

Introduction

Managing biases within sectors is an important task for portfolio managers. Sectors go through periods of under- and overperformance, and some are more risky than others. Sectors also exhibit different characteristics that can affect their performance. Bank stocks in 2007, for instance, had significant overweights in stocks with low price-to-book ratios and high leverage. These stocks were hit harder by the 2008 financial downturn than other sectors.

Factor models offer a useful way to quantify these biases hidden within sectors. In this Research Bulletin, we examine how a multifactor model can help portfolio managers systematically examine the characteristics of their portfolios and identify how much of their historical return and risk resulted from various company characteristics.

Sector Characteristics Differ

Most investors are familiar with the main differences between sectors. IT stocks tend to have higher earnings growth. Telecoms tend to carry higher amounts of debt. Housing stocks are sensitive to changes in interest rates, and along with consumer discretionary stocks, are heavily dependent on economic conditions. A few examples of sector differences are shown in Exhibit 1.

Exhibit 1: Sector Characteristics Differ

	Average Market Cap (USD Billions)	Average Debt to Assets (D/A)*	Average Price-to- Earnings (P/E) over Past 5 Years*
Energy	10.3	0.17	13.5
Utilities	5.5	0.37	17.4
Financials	8.9	0.19	17.7
Health Care	8.7	0.20	22.5

* Market capitalization-weighted average shown for stocks in the Barra US Equity Model estimation universe as of May 3, 2010

Portfolio managers and investors who allocate across sectors may use this information in deciding how much to allocate. Some may try to achieve a balance of stocks with different characteristics across sectors when they do not have a view on the desirability of a particular characteristic.¹

Snapshots like Exhibit 1 are helpful for managers, but if they want to perform more complex analysis, such as identifying how much return or risk comes from a particular characteristic, this information may need to be supplemented. Managers can use models that quantify these characteristics consistently. Fundamental factor models are useful for measuring the biases of sectors toward stocks with certain traits and the level of return and risk that is attached to these biases.

A fundamental factor model, by extracting common trends in a universe of many stocks, can assess how a company's financial ratios affect its stock market performance. First, the model provides an exposure for each stock to a relevant characteristic, i.e., a common factor. The exposure measures the sensitivity of a stock/sector/portfolio to that factor. For instance, if the Value factor rises by 10%, a sector with an exposure of 1.0 to the Value factor will see a return of

¹ Analysts who cover specific sectors are less likely to care about sector differences, but they will look at similar characteristics for individual stocks.

10%, all else equal.² (More explanation of the mechanics of the factor model can be found in “The Fundamentals of Fundamental Factor Models,” *MSCI Research Insight*, June 2010).

Exhibit 2 shows sector exposures to select factors in the Barra Global Equity Model. For example, energy stocks are larger on average in market cap and employ little leverage. Telecom and Utilities have the highest book value relative to price and the lowest growth characteristics. Financials employ the highest amount of leverage but are also the most liquid.

Exhibit 2: Sector Exposures, April 2010, Barra Global Equity Model (GEM2)*

	Energy	Utilities	Financials	Health Care	Telecom
Value	0.3	0.6	0.3	0.3	0.8
Size	0.6	0.0	0.5	0.5	0.7
Growth	-0.1	-0.5	-0.2	-0.2	-0.4
Liquidity	-0.2	-0.2	0.3	-0.3	-0.3
Financial Leverage	-0.5	0.7	0.8	-0.4	0.3

*MSCI Global Sector Indices

Styles Matter to Sector Performance

Exposures in isolation are helpful to the extent that they reflect how much a sector is likely to move with a change in a particular factor, but their usefulness is limited unless the manager analyzes factor trends. However, factor exposures can be used with the model’s estimated factor returns to help quantify a sector’s return due to the common factors. This exercise, called return attribution, enables a manager to see the part of return that arose from each bias.

The contribution to return from each factor (i.e., source of bias) is calculated as the exposure of the sector to the factor multiplied by the return of the factor. The global Telecom sector fell by 14% in April. One important reason for its loss was its bias toward value stocks, low volatility/low beta stocks, and large caps. These biases were reflected in positive exposures to the Size and Value factors and a negative exposure to the Volatility factor, as shown in Exhibit 3.

Exhibit 3: Telecom Sector, Return Attribution, Annualized, March 31 – April 30, 2010, Barra Global Equity Model (GEM2)

	Return to Factor	Exposure to the Factor	Contribution to Return from Factor
Size	-11%	0.7	-8%
Volatility	6%	-0.8	-5%
Value	-4%	0.8	-3%

Sector and industry factor exposures can change significantly. For instance, at the beginning of an industry’s life cycle, the industry can have positive exposure to growth and leverage and negative exposure to dividend yield and value. As industries mature, these exposures will tend to drift to the opposite end. (For example, the exposure of the Wireless Telecom industry to the Growth factor peaked at 4.1 in January 1990 but fell to 0.5 by May 2010).

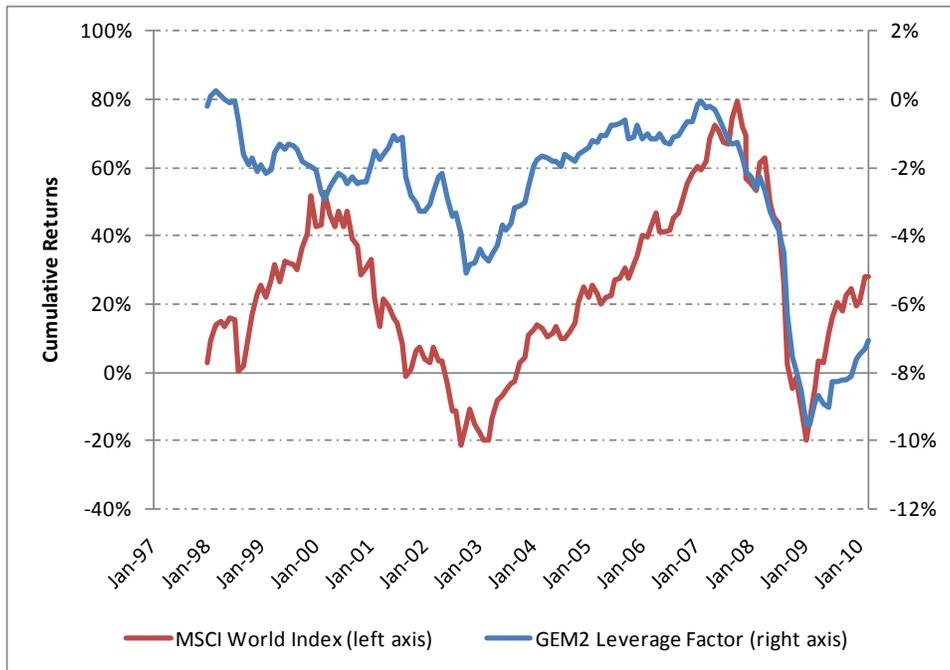
² Specifically, the effects of other factors as well as specific returns remain the same, and the risk-free rate unchanged.

Cyclical industries also will exhibit certain fluctuating exposures. In recessionary periods, non-cyclical segments such as food and beverages, home products, and other consumer staples tend to hold up and have stable earnings and cashflows relative to cyclical industries.

Be Aware of Style Biases when Under- and Overweighting Sectors

Style biases have implications for portfolio managers. Since style exposures affect sector performance, managers may want to limit exposures to certain styles (for instance, those that are highly volatile or have large downside risk). Style considerations can therefore enter the decision-making process for over- and underweighting certain sectors. For example, the Financial Leverage factor shown in Exhibit 4 exhibits little volatility during normal times. However, during periods of market turbulence, the factor can suffer significant losses.

Exhibit 4: Performance of the Financial Leverage Factor, Barra Global Equity Model, Monthly Cumulative Returns (January 1997 – April 2010)



The biases of sectors toward certain characteristics can interact, with important implications for portfolio construction. As a simple example, Exhibit 5 shows two possible combinations of Sector A and Sector B. If Sector A is Financials, then the exposure to Financial Leverage is 0.8, as we saw in Exhibit 2. If Sector B is Energy, then the exposure to Leverage will be mostly canceled; if Sector B is Utilities, then the exposure is not diversified.

Exhibit 5: Sector Weights Determine Overall Exposure, April 2010, Barra Global Equity Model (GEM2)

Sector A Overweight	Exposure to Leverage	Sector B Overweight	Exposure to Leverage	Combined Exposure*
Financials	0.8	Utilities	0.7	0.75
Financials	0.8	Energy	-0.5	0.15

*Assumes sectors are equally over-weighted

In October and November 2008, when the Financial Leverage factor fell dramatically, sectors such as Energy, Health Care, Information Technology, Consumer Discretionary, and Consumer Staples benefited from their negative exposures to the factor. These sectors were also the most resilient.³

In this section, we demonstrated how overweighting two sectors with the same factor bias leaves a manager exposed to that source of risk. Managers who do not consciously track their style exposures may benefit inadvertently from choosing sector over- and underweights that cancel key factor exposures. Managers can also lose inadvertently by selecting portfolios that are overweight (underweight) in sectors with similar positive (negative) exposures to styles. Generally, different combinations of overweights and underweights can either create or hedge unintended biases.

Conclusion

Managing sector biases is an important task for portfolio managers. A fundamental factor model offers a useful way to judge these biases. Managers can look at the characteristics of their portfolios to assess their exposure to a particular company characteristic and identify how much of their historical return and risk resulted from various company characteristics.

This type of analysis has multiple implications for constructing and rebalancing portfolios. Certain combinations of overweights and underweights can create unintended biases. Overweighting two sectors that have a bias toward stocks with the same trait magnifies the manager's exposure to that trait. While this may be an intentional result of a manager's strategy, it could also be an incidental side effect. In the latter case, it may be desirable for the manager to minimize unintended exposure to that trait. Factor models can identify ways to do so.

³ Overall returns to these sectors were also driven by other effects – the World Equity factor and the country, industry, and other style factors in the Global Equity Model.

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