The power of passive

Can a blindfolded monkey throwing darts at a list of stocks achieve better investment results than the 'experts'? Judging by my results from back-testing random stock entries and exits, the answer is most certainly 'yes'. Given the right algorithm, even random investing can be marginally profitable; and many professionally run unit trusts have not even achieved that heady height for very long.

We live in the dawn of the age of Big Data; at its heart, the universe itself may well consist of 'information'. The Age of Enlightenment may have started 400 years ago but the voyage of scientific discovery has only just begun. If a medieval monk would deem our present powers to be godlike, we in turn will look like mere superstitious children to the intelligent species of the far future. We may as well make use of our significant achievements so far and invest in accordance with science and mathematics rather than fallible human judgment and 'intuition'.

Statistical modelling outperforms human prediction. Human judgment is still necessary to choose and design the inputs to the model but, given that, the computer will spit out superior predictions based on data analysis. Every time. Big data has come to medicine, the law, politics and every other area of human enterprise. It will continue to grow in importance. It should be welcomed into the world of finance and investment with open arms and the old guard should be shown the door.

Since I have been accorded the honour of writing for Investors Chronicle I shall return the favour by directing readers to an article written by Yale University Professor Ian Ayres in its sister publication the Financial Times. His article appeared in the Financial Times Magazine on 31 August 2007 and is entitled 'How computers routed the experts'.

Let me take the liberty of quoting a few paragraphs from Professor Ayre's article: "Orley Ashenfelter is an economist at Princeton University, a former editor of the prestigious American Economic Review and a wine enthusiast. About 30 years ago, that led to some trouble. He decided that instead of using the 'swishing and spitting' approach of wine gurus such as Robert Parker to predict auction prices, he would use statistics.

"Ashenfelter started publishing his predictions in a newsletter called Liquid Assets. But his ideas reached a much larger audience in 1990, when The New York Times published a front-page article about his prediction machine. Where Parker had rated the 1986 Bordeaux as 'very good and

sometimes exceptional', Ashenfelter disagreed. Moreover, he predicted the 1989 Bordeaux, barely three months in the cask and yet to be tasted by critics, would be "the wine of the century". And, he said, 1990 was going to be even better.

"What was clear was this: Ashenfelter's predictions were astonishingly accurate. The 1989s turned out to be a truly excellent vintage and the 1990s were even better. And while few wine experts have publicly acknowledged the power of Ashenfelter's predictions, their own forecasts now correspond much more closely to his simple equation results. Take that, Robert Parker."

Professor Ayres should be compulsory reading for every investor. We have not yet reached the stage where algorithmic investment can be left entirely to its own devices. We have, however, reached the point where no investor, be it a private individual or a large institution, should rely solely on traditional stockpicking. The advent of cheap computer capacity means that vast amounts of information can be analysed swiftly and accurately to make investment decisions. Such decisions are likely to work out far more reliably in the long term than any amount of 'gut feel' or 'expert opinion'.

"Ashenfelter's predictions were astonishingly accurate... And while few wine experts have publicly acknowledged the power of Ashenfelter's predictions, their own forecasts now correspond much more closely to his simple equation results"
Professor Ian Ayres, Yale University

Forget the talking heads and place the vast majority of stockbrokers' research in the dustbin where it belongs. Always remember those Goldman Sachs analysts who were trying to convince you tech stocks were cheap just ahead of the crash in 2000. Switch off the news channels and put the phone down on the salesmen. Watch The Wolf of Wall Street (several times, not just once) and recognise that such beasts still roam the streets around the Royal Exchange and Canary Wharf and still prowl the canyons of Manhattan. Even if these days their fangs and claws are better disguised, their advice is likely all too often to be little better than that of Jordan Belfort and their motives are often alarmingly similar. Enough; but I hope you have taken my message on board.

What should the private investor do if I have managed to convince him or her that quantitative, rule-based investing is the correct approach, the 'safe' and 'sensible' approach?

Well for a start he or she should educate him/herself on stock market indices and index-tracking funds. 'Passive' investment, so called. That is the big daddy of rule-based investing.

There is much talk of 'passive investing' and huge fund managers such as Vanguard in the US and iShares in the UK have been built around the concept. It is reckoned that 30 per cent of institutional investment in the US is now done via 'index tracking'.

But ask yourself what 'index tracking' and 'passive investment' actually means. You might be surprised that the answer is actually 'quantitative', 'algorithmic', 'rule-based' investment. And it is not 'passive' at all.

Index tracking is exactly what most investors should be doing. But they should pick their 'index' carefully. Or rather their 'indices', since diversification is the only free lunch in investment, hackneyed as the phrase may sound.

Many stock market indices are purely quantitative in nature, although the rules are adapted from time to time as circumstances dictate. But there is nothing passive about a stock index: growing companies are brought into an index; failing companies exit, as corporate fortunes wane or a company merges or is swallowed up by a predator. The Dow Jones Industrial Average was first calculated on 26 May 1896. The components of the DJIA have changed 53 times in its 128-year history. Only one of the 12 original stocks remains in the index. How passive is that?

The FTSE 100 Index is a share index of the 100 companies listed on the London Stock Exchange with the highest market capitalisation. It is true that if you invest in an exchange traded fund (ETF) or unit trust tracking the FTSE, the manager of that fund will not have a great deal to do, but your investment is far from being 'passive'. Sales and purchases are regularly made which ensure that you hold only successful and large companies in line with the changing constituents of the index. How can that be said to be 'passive' investment?

So what am I proposing? That you put up your feet and buy a few index trackers? Well, you could do a lot worse, especially if you go global thus taking advantage of the diversification offered by the world economies.

But no, I am suggesting that you go a stage further. I am suggesting that you learn to put together your own 'indices' or rule-based investment systems. Or at least do enough of your own research to convince yourself that my suggested approach is right and then follow an index of some sort or another. Or indeed buy funds that follow indices which appeal to you.

Obtain historic daily price data for the instruments you wish to invest in and buy or rent appropriate back-testing software. Take the trouble to code your ideas and test them out. You can use something as basic as Excel as a first step, but it would be a clumsy procedure and you would be better off learning to 'code'. It really isn't that difficult. In future articles I hope to make some recommendations both for data providers and back-testing software.

Here is a rule-based index or system you might like to copy and experiment with:

A SIMPLE MOMENTUM SYSTEM FOR GLOBAL TACTICAL ASSET ALLOCATION (GTAA)

The aim is to achieve a strong, smooth 'equity curve' (an upward slope over time in your account value) by switching between major asset classes as market conditions dictate using exchange traded funds (ETFs). The most easily available asset classes in ETF format are equities, bonds, real estate, currencies and commodities. Momentum tends to persist both on the upside and the downside. Investments that have risen in price in recent times tend to carry on increasing in value as more investors follow rising prices. Stocks that have recently exhibited negative momentum tend to continue downward.

Portfolio rules: The portfolio featured here consists of 13 internationally diversified stock index-tracking ETFs, three real-estate investment trusts (Reits) and 12 bond funds. In future articles I intend to make specific suggestions for ETFs suitable for use by UK-based sterling investors. I will also be adding further asset classes such as commodities and currencies.

Ranking: The system invests in the top 10 funds ranked by performance on a monthly basis. Any existing holdings that have fallen outside the top 10 are sold and any new entrants to the top 10 category are purchased. Existing holdings that remain within the top 10 performers are retained.

Momentum calculation: Four look-back periods are used: 252, 125, 60 and 20 trading days. The performance measurement takes the most recent closing price of the relevant instrument and divides it by the closing price of that instrument at the beginning of the relevant look-back period. The measurements thus derived are then added and divided by four to form an average score for each instrument. The total potential portfolio is then ranked from the best performer down to the worst.

Money management and rebalancing: Rebalancing takes place at the end of each rolling monthly period. The portfolio is equally weighted at the initiation of a position: total account value is divided by 10 and 1/10th of the portfolio value is assigned to each position. At subsequent rebalancing, winning positions are cut back to 1/10th of the portfolio value but losing positions are not increased.

BACK-TEST ASSUMPTIONS

- **Portfolio concentration: 10 funds.**
- **Starting capital: $100,000**
- **Start date: 1 January 1997.**
- **End date: 14 January 2015.**
- **0.75 per cent management fee debited quarterly.**
- **Interest on cash balances: US three-month T Bill rate.**
- **Commissions by stock value: 0.2 per cent on both sales and purchases.**
- **Dividends and splits: price adjusted for stocks splits; cash dividends added to P&L and reinvested.**
- **Base currency: US dollars.**
- **Slippage: 7 per cent.**

Take a look at the charts and the table outlining the performance of this system (below). For illustrative purposes I compare the results of this back test to the returns obtained by buying and holding the SPDR S&P 500 ETF (SPY) for the same period (data taken from Reuters) including reinvestment of dividends. This is of course not strictly speaking an 'apples for apples' comparison but it will do for these purposes.

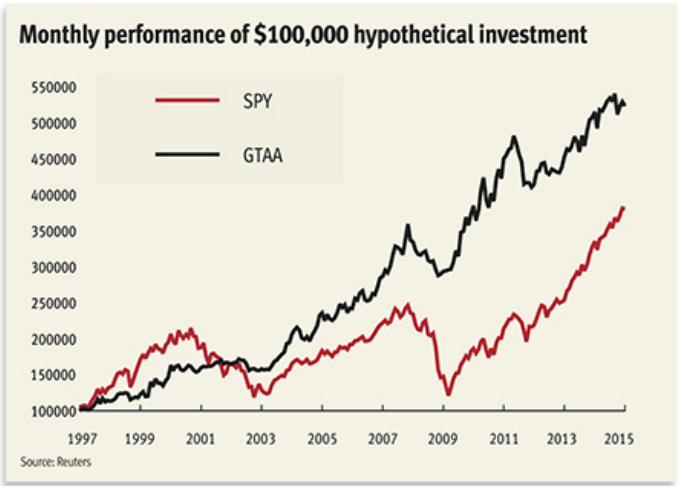
Note the relative performance of the two assets. The GTAA has outperformed the S&P 500 ETF in both absolute and risk-adjusted terms. The risk-adjusted CAGR of SPY is obtained by applying the ratio of the higher volatility (standard deviation) of the SPY divided by the lower volatility of the GTAA ((11.76/15.60) * 7.70 = 5.80). Also note the greatly reduced maximum peak to valley drawdown of the GTAA in the chart on the right – around 20 per cent as opposed to 51 per cent for the SPY. Peak to valley drawdown is the diminution in the value of your investment from its recent high to the next low point.

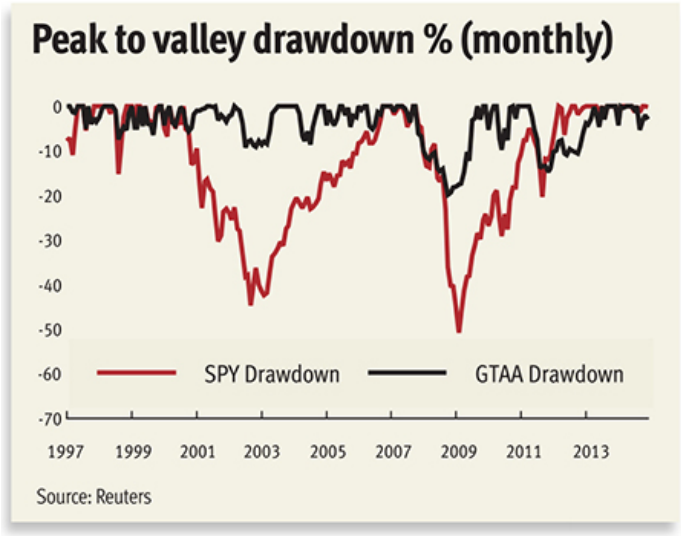
So, in back testing at least, you get a higher and less volatile return for a much lower drawdown.

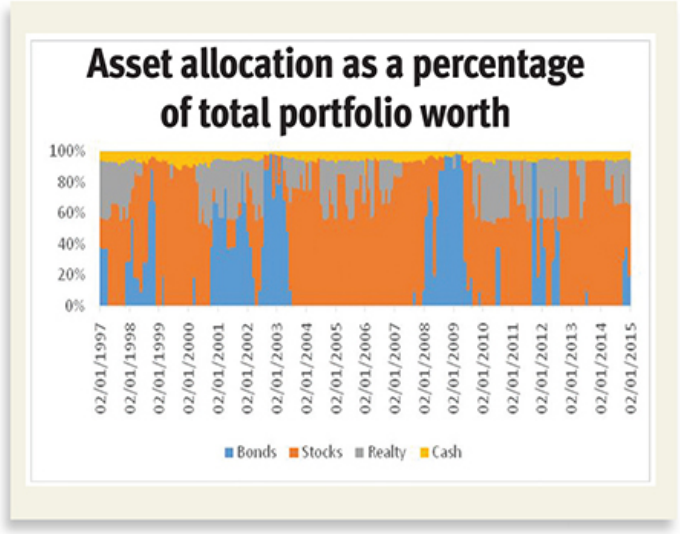
The drawdown chart shows just how much easier it is to hold an investment such as the GTAA over a standard index tracker such as the SPY. Stock indices go through almost unbearable periods of loss which often take some years to recover from. With a tactical asset allocation scheme the object is to lessen volatility, drawdown and length of drawdown. It may also be possible to achieve a similar or even increased return depending on your portfolio choice.

The asset allocation chart shows how the portfolio is composed over time. It explains how lower volatility and drawdown can be achieved over a basic and standard stock index tracker.

Note that during periods of market turmoil and collapsing equity prices such a system aims to invest mostly in bonds. When stock markets outshine bonds (2004 to 2008 for example) the momentum driven system automatically allocates back to the higher performing stock markets.







SPY vs GTAA

	SPY	GTAA
Compound annual growth rate %	7.70	9.66
Risk-adjusted CAGR %	5.80	9.66
Maximum monthly drawdown %	50.89	19.88
Annualised standard deviation of monthly returns %	15.60	11.76

CONCLUSION

I have no doubt that readers new to rule-based investing will be filled with doubt, scepticism and questions. I am happy to provide answers.

My overriding concern in this article is to show what is possible and to introduce the concept. I must warn readers that the business of quantitative investing is not without its dangers. The main danger is 'curve fitting' - designing and testing a system on a specific set of data and adapting the rules so as to produce pleasing theoretical investment returns from that data set. Such curve fit systems are unlikely to produce good returns in the future.

The systems and indices I devise are not 'black box' - the rules are fully disclosed and there are few of them. A system or index with fewer rules is likely to be far more robust than a complex scheme which carries the danger of curve fitting. But no guarantees can be given and hypothetical back-tested returns are not the same thing as actual returns.

I hope to explain in future articles how curve fitting can be avoided or at least mitigated. My experience in real trading over many years is that the future always holds unpleasant surprises - even for the rule-based investor. But the future often holds far worse surprises for the traditional stock picker and discretionary investor.

About the author

Anthony Garner is a hedge fund manager, trading consultant, and author. More of his work on rules-based trading can be found at: anthonyfjgarner.net

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