

# EUE4DEE and EUE3DEE Comparison Datasheet

## Barra Europe Equity Derived-Eastern Europe Model

### New Features in the EUE4DEE Model

- Improved risk forecast for optimized portfolios using the new Optimization Bias Adjustment methodology
- More responsive forecasts through the use of our new Volatility Regime Adjustment methodology
- New Daily-Horizon model to cater to investors with short investment horizons
- Enhanced style factors reflecting the latest research
- Full daily updates of the model including daily exposures
- Improved specific risk model, including Volatility Regime Adjustment and Bayesian Adjustment
- Addition of new frontier markets

### Model Summary

#### EUE3DEE

#### EUE4DEE

Asset Coverage<sup>1</sup>: 16,050+

Asset Coverage<sup>1</sup>: 17,000+

Model Estimation Universe<sup>2</sup>: 2,190+

Model Estimation Universe<sup>2</sup>: 1,670+

Style Factors: 9

Style Factors: 11

Industry Factors: 58

Industry Factors: 58

Country Factors: 29

Country Factors: 34

Currency Factors: 30

Currency Factors: 35

Market Factor: 2

Market Factor: 2

Covariance matrix built on daily data

Covariance matrix built on daily data

<sup>1</sup> As of February 2013

<sup>2</sup> Estimation universe definition changed for EUE4DEE to avoid illiquid assets and hence have a smaller but more robust result.

Model Features Comparison	EUE3DEE	EUE4DEE			
Model Start Dates	Aegis: 30 December 1994 Barra Portfolio Manager (BPM): 31-December 2002 Models Direct Data: 30 December 1994	Aegis: 30 December 1994 Barra Portfolio Manager (BPM): 31 December 2002 <sup>3</sup> Models Direct Data: 30 December 1994			
Estimation Universe	Based on MSCI AC Europe IMI, enhanced with further small-cap assets and non-index assets for frontier markets	MSCI All Country Europe Investable Market Index (IMI). Frontier markets added through MSCI Europe & CIS Frontier Market Index, stand-alone MSCI country indices, and further non-index assets			
Regression Weighting Scheme	Constant weights for the 5% largest stocks, square root of capitalization for the remainder	Square root of market capitalization			
Covariance Matrix: Half-life	<u>Long-Term</u>		Long	Short	Daily
	Variances: 250 days	Half-life for Volatility	252 days	84 days	42 days
	Correlations: 500 days	Newey-West Volatility Lags	10 days	10 days	N/A
		Half-life for Correlations	504 days	504 days	200 days
	<u>Short-Term</u>	Newey-West Correlation Lags	3 days	3 days	N/A
	Variances: 90 days	Half-life for Volatility Regime Adjustment	84 days	21 days	4 days
	Correlations: 180 days				
Specific Risk	<u>Long-Term</u>		Long	Short	Daily
	Asset-level historical Volatility: 180 days	Half-life for Specific Volatility	252 days	84 days	42 days
		Newey-West Auto-Correlation Lags	5 days	5 days	N/A
	<u>Short-Term</u>	Newey-West Auto-Correlation Half-Life	252 days	252 days	N/A
	Asset-level historical Volatility: 65 days	Bayesian Shrinkage Parameter	0.15	0.15	0.10
		Half-life for Volatility Regime Adjustment	168 days	42 days	4 days
	Linked Specific Risk available	Linked Specific Risk available	Yes	Yes	Yes
Industry Allocation Scheme	Single-industry allocation	Single-industry allocation			
Source of Industry Scheme	Based on Global Industry Classification Standard (GICS®)	Based on Global Industry Classification Standard (GICS®)			

<sup>3</sup> Upcoming in Q2 2013

Risk Factor Definitions	EUE3DEE	EUE4DEE
Beta <sup>4</sup>	N/A (used as descriptor in the EUE3BAS Volatility factor)	Captures the market risk that cannot be explained by the Market Equity factors
Momentum <sup>4</sup>	Describes risk associated with the trending behavior of stock returns over a horizon of about a year	Explains the return differences of stocks based on their relative performance over the trailing 6-12 months
Residual Volatility <sup>4</sup>	N/A (used as a descriptor in the EUE3BAS Volatility factor)	Explains returns associated with high-volatility stocks that are not captured by the beta factor
Volatility	Captures return and risk differences between high-beta and low-beta stocks. Complements the regional market factor, which represents the volatility of a broadly diversified market portfolio with $\beta=1$ .	N/A (split between Beta and Residual Volatility)
Size <sup>5</sup>	Captures systematic return and risk differences between large-cap and small-cap stocks	Captures the return differences between large-cap stocks and small-cap stocks
Earnings Yield <sup>5</sup>	Relates the current market valuation of a company to its ability to generate positive earnings and cash flows	Describes return differences based on a company's earnings relative to its price
Book-to-price <sup>5</sup>	N/A (contained in EUE3BAS Value factor as a descriptor)	Explains the return component attributable to a stock's book-to-price ratio and can be an indicator of value
Dividend-to-price <sup>5</sup>	N/A (use of Dividend Yield in EUE3BAS)	Explains the return component attributable to a stock's dividend-to-price ratio and can be an indicator of earnings
Dividend Yield	Yield based on past 12-month dividends	N/A (replaced by Dividend-to-price)
Value	Indicates how "inexpensively" a company is currently traded by using its book value and past revenues as yardsticks	N/A (replaced by Book-to-Price)
Liquidity <sup>5</sup>	Helps to assess systematic risk associated with infrequent trading	Describes the return differences of stocks based on their relative trading activity
Non-linear Size <sup>5</sup>	N/A	Describes size-related returns to stocks that are not captured by the size factor
Financial Leverage <sup>5</sup>	N/A (called Leverage in EUE3BAS)	Captures the return differences between high-leverage and low-leverage stocks
Growth <sup>5</sup>	Captures risk related to fundamental company growth	Describes return differences of stocks based on their prospects for sales or earnings growth
Leverage	Captures the relationship between a firm's stock returns and its level of indebtedness	N/A (replaced by Financial Leverage)

<sup>4</sup> Factors standardized by Europe region in EUE4DEE.

<sup>5</sup> Factors standardized by Country in EUE4DEE.

Risk Factor Descriptors	EUE3DEE	EUE4DEE
Beta <sup>4</sup>	N/A	<ul style="list-style-type: none"> <li>Historical Beta (1.000)</li> </ul>
Momentum <sup>4</sup>	<ul style="list-style-type: none"> <li>Historical weekly alpha (0.24)</li> <li>12-month relative strength, lagged by 1 month (0.36)</li> <li>6-month relative strength, lagged by 1 month (0.40)</li> </ul>	<ul style="list-style-type: none"> <li>Relative strength (0.600)</li> <li>Historical alpha (0.400)</li> </ul>
Residual Volatility <sup>4</sup>	N/A	<ul style="list-style-type: none"> <li>Historical sigma (0.100)</li> <li>Daily standard deviation calculation (0.600)</li> <li>Cumulative range (0.300)</li> </ul>
Volatility	<ul style="list-style-type: none"> <li>Historical weekly beta (0.53)</li> <li>Cumulative Range (0.25)</li> <li>Daily Asset Volatility (0.22)</li> </ul>	N/A
Size <sup>5</sup>	<ul style="list-style-type: none"> <li>Log of the month-end issuer capitalization (0.5)</li> <li>Log of total assets (0.5)</li> </ul>	<ul style="list-style-type: none"> <li>Log of market capitalization (1.000)</li> </ul>
Earnings Yield <sup>5</sup>	<ul style="list-style-type: none"> <li>Trailing earnings-to-price ratio (0.10)</li> <li>Cash earnings-to-price ratio (0.17)</li> <li>Return on equity (0.13)</li> <li>Predicted earnings-to-price ratio (0.60)</li> </ul>	<ul style="list-style-type: none"> <li>Cash earnings-to-price ratio (0.214)</li> <li>Trailing annual earnings-to-price ratio (0.143)</li> <li>Analyst-predicted earnings-to-price-ratio (0.643)</li> </ul>
Book-to-price <sup>5</sup>	N/A	<ul style="list-style-type: none"> <li>Book-to-price ratio (1.000)</li> </ul>
Dividend-to-price <sup>5</sup>	N/A	<ul style="list-style-type: none"> <li>Dividend-to-price ratio (1.000)</li> </ul>
Dividend Yield	<ul style="list-style-type: none"> <li>Dividend yield (1.0)</li> </ul>	N/A
Value	<ul style="list-style-type: none"> <li>Book-to-price ratio (0.62)</li> <li>Sales-to-price ratio (0.38)</li> </ul>	N/A
Liquidity <sup>5</sup>	<ul style="list-style-type: none"> <li>Log of annual share turnover (0.42)</li> <li>Log of quarterly share turnover (0.36)</li> <li>Log of monthly share turnover (0.22)</li> </ul>	<ul style="list-style-type: none"> <li>Annual share turnover (0.200)</li> <li>Quarterly share turnover (0.350)</li> <li>Monthly share turnover (0.450)</li> </ul>
Non-linear Size <sup>5</sup>	N/A	<ul style="list-style-type: none"> <li>Size-non-linear (1.000)</li> </ul>
Financial Leverage <sup>5</sup>	N/A	<ul style="list-style-type: none"> <li>Debt-to-assets ratio (0.500)</li> <li>Book leverage (0.400)</li> <li>Market leverage (0.100)</li> </ul>
Growth <sup>5</sup>	<ul style="list-style-type: none"> <li>Trailing growth of total assets (0.23)</li> <li>Trailing growth of annual sales (0.07)</li> <li>Trailing growth of annual net earnings (0.05)</li> <li>Short-term predicted earnings growth (0.50)</li> <li>Long-term (3-5 years) predicted earnings growth (0.15)</li> </ul>	<ul style="list-style-type: none"> <li>Earnings growth rate over last five years (0.700)</li> <li>Sales growth (0.150)</li> <li>Analyst-predicted earnings growth (0.150)</li> </ul>
Leverage <sup>5</sup>	<ul style="list-style-type: none"> <li>Book leverage (0.59)</li> <li>Market leverage (0.41)</li> </ul>	N/A

The Industry factors listed below are duplicated and split into Eastern and Western Europe. For example, Factor 1 in the following table is Energy Equipment and Services. It is split into Eastern Europe Energy Equipment and Services and Western Europe Energy Equipment and Services.

Industry Factors <sup>6</sup>	
EUE3DEE	EUE4DEE
1. Energy Equipment & Services	1. Energy Equipment and Services
2. Oil Gas & Consumable Fuels	2. Oil Gas and Consumable Fuels
3. Other Materials	3. Other Materials
4. Metals & Mining	4. Metals and Mining
5. Other Capital Goods	5. Other Capital Goods
6. Construction & Engineering	6. Construction and Engineering
7. Machinery	7. Machinery
8. Commercial Services	8. Commercial Services
9. Other Transport	9. Transportation Non-Airlines
10. Airlines	10. Airlines
11. Autos & Components	11. Automobiles and Components
12. Consumer Durables & Apparel	12. Consumer Durables and Apparel
13. Consumer Services	13. Hotels Restaurants and Leisure
14. Media	14. Media
15. Retailing	15. Retailing
16. Food & Staples Retailing	16. Food Drug Staples Retailing
17. Food Beverages & Tobacco	17. Food Beverages and Tobacco
18. Household & Personal Products	18. Household and Personal Products
19. Healthcare Equipment & Services	19. Health Care Equipment and Serv
20. Pharmaceuticals	20. Pharmaceuticals Life Sciences
21. Banks	21. Banks
22. Diversified Financials	22. Diversified Financials
23. Insurance	23. Insurance
24. Real Estate	24. Real Estate
25. Software & Services	25. IT Services and Software
26. Technology Hardware & Equipment	26. Technology Hardware and Equip
27. Semiconductors	27. Semiconductors
28. Telecommunication Services	28. Telecommunication Services
29. Utilities	29. Utilities

<sup>6</sup> Industry factors in EUE3DEE and EUE4DEE are identical except for the minor updates made to the display names.

Country Factors			
EUE3DEE		EUE4DEE	
1. Austria	18. Netherlands	1. Austria Mkt	18. <i>Kazakhstan Mkt</i>
2. Belgium	19. Norway	2. Belgium Mkt	19. Latvia Mkt
3. Croatia	20. Poland	3. <i>Bosnia and Herzegovina Mkt</i>	20. Lithuania Mkt
4. Cyprus	21. Portugal	4. <i>Bulgaria Mkt</i>	21. Netherlands Mkt
5. Czech Republic	22. Romania	5. Croatia Mkt	22. Norway Mkt
6. Denmark	23. Russia	6. Cyprus Mkt	23. Poland Mkt
7. Estonia	24. Slovenia	7. Czech Republic Mkt	24. Portugal Mkt
8. Finland	25. Spain	8. Denmark Mkt	25. Romania Mkt
9. France	26. Sweden	9. Estonia Mkt	26. Russia Mkt
10. Germany	27. Switzerland	10. Finland Mkt	27. <i>Serbia Mkt</i>
11. Greece	28. Turkey	11. France Mkt	28. Slovenia Mkt
12. Hungary	29. United Kingdom	12. Germany Mkt	29. Spain Mkt
13. Iceland		13. Greece Mkt	30. Sweden Mkt
14. Ireland		14. Hungary Mkt	31. Switzerland Mkt
15. Italy		15. Iceland Mkt	32. Turkey Mkt
16. Latvia		16. Ireland Mkt	33. <i>Ukraine Mkt</i>
17. Lithuania		17. Italy Mkt	34. United Kingdom Mkt
Currency Factors <sup>7</sup>			
1. Austria	19. Netherlands	1. Austria	19. <i>Kazakhstan</i>
2. Belgium	20. Norway	2. Belgium	20. Latvia
3. Croatia	21. Poland	3. <i>Bosnia and Herzegovina</i>	21. Lithuania
4. Cyprus	22. Portugal	4. <i>Bulgaria</i>	22. Netherlands
5. Czech	23. Romania	5. Croatia	23. Norway
6. Denmark	24. Russia	6. Cyprus	24. Poland
7. Estonia	25. Slovenia	7. Czech Republic	25. Portugal
8. Euro	26. Spain	8. Denmark	26. Romania
9. Finland	27. Sweden	9. Estonia	27. Russia
10. France	28. Switzerland	10. Euro	28. <i>Serbia</i>
11. Germany	29. Turkey	11. Finland	29. Slovenia
12. Greece	30. United Kingdom	12. France	30. Spain
13. Hungary		13. Germany	31. Sweden
14. Iceland		14. Greece	32. Switzerland
15. Ireland		15. Hungary	33. Turkey
16. Italy		16. Iceland	34. <i>Ukraine</i>
17. Latvia		17. Ireland	35. United Kingdom
18. Lithuania		18. Italy	
Market Factors			
1. Eastern Europe	2. Western Europe	1. Eastern Europe	2. Western Europe

**Note:** EUE4DEE covers 5 additional Frontier Markets. These new additions are shown in *italics* in the table above.

<sup>7</sup> Euro is available since 30-Dec-1998.

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<sup>1</sup>As of March 31, 2012, as published by eVestment, Lipper and Bloomberg in September 2012

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