243 5TH AVENUE SUITE 235 NEW YORK, NY 10016
T 1.646.435.0569 | F 1.646.827.9500
www.altavista-research.com

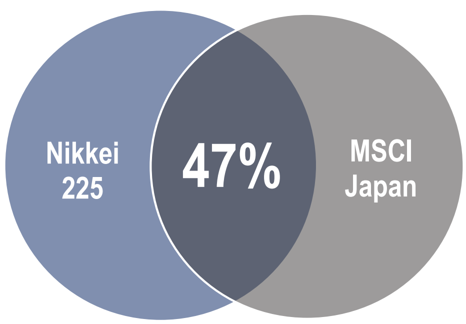
Special Report

Comparison of Nikkei 225 and MSCI Japan Indices

In this report:

- The Nikkei Stock Average is one of the most widely followed barometers of the Japanese stock market yet in the U.S. millions of investors are following the MSCI Japan index due to the dominant market share of investments tracking it.
- There are substantial differences between the two, with less overlap than many investors might assume (Figure 1). This results in different sector and market cap allocations, fundamentals, and performance characteristics, making index selection more than an academic matter.
- The broad availability of futures, options and other derivatives tied to the Nikkei makes the task of risk-management easier than with investments tracking the MSCI index.
- In the past, stocks in the Nikkei have also benefit disproportionately from the Japanese government's efforts to support the equity market.

Figure 1: Exposure overlap
Percentage of overlapping exposure in each index is less than half



Note: Based on consensus index constituents and weights as of September 30, 2014. Subject to change.

Source: AltaVista Research

Introduction

Academics and market strategists often debate the merits of one index or indexing methodology over the other. But for all the deliberation, investors in general—and retail investors in particular—tend to gravitate toward widely-recognized broadly followed benchmarks.

Which index or indices enjoy that recognition from the investing public however can sometimes differ across borders, and may be driven by the availability of different investment products in each country. This appears to be the case for Japanese stocks. In Japan, the Nikkei Stock Average is index most widely quoted in the financial news and followed by the Japanese public, and it is certainly widely-benchmarked to among Japanese financial institutions and investment managers.

Yet among U.S.-based investors in Japanese stocks, the MSCI Japan index—relatively unknown within Japan—is the preferred index, judging by assets in popular retail funds. Nonetheless, U.S. investors who want to track the benchmark of choice in Japan do have an easy way to do so.

In 2011, an exchange traded fund (ETF) tracking the Nikkei Average became available, The MAXIS® Nikkei™ 225 Index ETF. But the fund has gathered little in the way of assets since its debut, perhaps because U.S. investors have yawned at the new product, perhaps assuming both the Nikkei and MSCI indices are the same or "close enough", so why stray from the familiar?

However, an in-depth examination reveals that the two indices are in fact quite different. They have significantly different sector and market cap allocations, which in turn drive differences in fundamentals and performance. We don't conclude that either index is *inherently* superior to the other, but their differences are relevant to investors' objectives, and there may be certain practical benefits to tracking the more widely-followed Nikkei index, especially with regards to risk management.

One of the biggest benefits of the growth and popularity of index investing and related products is the choices they give ordinary investors. Of course, having so many choices complicates the selection process, but that's where research comes in. This paper examines the two indices so that investors in the world's second largest equity market can make an informed choice of index.

Index Construction

Disseminated since 1950, the Nikkei Stock Average is a "bellwether" of the post-war Japanese economy. Although initially calculated by the Tokyo Stock Exchange, since 1970 the index has been owned and calculated by the *Nihon Keizai Shimbun*—literally Japan Economic Newspaper—the country's equivalent of the Wall Street Journal. *Nikkei* is an abbreviated form of *Nihon Keizai*.

Like the Dow Jones Industrial Average, the Nikkei 225 is a price-weighted index, with some important differences in calculation which we'll examine shortly. The 225 constituents are selected from a candidate list of 450 common shares (2x the number of final constituent count) listed on the First Section of the Tokyo Stock Exchange based on liquidity. That candidate list is then narrowed down by further liquidity tests and sector balance, such that the number of stocks in each sector of the 225 finalists should be approximately one half the number of stocks in each sector of the starting candidate line-up of 450 shares. Final selection is determined by committee. (A detailed explanation of selection methodology is available from materials on the Nikkei Indexes website).

Index review and reconstitution is conducted annually in October, except in the case of extraordinary events such as a corporate acquisition, bankruptcy or delisting, where replacements for any deletions are named on an ad-hoc basis.

In contrast, the MSCI Japan index is a more familiar market cap-weighted index designed to measure the large- and mid-cap segments of the Japanese equity market, by including approximately 85% of the free-float adjusted market capitalization of Japan. As a result, the number of constituents in the index can vary, and currently numbers 311.

Eligibility and selection criteria are governed by MSCI's detailed Global Investable Market Indexes ("GIMI") Methodology, which are basically designed to ensure representativeness and tradability. Unlike the Nikkei, non-common shares including preferred shares and REITs are eligible for inclusion (presently however no preferred shares are included, and REITs amount to just 1%).

Table 1: Index construction methodologies

Index	Nikkei 225	MSCI Japan
Universe	Tokyo Stock Exchange First Section common shares	Japanese equities, including preferred shares and REITs
Selection criteria	• Liquidity • Sector balance	• 85% of total market cap • Liquidity & investability
Weighting	Price	Float adj. market cap
Constituents	225	Varies
Reconstitution	Annual	Quarterly

A few words about price-weighting

Although price-weighting may seem quaint in a world dominated by market cap-weighted indices, as a practical matter the Nikkei 225 is a well-balanced representation of the Japanese stock market. And while efficient market purists scoff at anything other than cap-weighted indices as sub-optimal, the returns data do not support that assertion, as we'll demonstrate later.

But before moving on, we need to examine a particular "quirk" of price-weighted indices. In the Dow Jones Industrial Average for example, a 2-for-1 stock split by any constituent would also effectively cut the weight of that constituent within the index in half, which is arbitrary and unreflective of anything fundamental to the stock market or economy. However, this is not the case with the Nikkei 225 in most instances.

Because Japanese shares often trade in lots of 100 or 1,000, in addition to single shares, the Nikkei index adjusts price quotations to normalize the par value[1] of each share, since it would be illogical to combine the price of stock A based on single shares with the price of stock B based a lot of 1,000 shares (Generally, price quotes from Bloomberg and similar sources are per single share, regardless of the trade lot size).

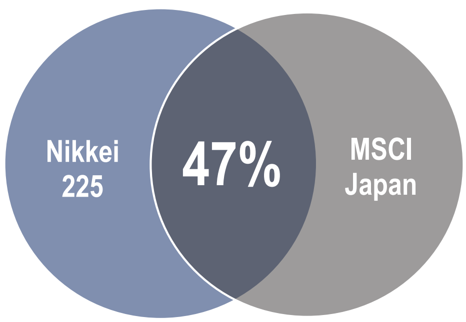
Japanese firms often spilt their shares 100:1 or 1,000:1 in order to change the lot size, in addition to the 2:1 stock splits more familiar to U.S. investors. A stock split of any magnitude also changes the par value by an equal magnitude, and as a result negates the impact of the stock split in the calculation of the index. Thus, a firm that split its shares 100:1 would not see its weight in the Nikkei index fall by 99%.

Smaller splits such as a 1.1:1 (based on a stock dividend, for example) do not result in changes to par value, in which case a constituent would lose weight in the index, and the index divisor would be changed to maintain continuity.

So far our discussion has been somewhat academic, but the implications for investors are significant. Although 162 of the Nikkei's 225 constituents also appear in the MSCI Japan index, due to differences in weighting the overlap between the two is only 46.8%, meaning that 53.2% of exposure is not replicated (Figure 2). One might say that the two indexes are more dissimilar than they are alike. As a result, each index has differences in sector allocation and market cap segmentation, which in turn affect index-level valuations and performance characteristics.

Figure 2: Exposure overlap

Percentage of overlapping exposure in each index is less than half



Note: Based on consensus index constituents and weights as of September 30, 2014. Subject to change.

Source: AltaVista Research

[1] *Technically, a "presumed par value" is used, since a 2001 revision to Japan's Commercial Law abolished par value.*

Composition Analysis

Sector Allocation

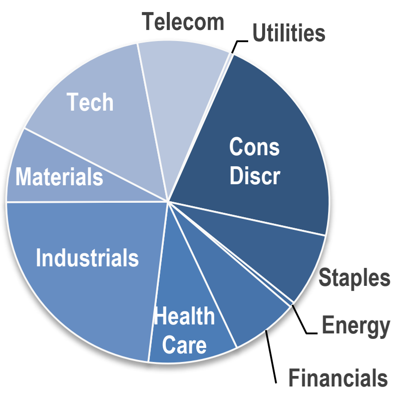
The Nikkei's 225 constituents are reasonably well-balanced by sector, with Industrials and Consumer Discretionary stocks accounting for the largest exposures at 23% and 22%, respectively, followed by still-sizeable exposure to Technology at 15%. At the other end of the spectrum, Energy and Utilities each make up less than 1% of the index (Figure 3).

We'd also characterize the MSCI Japan index as well-diversified, but its exposures are not the same as those offered by the Nikkei. The biggest difference is in exposure to the Financial sector, where the MSCI Japan index has 19% exposure versus just 7% for the Nikkei 225, making the price-weighted Nikkei "under-weight" by about twelve percentage points, relative to the market cap-weighted MSCI. As we'll demonstrate later, this divergence had important implications for performance in the wake of the Global Financial Crisis.

Of course, being underweight in one sector means that an index must be overweight in others. Figure 4 shows the relative sector weights between the two indices. Being underweight in Financials and Utilities (down to almost nil) the Nikkei offers slightly more exposure to most other sectors, the largest of which are Industrials and Telecom (+4% each) and Health Care (+2%). At the margins, the greater exposure to Health Care may be a positive, given the pronounced ageing of Japan's population.

The Consumer Discretionary sector looms equally large in both indices at 22%, compared with about 12% in the S&P500, for example. While this may give investors pause because of that same aging population, this is at least partially offset by the export-oriented nature of Japan's global consumer brands like Honda, Toyota, Sony, Canon, Bridgestone and others that derive the majority of sales outside Japan.

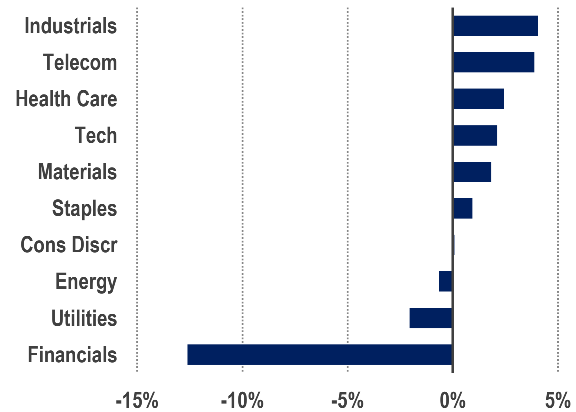
Figure 3: Sector breakdown
Nikkei 225 Index



Note: Based on current index constituents as of 9/30/14. Subject to change.

Source: AltaVista Research

Figure 4: Relative sector weights
Nikkei 225 Index minus MSCI Japan Index



Note: Based on current index constituents as of 9/30/14. Subject to change.

Source: AltaVista Research

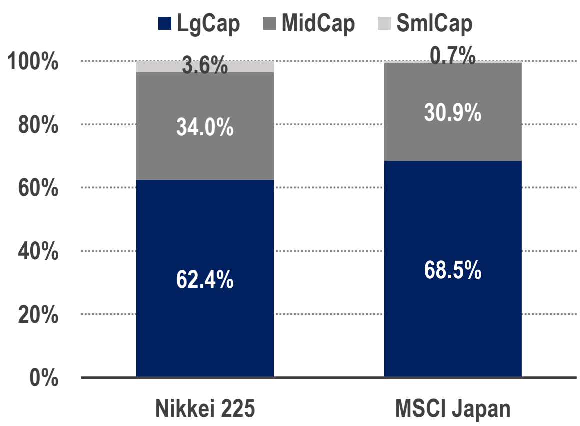
Market Cap Segmentation

In terms of market cap segmentation, despite the fact that the Nikkei has fewer constituents, it reaches down further into the small- and mid-cap space. The Nikkei has 37 constituents classified as small-cap (less than US$2 billion) and 113 classified as mid-cap (between US$2-10 billion), compared with 8 and 197 constituents, respectively, out of the MSCI Japan index's total 311 constituents. In terms of overall index exposure however the tilt is small: about three percentage points more in both small- and mid-caps for the Nikkei versus the MSCI index, and six percentage points less in large-caps, classified as greater than US$10 billion (Figure 5).

However, this probably masks the degree to which the Nikkei tilts towards smaller issuers. The weighted average market cap of the Nikkei's 255 constituents is approximately US$26 billion – large-caps by any definition—but still considerably smaller than the MSCI Japan index's weighted average market cap of $34 billion (Figure 6).

Even though both indices are dominated by large-caps, the effect of the Nikkei's price-weighting is a de-emphasis of mega-cap stocks. As an illustration one need only look at each index's largest holding: the Nikkei's largest is a US$36 billion company called Fast Retailing, owner of the UNIQLO chain of retail stores, whereas the MSCI index's largest holding is US$201 billion Toyota Motor Corp.

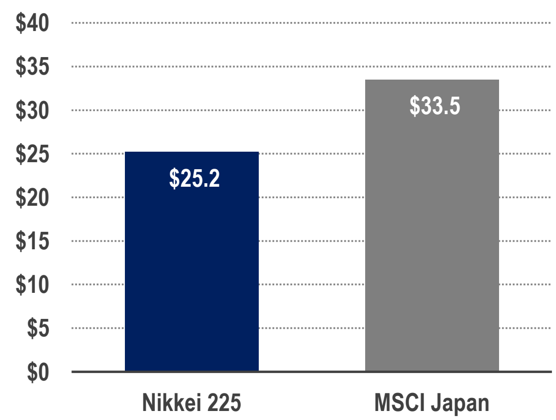
Figure 5: Market cap breakdown
Nikkei 225 and MSCI Japan indices



Note: Based on current index constituents as of 9/30/14. Subject to change.

Source: AltaVista Research

Figure 6: Weighted average market cap
Nikkei 225 and MSCI Japan indices (US$bns)



Note: Based on current index constituents as of 9/30/14. Subject to change.

Source: AltaVista Research

Looking Back: Performance Analysis

We regressed ten years of monthly returns data for the Nikkei 225 index against returns of the MSCI Japan index, and analyzed returns, volatility, correlation and information ratios over five different time periods: 1 year, 3 years, 5 years, 10 years ending September 30, 2014. Even though the price histories of these two indices are available going back much further, the net total returns series that we examined has a much shorter period available. Net total returns include the value of dividends received but gives effect to tax withholdings.

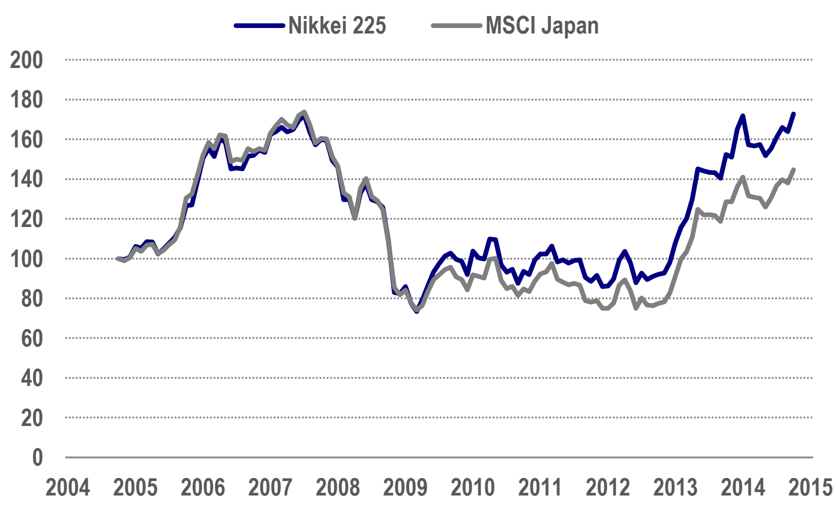
As is readily apparent, both indices performed nearly identically in the years leading up to the Global Financial Crisis, and during the crisis itself. Both lost about 54% of their value peak-to-trough. However, subsequently their fates began to diverge, with the Nikkei gradually outpacing the MSCI index in the years following the crisis, as Japanese financials lagged in the broader market.

Japan's "zombie banks" weren't at the epicenter of the real estate bubble the way U.S. and European banks were, but their stocks suffered regardless. The MSCI's greater allocation to the sector was a drag on performance during the period.

However that all began to change with the stock market rally that began in late 2012 in response to Prime Minister Abe's "Three Arrows" plan for economic reform. The first two arrows, fiscal stimulus and monetary easing, are the easy part. Like the Federal Reserve's quantitative easing in the U.S., the program was successful and reflating some financial assets, including stocks, and during 2013 Japanese financial issues did better than the overall market.

As doubts have grown however about the success of the third and most difficult arrow—structural reform—the rally has lost some of its steam in 2014, and financial stocks have once again started to underperform the broader market.

Figure 7: Ten Year Performance Returns (rebased)
Nikkei 225 and MSCI Net Total Returns, 9/30/2004-9/30/2014



Note: Monthly net total returns, rebased, September 30, 2004 = 100.

Source: Bloomberg and AltaVista Research
Past performance does not guarantee future results.

Turning our attention to statistical measures of performance, we see that, not surprisingly, the two indices tended to move together, with an r-squared value (technically, "coefficient of determination") of 94-95%. Nonetheless, the Nikkei managed to post higher returns than the MSCI index for the one, three, five and ten year periods measured. However, this came at the price of slightly higher volatility in most periods (Table 2).

Table 2: Performance Analysis

Index	Nikkei 225	MSCI Japan
Index ticker	NKYNTR	NDDLJN
1 YEAR		
Total return	13.4%	12.5%
Ann. volatility	17.1%	14.5%
r-squared (r^2)	93.7%	100.0%
Information ratio	0.67	--
3 YEARS		
Total return	25.0%	22.8%
Ann. volatility	18.2%	18.3%
r-squared (r^2)	94.7%	100.0%
Information ratio	1.78	--
5 YEARS		
Total return	11.6%	9.8%
Ann. volatility	19.5%	18.7%
r-squared (r^2)	94.1%	100.0%
Information ratio	1.36	--
10 YEARS		
Total return	5.6%	3.8%
Ann. volatility	20.1%	19.2%
r-squared (r^2)	94.6%	100.0%
Information ratio	1.37	--

Note: *All measurements are based on monthly observations for the period ending September 30, 2014. Three, five and ten year return figures annualized. "R-squared" (r^2) is a statistical measure of the strength of the relationship between the index being measured versus the MSCI Japan Index. Information ratio is a measure of the risk-adjusted performance of the index being measured versus that of the MSCI Japan Index.* ***Past performance does not guarantee future results.***

Source: *Bloomberg and AltaVista Research*

The Road Ahead: Fundamental Analysis

As investors are well aware, past performance is no guarantee of future results. Likewise, our analysis of construction methodologies and historical results only give investors a partial picture of an index's investment potential.

Fortunately, one of the often overlooked and most important advantages of index investments is that they are transparent—their holdings are public information. As a result, it is possible to conduct a study using the traditional tools of security analysis. The advantage of this approach is that it is forward-looking.

After a few years of outpacing their counterparts in the MSCI index, it's not surprising that stocks in the Nikkei trade at higher valuation multiples. Table 3 has common valuation metrics based on consensus 2013 figures for each index constituent, and aggregated up to the index level. While firms in the Nikkei trade at only a modest price-to-sales multiple of 0.8x 2013 sales, compared with 0.7x for firms in the MSCI Japan Index, other multiples carry a larger premium. The price-to-earnings multiple, for example, carries at 33% premium over firms in the MSCI index.

This is not merely the result of Nikkei's sector tilt away from the financial sector, which tends to garner lower multiples than sectors such as Health Care, where the Nikkei has more exposure. On a sector-by-sector basis, price-to-earnings multiples are higher in aggregate for Nikkei constituents than for MSCI constituents, except in two cases: Energy and Utilities, which in any case have minimal exposure (Figure 8).

Table 3: Valuation metrics

Index	Nikkei 225	MSCI Japan
Price-to-sales (x)	0.8	0.7
Price-to-earnings (x)	21.5	16.0
Price-to-book val. (x)	1.6	1.3
Yield (%)	1.4	1.7

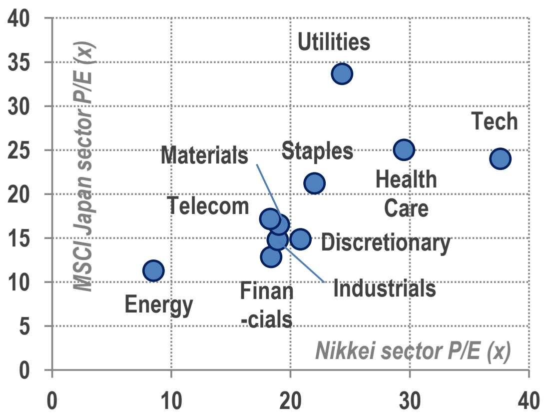
Note: Based on consensus 2013 per-share figures for individual constituents of each index and closing share prices as of September 30, 2014.

Source: AltaVista Research
Past performance does not guarantee future results.

One reason that stocks in the Nikkei might be worth their higher multiples is the faster anticipated earnings growth. Based again on current consensus estimates for individual index constituents, the long-term earnings growth rate (defined as 3-5 year compound growth rates among analysts surveyed), firms in the Nikkei 225 enjoy somewhat higher growth expectations, of 10.5% in aggregate, compared with 8.8% for firms in the MSCI Japan index (Figure 9).

No doubt part of this is due to the former's tilt towards smaller stocks, but in reality both figures are likely too optimistic (analysts tend to be an optimistic bunch). Nonetheless, we have no reason to think analysts are systematically biased in favor of one set of constituents over the other, so whatever the real number is, it is reasonable to conclude that the market's growth expectations for firms in the Nikkei are indeed somewhat higher.

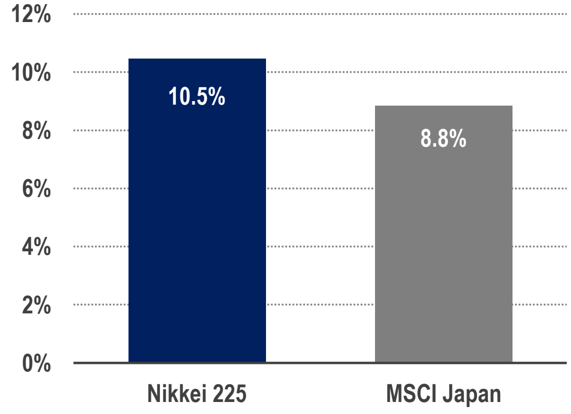
Figure 8: Trailing P/E multiple by sector
Based on 2013 consensus EPS



Note: Based on consensus figures for current index constituents as of 9/30/14. Subject to change.

Source: AltaVista Research

Figure 9: Long-term EPS growth est.
Consensus 3-5 year EPS growth



Note: Based on consensus 3-5 year EPS growth estimates for current index constituents as of 9/30/14. Subject to change.

Source: AltaVista Research

Benchmark of Choice

Risk management

The Nikkei index enjoys a broad line-up of products linked to it, including futures, options and other derivative instruments. These complimentary products can be used by investors to hedge all or part of a position, generate extra income, or react to major events occurring outside regular trading hours, such as the earthquake and tsunami that hit northeast Japan on March 11, 2011.

A very deep, liquid market for Nikkei futures—both USD and Yen-denominated—is available at the CME Group (formerly Chicago Mercantile Exchange) and which can be traded easily in any online brokerage account offering derivatives trading. For its part, MSCI has licensed its Japan index to the German-based Eurex Exchange, however open interest in the futures contracts listed is zero, and we did not find any trades to have taken place. Similarly, the OneChicago single-stock futures exchange has futures contracts listed for the ETF tracking the MSCI Japan index, but no trades have occurred.

Finally, for those with an appetite for more exotic strategies (some of which require a healthy appetite for risk, too), other exchange-traded products tied to the Nikkei 225 Index available in Japan include leveraged and inverse funds; covered-call index funds, and volatility index futures (Nikkei "VIX").

Table 4: Derivative products

Index	Nikkei 225	MSCI Japan	Notes
Futures contracts	Y	Y*	*licensed, but no trades
Singe-stock futures	N	Y*	*available, but no trades
Leveraged, inverse, volatility, etc.	Y	N	

Source: AltaVista Research and Bloomberg
Note: As of September 30, 2014

Obviously, not every investor is looking to hedge his or her exposure, but even buy-and-hold investors may benefit from the availability of such hedging products, because the market makers who buy and sell ETFs certainly seek to hedge, and their costs are reflected in the bid/ask spread on those securities.

Government support measures

In 2010, the Japanese government embarked on a mission to support equity prices via direct share purchases. The Government Pension Investment Fund increased its target allocation towards equities significantly (although specific targets have not been announced), and the Bank of Japan instituted a program to purchase ETFs. Purchases have been increasing since then (Figure 10), and most recently the BOJ committed to buying up to ¥2 trillion per year.

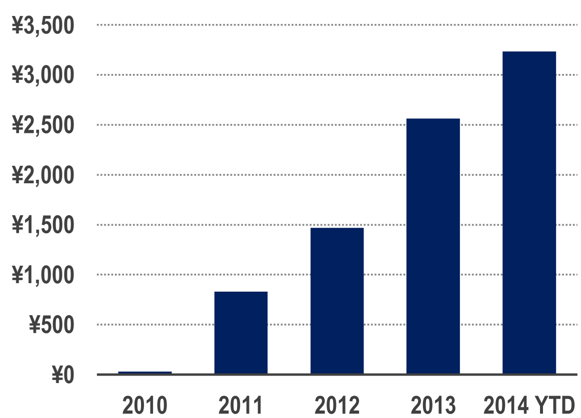
The bulk of these purchases flow into the five ETFs listed on the Tokyo Stock Exchange tracking the Nikkei 225. According to the BOJ's terms and conditions for ETF purchases, eligible ETFs must track either the Nikkei 225 or TOPIX (Tokyo Stock Price Index)—another widely-followed local benchmark—and purchases must be spread in proportion to each ETF's market value.

Based on aggregate assets for funds tracking the TOPIX and the Nikkei 225, we calculate that roughly 54% of BOJ purchases are in funds tracking the Nikkei, and 46% are in funds tracking the TOPIX (Figure 11). The TOPIX is a float-adjusted, cap-weighted index of all the shares listed on the first section of the Tokyo Stock Exchange, representing some 1,700 stocks. By definition, every stock in the Nikkei 225 also appears on the TOPIX.

One might think of the impact of the BOJ's support efforts in this way: funds are spread far and wide through the stock market via TOPIX-tracking ETFs; then the 225 stocks in the Nikkei get *additional* demand from BOJ buying via Nikkei-tracking ETFs. Thus Nikkei 225 constituents could benefit disproportionately from the government's support measures. And because the Nikkei is price-weighted, smaller companies have to absorb the extra BOJ allocation. No wonder Nikkei stocks trade at premium multiples!

Leaving aside the wisdom of such government ownership, the phrase "Don't fight the Fed" comes to mind, only adopted for our purposes as "Don't fight the BOJ." Whether or not the Bank of Japan is ultimately successful buoying equity markets via its ETF purchases, it is a major marginal buyer of Nikkei stocks to a greater extent than it is to stocks in the MSCI Japan Index. At least until the BOJ starts to unwind its ETF purchases.

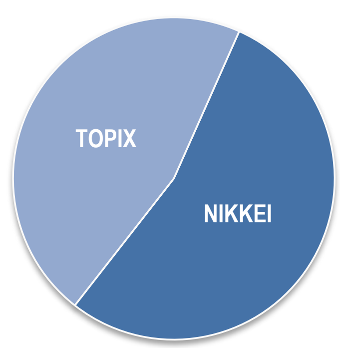
Figure 10: Bank of Japan ETF Ownership
Billions of Yen



Note: As of September 30, 2014

Source: Bank of Japan

Figure 11: BOJ ETF Buying by Index
Nikkei 225 vs. TOPIX



Note: Based on BOJ ETF purchase terms & conditions, and current market size of all TSE-listed ETFs tracking each index as of September 30, 2014. Numbers are approximations; actual breakdown not disclosed.

Source: AltaVista Research

Parting Thoughts

There is nothing sacred about traditional, market cap-weighted benchmark indices, and other index methodologies can hold plenty of appeal for investors. One of the potential advantages of index-tracking investing is the transparency with respect to constituents, which makes it possible for investors to examine and decide for themselves which index best suits their individual objectives.

The price-weighted Nikkei 225 Stock Average may seem to be a bit of an anachronism in a world dominated by cap-weighted indices, but like the Dow Jones Industrial Average in the U.S., the index occupies the "pole position" among indices with the Japanese investing public. However in the U.S., most investors get exposure to Japanese equities via the cap-weighted MSCI index.

While both indices represent a well-diversified portfolio of Japanese large cap stocks, there are important differences between the two. Most notably, the Nikkei is considerably less concentrated in Financials, giving it less exposure to Japan's "zombie banks." And the Nikkei's price weighting means that it is not dominated by mega-cap issues, and has comparatively more exposure to smaller, faster growing, large cap firms. As a result, in aggregate investors have awarded stocks in the Nikkei index higher valuation multiples than those in the MSCI index. Which index is more appropriate for an investor may come down to personal preferences regarding growth and value.

However, now that there is an ETF tracking the Nikkei there are several practical considerations that may prompt a switch. The first is that the wide availability of derivatives tied to the Nikkei index facilitates hedging and risk management for investors who are so inclined. The second is the Bank of Japan's market support efforts via purchases of Tokyo-listed ETFs. Because of the program's structure, this disproportionately benefits stocks in the Nikkei index.

While it remains to be seen whether *Abenomics* will be successful breaking the country out of its long slump, many investors will nonetheless want to maintain exposure to the world's third largest economy. Thanks to growth and popularity of index investing, they now have many choices as to how to do that

Important Disclosures

Investing involves risk and can include loss of principal. Additionally, investments in international securities may involve risk of capital loss from unfavorable movements in currency valuation, differences in generally accepted accounting principles, and from geopolitical and risks specific to a particular region or country. Securities focusing on a single country may experience higher volatility.

The fund is comprised of securities of companies that are traded on the Tokyo Stock Exchange and domiciled in Japan. The risks of investing in the Japanese market include risks of natural disasters, lack of natural resources, reliance on trading partners, national security, unpredictable political climate, large government debt, currency fluctuation and an aging labor force. The realization of such risks could have a negative impact on the value of securities of Japanese companies.

In addition the three largest sector concentrations of the Fund are consumer discretionary, industrials and information technology sectors. Concentrated Fund investments will subject the Fund to a greater risk of loss as a result of adverse economic, business or other developments that if its investments were diversified across many different industry sectors.

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Shares of MAXIS® Nikkei 225 Index ETF are bought and sold at a price determined in the market (not NAV) and are not individually redeemable with the fund. The market price of the fund is the current price at which shares can be bought or sold on an exchange. Net Asset Value is calculated daily at the market close and is the total value of all securities in the fund and generally expressed on a per share basis.

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AltaVista RESEARCH

243 Fifth Avenue Suite 235
New York, NY 10016
T 646.435.0569 | F 646.827.9500