Letters to the Editor: Moving Average: Holy Grail or Fairy Tale, Part I

June 30, 2009

The letters below are in response to Ted Wong's article two weeks ago, Moving Average: Holy Grail or Fairy Tale - Part 1. Part 2 of Ted's article appears in today's issue, here.

Mr. Wong,

I am a Registered Investment Advisor and a Principal with Chicago Wealth Management.

I read your articles on moving averages and the buy-and-hold myth and can say without any hesitancy that your work mirrors what we have found. While I completely agree with your conclusions, our testing in this area produces significantly different results for maximum drawdown.

For example, when I use a 12-month simple moving average system during the crash that ended in 1932, I get a maximum drawdown in the mid 20%. Similarly, in 1987 I get a maximum drawdown in the high 20%. In 1987 there was a very quick peak to trough and I can't imagine any monthly SMA or EMA that would have missed the 1987 crash, unless you were using daily data or you are weighting your EMA so heavily towards the most recent months -- and I do mean very recent months -- that you are effectively not using any data other than recent data. Am I reading your chart on maximum drawdown correctly?

Your chart shows that by using an EMA MAC system, no period of any length will ever get a maximum drawdown greater than 20%, but our work does not confirm this to be the case. This is a significant difference. Are you doing something other than what you've explained in your paper? I can't attribute it to your EMA, so it must be something else. .

Looking at your data in more detail, I have spent the last hour trying to reconstruct the signal you got at the close of September 1987 that got you out of the market while you were still above the 12 month moving average -- regardless of what type of moving average you use. Now that I see how similar the moving averages you used are to each other, this confirms my research that says the types of moving averages don't matter. Lastly, maximum drawadown would be calculated by taking the difference between the August peak and the November trough to arrive at 30.17%.

In my opinion, you are not using a moving average crossover system. I question your methodology. Please note however that you are on the right track towards reducing risk compared to a buy-and-hold rate of return. Your numbers are just too good on the risk side.

Sincerely,

Carlos Sera
Chicago Wealth Management
Chicago, IL

Ted Wong replies:

Dear Carlos

Thank you very much for your keen observations, which I should have clarified in my articles. Several readers wrote to me (see the Letters to the Editor last week) discussing different topics, most related to the issue you raised.

In all my calculations, I assumed that buy/sell orders were transacted in the same month that the signals were generated, i.e. when the March S&P500 Index crossed above its MA in March, a buy order was placed and carried out, not in April. The sell side would be the mirror image. You can argue that such transactions would not be possible. Well, in the Internet Age, everything seems possible. For example, one can project the closing price at 3:50PM on the last day of every month, calculate the MA and execute the buy/sell orders for SPDR via the internet before the market closes. There would be errors occasionally but over 138 years such random errors would likely cancel out.

Of course, this is hypothetical, especially since investors could not use the same-month MAC system in 1871.

I use Professor Robert Shiller's database, which is constructed using average prices (daily in recent years but could be weekly or extrapolated in ancient time - see his brief discussions on his website). So my calculations may vary slightly from yours if you use actual monthly closes.

I checked my calculations to make sure that my math was correct. I recalculated drawdown using SMA and the numbers didn't differ much from those of EMA. So for curiosity, I modeled the drawdown equation based on a "next-month" transaction scheme, i.e. buy/sell orders are implemented in the month following when the crossover signals are generated. I compared the 12-month-EMA (Shiller's Index) and the 12-

month-SMA (actual monthly closes - both are based on same-month signal execution) to a 12-month-SMA (actual monthly closes) based on next-month signal execution. The maximum drawdown for the third case is now 24%, very close to what you got.

I hope that I have solved the mystery of drawdowns.

Regards,

Ted

Dear Editor,

This is a great example of how the most basic technical analysis can have a profound affect on your investment strategy's results.

Maybe it has been mentioned already (certainly it has in the trading system literature), but I thought I should point out some concerns to readers who are about to implement such a strategy:

1. Moving average systems help identify turning points in the trend and validate the trend while you are in it. However, it takes time for the moving average to indicate a signal that the trend has changed. Therefore, the user will be waiting for the signal confirmation while their gut feeling and all evidence has pointed to a change in direction weeks ago. One way to lessen this impact is to choose shorter term moving averages, or weight the most recent observations more heavily, as an EMA does.

2. During periods of sideways movement in the market, moving average systems give conflicting signals that turn out to be false. One way to reduce this impact is have longer term moving averages. Unfortunately, this also increases the lag identified in paragraph one above.

3. Because of the inherent lags in a trend-following system, users will tend to discount it and lose faith in its capabilities. In sideways markets you get chopped up; in long trends you make your money. Knowing how a system works is one thing; following it takes some real bravery and determination.

4. There is a significant bias in Shiller's S&P 500 data, known as survivorship bias. For data that old, it is impossible to identify the correct value of the index, since the index is comprised of the companies that survived, and doesn't include the companies that failed. Survivorship bias gives a nicer result than what would

have been experienced. S&P only has the survivorship-free data going back to 1950, but the last time I looked they don't report a survivorship bias free index. Also, if you are using a dividend total return index, but in your actual investing don't have the same yield level in your equity investments as in the index, then a substantial portion of the return will have been lost.

5. There is also a problem with using average closing prices rather than the last month's closing price. If you are trading on a signal reported on the last day of the month, then you cannot possibly have purchased the average close of the month just passed. Your testing results have to be based on the next available trade date after you confirmed the signal. Also, if you used the system but instead used the next month's average close as the price at which you invested or sold, how do you execute such a trade? I would expect most readers do not want or are not able to implement such a strategy. Therefore, test a system that you would actually have a high degree of likelihood of implementing in real life, across all your client accounts.

6. I suspect that Shiller had a dearth of data for the S&P 500 and took what data he could, as an average, since many data was suspect and this is a method of removing outliers and bad data points. Bad data would have been rampant in the earliest years, so he rightly used a method that continued into the present to be consistent in his data cleaning. Also, Shiller is an economist, not an investment manager and he constructed an index for his purposes.

7. When testing any system, I advise against optimizing parameters. The reason is that parameters change over time. Also, any parameter that has wide swings in results is just not a good parameter to use in a system. If you think that changing from a 4-period moving average to a 5-period moving average will actually double your profits in the future as maybe your optimization has told you, then you are in for a surprise.

8. What is not shown is how a simple trend following system would have done if it were trained in the 1990-to-present era, when tested "out of sample" through the 1970s. Ted?

9. One of Ted's great contributions has not been commented on: his use of the risk parameter of maximum drawdown. They say that if you are winning in Vegas, take your profits as soon as possible since the longer you play, the more likely you are to lose it back to the house. Well, the corollary to the investment market is the longer you live, the higher the likelihood that you will experience its worst loss possible. That is the concept of maximum drawdown. Buy-and-hold will always experience the maximum drawdown, and if you want to avoid that scenario with your clients, you have to be ready to pull the trigger and go to cash

or all-bonds. Ted gives a simple signal that we can all implement to avoid those drawdowns.

Ted does a great job (Ockam would be proud) of pointing out that buy-and-hold or its modern equivalent “asset allocation with semi-annual rebalancing” just won’t do the trick of avoiding major losses. However, a good long-term trend indicator that is easy to follow as well as implement for your clients will help you take steps to avoid catastrophic loss.

Best regards,

Patrick A. Sullivan

Ted Wong replies:

Patrick,

Thank you for your feedback and kind words. I am flattered and honored. I don't have much to add to your comments since they are as thoughtful as they are rich in content. I have a few words regarding your points (7) to (9).

(1) First, I did use EMA to reduce the lags of SMA.

(7) I will have something to add to the topic of optimization in Part 3 (which I am writing in the next two weeks). But you are right - using in-sample data to optimize the system and out-of-sample data to validate the system would only work if the markets are static.

(8) Indeed, if one uses data from the 1930s and the 1940s to train the MAC system, it may fall apart in the 1950s and 1960s. I will have more to say about this in Part 3.

(9) In Part 2, I show that market exposure itself is a risk because it subjects investors to the volatility of the markets.

Thanks again for your inspiring comments. Ockam's principle echoes the tenet in modern physics of relying more on the elegance of simplicity as proof of any theory, especially when you cannot conduct experiments to validate it (like the String Theory).

Ted

Mr. Wong,

Very interesting article about MA's.

Back in my early days as an investment advisor in Southern California, I was introduced to Dick Fabian. If I recall correctly, he used an extremely simple 29- or 39-week moving average trading system for all funds and he tried to get clients (subscribers) to make the trades for themselves.

After a while he began managing the money for the clients, as he found that they would not follow through on the discipline for one reason or another.

Curious if you ever looked at his record?

In any event, I'd be very interested in your response.

I was on the track to using a similar management technique when the brokerage firm I worked for then (Prudential Bache) strongly advised against any "market timing" device and basically put an end to my plans. I've often wondered what would have happened had I been allowed to pursue that technique.

I really enjoyed the simple way you laid your research out…very readable.

Blessings,

Mark Hollingsworth

Ted Wong replies:

Mr. Hollingsworth,

Yes, I am familiar with Dick Fabian's work (I believe his son took over his "Telephone Switching" business, which should be renamed "Internet Switching" to reflect the era of technology). I didn't follow his records but heard rumors that his subscribers were warned about the October 19, 1987 crash, but were a bit too late to act that Friday.

You are right that the most difficult part of any active management approach is the discipline on the part of investors to adhere to the signals without questions. It's hard to do!

I used a major discount brokerage firm, and ran into similar resistance due to their "market timing" policies. I since have switched over to fund families such as ProFunds, which welcomes active investors.

Thanks again for your kind comments. I'm glad that you enjoy the articles.

Ted

Mr. Wong,

I read your article about moving averages with great interest. I have also done some work in this area, and have found – using weekly data on the S&P500 since 1980 – that a 40- to 45-week exponential moving average works best to signal buys, but a 60-week exponential moving average works better to signal exits. This is partly intuitive, as a longer moving average to signal sells reduces whipsaws to some extent.

Selling short with the same system is problematic, however. I have found in backtests that using the moving average crossover to signal short entry into the market is far less effective. While it generates more profit, ultimately it has greater drawdowns, higher volatility and more consecutive losing trades.

If you've written other articles that address this issue, I would be interested in knowing about them. Meanwhile, I look forward to Part 2 of your Holy Grail article.

Warm regards,

Anonymous

Ted Wong replies:

Dear Anonymous,

Thanks for sharing your research findings. Using different MA lengths for buy and for sell is wise. That's what I use in my own investment systems.
My intent in Part 1 and Part 2 is to demonstrate that a simple active system (MAC) beats buy-and-hold over a century-long time horizon. In Part 3 and/or Part 4, I plan to touch upon the topic of optimization, which might include using short and leveraged instruments.

Best,

Ted

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