MODEL DATASHEET

Barra US Equity Model Long-Term (USE3L)

USE3L	Details
Application Usage	Aegis Models Direct BIMe Text Files
Model Start Dates	Aegis Data: January 1973 Models Direct Data: January 1973 BIMe Data: October 1997 Barra PortfolioManager: December 1993 *Note on model history:* Daily data of sufficiently high quality for model construction exist only from the early 1980s onward. As a result, we construct factor covariance matrices based on daily data for the period from the mid-1980s to the present. In order to preserve as long a United States model history as possible, the source of the covariance matrix in the model history will depend on the time period: January 1973– December 1985: USE3 (monthly) January 1986– December 1986: blend of USE3 and USE3L January 1987– Present: USE3L (daily)
Estimation Universe	Largest 1,500 US stocks, plus smaller stocks which are added to ensure an adequate basis for estimating industry returns. Stocks with prices below five dollars are usually excluded, but S&P 500 members are always included. Timely fundamental data must be available. Turnover is limited by grandfathering rules.
Regression Weighting Scheme	Inverse of squared historical sigma $\frac{1}{(\text{Historical Sigma})^2}$
Covariance Matrix: Half-life	Variances: 250 days Correlations: 750 days
Covariance Matrix: Systematic Scaling	None
Industry Allocation Scheme	Multiple-industry allocation (up to five industries)
Source of Industry Scheme	Barra multiple-industry classification

Model Summary:
Asset Coverage: 10,500
Style Factors: 13
Industry Factors: 55
Covariance matrix built on daily data

Barra US Equity Model Long-Term (USE3L)

USE3L Style Factors	Purpose	Descriptor Components (weight)
Momentum	Captures sustained relative performance and its effect on risk.	• Relative strength (0.639) • Historical alpha (0.361)
Volatility	Captures relative volatility using measures of both long-term historical volatility (such as historical residual standard deviation) and near-term historical volatility (such as high-low price ratio, daily standard deviation, cumulative range over the last 12 months). Other proxies for volatility (volume beta) are also included in index.	• Historical beta times historical sigma (0.257) • Daily standard deviation (0.160) • Ratio of high price to low price over last month (0.127) • Logarithm of price (-0.153) • Cumulative range (0.161) • Volume beta (0.028) • Serial dependence (0.013) • Option-implied standard deviation (0.100)
Size	Captures systematic return and risk differences between large-cap and small-cap stocks	• Logarithm of market capitalization (1.000)
Trading Activity	Measures the relative activity of a firm's shares in the market, or the "institutional popularity" of the company.	• Monthly share turnover (0.175) • Quarterly share turnover (0.221) • Annual share turnover (0.245) • Five-year share turnover (0.208) • Indicator of forward split (0.010) • Volume to variance (0.142)
Value	Distinguishes between value stocks and growth stocks using the ratio of book-value of equity to market capitalization.	• Book-to-price ratio (1.000)
Earnings Yield	Combines current and historical E/P ratios with a measure of analyst-predicted E/P ratios. Stocks with similar values of earnings yield behave in a similar fashion with respect to their returns.	• Analyst-predicted earnings-to-price (0.444) • Trailing annual earnings-to-price (0.293) • Average earnings-to-price over past five years (0.263)
Dividend Yield	Computes a measure of predicted dividend yield using the past history of dividends and the market price behavior of the stock.	• Predicted dividend yield (1.000)
Growth	Characterizes a firm's growth in a number of aspects, particularly earnings.	• Five-year payout (-0.081) • Variability in capital structure (0.127) • Growth in total assets (0.342) • Earnings growth (0.099) • Analyst-predicted earnings growth (0.150) • Recent earnings changes (0.201)
Leverage	Measures the firm's financial leverage.	• Market leverage (0.301) • Book leverage (0.230) • Debt to assets (0.226) • Senior debt rating (0.242)
Currency Sensitivity	Measures sensitivity of a company's stock return to the return of a basket of foreign currencies.	• Foreign currency sensitivity (1.000)

Barra US Equity Model Long-Term (USE3L)

USE3L Style Factors	Purpose	Descriptor Components (weight)
Earnings Variation	Measures a company's historical earnings variability and cash flow fluctuations.	• Variability in earnings (0.248) • Standard deviation of analysts' predicted earnings to price (0.408) • Variability in cash flows (0.226) • Extraordinary items in earnings (0.118)
Size Non-Linearity	Captures deviations from linearity in the relationship between returns and logarithm of market cap.	• Cube of the logarithm of market cap (1.000)
Non-Estimation Universe	Flags companies outside the estimation universe. It allows the linear factor model to be extended to stocks outside the estimation universe.	• Non-estimation universe indicator (1.000)

USE3L	Details	
Industry Factors	1. Mining & Metals 2. Gold 3. Forestry & Paper 4. Chemicals 5. Energy Reserves 6. Oil Refining 7. Oil Services 8. Food & Beverages 9. Alcohol 10. Tobacco 11. Home Products 12. Grocery Stores 13. Consumer Durables 14. Motor Vehicles & Parts 15. Apparel & Textiles 16. Clothing Stores 17. Specialty Retail 18. Department Stores 19. Construction & Real Property 20. Publishing 21. Media 22. Hotels 23. Restaurants 24. Entertainment 25. Leisure 26. Environmental Services 27. Heavy Electrical Equipment 28. Heavy Machinery	29. Industrial Parts 30. Electrical Utility 31. Gas & Water Utilities 32. Railroads 33. Airlines 34. Trucking, Sea & Air Freight 35. Medical Services 36. Medical Products & Supplies 37. Drugs 38. Electronic Equipment 39. Semiconductors 40. Computer Hardware & Business Machines 41. Computer Software 42. Defense & Aerospace 43. Telephone 44. Wireless Telecommunications 45. Information Services 46. Industrial Services 47. Life & Health Insurance 48. Property & Casualty Insurance 49. Banks 50. Thrifts 51. Securities & Asset Management 52. Financial Services 53. Internet 54. Equity Real Estate Investment Trusts 55. Biotechnology

Barra US Equity Model Long-Term (USE3L)

USE3L Specific Risk Model	Details
Specific Risk Model: Asset-Level Forecast Specific Risk	$\hat{\sigma}_{it} = \kappa(1 + \hat{V}_{it}) \cdot \hat{S}_t$ where $\hat{\sigma}_{it}$ is the specific risk forecast for asset *i* in month *t* κ is the scaling factor that converts absolute return forecasts into standard deviation units $\hat{V}_{it}$ is the forecast relative absolute specific return of asset *i* at time *t* $\hat{S}_t$ is forecast average absolute specific return at time *t*
Specific Risk Model: Average Absolute Specific Return	$\hat{S}_t = \alpha + \sum_{i=1}^{k} \beta_i S_{t-i} + \beta_{k+1} r_{m_{t-1}}$ where $\hat{S}_t$ is the forecast average specific risk at time *t* α, β are estimated parameters k is the number of months, which is three S_{t-i} is the lagged realized mean absolute specific return of estimation universe assets in month *t – i* $r_{m_{t-1}}$ is the market excess return in month *t – 1*
Specific Risk Model: Relative Absolute Specific Return	$\hat{V}_{it} = \sum_{k=1}^{K} Z_{ikt} \gamma_k$ where $\hat{V}_{it}$ is the forecast relative specific return of asset *i* at time *t* K is the number of relative absolute specific return characteristics Z_{ikt} is the exposures of asset *i* to characteristic *k* at time *t* γ_k is characteristic *k*'s contribution to forecast relative specific return

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