

JP quantitative equity strategy

JP active fund managers facing headwind

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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.

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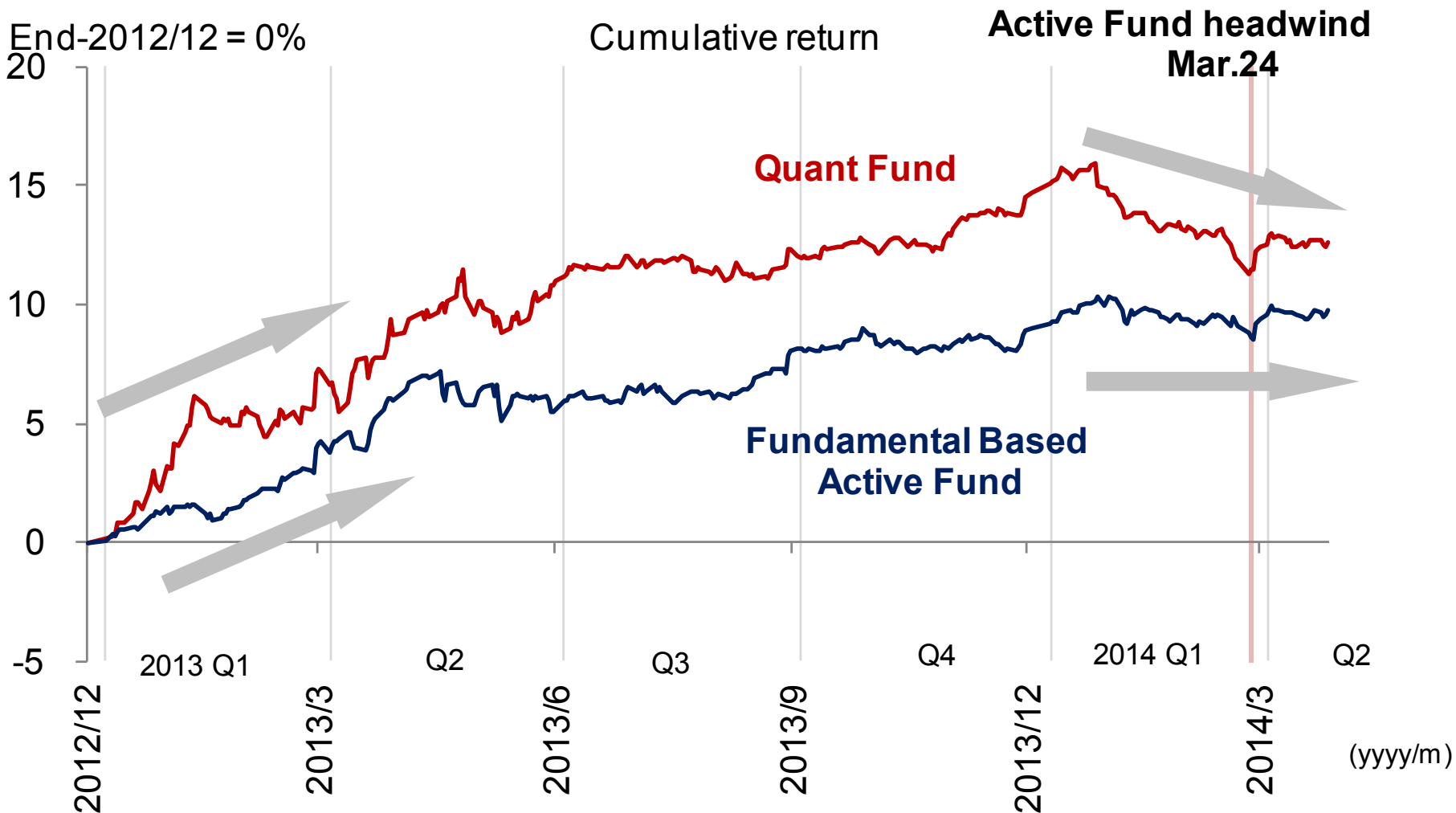
- Current investment environment in Japanese equities
 - A rotation from momentum to reversal
 - A strong headwind on 24 March

- Additional unwinding risk likely
 - Dissolution of employee pension funds (EPFs) is about to gain momentum in earnest

- Avoiding herding investment behavior is crucial
 - At both the factor and individual stock level

Japanese quant funds and fundamentals active funds had been doing well during last year ...

Average performance of Japanese equity fundamental-based active funds and quant funds

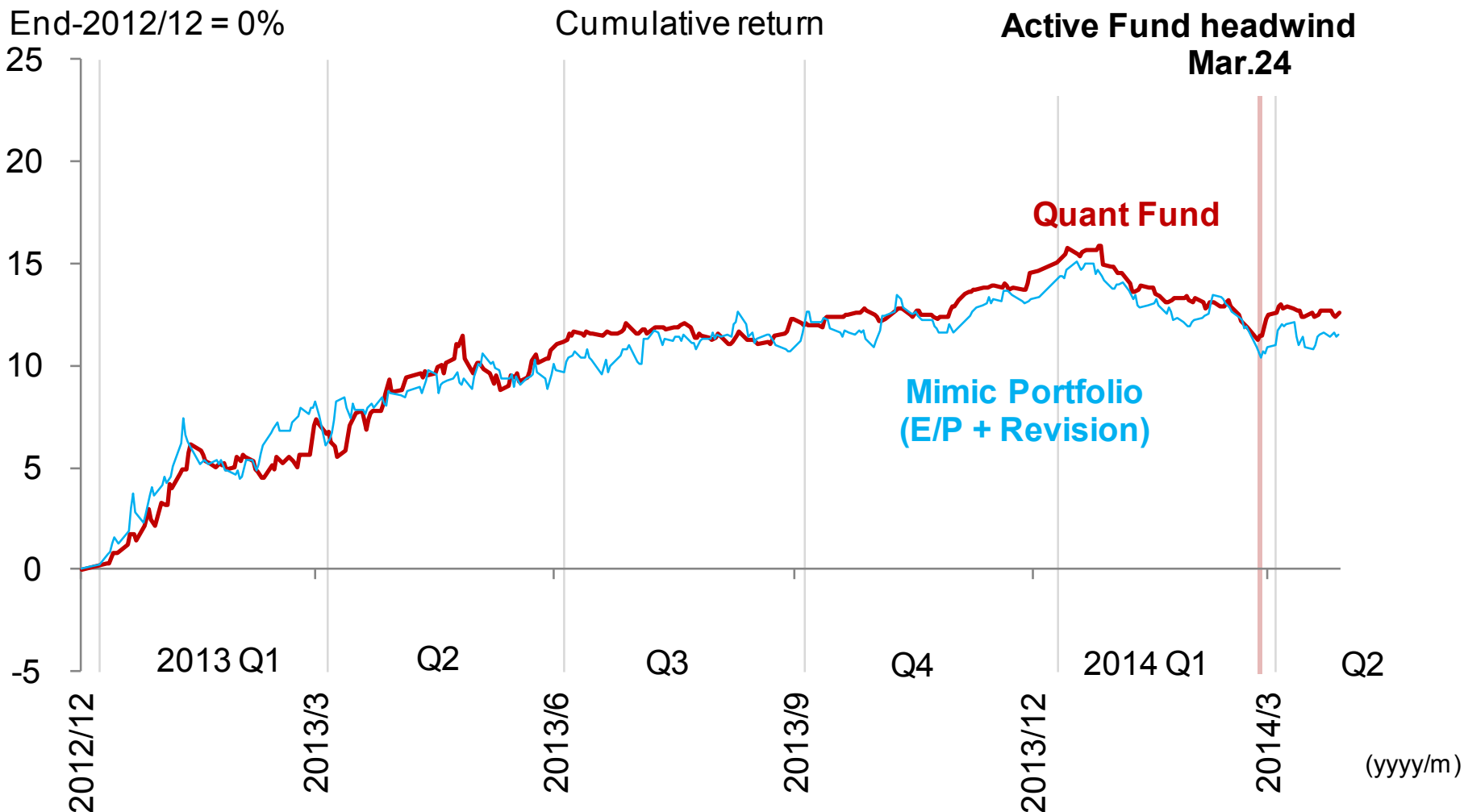


Note: Shows daily average return (Jensen's alpha), on an indexed basis, on 23 funds (domestic publicly offered investment trusts and nonresident investor funds) that invest in Japanese equities using a quant-based approach. Sample includes long-only, individual stock long-short, and market-neutral (long on individual stocks, short on index futures, for example) funds. Sample period is 4 January 2012 through 25 April 2014.

Source: Nomura

Japanese quant funds recently appear to focus on profit-based factors

Average performance of Mimic portfolio and Quant funds



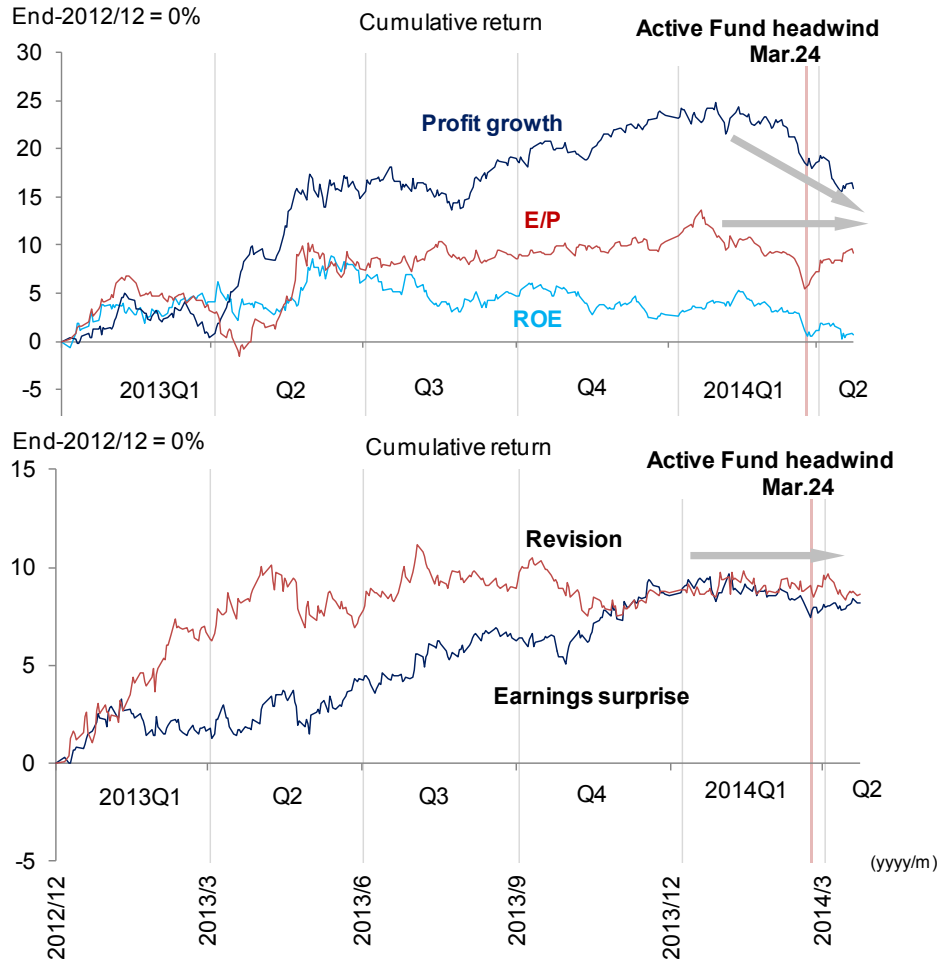
Note: Shows daily return of mimic portfolio (the composite factor of E/P and Revision)) and daily average return (Jensen's alpha), on an indexed basis, on 23 funds (domestic publicly offered investment trusts and nonresident investor funds) that invest in Japanese equities using a quant-based approach. Sample includes long-only, individual stock long-short, and market-neutral (long on individual stocks, short on index futures, for example) funds. Sample period is January 2013 through 25.April.2014

Source: Nomura

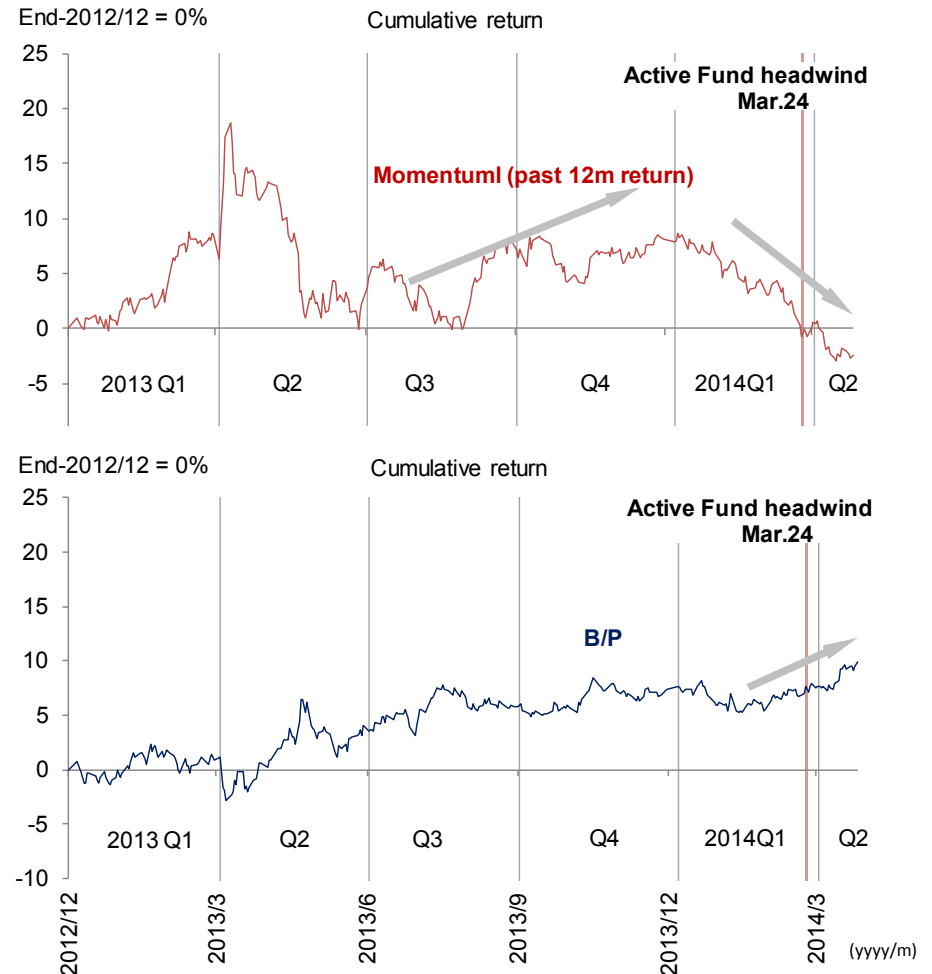
JP market facing the issues similar to those in global markets: Value and reversal have come back to Japan ?

■ Since 2014, profit-based factor and momentum have become less effective

Daily performance of main profit-based factors



Daily performance of share price momentum and B/P factors

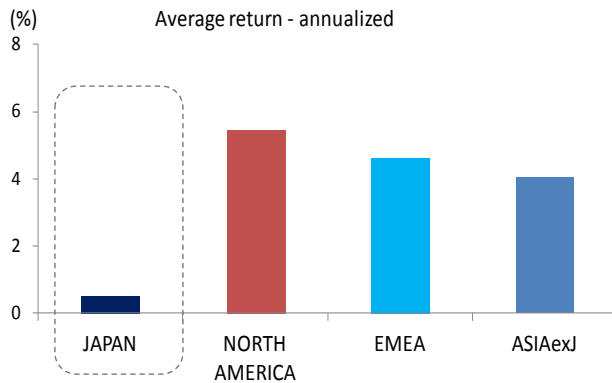


Note: For each factor, we divided our universe of TOPIX 500 stocks into five quintiles based on factor values at the beginning of each month. We then calculated daily returns on a strategy of going long on stocks with the highest factor values (undervalued) and short on stocks with the lowest values (overvalued). The graph shows cumulative returns exclusive of trading costs for the period from 4 January 2013 through 25 April 2014. Analysis is based on past performance and does not guarantee future performance.

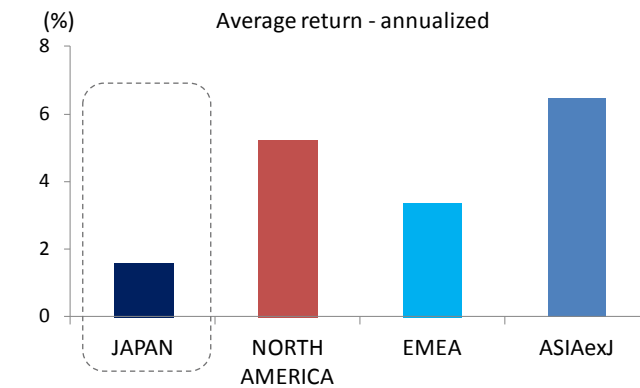
Japanese equities have missed recent value rally overseas

More recent : 2014 (Mar 18 – Apr 25)

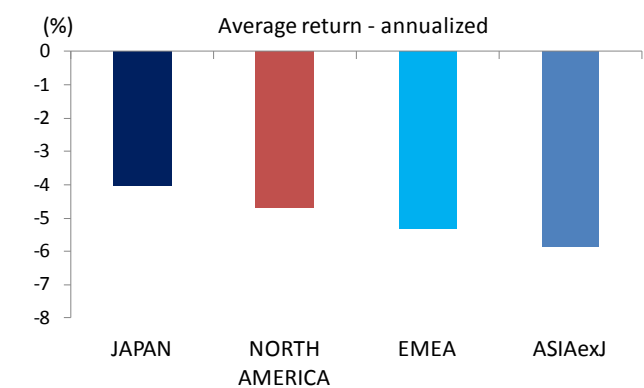
Value – E/P factor



Value – B/P factor

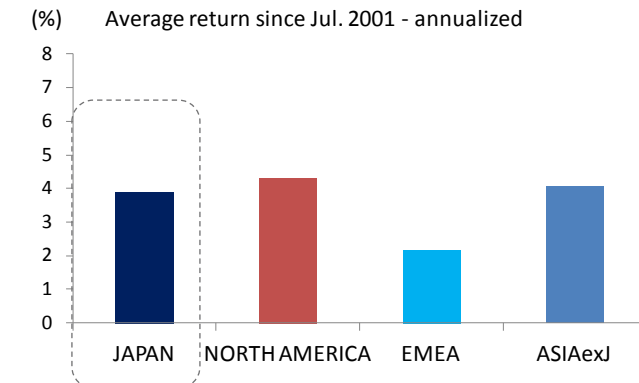


Momentum – 12 month return

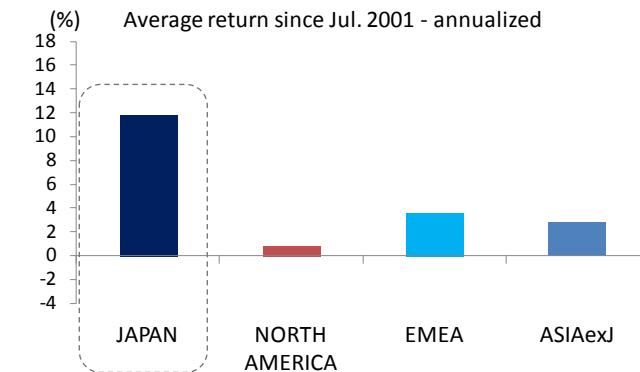


Long-term trend : Jul.2001 – Apr.2014

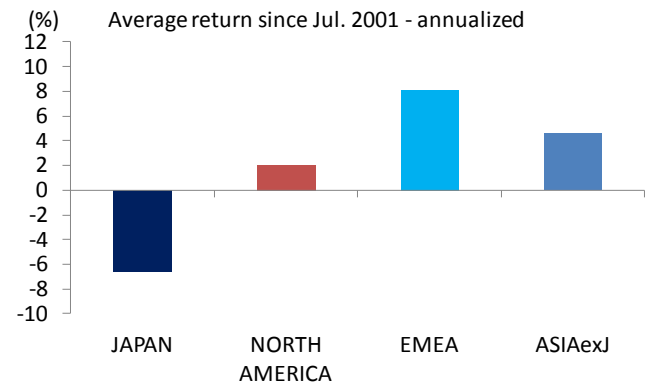
Value – E/P factor



Value – B/P factor



Momentum – 12 month return

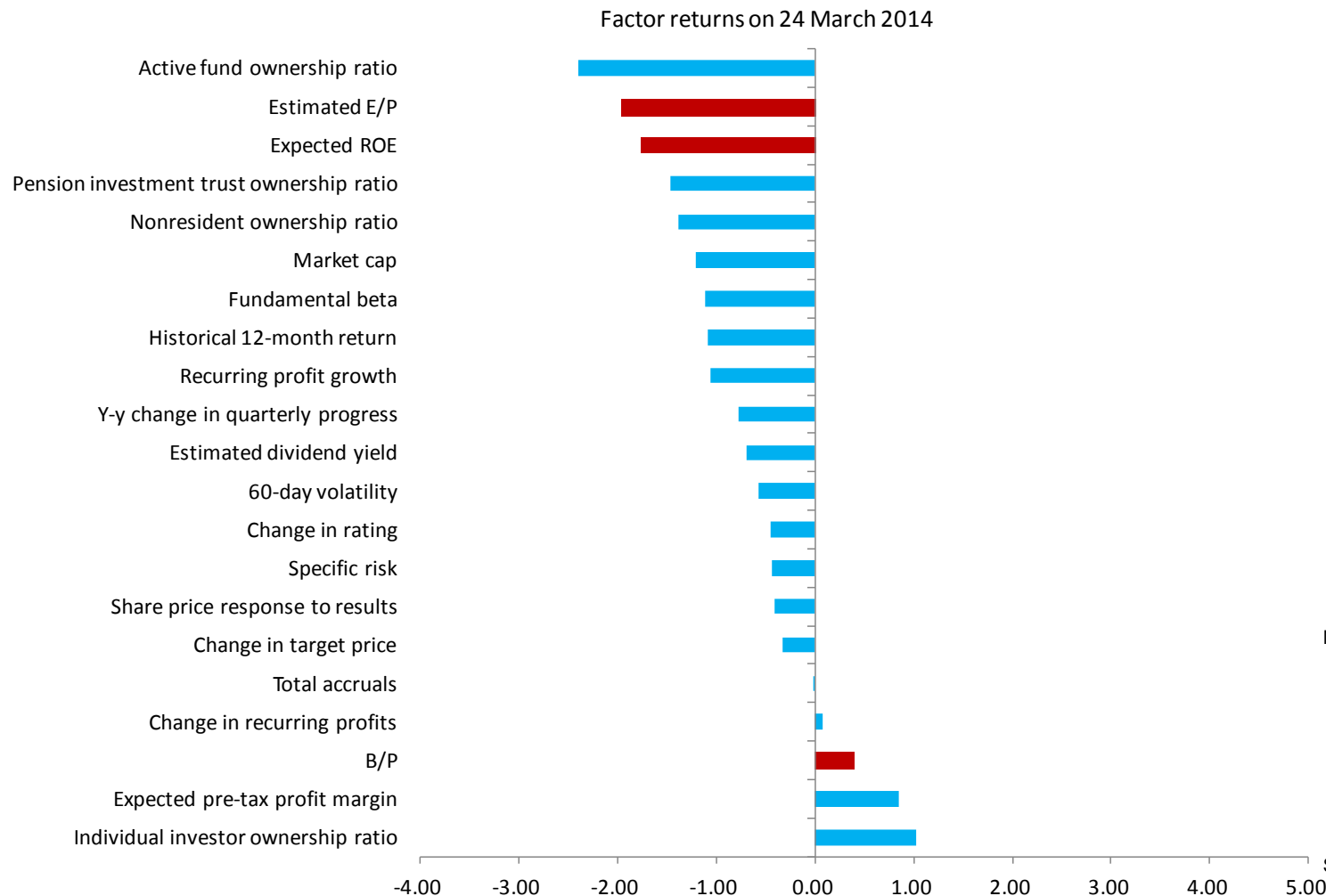


Note: For each factor, we divided our universe of MSCI Japan / North America / EMEA stocks into five quintiles based on factor values at the beginning of each month. We then calculated monthly(top) and daily(bottom) returns on a strategy of going long on stocks with the highest factor values and short on stocks with the lowest values. The graph shows cumulative returns exclusive of trading costs. Analysis is based on past performance and does not guarantee future performance.
Source: Nomura

Headwinds against Japan equities on 24 March

- “Earnings forecast based factors” and “active fund ownership ratio” showed negative returns
- “B/P” and “individual investor ownership ratio” showed positive returns

Factor returns on 24 March 2014



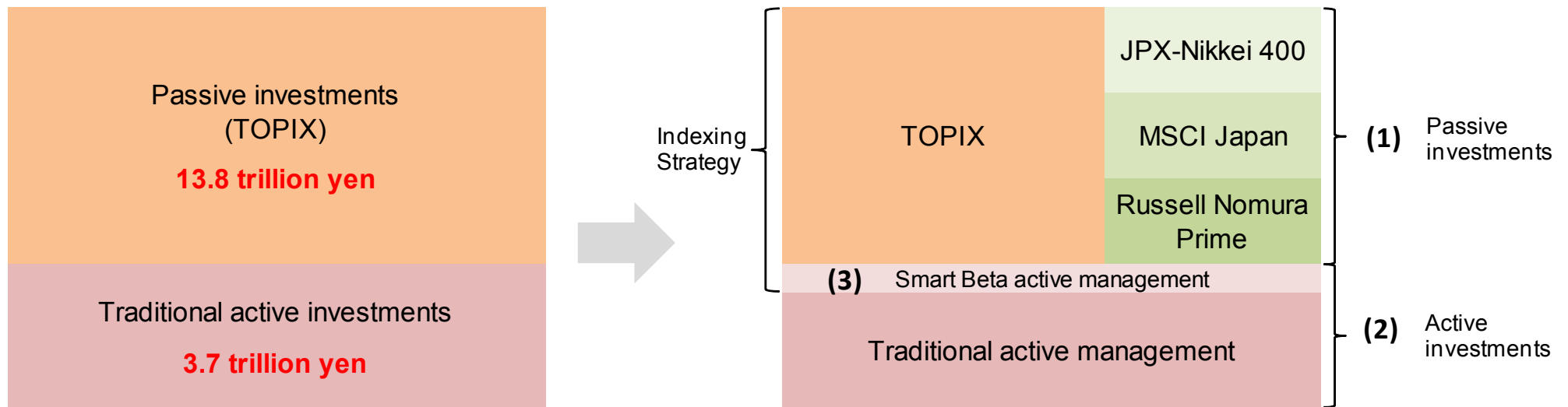
Note: Based on a universe of TOPIX 500 stocks, as at the time of rebalancing at the beginning of the month. For each factor, we divided each universe into quintiles based on factor values, and calculated the daily return (equally weighted basis) on 24 March, including dividends, on a strategy comprising long positions in the stocks in the quintile with the highest factor values and short positions in the stocks in the quintile with the lowest factor values. We did not take sector allocation into account.

Source: Nomura

GPIF's revisions of manager structure

- (1) Diversification of benchmarks for “passive investment”
- (2) Major changes to asset managers in “traditional active management”
- (3) Implementation of “smart beta active management”

Revision of manager structure for domestic equity investment

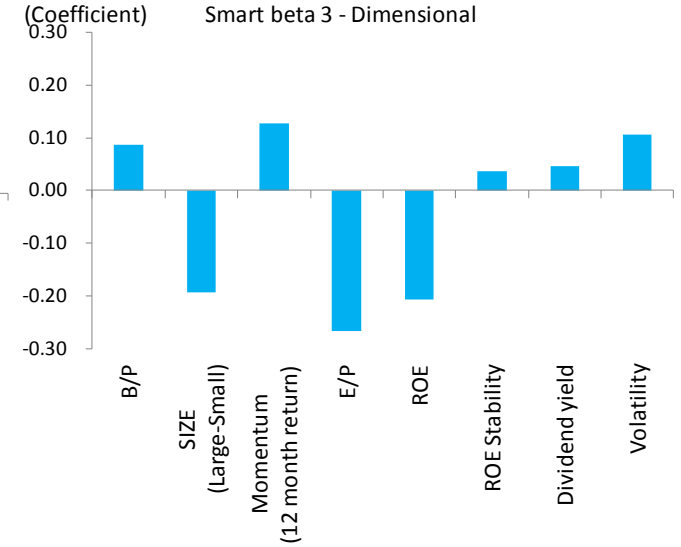
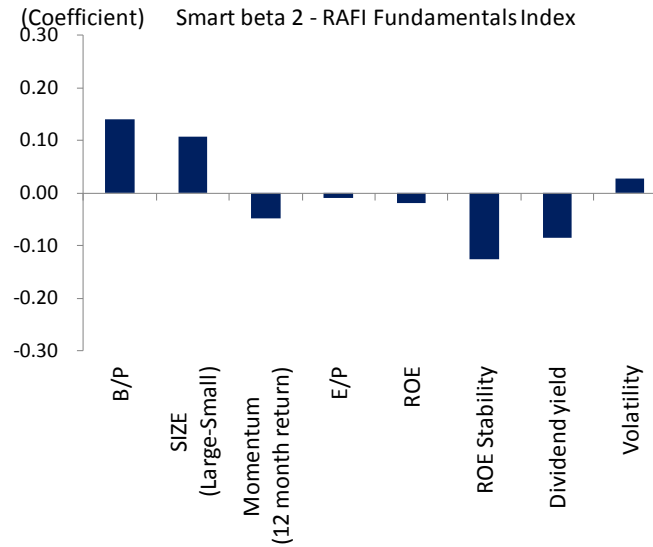
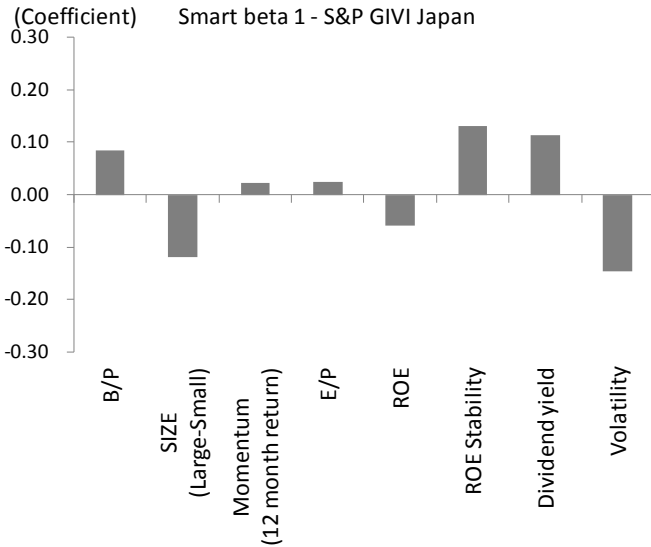


※Investment assets for passive and active are as of the end of March 2013.

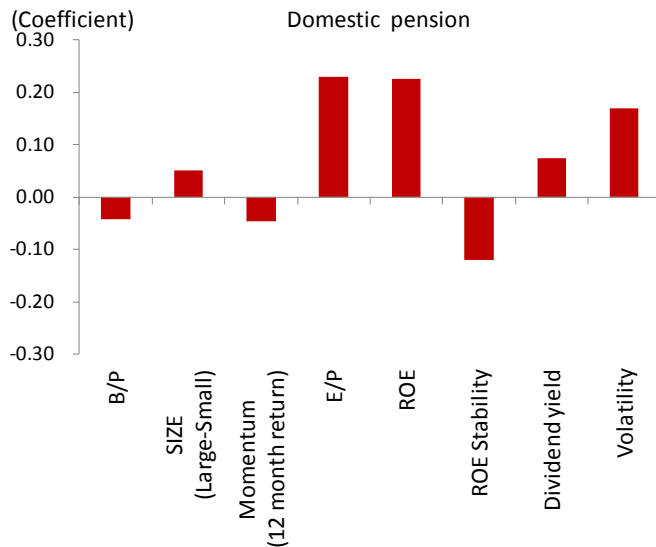
Style/Factor exposure of new strategies

Positive on B/P and small cap, Negative on E/P and ROE

Selected smart beta strategies



Domestic pension

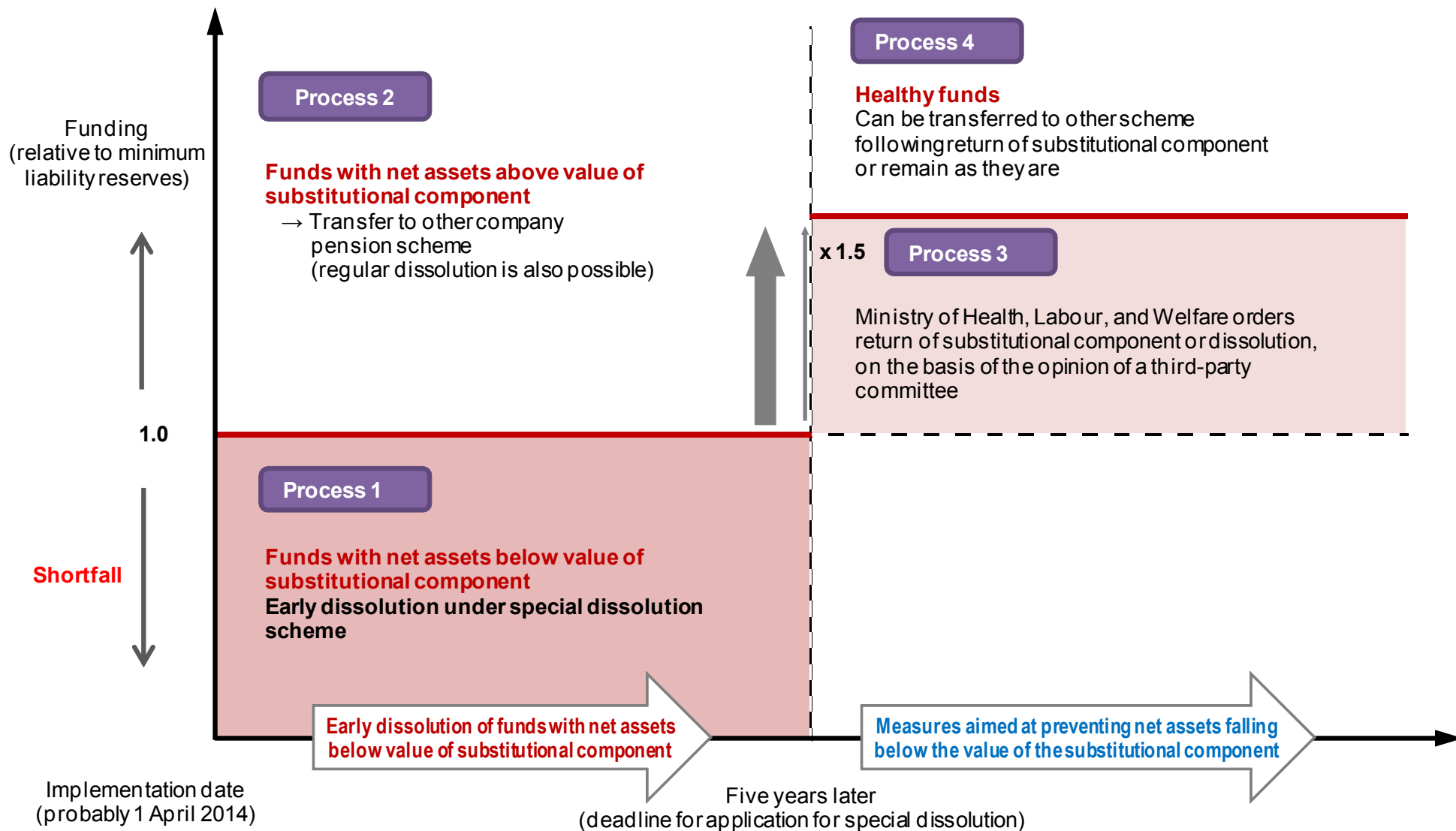


Note: we carried a time series regression on a daily basis to estimate the sensitivity to the representative factors return (B/P, Size, Momentum, E/P, ROE, ROE stability, Dividend yield and Volatility) on return of the following funds (1)S&P GIVI Japan gross total return index(2) Russell/Nomura Fundamental Prime Index With Dividend Index Value JPY (3) The DFA Global Equity Portfolio. Sample period is January 2002 through March 2014 for(1)-(2) and Oct 2008 through March 2014 for (3). Each factor returns for (1)-(2) are calculated as the spread between the returns of the top 20% and bottom 20% of TOPIX500 stocks based on each factor values. In similar way, factor returns for (3) are calculated in North America stocks in the MSCI World Index.

Source: Nomura

The possibility of similar thing happening again: Dissolution of pension funds

Change of employee pension fund system



The possibility of similar thing happening again: Impact on the market of changes to pension fund scheme

- Selling pressure of Japanese equities worth around ¥4–5trn by pensions' return of the substitutional portion

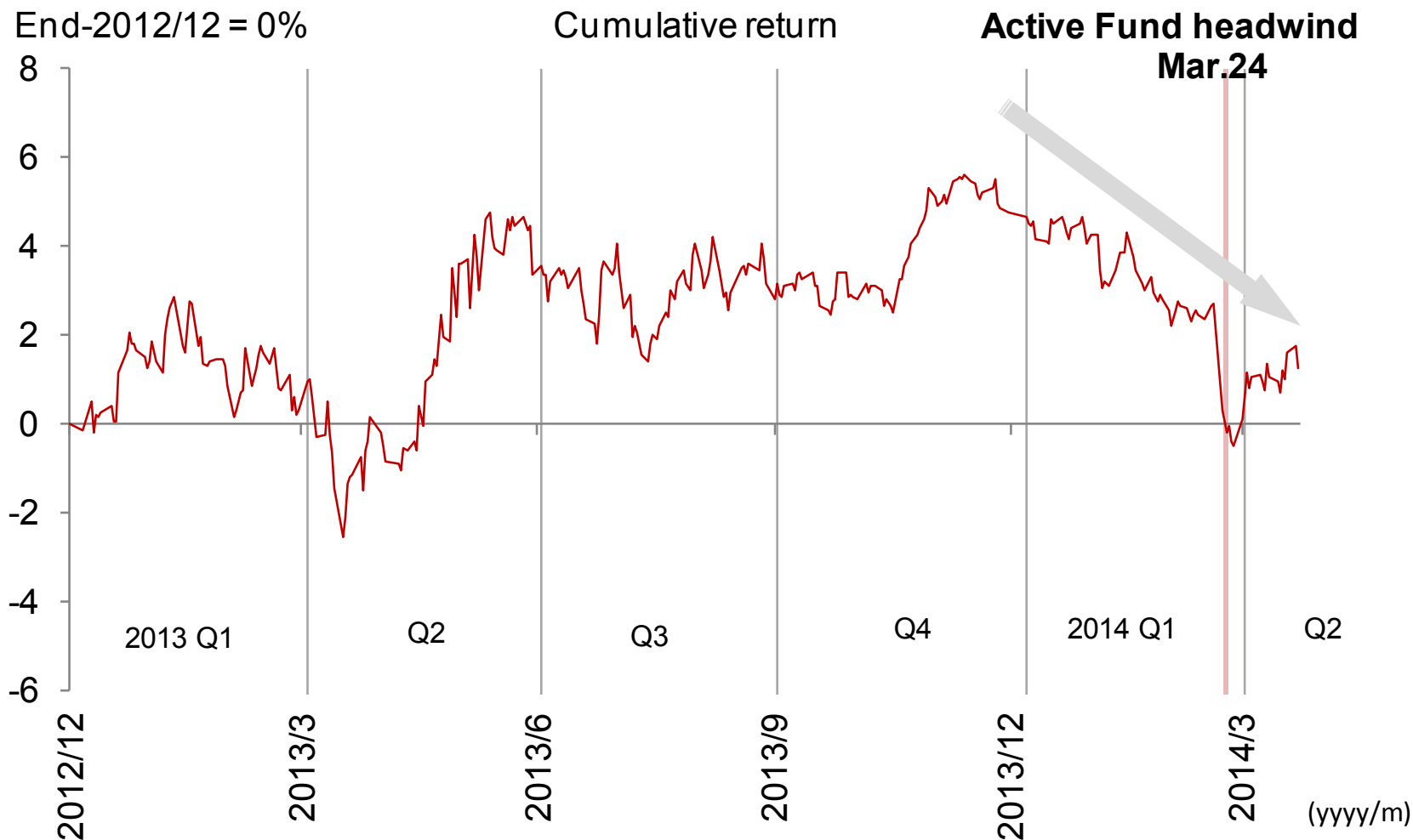
Pension funds' outstanding assets and outstanding investments in Japanese equities

(¥bn, except where noted)

	Total assets under management	of which allocation in Japanese equities (versus total asset allocation)	of which allocation in Japanese active funds (versus total allocation in Japanese equities)
Employees' pension funds	18,144.6	3,592.6 (19.8%)	2,152.0 (59.9%)
Pension Fund Association	10,744.6	1,504.2 (14.0%)	722.0 (48.0%)
Total	28,889.2	5,096.9	2,874.0

The possibility of similar thing happening again: Overcrowded stocks have recently deteriorated

Performance of stocks concentrated positions by active funds

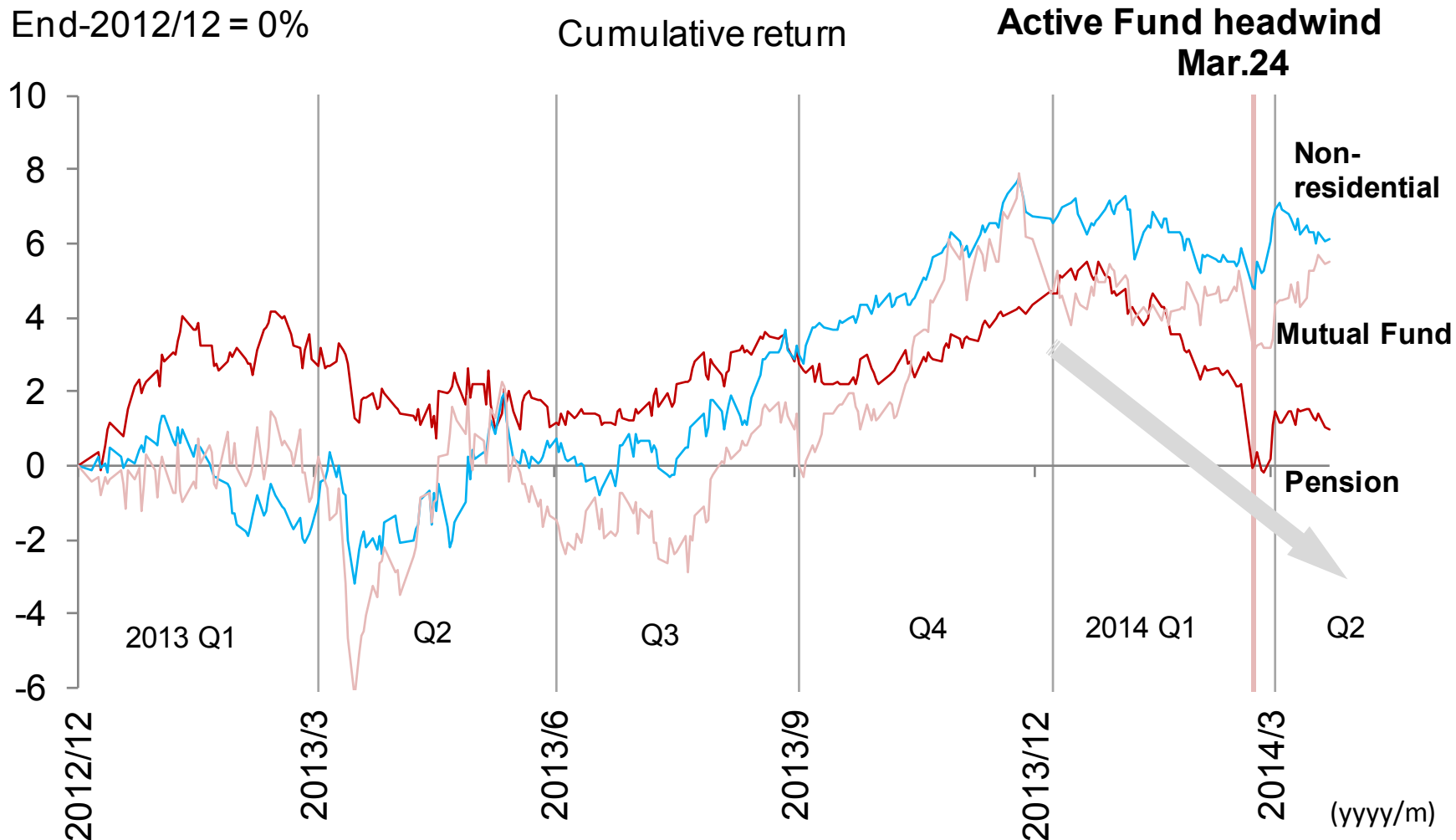


Note: We divided the universe of TOPIX 500 stocks into quintiles based on each stock's active funds' share ownership ratio, at the beginning of each month. Figure shows the cumulative daily return (equally weighted basis) on a strategy of going long on the stocks in the quintile with the highest factor values (ie, the most overweight stocks) and short on the stocks in the quintile with the lowest factor values (ie, the most underweight stocks). We did not take trading costs into account. Analysis is based on historical share prices and does not guarantee future performance. Sample period was January 2013 through 25 April 2014.

Source: Nomura

Dissolution of pension funds has probably started

Performance of stocks overweighted by domestic pension funds and nonresident investors



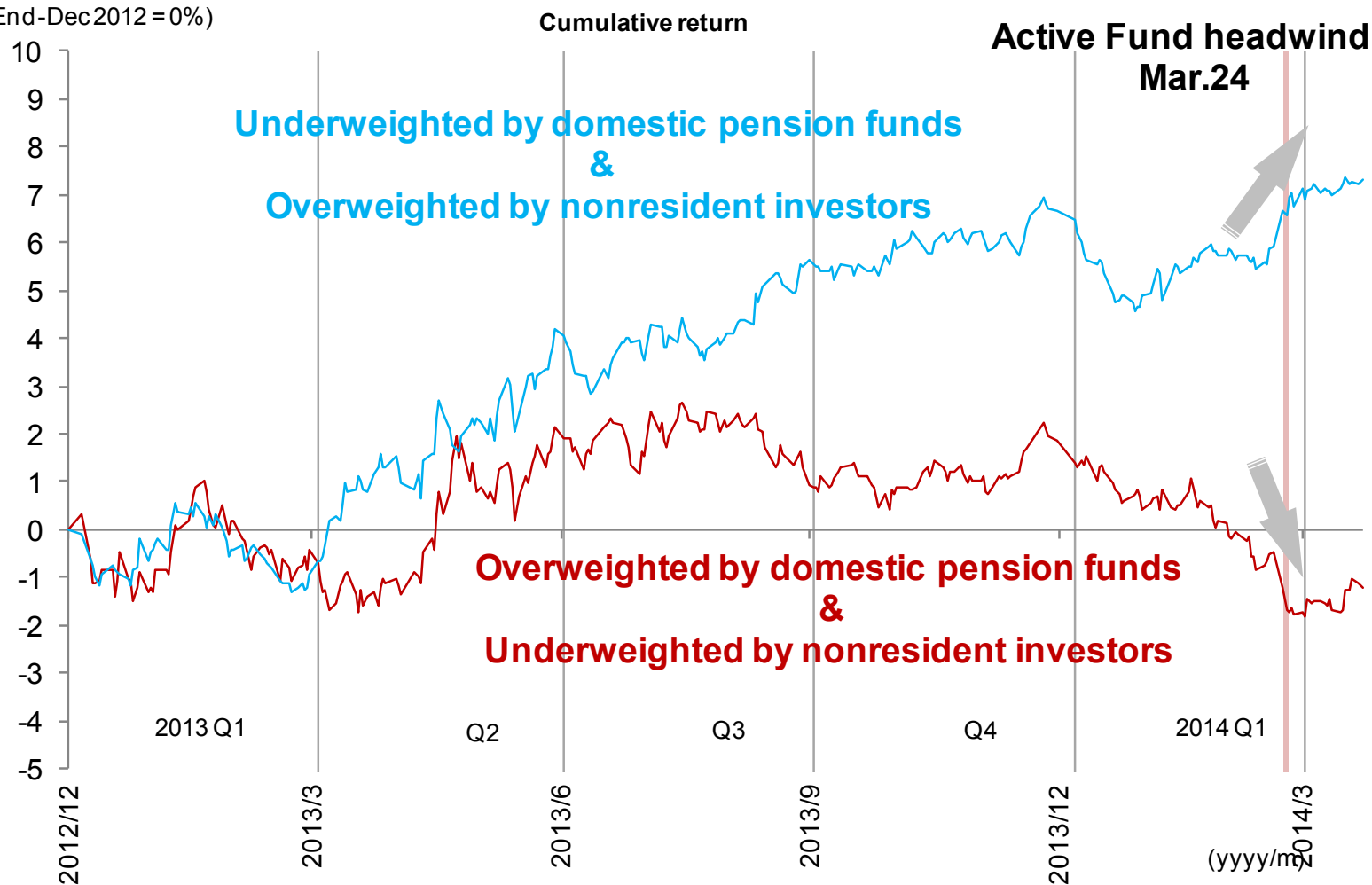
Note: We divided the universe of TOPIX 500 stocks into quintiles based on each stock's active weight versus the TOPIX as calculated from the portfolios of nonresident investors, domestic investment trusts, and domestic pension funds, respectively, at the beginning of each month. Figure shows the cumulative daily return (equally weighted basis) on a strategy of going long on the stocks in the quintile with the highest factor values (ie, the most overweight stocks) and short on the stocks in the quintile with the lowest factor values (ie, the most underweight stocks). We did not take trading costs into account. Analysis is based on historical share prices and does not guarantee future performance. Sample period was January 2013 through 25 April 2014.

Source: Nomura

Strategy for avoiding unwinding risk (1): Avoiding stocks preferred by pension funds

Performance of stocks where nonresident investors' and domestic pension funds' preferences differ

(End-Dec2012 = 0%)



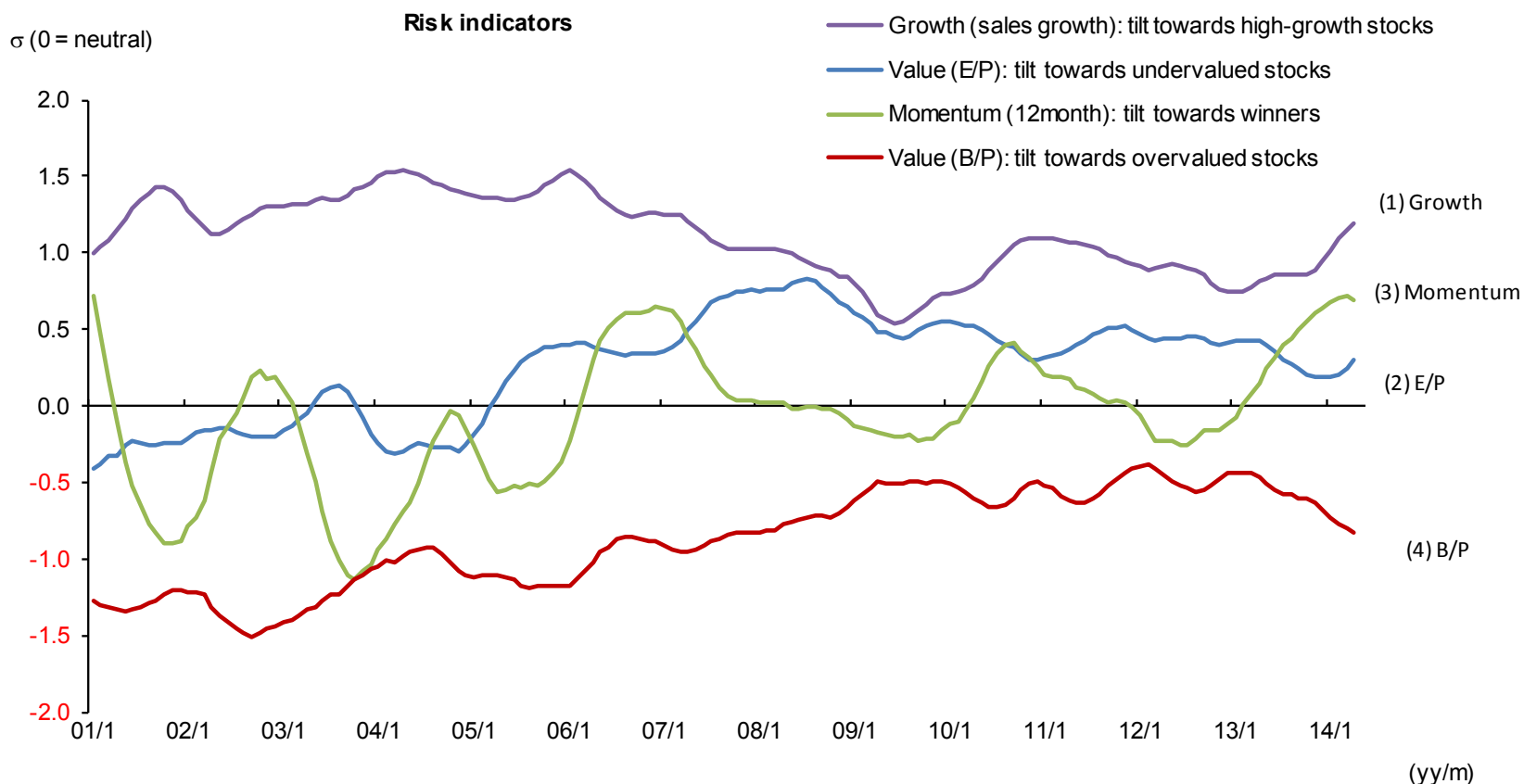
Note: We divided the universe of TOPIX 500 stocks into quintiles based on each stock's active weight versus the TOPIX as calculated from the portfolios of nonresident investors, domestic investment trusts, and domestic pension funds, respectively, at the beginning of each month. Figure shows the cumulative daily return (equally weighted basis) on a strategy of going long on the stocks in the quintile with the highest factor values (ie, the most overweight stocks) and short on the stocks in the quintile with the lowest factor values (ie, the most underweight stocks). We did not take trading costs into account. Analysis is based on historical share prices and does not guarantee future performance. Sample period was January 2013 through 25 April 2014.

Source: Nomura

Strategy for avoiding unwinding risk (2): Avoiding unwinding risk at factor level

Factors associated with active fund herding

Risk characteristics of stocks with a high percentage of shares held by active funds

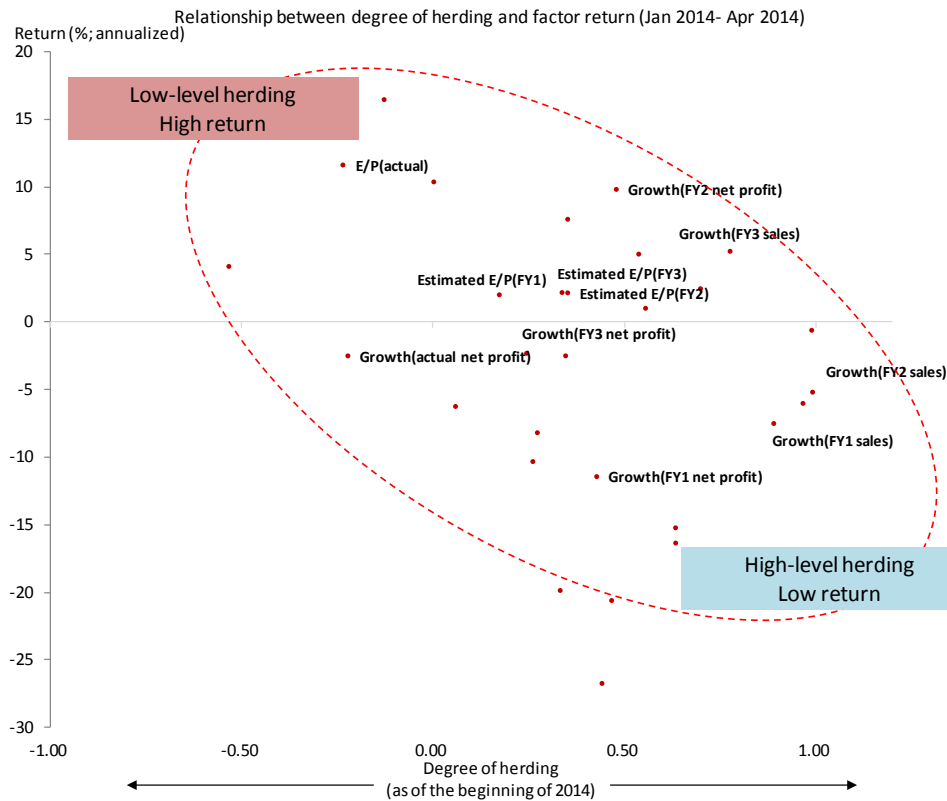


Note: Universe is TSE-1 stocks. Sample period is January 2001 through April 2014. We divided the universe into 10 groups of stocks according to the percentage of shares in each stock held by active funds and calculated the difference in the average exposure to seven factors between the group with the highest percentage of shares held by active funds (group #10) and the group with the lowest percentage (group #1), plotting the data as six-month moving averages. We rebased the cross-sectional average for each factor (E/P, B/P, share price return over the past 12 months and sales growth to 0, and the standard deviation to 1, at the beginning of each month. Also, to mitigate the impact of outliers, we reduced the standard deviation of stocks with a standard deviation of more than $\pm 3\sigma$ to $\pm 3\sigma$ three times.

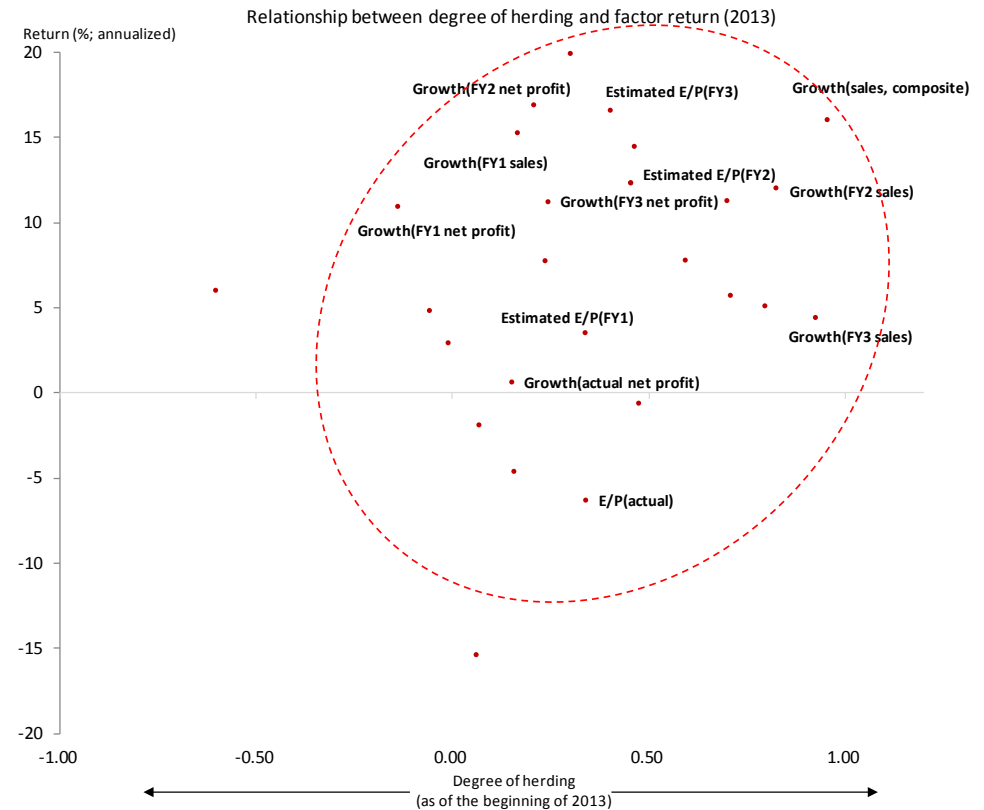
Strategy for avoiding unwinding risk (2): Avoiding unwinding risk at factor level (continued)

Relationship between degree of herding and factor return

(1) Relationship in 2014 (Jan 2014 - Apr 2014)



(2) Relationship in 2013



Note: (Left) We plotted each factor's herding level at the beginning of January 2014 on the x-axis and its factor return from January 2014 to 22 April 2014 on the y-axis, in a two-dimensional scatter plot. (Right) We plotted herding level at the beginning of 2013 on the x-axis and its factor return in 2013 on the y-axis for each factor. We did not take trading costs into account. Analysis is based on historical share prices and does not guarantee future performance.

Strategy for avoiding unwinding risk (2): Avoiding unwinding risk at factor level (continued)

Negative correlation between degree of herding and factor return

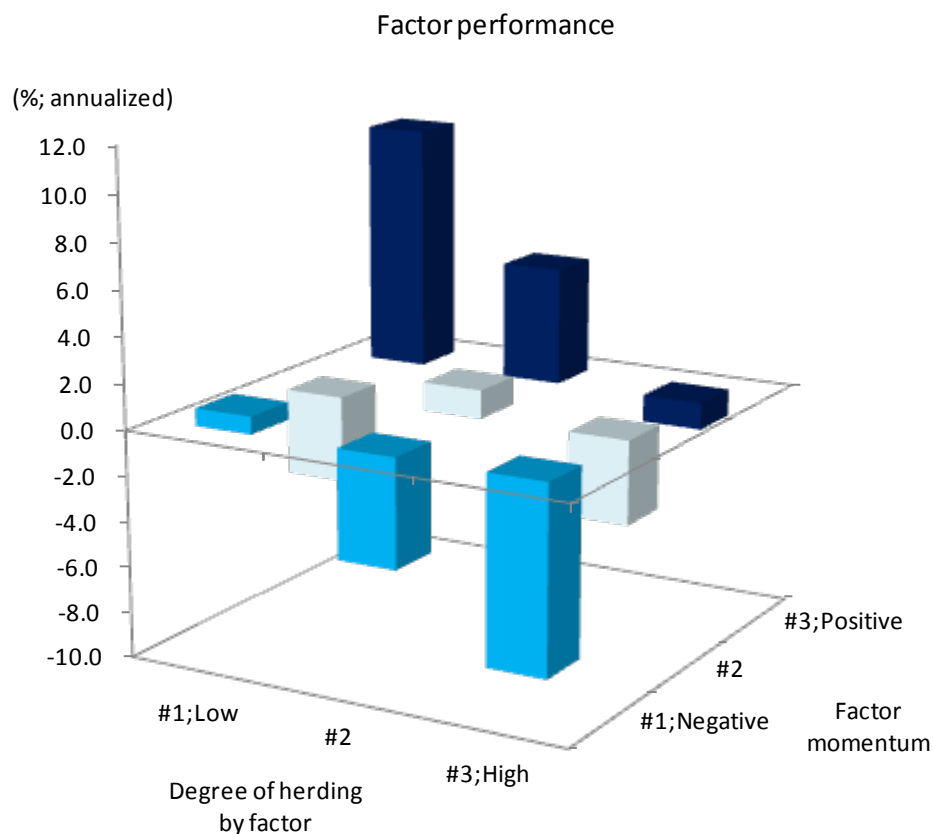
Regression analysis results - negative correlation between degree of herding and factor return

		Model1	Model2	Model3	Model4	Model5
Herding	Average	-0.31051			-0.23899	-0.24759
	Std	1.5403			1.6594	1.6515
	t-val	-2.5499 **			-1.8217 *	-1.8963 *
	Return/Risk	-0.69831			-0.49889	-0.51932
Perf_1M	Average		0.33599		0.37715	
	Std		2.202		2.4091	
	t-val		1.9301 *		1.9803 **	
	Return/Risk		0.52857		0.54231	
Perf_3M	Average			0.45206		0.3652
	Std			2.1246		2.3917
	t-val			2.6914 ***		1.9315 *
	Return/Risk			0.73707		0.52895

Note: Universe is 29 factors using in the figure of degree of herding and factor return. We carried out a cross-sectional regression analysis in our universe according to the following formula. $r_{i,t} = \alpha_{i,t} + \delta \sum f_{i,t} + \varepsilon_{i,t}$
 $r_{i,t}$ is the monthly return on factor i during period t, $x_{i,t}$ is the factor value (monthly) of character k(k=1,2,3) for factor i at the beginning of period t, and $\varepsilon_{i,t}$ is the error term. We use degree of herding (Herding), past 1-month / 3-month factor return (Perf_1M, Perf_3M) as characters. t-values are based on the null hypothesis in which the average monthly return is zero. *** indicates significance at 1%, ** indicates significance at 5%, and * indicates significance at 10%. Sample period is January 2001 through 22 April 2014.

Strategy for avoiding unwinding risk (2): Avoiding unwinding risk at factor level (continued)

Annualized performance



Statistics

		← Factor momentum →			
		Negative		Positive	
		#1	#2	#3	#3-#1
Low	Average	0.76	-3.77	10.73	9.96
	Standard deviation	9.82	15.16	10.11	15.55
	t-value	0.28	-0.91	3.88	2.34
				****	**
		Return/risk			
		0.08	-0.25	1.06	0.64
↑	Average	-4.78	1.23	5.14	9.92
	Standard deviation	10.85	9.09	10.15	16.22
	t-value	-1.61	0.49	1.85	2.23
				*	**
		Return/risk			
		-0.44	0.13	0.51	0.61
High	Average	-8.21	-3.66	-1.19	7.02
	Standard deviation	11.80	10.71	8.63	11.79
	t-value	-2.54	-1.25	-0.50	2.17
		**			**
		Return/risk			
		-0.70	-0.34	-0.14	0.60

Note: Universe is 29 factors in figure 5. We calculated factor herding level (Herding) and past 3-month return at the beginning of each month, for each factor. We divided into three groups based on factor herding level (Herding), each of which is then subdivided into three groups by past 3-month return, and calculated monthly equally-weighted returns for each group. t-values are based on the null hypothesis in which the average monthly return is zero. **** indicates significance at 0.1%, *** indicates significance at 1%, ** indicates significance at 5%, and * indicates significance at 10%. We did not take trading costs into account. Analysis is based on historical share prices and does not guarantee future performance.

Strategy for avoiding unwinding risk (2): Degree of herding and factor return for each factor

Degree of herding and factor return for each factor

	Factor		Degree of herding (<i>Herding</i>)	Factor return(%) (Jan 2014-Apr 2014)
Valuation	E/P(actual)	Undervalued - overvalued	-0.24	3.87
	Estimated E/P(FY1)	Undervalued - overvalued	0.17	0.67
	Estimated E/P(FY2)	Undervalued - overvalued	0.35	0.72
	Estimated E/P(FY3)	Undervalued - overvalued	0.34	0.73
	E/P(estimated, composite)	Undervalued - overvalued	0.35	2.54
	B/P	Undervalued - overvalued	-0.53	1.37
	Estimated dividend yield	Undervalued - overvalued	-0.13	5.49
Growth/Quality	Growth(actual sales)	High - low	0.27	-2.73
	Growth(FY1 sales)	High - low	0.89	-2.50
	Growth(FY2 sales)	High - low	0.99	-1.73
	Growth(FY3 sales)	High - low	0.78	1.75
	Growth(sales, composite)	High - low	0.97	-2.00
	Growth(actual recurring profit)	High - low	0.06	-2.08
	Growth(FY1 recurring profit)	High - low	0.47	-6.87
	Growth(FY2 recurring profit)	High - low	0.54	1.68
	Growth(FY3 recurring profit)	High - low	0.35	-0.83
	Growth(recurring profit, composite)	High - low	0.63	-5.45
	Growth(actual net profit)	High - low	-0.22	-0.83
	Growth(FY1 net profit)	High - low	0.43	-3.81
	Growth(FY2 net profit)	High - low	0.48	3.27
	Growth(FY3 net profit)	High - low	0.24	-0.77
	Growth(net profit, composite)	High - low	0.26	-3.44
	Expected ROE(FY2)	High - low	0.70	0.82
	ROE stability	High - low	0.00	3.46
Historical return	6-month return	High - low	0.33	-6.62
	12-month return	High - low	0.44	-8.91
Risk	60-day volatility	High - low	0.63	-5.07
Supply & demand	Nonresident active weight	High - low	0.55	0.34
	Pension funds active weight	High - low	0.99	-0.20

Note: Universe is TOPIX 500 stocks. We examined a herding level of active funds for each factor, at the beginning of January 2014. We divided our universe into five groups based on active fund ownership ratio, then calculated herding level defined by (average in highest group;#5 – average in lowest group;#1) / average in our universe. For factor return, we calculated cumulative daily return on a strategy of going long on the stocks with the highest factor values and short on the stocks with the lowest factor values from January 2014 to 22 April 2014. We did not take trading costs into account. Analysis is based on historical share prices and does not guarantee future performance.

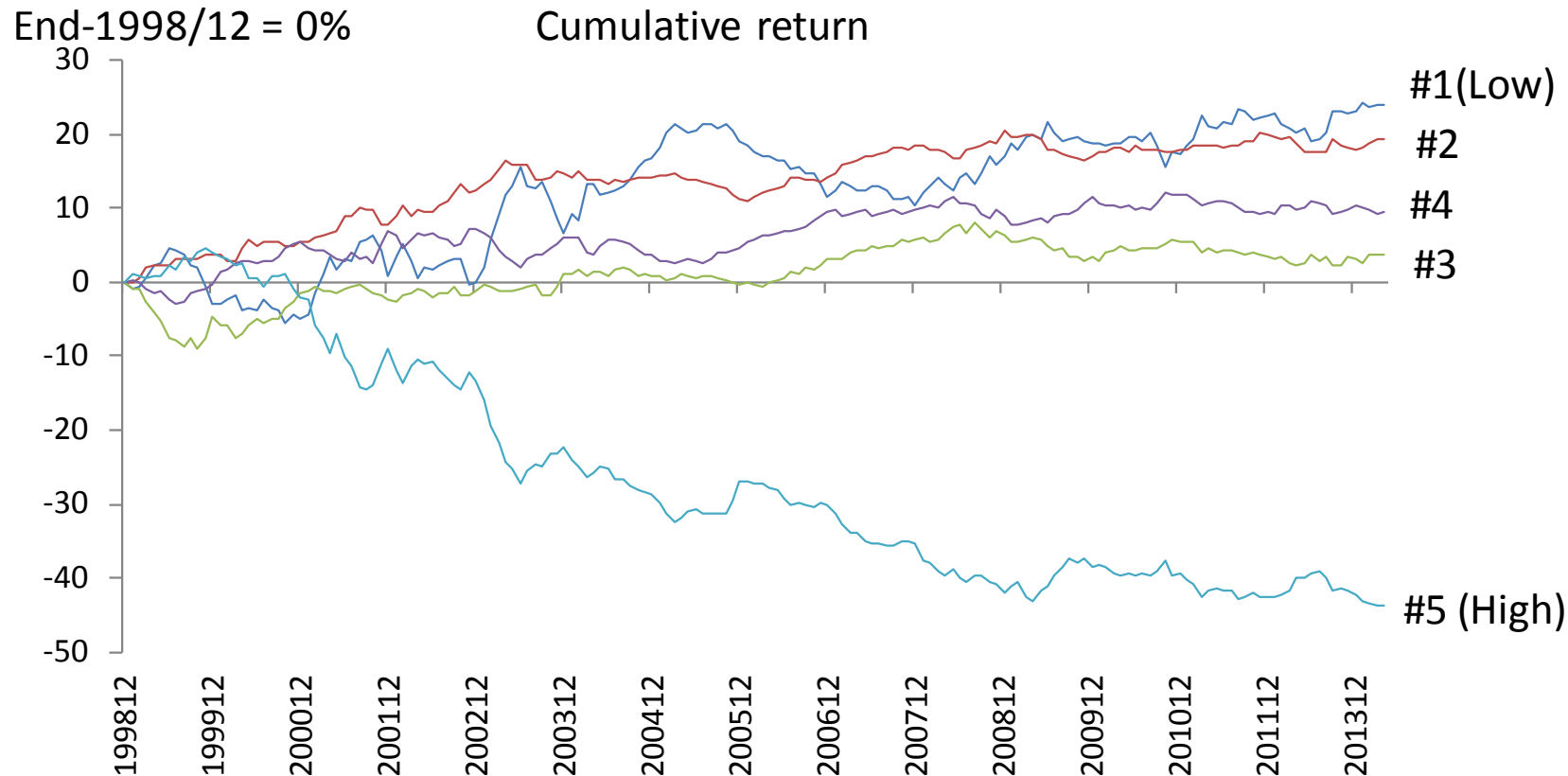
Source: Nomura

Strategy for avoiding unwinding risk (3): Avoiding unwinding risk at stock level

The size of *HoldShr* for active funds thus probably acts as a signal of share price reversal

$$HoldShr_{i,t}^F = \frac{\sum_{f \in F} Shr_i^f \text{ (Total no. of shares of stock } i \text{ held by Active fund group } F)}{OutShr_i * FFW_{i,t} \text{ (No. of shares issued and outstanding of stock } i \text{ adjusted for the FFW)}}$$

Performance of stocks in which positions have been accumulated(#5)

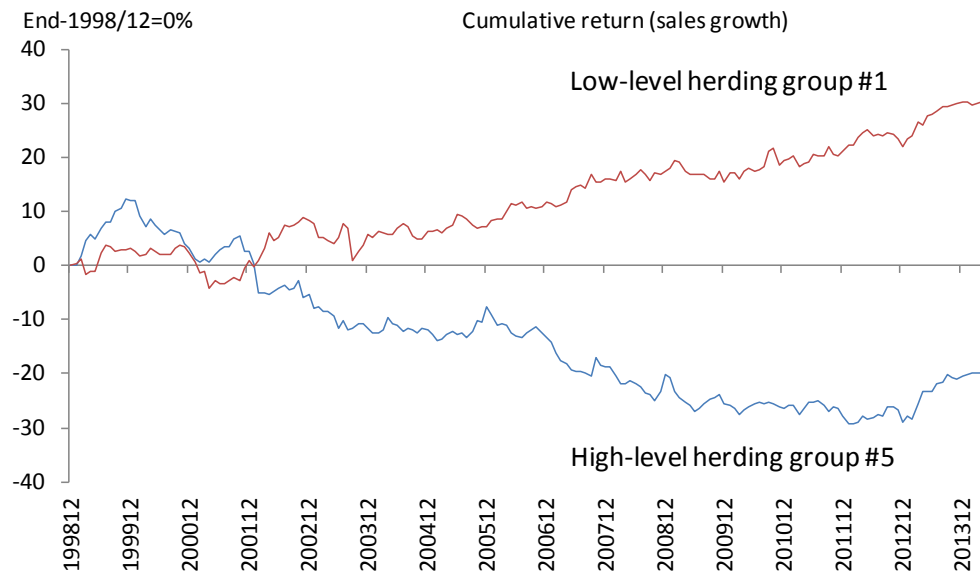


Note: We divided the universe of TSE-1 stocks into five groups in terms of active fund ownership (*HoldShr*) at the beginning of each month on the basis of the most recently disclosed data for each fund. We then calculated the difference between the monthly return on equally weighted portfolios comprising the stocks in each of these five groups when held through the month-end and the return on an equally weighted portfolio comprising all the stocks in the universe. Sample period is June 2002 through April 2014. Returns are exclusive of transaction costs. Analysis is based on past performance and does not guarantee future performance.

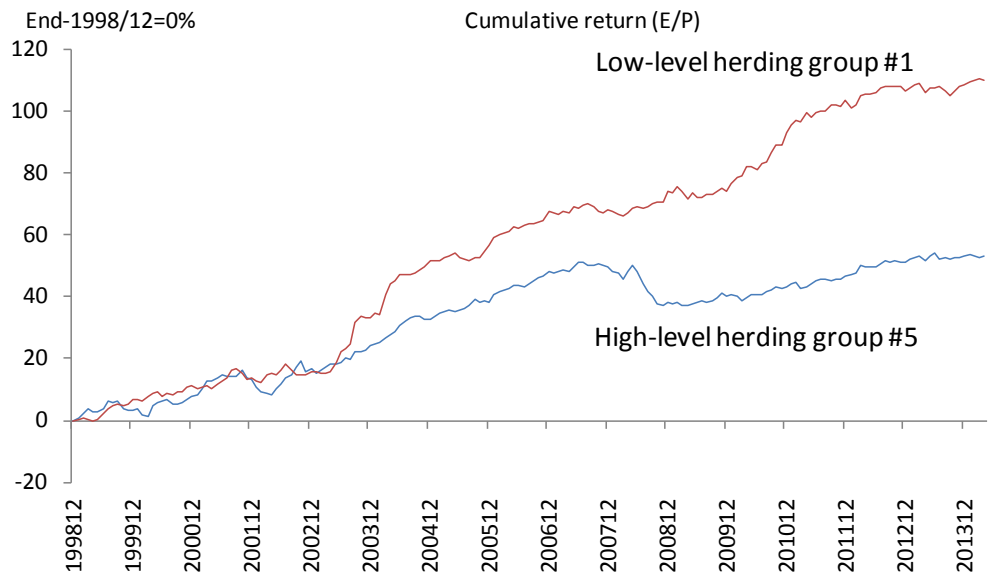
Strategy for avoiding unwinding risk (3): Avoiding unwinding risk at stock level (continued)

Limiting the universe to low herding stocks (group #1)
generates high risk-adjusted returns and low maximum drawdowns

(1) Sales growth



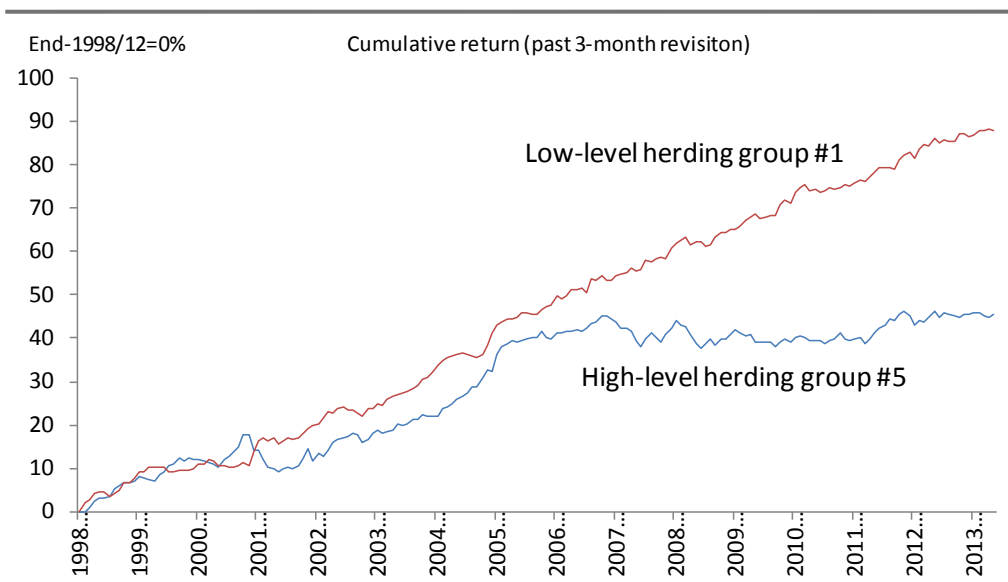
(2) E/P



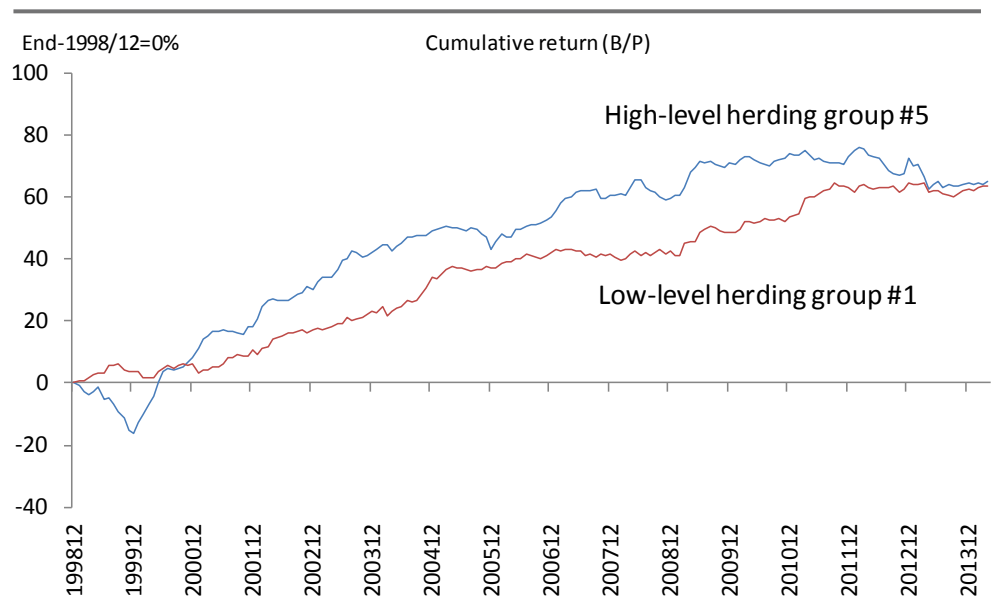
Note: Universe is TSE-1 stocks. Sample period is January 1999 through April 2014. We divided the universe into five groups based on the value of active fund share ownership ratio, using the groups with the highest (#5) and lowest (#1) values of herding for following Fama-MacBeth regression analysis, defining the regression coefficient β of explanatory variable x as the return on each factor strategy. $r_{i,t} = \alpha_{i,t} + \beta_i \text{Beta}_{i,t} + \gamma_i \log MV_{i,t} + \delta_i x_{i,t} + \epsilon_{i,t}$. $r_{i,t}$ is the monthly return on stock i during period t , $x_{i,t}$ is the factor value (monthly) for stock i at the beginning of period t , and $\epsilon_{i,t}$ is the error term. $\text{Beta}_{i,t}$ is CAPM beta for stock i estimated from past-60-month monthly return from the start of period t , and $\log MV_{i,t}$ is the log of market cap. For explanatory variable x , we used E/P, B/P, sales growth, and past-three-month revisions.

Strategy for avoiding unwinding risk (3): Avoiding unwinding risk at stock level (continued)

(3) Past 3-month revision



(4) B/P



Note: Universe is TSE-1 stocks. Sample period is January 1999 through April 2014. We divided the universe into five groups based on the value of active fund share ownership ratio, using the groups with the highest (#5) and lowest (#1) values of herding for following Fama-MacBeth regression analysis, defining the regression coefficient β of explanatory variable x as the return on each factor strategy. $r_{i,t} = \alpha_{i,t} + \beta_1 \text{Beta}_{i,t} + \beta_2 \log MV_{i,t} + \beta_3 x_{i,t} + \epsilon_{i,t}$. $r_{i,t}$ is the monthly return on stock i during period t , $x_{i,t}$ is the factor value (monthly) for stock i at the beginning of period t , and $\epsilon_{i,t}$ is the error term. $\text{Beta}_{i,t}$ is CAPM beta for stock i estimated from past-60-month monthly return from the start of period t , and $\log MV_{i,t}$ is the log of market cap. For explanatory variable x , we used E/P, B/P, sales growth, and past-three-month revisions.

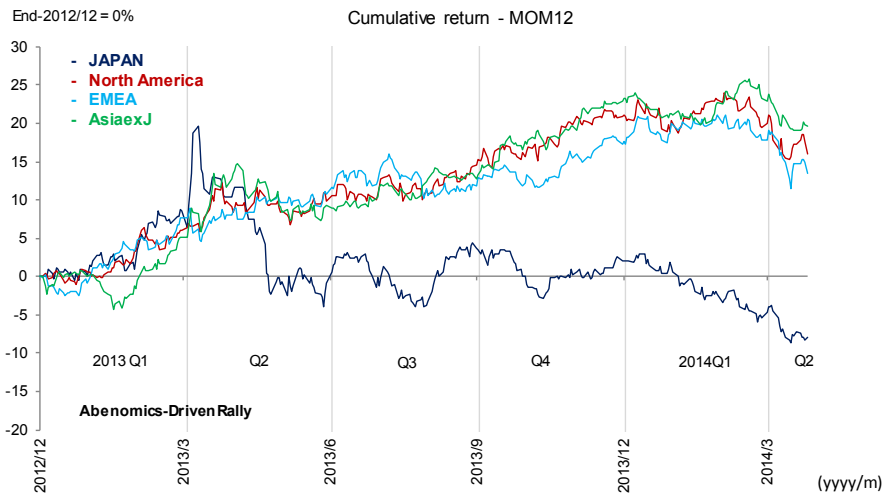
- A strong headwind on 24 March 2014 had negative impact on earnings forecast-related factors and overcrowded stocks

- Active funds still facing headwinds
 - Similar phenomenon possibly remains to be seen
 - The dissolution of employee pension funds (EPFs) is about to gain momentum in earnest

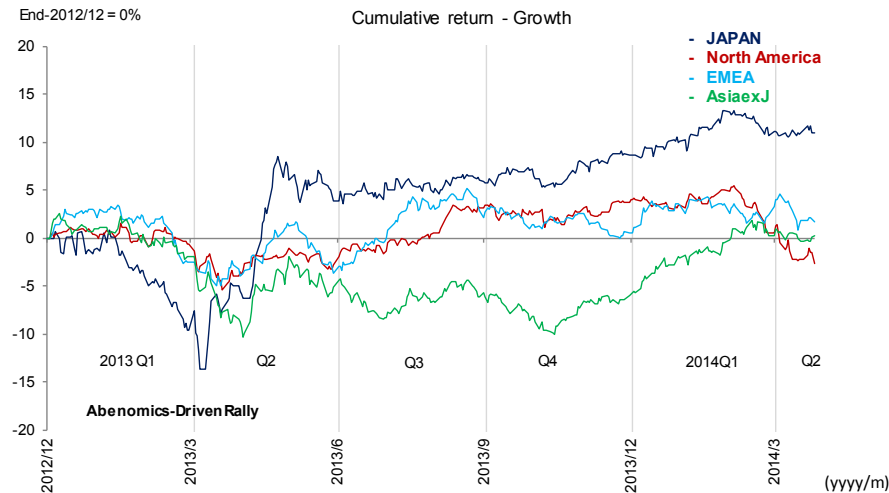
- We recommend that investors avoid herding investment behavior at both factor and individual stock level

Appendix : Global factor performance

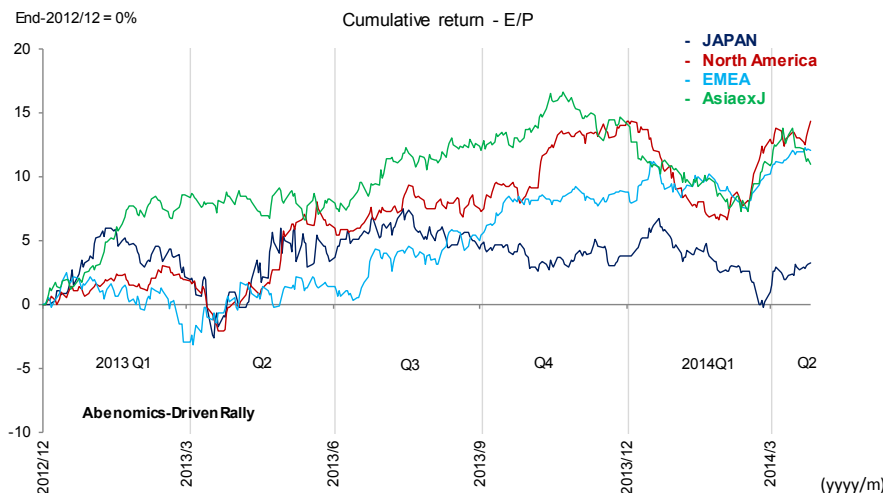
(1) Share price momentum(past 12-month return)



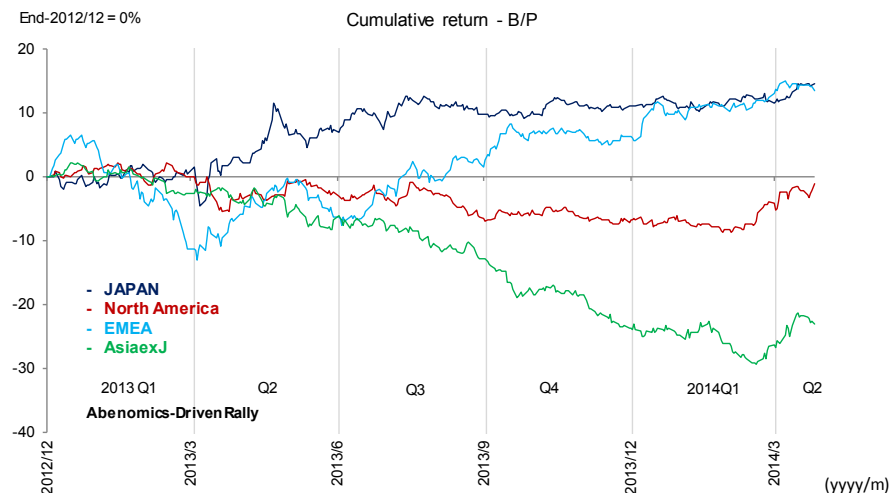
(2) Growth(net profit forecast: FY2←FY1)



(3) E/P



(4) B/P



Note: Our universe was Japanese, North American, EMEA, and Asia ex Japan stocks in the MSCI World Index, and we looked at the effectiveness of share price momentum, net profit growth (FY2←FY1), E/P, and B/P for each region. For each factor, we divided the universe into quintiles based on factor values at the beginning of each month. We then calculated daily returns on a strategy comprising long positions in the stocks in the quintile with the highest factor values and short positions in the stocks in the quintile with the lowest factor values. All returns were calculated on a US dollar basis. We looked at cumulative factor performance from January 2013 to 25 April 2014. We did not take trading costs into account. Analysis is based on historical share prices and does not guarantee future performance.

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STOCKS

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STOCKS

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