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Nomura Japan Equity Beta Select Indices using market, forex beta

EQUITY QUANTITATIVE RESEARCH

High/low beta index selection uses market forecasts

Global Markets Research

24 January 2017

Research analysts

Japan quantitative research

Sayuri Otsuka - NSC
sayuri.otsuka@nomura.com
+81 3 6703 1397

Yasuhiro Shimizu - NSC
yasuhiro.shimizu@nomura.com
+81 3 6703 1748

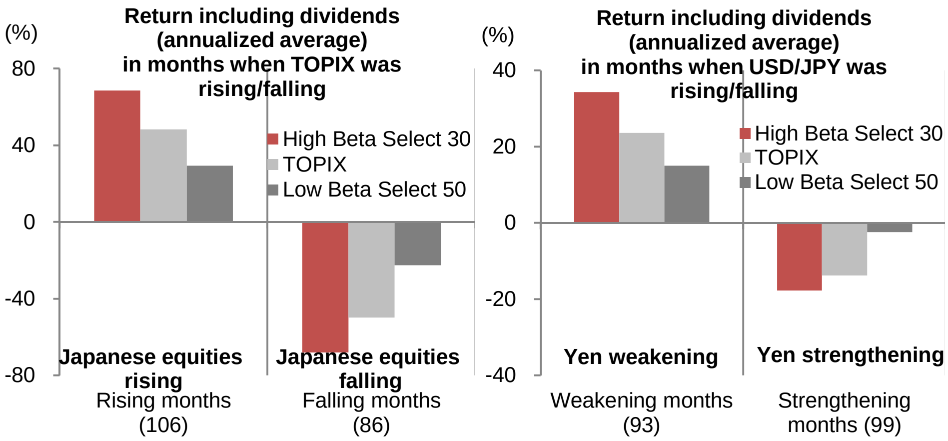
Focus on share price sensitivity (beta) versus Japanese equity market and USD/JPY

In recent years, we have a seen a strengthening of the simultaneous correlation between the Japanese equity market and USD/JPY, and it has become common to have periods when Japanese equity prices have risen while the yen has weakened, or when Japanese equity prices have fallen while the yen has strengthened. In the Abenomics-driven market from end-2012 onward in particular, there was a marked tendency for Japanese equity prices to rise simultaneously with a weakening of the yen. In recent months too, Japanese equity prices rose sharply as the yen weakened rapidly after the US presidential election on 8 November 2016 through mid-December.

We have developed the Nomura Japan Equity Beta Select Indices, which are based on Japanese equities, to meet the needs of investors who want to be able to adjust their investments to reflect their forecasts for the Japanese equity market and USD/JPY with ease. The Nomura Japan Equity High Beta Select 30 (hereafter, the High Beta Select 30) is highly sensitive to the Japanese equity market and USD/JPY, while the Nomura Japan Equity Low Beta Select 50 (hereafter, the Low Beta Select 50) exhibits little sensitivity to these two markets. We hope investors who are bullish on the Japanese equity market and expect the yen to weaken will reflect their market outlook in their positions by investing in the High Beta Select 30. Conversely, we see investment in the Low Beta Select 50 as an attractive option for investors who want to reduce their risk exposure versus a fall in share prices and a strengthening yen while maintaining exposure to a rise in Japanese equities.

Over the past 16 years, the High Beta Select 30 has substantially outperformed the market when Japanese equities have been rising and the yen has been weakening, while the Low Beta Select 50 has reduced the risk of share price declines relative to the market when Japanese equities have been falling and the yen has been strengthening (Figure 1). We hope investors will use the two indices in accordance with their forecasts for the Japanese equity market and USD/JPY, and that this will help to improve their investment performance.

Fig. 1: Performance of Nomura Japan Equity Beta Indices by market conditions



Note: Shows data for Jan 2001 through Dec 2016. Based on monthly returns including dividends.

Source: Nomura

Japanese version published on January 18, 2017

Production Complete: 2017-01-24 07:48 UTC

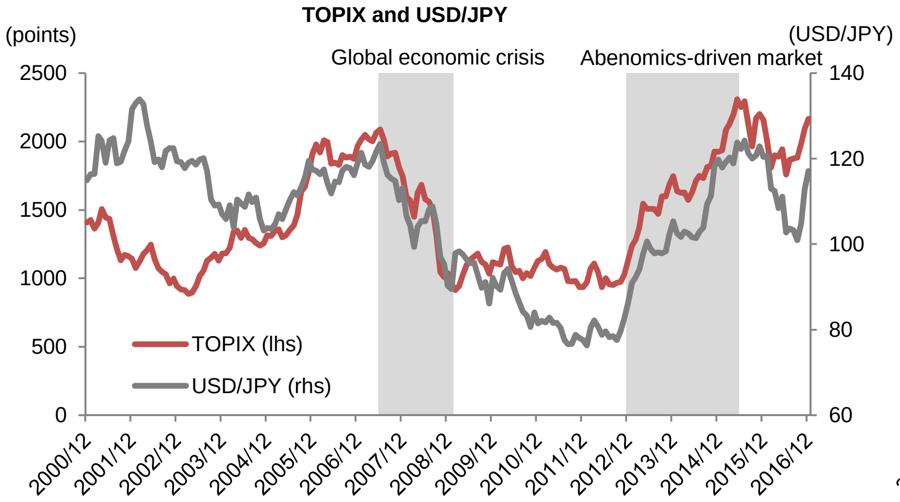
1. Increasing correlation between equity and forex markets

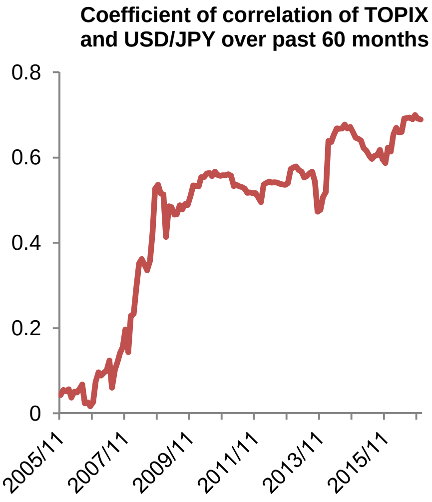
In recent years, we have a seen a strengthening of the simultaneous correlation between the Japanese equity market and USD/JPY, and it has become common to have periods when Japanese equity prices have risen while the yen has weakened, or when Japanese equity prices have fallen while the yen has strengthened. Some people have suggested that this growing simultaneous correlation might be partly due to an increase in program trading that focuses on the correlation between macroeconomic indicators and the adjustment of forex hedging ratios by nonresident investors on the Japanese equity market, or to nonresident investors' growing expectations of Abenomics.

In the Abenomics-driven market from end-2012 onward in particular, there was a marked tendency for Japanese equity prices to rise simultaneously with a weakening of the yen (Figure 2). In recent months too, Japanese equity prices rose sharply as the yen weakened rapidly after the US presidential election on 8 November 2016. We think stocks with a high beta versus the Japanese equity market and USD/JPY are likely to be attractive to investors who expect the trend of rising Japanese equity prices plus a weakening yen to continue as a result of the various economic policies to be introduced by the Japanese and US governments. However, Japanese equity prices fell sharply while the yen strengthened rapidly around the time of the 2008 global financial crisis. In our view, stocks with a low beta versus the Japanese equity market and USD/JPY were relatively attractive at this time, when investors' risk tolerance had diminished because of uncertainty surrounding the global economic outlook.

We have developed two new indices, the High Beta Select 30 and the Low Beta Select 50, to meet the needs of investors who want to be able to adjust their investments to reflect their forecasts for the Japanese equity market and USD/JPY with ease, because the globalization of corporate activity and investment is progressing rapidly and we think the correlation between the Japanese equity market and the forex market is likely to remain strong. The High Beta Select 30 is highly sensitive to the Japanese equity market and the USD/JPY, while the Low Beta Select 50 exhibits little sensitivity to these two markets. We hope investors will use these two indices to manage their funds in a way that reflects their market outlook, with investors who are bullish on the Japanese equity market and expect the yen to weaken investing in the High Beta Select 30, and those who want to reduce their risk exposure versus a fall in share prices and a strengthening yen while maintaining exposure to a rise in Japanese equity prices investing in the Low Beta Select 50.

Fig. 2: TOPIX and USD/JPY and correlation coefficient





Note: Shows data for end-Dec 2000 through to end-Dec 2016. Shading in the left-hand chart is for end-Jun 2007 through to end-Jan 2009 and end-Dec 2012 through to end-May 2015. The correlation coefficient shown in the right-hand chart is the coefficient of correlation over the past 60 months for monthly returns on the TOPIX (including dividends) and monthly forex market returns (based on the USD/JPY middle rate as announced by the Bank of Japan (BOJ) at 17:00 JST each day), from Nov 2005 through Dec 2016.

Source: Nomura

2. Stock selection concept

Stocks are selected for the two indices on the basis of the correlation between share price returns and longer-term trends in the Japanese equity market and USD/JPY.

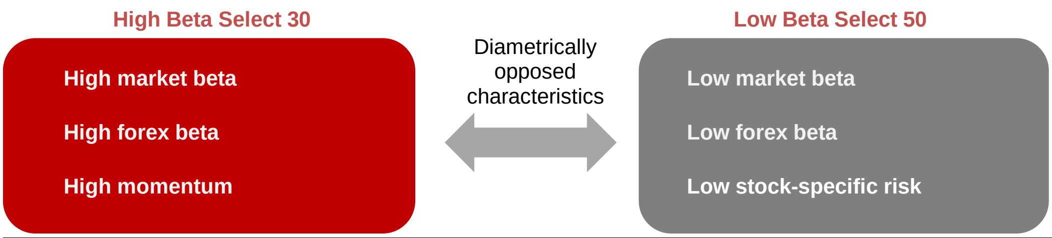
We use beta to evaluate the correlation between the Japanese equity market and the forex market. Beta indicates the average change in share price in response to a 1% change in the Japanese equity market or the forex market. A higher (lower) beta indicates that the stock market or forex market has a larger (smaller) impact on the price of the stock. Stocks are selected for our two indices using beta versus the Japanese equity market (market beta) and beta versus the forex market (forex beta) as the key criteria.

Below, we set out the respective stock selection criteria for the High Beta Select 30 and the Low Beta Select 50.

The High Beta Select 30 comprises the top 30 stocks in terms of an indicator that reflects market beta, forex beta, and momentum (Figures 3, 4). Because it comprises stocks that exhibit a strong correlation with the equity and forex markets, we expect this index to outperform the market when Japanese equity prices are rising and the yen is weakening. Investors who expect Japanese equity prices to rise and the yen to weaken should be able to reflect this forecast quickly in their positions by investing in this index. In addition, the momentum effect, whereby stocks that have already seen their prices rise continue to outperform the market, has been observed to be more marked when share prices are in a strong upward trend. The High Beta Select 30 aims to boost performance when share prices are rising by also taking momentum into account.

In contrast, the Low Beta Select 50 comprises the bottom 50 stocks in terms of an indicator that reflects market beta, forex beta, and stock-specific risk. Because it comprises stocks that exhibit little correlation with the equity and forex markets, these stocks should see relatively limited price declines when Japanese equity prices are falling and the yen is strengthening, and we therefore expect this index to outperform the market during such periods. The Low Beta Select 50 is also designed to limit share price fluctuation risk further by selecting stocks with a low level of stock-specific risk (ie, risk other than market correlation). Because a low stock-specific risk effect, whereby stocks with lower stock-specific risk generate higher returns, has been observed on many stock markets, we expect this effect to boost performance of the index. We think this index will be an attractive investment target for investors who wish to remain exposed to rises in Japanese equity prices but also want to minimize risk at times when the market outlook is unclear, share prices are weak, and the yen is strengthening.

Fig. 3: High Beta Select 30 and Low Beta Select 50 have diametrically opposed characteristics



Source: Nomura

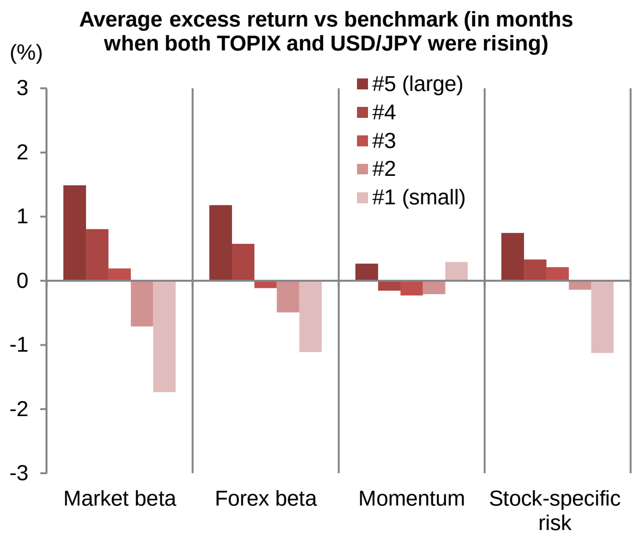
Fig. 4: Four indicators used for stock selection

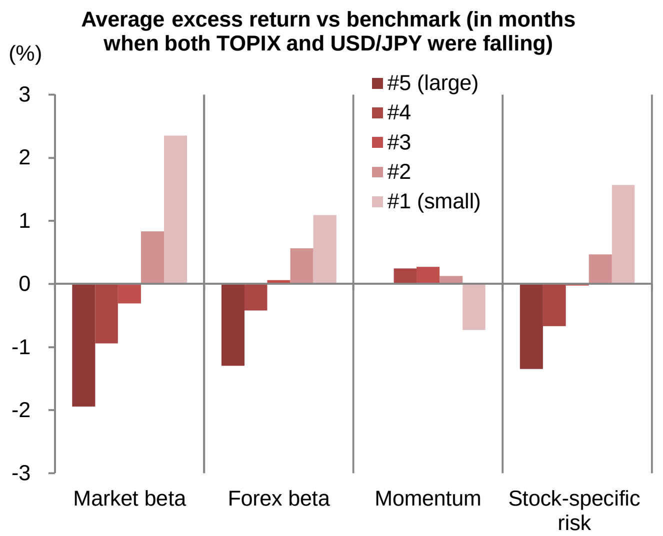
Indicator	Details	High Beta Select 30	Low Beta Select 50
Market beta	Market beta over past 60 months	○	○
Forex beta	USD/JPY beta over past 60 months	○	○
Momentum	Share price return over past 11 months adjusted for market beta	○	-
Stock-specific risk	Standard deviation of share price return over past 60 months adjusted for market beta	-	○

Source: Nomura

We will now look at the relationship between each of the indicators used for these two indices and their performance during periods when Japanese equity prices are rising and the yen is weakening, or when Japanese equity prices are falling and the yen is strengthening. We divided large cap Japanese stocks into five groups based on the value of each of these four indicators, and Figure 5 compares the excess return versus the market on each group during months when the TOPIX and USD/JPY rose and months when the TOPIX and USD/JPY fell. When Japanese equity prices were rising and the yen was weakening, high-beta and high-momentum stocks performed well, but conversely, when Japanese equity prices were falling and the yen was strengthening, low-beta and low stock-specific risk stocks performed well. Our two indices are designed to enable investors to reflect their market forecasts in their positions with ease by taking advantage of this difference in performance between the two indices depending on market conditions.

Fig. 5: Performance of five portfolios based on four indicators used to select stocks for our two indices, by market conditions





Note: Shows data for Jan 2001 through Dec 2016. Based on monthly returns including dividends. We divided the universe of Russell/Nomura Large Cap Index (the benchmark index) constituent stocks into five groups for each of the four indicators, by value of indicator, at the beginning of each month, and calculated the equally weighted return on each group. Figure shows average monthly equally weighted excess return on each group versus the equally weighted return on the benchmark index. For all stock selection indicators except momentum, we used the most recent values. For momentum, we used the most recent values at the beginning of the previous month.

Source: Nomura

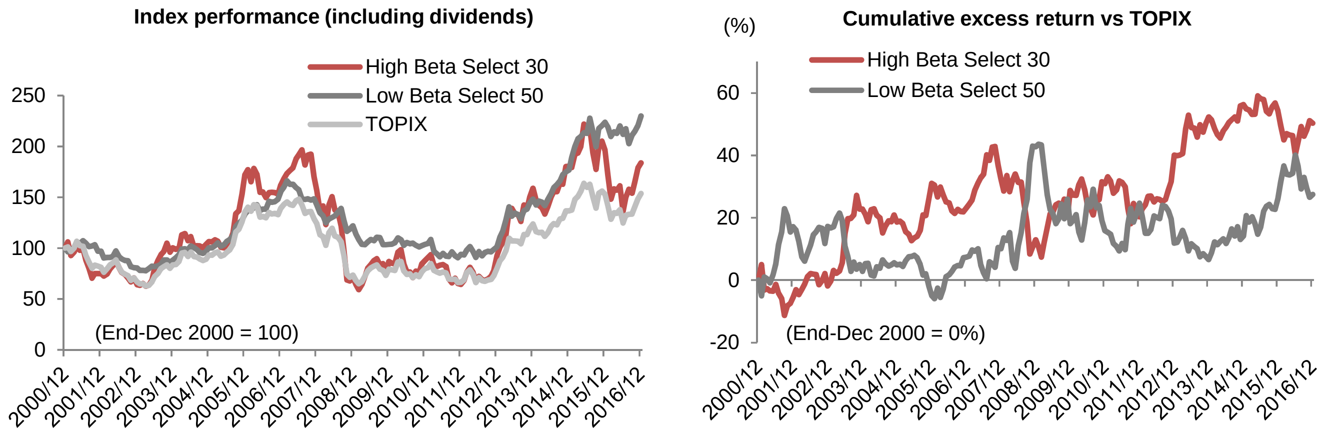
3. Index performance

We now look at the historical performance of the two indices.

The left-hand chart in Figure 6 shows the cumulative performance of the two indices and the TOPIX. It is immediately clear from this that the Low Beta Select 50 has performed better than the other two indices. This is largely because the Low Beta Select 50 saw relatively small declines in periods when the Japanese equity market fell sharply, such as around the time of the 2008 global financial crisis. In addition, the standard deviation of absolute returns was 26.80% for the High Beta Select 30 and 12.79% for the Low Beta Select 50. As expected, the High Beta Select 30, which is highly market-sensitive, was more volatile than the TOPIX (18.00% annualized standard deviation), while the Low Beta Select 50, which has little market sensitivity, was less volatile, indicating reduced risk. In addition, if we compare the TOPIX beta and forex beta of the two indices, we see that the High Beta Select 30 has a high beta while the Low Beta Select 50 has a low beta, which is in line with the concept on which the two indices are based.

It is clear from the cumulative excess returns versus the TOPIX shown in the right-hand chart in Figure 6 that both indices have outperformed the TOPIX while moving mostly in the opposite direction to each other. The annualized average excess return versus the TOPIX over the past 16 years is 3.15% for the High Beta Select 30 and 1.72% for the Low Beta Select 50. In addition, the TOPIX beta and forex beta of the excess return versus the TOPIX on the two indices have opposite signs (ie, positive for the High Beta Select 30 and negative for the Low Beta Select 50), indicating that the excess returns versus the TOPIX of the two indices have tended to move in the opposite direction in response to changes in the Japanese equity market or the USD/JPY.

Fig. 6: Performance of Nomura Japan Equity High Beta Select 30 and Nomura Japan Equity Low Beta Select 50



Summary of performance since Jan 2001

Absolute return	High Beta Select 30	Low Beta Select 50	TOPIX
Geometric mean return (annualized, %)	3.88	5.35	2.72
Standard deviation (annualized, %)	26.80	12.79	18.00
Return/risk	0.14	0.42	0.15
TOPIX beta	1.41	0.52	1.00
Forex beta	1.27	0.35	0.86

Excess return vs TOPIX	High Beta Select 30	Low Beta Select 50
Average excess return (annualized, %)	3.15	1.72
Standard deviation (annualized, %)	11.26	12.33
Return/risk	0.28	0.14
TOPIX beta	0.41	-0.48
Forex beta	0.41	-0.51

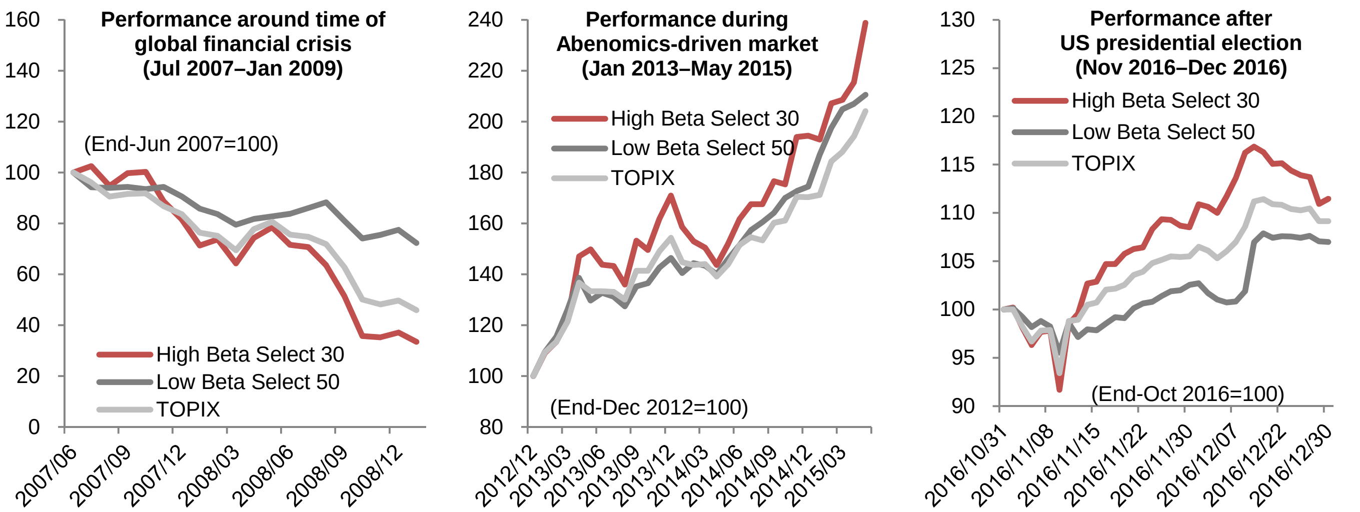
Note: Shows data for Jan 2001 through Dec 2016. Based on monthly returns including dividends. We did not take transaction costs into account. Analysis is based on past share price performance and does not guarantee future performance. TOPIX beta (or forex beta) is the regression coefficient obtained through a regression of the monthly index return including dividends against the monthly return on the TOPIX including dividends (or USD/JPY).

Source: Nomura

Next, we look at specific examples of index performance during periods when Japanese equities were continuously rising and the yen was continuously weakening and periods when Japanese equities were continuously falling and the yen was continuously strengthening. Figure 7 shows three examples: around the time of the 2008 global financial crisis, the Abenomics-driven market from end-2012 onward, and the period after the US presidential election in November 2016. The charts confirm that the High Beta Select 30 substantially outperformed the TOPIX when Japanese equities were rising and the yen was weakening, while the Low Beta Select 50 substantially outperformed the TOPIX when Japanese equities were falling and the yen was strengthening. This result is what we would expect in view of the concept on which the two indices are based.

Fig. 7: Index performance during historical periods of falling equities/strong yen and rising equities/weak yen

(a) Japanese equities falling/yen strengthening (b) Japanese equities rising/yen weakening

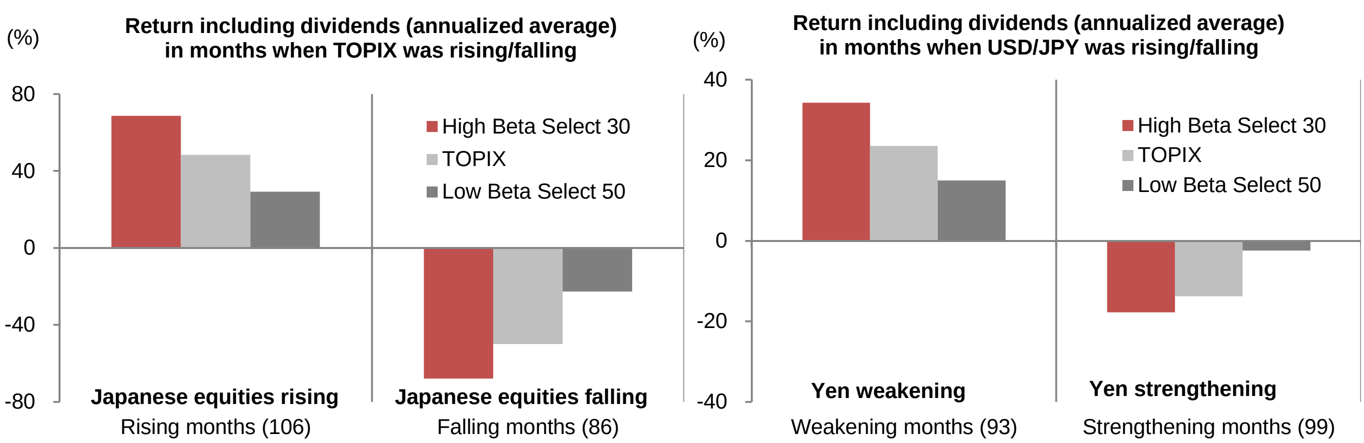


Note: Shows monthly data for Jul 2007 through Jan 2009 (left-hand chart) and Jan 2013 through May 2015 (middle chart) and daily data for Nov 2016 through Dec 2016 (right-hand chart). Returns are cumulative and include dividends. We did not take transaction costs into account. Analysis is based on past share price performance and does not guarantee future performance.

Source: Nomura

In addition, there are substantial differences of several tens of percentage points, expressed as an annualized average, between the dividend-inclusive returns on the two indices divided into months when the Japanese equity market and USD/JPY were rising or falling (Figure 8).

Fig. 8: Index performance by market conditions



Note: Shows data for Jan 2001 through Dec 2016. Based on monthly returns including dividends.

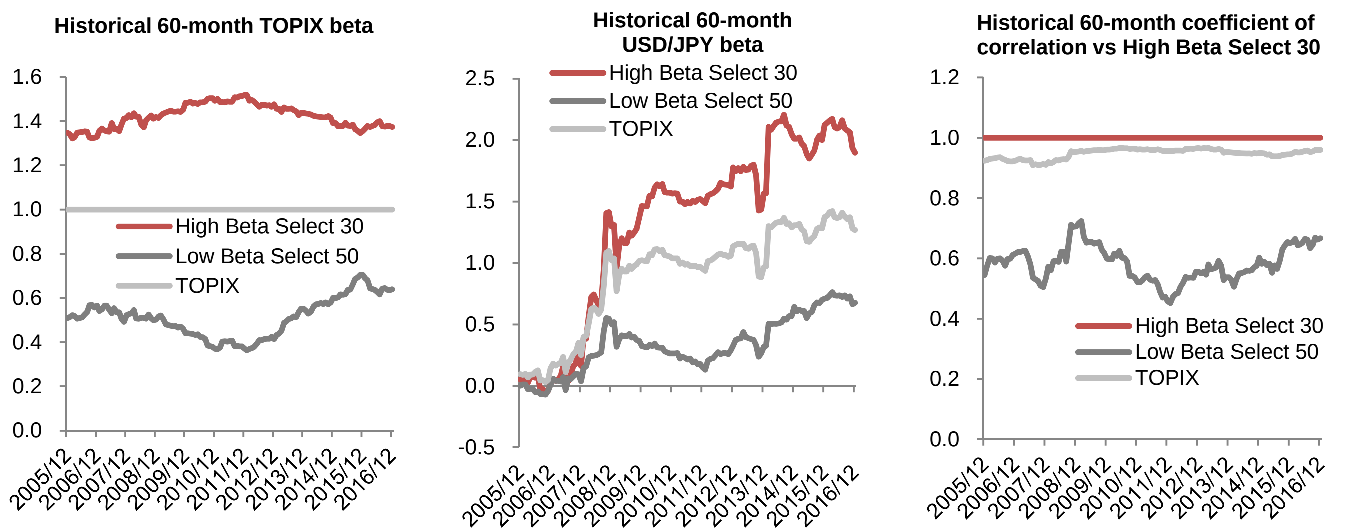
Source: Nomura

4. High/low beta indices with contrasting characteristics

In this chapter, we look at the beta values, valuations, and sector weights of the two indices.

Figure 9 shows the historical 60-month beta values for the two indices and the coefficient of correlation between the indices. It is clear from this that the High Beta Select 30 has high beta values and the Low Beta Select 50 has low beta values, in line with the concept on which the two indices are based. Both the TOPIX beta and the forex beta of the two indices tend to move in opposite directions and lie on opposite sides of the values for the TOPIX. In addition, the coefficient of correlation between the two indices has been consistently low.

Fig. 9: Historical beta and correlation coefficient

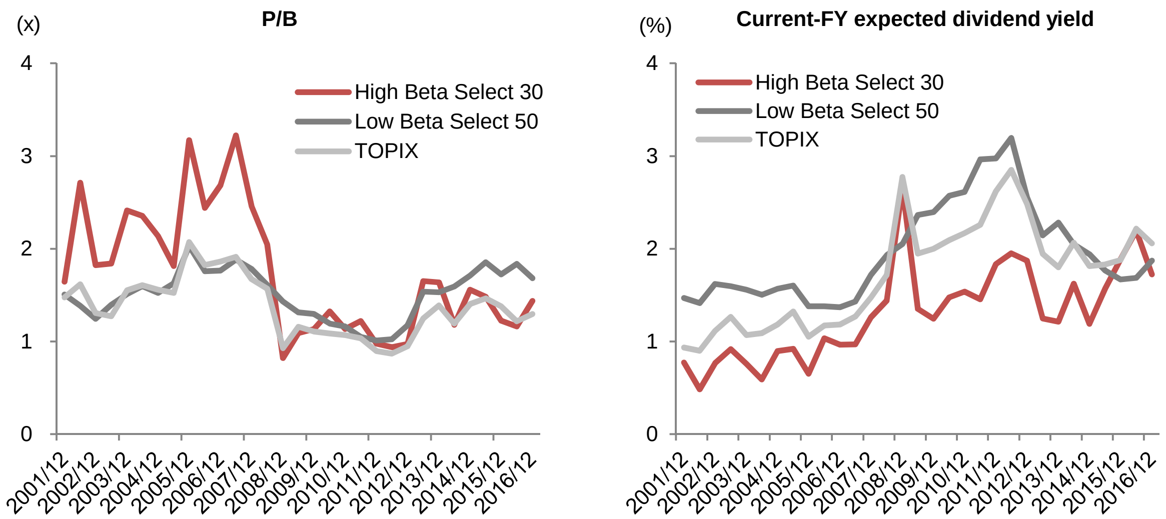


Note: Based on monthly returns including dividends from Jan 2001 through Dec 2016.

Source: Nomura

It is clear from Figure 10, which shows the P/B ratios and current-FY expected dividend yield of the two indices, that these valuations for the two indices relative to the TOPIX have changed substantially of late. At the beginning of December 2016, the average P/B ratio of the Low Beta Select 50 was high relative to the other indices, and its expected dividend yield was low. Meanwhile, the average P/B ratio of the High Beta Select 30 used to be high, and its expected dividend yield used to be low, but both valuations have recently moved close to the equivalent valuations for the TOPIX.

Fig. 10: Historical index valuations



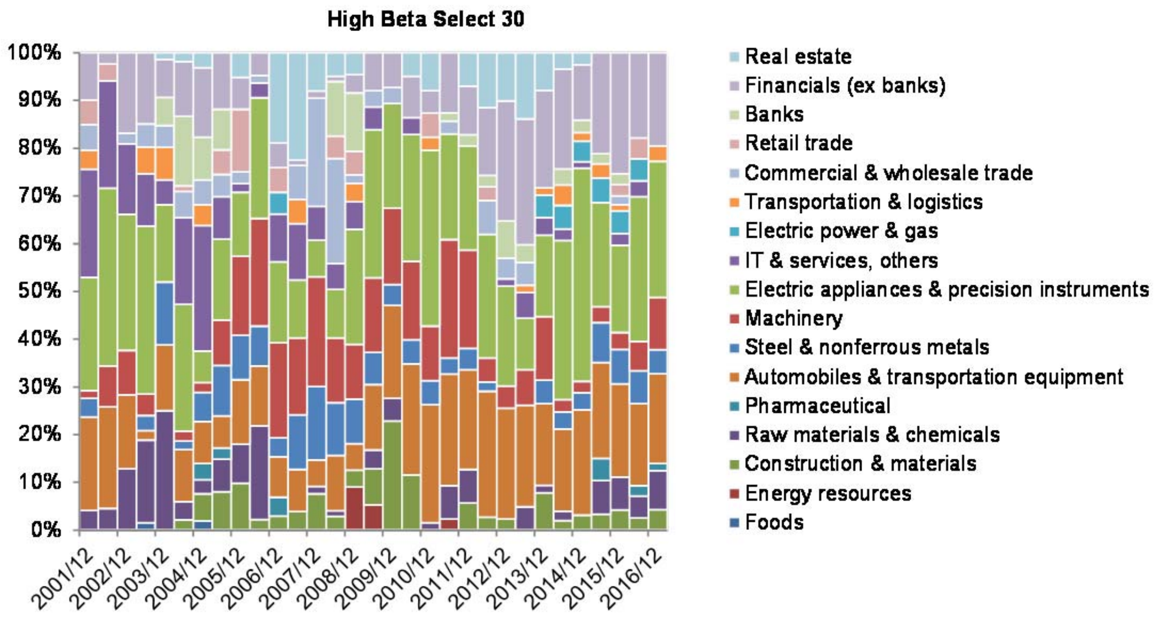
Note: Shows data as of index reconfigurations from Dec 2001 through to Dec 2016. Net asset yield and current-FY expected dividend yield calculated for index constituents after each reconfiguration on a weighted average basis, using index weights as at end of previous month. P/B is the inverse of net asset yield.

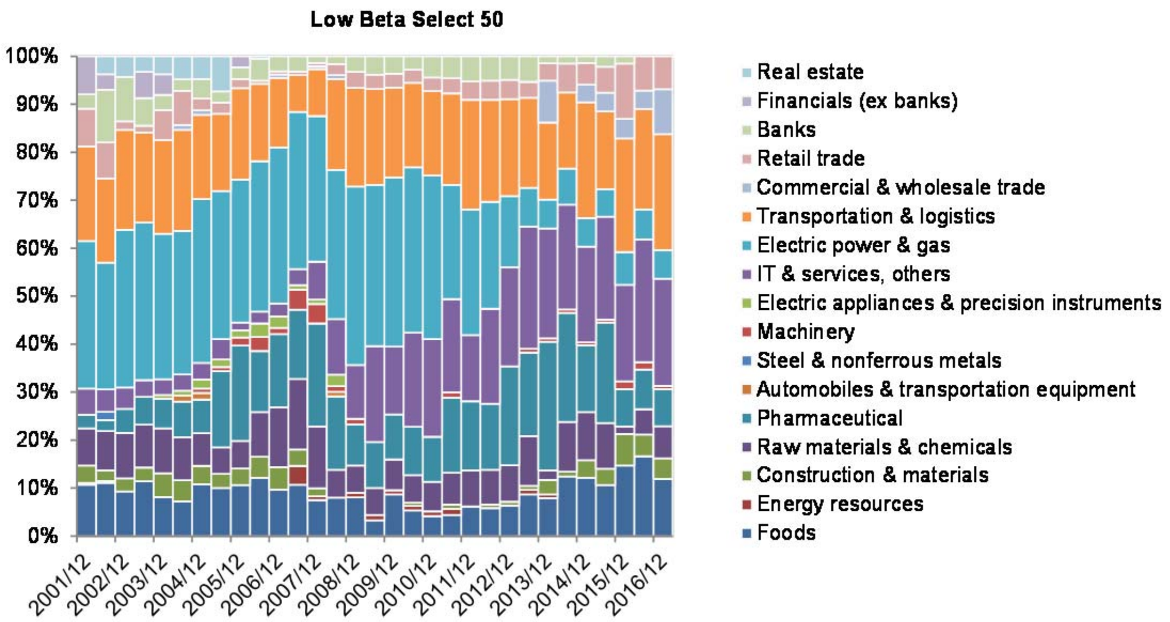
Source: Nomura

Figure 11 shows sector weights at the time of periodic reconfigurations from December 2001 onward. Sector weights have changed substantially for the High Beta Select 30. We think this is because the index comprises only 30 stocks and the lineup of high-beta stocks has changed considerably over time. The electric appliances & precision instruments and automobiles & transportation equipment sectors, which are typical external demand sectors, have often had a high index weight, but in the past few years the financials (ex banks) sector has consistently had a particularly high weight. Meanwhile, sector weights in the Low Beta Select 50 have been relatively stable, and recently the domestic demand sectors of transportation & logistics, IT & services, others, and foods have had particularly high weights. However, the weight of electric power & gas, which is a typical domestic demand sector, has fallen recently compared to previous levels.

We have not adjusted the sector weightings of the two indices. This is because market beta and forex beta vary substantially from sector to sector, and thus the high-beta and low-beta characteristics of the two indices are clearer if sector adjustment is not carried out. The two indices are designed in such a way as to maintain their respective beta characteristics after reflecting the latest data at the time of the twice-yearly periodic reconfigurations, and are in our view highly convenient tools that will enable investors to adjust their positions with ease on the basis of their forecasts for Japanese equities and USD/JPY.

Fig. 11: Index sector weights





Note: Index weights at end of previous month for the TOPIX 17 sectors, based on constituent stocks after each periodic reconfiguration from Dec 2001 through to Dec 2016.
Source: Nomura

As we already have discussed, we have developed the High Beta Select 30 and the Low Beta Select 50 in order to enable investors to reflect their market forecasts in their positions with ease. Our aim is that investors will use these two indices to manage their portfolios in a way that reflects their market outlook, with investors who are bullish on the Japanese equity market and expect the yen to weaken investing in the High Beta Select 30 and those who want to reduce their risk exposure versus a fall in share prices and a strong yen because they are unsure about the market outlook investing in the Low Beta Select 50. We hope the two indices will help investors with various and different forecasts to improve the efficiency of their investments.

(Reference) Index construction method

Here we give a simple explanation of the method used to construct the two indices. Figure 12 shows the flow of the stock selection process. The indices are reconfigured twice a year, on the first business day of June and the first business day of December (using data as of the fifth business day of the preceding month). Please see the index rulebook for more details.

[Index construction process]

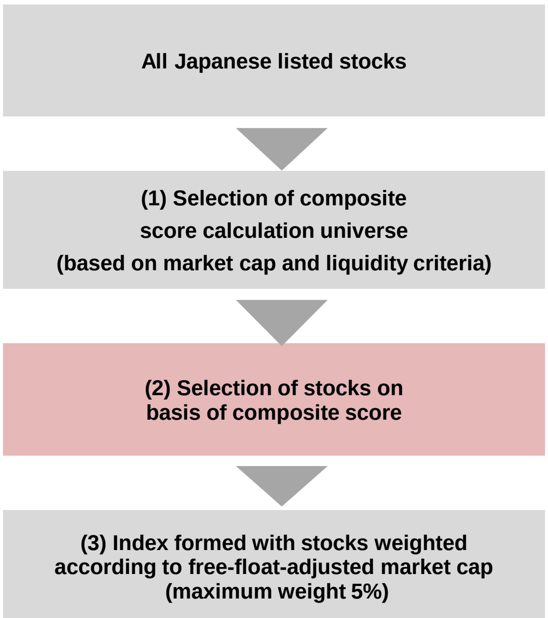
(1) Stocks that are both in the top 85% of all Japanese listed stocks in terms of free-float-adjusted market cap and in the top 500 of all Japanese listed stocks in terms of average daily turnover over the past 60 days are selected for the composite score calculation universe.

(2) For each stock, a linear regression based on the least sum of squares method is used to calculate values of the four indicators on which the composite score is based (market beta, forex beta, momentum, and stock-specific risk). For each of these scores, a standardized score is then calculated by adjusting the scores so that the average for the composite score calculation universe is zero and the standard deviation is one.

We then calculate a composite score for each stock, for each index separately. In the case of the High Beta Select 30, the composite score is the average of the standardized scores for market beta, forex beta, and momentum, while for the Low Beta Select 50 it is the average of the standardized scores for market beta, forex beta, and stock-specific risk. The top 30 stocks in terms of composite score are selected for the High Beta Select 30 and the bottom 50 stocks in terms of composite score are selected for the Low Beta Select 50.

(3) Lastly, the weights of constituent stocks are determined. Weights are essentially determined on the basis of free-float-adjusted market cap, but the maximum weight for each constituent stock is set at 5% to prevent certain stocks from having an excessively high index weight. Any weight exceeding 5% is allocated among other constituent stocks in proportion to their free-float-adjusted market cap.

Fig. 12: Index construction method



Source: Nomura

Appendix A-1

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