Evaluating Stock Screens with Performance Attribution | June 2010

Stock picking often is carried out with stock screens that reduce the set of eligible stocks. Such screens usually are assessed through the level and volatility of the resultant returns, mostly with associated statistics such as information ratio or Sharpe ratio. This evaluation, however, often is insufficient for portfolio managers to uncover unintended bets, and this research bulletin suggests complementing this evaluation by conducting Barra performance attribution on the portfolios obtained from such screening strategies.

For example, the book-to-price screen is shown to have performed poorly in Australia over the last decade, largely because the selected stocks were low-momentum ones rather than because value was generating negative returns. As another example, the difference in performance between the book-to-price and the dividend yield screens in Japan from 2009 is shown to have arisen because of non-value tilts. Disentangling the returns attributable to different sources could provide portfolio managers with a better understanding of the unintended tilts in a stock screen and hence better enable a user to evaluate these screens.

Introduction

Stock screening is the process of searching for stocks that meet certain investment and financial criteria. A stock screen involves three components: a database of companies, a selection criterion based on one or more variables, and a screening engine that both finds the companies that satisfy the criterion and generates a list of matches. Automatic screens query a stock database to select and rank stocks according to user-specified or other criteria. Technical screens search for stocks based on technical patterns associated with price or volume. Fundamental screens focus on sales, profits, and other business-related factors of the underlying companies.

Later in this research bulletin, two fundamental screens based on book-to-price and dividend yield are used separately with the objective of allowing portfolio managers to identify value stocks. By focusing on measurable factors, stock screens help in the stock selection process. Even for stock-pickers using non-quantitative techniques, such screens are useful in narrowing the universe to a manageable size before qualitative procedures are applied.

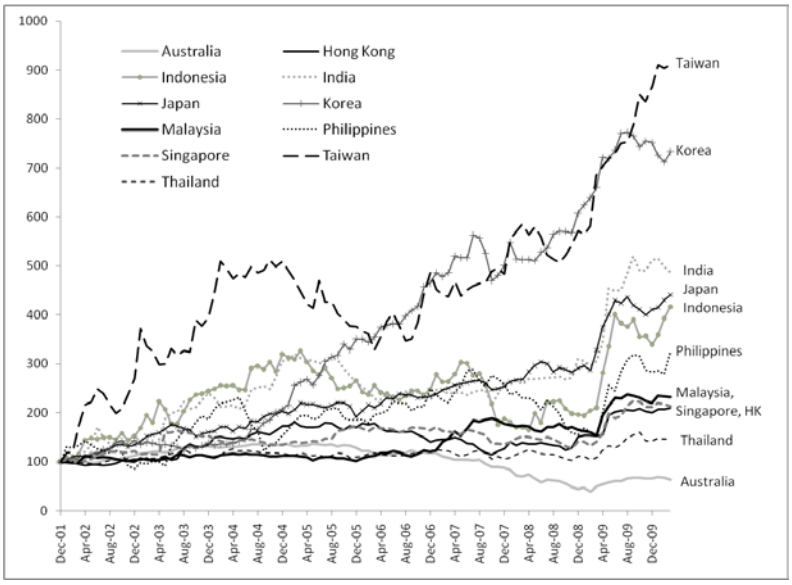
The portfolios derived from such selection screens often are evaluated for the level and volatility of their returns. Usually, these are expressed in terms of statistics such as information ratio or Sharpe ratio. In this research bulletin, we show how Barra performance analysis tools may be applied to potentially yield deeper insights to portfolio managers into the drivers behind the performance of these selection strategies. Performance analytics obtained from this process better enable a portfolio manager to grasp the historical drivers behind a stock screen, and hence better assess the likely future performance of the stock screen.

A Book-to-Price Stock Screen in Asia Pacific Markets

Consider a straightforward value screen that selects the top twenty percent of stocks in terms of book-to-price (B/P) in the Asia Pacific universe. The universe is set as the Barra Asia Pacific equity model estimation universe, which holds about 5,700 of the approximately 20,000 stocks that the model covers, and it includes all of those within the MSCI All Country Asia Pacific Investable Market Index.[1]

The bottom twenty percent of the universe according to the same criterion is used as the benchmark, such that the active return is simply the relative return of high book-to-price to low book-to-price stocks, both equally weighted. This is done separately for the various markets in the Asia Pacific universe, and Exhibit 1 shows the active performance, with monthly rebalancing, of the stocks selected using this screen.

Exhibit 1: Active Performance of Book-to-Price Stock Screen in Asia Pacific Markets (Cumulative Active Returns with Monthly Rebalancing and Equal Weighting, Dec 2001 = 100)



[1] This universe covers 15 markets, including the Japan and China A markets. They are also grouped into seven sub-regions or local scopes including Pacific (Australia, New Zealand), Southeast Asia (Indonesia, Malaysia, Philippines, Thailand), East Asia Emerging (Korea, Taiwan), East Asia Developed and China International (Hong Kong, Singapore, China International), South Asia (India, Pakistan), as well as China A and Japan separately.

Among the markets in the Asia Pacific region, Australia performed the worst in terms of active returns with this stock screen. This performance may be analyzed further by breaking down the active return into its various sources. Exhibit 2 shows the impact of industry tilts on the active return of the book-to-price stock screen for Australia. The bold line represents the total active return of this screen, while the active return attributable to all industry tilts is represented by the gray line. Clearly, the industry effect on this stock screen was muted and was thus not the main contributor to its performance. Hence, Brinson attribution likely would not help much in this performance analysis.

Exhibit 2: Contribution of Industry Effects on Performance of Value Screen for Australia (Cumulative Active Returns, Dec 2001 = 100)

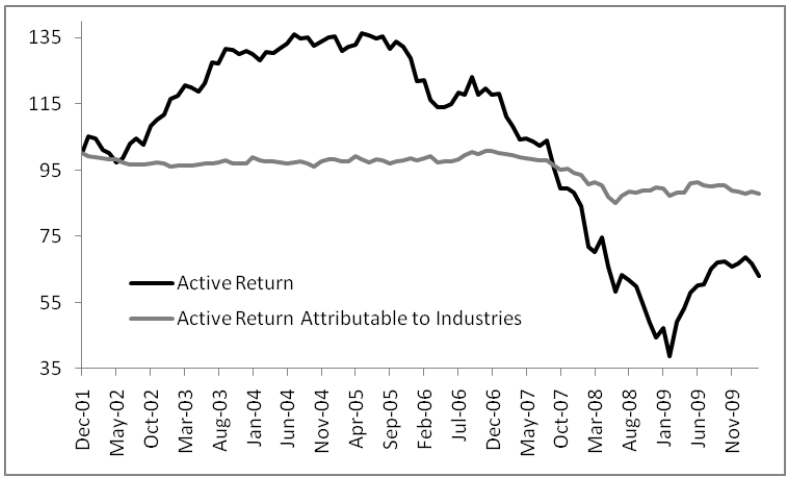
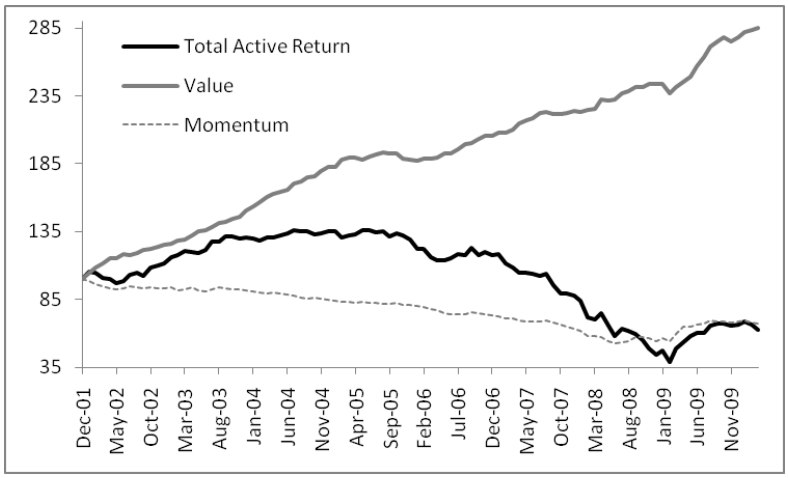


Exhibit 3 shows the effect of style factors, which was much more significant for the Australia market. In particular, the active return attributable to the Value factor moved consistently upward.[2] This confirms that the value tilt worked the way it was intended. However, the total active return was reduced by the negative contribution from other factors, especially Momentum. Since the selected stocks also tended to be low-momentum stocks, which underperformed during the bull market rally from 2003 to 2008, it is unsurprising that the total active return also declined during this period. This is a case in which an unintended tilt worsens the effectiveness of a particular stock screen.

Exhibit 3: Active Returns for Australia Market
(Cumulative Active Returns, Dec 2001 = 100)



Comparing Two Stock Screens

Performance attribution tools may also be used to compare two or more stock screens. In the last section, we used an example of a value screen based on the book-to-price ratio. There are many more variables that may be used as criteria to select value stocks. Here, we consider a screen based on dividend yield. As before, the top twenty percent of stocks in the initial universe is selected, and the bottom twenty percent constitute the benchmark, such that the active return with equal weighting represents the relative performance of stocks with high dividend yield to those with low dividend yield.

[2] The Barra Value style factor is based on five value series, including price-to-book, price-to-sales, trailing and forward P/E, as well as dividend yield.

Exhibit 4 shows the active returns, with monthly rebalancing, of the book-to-price and dividend yield screens from January 2009 onward, together with the contributions from the respective value tilts. While the active returns attributable to value (the dashed lines) were very similar for the two selection screens, the total active performance (the solid lines) differed significantly across them. The book-to-price criterion performed much better than dividend yield in terms of total active returns. However, the difference was largely due to non-value tilts. To examine the source of this discrepancy, Exhibit 5 shows the contributions of the most significant factors for the book-to-price screen.

Exhibit 4: Active Returns of Two Stock Screens in Japan Market (Cumulative Active Returns with Monthly Rebalancing, Jan 2009 = 100)

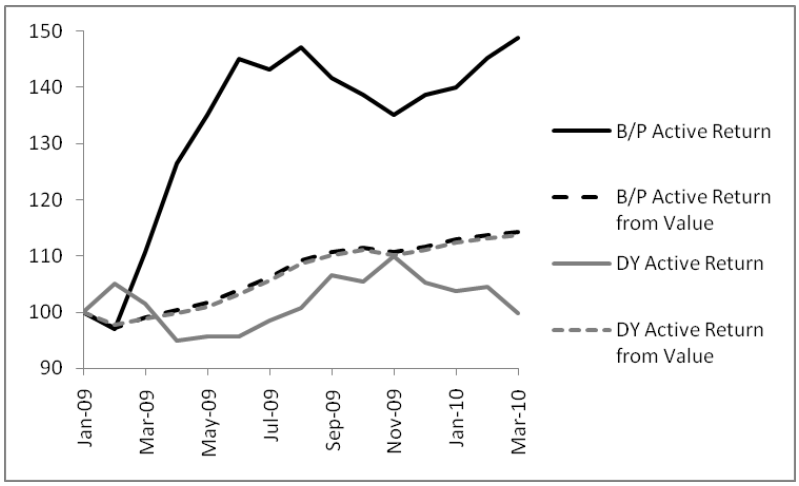
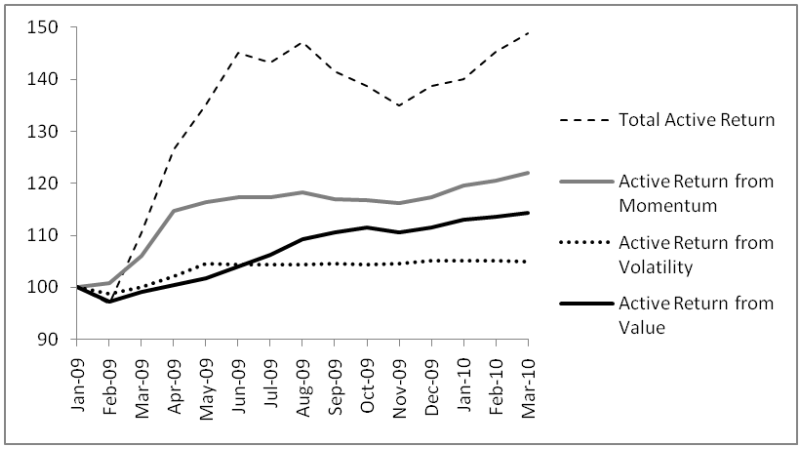


Exhibit 5 displays the cumulative active returns attributable to the Value, Momentum, and Volatility factors. The positive contribution of Value was smaller than that arising from Momentum. In fact, in the first half of 2009, both Momentum and Volatility generated higher active returns than Value. These unintended tilts were actually the key reason behind the superior performance of the book-to-price screen, and knowing this is important in evaluating these two selection criteria.

Exhibit 5: Active Returns of Book-to-Price Screen in Japan Market (Cumulative Active Returns, Jan 2009 = 100)



Conclusion

Stock screens often are used by both quantitative and non-quantitative investors for either reducing the investment universe or direct stock selection. The evaluation of these screens often involves statistics, such as information ratio, based on the resultant returns or their volatility, but these statistics do not necessarily reveal the sources and hidden tilts of those returns. Performance attribution tools can help portfolio managers to uncover the sources of returns and reveal hidden tilts. For example, performance attribution indicates that the book-to-price screen performed relatively poorly in Australia because of an unintended tilt toward low-momentum stocks. In Japan, performance attribution shows that the superior performance of book-to-price over dividend yield as a selection screen from 2009 onward was largely due to non-value tilts.

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