FUNDAMENTALS

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"Some alternative beta strategies appear to fail the first part of the objective: efficient capture of a sound investment idea."

What Makes Alternative Beta Smart?

A growing variety of alternative beta strategies have come to market in recent years. Many of these strategies are purported to be "Smart Betas." Are they? What makes them smart?

According to Towers Watson (2013), a leading global investment-consulting firm, "Smart beta is simply about trying to identify good investment ideas that can be structured better... smart beta strategies should be simple, low cost, transparent and systematic." This straightforward definition indicates what investors ought to expect of a "Smart Beta." Our research suggests that many alternative beta strategies fall short of this definition. Some are overly complex and opaque in the source of their value added. Others will incur unnecessary implementation costs. Many alternative beta strategies don't seem so smart.

Sources of Value Added

A growing body of research shows that non-price-weighted strategies add value over their capitalization-weighted benchmarks.[1] The results show surprisingly consistent simulated value added for the most popular alternative beta strategies.

In an article published in the *Journal of Portfolio Management* (*JPM*), Arnott, Hsu, Kalesnik, and Tindall (2013) extend the research to a set of "sensible investment beliefs." The authors demonstrate that sensible investment beliefs, when translated into portfolio-weighting strategies, result in outperformance against the cap-weighted benchmark index—and so do the arguably nonsensical inverses[2] of those weighting strategies! The authors go on to show that even random weighting, as by Malkiel's monkey,[3] consistently outperforms a cap-weighted index.

How can seemingly sensible weighting strategies, the inverses of those strategies, and Malkiel's monkey throwing darts all consistently add value? The authors observe that all of these strategies involve rebalancing the securities in the portfolio to target weights calculated without reference to market prices. This rebalancing involves a "contra-trade against the market's price changes at each rebalancing," which "necessarily results in value and size tilts, regardless of the weighting method chosen."

Arnott et al. (2013) conclude that value and size factor exposures arise naturally in non-price-weighted strategies and constitute the main source of their return advantage. Revealingly, the authors find "that the investment beliefs upon which many investment strategies are ostensibly based play little or no role in their outperformance.... This does not mean that these strategies' outperformance is suspect. Rather, as it turns out, these investment

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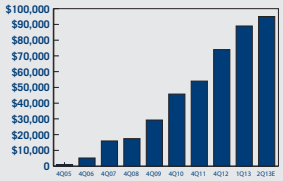

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beliefs work because they introduce, often unintentionally, value and small cap tilts into the portfolio." With these results in mind, some alternative beta strategies appear to fail the first part of the objective: efficient capture of a sound investment idea. These strategies add value, like Malkiel's monkey, simply because they rebalance to non-price weights.

Small Company Tilts

When assessing whether an alternative beta is smart, investors should examine not just average simulated returns, but also risk. Does an alternative beta strategy subject an investor to greater risk relative to the cap-weighted market portfolio? In many cases, they do because of their small company tilt.

According to Arnott et al. (2013), a simulated monkey portfolio (with annual rebalancing to a randomly selected group of stocks) provided 1.6% annual value added relative to the cap-weighted market portfolio. Before deciding to implement such a monkey portfolio, however, a prudent investor will consider its risk. The average size of the companies in a monkey portfolio is far smaller than the cap-weighted market. Smaller companies are typically riskier than larger companies. A monkey portfolio's tilt toward smaller, riskier companies increases reported annual volatility to 18.3% from the 15.3% volatility of the cap-weighted market and produces tracking error of nearly 8%. After considering these risks, an investor may conclude that the simulated simians don't seem so smart.

Some other alternative beta strategies also don't seem as smart after considering risk. An equal-weighted strategy, for example, produces a pronounced tilt to smaller companies relative to the cap-weighted market portfolio. It also produces higher volatility (17.4% versus 15.3% for the market). Both these characteristics are rather like those of a monkey portfolio. Strategies optimized specifically to reduce volatility also display prominent small size tilts and high tracking error (TE) (8% for the minimum variance strategy).

> *"Avoiding unproductive turnover is a smarter way to design a strategy."*

An investor could have achieved the simulated rebalancing return without a significant tilt to small companies and the resulting increase in volatility and tracking error. By rebalancing to the fundamental size of companies, Research Affiliates' simple and transparent RAFI® Fundamental Index® strategy[4] practically eliminates the unnecessary size tilt. This lack of a material size tilt for RAFI Fundamental Index strategies makes perfect sense; by rebalancing to fundamental measures of company size, they steer the large companies to large weights, medium companies to medium weights, and small companies to small weights.

In Arnott et al. (2013), the simulated fundamentals-weighted strategy displays 1.9% average annual value added with no material size tilt. The reported volatility of the fundamentals-weighted strategy of 15.5% is far below those of the monkey and equal-weighting strategies and approximately matches the 15.3% volatility of the cap-weighted market. The reported tracking error for the fundamentals-weighted strategy of 4.6% is far below the monkey portfolio's TE. It is lower also than the TE of equal weighting, and materially lower than those of low volatility strategies.

Trading Incurs Costs

The surprisingly strong simulated performance reported in the *JPM* article across many alternative beta strategies, and the often even stronger performance of their inverses, ignores trading costs. Careful consideration of many of these strategies reveals that much of the simulated value added is derived from the assumed costless trading of small and illiquid stocks. Some or all of that outperformance will disappear after trading costs are incurred. For this reason, investors should understand the expected source and magnitude of trading costs associated with implementing various alternative beta strategies.

Trading costs will vary across time, across markets, and with the size of assets invested in a strategy. But most of all, investors should expect trading costs to be a function of portfolio turnover and the size of the companies traded.

Rebalancing to a new group of companies (whether selected by a monkey throwing darts, a random number generator, or a computerized optimization program) generates substantial turnover at material cost. Note in **Table 1** that the simulated average turnover for an annually rebalanced monkey portfolio was 98% and for minimum variance was 48%.

Even if the selected constituents for two indices are identical, the weighting method can have a material impact on trading costs. In a 1,000 stock index,

Table 1. Characteristics of Simulated U.S. Strategies, 1964–2012

US (1964-2012)	Return	Value Added	Volatility	Tracking Error	Turnover	Dec. 2012 Market Cap ($B)
Cap-Weighted	9.66%		15.29%		4.7%	$96.95
Equal-Weighted	11.46%	1.80%	17.37%	5.00%	18.7%	$15.56
Minimum Variance	11.75%	2.09%	11.69%	8.04%	48.0%	$29.87
Average of 100 Monkeys	11.26%	1.60%	18.34%	7.76%	97.5%	$15.31
RAFI	11.60%	1.93%	15.45%	4.64%	11.5%	$82.29

Source: Research Affiliates, LLC.

liquidity and capacity are much deeper in the largest 100 companies than in the smallest 100. Size tilts don't just cause higher volatility and tracking error, but also higher trading costs. High turnover, particularly in smaller companies, isn't smart.

As Table 1 shows, the RAFI Fundamental Index strategy has relatively low turnover relative to other alternative beta strategies. Because the RAFI Fundamental Index strategy rebalances to target weights that reflect the fundamental size of the constituent companies, the turnover of its annual rebalance is isolated to the change in stock prices. The average annual turnover for the simulated fundamentals-weighted strategy was only 11.5%. In addition to keeping turnover low, this methodology cost-effectively concentrates that turnover in the largest and most liquid stocks.

Stable Target Weights

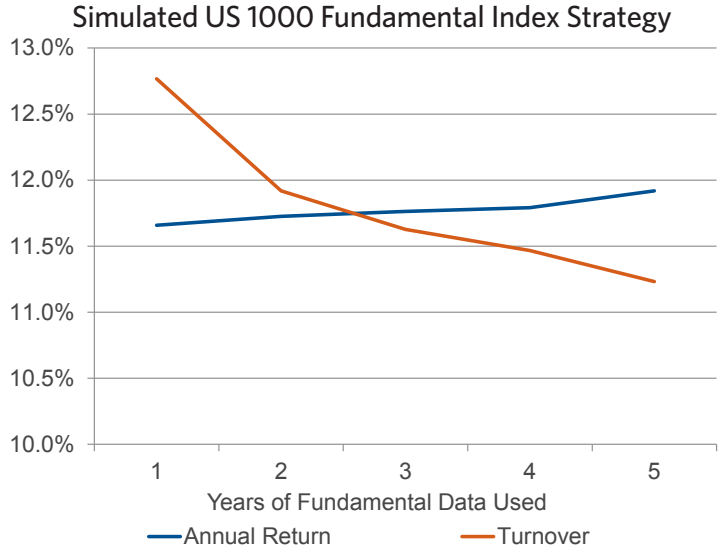
If trading incurs costs, then avoiding unproductive turnover is a smarter way to design a strategy. One way to reduce unproductive turnover is to use stable target weights. A simple way to improve the stability of target weights is to calculate the weights over longer periods of time rather than shorter periods of time.

In the case of the RAFI Fundamental Index methodology, the calculation of fundamental weights requires a choice of the fiscal period for observation of the financial measures of company size. Many financial variables, particularly the flow variables on the income statement, can be quite volatile year to year; they may even switch between positive and negative from one year to the next. As a result, calculating fundamental weights using a single year's financial measures results in relatively unstable target weights, which in turn creates unproductive turnover.

Using multiple-year averages of financial measures of company size results in more stable target weights. Rebalancing to more stable targets measurably improves performance by diminishing the correlation of the target weight to stock price movements. Companies with rising sales, cash flow, and earnings also tend to have rising stock prices and vice versa. Rebalancing to a target weight that is correlated with market price changes sacrifices some of the contra-trading opportunity.

More significantly, turnover is reduced as the observation period moves from a single year's financials to a multiple-year average. (**Figure 1**). The RAFI Fundamental Index methodology uses five-year averages when measuring a company's

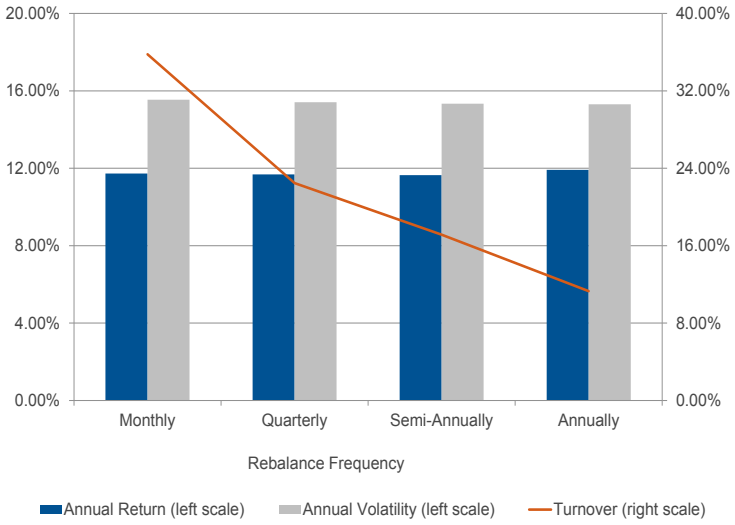
Figure 1. Averaging Fundamental Measures of Size Reduces Turnover, from 1962 through June 2013



Source: Research Affiliates, LLC.

Figure 2. Annual Rebalancing Reduces Turnover, from 1962 through June 2013

Simulated US 1000 Fundamental Index Strategies



Source: Research Affiliates, LLC.

sales, cash flow, and dividends. Book value, a stock variable, is the accumulation of all past year's retained earnings; averaging historical period observations of book value would be redundant and unnecessary.

Rebalancing Frequency

Another source of unproductive turnover is too-frequent rebalancing. The optimal frequency of rebalancing is a trade-off among several factors: the opportunity to profit from long-term mean reversion of stock prices, the cost of trading against short-term price momentum, and the cost of turnover. **Figure 2** displays the impact of varying the frequency of rebalancing on simulated return, volatility, and turnover.

By squinting at Figure 2, one can detect slight increases in return and declines in volatility (left scale) from moving toward less frequent rebalancing intervals. This result is consistent with the widely observed pattern of short-term momentum and long-term mean reversion in stock prices; frequent rebalancing is like swimming upstream against stock price momentum. But the magnitude of these differences in return and volatility are not practically meaningful.

The decline in turnover displayed on the right scale is significant. Moving from monthly to annual rebalancing reduces average annual turnover from approximately 36% to about 11%. For this reason, the RAFI Fundamental Index strategy is rebalanced only annually (even when this annual rebalance is staggered over four quarters).[5]

Selecting *and* Weighting

Selecting (not just weighting) by non-price measures of size is a source of value added. An investable stock market index normally includes only a fraction of the stocks in the relevant market. For instance, the most popular U.S. indices select 500 or 1,000 constituents from the more than 5,000 listed equity securities in the United States. Therefore, index construction typically has two primary steps: defining the securities to be included in the index (selecting) and then setting the weights for these selected index constituents (weighting). Selecting and weighting by non-price measures of size results in a surprisingly large difference in performance, as **Table 2** shows.

Why does fundamentally reweighting a capitalization index fail to capture the full return available to fundamental indexing? In a typical strategy, the overlap in constituents between a RAFI Fundamental Index strategy that selects and weights by fundamental size and a reweighted value index is approximately 80%; alternatively stated, about 20% of the constituents are different. Even though

Table 2. Selecting and Weighting is Superior to Reweighting Simulated Fundamental Index Strategies, 1962 through June 2013

Region	RAFI Fundamental Index Return	Fundamentally Reweighted Return	RAFI Fundamental Index Minus Reweighted Return	Start Year
Developed 1000	12.2%	11.8%	0.46%	1984
Dev ex US Large	12.5%	11.8%	0.68%	1984
US Large	11.9%	11.2%	0.76%	1962
All World 3000	10.2%	9.1%	1.13%	1996
Emerging Markets	16.1%	11.4%	4.76%	1996

Source: Research Affiliates, LLC.

these non-overlapping constituents are usually the smaller companies in the indices, the performance implications are material.

Comparing the difference in constituents between a RAFI Fundamental Index implementation and a reweighted index, an investor will find that companies with large fundamental size but low prices are selected into the former. Conversely, companies with small fundamental size but with high stock prices are selected into a reweighted index. Unsurprisingly, large companies with low prices tend to outperform small companies with high prices.

Conclusion

A Smart Beta strategy should be simple in structure and transparent in its source of value added, balance risk against return, and keep implementation costs low. Not all alternative beta strategies meet these tests for superior Smart Beta investing. Many alternative beta strategies are overly complex and opaque as to the sources of their value added. Strategies premised on seemingly sensible investment beliefs have been shown to add the same or more value when inverted. Thus, the investment thesis for many alternative beta strategies seems unrelated to their simulated value added. These strategies add value simply because, like Malkiel's monkey, they rebalance to non-price target weights.

"A Smart Beta strategy should be simple in structure and transparent in its source of value added, balance risk against return, and keep implementation costs low."

The design and implementation of the RAFI Fundamental Index strategy meets the standard of a Smart Beta. It delivers a full rebalancing return without a significant tilt to small companies, which is risky and unnecessary. Further, the RAFI Fundamental Index design creates stable target weights, thereby avoiding costly, unproductive turnover. Finally, selecting as well as weighting by fundamental measures of size adds value.

RAFI strategies are Smart Beta.

Endnotes

1. See Hsu, Kalesnik, and Li (2012); Chow, Hsu, Kalesnik, and Little (2011); and Arnott, Kalesnik, Moghtader, and Scholl (2010).
2. See Arnott et al. (2013) for details on the methodology and additional results not cited here.
3. Burton Malkiel (1973) asserts that "a blindfolded monkey throwing darts at a newspaper's financial pages could select a portfolio that would do just as well as one carefully selected by experts."
4. The RAFI Fundamental Index approach selects and weights companies based on their fundamental size as measured by sales, cash flow, dividends, and book value (Arnott, Hsu, and Moore, 2005). The Russell Fundamental Index Series uses three fundamental characteristics: adjusted sales, retained operating cash flow, and dividends plus buybacks.
5. A quarterly staggered rebalance spreads the turnover from an annual rebalance over four quarters by creating an index equal weighted to four sub-indexes identical in all respects except for the date of the rebalance.

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Performance Update

FTSE RAFI® Equity Index Series*

TOTAL RETURN AS OF 8/31/13	BLOOMBERG TICKER	YTD	12 MONTH	ANNUALIZED 3 YEAR	ANNUALIZED 5 YEAR	ANNUALIZED 10 YEAR	10 YEAR VOLATILITY
FTSE RAFI® All World 3000[1]	TFRAW3	11.11%	20.76%	11.98%	6.00%	10.46%	18.63%
MSCI All Country World[2]	GDUEACWF	9.23%	16.11%	12.33%	4.39%	7.94%	16.61%
FTSE RAFI® Developed ex US 1000[3]	FRX1XTR	8.98%	21.00%	8.35%	2.63%	8.96%	20.28%
MSCI World ex US Large Cap[4]	MLCUWXUG	7.49%	17.42%	9.26%	1.97%	8.26%	18.25%
FTSE RAFI® Developed ex US Mid Small[5]	TFRDXUSU	8.17%	19.44%	10.31%	7.70%	11.85%	18.85%
MSCI World ex US Small Cap[6]	GCUDWXUS	12.32%	24.72%	12.44%	5.84%	10.37%	20.01%
FTSE RAFI® Emerging Markets[7]	TFREMU	-13.39%	-3.86%	-0.75%	1.98%	16.38%	24.53%
MSCI Emerging Markets[8]	GDUEEGF	-9.94%	0.87%	1.41%	2.20%	12.53%	23.93%
FTSE RAFI® 1000[9]	FR10XTR	19.10%	25.62%	19.40%	10.60%	9.26%	17.19%
Russell 1000[10]	RU10INTR	16.69%	19.84%	18.74%	7.59%	7.50%	14.98%
S&P 500[11]	SPTR	16.15%	18.70%	18.40%	7.32%	7.12%	14.68%
FTSE RAFI® US 1500[12]	FR15USTR	21.61%	30.14%	21.26%	12.38%	11.87%	21.81%
Russell 2000[13]	RU20INTR	20.03%	26.27%	20.50%	7.98%	8.76%	19.77%
FTSE RAFI® Europe[14**]	TFREUE	9.75%	22.50%	8.28%	1.34%	8.93%	22.85%
MSCI Europe[15**]	GDDLE15	8.87%	20.03%	10.69%	1.85%	8.54%	20.00%
FTSE RAFI® Australia[16**]	FRAUSTR	-0.37%	9.86%	12.32%	8.00%	13.69%	23.83%
S&P/ASX 200[17**]	ASA51	-2.44%	7.10%	10.16%	5.35%	13.11%	24.20%
FTSE RAFI® Canada[18**]	FRCANTR	1.41%	7.59%	7.37%	5.35%	12.66%	21.17%
S&P/TSX 60[19**]	TX60AR	-1.85%	2.74%	4.92%	0.56%	11.18%	21.43%
FTSE RAFI® Japan[20**]	FRJPNTR	17.41%	29.89%	7.37%	2.02%	5.86%	16.86%
MSCI Japan[21**]	GDDLJN	14.82%	24.38%	7.80%	1.20%	4.73%	16.46%
FTSE RAFI® UK[22**]	FRGBRTR	8.15%	17.27%	12.52%	4.03%	8.48%	19.67%
MSCI UK[23**]	GDDLUK	6.45%	13.52%	11.41%	3.20%	7.94%	17.84%

*To see the complete series, please go to: http://www.ftse.com/Indices/FTSE_RAFI_Index_Series/index.jsp.

**The above indices have been restated to reflect the use of local currencies for all single country strategies and EUR for Europe regional strategies rather than USD.

Russell Fundamental Index Series*

TOTAL RETURN AS OF 8/31/13	BLOOMBERG TICKER	YTD	12 MONTH	ANNUALIZED 3 YEAR	ANNUALIZED 5 YEAR	ANNUALIZED 10 YEAR	10 YEAR VOLATILITY
Russell Fundamental Global Index Large Company[24]	RUFGLTU	11.87%	20.49%	13.70%	6.69%	10.49%	16.95%
MSCI All Country World Large Cap[25]	MLCUAWOG	8.80%	15.35%	12.13%	4.08%	7.47%	16.29%
Russell Fundamental Developed ex US Index Large Company[26]	RUFDXLTU	9.73%	21.09%	9.16%	3.10%	9.50%	18.35%
MSCI World ex US Large Cap[27]	MLCUWXUG	7.19%	17.02%	9.05%	1.68%	7.89%	18.14%
Russell Fundamental Developed ex US Index Small Company[28]	RUFDXSTU	11.59%	23.56%	12.42%	7.85%	12.13%	18.28%
MSCI World ex US Small Cap[6]	GCUDWXUS	10.08%	20.97%	11.32%	5.52%	10.27%	20.25%
Russell Fundamental Emerging Markets[29]	RUFGETRU	-8.68%	2.27%	3.42%	5.21%	16.96%	24.18%
MSCI Emerging Markets[8]	GDUEEGF	-9.94%	0.87%	1.41%	2.20%	12.53%	23.93%
Russell Fundamental US Index Large Company[30]	RUFUSLTU	18.55%	23.69%	20.06%	10.13%	9.68%	15.58%
Russell 1000[10]	RU10INTR	16.69%	19.84%	18.74%	7.59%	7.50%	14.98%
S&P 500[11]	SPTR	16.15%	18.70%	18.40%	7.32%	7.12%	14.68%
Russell Fundamental US Index Small Company[31]	RUFUSSTU	18.91%	27.57%	20.91%	12.54%	12.42%	20.80%
Russell 2000[13]	RU20INTR	20.03%	26.27%	20.50%	7.98%	8.76%	19.77%
Russell Fundamental Europe[32**]	RUFEUTE	8.52%	15.52%	8.27%	5.01%	8.38%	15.97%
MSCI Europe[15**]	GDDLE15	7.82%	13.72%	8.83%	3.80%	6.52%	14.82%

*To see the complete series, please go to: http://www.russell.com/indexes/data/Fundamental/About_Russell_Fundamental_indexes.asp.

**The above indices have been restated to reflect the use of local currencies for all single country strategies and EUR for Europe regional strategies rather than USD.

Performance Update

Fixed Income/Alternatives

TOTAL RETURN AS OF 8/31/13	BLOOMBERG TICKER	YTD	12 MONTH	ANNUALIZED 3 YEAR	ANNUALIZED 5 YEAR	ANNUALIZED 10 YEAR	ANNUALIZED 10 YEAR VOLATILITY
RAFI® Bonds US Investment Grade Master[33]	—	-3.28%	-2.15%	4.27%	7.67%	5.86%	5.89%
ML Corporate Master[34]	C0A0	-3.25%	-1.35%	4.35%	7.22%	5.56%	6.03%
RAFI® Bonds US High Yield Master[35]	—	0.81%	4.68%	9.16%	11.99%	9.75%	9.50%
ML Corporate Master II High Yield BB-B[36]	H0A4	1.85%	6.35%	9.05%	9.85%	8.17%	9.16%
RAFI® US Equity Long/Short[37]	—	9.78%	18.25%	4.01%	9.30%	5.62%	11.21%
1-Month T-Bill[38]	GB1M	0.02%	0.05%	0.06%	0.11%	1.53%	0.52%
FTSE RAFI® Global ex US Real Estate[39]	FRXR	0.65%	19.18%	10.20%	5.75%	—	—
FTSE EPRA/NAREIT Global ex US[40]	EGXU	-3.62%	10.41%	8.77%	3.36%	—	—
FTSE RAFI® US 100 Real Estate[41]	FRUR	1.67%	4.58%	14.31%	8.82%	—	—
FTSE EPRA/NAREIT United States[42]	UNUS	-0.03%	0.69%	12.71%	4.68%	—	—
Citi RAFI Sovereign Developed Markets Bond Index Master[43]	CRFDMU	-4.01%	-1.27%	3.33%	4.09%	6.13%	7.58%
Merrill Lynch Global Governments Bond Index II[44]	W0G1	-4.95%	-5.55%	1.26%	3.74%	5.21%	6.95%
Citi RAFI Sovereign Emerging Markets Local Currency Bond Index Master[45]	CRFELMU	-11.63%	-6.30%	—	—	—	—
JPMorgan GBI-EM Global Diversified[46]	JGENVUUG	-11.45%	-5.38%	—	—	—	—

Definition of Indices:

(1) The FTSE RAFI® All World 3000 Index is a measure of the largest 3,000 companies, selected and weighted using fundamental factors; (sales, cash flow, dividends, book value), across both developed and emerging markets.
(2) The MSCI All Country World Index is a free float-adjusted market capitalization weighted index that is designed to measure the equity market performance of developed and emerging markets.
(3) The FTSE RAFI® Developed ex US 1000 Index is a measure of the largest 1000 non U.S. listed, developed market companies, selected and weighted using fundamental factors; (sales, cash flow, dividends, book value).
(4) The MSCI World ex US Large Cap Index is a free float-adjusted market capitalization weighted index that is designed to measure the equity market performance of developed markets, excluding the United States.
(5) The FTSE RAFI® Developed ex US Mid Small Index tracks the performance of small and mid-cap companies domiciled in developed international markets (excluding the United States), selected and weighted based on the following four fundamental measures of firm size: sales, cash flow, dividends and book value.
(6) The MSCI World ex US Small Cap Index is a free float-adjusted market capitalization weighted index that is designed to measure the equity market performance of small cap developed markets, excluding the United States.
(7) The FTSE RAFI® Emerging Markets Index comprises the largest 350 Emerging Market companies selected and weighted using fundamental factors (sales, cash flow, dividends, book value).
(8) The MSCI Emerging Markets Index is an unmanaged, free-float-adjusted cap-weighted index designed to measure equity market performance of emerging markets.
(9) The FTSE RAFI® 1000 Index is a measure of the largest 1,000 U.S. listed companies, selected and weighted using fundamental factors; (sales, cash flow, dividends, book value).
(10) The Russell 1000 Index is a market-capitalization-weighted benchmark index made up of the 1,000 highest-ranking U.S. stocks in the Russell 3000.
(11) The S&P 500 Index is an unmanaged market index that focuses on the large-cap segment of the U.S. equities market.
(12) The FTSE RAFI® US 1500 Index is a measure of the 1,001st to 2,500th largest U.S. listed companies, selected and weighted using fundamental factors; (sales, cash flow, dividends, book value).
(13) The Russell 2000 is a market-capitalization weighted benchmark index made up of the 2,000 smallest U.S. companies in the Russell 3000.
(14) The FTSE RAFI® Europe Index is comprised of all European companies listed in the FTSE RAFI® Developed ex U.S. 1000 Index, which in turn is comprised of the largest 1,000 non U.S. listed developed market companies, selected and weighted using fundamental factors; (sales, cash flow, dividends, book value).
(15) The MSCI Europe Index is a free-float adjusted market capitalization weighted index that is designed to measure the equity market performance of the developed markets in Europe.
(16) The FTSE RAFI® Australia Index is comprised of all Australian companies listed in the FTSE RAFI® Developed ex U.S. 1000 Index, which in turn is comprised of the largest 1,000 non U.S. listed developed market companies, selected and weighted using fundamental factors; (sales, cash flow, dividends, book value).
(17) The S&P/ASX 200 Index, representing approximately 78% of the Australian equity market, is a free-float-adjusted, cap-weighted index.
(18) The FTSE RAFI® Canada Index is comprised of all Canadian companies listed in the FTSE RAFI® Developed ex U.S. 1000 Index, which in turn is comprised of the largest 1,000 non U.S. listed developed market companies, selected andweighted using fundamental factors; (sales, cash flow, dividends, book value).
(19) The S&P/Toronto Stock Exchange (TSX) 60 is a cap-weighted index consisting of 60 of the largest and most liquid (heavily traded) stocks listed on the TSX, usually domestic or multinational industry leaders.
(20) The FTSE RAFI® Japan Index is comprised of all Japanese companies listed in the FTSE RAFI® Developed ex U.S. 1000 Index, which in turn is comprised of the largest 1,000 non U.S. listed developed market companies, selected and weighted using fundamental factors; (sales, cash flow, dividends, book value).
(21) The MSCI Japan Index is an unmanaged, free-float-adjusted cap-weighted index that aims to capture 85% of the publicly available total market capitalization of the Japanese equity market.
(22) The FTSE RAFI® UK Index is comprised of all UK companies listed in the FTSE RAFI® Developed ex U.S. 1000 Index, which in turn is comprised of the largest 1,000 non U.S. listed developed market companies, selected and weighted using fundamental factors; (sales, cash flow, dividends, book value).
(23) The MSCI UK Index is an unmanaged, free-float-adjusted cap-weighted index that aims to capture 85% of the publicly available total market capitalization of the British equity market.
(24) The Russell Fundamental Global Index Large Company is a measure of the largest companies, selected and weighted using fundamental factors; (adjusted sales, retained cash flow, dividends + buybacks), across both developed and emerging markets.
(25) The MSCI All Country World Large Cap Index is a free float-adjusted market capitalization weighted index that is designed to measure the equity market performance of developed and emerging markets.
(26) The Russell Fundamental Developed ex US Large Company is a subset of the Russell Fundamental Developed ex US Index, and is a measure of the largest non-U.S. listed developed country companies, selected and weighted using fundamental factors; (adjusted sales, retained cash flow, dividends + buybacks).
(27) The MSCI World ex US Large Cap Index is a free float-adjusted market capitalization weighted index that is designed to measure the equity market performance of large cap-developed markets, excluding the United States.
(28) The Russell Fundamental Developed ex US Index Small Company is a subset of the Russell Fundamental Developed ex US Index, and is a measure of small non-U.S. listed developed country companies, selected and weighted using fundamental factors; (adjusted sales, retained cash flow, dividends + buybacks).
(29) The Russell Fundamental Emerging Markets Index is a measure of Emerging Market companies, selected and weighted using fundamental factors; (adjusted sales, retained cash flow, dividends + buybacks).
(30) The Russell Fundamental U.S. Index Large Company is a subset of the Russell Fundamental US Index, and is a measure of the largest U.S. listed companies, selected and weighted using fundamental measures; (adjusted sales, retained cash flow, dividends + buybacks).
(31) The Russell Fundamental US Index Small Company is a subset of the Russell Fundamental US Index, and is a measure of U.S. listed small companies, selected and weighted using fundamental measures; (adjusted sales, retained cash flow, dividends + buybacks).
(32) The Russell Fundamental Europe Index is a measure of European companies, selected and weighted using fundamental factors; (adjusted sales, retained cash flow, dividends + buybacks).
(33) The RAFI® Bonds US Investment Grade Master Index is a U.S. investment-grade corporate bond index comprised of non-zero fixed coupon debt with maturities ranging from 1 to 30 years issued by publicly traded companies. The issuers held in the index are weighted by a combination of four measures of their fundamental size—sales, cash flow, dividends, and book value of assets.
(34) The Merrill Lynch U.S. Corporate Master Index is representative of the entire U.S. corporate bond market. The index includes dollar-denominated investment-grade corporate public debt issued in the U.S. bond market.
(35) The RAFI® Bonds US High Yield Master is a U.S. high-yield corporate bond index comprised of non-zero fixed coupon debt with maturities ranging from 1 to 30 years issued by publicly traded companies. The issuers held in the index are weighted by a combination of four measures of their fundamental size—sales, cash flow, dividends, and book value of assets.
(36) The Merrill Lynch Corporate Master II High Yield BB-B Index is representative of the U.S. high yield bond market. The index includes domestic high-yield bonds, including deferred interest bonds and payment-in-kind securities. Issues included in the index have maturities of one year or more and have a credit rating lower than BBB-/Baa3, but are not in default.
(37) The RAFI® US Equity Long/Short Index utilizes the Research Affiliates Fundamental Index® (RAFI®) methodology to identify opportunities that are implemented through long and short securities positions for a selection of U.S. domiciled publicly traded companies listed on major exchanges. Returns for the index are collateralized and represent the return of the strategy plus the return of a cash collateral yield.
(38) The 1-Month T-bill return is calculated using the Bloomberg Generic 1-month T-bill. The index is interpolated based off of the currently active U.S. 1 Month T-bill and the cash management bill closest to maturing 30 days from today.
(39) The FTSE RAFI® Global ex US Real Estate Index comprises 150 companies with the largest RAFI fundamental values selected from the constituents of the FTSE Global All Cap ex U.S. Index that are classified by the Industry Classification Benchmark (ICB) as Real Estate.
(40) The FTSE EPRA/NAREIT Global ex US Index is a free float-adjusted index, and is designed to represent general trends in eligible listed real estate stocks worldwide, excluding the United State. Relevant real estate activities are defined as the ownership, trading and development of income-producing real estate.
(41) The FTSE RAFI® US 100 Real Estate Index comprises of the 100 U.S. companies with the largest RAFI fundamental values selected from the constituents of the FTSE USA All Cap Index that are classified by the Industry Classification Benchmark (ICB) as Real Estate.
(42) The FTSE EPRA/NAREIT United States Index is a free float-adjusted index, is a subset of the EPRA/NARIET Global Index and the EPRA/NAREIT North America Index and contains publicly quoted real estate companies that meet the EPRA Ground Rules. EPRA/NARIET Index series is seen as the representative benchmark for the real estate sector.
(43) The Citi RAFI Sovereign Developed Markets Bond Index Series seeks to reflect exposure to the government securities of a universe of 23 developed markets. By weighting components by their fundamentals, the indices aim to represent each country's economic footprint and proxies for its ability to service debt.
(44) The Merrill Lynch Global Government Bond Index II tracks the performance of investment grade sovereign debt publicly issued and denominated in the issuer's own domestic market and currency.
(45) The Citi RAFI Sovereign Emerging Markets Local Currency Bond Index Series seeks to reflect exposure to the government securities of a universe of 14 emerging markets. By weighting components by their fundamentals, the indices aim to represent each country's economic footprint and proxies for its ability to service debt.
(46) The JPMorgan GBI-EM Diversified Index seeks exposure to the local currency sovereign debt of over 15 countries in the emerging markets.

Source: All index returns are calculated using total return data from Bloomberg and FactSet. Returns for all single country strategies and Europe regional strategies are in local currency. All other returns are in USD.

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