

Active versus passive



What else
is on the

Menu?



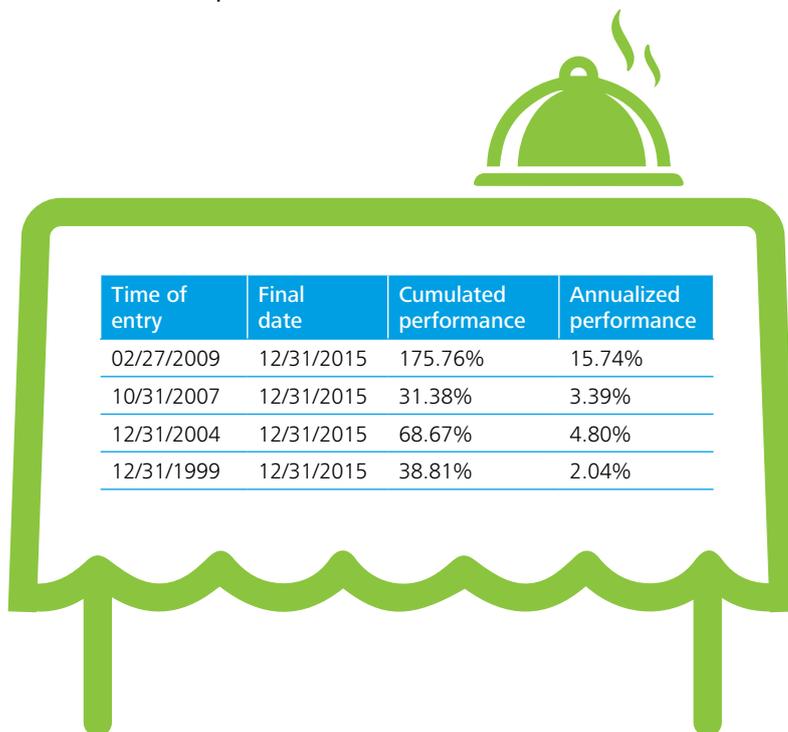
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Before investing, the retail investor has to face a dilemma between active versus passive funds:

- On the one hand, academic research has shown that active portfolio managers fail to beat their benchmark on average after accounting for fees. Those who managed to beat their benchmark fail to repeat their performance over a consistent period of time. Their outperformance was probably due to sheer luck rather than investment skills.
- On the other hand, the performance of passive investing has been shown to be extremely dependent on the time of entry into the markets. As an example of the importance of entry time, we can compare the performance (including dividend reinvested) of a passive investment in the Standard & Poor's 500 (S&P 500)¹ in the table below:

Table 1: S&P 500 performance



Time of entry	Final date	Cumulated performance	Annualized performance
02/27/2009	12/31/2015	175.76%	15.74%
10/31/2007	12/31/2015	31.38%	3.39%
12/31/2004	12/31/2015	68.67%	4.80%
12/31/1999	12/31/2015	38.81%	2.04%

As we can observe, the annualized performance is highly dependent on the time of entry. There is also no guarantee that holding the investment for a longer period will yield a higher return over time. To make things worse, the retail investor is often lured into investing in the stock markets at the worst time—when asset prices have already gone up and the upside potential for the coming year is limited. Moreover, passive investing may suffer from large drawdowns during a bear market making it psychologically difficult to remain fully invested or even add capital.

In this article, we will present two alternative strategies that can be used by a portfolio manager. The strategies will exist in two versions (low-risk and high-risk profiles) and the management of the strategies will be kept to a minimum—no stop loss will be used and the number of trades will be limited to one per month. We will compare these two strategies to a simple buy-and-hold strategy in the S&P 500. We will also look at the behavior of the different strategies under extremely volatile market conditions.

Here are two option-based strategies:

Strategy #1: selling an At-the-Money (ATM) put option

The first strategy will consist in selling ATM put options on the S&P 500 index with 45 days to the expiration date. The put option will be cash-secured. A cash-secured put involves writing a put while setting aside the money corresponding to the maximum loss on the put. That money will be invested in treasury bills. By cash securing the put, it eliminates the leverage embedded in options. This strategy is therefore conservative and can be implemented on behalf of clients with the majority of risk profiles.

One should then mechanically exit the position after 30 calendar days, irrespective of the profit & loss (P&L). The reasons for not waiting until the option's maturity are twofold. First, the risk/return ratio deteriorates over time. The position carries the same amount of risk (i.e., the maximum loss remains the same during the option's lifetime) but the remaining premium decreases over time (i.e., option prices decay over time).

¹ The exposure to the S&P 500 is gained through an ETF on this index.

² The Standard & Poor's 500, often abbreviated as the S&P 500, or just "the S&P" is an American stock market index based on the market capitalizations of 500 large companies having common stock listed on the NYSE or NASDAQ.

Secondly, the gamma risk increases exponentially as the expiration date approaches. Gamma risk represents the risk of a profitable product rapidly losing ground because of an adverse movement in the underlying. Gamma risk is at its highest point close to the expiration date. If the position goes against the investor close to expiration, there is no way he or she can hedge the position because of the limited remaining time. Therefore, they should exit their position after 30 days in the trade to limit gamma risk.

Strategy #2: selling At-the-Money (ATM) straddle

The second strategy is actually a variation of the first. In addition to selling the ATM put option, the investor could also sell the ATM call on the S&P 500 index. The simultaneous selling of both ATM call and put options is called a straddle. Unlike a put option, selling a naked call option can lead to unlimited loss (i.e. the underlying price can theoretically go to infinity).

Therefore, the maximum loss cannot be set aside in cash. Instead, one relies on the margin formulae provided by most brokerage firms to estimate the collateral need. They will use 25 percent of the account to cover the margin requirement for the straddle. This 25 percent exposure allows some room for margin expansion—the margin requirement is recomputed on a continuous basis by the broker and may be increased if the position goes against the investor. To avoid any subsequent margin calls, it is important to limit the exposure to 25 percent. The remaining 75 percent of the portfolio is invested in treasury bills. One should mechanically exit the position after 30 calendar days irrespective of the P&L for the same reasons stated above. Because this strategy involves the potential for unlimited loss, this strategy fits the profile of an aggressive investor.

Below is a summary of the two strategies:

	Risk profile	Description	Entry	Exit	Position sizing
Strategy #1	Conservative	Sell ATM put on S&P 500 with a number of days to expiration	Open a new position on the first day of each month	Exit the position after 30 calendar days (irrespective of the P&L)	Cash-secured put option. The collateral is invested in treasury bills
Strategy #2	Aggressive	Sell ATM straddle on S&P 500 with a number of days to expiration closest to 45 days			25 percent of the account is used as collateral for the straddle. Remaining funds is invested in treasury bills



We qualify these two strategies as “mechanical” as the rules used for the trades are fixed over time. Unlike active investing, these strategies do not involve making any decisions whatsoever with respect to asset allocation among different asset classes or selecting specific securities. Investors only trade options on the S&P 500 index. These strategies differ from passive investing in that investors sell the existing position and re-establish a new one every month at the new volatility environment prevailing at the beginning of the month. In that sense, this investment style is more active than passive.

Below, we compare the historical performance of the following three portfolios over the last 10 years (from 31 January 2005 to 31 December 2015). We retrospectively tested the performance of an account worth US\$1,000,000 invested in the following three portfolios.

- **Portfolio #1:** buy-and-hold in ETFs tracking the S&P 500 including dividend reinvested (i.e., total return)
- **Portfolio #2:** portfolio following strategy #1 as described above
- **Portfolio #3:** portfolio following strategy #2 as described above

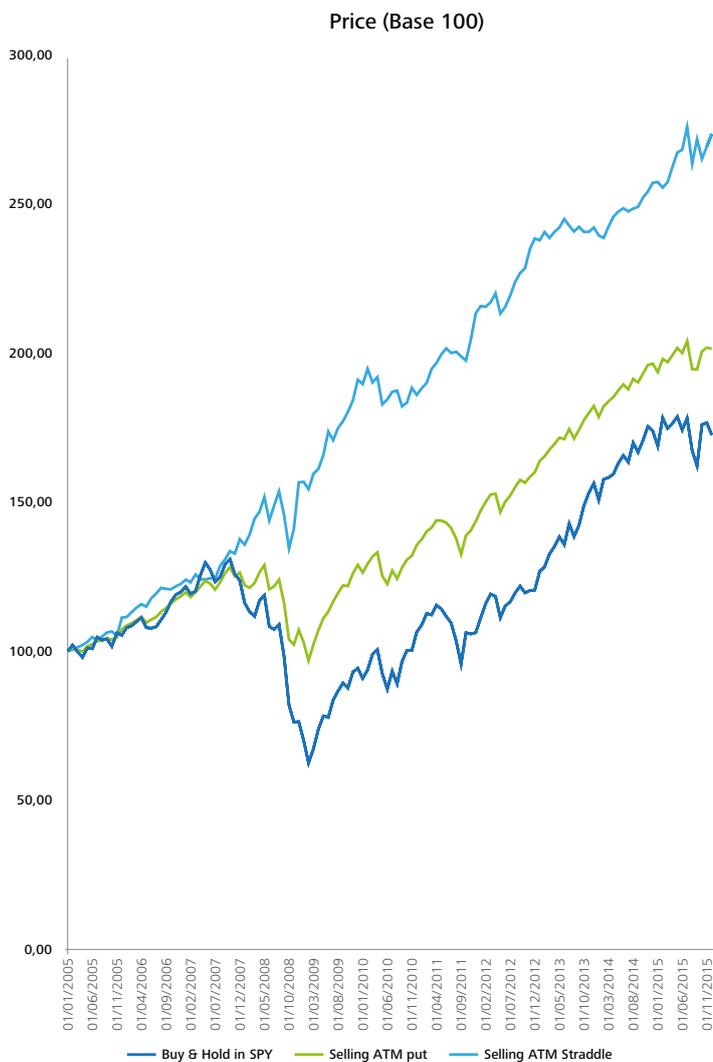
For Portfolios 2 and 3, we accounted for the transaction costs² and interest earned on the T-bills.

2 We assumed a US\$1 commission per contract and per trade.

Table 2: comparison of performance metrics

	Portfolio 1	Portfolio 2	Portfolio 3
Cumulated performance	72.54%	101.41%	173.46%
Total number of months	131	131	131
Average annual performance	5.12%	6.62%	9.65%
Number of positive months	80	92	94
Number of negative months	51	39	37
Volatillity	14.53%	8.14%	7.60%
Sharpe ratio	0.24	0.62	1.06
Max drawdown	-52.20%	-24.84%	-12.47%
Longest time to recover from valley (in months)	65	19	14





As we can observe on the graph above, the two mechanical strategies outperform the buy-and-hold strategy in the following respects:

- Cumulated performance: the performance of both portfolios 2 and 3 outperform the buy-and-hold strategy
- Volatility: the volatility of the performance has been reduced by about half
- Resilience in extreme market conditions: the most remarkable aspect of these two mechanical strategies is the limited drawdown during periods of high volatility. The difference in performance over the studied period is actually explained by the higher resilience of portfolios 2 and 3 during the subprime crisis (see the difference in maximum drawdown). Below, we analyze the performance of the three portfolios from 31 October 2007 to 27 February 2009. This period corresponds to the peak-to-valley period of the S&P 500 during the subprime crisis

The higher resilience of portfolios 2 and 3 may be attributed to the following factors:

- The cash is invested in US Treasury bills, which act as a cushion when equities markets fall
- Option prices tend to adapt naturally to the market conditions. When equities markets fall, volatility rises. As a result, option prices increase (i.e., there is a positive relationship between higher volatility and option prices) and we are therefore able to collect a higher premium. This higher premium acts as a buffer against declining equity prices. Because straddles are composed of two options, we are able to collect a higher premium than selling a single ATM put. As a result, portfolio 3 was more resilient during the subprime crisis

Mechanical strategies can provide a superior risk-adjusted return at a very low cost and with limited trade management

As we have demonstrated in this study, there is life beyond actively managed funds and indexed funds. Mechanical strategies can provide a superior risk-adjusted return at a very low cost and with limited trade management. Mechanical strategies can act as a cushion during market turmoil and therefore should be considered in any type of portfolio. The retail investor will be able to invest in funds following these mechanical strategies to outperform indexed funds and provide greater portfolio diversification.

Cumulated performance during subprime crisis



To the point:

- The performance of passive investment is highly dependent on the time of entry
- Mechanical strategies can outperform active and passive investing in terms of performance and risk
- Retail investors have other choices than active and passive investments to build a portfolio

