Introduction to the Screening Method for Analysis of Relative Strength

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November, 2009

Over the very long term, covering multiple decades and including several major bull/bear cycles, Relative Strength is one of the best stock selection strategies. Relative Strength returned a 15.7% compound average annual growth rate over the past 21 years, thereby ranking second best out of 50 diverse investment strategies tracked since 1987 by Merrill Lynch Quantitative Strategy. Performance was measured against a universe of 1600 common stocks.

The Relative Strength Strategy is easy to understand: buy and hold only the strongest stocks. When a stock slips enough so that it is no longer among the strongest, sell and replace it with whatever is the new strongest.

With the computerized screening method's predefined criteria programmed into a computer, any financial instrument can be quantitatively measured and ranked, quickly and objectively, against many thousands of competing instruments. For example, the entire universe of all stocks, all futures, all commodities and all currencies can be efficiently ranked form best to worst relative strength performance.

In the late 1960's, Robert A. Levy, Ph.D., and Charles D. Kirkpatrick worked together on a variety of experiments in technical forecasting. Their relative strength model, published continuously since 1982, has outperformed the S&P 500 by more than four to one. The model ranks 5,000 stocks each week by relative strength, from strongest to weakest. Every stock's recent performance is compared against the whole universe of stocks, over a constant, pre-defined specific time period. Specifically, the model divides the closing price each Thursday by the trailing 26-week moving average of those weekly prices. Next, the model ranks the ratio for each stock against the comparable calculations for all other stocks, forming a list of stocks ordered by performance from strongest to weakest. The top percentiles of the list represent the top performing stocks, those with the highest relative strength. Conversely, the bottom percentiles of the list represent the worst performing stocks, those with the lowest relative strength. The midpoint of the list shows the median past performance. See: Levy, Robert A., Ph.D., "Relative Strength as a Criterion for Investment Selection," the Journal of Finance, December 1967, 22, pages 595-610. See: Narasimhan Jegadeesh and Sheridan Titman, "Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency," Journal of Finance, vol. XLVIII, No. 1, March 1993, pages 65-91.

William J. O'Neil, publisher Investor's Business Daily, calculates each stock's price change over the latest year, then he ranks this price velocity against all other stocks. These Relative Strength ranks are expressed on a percentile scale, with 99 representing the strongest price performers and 1 the worst price velocity. For example, a stock with a 80 Relative Strength Rating outperformed 80% of all other stocks over the past year and, based on this above-average Relative Strength, is a buy candidate. Stocks dropping below a 70 Relative Strength Rating show weakening relative price performance and are sell candidates. Stocks with high Relative Strength Ratings have greater upside potential, while stocks with low Relative Strength Ratings are more vulnerable to disappointments. The average Relative Strength Rating in O'Neil's models of the Greatest Stock Market Winners was 87 before these stocks made their

biggest price advances. See: O'Neil, William J., How to Make Money In Stocks: a Winning System in Good Times or Bad, McGraw-Hill, New York, 1991, 248 pages.

Published studies suggest that the strong tend to grow stronger and the weak tend to become weaker over long-term time intervals measured in months and years. Independent academic research confirms that momentum strategies are most profitable at the medium time horizon, three to twelve months, according to Conrad and Kaul, "An Anatomy of Trading Strategies", The Review of Financial Studies, volume 11, Fall 1998, pages 489-519.

Top-ranked stocks by relative price strength rose in price at a 70% annual rate over the past 15 years, four times faster than the 18% annual rate recorded by Value Line's top-ranked stocks (by both earnings and price momentum), and 4.5 times faster than the 15.6% annual price appreciation of the S&P 500 index, according to data provided by Samuel Eisenstadt, Research Chairman of the Value Line Investment Survey, Value Line Selection & Opinion, Value Line Publishing, Inc., 220 East 42nd Street, New York, NY 10017-5891, January 28, 2000, pages 5099-5114. The 35-year average performance of Value Line's top Timeliness stocks (highest earnings and price momentum) is more than 20%, compounded annually, 2.4 times faster than the S&P 500 market price appreciation of 8.4%. All data is exclusive of transactions costs, dividends and taxes.

Past performance is a good indicator of future performance, according to Jonathan Clements, "Hot Stocks Are Sizzling on Momentum", The Wall Street Journal, September 7, 1999, page C1. If a stock has dazzling performance one year, there is a good chance it will post better-than-average performance the next. "Winners continue to win, but losers really continue to lose," says Tobias Moskowitz, Professor of Finance at the University of Chicago. The reason may be that investors are slow to react to new information, and analysts tend to change their earnings estimates too gradually in an attempt to avoid the career risk of going too far out on a limb, according to John Bogel Jr., president of Bogel Investment Management. Also, with mutual funds, last year's top-performing funds often continue to outperform, according to a study by Mark Carhart, co-head of quantitative research for Goldman Sachs Asset Management, published in the March 1997 Journal of Finance. This study was based on stock-fund performance for the 31 years ended December 1993. The top 10% funds in one year did noticeably better than average the next year. But funds in the bottom 10% lagged badly the subsequent year. The top performers earned an average of eight percentage points per year more than the worst performing funds. Moreover, there is a strong tendency for the worst performers to continue trailing, and this bad performance often persisted until the funds were liquidated or merged. The poor performers tended to be funds that charge high expenses and trade rapidly. Another study by Sheldon Jacobs, editor of No-load Fund Investor newsletter, found that buying the top diversified no-load fund each year returned 22.2% annually over the past 23 years, and that was 48% better than the 15% return of the average U.S. diversified fund. Mark Carhart suggests that persistence of relative performance of funds reflects more the continued momentum in the underlying stocks, rather than any particular actions by fund management. Clements concludes that investors need not be afraid to buy stocks that have performed well, and they should not be anxious to buy stocks that have been crushed.

"Keep momentum on your side, by hanging onto winning investments, while dumping your losers quickly. Academic research suggests that the best performing stocks and funds in any given year often enjoy good results in the year that follows. Meanwhile, losing positions tend to keep on losing," according to Jonathan Clements, "Rules for When You Shred the Rules", The Wall Street Journal, January

25, 2000, page C1. Clements quotes investment researcher James P. O'Shaughnessy, chairman of O'Shaughnessy Capital Management in Greenwich, CT, "Let the momentum work for you. If you've got five stocks and two are winning, sell the other three and concentrate your money on the ones that are winning. And the minute you see a break in the momentum, get out." Clements adds, "This is also the smartest tax strategy… By hanging onto your winners, you delay the capital-gains tax bill, while selling losers generates a loss that can be used to reduce your taxes."

The top investment strategies "buy stocks with the best relative price strength," O'Shaughnessy concludes. On a risk adjusted basis, the worst performing strategy is buying the stocks with the worst one-year performance. "Avoid last year's biggest price losers at all costs--their record over the last 40 years is abysmal." For further details on his research and a detailed bibliography of serious books and papers on investment returns and risks, see O'Shaughnessy, James P., What Works on Wall Street, Revised Edition, McGraw-Hill, New York, 1998.

Relative price strength works well with real-time, unseen data over the long-term, according to Charles D. Kirkpatrick II, CMT. Kirkpatrick established stock selection and deletion criteria and determined the performance measurement method (equally weighting in each stock each week). Over 17.5 years, from July 1982 to December 31, 2000, Kirkpatrick found that the top ranked Relative Strength stocks outperformed the indexes by 4.7 to 1. See: Kirkpatrick, C. D., "Stock Selection: A Test of Relative Stock Values Reported over 17.5 Years", www.mta.org, 2001.

Momentum investing in equity markets delivers "striking" and "remarkably persistent" excess returns, according to the most comprehensive study to date published by Elroy Dimson, Paul Marsh and Mike Staunton, all of the London Business School. Using data on the UK's 100 largest stocks since 1900, the team created two portfolios, one based on the 20 best-performing equities in the previous 12 months and the other the 20 worst performers. These portfolios were then re-calculated every month. The portfolio of winners produced compound annual returns of 15.2 per cent, turning £1 into more than £4.2m (€5.6m, $8.2m) by the end of 2007. In contrast, the portfolio of laggards returned just 4.5 per cent a year, turning £1 into £111. The gulf was wider when the team used data from the entire London market since 1955; the portfolio based on the previous 12 month's best-performing stocks returned 18.3 per cent a year, against 6.8 per cent for the erstwhile worst performers. When the portfolios were constructed on an equal-weighted, rather than market cap-weighted basis, the divide was starker. This momentum premium also appeared to hold across borders; Messrs Dimson, Marsh and Staunton found positive returns from each of the 16 other countries they crunched post-2000 data for, with winners outperforming losers by 4 per cent a year in the US, 21 per cent in France and 39 per cent in Germany. See: Steve Johnson, Financial Times, Feb 18, 2008.

Published References:

Colby, Robert W., *The Encyclopedia of Technical Market Indicators*, Second Edition, McGraw-Hill Publishing, 2003, pages 600-609.

Kirkpatrick, C. D., "Stock Selection: A Test of Relative Stock Values Reported over 17.5 Years", www.mta.org, 2001. Kirkpatrick & Company, Inc., 7669 County Road 502, Bayfield, CO, 81122, e-mail: kirkco@capecod.net.

Levy, Robert A., Ph.D., the Journal of Finance, December 1967, pages 595-610.

Jegadeesh, Narasimhan, and Titman, Sheridan, “Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency,” Journal of Finance, vol. XLVIII, No. 1, March 1993, pages 65-91.

O’Neil, William J., How to Make Money In Stocks: a Winning System in Good Times or Bad, McGraw-Hill, New York, 1991, 248 pages.)

Conrad and Kaul, "An Anatomy of Trading Strategies", The Review of Financial Studies, volume 11, Fall 1998, pages 489-519.

Eisenstadt, Samuel, Research Chairman of the Value Line Investment Survey, Value Line Selection & Opinion, Value Line Publishing, Inc., 220 East 42nd Street, New York, NY 10017-5891, January 28, 2000, pages 5099-5114.

Clements, Jonathan, "Hot Stocks Are Sizzling on Momentum", The Wall Street Journal, September 7, 1999, page C1.

Clements, Jonathan, "Rules for When You Shred the Rules", The Wall Street Journal, January 25, 2000, page C1.

O'Shaughnessy, James P., What Works on Wall Street, Revised Edition, McGraw-Hill, New York, 1998.

Johnson, Steve, Financial Times, Feb 18, 2008.