



***Predicting Fund Performance  
Using Momentum and  
Risk-Return Balancing***

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One of the most critical issues in asset allocation is choosing when to follow the herd and when to be contrarian. It is often tempting to buy into the hot asset class and, indeed, it appears that the temptation to chase the hot sector may cost the average mutual fund investor as much as 2% in return per year:

([http://www.vanguard.com/bogle\\_site/sp20060101.htm](http://www.vanguard.com/bogle_site/sp20060101.htm))

That said, there is considerable evidence that momentum effects do exist and that considering momentum effects can improve long-term portfolio performance—see, for example, the track record of *No Load FundX*, a newsletter that recommends funds that have recently out-performed their peers as a way to beat the market. The *No Load FundX* ([www.fundx.com](http://www.fundx.com)) strategy has soundly beaten the market as a whole over the past 25 years according to *Hulberts Financial Digest* (which audits and tracks newsletter performance). The evidence for persistent momentum effects is typically strongest when you look at highest relative performance of assets in a group

(<http://www.forbes.com/2002/09/23/0923adviser.html>)

If you have read some of our articles about using our Monte Carlo tools for portfolio planning (*Quantext Portfolio Planner* and *Quantext Retirement Planner*), you may note our case studies show that one of largest benefits of using Quantext Portfolio Planner (QPP) is that QPP tends to discount recent out-performance in hot asset classes and projects future performance at far lower levels. One of our articles discusses this issue with special emphasis on emerging markets in recent years and the tech market boom of the late 1990's:

<http://www.quantext.com/TechvsEmerging.pdf>

Many investors who bet on momentum in tech stocks near the end of the bubble and emerging markets near the end of their enormous run-up this year have lost a great deal of money. In both cases, using data available prior to the collapse of the rally, QPP predicted future returns far below what had been seen during the rally. QPP did not predict when a collapse would occur, but simply warned that the recent returns were far too high to be sustainable if capital markets are even remotely efficient.

QPP predicts future returns for a stock or fund using risk-return balancing, a technique that essentially relies on a rational long-term balance between risk and return. Risk, measured by volatility in returns, must be compensated by the expectation of higher returns. This is the idea underpinning capital markets. If the capital markets do not compensate investors with higher returns for bearing more risk, capital markets are fundamentally flawed. Over long periods of time and across many assets, we find that risk and return are aligned and I am willing to bet that this will continue to be the case. QPP takes recent performance data (I typically use the trailing three years) and then creates an estimate of future return on the assumption that the expected future return is determined largely by how risky that asset or asset class has been relative to the long-term balance of risk and return across asset classes. If an asset has been generating average returns that are far higher than can be justified based on the risk level of that asset, QPP will project a future return that is lower than recent performance. Predicting future performance using risk-return balancing often appears to run counter to momentum strategies (as in the article on tech and emerging markets cited earlier).

Since we know that momentum effects can be present and there is a sound rational basis for assuming that asset classes that outperform on a risk-adjusted basis cannot continue to do so forever, how can we reach reconciliation? To address this issue, I have examined a series of *iShares ETF*'s that have at least 6 years of performance data. I used three years of market data, from 8/1/2000 through 7/31/2003, to predict the average return over the next three years (8/1/2003 through 7/31/2006) for each of the funds shown in the table below. I predicted future average return using momentum (future high returns are predicted by high returns in the current three year period) and using QPP with its risk-return balancing, which predicts future expected return using volatility and process described above.

Ticker	Name
IYK	Dow Jones U.S. Consumer Goods Sector Index Fund
IYR	Dow Jones U.S. Real Estate Index Fund
IYH	Dow Jones U.S. Healthcare Sector Index Fund
IVV	S&P 500 Index Fund
IWB	Russell 1000 Index Fund
IYG	Dow Jones U.S. Financial Services Index Fund
IYY	Dow Jones U.S. Total Market Index Fund
IVW	S&P 500 Growth Index Fund
IYE	Dow Jones U.S. Energy Sector Index Fund
EWO	MSCI Austria Index Fund
EWA	MSCI Australia Index Fund
IYC	Dow Jones U.S. Consumer Services Sector Index Fund
EWC	MSCI Canada Index Fund
EWK	MSCI Belgium Index Fund
EWP	MSCI Spain Index Fund
IWF	Russell 1000 Growth Index Fund
EWS	MSCI Singapore Index Fund
IWZ	Russell 3000 Growth Index Fund
EWV	MSCI Mexico Index Fund
EWG	MSCI Germany Index Fund

***Twenty Exchange Traded Funds***

To compare momentum strategies vs. risk-return balancing, we are going to look at the predicted relative performance of the funds, as ranked by each approach. In other words, would it have been better to invest based on momentum or assuming that risk and return tend to work in a consistent balance?

To test risk-return balancing, we used QPP to generate an outlook for each ETF using only the historical data 8/1/2000 through 7/31/2003 as input. We then separated the twenty ETF's into the predicted top ten performers and the predicted bottom ten performers, and looked at the actual returns from 8/1/2003-7/31/2006:

	Predicted Average Annual Return	Actual Average Annual Return
Ten Lowest Predictions	7.9%	16.2%
Ten Highest Predictions	11.0%	20.6%

***QPP predicted average annual return vs. actual average annual return for the ten ETF's with the highest predicted future returns and the ten ETF's with the lowest predicted future returns***

The ten ETF's that were predicted to have the highest returns generated an average annual return of 20.6% over the next three years, whereas those predicted to have the lowest returns generated 16.2%. From these results, we see that predicting future returns based on the assumption that risk and return are coupled works quite well—generating an advantage of 4.4% per year. We can compare these results to how well momentum predicted relative winners and losers over this three year period. We simply separated the twenty ETF's in our sample into the ten with the highest average annual returns and the ten with the lowest average annual return over the period 8/1/2000 through 7/31/2003 and then looked at the performance over the next three years:

	Actual Average Annual Return
Ten ETF's with lowest trailing three year returns	15.2%
Ten ETF's with highest trailing three year returns	21.6%

***Momentum effects in ETF performance***

The ten ETF's with the highest return in the 8/1/2000 through 7/31/2003 time frame generated an average return of 21.6% over the next three years, whereas the ten ETF's with the lowest trailing average returns generates 15.2% per year over the next three years. These results confirm the presence of momentum effects in ETF performance. Those with the best returns tended to continue to have the best returns and vice versa.

While the momentum effect is slightly larger in this sample of data, the two effects are of the same general size. There is, of course, the general consideration of risk in these samples. If you choose an ETF based on either momentum or risk-return balancing, you may have obtained the average returns above, but what is the spread in returns across the sample of ten? If the spread is high, then you have a higher level of uncertainty—i.e. risk of a bad outcome. When we look at the standard deviation in returns across the twenty ETF's in the period 8/1/2003-7/31/2006, we obtain the following:

Risk-Return Balanced	SD Low Prediction	11.4%
	SD High Prediction	11.3%

Momentum	SD Low Prediction	9.2%
	SD High Prediction	12.6%

***Observed standard deviation (SD) in annual return in each sample***

There is slightly more spread in the returns for the ten ETF's with the highest predicted values using momentum, which offsets the slightly higher returns. On a risk-adjusted basis, momentum and risk-return balancing generate remarkably similar advantages.

Given the similarity in the apparent advantage in choosing between a set of assets using relative out-performance and using risk-return balancing, one may ask whether these are generated by the same underlying drivers. Is risk-return balancing somehow a proxy for capturing momentum-driven out-performance across a group of assets? There is a standard way to test this proposition called ***multiple regression***. We used a regression model to predict the average annual return over the period 8/1/2003-7/31/2006, using only the average annual return for each fund in the earlier three years and the average annual return predicted by QPP (which used only data from the previous three years). If the risk-return balancing was simply capturing relative momentum effects, then the regression would show that the QPP-predicted return was not a ***statistically significant*** predictor beyond simply using relative performance. This is not what we find. To the

contrary, both trailing average return and QPP-predicted return are both highly significant in predicting the future performance of the ETF's in the sample. That said, the QPP-predicted return is vastly more significant than the trailing return as a predictor of future performance. Using both of these variables as predictors, the ability to predict future return that is observed here may have occurred by chance with a probability of only 1-in-10,000.

What does all this mean? These results suggest that relative out-performance has some predictive value for this class of funds: momentum effects can help you predict funds which will out-perform. These results also suggest that QPP's Risk-Return Balancing has predictive value. Perhaps most significantly, these results suggest that momentum and the market's tendency to provide higher returns for riskier asset classes are complementary effects. QPP's risk-return balancing will sometimes predict future returns that are consistent with momentum effects and sometimes will go against momentum effects. To give a sense of these effects, we have generated the future rankings for the predicted future average annual returns of these twenty ETF's using momentum, QPP's risk-return balancing, and both:

Fund	Trailing Performance	Risk-Return Balanced (QPP)	Both
Dow Jones U.S. Consumer Goods Sector Index Fund	19	15	19
Dow Jones U.S. Real Estate Index Fund	2	8	3
Dow Jones U.S. Healthcare Sector Index Fund	20	16	20
S&P 500 Index Fund	15	14	13
Russell 1000 Index Fund	14	12	12
Dow Jones U.S. Financial Services Index Fund	18	11	15
Dow Jones U.S. Total Market Index Fund	13	13	11
S&P 500 Growth Index Fund	17	17	18
Dow Jones U.S. Energy Sector Index Fund	1	3	1
MSCI Austria Index Fund	5	1	4
MSCI Australia Index Fund	7	5	7
Dow Jones U.S. Consumer Services Sector Index Fund	11	20	17
MSCI Canada Index Fund	8	7	9
MSCI Belgium Index Fund	9	4	6
MSCI Spain Index Fund	6	6	8
Russell 1000 Growth Index Fund	12	19	16
MSCI Singapore Index Fund	16	10	10
Russell 3000 Growth Index Fund	10	18	14
MSCI Mexico Index Fund	3	2	2
MSCI Germany Index Fund	4	9	5

***Ranking the predicted annual average return for September 2006 and beyond (1=highest)***

Note that these results are not risk-adjusted. The asset classes with higher predicted returns from QPP are also predicted to be riskier. It is very important to note that while momentum and risk-return balancing agree on some sectors, there are major disagreements in others—notably consumer services, growth funds, real estate, and financial services.

Many of our articles show results in which QPP's risk-return balancing suggests that the currently out-performing asset class will tend to generate far less impressive future performance—QPP sometimes appears to bet consistently against momentum. These results do not, however, suggest that relative out-performance cannot be the basis for intelligent asset allocation as long as you realize that the past out-performance is likely to give you only a relative measure of performance as opposed to an absolute measure and that high momentum is also usually accompanied by high volatility. In other words, while QPP's Monte Carlo output often finds the recently out-performing asset class to be highly risky and may predict that such an asset class will (1) generate lower future returns or (2) has the potential for extreme losses, QPP does not bet for or against momentum. QPP simply projects future returns that suggest that riskier asset classes will generate higher expected returns. On a practical basis, this means that there is often nothing wrong with investing in the current hot sector as long as you (1) can handle the volatility, (2) understand that momentum effects usually show up as predictors of relative performance, and (3) understand that a position that looks good on the basis of momentum but bad on the basis of risk-return balancing may be about to reach the end of its rally.

*More information on Quantext Monte Carlo planning tools, as well as a free trial, is available at: <http://www.quantext.com/gpage3.html>*