

VALUETRUST

finexpert capital market report

12 | 2015

Volume 5

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Preface

Dear finexpert members,

we are pleased to release the Q4 2015 finexpert capital market report. Please note the new structure and layout of this report: The research corner provides a short description of two important academic papers. Our industry beta estimates tables are followed by a graphical representation of the “rolling” estimate for 1y and 2y betas including the corresponding model power. You as a reader may use this graphs to further analyze the development and stability of the different industry beta estimates. Finally our estimate of the Svensson yield curve for the German market closes this report.

For the next year 2016 we decided on a new structure and sequence of our finexpert market reports. We will start with our German takeover report in March, covering and analyzing the WpÜG takeovers of 2015. The second report in summer 2016 will be dealing with industry multiples whereas the third one in fall will cover the industry betas.



Best regards,

Bernhard Schwetzler

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People



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Current Research

Current Research on Asset Pricing Topics

Return Predictability: Learning from the Cross-Section

Julien Penasse

Research question:

If and how much does return predictability differ among countries?

Sample:

15 OECD countries (AUS, BEL, CAN, DNK, FRA, DEU, ITA, JPN, NLD, NOR, ESP, SWE, CHE, GBR, USA), sample periods differ among countries

Results:

- International heterogeneity is a lot smaller than previously reported
 - ⇒ Investment decisions differ only a little across countries
 - ⇒ Cross-sectional information is an important investment decision tool
 - ⇒ The cost of ignoring the cross-sectional information differs extremely between countries
- The United States have both a high equity premium and a high stock return predictability.
 - ⇒ This is an exception not the rule

Misspecified Recovery

Jaroslav Borovička, Lars Peter Hansen, José A. Scheinkman

Research question:

How can information about investors' belief be isolated from asset prices?

Theory used:

Perron—Frobenius Theory

Results:

- Asset prices contain information about the investors' belief and the probability distributions used to assess risk
 - ⇒ Information about Investors' belief needs to be isolated
- The Perron—Frobenius Theory recovers a probability measure that absorbs the long-term risk adjustments
 - ⇒ This probability measure is called “long-term risk neutral measure”
 - ⇒ Absorbing the long-term risk from the asset prices leaves the information about the investors' belief isolated

Note:

Further working papers are available on

<http://www.finexpert.info/publications.html>

Cost of Capital: Overview

Cost of Capital Q1 2015

Prime All Share Industries, DAX 30, TecDAX 30, MDAX 50: Betas and Debt-to-Equity Ratios

as of 15.01.2015

	1 year Equity Beta	R ²	n	Cost of Equity	Debt - Equity Ratio (Market Values)	Asset Beta	Asset Beta Miles Ezzell (Debt Beta = 0.3)	Net-Debt - Equity Ratio (Market Values)	Operating Asset Beta	Operating Asset Beta Miles Ezzell (Debt Beta = 0.3)
Automobiles	1.16	0.85	13	6.8%	1.12	0.67	0.69	0.85	0.75	0.75
Banks	1.15	0.62	3	6.8%						
Basic Resources	1.03	0.50	5	6.1%	1.06	0.61	0.63	0.73	0.70	0.71
Chemicals	1.17	0.89	14	6.9%	0.26	1.00	0.99	0.21	1.03	1.02
Construction	1.04	0.59	5	6.1%	0.93	0.65	0.67	0.63	0.74	0.74
Consumer	0.69	0.55	27	4.2%	0.11	0.64	0.64	-0.01	0.69	0.69
Financial Services	0.60	0.66	32	3.7%						
Food & Beverages	0.71	0.09	2	4.3%	1.23	0.40	0.45	0.93	0.44	0.49
Industrial	0.99	0.86	77	5.9%	0.38	0.80	0.80	0.20	0.88	0.88
Insurance	0.80	0.72	4	4.8%						
Media	0.74	0.53	12	4.5%	0.18	0.66	0.67	0.12	0.69	0.69
Pharma & Healthcare	0.70	0.59	33	4.2%	0.27	0.59	0.60	0.19	0.62	0.62
Retail	0.73	0.57	20	4.4%	0.38	0.58	0.60	0.20	0.64	0.65
Software	0.95	0.66	32	5.6%	0.15	0.86	0.86	0.09	0.90	0.89
Technology	1.00	0.53	21	5.9%	0.10	0.94	0.94	-0.16	1.12	1.13
Telecommunication	1.02	0.62	8	6.0%	0.67	0.71	0.72	0.53	0.76	0.76
Transport. & Logistics	1.09	0.73	10	6.4%	0.51	0.82	0.82	0.28	0.92	0.92
Utilities	1.05	0.56	4	6.2%	1.81	0.48	0.53	1.15	0.60	0.63
Prime All Share	1.00	1.00	322	5.9%	0.55	0.74	0.74	0.38	0.80	0.80
DAX 30	1.05	0.99	30	6.2%	0.52	0.79	0.79	0.39	0.84	0.84
TecDAX 30	0.94	0.70	30	5.6%	0.10	0.88	0.88	-0.02	0.96	0.96
MDAX 50	0.79	0.84	50	4.8%	0.34	0.65	0.66	0.14	0.73	0.73

Prime All Share Industries, DAX 30, TecDAX 30, MDAX 50: Cost of Capital

as of 15.01.2015

	Median ROE (Return on Equity)	Median Non- Cash ROE (Return on Equity)	Median ROC (Return on Capital)	Median Non- cash ROC (Return on Capital)	Median Capex / Depr.	Median Dividend payout
Automobiles	0.20	0.12	0.13	0.14	1.16	0.31
Banks					1.80	0.00
Basic Resources	-0.02	0.02	0.02	0.02	1.03	0.24
Chemicals	0.10	0.09	0.08	0.09	1.18	0.47
Construction	0.05	-0.04	0.06	0.07	0.90	1.32
Consumer	0.11	0.07	0.08	0.09	1.11	0.44
Financial Services	0.02		0.03		2.90	0.26
Food & Beverages	0.14	0.06	0.11	0.13	0.80	0.46
Industrial	0.14	0.08	0.10	0.12	0.79	0.26
Insurance					1.73	0.42
Media	0.04	0.09	0.05	0.12	0.47	0.97
Pharma & Healthcare	0.02	0.04	0.04	0.06	0.46	0.31
Retail	0.02	0.05	0.03	0.03	1.03	0.30
Software	0.14	0.09	0.11	0.17	0.51	0.29
Technology	0.05	0.03	0.05	0.06	0.58	0.29
Telecommunication	0.05	0.02	0.03	0.03	0.59	0.72
Transport. & Logistics	0.11	0.04	0.07	0.08	1.07	0.52
Utilities	0.03	0.04	0.04	0.04	1.28	0.81
Prime All Share	0.09	0.06	0.07	0.10	0.83	0.35
DAX 30	0.19	0.10	0.12	0.11	1.12	0.37
TecDAX 30	0.12	0.09	0.12	0.15	0.51	0.37
MDAX 50	0.13	0.09	0.10	0.13	1.14	0.40

Cost of Capital Q2 2015

Prime All Share Industries, DAX 30, TecDAX 30, MDAX 50: Betas and Debt-to-Equity Ratios

as of 15.04.2015

	1 year Equity Beta	R ²	n	Cost of Equity	Debt - Equity Ratio (Market Values)	Asset Beta	Asset Beta Miles Ezzell (Debt Beta = 0.3)	Net-Debt - Equity Ratio (Market Values)	Operating Asset Beta	Operating Asset Beta Miles Ezzell (Debt Beta = 0.3)
Automobiles	1.21	0.83	13	6.8%	1.05	0.72	0.70	0.83	0.78	0.76
Banks	1.12	0.58	3	6.2%						
Basic Resources	0.96	0.41	5	5.4%	0.87	0.61	0.61	0.61	0.69	0.68
Chemicals	1.18	0.89	14	6.6%	0.28	1.00	0.97	0.25	1.02	0.99
Construction	1.05	0.62	5	5.9%	0.73	0.71	0.70	0.49	0.79	0.78
Consumer	0.70	0.57	27	3.9%	0.17	0.63	0.63	0.03	0.68	0.68
Financial Services	0.61	0.63	32	3.5%						
Food & Beverages	0.69	0.08	2	3.9%	1.07	0.41	0.44	0.81	0.45	0.48
Industrial	0.98	0.84	77	5.5%	0.40	0.78	0.76	0.26	0.84	0.82
Insurance	0.79	0.70	4	4.4%						
Media	0.71	0.53	13	4.0%	0.11	0.66	0.66	0.07	0.68	0.68
Pharma & Healthcare	0.69	0.56	32	3.9%	0.28	0.58	0.58	0.18	0.62	0.62
Retail	0.72	0.55	20	4.1%	0.32	0.60	0.60	0.14	0.66	0.66
Software	0.93	0.61	32	5.2%	0.12	0.86	0.85	0.07	0.88	0.88
Technology	0.98	0.49	21	5.5%	0.07	0.94	0.93	-0.12	1.06	1.08
Telecommunication	1.01	0.61	8	5.7%	0.60	0.73	0.71	0.48	0.77	0.76
Transport. & Logistics	0.99	0.65	9	5.6%	0.56	0.73	0.72	0.41	0.78	0.77
Utilities	1.06	0.50	4	5.9%	1.56	0.53	0.54	1.08	0.62	0.62
Prime All Share	1.00	1.00	321	5.6%	0.53	0.74	0.73	0.40	0.79	0.78
DAX 30	1.06	0.99	30	5.9%	0.49	0.80	0.78	0.39	0.84	0.82
TecDAX 30	0.88	0.69	30	4.9%	0.13	0.81	0.80	-0.02	0.89	0.89
MDAX 50	0.79	0.84	50	4.4%	0.35	0.64	0.64	0.22	0.69	0.68

Prime All Share Industries, DAX 30, TecDAX 30, MDAX 50: Cost of Capital

as of 15.04.2015

	Median ROE (Return on Equity)	Median Non- Cash ROE (Return on Equity)	Median ROC (Return on Capital)	Median Non- cash ROC (Return on Capital)	Median Capex / Depr.	Median Dividend payout
Automobiles	0.19	0.12	0.13	0.14	1.34	0.29
Banks					0.67	0.14
Basic Resources	-0.01	0.02	0.02	0.02	1.03	0.24
Chemicals	0.11	0.07	0.09	0.11	1.17	0.48
Construction	0.04	0.03	0.06	0.07	1.12	0.23
Consumer	0.11	0.07	0.09	0.10	1.37	0.48
Financial Services	0.03		0.03		2.27	0.22
Food & Beverages	0.14	0.06	0.11	0.13	0.80	0.46
Industrial	0.13	0.07	0.10	0.12	0.86	0.34
Insurance					1.69	0.42
Media	0.20	0.15	0.18	0.29	0.48	0.40
Pharma & Healthcare	0.05	0.04	0.04	0.07	0.62	0.42
Retail	0.04	0.05	0.04	0.04	0.87	0.28
Software	0.15	0.09	0.12	0.21	0.53	0.29
Technology	0.07	0.03	0.06	0.08	0.71	0.20
Telecommunication	0.08	0.06	0.06	0.06	0.52	0.42
Transport. & Logistics	0.08	0.05	0.06	0.06	1.10	0.49
Utilities	0.02	0.05	0.04	0.04	1.43	0.63
Prime All Share	0.09	0.07	0.08	0.10	0.88	0.34
DAX 30	0.17	0.10	0.10	0.13	1.27	0.44
TecDAX 30	0.14	0.09	0.11	0.15	0.60	0.33
MDAX 50	0.16	0.10	0.12	0.13	0.98	0.40

Cost of Capital Q3 2015

Prime All Share Industries, DAX 30, TecDAX 30, MDAX 50: Betas and Debt-to-Equity Ratios

as of 15.07.2015

	1 year Equity Beta	R ²	n	Cost of Equity	Debt - Equity Ratio (Market Values)	Asset Beta	Asset Beta Miles Ezzell (Debt Beta = 0.3)	Net-Debt - Equity Ratio (Market Values)	Operating Asset Beta	Operating Asset Beta Miles Ezzell (Debt Beta = 0.3)
Automobiles	1.19	0.84	13	7.3%	1.20	0.67	0.70	0.95	0.73	0.76
Banks	1.03	0.59	4	6.5%						
Basic Resources	0.87	0.40	5	5.5%	0.80	0.57	0.61	0.56	0.64	0.66
Chemicals	1.19	0.93	13	7.3%	0.30	1.00	1.00	0.27	1.02	1.02
Construction	1.02	0.69	5	6.4%	0.77	0.68	0.71	0.52	0.76	0.78
Consumer	0.76	0.69	27	5.0%	0.18	0.68	0.69	0.04	0.74	0.75
Financial Services	0.68	0.67	30	4.5%						
Food & Beverages	0.49	0.05	2	3.5%	0.84	0.31	0.38	0.62	0.35	0.40
Industrial	0.94	0.89	76	6.0%	0.39	0.75	0.77	0.22	0.82	0.83
Insurance	0.85	0.76	4	5.4%						
Media	0.70	0.65	12	4.6%	0.17	0.63	0.64	0.12	0.65	0.66
Pharma & Healthcare	0.79	0.66	32	5.1%	0.29	0.66	0.68	0.19	0.70	0.71
Retail	0.65	0.57	22	4.3%	0.31	0.54	0.56	0.14	0.59	0.60
Software	0.88	0.67	31	5.6%	0.12	0.82	0.82	0.07	0.85	0.85
Technology	0.94	0.55	21	6.0%	0.08	0.90	0.90	-0.11	1.01	1.01
Telecommunication	1.10	0.73	8	6.8%	0.61	0.79	0.80	0.48	0.84	0.85
Transport. & Logistics	0.93	0.73	10	5.9%	0.62	0.66	0.69	0.46	0.71	0.73
Utilities	0.99	0.55	4	6.2%	1.95	0.44	0.52	1.35	0.53	0.58
Prime All Share	1.00	1.00	319	6.3%	0.56	0.73	0.75	0.42	0.79	0.80
DAX 30	1.05	0.99	30	6.6%	0.53	0.78	0.80	0.42	0.83	0.84
TecDAX 30	0.87	0.75	30	5.6%	0.13	0.81	0.81	0.03	0.86	0.86
MDAX 50	0.79	0.88	50	5.1%	0.32	0.65	0.67	0.17	0.71	0.72

Prime All Share Industries, DAX 30, TecDAX 30, MDAX 50: Cost of Capital

as of 15.07.2015

	Median ROE (Return on Equity)	Median Non- Cash ROE (Return on Equity)	Median ROC (Return on Capital)	Median Non- cash ROC (Return on Capital)	Median Capex / Depr.	Median Dividend payout
Automobiles	0.19	0.11	0.10	0.11	1.34	0.30
Banks					0.67	0.14
Basic Resources	0.02	0.03	0.03	0.03	0.90	0.55
Chemicals	0.12	0.07	0.09	0.11	1.17	0.48
Construction	0.01	0.03	0.05	0.06	0.88	0.21
Consumer	0.11	0.07	0.09	0.10	1.03	0.50
Financial Services	0.03		0.03		2.25	0.38
Food & Beverages	0.05	0.03	0.05	0.07	4.60	4.30
Industrial	0.12	0.07	0.09	0.10	0.87	0.35
Insurance					1.69	0.42
Media	0.07	0.10	0.06	0.06	0.40	0.38
Pharma & Healthcare	0.06	0.04	0.04	0.06	0.74	0.35
Retail	0.08	0.05	0.07	0.05	0.87	0.28
Software	0.17	0.09	0.12	0.15	0.73	0.33
Technology	0.06	0.03	0.05	0.08	0.74	0.24
Telecommunication	0.02	0.04	0.02	0.02	0.53	0.44
Transport. & Logistics	0.16	0.07	0.08	0.08	0.82	0.48
Utilities	0.02	0.05	0.04	0.04	1.43	0.63
Prime All Share	0.09	0.07	0.07	0.09	0.89	0.36
DAX 30	0.18	0.10	0.10	0.13	1.27	0.44
TecDAX 30	0.14	0.09	0.11	0.15	0.54	0.33
MDAX 50	0.12	0.10	0.10	0.13	0.99	0.40

Cost of Capital Q4 2015

Prime All Share Industries, DAX 30, TecDAX 30, MDAX 50: Betas and Debt-to-Equity Ratios
as of 15.10.2015

	1 year Equity Beta	R ²	n	Cost of Equity	Debt - Equity Ratio (Market Values)	Asset Beta	Asset Beta Miles Ezzell (Debt Beta = 0.3)	Net-Debt - Equity Ratio (Market Values)	Operating Asset Beta	Operating Asset Beta Miles Ezzell (Debt Beta = 0.3)
Automobiles	1.21	0.82	14	7.2%	1.49	0.61	0.65	1.18	0.68	0.71
Banks	1.09	0.67	4	6.6%						
Basic Resources	0.84	0.44	5	5.2%	0.84	0.54	0.58	0.58	0.61	0.63
Chemicals	1.15	0.94	14	6.9%	0.37	0.93	0.92	0.32	0.95	0.94
Construction	0.97	0.70	4	5.9%	0.83	0.63	0.65	0.56	0.71	0.72
Consumer	0.76	0.75	24	4.7%	0.17	0.69	0.69	0.03	0.75	0.75
Financial Services	0.74	0.71	29	4.6%						
Food & Beverages	0.37	0.04	2	2.6%	0.87	0.24	0.31	0.64	0.26	0.32
Industrial	0.93	0.90	75	5.7%	0.44	0.73	0.74	0.25	0.80	0.80
Insurance	0.85	0.84	4	5.2%						
Media	0.76	0.71	12	4.7%	0.19	0.68	0.68	0.14	0.70	0.70
Pharma & Healthcare	0.88	0.73	32	5.4%	0.32	0.73	0.73	0.18	0.79	0.79
Retail	0.64	0.64	22	4.1%	0.34	0.52	0.54	0.14	0.59	0.60
Software	0.90	0.75	33	5.5%	0.12	0.83	0.83	0.07	0.86	0.86
Technology	1.00	0.60	22	6.0%	0.08	0.95	0.95	-0.11	1.08	1.08
Telecommunication	1.11	0.77	8	6.7%	0.67	0.78	0.79	0.53	0.83	0.83
Transport. & Logistics	0.85	0.72	10	5.2%	0.66	0.59	0.62	0.49	0.64	0.66
Utilities	1.07	0.46	4	6.5%	2.99	0.36	0.46	2.07	0.46	0.53
Prime All Share	1.00	1.00	318	6.1%	0.64	0.71	0.72	0.48	0.76	0.77
DAX 30	1.05	1.00	30	6.3%	0.61	0.75	0.76	0.48	0.80	0.81
TecDAX 30	0.88	0.79	30	5.4%	0.13	0.81	0.81	0.03	0.86	0.86
MDAX 50	0.81	0.91	50	5.0%	0.37	0.65	0.67	0.20	0.72	0.72

Prime All Share Industries, DAX 30, TecDAX 30, MDAX 50: Cost of Capital

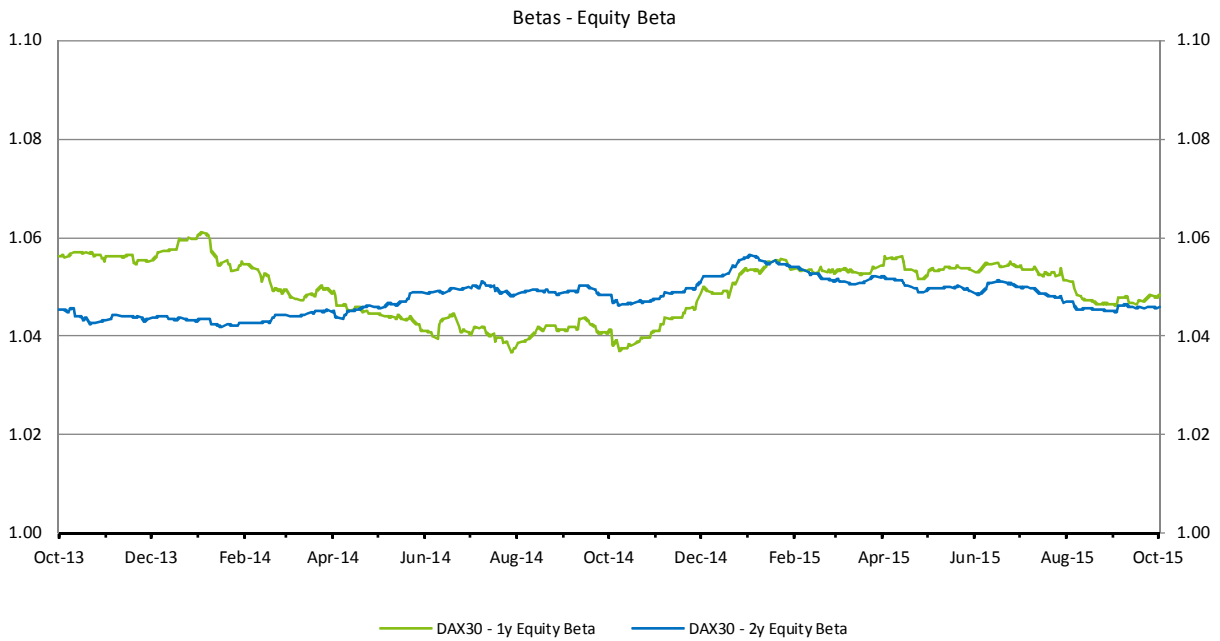
as of 15.10.2015

	Median ROE (Return on Equity)	Median Non- Cash ROE (Return on Equity)	Median ROC (Return on Capital)	Median Non- cash ROC (Return on Capital)	Median Capex / Depr.	Median Dividend payout
Automobiles	0.19	0.12	0.12	0.13	1.28	0.30
Banks					0.67	0.14
Basic Resources	0.02	0.03	0.03	0.03	0.90	0.55
Chemicals	0.13	0.07	0.09	0.11	1.17	0.48
Construction	0.03	0.04	0.06	0.07	1.01	0.21
Consumer	0.12	0.07	0.09	0.10	0.98	0.49
Financial Services	0.02		0.03		2.36	0.39
Food & Beverages	0.05	0.03	0.05	0.07	4.71	4.30
Industrial	0.12	0.07	0.09	0.10	0.87	0.35
Insurance					1.58	0.42
Media	0.08	0.10	0.06	0.06	0.45	0.40
Pharma & Healthcare	0.06	0.04	0.04	0.06	0.74	0.35
Retail	0.08	0.05	0.07	0.05	0.91	0.28
Software	0.16	0.09	0.12	0.15	0.66	0.33
Technology	0.06	0.03	0.05	0.08	0.66	0.24
Telecommunication	0.02	0.04	0.02	0.02	0.53	0.44
Transport. & Logistics	0.16	0.07	0.08	0.08	0.82	0.48
Utilities	0.02	0.05	0.04	0.04	1.43	0.63
Prime All Share	0.09	0.07	0.07	0.09	0.88	0.35
DAX 30	0.18	0.10	0.10	0.13	1.19	0.42
TecDAX 30	0.14	0.09	0.11	0.15	0.54	0.33
MDAX 50	0.14	0.10	0.10	0.13	0.98	0.40

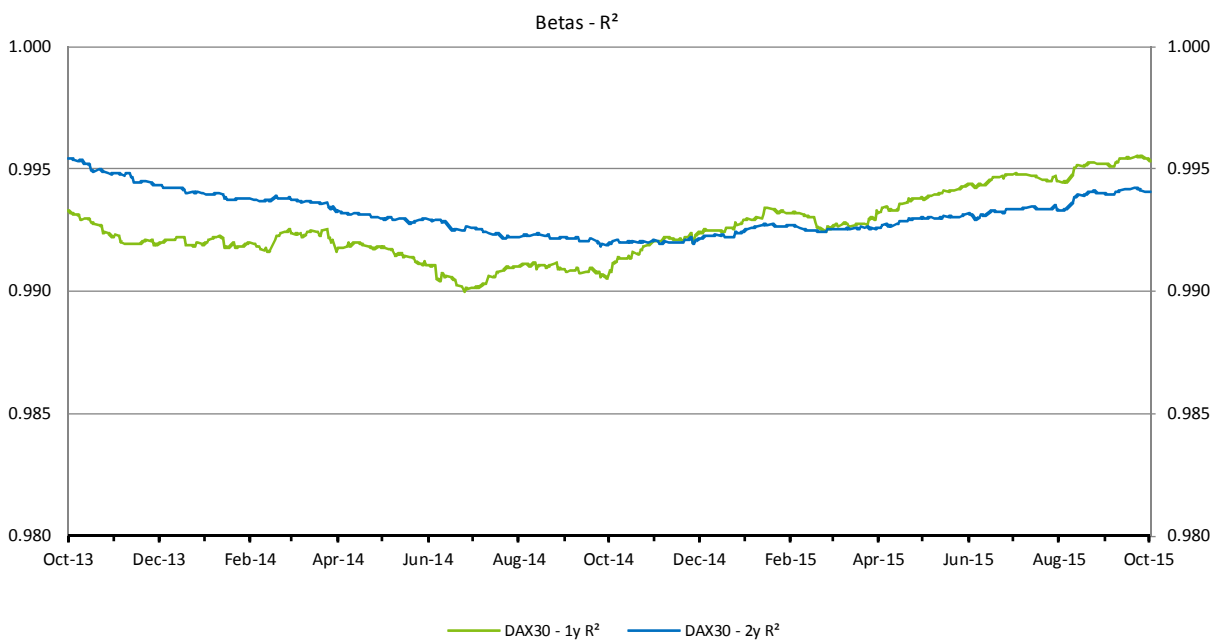
CAPM: Beta Factor Development

Development of CAPM Beta Factors - DAX 30

1 year vs. 2 year CAPM Equity Beta

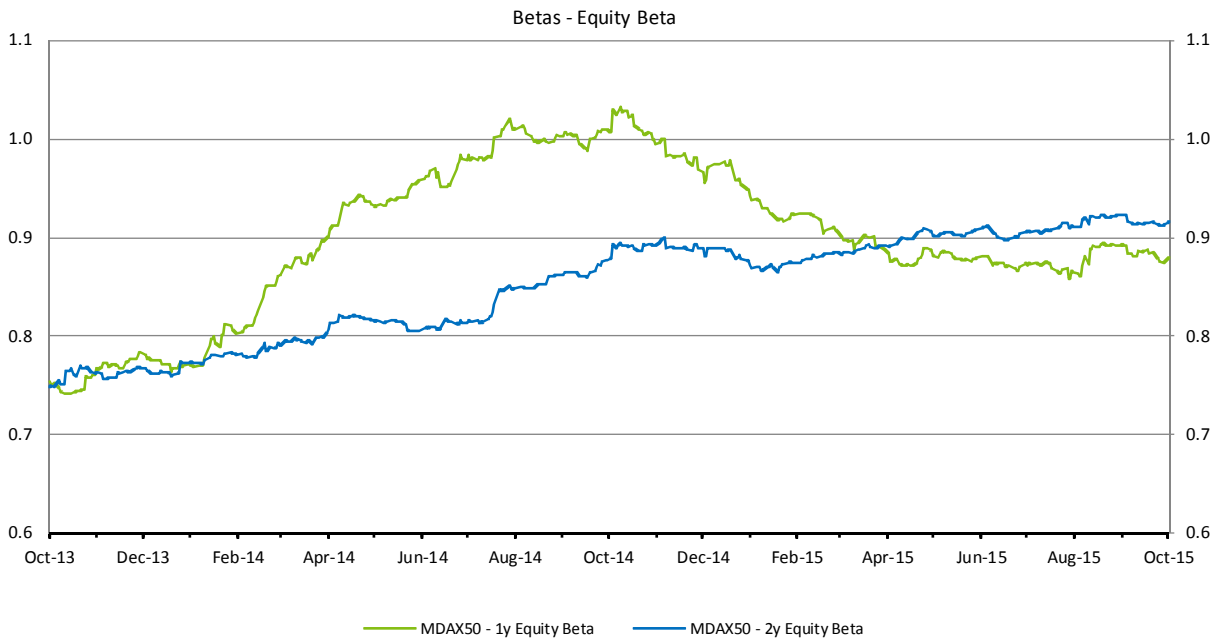


1 year vs. 2 year CAPM R²

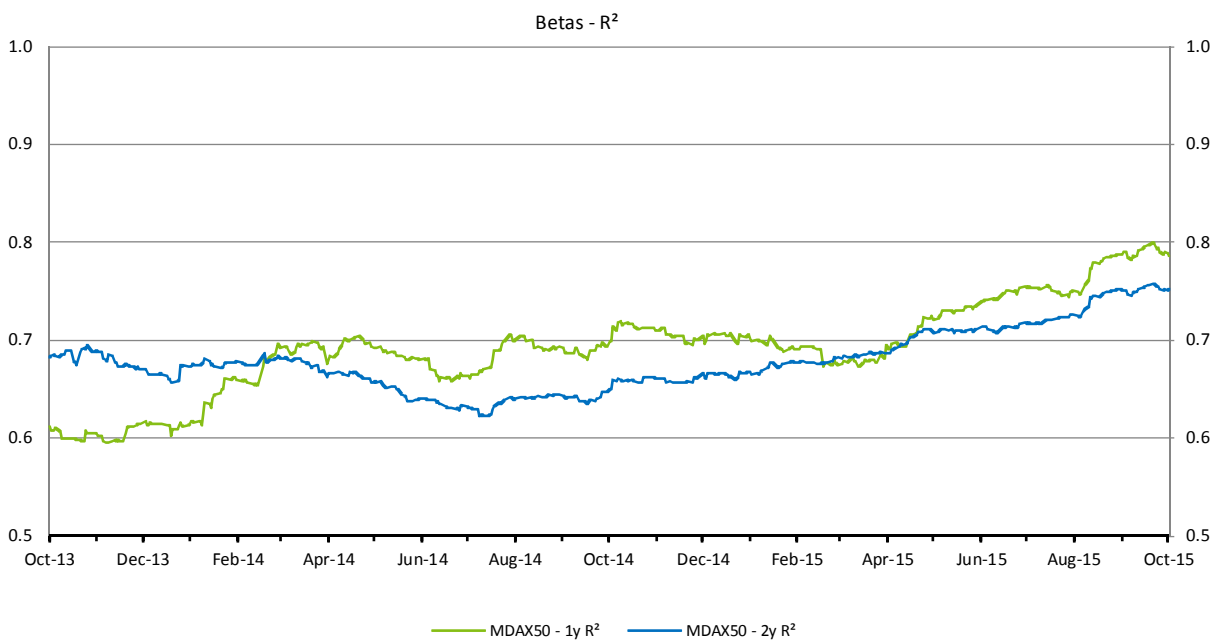


Development of CAPM Beta Factors - MDAX 50

1 year vs. 2 year CAPM Equity Beta

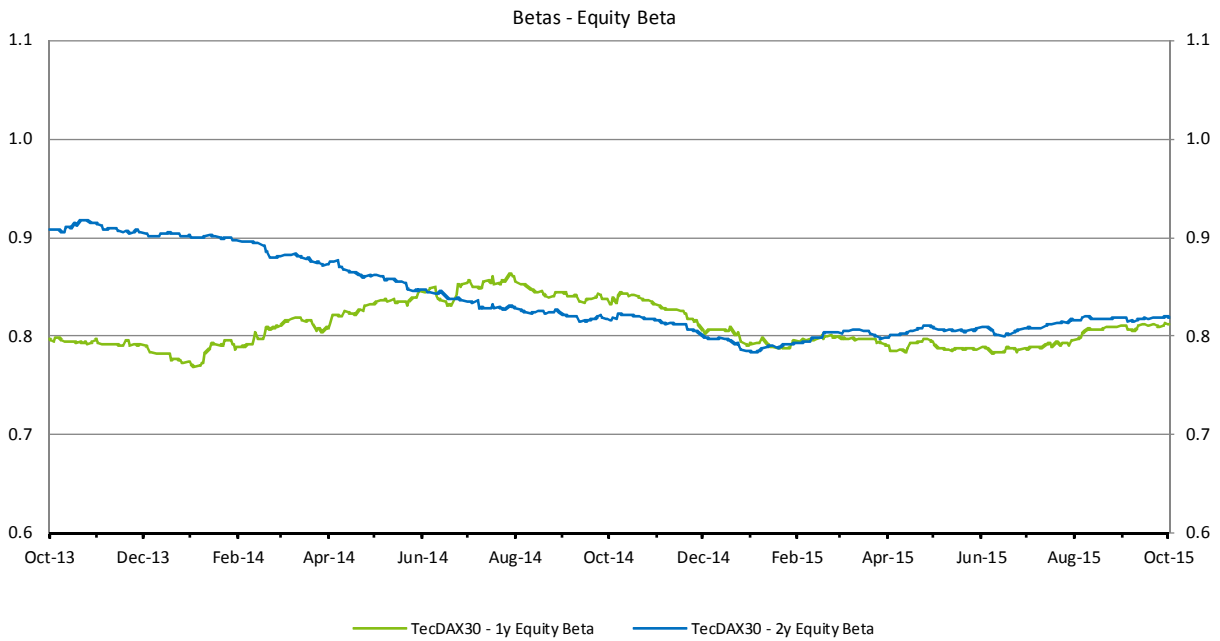


1 year vs. 2 year CAPM R²

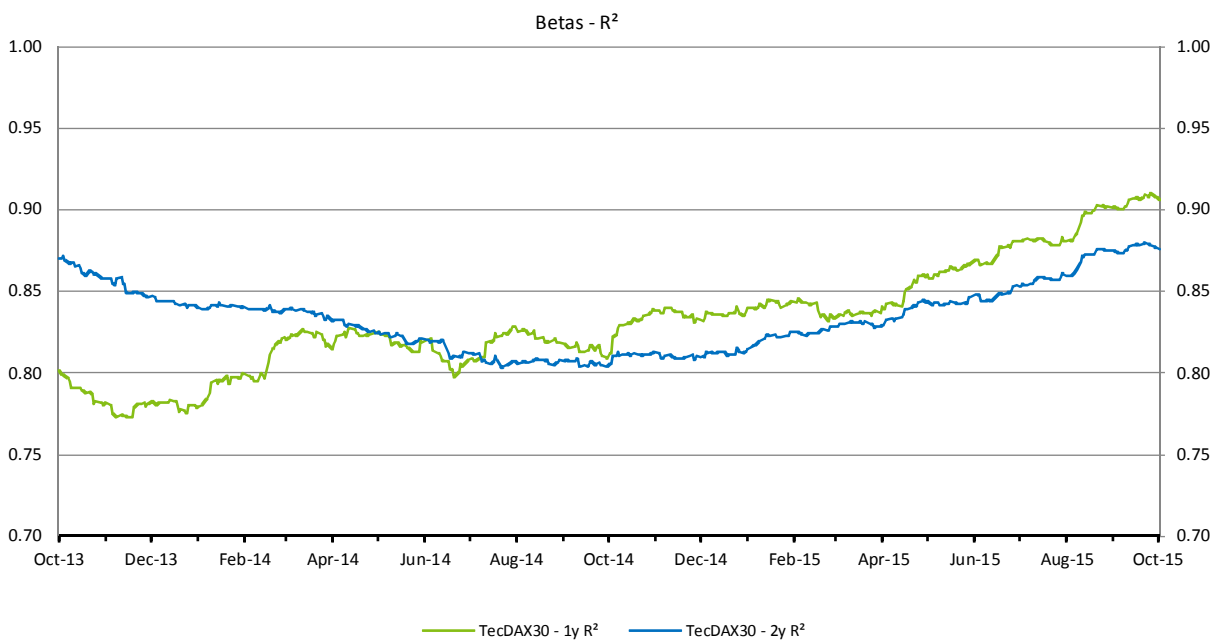


Development of CAPM Beta Factors - TecDAX 30

1 year vs. 2 year CAPM Equity Beta

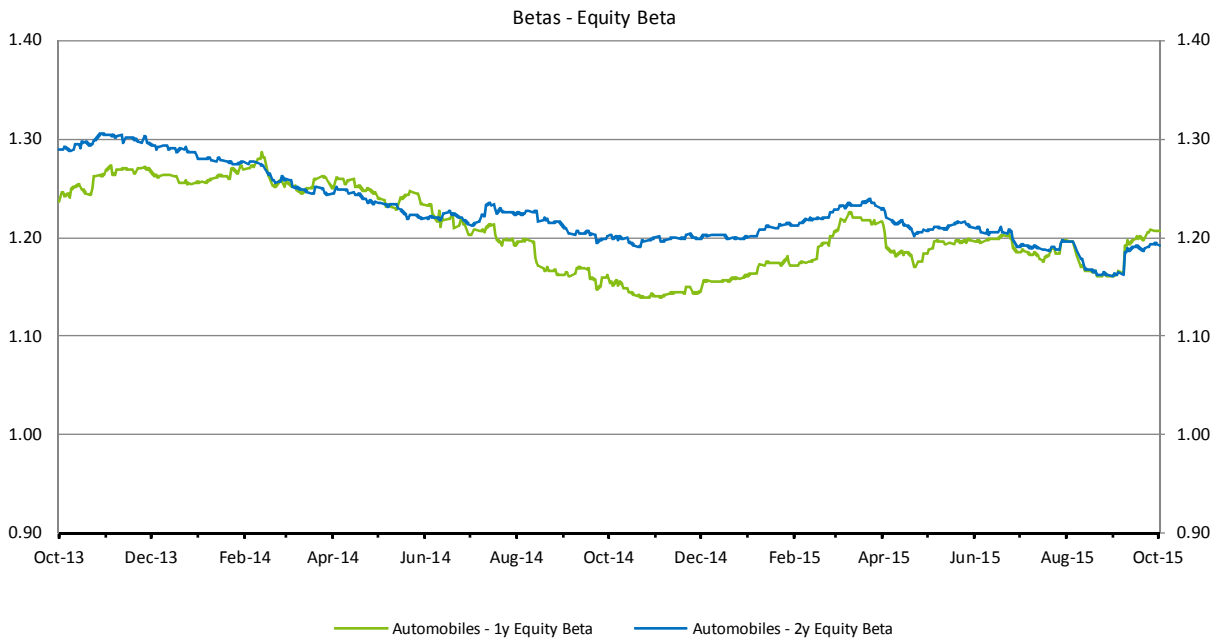


1 year vs. 2 year CAPM R²

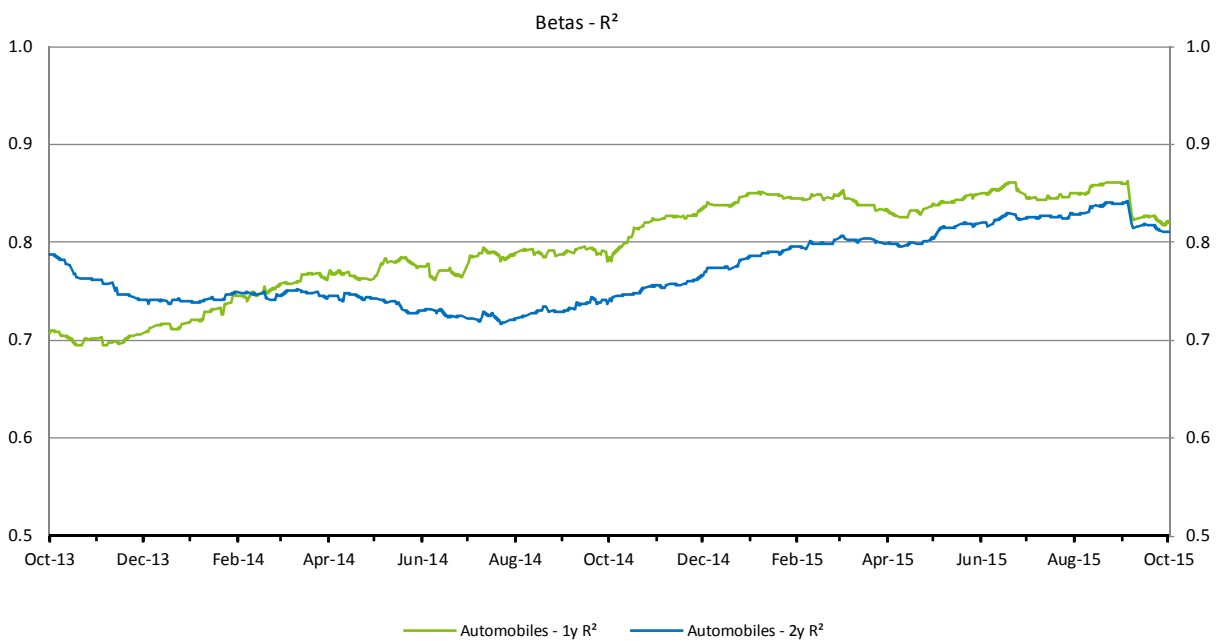


Development of CAPM Beta Factors - Automobiles

1 year vs. 2 year CAPM Equity Beta

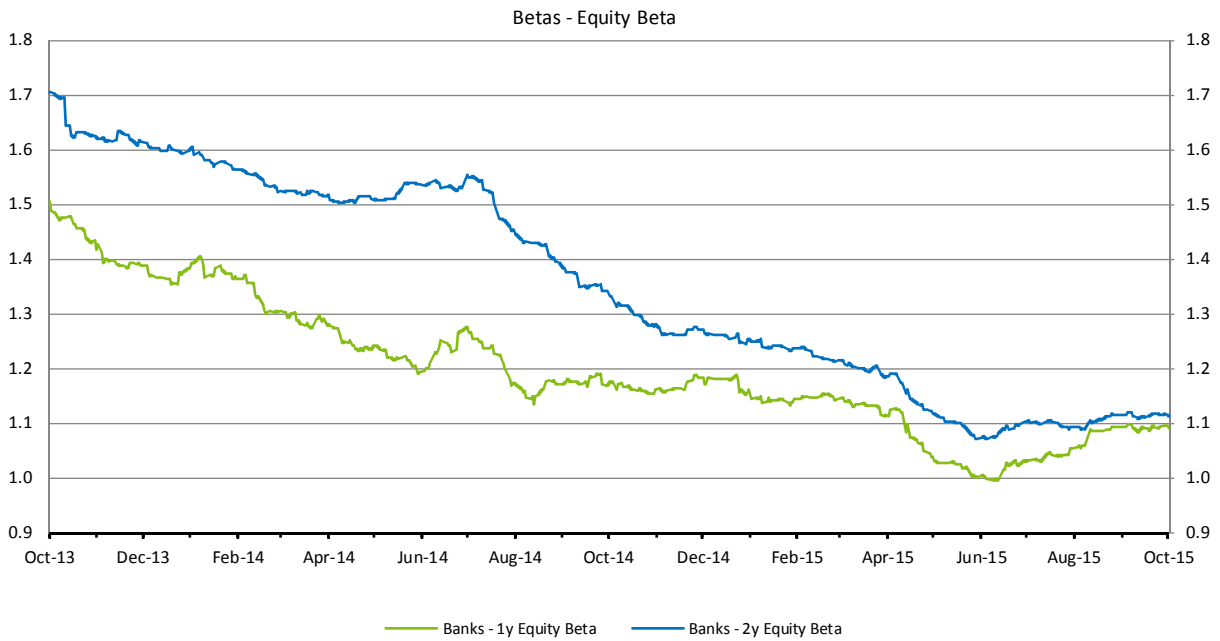


1 year vs. 2 year CAPM R²

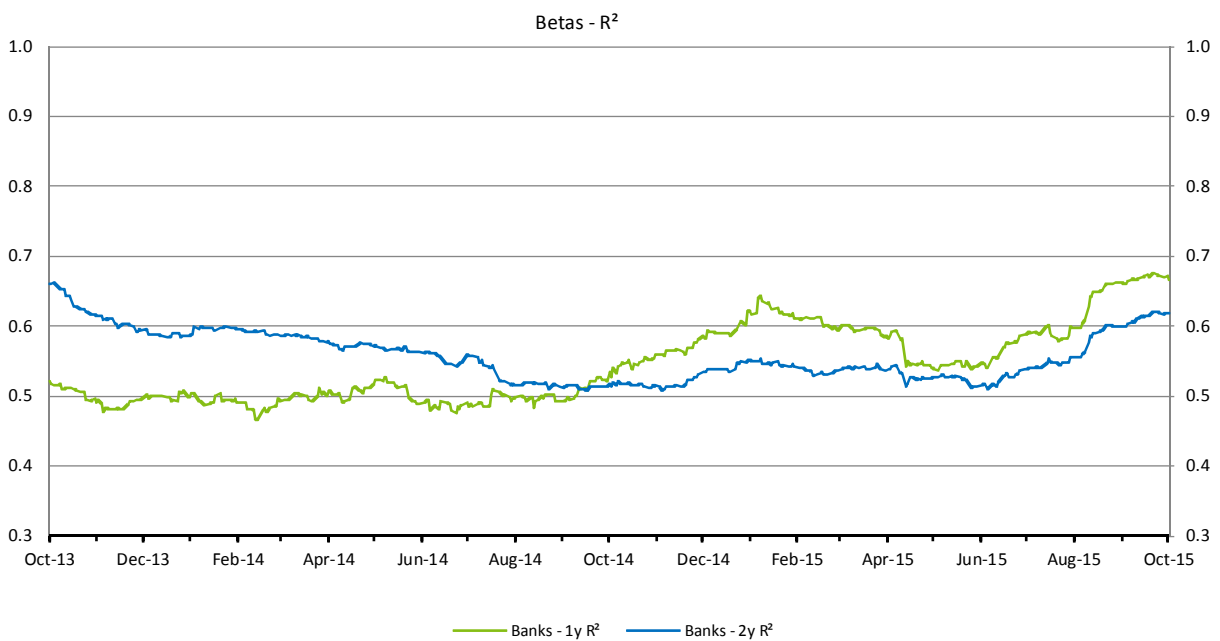


Development of CAPM Beta Factors - Banks

1 year vs. 2 year CAPM Equity Beta

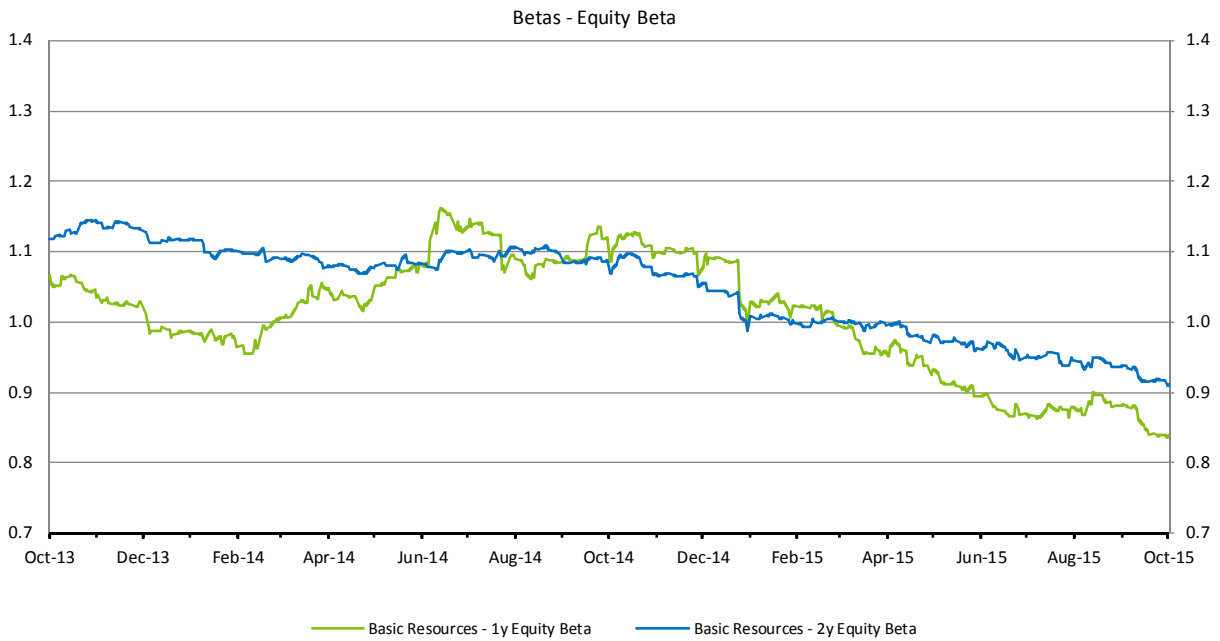


1 year vs. 2 year CAPM R²

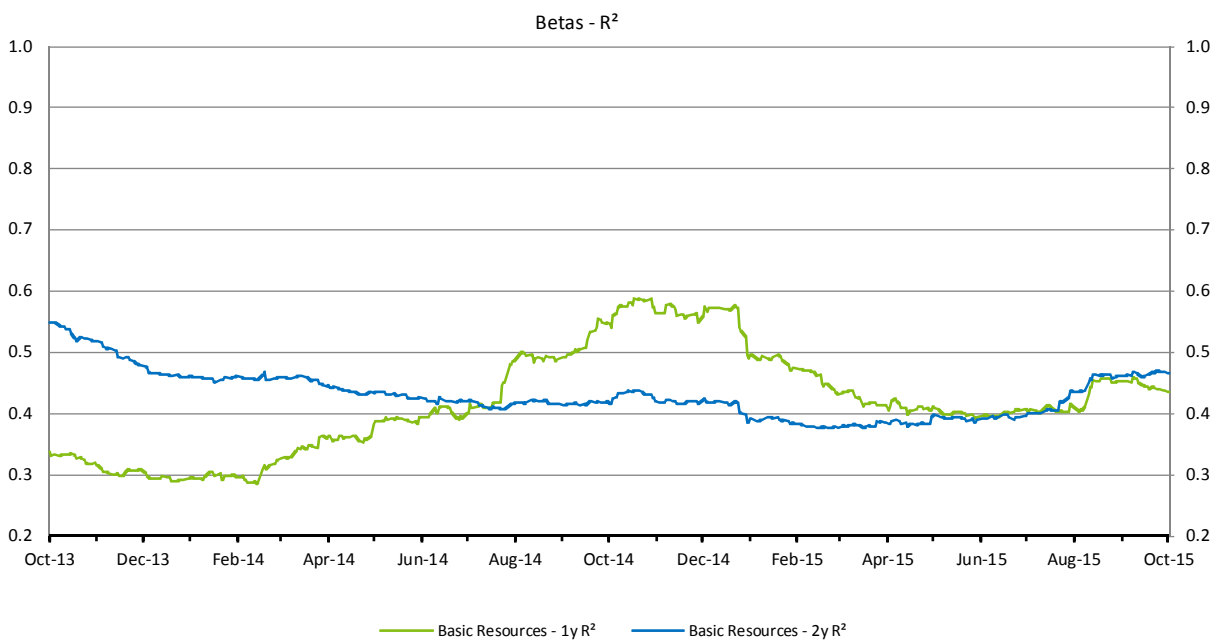


Development of CAPM Beta Factors - Basic Resources

1 year vs. 2 year CAPM Equity Beta

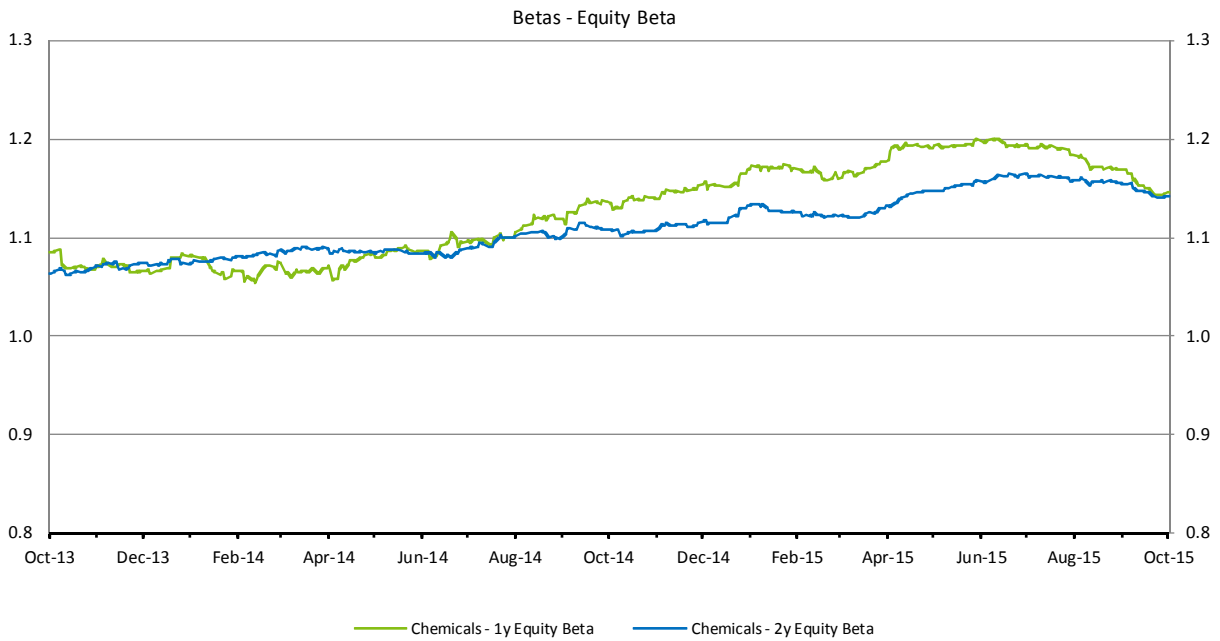


1 year vs. 2 year CAPM R²

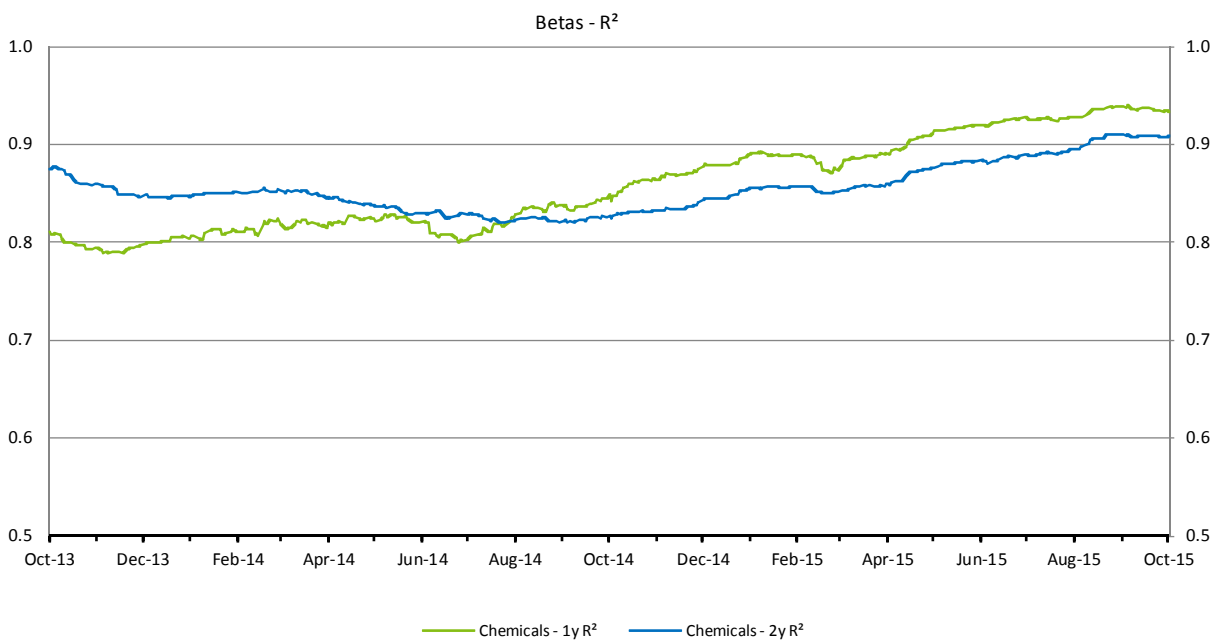


Development of CAPM Beta Factors - Chemicals

1 year vs. 2 year CAPM Equity Beta

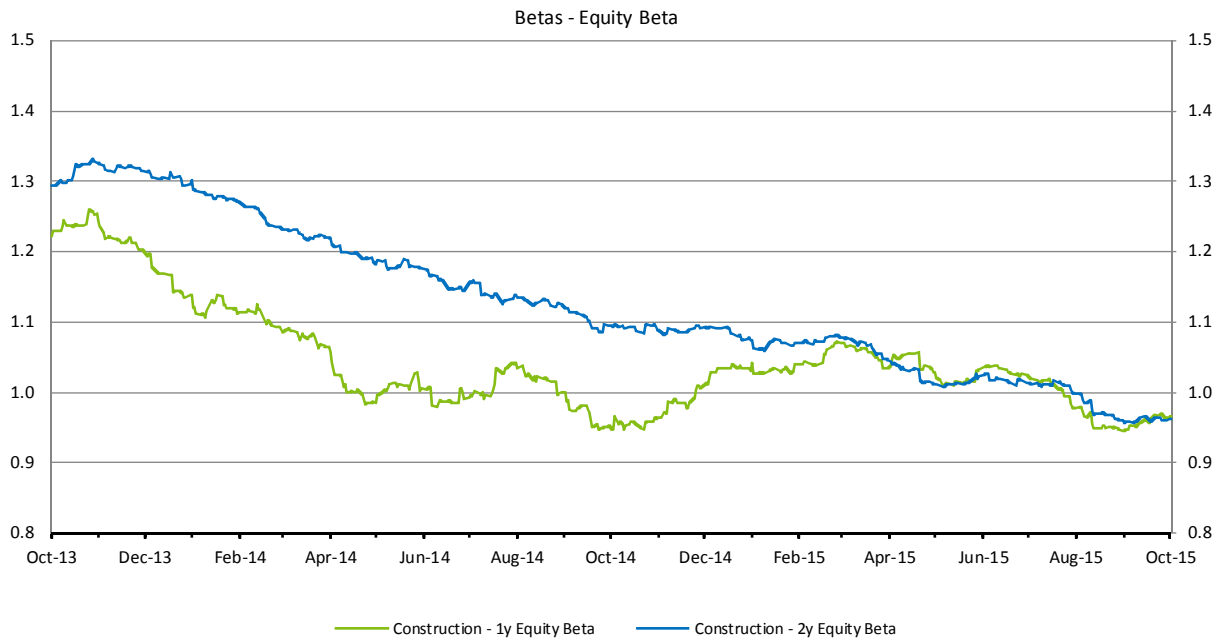


1 year vs. 2 year CAPM R²

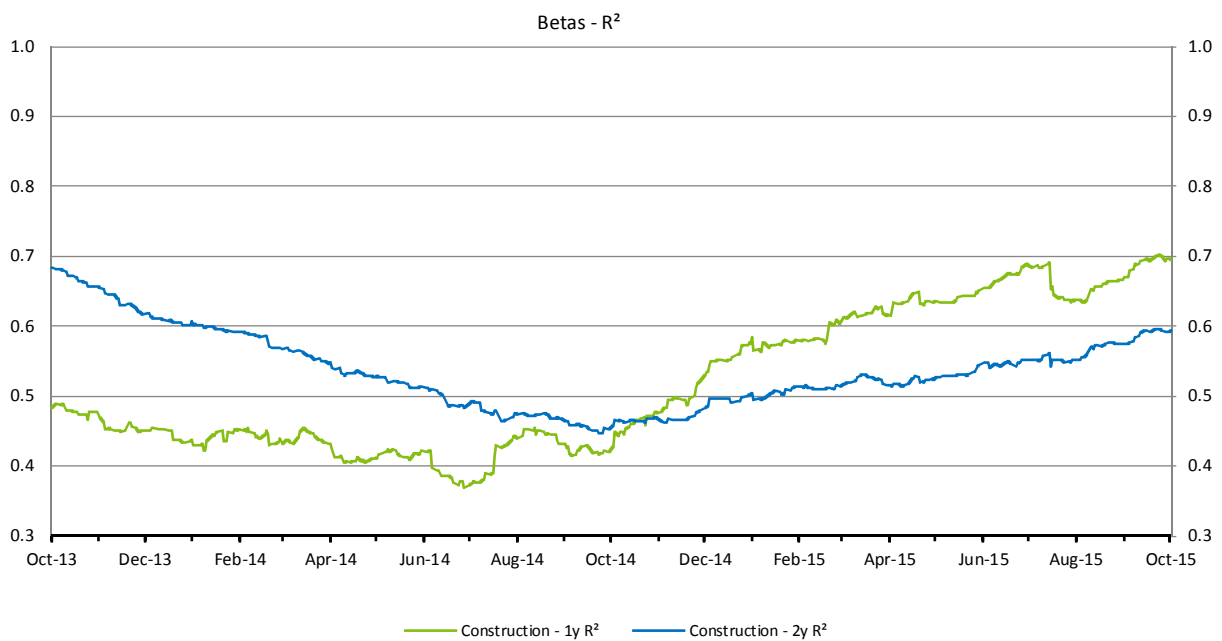


Development of CAPM Beta Factors - Construction

1 year vs. 2 year CAPM Equity Beta

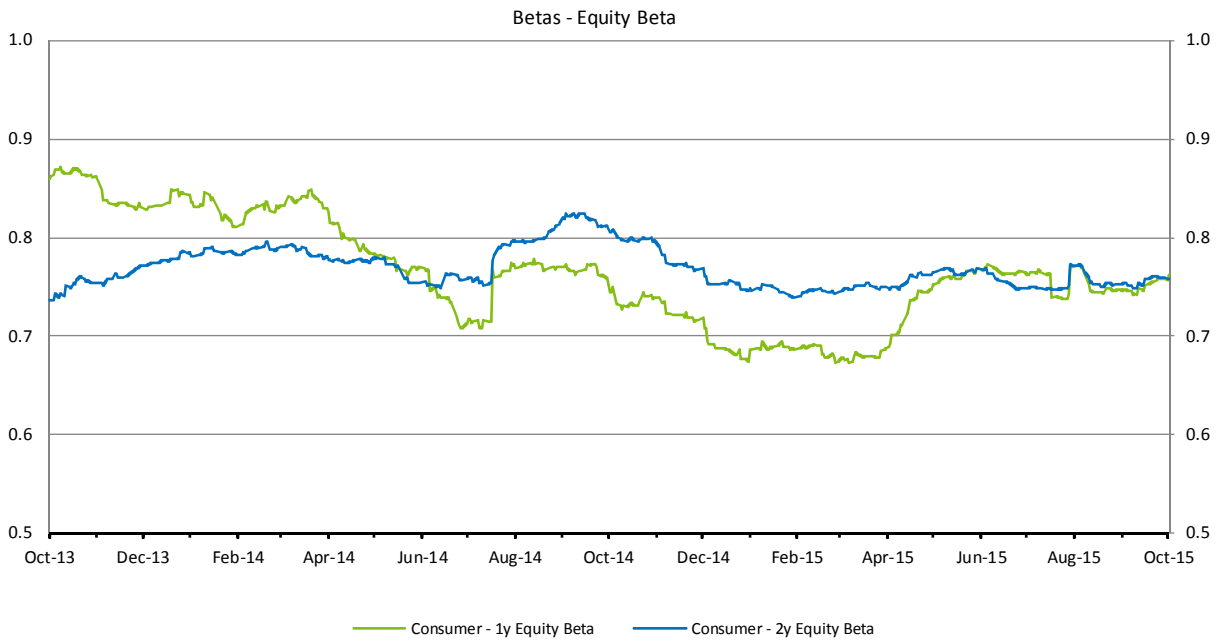


1 year vs. 2 year CAPM R²

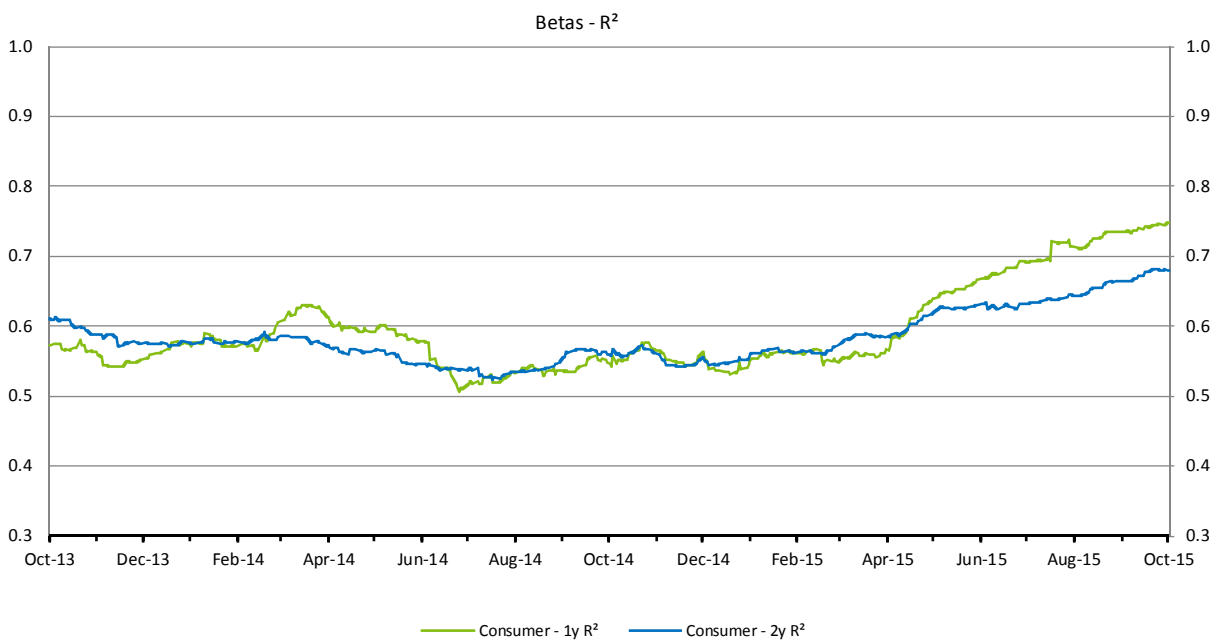


Development of CAPM Beta Factors - Consumer

1 year vs. 2 year CAPM Equity Beta

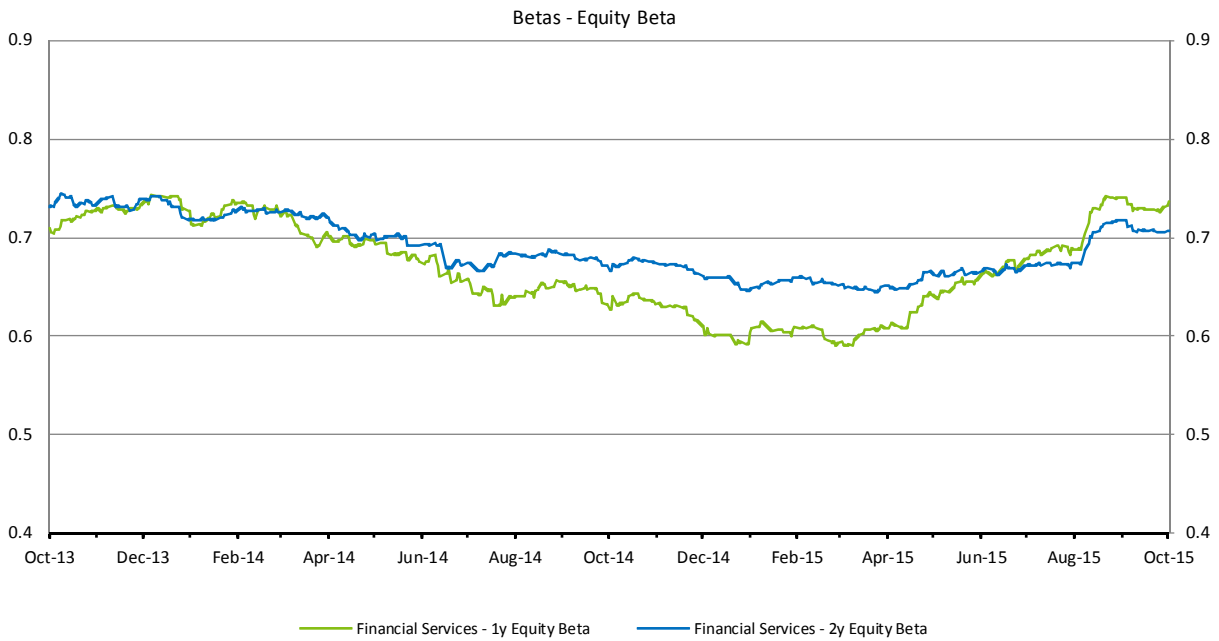


1 year vs. 2 year CAPM R²

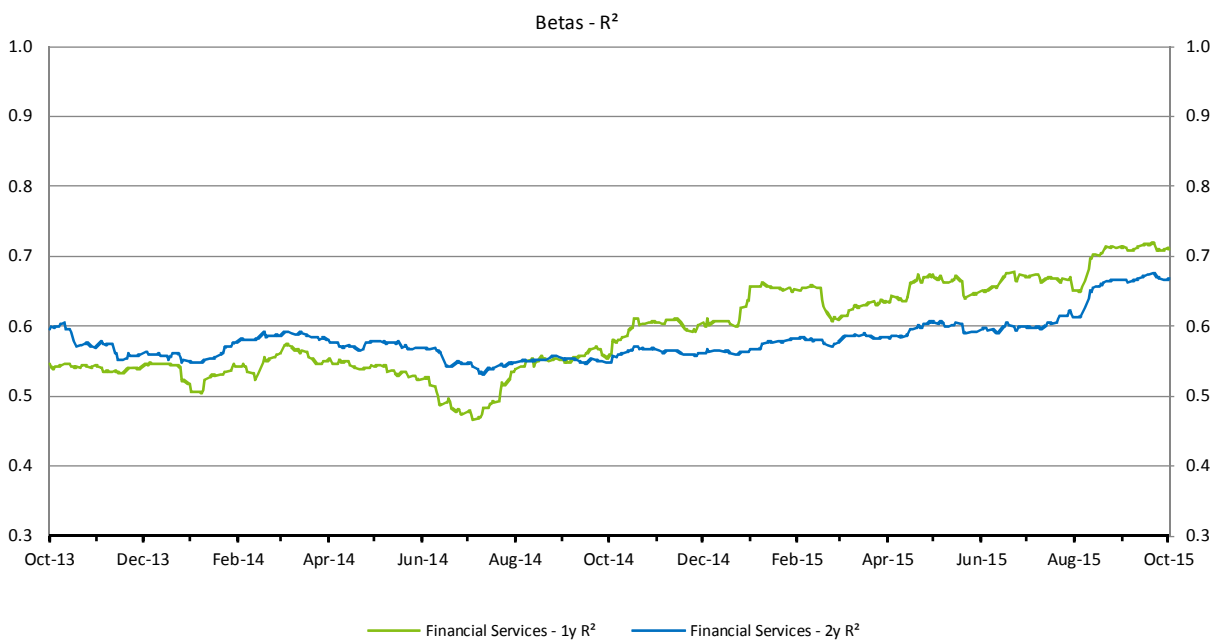


Development of CAPM Beta Factors - Financial Services

1 year vs. 2 year CAPM Equity Beta

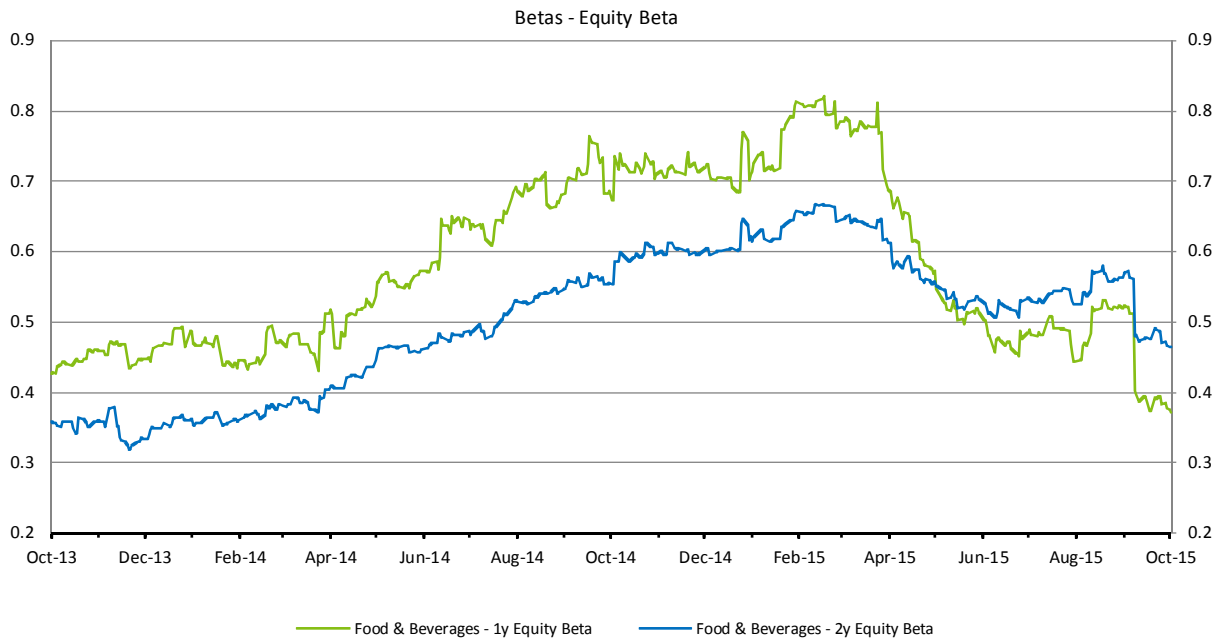


1 year vs. 2 year CAPM R²

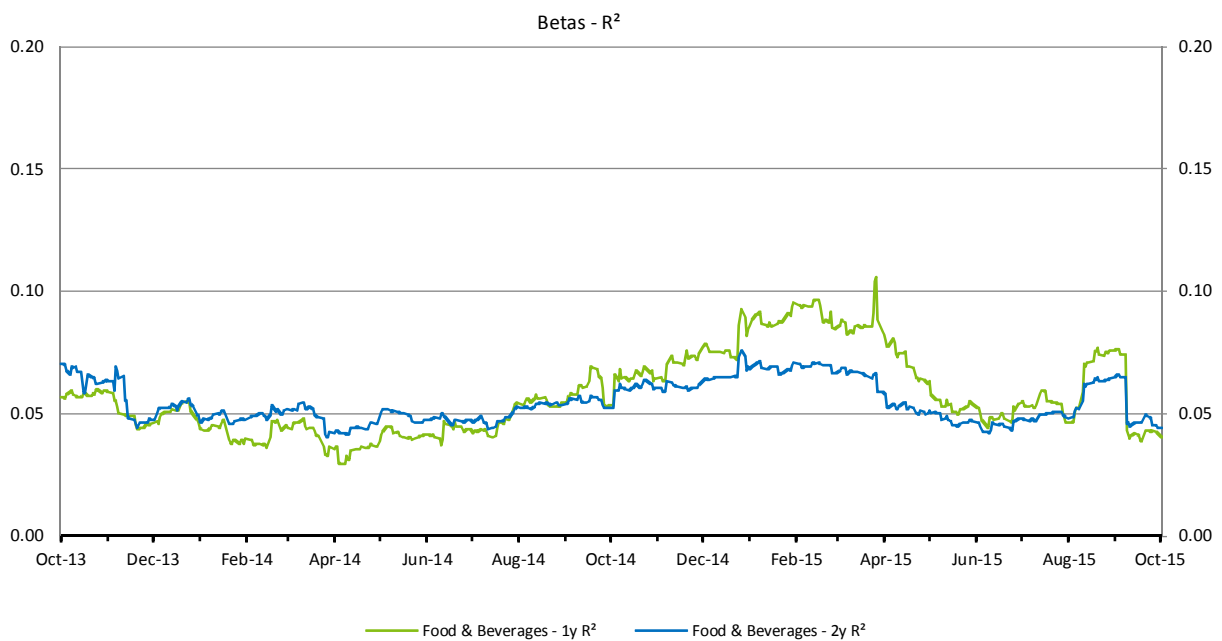


Development of CAPM Beta Factors - Food & Beverages

1 year vs. 2 year CAPM Equity Beta

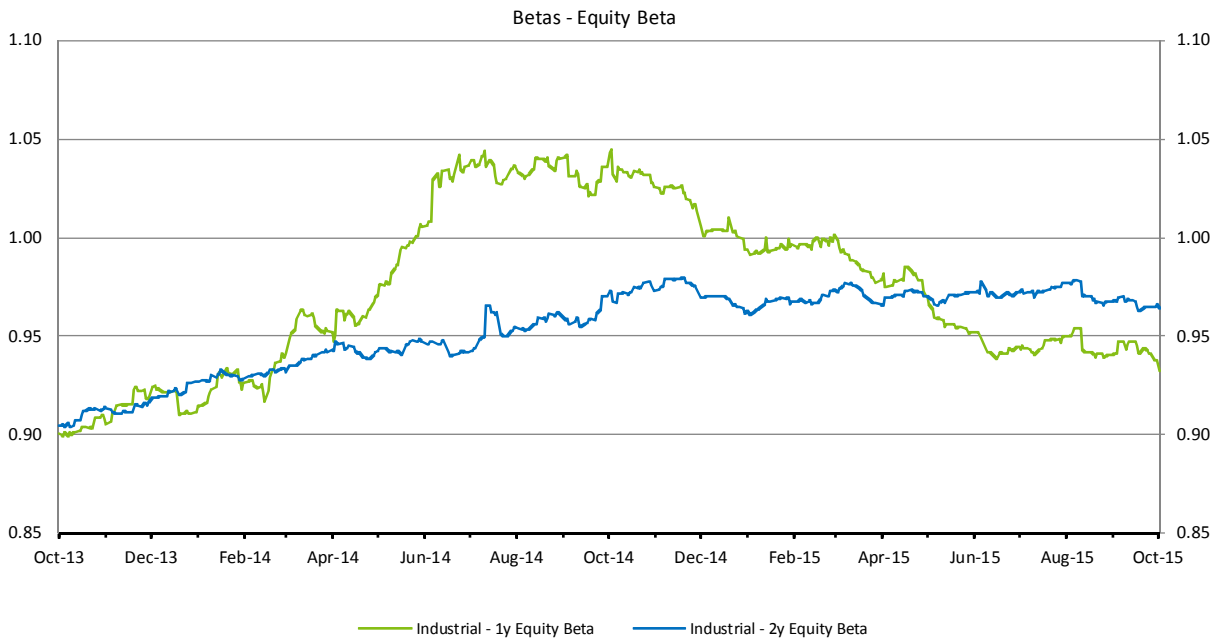


1 year vs. 2 year CAPM R²

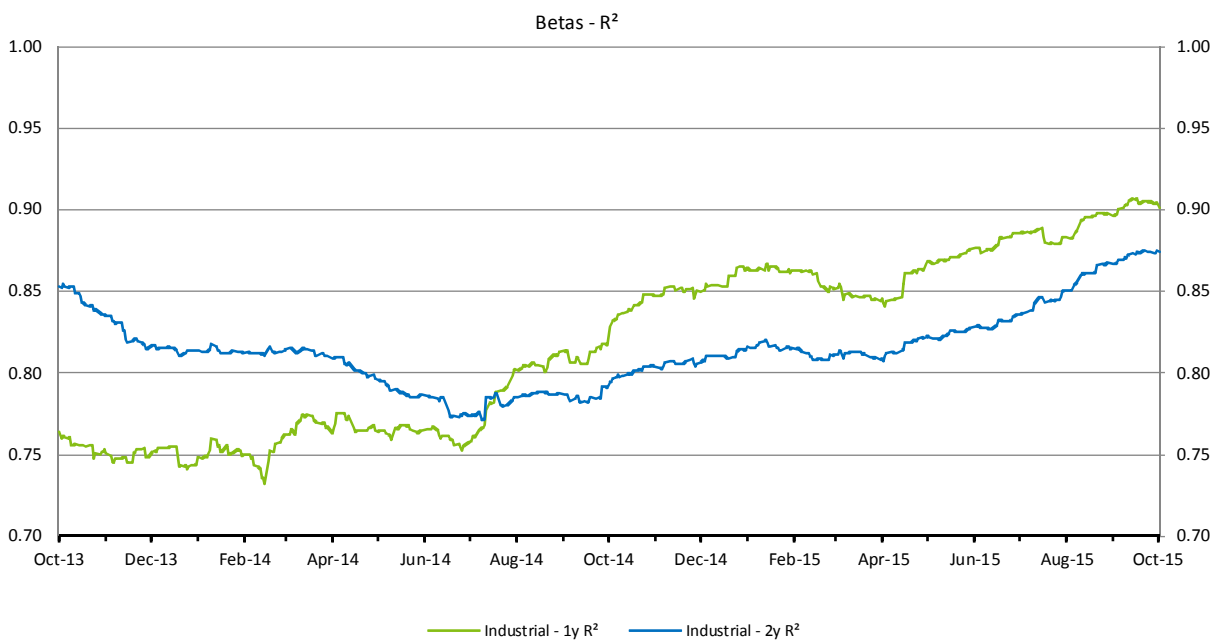


Development of CAPM Beta Factors - Industrial

1 year vs. 2 year CAPM Equity Beta

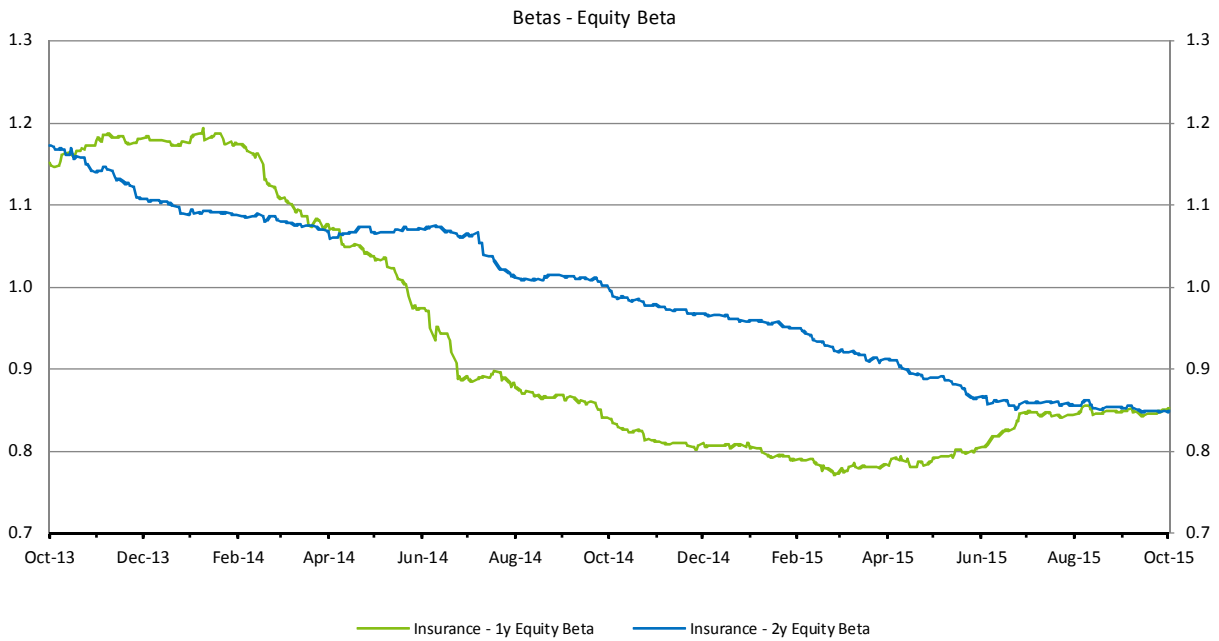


1 year vs. 2 year CAPM R²

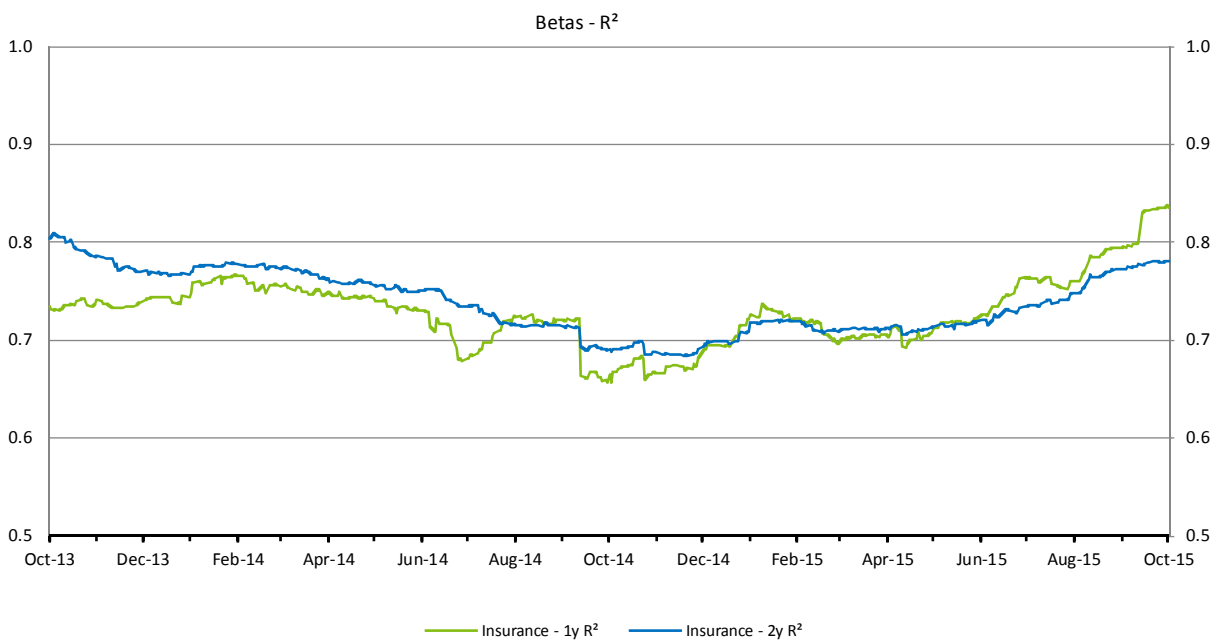


Development of CAPM Beta Factors - Insurance

1 year vs. 2 year CAPM Equity Beta

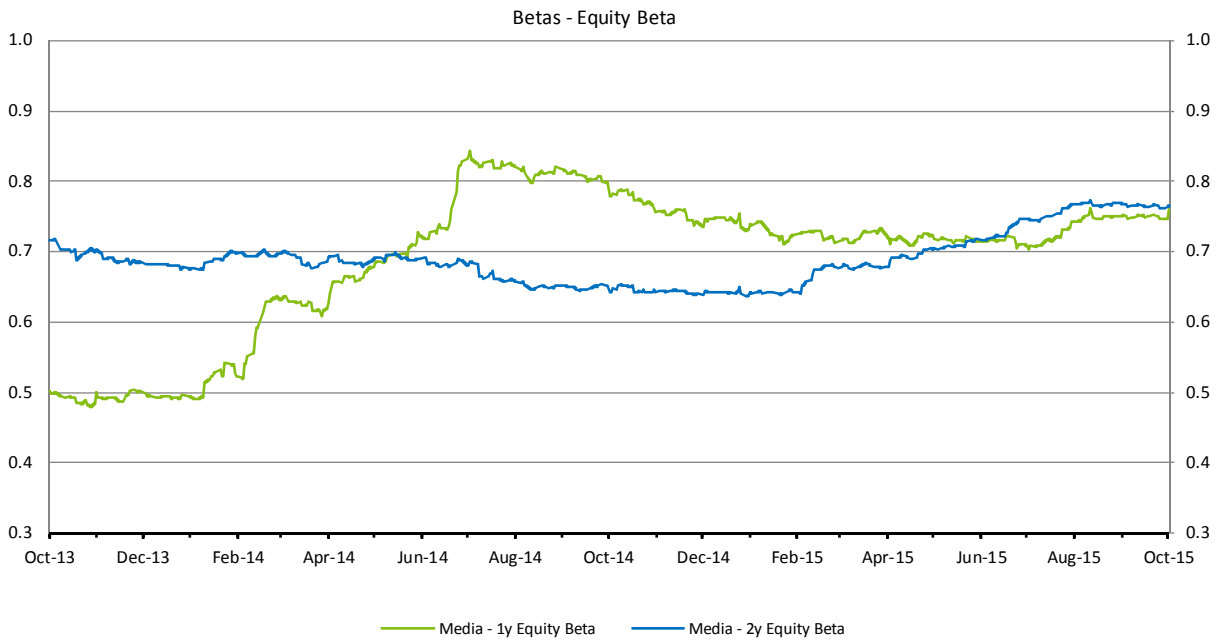


1 year vs. 2 year CAPM R²

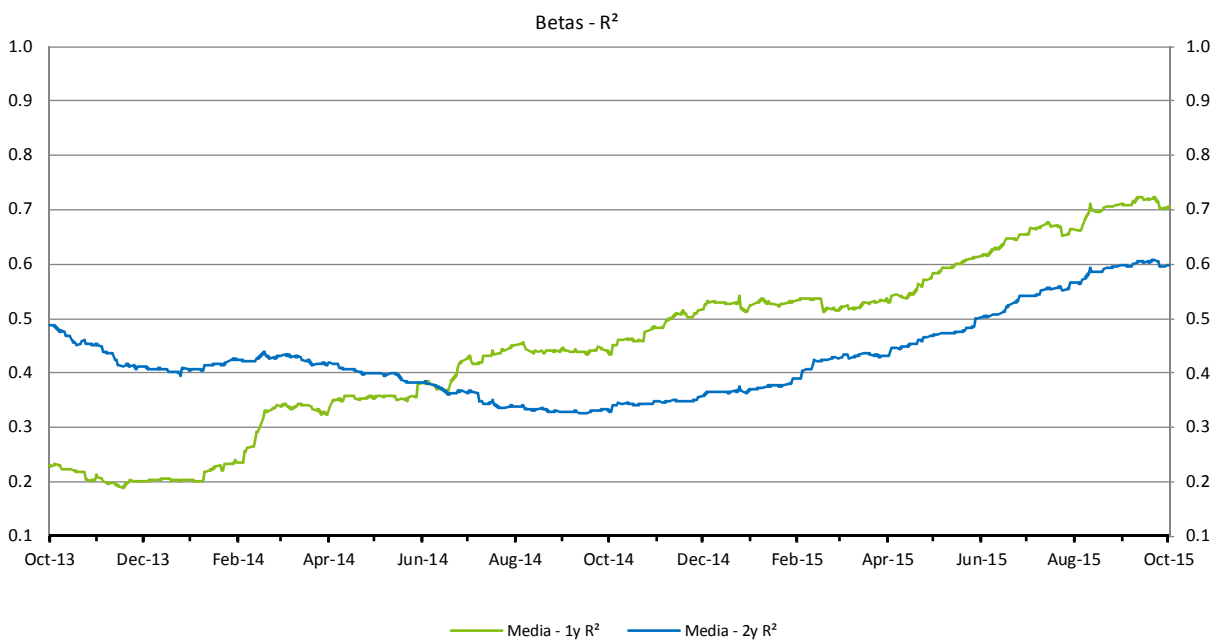


Development of CAPM Beta Factors - Media

1 year vs. 2 year CAPM Equity Beta

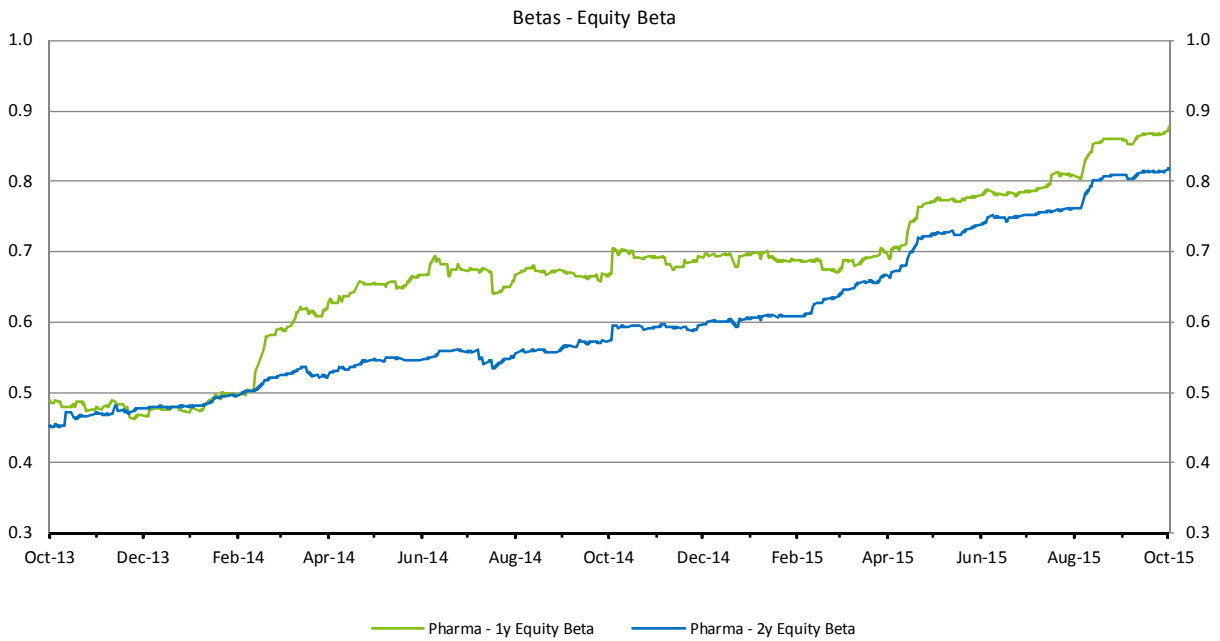


1 year vs. 2 year CAPM R²

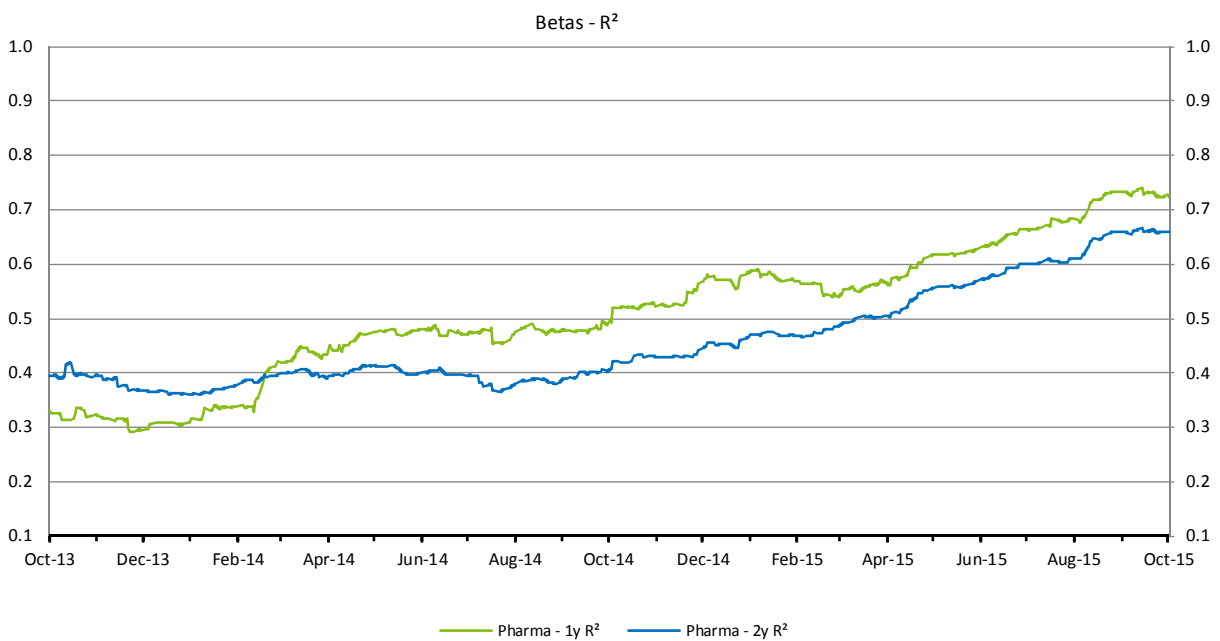


Development of CAPM Beta Factors - Pharma & Healthcare

1 year vs. 2 year CAPM Equity Beta

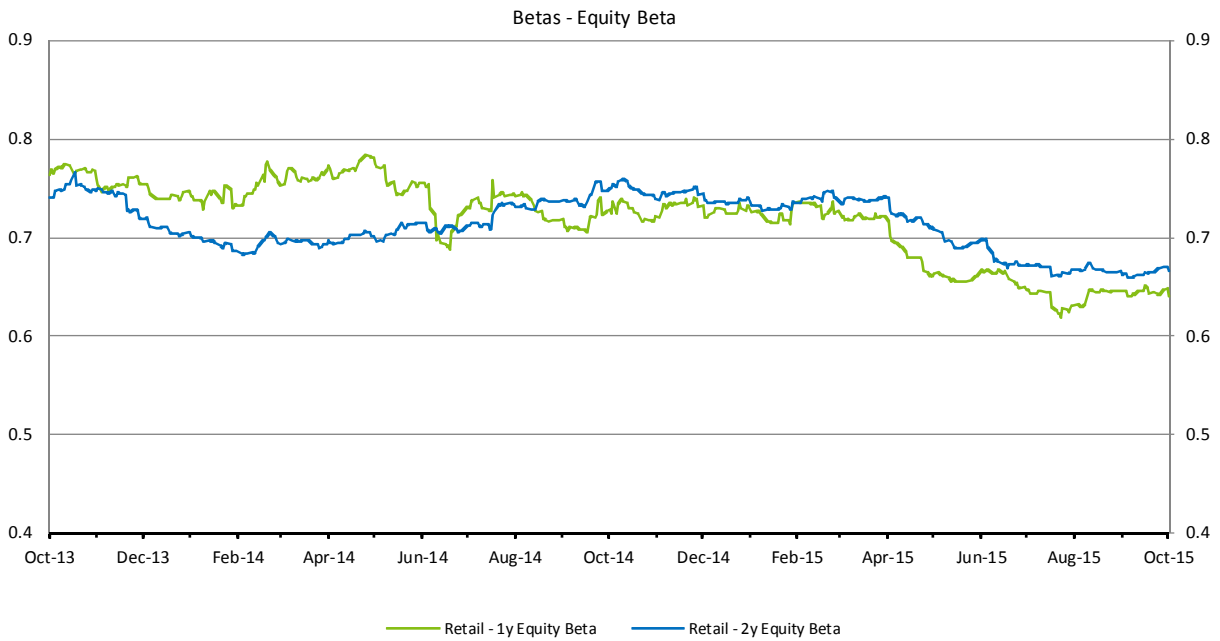


1 year vs. 2 year CAPM R²

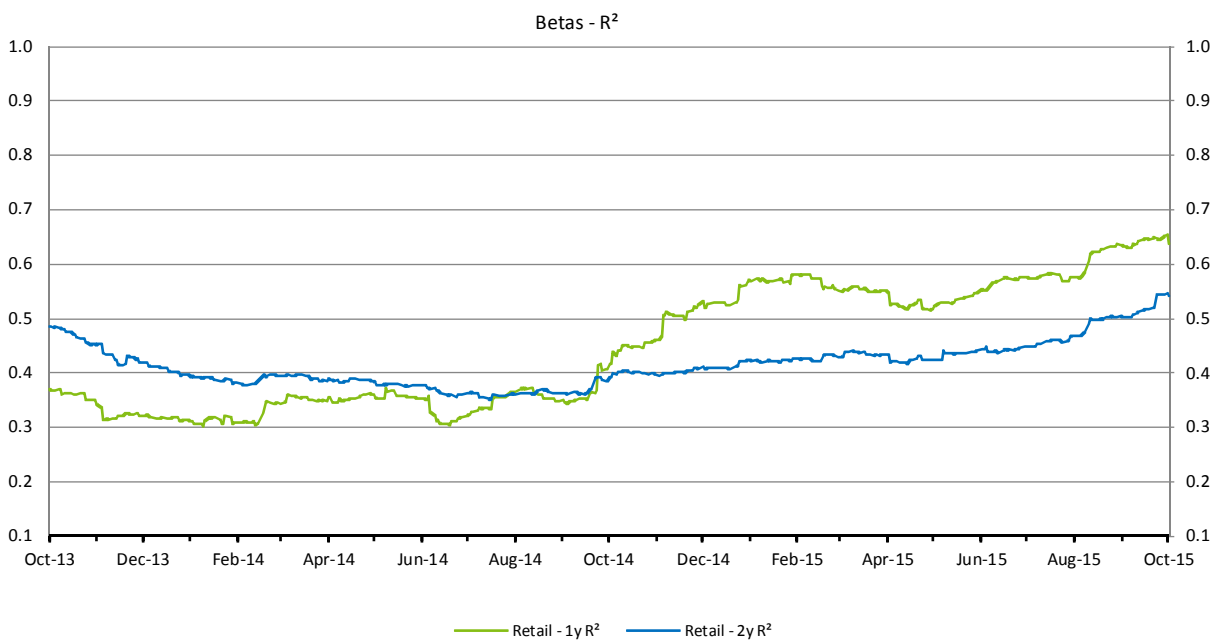


Development of CAPM Beta Factors - Retail

1 year vs. 2 year CAPM Equity Beta

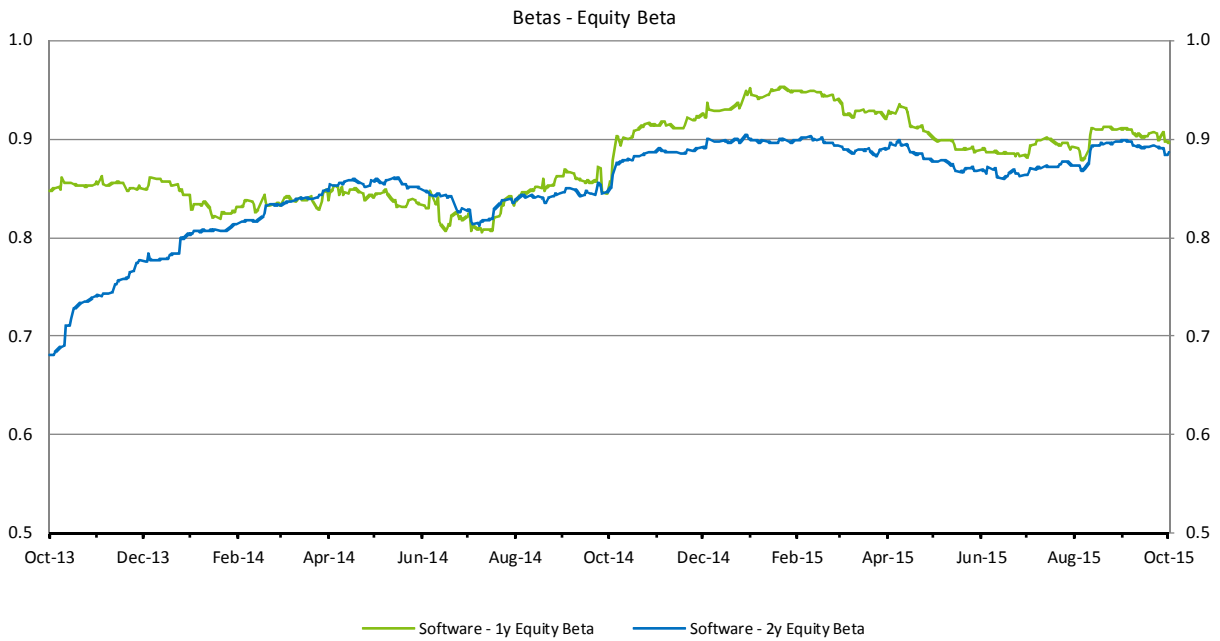


1 year vs. 2 year CAPM R²

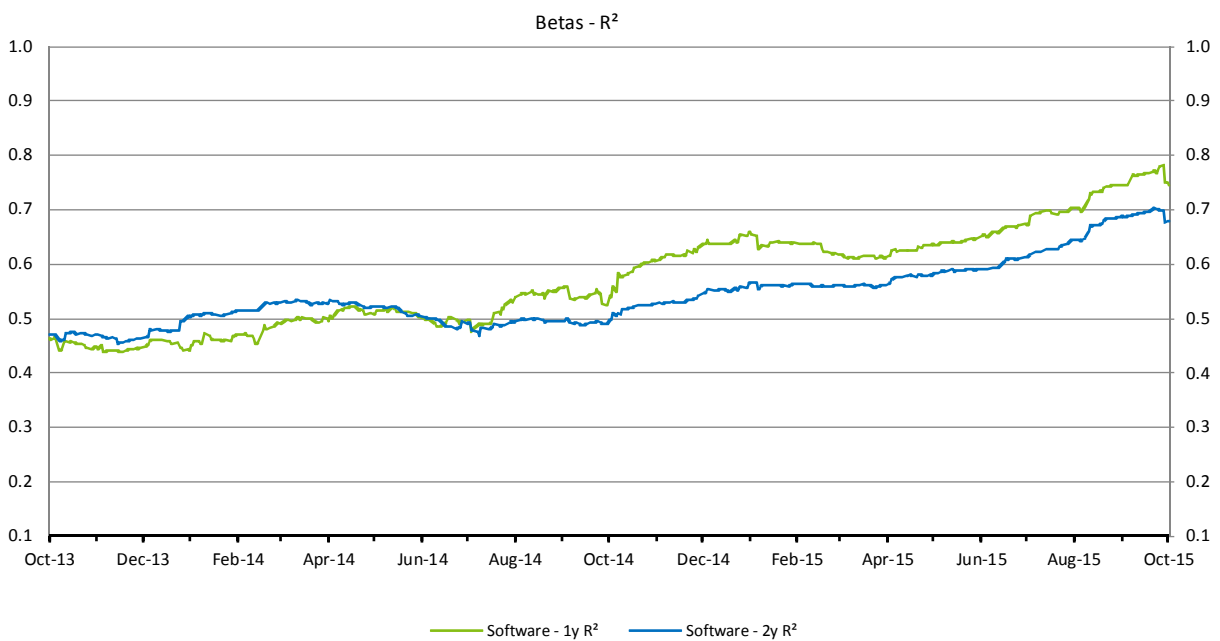


Development of CAPM Beta Factors - Software

1 year vs. 2 year CAPM Equity Beta

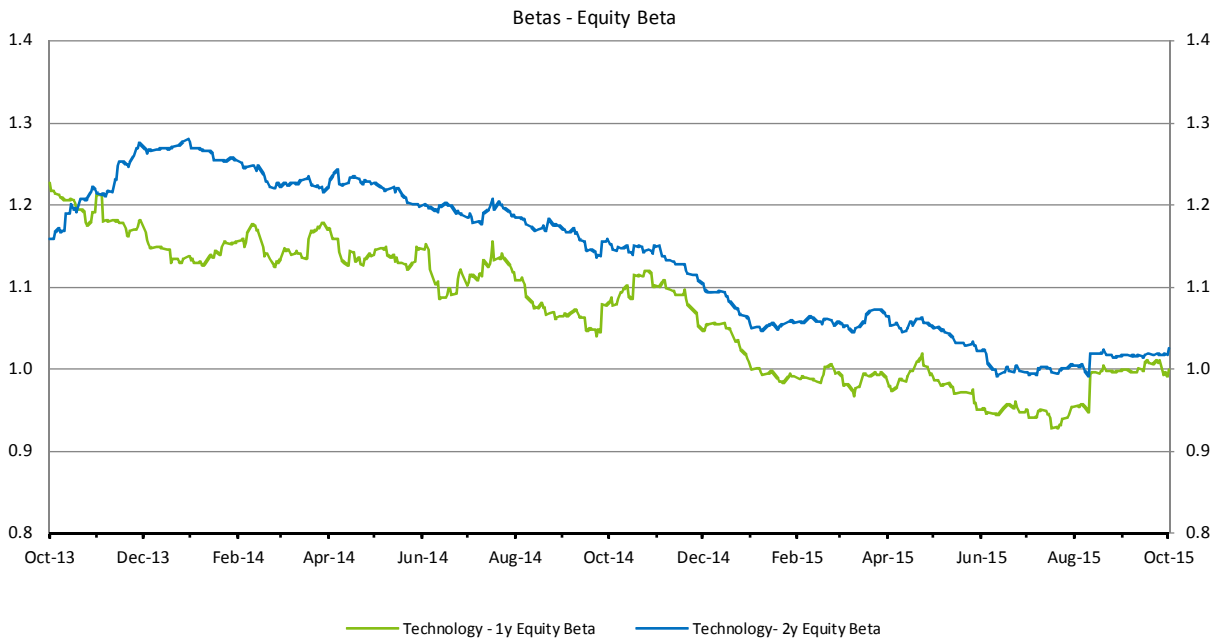


1 year vs. 2 year CAPM R²

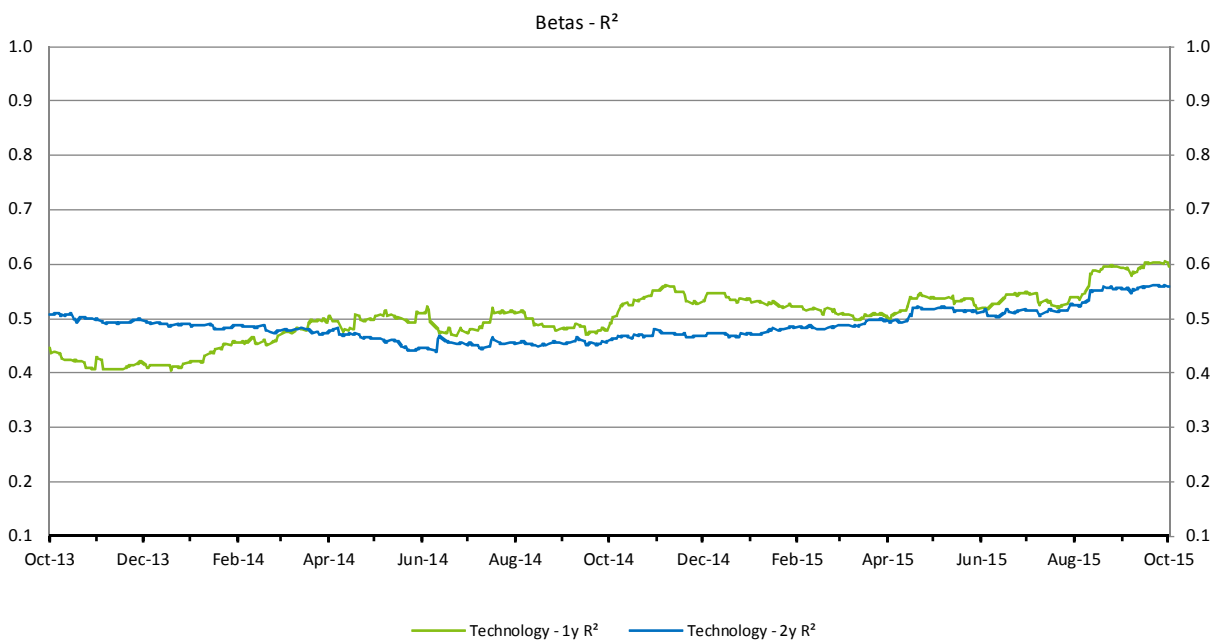


Development of CAPM Beta Factors - Technology

1 year vs. 2 year CAPM Equity Beta

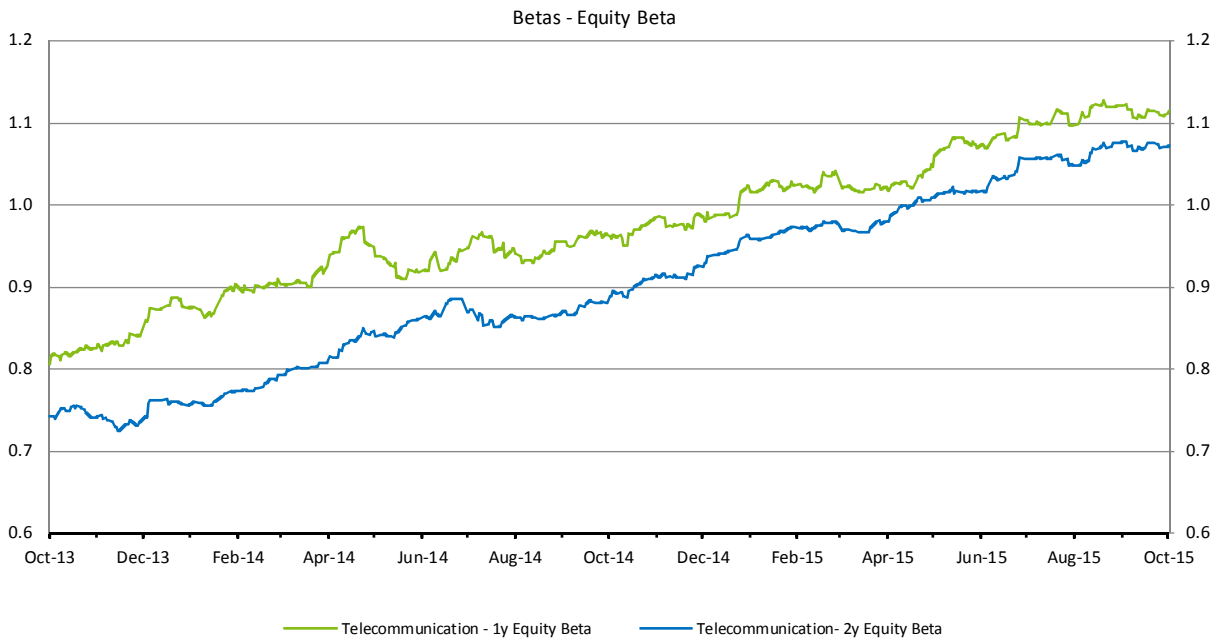


1 year vs. 2 year CAPM R²

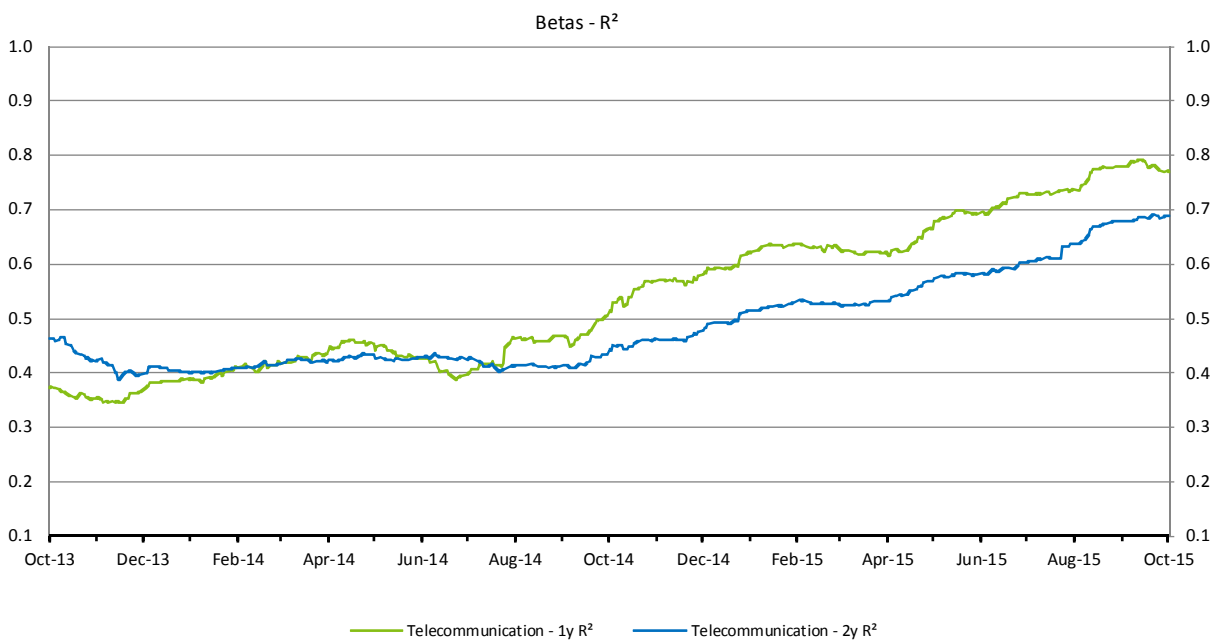


Development of CAPM Beta Factors - Telecommunication

1 year vs. 2 year CAPM Equity Beta

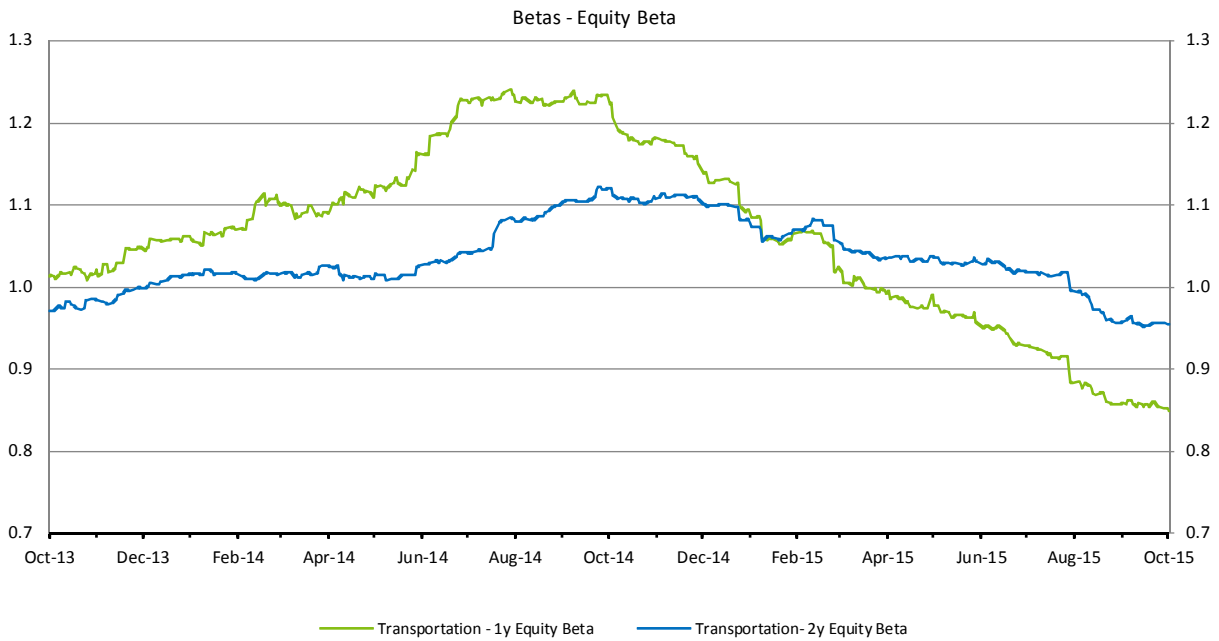


1 year vs. 2 year CAPM R²

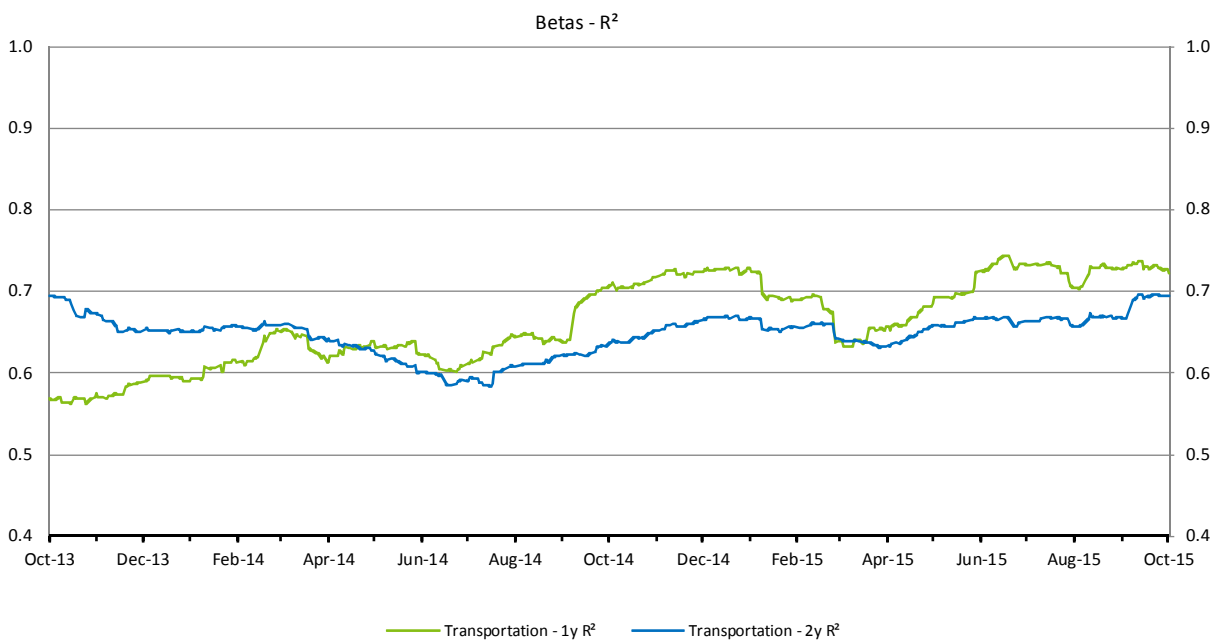


Development of CAPM Beta Factors - Transport & Logistics

1 year vs. 2 year CAPM Equity Beta

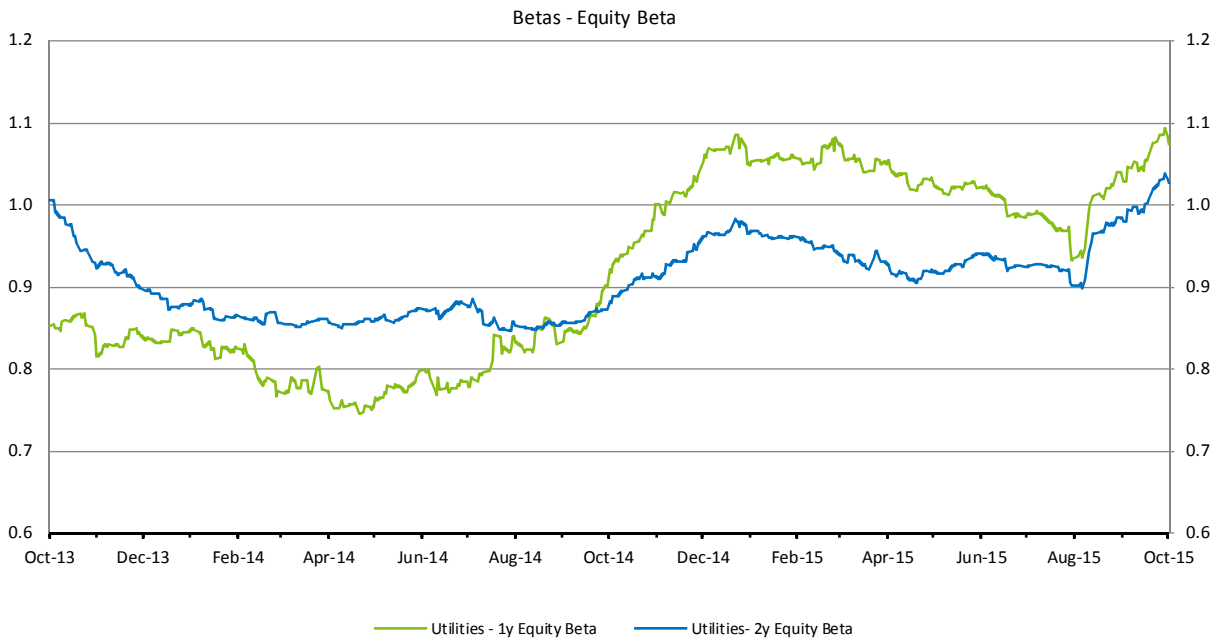


1 year vs. 2 year CAPM R²

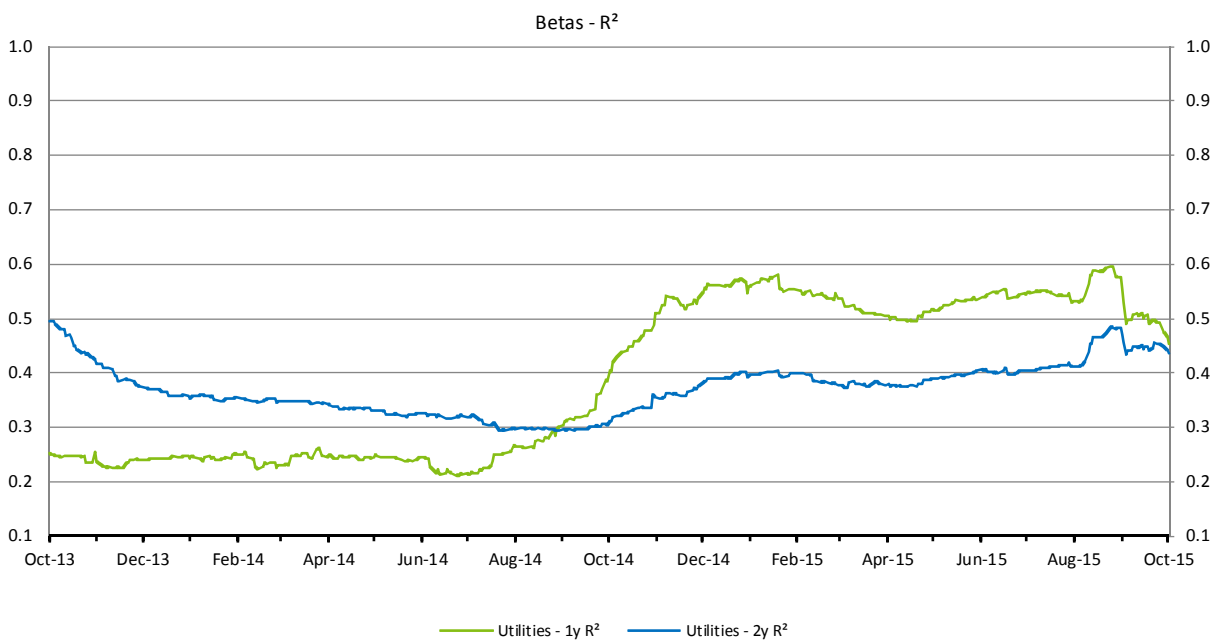


Development of CAPM Beta Factors - Utilities

1 year vs. 2 year CAPM Equity Beta



1 year vs. 2 year CAPM R²



Yield Curve: Svensson

Yield Curve: Svensson (1994)

In this section, we provide a detailed overview on the estimation of a single risk-free rate for corporate valuation out of a non-flat yield curve. The yield curve depicts the relation between the time to maturity and the yield of a bond without any default risk. Due to the lack of zero bonds for each maturity, the continuous yield curve has to be estimated either out of observed bond yields using the Nelson and Siegel (1987) or the parametric approach by Svensson (1994).

To determine the yield curve according to the Svensson procedure, the following standard formula is applied:

$$\beta_0 + \beta_1 \left(\frac{1 - \exp\left(-\frac{T}{\tau_1}\right)}{\frac{T}{\tau_1}} \right) + \beta_2 \left(\frac{1 - \exp\left(-\frac{T}{\tau_1}\right)}{\frac{T}{\tau_1}} - \exp\left(-\frac{T}{\tau_1}\right) \right) + \beta_3 \left(\frac{1 - \exp\left(-\frac{T}{\tau_2}\right)}{\frac{T}{\tau_2}} - \exp\left(-\frac{T}{\tau_2}\right) \right)$$

All necessary parameters are provided by the German Central Bank (Deutsche Bundesbank).

To illustrate the results, Figure 1 displays the overall minimum (march) and maximum (june) yield curves for the year 2015. As a reference, the estimated yield curve for November 2015 is also displayed. Note that for all three cases short term rates are negative. While the curves proceed similar for the short terms, the difference between the highest and lowest yields is more than one percentage point for longer maturities. To highlight these differences Table 1 displays the maturity-specific minimum (min), maximum (max), average (avg), median and variance of the monthly estimations from Nov 2014 to Nov 2015.

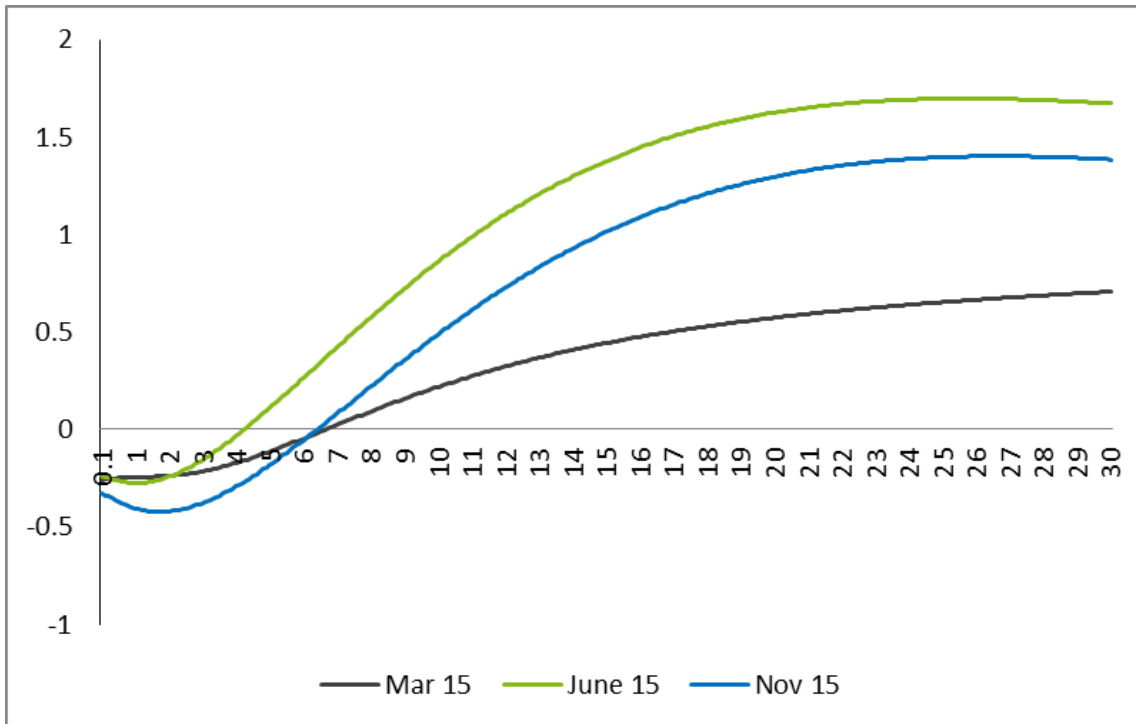


Figure 1: Highest and lowest yield curve for the year 2015

Term	1	2	3	4	5	6	7	8	9	10
min	-0.4048	-0.4192	-0.3759	-0.2922	-0.1813	-0.0540	0.0248	0.0936	0.1588	0.2192
max	-0.0997	-0.0987	-0.0985	-0.0326	0.1110	0.2653	0.4223	0.5765	0.7239	0.8619
avg	-0.2525	-0.2444	-0.1999	-0.1255	-0.0302	0.0777	0.1912	0.3053	0.4163	0.5217
median	-0.2547	-0.2388	-0.1851	-0.1033	-0.0101	0.0894	0.1905	0.3089	0.4236	0.5323
var	0.0055	0.0057	0.0048	0.0050	0.0067	0.0096	0.0136	0.0188	0.0248	0.0316

Term	11	12	13	14	15	16	17	18	19	20
min	0.2741	0.3237	0.3682	0.4079	0.4434	0.4752	0.5037	0.5292	0.5523	0.5732
max	0.9890	1.1042	1.2073	1.2984	1.3779	1.4464	1.5046	1.5534	1.5934	1.6257
avg	0.6201	0.7107	0.7929	0.8670	0.9330	0.9913	1.0425	1.0869	1.1252	1.1579
median	0.6337	0.7314	0.8226	0.9105	0.9898	1.0597	1.1206	1.1729	1.2172	1.2540
var	0.0388	0.0461	0.0532	0.0600	0.0662	0.0716	0.0761	0.0798	0.0825	0.0843

Term	21	22	23	24	25	26	27	28	29	30
min	0.5922	0.6095	0.6253	0.6398	0.6531	0.6655	0.6769	0.6875	0.6974	0.7067
max	1.6509	1.6699	1.6833	1.6918	1.6961	1.6967	1.6941	1.6888	1.6813	1.6718
avg	1.1854	1.2083	1.2270	1.2420	1.2537	1.2625	1.2687	1.2727	1.2746	1.2749
median	1.2840	1.3078	1.3260	1.3390	1.3476	1.3520	1.3530	1.3507	1.3458	1.3384
var	0.0852	0.0854	0.0849	0.0839	0.0824	0.0806	0.0785	0.0762	0.0739	0.0716

Table 1: Minimum, maximum, arithmetic average, median and variance of maturity specific yields

To reduce the impact of high interest rate volatility on the calculation of firm values the IDW recommends to use the average of the daily calculated spot rates over the last three months (see "WP-Handbuch" (IDW), Band II, 14. Aufl. 2014, S. 119ff.) for each term. Figure 2 shows the respective curve as of November 30th, 2015.

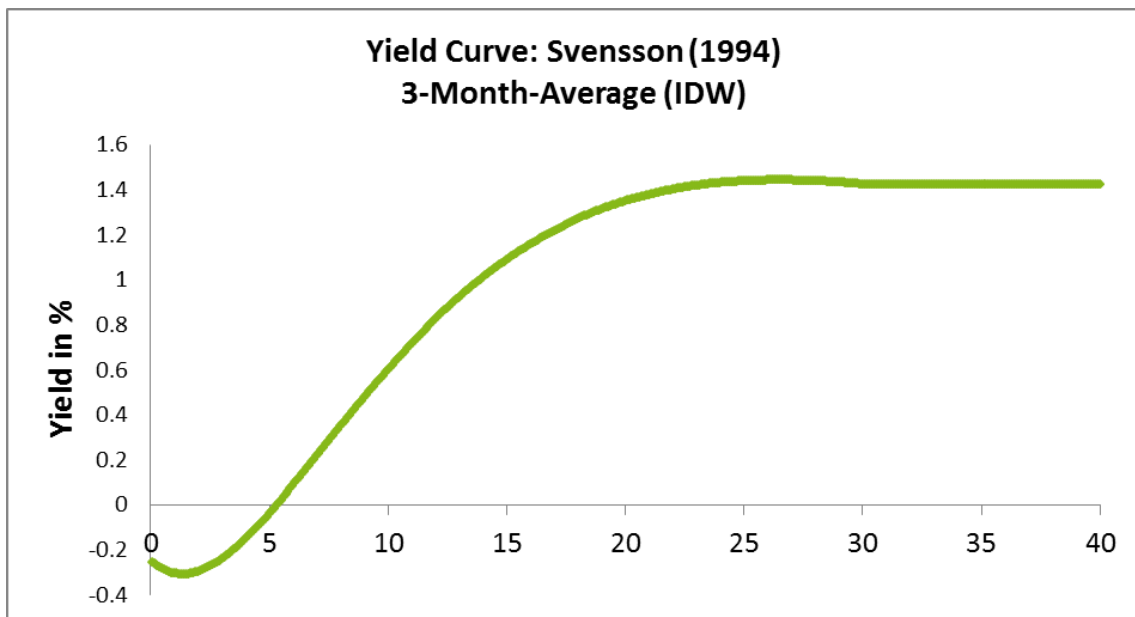


Figure 2: Svensson Yield curve using the IDW 3-month-average technique

Based on this 3-month-average yield curve, we calculate a single interest rate over all maturities that results in the same present value as the term specific rates (For a detailed explanation refer to Dörschel / Franken / Schulte, "Der Kapitalisierungszinssatz in der Unternehmensbewertung" (IDW), 1. Aufl. 2009, S. 52 ff.). If this requirement shall be met, the following equality has to hold:

$$\sum_t^T \frac{E[FCF_t](1+g)^t}{(1+i_{0,t}+z)^t} = \frac{E[FCF_t](1+g)}{i_e+z-g}$$

Rearranging yields

$$i_e = \frac{(1+g)}{\sum_t^T \frac{(1+g)^t}{(1+i_{0,t}+z)^t}} + g - z$$

where $i_{0,t}$ is the term specific rate, i_e the single interest rate that results in an equivalent present value, z the risk premium ($MRP * \beta$) and g the growth rate of the firms future cash flows. We assume the parameters $g=1\%$, $MRP=6\%$ and $\beta=1$, and round the resulting single rate to quarter percentage points. This results in a final rate of $i_e=1,25\%$. Following the IDW recommendations this rate represents the risk-free rate for the estimation of the firm's cost of equity.

FINANCIAL EXPERTS IN ACTION

ValueTrust is the sole financial advisory firm in the German-speaking countries that focuses on the core competencies of enterprise valuation and corporate finance. ValueTrust advises management, boards and investors in acquisitions, mergers, restructurings, disputes and litigations as well as value management.

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