

Barra US Sector Equity Models

The **Barra US Sector Equity Model** family is designed for managers who invest within specific sectors in the US equity market. Leveraging MSCI's experience in building single-country, multi-factor models and indexes, this family of models consists of 10 sector-specific models and an integrated version that combines the individual sector models. Each model incorporates the latest research and innovation in risk modeling, including Systematic Equity Strategies, Volatility Regime Adjustment, and Optimization Bias Adjustment. The Barra US Sector Equity Model family aligns with the investment strategy and investment universe to deliver insight into drivers of risk and return.

Key Features

- » **Aligned with US sector-specific investment strategies.**
The models are estimated from a universe that resembles the investment universe for a US sector-specific investment strategy. Each model has sector-specific factor returns for improved insight into the drivers of risk and return of US companies relative to their sector.
- » **Incorporates new factors based on Systematic Equity Strategies.** The models deliver improved forecast accuracy and captures unique sources of risk from common sources of return.
- » **Broad coverage of US securities.** As of October 2013, coverage is over 20,000 securities including IPOs, pink sheets, OTC securities, and over 4,500 foreign-listed shares of US companies.
- » **Estimated daily for improved insight.** The models are estimated daily for improved risk monitoring, portfolio construction and rebalancing, 'what-if' and stress analysis, and backtesting. Factor exposures, correlations, and specific risk are updated daily.
- » **Enhanced beta estimation** incorporates shrinking to industry betas to provide improved stability and decrease dispersion. This methodology can reduce errors in the predicted beta estimates.
- » **Optimization Bias Adjustment** improves risk forecasts for optimized portfolios. Clients can reduce forecasting bias by scaling volatility during periods of under- and over-forecasting.
- » **Volatility Regime Adjustment** allows clients to calibrate factor volatilities to current levels, resulting in faster response to market trends. This methodology can reduce the under-prediction of risk when entering a period of increased volatility and the over-prediction of risk when exiting a period of reduced volatility.
- » **Updated specific risk model** that incorporates Volatility Regime Adjustment and Bayesian Adjustment techniques for improved forecast accuracy.
- » **Utilizes the US Country factor** to isolate the market and industry effects, which allows clients to capture correlations between industries. The models use 60 industry factors based on the Global Industry Classification Standard (GICS®).
- » **Model history available from July 1995.**

- » **Model Receipts** are updated daily and posted on the Client Support site. The receipts provide a summary of the model quality controls, offering transparency and insight into model reaction from changes in underlying data.
- » **Available in Barra Portfolio Manager and Barra Models Direct.**

Motivation

Each sector has a unique risk and return profile. Sector profiles are different from the total US market and from each other. The table below exhibits characteristics of the 10 economic sectors defined by GICS® within the MSCI USA IMI. An investment manager focused on a sector-specific investment strategy can gain better insight and construct more meaningful portfolios through alignment of the Barra US Sector Equity Models and the investment universe of their strategy.

| MSCI USA IMI broken down by GICS® sector (as of September 30, 2013) | | | | | |
|--|-------------|------------------------|---------------------------------|-------------------------|------------------|
| Sector | # of stocks | Weight in MSCI USA IMI | Average market cap ⁺ | Div. yield [*] | ROE [*] |
| Information Technology | 407 | 18.07% | 8,755 | 1.58% | 23.56% |
| Financials | 514 | 17.08% | 6,494 | 2.25% | 10.92% |
| Consumer Discretionary | 368 | 13.03% | 7,408 | 1.26% | 25.68% |
| Health Care | 284 | 12.61% | 8,460 | 1.58% | 19.18% |
| Industrials | 340 | 10.96% | 6,547 | 1.82% | 28.72% |
| Energy | 156 | 9.82% | 12,022 | 2.06% | 15.06% |
| Consumer Staples | 111 | 9.06% | 16,869 | 2.76% | 35.93% |
| Materials | 134 | 3.83% | 5,629 | 2.03% | 16.46% |
| Utilities | 78 | 3.24% | 7,681 | 3.88% | 9.47% |
| Telecommunication Services | 32 | 2.29% | 13,904 | 4.49% | 4.42% |

⁺ In millions of USD ^{*} Source: MSCI Fundamental Data

Systematic Equity Strategies

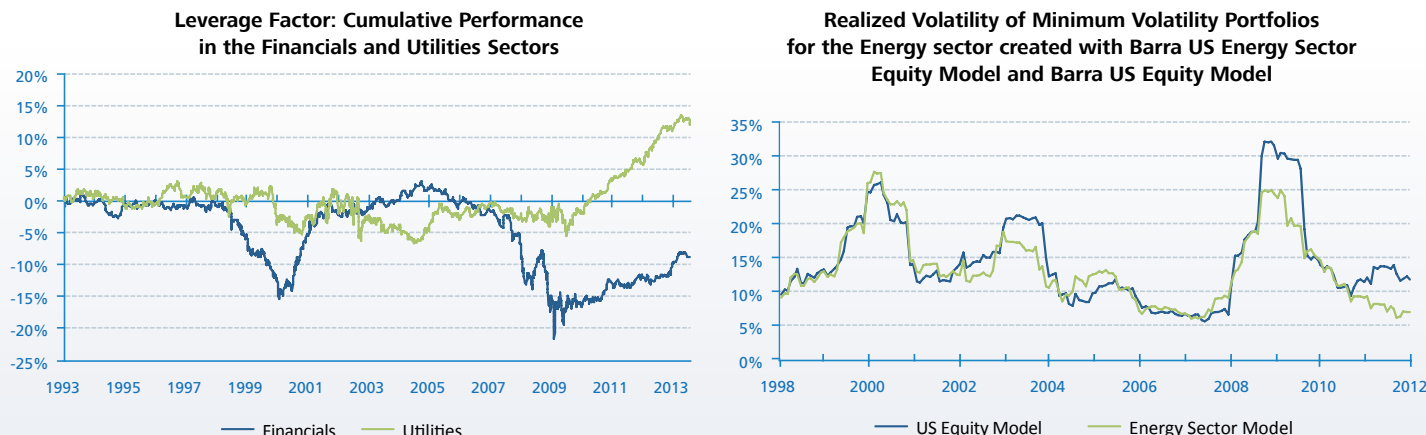
Incorporating Systematic Equity Strategy factors helps identify persistent market anomalies, track the seasonality or market-timing opportunities, and improves portfolio construction and monitoring. The following Systematic Equity Strategies are available in the Barra US Sector Equity Models.

| VALUATION | QUALITY | SENTIMENT | MOMENTUM |
|--|--|---|--|
| Value Book-to-Price Sales-to-Price Cash Flow-to-Price Trailing Earnings-to-Price Forward Earnings-to-Price Dividend Yield | Earnings Quality Accruals Cash Earnings Variability of Sales Asset Turnover Profitability Return on Equity Return on Assets Sales Profit Margin EBIT to Enterprise Value | Sentiment Analyst Ratings Changes Analyst Estimate Revisions | Stock Momentum Industry Momentum Seasonality Short-term Reversal Long-term Reversal Prospect Skewness Drawdown Lottery |

Key Benefits

» **Each Sector is Unique** – Sector models are designed to evaluate risk and performance of sector-specific portfolios, because they incorporate sector-specific dynamics. The models are **aligned with the investment universe** and lead to risk and performance attribution that **accurately reflect the manager’s investment philosophy**.

The first figure shows the cumulative performance of the Leverage factor for the Utilities and Financials sectors. The differences in factor returns between these two factors illustrate the value that sector models capture. The second figure shows the performance of the Barra US Energy Sector Equity Model compared with the complete Barra US Equity Model when used in a minimum volatility backtest.



» **Integrated Model for Universal Coverage** – An integrated model is available to get an aggregated perspective when evaluating multiple sector-specific strategies or managers. The Barra US Sector Integrated Model provides a total market perspective while recognizing the uniqueness of risk and return characteristics of each individual sector.

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About MSCI

MSCI Inc. is a leading provider of investment decision support tools to investors globally, including asset managers, banks, hedge funds and pension funds. MSCI products and services include indexes, portfolio risk and performance analytics, and governance tools.

The company’s flagship product offerings are: the MSCI indexes with approximately USD 7.5 trillion estimated to be benchmarked to them on a worldwide basis¹; Barra multi-asset class factor models, portfolio risk and performance analytics; RiskMetrics multi-asset class market and credit risk analytics; IPD real estate information, indexes and analytics; MSCI ESG (environmental, social and governance) Research screening, analysis and ratings; ISS corporate governance research, data and outsourced proxy voting and reporting services; and FEI valuation models and risk management software for the energy and commodities markets. MSCI is headquartered in New York, with research and commercial offices around the world.

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¹ As of March 31, 2013, as reported on July 31, 2013 by eVestment, Lipper and Bloomberg.