

# Decomposing Strategy Returns

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Superior strategy returns are generated by analyzing economic, market, and company specific return factors and then constructing a portfolio to exploit these factors. The goal of this article is to decompose a time series of strategy returns into that associated with common return factors and that associated with unique (or strategy specific) factors. This shines a light on the skill possessed by managers within a particular strategy.

I decompose 10 strategy return series over the 1988 through 2008 time period into a common factor return (CFR) and a unique factor return (UFR). I find that six strategies generate superior returns while four do not. For three of the superior strategies, Valuation, Opportunity, and Future Growth, the major source of superior return is CFR, while for the other three, Competitive Position, Quantitative, and Profitability, the major source is UFR. The four inferior strategies Market Conditions, Social Considerations, Economic Conditions, and Risk lack exposure to common return factors and are unable to exploit unique factors.

## Decomposition Methodology

The basis for the decomposition is the skill return estimation presented in “Labeling Equity Fund Managers” (available on [www.athenainvest.com](http://www.athenainvest.com)). A particular investment strategy, by definition, is created to take advantage of both common and unique return factors. The absolute across strategy correlation for a particular strategy, averaged across other strategies, provides a glimpse into how pervasive are common factors within a strategy. Skilled strategy managers take advantage of higher exposure to common factors and so I expect a positive relationship between average strategy returns and the strategy’s average absolute cross cluster correlation ( $\rho_i$ ).

I focus on the return factors driving relative strategy performance and not on broad economic and market factors which drive equity returns as a whole. These latter factors are removed by using strategy return deviations ( $D_i$ ), which are monthly strategy return net of the across strategy average return for that month. Thus I address the question of what drives one strategy to perform differently from another and not the question of why all strategies perform well or poorly in a particular month.

Since return factors are not directly observable, cross fund correlations are used to identify managers pursuing a common strategy. The larger the correlation, the stronger the evidence of common factors and a common investment strategy. If the correlation is positive, managers are responding to the return factors in a similar manner, while if it is negative, they are responding to the same factors in the opposite manner.

The slope of the simple regression of average strategy returns on  $\rho_i$  is called skill return (SR) and is given by equation 1.

$$D_i = \alpha + SR \rho_i + e_i \quad (1)$$

where:

$D_i$  = average strategy  $i$  monthly deviation,

SR = skill return or slope coefficient,

$\rho_i$  = average absolute across strategy correlation for strategy  $i$ , and

$e_i$  = error term.

The strategy return decomposition follows directly from equation 1 as follows:

$$CFR_i = \text{common factor return for strategy } i = SR \rho_i, \text{ and} \quad (2)$$

$$UFR_i = \text{unique (i.e. strategy specific) factor return for strategy } i = e_i \quad (3)$$

Equations 2 and 3 are used to estimate CFR and UFR for each of the 10 strategies over the 1988 through 2007 time period using the US equity active mutual fund sample described next.

### US Equity Active Mutual Fund Sample

The US active equity mutual fund sample is comprised of all strategy identified funds (see SBI Basics in SBI University at [www.athenainvest.com](http://www.athenainvest.com) for a description of how funds are strategy identified), which represents over 89% of all US equity active open end mutual funds as of December 2007. The sample includes 408 strategy identified funds in January 1988, growing to 2120 in December 2007. The sample excludes index, allocation, 529, and life style funds, thus focuses exclusively on actively managed equity funds.

Fund/month returns are calculated as a simple average over all fund share class returns for that month. Returns are net of management, 12B-1 and other automatically deducted fees, but not of other fees such as load charges and third party management fees. Table 1 below reports summary statistics for the 10 equity strategies over the 1988 – 2007 time period. The sample includes 276,317 fund/month observations. Average annual fund returns are annual compound returns using the 12 monthly simple average returns of all funds that existed in a particular month. The average fund standard deviation and best fit  $R^2$  is the average over all individual fund 36 month standard deviations and best fit  $R^2$  for that particular time period. The best fit  $R^2$  is the best fit among the four style indices small value, small growth, large value and large growth.

The results presented in Table 2 below reveal that there are large correlations, both negative and positive, highlighting the existence of strong common return factors. Recall that these correlations are based on monthly strategy return deviations, so they are not the result of economy or market wide return factors. Instead, these correlations capture the extent to which the relative performance of strategies move together or in opposite directions. For example, the largest positive correlation, 0.73, is between the Competitive Position and Future Growth strategies. This means that managers in these two strategies focus on common underlying return factors and use similar approaches to managing their portfolios. On the other hand, the largest negative correlation, -0.86, is between Future Growth and Valuation which means again these managers focus on common factors, but respond in opposite directions.

**Table 1: Annual US Equity Strategy Performance Statistics**  
Based on monthly returns 1988 - 2007

Strategy	Fund/Mth Count	Ave Fund Return	Ave Fund SD	Ave Fund R <sup>2</sup>
Competitive Position	95,622	12.89	17.51	0.67
Economic Conditions	8,461	10.07	18.51	0.61
Future Growth	64,895	12.04	18.79	0.69
Market Conditions	1,606	10.63	18.44	0.60
Opportunity	5,798	12.03	14.11	0.63
Profitability	6,695	11.73	16.84	0.68
Quantitative	9,970	12.25	15.01	0.76
Risk	1,739	8.89	18.05	0.57
Social Considerations	5,134	10.35	16.24	0.69
Valuation	76,397	12.25	14.65	0.69
<b>Total/Average</b>	<b>276,317</b>	<b>11.31</b>	<b>16.89</b>	<b>0.68</b>

**Table 2: Correlation Matrix for Monthly Strategy Deviations 1988-2007**

	<i>CP</i>	<i>EC</i>	<i>FG</i>	<i>MC</i>	<i>Opp</i>	<i>Profit</i>	<i>Quant</i>	<i>Risk</i>	<i>SC</i>	<i>Val</i>
Competitive Position										
Economic Conditions	0.11									
Future Growth	0.73	0.21								
Market Conditions	0.03	-0.18	0.36							
Opportunity	-0.42	-0.15	-0.73	-0.63						
Profitability	0.28	-0.21	-0.02	-0.26	0.12					
Quantitative	0.07	-0.23	-0.25	-0.36	0.42	0.13				
Risk	-0.45	0.16	-0.26	-0.27	-0.01	-0.22	-0.43			
Social Considerations	-0.14	-0.26	-0.14	-0.29	0.22	-0.02	0.13	-0.19		
Valuation	-0.43	-0.39	-0.86	-0.42	0.72	0.15	0.43	-0.04	0.22	

### Decomposition Results

Graph 1 below presents the CFR and UFR for each of the 10 strategies. The values reported are relative to the all strategy average. For example, for Competitive Position (CP) the CFR-UFR pair is 7, 150 which means that the average CP fund generated a CFR that was 7 bps higher than the all strategy average return over the period 1988 through 2007, while it generated a UFR that was 150 bps higher. In total, the average CP fund generated a return that was 157 bp (= 7 + 150) higher than the all strategy average return. Thus the 157 bp of superior performance is decomposed into 7 bp in CFR and 150 bp in UFR. This is the same 157 bp obtained by subtracting the all strategy average (11.31%) reported at the bottom of column 3 in Table 1 from the CP average return (12.89%) at the top of the column.

I conducted a single factor ANOVA to test if the 10 strategies are drawn from the same population and thus have expected deviations of zero. The resulting F-test (9, 2390 df) produced a p-value of 0.033, which means that it is highly unlikely that expected deviations are zero. That is, the differences among the 10 strategy deviations are statistically significant. I then tested if these differences can be explained by differences in risk. The correlation between strategy returns and fund standard deviations is strongly negative (-0.44), as is the average beta-return correlation (-0.16). So return differences cannot be explained by risk differences and in fact higher strategy returns are associated with lower risk (as measured by standard deviation or beta).

The 10 strategies can be divided into three sub-groups: those for which CFR is the primary source of superior returns, those for which UFR is the primary source of superior returns, and those for which UFR is the primary source of inferior returns. Superior and inferior are used here to denote values greater or less than the all strategy average annual return of 11.31% over the 1988 through 2007 time period.

### CFR Driven Superior Returns

From Graph 1 we can see that Opportunity, Future Growth, and Valuation generate roughly the same superior returns (72, 73, and 94 bps, respectively), with the primary source being CFR (70, 81, and 90 respectively), and virtually no UFR (2, -8, and 4 bps, respectively). This means that managers in these strategies are successful at taking advantage of common return factors in order to generate superior returns. However, the way they go about accomplishing this is quite different from strategy to strategy.

The Opp and Val strategies display a high cross correlation (0.72) and so most likely they focus on a similar set of common return factors and their investment strategies share common features. However, Val and FG display a strong negative cross correlation and so most likely they focus on a similar set of common return factors, but respond to them in opposite ways.

### UFR Driven Superior Returns

The three strategies Competitive Position, Quantitative, and Profitability all generate superior returns (157, 96, and 41 bps, respectively), with UFR being the primary source of these returns (150, 102, and 132 bps, respectively). Both CP and Quant managers have an average exposure to common return factors while Profit has the lowest exposure among all 10 strategies.

This means that each strategy successfully focuses on a unique and thus independent set of return factors. CP managers look for strong, high quality, innovative companies; Quant managers rely on mathematical and statistical models to identify attractive stocks with little or no fundamental analysis; and Profit managers focus on strong cash flows and profit margins. Each in their own way are able to earn comparable levels of UFR (150, 102, and 132 bps, respectively).

### UFR Driven Inferior Returns

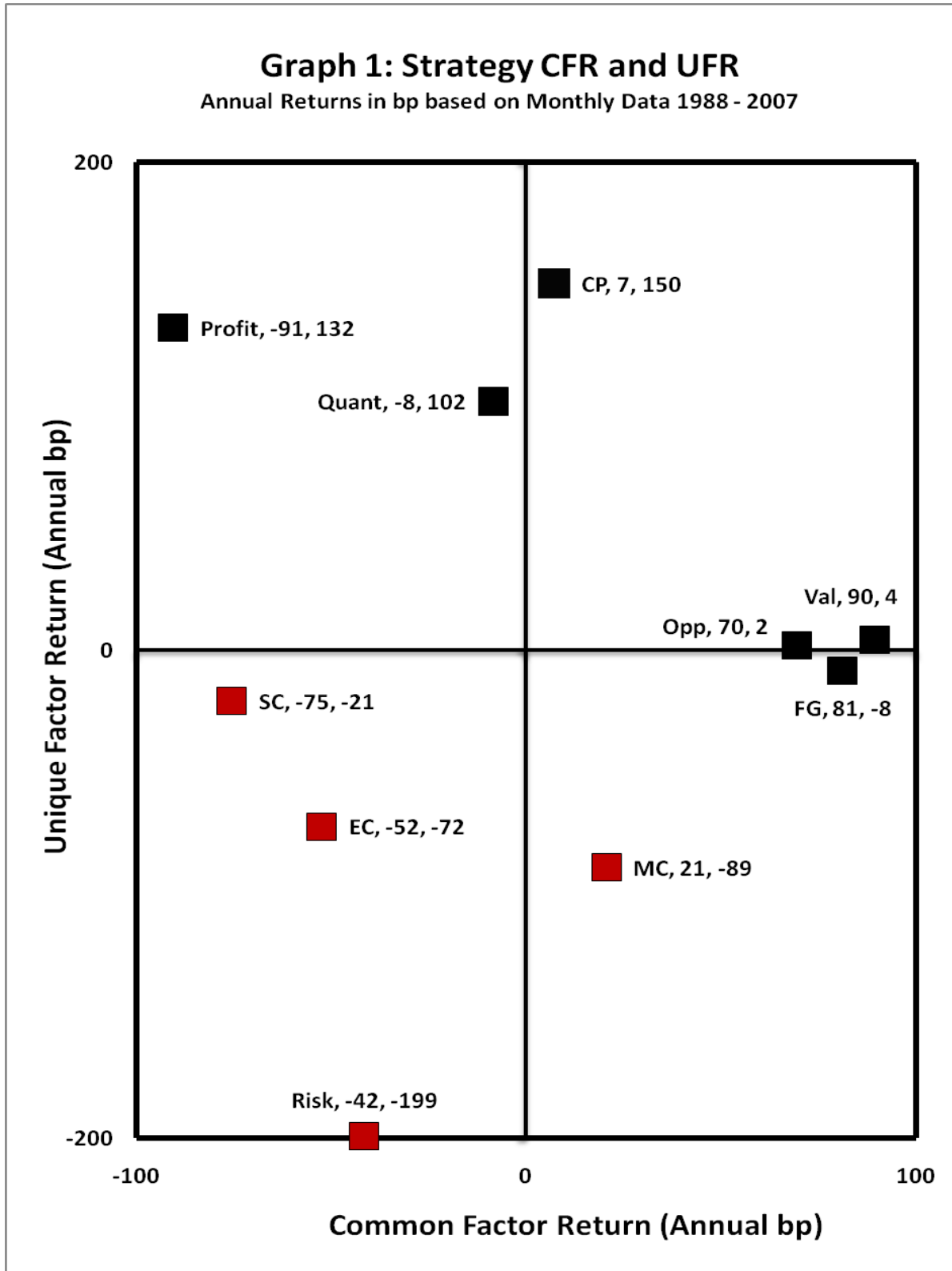
The four strategies Market Conditions, Social Considerations, Economic Conditions, and Risk all generate inferior returns ( -67, -96, -124, and -241 bps, respectively). For the latter three, both CFR and UFR contribute to this poor performance. For MC there is a small positive contribution made by CFR. The poor performance by these strategies begs the question of why managers do not attempt to increase exposure to common factors. It may be that they are not able to take advantage of these common factors as do managers in other strategies. It is also apparent that they are not able to exploit the unique factors to which they are exposed. MC managers focus on short term market imbalances using technical analysis, SC managers look for socially responsible companies, EC managers attempt to exploit broad economic trends, and Risk managers focus on controlling risk with returns as a secondary consideration. Collectively these approaches are unable to generate superior returns.

So why would managers continue to pursue these strategies? For one thing, the results are based on average fund performance in each strategy so there are no doubt funds in each strategy that are doing well. For another, there are times when these strategies have done well even though their 20 year performance is poor. So investing in them at the right time produces superior returns (e.g. EC heading into a recession and Risk when overall returns have been relatively low, such as during the last 10 years). For another, investors may choose to invest for reasons other than the highest return, such as investing in SC funds.

### Conclusions

I decompose 10 strategy return series over the 1988 through 2008 time period into a common factor return (CFR) and a unique factor return (UFR). I find that six strategies generate superior returns while four do not. For three of the superior strategies, Valuation, Opportunity, and Future Growth, the major source of superior return is CFR, while for the other three, Competitive Position, Quantitative, and Profitability, the major source is UFR. The four inferior strategies Market Conditions, Social Considerations, Economic Conditions, and Risk lack exposure to common return factors and are unable to exploit unique factors.

Broadly speaking there are at least eight distinct return factor groupings upon which active equity managers focus. One of these groupings is the focus of Valuation, Opportunity, and Future Growth managers. The other seven groupings are associated one each with the other seven strategies. Managers have successfully exploited four of these groupings (those associated with Competitive Position, Valuation, Opportunity, Future Growth, Quantitative, and Profitability), while they are unable to exploit the other four groupings (those associated with Market Conditions, Social Considerations, Economic Conditions, and Risk).



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