A closer look at CRSP

Vanguard commentary March 2013

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Executive summary. Vanguard's decision to select the Center for Research in Security Prices (CRSP) as the benchmark provider for 16 U.S. stock and balanced index funds came down to two key factors—costs and expertise.

As the differences between providers over index construction practices have narrowed in recent years, costs have become an increasingly important factor in this decision. One of the costs in managing index funds is licensing fees paid to providers. These costs have been rising in recent years and by locking in long-term agreements with CRSP, we expect these changes to realize considerable savings over time that can be passed on to shareholders in the form of lower expense ratios.

But CRSP's unique capabilities and considerable expertise in indexing were also important factors in our decision.

This commentary takes a closer look at CRSP as an organization, its unique areas of expertise, and why we think CRSP is well positioned to provide high quality indexes at the lowest possible costs to investors.

Learn more about CRSP and their indexes

For more information about CRSP, including fact sheets, methodology, index constituents, and performance, visit their website at **www.crsp.chicagobooth.edu.**

In 2013, Vanguard will be changing benchmarks for 16 U.S. stock and balanced index funds to indexes developed by the Center for Research in Security Prices (CRSP) at the University of Chicago Booth School of Business. The initiative marks CRSP's first venture into the world of real-time investable indexes.

Figure 1. Vanguard funds tracking new CRSP benchmarks

Total Stock Market index funds
Mega-Cap index funds
Large-Cap index funds
Mid-Cap index funds
Small-Cap index funds
Balanced Index funds

As the first investment management firm to use CRSP benchmarks, we have been asked why an organization relatively unknown to many investors would be tapped as the benchmark provider for some of our largest, most prominent index funds?

The primary reason for selecting CRSP is the opportunity to lock in long-term licensing agreements, which should generate considerable cost savings that can be passed on to investors. But CRSP's unique capabilities and considerable expertise in indexing were also important factors.

Industry convergence makes controlling costs more critical

As a manager of index funds for more than 35 years, Vanguard has been a leader in developing best practices for benchmark providers. Until recently, indexes from various providers were constructed differently, often leading to highly contrasting results—even when measuring similar market segments. But during the past decade, the methodologies of prominent index providers have converged, alleviating many of the challenges faced by investors when evaluating similar indexes from different providers.

As differences in benchmark construction practices have narrowed, the decision over benchmark selection is based increasingly on costs. One of the costs in managing index funds is licensing fees paid to providers. The costs associated with licensing fees have been rising as a percentage of total fund expense ratios and now represent a larger portion of expenses that investors pay to hold index funds.

By locking in long-term licensing agreements with CRSP, we expect the changes to our 16 domestic index funds to result in considerable cost savings over time, which can be passed on to shareholders in the form of lower expense ratios.

Who is CRSP?

As one of 11 research centers at The University of Chicago Booth School of Business, CRSP has more than 50 years of academic and research index experience and is a trusted source of historical U.S. stock market data spanning nearly 90 years. Considered the premier data provider by many in academic, government, and institutional investment circles, CRSP's data has been the basis for some of the most seminal research over the past half-century on the return and risk relationships inherent in U.S. stock market investing.

With more than 500 clients worldwide and leadership and advisory teams that include financial scholars Eugene Fama, John Heaton, and Lubos Pastor, CRSP clearly has extensive experience in analyzing stock market data and producing stock indexes that accurately reflect conditions in specific market segments.

To evolve and refine its research capabilities, CRSP has developed indexes that money managers, such as Vanguard, could use as benchmarks for investment products. Expanding its role to include investable indexes allows CRSP to pursue new fields of study, including market microstructure and price discovery.

Index construction

CRSP adheres to all the hallmarks of effective index construction, starting with an objective, rules-based methodology so there's no ambiguity about including or excluding a stock from a benchmark. Like other leading providers, CRSP uses a quarterly reconstitution process with gradual migrations as stocks move among the style boxes.

CRSP's methodology includes the following industry best practices

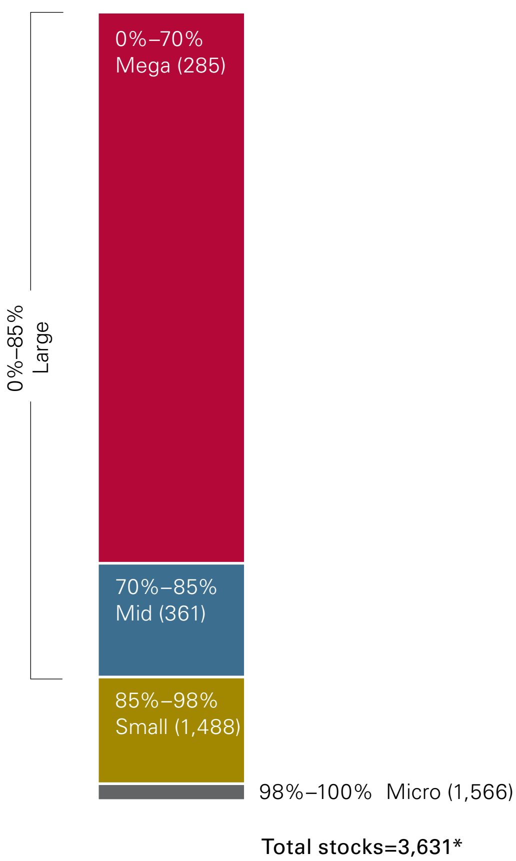
- Index construction based on objective rules.
- Float adjustments reflect only available shares.
- Overlapping buffer zones around market capitalization breakpoints.
- Multiple criteria to identify growth versus value.
- Gradual and orderly rebalancing to reflect market changes.

Source: Vanguard, 2013.

In addition, CRSP also offers the following features commonly associated with a leading benchmark provider to lower transaction costs, reduce turnover, and maintain style purity:

- Buffer zones around market-cap breakpoints to prevent abrupt moves back and forth between cap-size segments, such as small-cap and mid-cap.
- Float-adjusted shares or shares available to the broader investing public.
- Multiple criteria for determining whether a security is in a growth or value category.

Figure 2. CRSP determines index holdings based on cumulative market-cap rankings



*Note: Due to CRSP's packeting approach to migrating stocks along the market-cap spectrum, individual securities may be included in more than one market-cap size, resulting in a sum of the securities in the indexes greater than the total number of invested securities.

Source: CRSP. Data as of January 31, 2013.

Like any representative market benchmark, CRSP's indexes are market-capitalization weighted. So the weights of the companies in the index reflect their weights within their respective investment universe as determined by all investors' assessments of the value of those securities.

Like the returns of other leading providers that are highly correlated with one another, the returns of CRSP Indexes also produce high correlations with those of their peers.

Because CRSP benchmarks are similar to the equity indexes of other providers, there won't be any changes to the investment objectives of our funds or their asset allocations or strategies. But there are a few key differences that distinguish CRSP, which we believe will result in better benchmark construction and investment solutions.

Unlike other domestic providers, CRSP doesn't use a fixed number of names to construct an index. Instead, it ranks every stock by market capitalization and then forms its indexes based on specific percentages of the market. For example, under CRSP's approach, the top 70% of the market represents the mega-cap universe. And the next 15% of the market-cap spectrum represents CRSP's mid-cap universe. (See Figure 2.)

The number of names in a benchmark will vary from quarter to quarter. But we consider CRSP's percentage-based approach, which is more common in stock benchmarks outside the United States, an effective strategy. Because the number of stocks in the entire market can change significantly over time, the characteristics of a benchmark's market coverage can shift even more dramatically with the traditional approach of a fixed number of names.

As a result, Vanguard finds that CRSP's percentage approach more accurately covers each market segment over the long term.

CRSP also has designed a securities migration approach, called packeting, which lowers turnover and minimizes transaction costs. Packeting allows holdings to be shared between two indexes. A company with a changing market capitalization is moved in separate stages or packets to the next index through a shared market-cap band between them. This helps lower turnover in an index by avoiding the need to move a company all at once when its market-cap changes.

A deep and talented team

After partnering with CRSP for three years to exchange ideas on index construction, Vanguard has been most impressed with CRSP's organizational capabilities, including the experience and depth of its team.

With more than 70 full-time staff members and nearly half of them dedicated to managing the investable indexes we use, CRSP is a very stable, experienced organization with access to many of the world's leading financial experts through its association with the University of Chicago Booth School of Business. David Barclay, CRSP chief operating officer, has been with the organization for more than a decade.

In addition, CRSP's index operations team includes highly-educated and experienced individuals, including several who hold M.B.A. degrees and CFA® designations.

Through decades of experience producing research indexes, CRSP has refined its expertise and processes and applied them to the development and maintenance of investable indexes. CRSP is able to process and communicate corporate actions to clients in a timely manner and update changes to its benchmarks four times a day, a capability equal to that of other leading providers.

We're confident that CRSP produces the best investable indexes at the lowest costs to our shareholders. Through our relationship with CRSP, we believe we're better positioned to accomplish this important objective that remains at the forefront of our mission.

CRSP INDEXES

John C. Heaton is Joseph L. Gidwitz Professor of Finance and Deputy Dean for Faculty at the University of Chicago Booth School of Business. Professor Heaton studies asset pricing, portfolio allocation, and time-series economics. He first became drawn to this area because he was "intrigued by the idea of understanding economic phenomena both to guide policy and to help people make better decisions." His research in these areas has earned him numerous fellowships, including an Alfred P. Sloan Research Fellowship from 1993 to 1995, a National Science Foundation Fellowship from 1993 to 1998, and a Provost Fund Fellowship from Massachusetts Institute of Technology (MIT) from 1989 to 1992.

Prior to joining the Chicago Booth faculty in 2000, Heaton was the Nathan S. and Mary P. Sharp Distinguished Professor of Finance at Northwestern University's Kellogg School of Management. He also has held positions at MIT's Sloan School of Management and at the Hoover Institution. Heaton is a research associate of the National Bureau of Economic Research. The practical problems investors and institutions face are a key component of his teaching.

Originally from Canada, Heaton earned a bachelor's degree in commerce at the University of Windsor in 1982, a master's degree in economics from the University of Western Ontario in 1984, and a Ph.D. in economics from the University of Chicago in 1989.

Lubos Pastor is Charles P. McQuaid Professor of Finance at the University of Chicago Booth School of Business. He is also a Research Associate at the National Bureau of Economic Research and a Research Fellow at the Centre for Economic Policy and Research. In addition, he serves as an Associate Editor of the *Journal of Finance* and *Journal of Financial Economics*, as a Director of the Western Finance Association, and is a former Associate Editor of the *Review of Financial Studies*.

Professor Pastor's research focuses mostly on financial markets and asset management. His latest work analyzes the effects of political uncertainty on asset prices. He has also written on a broad range of topics such as liquidity risk, stock price bubbles, portfolio choice, performance evaluation, stock volatility, return predictability, technological revolutions, and IPOs. He has analyzed various effects of parameter uncertainty and learning in finance.

Professor Pastor has been teaching at Chicago Booth since 1999, when he obtained a Ph.D. in finance from the Wharton School at the University of Pennsylvania.

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Prices of mid- and small-cap stocks often fluctuate more than those of large-company stocks.

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