



Modeling the Active versus Passive Debate

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The active versus passive investment argument is not going to be resolved by a contest. But can it be resolved by research? I think so, and here's my attempt:

On February 1st, Cassandra picks up the Wall Street Journal outside her door and discovers that it is the paper for March 1st, one month in the future. Not trusting that it is the real deal, she simply saves the paper. The next day, February 2nd, a paper dated March 2nd appears. This continues unabated. Come March 1st Cassandra checks the actual stock prices and, sure enough, they all match the prices in the paper she received a month before. The same is true of all the subsequent newspapers. She has a perfect forecasting tool, the dream of all buy-and-hold investors.

Soon Cassandra puts a PC to use and starts ranking stocks based on their average one-month growth rates, using her perfect knowledge. She then partitions her available capital into 21 equal tranches, and each day she uses one of them to purchase the 200 stocks of the Russell 3,000 expected (actually "guaranteed") to do the best over the next 21 market days (one calendar month). Her partitioning eliminates any start-date bias. The returns she achieves are the best possible for a buy-and-hold strategy over that time frame. After all, it is the result of perfect look-ahead bias. Returns that Cassandra's "strategy" would have yielded between 2001 and 2008 aren't surprising: Cassandra would have earned 25.53 times her capital per year.

Cassandra, however, is curious. Although she knows she cannot do better over that period, she recognizes that each day she has additional information. According to information theory, that knowledge has to be worth something.

Cassandra alters her trading. She will now only hold her positions for 15 days instead of 21 days. She does this without knowing in advance what the prices will be 15 days after her purchases, the papers having been long since discarded. When Cassie sells the portfolio on day 15, she will then purchase another 200 stocks based on their next 21-day forecast. Of course, she is



investing with sub-perfect knowledge, because she does not know the advance price of those stocks to be sold on day 15.

Intuitively it would seem unlikely that she could tinker her way to a better return than the perfect portfolio. But she can, and she does so repeatedly. Strategy B beats Strategy A, where Strategy B consists of more-frequent forecasting and trading with sub-perfect knowledge, and Strategy A consists of less-frequent activity with perfect knowledge. The 15-day recast produces 39.52 times her capital per annum, about half-again better than the control.

Encouraged by the success of active investment management against a seemingly unbeatable investment, Cassandra shortens up even more. She still forecasts 21 days ahead on the basis of the newspapers, but she only holds for 10 days, or half the forecast period. This yields a whopping 138.53 times her capital per year. Recasting every five days produces 56.62 times her capital annually – less than 10 days, but greater than 15 days or the control period of 21 days.

Her experiences are not exclusive to monthly forecasting. The perfect quarterly portfolio, for example, loses handily to reselection of stocks either every two months or every month. (Testing annual periods would require either too much data or produce too few results for statistical significance.)

There are two possible explanations for the increased profitability Cassandra observed. The least obvious factor would be rebalancing of the entire portfolio every time a new position is taken. Indeed, rebalancing adds tremendous profitability; the more frequent the better. In this study, however, there was no rebalancing involved in either strategy. New positions would have had an equal value allocation, and existing positions were left alone to grow or decline in value, unchanged in size until liquidated. Thus, with rebalancing absent, there can only be one explanation: that more-frequent forecasting is inherently profitable, even more so than some forms of perfect knowledge.

Focusing on increasing profits while ignoring risk is foolhardy. It is worth noting, as an aside, that even perfect knowledge does not always produce profits in every period. Cassandra's is a long-only strategy in which she is purchasing the top-200 ranked stocks. There are some periods during which virtually all stocks decline, or at least during which the average return of the top-200 is negative. Thus we must consider the dark side of investing.

One of the distinct advantages of more-frequent analysis and forecasting is that losses get cut earlier, providing damage control. Shortened time horizons play an obvious role in risk reduction. Recasting our 21-day forecast every 15 days produced an annual return of 39 times one's money, but at the risk of a 30



percent decline in capital. At 10 days the returns were 138 times, but with a 47 percent drawdown. At five days, the returns were 56 times, but the maximum drawdown was only 14 percent. Thus five days had a reward-to-risk ratio of 4 (56/14), compared to 2.9 (138/47) for 10 days and 1.27 (39/30) for 15 days. The monotone progression makes the point. A similar finding appears in the quarterly data as well; the risk-adjusted rewards are improved by ever shorter forecasting periods.

Also of interest were the results of holding beyond the forecasted period. They were horrible, which underscores that the perfectly selected portfolio is extremely time-specific.

Here we see a situation in which our investor has perfect future knowledge, and yet she gains a clear advantage by re-evaluating her decisions with increasing frequency. This is essentially a conflict between two mutually exclusive ideas. On the one hand, perfect knowledge has to win, and indeed it will over that exact period. That's intuitive. It is also intuitive, however, that more frequent information proves beneficial, if one is willing to shorten the trading period. And here we have evidence of the latter's success over a perfectly chosen portfolio. If active management can improve a portfolio chosen with perfect foresight, surely logic dictates its value over a sub-perfect portfolio. That would have to be proven, but any of those results would be dependent upon a particular investment or trading program. The beauty of this particular study is that it is program-independent. The lesson? If you ignore interim news or market action, you do so at your peril. The buy-and-ignore strategy is only acceptable if you are unable or unwilling to devote more time to your investment analysis.

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