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Russell 2000® Index Construction:

When Small Caps Became a Big Problem

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The Russell 2000® Index, a subset of the Russell 3000® Index, measures the performance of the small-cap segment of the U.S. equity universe and includes approximately 2000 of the smallest securities based on a combination of their market cap and current index membership. The index is unmanaged and cannot be invested in directly. Russell Investments is the owner of the trademarks, service marks and copyrights related to its indexes. Past performance is not a guarantee of future results.

Introduction

Passive investing via exchange-traded funds ("ETFs") has risen at an enormous rate over the past several years, as evidenced by the total assets under management held by ETFs. From 2001 to 2011, ETF assets have grown from $82.9 billion to $1.0 trillion, representing a compound annual growth rate of 28.8%. During 2012, assets rose an additional 25% to $1.3 trillion[1], which, as we will see, has deep implications not only for equity ETF investors, but for *all* equity investors.

This change occurred even as total assets invested in U.S. equity mutual funds have declined since the 2008 Financial Crisis, in favor of bonds. It might be surprising that the net outflows from U.S. equity mutual funds during the first 10 months of 2012 were $99.3 billion, exceeding the $80.1 billion outflows during the same period in 2011 (for the full year of 2011, total net outflows reached $129.6 billion). At this rate, the amounts withdrawn from equity mutual funds over the 2011-2012 time frame (during which the S&P 500 Index ("S&P 500") produced positive returns) will easily eclipse the $228.5 billion of assets withdrawn during the 2008 crisis year. Yet, within a net outflow market for equity mutual funds, equity ETFs have received large scale, ongoing net inflows. One might be especially surprised that even while equity mutual funds experienced large outflows in 2008, equity ETFs enjoyed *inflows* of over $143 billion.

This may be one of the greatest flows of funds on record. This paper will examine whether this phenomenon is of sufficient scale to alter security and sector clearing prices and distort the character of the critical benchmarking tools upon which investors rely: equity indexes. If so, then the very tools that investors employ to measure risk and return have become unreliable and perhaps, in the extreme, dangerous. We will commence with two of the largest, most prominent equity indexes: the Russell 1000 and Russell 2000 Indexes ("Russell 1000 and Russell 2000," respectively), although distortions within smaller and more sector-specific indexes will be shown to be far more dramatic.

This phenomenon is not strictly a result of retail investor demand. In fact, many institutional investors, such as pension funds and endowments, have increasingly utilized ETFs as a means to gain exposure to multiple asset classes, including fixed income, commodities, and more esoteric ones such as volatility. These highly sophisticated investors utilize quantitative tools to establish asset allocation policies in accordance with Modern Portfolio Theory, which is based on a belief in the applicability of the Efficient Frontier.

Those familiar with the process of establishing institutional investment policy well understand that a portfolio's allocation into various strategies, such as "large cap equity," "small capitalization equity ("small cap")," and "foreign equity," among others, is established only after careful consideration, often utilizing complex calculations that consider data on risk, returns, and volatility. Thus, it fundamentally follows that the investment vehicles chosen to represent a desired asset class must actually own securities from that asset class; otherwise, the investment characteristics expected of the investment would not actually be represented. For example, if an investment vehicle were chosen because it purported to invest in "value" stocks, but instead held "growth" stocks, the entire investment policy would be invalidated.

[1] Source: Investment Company Institute

With regard to active managers, the discrepancy described above is referred to as "style drift." To institutional investors, style drift is a serious offense and is grounds for dismissing the investment manager responsible for perpetrating it. However, what if the style drift is committed by indexes and, by extension, index funds? What would the recourse be if the index is a nationally-recognized standard for scores of billions of dollars of investment capital? Indeed, given that investors typically do not scrutinize index funds in the same way they do active managers, one must assume that the issue of style drift is never mentioned when index funds are utilized.

Consider the Russell 1000 and Russell 2000. These are a subset of the Russell 3000 Index ("Russell 3000"), which contains the largest 3,000 companies in the United States and captures approximately 98% of the U.S. equity market. By definition, the Russell 1000 consists of the 1,000 largest companies as measured by market capitalization ("market cap"), and is universally accepted as an appropriate representation of large cap ("large cap") companies. The following 2,000 companies, that is, the 1,001st largest capitalization company to the 3,000th largest capitalization company, make up the Russell 2000, which is considered a proxy for small cap stocks. The construction of these indexes is fairly transparent and easily understood.

So far, so good. Except for one problem: the Russell 1000 doesn't actually represent the largest 1,000 companies and the Russell 2000 doesn't hold the 2,000 smallest companies. For example, the last company in the Russell 1000 by index weight is Groupon Inc. (Nasdaq: GRPN), which has a market cap of $3.14 billion.[2] The largest security in the Russell 2000 by index weight is Ocwen Financial (NYSE: OCN). Its market cap is $4.72 billion, or 1.5x as large as Groupon. On a float-adjusted basis (which is the market cap excluding shares held by company insiders), the discrepancy is even more glaring. Groupon's float-adjusted market cap (i.e. the total market cap of its equity not held by insiders) is $1.25 billion, while Ocwen's is $2.83 billion, or about 2.25x as large. Can one persuasively argue that Groupon deserves to be in the large cap index and Ocwen Financial in the small cap index?

Lest one suspect that this discrepancy is an isolated event, expanding the observation to the bottom 50 companies in the Russell 1000 and the top 50 companies in the Russell 2000 yields a similar conclusion. The combined market cap of the bottom 50 companies in the Russell 1000 totals $110 billion. In contrast, the top 50 companies in the Russell 2000 have an aggregate market cap of $136 billion.

How, one might reasonably ask, can the aggregate market cap of the top fifty companies in the small cap index exceed the aggregate market cap of the bottom fifty components of the large cap index?

Clearly, a distortion exists in the construction of the Russell indexes (and, we suspect, in many others) that is not recognized by the investment community. Although the construction of these indexes is simple in theory, it is more complex in practice. The result is that investment products are not quite what they purport to be. Given the vast sum of investment dollars affected, which measures in the trillions[3], this is a serious issue that requires study.

[2] References to market prices are as of December 14, 2012.
[3] Russell reports assets under management of $159.1 billion, and $3.9 trillion of assets invested in products that are benchmarked to the Russell U.S. indexes.

Therefore, this paper attempts to provide greater clarity with regard to the risks lurking in index-based passive investment products—risks that are not immediately obvious even to professional investors. However, because this paper is intended to be introductory, and the subject matter is complex, we will only touch on the most glaring problems, with less breadth or depth than is truly required. We will explore the central theme—distortions in index construction—as well as highlight a number of other, no less serious, issues arising from the ETF phenomenon.

Index Construction and Methodology According to Russell Investments

In order to highlight the distortions in index construction, one must first be familiar with their stated methodology. In the case of Russell Investments ("Russell"), the creator of the Russell indexes, the Russell 3000 (and by extension, the Russell 1000 and Russell 2000) methodology is disclosed in the paper "Russell U.S. Equity Indexes Construction and Methodology."[4]

According to Russell, the indexes "are constructed to be unbiased and comprehensive, with each index incorporating the entire market segment it is designed to represent." Additionally, the process is intended to be transparent and rule-based, in that all rules regarding the construction and maintenance of the indexes are published and publicly available. The indexes are designed to be a comprehensive representation of the investable U.S. equity market and to serve three main purposes: to act as performance standards for active managers, to serve as proxies for asset allocation purposes, and to become purchasable and replicable vehicles for passive investment strategies.

To ensure that the market segments are represented accurately, the indexes are reconstituted—that is, rebuilt—annually. This allows for the inclusion of securities in the appropriate market cap (and style) index as they change in size and style over time. We will see that the annual reconstitution is the starting point of the distortion. One will also observe that most of the steps outlined below seem entirely straightforward and logical.

Basic Methodology

Index construction begins with the Russell 3000 Extended ("Russell 3000E"), which is intended to be the broadest U.S. index and is comprised of the largest 4,000 U.S. companies. It is from this comprehensive universe that the various domestic Russell indexes are created, including the similarly-named Russell 3000, which holds the largest 3,000 securities. All companies that are determined to be part of the U.S. equity market are included in the Russell U.S. indexes. Those determined to be non-U.S. are included in the Russell Global ex-U.S. Index.

Inclusion in the U.S. index can be determined based on a number of criteria. These are:

- Home-country indicator—if a company incorporates in, has a stated headquarters location in, and also trades in the U.S., it is assigned to the U.S. index; however, ADRs and ADSs are not eligible.
- Trading requirement—all securities for inclusion must trade on a major U.S. exchange; bulletin board, pink sheet or over-the-counter traded securities are not eligible for inclusion.
- Minimum closing price—a stock must have a closing price at or above $1.00 on the last trading day in May.

[4] http://www.russell.com/indexes/data/US_Equity/russell_US_indexes_methodology.asp

- Minimum total market cap—companies with a total market cap of less than $30 million are not eligible.
- Minimum float requirement—companies with less than 5% available float (those shares available to the public; i.e. excluding shares owned by insiders/management) will not be eligible for inclusion.
- Corporate structure—companies with the following structures are excluded from inclusion: royalty trusts, U.S. limited liability companies, closed-end investment companies (although business development companies are eligible), blank-check companies, special-purpose acquisition companies, and limited partnerships.
- UBTI—companies that produce unrelated business taxable income ("UBTI") are restricted from inclusion in Russell U.S. indexes.
- Share exclusion—the following share types are not eligible for inclusion: preferred and convertible preferred stock, redeemable shares, participating preferred stock, warrants, rights, and trust receipts.

Once eligible members are identified, Russell calculates the market cap of each security and sorts them in descending order. Companies number 1 through 1,000 are then included in the Russell 1000, which is the company's large cap index offering. Companies number 1,001 through 3,000 are allocated to the Russell 2000, the company's small cap index. Numbers 2,001 through 4,000 become members of the Russell Microcap Index (i.e. the smallest 1,000 securities in the Russell 2000 plus the next 1,000 securities).

The market cap level that separates the 1,000th and 1,001st company is deemed the "breakpoint" between the Russell 1000 and Russell 2000. Given that the breakpoint is based upon the demarcation line between companies 1,000 and 1,001, and not a predetermined market cap level, the breakpoints vary year to year, as market caps invariably fluctuate. This is evident from the following table.

Exhibit 1: Historical Breakpoints for Russell 1000/Russell 2000

Year	1,001st Breakpoint
2012	$ 1,943,992,920
2011	$ 2,066,827,500
2010	$ 1,714,702,220
2009	$ 1,296,536,150

Source: ITG

Accordingly, Russell's definition of large cap stocks, as expressed in the Russell 1000 has ranged from as low as $1.29 billion to as high as $1.94 billion within the past four years. Investors typically define large cap stocks as companies with market caps over $10 billion. If this definition is used, then the Russell 1000 represents a deviation from the commonly accepted notion.

The Russell indexes follow market cap weighting rules, which means that the index weighting of each member is based upon the size of its market cap relative to the entire universe. In such a scheme, the largest companies (i.e. Exxon Mobil Corp. and Apple Inc.) have a commensurate

weighting in the indexes, with an additional proviso that the weightings be adjusted to reflect free float.[5] The method by which this is achieved is as follows:

- Sort the Russell 3000 members in descending order by total market cap.
- After membership is determined, adjust a security's shares to include only those shares available to the public.
- Calculate the total market cap of the Russell 3000 by summing all members' float-adjusted market caps.
- Calculate the percentiles for each company in the Russell 3000 by dividing the float-adjusted market cap associated with each member by the total market cap of the Russell 3000.

Within the index world, the adoption of float-adjusted ranking is relatively new and represents a material methodological change. Although correlation is not necessarily indicative of causation, it is interesting to note that several major index providers moved to float-adjusted weightings within a few years of one another, just as the flow of capital into ETFs began to surge. For example, FTSE, the British-based provider of global indexes, moved to a free float methodology in 2000. In 2002, the investment analytics and index company MSCI made the change. This was followed by Standard & Poors, which made the decision to move to a free float system for its U.S. indexes, including the S&P 500, S&P MidCap 400, and the S&P Small Cap 600 Indexes, in 2005. Between 2000 and 2005, ETF assets under management swelled from $65.5 billion to $300.8 billion, a 4.5-fold increase. There are important implications of such methodological changes that are not immediately obvious.

One will therefore find that the companies at the top of the indexes virtually dominate the rest of the index members. For example, the top 10 companies in the Russell 1000, combined, represent 17% of the index, while the bottom 100 have an aggregate weight of only 0.8%, which equates to less than 1 basis point, or 1/100th of 1%, each.

Reconstitution

The process by which the indexes are constructed occurs once every year, which is called the Russell Reconstitution, a rebalancing in layman's terms.

Reconstitution begins in May. On the last trading day in May, all of the eligible securities are ranked by their total market cap, in accordance with the process delineated above. In the beginning of June, preliminary lists for the additions and deletions to the indexes are communicated to the marketplace. In late June (June 22nd in 2012), the changes go into effect.

The exception to the reconstitution process involves corporate actions that occur between the rebalancings. For example, securities that leave an index for any reason (i.e. mergers, acquisitions, bankruptcy, among others) are not replaced. Specifically in mergers, the company that survives remains in the index, with the acquired company's market cap moving to the acquiring company's stock. Additionally, newly-created companies following spin-offs and initial public offerings are added as they occur, provided they meet the requirements of the index.

[5] The purpose of this adjustment is to exclude the capitalizations that are not available for purchase and therefore not part of the investable opportunity set.

Overall, the methodology that Russell follows in constructing its indexes is fairly straightforward. However, it did introduce a slight change—yet one with great implications—in 2007. Prior to that year, Russell followed a "hard cutoff," in that the ranking was strictly arbitrary. In other words, the 1,001st stock in the ranking became the first stock in the Russell 2000.

In 2007, Russell began to use a "capitalization band," in which the company retained the flexibility to override the process. It works as follows: Russell calculates a range of five percent around the newly determined market cap breakpoints, this being a range of 2.5% above and 2.5% below the breakpoints. Those companies that would automatically be deleted from an index due to a change in their ranking (e.g., from #995 [Russell 1000] to #1,050 [Russell 2000]), would stay in the current index. Such banding, according to Russell, is intended to reduce "unnecessary turnover."

Theory versus Practice

"In theory there is no difference between theory and practice. In practice there is."
-Yogi Berra

In theory, if one desired to replicate the Russell 1000/2000/3000, it would be a relatively straightforward exercise, given the rules that must be followed. Each company would be listed in order of its market cap (float-adjusted), and one could easily discern where the breakpoint should be.

However, if one were to examine Russell's own data, one would find that the theoretical list and the actual list diverge markedly, as shown in the following table:

Exhibit 2: Russell Index Historical Market Capitalization Ranges (1995-2012)

	Russell 3000		Russell 1000		Russell 2000	
	Hi	Lo	Hi	Lo	Hi	Lo
2012	$ 540,213	$ 101	$ 540,213	$ 1,354	$ 2,608	$ 101
2011	411,180	130	411,180	1,624	2,971	130
2010	283,061	112	283,061	1,256	2,274	112
2009	338,408	78	338,408	829	1,688	78
2008	468,981	167	468,981	1,363	2,751	167
2007	468,500	262	468,500	2,500	2,500	262
2006	368,500	218	368,500	1,970	1,960	218
2005	386,900	183	386,900	1,800	1,800	183
2004	317,800	176	317,800	1,600	1,600	176
2003	286,600	117	286,600	1,200	1,200	117
2002	309,500	128	309,500	1,300	1,300	128
2001	486,700	147	486,700	1,400	1,400	147
2000	520,200	178	520,200	1,600	1,500	178
1999	407,200	178	407,200	1,400	1,300	178
1998	271,600	222	271,600	1,400	1,400	222
1997	198,000	172	198,000	1,100	1,100	172
1996	138,000	162	138,000	1,000	1,000	162
1995	98,400	104	98,400	748	750	104

($ in millions)
Source: Russell Investments

The above exhibit shows that from 1995 until 2007, the separation between the Russell 1000 and Russell 2000 was discernible: the low range of the Russell 1000 matched very closely to the high range of the Russell 2000 for each respective year. For example, in 2006, the Russell 1000 contained companies with a market cap of $368.5 billion at the upper end and $1.97 billion at the lower end. The Russell 2000 then contained companies with market caps of $1.96 billion at the upper end and $218 million at the lower end. These are the types of ranges one would expect.

However, following the introduction of banding, the market cap ranges between the Russell 1000 and Russell 2000 began to overlap. During 2008, the Russell 1000 contained companies with a market cap of as little as $1.36 billion. Meanwhile, the Russell 2000 held companies with market caps of as much as $2.75 billion. In other words, the small cap index included companies that were almost twice as large as those in the large cap index. As a result, the indexes are no longer true to their original mandates.

This naturally leads to the question: "Why have they changed?"

Answer: Because they are no longer theoretical constructs; they are now substantial asset management businesses.

The Transformation of the Index into a Business

Recall that Russell cites three specific goals for its indexes:

1. to act as performance standards for active managers
2. to serve as proxies for asset allocation purposes, and
3. to become purchasable and replicable vehicles for passive investment strategies.

Historically, the index industry fulfilled the three purposes to varying degrees, with the greatest emphasis on being a performance standard for active managers. This purpose is self-explanatory: without a credible benchmark, it is difficult for investors to evaluate their investment managers. As well, the Russell indexes were utilized as proxies for asset allocation purposes. It is for this reason that Russell offers multiple indexes: by combining groups of equities with different characteristics (i.e. small cap and large cap; domestic and foreign), diversification can presumably be achieved, and in doing so, returns can be enhanced and risk reduced for the entire investment portfolio.

However, the index industry has increasingly evolved from one of measurement into one of providing investment products—the third leg of the index business "stool." Although passive investing has existed for many years, such as through index mutual funds, over the last several years it has virtually exploded with the rise of ETFs. According to the Investment Company Institute, in only five years (2006-2011), assets under management in equity ETFs essentially doubled, from $387.3 billion to $754.4 billion, representing a compound annual growth rate of 14.2%. The benchmarks are now vigorously competing for investment dollars with active managers. As the following table will illustrate, the strategy is winning.

Exhibit 3: Net Cash Flows (2006-2011)

	Net New Cash Flows	
Year	Equity Mutual Funds	Equity ETFs
2011	$ (129,650)	$ 68,585
2010	(36,910)	80,031
2009	(138)	42,086
2008	(228,498)	143,644
2007	74,151	128,116
2006	148,494	59,792

($ in millions)

Source: Investment Company Institute

With this transformation, distortion of the index itself is unavoidable, because indexation as a business is a low-fee endeavor. The expense ratio of the iShares Russell 2000 Index (ticker IWM), for instance, with $15 billion of AUM, is all of 0.2%. Accordingly, in order to remain a viable business, the indexes must be highly scalable. A given ETF's asset gathering capacity, though, will be limited by its least liquid member.

Let's illustrate with a simplified example: an ETF with, say, 100 constituents, all equally weighted at 1%, its smallest constituent having a $150 million market cap, and limited to owning not more than 4.9% of a constituent's shares. The allowable limit for each holding would then be $7.35 million[6]. This ETF will be able to accept only $735 million of assets.[7]

If the next-largest constituent has a $300 million stock market cap, and if the rule set can be altered to exclude the smallest company, then the asset gathering limit rises to $1.5 billion. Alternatively, if that smallest company has inside ownership of 50%, and if the ETF adopts a float-adjusted weighting methodology, then it can be reduced from a 1% to 0.5% position, and the asset gathering limit again rises to $1.5 billion. Thus, it is the liquidity issue that influences index construction, and the fixed mechanical rules are not really fixed anymore.

What is the result? Those companies that belong at the top of the Russell 2000, but which have limited float, are instead placed at the bottom of the Russell 1000. In this way, the weighting of the security (and thus the amount of stock required to be traded) is reduced greatly, since the indexes are capitalization weighted. Whereas the top 100 companies in the Russell 2000 typically have an average weighting of approximately 19 basis points, the bottom 100 companies in the Russell 1000 have weightings of less than one basis point.

In return, companies that would normally belong at the bottom of the Russell 1000 but which have ample liquidity are moved into the top of the Russell 2000, where the weighting is some 20 times larger than if they were in their proper place in the Russell 1000. But even this does not fully capture the potential rate of expansion, since there is far more money allocated to the Russell 2000 than the Russell 1000. Judging by the respective iShares ETFs, the differential is

[6] $150 million market cap x 4.9% ownership = $7.35 million.
[7] $7.35 million per holding x 100 members = $735 million.

on the order of 2.5-to-1. Effectively, then, the dollar volume of demand for companies placed at the top of the Russell 2000 is some 40x larger than if placed at the bottom of the Russell 1000.

The following table highlights a few of the companies whose placement appears to be biased in favor of the Russell 1000, even though their float-adjusted market caps would argue against their inclusion in that index.

Exhibit 4: Sample Companies in Russell 1000

Company	Market Cap	Owned by	% Ownership	Float-adjusted Market Cap
U.S. Cellular (USM)	$ 3,092.0	Telephone & Data Systems	84.3%	$ 507.2
Echostar (SATS)	2,936.9	Charles Ergen	50.6%	1,330.0
Kronos Worldwide (KRO)	1,905.4	Valhi	50.5%	340.3
Titanium Metals (TIE)	2,883.9	Various Harold Simmons Entities	54.3%	1,316.0
Clear Channel Outdoor (CCO)	2,443.4	Clear Channel Communications	88.7%	273.6

($ in millions)

Source: Bloomberg

It can be seen that these companies have substantial insider ownership, and therefore the float-adjusted market caps are substantially less than the stated market caps. Indeed, several of these (U.S. Cellular, Kronos Worldwide, Clear Channel Outdoor) have float-adjusted market caps of $500 million or less.

If these securities were instead included in the Russell 2000, it would be very difficult to execute the index along the lines of the current methodologies, since the scalability of the index would be limited by the float of these companies and others like them. However, because these securities are overshadowed by the likes of Apple and ExxonMobil, which occupy the lion's share of the aggregate market cap of the Russell 1000, they are assigned to the lower reaches of the Russell 1000, where they have essentially zero weight. Even one hundred of such companies, and even if they were all rapidly expanding and very successful, would make no statistically meaningful impact upon the performance of that index (although, within the Russell 2000, such a cohort could have a dramatic impact).

Compare the above with the following constituents of the Russell 2000:

Exhibit 5: Sample Companies in the Russell 2000

Company	Market Cap	Float-adjusted Market Cap
Pharmacyclics (PCYC)	$ 4,380.0	$ 3,476.4
Two Harbors Investment Corp. (TWO)	3,376.4	3,329.6
athenahealth Inc. (ATHN)	2,747.2	2,648.8
Dril-Quip Inc. (DRQ)	2,838.5	2,304.5
Coeur d'Alene Mines (CDE)	2,084.5	2,072.8

($ in millions)

Source: Bloomberg

Comparing Exhibit 4 with Exhibit 5, one can easily observe the inherent flaw in the actual implementation of the indexes. There is no reason—other than the attempt to accommodate massive demand—why a company such as Two Harbors, with a market cap of $3.4 billion and a float-adjusted market cap of $3.3 billion should be included in the small cap index while a company such as Kronos Worldwide, which has a market cap of $1.9 billion and a float-adjusted market cap of only $340 million, should be in the large cap index.

In the process of filling that demand, the fund flows will ultimately influence the price of the underlying stocks in significant ways. Take, for example, the following table, which contains data on the bottom 50 companies in the Russell 1000 and the top 50 companies in the Russell 2000.

Exhibit 6: Comparative Valuation Metrics

	Collective Data for the Bottom 50 of the Russell 1000		Collective Data for the Top 50 of the Russell 2000		Difference
Total Market Cap.:	$ 109,984		$ 135,540		
Total Book Value:	$ 71,182		$ 56,118		
Total Sales:	$ 94,849		$ 68,936		
Total Net Income:	$ 5,062		$ 6,595		
Price/Book Value:	1.55	x	2.42	x	56%
Price/Sales:	1.16	x	1.97	x	70%
Forward P/E:	21.73	x	20.55	x	-5%

($ in millions)
Source: Bloomberg

When comparing the Russell 1000's bottom 50 companies with the top 50 of the Russell 2000, we see that the aggregate market cap of the top 50 Russell 2000 companies actually exceeds that of the bottom 50 in the Russell 1000. As we said before, this is quite extraordinary given the market cap-based weighting rules the indexes purportedly follow.

In terms of equity valuations, the top 50 Russell 2000 companies clearly command a valuation premium. For instance, the aggregate price to book value multiple for the Top 50 is 2.4x, while the Bottom 50 trades at a much lower multiple of 1.5x. The price to sales measure is equally lopsided: the Top 50 companies have a price to sales multiple of almost 2x, which is much higher than the Bottom 50's multiple of only 1.1x. Only on the forward P/E measure are the two groups comparable, owing to a number of companies with negative earnings in the Bottom 50. If we were to exclude these unprofitable companies (since negative P/Es distort the aggregate valuation), the valuation discrepancy becomes even clearer, as shown below:

Exhibit 7: Comparative (Adjusted) Valuation Metrics

	Collective (Adjusted) Data* for the Bottom 50 of the Russell 1000		Collective (Adjusted) Data* for the Top 50 of the Russell 2000		Difference
Total Market Cap.:	$ 84,904		$ 132,690		
Total Book Value:	$ 63,292		$ 55,895		
Total Sales:	$ 77,324		$ 68,732		
Total Net Income:	$ 5,635		$ 6,650		
Price/Book Value:	1.34	x	2.37	x	77%
Price/Sales:	1.10	x	1.93	x	76%
Forward P/E:	15.07	x	19.95	x	32%

*Adjusted to exclude companies with negative earnings

($ in millions)

Source: Bloomberg

The issue of index construction is not merely academic. Companies that should be in the top of the Russell 2000 but which have fallen to the bottom of the Russell 1000 because of liquidity concerns are heavily penalized. Were they to remain in their proper location, that is, the top of the Russell 2000, their share prices would be higher, all else being equal. Conversely, companies that are fortunate enough to be placed at the top of the Russell 2000 solely because of their available float have an unfair advantage. The reason for this occurrence is that the Russell must accommodate the needs of the ETF industry.

Unintended Consequences

Aside from the problem of style drift, the way in which the Russell indexes are currently constructed also introduces other unanticipated and unintended consequences that would adversely impact returns. We highlight five that are especially relevant.

Indexes vs. Insiders

The purchase or sale of company stock by an insider, such as the chief executive officer, chairman, or founder, is a closely watched affair. Those companies in which insiders make significant purchases are considered to be attractive candidates for investment. Conversely, when insiders sell, outside observers may infer that the shares might be overvalued or that the company might be encountering problems.

This is a rational strategy that attempts to profit from asymmetric information: insiders are much more knowledgeable about the prospects of their companies than the average outside minority investor, and this information is manifest in their stock transactions. As well, one can assume that wealthy entrepreneurs and owner-operators who have personal capital at risk in their companies, tend to make a distinguished series of risk/reward decisions (i.e. capital deployment) that ultimately should result in excess share price returns over time relative to various broad market benchmarks. There is ample statistical support of this phenomenon.

According to this theory, large insider purchases should be a positive signal that argues for purchase of the shares. Yet, by the rules of the float-adjusted weighting system, the opposite

would occur. As insiders buy shares, the available float declines, prompting a reduction in the company's weighting in the index, all else equal. This is counter-rational behavior and, we suspect, is not even noticed by the index investor.

At the other extreme, when companies issue more shares, it is typically considered to be negative for existing shareholders, as dilution reduces the intrinsic value of their equity. However, an increase in a company's available shares that leads to a higher float-adjusted market cap will induce the indexes to purchase more shares, even as informed insiders sell.

Ultimately, as a result of the index methodology, the emphasis is not on the qualitative features of the index members, but simply on their liquidity.

Small Cap vs. "Small Cap"

In light of the evidence presented thus far, one might legitimately ask, "What is a small cap stock?" This question is a serious one because, if a small cap stock is merely an enterprise that has the same characteristics as a large cap stock except that it has fewer shares outstanding and is, therefore, less liquid, then the method of indexation as practiced by Russell (and others) is entirely appropriate. However, if one views small capitalization stocks as smaller businesses and, consequently, as a source of incremental optionality (as we discuss below), then it means indexation as currently practiced is far from appropriate.

In this discussion, optionality refers to the phenomenon of investing in small cap companies which become extraordinarily successful. Indeed, the allure of holding small companies lies in the possibility of producing a return on the order of 10, 20, 30, or even 40 times one's invested capital. The whole concept of small capitalization investing, therefore, is to develop a structure in which it is possible to take the risk of allowing one or more companies to flourish.

However, if the structure of the index emphasizes market cap as dictated by available float, then the same dynamic would not apply. The index would include "small caps," which would only be small caps by the narrow definition of indexation, but which are really large (or larger) companies without the same potential for expansion as true small cap stocks, as dictated by the law of large numbers. Wal-Mart has $445 billion of annual revenue, Microsoft $74 billion; it has been a long time since they were capable of a sustained double-digit rate of revenue expansion. The index-altered definition is not small cap investing in the traditional sense; it's something else, and it's not likely to produce a very robust rate of return.

Gresham's Law[8] and IPOs

The investment banking community is beginning to realize that an initial public offering ("IPO") issued with sufficient liquidity and market cap will be included in a variety of indexes. Therefore, one effectively has a mathematically certain aftermarket bid, which is a phenomenon that had not previously existed, since the construction rules, as one may recall, allow for the addition of IPOs outside of the reconstitution time frame.

[8]Gresham's law is an economic principle that states that when a government compulsorily overvalues one type of money and undervalues another, the undervalued money will leave the country or disappear from circulation into hoards, while the overvalued money will flood into circulation. It is commonly stated as: "Bad money drives out good."

If this pattern continues, it is mathematically possible that the Russell 2000 will gradually, but inexorably be populated by IPO companies. An IPO-type of Gresham's Law will crowd out the smaller cap, more reasonably valued small positions within the index.

Since index funds must follow their respective index construction rules (i.e. avoid any tracking error), they will be required to purchase such IPOs. Yet, not only would they have no information about the company in question, they would have no desire for any information other than its market cap and float. In other words, these funds would be the ultimate uninformed buyer.

Turnover as a Source of Risk

What does it mean for investors when the liquidity—the dollar volume of buying and selling—of a derivative instrument such as an ETF is greater than that of its constituent parts?

The average daily trading turnover for IWM is equal to roughly 20% of its market cap; phrased differently, annual turnover is on the order of 5,000%, which is, frankly, absolutely astounding. For 2011, ETFs alone were responsible for over $20 trillion of trading, which means that turnover for the entire group was 20x their $1 trillion of assets under management, or about 2,000%. As a result, there is greater trading volume in IWM than in many of the companies comprising it. It has been calculated that if IWM had to create a sufficient number of new units (provide liquidity) for the aggregate volume of short positions in that fund, it would take the ETF more than 180 days to buy all the component securities if it limits its buying to 10% of the average daily volume of each holding.[9] This extreme does not apply to the more liquid Russell 2000 holdings, and there are other mechanisms for providing liquidity in a continuous market, such as derivatives, but clearly the daily liquidity needs of the ETF in creating new or destroying old units cannot always be met in the open market.

Because the liquidity and daily trading volume of some of the largest ETFs now exceed the liquidity of the stocks that comprise their underlying indexes, this phenomenon has reached a critical point: indexes, which are meant to measure the performance of, and provide exposure to groups of stocks, have come to distort the prices of the stocks they are meant to measure. Paradoxically, the trauma of the 2008 financial crisis, which instigated a surge by investors into these instruments as a tool to diversify their holdings in order to reduce overall portfolio volatility has, by the magnitude of these efforts, actually contributed to the increasingly lockstep movements among indexes.

Hard Indexes vs. Soft Indexes, the Nasdaq 100 Index, and the Top-Heaviness Problem

Hard indexes and soft indexes are terms invented for this paper. A "hard index" is one with fixed mechanical rules for inclusion and weighting, such as the Russell indexes or the Nasdaq 100 Index ("Nasdaq 100"). The Nasdaq 100, it should be remarked, is deceptively simple: the 100 largest domestic and international non-financial securities (based on market cap) listed on the Nasdaq.

[9] Primary source: J.P. Morgan Equity Derivatives Strategy; cited by Harold Bradley and Robert E Litan, for the Ewing Marion Kauffman Foundation in their October 19, 2011 prepared testimony before the U.S. Senate Committee on Banking, Housing and Urban Affairs, Subcommittee on Securities, Insurance and Investments. However, the ETF Industry Organization has estimated ETFs' proportion of total notional U.S. equity volume at 33% (http://www.etf-ia.com/sites/default/files/Notional-Volume.pdf).

A "soft index" is one that allows for human judgment. The Dow Jones Industrial Average and the S&P 500 are examples of soft indexes because apart from any mechanical rules, there are committees that can decide to include or exclude given securities for those two indexes.

There is an inherent problem with hard indexes: they eventually become top-heavy. One of the constituents within the hard index is going to be the best investment, even if the index itself does not rise in value. In the case of the Nasdaq 100, that constituent would be Apple Inc. So successful was Apple that it was necessary to limit that company's weight in the Nasdaq 100. At present, its weighting in the index is approximately 16%. Were an active manager to report a 16% concentration in a single stock, it would almost certainly attract due diligence attention.

To have a single company representing 16% of an index that purports to be a diversified portfolio representing the largest companies that trade on Nasdaq is reason enough for concern. However, that's only the beginning.

It should be noted that Microsoft Corp. has a 7.5% weighting. Intel, the semiconductor company, accounts for 3.4% of the Nasdaq 100. Including Apple, these three companies are battling for dominance in the personal electronic device market. Other companies in the Nasdaq 100 that also compete in the personal computer industry include Adobe Systems (0.62% weight), Dell Inc. (0.61%), Symantec Corp. (0.44%), Seagate Technology (0.37%), NVIDIA Corp. (0.26%), Research in Motion (0.24%), and Micron Technology (0.23%).

What is the implication? It means that the Nasdaq 100, with the above companies accounting for one third of the index, is effectively a personal computer index, even though it's supposed to have much broader representation. Thus, it negates the basic conception of indexation, which is that a panoply of companies will be owned such that no single element can unduly affect the investment result. However, it is obvious here that one single investment element not only affects the result, but determines the result in every conceivable scenario. No other industry in the Nasdaq 100 is as large as that of personal computers.

Conclusion

The theory behind indexation is very simple: asset managers generally do not beat the indexes, and securities markets are generally efficient in any case. With fees and transactional friction, active managers might even subtract value.

ETFs enable investors to invest in passive indexes in an efficient manner. The advantages are well known: they have low expense ratios, are easily traded (with liquidity available throughout the day), provide broad diversification, and are tax efficient. However, much like any other investment product, buyers should conduct due diligence before purchasing.

While the concept of indexes is straightforward, implementation is another matter. There is ample evidence to suggest that, for business reasons, indexes have been manipulated in ways that belie their stated goals. However, because they are taken at face value, investors do not invest the time needed to fully understand the compromises that must inevitably be taken in order to make the product viable. In other words, what one intends to buy may not be what one actually gets, and that may mean the difference between meeting or missing one's investment goals.

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