Pension fund management

Periodic Adjustment of the Topix Index Free-Float Weighting and Implications for Index Management

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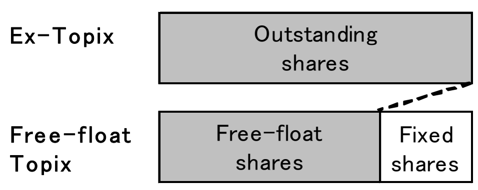
Free-float weights of the Topix Index are revised on a quarterly basis. Since weighting changes are announced prior to implementation, advance trading in anticipation of the adjustment tends to increase stock price volatility. Index fund managers thus need to consider how to minimize tracking error while averting the downside risk to real fund value.

For many years, the Topix Index—a leading equity benchmark along with the Nikkei 225 Index—was calculated based on the total market capitalization of the TSE First Section with January 4, 1968 as the reference date. However, from October 2005 to June 2006, the Topix Index was converted to a free-float adjusted index in three phases. As a result, each company's weighting is now based on the number of shares available for trading (free float) rather than the total number of shares outstanding (float). Thus fixed shares—shares held by major shareholders and directors, and treasury stocks including cross-shareholdings—are no longer included in the weighting (Exhibit 1).

The move to a free-float adjusted index was prompted by the growth of index management of pension funds and others and exchange traded funds (ETFs), which increased the price distortion risk of stocks with smaller free floats. Another consideration was the fact that free-float adjustment is the prevailing practice among leading stock indexes abroad.

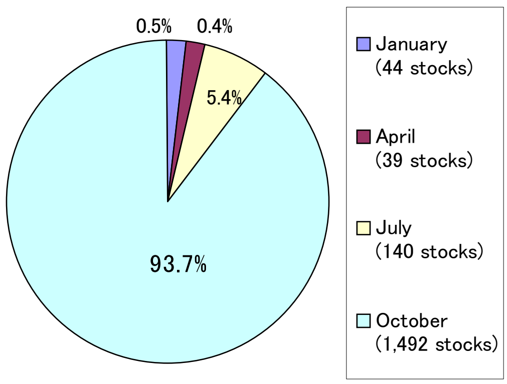
Exhibit 1 Shares Included in Weighting



Note: The previous index, called Ex-Topix, is still published for reference purposes.

In the free-float adjusted Topix, each company's free-float weight (FFW) is reviewed upon the release of annual financial statements, with revisions reflected in the Topix Index on a quarterly basis. Since most companies have a fiscal year ending in March, as many as 1,492 FFW revisions can occur at the end of October, representing approximately 94% of the market capitalization (Exhibit 2).

Exhibit 2 Timing of FFW Revision

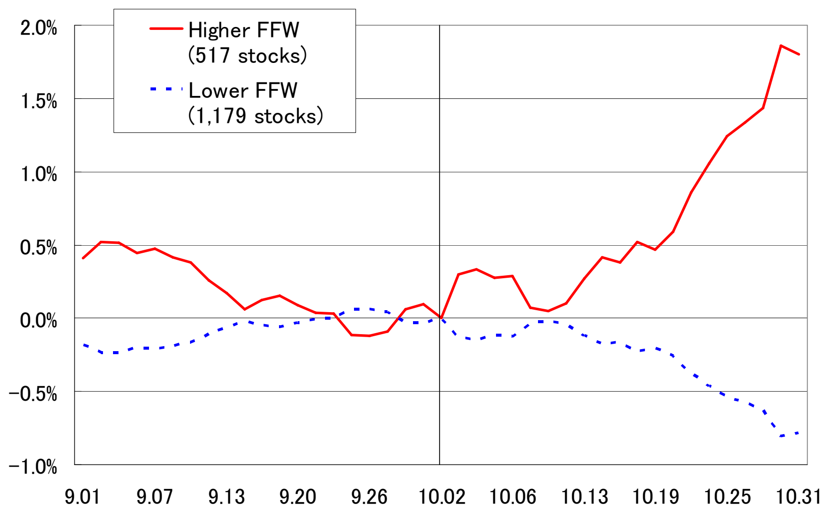


The TSE announces the periodic revision one month prior to implementation, allowing the market to anticipate the adjustment. For this reason, trading activity in advance of index funds—whose assets are estimated at over ¥20 trillion—tends to increase stock price volatility.

The first major FFW revision following the completion of free-float adjustment was conducted at the end of October 2006. The weighting change was significant and predicted to cause a one-way turnover ratio of 2.9% in the overall Topix (the actual result was very close), or the same level as in the first transition phase. To measure the impact on stock prices, we first separated the index constituents into two groups—stocks that index funds were expected to buy (due to a weight increase), and stocks they were expected to sell (due to a weight decrease)—and compared price movements.

For the period from one month before to one month after October 2 (the announcement date of revised free-float weights), we plotted the cumulative difference in daily return against the Topix (as a simple average) for each group (Exhibit 3). The results show a higher return for stocks whose weighting was increased, with the disparity widening toward the end of October.

Exhibit 3　Stock Price Return by FFW Change Announced on October 2, 2006



Next, to assess the impact of price fluctuations on index management, we simulated the performance of two hypothetical portfolios. One portfolio replicates the Topix as of October 2 and remains unadjusted, while the other adjusts immediately to the new free-float weights announced on October 2 (Exhibit 4).

Our results show that the estimated tracking error (which as of October 2 quantifies the risk of divergence in future return against the Topix) is 0.0 bp for the unadjusted portfolio, compared to 17.0 bp for the adjusted portfolio. Similarly, the adjusted portfolio shows a larger excess return against the Topix (from October 2 to 31), reflecting the price divergence shown in Exhibit 3.

Exhibit 4　Porfolio Simulation

	Unadjusted until Oct. 31	Adjusted immediately
Excess return	2.6 (bp)	14.2 (bp)
Estimated tracking error	0.0 (bp)	17.0 (bp)

Insofar as the estimated tracking error and excess return are minimized, the unadjusted portfolio earns high marks as a Topix index fund. However, considering that stock prices diverge widely as October 31 approaches, the unadjusted portfolio must buy in at a higher price and sell out at a lower price—something which fund investors may not find pleasing.

The next periodic revision may not see the same price divergence pattern shown in Exhibit 3, as the actual pattern depends on advance trading activity by other index funds and speculators. For index managers, this means that incorporating FFW changes in advance carries a downside risk. That is, a tradeoff arises between benchmark replication (minimizing the estimated tracking error and excess return) and protection of real fund value. In future periodic revisions, index managers will need to confront the issue of balancing the two aims.