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Responsible Investing: Delivering competitive performance

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GROWING INTEREST IN RI, BUT PERFORMANCE QUESTIONS PERSIST

Interest in Responsible Investing (RI) is growing rapidly. From 2012 to 2016, RI assets in the U.S. more than doubled to $8.72 trillion,[1] according to the Forum for Sustainable and Responsible Investment (US SIF Foundation). This represents more than 20% of assets under professional investment management in the U.S., as tracked by Cerulli Associates.

RI strategies apply various environmental, social and governance (ESG) criteria in selecting public companies for inclusion in a portfolio. The process of incorporating nonfinancial criteria restricts the range of investment opportunities, potentially limiting returns. On the other hand, companies that wisely manage ESG risks and opportunities may also improve financial measures, potentially enhancing stock performance.

EXECUTIVE SUMMARY

- Growing interest in Responsible Investing raises an important question: Does pursuing social goals — limiting the range of potential investment opportunities — require sacrificing performance?
- A Nuveen analysis of leading RI equity indexes over the long term found no statistical difference in returns compared to broad market benchmarks, suggesting the absence of any systematic performance penalty.
- Moreover, incorporating environmental, social and governance (ESG) criteria in security selection did not entail additional risk. RI indexes and their broad market counterparts had similar risk profiles, based on Sharpe Ratio and standard deviation measures.
- Although return patterns were similar over the long term, there were significant return and tracking error differences between RI indexes and broad market benchmarks over shorter periods. By narrowing the range of eligible investments, the RI process introduced biases that caused short-term index performance to deviate from broad market benchmarks, resulting in tracking error.
- RI index construction methodology is an important determinant of tracking error. Investors should consider specific ESG methodology and the relevant market benchmark when selecting an RI strategy.

The key question for investors: Does investing in an RI strategy require sacrificing performance or taking on additional risk, compared to a broad market index?

Many studies on the performance of RI mutual funds versus non-RI funds have attempted to answer this question.[2] However, the range, variety and diversity of RI fund management strategies make apples-to-apples comparisons difficult. Instead, Nuveen sought answers through a simpler comparison, analyzing the performance of several leading RI indexes versus broad market benchmarks. We focused on equity strategies because indexes with longer-term track records are readily available — and represent the majority of RI assets. (For performance of the TIAA-CREF Social Choice Equity Fund vs. the Russell 3000 Index, see Appendix 6 on page 15.) It is important to note that RI indexes themselves are not perfectly comparable, due to differences in index construction and ESG evaluation processes. However, they provide a close proxy for RI as a strategy versus the broad market.

HOW RI PERFORMED VERSUS BROAD MARKET INDEXES

We selected five widely known U.S. equity RI indexes with track records of at least 10 years: Calvert U.S. Large Cap Core Responsible Index, Dow Jones Sustainability U.S. Index (DJSI U.S.), FTSE4Good US Index, MSCI KLD 400 Social Index, and MSCI USA IMI ESG Leaders Index.[3] We compared returns for these indexes with two widely recognized U.S. equity-based indexes, the Russell 3000 and S&P 500 indexes.[4] We also examined volatility measures, and calculated Sharpe Ratios to understand risk-adjusted results. Finally, we compared index returns with respective benchmarks to determine tracking error rates. We also sought to determine whether differences in results were statistically significant or caused by random variation.

Our analysis found no statistical differences in RI index returns compared to the two broad market benchmarks.

Exhibit 1: Comparing returns of RI indexes and broad market indexes

Cumulative returns: Five U.S. RI indexes vs. S&P 500 and Russell 3000 indexes (1990 – 2017)

Data through 29 Dec 2017. Series indexed to 100, inception dates: S&P 500, Russell 3000, and MSCI KLD 400 Social, 04 May 1990; DJSI U.S., 01 Jan 1999; Calvert U.S. Large Cap Core Responsible, 28 Apr 2000; MSCI USA IMI ESG Leaders, 22 Dec 2000; and FTSE4Good US, 03 Jan 2003. MSCI indexes include aggregated, multisource histories prior to acquisition on 01 Sep 2010.

It is not possible to invest in an index. Performance for indices does not reflect investment fees or transactions costs.

Sources: FactSet Research Systems Inc., Morningstar, Inc., MSCI Inc. and Nuveen.

The result: our analysis found no statistical difference in RI index returns compared to the two broad market benchmarks. In other words, RI can achieve comparable performance over the long term without additional risk, despite using a smaller universe of securities meeting ESG criteria. Exhibit 1 illustrates the similarity of cumulative returns for RI indexes and broad market benchmarks over the long term.

RI RETURNS WERE COMPARABLE TO BROAD MARKET INDEXES

Returns for the RI indexes were similar to each other, and compared to the broad market. Ten-year average annual performance for the five U.S. RI indexes ranged from 7.67% to 9.16% versus 8.47% to 8.57% for the S&P 500 and Russell 3000 indexes, respectively. The gap between best and worst average annual performance spanned 149 basis points (Exhibit 2).

Exhibit 2: RI index returns were comparable to broad market indexes

Index average annual returns (as of 29 Dec 2017)

Top performer Bottom performer

	1 Yr	3 Yr	5 Yr	10 Yr
MSCI USA IMI ESG Leaders	19.91%	10.04%	14.84%	8.32%
MSCI KLD 400 Social	21.61%	10.81%	15.84%	8.68%
Calvert U.S. Large Cap Core Responsible	16.13%	11.01%	16.33%	9.16%
FTSE4Good US	23.52%	12.42%	17.10%	9.06%
DJSI U.S.	18.36%	11.46%	15.44%	7.67%
Range top/bottom performer	7.39%	2.38%	2.26%	1.49%
RI index average	**19.91%**	**11.15%**	**15.91%**	**8.58%**
S&P 500	21.83%	11.38%	15.74%	8.47%
Russell 3000	21.13%	11.09%	15.53%	8.57%

Based on daily returns for periods ending 29 Dec 2017.
Sources: FactSet, Morningstar, MSCI and Nuveen.

More importantly, statistical analysis showed no meaningful difference in returns when comparing RI indexes with relevant broad market indexes.[5] Any return variations appeared to be random and not systematic. For the analysis, performance was measured from the period when weekly returns first became available for each index. Track records ranged from 15 years for the FTSE4Good US Index, to 27 years for the MSCI KLD 400 Social Index. Time periods were long enough to ensure that results were statistically valid.

RI index returns were similar to each other and compared to the broad market. Any return variations appeared to be random and not systematic.

VOLATILITY AND RISK-ADJUSTED MEASURES WERE ALSO COMPARABLE:

Standard deviations for the RI indexes clustered fairly closely together, and were similar to the S&P 500 and Russell 3000 indexes:

- Average annualized standard deviations for the RI indexes ranged from 15.99% to 17.31% over the past 10 years, compared to 16.67% and 17.18% for the S&P 500 and Russell 3000, respectively (Exhibit 3).
- The spreads between standard deviations for RI indexes and benchmarks averaged only 26 basis points for the 10-year period.
- Even though some standard deviations topped 40% during the 2008–2009 market collapse, the maximum spread between RI indexes and their benchmarks averaged only 1.78% for the 10-year period.

Meanwhile, *risk-adjusted returns* also showed little variation from broad market indexes. Sharpe Ratios, or returns per unit of risk, also tracked fairly closely over various time periods, with average RI index Sharpe Ratios mirroring the underlying market or lagging only slightly.

- For the 10-year period, RI index average annual Sharpe Ratios ranged between 0.81 and 0.92, compared with 0.88 and 0.86 for the S&P 500 and Russell 3000, respectively (Exhibit 3).

With standard deviations of returns and Sharpe Ratios comparable between RI indexes and benchmarks, this suggests that incorporating ESG criteria in investment decisions doesn't require taking on additional risk relative to broad market benchmarks.

Exhibit 3: Volatility measures and risk-adjusted returns were similar overall (2008 – 2017)

Standard deviation and Sharpe Ratios: RI indexes and broad market benchmarks

	Average Annualized Standard Deviation (%)	Spread*** vs. benchmark for 10-Yr period (%)		Average Annual Sharpe Ratio
Index	**10 Yr**	**Avg.**	**Max.**	**10 Yr**
Calvert U.S. Large Cap Core Responsible*	17.31	0.13	1.61	0.88
DJSI U.S.**	15.99	0.68	2.87	0.81
FTSE4Good US**	16.96	0.29	2.50	0.92
MSCI KLD 400 Social**	16.53	0.14	1.13	0.86
MSCI USA IMI ESG Leaders*	17.12	0.06	0.78	0.83
RI Index average	16.78	0.26	1.78	0.86
S&P 500	16.67			0.88
Russell 3000	17.18			0.86

Based on weekly returns for 10-year period through 29 Dec 2017.
* Benchmark: Russell 3000.
** Benchmark: S&P 500.
*** Spread equals index value minus benchmark value. Spread averages and maximums are absolute values.
Sources: FactSet, Morningstar, MSCI and Nuveen.

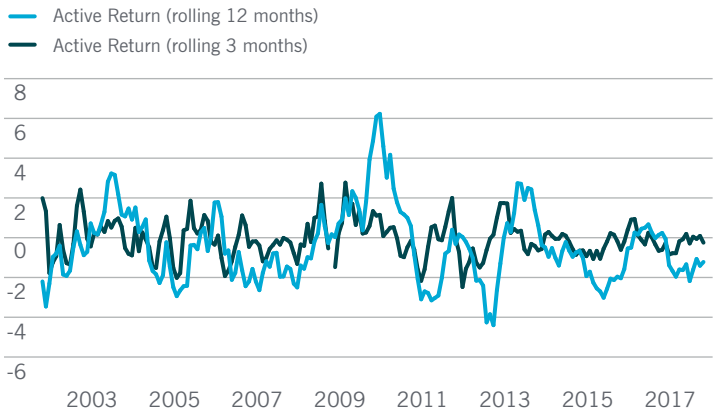
RI INDEXES: SIGNIFICANT SHORT-TERM PERFORMANCE VARIATIONS

Although our results showed that index returns patterns were similar, they were not the *same*. In particular, performance variations increased significantly over short time periods, compared to broad market indexes. Short-term differences are to be expected because any strategy that does not replicate the index, such as the RI process, introduces portfolio biases causing performance to deviate from broad market indexes.

Exhibit 4 shows an example of how variable short-term performance can be. Measured on a 3- and 12-month basis, the rolling active return of the MSCI USA IMI ESG Leaders Index reveals considerable volatility, relative to an equivalent broad market benchmark, the Russell 3000 Index. This multicap RI index outperformed by as much as 6%, and underperformed by up to 4% on a 12-month basis.

Exhibit 4: RI indexes subject to greater short-term performance variations

Rolling active return — MSCI USA IMI ESG Leaders vs. Russell 3000 (2002 - 2017)



Rolling returns calculated for 3-month and 12-month periods for MSCI USA IMI ESG Leaders for period 31 Dec 2001 – 29 Dec 2017 vs. Russell 3000 based on monthly returns.
Sources: FactSet, MSCI and Nuveen.

RI INDEX TRACKING ERROR RATES VARIED MEASURABLY

Some RI indexes tracked the performance of broad market benchmarks more closely than others — differences that investors should consider.

All the RI indexes had performance that deviated from broad market indexes, as measured by their tracking error. An important question for investors is whether some RI indexes more closely matched the performance of broad market benchmarks than others. We performed statistical analysis to determine whether the tracking error rates were similar or different across the five RI indexes. Results showed that tracking error differences were statistically significant and, therefore, important for investors to consider.

We compared the MSCI USA IMI ESG Leaders Index and Calvert U.S. Large Cap Core Responsible Index to the Russell 3000 Index because these RI indexes include smaller-capitalization stocks. (MSCI actually benchmarks this RI index against its own MSCI USA IMI Index.) The remaining RI indexes were compared with the S&P 500 because they included primarily large-capitalization stocks. Among the indexes, the MSCI USA IMI ESG Leaders Index showed the lowest tracking error at 1.68%, and the DJSI U.S. had the highest at 3.27% (Exhibit 5). All tracking error rates were measured from the inception date for each index, or first availability of weekly data through 29 Dec 2017. Although time periods varied by index, all were sufficiently long to ensure statistical validity.

Average tracking error for the MSCI USA IMI ESG Leaders Index was meaningfully lower than for the Calvert U.S. Large Cap Core Responsible Index. For RI indexes benchmarked to the S&P 500, the MSCI KLD 400 Social tracking error was lower than the DJSI U.S. and the FTSE4Good US by a statistically significant margin. However, there appears to be no statistical difference between tracking errors for the DJSI U.S. and the FTSE4Good US.[6]

The consistency of returns versus a selected benchmark is an important consideration for investors in measuring performance and managing risk. Tracking error does not introduce absolute risk per se, but is a source of relative risk versus a benchmark. Low tracking error indicates the index's performance and risk characteristics closely match the benchmark's profile.

Investors considering RI strategies may be indifferent to the level of tracking error, provided that long-term performance is comparable to the broad market. However, they should be aware of tracking error variations and their causes. Institutional investors, for example, may be constrained by client mandates to limit tracking error within specific ranges and against specific benchmarks.

Exhibit 5: Tracking error variations were significant across RI indexes

Tracking error rates since index inception, through 29 Dec 2017 (%)

RI Index	Min	Max	Avg	ST DEV	Benchmark
MSCI USA IMI ESG Leaders	0.79	3.96	1.68	0.61	Russell 3000
MSCI KLD 400 Social	1.23	5.51	2.50	1.01	S&P 500
Calvert U.S. Large Cap Core Responsible Index	0.82	5.46	2.51	1.14	Russell 3000
FTSE4Good US	1.33	6.02	2.73	0.99	S&P 500
DJSI U.S.	1.63	7.28	3.27	1.38	S&P 500

Weekly index total returns through 29 Dec 2017. Beginning dates: MSCI KLD 400 Social, 11 Nov 1994; DJSI U.S., 08 Jan 1999; Calvert U.S. Large Cap Core Responsible Index, 05 May 2000; MSCI USA IMI ESG Leaders, 01 Apr 2001; and FTSE4Good US, 10 Jan 2003. MSCI indexes include aggregated, multisource histories prior to acquisition on 01 Sep 2010. Dates reflect first availability of weekly returns after index inception date.

Sources: FactSet, Morningstar, MSCI and Nuveen.

INDEX METHODOLOGY DRIVES SHORT-TERM RETURN VARIABILITY

Variations in tracking error and short-term returns, relative to benchmark indexes, are by-products of the RI process. Some approaches for incorporating ESG criteria can eliminate or concentrate holdings in certain industries, resulting in portfolio characteristics that differ from the market.

The five RI indexes use explicit ESG criteria to select a smaller subset of stocks from a universe of eligible companies. A particular strategy can involve excluding certain industries (such as gambling, tobacco and firearms), favoring companies that are leaders among their sector peers in managing relevant ESG risks and opportunities, or a combination of both. Decisions about how stocks are rated, selected and managed differentiate RI indexes from each other and the broad market.

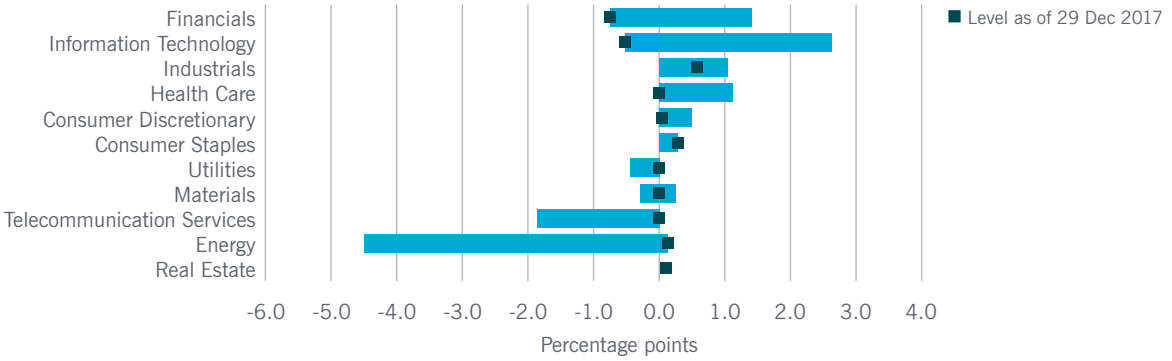
The ESG evaluation and rating process itself can vary, as indexes use different research approaches to select companies for inclusion in the index. Company assessments may differ depending on the ESG approach, the range of factors considered, and relative emphasis on the "E," "S," or "G" components. The potential impact on performance of different ESG research approaches was beyond the scope of this paper. However, an understanding of these differences may help investors select an RI index appropriate for their needs. (See Appendix 4 for details on ESG rating and index methodologies.) Differences in index construction drive tracking error and short-term return variability, including some of the following factors:

Sector/industry weighting: Certain industries or companies may tend to be excluded or have lower ESG ratings due to the nature of their business, such as gambling, tobacco or firearms. Conversely, some industries, like technology, may tend to receive higher ratings because they may face fewer ESG challenges than other industries. These variations can impact performance, and alter the investment style versus the benchmark. Omitting mining and energy companies due to environmental concerns, for example, could potentially exclude some value-oriented companies, and introduce a growth style bias to an index. Heavily capitalized and highly concentrated industries often include some of the largest companies, so including or excluding them could also skew the average size of companies in the index.

As an example, Exhibit 6 shows sector over/under weights for the MSCI USA IMI ESG Leaders Index, compared to MSCI's own broad market index over a five-year period, and how these levels changed over time.

Exhibit 6: Sector weight deviations can change over time

MSCI USA IMI ESG Leaders Index relative sector weights: 2013 - 2017



Sector weight ranges for MSCI USA IMI ESG Leaders Index relative to MSCI USA IMI Index for period 30 Dec 2012 – 29 Dec 2017
Note: MSCI included real estate in the financials sector until 2016, when real estate became a separate sector.
Sources: MSCI and Nuveen.

Number of holdings: In general, the more stocks in an RI index, the greater the opportunity to diversify risk, and match the performance of a broad market benchmark. An index with fewer stocks increases the potential for individual names or sectors to impact performance. The market capitalization target, such as large-cap vs. all-cap, can influence the number of stocks in the index.

The MSCI USA IMI ESG Leaders Index broadly targets stocks of all capitalizations with higher ESG ratings, starting with a universe of over 2,400 securities. In contrast, the DJSI U.S. begins with the 600 largest-cap U.S. companies in the Dow Jones Sustainability North America Index and selects the most highly rated 20%. As a result, the MSCI index held 1,110 mostly large- and mid-cap names as of 29 December 2017, while the Dow Jones index held only 133 large-cap names. The Calvert U.S. Large Cap Core Responsible Index had 725 holdings, the MSCI KLD 400 Social Index held 405 issues, and the FTSE4Good US Index had 229 holdings.

Overall, we found that RI indexes with a larger number of stocks tended to have lower tracking error. The MSCI USA IMI ESG Leaders Index and the MSCI KLD 400 Social Index had the largest number of holdings among indexes tracking the Russell 3000 and S&P 500, respectively, and the lowest tracking error. The DJSI U.S. had the fewest names and the highest tracking error.

Efforts to address tracking error: RI indexes have various procedures for adjusting position size and weights to help the index more closely and consistently track a broad market benchmark. These may include optimizing sector/industry weightings, limiting the size of individual holdings, periodic rebalancing, and using buffers and ranges to limit turnover when making constituent changes.

For example, MSCI ESG Leaders indexes specifically target sector weights to match MSCI's own underlying benchmarks. Calvert caps individual positions based on economic sector weights, but does not match a benchmark per se. The DJSI U.S. weights its holdings by market capitalization and relative industry weights, with individual constituents capped at 10%. The FTSE4Good US Index weights individual constituents based on their adjusted market cap, but does not adjust sector weights.

TRACKING ERROR CONSIDERATIONS FOR INVESTORS

Since long-term RI index performance is comparable to the broad market, tracking error may matter most to institutional investors subject to specific limits over shorter time periods. It's important to note, however, that RI indexes with lower tracking error are more likely to provide performance more consistent with a broad market benchmark.

Investors should carefully consider specific RI index construction, the ESG evaluation process, and the underlying market benchmark when selecting a strategy. Index methodology drives tracking error, resulting in meaningful differences among RI indexes.

Conclusions

- RI indexes achieved long-term performance similar to broad market benchmarks, while pursuing social goals.
- Incorporating ESG criteria did not result in higher risk levels, measured by Sharpe Ratio and standard deviation. By constraining their investment universes, RI indexes introduce tracking error and greater short-term return variability, although the magnitude depended on how the index is constructed.
- RI indexes differed significantly in how closely they tracked broad market indexes. Understanding index methodology is critical to properly evaluating and selecting a specific index. In particular, investors should consider an index's breadth of holdings, market-cap and benchmark exposure, and steps taken to reduce tracking error and help improve consistency, relative to its broad market benchmark.

For more information, contact your relationship manager or financial advisor, and visit nuveen.com.

APPENDIX 1

Many studies have analyzed the performance of RI-focused mutual funds versus their conventional counterparts, and concluded the two are statistically similar. A May 2014 Empirical Research Partners publication reported there have been more than 60 separate academic studies on the subject, and that 80% found no significant performance difference between RI funds and non-RI funds. A January 2018 Morningstar report, Sustainable Funds U.S. Landscape Report, noted: "… the weight of research evidence suggests no systematic performance penalty associated with sustainable investing, and possible avenues for outperformance based on reduced risk or added alpha." The report said Morningstar's analysis of sustainable mutual fund performance is consistent with industry research. Overall, sustainable funds "performed well as a group" in 2017, with 54% ranking in the top half of their Morningstar category — a finding consistent across stock and bond funds.

There has been much less research on the performance of RI indexes, the subject of our report. However, here too, research has shown the financial performance of RI indexes has been similar to conventional benchmarks.

Below is a sampling of academic papers and institutional research on the impact of ESG investing, including some that identify additional academic resources:

General research

Sustainable Funds U.S. Landscape Report, Morningstar Research, January 2018, Morningstar Inc.

Empirical Research Partners, May 2014, "Stock Selection: Research and Results, May 2014: Perspectives on Socially Responsible Investing"

Kidd D., May 2014, "Sustainable Investing: Reducing Risk to Create Alpha," CFA Institute Investment Risk and Performance Feature Articles, Vol. 2014, No. 1.

Brièrea M., Peillexb J., and Ureche-Rangauc L., January 2014, "Do Social Responsibility Screens Really Matter? A Comparison with Conventional Sources of Performance," Social Science Research Network working papers series

Gil-Bazo J., Ruiz-Verdu P., Portela A.A.P., 2010, "The performance of socially responsible mutual funds: the role of fees and management companies," Journal of Business Ethics, 94(2), 243–263.

Cortez M.C., Silva F., Areal N., 2009, "The performance of European socially responsible funds," Journal of Business Ethics, 87(4), 573–588.

Hoepnerab A., McMillana D., August 2009, "Research on 'Responsible Investment': An Influential Literature Analysis comprising a rating, characterisation, categorisation & investigation," Social Science Research Network working papers series

Mercer white paper, Nov. 2009, "Shedding Light on Responsible Investment: Approaches, returns, and impacts."

Index-related studies

Schröder M., 2007, "Is there a difference? The performance characteristics of RI equity indexes," Journal of Business Finance & Accounting, 34(1–2), 331–348.

Statman M., 2006, "Socially responsible indexes: composition, performance and tracking error," Journal of Portfolio Management, 32(3), 100–109.

Sauer D.A., 1997, "The impact of social-responsibility screens on investment performance: evidence from the Domini 400 Social Index and Domini equity mutual fund," Review of Financial Economics, 6(2), 137–149.

APPENDIX 2

Survey methodology: To measure the efficacy of RI strategies versus the broad market, we compared risk and return measures of RI indexes to appropriate benchmarks. We selected indexes with track records of at least 10 years. We focused on RI equity strategies because indexes with longer-term track records are readily available and represent the bulk of RI assets.

Our data came from FactSet Research Systems Inc., Morningstar, Inc., and MSCI Inc., and consisted of the daily, weekly and monthly total returns (gross of fees) for five widely followed U.S. RI indexes, and the S&P 500 and Russell 3000 indexes. Returns were used to calculate mean performance, volatility and tracking error for periods when necessary data first became available following index inception.

Performance analysis: We conducted hypothesis tests to determine whether RI index returns were statistically similar to broad market benchmarks. The analysis showed that differences were more likely the result of random variation, rather than systematic causes. We calculated t-statistics to determine if there was a difference in mean returns, pairing an RI index with either the S&P 500 or Russell 3000 index as appropriate. We assumed the two samples were independent, approximately normally distributed, and drawn from a population with the same underlying variance. We conducted an F-test to determine if return variances were the same. Analysis was for the period beginning when weekly performance data was first available for each RI index, through 29 December 2017. Exhibit 2A below shows the F- and t-test results: F-test allows us to assume the sample pair variances were similar; t-test shows return pairs were statistically the same, indicating that performance was comparable.

Exhibit 2A: Hypothesis tests of returns for RI indexes and broad market benchmarks

F-Test Two-Sample for Variances

	MSCI KLD 400	SP 500	DJSI U.S.	SP500	FTSE 4Good US	SP500	Calvert	Russell 3000	MSCI USA IMI ESG Leaders	Russell 3000
Mean	0.21	0.21	0.14	0.14	0.20	0.20	0.12	0.14	0.16	0.17
Variance	5.65	5.49	5.90	5.86	5.39	5.15	6.40	5.93	6.01	5.84
Observations	1208.00	1208.00	991.00	991.00	782.00	782.00	922.00	922.00	874.00	874.00
Degrees of freedom	1207.00	1207.00	990.00	990.00	781.00	781.00	921.00	921.00	873.00	873.00
F stat	1.03		1.01		1.05		1.08		1.03	
P(F<=f) one-tail	0.31		0.46		0.26		0.12		0.34	
F Critical value one-tail	1.10		1.11		1.13		1.11		1.12	

If value of F stat is less than F Critical value, it can be assumed that sample pairs have the same variances (i.e., are statistically similar).

t-Test: Two-Sample Assuming Equal Variances

Mean	0.21	0.21	0.14	0.14	0.20	0.20	0.12	0.14	0.16	0.17
Variance	5.65	5.49	5.90	5.86	5.39	5.15	6.40	5.93	6.01	5.84
Observations	1208.00	1208.00	991.00	991.00	782.00	782.00	922.00	922.00	874.00	874.00
Pooled Variance	5.57		5.88		5.27		6.16		5.92	
Hypothesized mean diff.	0.00		0.00		0.00		0.00		0.00	
Degrees of freedom	2414.00		1980.00		1562.00		1842.00		1746.00	
t Stat	0.04		-0.06		-0.03		-0.14		-0.06	
P(T<=t) one-tail	0.48		0.48		0.49		0.44		0.48	
t Critical one-tail	1.65		1.65		1.65		1.65		1.65	
P(T<=t) two-tail	0.97		0.95		0.98		0.89		0.95	
t Critical value two-tail	1.96		1.96		1.96		1.96		1.96	

If value of t stat is less than t Critical value, it can be assumed that sample pairs of returns are statistically the same.

Index weekly total returns through 29 Dec 2017. Beginning dates: MSCI KLD 400 Social, 11 Nov 1994; DJSI U.S., 08 Jan 1999; Calvert U.S. Large Cap Core Responsible, 05 May 2000; MSCI USA IMI ESG Leaders, 01 Apr 2001; FTSE4Good U.S., 10 Jan 2003. Dates reflect first availability of weekly returns after index inception date.

Sources: FactSet, Morningstar, MSCI and Nuveen.

APPENDIX 3

Tracking error analysis: We performed a similar analysis of tracking error rates to determine if variances were random or statistically significant. We calculated t-statistics on pairs of RI indexes. We also calculated an F-distribution to test if variances for the tracking error rates were the same. Analysis was for the period beginning when weekly performance data was first available for both RI indexes in each pair tested, through 29 Dec 2017. Exhibit 3A below shows the t- and F-test results. F-test results allow us to conclude the sample pair variances were not similar; t-test results show that pairs of tracking error rates were statistically different and not the result of randomness.

Exhibit 3A: Hypothesis testing for RI index and broad market benchmark tracking error rates

F-Test Two-Sample for Variances

	Calvert	MSCI USA IMI ESG Leaders	FTSE 4Good US	DJSI U.S.	DJSI U.S.	MSCI KLD 400	FTSE 4Good US	MSCI KLD 400
Mean	2.38	1.68	2.73	2.66	3.27	2.42	2.73	2.07
Variance	1.07	0.37	0.99	0.45	1.89	0.88	0.99	0.31
Observations	823.00	823.00	731.00	731.00	940.00	940.00	731.00	731.00
Degrees of freedom	822.00	822.00	730.00	730.00	939.00	939.00	730.00	730.00
***F* stat**	2.89		2.19		2.16		3.14	
***P*(F<=f) one-tail**	0.00		0.00		0.00		0.00	
***F* Critical value one-tail**	1.12		1.13		1.11		1.13	

If value of F stat is less than F Critical value, it can be assumed that sample pairs have the same variances (i.e., are statistically similar).

t-Test: Two-Sample Assuming Unequal Variances

Mean	2.38	1.68	2.73	2.66	3.27	2.42	2.73	2.07
Variance	1.07	0.37	0.99	0.45	1.89	0.88	0.99	0.31
Observations	823.00	823.00	731.00	731.00	940.00	940.00	731.00	731.00
Hypothesized mean diff.	0.00		0.00		0.00		0.00	
Degrees of freedom	1330.00		1281.00		1655.00		1152.00	
***t* Stat**	16.72		1.43		15.64		15.66	
***P*(T<=t) one-tail**	0.00		0.08		0.00		0.00	
***t* Critical one-tail**	1.65		1.65		1.65		1.65	
***P*(T<=t) two-tail**	0.00		0.15		0.00		0.00	
***t* Critical value two-tail**	1.96		1.96		1.96		1.96	

If value of t stat is greater than t Critical value, it can be assumed that sample pairs of tracking error rates are not statistically the same or the result of randomness.

Weekly index total returns through 29 Dec 2017. Beginning dates: DJSI U.S. vs. KLD 400 Social, 31 Dec 1999; Calvert vs. MSCI USA IMI ESG Leaders, 29 Mar 2002; DJSI U.S. vs. FTSE4Good US, 02 Jan 2004; FTSE4Good US vs. MSCI KLD 400 Social, 02 Jan 2004. For each index pair, dates are 12 months after inception date of index with shortest track record. Initial TE calculations require a full year of returns data.

Sources: FactSet, Morningstar, MSCI and Nuveen.

APPENDIX 4

Index methodology and ESG evaluation processes

The evaluation process used to assess ESG performance and identify securities for inclusion may be performed in-house or by a third party. It is important to note that there are differences in research approaches and methodologies for assessing company ESG performance. For example, sources of ESG data may come solely from publicly available, self-reported information, in-depth interviews with companies, proprietary research, or a combination of sources. The type and scope of ESG issues emphasized may vary. Companies may be assessed on the same set of criteria on an absolute basis, or on industry-specific issues, and relative to peers. Familiarity with differences in ESG research approaches may be an additional dimension to help investors evaluate an RI index.

Below is a summary of index methodology and rating processes:

Exhibit 4A: RI index methodologies and rating processes

RI Index	*Stock selection methodology and rating process*
Calvert U.S. Large Cap Core Responsible Index	• Calvert derives the initial universe on an annual basis from the common stocks of the 1,000 largest publicly traded U.S. companies by market capitalization. • Calvert selects companies operating their businesses in a manner consistent with the Calvert Principles for Responsible Investment. The principles serve as a framework for considering environmental, social and governance (ESG) factors that may affect investment performance.
Dow Jones Sustainability Index U.S. (DJSI U.S.)	• Target percentage of companies ranked highest for sustainability (top 20% in each industry); constituents market-cap weighted; cap on individual positions. • Sustainability ranking generated through self-reporting by companies and third-party analysis.
FTSE4Good US Index	• Companies from FTSE's broad market universe, meeting FTSE's ESG criteria; constituents market-cap weighted. • Excludes companies involved in weapons and tobacco, and companies where coal mining is the main business. • Ratings based on publicly available data; process overseen by an independent committee.
MSCI USA IMI ESG Leaders Index	• Companies at or above ESG rating threshold, constituents market-cap weighted; sector weight targets tied to benchmark to reduce tracking error. • Ratings from in-house research, looking at key ESG performance indicators and extensive data to create individual company ESG ratings.
MSCI KLD 400 Social Index	• Selection universe is the MSCI USA IMI Index, but limited to a minimum of 400 constituents. (200 large-cap, 200 mid-cap); market-cap weighted. • Excludes companies involved with alcohol, gambling, tobacco, firearms, military weapons, nuclear energy, adult entertainment and genetically modified organisms.

Source: Index providers.

APPENDIX 5

Portfolio characteristics — a closer look

Despite efforts to reduce tracking error and more closely approximate a broad market profile, RI indexes look different than their benchmarks in other ways. A case in point is the MSCI USA IMI ESG Leaders Index. Compared with the Russell 3000, this RI index had the lowest tracking error of the five we studied, yet still had only 37% of the number of benchmark holdings, an average weighted market cap 73% of the benchmark, and a weighted average price/earnings ratio 5% higher than the broad market index.

Exhibit 5A: Portfolio characteristics: MSCI USA IMI ESG Leaders vs. Russell 3000

(as of 29 Dec 2017)

	MSCI USA IMI ESG Leaders	Russell 3000	% relative to Russell 3000
Market Capitalization			
Weighted Average	118,863.2	163,745.3	73%
Median	3,202.5	1,790.3	179%
Weighted Median	50,804.6	67,377.6	75%
# of Securities	1,110	2,961	37%
Dividend Yield	1.8	1.7	106%
Price/Earnings			
Weighted Average	22.5	21.5	105%
P/E using FY1 Est			
Weighted Average	20.4	20.1	101%
Price/Cash Flow			
Weighted Average	13.4	12.7	106%
Price/Book			
Weighted Average	3.3	3.0	110%
Price/Sales			
Weighted Average	2.1	2.0	105%
ROA	7.11	7.01	101%
ROE	19.7	17.8	111%

Sources: FactSet and MSCI.

APPENDIX 6

TIAA-CREF Social Choice Equity Fund – Institutional class

Net of fees, as of 29 Dec 2017*

Average annual returns vs. Russell 3000 Index

Gross expense ratio: 0.19%/Net expense ratio: 0.19%

	3 Month	1 Year	3 Year	5 Year	10 Year	Since Inception
Social Choice Equity Fund (Institutional Class)	6.19%	20.93%	10.24%	14.89%	8.38%	5.84%
Russell 3000 Index	6.34%	21.13%	11.12%	15.58%	8.60%	6.12%

* The Fund's inception date is July 01, 1999. Returns do not reflect the taxes that a shareholder would pay on fund distributions or on redemptions of fund shares. Investment return and principal value will fluctuate so that, when redeemed, shares may be worth more or less than the original cost.

The performance presented represents past performance, and is not an indicator or guarantee of future results. Performance data for the Fund is presented net of management fees and expenses, and includes the reinvestment of dividends through 29 Dec 2017. Current performance may be lower or higher than the performance presented herein. For performance current to the most recent month-end, please visit Nuveen.com or call 800-752-8700.

The expense ratio for this portfolio is 0.19% (gross)/0.19% (net). A contractual arrangement is in place that limits certain fees and/or expenses. Had fees/expenses not been limited ("capped"), currently or in the past, returns would have been lower. Expense Cap Expiration Date: February 28, 2018. Please see the prospectus for details.

The Russell 3000 Index measures the performance of the stocks of the 3,000 largest publicly traded U.S. companies, based on market capitalization. The index measures the performance of about 98% of the total market capitalization of the publicly traded U.S. equity market. You cannot invest directly in any index. Index returns do not reflect a deduction for fees or expenses.

Endnotes

1 Report on U.S. Sustainable, Responsible and Impact Investing Trends 2016, US SIF Foundation, November 2016. Total includes assets managed under ESG incorporation strategy alone or in combination with shareholder advocacy, but excludes assets only under shareholder advocacy strategy.

2 See Appendix 1.

3 See Appendix 2 for study methodology.

4 The Russell 3000 and S&P 500 indexes were selected as the most appropriate proxies against which most investors might measure RI performance. They have not necessarily been constructed for these comparisons, and do not necessarily represent what would be an appropriate comparison as a parent index.

5 See Appendix 2 for the statistical analysis of RI index returns vs. broad market indexes.

6 Statistical comparison is based on the shorter time period common to both indexes, based on the 10 Jan 2003 inception of the FTSE4Good US Index. The average tracking error for the DJSI U.S. Index shown in Exhibit 5 is based on the index's 08 Jan 1999 inception date. See Appendix 3 for tracking error statistical analysis.

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