.0%	-2.6%	2.4%	1.3%	-0.8%	0.5%	-2.5%	9.4%	27.8%
1992	-1.9%	0.7%	-2.0%	2.1%	1.2%	-1.1%	3.0%	-2.1%	0.1%	1.6%	1.9%	1.1%	4.3%
1993	1.6%	-0.1%	1.9%	-1.7%	2.6%	-1.1%	0.3%	2.9%	-0.4%	1.7%	-1.5%	0.8%	6.9%
1994	3.0%	-3.2%	-5.5%	3.2%	1.0%	-2.5%	3.3%	2.6%	-2.4%	1.4%	-4.2%	2.3%	-1.4%
1995	2.5%	3.2%	3.3%	2.5%	3.7%	2.5%	2.3%	0.8%	3.2%	0.4%	3.9%	2.3%	35.2%
1996	2.9%	0.9%	1.5%	0.1%	2.0%	1.2%	-3.8%	0.7%	5.2%	2.1%	7.5%	-2.6%	18.7%
1997	6.7%	1.1%	-4.5%	5.1%	6.0%	5.3%	6.3%	-2.1%	3.0%	-1.7%	3.8%	0.0%	32.3%
1998	2.7%	4.6%	5.8%	1.2%	-2.7%	5.3%	-3.1%	-10.6%	-0.8%	12.7%	5.7%	4.5%	26.0%
1999	3.7%	-2.9%	4.7%	4.7%	-4.5%	6.7%	-3.8%	0.2%	-3.6%	5.6%	3.2%	4.1%	18.5%
2000	-3.2%	-2.1%	9.2%	-2.5%	-1.3%	1.4%	-2.1%	5.7%	-5.6%	-1.0%	-7.5%	-2.4%	-11.8%
2001	7.0%	-9.6%	-7.7%	10.5%	-0.5%	-1.9%	-1.7%	-6.8%	-8.3%	4.4%	4.2%	2.2%	-10.0%
2002	-2.8%	0.9%	1.3%	-5.2%	-4.2%	-6.9%	-8.7%	-0.8%	-3.4%	6.3%	3.7%	-2.7%	-21.3%
2003	-5.4%	-3.0%	2.8%	6.7%	5.5%	1.6%	-0.2%	4.3%	-0.4%	4.0%	1.0%	3.6%	21.9%
2004	2.4%	1.8%	-2.1%	-1.3%	0.3%	0.7%	-2.0%	-0.1%	2.3%	-0.1%	5.4%	0.9%	8.4%
2005	-1.1%	1.8%	-3.1%	-0.9%	3.4%	-0.6%	3.4%	-1.1%	0.4%	-2.0%	5.1%	0.3%	5.6%
2006	1.1%	0.7%	0.5%	0.6%	-1.5%	-0.4%	-0.7%	3.2%	1.5%	2.7%	2.1%	1.4%	11.6%
2007	2.1%	-3.0%	1.5%	4.3%	3.4%	-1.1%	-3.5%	1.6%	3.9%	-2.5%	-2.4%	-1.7%	2.2%
2008	-3.6%	-4.6%	2.9%	2.9%	-1.7%	-7.3%	-1.9%	1.4%	-9.1%	-16.8%	-15.5%	14.2%	-35.6%
2009	-11.4%	-15.1%	15.7%	8.2%	7.4%	-2.1%	8.6%	-0.5%	3.2%	1.3%	6.3%	2.2%	21.6%
2010	-3.9%	2.4%	5.6%	2.1%	-10.9%	-4.0%	9.6%	-4.0%	6.1%	3.3%	1.8%	4.3%	11.0%
Avg	1.1%	-0.2%	1.1%	1.6%	0.1%	-0.3%	0.3%	0.2%	-0.3%	0.9%	0.8%	1.7%	

8.2.2 Timing System 50-Day Moving Average - S&P500 - 1/1/1962 - 12/31/2010

Figure 14 - Timing System 50-Day Moving Average - S&P500 - 1/1/1962 - 12/31/2010 - Back Test Report

Statistics

	All trades	Long trades	Short trades
Initial capital	1000000.00	1000000.00	1000000.00
Ending capital	10916203.14	10916203.14	1000000.00
Net Profit	9916203.14	9916203.14	0.00
Net Profit %	991.62 %	991.62 %	0.00 %
Exposure %	61.52 %	61.52 %	0.00 %
Net Risk Adjusted Return %	1611.94 %	1611.94 %	N/A
Annual Return %	5.00 %	5.00 %	0.00 %
Risk Adjusted Return %	8.12 %	8.12 %	N/A
All trades	380	380 (100.00 %)	0 (0.00 %)
Avg. Profit/Loss	26095.27	26095.27	N/A
Avg. Profit/Loss %	0.72 %	0.72 %	N/A
Avg. Bars Held	20.97	20.97	N/A
Winners	110 (28.95 %)	110 (28.95 %)	0 (0.00 %)
Total Profit	31734408.61	31734408.61	0.00
Avg. Profit	288494.62	288494.62	N/A
Avg. Profit %	5.22 %	5.22 %	N/A
Avg. Bars Held	54.30	54.30	N/A
Max. Consecutive	7	7	0
Largest win	1863175.74	1863175.74	0.00
# bars in largest win	258	258	0
Losers	270 (71.05 %)	270 (71.05 %)	0 (0.00 %)
Total Loss	-21818205.47	-21818205.47	0.00
Avg. Loss	-80808.17	-80808.17	N/A
Avg. Loss %	-1.12 %	-1.12 %	N/A
Avg. Bars Held	7.39	7.39	N/A
Max. Consecutive	14	14	0
Largest loss	-893799.82	-893799.82	0.00
# bars in largest loss	22	22	0
Max. trade drawdown	-1477716.67	-1477716.67	0.00
Max. trade % drawdown	-11.19 %	-11.19 %	0.00 %
Max. system drawdown	-6345027.49	-6345027.49	0.00
Max. system % drawdown	-44.88 %	-44.88 %	0.00 %
Recovery Factor	1.56	1.56	N/A
CAR/MaxDD	0.11	0.11	N/A
RAR/MaxDD	0.18	0.18	N/A
Profit Factor	1.45	1.45	N/A
Payoff Ratio	3.57	3.57	N/A

Standard Error	1203346.10	1203346.10	0.00
Risk-Reward Ratio	0.21	0.21	N/A
Ulcer Index	14.00	14.00	0.00
Ulcer Performance Index	-0.03	-0.03	N/A
Sharpe Ratio of trades	0.20	0.20	0.00
K-Ratio	0.0265	0.0265	-1.#IND

Figure 15 - Timing System 50-Day Moving Average - S&P500 - 1/1/1962 - 12/31/2010 - Monthly Profit Report

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr%
1962	N/A	-0.8%	-2.2%	N/A	N/A	N/A	0.9%	1.4%	-1.5%	N/A	7.1%	1.2%	6.0%
1963	5.8%	-3.0%	1.5%	4.7%	1.0%	-1.8%	-0.8%	4.1%	-0.6%	1.7%	-1.1%	2.4%	14.2%
1964	2.0%	1.3%	1.6%	1.2%	-0.1%	2.2%	0.9%	-2.6%	1.7%	1.3%	-0.9%	-0.7%	8.2%
1965	3.1%	-0.4%	-1.2%	2.4%	-2.0%	-1.8%	-0.1%	2.0%	3.1%	2.6%	-0.8%	-1.3%	5.5%
1966	-0.0%	0.0%	N/A	-0.5%	-1.2%	N/A	-2.6%	N/A	N/A	2.6%	-0.9%	0.7%	-1.9%
1967	5.8%	1.4%	1.8%	4.3%	-2.8%	-0.2%	3.5%	-2.4%	2.8%	-1.7%	N/A	1.0%	13.9%
1968	-2.2%	N/A	-0.1%	5.9%	2.1%	-0.6%	-0.1%	N/A	2.7%	0.2%	4.9%	-2.8%	10.1%
1969	N/A	N/A	0.2%	1.6%	-0.6%	-1.1%	N/A	-0.6%	-3.9%	2.6%	-2.3%	N/A	-4.0%
1970	N/A	-0.5%	-1.1%	-2.7%	N/A	N/A	2.3%	3.9%	4.2%	-1.0%	3.6%	4.2%	13.3%
1971	5.8%	0.6%	3.5%	2.9%	-2.5%	N/A	-1.3%	0.2%	-0.4%	-0.8%	N/A	6.0%	14.4%
1972	2.3%	3.2%	0.1%	-0.3%	1.5%	-3.3%	-0.9%	2.9%	-3.0%	0.8%	4.2%	1.5%	9.0%
1973	-2.0%	N/A	N/A	N/A	-0.8%	-0.7%	0.6%	-1.9%	0.7%	-0.5%	-0.6%	N/A	-5.1%
1974	-3.0%	0.0%	-0.7%	N/A	N/A	-2.2%	N/A	N/A	N/A	2.4%	-6.2%	-0.1%	-9.6%
1975	10.8%	6.7%	-0.5%	4.0%	5.1%	2.5%	-3.6%	N/A	N/A	2.4%	2.9%	-2.7%	30.2%
1976	11.0%	-0.8%	2.2%	-2.4%	-2.1%	1.5%	-0.4%	0.1%	0.1%	N/A	-0.9%	3.6%	11.8%
1977	-4.4%	N/A	-0.9%	-1.8%	-1.0%	1.3%	-1.5%	N/A	N/A	N/A	-0.1%	-2.6%	-10.6%
1978	-0.3%	N/A	-2.4%	8.8%	-0.3%	-0.9%	1.6%	3.0%	-1.9%	-2.0%	N/A	0.3%	5.7%
1979	3.3%	-3.3%	1.2%	0.8%	-1.0%	0.6%	2.1%	3.1%	1.0%	-1.8%	-1.0%	-0.1%	5.0%
1980	8.8%	-2.3%	-1.2%	-0.5%	5.0%	3.8%	5.5%	2.1%	1.1%	-0.8%	6.3%	-2.4%	27.7%
1981	-2.8%	-0.1%	1.3%	-2.8%	-0.3%	-3.8%	N/A	-0.9%	N/A	1.8%	1.5%	-3.0%	-8.9%
1982	N/A	N/A	-0.1%	2.7%	-1.7%	N/A	-1.2%	8.3%	3.1%	11.1%	2.4%	-3.8%	21.9%
1983	1.9%	5.5%	1.4%	5.9%	0.3%	3.7%	-5.5%	N/A	-0.8%	0.1%	-1.3%	-1.0%	10.2%
1984	-2.0%	N/A	-1.3%	1.5%	-2.7%	N/A	-0.1%	7.0%	-0.2%	-3.5%	-2.7%	-1.7%	-5.9%
1985	6.0%	2.6%	-3.8%	-1.5%	4.5%	1.6%	-1.0%	-2.2%	N/A	2.7%	4.7%	4.6%	19.2%
1986	0.5%	5.4%	4.3%	0.0%	1.6%	2.9%	-4.5%	2.0%	-5.4%	1.9%	-1.0%	-1.9%	5.5%
1987	12.2%	2.4%	3.3%	-4.4%	-3.1%	3.1%	4.8%	1.8%	-4.1%	-2.5%	N/A	2.6%	16.2%
1988	-3.7%	4.8%	-4.1%	-2.3%	1.6%	1.9%	-3.1%	-2.1%	1.6%	2.8%	-4.5%	-0.8%	-8.0%
1989	7.9%	-3.4%	0.3%	4.3%	4.2%	-0.9%	7.7%	2.9%	-2.1%	-4.9%	0.6%	2.2%	19.3%
1990	-5.5%	N/A	0.1%	-1.1%	7.2%	-1.0%	-1.2%	N/A	N/A	N/A	2.1%	0.7%	1.0%
1991	1.0%	8.0%	0.2%	1.9%	1.5%	-4.7%	1.1%	-2.5%	-3.4%	-2.5%	-2.2%	7.7%	5.3%
1992	-1.9%	0.7%	0.1%	-0.1%	1.2%	-1.8%	1.2%	-3.8%	-1.4%	0.8%	1.9%	1.1%	-2.1%
1993	1.1%	-1.8%	1.9%	-2.8%	1.3%	-2.9%	-3.2%	2.9%	-1.2%	1.7%	-3.7%	-0.4%	-7.2%
1994	3.0%	-3.0%	N/A	N/A	0.8%	-2.2%	0.7%	2.6%	-3.1%	0.2%	-1.9%	-0.8%	-4.0%
1995	2.0%	3.2%	3.3%	2.5%	3.7%	2.5%	2.3%	0.8%	3.2%	0.4%	3.9%	2.3%	34.6%
1996	0.7%	0.9%	1.5%	-0.5%	0.5%	1.2%	-2.7%	-1.7%	3.9%	2.1%	7.5%	-3.4%	10.0%
1997	6.7%	1.1%	-1.5%	0.5%	6.0%	5.3%	6.3%	-6.4%	0.0%	-1.4%	1.5%	-2.4%	15.7%
1998	-1.3%	4.6%	5.8%	1.2%	-2.4%	0.5%	-4.0%	N/A	N/A	6.0%	5.7%	4.5%	21.8%
1999	3.7%	-4.7%	3.7%	4.7%	-3.5%	1.5%	-2.9%	-1.0%	-0.6%	-1.7%	3.2%	4.1%	5.9%
2000	-6.6%	-2.3%	3.2%	-11.9%	-4.0%	-0.6%	-1.2%	2.9%	-2.9%	N/A	N/A	-0.8%	-22.5%
2001	1.8%	-3.0%	N/A	2.2%	-0.5%	-3.2%	N/A	N/A	N/A	-2.1%	3.8%	2.2%	1.0%
2002	-3.1%	-0.1%	1.3%	-4.6%	N/A	N/A	N/A	-3.5%	-2.6%	-0.2%	3.7%	-4.7%	-13.3%
2003	-0.8%	N/A	-0.6%	6.7%	5.5%	1.6%	-0.2%	2.3%	-3.7%	4.0%	-1.7%	3.6%	17.5%
2004	2.4%	1.8%	-2.8%	-4.3%	-0.1%	0.1%	-1.1%	-0.6%	2.3%	-2.7%	5.4%	0.9%	0.9%
2005	-3.7%	0.3%	-1.8%	N/A	2.3%	-0.6%	3.4%	-1.4%	-1.5%	-1.0%	4.0%	0.3%	-0.0%
2006	1.1%	-0.3%	-0.6%	-1.4%	-1.1%	-0.1%	-2.0%	3.2%	1.5%	2.7%	2.1%	1.4%	6.6%
2007	2.1%	-3.2%	-1.3%	3.3%	3.4%	-2.3%	-1.2%	-0.1%	-0.1%	-2.5%	-3.0%	-3.5%	-8.6%
2008	N/A	N/A	-0.8%	0.4%	-1.7%	-3.7%	N/A	-4.9%	-3.2%	N/A	N/A	1.2%	-12.2%
2009	-9.8%	-5.0%	-2.9%	8.2%	7.4%	-3.0%	4.3%	-0.5%	3.2%	-1.7%	3.9%	2.2%	4.8%
2010	-3.6%	-0.3%	5.6%	2.1%	-3.0%	N/A	-0.1%	-5.3%	5.0%	3.3%	1.8%	4.3%	9.4%
Avg	1.1%	0.3%	0.4%	0.8%	0.6%	-0.1%	0.1%	0.3%	-0.1%	0.5%	1.1%	0.5%	

8.2.3 Timing System 200-Day Moving Average - S&P500 - 1/1/1962 - 12/31/2010

Figure 16 - Timing System 200-Day Moving Average - S&P500 - 1/1/1962 - 12/31/2010 - Back Test Report

Statistics

	All trades	Long trades	Short trades
Initial capital	1000000.00	1000000.00	1000000.00
Ending capital	19789641.92	19789641.92	1000000.00
Net Profit	18789641.92	18789641.92	0.00
Net Profit %	1878.96 %	1878.96 %	0.00 %
Exposure %	66.57 %	66.57 %	0.00 %
Net Risk Adjusted Return %	2822.65 %	2822.65 %	N/A
Annual Return %	6.28 %	6.28 %	0.00 %
Risk Adjusted Return %	9.43 %	9.43 %	N/A
All trades	154	154 (100.00 %)	0 (0.00 %)
Avg. Profit/Loss	122010.66	122010.66	N/A
Avg. Profit/Loss %	2.27 %	2.27 %	N/A
Avg. Bars Held	54.32	54.32	N/A
Winners	41 (26.62 %)	41 (26.62 %)	0 (0.00 %)
Total Profit	31396191.60	31396191.60	0.00
Avg. Profit	765760.77	765760.77	N/A
Avg. Profit %	11.53 %	11.53 %	N/A
Avg. Bars Held	181.63	181.63	N/A
Max. Consecutive	3	3	0
Largest win	6175005.92	6175005.92	0.00
# bars in largest win	526	526	0
Losers	113 (73.38 %)	113 (73.38 %)	0 (0.00 %)
Total Loss	-12606549.68	-12606549.68	0.00
Avg. Loss	-111562.39	-111562.39	N/A
Avg. Loss %	-1.09 %	-1.09 %	N/A
Avg. Bars Held	8.13	8.13	N/A
Max. Consecutive	8	8	0
Largest loss	-919096.21	-919096.21	0.00
# bars in largest loss	16	16	0
Max. trade drawdown	-2538107.01	-2538107.01	0.00
Max. trade % drawdown	-13.31 %	-13.31 %	0.00 %
Max. system drawdown	-5888079.56	-5888079.56	0.00
Max. system % drawdown	-29.63 %	-29.63 %	0.00 %
Recovery Factor	3.19	3.19	N/A
CAR/MaxDD	0.21	0.21	N/A
RAR/MaxDD	0.32	0.32	N/A
Profit Factor	2.49	2.49	N/A
Payoff Ratio	6.86	6.86	N/A

Standard Error	2506014.73	2506014.73	0.00
Risk-Reward Ratio	0.17	0.17	N/A
Ulcer Index	10.05	10.05	0.00
Ulcer Performance Index	0.09	0.09	N/A
Sharpe Ratio of trades	0.24	0.24	0.00
K-Ratio	0.0213	0.0213	-1.#IND

Figure 17 - Timing System 200-Day Moving Average - S&P500 - 1/1/1962 - 12/31/2010 - Monthly Profit Report

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr%
1962	N/A	N/A	N/A	-1.0%	N/A	N/A	N/A	N/A	N/A	N/A	0.5%	1.2%	0.8%
1963	5.8%	-3.3%	4.3%	4.7%	1.0%	-2.6%	0.3%	5.2%	-0.6%	2.2%	-4.1%	2.4%	15.6%
1964	2.0%	1.3%	1.6%	1.2%	-0.1%	2.7%	0.9%	-1.0%	2.3%	1.3%	-1.9%	0.8%	11.7%
1965	4.0%	-0.4%	-1.1%	3.4%	-0.6%	-4.1%	N/A	0.8%	3.1%	2.6%	-0.8%	0.7%	7.6%
1966	-0.0%	-2.3%	-1.1%	1.1%	-1.2%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-3.5%
1967	3.4%	1.4%	1.8%	5.2%	-3.8%	0.8%	4.9%	-1.8%	2.8%	-3.7%	-0.7%	1.7%	12.0%
1968	-2.5%	N/A	N/A	2.4%	2.1%	-0.6%	-2.1%	2.1%	3.6%	0.2%	4.9%	-3.9%	5.8%
1969	-1.0%	-2.2%	-0.2%	1.2%	-0.6%	-0.8%	N/A	N/A	N/A	N/A	N/A	N/A	-3.5%
1970	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.7%	-1.0%	4.7%	4.2%	9.9%
1971	5.8%	0.6%	3.5%	2.9%	-3.0%	-0.4%	-4.3%	-1.3%	-1.0%	-0.8%	N/A	1.8%	3.4%
1972	2.3%	3.2%	0.1%	-0.7%	2.8%	-2.0%	0.8%	2.9%	-1.2%	0.8%	4.2%	1.5%	15.5%
1973	-3.6%	-3.4%	-1.4%	-0.6%	N/A	N/A	N/A	N/A	N/A	-3.3%	N/A	N/A	-11.7%
1974	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0%
1975	-0.5%	6.7%	-0.5%	6.6%	5.1%	2.5%	-7.2%	-2.9%	-3.4%	2.4%	2.9%	-2.5%	8.5%
1976	11.0%	-0.8%	2.2%	-1.3%	-1.1%	3.7%	-0.4%	0.8%	0.1%	-3.6%	-4.0%	3.6%	9.9%
1977	-4.8%	N/A	N/A	N/A	N/A	N/A	-1.0%	N/A	N/A	N/A	N/A	N/A	-5.7%
1978	N/A	N/A	N/A	2.7%	-0.3%	-2.3%	5.9%	3.0%	-0.7%	-6.8%	-1.3%	-0.5%	-0.9%
1979	1.3%	-2.3%	1.2%	0.8%	-3.5%	1.3%	2.1%	3.1%	1.0%	-6.4%	2.1%	-0.1%	0.3%
1980	8.9%	-2.3%	-6.2%	N/A	2.0%	3.8%	5.5%	2.1%	2.7%	1.5%	6.3%	-0.6%	25.2%
1981	-6.9%	4.0%	3.5%	-2.8%	-2.0%	-2.3%	N/A	-1.9%	N/A	N/A	N/A	N/A	-8.5%
1982	N/A	N/A	N/A	N/A	-0.3%	N/A	N/A	1.7%	3.1%	11.1%	2.4%	-0.3%	18.7%
1983	3.3%	5.5%	1.4%	5.9%	0.3%	3.7%	-3.9%	1.4%	1.0%	-1.3%	1.7%	-2.4%	17.4%
1984	-2.0%	N/A	N/A	N/A	N/A	N/A	N/A	1.5%	-0.2%	1.7%	-2.8%	1.6%	-0.3%
1985	8.0%	2.6%	-1.1%	-1.6%	6.1%	1.6%	-0.2%	-2.2%	-5.1%	2.0%	4.7%	4.6%	20.4%
1986	2.1%	5.4%	4.3%	0.0%	4.2%	2.9%	-6.8%	5.8%	-7.4%	5.2%	-1.0%	-1.0%	13.2%
1987	12.2%	2.4%	3.3%	-1.5%	0.6%	4.5%	4.8%	1.8%	1.2%	-8.9%	N/A	N/A	20.9%
1988	N/A	N/A	N/A	N/A	N/A	-0.8%	0.2%	-6.7%	2.5%	2.8%	-3.7%	1.0%	-4.9%
1989	7.9%	-3.4%	3.2%	4.3%	4.2%	-0.9%	7.7%	2.9%	-0.8%	-2.8%	2.8%	2.6%	30.6%
1990	-8.1%	N/A	-2.1%	-1.2%	6.1%	-1.0%	-1.1%	-3.0%	N/A	N/A	N/A	N/A	-10.5%
1991	2.4%	8.0%	0.2%	2.4%	2.0%	-2.6%	2.4%	1.3%	-0.8%	0.5%	-3.0%	8.4%	22.8%
1992	-1.9%	0.7%	-2.0%	0.4%	1.2%	-1.8%	3.0%	-2.1%	0.1%	0.3%	1.9%	1.1%	0.6%
1993	1.6%	-0.1%	1.9%	-1.7%	2.6%	-1.1%	0.3%	2.9%	-0.4%	1.7%	-1.5%	0.8%	6.9%
1994	3.0%	-3.2%	-0.8%	N/A	N/A	-0.5%	-0.1%	1.5%	-3.0%	-1.1%	-2.2%	-0.5%	-6.8%
1995	2.5%	3.2%	3.3%	2.5%	3.7%	2.5%	2.3%	0.8%	3.2%	0.4%	3.9%	2.3%	35.2%
1996	2.9%	0.9%	1.5%	0.1%	2.0%	1.2%	-6.8%	0.7%	5.2%	2.1%	7.5%	-2.6%	15.1%
1997	6.7%	1.1%	-4.5%	5.1%	6.0%	5.3%	6.3%	-2.1%	3.0%	-1.7%	3.8%	0.0%	32.3%
1998	2.7%	4.6%	5.8%	1.2%	-2.7%	5.3%	-3.1%	-6.3%	-2.3%	0.7%	5.7%	4.5%	16.2%
1999	3.7%	-2.9%	4.7%	4.7%	-4.5%	6.7%	-3.8%	0.2%	-3.8%	-2.4%	3.2%	4.1%	9.4%
2000	-3.2%	-3.7%	5.5%	-5.7%	-7.8%	1.4%	-3.0%	5.7%	-8.0%	N/A	N/A	N/A	-18.1%
2001	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0%
2002	-0.7%	N/A	-3.4%	-0.9%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-5.0%
2003	N/A	N/A	-3.6%	1.7%	5.5%	1.6%	-0.2%	4.3%	-0.4%	4.0%	1.0%	3.6%	18.6%
2004	2.4%	1.8%	-2.1%	-1.3%	0.3%	0.7%	-3.8%	N/A	-0.6%	-1.2%	5.4%	0.9%	2.2%
2005	-1.1%	1.8%	-3.1%	-5.1%	2.3%	-0.6%	3.4%	-1.1%	0.4%	-3.2%	5.1%	0.3%	-1.4%
2006	1.1%	0.7%	0.5%	0.6%	-1.7%	-1.8%	-2.9%	1.0%	1.5%	2.7%	2.1%	1.4%	5.1%
2007	2.1%	-3.0%	1.5%	4.3%	3.4%	-1.1%	-3.5%	-5.1%	2.5%	-2.5%	-2.2%	-3.4%	-7.2%
2008	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0%
2009	N/A	N/A	N/A	N/A	-0.1%	-3.0%	5.5%	-0.5%	3.2%	1.3%	6.3%	2.2%	15.5%
2010	-3.9%	2.4%	5.6%	2.1%	-10.9%	-1.9%	-0.3%	-3.2%	2.1%	3.3%	1.8%	4.3%	0.3%
Avg	1.4%	0.5%	0.6%	0.9%	0.4%	0.4%	0.0%	0.3%	0.1%	0.0%	1.1%	0.9%	

8.2.4 Timing System 50/200 SMA Cross - S&P500 - 1/1/1962 - 12/31/2010

Figure 18 - Timing System 50/200 SMA Cross - S&P500 - 1/1/1962 - 12/31/2010 - Back Test Report

Statistics

	All trades	Long trades	Short trades
Initial capital	1000000.00	1000000.00	1000000.00
Ending capital	23639377.25	23639377.25	1000000.00
Net Profit	22639377.25	22639377.25	0.00
Net Profit %	2263.94 %	2263.94 %	0.00 %
Exposure %	66.95 %	66.95 %	0.00 %
Net Risk Adjusted Return %	3381.65 %	3381.65 %	N/A
Annual Return %	6.66 %	6.66 %	0.00 %
Risk Adjusted Return %	9.95 %	9.95 %	N/A
All trades	26	26 (100.00 %)	0 (0.00 %)
Avg. Profit/Loss	870745.28	870745.28	N/A
Avg. Profit/Loss %	14.88 %	14.88 %	N/A
Avg. Bars Held	318.65	318.65	N/A
Winners	22 (84.62 %)	22 (84.62 %)	0 (0.00 %)
Total Profit	23329577.32	23329577.32	0.00
Avg. Profit	1060435.33	1060435.33	N/A
Avg. Profit %	18.67 %	18.67 %	N/A
Avg. Bars Held	363.95	363.95	N/A
Max. Consecutive	9	9	0
Largest win	6446703.37	6446703.37	0.00
# bars in largest win	1021	1021	0
Losers	4 (15.38 %)	4 (15.38 %)	0 (0.00 %)
Total Loss	-690200.06	-690200.06	0.00
Avg. Loss	-172550.02	-172550.02	N/A
Avg. Loss %	-5.97 %	-5.97 %	N/A
Avg. Bars Held	69.50	69.50	N/A
Max. Consecutive	2	2	0
Largest loss	-434741.43	-434741.43	0.00
# bars in largest loss	73	73	0
Max. trade drawdown	-4238251.11	-4238251.11	0.00
Max. trade % drawdown	-33.24 %	-33.24 %	0.00 %
Max. system drawdown	-4349595.99	-4349595.99	0.00
Max. system % drawdown	-33.24 %	-33.24 %	0.00 %
Recovery Factor	5.20	5.20	N/A
CAR/MaxDD	0.20	0.20	N/A
RAR/MaxDD	0.30	0.30	N/A
Profit Factor	33.80	33.80	N/A
Payoff Ratio	6.15	6.15	N/A

Standard Error	2930462.39	2930462.39	0.00
Risk-Reward Ratio	0.14	0.14	N/A
Ulcer Index	8.11	8.11	0.00
Ulcer Performance Index	0.16	0.16	N/A
Sharpe Ratio of trades	0.26	0.26	0.00
K-Ratio	0.0177	0.0177	-1.#IND

Figure 19 - Timing System 50/200 SMA Cross - S&P500 - 1/1/1962 - 12/31/2010 - Monthly Profit Report

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr%
1962	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0%
1963	4.0%	-3.3%	4.3%	4.7%	1.0%	-2.6%	0.3%	5.2%	-0.6%	2.2%	-0.2%	2.4%	18.3%
1964	2.0%	1.3%	1.6%	1.2%	-0.1%	2.7%	0.9%	-1.0%	2.3%	1.3%	-1.9%	0.8%	11.7%
1965	4.0%	-0.4%	-1.1%	3.4%	-0.6%	-4.8%	-0.7%	N/A	-0.3%	2.6%	-0.8%	0.7%	1.8%
1966	-0.0%	-2.3%	-0.1%	1.3%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-1.1%
1967	N/A	0.3%	1.8%	5.2%	-3.8%	0.8%	4.9%	-1.8%	2.8%	-3.7%	1.9%	1.7%	9.9%
1968	-3.7%	-2.2%	N/A	N/A	3.1%	-0.6%	-2.1%	2.1%	3.6%	0.2%	4.9%	-3.9%	0.9%
1969	-1.0%	-4.4%	0.0%	N/A	-0.7%	-6.5%	N/A	N/A	N/A	N/A	N/A	N/A	-12.1%
1970	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.1%	4.7%	4.2%	9.2%
1971	5.8%	0.6%	3.5%	2.9%	-3.0%	-0.4%	-3.8%	3.2%	-0.9%	N/A	N/A	N/A	7.7%
1972	1.4%	3.2%	0.1%	-0.7%	2.8%	-2.0%	0.8%	2.9%	-1.2%	2.3%	4.2%	1.5%	16.1%
1973	-3.6%	-3.2%	-0.8%	1.2%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-6.3%
1974	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0%
1975	N/A	N/A	-1.4%	6.6%	5.1%	2.5%	-7.2%	-2.9%	-3.0%	6.2%	2.9%	0.3%	8.5%
1976	11.0%	-0.8%	2.2%	-1.3%	-1.1%	3.7%	-0.4%	0.8%	0.1%	-1.0%	-0.6%	N/A	12.8%
1977	-3.1%	-1.8%	0.2%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-4.7%
1978	N/A	N/A	N/A	N/A	-1.9%	-2.3%	5.9%	3.0%	-0.7%	-5.9%	-0.6%	-0.2%	-3.2%
1979	N/A	N/A	-0.4%	0.8%	-2.5%	2.8%	2.1%	3.1%	1.0%	-5.5%	3.2%	-0.1%	4.3%
1980	8.8%	-2.3%	-9.2%	1.2%	N/A	-1.0%	5.5%	2.1%	2.7%	1.5%	6.3%	-0.6%	14.8%
1981	-6.9%	4.0%	3.5%	-2.8%	-0.2%	-2.0%	-0.9%	N/A	N/A	N/A	N/A	N/A	-5.6%
1982	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-1.1%	11.1%	2.4%	-0.3%	12.1%
1983	3.3%	5.5%	1.4%	5.9%	0.3%	3.7%	-3.9%	1.4%	1.0%	-1.3%	1.7%	-1.5%	18.6%
1984	-0.8%	-1.1%	N/A	N/A	N/A	N/A	N/A	N/A	-0.1%	1.7%	-2.8%	1.6%	-1.6%
1985	8.0%	2.6%	-1.1%	-1.6%	6.1%	1.6%	-0.2%	-2.2%	-1.5%	3.5%	4.7%	4.6%	26.7%
1986	2.1%	5.4%	4.3%	0.0%	4.2%	2.9%	-6.8%	5.8%	-6.0%	5.2%	-3.4%	-1.0%	12.1%
1987	12.2%	2.4%	3.3%	-1.5%	0.6%	4.5%	4.8%	1.8%	1.2%	-21.9%	-0.5%	N/A	3.3%
1988	N/A	N/A	N/A	N/A	N/A	-0.3%	0.2%	-5.1%	5.0%	2.8%	-2.4%	1.0%	1.0%
1989	7.9%	-3.4%	3.2%	4.3%	4.2%	-0.9%	7.7%	2.9%	-0.8%	-2.8%	2.8%	2.6%	30.6%
1990	-8.6%	-0.0%	N/A	N/A	2.3%	-1.0%	-1.1%	-9.1%	0.1%	N/A	N/A	N/A	-16.7%
1991	N/A	0.3%	0.2%	2.4%	2.0%	-2.6%	2.4%	1.3%	-0.8%	0.5%	-2.5%	9.4%	12.9%
1992	-1.9%	0.7%	-2.0%	2.1%	1.2%	-1.1%	3.0%	-2.1%	0.1%	1.6%	1.9%	1.1%	4.3%
1993	1.6%	-0.1%	1.9%	-1.7%	2.6%	-1.1%	0.3%	2.9%	-0.4%	1.7%	-1.5%	0.8%	6.9%
1994	3.0%	-3.2%	-5.5%	0.8%	N/A	N/A	N/A	N/A	-2.8%	1.4%	-4.2%	2.3%	-8.2%
1995	2.5%	3.2%	3.3%	2.5%	3.7%	2.5%	2.3%	0.8%	3.2%	0.4%	3.9%	2.3%	35.2%
1996	2.9%	0.9%	1.5%	0.1%	2.0%	1.2%	-3.8%	0.7%	5.2%	2.1%	7.5%	-2.6%	18.7%
1997	6.7%	1.1%	-4.5%	5.1%	6.0%	5.3%	6.3%	-2.1%	3.0%	-1.7%	3.8%	0.0%	32.3%
1998	2.7%	4.6%	5.8%	1.2%	-2.7%	5.3%	-3.1%	-10.6%	5.5%	N/A	N/A	3.9%	11.7%
1999	3.7%	-2.9%	4.7%	4.7%	-4.5%	6.7%	-3.8%	0.2%	-3.6%	5.6%	1.7%	4.1%	16.8%
2000	-3.2%	-2.1%	9.2%	-2.5%	-1.3%	1.4%	-2.1%	5.7%	-5.6%	-2.6%	N/A	N/A	-3.9%
2001	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0%
2002	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0%
2003	N/A	N/A	N/A	N/A	2.8%	1.6%	-0.2%	4.3%	-0.4%	4.0%	1.0%	3.6%	17.9%
2004	2.4%	1.8%	-2.1%	-1.3%	0.3%	0.7%	-2.0%	-1.0%	N/A	N/A	2.1%	0.9%	1.7%
2005	-1.1%	1.8%	-3.1%	-0.9%	3.4%	-0.6%	3.4%	-1.1%	0.4%	-2.0%	5.1%	0.3%	5.6%
2006	1.1%	0.7%	0.5%	0.6%	-1.5%	-0.4%	-1.6%	N/A	1.3%	2.7%	2.1%	1.4%	7.0%
2007	2.1%	-3.0%	1.5%	4.3%	3.4%	-1.1%	-3.5%	1.6%	3.9%	-2.5%	-2.4%	0.8%	4.8%
2008	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0%
2009	N/A	N/A	N/A	N/A	N/A	3.1%	8.6%	-0.5%	3.2%	1.3%	6.3%	2.2%	26.4%
2010	-3.9%	2.4%	5.6%	2.1%	-10.9%	-4.0%	-0.5%	N/A	N/A	0.0%	1.8%	4.3%	-4.2%
Avg	1.3%	0.1%	0.7%	1.0%	0.5%	0.4%	0.2%	0.3%	0.3%	0.2%	1.1%	1.0%	

8.2.5 Timing System 50-Day Moving Average - NYSE - 1/1/1962 - 12/31/2010

Figure 20 - Timing System 50-Day Moving Average - NYSE - 1/1/1962 - 12/31/2010 - Back Test Report

Statistics			
	All trades	**Long trades**	**Short trades**

Initial capital	1000000.00	1000000.00	1000000.00
Ending capital	44997160.45	44997160.45	1000000.00
Net Profit	43997160.45	43997160.45	0.00
Net Profit %	4399.72 %	4399.72 %	0.00 %
Exposure %	79.87 %	79.87 %	0.00 %
Net Risk Adjusted Return %	5508.35 %	5508.35 %	N/A
Annual Return %	8.07 %	8.07 %	0.00 %
Risk Adjusted Return %	10.11 %	10.11 %	N/A
All trades	12335	12335 (100.00 %)	0 (0.00 %)
Avg. Profit/Loss	3566.86	3566.86	N/A
Avg. Profit/Loss %	0.75 %	0.75 %	N/A
Avg. Bars Held	15.74	15.74	N/A
Winners	2562 (20.77 %)	2562 (20.77 %)	0 (0.00 %)
Total Profit	382375885.83	382375885.83	0.00
Avg. Profit	149248.98	149248.98	N/A
Avg. Profit %	12.79 %	12.79 %	N/A
Avg. Bars Held	53.13	53.13	N/A
Max. Consecutive	15	15	0
Largest win	5900778.37	5900778.37	0.00
# bars in largest win	125	125	0
Losers	9773 (79.23 %)	9773 (79.23 %)	0 (0.00 %)
Total Loss	-338378725.38	-338378725.38	0.00
Avg. Loss	-34623.83	-34623.83	N/A
Avg. Loss %	-2.40 %	-2.40 %	N/A
Avg. Bars Held	5.94	5.94	N/A
Max. Consecutive	108	108	0
Largest loss	-1881632.32	-1881632.32	0.00
# bars in largest loss	3	3	0
Max. trade drawdown	-2747709.22	-2747709.22	0.00
Max. trade % drawdown	-58.97 %	-58.97 %	0.00 %
Max. system drawdown	-65262913.61	-65262913.61	0.00
Max. system % drawdown	-69.19 %	-69.19 %	0.00 %
Recovery Factor	0.67	0.67	N/A
CAR/MaxDD	0.12	0.12	N/A
RAR/MaxDD	0.15	0.15	N/A
Profit Factor	1.13	1.13	N/A
Payoff Ratio	4.31	4.31	N/A
Standard Error	11530774.38	11530774.38	0.00
Risk-Reward Ratio	0.12	0.12	N/A
Ulcer Index	16.79	16.79	0.00
Ulcer Performance Index	0.16	0.16	N/A
Sharpe Ratio of trades	0.13	0.13	0.00
K-Ratio	0.0157	0.0157	-1.#IND

Figure 21 - Timing System 50-Day Moving Average - NYSE - 1/1/1962 - 12/31/2010 - Monthly Profit Report

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr%
1962	N/A	N/A	-0.3%	-0.5%	-0.0%	N/A	-0.4%	1.0%	-1.7%	0.2%	2.2%	-0.0%	0.4%
1963	2.8%	-0.9%	0.5%	1.0%	1.8%	-1.3%	-0.3%	0.8%	-0.6%	-0.0%	-0.0%	0.9%	4.8%
1964	1.8%	1.6%	2.5%	-0.8%	0.5%	1.1%	-2.6%	0.6%	1.2%	0.5%	0.1%	0.8%	7.6%
1965	2.6%	-0.7%	-1.9%	2.0%	0.0%	-2.3%	0.3%	1.4%	3.5%	2.1%	0.7%	0.9%	8.7%
1966	1.8%	0.6%	-0.4%	0.8%	-2.6%	-0.9%	-1.5%	-0.5%	-0.3%	2.3%	3.1%	1.9%	4.3%
1967	3.4%	0.9%	1.1%	6.5%	-2.1%	1.0%	1.6%	-0.9%	0.9%	0.3%	-2.2%	-1.0%	9.7%
1968	-1.3%	-0.3%	1.6%	3.1%	-1.8%	-2.2%	-0.5%	1.0%	0.6%	0.3%	1.5%	-1.6%	0.2%
1969	-0.1%	-1.1%	0.9%	1.1%	-0.3%	-1.3%	-0.3%	0.5%	-0.6%	2.2%	-1.0%	0.6%	0.4%
1970	-0.4%	-0.1%	-1.1%	-2.7%	1.0%	-2.4%	1.4%	4.9%	2.2%	0.7%	5.1%	2.6%	11.6%
1971	9.9%	3.9%	3.9%	4.6%	-0.6%	0.7%	-3.0%	-0.2%	-0.1%	-2.3%	0.3%	8.1%	27.4%
1972	5.5%	2.4%	0.7%	2.1%	3.2%	-0.1%	0.5%	1.2%	-1.7%	3.1%	3.4%	3.0%	25.6%
1973	-2.0%	-1.6%	-2.5%	-0.7%	-4.2%	-2.4%	1.5%	0.7%	3.8%	-0.1%	-4.5%	0.6%	-11.2%
1974	-4.8%	-2.0%	-1.5%	-1.6%	-0.7%	-2.0%	-1.8%	-2.7%	-1.3%	2.3%	-6.0%	-0.9%	-20.8%
1975	15.9%	8.6%	4.1%	11.1%	1.0%	0.3%	-4.8%	-0.5%	-4.1%	7.1%	5.3%	-1.9%	48.4%
1976	11.8%	-1.2%	-0.6%	-2.2%	0.5%	4.5%	-1.4%	1.0%	0.9%	-1.6%	0.3%	2.6%	14.7%
1977	-1.5%	-1.0%	-2.1%	0.6%	0.8%	7.0%	1.6%	-0.8%	-0.4%	-4.0%	3.0%	-2.7%	-0.0%
1978	-3.3%	-1.0%	1.7%	13.9%	1.8%	-2.0%	7.8%	3.7%	-2.7%	-4.0%	-0.5%	0.4%	15.4%
1979	3.1%	-3.4%	3.7%	1.8%	-2.6%	1.8%	2.7%	5.7%	0.2%	-3.4%	5.9%	0.2%	16.4%
1980	9.7%	-2.5%	-4.3%	6.0%	4.4%	3.6%	5.6%	-0.3%	2.1%	0.1%	6.1%	0.7%	34.9%
1981	-4.0%	7.3%	5.7%	1.2%	3.4%	-3.2%	-0.3%	-4.0%	-0.7%	7.3%	1.3%	-3.7%	9.6%
1982	-3.0%	2.5%	0.4%	2.4%	-3.4%	0.7%	1.4%	7.3%	1.4%	10.4%	2.1%	-0.6%	23.0%
1983	4.2%	5.7%	0.9%	4.6%	3.3%	4.0%	-6.1%	1.8%	1.1%	-0.1%	1.4%	-3.2%	18.3%
1984	1.6%	-1.3%	1.0%	3.8%	-6.5%	1.3%	3.4%	4.6%	-2.0%	2.5%	-2.0%	2.8%	8.9%
1985	9.4%	7.1%	0.2%	4.1%	7.1%	3.4%	-0.3%	-4.6%	-2.6%	1.1%	7.7%	2.5%	40.2%
1986	3.2%	2.6%	5.5%	-1.2%	2.7%	-3.3%	-3.1%	8.5%	-0.7%	2.4%	-0.8%	2.1%	18.8%
1987	11.6%	6.6%	-0.1%	-3.8%	-0.6%	3.9%	6.7%	-2.3%	1.6%	-13.8%	-4.4%	-1.8%	1.3%
1988	1.6%	4.4%	1.5%	2.8%	-1.3%	5.6%	-3.5%	-3.7%	2.4%	0.7%	-4.0%	0.8%	7.0%
1989	5.2%	-1.3%	0.2%	5.4%	2.3%	-2.8%	4.5%	-0.0%	-0.0%	-6.1%	3.4%	1.7%	12.3%
1990	-9.5%	-1.2%	3.2%	-5.7%	4.3%	-0.8%	-3.9%	-15.6%	-8.0%	-2.1%	3.5%	2.9%	-30.0%
1991	2.1%	9.0%	3.5%	-0.2%	1.4%	0.2%	1.8%	-3.5%	-0.4%	2.3%	-2.4%	7.0%	22.1%
1992	0.2%	2.6%	-5.1%	-5.1%	0.2%	-3.4%	1.0%	-2.9%	-2.8%	5.8%	6.9%	3.9%	0.4%
1993	6.2%	-1.1%	3.5%	4.6%	2.6%	-3.1%	3.8%	5.0%	-0.7%	3.5%	-3.0%	1.5%	24.7%
1994	0.3%	-3.3%	-7.6%	-3.6%	2.0%	-4.6%	-1.5%	4.3%	-0.7%	-0.2%	-3.6%	-1.0%	-18.3%
1995	2.4%	1.8%	2.6%	2.0%	17.0%	0.9%	17.8%	0.6%	-0.3%	2.1%	3.4%	1.4%	62.8%
1996	-0.9%	3.5%	2.5%	0.8%	0.4%	-3.4%	-2.7%	8.2%	18.1%	-3.8%	5.2%	-0.3%	28.8%
1997	6.9%	2.8%	-1.5%	-5.9%	3.6%	2.4%	2.2%	-0.2%	7.7%	-4.0%	2.0%	-0.4%	15.5%
1998	0.9%	4.4%	2.1%	-1.0%	-4.1%	2.4%	-7.0%	-9.6%	-2.4%	4.2%	3.3%	0.6%	-7.0%
1999	-0.1%	-3.0%	1.4%	11.0%	-4.7%	6.0%	-3.5%	-5.4%	-1.0%	-2.2%	-0.5%	4.2%	1.0%
2000	2.6%	4.9%	-0.2%	-3.6%	4.9%	2.0%	2.3%	7.7%	-2.4%	0.6%	-0.2%	4.1%	24.5%
2001	2.7%	0.0%	-3.7%	4.4%	1.1%	-2.8%	2.4%	-2.5%	-5.1%	1.2%	0.7%	3.6%	1.6%
2002	2.6%	2.5%	3.8%	1.6%	-2.0%	-2.7%	-15.7%	-4.5%	-3.8%	3.8%	2.7%	0.2%	-12.5%
2003	-5.7%	-2.2%	1.9%	13.7%	6.3%	9.7%	4.4%	7.9%	0.2%	1.3%	6.2%	17.3%	77.7%
2004	-1.0%	-1.3%	-3.9%	-8.1%	-2.4%	1.7%	-1.5%	-0.5%	1.2%	-0.3%	8.0%	-0.3%	-8.7%
2005	0.3%	2.3%	-4.5%	-1.6%	1.7%	3.9%	1.7%	-2.5%	-1.1%	-2.5%	6.3%	1.1%	4.7%
2006	2.6%	3.8%	-0.7%	0.7%	-4.3%	0.8%	-1.4%	3.1%	0.4%	2.4%	5.5%	0.6%	13.9%
2007	3.1%	-2.6%	0.6%	3.8%	3.2%	3.7%	-5.3%	-3.9%	3.2%	-1.6%	-3.9%	2.1%	1.7%
2008	-4.1%	-3.8%	-4.4%	-0.6%	1.9%	-6.3%	-5.7%	2.7%	-17.6%	-28.0%	-18.1%	8.0%	-57.4%
2009	-6.4%	-10.0%	5.4%	16.8%	3.9%	-5.2%	1.4%	-1.8%	4.7%	-4.6%	2.8%	3.6%	8.1%
2010	-4.4%	1.6%	3.2%	11.3%	-13.7%	-0.2%	6.1%	0.9%	5.2%	2.6%	4.3%	1.1%	17.0%
Avg	1.7%	1.0%	0.5%	2.1%	0.6%	0.3%	0.1%	0.2%	-0.1%	-0.2%	1.2%	1.6%	

8.2.6 Timing System 200-Day Moving Average -NYSE - 1/1/1962 - 12/31/2010

Figure 22 - Timing System 200-Day Moving Average -NYSE - 1/1/1962 - 12/31/2010 - Back Test Report

Statistics

	All trades	Long trades	Short trades
Initial capital	1000000.00	1000000.00	1000000.00
Ending capital	25110766.91	25110766.91	1000000.00
Net Profit	24110766.91	24110766.91	0.00
Net Profit %	2411.08 %	2411.08 %	0.00 %
Exposure %	81.69 %	81.69 %	0.00 %
Net Risk Adjusted Return %	2951.60 %	2951.60 %	N/A
Annual Return %	6.80 %	6.80 %	0.00 %
Risk Adjusted Return %	8.32 %	8.32 %	N/A
All trades	5088	5088 (100.00 %)	0 (0.00 %)
Avg. Profit/Loss	4738.75	4738.75	N/A
Avg. Profit/Loss %	1.74 %	1.74 %	N/A
Avg. Bars Held	34.98	34.98	N/A
Winners	783 (15.39 %)	783 (15.39 %)	0 (0.00 %)
Total Profit	145977160.47	145977160.47	0.00
Avg. Profit	186433.16	186433.16	N/A
Avg. Profit %	26.05 %	26.05 %	N/A
Avg. Bars Held	177.38	177.38	N/A
Max. Consecutive	15	15	0
Largest win	7354373.74	7354373.74	0.00
# bars in largest win	737	737	0
Losers	4305 (84.61 %)	4305 (84.61 %)	0 (0.00 %)
Total Loss	-121866393.56	-121866393.56	0.00
Avg. Loss	-28308.11	-28308.11	N/A
Avg. Loss %	-2.68 %	-2.68 %	N/A
Avg. Bars Held	9.09	9.09	N/A
Max. Consecutive	105	105	0
Largest loss	-787030.36	-787030.36	0.00
# bars in largest loss	18	18	0
Max. trade drawdown	-6554041.34	-6554041.34	0.00
Max. trade % drawdown	-56.67 %	-56.67 %	0.00 %
Max. system drawdown	-55177548.33	-55177548.33	0.00
Max. system % drawdown	-76.91 %	-76.91 %	0.00 %
Recovery Factor	0.44	0.44	N/A
CAR/MaxDD	0.09	0.09	N/A
RAR/MaxDD	0.11	0.11	N/A
Profit Factor	1.20	1.20	N/A
Payoff Ratio	6.59	6.59	N/A

Standard Error	8483810.78	8483810.78	0.00
Risk-Reward Ratio	0.11	0.11	N/A
Ulcer Index	18.61	18.61	0.00
Ulcer Performance Index	0.07	0.07	N/A
Sharpe Ratio of trades	0.12	0.12	0.00
K-Ratio	0.0142	0.0142	-1.#IND

Figure 23 - Timing System 200-Day Moving Average -NYSE - 1/1/1962 - 12/31/2010 - Monthly Profit Report

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr%
1962	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.1%	1.0%	-0.5%	0.5%
1963	1.8%	-2.2%	1.4%	1.4%	1.6%	-1.6%	0.0%	2.1%	-0.7%	1.4%	-0.6%	1.0%	5.7%
1964	2.2%	1.8%	2.9%	-1.5%	0.8%	1.1%	-4.3%	0.6%	1.8%	0.2%	0.4%	1.7%	7.8%
1965	2.6%	-2.4%	-2.7%	3.6%	0.8%	-3.5%	1.5%	2.4%	3.8%	2.5%	0.6%	2.0%	11.5%
1966	1.8%	-0.3%	0.9%	1.8%	-4.5%	-0.3%	-0.6%	-1.4%	-0.4%	0.2%	1.2%	1.7%	-0.0%
1967	2.9%	1.4%	1.3%	6.3%	-2.3%	1.0%	1.5%	-1.6%	0.9%	-0.3%	-1.8%	-1.7%	7.5%
1968	-1.2%	-0.8%	1.6%	1.8%	-2.8%	-1.5%	-1.6%	1.3%	0.7%	0.1%	1.6%	-1.7%	-2.7%
1969	0.2%	-1.5%	1.3%	1.2%	-0.5%	-2.2%	-1.1%	0.1%	0.6%	2.9%	-0.8%	1.9%	2.0%
1970	-0.4%	0.2%	-0.2%	-2.2%	-1.3%	-0.1%	0.2%	0.4%	0.0%	0.1%	4.8%	4.3%	5.8%
1971	8.2%	1.7%	4.1%	3.0%	0.4%	-0.1%	-3.9%	4.5%	-0.4%	-4.0%	1.9%	5.4%	22.0%
1972	4.5%	3.2%	2.0%	1.6%	5.8%	1.1%	1.3%	1.0%	-2.1%	4.0%	3.8%	5.4%	36.1%
1973	-2.6%	-3.7%	-0.3%	-2.2%	-3.9%	-2.1%	0.0%	0.0%	2.0%	-1.0%	-8.3%	2.2%	-18.6%
1974	-1.9%	-0.2%	-1.2%	0.5%	-1.5%	-0.8%	-2.1%	-2.6%	-1.0%	1.0%	-0.7%	-0.3%	-10.4%
1975	5.4%	5.7%	-0.1%	9.7%	3.6%	3.6%	-5.5%	1.0%	-3.3%	6.0%	4.4%	0.0%	34.0%
1976	11.8%	-1.3%	1.3%	-1.1%	-1.8%	-0.1%	0.3%	0.9%	1.0%	-1.7%	0.7%	2.9%	12.9%
1977	0.5%	-0.4%	-0.5%	1.3%	0.3%	3.5%	-1.0%	-2.8%	-0.7%	-3.0%	5.2%	-1.5%	0.6%
1978	-4.6%	0.2%	0.9%	12.8%	2.5%	-2.2%	9.1%	4.4%	-4.6%	-7.2%	-0.6%	0.9%	10.3%
1979	2.7%	-4.1%	3.7%	1.2%	-2.0%	2.4%	3.8%	3.8%	0.8%	-4.9%	6.6%	0.7%	15.1%
1980	11.4%	-5.2%	-8.8%	0.2%	3.2%	2.7%	3.1%	-0.0%	1.1%	-0.6%	3.6%	1.1%	11.3%
1981	-5.8%	5.9%	2.1%	-0.7%	3.0%	-2.4%	-2.9%	-3.9%	-2.7%	7.3%	0.4%	-1.4%	-2.1%
1982	0.8%	1.5%	0.6%	4.4%	-4.3%	2.8%	3.2%	10.4%	2.5%	8.8%	4.6%	2.4%	43.9%
1983	3.4%	5.0%	2.0%	7.2%	1.8%	4.6%	-1.7%	-1.9%	5.6%	2.7%	0.6%	-4.1%	27.3%
1984	-4.7%	-2.1%	1.2%	3.0%	-5.5%	-0.4%	2.4%	2.9%	-0.0%	3.0%	-2.8%	0.7%	-2.8%
1985	6.4%	2.5%	0.5%	-1.8%	5.7%	2.3%	-2.2%	-1.1%	-2.9%	4.1%	5.2%	4.8%	25.6%
1986	2.9%	5.9%	5.6%	-1.4%	4.2%	4.7%	-3.6%	3.8%	-8.0%	2.3%	1.4%	-2.7%	15.2%
1987	11.1%	1.6%	1.3%	-4.2%	3.0%	2.7%	3.4%	2.4%	-1.2%	-18.6%	-4.3%	2.4%	-3.2%
1988	-3.5%	5.3%	0.9%	2.2%	-2.4%	-0.5%	1.3%	-7.9%	2.5%	1.7%	-4.5%	0.6%	-4.8%
1989	4.3%	-1.0%	1.4%	5.7%	5.6%	-0.4%	8.5%	2.2%	1.4%	-3.7%	6.6%	1.7%	36.6%
1990	-7.1%	-0.1%	-2.0%	-4.9%	9.4%	1.9%	0.0%	-7.2%	-5.7%	-3.9%	5.5%	1.3%	-13.3%
1991	4.0%	4.2%	4.3%	2.5%	2.4%	-0.2%	2.2%	4.2%	-0.1%	6.4%	-1.9%	9.2%	43.6%
1992	1.1%	0.8%	0.8%	-3.4%	2.5%	-2.8%	2.5%	-0.0%	0.2%	2.1%	4.6%	1.8%	10.4%
1993	3.6%	2.3%	1.6%	-1.1%	0.5%	-0.8%	2.1%	3.1%	-5.3%	5.4%	-1.1%	3.5%	14.0%
1994	4.0%	-1.8%	-6.4%	-0.9%	-2.0%	-0.9%	2.0%	0.8%	-2.3%	-0.9%	-4.4%	0.1%	-12.4%
1995	0.3%	1.7%	0.7%	2.3%	4.3%	1.7%	2.1%	2.8%	2.3%	1.7%	3.1%	3.0%	29.2%
1996	0.8%	0.5%	-1.1%	0.1%	2.4%	-1.3%	-7.2%	1.7%	3.3%	1.6%	2.0%	1.2%	3.7%
1997	4.7%	-0.9%	-3.4%	-2.0%	4.5%	3.7%	6.3%	1.7%	2.9%	-4.2%	-0.4%	0.4%	13.4%
1998	-2.6%	3.9%	3.4%	-1.1%	-2.6%	1.8%	-3.8%	-11.4%	2.1%	2.9%	2.5%	3.5%	-2.6%
1999	0.8%	-0.0%	-2.8%	6.7%	-2.8%	5.3%	-4.3%	-1.4%	1.6%	-6.2%	0.1%	-0.5%	-4.3%
2000	1.6%	8.9%	-1.4%	5.9%	-2.0%	4.8%	4.0%	11.7%	-1.1%	12.5%	7.2%	7.3%	76.2%
2001	-4.4%	-4.4%	-9.2%	3.0%	4.4%	-0.8%	3.6%	-0.9%	-6.9%	0.8%	-1.2%	-4.0%	-19.1%
2002	5.0%	0.4%	2.7%	3.8%	-2.6%	-2.8%	-10.1%	-2.5%	-5.9%	-1.0%	-4.1%	0.2%	-16.4%
2003	-2.1%	0.3%	0.8%	6.4%	8.4%	0.5%	3.2%	3.1%	2.0%	7.5%	4.2%	7.4%	49.7%
2004	-3.2%	9.1%	-1.2%	-9.6%	-3.4%	1.7%	1.0%	1.7%	2.3%	0.7%	4.9%	1.0%	3.8%
2005	4.5%	3.5%	-2.2%	-2.5%	3.2%	5.0%	2.1%	-1.6%	1.1%	-1.9%	7.5%	3.2%	23.5%
2006	4.9%	1.8%	1.2%	-2.1%	-2.7%	0.7%	-2.2%	3.3%	-2.8%	5.2%	4.3%	3.9%	16.0%
2007	2.7%	-2.7%	4.1%	3.7%	6.0%	-0.9%	-6.3%	-6.4%	3.5%	-0.2%	-5.6%	-1.9%	-4.8%
2008	-4.5%	-3.3%	-3.5%	3.4%	-0.3%	-4.7%	-6.3%	-3.5%	-19.7%	-33.8%	-18.6%	3.5%	-64.5%
2009	-8.2%	-9.9%	5.8%	2.9%	8.1%	1.9%	0.4%	-0.0%	2.0%	-3.2%	0.8%	2.2%	1.3%
2010	-2.7%	1.9%	4.5%	2.8%	-7.9%	-1.5%	3.8%	3.5%	5.6%	3.4%	2.6%	2.7%	19.4%
Avg	1.3%	0.7%	0.4%	1.4%	0.8%	0.5%	0.1%	0.5%	-0.5%	-0.0%	0.9%	1.6%	

8.2.7 Timing System 50/200 SMA Cross - NYSE - 1/1/1962 - 12/31/2010

Figure 24 - Timing System 50/200 SMA Cross - NYSE - 1/1/1962 - 12/31/2010 - Back Test Report

Statistics

	All trades	Long trades	Short trades
Initial capital	1000000.00	1000000.00	1000000.00
Ending capital	95904842.51	95904842.51	1000000.00
Net Profit	94904842.51	94904842.51	0.00
Net Profit %	9490.48 %	9490.48 %	0.00 %
Exposure %	80.19 %	80.19 %	0.00 %
Net Risk Adjusted Return %	11835.09 %	11835.09 %	N/A
Annual Return %	9.75 %	9.75 %	0.00 %
Risk Adjusted Return %	12.16 %	12.16 %	N/A
All trades	830	830 (100.00 %)	0 (0.00 %)
Avg. Profit/Loss	114343.18	114343.18	N/A
Avg. Profit/Loss %	14.75 %	14.75 %	N/A
Avg. Bars Held	206.84	206.84	N/A
Winners	343 (41.33 %)	343 (41.33 %)	0 (0.00 %)
Total Profit	199411963.39	199411963.39	0.00
Avg. Profit	581375.99	581375.99	N/A
Avg. Profit %	52.11 %	52.11 %	N/A
Avg. Bars Held	363.92	363.92	N/A
Max. Consecutive	17	17	0
Largest win	15182661.33	15182661.33	0.00
# bars in largest win	835	835	0
Losers	487 (58.67 %)	487 (58.67 %)	0 (0.00 %)
Total Loss	-104507120.88	-104507120.88	0.00
Avg. Loss	-214593.68	-214593.68	N/A
Avg. Loss %	-11.56 %	-11.56 %	N/A
Avg. Bars Held	96.21	96.21	N/A
Max. Consecutive	22	22	0
Largest loss	-4572035.02	-4572035.02	0.00
# bars in largest loss	142	142	0
Max. trade drawdown	-55184590.66	-55184590.66	0.00
Max. trade % drawdown	-93.33 %	-93.33 %	0.00 %
Max. system drawdown	-81089948.63	-81089948.63	0.00
Max. system % drawdown	-62.42 %	-62.42 %	0.00 %
Recovery Factor	1.17	1.17	N/A
CAR/MaxDD	0.16	0.16	N/A
RAR/MaxDD	0.19	0.19	N/A
Profit Factor	1.91	1.91	N/A
Payoff Ratio	2.71	2.71	N/A

Standard Error	22394182.01	22394182.01	0.00
Risk-Reward Ratio	0.08	0.08	N/A
Ulcer Index	19.61	19.61	0.00
Ulcer Performance Index	0.22	0.22	N/A
Sharpe Ratio of trades	0.15	0.15	0.00
K-Ratio	0.0106	0.0106	-1.#IND

Figure 25 - Timing System 50/200 SMA Cross - NYSE - 1/1/1962 - 12/31/2010 - Monthly Profit Report

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr%
1962	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0%	0.3%	0.3%
1963	0.7%	-2.1%	1.0%	1.5%	1.3%	-1.1%	0.3%	2.1%	-0.2%	1.5%	0.3%	1.2%	6.6%
1964	2.1%	1.8%	2.6%	-1.0%	0.7%	1.2%	-3.6%	0.5%	1.1%	0.2%	0.4%	1.8%	7.9%
1965	2.7%	-2.4%	-2.5%	4.2%	0.7%	-3.0%	2.5%	2.9%	4.9%	3.9%	1.4%	1.3%	17.5%
1966	2.9%	-0.3%	1.2%	1.7%	-4.2%	1.4%	-1.2%	-1.2%	-1.0%	-0.9%	0.0%	1.1%	-0.7%
1967	1.8%	1.4%	1.7%	5.7%	-1.9%	1.3%	1.3%	-1.2%	0.8%	-0.2%	-2.7%	-1.8%	6.0%
1968	-0.9%	-0.4%	1.4%	1.7%	-2.9%	-1.2%	-0.9%	1.3%	0.3%	-0.0%	2.1%	-1.6%	-1.3%
1969	0.3%	-1.8%	1.5%	1.4%	-0.5%	-1.2%	-0.9%	0.4%	-0.2%	3.1%	-0.6%	1.8%	3.2%
1970	-0.4%	0.1%	-0.3%	-2.6%	-1.0%	-0.2%	0.2%	0.2%	0.1%	0.2%	1.0%	1.3%	-1.5%
1971	6.4%	1.5%	2.5%	3.7%	0.2%	-1.6%	-4.9%	3.9%	0.9%	-4.2%	1.9%	4.0%	14.5%
1972	2.9%	2.7%	0.5%	1.1%	5.7%	1.0%	2.7%	1.0%	-1.2%	4.0%	2.9%	4.4%	31.3%
1973	-3.7%	-2.8%	0.0%	-1.5%	-0.9%	0.3%	-0.1%	0.1%	0.9%	-0.9%	-10.3%	3.6%	-14.7%
1974	-1.9%	0.3%	-0.1%	0.1%	-1.9%	0.1%	-3.5%	-1.7%	-2.4%	2.0%	-0.1%	0.1%	-8.7%
1975	1.1%	0.8%	-0.5%	9.0%	4.7%	4.1%	-6.5%	-0.8%	-1.6%	5.0%	2.8%	1.1%	19.9%
1976	10.6%	-2.9%	1.0%	-0.5%	-0.9%	0.8%	0.8%	1.3%	1.2%	-1.7%	0.0%	2.5%	12.3%
1977	0.4%	-1.0%	-1.0%	-0.2%	-0.3%	2.4%	-0.5%	-2.3%	1.3%	-4.0%	4.8%	-0.8%	-1.4%
1978	-3.5%	-1.4%	0.1%	5.3%	0.3%	-1.6%	8.0%	2.8%	-1.5%	-7.5%	0.2%	0.0%	0.3%
1979	1.2%	-2.6%	3.9%	0.5%	-3.2%	2.9%	3.5%	5.5%	0.8%	-7.3%	1.3%	-0.7%	5.1%
1980	6.2%	-2.7%	-6.1%	1.3%	2.1%	3.6%	5.2%	0.6%	1.5%	-0.2%	2.7%	3.7%	18.6%
1981	-4.8%	6.5%	3.1%	-2.6%	4.4%	-2.7%	-2.0%	-4.0%	1.3%	4.1%	0.7%	-2.2%	0.9%
1982	-1.1%	0.3%	2.3%	3.6%	-4.4%	1.8%	3.7%	10.9%	4.7%	7.6%	6.3%	-0.3%	40.6%
1983	1.7%	5.2%	2.3%	6.2%	3.1%	4.9%	-3.3%	0.7%	4.0%	-1.9%	3.1%	-2.9%	25.0%
1984	-5.2%	-3.6%	2.5%	3.7%	-7.0%	-4.9%	-3.5%	4.8%	-0.7%	4.9%	-3.1%	2.7%	-9.8%
1985	6.2%	5.2%	-0.9%	-1.3%	8.7%	3.0%	-1.5%	-1.7%	-3.9%	1.4%	4.1%	3.4%	24.2%
1986	2.8%	5.7%	5.2%	0.1%	3.7%	4.3%	-3.4%	4.5%	-7.2%	2.9%	1.7%	-0.8%	20.2%
1987	10.0%	0.5%	5.0%	-0.0%	0.5%	5.3%	11.6%	-1.1%	-2.6%	-26.1%	-1.4%	1.0%	-2.8%
1988	2.2%	0.4%	-2.4%	-0.2%	3.6%	-0.3%	-1.8%	-4.2%	2.8%	3.6%	-2.3%	0.6%	1.5%
1989	6.0%	-1.5%	7.1%	6.5%	5.7%	0.8%	7.6%	3.2%	0.3%	-4.2%	1.8%	-1.3%	36.2%
1990	-6.4%	1.8%	0.5%	-4.2%	6.7%	0.3%	-2.5%	-11.6%	-3.7%	-1.1%	-0.2%	2.1%	-17.9%
1991	1.3%	4.9%	1.0%	3.3%	-0.1%	-3.1%	-2.6%	-0.6%	0.1%	-1.5%	-1.9%	6.0%	6.7%
1992	-0.5%	0.1%	0.7%	2.1%	2.5%	-0.2%	3.2%	-2.7%	-2.0%	1.0%	3.1%	1.5%	8.9%
1993	3.9%	3.5%	4.7%	1.3%	-2.1%	1.1%	2.7%	3.8%	0.6%	2.8%	-2.9%	6.9%	29.1%
1994	4.1%	-2.0%	-8.8%	4.0%	3.6%	-1.1%	1.8%	5.8%	1.2%	0.4%	-2.5%	0.9%	6.6%
1995	-0.1%	0.5%	2.3%	5.4%	1.5%	0.9%	5.3%	-1.7%	-2.6%	-2.0%	3.7%	0.8%	14.5%
1996	0.2%	-0.7%	4.5%	3.5%	2.3%	-1.1%	-7.5%	1.8%	1.0%	3.5%	9.1%	-0.2%	16.6%
1997	3.7%	0.2%	-3.9%	2.6%	3.3%	5.6%	6.6%	0.4%	8.0%	1.0%	4.6%	2.9%	40.4%
1998	1.0%	0.3%	7.7%	-0.9%	0.3%	1.5%	-6.9%	-8.3%	1.9%	6.9%	6.8%	4.9%	14.7%
1999	-3.8%	-7.4%	-3.5%	10.5%	6.6%	13.2%	-1.0%	9.3%	6.9%	29.4%	2.7%	37.3%	142.2%
2000	-10.8%	43.3%	-36.7%	-23.6%	-6.2%	5.5%	4.2%	7.0%	2.1%	-2.9%	-0.4%	9.8%	-26.1%
2001	-1.5%	2.4%	-3.7%	7.4%	3.4%	-2.3%	-2.5%	3.5%	-3.2%	-0.2%	-1.3%	-1.5%	-0.0%
2002	-2.3%	1.3%	4.0%	3.1%	-1.5%	-3.6%	-5.6%	1.6%	1.2%	-3.4%	-0.2%	2.1%	-3.7%
2003	-0.3%	-0.7%	3.7%	3.2%	9.9%	2.4%	1.2%	6.7%	0.8%	6.6%	4.4%	8.5%	56.7%
2004	-1.0%	5.8%	2.1%	-7.3%	1.0%	3.7%	1.8%	2.8%	7.7%	4.0%	8.2%	1.6%	33.8%
2005	2.7%	3.8%	1.3%	-7.1%	3.4%	2.5%	3.3%	2.3%	3.4%	-6.3%	4.7%	3.2%	17.5%
2006	6.5%	0.6%	-0.8%	-1.5%	0.3%	-1.2%	-0.8%	3.6%	2.8%	3.6%	-0.2%	1.3%	14.7%
2007	4.9%	-0.7%	2.4%	2.7%	1.9%	-0.6%	-3.9%	-1.1%	1.5%	5.4%	-3.0%	0.4%	9.8%
2008	-4.5%	-0.6%	-4.0%	1.0%	3.5%	11.3%	-13.6%	1.0%	-18.4%	-21.8%	-6.6%	0.5%	-44.5%
2009	-6.6%	-6.8%	2.2%	-3.8%	16.6%	-2.2%	2.3%	-0.5%	3.2%	-0.4%	4.0%	-0.3%	5.9%
2010	-4.8%	1.9%	4.7%	2.3%	-5.0%	0.4%	3.2%	2.2%	4.9%	4.6%	0.9%	4.7%	21.3%
Avg	0.7%	1.2%	0.2%	1.0%	1.4%	1.1%	-0.0%	1.1%	0.4%	0.3%	1.1%	2.4%	

8.2.8 Buy and Hold - GSCI - 2/17/1998 - 12/31/2010

Figure 26 - Buy and Hold - GSCI - 2/17/1998 - 12/31/2010 - Back Test Report

Statistics			
	All trades	**Long trades**	**Short trades**
Initial capital	1000000.00	1000000.00	1000000.00
Ending capital	3785814.68	3785814.68	1000000.00
Net Profit	2785814.68	2785814.68	0.00
Net Profit %	278.58 %	278.58 %	0.00 %
Exposure %	99.99 %	99.99 %	0.00 %
Net Risk Adjusted Return %	278.60 %	278.60 %	N/A
Annual Return %	10.86 %	10.86 %	0.00 %
Risk Adjusted Return %	10.86 %	10.86 %	N/A
All trades	1	1 (100.00 %)	0 (0.00 %)
Avg. Profit/Loss	2785814.68	2785814.68	N/A
Avg. Profit/Loss %	278.74 %	278.74 %	N/A
Avg. Bars Held	3248.00	3248.00	N/A
Winners	1 (100.00 %)	1 (100.00 %)	0 (0.00 %)
Total Profit	2785814.68	2785814.68	0.00
Avg. Profit	2785814.68	2785814.68	N/A
Avg. Profit %	278.74 %	278.74 %	N/A
Avg. Bars Held	3248.00	3248.00	N/A
Max. Consecutive	1	1	0
Largest win	2785814.68	2785814.68	0.00
# bars in largest win	3248	3248	0
Losers	0 (0.00 %)	0 (0.00 %)	0 (0.00 %)
Total Loss	0.00	0.00	0.00
Avg. Loss	N/A	N/A	N/A
Avg. Loss %	N/A	N/A	N/A
Avg. Bars Held	N/A	N/A	N/A
Max. Consecutive	0	0	0
Largest loss	0.00	0.00	0.00
# bars in largest loss	0	0	0
Max. trade drawdown	-3435214.33	-3435214.33	0.00
Max. trade % drawdown	-65.54 %	-65.54 %	0.00 %
Max. system drawdown	-3435214.33	-3435214.33	0.00
Max. system % drawdown	-65.54 %	-65.54 %	0.00 %
Recovery Factor	0.81	0.81	N/A
CAR/MaxDD	0.17	0.17	N/A
RAR/MaxDD	0.17	0.17	N/A
Profit Factor	N/A	N/A	N/A
Payoff Ratio	N/A	N/A	N/A

Standard Error	480172.89	480172.89	0.00
Risk-Reward Ratio	0.46	0.46	N/A
Ulcer Index	23.58	23.58	0.00
Ulcer Performance Index	0.23	0.23	N/A
Sharpe Ratio of trades	N/A	N/A	0.00
K-Ratio	0.0302	0.0302	-1.#IND

Figure 27 - Buy and Hold - GSCI - 2/17/1998 - 12/31/2010 - Monthly Profit Report

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr%
1998	N/A	-1.7%	0.3%	0.7%	-5.7%	-1.4%	-8.9%	-1.3%	8.1%	-1.6%	-10.2%	1.2%	-19.7%
1999	-0.9%	-1.8%	16.6%	5.7%	-7.2%	8.4%	5.3%	5.9%	5.4%	-3.9%	4.0%	1.7%	44.1%
2000	7.8%	6.3%	-7.9%	0.3%	10.1%	4.1%	-8.5%	13.9%	-0.7%	-1.7%	4.4%	-4.3%	23.2%
2001	-1.7%	-5.2%	-5.4%	7.2%	-4.0%	-7.2%	0.2%	-0.0%	-10.3%	-4.6%	-1.0%	1.5%	-27.6%
2002	-1.7%	5.9%	13.5%	-1.6%	-3.5%	4.6%	-1.7%	4.7%	9.5%	-5.2%	1.4%	9.4%	39.0%
2003	4.4%	7.8%	-16.1%	-5.0%	11.4%	-2.8%	3.4%	-4.0%	0.5%	1.0%	4.8%	6.0%	8.6%
2004	1.9%	6.2%	-2.2%	6.6%	7.0%	-6.8%	4.0%	-0.7%	11.7%	2.3%	-5.9%	-6.9%	16.3%
2005	7.5%	8.6%	10.4%	-8.8%	3.3%	5.9%	4.6%	16.5%	-2.0%	-9.8%	1.0%	3.0%	44.0%
2006	1.6%	-6.1%	6.4%	8.7%	-2.6%	3.0%	2.7%	-7.9%	-8.5%	2.2%	7.6%	-9.6%	-4.6%
2007	1.2%	6.0%	4.2%	0.8%	1.0%	3.4%	3.4%	-1.5%	7.9%	9.9%	-2.6%	8.8%	50.7%
2008	-5.5%	15.1%	-3.3%	10.4%	8.3%	9.7%	-12.3%	-11.2%	-9.4%	-29.1%	-15.9%	-1.9%	-43.0%
2009	-8.9%	-3.9%	12.0%	7.6%	21.0%	-2.1%	5.2%	-6.2%	3.7%	9.6%	2.8%	3.9%	49.8%
2010	-8.3%	4.0%	4.9%	2.8%	-13.0%	0.6%	10.9%	-5.2%	8.4%	3.1%	4.2%	6.9%	17.9%
2011	1.4%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.4%
Avg	-0.1%	3.2%	2.5%	2.7%	2.0%	1.5%	0.6%	0.2%	1.9%	-2.1%	-0.4%	1.5%	

8.2.9 Timing System 50-Day Moving Average - GSCI - 2/17/1998 - 12/31/2010

Figure 28 - Timing System 50-Day Moving Average - GSCI - 2/17/1998 - 12/31/2010 - Back Test Report

Statistics

	All trades	Long trades	Short trades
Initial capital	1000000.00	1000000.00	1000000.00
Ending capital	2207029.11	2207029.11	1000000.00
Net Profit	1207029.11	1207029.11	0.00
Net Profit %	120.70 %	120.70 %	0.00 %
Exposure %	61.28 %	61.28 %	0.00 %
Net Risk Adjusted Return %	196.96 %	196.96 %	N/A
Annual Return %	6.34 %	6.34 %	0.00 %
Risk Adjusted Return %	10.35 %	10.35 %	N/A
All trades	113	113 (100.00 %)	0 (0.00 %)
Avg. Profit/Loss	10681.67	10681.67	N/A
Avg. Profit/Loss %	0.88 %	0.88 %	N/A
Avg. Bars Held	18.56	18.56	N/A
Winners	28 (24.78 %)	28 (24.78 %)	0 (0.00 %)
Total Profit	3516946.42	3516946.42	0.00
Avg. Profit	125605.23	125605.23	N/A
Avg. Profit %	9.25 %	9.25 %	N/A
Avg. Bars Held	54.29	54.29	N/A
Max. Consecutive	3	3	0
Largest win	543714.03	543714.03	0.00
# bars in largest win	111	111	0
Losers	85 (75.22 %)	85 (75.22 %)	0 (0.00 %)
Total Loss	-2309917.31	-2309917.31	0.00
Avg. Loss	-27175.50	-27175.50	N/A
Avg. Loss %	-1.88 %	-1.88 %	N/A
Avg. Bars Held	6.79	6.79	N/A
Max. Consecutive	19	19	0
Largest loss	-157057.30	-157057.30	0.00
# bars in largest loss	3	3	0
Max. trade drawdown	-304414.83	-304414.83	0.00
Max. trade % drawdown	-12.15 %	-12.15 %	0.00 %
Max. system drawdown	-626008.87	-626008.87	0.00
Max. system % drawdown	-35.23 %	-35.23 %	0.00 %
Recovery Factor	1.93	1.93	N/A
CAR/MaxDD	0.18	0.18	N/A
RAR/MaxDD	0.29	0.29	N/A
Profit Factor	1.52	1.52	N/A
Payoff Ratio	4.62	4.62	N/A

Standard Error	205617.39	205617.39	0.00
Risk-Reward Ratio	0.45	0.45	N/A
Ulcer Index	14.64	14.64	0.00
Ulcer Performance Index	0.06	0.06	N/A
Sharpe Ratio of trades	0.27	0.27	0.00
K-Ratio	0.0295	0.0295	-1.#IND

Figure 29 - Timing System 50-Day Moving Average - GSCI - 2/17/1998 - 12/31/2010 - Monthly Profit Report

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr%
1998	N/A	N/A	N/A	-0.1%	-0.9%	N/A	N/A	N/A	2.4%	-1.6%	-2.2%	N/A	-2.5%
1999	-3.8%	N/A	13.8%	5.7%	-6.4%	3.1%	5.3%	5.9%	5.4%	-6.6%	2.2%	1.7%	27.5%
2000	5.9%	6.3%	-7.0%	N/A	7.5%	4.1%	-8.0%	8.5%	-1.8%	-4.4%	0.8%	-7.0%	2.9%
2001	-1.9%	N/A	N/A	-1.8%	-5.3%	-0.9%	N/A	-0.9%	-3.0%	N/A	N/A	-3.4%	-16.0%
2002	-6.7%	3.8%	13.5%	-1.6%	-1.1%	-1.0%	-2.3%	1.9%	9.5%	-3.9%	-0.1%	5.7%	17.1%
2003	4.4%	7.8%	-6.4%	N/A	3.5%	-7.6%	-4.3%	-4.0%	N/A	-1.6%	1.3%	6.0%	-2.1%
2004	-0.9%	2.9%	-2.2%	6.6%	7.0%	-10.2%	-1.8%	-2.3%	6.7%	2.3%	-8.9%	N/A	-2.5%
2005	-1.2%	8.8%	10.3%	-10.5%	-0.1%	5.9%	4.6%	16.5%	-2.0%	-6.6%	N/A	-3.6%	20.7%
2006	1.6%	-2.1%	-1.2%	8.7%	-2.6%	-0.5%	2.7%	-3.6%	N/A	-4.3%	0.7%	-6.2%	-7.3%
2007	N/A	1.1%	4.2%	0.8%	0.4%	3.4%	3.4%	-7.0%	7.9%	9.9%	-2.6%	5.2%	28.9%
2008	-6.0%	12.7%	-3.3%	10.4%	8.3%	9.7%	-7.6%	N/A	N/A	N/A	N/A	N/A	24.2%
2009	N/A	-7.3%	-4.6%	7.6%	21.0%	-2.1%	-4.9%	-6.2%	-0.7%	4.2%	2.8%	0.5%	7.5%
2010	-5.5%	-1.7%	4.9%	2.8%	-5.6%	-4.5%	4.7%	-7.3%	7.3%	-8.6%	4.2%	6.5%	-4.6%
Avg	-1.2%	2.5%	1.7%	2.2%	2.0%	-0.0%	-0.6%	0.1%	2.4%	-1.6%	-0.1%	0.4%	

8.2.10 Timing System 200-Day Moving Average - GSCI - 2/17/1998 - 12/31/2010

Figure 30 - Timing System 200-Day Moving Average - GSCI - 2/17/1998 - 12/31/2010 - Back Test Report

Statistics

	All trades	Long trades	Short trades
Initial capital	1000000.00	1000000.00	1000000.00
Ending capital	3254724.63	3254724.63	1000000.00
Net Profit	2254724.63	2254724.63	0.00
Net Profit %	225.47 %	225.47 %	0.00 %
Exposure %	68.48 %	68.48 %	0.00 %
Net Risk Adjusted Return %	329.24 %	329.24 %	N/A
Annual Return %	9.60 %	9.60 %	0.00 %
Risk Adjusted Return %	14.01 %	14.01 %	N/A
All trades	42	42 (100.00 %)	0 (0.00 %)
Avg. Profit/Loss	53683.92	53683.92	N/A
Avg. Profit/Loss %	3.61 %	3.61 %	N/A
Avg. Bars Held	53.79	53.79	N/A
Winners	8 (19.05 %)	8 (19.05 %)	0 (0.00 %)
Total Profit	3552911.19	3552911.19	0.00
Avg. Profit	444113.90	444113.90	N/A
Avg. Profit %	26.78 %	26.78 %	N/A
Avg. Bars Held	251.38	251.38	N/A
Max. Consecutive	1	1	0
Largest win	1087610.22	1087610.22	0.00
# bars in largest win	351	351	0
Losers	34 (80.95 %)	34 (80.95 %)	0 (0.00 %)
Total Loss	-1298186.56	-1298186.56	0.00
Avg. Loss	-38181.96	-38181.96	N/A
Avg. Loss %	-1.85 %	-1.85 %	N/A
Avg. Bars Held	7.29	7.29	N/A
Max. Consecutive	13	13	0
Largest loss	-126439.01	-126439.01	0.00
# bars in largest loss	10	10	0
Max. trade drawdown	-854821.04	-854821.04	0.00
Max. trade % drawdown	-21.80 %	-21.80 %	0.00 %
Max. system drawdown	-1280882.18	-1280882.18	0.00
Max. system % drawdown	-38.85 %	-38.85 %	0.00 %
Recovery Factor	1.76	1.76	N/A
CAR/MaxDD	0.25	0.25	N/A
RAR/MaxDD	0.36	0.36	N/A
Profit Factor	2.74	2.74	N/A
Payoff Ratio	11.63	11.63	N/A

Standard Error	277415.55	277415.55	0.00
Risk-Reward Ratio	0.65	0.65	N/A
Ulcer Index	16.60	16.60	0.00
Ulcer Performance Index	0.25	0.25	N/A
Sharpe Ratio of trades	0.37	0.37	0.00
K-Ratio	0.0422	0.0422	-1.#IND

Figure 31 - Timing System 200-Day Moving Average - GSCI - 2/17/1998 - 12/31/2010 - Monthly Profit Report

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr%
1998	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0%
1999	N/A	N/A	3.6%	5.7%	-7.2%	8.4%	5.3%	5.9%	5.4%	-3.9%	4.0%	1.7%	31.7%
2000	7.8%	6.3%	-7.9%	0.3%	10.1%	4.1%	-8.5%	13.9%	-0.7%	-1.7%	4.4%	-4.3%	23.2%
2001	-5.5%	-3.0%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-8.3%
2002	N/A	N/A	7.9%	-1.6%	-3.5%	4.6%	-1.7%	4.7%	9.5%	-5.2%	1.4%	9.4%	27.0%
2003	4.4%	7.8%	-22.1%	-3.3%	2.2%	-7.4%	-4.8%	-4.0%	N/A	-2.6%	1.3%	6.0%	-23.3%
2004	1.9%	6.2%	-2.2%	6.6%	7.0%	-6.8%	4.0%	-0.7%	11.7%	2.3%	-5.9%	-10.8%	11.3%
2005	3.0%	7.6%	10.3%	-8.8%	3.3%	5.9%	4.6%	16.5%	-2.0%	-9.8%	1.0%	3.0%	36.8%
2006	1.6%	-12.2%	0.4%	8.7%	-2.6%	3.0%	2.7%	-7.9%	-1.3%	N/A	0.7%	-2.0%	-10.0%
2007	N/A	-0.4%	4.0%	0.8%	1.0%	3.4%	3.4%	-1.5%	7.9%	9.9%	-2.6%	8.8%	39.7%
2008	-5.5%	15.1%	-3.3%	10.4%	8.3%	9.7%	-12.3%	-14.6%	N/A	N/A	N/A	N/A	3.4%
2009	N/A	N/A	N/A	N/A	4.9%	-2.1%	5.2%	-6.2%	3.7%	9.6%	2.8%	3.9%	23.1%
2010	-8.3%	4.0%	4.9%	2.8%	-9.3%	-5.2%	1.6%	-5.7%	7.3%	-8.6%	4.2%	6.5%	-7.8%
Avg	-0.0%	2.4%	-0.3%	1.7%	1.1%	1.4%	-0.0%	0.0%	3.2%	-0.8%	0.9%	1.7%	

8.2.11 Timing System 50/200 SMA Cross - GSCI - 2/17/1998 - 12/31/2010

Figure 32 - Timing System 50/200 SMA Cross - GSCI - 2/17/1998 - 12/31/2010 - Back Test Report

Statistics

	All trades	Long trades	Short trades
Initial capital	1000000.00	1000000.00	1000000.00
Ending capital	4707521.79	4707521.79	1000000.00
Net Profit	3707521.79	3707521.79	0.00
Net Profit %	370.75 %	370.75 %	0.00 %
Exposure %	67.34 %	67.34 %	0.00 %
Net Risk Adjusted Return %	550.54 %	550.54 %	N/A
Annual Return %	12.78 %	12.78 %	0.00 %
Risk Adjusted Return %	18.98 %	18.98 %	N/A
All trades	9	9 (100.00 %)	0 (0.00 %)
Avg. Profit/Loss	411946.87	411946.87	N/A
Avg. Profit/Loss %	21.45 %	21.45 %	N/A
Avg. Bars Held	243.22	243.22	N/A
Winners	7 (77.78 %)	7 (77.78 %)	0 (0.00 %)
Total Profit	4145918.39	4145918.39	0.00
Avg. Profit	592274.06	592274.06	N/A
Avg. Profit %	29.98 %	29.98 %	N/A
Avg. Bars Held	295.00	295.00	N/A
Max. Consecutive	3	3	0
Largest win	1251932.82	1251932.82	0.00
# bars in largest win	598	598	0
Losers	2 (22.22 %)	2 (22.22 %)	0 (0.00 %)
Total Loss	-438396.60	-438396.60	0.00
Avg. Loss	-219198.30	-219198.30	N/A
Avg. Loss %	-8.42 %	-8.42 %	N/A
Avg. Bars Held	62.00	62.00	N/A
Max. Consecutive	1	1	0
Largest loss	-367455.11	-367455.11	0.00
# bars in largest loss	121	121	0
Max. trade drawdown	-1628846.57	-1628846.57	0.00
Max. trade % drawdown	-33.62 %	-33.62 %	0.00 %
Max. system drawdown	-1628846.57	-1628846.57	0.00
Max. system % drawdown	-33.62 %	-33.62 %	0.00 %
Recovery Factor	2.28	2.28	N/A
CAR/MaxDD	0.38	0.38	N/A
RAR/MaxDD	0.56	0.56	N/A
Profit Factor	9.46	9.46	N/A
Payoff Ratio	2.70	2.70	N/A

Standard Error	313200.83	313200.83	0.00
Risk-Reward Ratio	0.87	0.87	N/A
Ulcer Index	13.14	13.14	0.00
Ulcer Performance Index	0.56	0.56	N/A
Sharpe Ratio of trades	0.61	0.61	0.00
K-Ratio	0.0565	0.0565	-1.#IND

Figure 33 - Timing System 50/200 SMA Cross - GSCI - 2/17/1998 - 12/31/2010 - Monthly Profit Report

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr%
1998	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0%
1999	N/A	N/A	N/A	3.0%	-7.2%	8.4%	5.3%	5.9%	5.4%	-3.9%	4.0%	1.7%	23.8%
2000	7.8%	6.3%	-7.9%	0.3%	10.1%	4.1%	-8.5%	13.9%	-0.7%	-1.7%	4.4%	-4.3%	23.2%
2001	-1.7%	-4.7%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-6.4%
2002	N/A	N/A	N/A	1.2%	-3.5%	4.6%	-1.7%	4.7%	9.5%	-5.2%	1.4%	9.4%	21.0%
2003	4.4%	7.8%	-16.1%	-5.0%	8.5%	N/A	3.6%	-5.7%	N/A	N/A	-1.4%	6.0%	-0.7%
2004	1.9%	6.2%	-2.2%	6.6%	7.0%	-6.8%	4.0%	-0.7%	11.7%	2.3%	-5.9%	-6.9%	16.3%
2005	7.5%	8.6%	10.3%	-8.8%	3.3%	5.9%	4.6%	16.5%	-2.0%	-9.8%	1.0%	3.0%	44.0%
2006	1.6%	-6.1%	6.4%	-1.8%	-2.6%	3.0%	2.7%	-7.9%	-8.5%	1.5%	N/A	N/A	-12.1%
2007	N/A	N/A	N/A	1.4%	1.0%	3.4%	3.4%	-1.5%	7.9%	9.9%	-2.6%	8.8%	35.7%
2008	-5.5%	15.1%	-3.3%	10.4%	8.3%	9.7%	-12.3%	-11.2%	-3.0%	N/A	N/A	N/A	4.3%
2009	N/A	N/A	N/A	N/A	N/A	1.4%	5.2%	-6.2%	3.7%	9.6%	2.8%	3.9%	21.5%
2010	-8.3%	4.0%	4.9%	2.8%	-13.0%	2.6%	N/A	N/A	3.2%	3.1%	4.2%	6.5%	8.4%
Avg	0.6%	2.9%	-0.6%	0.8%	0.9%	2.8%	0.5%	0.6%	2.1%	0.4%	0.6%	2.2%	