

## Multiple-Horizon United States Short-Term (USE3S)

Risk Index	Purpose	Descriptors (weight)
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.	<ul style="list-style-type: none"> <li>• Historical beta times historical sigma (0.257)</li> <li>• Daily standard deviation (0.160)</li> <li>• Ratio of high price to low price over the last month (0.127)</li> <li>• Logarithm of price (−0.153)</li> <li>• Cumulative range (0.161)</li> <li>• Volume beta (0.028)</li> <li>• Serial dependence (0.013)</li> <li>• Option-implied standard deviation (0.100)</li> </ul>
Momentum	Captures sustained relative performance and its effect on risk.	<ul style="list-style-type: none"> <li>• Relative strength (0.639)</li> <li>• Historical alpha (0.361)</li> </ul>
Size	Differentiates between largecap and smallcap stocks.	<ul style="list-style-type: none"> <li>• Logarithm of capitalization (1.000)</li> </ul>
Size Non-Linearity	Captures deviations from linearity in the relationship between returns and logarithm of market capitalization.	<ul style="list-style-type: none"> <li>• Cube of the logarithm of market capitalization (1.000)</li> </ul>
Trading Activity	Measures the relative activity of a firm's shares in the market, or the "institutional popularity" of the company.	<ul style="list-style-type: none"> <li>• Monthly share turnover (0.175)</li> <li>• Quarterly share turnover (0.221)</li> <li>• Annual share turnover (0.245)</li> <li>• Five-year share turnover (0.208)</li> <li>• Indicator of forward split (0.010)</li> <li>• Volume to variance (0.142)</li> </ul>
Growth	Characterizes a firm's growth in a number of aspects, particularly earnings.	<ul style="list-style-type: none"> <li>• Five-year payout (−0.081)</li> <li>• Variability in capital structure (0.127)</li> <li>• Growth in total assets (0.342)</li> <li>• Earnings growth (0.099)</li> <li>• Analyst-predicted earnings growth (0.150)</li> <li>• Recent earnings change (0.201)</li> </ul>

### Model Summary

Asset Coverage: 10,500

Number of Risk Indices: 13

Number of Industries: 55

Covariance matrix built on daily data

Risk Index	Purpose	Descriptors (weight)
Earnings Yield	Combines current and historical earnings-to-price ratios with a measure of analyst-predicted earnings-to-price ratio. Stocks with similar values of earnings yield behave in a similar fashion with respect to their returns.	<ul style="list-style-type: none"> <li>Analyst-predicted earnings to price (0.444)</li> <li>Trailing annual earnings to price (0.293)</li> <li>Average earnings to price over the past five years (0.263)</li> </ul>
Value	Distinguishes between value stocks and growth stocks using the ratio of book-value of equity to market capitalization.	<ul style="list-style-type: none"> <li>Book to price (1.000)</li> </ul>
Earnings Variation	Measures a company's historical earnings variability and cash flow fluctuations.	<ul style="list-style-type: none"> <li>Variability in earnings (0.248)</li> <li>Standard deviation of analysts' predicted earnings to price (0.408)</li> <li>Variability in cash flows (0.226)</li> <li>Extraordinary items in earnings (0.118)</li> </ul>
Leverage	Measures the firm's financial leverage.	<ul style="list-style-type: none"> <li>Market leverage (0.301)</li> <li>Book leverage (0.230)</li> <li>Debt to assets (0.226)</li> <li>Senior debt rating (0.242)</li> </ul>
Currency Sensitivity	Measures the sensitivity of a company's stock return to the return of a basket of foreign currencies.	<ul style="list-style-type: none"> <li>Foreign currency sensitivity (1.000)</li> </ul>
Dividend Yield	Computes a measure of predicted dividend yield using the past history of dividends and the market price behavior of the stock.	<ul style="list-style-type: none"> <li>Predicted dividend yield (1.000)</li> </ul>
Non-Estimation Universe	Flags companies outside the estimation universe. It allows the linear factor model to be extended to stocks outside the estimation universe.	<ul style="list-style-type: none"> <li>Non-estimation universe indicator (1.000)</li> </ul>

USE3S	Details	
Application Usage	<ul style="list-style-type: none"> <li>• Aegis</li> <li>• Text Files</li> </ul>	
Model Start Dates	Aegis data	January 1998
	Text file data	January 1973
	Barra PortfolioManager	December 1993
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: 90 days	
	Correlations: 480 days	
Covariance Matrix: Systematic Scaling	none	
Specific Risk Model: Asset-Level Forecast Specific Risk	$\hat{\sigma}_{it} = \kappa (1 + \hat{V}_{it}) \cdot \hat{S}_t$ <p>where:</p> <ul style="list-style-type: none"> <li><math>\hat{\sigma}_{it}</math> is the specific risk forecast for asset <math>i</math> in month <math>t</math>,</li> <li><math>\kappa</math> is the scaling factor that converts absolute return forecasts into standard deviation units,</li> <li><math>\hat{V}_{it}</math> is the forecast relative absolute specific return of asset <math>i</math> at time <math>t</math>, and</li> <li><math>\hat{S}_t</math> is the forecast average absolute specific return at time <math>t</math>.</li> </ul>	
Specific Risk Model: Average Absolute Specific Return	$\hat{S}_t = \alpha + \sum_{i=1}^k \beta_i S_{t-i} + \beta_{k+1} r_{m_{t-1}}$ <p>where:</p> <ul style="list-style-type: none"> <li><math>\hat{S}_t</math> is the forecast average specific risk at time <math>t</math>,</li> <li><math>\alpha, \beta</math> are estimated parameters,</li> <li><math>k</math> is the number of months, which is three,</li> <li><math>S_{t-i}</math> is the lagged realized mean absolute specific return of estimation universe assets in month <math>t-i</math>, and</li> <li><math>r_{m_{t-1}}</math> is the market excess return in month <math>t-1</math>.</li> </ul>	

USE3S	Details
Specific Risk Model: Relative Absolute Specific Return	$\hat{V}_{it} = \sum_{k=1}^K Z_{ikt} \gamma_k$ <p>where:</p> <ul style="list-style-type: none"> <li><math>\hat{V}_{it}</math> is the forecast relative absolute specific return of asset <math>i</math> at time <math>t</math>,</li> <li><math>K</math> is the number of relative absolute specific return characteristics,</li> <li><math>Z_{ikt}</math> is the exposure of asset <math>i</math> to characteristic <math>k</math> at time <math>t</math>, and</li> <li><math>\gamma_k</math> is characteristic <math>k</math>'s contribution to forecast relative specific return.</li> </ul>
Industry Allocation Scheme	Multiple-industry allocation (up to five industries)
Source of Industry Scheme	Barra multiple-industry classification

USE3S	Details
Industries	<ol style="list-style-type: none"> <li>1. Mining &amp; Metals</li> <li>2. Gold</li> <li>3. Forestry &amp; Paper</li> <li>4. Chemicals</li> <li>5. Energy Reserves</li> <li>6. Oil Refining</li> <li>7. Oil Services</li> <li>8. Food &amp; Beverages</li> <li>9. Alcohol</li> <li>10. Tobacco</li> <li>11. Home Products</li> <li>12. Grocery Stores</li> <li>13. Consumer Durables</li> <li>14. Motor Vehicles &amp; Parts</li> <li>15. Apparel &amp; Textiles</li> <li>16. Clothing Stores</li> <li>17. Specialty Retail</li> <li>18. Department Stores</li> <li>19. Construction &amp; Real Property</li> <li>20. Publishing</li> <li>21. Media</li> <li>22. Hotels</li> <li>23. Restaurants</li> <li>24. Entertainment</li> <li>25. Leisure</li> <li>26. Environmental Services</li> <li>27. Heavy Electrical Equipment</li> <li>28. Heavy Machinery</li> <li>29. Industrial Parts</li> <li>30. Electrical Utility</li> <li>31. Gas &amp; Water Utilities</li> <li>32. Railroads</li> <li>33. Airlines</li> <li>34. Trucking, Sea, &amp; Air Freight</li> <li>35. Medical Services</li> <li>36. Medical Products &amp; Supplies</li> <li>37. Drugs</li> <li>38. Electronic Equipment</li> <li>39. Semiconductors</li> <li>40. Computer Hardware &amp; Business Machines</li> <li>41. Computer Software</li> <li>42. Defense &amp; Aerospace</li> <li>43. Telephone</li> <li>44. Wireless Telecommunications</li> <li>45. Information Services</li> <li>46. Industrial Services</li> <li>47. Life &amp; Health Insurance</li> <li>48. Property &amp; Casualty Insurance</li> <li>49. Banks</li> <li>50. Thrifts</li> <li>51. Securities &amp; Asset Management</li> <li>52. Financial Services</li> <li>53. Internet</li> <li>54. Equity Real Estate Investment Trusts</li> <li>55. Biotechnology</li> </ol>