

Alternative beta: A future for fund management?

NOMURA



Inigo Fraser Jenkins – Nipic

Global Head of Quantitative Equity Strategy

Head of European Equity Strategy

+44 20 7102 4658

inigo.fraser-jenkins@nomura.com

See Appendix A-1 for analyst certification, important disclosures and the status of non-US analysts.

Any authors named on this report are research analysts unless otherwise indicated.

May 2013

- **Alternative beta: A future for fund management?**
 - **Why alternative beta?**
 - **What does an alternative beta programme look like?**
 - **The case for a cross-asset approach**
 - **How does one implement this stuff?**
- **Traditional quant fund management**
- **Market and factor outlook**

Alternative beta: A future for fund management?

Alternative beta, ɔ:l'tɜ:nətɪv / 'bi:tə, noun

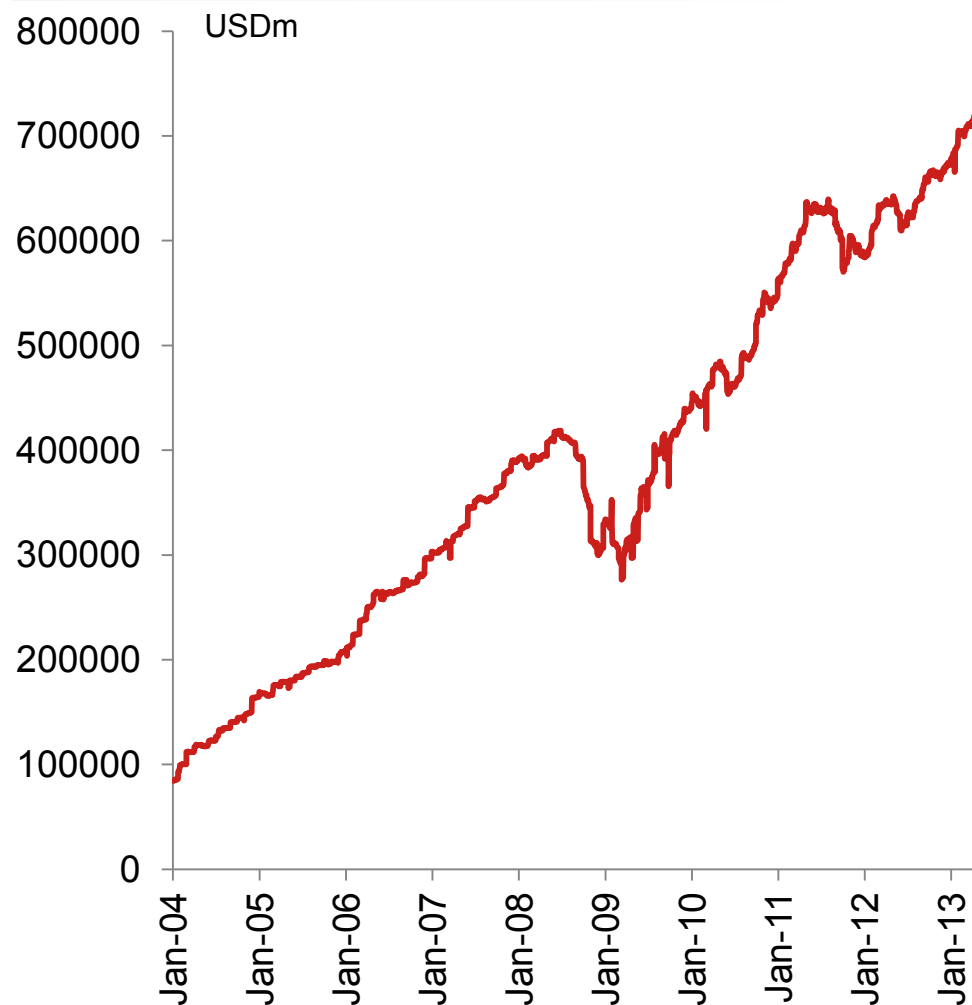
1. A financial market investment strategy previously thought of as being 'active', but now more freely available especially when pre-packaged, eg, in ETF or swap format.
2. A non-traditional benchmark (eg, as opposed to market cap weighting), specifically that outperforms traditional benchmarks by already incorporating characteristics that are generally agreed to add value in the long term.

Alternative beta subsumes several key strands of recent debate in finance:

1. desire for diversification, especially via multi-asset investments;
2. macro exposures are more easily available and greater willingness to invest in them; and
3. what should one's benchmark really be?

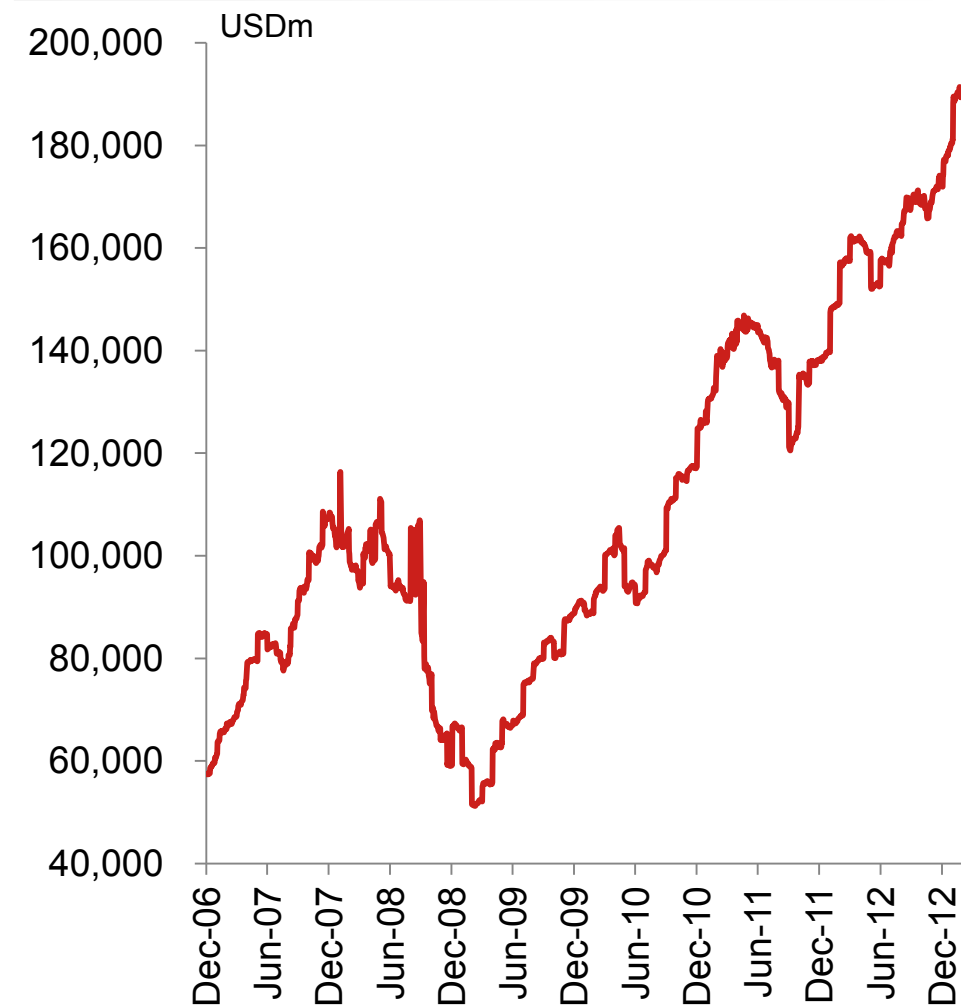
Moreover, in a low-return or low-yield world we think that alternative beta becomes particularly important. Other sources of return are harder to come by.

AUM of multi-asset funds



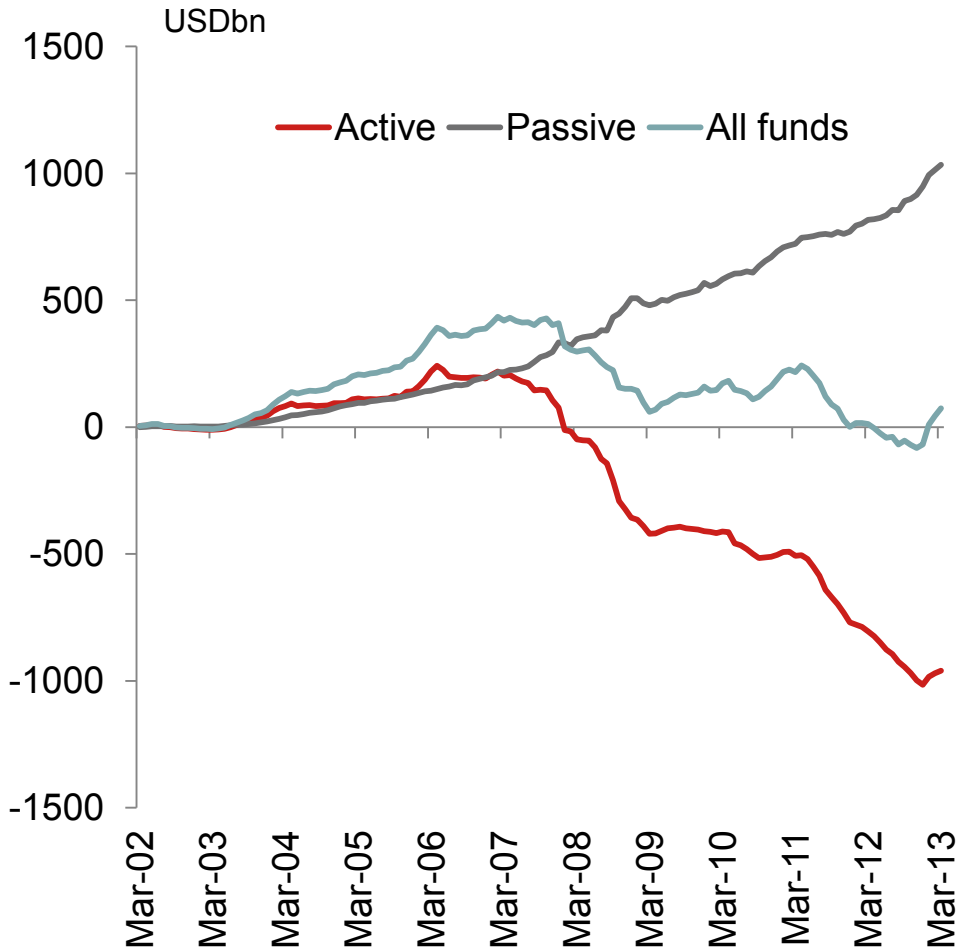
Source: Bloomberg, Nomura Delta1 Team, Nomura Quantitative research

AUM of alternative beta ETFs



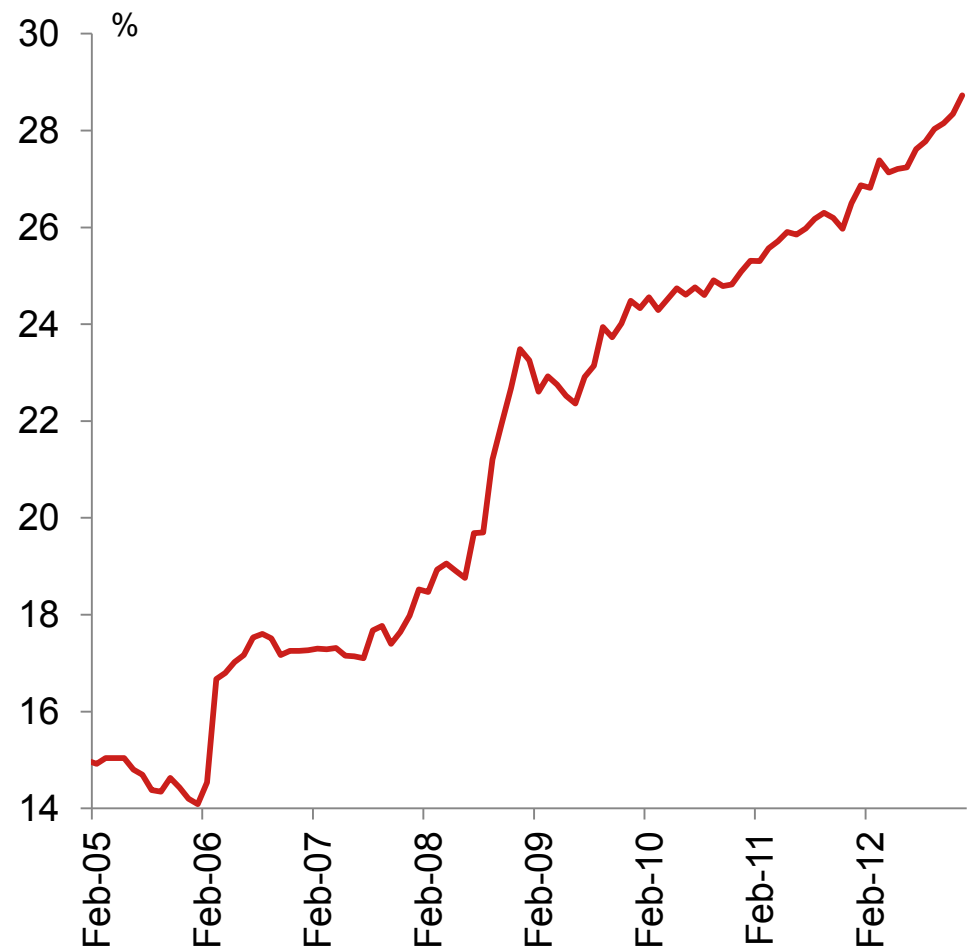
Source: Bloomberg, Nomura Delta1 Team, Nomura Quantitative research

Global equity mutual fund flows active passive



Source: EPFR, Nomura Quantitative Strategy research

Share of passively-managed equities



Source: EPFR, Nomura Quantitative Strategy research

The initial development came from the asset end-owners. But there are business opportunities for asset managers here too.

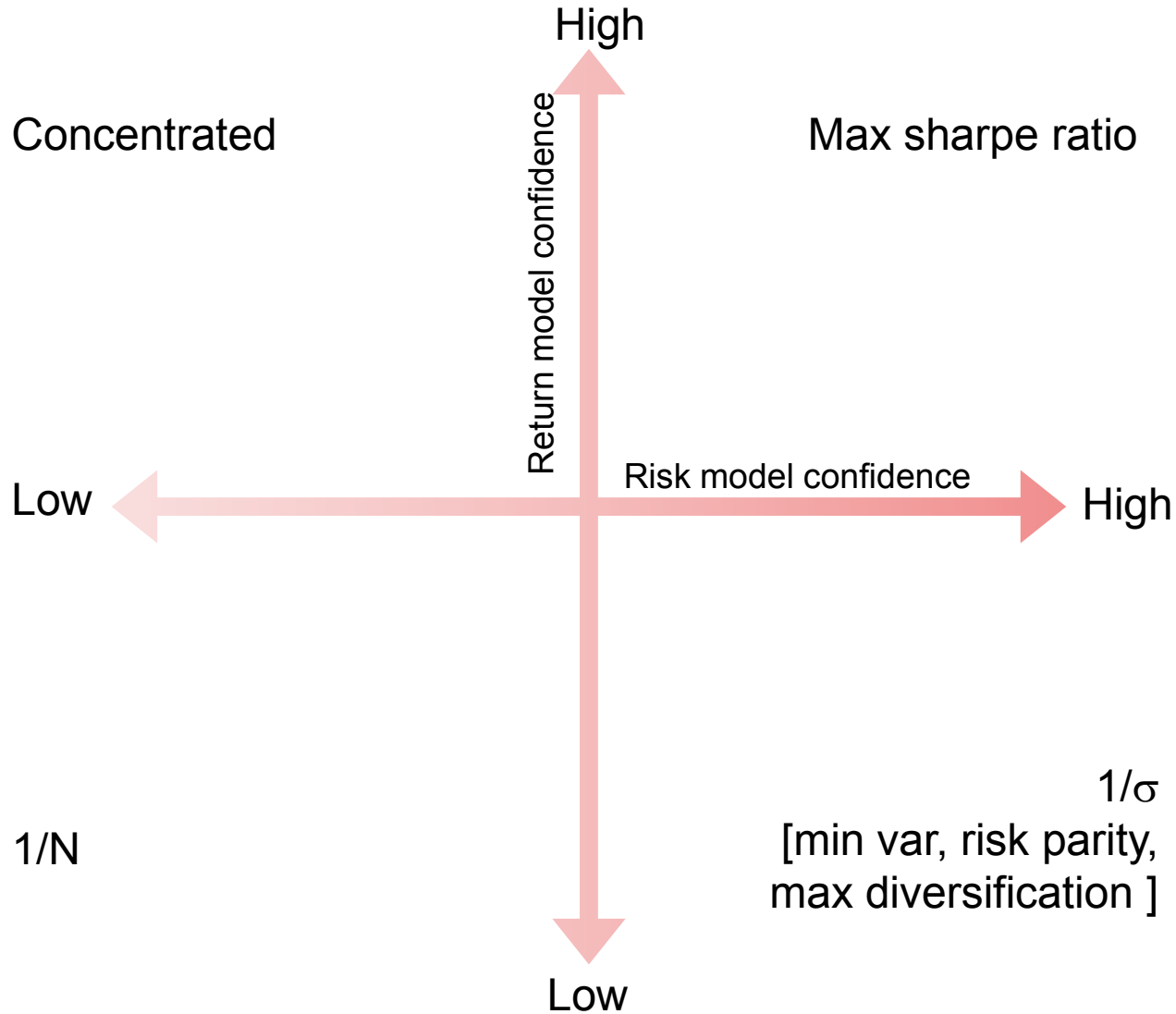
Offers a response by the asset management community to the business risk posed by the rotation from active to passive.

1. Selling of underlying strategies (funds, ETFs).
2. Bespoke solutions bringing a combination of alternative beta strategies together, eg, to meet a given liability target.
3. Helping the development of dynamic allocation models for alternative beta.

Choice of weighting scheme, Static or Dynamic

Traditional equity factors	Equity alternative weighting schemes	Other equity strategies	Fixed income strategies: rates, credit, FX & commodities
Value	1/N	Call overwriting (index)	Carry
Yield	Minimum variance	Call overwriting (stocks)	Value
Quality	Max diversification	Vol cap	Momentum
Momentum	Risk parity	M&A arb	Volatility
Growth	Diversity weighted	Implied-realised volatility	
Gearing			

Value	Income	Quality	Momentum	Growth	Risk	Gearing	Size
Price/book	Dividend yield	ROE	Price	Expected growth	Volatility	Debt/equity	Large-small
PE	Buyback adj. div yield	ROCE	Earnings	Trailing growth	β	Interest cover	
EV/CE		Credit rating	Short-term	Growth potential	Earnings vol		
EV/EBITDA		Δ number of shares	Long-term				
FCF yield		Δ assets Accruals					



Weighting scheme:

- Equal
- Risk parity
- Minimum variance
- Max diversification
- Equal risk contribution
- IR-based

Equity Strategies

- Income
- Value
- Quality
- Momentum

Credit Strategies

- Carry
- Value
- Momentum

Rates Strategies

- Carry
- Value
- Momentum

Performance of alternative beta portfolio combinations

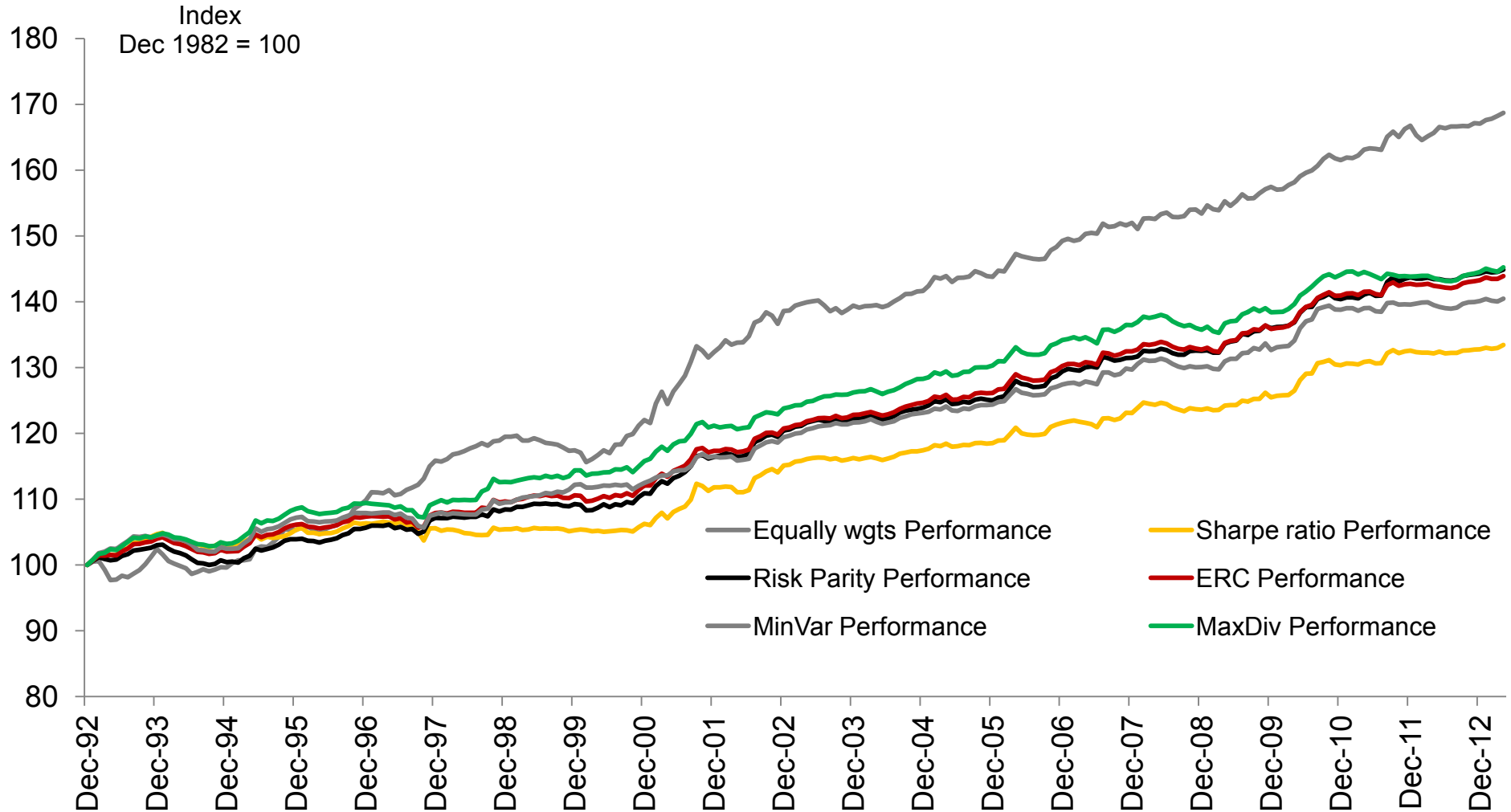


Chart shows the performance of different portfolio combinations applied to cross-asset alternative betas. Strategies are rebalanced annually.
Source: Nomura Quantitative Strategy research

Stats	Risk Parity	Minimum Variance	ERC	Sharpe Ratio	Max Diversification	Equally weighted
Return	1.84%	1.69%	1.81%	1.43%	1.85%	2.60%
Vol	1.34%	1.37%	1.33%	1.47%	1.47%	1.97%
Return/risk	1.38	1.23	1.36	0.97	1.26	1.32
Max drawdown (%)	-3.0%	-2.5%	-2.4%	-2.7%	-2.0%	-3.7%

The benefits of a cross-asset approach to alternative beta portfolio construction

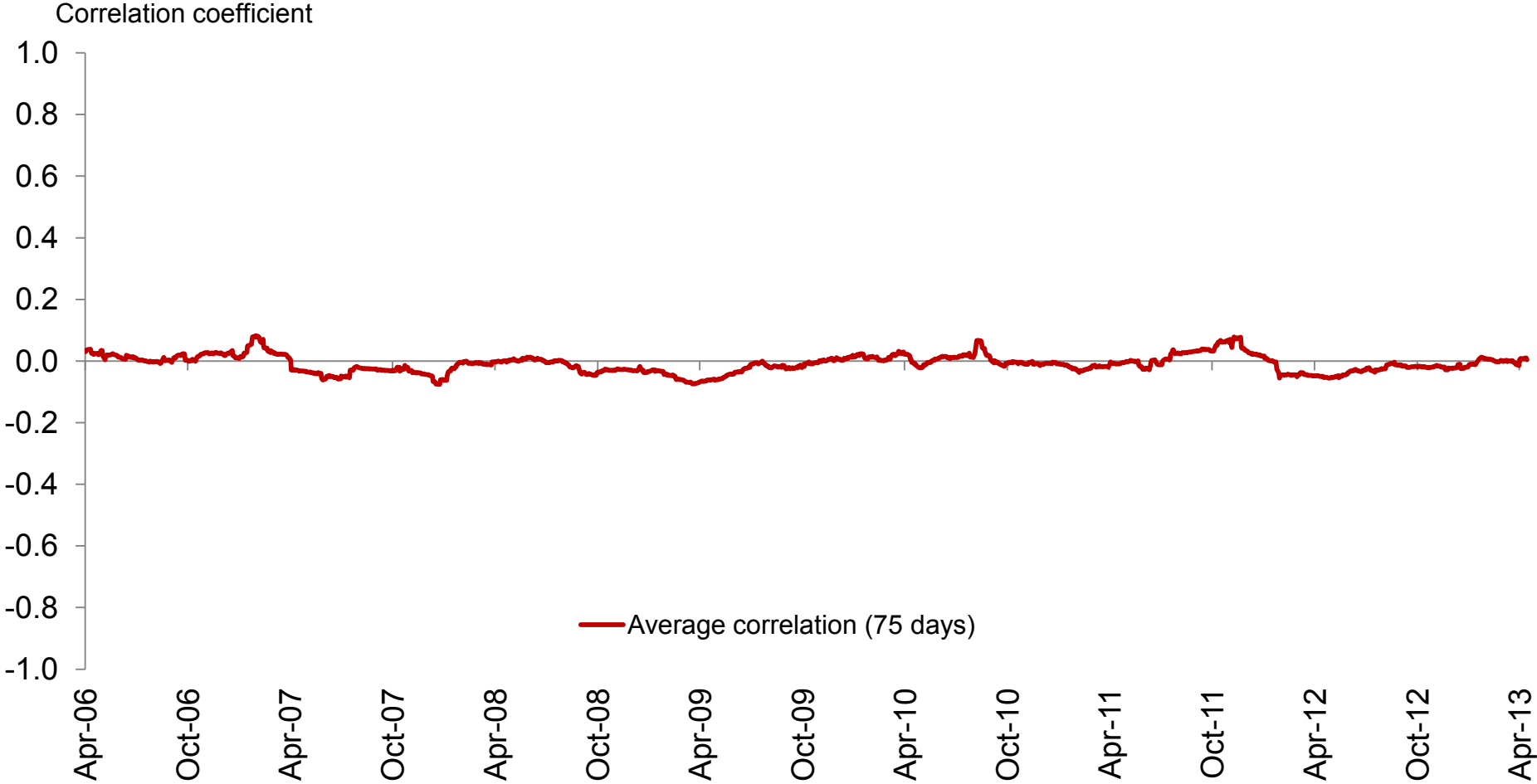
Model \ Strategy		Risk Parity	Minimum Variance	ERC	Sharpe Ratio	Max Diversification	Equally weighted
Equity	return	4.39%	2.26%	3.43%	2.55%	2.80%	4.22%
	vol	4.51%	4.53%	4.21%	5.77%	5.77%	4.55%
	R/R	0.97	0.50	0.82	0.44	0.49	0.93
	MDD (%)	-13.6%	-17.3%	-16.2%	-18.4%	-13.2%	-10.9%
Fixed Income	return	1.43%	1.56%	1.55%	1.36%	1.64%	1.50%
	vol	1.37%	1.40%	1.38%	1.45%	1.45%	1.38%
	R/R	1.05	1.11	1.13	0.94	1.13	1.08
	MDD (%)	-3.2%	-3.0%	-2.8%	-3.5%	-2.7%	-2.9%
Cross asset	return	1.84%	1.69%	1.81%	1.43%	1.85%	2.60%
	vol	1.34%	1.37%	1.33%	1.47%	1.47%	1.97%
	R/R	1.38	1.23	1.36	0.97	1.26	1.32
	MDD (%)	-2.97%	-2.49%	-2.44%	-2.71%	-2.00%	-3.68%
Uplift in return/risk	EQUITY	+42%	+147%	+67%	+119%	+159%	+42%
	FIC	+32%	+11%	+21%	+3%	+11%	+22%

Figure shows return statistics for combinations of alternative betas within fixed income, within equities and across both asset classes. Bottom row shows the uplift in the return/risk ratio that results in moving from a single asset to multi-asset approach. R/R is return/risk ratio and MDD is max drawdown. Sample run December 1992-April 2013. Source: Nomura Quantitative Strategy research

Correlation of alternative beta strategies

<i>Correlation table</i>		Rates			Credit			Equity				
		<i>Momentum</i>	<i>Carry</i>	<i>Value</i>	<i>Momentum</i>	<i>Carry</i>	<i>Value</i>	<i>Price to book</i>	<i>ROE</i>	<i>Div Yield + Buyback</i>	<i>Momentum</i>	
Rates	<i>Momentum</i>	1										
	<i>Carry</i>	0.19	1									
	<i>Value</i>	-0.33	0.12	1								
Credit	<i>Momentum</i>	0.07	-0.09	-0.09	1							
	<i>Carry</i>	-0.04	-0.15	-0.09	0.42	1						
	<i>Value</i>	-0.04	-0.16	-0.03	0.01	0.29	1					
Equity	<i>Price to book</i>	-0.12	-0.02	0.10	-0.02	0.06	0.04	1				
	<i>ROE</i>	0.15	0.03	-0.07	-0.04	-0.09	-0.06	-0.26	1			
	<i>Div Yield + Buyback</i>	0.17	-0.03	-0.07	0.05	0.06	-0.02	0.35	0.47	1		
	<i>Momentum</i>	0.02	0.09	-0.10	-0.09	-0.21	-0.08	-0.57	0.28	-0.12	1	

Correlation of alternative beta strategies



Style and sector exposure of strategies

T-STAT

R^2	Benchmark	Market	Gearing	Risk	Size	Momentum	Quality	Growth	Value	b
1.00	Equally Weighted	187.7	2.16	-0.41	-5.20	-0.28	-2.76	1.24	3.56	2.8
1.00	Diversity Weighted	342.2	2.14	-0.36	-4.99	-0.30	-2.94	1.31	4.05	2.8
0.97	Fundamental Weighted	63.2	-1.94	3.34	-0.19	3.17	0.99	-3.03	10.70	0.8
0.79	Minimum Variance	24.2	2.14	-8.19	1.02	-0.58	-3.20	-1.27	-2.18	1.8
0.78	Max Diversification	21.7	2.53	-5.66	0.16	-0.42	-3.18	-0.81	-3.56	2.0
0.99	Risk Parity	113.8	4.56	-6.91	-1.45	2.47	0.16	1.20	6.17	2.5
0.94	Min Var (naïve approach)	41.6	0.87	-12.26	3.62	1.46	1.26	0.55	4.31	0.3

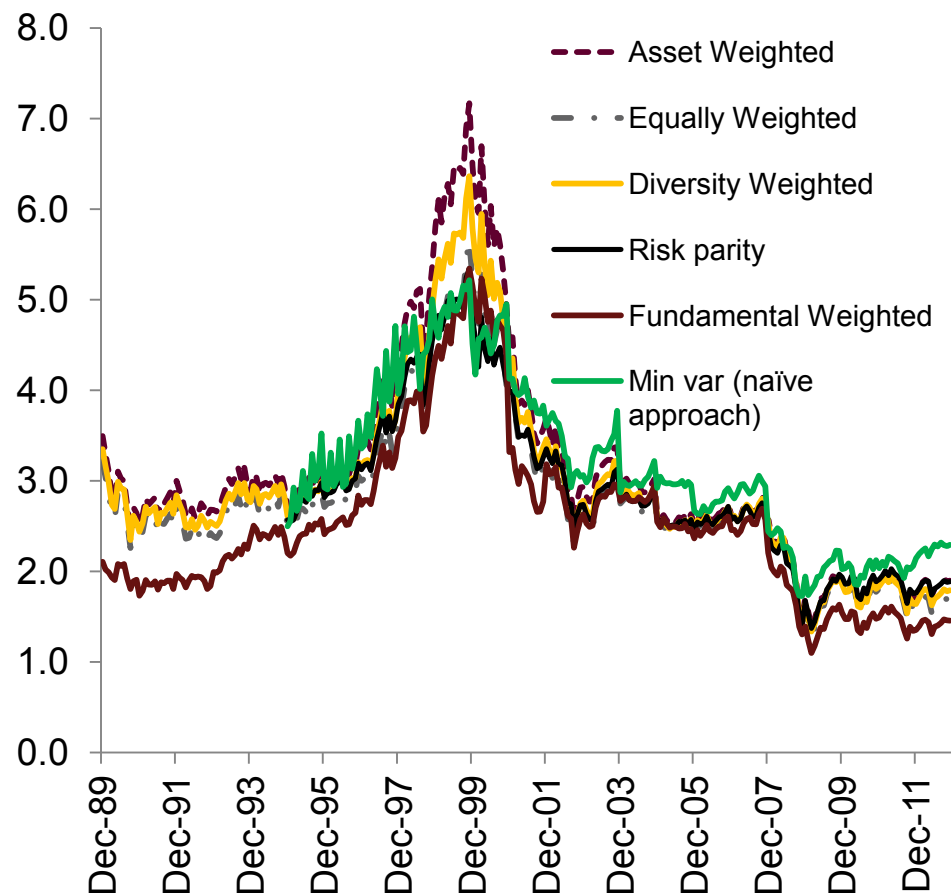
Regression of alternative indices on the Nomura equity factor indices. Source: Nomura Quantitative Strategy

Relative sector exposure Dec 2012 (%)	Basic Industries	Capital Goods	Consumer Cyclicals	Consumer Staples	Energy	Financials	Healthcare	Technology	Utilities	Media	Telecoms
Equally Weighted	0.6	0.1	0.1	-0.2	-1.0	0.8	0.1	0.6	0.6	0.0	-0.2
Diversity Weighted	0.4	-0.5	-0.1	0.1	-0.5	0.5	0.6	1.1	-0.0	-0.2	0.1
Fundamental Weighted	-0.7	-2.8	-2.2	-3.1	5.4	2.5	-0.4	-0.2	0.1	-0.7	3.6
Minimum Variance	-0.6	2.1	1.2	9.5	-7.8	-14.3	-1.4	0.8	17.2	-3.1	-2.1
Max Diversification	5.9	-3.2	8.1	2.5	-7.8	-14.8	-1.3	7.2	10.5	-3.1	-2.5
Risk Parity	-0.9	-0.2	-0.1	1.3	-1.4	-3.9	1.9	0.7	3.5	-0.4	1.0
Min Var (naïve approach)	-5.2	-3.3	-5.2	13.2	-5.0	-16.1	9.9	-1.9	12.3	-2.2	4.8

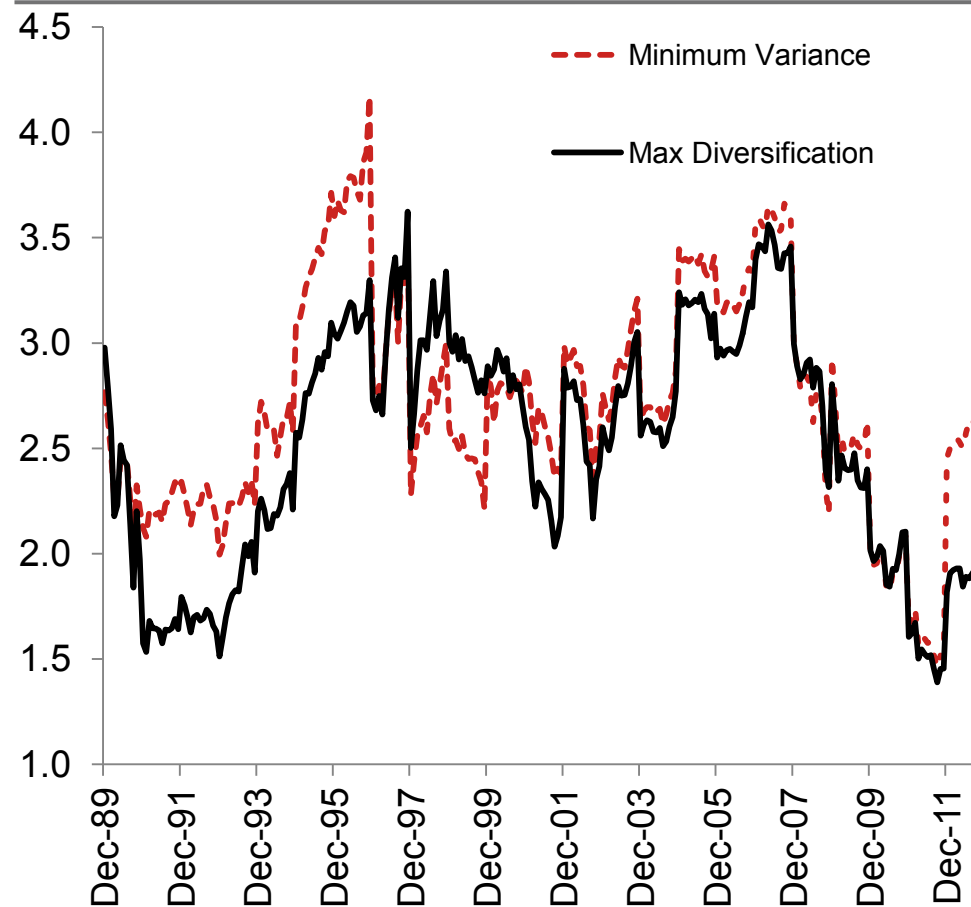
Table shows the current percentage over/underweight of sectors within alternative indices relative to their weight in the market cap weighted index.

Source: Nomura Quantitative Strategy research

Price/book valuation of heuristic-based strategies (12-month rebalancing)

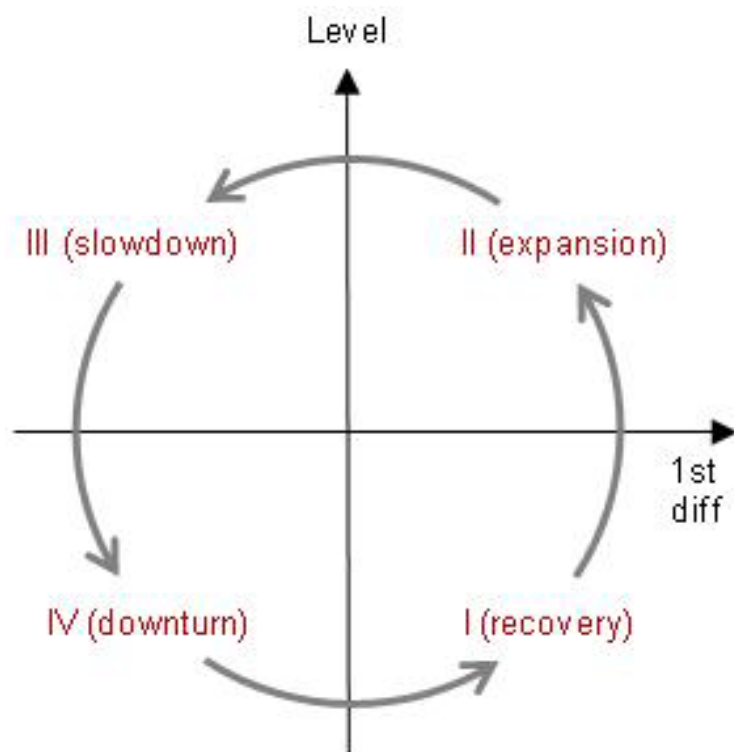


Price/book valuation of optimisation-based strategies (12-month rebalancing)



Price/book ratio of each strategy, calculated as a sum of market caps divided by a sum of book values. Source: Nomura Quantitative Strategy research

Price/book ratio of each strategy, calculated as a sum of market caps divided by a sum of book values. Source: Nomura Liquid Market Analytics, Nomura Quantitative Strategy research



OECD CLI	Relative Performance	Equally Weighted	Diversity Weighted	Fundamental Weighted	Minimum Variance	Max Diversification	Risk Parity	Min Var (naïve approach)
recovery		0.15%	0.08%	0.12%	-1.53%	-1.48%	-0.04%	-1.01%
expansion		0.04%	0.02%	0.02%	-0.98%	-0.73%	-0.15%	-0.62%
slowdown		0.06%	0.03%	0.02%	0.49%	0.31%	0.36%	1.08%
downturn		-0.04%	-0.02%	0.12%	0.56%	0.28%	0.15%	0.66%

Performance of alternative betas over the cycle

NBER									Min Var (naïve approach)
recession cycles	Relative Performance	Equally Weighted	Diversity Weighted	Fundamental Weighted	Minimum Variance	Max Diversification	Risk Parity		
	Late Expansion	0.07%	0.04%	0.25%	-0.53%	-0.53%	0.08%		-0.01%
	Mid Expansion	-0.00%	-0.00%	-0.03%	-0.28%	-0.23%	0.07%		0.28%
	Early Expansion	0.13%	0.07%	0.04%	-0.16%	-0.32%	0.06%		-0.19%
	Late Recession	0.11%	0.06%	0.19%	-1.89%	-1.88%	-0.06%		-1.11%
	Early Recession	0.01%	-0.00%	-0.28%	1.41%	1.16%	0.21%		0.94%
Profit Cycle	Relative Performance	Equally Weighted	Diversity Weighted	Fundamental Weighted	Minimum Variance	Max Diversification	Risk Parity		Min Var (naïve approach)
	Up	0.09%	0.05%	0.06%	-0.79%	-0.74%	-0.05%		-0.48%
	Mid	0.02%	0.01%	0.03%	-0.35%	-0.17%	0.07%		0.16%
	Down	0.04%	0.02%	0.10%	0.06%	-0.23%	0.17%		0.41%

Performance of each strategy relative to the market cap weighted index (total return USD basis). Strategies rebalanced annually. Definition of the cycle taken from US GDP. Source: Nomura Quantitative Strategy research

Possible implementation channels for alternative beta

Characteristic	Futures	ETFs	Stocks	Swaps	Certificates
Classification	Exchange listed derivative contracts (un-funded)	Exchange Traded Fund UCITs compliant for European listings (funded)	Physical Holding of Stock Basket / (funded)	OTC Derivative (un-funded)	Notes (funded)
Fees	Commission paid per contract. e.g. 1 EUR per lot (minimal cost for index such as SX5E)	Management fee paid to ETF issuer Broker Commission	Broker Commission Borrow fee for shorts positions	Financing Spread over Libor Broker Commission	Management fee and/or Broker Commission
Liquidity	Some contracts are very liquid on exchange, otherwise determined by cash market liquidity	Primary: Determined by underlying liquidity Secondary: On exchange trading with market makers	Depending on underlying Borrow cost for short positions	Depending on underlying Borrow cost for short positions	Depending on underlying Borrow cost for short positions
Counterparty Risk	None. Client faces the exchange and only posts small initial margin to their clearer	•Physical ETFs: Counterparty risk due to stock lending • Synthetic ETFs: The fund enters into a swap with credit institution (s) which are fully collateralized	None	Client faces the swap counterparty and has risk to the relevant institution (which will be collateralized)	Client buys funded note from the counterparty with full counterparty risk in case of default
Customize to get exposure to theme	No	Ask ETF provider to create ETF - due diligence process required	Yes	Yes	Yes
On-going management / operational effort	Requires cash management Rolling futures Daily margining	Custodian will take care of day-to-day management Accounting is relatively simple	Custodian will take care of day-to-day management	Requires cash management Collateral management needed on both sides	Custodian will take care of day-to-day management
Market Making	On screen with anonymous counterparty during opening times of the exchange Off screen with counterparty	On screen with anonymous counterparty during opening times of the exchange Directly with market maker OTC	On Exchange	Trading with initial counterparty but can be economically closed out with third counterparty at any time	Trading only with initial counterparty
Leverage	Yes	In general no (only a small number of ETFs give leverage)	No	Yes	Yes
Shorting	Yes	L-S ETFs are possible , though short ing ETFs can be hard in individual cases of poor liquidity	Yes	Yes	Yes

Average pairwise correlation of infrastructure indices

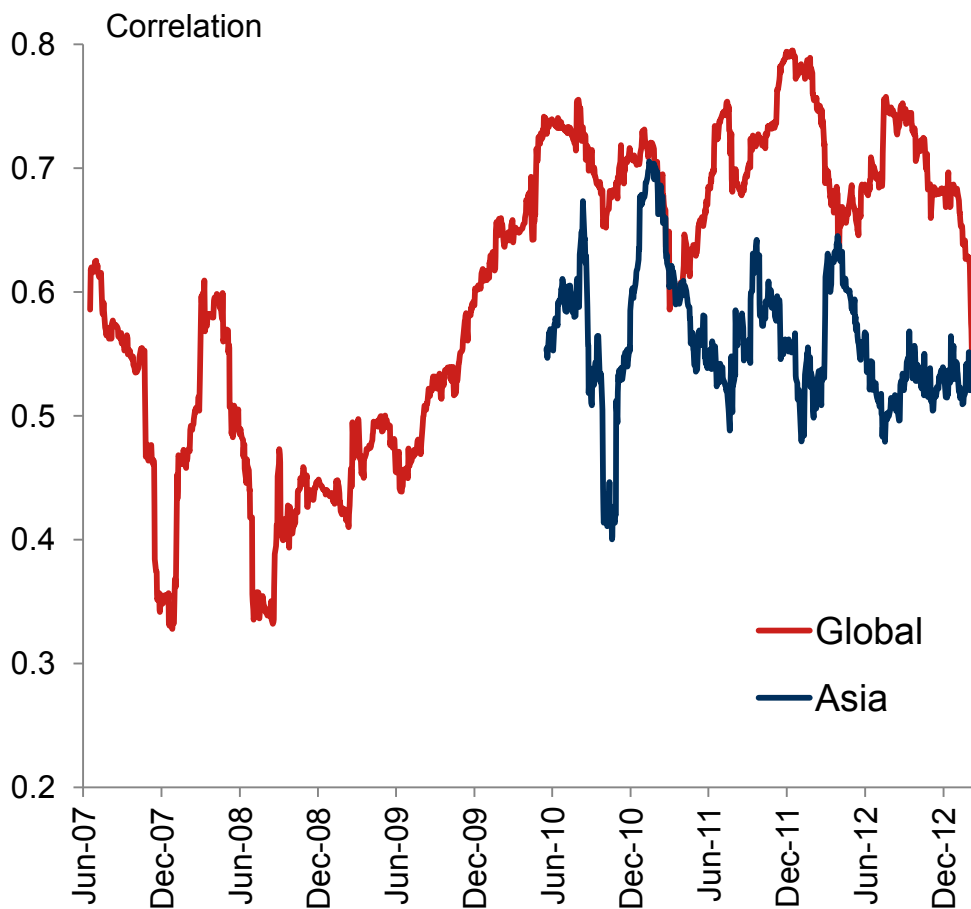


Figure shows 75-day pairwise average correlation between ETFs within each category.
Source: Bloomberg, Nomura Quantitative research

Average pairwise correlation of M&A arbitrage indices

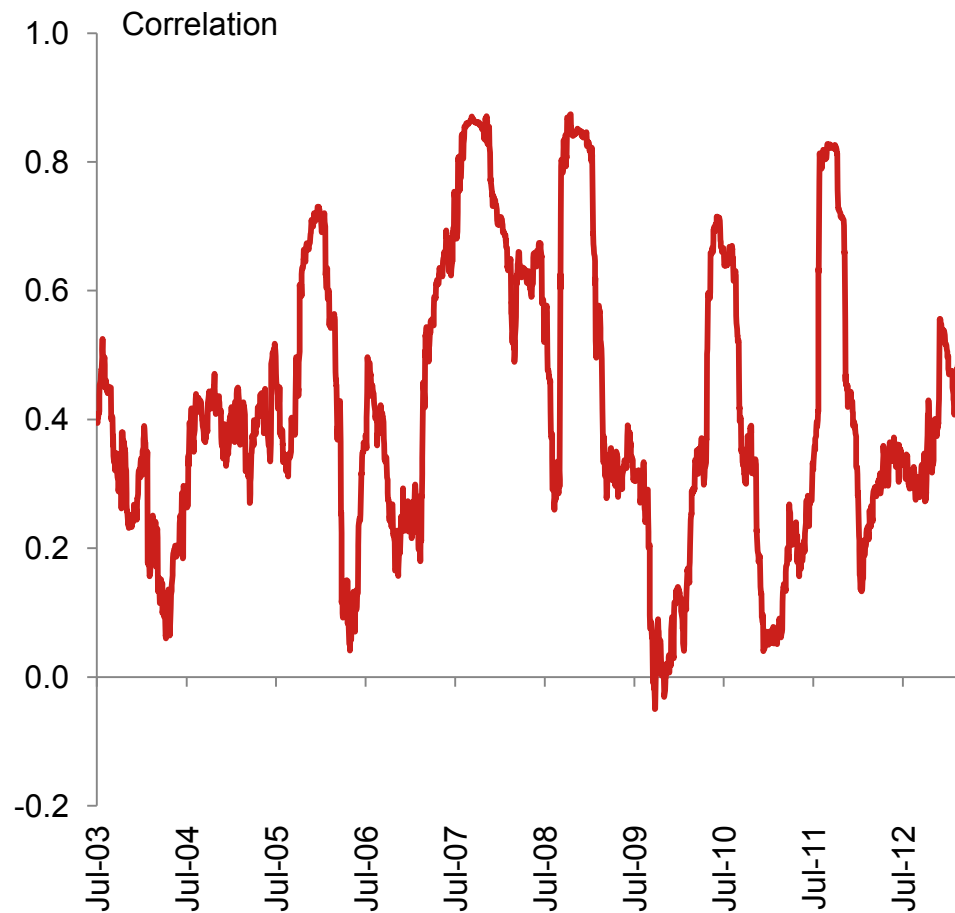


Figure shows 75-day pairwise average correlation between ETFs within each category.
Source: Bloomberg, Nomura Quantitative research

Average pairwise correlation of minimum variance funds and ETFs

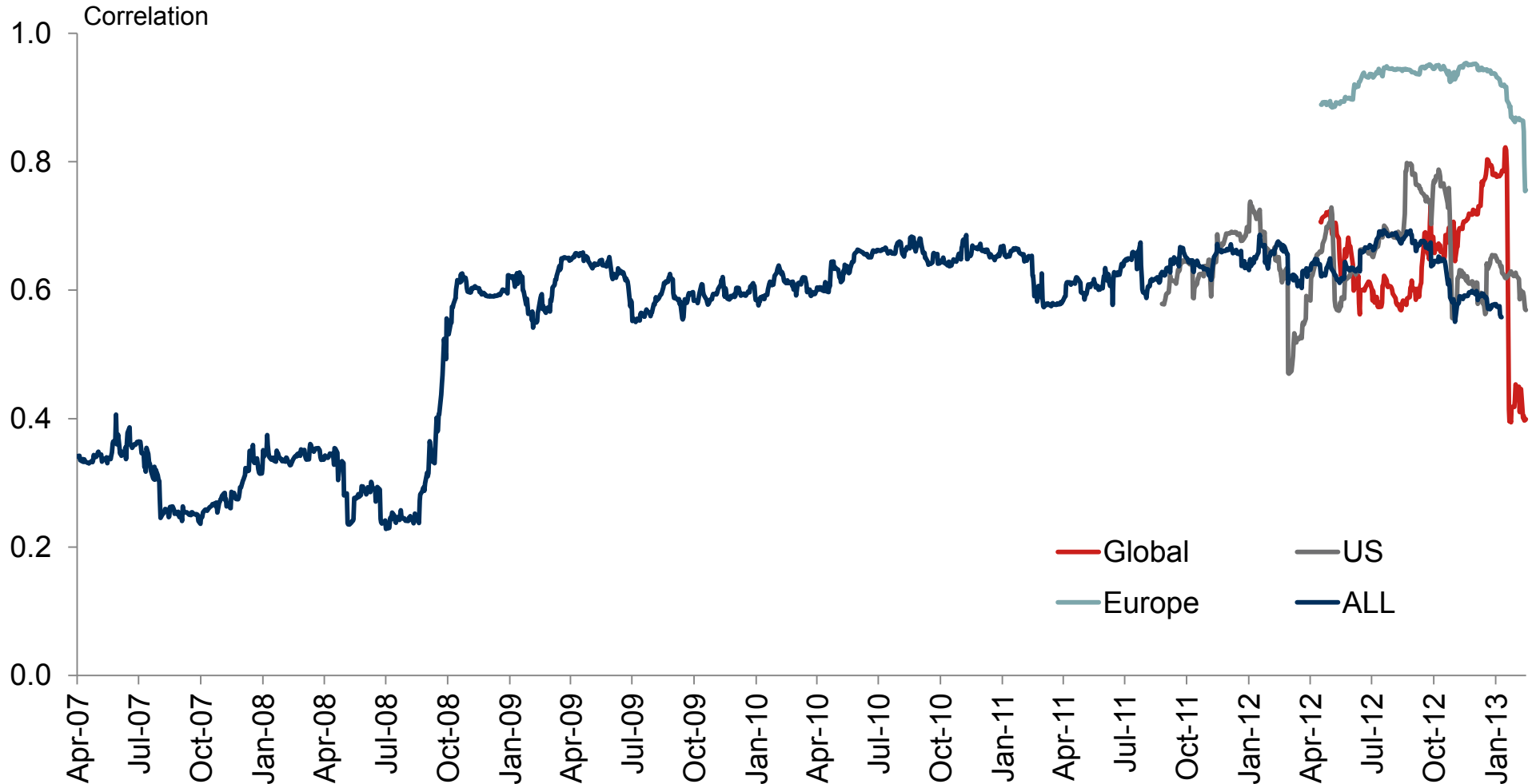


Figure shows 75-day pairwise average correlation between ETFs within each category.

Source: Bloomberg, Nomura Quantitative research

Quant fund management

AUM of global quant funds as a share of total active equity AUM

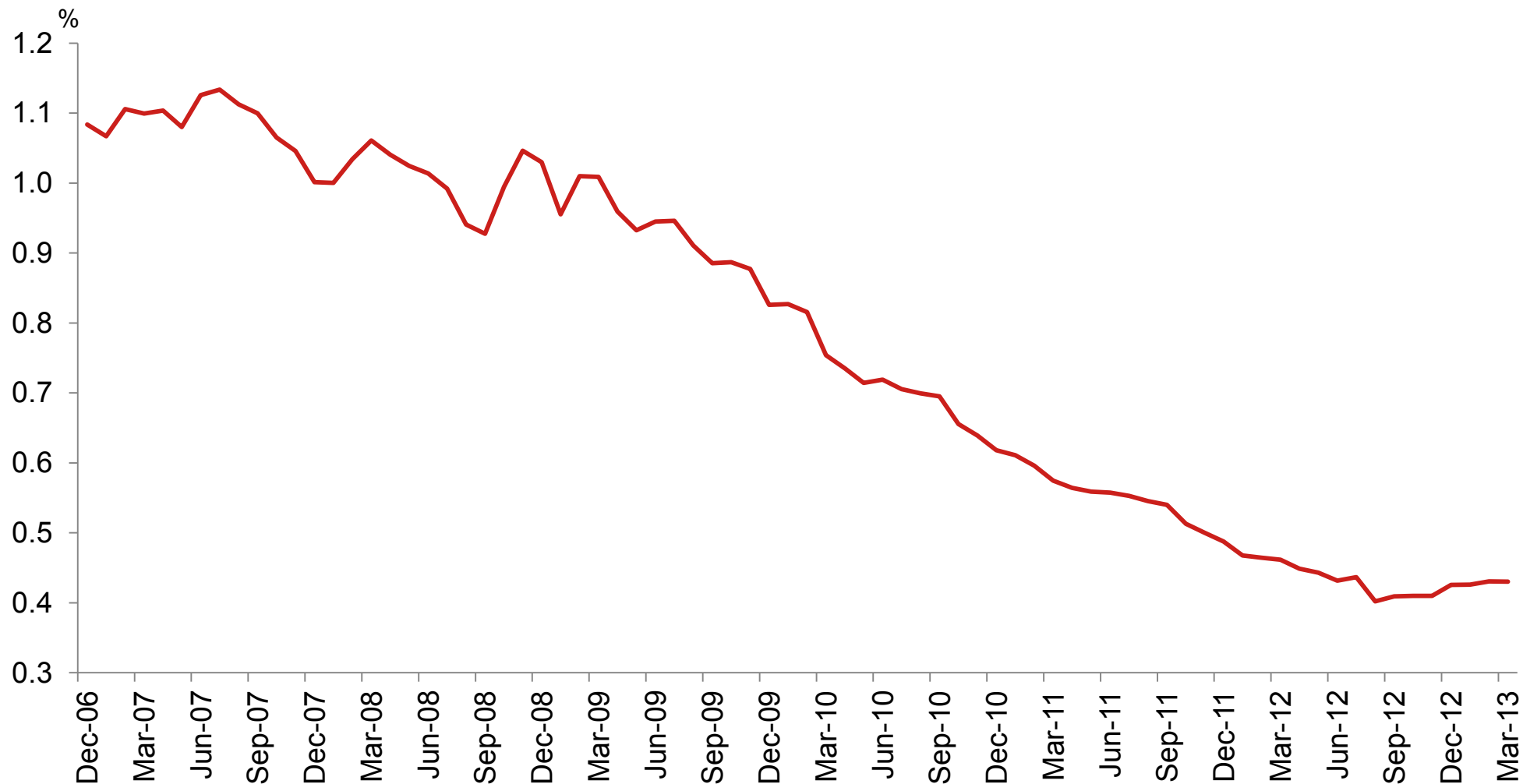
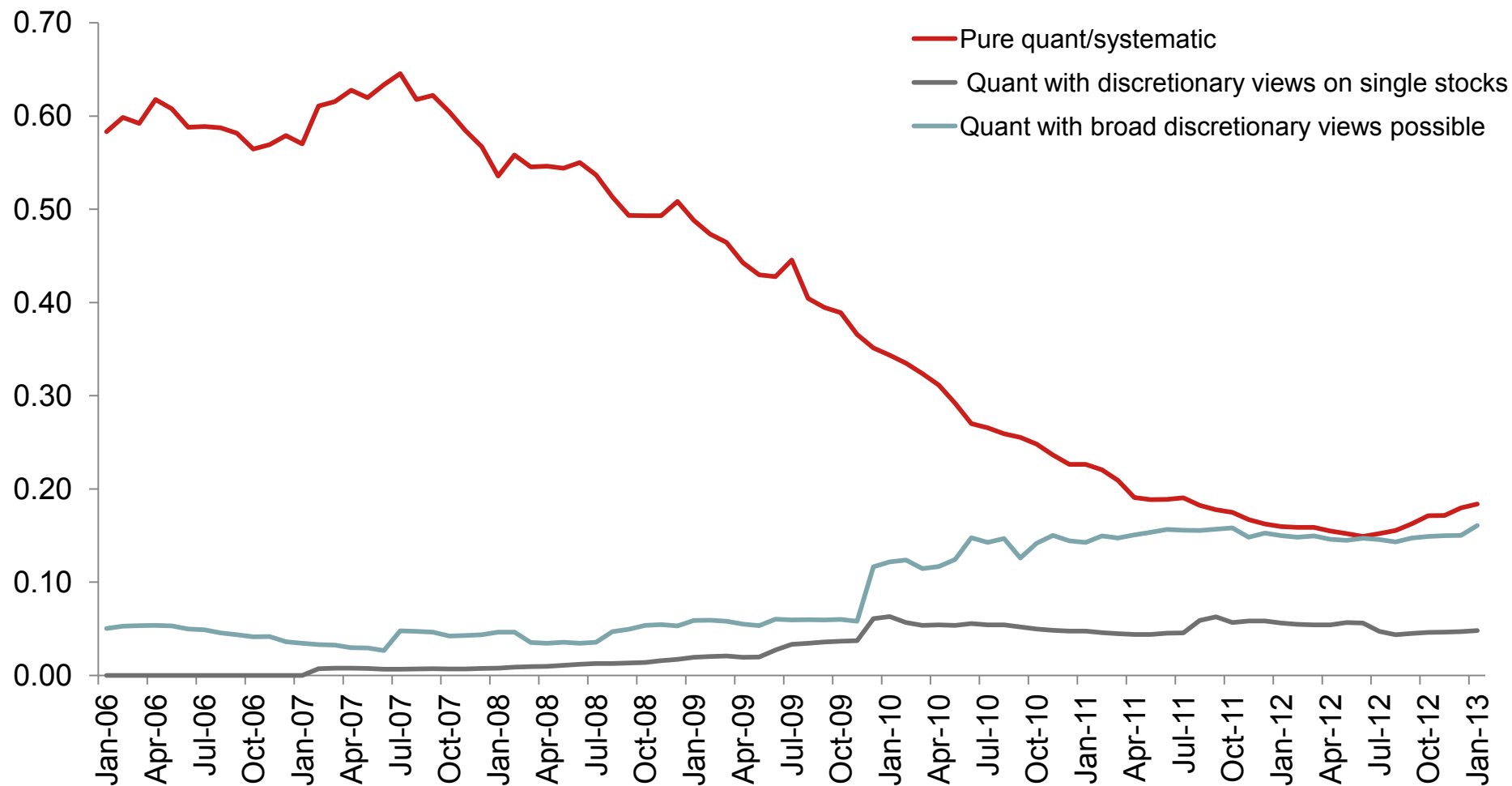
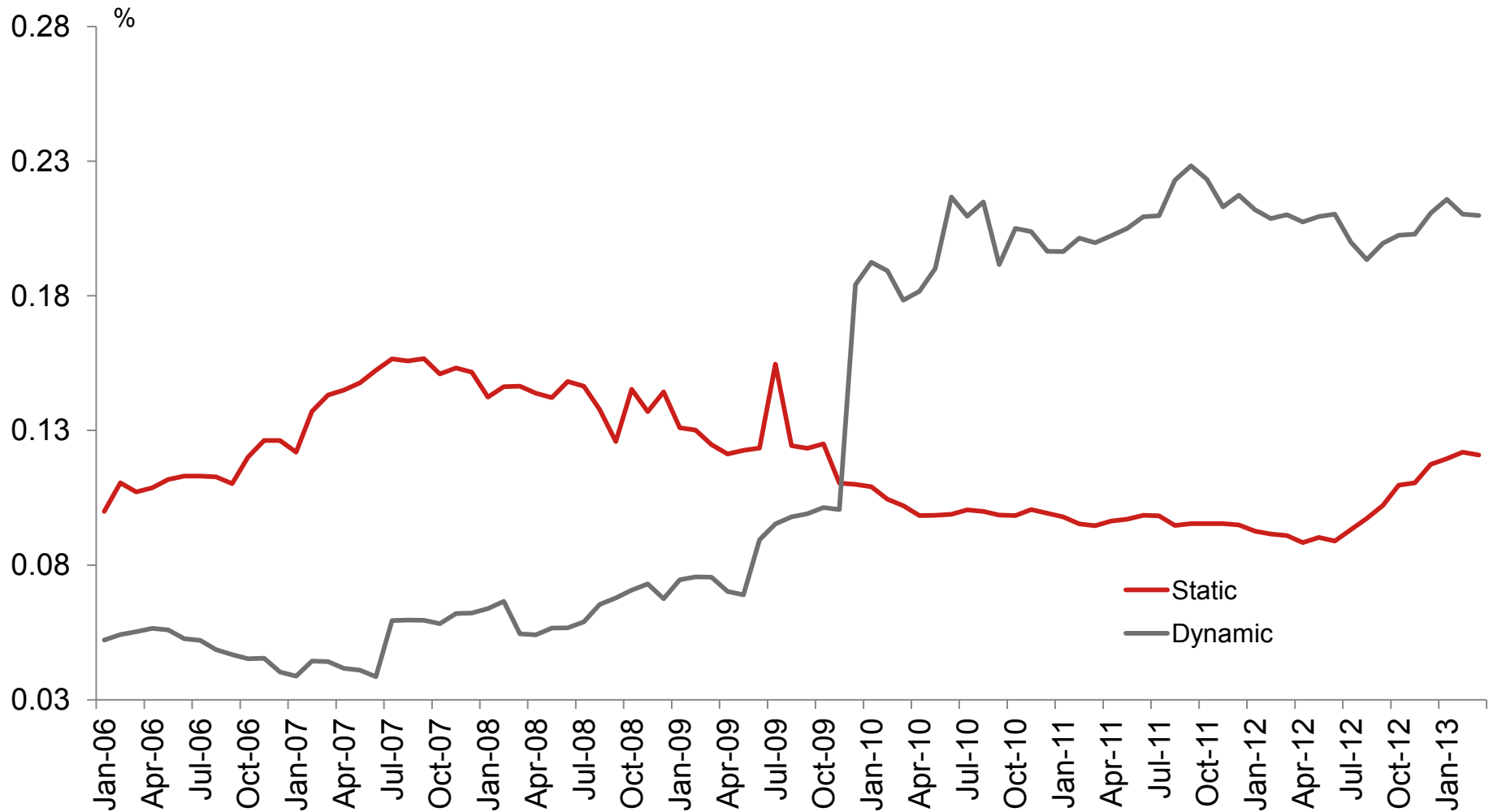


Figure shows the total assets under management for quant funds that are present throughout our sample since 2007 as a percentage of the total amount of assets invested in active equity mandates that are either global or have the US, Europe or Australia as their benchmark. Source: Bloomberg, EPFR, Nomura Strategy research

Asset share for funds with differing levels of discretion

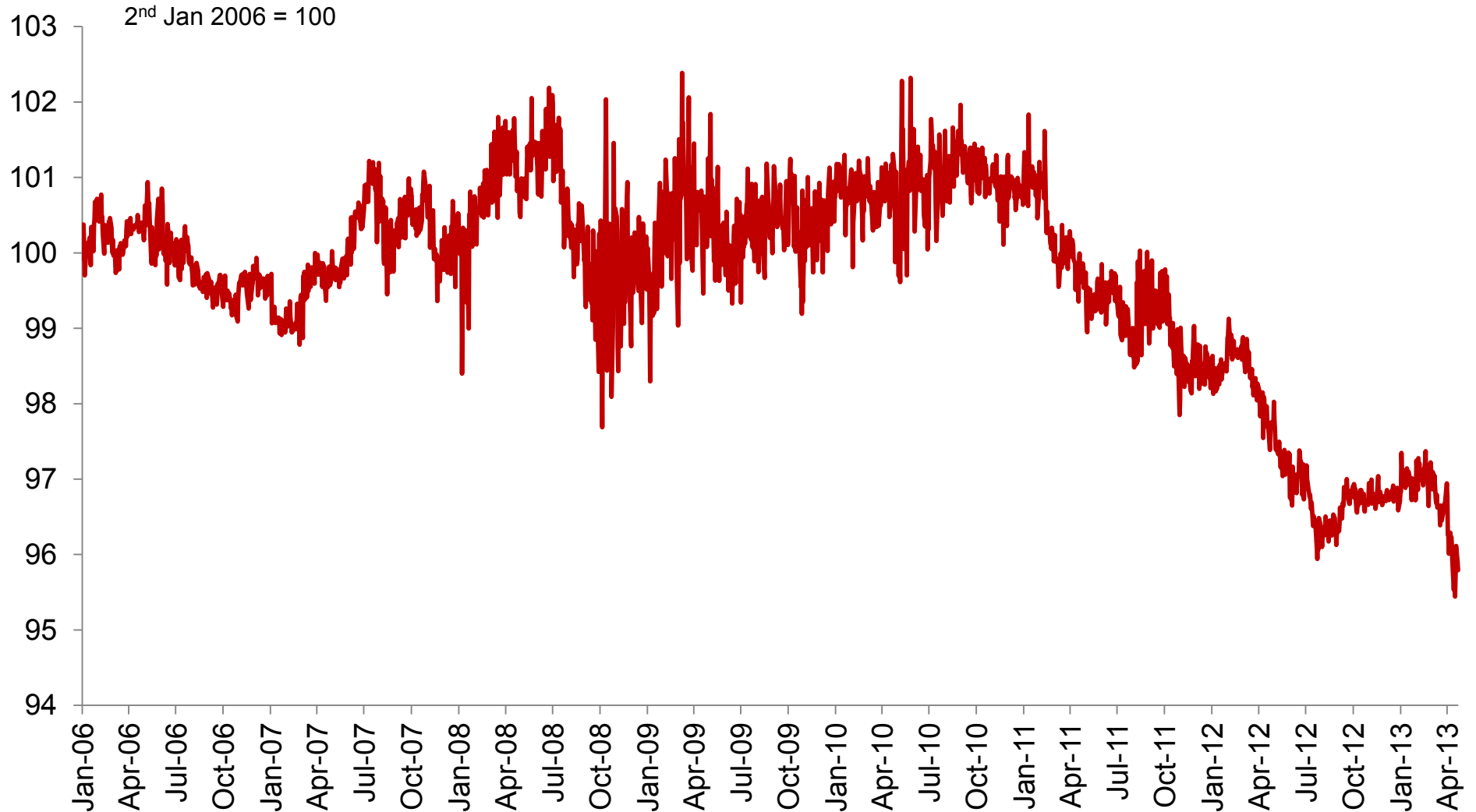


Share of AUM for dynamic and static quant funds



Percentage AUM as a share of active equity funds
Source: Nomura Strategy research

Performance of inductive relative to deductive models



$$r_{t,t+\delta} = \alpha + \beta_1 \text{StockCorrel}_t + \beta_2 \text{FactorCorrel}_t + \beta_3 \text{Value}_t + \beta_4 \text{Momentum}_t + \varepsilon$$

	β	t-statistic
Factor Correlation	-4.2	-1.2
Stock Correlation	-9.6	-3.1
Value	3.0	3.8
Momentum	-0.3	-1.6
Constant	-2.0	-1.3
R ²	0.27	

Where Stock Correlation is the average pair-wise correlation between stocks and Factor Correlation is the average pair-wise correlation between factors. Value and Momentum refer to the dispersion of these factors across the market. Dispersion of Value and Momentum is measured as the inter-octile range on P/E and 12-month price momentum. For all terms the benchmark universe used for calculation is the 500 largest stocks in the FTSE World Index with quarterly rebalancing.

Source: Nomura Quantitative Strategy research

Predicted quant returns (the Nomura Quant Meta Model)

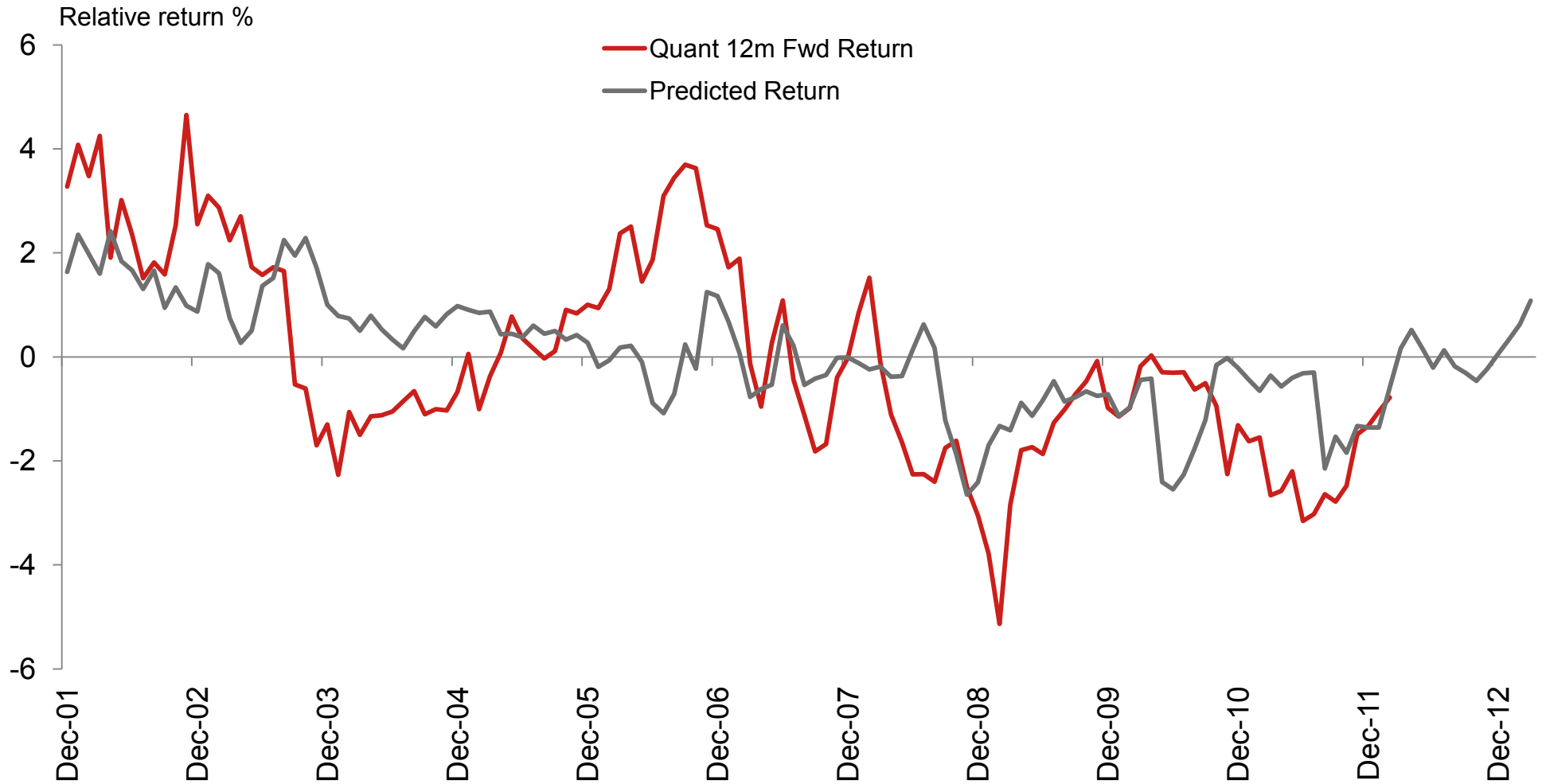


Figure shows the realised and predicted 12-month forward returns to quant strategies relative to the market. The realised returns are based on the Nomura Global Quant Benchmark index while the predicted returns use our meta model. In the quant index all funds are expressed relative to their local index and then aggregated.

Source: Nomura Quantitative Strategy research

Market and factor outlook

Long	Value Risk
Neutral	Expected growth Gearing Size Momentum
Short	Quality

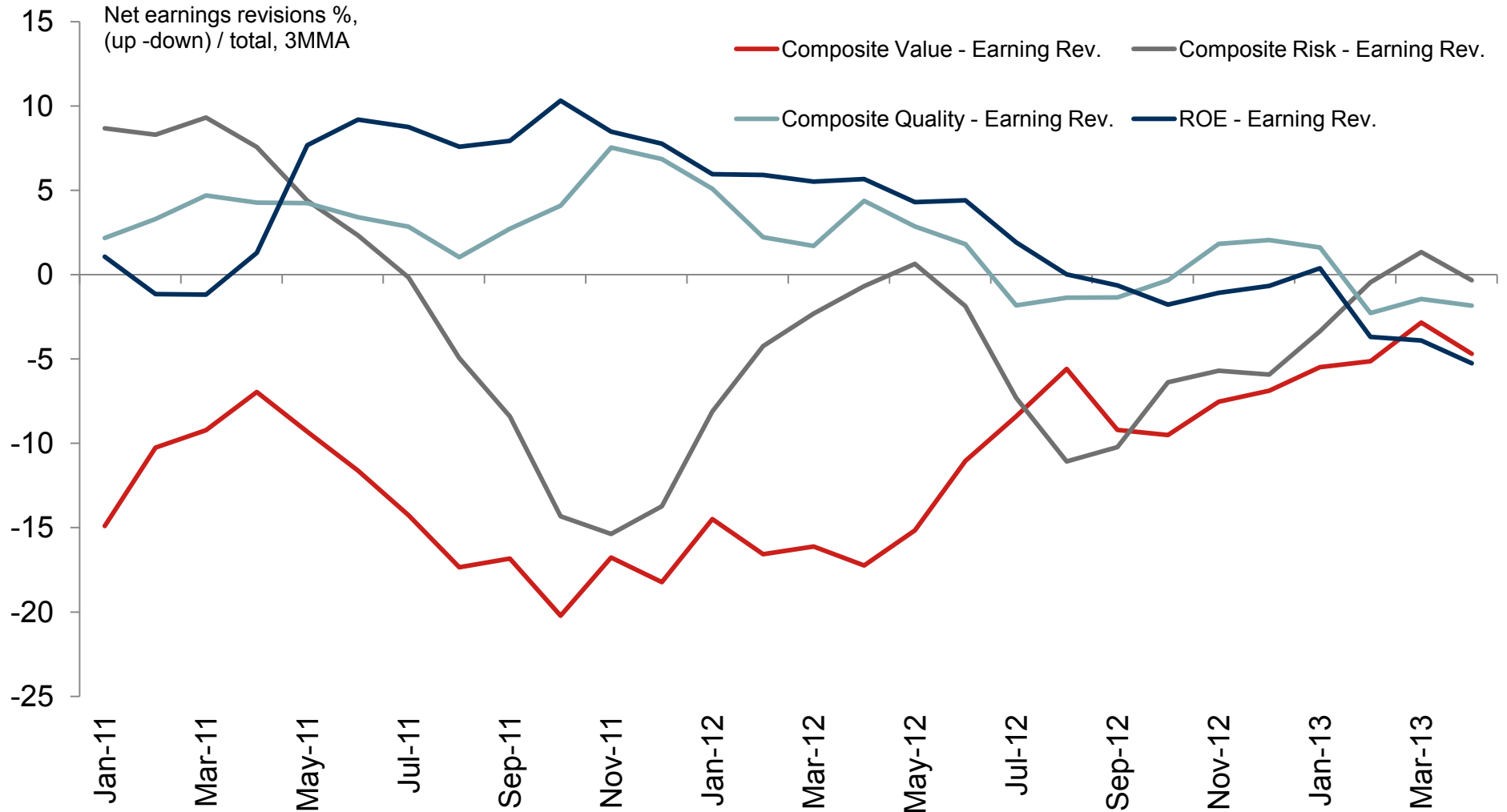
Divergence of factor valuations by region

	US	Europe	Japan	Asia Pacific	Emerging Markets	Australia
Value	-0.29	-0.91	-0.70	-0.76	-0.55	-0.94
Growth	-0.25	0.12	-0.29	0.53	0.74	0.27
Risk	-1.33	-1.24	-1.13	-0.01	-1.13	-0.60
Momentum	-0.37	0.29	0.29	-0.17	0.38	0.32
ROE	0.13	2.08	1.50	0.61	1.04	1.58

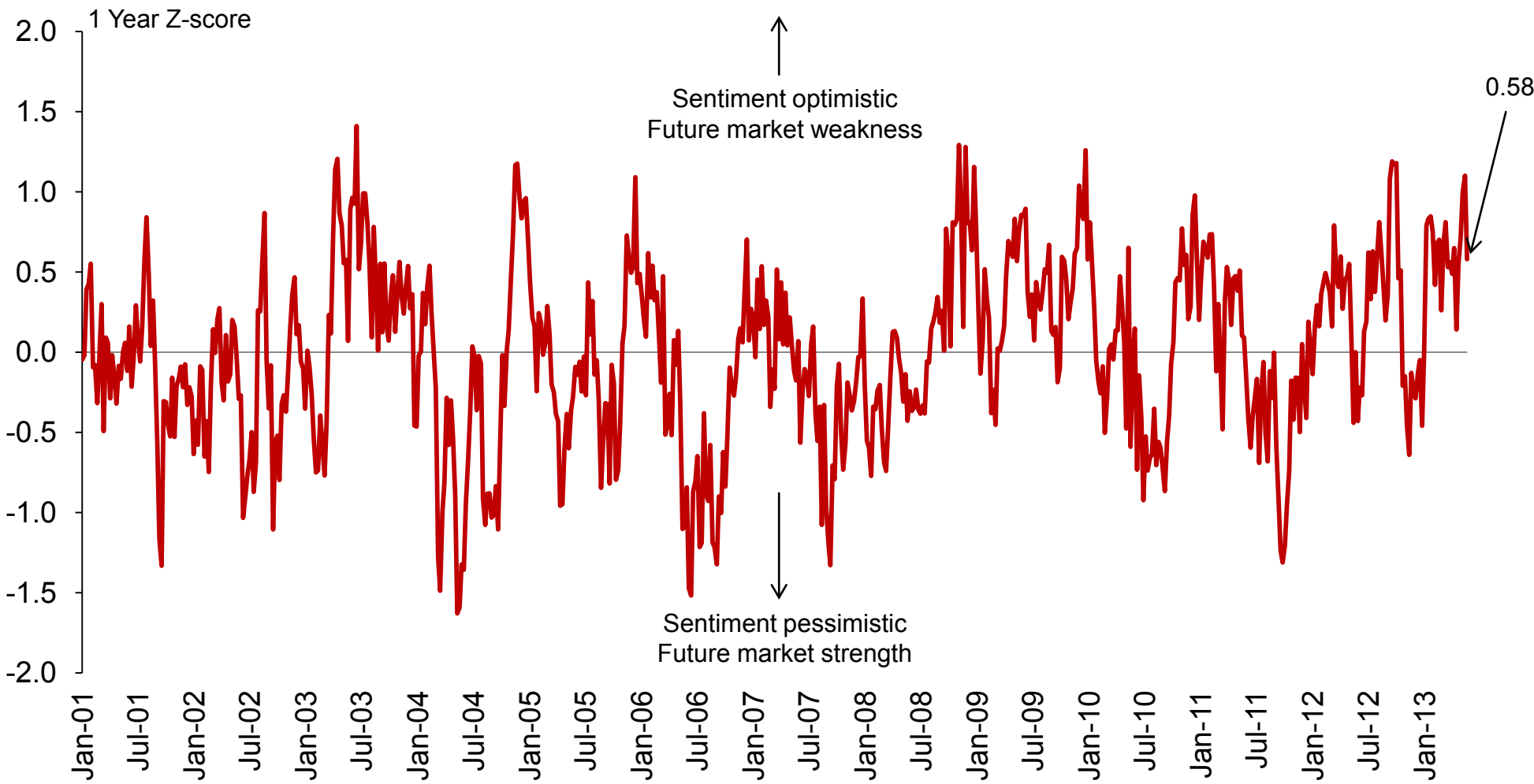
Figure shows Z scores of the current price/book of top relative to bottom quartile of stocks for each factor within each region relative to that style's own 25 year history. Source: Nomura Strategy research

Value and risk companies are seeing fewer downgrades

Earnings revision for global styles



Composite sentiment indicator



Our composite sentiment indicator combines five different sentiment signals: Mutual flows, Nasdaq speculative positioning, Investors Intelligence survey, Put-call ratios and Implied to realised volatility. Source: Nomura Strategy research

Any Authors named on this report are Research Analysts unless otherwise indicated
Analyst Certification

I, Inigo Fraser-Jenkins, hereby certify (1) that the views expressed in this Research report accurately reflect my personal views about any or all of the subject securities or issuers referred to in this Research report, (2) no part of my compensation was, is or will be directly or indirectly related to the specific recommendations or views expressed in this Research report and (3) no part of my compensation is tied to any specific investment banking transactions performed by Nomura Securities International, Inc., Nomura International plc or any other Nomura Group company.

Important Disclosures

Online availability of research and conflict-of-interest disclosures

Nomura research is available on www.nomuranow.com/research, Bloomberg, Capital IQ, Factset, MarkitHub, Reuters and ThomsonOne.

Important disclosures may be read at <http://go.nomuranow.com/research/globalresearchportal/pages/disclosures/disclosures.aspx> or requested from Nomura Securities International, Inc., on 1-877-865-5752. If you have any difficulties with the website, please email grpsupport@nomura.com for help.

The analysts responsible for preparing this report have received compensation based upon various factors including the firm's total revenues, a portion of which is generated by Investment Banking activities. Unless otherwise noted, the non-US analysts listed at the front of this report are not registered/qualified as research analysts under FINRA/NYSE rules, may not be associated persons of NSI, and may not be subject to FINRA Rule 2711 and NYSE Rule 472 restrictions on communications with covered companies, public appearances, and trading securities held by a research analyst account.

Nomura Global Financial Products Inc. ("NGFP") Nomura Derivative Products Inc. ("NDPI") and Nomura International plc. ("NIplc") are registered with the Commodities Futures Trading Commission and the National Futures Association (NFA) as swap dealers. NGFP, NDPI, and NIplc are generally engaged in the trading of swaps and other derivative products, any of which may be the subject of this report.

Any authors named in this report are research analysts unless otherwise indicated. *Industry Specialists* identified in some Nomura International plc research reports are employees within the Firm who are responsible for the sales and trading effort in the sector for which they have coverage. Industry Specialists do not contribute to the content of research reports in which their names appear.

Marketing Analysts identified in some Nomura research reports are research analysts employed by Nomura International plc who are primarily responsible for marketing Nomura's Equity Research product in the sector for which they have coverage. Marketing Analysts may also contribute to research reports in which their names appear and publish research on their sector.

Distribution of ratings (Global)

The distribution of all ratings published by Nomura Global Equity Research is as follows:

43% have been assigned a Buy rating which, for purposes of mandatory disclosures, are classified as a Buy rating; 40% of companies with this rating are investment banking clients of the Nomura Group*.

46% have been assigned a Neutral rating which, for purposes of mandatory disclosures, is classified as a Hold rating; 48% of companies with this rating are investment banking clients of the Nomura Group*.

11% have been assigned a Reduce rating which, for purposes of mandatory disclosures, are classified as a Sell rating; 23% of companies with this rating are investment banking clients of the Nomura Group*.

As at 31 March 2013. *The Nomura Group as defined in the Disclaimer section at the end of this report.

Explanation of Nomura's equity research rating system in Europe, Middle East and Africa, US and Latin America

The rating system is a relative system indicating expected performance against a specific benchmark identified for each individual stock. Analysts may also indicate absolute upside to target price defined as (fair value - current price)/current price, subject to limited management discretion. In most cases, the fair value will equal the analyst's assessment of the current intrinsic fair value of the stock using an appropriate valuation methodology such as discounted cash flow or multiple analysis, etc.

STOCKS

A rating of '**Buy**', indicates that the analyst expects the stock to outperform the Benchmark over the next 12 months. A rating of '**Neutral**', indicates that the analyst expects the stock to perform in line with the Benchmark over the next 12 months. A rating of '**Reduce**', indicates that the analyst expects the stock to underperform the Benchmark over the next 12 months. A rating of '**Suspended**', indicates that the rating, target price and estimates have been suspended temporarily to comply with applicable regulations and/or firm policies in certain circumstances including, but not limited to, when Nomura is acting in an advisory capacity in a merger or strategic transaction involving the company. Benchmarks are as follows: **United States/Europe**: please see valuation methodologies for explanations of relevant benchmarks for stocks, which can be accessed at: <http://go.nomuranow.com/research/globalresearchportal/pages/disclosures/disclosures.aspx>; **Global Emerging Markets (ex-Asia)**: MSCI Emerging Markets ex-Asia, unless otherwise stated in the valuation methodology.

SECTORS

A '**Bullish**' stance, indicates that the analyst expects the sector to outperform the Benchmark during the next 12 months. A '**Neutral**' stance, indicates that the analyst expects the sector to perform in line with the Benchmark during the next 12 months. A '**Bearish**' stance, indicates that the analyst expects the sector to underperform the Benchmark during the next 12 months. Benchmarks are as follows:

United States: S&P 500; **Europe**: Dow Jones STOXX 600; **Global Emerging Markets (ex-Asia)**: MSCI Emerging Markets ex-Asia.

Explanation of Nomura's equity research rating system in Japan and Asia ex-Japan

STOCKS

Stock recommendations are based on absolute valuation upside (downside), which is defined as $(\text{Target Price} - \text{Current Price}) / \text{Current Price}$, subject to limited management discretion. In most cases, the Target Price will equal the analyst's 12-month intrinsic valuation of the stock, based on an appropriate valuation methodology such as discounted cash flow, multiple analysis, etc. A '**Buy**' recommendation indicates that potential upside is 15% or more. A '**Neutral**' recommendation indicates that potential upside is less than 15% or downside is less than 5%. A '**Reduce**' recommendation indicates that potential downside is 5% or more. A rating of '**Suspended**' indicates that the rating and target price have been suspended temporarily to comply with applicable regulations and/or firm policies in certain circumstances including when Nomura is acting in an advisory capacity in a merger or strategic transaction involving the subject company. Securities and/or companies that are labelled as '**Not rated**' or shown as '**No rating**' are not in regular research coverage of the Nomura entity identified in the top banner. Investors should not expect continuing or additional information from Nomura relating to such securities and/or companies.

SECTORS

A '**Bullish**' rating means most stocks in the sector have (or the weighted average recommendation of the stocks under coverage is) a positive absolute recommendation. A '**Neutral**' rating means most stocks in the sector have (or the weighted average recommendation of the stocks under coverage is) a neutral absolute recommendation. A '**Bearish**' rating means most stocks in the sector have (or the weighted average recommendation of the stocks under coverage is) a negative absolute recommendation.

Target Price

A Target Price, if discussed, reflects in part the analyst's estimates for the company's earnings. The achievement of any target price may be impeded by general market and macroeconomic trends, and by other risks related to the company or the market, and may not occur if the company's earnings differ from estimates.

Disclaimers

This document contains material that has been prepared by the Nomura entity identified at the top or bottom of page 1 herein, if any, and/or, with the sole or joint contributions of one or more Nomura entities whose employees and their respective affiliations are specified on page 1 herein or identified elsewhere in the document. The term "Nomura Group" used herein refers to Nomura Holdings, Inc. or any of its affiliates or subsidiaries and may refer to one or more Nomura Group companies including: Nomura Securities Co., Ltd. ('NSC') Tokyo, Japan; Nomura International plc ('Nlplc'), UK; Nomura Securities International, Inc. ('NSI'), New York, US; Nomura International (Hong Kong) Ltd. ('NIHK'), Hong Kong; Nomura Financial Investment (Korea) Co., Ltd. ('NFIK'), Korea (Information on Nomura analysts registered with the Korea Financial Investment Association ('KOFIA') can be found on the KOFIA Intranet at <http://dis.kofia.or.kr>); Nomura Singapore Ltd. ('NSL'), Singapore (Registration number 197201440E, regulated by the Monetary Authority of Singapore); Nomura Australia Ltd. ('NAL'), Australia (ABN 48 003 032 513), regulated by the Australian Securities and Investment Commission ('ASIC') and holder of an Australian financial services licence number 246412; P.T. Nomura Indonesia ('PTNI'), Indonesia; Nomura Securities Malaysia Sdn. Bhd. ('NSM'), Malaysia; NIHK, Taipei Branch ('NITB'), Taiwan; Nomura Financial Advisory and Securities (India) Private Limited ('NFASL'), Mumbai, India (Registered Address: Ceejay House, Level 11, Plot F, Shivsagar Estate, Dr. Annie Besant Road, Worli, Mumbai- 400 018, India; Tel: +91 22 4037 4037, Fax: +91 22 4037 4111; SEBI Registration No: BSE INB011299030, NSE INB231299034, INF231299034, INE 231299034, MCX: INE261299034) and Nlplc, Madrid Branch ('Nlplc, Madrid'). 'CNS Thailand' next to an analyst's name on the front page of a research report indicates that the analyst is employed by Capital Nomura Securities Public Company Limited ('CNS') to provide research assistance services to NSL under a Research Assistance Agreement. CNS is not a Nomura entity.

THIS MATERIAL IS: (I) FOR YOUR PRIVATE INFORMATION, AND WE ARE NOT SOLICITING ANY ACTION BASED UPON IT; (II) NOT TO BE CONSTRUED AS AN OFFER TO SELL OR A SOLICITATION OF AN OFFER TO BUY ANY SECURITY IN ANY JURISDICTION WHERE SUCH OFFER OR SOLICITATION WOULD BE ILLEGAL; AND (III) BASED UPON INFORMATION FROM SOURCES THAT WE CONSIDER RELIABLE, BUT HAS NOT BEEN INDEPENDENTLY VERIFIED BY NOMURA GROUP.

Nomura Group does not warrant or represent that the document is accurate, complete, reliable, fit for any particular purpose or merchantable and does not accept liability for any act (or decision not to act) resulting from use of this document and related data. To the maximum extent permissible all warranties and other assurances by Nomura group are hereby excluded and Nomura Group shall have no liability for the use, misuse, or distribution of this information.

Opinions or estimates expressed are current opinions as of the original publication date appearing on this material and the information, including the opinions and estimates contained herein, are subject to change without notice. Nomura Group is under no duty to update this document. Any comments or statements made herein are those of the author(s) and may differ from views held by other parties within Nomura Group. Clients should consider whether any advice or recommendation in this report is suitable for their particular circumstances and, if appropriate, seek professional advice, including tax advice. Nomura Group does not provide tax advice.

Nomura Group, and/or its officers, directors and employees, may, to the extent permitted by applicable law and/or regulation, deal as principal, agent, or otherwise, or have long or short positions in, or buy or sell, the securities, commodities or instruments, or options or other derivative instruments based thereon, of issuers or securities mentioned herein. Nomura Group companies may also act as market maker or liquidity provider (within the meaning of applicable regulations in the UK) in the financial instruments of the issuer. Where the activity of market maker is carried out in accordance with the definition given to it by specific laws and regulations of the US or other jurisdictions, this will be separately disclosed within the specific issuer disclosures.

This document may contain information obtained from third parties, including ratings from credit ratings agencies such as Standard & Poor's. Reproduction and distribution of third party content in any form is prohibited except with the prior written permission of the related third party. Third party content providers do not guarantee the accuracy, completeness, timeliness or availability of any information, including ratings, and are not responsible for any errors or omissions (negligent or otherwise), regardless of the cause, or for the results obtained from the use of such content. Third party content providers give no express or implied warranties, including, but not limited to, any warranties of merchantability or fitness for a particular purpose or use. Third party content providers shall not be liable for any direct, indirect, incidental, exemplary, compensatory, punitive, special or consequential damages, costs, expenses, legal fees, or losses (including lost income or profits and opportunity costs) in connection with any use of their content, including ratings. Credit ratings are statements of opinions and are not statements of fact or recommendations to purchase hold or sell securities. They do not address the suitability of securities or the suitability of securities for investment purposes, and should not be relied on as investment advice.

Any MSCI sourced information in this document is the exclusive property of MSCI Inc. ('MSCI'). Without prior written permission of MSCI, this information and any other MSCI intellectual property may not be reproduced, re-disseminated or used to create any financial products, including any indices. This information is provided on an "as is" basis. The user assumes the entire risk of any use made of this information. MSCI, its affiliates and any third party involved in, or related to, computing or compiling the information hereby expressly disclaim all warranties of originality, accuracy, completeness, merchantability or fitness for a particular purpose with respect to any of this information. Without limiting any of the foregoing, in no event shall MSCI, any of its affiliates or any third party involved in, or related to, computing or compiling the information have any liability for any damages of any kind. MSCI and the MSCI indexes are services marks of MSCI and its affiliates.

Investors should consider this document as only a single factor in making their investment decision and, as such, the report should not be viewed as identifying or suggesting all risks, direct or indirect, that may be associated with any investment decision. Nomura Group produces a number of different types of research product including, among others, fundamental analysis, quantitative analysis and short term trading ideas; recommendations contained in one type of research product may differ from recommendations contained in other types of research product, whether as a result of differing time horizons, methodologies or otherwise. Nomura Group publishes research product in a number of different ways including the posting of product on Nomura Group portals and/or distribution directly to clients. Different groups of clients may receive different products and services from the research department depending on their individual requirements. Clients outside of the US may access the Nomura Research Trading Ideas platform (Retina) at <http://go.nomuranow.com/equities/tradingideas/retina/>

Figures presented herein may refer to past performance or simulations based on past performance which are not reliable indicators of future performance. Where the information contains an indication of future performance, such forecasts may not be a reliable indicator of future performance. Moreover, simulations are based on models and simplifying assumptions which may oversimplify and not reflect the future distribution of returns.

Certain securities are subject to fluctuations in exchange rates that could have an adverse effect on the value or price of, or income derived from, the investment.

The securities described herein may not have been registered under the US Securities Act of 1933 (the '1933 Act'), and, in such case, may not be offered or sold in the US or to US persons unless they have been registered under the 1933 Act, or except in compliance with an exemption from the registration requirements of the 1933 Act. Unless governing law permits otherwise, any transaction should be executed via a Nomura entity in your home jurisdiction.

This document has been approved for distribution in the UK and European Economic Area as investment research by Nlplc. Nlplc is authorised by the Prudential Regulation Authority ('PRA'), regulated by the Financial Conduct Authority and the PRA, and is a member of the London Stock Exchange. This document does not constitute a personal recommendation within the meaning of applicable regulations in the UK, or take into account the particular investment objectives, financial situations, or needs of individual investors. This document is intended only for investors who are 'eligible counterparties' or 'professional clients' for the purposes of applicable regulations in the UK, and may not, therefore, be redistributed to persons who are 'retail clients' for such purposes. This document has been approved by NIHK, which is regulated by the Hong Kong Securities and Futures Commission, for distribution in Hong Kong by NIHK. This document has been approved for distribution in Australia by NAL, which is authorized and regulated in Australia by the ASIC. This document has also been approved for distribution in Malaysia by NSM. In Singapore, this document has been distributed by NSL. NSL accepts legal responsibility for the content of this document, where it concerns securities, futures and foreign exchange, issued by their foreign affiliates in respect of recipients who are not accredited, expert or institutional investors as defined by the Securities and Futures Act (Chapter 289). Recipients of this document in Singapore should contact NSL in respect of matters arising from, or in connection with, this document. Unless prohibited by the provisions of Regulation S of the 1933 Act, this material is distributed in the US, by NSI, a US-registered broker-dealer, which accepts responsibility for its contents in accordance with the provisions of Rule 15a-6, under the US Securities Exchange Act of 1934.

This document has not been approved for distribution to persons other than 'Authorised Persons', 'Exempt Persons' or 'Institutions' (as defined by the Capital Markets Authority) in the Kingdom of Saudi Arabia ('Saudi Arabia') or to clients other than 'professional clients' (as defined by the Dubai Financial Services Authority) in the United Arab Emirates ('UAE') by Nomura Saudi Arabia, Nlplc or any other member of Nomura Group, as the case may be. Neither this document nor any copy thereof may be taken or transmitted or distributed, directly or indirectly, by any person other than those authorised to do so into Saudi Arabia or in the UAE or to any person other than 'Authorised Persons', 'Exempt Persons' or 'Institutions' located in Saudi Arabia or to clients other than 'professional clients' in the UAE. By accepting to receive this document, you represent that you are not located in Saudi Arabia or that you are an 'Authorised Person', an 'Exempt Person' or an 'Institution' in Saudi Arabia or that you are a 'professional client' in the UAE and agree to comply with these restrictions. Any failure to comply with these restrictions may constitute a violation of the laws of the UAE or Saudi Arabia.

NO PART OF THIS MATERIAL MAY BE (I) COPIED, PHOTOCOPIED, OR DUPLICATED IN ANY FORM, BY ANY MEANS; OR (II) REDISTRIBUTED WITHOUT THE PRIOR WRITTEN CONSENT OF A MEMBER OF NOMURA GROUP. If this document has been distributed by electronic transmission, such as e-mail, then such transmission cannot be guaranteed to be secure or error-free as information could be intercepted, corrupted, lost, destroyed, arrive late or incomplete, or contain viruses. The sender therefore does not accept liability for any errors or omissions in the contents of this document, which may arise as a result of electronic transmission. If verification is required, please request a hard-copy version.

Nomura Group manages conflicts with respect to the production of research through its compliance policies and procedures (including, but not limited to, Conflicts of Interest, Chinese Wall and Confidentiality policies) as well as through the maintenance of Chinese walls and employee training.

Additional information is available upon request and disclosure information is available at the Nomura Disclosure web page:

<http://go.nomuranow.com/research/globalresearchportal/pages/disclosures/disclosures.aspx>

Copyright © 2013 Nomura International plc. All rights reserved.