

## Quantitative Equity Management and the Great Recession: Pitfalls and Opportunities

The financial crisis of 2008, subsequent recession, and the onset of economic recovery in 2009 presented unique challenges to quantitatively-oriented equity portfolio managers. Most importantly, as events unfolded, substantial changes to the weightings of underlying variables in quantitative equity ranking models were necessary. Failure to do so, in many instances, led to losses in long/short equity portfolios, and underperformance versus benchmarks in long equity portfolios. Some managers have referred to the poor performance of many quantitative strategies over the last two years as “anomalies” or “irrational investor behavior”. We disagree, and are of the belief that equity markets behaved in a highly rational way.

### The Model Framework

Active quantitative portfolio processes often rank stocks with multiple-factor linear ranking models. Individual potential model factors are numerous, but usually fall into one of the following broad categories:

- *Value models*, which can include measures such as ratios of earnings, cash flow, and book value divided by stock price. Values of these measures can be actual trailing, future estimates, or combinations of both.
- *Growth models*, which often include measures of historical revenue and earnings growth, return on equity or invested capital, R&D spending as a percent of revenue, and similar measures
- *Momentum models*, which can include relative price strength over trailing time intervals, earnings “surprise” and earnings estimate revisions, and second-order rates of change in revenue and earnings
- *Financial Strength and Quality models*, which include cash flow and free cash flow per share, leverage ratios, and stability measures of historical revenue and earnings

Multi-factor equity models apply linear weights to a set of sub-factors from the listed categories. The weights of individual factors in the model are often determined by “back-testing” over historical time frames. Models exhibiting historical evidence of predictive power for excess returns are given weights based on the magnitude and consistency of predictive power over past time frames. The hope is that the markets of the future are similar enough to past markets to make the model rankings positive predictors of future excess returns.

A period of severe recession, and the aftermath, present a challenge to the model framework. First, the model estimation period may not encompass recession periods as severe as the recession just experienced. Second, both the relative performance of individual stocks, and financial measures such as revenue and earnings, may be severely influenced by the recession. In many such instances, the predictive power of models based on these metrics will “change sign” when

the recession ends and economic recovery begins, with the most poorly ranked stocks posting the highest excess returns, and vice versa.

The following table lists a representative sampling of quantitative factors that could logically be expected to perform inversely as predictors of excess return as the economy transitions from recession to recovery

<b>Quantitative factors</b>	<b>Rationale for inverse performance as economy passes inflection point</b>
Price Momentum	Companies most adversely impacted by recession show poorest relative price performance as recession proceeds. Upon inflection point in the economy, these same companies have the most to gain from recovery, and stock price performance exceeds benchmark.
Earnings revisions	Same argument as price momentum. Worst earnings revisions on the way down signal strongest potential recovery.
Value metrics based on current year earnings	Companies whose earnings are most adversely impacted by recession have greatest recovery potential.
Measures of historical revenue and earnings growth	Same argument. Companies that generate stable growth as recession develops don't see the magnitude of cyclical recovery that adversely impacted companies do.
Measures of Financial strength, leverage, And earnings quality	Higher risk assets are hit hardest on the way down, and experience strong percentage price appreciation as recovery develops.

## Responding to the challenge

The issues described on the prior page require a series of responsive actions. Most importantly, the multi-factor model weightings must be modified. The following steps can be taken:

De-emphasize momentum factors	The weights on factors such as relative historical price strength should be reduced sharply or taken to zero.
Modify growth factors	Reduce or eliminate weights on factors based on stability of earnings and historical growth.
Financial Strength, Quality, and Leverage	Minimize or eliminate weights to these factors.
Value factors	Introduce a “normalized” or “recovery” earnings metric. Reduce weight on factors based on current earnings relative to stock price.

As the inflection point passes and the economic recovery progresses, the de-emphasized quantitative factors will gradually begin to regain positive correlation with excess return. Earnings revision factors are a case in point. As multiple quarters of recovery transpire, companies with the greatest positive exposure to recovery should begin exhibiting a positive pattern of earnings revisions. Similar patterns will emerge with factors based on relative price strength and earnings momentum.

As 2010 begins, we are in the third quarter of economic recovery, so we should be seeing many of the models discussed exhibiting more favorable correlation with excess return. We would caution, however, that the financial results of a large percentage of companies in the equity market are still being impacted by the recession. It could be some time before the model adjustments described here can be completely reversed, and we believe that most of the model modifications are still called for.

Investors should evaluate managers on the basis of their response to the events of the last couple of years. The Economy and the Markets are continuously evolving and changing. Quantitative approaches to investing that are adaptive, versus static, have the best chance of adding value, and should be emphasized.

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