

Financial Econometrics (ECO 764A)

Group Assignment # 1

Group - 5
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Abstract. We calculated and analysed the Fama and French 3 Factors model and Carhart four-factor model for Clean Energy Data of Europe. Factors are monthly for fifteen years. In the later section, we critically examine the results obtained from different models and their relevance. Further, appendix can be referred for detailed analysis.

1. Fama and French Three-Factor Model (Investopedia)

The Fama and French Three-Factor Model (or the Fama French Model for short) is an asset pricing model developed in 1992 that expands on the capital asset pricing model (CAPM) by adding size risk and value risk factors to the market risk factor in CAPM. This model considers the fact that value and small-cap stocks outperform markets on a regular basis. By including these two additional factors, the model adjusts for this outperforming tendency, which is thought to make it a better tool for evaluating manager performance. The formula for the Fama French model is:

$$R_{it} - R_{ft} = \alpha_{it} + \beta_1(R_{Mt} - R_{Ft}) + \beta_2SMB_t + \beta_3HML_t + \epsilon_{it} \text{ where:}$$

R_{it} = Total return of a stock or portfolio i at time t

R_{ft} = risk free rate of return at time t

R_{Mt} = total market portfolio return at time t

$R_{it} - R_{ft}$ = expected excess return

$R_{Mt} - R_{ft}$ = excess return on the market portfolio (index)

SMB_t = size premium (small minus big)

HML_t = value premium (high minus low)

$\beta_{1,2,3}$ = factor coefficients

2. How the Fama French model works? (Investopedia)

Nobel Laureate Eugene Fama and researcher Kenneth French, former professors at the University of Chicago Booth School of Business, attempted to better measure market returns and, through

research, found that value stocks outperform growth stocks. Similarly, small-cap stocks tend to outperform large-cap stocks. As an evaluation tool, the performance of portfolios with a large number of small-cap or value stocks would be lower than the CAPM result, as the Three-Factor Model adjusts downward for observed small-cap and value stock out-performance.

The Fama and French model has three factors: size of firms, book-to-market values and excess return on the market. In other words, the three factors used are SMB (small minus big), HML (high minus low) and the portfolio's return less the risk free rate of return. SMB accounts for publicly traded companies with small market caps that generate higher returns, while HML accounts for value stocks with high book-to-market ratios that generate higher returns in comparison to the market.

There is a lot of debate about whether the outperformance tendency is due to market efficiency or market inefficiency. In support of market efficiency, the outperformance is generally explained by the excess risk that value and small-cap stocks face as a result of their higher cost of capital and greater business risk. In support of market inefficiency, the outperformance is explained by market participants incorrectly pricing the value of these companies, which provides the excess return in the long run as the value adjusts. Investors who subscribe to the body of evidence provided by the Efficient Markets Hypothesis (EMH) are more likely to agree with the efficiency side.

3. What the Fama French model means for investors? (Investopedia)

Fama and French highlighted that investors must be able to ride out the extra short-term volatility and periodic underperformance that could occur in a short time. Investors with a long-term time horizon of 15 years or more will be rewarded for losses suffered in the short term. Using thousands of random stock portfolios, Fama and French conducted studies to test their model and found that when size and value factors are combined with the beta factor, they could then explain as much as 95% of the return in a diversified stock portfolio.

Given the ability to explain 95% of a portfolio's return versus the market as a whole, investors can construct a portfolio in which they receive an average expected return according to the relative risks they assume in their portfolios. The main factors driving expected returns are sensitivity to the market, sensitivity to size, and sensitivity to value stocks, as measured by the book-to-market ratio. Any additional average expected return may be attributed to unpriced or unsystematic risk.

4. Carhart Model

The Carhart model can be modelled as:

$$R_{it} - R_{ft} = \alpha_{it} + \beta_1(R_{Mt} - R_{Ft}) + \beta_2SMB_t + \beta_3HML_t + \beta_4MOM_t + \epsilon_{it} \text{ where:}$$

R_{it} = Total return of a stock or portfolio i at time t

R_{ft} = risk free rate of return at time t

R_{Mt} = total market portfolio return at time t

$R_{it} - R_{ft}$ = expected excess return

$R_{Mt} - R_{ft}$ = excess return on the market portfolio (index)

SMB_t = size premium (small minus big)

HML_t = value premium (high minus low)

MOM_t = return premium (winners minus losers)

$\beta_{1,2,3,4}$ = factor coefficients

5. Construction of factors

We can construct *SMB*, *HML* and *MOM* factors following the steps:

- (i) Calculate the excess returns, i.e. $R_i - R_f$.
- (ii) Sort the excess returns on Size (market capitalization, denoted as S) and then on value (ROE).
- (iii) Denote bottom 30 percent, middle (40 percent) and top (30 percent) as Small (1), Medium (2) and Big (3) when arranged according to their market capitalisation.
- (iv) Denote bottom 30 percent, middle (40 percent) and top (30 percent) as Value (1), Neutral (2) and Growth (3) when arranged according to their ($\frac{B}{M}$) ratio, which in this case is calculated from return on investments from the data.
- (v) Winners (W) are calculated by taking the top 30% of all the stocks according to the returns on the stocks. The returns are calculated according to the Price Indices of the different stocks.
- (vi) Similarly, losers (L) are calculated by taking the bottom 30% of all the stocks according to the returns on the stocks.
- (vii) Use the formula to calculate *SMB*:

$$SMB = \frac{1}{3}(\text{small value} + \text{small neutral} + \text{small growth}) - \frac{1}{3}(\text{big value} + \text{big neutral} + \text{big growth})$$
$$SMB = \frac{1}{3}(S_1V_1 + S_1V_2 + S_1V_3) - \frac{1}{3}(S_3V_1 + S_3V_2 + S_3V_3)$$

- (viii) Use the formula to calculate *HML*:

$$HML = \frac{1}{2}(\text{small value} + \text{big value}) - \frac{1}{2}(\text{small growth} + \text{big growth})$$
$$HML = \frac{1}{2}(S_1V_1 + S_3V_1) - \frac{1}{2}(S_1V_3 + S_3V_3)$$

The *HML* factor is thus designed to capture the effect of value while being largely free of the influence of size.

- (ix) Use the formula to calculate *MOM*:

$$MOM = \frac{1}{2}(\text{small winner} + \text{big winner}) - \frac{1}{2}(\text{small loser} + \text{big loser})$$
$$MOM = \frac{1}{2}(S_1W_1 + S_3W_1) - \frac{1}{2}(S_1W_2 + S_3W_2)$$

The *MOM* factor is thus designed to capture the effect of the past performance value while being largely free of the influence of size and book to market ratio.

6. Data

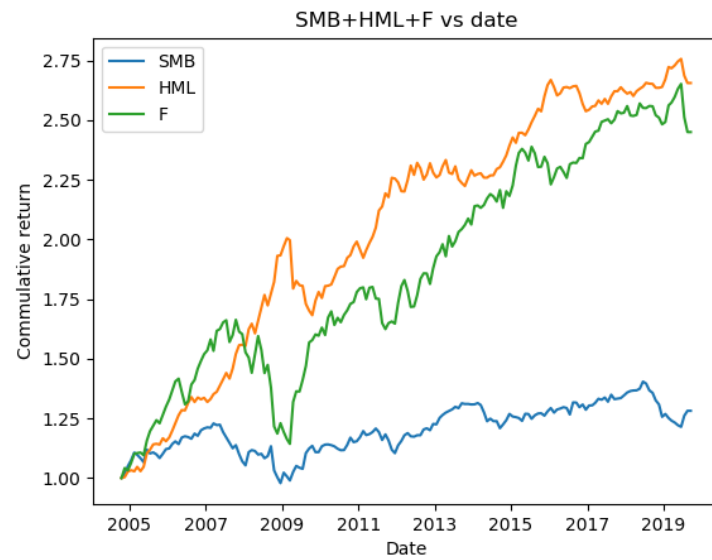
We took the Clean Energy Data for Europe across the years 2004 – 2020 over the monthly data given.

We substituted 0 for the data marked as *NA*. We assumed risk free rate to be 0.5% per month.

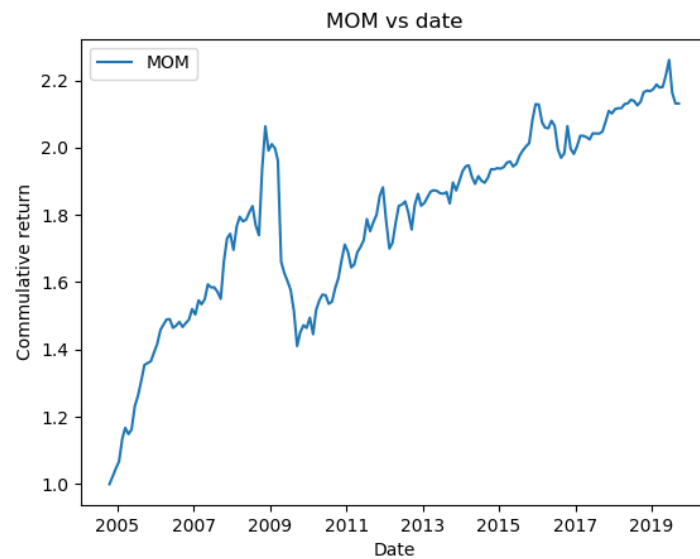
7. Plots

We made two plots with the following parameters

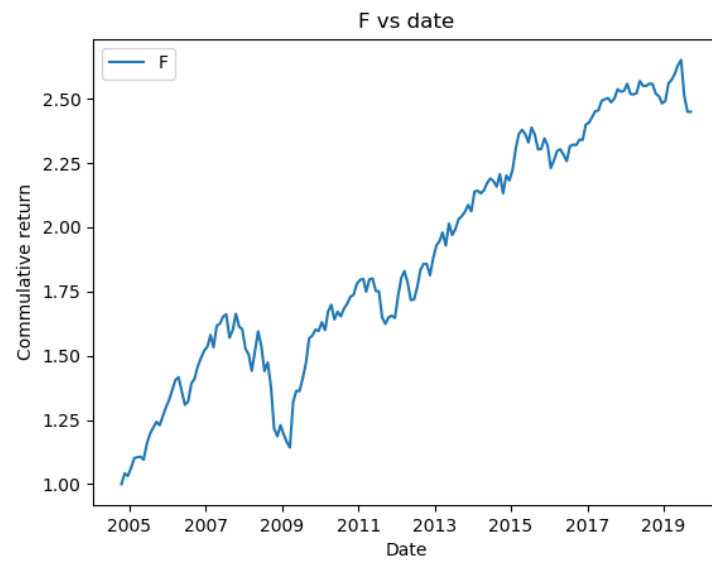
- We plot HML, SMB and Market Return versus date.



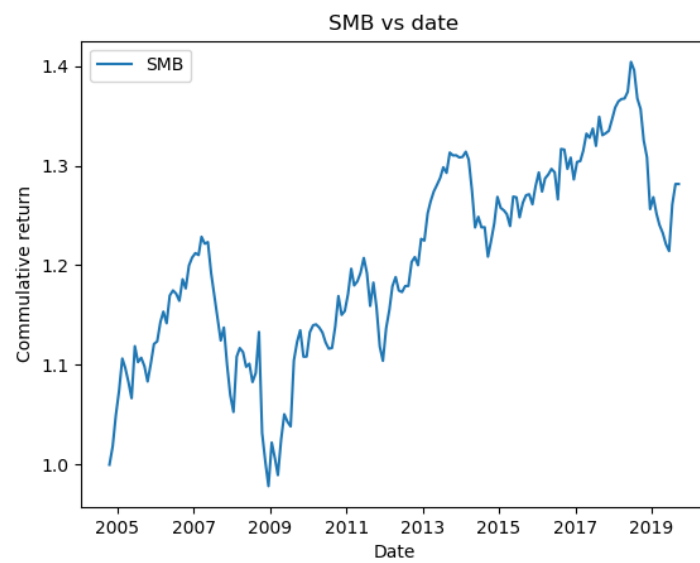
- We plot MOM versus date.



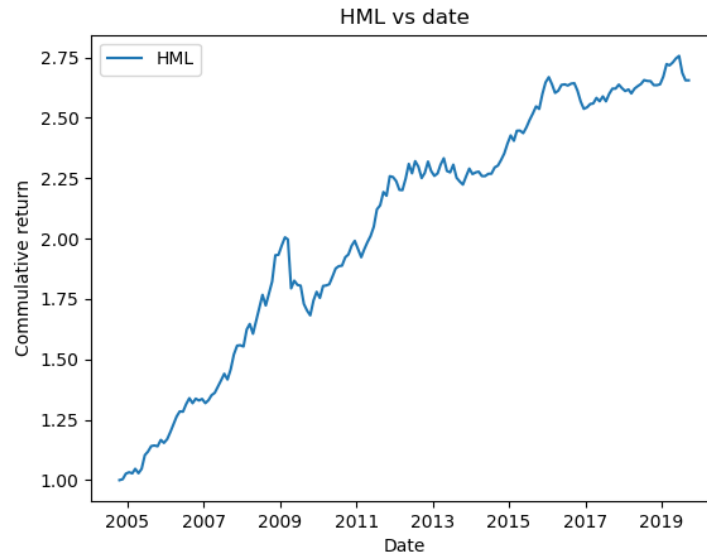
- We plot F versus date.



- We plot SMB versus date.



- We plot HML versus date.



8. Analysis

- Average R_{sq} for all the regressions is listed below

CAP Model: Average $R_{sq} = 0.3652$

Fama Fench Model: Average $R_{sq} = 0.3704$

4-Factor Model: Average $R_{sq} = 0.3712$

While the value of R_{sq} is not very different, CAPM slightly outperforms the other two.

- Intercept is never zero $\alpha \neq 0$ and in general, significant thus implying that CAPM cannot explain the results very well. Infact, none of the 3 models perform very well on the dataset.
- Market risk premium is positive throughout suggesting that investing in market portfolio is always profitable. The results are inline with all the three models.
- Higher moment CAPM models have insignificant intercepts which is as expected.
- The results for 3 moment are not much different from 4 moment CAPM as shown in Table 2. Hence, to evaluate another factor seems to be an overshoot.
- This shows that MOM factor has less significant impact on the return of individual companies.
- The performance of CAPM over other methods here also shows that HML and SMB has less significance when compared to Market Return.

Thus, across three models CAPM fits best incase of Clean Energy dataset for Europe.

Additional observations

- There is a significant dip in all economic factors during 2008 – 09 which is roughly the time of Global Economic Recession. Clean Energy companies were also significantly damaged by the recession.
- Return of most of the companies is heavily influenced by the market return.

9. Appendix

Table 1: CAPM model

Company Name	α	β_{F-r_f}
NESTLE SA	0.192	0.499
NOVARTIS	-0.221	0.463
LVMH MOET HENNESSY	0.543	1.062
ROCHE HOLDING AG	-0.174	0.476
3I GROUP PLC	0.194	1.364
HSBC HOLDINGS PLC	-0.701	0.79
SAP SE	0.148	0.714
ANHEUSER BUSCH IN	0.474	0.667
L'OREAL SA	0.275	0.741
BP PLC	-0.535	0.796
TOTAL SA	-0.508	0.878
ASTRAZENECA PLC	0.237	0.483
ASML HOLDING NV	1.199	1.015
SANOFI	-0.317	0.523
ROYAL DUTCH SHELL	-0.384	0.667
ALLIANZ SE	-0.044	1.159
GLAXOSMITHKLINE	-0.29	0.367
AIRBUS SE	0.527	1.302
SIEMENS AG	-0.297	1.1
INDUSTRI	0.503	0.857
DIAGEO PLC	0.277	0.514
UNILEVER N.V.	0.172	0.527
NOVO NORDISK A/S	0.854	0.587
DEUTSCHE TELEKOM AG	-0.477	0.506
BRITISH AMERICAN TOB	0.22	0.431
ENEL SPA	-0.402	0.792
BAYER AG	0.159	0.861
UNILEVER PLC	0.378	0.406
BANCO SANTANDER SA	-0.673	1.188
HERMES INTERNATIONAL	1.04	0.606
ADIDAS AG	0.765	0.941
VINCI	0.209	1.034
BASF SE	-0.026	1.063
RIO TINTO PLC	0.38	1.242
BNP PARIBAS SA	-0.535	1.152
KERING	0.601	1.318
VODAFONE GROUP PLC	-0.411	0.442
AXA SA	-0.322	1.44
AIR LIQUIDE SA	0.118	0.684
EQUINOR ASA	-0.154	0.873
DAIMLER AG	-0.35	1.394
DANONE SA	-0.015	0.559
HEINEKEN N.V.	0.198	0.716
IBERDROLA SA	0.168	0.759
SAFRAN	0.756	1.051
ZURICH INSURANCE	-0.137	1.002

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Table 1 – *Continued from previous page*

Company Name	α	β_{F-r_f}
ESSILORLUXOTTICA SA	0.383	0.575
ENI GROUP	-0.706	0.962
LLOYDS BANKING GROUP	-1.028	1.744
BAYER. MOTOREN WERKE	-0.133	0.996
RECKITT BENCKISER	0.305	0.541
VOLKSWAGEN AG	0.892	1.167
PRUDENTIAL PLC	0.142	1.397
SCHNEIDER ELECTRIC	0.039	1.196
BHP GROUP PLC	0.278	1.285
UBS GROUP AG	-1.104	1.234
ING GROEP N.V.	-0.627	1.937
PERNOD RICARD SA	0.199	0.805
BARCLAYS PLC	-0.927	1.91
GLENCORE PLC	-0.608	0.537
INTESA SANPAOLO SPA	-0.576	1.194
TELEFONICA S.A.	-0.784	0.764
ABB LTD	0.038	1.278
COMPASS GROUP PLC	0.687	0.694
DEUTSCHE POST AG	-0.193	1.092
NATIONAL GRID PLC	-0.091	0.276
RELX PLC	0.195	0.563
ENGIE SA	-0.877	0.643
ORANGE SA	-0.692	0.533
KONINKLIJKE PHILIPS	0.034	0.977
TESCO PLC	-0.556	0.586
ANGLO AMERICAN PLC	0.124	1.468
DASSAULT SYSTEMES	0.53	0.663
MUNCHENER RUCKVER	0.07	0.696
OERSTED A/S	0.067	-0.046
COMPAGNIE FINAN	0.371	1.285
BANCO BILBAO VIZCAYA	-0.885	1.275
CREDIT AGRICOLE SA	-0.731	1.442
ROYAL BANK	-1.851	1.696
ASSICUR GENERALI SPA	-0.593	1.025
CREDIT SUISSE GROUP	-0.986	1.122
LONDON STOCK EXCH	1.338	1.271
SWISS RE	-0.171	1.303
VIVENDI SA	-0.417	0.654
ELECTRICIT DE FRANCE	-1.054	0.962
UNICREDIT SPA	-1.434	1.632
DEUTSCHE BANK AG	-1.391	1.429
HENNES & MAURITZ AB	-0.169	0.646
KBC GROUP NV	-0.021	2.04
KONE CORPORATION	0.924	0.781
KONINKLIJKE AHOLD	0.274	0.625
NOKIA OYJ	-0.666	1.086
STANDARD CHARTERED	-0.56	1.028

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Table 1 – *Continued from previous page*

Company Name	α	β_{F-r_f}
ALCON AG	-0.485	-0.008
AMADEUS IT GROUP SA	0.429	0.313
DEUTSCHE BOERSE AG	0.583	1.03
DNB ASA	0.069	1.235
E.ON SE	-0.885	0.911
TELEFONAKTIEBOLAGET	-0.606	0.866
EXPERIAN PLC	0.306	0.754
LAFARGEHOLCIM	-0.614	1.338
VOLVO AB	0.065	1.35
AENA SME SA	-0.064	0.125
BEIERSDORF AG	0.308	0.571
BT GROUP PLC	-0.508	0.835
FIAT CHRYSLER	0.95	2.011
GIVAUDAN SA	0.192	0.688
STE. GENL. DE FRANCE	-0.852	1.57
TELENOR GROUP	0.256	0.84
VONOVIA SE	0.014	0.223
ATLAS COPCO	0.789	1.208
CONTINENTAL AG	0.312	1.701
ENDESA S.A.	0.212	0.78
HEINEKEN HOLDING	0.193	0.784
INFINEON TECHNOLOGIE	0.797	2.276
LONZA GROUP AG	0.642	0.762
REPSOL SA	-0.415	1.059
SIKA AG	0.872	0.986
SWISSCOM	-0.467	0.431
ASSA ABLOY AB	0.497	0.968
BAE SYSTEMS	0.001	0.679
KONINKLIJKE DSM N.V.	0.378	0.956
DSV A/S	1.162	1.077
NATURGY ENERGY GROUP	-0.249	0.932
NESTE OYJ	0.524	1.003
PEUGEOT SA	-0.38	1.373
COMPAGNIE DE	-0.632	1.399
THALES SA	0.233	0.734
AKZO NOBEL N.V.	0.026	1.0
AVIVA PLC	-0.703	1.347
COLOPLAST A/S	1.052	0.463
FRESENIUS SE	0.481	0.713
HANNOVER RUECK SE	0.418	0.734
IMPERIAL BRANDS	-0.111	0.445
COMPAGNIE	-0.037	1.276
PARTNERS GRP HLDG	0.814	1.017
RENAULT REGIE	-0.471	1.909
SAMPO OYJ	0.208	0.942
SANDVIK AB	0.058	1.258
SSE PLC	-0.257	0.314

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Table 1 – *Continued from previous page*

Company Name	α	β_{F-r_f}
WFD UNIBAIL ROD	-0.342	0.952
ABN AMRO BANK	-0.512	0.054
AEROPORTS DE PARIS	0.166	0.707
ADYEN NV	-0.214	0.027
ARCELORMITTAL SA	-0.818	1.925
ASSOCIATED BRITISH	0.163	0.594
ATLANTIA SPA	-0.369	0.977
FERROVIAL SA	0.226	1.054
FORTUM OYJ	-0.005	0.664
FRESENIUS MEDICAL CA	0.127	0.518
INVESTOR AB	0.358	1.038
KERRY GROUP PLC	0.5	0.538
LEGAL & GEN'L GRP	0.027	1.398
OMV AG	0.019	1.223
SKANDINAVISKA ENSK	-0.314	1.269
SMITH & NEPHEW PLC	0.317	0.501
VESTAS WIND SYSTEMS	1.096	1.587
WIRECARD AG	2.418	1.103
CAPGEMINI SE	0.509	1.188
FERGUSON PLC	-0.131	1.396
LEGRAND S.A.	-0.004	0.919
ROLLS	0.344	0.978
RWE AG	-0.612	0.802
SV. HANDELSBANKEN AB	-0.256	0.908
TELIA COMPANY AB	-0.399	0.655
UPM	-0.146	1.178
WOLTERS KLUWER N.V.	0.246	0.86
BOUYGUES SA	-0.455	1.151
CAIXABANK	-0.778	1.005
CARLSBERG A/S	0.332	1.039
CELLNEX TEL	0.044	0.06
GEBERIT AG	0.345	0.992
KUEHNE UND NAG	0.152	0.902
MERCK KGAA	0.387	0.55
SGS SA	0.131	0.684
SODEXO	0.354	0.744
SWISS LIFE HOLDING	0.415	1.239
WPP PLC	-0.202	0.992
CARREFOUR S.A.	-0.821	0.834
DEUTSCHE WOHNEN SE	-0.052	0.894
EDP	-0.281	0.687
ERSTE GROUP BANK AG	-0.241	1.728
EXOR NV	0.736	0.97
GROEP BRUSSEL LAM	-0.4	0.801
HEIDELBERGCEMENT AG	-0.076	1.476
HEXAGON AB	1.347	1.402
INTERCONTINENTAL	0.531	1.165

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Table 1 – *Continued from previous page*

Company Name	α	β_{F-r_f}
MTU AERO ENGINES AG	0.845	0.981
NEXT PLC	0.299	0.735
RYANAIR HOLDINGS PLC	0.591	0.713
SCHINDLER HOLDING AG	0.46	0.769
SNAM SPA	-0.097	0.43
SWEDBANK AB	-0.391	1.446
ACCOR SA	-0.207	1.265
CNH INDUSTRIAL NV	-0.381	0.218
COMMERZBANK AG	-1.635	1.897
GRIFOLS SA	0.953	0.697
IAG SA	-0.125	0.507
KONINKLIJKE KPN NV	-0.578	0.593
MEDIOBANCA SPA	-0.39	1.112
WM. MORRISON SUPERMT	-0.433	0.511
MOWI ASA	1.831	0.934
J SAINSBURY PLC	-0.521	0.772
SEGRO PLC	-0.403	0.878
SOLVAY SA	-0.351	1.108
SONOVA HOLDING AG	0.545	0.915
STANDARD LIFE ABER	-0.41	0.772
VEOLIA ENVIRONNEMENT	-0.492	1.182
AP MOELLER MAERSK	-0.535	1.235
AGEAS SA	-0.446	1.587
ANTOFAGASTA PLC	0.565	1.163
ASHTED GROUP PLC	1.866	1.377
BRITISH LAND COMPANY	-0.525	0.712
BURBERRY GROUP	0.58	1.14
DANSKE BANK A/S	-0.679	1.122
EIFFAGE SA	0.383	1.27
GALP ENERGIA	0.025	0.972
GECINA	-0.048	1.342
INFORMA PLC	0.135	1.223
JULIUS BAER	-0.409	0.502
KLEPIERRE SA	-0.28	1.314
LAND SECURITIES	-0.619	0.887
MELROSE	1.326	1.259
NN GROUP NV	-0.28	0.125
OCADO GROUP PLC	1.504	0.834
PUBLICIS GROUPE SA	-0.177	0.911
RENTOKIL INITIAL PLC	0.172	0.985
STRAUMANN HOLDING AG	0.244	0.689
SYMRISE AG	0.338	0.744
TEMENOS AG	1.28	1.244
TENARIS S.A.	0.272	1.28
TERNA SPA	0.084	0.411
UCB SA	-0.094	0.519
UMICORE SA	0.598	1.248

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Table 1 – *Continued from previous page*

Company Name	α	β_{F-r_f}
YARA INTERNATIO	0.673	1.143
ACS ACTIVIDADES	0.184	1.116
AEGON N.V.	-0.81	1.569
ALFA LAVAL AB	0.557	1.23
ALSTOM SA	0.319	1.326
AROUNDTOWN SA	-0.136	0.044
BARRATT DEVELOPMENTS	0.491	1.357
CHR HANSEN HOLDING	0.49	0.318
COVESTRO AG	-0.092	0.097
GALAPAGOS	1.723	0.573
GENMAB A/S	1.687	1.026
INTERTEK GROUP	0.701	0.599
MARKS & SPENCER	-0.756	0.971
MONCLER SPA	0.038	0.216
MONDI PLC	0.265	1.05
NOVOZYMES A/S	0.518	0.815
PERSIMMON PLC	0.476	0.822
PORSCHE AUTOMOBIL	-0.193	1.396
RANDSTAD NV	-0.149	1.626
SCHRODERS PLC	0.306	1.199
SEVERN TRENT PLC	-0.04	0.354
AB SKF	0.07	1.056
SMITHS INDUSTRIES	-0.095	0.761
TELEPERFORMANCE SE	0.958	0.839
UNITED UTILITIES PLC	-0.259	0.327
VALEO SA	0.26	1.592
ADECCO GROUP	-0.565	1.26
ARKEMA SA	0.158	1.367
ATOS SE	-0.014	0.954
BALOISE HOLDING AG	0.154	1.232
BANK OF IRELAND	-1.747	2.189
BOLIDEN AB	1.012	1.788
CHOCO LINDT & SPRUEN	0.35	0.625
CLARIANT AG	-0.257	1.545
CRODA INTERNATIONAL	1.01	0.745
DEUTSCHE LUFTHANSA	-0.214	1.053
EASYJET PLC	0.991	0.527
EDENRED S.A	0.215	0.289
ELISA CORP	0.301	0.545
EPIROC AB	-0.376	0.005
GVC HOLDINGS	0.772	0.566
HALMA PLC	0.864	0.719
HARGREAVES LANSD	0.891	0.641
LANXESS AG	0.25	1.438
MICRO FOCUS INTL	1.09	0.773
NORSK HYDRO ASA	-0.339	1.312
ORKLA ASA	-0.12	0.952

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Table 1 – *Continued from previous page*

Company Name	α	β_{F-r_f}
PROXIMUS NV	-0.515	0.373
RED ELECTRICA	0.392	0.787
THE SAGE GROUP PLC	0.259	0.652
SCOR SE	0.099	0.831
STORA ENSO OYJ	-0.408	1.244
SUEZ SA	-0.673	0.657
TELE2 AB	-0.037	0.798
TELECOM ITALIA	-1.127	0.816
THE SWATCH GROUP	-0.255	1.099
THYSSENKRUPP AG	-0.507	1.498
UBISOFT ENTM.	1.567	0.964
VIFOR PHARMA AG	0.76	0.656
WARTSILA OYJ	0.386	1.281
WHITBREAD PLC	0.429	0.932
BANCO SABADELL	-0.975	0.895
BERKELEY GROUP	0.788	0.468
BRENNTAG AG	0.014	0.396
BUNZL PLC	0.387	0.463
CARNIVAL PLC	-0.319	0.907
CENTRICA PLC	-1.018	0.45
COBHAM PLC	-0.109	0.636
DCC PLC	0.591	0.746
ELECTROLUX AB	0.264	1.292
JOHNSON MATTHEY PLC	0.141	1.023
KINGSPAN GROUP PLC	0.739	1.165
LEG IMMOBILIEN AG	-0.062	0.234
LEONARDO SPA	-0.233	1.343
METSO OYJ	0.409	1.459
PEARSON PLC	-0.242	0.59
PROSIEBENSAT.1 MEDIA	-0.13	1.754
SKANSKA AB	-0.076	0.92
SPIRAX	0.889	0.788
ST. JAMES'S	0.473	0.943
SWEDISH MATCH AB	0.466	0.398
TAYLOR WIMPEY PLC	0.279	1.873
DIRECT LINE	-0.246	0.155
G4S PLC	-0.147	0.555
GEA GROUP AG	0.114	1.433
IMI PLC	0.096	1.247
ISS AS	-0.529	0.175
ITV PLC	-0.305	1.281
KINGFISHER PLC	-0.674	0.714
KINNEVIK	0.465	1.152
LOGITECH INTERNAT	0.317	1.0
NOKIAN TYRES PLC	0.342	1.254
PANDORA	0.382	0.663
PRYSMIAN SPA	-0.39	1.108

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Table 1 – *Continued from previous page*

Company Name	α	β_{F-r_f}
RSA INSURANCE GROUP	-0.235	0.671
SECURITAS AB	0.007	0.885
SMURFIT KAPPA GROUP	0.11	1.417
SVENSKA CELLULOSA	0.4	0.724
SWISS PRIME SITE	-0.042	0.432
TATE & LYLE PLC	-0.037	0.521
TRAVIS PERKINS PLC	-0.158	1.327
UNITED INTERNET AG	0.675	1.024
WEIR GROUP PLC	0.545	1.321
ENAGAS SA	-0.123	0.723
INDUSTRIVARDEN AB	0.007	1.165
DS SMITH PLC	0.348	1.115
FLUTTER ENTERTAIN	0.899	0.592
NORDEA BANK ABP	-0.378	1.12
TUI AG	-0.558	-0.043
CRH PLC	-0.179	1.042
FERRARI NV	0.29	0.068
QIAGEN N.V.	0.212	0.791
SES S.A.	-0.086	0.457
STMICROELECTRONICS	-0.182	1.55
ESSITY AB	-0.417	0.069
HENKEL AG AND	0.312	0.836

Table 2: Three factor model

Company Name	α	β_{F-r_f}	β_{HML}	β_{SMB}
NESTLE SA	0.138	0.532	0.083	-0.206
NOVARTIS	-0.336	0.518	0.154	-0.278
LVMH MOET HENNESSY	0.582	1.041	-0.056	0.123
ROCHE HOLDING AG	-0.208	0.477	0.025	0.069
3I GROUP PLC	0.566	1.129	-0.579	1.483
HSBC HOLDINGS PLC	-0.241	0.666	-0.483	0.142
SAP SE	0.085	0.679	-0.007	0.509
ANHEUSER BUSCH IN	0.061	0.691	0.313	0.754
L'OREAL SA	0.135	0.774	0.14	0.007
BP PLC	-0.62	0.853	0.138	-0.38
TOTAL SA	-0.449	0.909	0.004	-0.463
ASTRAZENECA PLC	0.175	0.541	0.123	-0.441
ASML HOLDING NV	1.39	0.95	-0.221	0.204
SANOFI	-0.114	0.509	-0.156	-0.351
ROYAL DUTCH SHELL	-0.44	0.732	0.128	-0.525
ALLIANZ SE	0.493	1.026	-0.548	0.045
GLAXOSMITHKLINE	-0.278	0.384	0.016	-0.202
AIRBUS SE	0.143	1.36	0.341	0.336
SIEMENS AG	-0.4	1.105	0.076	0.208
INDUSTRI	0.675	0.807	-0.186	0.087
DIAGEO PLC	-0.035	0.57	0.289	0.192

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Table 2 – *Continued from previous page*

Company Name	α	β_{F-r_f}	β_{HML}	β_{SMB}
UNILEVER N.V.	0.062	0.57	0.135	-0.171
NOVO NORDISK A/S	0.302	0.746	0.594	-0.27
DEUTSCHE TELEKOM AG	-0.163	0.511	-0.205	-0.811
BRITISH AMERICAN TOB	-0.054	0.491	0.269	0.056
ENEL SPA	0.16	0.639	-0.593	0.192
BAYER AG	0.072	0.833	0.019	0.498
UNILEVER PLC	0.287	0.437	0.105	-0.097
BANCO SANTANDER SA	0.539	0.931	-1.176	-0.338
HERMES INTERNATIONAL	0.844	0.594	0.116	0.595
ADIDAS AG	0.8	0.907	-0.072	0.259
VINCI	0.249	0.982	-0.098	0.424
BASF SE	-0.031	1.034	-0.037	0.307
RIO TINTO PLC	0.253	1.229	0.066	0.447
BNP PARIBAS SA	0.566	0.899	-1.095	-0.108
KERING	0.607	1.252	-0.096	0.654
VODAFONE GROUP PLC	-0.43	0.457	0.035	-0.113
AXA SA	0.672	1.166	-1.053	0.365
AIR LIQUIDE SA	0.147	0.672	-0.037	0.061
EQUINOR ASA	-0.242	0.914	0.117	-0.21
DAIMLER AG	-0.389	1.349	-0.037	0.551
DANONE SA	-0.051	0.576	0.047	-0.077
HEINEKEN N.V.	-0.035	0.757	0.213	0.155
IBERDROLA SA	0.343	0.699	-0.202	0.186
SAFRAN	0.57	0.994	0.047	1.028
ZURICH INSURANCE	0.127	0.876	-0.355	0.644
ESSILORLUXOTTICA SA	0.225	0.576	0.108	0.377
ENI GROUP	-0.592	0.948	-0.096	-0.135
LLOYDS BANKING GROUP	0.537	1.23	-1.772	1.412
BAYER. MOTOREN WERKE	-0.159	0.974	-0.012	0.284
RECKITT BENCKISER	-0.024	0.597	0.3	0.228
VOLKSWAGEN AG	1.353	0.996	-0.551	0.623
PRUDENTIAL PLC	0.53	1.208	-0.525	0.972
SCHNEIDER ELECTRIC	0.114	1.148	-0.116	0.298
BHP GROUP PLC	0.314	1.277	-0.035	-0.01
UBS GROUP AG	-0.175	1.026	-0.917	-0.143
ING GROEP N.V.	0.619	1.533	-1.404	1.077
PERNOD RICARD SA	0.002	0.83	0.168	0.221
BARCLAYS PLC	1.269	1.308	-2.321	0.781
GLENCORE PLC	0.073	0.414	-0.63	-0.409
INTESA SANPAOLO SPA	0.69	0.866	-1.311	0.254
TELEFONICA S.A.	-0.508	0.743	-0.215	-0.46
ABB LTD	0.113	1.236	-0.109	0.247
COMPASS GROUP PLC	0.506	0.73	0.172	0.078
DEUTSCHE POST AG	0.135	0.965	-0.399	0.493
NATIONAL GRID PLC	-0.394	0.339	0.291	0.103
RELX PLC	-0.023	0.602	0.201	0.136
ENGIE SA	-0.958	0.645	0.058	0.174

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Table 2 – *Continued from previous page*

Company Name	α	β_{F-r_f}	β_{HML}	β_{SMB}
ORANGE SA	-0.453	0.536	-0.156	-0.614
KONINKLIJKE PHILIPS	-0.025	0.952	0.005	0.396
TESCO PLC	-0.596	0.605	0.053	-0.094
ANGLO AMERICAN PLC	0.828	1.332	-0.665	-0.326
DASSAULT SYSTEMES	0.314	0.691	0.185	0.239
MUNCHENER RUCKVER	0.155	0.677	-0.084	-0.018
OERSTED A/S	0.094	-0.062	-0.04	0.098
COMPAGNIE FINAN	0.445	1.227	-0.131	0.406
BANCO BILBAO VIZCAYA	0.274	1.018	-1.141	-0.205
CREDIT AGRICOLE SA	0.708	1.095	-1.455	0.026
ROYAL BANK	-0.514	1.252	-1.521	1.256
ASSICUR GENERALI SPA	0.207	0.827	-0.816	0.064
CREDIT SUISSE GROUP	-0.155	0.883	-0.893	0.404
LONDON STOCK EXCH	1.507	1.115	-0.332	1.177
SWISS RE	0.473	1.098	-0.721	0.524
VIVENDI SA	-0.273	0.629	-0.131	-0.096
ELECTRICIT DE FRANCE	-0.946	0.94	-0.104	-0.038
UNICREDIT SPA	0.545	1.127	-2.038	0.31
DEUTSCHE BANK AG	0.003	1.102	-1.396	-0.069
HENNES & MAURITZ AB	-0.139	0.628	-0.045	0.105
KBC GROUP NV	1.847	1.444	-2.091	1.515
KONE CORPORATION	0.275	0.879	0.575	0.585
KONINKLIJKE AHOLD	-0.147	0.698	0.386	0.277
NOKIA OYJ	-0.093	0.982	-0.532	-0.334
STANDARD CHARTERED	-0.152	0.918	-0.43	0.133
ALCON AG	-0.475	-0.012	-0.012	0.011
AMADEUS IT GROUP SA	0.286	0.32	0.106	0.277
DEUTSCHE BOERSE AG	0.534	1.033	0.037	0.092
DNB ASA	0.696	1.05	-0.681	0.353
E.ON SE	-0.673	0.857	-0.217	0.031
TELEFONAKTIEBOLAGET	-0.616	0.928	0.093	-0.601
EXPERIAN PLC	0.033	0.78	0.219	0.402
LAFARGEHOLCIM	-0.096	1.152	-0.608	0.629
VOLVO AB	0.251	1.276	-0.23	0.302
AENA SME SA	-0.117	0.144	0.062	-0.068
BEIERSDORF AG	-0.139	0.649	0.41	0.296
BT GROUP PLC	-0.362	0.783	-0.171	0.174
FIAT CHRYSLER	2.036	1.695	-1.173	0.564
GIVAUDAN SA	-0.07	0.724	0.227	0.269
STE. GENL. DE FRANCE	0.701	1.172	-1.602	0.264
TELENOR GROUP	0.365	0.801	-0.128	0.137
VONOVIA SE	-0.087	0.256	0.114	-0.091
ATLAS COPCO	0.467	1.271	0.304	0.15
CONTINENTAL AG	0.388	1.618	-0.168	0.661
ENDESA S.A.	0.335	0.718	-0.17	0.327
HEINEKEN HOLDING	0.008	0.81	0.162	0.182
INFINEON TECHNOLOGIE	2.695	1.676	-2.118	1.484

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Table 2 – *Continued from previous page*

Company Name	α	β_{F-r_f}	β_{HML}	β_{SMB}
LONZA GROUP AG	0.426	0.742	0.117	0.736
REPSOL SA	0.03	0.981	-0.408	-0.299
SIKA AG	0.783	0.919	-0.034	0.897
SWISSCOM	-0.372	0.427	-0.07	-0.189
ASSA ABLOY AB	0.259	1.011	0.22	0.148
BAE SYSTEMS	-0.279	0.68	0.189	0.674
KONINKLIJKE DSM N.V.	0.351	0.882	-0.085	0.818
DSV A/S	0.89	1.036	0.125	1.08
NATURGY ENERGY GROUP	-0.089	0.853	-0.217	0.404
NESTE OYJ	0.435	0.943	-0.024	0.826
PEUGEOT SA	0.415	1.099	-0.919	0.853
COMPAGNIE DE	-0.131	1.231	-0.572	0.488
THALES SA	-0.083	0.726	0.201	0.852
AKZO NOBEL N.V.	0.06	0.904	-0.157	0.893
AVIVA PLC	-0.146	1.143	-0.66	0.719
COLOPLAST A/S	0.516	0.58	0.524	0.119
FRESENIUS SE	-0.331	0.862	0.755	0.461
HANNOVER RUECK SE	0.248	0.746	0.131	0.295
IMPERIAL BRANDS	-0.319	0.496	0.212	-0.015
COMPAGNIE	0.217	1.164	-0.328	0.521
PARTNERS GRP HLDG	0.859	0.898	-0.196	1.092
RENAULT REGIE	0.535	1.602	-1.105	0.666
SAMPO OYJ	0.393	0.838	-0.269	0.605
SANDVIK AB	0.014	1.238	0.002	0.312
SSE PLC	-0.595	0.343	0.269	0.519
WFD UNIBAIL ROD	-0.289	0.881	-0.134	0.584
ABN AMRO BANK	-0.477	0.035	-0.051	0.108
AEROPORTS DE PARIS	0.413	0.6	-0.316	0.481
ADYEN NV	-0.336	0.047	0.11	0.091
ARCELORMITTAL SA	0.067	1.646	-0.986	0.677
ASSOCIATED BRITISH	-0.23	0.637	0.325	0.515
ATLANTIA SPA	-0.193	0.905	-0.219	0.304
FERROVIAL SA	0.423	0.946	-0.283	0.616
FORTUM OYJ	-0.129	0.65	0.063	0.453
FRESENIUS MEDICAL CA	-0.347	0.616	0.456	0.155
INVESTOR AB	0.454	1.025	-0.083	-0.097
KERRY GROUP PLC	0.164	0.589	0.299	0.295
LEGAL & GEN'L GRP	0.493	1.183	-0.615	1.052
OMV AG	0.071	1.162	-0.12	0.492
SKANDINAVISKA ENSK	0.371	1.066	-0.744	0.395
SMITH & NEPHEW PLC	0.112	0.504	0.143	0.463
VESTAS WIND SYSTEMS	1.151	1.52	-0.131	0.551
WIRECARD AG	2.184	1.056	0.092	1.05
CAPGEMINI SE	0.482	1.1	-0.106	0.965
FERGUSON PLC	0.51	1.17	-0.747	0.734
LEGRAND S.A.	0.032	0.886	-0.069	0.241
ROLLS	0.221	0.978	0.083	0.301

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Table 2 – *Continued from previous page*

Company Name	α	β_{F-r_f}	β_{HML}	β_{SMB}
RWE AG	-0.604	0.778	-0.039	0.221
SV. HANDELSBANKEN AB	0.236	0.824	-0.448	-0.346
TELIA COMPANY AB	-0.294	0.679	-0.038	-0.494
UPM	-0.27	1.135	0.023	0.744
WOLTERS KLUWER N.V.	0.098	0.868	0.11	0.285
BOUYGUES SA	-0.207	1.067	-0.285	0.255
CAIXABANK	0.082	0.8	-0.865	-0.008
CARLSBERG A/S	0.322	0.982	-0.073	0.602
CELLNEX TEL	-0.038	0.086	0.092	-0.063
GEBERIT AG	0.024	0.984	0.204	0.863
KUEHNE UND NAG	-0.123	0.905	0.19	0.634
MERCK KGAA	0.177	0.615	0.233	-0.152
SGS SA	-0.088	0.692	0.159	0.449
SODEXO	0.022	0.795	0.295	0.29
SWISS LIFE HOLDING	1.23	0.961	-0.938	0.844
WPP PLC	-0.252	0.93	-0.052	0.746
CARREFOUR S.A.	-0.615	0.795	-0.193	-0.103
DEUTSCHE WOHNEN SE	-0.185	0.779	-0.07	1.49
EDP	-0.213	0.654	-0.092	0.177
ERSTE GROUP BANK AG	0.775	1.365	-1.19	1.212
EXOR NV	1.399	0.791	-0.697	0.208
GROEP BRUSSEL LAM	-0.415	0.776	-0.025	0.297
HEIDELBERGCEMENT AG	0.464	1.242	-0.69	1.063
HEXAGON AB	1.111	1.383	0.131	0.77
INTERCONTINENTAL	0.535	1.077	-0.126	0.887
MTU AERO ENGINES AG	0.479	1.026	0.31	0.431
NEXT PLC	-0.087	0.753	0.286	0.751
RYANAIR HOLDINGS PLC	0.135	0.737	0.341	0.862
SCHINDLER HOLDING AG	-0.071	0.814	0.421	0.832
SNAM SPA	-0.182	0.454	0.091	-0.034
SWEDBANK AB	0.51	1.186	-0.97	0.451
ACCOR SA	-0.118	1.17	-0.193	0.754
CNH INDUSTRIAL NV	-0.287	0.209	-0.075	-0.139
COMMERZBANK AG	0.186	1.419	-1.895	0.427
GRIFOLS SA	0.719	0.665	0.113	0.893
IAG SA	-0.106	0.465	-0.073	0.385
KONINKLIJKE KPN NV	-0.395	0.58	-0.141	-0.313
MEDIOBANCA SPA	0.647	0.823	-1.102	0.413
WM. MORRISON SUPERMT	-0.5	0.522	0.061	0.041
MOWI ASA	0.992	0.964	0.607	1.734
J SAINSBURY PLC	-0.74	0.761	0.132	0.643
SEGRO PLC	-0.088	0.698	-0.464	1.065
SOLVAY SA	0.029	0.943	-0.486	0.75
SONOVA HOLDING AG	0.118	0.958	0.347	0.6
STANDARD LIFE ABER	0.014	0.653	-0.451	0.177
VEOLIA ENVIRONNEMENT	-0.198	1.055	-0.375	0.574
AP MOELLER MAERSK	-0.124	1.112	-0.448	0.245

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Table 2 – *Continued from previous page*

Company Name	α	β_{F-r_f}	β_{HML}	β_{SMB}
AGEAS SA	-0.011	1.287	-0.713	1.994
ANTOFAGASTA PLC	0.629	1.103	-0.127	0.453
ASHTREAD GROUP PLC	1.919	1.18	-0.311	1.874
BRITISH LAND COMPANY	-0.303	0.567	-0.353	0.938
BURBERRY GROUP	0.539	1.056	-0.089	0.951
DANSKE BANK A/S	0.012	0.878	-0.807	0.801
EIFFAGE SA	0.625	1.111	-0.385	1.028
GALP ENERGIA	0.177	0.923	-0.172	0.133
GECINA	0.59	1.06	-0.824	1.316
INFORMA PLC	-0.002	1.144	-0.017	1.13
JULIUS BAER	-0.162	0.431	-0.266	0.122
KLEPIERRE SA	-0.034	1.148	-0.398	1.097
LAND SECURITIES	-0.219	0.712	-0.515	0.81
MELROSE	1.286	1.147	-0.131	1.239
NN GROUP NV	-0.357	0.139	0.073	0.038
OCADO GROUP PLC	1.698	0.662	-0.372	1.28
PUBLICIS GROUPE SA	-0.144	0.83	-0.135	0.739
RENTOKIL INITIAL PLC	0.169	0.868	-0.161	1.19
STRAUMANN HOLDING AG	0.144	0.618	-0.032	0.974
SYMRISE AG	-0.005	0.784	0.288	0.427
TEMENOS AG	1.318	1.161	-0.142	0.755
TENARIS S.A.	0.101	1.268	0.098	0.54
TERNA SPA	-0.049	0.411	0.09	0.326
UCB SA	-0.43	0.552	0.273	0.477
UMICORE SA	0.673	1.14	-0.202	0.915
YARA INTERNATIO	-0.054	1.236	0.619	0.828
ACS ACTIVIDADES	0.651	1.02	-0.449	-0.16
AEGON N.V.	0.022	1.287	-0.954	0.84
ALFA LAVAL AB	0.142	1.306	0.387	0.236
ALSTOM SA	0.347	1.261	-0.11	0.594
AROUNDTOWN SA	-0.284	0.071	0.137	0.086
BARRATT DEVELOPMENTS	1.612	0.876	-1.428	2.165
CHR HANSEN HOLDING	0.103	0.419	0.401	-0.087
COVESTRO AG	-0.297	0.117	0.165	0.299
GALAPAGOS	1.804	0.434	-0.25	1.224
GENMAB A/S	1.592	0.948	-0.044	1.02
INTERTEK GROUP	0.413	0.619	0.221	0.5
MARKS & SPENCER	-0.848	0.949	0.032	0.445
MONCLER SPA	-0.15	0.242	0.163	0.194
MONDI PLC	0.546	0.884	-0.421	1.004
NOVOZYMES A/S	-0.0	0.957	0.548	-0.188
PERSIMMON PLC	0.504	0.645	-0.265	1.722
PORSCHE AUTOMOBIL	-0.081	1.352	-0.138	0.18
RANDSTAD NV	-0.194	1.493	-0.156	1.461
SCHRODERS PLC	0.353	1.155	-0.092	0.327
SEVERN TRENT PLC	-0.188	0.4	0.164	-0.109
AB SKF	-0.032	1.042	0.049	0.394

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Table 2 – *Continued from previous page*

Company Name	α	β_{F-r_f}	β_{HML}	β_{SMB}
SMITHS INDUSTRIES	-0.332	0.761	0.16	0.575
TELEPERFORMANCE SE	0.547	0.831	0.265	1.085
UNITED UTILITIES PLC	-0.523	0.39	0.266	0.0
VALEO SA	0.554	1.391	-0.479	1.322
ADECCO GROUP	-0.519	1.167	-0.161	0.837
ARKEMA SA	0.468	1.176	-0.475	1.185
ATOS SE	-0.077	0.842	-0.115	1.296
BALOISE HOLDING AG	0.441	1.113	-0.361	0.518
BANK OF IRELAND	0.338	1.531	-2.324	1.614
BOLIDEN AB	1.617	1.609	-0.657	0.349
CHOCO LINDT & SPRUEN	0.075	0.657	0.23	0.342
CLARIANT AG	-0.155	1.393	-0.282	1.295
CRODA INTERNATIONAL	0.608	0.755	0.284	0.881
DEUTSCHE LUFTHANSA	0.086	0.922	-0.385	0.601
EASYJET PLC	1.005	0.4	-0.186	1.249
EDENRED S.A	0.15	0.319	0.086	-0.146
ELISA CORP	0.247	0.544	0.034	0.146
EPIROC AB	-0.397	0.005	0.014	0.049
GVC HOLDINGS	0.999	0.368	-0.43	1.462
HALMA PLC	0.428	0.759	0.35	0.656
HARGREAVES LANSD	0.508	0.637	0.251	0.977
LANXESS AG	0.424	1.29	-0.323	1.078
MICRO FOCUS INTL	0.306	0.918	0.731	0.431
NORSK HYDRO ASA	-0.117	1.187	-0.325	0.732
ORKLA ASA	-0.089	0.94	-0.038	0.051
PROXIMUS NV	-0.408	0.377	-0.067	-0.293
RED ELECTRICA	0.276	0.778	0.064	0.377
THE SAGE GROUP PLC	-0.066	0.647	0.212	0.837
SCOR SE	0.093	0.831	0.003	0.02
STORA ENSO OYJ	-0.307	1.133	-0.223	0.877
SUEZ SA	-0.258	0.524	-0.466	0.348
TELE2 AB	-0.044	0.815	0.029	-0.152
TELECOM ITALIA	-0.808	0.729	-0.336	0.106
THE SWATCH GROUP	0.024	0.95	-0.397	0.839
THYSSENKRUPP AG	-0.177	1.367	-0.406	0.532
UBISOFT ENTM.	1.645	0.853	-0.207	0.935
VIFOR PHARMA AG	0.423	0.709	0.301	0.279
WARTSILA OYJ	-0.071	1.312	0.35	0.798
WHITBREAD PLC	0.016	0.933	0.28	0.993
BANCO SABADELL	0.059	0.659	-1.026	-0.117
BERKELEY GROUP	0.594	0.405	0.042	1.11
BRENNTAG AG	-0.144	0.403	0.116	0.314
BUNZL PLC	0.037	0.515	0.309	0.325
CARNIVAL PLC	-0.294	0.845	-0.103	0.572
CENTRICA PLC	-1.149	0.453	0.092	0.288
COBHAM PLC	-0.113	0.569	-0.091	0.692
DCC PLC	0.421	0.729	0.09	0.59

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Table 2 – *Continued from previous page*

Company Name	α	β_{F-r_f}	β_{HML}	β_{SMB}
ELECTROLUX AB	0.475	1.193	-0.281	0.49
JOHNSON MATTHEY PLC	0.161	0.956	-0.107	0.636
KINGSPAN GROUP PLC	0.989	0.97	-0.441	1.369
LEG IMMOBILIEN AG	-0.097	0.258	0.057	-0.161
LEONARDO SPA	0.14	1.19	-0.465	0.652
METSO OYJ	0.209	1.428	0.092	0.794
PEARSON PLC	-0.108	0.553	-0.142	0.053
PROSIEBENSAT.1 MEDIA	-0.025	1.512	-0.409	2.204
SKANSKA AB	-0.078	0.907	-0.017	0.142
SPIRAX	0.69	0.77	0.11	0.66
ST. JAMES'S	0.303	0.883	0.03	1.025
SWEDISH MATCH AB	0.197	0.469	0.279	-0.059
TAYLOR WIMPEY PLC	1.882	1.22	-1.992	2.729
DIRECT LINE	-0.38	0.179	0.125	0.08
G4S PLC	-0.522	0.587	0.298	0.585
GEA GROUP AG	-0.154	1.402	0.138	0.961
IMI PLC	0.14	1.128	-0.196	1.105
ISS AS	-0.678	0.211	0.151	-0.005
ITV PLC	0.362	1.013	-0.823	1.098
KINGFISHER PLC	-0.486	0.607	-0.276	0.63
KINNEVIK	0.337	1.13	0.055	0.534
LOGITECH INTERNAT	0.569	0.859	-0.367	0.821
NOKIAN TYRES PLC	0.073	1.215	0.127	1.052
PANDORA	0.281	0.665	0.07	0.229
PRYSMIAN SPA	-0.169	0.963	-0.35	0.932
RSA INSURANCE GROUP	-0.437	0.653	0.111	0.672
SECURITAS AB	-0.093	0.93	0.13	-0.217
SMURFIT KAPPA GROUP	0.051	1.198	-0.267	2.374
SVENSKA CELLULOSA	0.259	0.711	0.077	0.477
SWISS PRIME SITE	0.191	0.324	-0.308	0.535
TATE & LYLE PLC	-0.087	0.491	-0.008	0.43
TRAVIS PERKINS PLC	0.362	1.024	-0.773	1.814
UNITED INTERNET AG	0.456	1.0	0.113	0.783
WEIR GROUP PLC	0.709	1.223	-0.248	0.598
ENAGAS SA	-0.437	0.767	0.274	0.31
INDUSTRIVARDEN AB	0.28	1.087	-0.292	0.129
DS SMITH PLC	0.364	0.977	-0.204	1.362
FLUTTER ENTERTAIN	0.346	0.629	0.425	0.97
NORDEA BANK ABP	0.194	0.972	-0.592	0.106
TUI AG	-0.591	-0.078	-0.027	0.438
CRH PLC	-0.194	0.995	-0.055	0.509
FERRARI NV	0.242	0.052	0.01	0.277
QIAGEN N.V.	-0.159	0.87	0.36	0.103
SES S.A.	-0.347	0.485	0.214	0.356
STMICROELECTRONICS	0.433	1.336	-0.714	0.678
ESSITY AB	-0.462	0.093	0.064	-0.136
HENKEL AG AND	0.212	0.84	0.073	0.201

Table 3: Four factor Model

Company Name	α	β_{F-r_f}	β_{HML}	β_{SMB}	β_{MOM}
NESTLE SA	1.409	0.539	0.068	-0.224	-0.091
NOVARTIS	1.274	0.526	0.136	-0.301	-0.115
LVMH MOET HENNESSY	0.913	1.043	-0.06	0.118	-0.024
ROCHE HOLDING AG	1.401	0.485	0.007	0.045	-0.115
3I GROUP PLC	-0.474	1.124	-0.567	1.498	0.074
HSBC HOLDINGS PLC	-1.094	0.662	-0.473	0.155	0.061
SAP SE	0.954	0.683	-0.017	0.496	-0.062
ANHEUSER BUSCH IN	1.976	0.701	0.291	0.726	-0.137
L'OREAL SA	1.388	0.78	0.126	-0.011	-0.089
BP PLC	0.024	0.856	0.13	-0.39	-0.046
TOTAL SA	1.068	0.917	-0.013	-0.485	-0.108
ASTRAZENECA PLC	1.103	0.546	0.113	-0.454	-0.066
ASML HOLDING NV	0.805	0.947	-0.214	0.212	0.042
SANOFI	1.521	0.517	-0.174	-0.375	-0.117
ROYAL DUTCH SHELL	0.813	0.738	0.114	-0.543	-0.089
ALLIANZ SE	2.436	1.036	-0.57	0.017	-0.139
GLAXOSMITHKLINE	-0.074	0.385	0.013	-0.205	-0.015
AIRBUS SE	0.718	1.363	0.334	0.328	-0.041
SIEMENS AG	0.781	1.111	0.063	0.191	-0.084
INDUSTRI	-0.964	0.799	-0.167	0.111	0.117
DIAGEO PLC	0.185	0.571	0.286	0.189	-0.016
UNILEVER N.V.	0.858	0.574	0.126	-0.183	-0.057
NOVO NORDISK A/S	1.076	0.75	0.585	-0.282	-0.055
DEUTSCHE TELEKOM AG	0.522	0.514	-0.212	-0.821	-0.049
BRITISH AMERICAN TOB	0.061	0.492	0.268	0.054	-0.008
ENEL SPA	2.476	0.65	-0.619	0.158	-0.165
BAYER AG	0.083	0.833	0.019	0.498	-0.001
UNILEVER PLC	1.016	0.441	0.097	-0.107	-0.052
BANCO SANTANDER SA	1.271	0.935	-1.184	-0.349	-0.052
HERMES INTERNATIONAL	-3.059	0.575	0.16	0.652	0.278
ADIDAS AG	1.581	0.911	-0.081	0.247	-0.056
VINCI	1.208	0.987	-0.109	0.41	-0.068
BASF SE	1.459	1.041	-0.054	0.285	-0.106
RIO TINTO PLC	-0.395	1.226	0.074	0.456	0.046
BNP PARIBAS SA	2.008	0.906	-1.112	-0.129	-0.103
KERING	0.471	1.252	-0.094	0.656	0.01
VODAFONE GROUP PLC	-0.415	0.457	0.034	-0.113	-0.001
AXA SA	1.532	1.17	-1.063	0.352	-0.061
AIR LIQUIDE SA	1.252	0.677	-0.05	0.045	-0.079
EQUINOR ASA	1.575	0.923	0.097	-0.236	-0.13
DAIMLER AG	0.656	1.354	-0.049	0.536	-0.074
DANONE SA	1.899	0.585	0.025	-0.106	-0.139
HEINEKEN N.V.	2.547	0.77	0.184	0.118	-0.184
IBERDROLA SA	3.049	0.712	-0.232	0.147	-0.193
SAFRAN	0.311	0.993	0.05	1.032	0.018
ZURICH INSURANCE	0.475	0.878	-0.359	0.639	-0.025

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Table 3 – *Continued from previous page*

Company Name	α	β_{F-r_f}	β_{HML}	β_{SMB}	β_{MOM}
ESSILORLUXOTTICA SA	0.442	0.577	0.106	0.374	-0.016
ENI GROUP	0.715	0.955	-0.111	-0.154	-0.093
LLOYDS BANKING GROUP	-2.861	1.213	-1.733	1.461	0.242
BAYER. MOTOREN WERKE	-0.339	0.973	-0.01	0.286	0.013
RECKITT BENCKISER	-0.086	0.597	0.301	0.229	0.004
VOLKSWAGEN AG	-0.044	0.989	-0.535	0.643	0.1
PRUDENTIAL PLC	-2.962	1.191	-0.485	1.023	0.249
SCHNEIDER ELECTRIC	0.919	1.152	-0.126	0.286	-0.057
BHP GROUP PLC	-1.183	1.27	-0.018	0.012	0.107
UBS GROUP AG	1.209	1.033	-0.932	-0.163	-0.099
ING GROEP N.V.	-2.029	1.52	-1.374	1.116	0.189
PERNOD RICARD SA	1.359	0.837	0.153	0.201	-0.097
BARCLAYS PLC	-6.018	1.272	-2.239	0.887	0.52
GLENCORE PLC	-0.858	0.41	-0.62	-0.395	0.066
INTESA SANPAOLO SPA	3.355	0.879	-1.341	0.216	-0.19
TELEFONICA S.A.	-0.314	0.744	-0.218	-0.463	-0.014
ABB LTD	2.575	1.248	-0.137	0.211	-0.176
COMPASS GROUP PLC	-0.094	0.727	0.178	0.087	0.043
DEUTSCHE POST AG	1.027	0.969	-0.409	0.48	-0.064
NATIONAL GRID PLC	0.311	0.342	0.283	0.092	-0.05
RELX PLC	0.913	0.607	0.191	0.123	-0.067
ENGIE SA	0.421	0.652	0.042	0.154	-0.098
ORANGE SA	0.217	0.539	-0.164	-0.624	-0.048
KONINKLIJKE PHILIPS	2.485	0.964	-0.023	0.359	-0.179
TESCO PLC	-0.433	0.606	0.051	-0.096	-0.012
ANGLO AMERICAN PLC	0.781	1.332	-0.665	-0.325	0.003
DASSAULT SYSTEMES	2.007	0.699	0.166	0.214	-0.121
MUNCHENER RUCKVER	0.817	0.68	-0.091	-0.028	-0.047
OERSTED A/S	1.472	-0.055	-0.056	0.078	-0.098
COMPAGNIE FINAN	-1.595	1.217	-0.108	0.435	0.145
BANCO BILBAO VIZCAYA	-0.011	1.016	-1.138	-0.2	0.02
CREDIT AGRICOLE SA	2.658	1.104	-1.477	-0.002	-0.139
ROYAL BANK	4.528	1.277	-1.578	1.183	-0.36
ASSICUR GENERALI SPA	0.684	0.83	-0.821	0.057	-0.034
CREDIT SUISSE GROUP	2.414	0.896	-0.923	0.367	-0.183
LONDON STOCK EXCH	1.712	1.116	-0.334	1.174	-0.015
SWISS RE	-3.097	1.08	-0.681	0.576	0.255
VIVENDI SA	1.593	0.638	-0.153	-0.124	-0.133
ELECTRICIT DE FRANCE	0.609	0.948	-0.121	-0.061	-0.111
UNICREDIT SPA	-0.156	1.124	-2.03	0.32	0.05
DEUTSCHE BANK AG	-0.625	1.099	-1.389	-0.06	0.045
HENNES & MAURITZ AB	-0.346	0.627	-0.043	0.108	0.015
KBC GROUP NV	0.256	1.436	-2.073	1.538	0.114
KONE CORPORATION	-0.531	0.875	0.584	0.596	0.057
KONINKLIJKE AHOLD	-0.36	0.697	0.389	0.28	0.015
NOKIA OYJ	0.701	0.986	-0.541	-0.345	-0.057
STANDARD CHARTERED	0.825	0.922	-0.441	0.119	-0.07

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Table 3 – *Continued from previous page*

Company Name	α	β_{F-r_f}	β_{HML}	β_{SMB}	β_{MOM}
ALCON AG	-0.466	-0.011	-0.012	0.011	-0.001
AMADEUS IT GROUP SA	-0.041	0.319	0.109	0.282	0.023
DEUTSCHE BOERSE AG	0.838	1.034	0.034	0.087	-0.022
DNB ASA	-0.238	1.045	-0.67	0.367	0.067
E.ON SE	0.694	0.864	-0.233	0.012	-0.098
TELEFONAKTIEBOLAGET	0.787	0.935	0.078	-0.621	-0.1
EXPERIAN PLC	-0.963	0.775	0.23	0.417	0.071
LAFARGEHOLCIM	-0.868	1.148	-0.599	0.64	0.055
VOLVO AB	1.257	1.281	-0.241	0.287	-0.072
AENA SME SA	0.44	0.147	0.056	-0.076	-0.04
BEIERSDORF AG	0.859	0.654	0.399	0.282	-0.071
BT GROUP PLC	0.972	0.79	-0.186	0.155	-0.095
FIAT CHRYSLER	2.499	1.698	-1.179	0.557	-0.033
GIVAUDAN SA	1.827	0.733	0.206	0.242	-0.135
STE. GENL. DE FRANCE	1.962	1.179	-1.616	0.246	-0.09
TELENOR GROUP	2.276	0.81	-0.15	0.109	-0.136
VONOVIA SE	-0.147	0.256	0.115	-0.09	0.004
ATLAS COPCO	1.521	1.276	0.292	0.135	-0.075
CONTINENTAL AG	2.459	1.628	-0.191	0.631	-0.148
ENDESA S.A.	3.349	0.733	-0.204	0.284	-0.215
HEINEKEN HOLDING	2.535	0.823	0.133	0.145	-0.18
INFINEON TECHNOLOGIE	-9.995	1.613	-1.974	1.669	0.905
LONZA GROUP AG	3.819	0.758	0.079	0.686	-0.242
REPSOL SA	2.026	0.991	-0.43	-0.328	-0.142
SIKA AG	2.541	0.928	-0.054	0.872	-0.125
SWISSCOM	0.814	0.433	-0.083	-0.206	-0.085
ASSA ABLOY AB	-1.603	1.001	0.241	0.175	0.133
BAE SYSTEMS	1.381	0.688	0.171	0.65	-0.118
KONINKLIJKE DSM N.V.	3.394	0.897	-0.119	0.774	-0.217
DSV A/S	2.007	1.042	0.113	1.064	-0.08
NATURGY ENERGY GROUP	1.457	0.861	-0.235	0.382	-0.11
NESTE OYJ	2.954	0.955	-0.053	0.789	-0.18
PEUGEOT SA	5.48	1.124	-0.976	0.779	-0.361
COMPAGNIE DE	-0.326	1.23	-0.57	0.491	0.014
THALES SA	0.597	0.729	0.194	0.842	-0.049
AKZO NOBEL N.V.	0.836	0.908	-0.165	0.882	-0.055
AVIVA PLC	-0.958	1.139	-0.651	0.731	0.058
COLOPLAST A/S	0.384	0.579	0.525	0.121	0.009
FRESENIUS SE	2.819	0.878	0.72	0.415	-0.225
HANNOVER RUECK SE	0.511	0.747	0.128	0.291	-0.019
IMPERIAL BRANDS	-0.28	0.497	0.212	-0.016	-0.003
COMPAGNIE	0.263	1.165	-0.328	0.52	-0.003
PARTNERS GRP HLDG	1.015	0.899	-0.198	1.09	-0.011
RENAULT REGIE	0.587	1.603	-1.106	0.665	-0.004
SAMPO OYJ	-0.973	0.832	-0.254	0.624	0.097
SANDVIK AB	1.185	1.243	-0.012	0.295	-0.084
SSE PLC	1.211	0.352	0.249	0.493	-0.129

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Table 3 – *Continued from previous page*

Company Name	α	β_{F-r_f}	β_{HML}	β_{SMB}	β_{MOM}
WFD UNIBAIL ROD	-1.049	0.878	-0.126	0.595	0.054
ABN AMRO BANK	-0.255	0.036	-0.053	0.105	-0.016
AEROPORTS DE PARIS	0.888	0.603	-0.321	0.474	-0.034
ADYEN NV	0.564	0.052	0.1	0.078	-0.064
ARCELORMITTAL SA	-2.078	1.636	-0.961	0.708	0.153
ASSOCIATED BRITISH	-0.838	0.634	0.332	0.524	0.043
ATLANTIA SPA	-0.184	0.906	-0.219	0.304	-0.001
FERROVIAL SA	2.793	0.958	-0.31	0.581	-0.169
FORTUM OYJ	2.652	0.663	0.032	0.412	-0.198
FRESENIUS MEDICAL CA	-0.333	0.616	0.456	0.155	-0.001
INVESTOR AB	1.621	1.03	-0.096	-0.114	-0.083
KERRY GROUP PLC	1.958	0.598	0.278	0.269	-0.128
LEGAL & GEN'L GRP	-2.373	1.169	-0.582	1.094	0.204
OMV AG	2.598	1.174	-0.149	0.455	-0.18
SKANDINAVISKA ENSK	-0.12	1.064	-0.739	0.402	0.035
SMITH & NEPHEW PLC	2.387	0.516	0.117	0.43	-0.162
VESTAS WIND SYSTEMS	1.71	1.522	-0.138	0.543	-0.04
WIRECARD AG	1.538	1.052	0.099	1.06	0.046
CAPGEMINI SE	2.333	1.109	-0.127	0.938	-0.132
FERGUSON PLC	-0.232	1.167	-0.739	0.745	0.053
LEGRAND S.A.	0.226	0.887	-0.071	0.238	-0.014
ROLLS	-0.79	0.973	0.094	0.316	0.072
RWE AG	1.857	0.79	-0.067	0.185	-0.176
SV. HANDELSBANKEN AB	-1.608	0.815	-0.427	-0.319	0.132
TELIA COMPANY AB	0.479	0.682	-0.047	-0.505	-0.055
UPM	1.153	1.142	0.007	0.723	-0.101
WOLTERS KLUWER N.V.	1.114	0.873	0.099	0.27	-0.072
BOUYGUES SA	0.596	1.071	-0.294	0.244	-0.057
CAIXABANK	-0.052	0.8	-0.864	-0.006	0.01
CARLSBERG A/S	1.403	0.988	-0.085	0.587	-0.077
CELLNEX TEL	1.878	0.095	0.07	-0.091	-0.137
GEBERIT AG	0.41	0.986	0.2	0.857	-0.028
KUEHNE UND NAG	-0.884	0.901	0.198	0.645	0.054
MERCK KGAA	1.651	0.622	0.216	-0.173	-0.105
SGS SA	0.44	0.695	0.153	0.441	-0.038
SODEXO	0.852	0.799	0.286	0.278	-0.059
SWISS LIFE HOLDING	2.922	0.969	-0.957	0.819	-0.121
WPP PLC	-0.41	0.93	-0.05	0.749	0.011
CARREFOUR S.A.	0.398	0.8	-0.204	-0.118	-0.072
DEUTSCHE WOHNEN SE	-2.467	0.768	-0.044	1.523	0.163
EDP	1.147	0.66	-0.108	0.158	-0.097
ERSTE GROUP BANK AG	-1.307	1.355	-1.166	1.242	0.148
EXOR NV	-2.514	0.772	-0.653	0.265	0.279
GROEP BRUSSEL LAM	1.387	0.785	-0.045	0.271	-0.129
HEIDELBERGCEMENT AG	-1.111	1.234	-0.672	1.086	0.112
HEXAGON AB	0.39	1.379	0.14	0.781	0.051
INTERCONTINENTAL	-1.321	1.067	-0.105	0.914	0.132

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Table 3 – *Continued from previous page*

Company Name	α	β_{F-r_f}	β_{HML}	β_{SMB}	β_{MOM}
MTU AERO ENGINES AG	0.948	1.028	0.304	0.424	-0.033
NEXT PLC	-1.92	0.744	0.307	0.778	0.131
RYANAIR HOLDINGS PLC	-0.595	0.734	0.349	0.872	0.052
SCHINDLER HOLDING AG	0.85	0.819	0.41	0.818	-0.066
SNAM SPA	1.001	0.46	0.078	-0.051	-0.084
SWEDBANK AB	-2.7	1.17	-0.934	0.497	0.229
ACCOR SA	-0.028	1.17	-0.195	0.753	-0.006
CNH INDUSTRIAL NV	-0.031	0.21	-0.078	-0.143	-0.018
COMMERZBANK AG	-0.821	1.414	-1.883	0.441	0.072
GRIFOLS SA	1.285	0.668	0.107	0.885	-0.04
IAG SA	-0.109	0.465	-0.073	0.385	0.0
KONINKLIJKE KPN NV	1.134	0.588	-0.159	-0.336	-0.109
MEDIOBANCA SPA	-0.225	0.819	-1.092	0.425	0.062
WM. MORRISON SUPERMT	-0.517	0.522	0.061	0.042	0.001
MOWI ASA	0.776	0.963	0.61	1.738	0.015
J SAINSBURY PLC	-0.623	0.762	0.131	0.642	-0.008
SEGRO PLC	3.775	0.717	-0.508	1.009	-0.275
SOLVAY SA	-0.549	0.941	-0.48	0.759	0.041
SONOVA HOLDING AG	0.77	0.962	0.34	0.59	-0.046
STANDARD LIFE ABER	0.352	0.655	-0.455	0.172	-0.024
VEOLIA ENVIRONNEMENT	3.597	1.074	-0.418	0.519	-0.271
AP MOELLER MAERSK	0.493	1.115	-0.455	0.236	-0.044
AGEAS SA	2.238	1.298	-0.739	1.961	-0.16
ANTOFAGASTA PLC	-1.118	1.095	-0.107	0.479	0.125
ASHTREAD GROUP PLC	0.45	1.172	-0.295	1.896	0.105
BRITISH LAND COMPANY	1.126	0.574	-0.37	0.917	-0.102
BURBERRY GROUP	-1.71	1.045	-0.064	0.984	0.16
DANSKE BANK A/S	0.433	0.88	-0.812	0.795	-0.03
EIFFAGE SA	3.225	1.124	-0.414	0.99	-0.185
GALP ENERGIA	-0.374	0.92	-0.166	0.141	0.039
GECINA	-1.339	1.05	-0.802	1.344	0.138
INFORMA PLC	-0.078	1.144	-0.017	1.131	0.005
JULIUS BAER	0.815	0.436	-0.277	0.108	-0.07
KLEPIERRE SA	-1.541	1.14	-0.381	1.119	0.107
LAND SECURITIES	0.37	0.714	-0.521	0.801	-0.042
MELROSE	1.254	1.146	-0.13	1.239	0.002
NN GROUP NV	-0.558	0.138	0.075	0.04	0.014
OCADO GROUP PLC	3.599	0.671	-0.393	1.252	-0.136
PUBLICIS GROUPE SA	-1.004	0.826	-0.125	0.751	0.061
RENTOKIL INITIAL PLC	-0.388	0.866	-0.155	1.198	0.04
STRAUMANN HOLDING AG	3.879	0.636	-0.075	0.92	-0.266
SYMRISE AG	1.717	0.793	0.268	0.401	-0.123
TEMENOS AG	1.508	1.162	-0.145	0.752	-0.014
TENARIS S.A.	0.172	1.268	0.097	0.539	-0.005
TERNA SPA	0.886	0.416	0.079	0.312	-0.067
UCB SA	-1.373	0.548	0.284	0.49	0.067
UMICORE SA	2.272	1.148	-0.22	0.892	-0.114

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Table 3 – *Continued from previous page*

Company Name	α	β_{F-r_f}	β_{HML}	β_{SMB}	β_{MOM}
YARA INTERNATIO	-2.139	1.226	0.642	0.859	0.149
ACS ACTIVIDADES	0.376	1.019	-0.445	-0.156	0.02
AEGON N.V.	-0.78	1.283	-0.945	0.852	0.057
ALFA LAVAL AB	0.014	1.305	0.388	0.238	0.009
ALSTOM SA	2.174	1.27	-0.13	0.567	-0.13
AROUNDTOWN SA	0.137	0.073	0.132	0.08	-0.03
BARRATT DEVELOPMENTS	-0.06	0.868	-1.409	2.19	0.119
CHR HANSEN HOLDING	-0.16	0.418	0.404	-0.083	0.019
COVESTRO AG	-0.046	0.118	0.163	0.295	-0.018
GALAPAGOS	3.561	0.442	-0.27	1.199	-0.125
GENMAB A/S	3.346	0.957	-0.064	0.994	-0.125
INTERTEK GROUP	-0.396	0.615	0.23	0.512	0.058
MARKS & SPENCER	-3.14	0.938	0.058	0.479	0.163
MONCLER SPA	-0.109	0.242	0.162	0.193	-0.003
MONDI PLC	2.653	0.895	-0.444	0.974	-0.15
NOVOZYMES A/S	2.023	0.967	0.526	-0.217	-0.144
PERSIMMON PLC	1.746	0.652	-0.279	1.704	-0.089
PORSCHE AUTOMOBIL	2.607	1.365	-0.168	0.141	-0.192
RANDSTAD NV	-1.288	1.488	-0.143	1.477	0.078
SCHRODERS PLC	0.615	1.156	-0.095	0.323	-0.019
SEVERN TRENT PLC	0.399	0.403	0.158	-0.118	-0.042
AB SKF	-0.124	1.042	0.05	0.396	0.007
SMITHS INDUSTRIES	2.044	0.773	0.133	0.54	-0.169
TELEPERFORMANCE SE	2.276	0.839	0.246	1.06	-0.123
UNITED UTILITIES PLC	0.596	0.396	0.253	-0.016	-0.08
VALEO SA	1.291	1.395	-0.487	1.311	-0.053
ADECCO GROUP	0.579	1.172	-0.174	0.821	-0.078
ARKEMA SA	0.725	1.178	-0.478	1.181	-0.018
ATOS SE	1.157	0.848	-0.129	1.278	-0.088
BALOISE HOLDING AG	-0.577	1.108	-0.35	0.533	0.073
BANK OF IRELAND	-0.908	1.525	-2.31	1.632	0.089
BOLIDEN AB	-0.804	1.597	-0.63	0.384	0.173
CHOCO LINDT & SPRUEN	1.476	0.664	0.214	0.322	-0.1
CLARIANT AG	-0.031	1.394	-0.283	1.294	-0.009
CRODA INTERNATIONAL	0.018	0.752	0.291	0.89	0.042
DEUTSCHE LUFTHANSA	1.745	0.93	-0.404	0.577	-0.118
EASYJET PLC	1.871	0.405	-0.196	1.236	-0.062
EDENRED S.A	0.479	0.321	0.083	-0.151	-0.023
ELISA CORP	3.694	0.561	-0.005	0.096	-0.246
EPIROC AB	0.81	0.011	0.001	0.032	-0.086
GVC HOLDINGS	-1.158	0.357	-0.405	1.493	0.154
HALMA PLC	0.651	0.76	0.347	0.652	-0.016
HARGREAVES LANSD	-0.906	0.63	0.267	0.997	0.101
LANXESS AG	1.242	1.294	-0.333	1.066	-0.058
MICRO FOCUS INTL	-3.926	0.897	0.779	0.492	0.302
NORSK HYDRO ASA	-0.0	1.188	-0.326	0.73	-0.008
ORKLA ASA	2.09	0.951	-0.063	0.019	-0.155

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Table 3 – *Continued from previous page*

Company Name	α	β_{F-r_f}	β_{HML}	β_{SMB}	β_{MOM}
PROXIMUS NV	1.271	0.385	-0.086	-0.317	-0.12
RED ELECTRICA	1.302	0.783	0.053	0.362	-0.073
THE SAGE GROUP PLC	0.177	0.649	0.209	0.834	-0.017
SCOR SE	-0.481	0.828	0.01	0.029	0.041
STORA ENSO OYJ	0.94	1.139	-0.237	0.858	-0.089
SUEZ SA	1.243	0.531	-0.483	0.326	-0.107
TELE2 AB	1.06	0.821	0.016	-0.168	-0.079
TELECOM ITALIA	-0.218	0.732	-0.343	0.098	-0.042
THE SWATCH GROUP	-1.127	0.944	-0.384	0.856	0.082
THYSSENKRUPP AG	1.206	1.374	-0.422	0.511	-0.099
UBISOFT ENTM.	4.568	0.868	-0.24	0.892	-0.208
VIFOR PHARMA AG	2.408	0.719	0.279	0.25	-0.142
WARTSILA OYJ	-0.922	1.307	0.36	0.811	0.061
WHITBREAD PLC	0.729	0.937	0.271	0.983	-0.051
BANCO SABADELL	0.428	0.661	-1.03	-0.122	-0.026
BERKELEY GROUP	1.701	0.411	0.03	1.094	-0.079
BRENTAG AG	0.406	0.406	0.11	0.306	-0.039
BUNZL PLC	1.474	0.522	0.292	0.304	-0.103
CARNIVAL PLC	-0.821	0.842	-0.097	0.58	0.038
CENTRICA PLC	-1.747	0.45	0.099	0.297	0.043
COBHAM PLC	1.83	0.578	-0.113	0.664	-0.139
DCC PLC	1.695	0.735	0.076	0.572	-0.091
ELECTROLUX AB	-1.915	1.181	-0.253	0.524	0.17
JOHNSON MATTHEY PLC	-0.131	0.955	-0.104	0.64	0.021
KINGSPAN GROUP PLC	3.34	0.982	-0.467	1.335	-0.168
LEG IMMOBILIEN AG	-0.232	0.257	0.059	-0.159	0.01
LEONARDO SPA	3.788	1.208	-0.507	0.599	-0.26
METSO OYJ	3.438	1.444	0.055	0.747	-0.23
PEARSON PLC	-1.337	0.547	-0.129	0.071	0.088
PROSIEBENSAT.1 MEDIA	0.869	1.516	-0.419	2.191	-0.064
SKANSKA AB	0.181	0.908	-0.02	0.138	-0.018
SPIRAX	0.184	0.768	0.116	0.668	0.036
ST. JAMES'S	2.217	0.893	0.008	0.997	-0.136
SWEDISH MATCH AB	0.765	0.471	0.273	-0.067	-0.04
TAYLOR WIMPEY PLC	-7.726	1.173	-1.883	2.869	0.685
DIRECT LINE	-0.867	0.177	0.13	0.087	0.035
G4S PLC	-0.265	0.589	0.295	0.582	-0.018
GEA GROUP AG	1.709	1.412	0.117	0.934	-0.133
IMI PLC	-0.958	1.122	-0.184	1.121	0.078
ISS AS	-1.228	0.209	0.157	0.003	0.039
ITV PLC	-2.117	1.001	-0.795	1.134	0.177
KINGFISHER PLC	-4.163	0.589	-0.235	0.684	0.262
KINNEVIK	1.286	1.135	0.044	0.52	-0.068
LOGITECH INTERNAT	1.073	0.861	-0.373	0.813	-0.036
NOKIAN TYRES PLC	-0.788	1.21	0.137	1.065	0.061
PANDORA	1.505	0.671	0.056	0.212	-0.087
PRYSMIAN SPA	2.223	0.975	-0.377	0.897	-0.171

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Table 3 – *Continued from previous page*

Company Name	α	β_{F-r_f}	β_{HML}	β_{SMB}	β_{MOM}
RSA INSURANCE GROUP	0.534	0.658	0.1	0.658	-0.069
SECURITAS AB	0.056	0.931	0.129	-0.22	-0.011
SMURFIT KAPPA GROUP	1.11	1.203	-0.279	2.358	-0.076
SVENSKA CELLULOSA	1.0	0.715	0.068	0.466	-0.053
SWISS PRIME SITE	-0.142	0.322	-0.305	0.54	0.024
TATE & LYLE PLC	-0.378	0.49	-0.005	0.435	0.021
TRAVIS PERKINS PLC	-1.787	1.013	-0.748	1.845	0.153
UNITED INTERNET AG	1.374	1.004	0.102	0.77	-0.065
WEIR GROUP PLC	1.186	1.225	-0.253	0.591	-0.034
ENAGAS SA	0.942	0.774	0.259	0.29	-0.098
INDUSTRIVARDEN AB	1.161	1.091	-0.302	0.116	-0.063
DS SMITH PLC	1.787	0.984	-0.22	1.342	-0.101
FLUTTER ENTERTAIN	-1.335	0.621	0.444	0.995	0.12
NORDEA BANK ABP	-1.826	0.962	-0.569	0.135	0.144
TUI AG	-0.442	-0.077	-0.029	0.436	-0.011
CRH PLC	-1.16	0.99	-0.044	0.523	0.069
FERRARI NV	1.29	0.057	-0.002	0.261	-0.075
QIAGEN N.V.	-0.806	0.867	0.367	0.112	0.046
SES S.A.	0.327	0.488	0.206	0.346	-0.048
STMICROELECTRONICS	0.822	1.337	-0.718	0.673	-0.028
ESSITY AB	0.069	0.096	0.058	-0.144	-0.038
HENKEL AG AND	1.114	0.844	0.063	0.188	-0.064