Hewitt enniskupp

An Aon Company

Benchmark Evaluation Report
Thrift Savings Plan

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Contents

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Executive Summary

The Federal Thrift Savings Plan (TSP) requested Hewitt EnnisKnupp review and evaluate the appropriate indexes to use for the following investment options:

- Common Stock Index Investment Fund (C Fund)
- Small Capitalization Stock Index Investment Fund (S Fund)
- Fixed Income Investment Fund (F Fund)
- International Stock Index Investment Fund (I Fund)

As part of our analysis, we reviewed multiple indexes/benchmarks for each investment option, the construction methodology and opportunity set covered by each, the investability and liquidity of the indexes, acceptance of the indexes by the investment community, the appropriateness of the indexes for the TSP, and the estimated costs associated with making a change. Based on our review, we have the following recommendations:

C Fund and S Fund

Maintain the S&P 500 Index for the C Fund and the DJ U.S. Completion Total Stock Market Index (formerly the Dow Jones Wilshire 4500 Index) for the S Fund

Our recommendation is based on the following primary reasons:

- Total passive assets benchmarked to the S&P 500 and DJ U.S. Completion Total Stock Market Index are about eight times of those benchmarked to the other combination considered: Russell 1000 and Russell 2000.

- Potential transaction costs would be relatively lower for a combination of S&P 500 and DJ U.S. Completion Total Stock Market Index, given the scale of TSP plan.

F Fund

Maintain the Barclays Capital Aggregate Bond Index (formerly the Lehman Brothers Aggregate Bond Index)

We considered the Barclays Capital Universal Bond Index and the Citigroup Broad Investment Grade (BIG) Bond Index as the main alternatives. Our recommendation is based on the following main reasons:

- The Barclays Capital Aggregate Bond Index provides broad coverage to the investment-grade U.S. fixed income market and is the most widely recognized fixed income benchmark in the U.S.

- The Barclays Capital Universal Bond Index provides broader coverage to an investor; however, it includes high yield debt which is more correlated to stocks, reducing the diversification benefit relative to the Barclays Capital Aggregate.

I Fund

Replace the MSCI EAFE Index, with the MSCI World ex-U.S. Index, which is the MSCI EAFE + MSCI Canada indices.

- The MSCI indices remain the most popular indices for U.S. based institutional investors investing in overseas equity markets.
- Canada is the third-largest equity market in the world, representing 11% of the developed non-U.S. equity opportunity set.
- The transition costs associated with the change in the I Fund benchmark are reasonable.

We look forward to discussing our report with you.

C Fund and S Fund

We have reviewed the legislative guidelines related to the investment objectives for the Common Stock Index Investment Fund (C Fund) and the Small Capitalization Stock Index Investment Fund (S Fund), and have compared each of these Funds' existing benchmarks to several reasonable alternatives. We find that the existing benchmarks, the S&P 500 Index for the C Fund and the Dow Jones U.S. Completion Total Stock Market Index (formerly the Dow Jones Wilshire 4500 Index) for the S Fund, are appropriate. We therefore recommend no change in the benchmarks for the C and S Funds.

Legislative Guidelines

The goal or objective of any investment option or portfolio plays an important role in determining the appropriate benchmark for that investment. The Federal Employees Retirement System Act of 1986 (FERSA) states the following regarding the C Fund and the S Fund, under section 8438 (b):

C Fund

(2)(A) The Board shall select an index which is a commonly recognized index comprised of common stock the aggregate market value of which is a reasonably complete representation of the United States equity markets.

(B) The Common Stock Index Investment Fund shall be invested in a portfolio designed to replicate the performance of the index selected under subparagraph (A). The portfolio shall be designed such that, to the extent practicable, the percentage of the Common Stock Index Investment Fund that is invested in each stock is the same as the percentage determined by dividing the aggregate market value of all shares of that stock by the aggregate market value of all shares of all stocks included in such index.

S Fund

(3)(A) The Board shall select an index which is a commonly recognized index comprised of common stock the aggregate market value of which represents the United States equity markets excluding the common stocks included in the Common Stock Index Investment Fund.

(B) The Small Capitalization Stock Index Investment Fund shall be invested in a portfolio designed to replicate the performance of the index in subparagraph (A). The portfolio shall be designed such that, to the extent practicable, the percentage of the Small Capitalization Stock Index Investment Fund that is invested in each stock is the same as the percentage determined by dividing the aggregate market value of all shares of that stock by the aggregate market value of all shares of all stocks included in such index.

The C Fund is benchmarked against the S&P 500 Index, which provides coverage of the large capitalization segment of the U.S. equity market. The FERSA guidelines for the C Fund do not specify that it should be benchmarked to a large capitalization U.S. stock index. If the C Fund were *the only* U.S. equity investment option available to TSP participants, it would have made sense to consider a broader, more inclusive benchmark that also includes smaller capitalization stocks, such as the Russell 3000 Index or the Dow Jones U.S. Total Market Index.

We recognize, however, that the S Fund is meant to complement the C Fund, not to compete or overlap with it. This clearly implies that the C Fund should be benchmarked to a large capitalization U.S. index.

As the C and S Funds are complementary, and in combination should represent the broad U.S. equity market, we have included the broad-based Russell 3000 Index and the Dow Jones U.S. Total Market Index in our analysis of benchmarks to aid the decision-making process.

C Fund

We began our review by first listing several broad U.S. equity benchmarks for the C Fund:

- Dow Jones U.S. Large Cap Total Stock Market Index (The largest 750 names in DJ U.S. Total Stock Market Index Set)
- Dow Jones U.S. Broad Stock Market Index (All names in DJ U.S. Total Stock Market Index, excluding those defined as micro-caps)
- Dow Jones U.S. Total Stock Market Index (Including all U.S. equity issues with readily available prices, except for bulletin-board issues)
- MSCI USA All Cap Index (Broad U.S. equity universe across large, mid, small and micro capitalizations)
- MSCI USA Index (Captures the large and mid capitalizations of U.S. equity universe)
- MSCI USA Investable Market Index (IMI) (Captures the large, mid and small capitalizations of U.S. equity universe)
- Russell 1000 Index (The largest approximately 1000 names in Russell 3000 Index)
- Russell 3000 Index (The largest 3000 U.S. companies)
- Standard & Poor's (S&P) 500 Index (500 leading companies in leading industries of U.S. economy – Current Benchmark)
- S&P Composite 1500 Index (The combination of S&P 500, S&P MidCap 400 and S&P SmallCap 600 Indexes)

From the perspective of U.S. based investors, the MSCI indices are the most commonly used indices to measure and benchmark the performance of international equity investments. A few years ago, MSCI launched a series of U.S. based indices to complement their non-U.S. equity index offerings. MSCI adopts a building block approach constructing regional indices that can be combined to capture the full extent of the investable global equity opportunity set.

MSCI U.S. indices have not, however, received material traction in the institutional marketplace. Only one of the five major index fund providers in the U.S. has assets benchmarked to MSCI's U.S. indices.

The MSCI indices are relatively new, and lack significant assets managed to them, either actively or passively. The Dow Jones U.S. Large Cap Total Stock Market Index, the Dow Jones U.S. Broad Stock Market Index, and the S&P 1500 Index are also not widely used by the investment community. None of the major index fund managers offer index funds benchmarked to these indexes. We have therefore focused our analysis on the following four benchmarks (from lowest to broadest market coverage):

- S&P 500 Index
- Russell 1000 Index
- Russell 3000 Index
- Dow Jones U.S. Total Stock Market Index

Table 1 below provides a broad comparison of these benchmarks.

Table 1: Benchmark Comparison (As of 12/31/2011)

	S&P 500	Russell 1000	Russell 3000	DJ U.S. Total Stock Market Index
Inclusion criteria	Market cap and other criteria such as profitability	Largest 1,000 stocks based on market cap	Largest 3,000 stocks based on market cap	All stocks, subject to some liquidity considerations
# of securities	500	980	2,946	3,740
Market cap[1]	$11.4 trillion	$12.9 trillion	$14.0 trillion	$14.5 trillion
Largest company's market cap	$406 billion	$406 billion	$406 billion	$406 billion
Smallest company's market cap	$1,220 million	$36 million	$23 million	$1 million
Coverage of U.S. stocks	75%	92%	98%	100%
Reconstitution frequency	As needed	Annual	Annual	Monthly
Turnover	3.6%	3.4%	3.6%	5.9%

Source: S&P, Russell and DJ Index Service

[1] Float adjusted

The Russell 1000 Index and the Russell 3000 Index rely on market capitalization to determine which stocks are included in the index. Stocks are ranked from highest to lowest capitalizations; the largest 1,000 stocks are included in the Russell 1000 Index and the largest 3,000 in the Russell 3000 Index. The Dow Jones U.S. Total Stock Market Index is generally all-inclusive. The S&P 500 Index is not made up of the largest 500 stocks by market capitalization. S&P uses some subjective criteria, most notable being the requirement for a stock to have "financial viability," and that the index sector allocations should be representative of the sector allocations of all stocks with market capitalizations of $4 billion or more.

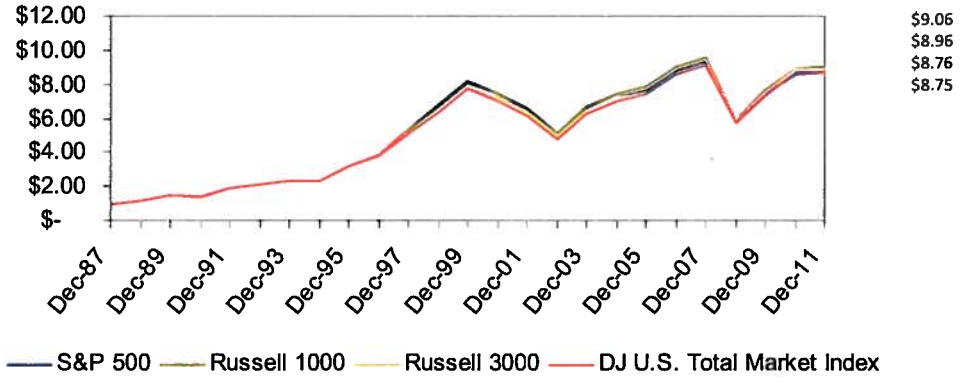
We believe the Russell and Dow Jones indexes are superior from a construction methodology point of view, with little to no subjectivity involved. Nevertheless, we find the S&P 500 Index as an acceptable benchmark for U.S. large capitalization stocks as the S&P 500 Index provides very close coverage of the largest 500 U.S. stocks.

Performance

Chart 1 below illustrates how $1 invested in each of the indexes over the longest common time period would have grown over time. As shown, all four indexes have tended to perform quite similarly over time.

Chart 1

Growth of $1
24 Years Ending 12/31/2011



	S&P 500	Russell 1000	Russell 3000	DJ U.S. Total Stock Market Index
Value At The End of 24 Years	$8.75	$9.06	$8.96	$8.76

The correlation coefficients between each pair of indexes are shown below in Table 2. Correlation coefficients can range from +1 to -1. A correlation of +1 between two indexes implies that the returns of the two indexes move in the same direction and in the same proportion, while a correlation of -1 means that the returns move in opposite directions but in the same proportion. As can be seen, all the indexes are highly positively correlated to each other.

Table 2: Correlation Matrix

	S&P 500	Russell 1000	Russell 3000	DJ U.S. Total Stock Market Index
S&P 500	1.000			
Russell 1000	0.998	1.000		
Russell 3000	0.996	0.999	1.000	
DJ U.S. Total Stock Market Index	0.995	0.998	0.999	1.000

(Longest common time period = 24 years)

Table 3 below details the annual return histories of the indexes and their cumulative annualized returns over several trailing historical periods.

Table 3: Return History

	S&P 500	Russell 1000	Russell 3000	DJ U.S. Total Stock Market Index
1971	14.3%	--	--	--
1972	18.9	--	--	--
1973	-14.8	--	--	--
1974	-26.5	--	--	--
1975	37.2	--	--	--
1976	23.9	--	--	--
1977	-7.2	--	--	--
1978	6.6	--	--	--
1979	18.6	22.3%	24.1%	--
1980	32.5	31.9	32.5	--
1981	-4.9	-5.1	-4.4	--
1982	21.5	20.3	20.7	--
1983	22.6	22.1	22.7	--
1984	6.3	4.7	3.4	--
1985	31.7	32.3	32.2	--
1986	18.7	17.9	16.7	--
1987	5.3	2.9	1.9	--
1988	16.6	17.2	17.8	17.9%
1989	31.7	30.4	29.3	29.2

1990	-3.1	-4.2	-5.1	-6.2
1991	30.5	33.1	33.7	34.2
1992	7.6	9.0	9.7	9.7
1993	10.1	10.2	10.9	9.8
1994	1.3	0.4	0.2	0.2
1995	37.6	37.8	36.8	36.6
1996	23.0	22.4	21.8	22.0
1997	33.4	32.9	31.8	31.8
1998	28.6	27.0	24.1	24.9
1999	21.0	20.9	20.9	22.7
2000	-9.1	-7.8	-7.5	-10.2
2001	-11.9	-12.5	-11.5	-11.9
2002	-22.1	-21.7	-21.6	-22.1
2003	28.7	29.9	31.0	30.7
2004	10.9	11.4	11.9	12.0
2005	4.9	6.3	6.1	6.3
2006	15.8	15.5	15.7	15.6
2007	5.5	5.8	5.1	5.7
2008	-37.0	-37.6	-37.3	-37.2
2009	26.5	28.4	28.3	28.6
2010	15.1	16.1	16.9	17.5
2011	2.1	1.5	1.0	1.1
1 Year	2.1%	1.5%	1.0%	1.1%
3 Years	14.1	14.8	14.9	15.2
5 Years	-0.3	0.0	0.0	0.3
10 Years	2.9	3.3	3.5	3.6
15 Years	5.5	5.7	5.7	5.6
20 Years	7.8	8.0	8.0	7.9
25 Years	9.3	9.3	9.3	--
30 Years	11.0	10.9	10.8	--
35 Years	10.6	--	--	--
40 Years	9.8	--	--	--

Source: Investorforce

While returns do vary year to year, long term returns tend to be in a very tight range. However, the numbers above do not indicate the risk incurred to earn these returns. Table 4 shows the annualized standard deviation over various time periods. The ten-year standard deviation of the S&P 500 Index of 20.5% means that based on the last ten years of historical returns data, the return of the S&P 500 Index in any given year is expected to be in a range of +/- 20.5% around the average return, about two-thirds of the time.

Table 4: Annualized Standard Deviation

	S&P 500	Russell 1000	Russell 3000	DJ U.S Total Market Index
5 Years	24.0%	24.9%	24.8%	25.0%
10 Years	20.5	21.0	21.2	21.2
15 Years	20.3	20.5	20.2	20.5
20 Years	19.1	19.1	18.8	19.1
25 Years	18.3	18.5	18.3	--
30 Years	17.3	17.5	17.3	--
35 Years	17.0	--	--	--
40 Years	18.2	--	--	--

As of 12/31/2011

The risk, as measured by the standard deviation of returns, also tends to be in a narrow range. The Sharpe ratio measures excess return over the risk-free rate (such as T-Bills) per unit of additional risk. Sharpe ratios are appropriate for any kind of investment, including indexes and managers. The Sharpe ratio can be used to compare the *risk-adjusted* performance of two or more indexes, compare the risk-adjusted performance of a manager with an index, or compare the risk-adjusted performance of two or more managers. A higher Sharpe ratio is always better. A positive Sharpe ratio means that the investment has produced a better return than the risk-free rate over the period analyzed. The Sharpe ratios for each of the indexes over various periods are shown below in Table 5.

Table 5: Sharpe Ratios

	S&P 500	Russell 1000	Russell 3000	DJ U.S. Total Stock Market Index
10 Years	0.07	0.09	0.09	0.10
15 Years	0.19	0.20	0.21	0.20
20 Years	0.33	0.34	0.34	0.33
25 Years	0.43	0.42	0.42	--
30 Years	0.55	0.54	0.54	--
35 Years	0.53	--	--	--
40 Years	0.46	--	--	--

As of 12/31/2011

Based on historical performance, we do not find evidence of superiority of one or more benchmarks relative to the others on a risk-adjusted basis.

Investability & Liquidity

A good benchmark should be investable, i.e. an investor should be able to earn a return similar to that of the index *after* costs.

The stocks in the S&P 500 Index are liquid and trade frequently, allowing index fund managers to hold all the stocks at the appropriate index weights. The existence of an extremely liquid market for S&P 500 futures contracts also allows index fund managers to manage cash flows more efficiently, resulting in tighter tracking of the Index.

The Russell 1000 Index is also large cap-oriented and relatively liquid, allowing index fund managers to replicate the Index and control tracking error. As the opportunity set broadens to include small capitalization stocks, liquidity tends to decline. While the major index fund providers replicate their Russell 3000 Index funds, they are willing to incur slightly higher tracking due to the costs associated with trying to match the index weightings precisely for the Dow Jones U.S. Total Stock Market Index. Index fund managers typically do not hold all the stocks in their Dow Jones U.S. Total Stock Market Index funds; rather, they hold the largest stocks at approximately the market weights and use an optimization strategy for the smaller capitalization stocks. Optimization refers to the process of holding a representative, risk-controlled sample of the index constituents to avoid investing in the least liquid constituents in an effort to minimize trading costs. While this results in higher tracking error than say, an S&P 500 Index fund, it still tends to be within narrow bands. It should also be noted that index fund managers that have managed broad market strategies, such as the Dow Jones U.S. Total Stock Market Index, for long periods of time and have substantial passive assets benchmarked to such indices have over time been able accumulate most, if not all, the securities comprised in the broad market indices, trading opportunistically when liquidity opportunities present/have presented themselves.

Table 6 compares the historical 5-year tracking errors of institutional index funds (ERISA-qualified) managed by BlackRock, Vanguard, State Street Global Advisors (SSgA), Bank of New York Mellon (BNY Mellon) and Northern Trust, five of the major index fund managers in the world, for the S&P 500 Index, Russell 1000 Index, Russell 3000 Index, and Dow Jones U.S. Total Stock Market Index. While the tracking error increases as the index coverage increases, we consider the tracking error on the Dow Jones U.S. Total Stock Market Index funds to be reasonable. Higher tracking error by Northern Trust is primarily attributable to securities lending.

Table 6: Index Fund 5-Year Tracking Error

	S&P 500	Russell 1000	Russell 3000	DJ U.S. Total Stock Market Index
BlackRock	0.05%	0.02%	0.05%	0.20%
SSgA	0.05	0.10	0.10	0.20
Vanguard	0.04	N/A	0.03	0.08
BNY Mellon	0.04	0.03	0.03	0.15
Northern Trust	0.13	0.09	0.11	0.32

As of 12/31/2011

Source: BlackRock, SSgA, Vanguard, BNY Mellon and Northern Trust

Acceptance

An important consideration for benchmark selection is the benchmark's acceptance and use among the investment community. Table 7 displays the value of passively managed assets in all vehicles benchmarked to each of the four indexes by the above five index managers.

Table 7: Assets Indexed to Benchmark

	S&P 500	Russell 1000	Russell 3000	DJ U.S. Total Stock Market Index
Passive Assets	$759 Billion	$78 Billion	$92 Billion	$41 Billion

The S&P 500 Index has, by far, the greatest amount of assets indexed to it. The table only shows about half of the total passive assets benchmarked to the S&P 500 Index. If the assets managed by other fund families are counted, the total passive assets benchmarked to the S&P 500 Index total approximately $1.3 trillion at the end of 2011. Although the Russell 3000 Index ranks a distant second, the absolute level of assets is still considerable. Assets indexed to the Russell 1000 Index and the Dow Jones U.S. Total Stock Market Index are much lower, but still high on an absolute basis. In addition, based on the Russell 1000's share of the Russell 3000 and the DJ U.S. Total Stock Market Index on a market cap basis, we estimate that there is an additional $120 billion managed to the Russell 1000 as apart of these broader passive U.S. equity mandates.

Summary

Although the Russell 3000 Index and DJ U.S. Total Stock Market Index provide broader coverage of the U.S. equity market than the S&P 500 Index and Russell 1000, both indexes could overlap with the benchmark for S Fund. Given that the C Fund and the S Fund are intended to be complementary (based on legislative intent) and provide coverage of the entire U.S. opportunity set, we shortlist the large cap indices, namely the S&P 500 Index and the Russell 1000 Index, for further consideration. We believe the S&P 500 Index and Russell 1000 Index are compatible by many criteria.

Both indexes will be reviewed in conjunction with a recommendation for the benchmark for the S Fund to determine the most suitable combination for C and S Funds.

S FUND

Benchmarks Considered
We considered the following U.S. equity mid/small capitalization indexes in our initial review of benchmarks for the S Fund:

- Dow Jones U.S. Small Cap Total Stock Market Index (including 751-2500th stocks in DJ U.S. Total Stock Market Index ranked by capitalization)
- DJ U.S. Completion Total Stock Market Index (current benchmark, DJ U.S. Total Stock Market Index excluding S&P 500 Index members)
- MSCI USA Small Cap Index
- Russell 2000 Index
- S&P MidCap 400 Index
- S&P SmallCap 600 Index
- S&P 1000 Index (Combination of S&P 400 and S&P 600 Indexes)
- S&P Completion Index (S&P Total Market Index excluding S&P 500 members)

We eliminated the Dow Jones U.S. Small Cap Total Stock Market Index and the MSCI USA Small Cap Index as these indexes do not complement either of the two C Fund benchmarks under consideration, the S&P 500 Index and the Russell 1000 Index. While the S&P MidCap 400 Index complements the S&P 500 Index, it fails to capture a significant portion of U.S. small capitalization stocks. The S&P SmallCap 600 Index leaves out 400 mid-capitalization stocks when combined with the S&P 500 Index, and creates overlap when combined with the Russell 1000 Index. Though the S&P 1000 Index is more inclusive and complements the S&P 500 Index, it is not widely used, and lacks significant assets managed against it, either actively or passively. The S&P Completion Index complements the S&P 500 Index very well. The combination covers the entire U.S. opportunity set.

However, with about $18 billion in passive assets, Vanguard is the only fund manager who offers a fund benchmarked to the S&P Completion Index. Competitive bidding would not be feasible if the S&P Completion Index is recommended as the benchmark for S Fund. We therefore focus our attention on the remaining two benchmarks:

- Russell 2000 Index (as a complement to the Russell 1000 Index)
- DJ U.S. Completion Total Stock Market Index (as a complement to the S&P 500 Index)

A comparison between the two benchmarks is shown below in Table 8.

Table 8: Benchmark Comparison (As of 12/31/2011)

	Russell 2000	**DJ U.S. Completion Total Stock Market Index**
Inclusion criteria	Stocks ranking from 1,001 to 3,000 based on market cap	All stocks in the DJ U.S. Total Market Index minus the stocks in the S&P 500
# of securities	2,016	3,174
Market cap	$1.2 trillion	$2.5 trillion
Largest company's market cap	$3.8 billion	$23.4 billion
Smallest company's market cap	$8.0 million	> $1 million
Coverage of U.S. stocks	10%	23%
Reconstitution frequency	Annual	Quarterly
Turnover	15.0%	10.4%

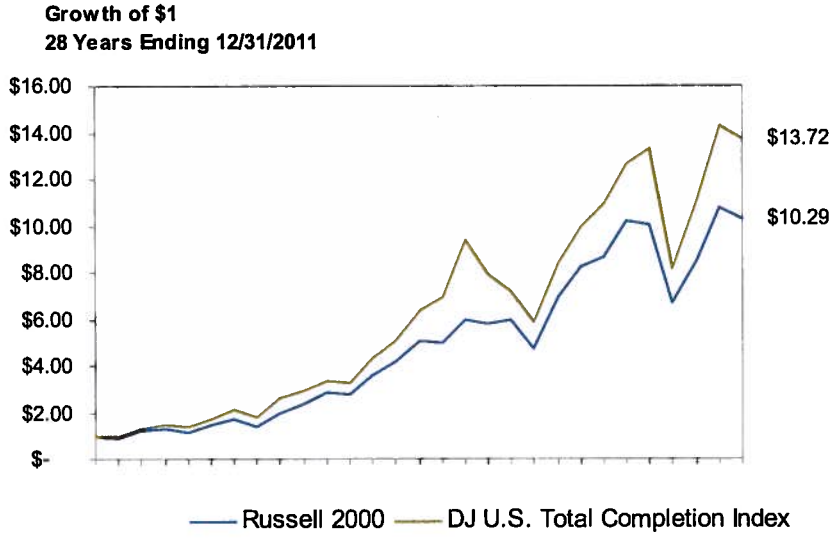
While the Russell 2000 Index provides coverage to only 10% of the U.S. stock market as opposed to 23% by the DJ U.S. Completion Total Stock Market Index, it is more relevant to consider it in combination with the Russell 1000 Index – resulting in 98% coverage of the market. The combination of the S&P 500 Index with the DJ U.S. Completion Total Stock Market Index provides 100% coverage.

An important point to note is the high turnover of the Russell 2000 Index relative to the DJ U.S. Completion Total Stock Market Index. The Russell 2000 Index is impacted by additions and deletions at the higher and the lower end of its market capitalization range, while the DJ U.S. Completion Total Stock Market Index is impacted mainly on the large cap end of its range (as stocks graduate to the S&P 500 Index), as it is all-inclusive on the smallest cap side. The high turnover exhibited by the Russell 2000 Index can result in higher transaction costs.

Performance

Chart 2 illustrates the growth of $1 invested in each of the indexes over the longest common time period. The DJ U.S. Completion Total Stock Market Index has performed better than the Russell 2000 Index due to the inclusion of more small-cap stocks and lower turnover ratio.

Chart 2



The correlation between the two indexes is shown below in Table 9. As shown, the correlation between the two indexes is quite high.

Table 9

Correlation Matrix

	Russell 2000	DJ U.S. Completion Total Stock Market Index
Russell 2000	1.000	
DJ U.S. Completion Total Stock Market Index	0.948	1.000

(Longest common time period = 28 years)

The annual return histories of the indexes and their cumulative annualized returns over several trailing historical periods are shown below in Table 10.

Table 10
Return History

	Russell 2000	DJ U.S. Completion Total Stock Market Index
1984	-7.3%	-1.7%
1985	31.1	32.0
1986	5.7	11.8
1987	-8.8	-3.5
1988	24.9	20.5
1989	16.2	23.9
1990	-19.5	-13.6
1991	46.0	43.5
1992	18.6	11.9
1993	18.9	14.6
1994	-1.8	-2.7
1995	28.4	33.5
1996	16.5	17.2
1997	22.4	25.7
1998	-2.5	8.6
1999	21.3	35.5
2000	-3.0	-15.8
2001	2.5	-9.3
2002	-20.5	-17.8
2003	47.3	43.8
2004	18.3	18.1
2005	4.6	10.0
2006	18.4	15.3
2007	-1.6	5.4
2008	-33.8	-39.0
2009	27.2	37.0
2010	26.9	28.4
2011	-4.2	-4.1
1 Year	-4.2%	-4.1%
3 Years	15.6	19.0
5 Years	0.2	1.6
10 Years	5.6	6.7
15 Years	6.3	6.9
20 Years	8.5	8.7
25 Years	8.7	9.4

Given the substantial differences in market coverage between the two indexes, annual returns tend to differ by relatively large margins. The difference in returns narrows over long periods of time but is still higher than that of large capitalization indexes.

The standard deviation of these benchmarks is shown in Table 11.

Table 11
Annualized Standard Deviation

	Russell 2000	DJ U.S. Completion Total Stock Market Index
5 Years	25.4%	30.0%
10 Years	24.2	25.2
15 Years	20.6	23.4
20 Years	18.7	21.0
25 Years	19.8	21.0

The DJ U.S. Completion Total Stock Market Index has posted higher returns over all historical periods at a slightly higher level of risk. The DJ U.S. Completion Total Stock Market Index has a higher Sharpe ratio over most of those periods.

Table 12
Sharpe Ratios

	Russell 2000	DJ U.S. Completion Total Stock Market Index
10 Years	0.17	0.21
15 Years	0.23	0.23
20 Years	0.38	0.34
25 Years	0.36	0.38

Over the longest common time period, the DJ U.S. Completion Total Stock Market Index has outperformed the Russell 2000 Index on a risk-adjusted basis. However, in combination with the corresponding large capitalization indexes, these differences are diminished.

Investability & Liquidity

Most of the significant players in the index fund management business offer Russell 2000 Index funds and DJ U.S. Completion Total Stock Market Index funds. Managers for the DJ U.S. Completion Total Stock Market Index funds typically hold all the mid-cap stocks, as well as most of the small cap stocks, and optimize the balance of the micro-cap segment. Again, they have shown an ability to do this at reasonable costs and tracking error. Fund managers tend to hold all the stocks in the Russell 2000 Index as part of their investment strategy.

Table 13 below compares the historical tracking errors of institutional index funds managed by BlackRock, SSgA, Bank of New York Mellon and Northern Trust (Vanguard does not manage stand-alone index funds benchmarked to either index). All managers have been successful in earning the returns of the indexes within a reasonable level of tracking error.

Table 13
Index Fund 5-YearTracking Error

	Russell 2000	DJ U.S. Completion Total Stock Market Index
BlackRock	0.17%	0.64%
SSgA	0.15	0.20
BNY Mellon	0.14	0.15
Northern Trust	0.17	0.33

Acceptance

An important consideration for index benchmark consideration is the benchmark's acceptance and use among the investment community. The following table displays the value of passively managed assets by four of the five leading fund managers and benchmarked to each of the two indexes.

Table 14
Assets Indexed to Benchmark

	Russell 2000	DJ U.S. Completion Total Stock Market Index
Passive Assets	$37 billion	$34 billion

Both indexes are accepted passive benchmarks. The assets managed by four of the five fund managers only account for about half of the total passive assets benchmarked to the two indexes. If other fund families and assets that are part of other mandates are included, the total assets managed to these benchmarks is much larger. For example, the Russell 2000 Index fund could be managed on a stand-alone basis or within the mandate of a Russell 3000 index fund, which has a much larger asset base. The same holds true for the DJ U.S. Completion Total Stock Market Index being managed alone or within the DJ U.S. Total Stock Market Index.

There is also a fairly large level of overlap that exists between the different small capitalization indices at the underlying security level. Given the large overlap in securities between the indices, providers hold and trade most of the same securities that are held in the DJ U.S. Completion Total Stock Market Index as part of their other small capitalization index strategies. As a result, we believe it is appropriate to consider assets managed to indices such as the S&P Completion Index, in addition to the Russell 2000 Index and the DJ U.S. Completion Total Stock Market Index, when assessing the size of total passive assets benchmarked to the indices discussed above.

Table 15

	Russell 2000	DJ U.S. Completion Total Stock Market Index	S&P Completion Index	Total U.S. Small Capitalization Stock Indexed AUM
Passive Assets	$37 billion	$34 billion	$18 billion	$89 billion

As of 12/31/2011

While the greatest amount of assets is passively managed against the Russell 2000 Index, the DJ U.S. Completion Total Stock Market Index has considerable passive assets managed against it as well.

Benchmark Recommendation for the C and S Funds

There are two combinations of benchmarks that make the most sense for the C and S Funds:

1. The current combination of the S&P 500 Index for the C Fund and the DJ U.S. Completion Total Stock Market Index for the S Fund; and
2. An alternate combination of the Russell 1000 Index for the C Fund and the Russell 2000 Index for the S Fund

Either of these combinations would be consistent with the FERSA provisions. We recommend that the existing benchmarks be maintained for the C and S Funds for the following reasons:

- Total passive assets benchmarked to the S&P 500 and DJ U.S. Completion Total Stock Market Index are about eight times of those benchmarked to the combination of Russell 1000 and Russell 2000.
- Potential transaction costs would be relatively lower for a combination of S&P 500 and DJ U.S. Completion Total Stock Market Index, given the scale of TSP plan.
- The costs associated with picking up the bottom 4% of market capitalization have not impacted index fund managers' ability to track the DJ U.S. Completion Total Stock Market Index.
- The S&P 500 Index has high recognition value among non-investment professionals, which constitute the vast majority of the participants.

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F Fund

Summary

We have reviewed the Fixed Income Investment Fund's (F Fund) legislative guidelines and compared its current benchmark the Barclays Capital Aggregate Bond Index (formerly, Lehman Brothers Aggregate Bond Index) to other leading fixed income market indices. We recommend the continued use of the Barclays Capital Aggregate Bond Index for the F Fund.

Legislative Guidelines

FERSA states the following as it relates to the F Fund:

(B) The Board shall establish a Fixed Income Investment Fund under which sums in the Thrift Savings Fund are invested in—

i. insurance contracts

ii. certificate of deposits; or

iii. other instruments or obligations selected by qualified professional asset managers, which return the amount invested and pay interest, at a specified rate or rates, on that amount during a specified period of time.

The guidelines for the eligible instruments in which the F Fund may invest are very general in nature. There is no guidance on whether investments may be made in non-U.S. dollar denominated debt, non-investment grade loans, U.S. dollar-denominated foreign debt, etc.

The legislative guidelines specify that the F Fund may invest in insurance contracts and certificates of deposits. We note that the relative stability in returns provided by insurance contracts and certificates of deposit is already available to participants through the Government Securities Investment Fund (G Fund). Insurance contracts and certificates of deposit are not included in marketable security fixed income benchmarks. As participants have access to an investment option in the G Fund that provides the key elements of insurance contracts and certificates of deposit – return of capital and payment of interest – we believe that it is appropriate to offer participants exposure to a broad array of marketable fixed income securities as the F Fund currently provides. Therefore, we focus our attention on the leading broad-based fixed income indexes that comprise publicly traded fixed income securities.

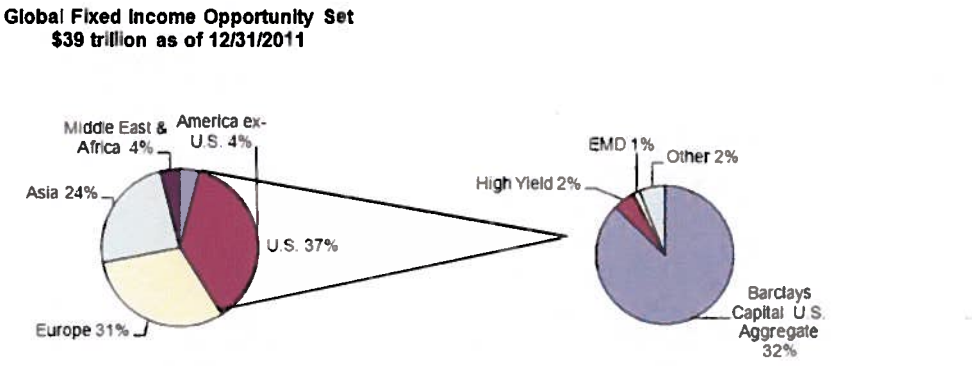
Benchmarks Considered

We initially considered the following indices in our review of reasonable benchmarks for the F Fund:

- Citigroup Broad Investment Grade (BIG) Bond Index
- Citigroup World Government Bond Index
- Barclays Capital Aggregate Bond Index (Current Benchmark)
- Barclays Capital Global Aggregate Bond Index
- Barclays Capital Universal Bond Index

Chart 3 below provides a representation of the global investable fixed income market. The Barclays Capital Aggregate Bond Index, the most widely used benchmark by U.S. institutional investors, is broken out as a sub-component of the global fixed income markets.

Chart 3



Source: Barlays Global Investors, UBS Global Asset Management

Benchmarks such as the Barclays Capital Aggregate Bond Index, Citigroup BIG Bond Index, as well as the Barclays Capital Universal Bond Index, capture only about 35% to 40% of the global fixed income opportunity set. Global fixed income benchmarks, such as the Citigroup World Government Bond Index and Barclays Capital Global Aggregate Bond Index, seem appealing given the broader coverage of the fixed income markets; however, there are little to no passive assets managed to such benchmarks. Additionally, global fixed income benchmarks are exposed to a meaningful amount of volatility associated with foreign currency exchange rate fluctuation and credit risk, which may not be appealing to a U.S. based investor in fixed income seeking stability in returns and principal. Our analysis, therefore, focuses on the Barclays Capital Aggregate, Barclays Capital Universal, and the Citigroup BIG indexes.

Table 16

	Barclays Capital Aggregate	Barclays Capital Universal	Citigroup BIG
Inclusion criteria	U.S. Investment grade, dollar denominated, non-convertible, fixed-rate instruments. Maturity greater than one year. Includes Treasuries, Agencies, mortgages, asset-backed securities, corporate debt. Minimum outstanding size $250 million.	Barclays Capital Aggregate + U.S. high yield, Eurodollars, municipal debt, U.S. dollar denominated emerging market debt	Similar to Barclays Aggregate, same minimum size on corporate and asset backed issues, but with higher minimum size requirements for Treasuries, Agencies and mortgage backed issues.
# of securities	7,829	11,951	5,072
Market cap	$15.9 trillion	$18.3 trillion	$14.7 trillion
Coverage of U.S. dollar denominated fixed income opportunity set	85%	100%	86%
Reconstitution frequency	Monthly	Monthly	Monthly

As of 12/31/2011

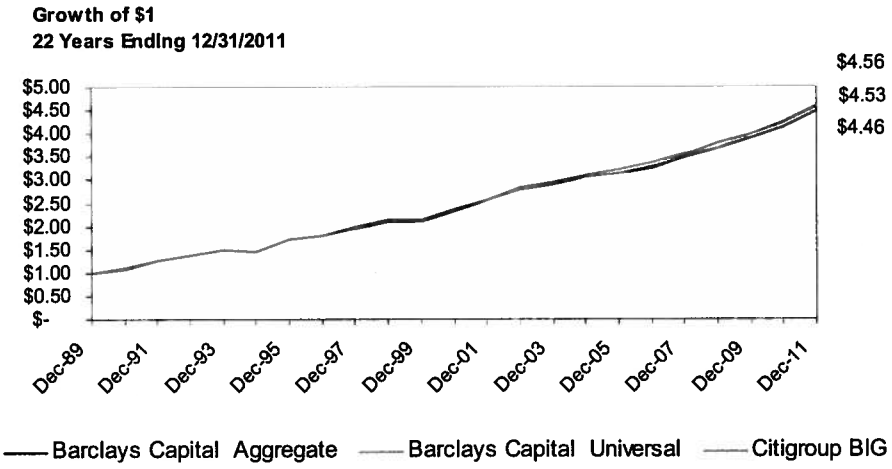
Source: Barclays Global Investors, Citigroup

The Citigroup BIG Index has far fewer securities as compared to both the Barclays Capital Aggregate Bond Index and the Barclays Capital Universal Index. The number of securities in the Barclays Capital Universal Index is about 50% higher than those in the Barclays Capital Aggregate, although the market capitalization increases by only $2.4 trillion, indicating the relatively small market value of outstanding issues in high yield, dollar denominated emerging market debt, and Eurodollar debt.

Performance

Chart 4 below illustrates the growth of $1 invested in each of the indexes over the longest common time period. All three indexes have performed quite similarly over time.

Chart 4



Source: Investorforce, Hewitt EnnisKnupp

Table 17 shows the correlation between each of these fixed income indexes, as well as with equities.

Table 17
Correlation Matrix *(Longest common time period = 21 years)*

	Barclays Capital Aggregate	Barclays Capital Universal	Citigroup BIG	DJ U.S. Total Market Index	MSCI EAFE	MSCI ACW ex-U.S.
Barclays Capital Aggregate	1.000					
Barclays Capital Universal	0.974	1.000				
Citigroup BIG	0.996	0.954	1.000			
DJ U.S. Total Market Index	0.149	0.306	0.098	1.000		
MSCI EAFE	-0.196	-0.028	-0.244	0.771	1.000	
MSCI ACW ex-U.S.	-0.200	-0.031	-0.263	0.754	0.999	1.000

As would be expected, all three fixed income indexes have a high correlation with each other. The correlation coefficient of the two investment grade indexes, the Barclays Capital Aggregate and the Citigroup BIG, with U.S. and international stocks is low, pointing towards the diversification benefit they provide in a portfolio. While the Barclays Capital Universal also provides a diversification benefit, the benefit is reduced because of a higher correlation due to the inclusion of high yield securities, emerging market debt, etc., which tend to have a higher correlation to equities.

F Fund

Table 18 details the annual return histories of the indices and their cumulative annualized returns over several trailing historical periods.

Table 18
Return History

	Barclays Capital Aggregate	Barclays Capital Universal	Citigroup BIG
1980	2.7%	--	2.8%
1981	6.2	--	6.5
1982	32.6	--	31.8
1983	8.4	--	8.2
1984	15.1	--	15.0
1985	22.1	--	22.3
1986	15.3	--	15.4
1987	2.8	--	2.6
1988	7.9	--	8.0
1989	14.5	--	14.4
1990	9.0	8.6%	9.1
1991	16.0	16.4	16.0
1992	7.4	7.5	7.6
1993	9.7	10.4	9.9
1994	-2.9	-3.1	-2.8
1995	18.5	18.5	18.5
1996	3.6	4.5	3.6
1997	9.7	9.8	9.6
1998	8.7	7.3	8.7
1999	-0.8	0.2	-0.8
2000	11.6	10.8	11.6
2001	8.4	8.1	8.5
2002	10.3	9.8	10.1
2003	4.1	5.8	4.2
2004	4.3	5.0	4.5
2005	2.4	2.7	2.6
2006	4.3	5.0	4.3
2007	7.0	6.5	7.2
2008	5.2	2.4	7.0
2009	5.9	8.6	5.1
2010	6.5	7.2	6.3
2011	7.8	7.4	7.9

1 Year	7.8%	7.4%	7.9%
3 Years	6.8	7.7	6.4
5 Years	6.5	6.4	6.7
10 Years	5.8	6.0	5.9
15 Years	6.3	6.4	6.4
20 Years	6.5	6.6	6.6
25 Years	7.2	--	7.2
30 Years	9.0	--	9.0

Source: Investorforce, Hewitt EnnisKnupp

The returns of the Barclays Capital Aggregate Bond Index and the Citigroup BIG Bond Index track each other closely over most annual periods and over trailing annualized periods. The Barclays Capital Universal differs more on an annual basis, but has generated similar returns as the other two indexes over long periods of time.

Table 19 below shows the volatility (annualized standard deviation) of the indexes over several trailing historical periods; there is little to no difference over long time periods.

Table 19
Annualized Standard Deviation

	Barclays Capital Aggregate	Barclays Capital Universal	Citigroup BIG
5 Years	1.0%	2.4%	1.1%
10 Years	2.2	2.4	2.2
15 Years	3.3	3.0	3.2
20 Years	4.6	4.5	4.6
25 Years	4.8	--	4.8
30 Years	7.0	--	6.9

As of 12/31/2011

Sharpe ratios for each of the indexes over various periods are shown in Table 20. The Barclays Capital Universal has a higher Sharpe ratio over fifteen and twenty years relative to the other benchmarks, indicating slightly better performance on a risk-adjusted basis.

Table 20
Sharpe Ratios

	Barclays Capital Aggregate	Barclays Capital Universal	Citigroup BIG
5 Years	5.04	2.05	4.87
10 Years	1.91	1.90	1.99
15 Years	1.48	1.64	1.52
20 Years	1.09	1.15	1.11
25 Years	1.17	--	1.19
30 Years	1.06	--	1.08

As of 12/31/2011

Investability & Liquidity

While the sheer number of securities in the Barclays Capital Aggregate Bond Index make it almost impossible to replicate the index precisely, index fund managers are able to track the benchmark quite closely by matching the industry, sector, duration, maturity, and quality characteristics of the Index. Passive managers that have assets managed against the Barclays Capital Aggregate Bond Index have over the years been able to accumulate a greater portion of the securities comprised in the index by investing securities when liquidity opportunities have presented themselves. For example, BlackRock held 5,912 securities to replicate the index, while State Street held 6,132 at the end of 2011.

The major index fund managers do not offer passive funds benchmarked to the Barclays Capital Universal Bond Index or the Citigroup BIG Bond Index. The high yield segment of the Barclays Capital Universal can also present some challenges in terms of trading costs and tracking error due to optimization, and can result in higher tracking error.

Table 21 compares the historical tracking error of institutional index funds managed to the Barclays Capital Aggregate Bond Index by leading index fund providers. Most of managers have been able to track the Barclays Capital Aggregate Bond Index closely. Vanguard's higher tracking error is primarily attributable to the timing of when the fund's net asset value (NAV) is struck, which is different than that of the index, and the use of a different pricing source than that of the index. Northern Trust's higher tracking error is primarily due to the impact of securities lending.

Table 21
Index Fund 5-Year Tracking Error

	Barclays Capital Aggregate	Barclays Capital Universal	Citigroup BIG
BlackRock	0.09%	--	--
SSgA	0.08	--	--
Vanguard	0.42	--	--
Bank of NY Mellon	0.11	--	--
Northern Trust	0.53	--	--

As of 12/31/2011

Acceptance

Table 22 displays the value of passively managed assets benchmarked to each of the three indexes by five leading index fund providers. As noted previously, the five index managers do not offer products indexed to the Barclays Capital Universal of Citigroup BIG indices.

Table 22
Assets Indexed to Benchmark

	Barclays Capital Aggregate	Barclays Capital Universal	Citigroup BIG
Passive Assets	$275 Billion	--	--

As of 12/31/2011

The Barclays Capital Aggregate is a widely-followed performance benchmark that is tracked by hundreds of billions of dollars in institutional assets. It is the most widely used fixed income benchmark by U.S.-based institutional investors. The Barclays Capital Universal has still not gained acceptance as a passive benchmark, with no products offered by the five major index managers. Similarly, there are no passive assets benchmarked to the Citigroup BIG Index.

F Fund

Benchmark Recommendation for the F Fund

We recommend that the Barclays Capital Aggregate Bond Index be maintained as the benchmark for the F Fund. The main reasons for our recommendation are as follows:

- The Barclays Capital Aggregate Bond Index provides broad coverage to the investment-grade U.S. fixed income market.
- It is the most widely recognized fixed income benchmark in the U.S.
- There are no material benefits associated with a change to the Citigroup BIG Bond Index in addition to the fact that the Citigroup BIG Index is not a commonly used benchmark across the institutional space and there are no passive assets that track the benchmark.
- The Barclays Capital Universal Bond Index provides broader coverage to an investor; however, it includes high yield debt which is more correlated to stocks, reducing the diversification benefit relative to the Barclays Capital Aggregate.

I Fund

Summary

We have reviewed the International Stock Index Investment Fund's (I Fund) legislative guidelines and compared its current benchmark index, the MSCI EAFE Index, to other leading international equity indexes.

Legislative Guidelines

The legislative guidelines that describe the I Fund are stated below:

(4)(A) The Board shall select an index which is a commonly recognized index comprised of stock the aggregate market value of which is a reasonably complete representation of the international equity markets excluding the United States equity markets.

(B) The International Stock Index Investment Fund shall be invested in a portfolio designed to replicate the performance of the index selected under subparagraph (A). The portfolio shall be designed such that, to the extent practicable, the percentage of the International Stock Index Investment Fund that is invested in each stock is the same as the percentage determined by dividing the aggregate market value of all shares of that stock by the aggregate market value of all shares of all stocks included in such index.

Benchmarks Considered

We initially short-listed the following benchmarks for the I Fund:

- Dow Jones Developed World ex-U.S. Index
- MSCI Europe, Australasia, Far East (EAFE) Index
- MSCI World ex-U.S. Index
- MSCI All Country World ex-U.S. (ACW ex-U.S.) Index
- MSCI All Country World ex-U.S. Investable Market Index (ACW ex-U.S. IMI)
- FTSE All World Developed ex-North America Index (AWD ex-N.A.)
- FTSE All World ex-U.S. Index (AW ex-U.S.)
- S&P/Citigroup Broad Market Index (BMI)
- S&P/Citigroup Primary Market Index (PMI)

We eliminated the Dow Jones Developed World ex-U.S. Index and the S&P/Citigroup indexes from further consideration based on the lack of significant passive assets managed to them. None of the major index fund managers offer funds indexed to these benchmarks, either in the U.S. or internationally.

The use of FTSE indexes is very limited in the U.S. For example, with $11.6 Billion benchmarked against the FTSE All World ex-US Index, Vanguard is the only index manager that manages significant dollar amount passive assets benchmarked against FTSE indexes in the U.S. Therefore, we excluded both FTSE indexes in further study. We compare the broad characteristics of each of the remaining benchmarks in Table 23.

Table 23
Benchmark Comparison (As of 12/31/2011)

	MSCI EAFE	MSCI World ex-U.S.	MSCI ACW ex-U.S.	MSCI ACW ex-U.S. IMI
Inclusion criteria	Targets 85% market-cap coverage of each country (Large and Mid Cap)	Same as MSCI EAFE	Same as MSCI EAFE	Includes Large, Mid, and Small Cap portions of each country
Country coverage	22 developed market countries	23 Developed countries (EAFE plus Canada)	23 developed countries + 21 emerging market countries	23 developed countries + 21 emerging market countries
Coverage of non-U.S. equity markets	55%	65%	86%	98%
# of securities	925	1,027	1,847	6,354
Market cap	$9.5 trillion	$11.2 trillion	$14.8 trillion	$16.9 trillion
Reconstitution frequency	Quarterly	Quarterly	Quarterly	Quarterly
Turnover	2.0%	2.1%	2.7%	3.1%

As of 1/31/2012

Table 24 compares the country allocation of each of the indices. Among developed countries, Canada is the third-largest country by market capitalization after the United Kingdom and Japan. Canada comprises 11.4% of the MSCI World ex-U.S. Index, which provides coverage of large and mid-cap stocks across developed countries.

It is also important to note that several emerging market countries have market capitalizations that are greater than several developed countries.

For instance, when evaluating the MSCI All-Country World ex-U.S. Index, which provides coverage of the large and mid-cap stocks across developed and emerging countries, countries such as Brazil, China, India, Russia, Korea, South Africa, and Taiwan have market capitalizations that are greater than those of several EAFE countries (Austria, Denmark, Greece, Ireland, New Zealand, Norway, Portugal, and Singapore).

Table 24
Country Allocations

	MSCI EAFE	MSCI World ex-U.S.	MSCI ACW ex-U.S.	MSCI ACW ex-U.S. IMI
Developed Markets				
Australia	8.8%	7.8%	6.0%	5.9%
Austria	0.4	0.3	0.2	0.2
Belgium	1.0	0.9	0.7	0.7
Canada	--	**11.4**	**8.8**	**8.7**
Denmark	1.1	1.0	0.8	0.8
Finland	0.9	0.8	1.2	0.6
Israel	0.7	0.6	0.6	0.5
France	8.4	7.5	5.7	5.8
Germany	7.5	6.6	5.1	5.2
Greece	0.2	0.1	0.1	0.1
Hong Kong	2.9	2.6	2.0	1.9
Ireland	0.4	0.3	0.3	0.3
Italy	2.3	2.0	1.6	1.6
Japan	22.9	20.3	15.6	15.4
Netherlands	2.4	2.1	1.6	1.6
New Zealand	0.2	0.2	0.1	0.1
Norway	1.1	1.0	0.7	0.7
Portugal	0.2	0.2	0.2	0.2
Singapore	1.8	1.6	1.2	1.2
Spain	3.0	2.7	2.1	2.1
Sweden	3.1	2.8	2.2	2.1
Switzerland	8.0	7.1	5.5	5.5
U.K	22.7	20.1	15.5	15.6
Emerging Markets				
Argentina	--	--	--	--
Brazil	**--**	**--**	**3.5**	**3.2**
Chile	--	--	0.4	0.4
China	**--**	**--**	**4.2**	**4.1**
Colombia	--	--	0.2	0.2

Czech Rep.	--	--	0.1	0.1
Egypt	--	--	0.1	0.1
Hungary	--	--	0.1	0.1
India	**--**	**--**	**1.4**	**1.5**
Indonesia	--	--	0.7	0.7
Jordan	--	--	--	--
Korea	**--**	**--**	**3.5**	**3.5**
Malaysia	--	--	0.8	0.9
Mexico	--	--	1.1	1.0
Morocco	--	--	0.0	0.0
Pakistan	--	--	--	--
Peru	--	--	0.2	0.2
Philippines	--	--	0.2	0.2
Poland	--	--	0.3	0.3
Russia	**--**	**--**	**1.5**	**1.3**
South Africa	**--**	**--**	**1.8**	**1.9**
Taiwan	**--**	**--**	**2.6**	**2.7**
Thailand	--	--	0.5	0.5
Turkey	--	--	0.3	0.3
Venezuela	--	--	--	--
Total Developed	100.0%	100.0%	76.5%	76.8%
Total Emerging	0.0%	0.0%	23.5%	23.2
Total Index	**100.0%**	**100.0%**	**100.0%**	**100.0%**

As of 12/31/2011

Source: MSCI Index Service

Performance

Chart 5 below represents the growth of $1 invested in each of the indexes over the longest common time period. MSCI World ex-U.S. and MSCI EAFE Indexes were launched in 1969, and MSCI ACW ex-U.S. in May 1994. MSCI ACW ex-U.S. IMI, the newest among the four, were launched in 2007.The performance of MSCI ACW ex-U.S. IMI in the following chart is back filled for illustration. Over the past 17 years, the MSCI ACW ex-U.S. Index has outperformed the other three indexes, primarily driven by favorable returns in the emerging markets over the last two decades.

Chart 5

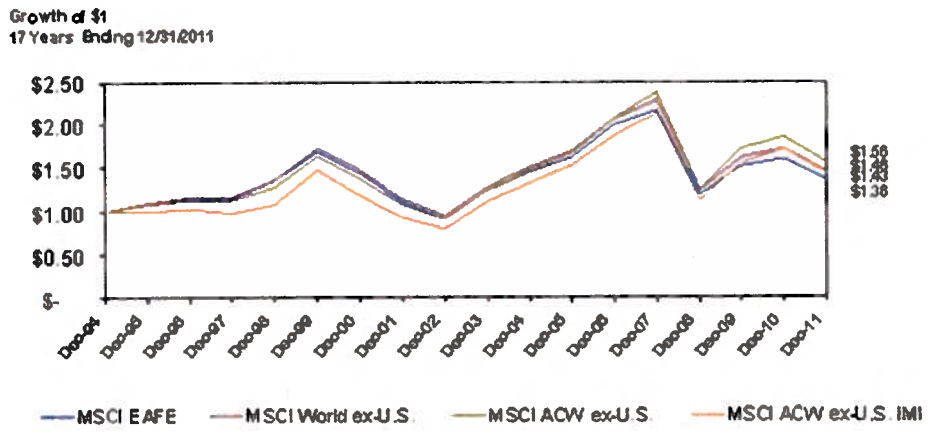


Table 25 shows the correlation between the indices under consideration. As expected, the correlation between the indices is high.

Table 25
Correlation Matrix

	MSCI EAFE	MSCI World ex-U.S.	MSCI ACW ex-U.S.	MSCI ACW ex-U.S. IMI
MSCI EAFE	1.000			
MSCI World ex-U.S.	0.999	1.000		
MSCI ACW ex-U.S.	0.990	0.994	1.000	
MSCI ACW ex-U.S. IMI	0.973	0.978	0.991	1.000

(Longest common time period = 17 years)

I Fund

Table 26 compares the correlation for the indices under consideration for the I Fund with those recommended for the C, S, and F Funds.

Table 26
Correlation Matrix

	Barclays Aggregate	S&P 500	DJ U.S. Completion	MSCI EAFE	MSCI World ex-U.S.	MSCI ACW ex-U.S.	MSCI ACW ex-U.S. IMI
Barclays Aggregate	1.000						
S&P 500	0.046	1.000					
DJ U.S. Completion	-0.157	0.910	1.000				
MSCI EAFE	-0.310	0.816	0.883	1.000			
MSCI World ex-U.S.	-0.316	0.814	0.888	0.999	1.000		
MSCI ACW ex-U.S.	-0.346	0.780	0.887	0.990	0.994	1.000	
MSCI ACW ex-U.S. IMI	-0.441	0.712	0.856	0.973	0.978	0.991	1.000

(Longest common time period = 17 years)

I Fund

Annual calendar year returns as well as annualized trailing-period returns are shown in Table 27.

Table 27
Return History

	MSCI EAFE	MSCI World ex-U.S.	MSCI ACW ex-U.S.	MSCI ACW ex-U.S. IMI
1970	-14.1%	-16.8%	--	--
1971	26.1	28.2	--	--
1972	33.3	35.9	--	--
1973	-16.8	-13.4	--	--
1974	-25.6	-22.2	--	--
1975	31.2	26.9	--	--
1976	-0.4	-0.6	--	--
1977	14.6	12.6	--	--
1978	28.9	27.6	--	--
1979	1.8	6.3	--	--
1980	19.0	19.8	--	--
1981	-4.9	-6.5	--	--
1982	-4.6	-4.2	--	--
1983	20.9	21.0	--	--
1984	5.0	0.6	--	--
1985	53.0	47.7	--	--
1986	66.8	62.7	--	--
1987	23.2	22.8	--	--
1988	26.7	25.8	25.9%	
1989	9.2	9.8	10.3	
1990	-24.7	-24.4	-24.3	
1991	10.2	10.1	11.5	
1992	-13.9	-14.0	-13.0	
1993	30.5	30.1	32.4	
1994	6.2	5.8	4.8	
1995	9.4	9.6	7.8	5.5%
1996	4.4	5.2	4.7	3.1
1997	0.2	0.7	0.2	-5.0
1998	18.2	17.0	12.4	10.3
1999	25.3	26.2	28.8	36.2
2000	-15.2	-14.4	-16.3	-20.3
2001	-22.6	-22.6	-21.0	-21.0
2002	-17.5	-17.4	-16.5	-14.5
2003	35.3	36.2	37.5	39.1
2004	17.6	17.8	18.3	19.4
2005	10.9	11.9	13.9	15.0
2006	23.5	22.9	23.8	23.8
2007	8.6	9.9	14.1	13.6
2008	-45.1	-45.2	-47.1	-47.5
2009	27.7	29.7	37.4	39.6

2010	4.9	6.2	8.4	10.0
2011	-14.8	-14.8	-16.1	-16.7
1 Year	14.8%	-14.8%	-16.1%	-16.7%
3 Years	4.5	5.5	7.7	8.6
5 Years	-7.4	-6.7	-5.5	-5.3
10 Years	2.0	2.6	3.8	4.4
15 Years	1.2	1.6	2.2	2.2
20 Years	2.5	2.8	3.2	--
25 Years	3.4	3.6	--	--
30 Years	6.8	6.6	--	--
35 Years	7.4	7.3	--	--
40 Years	6.6	6.7	--	--

As of 12/31/2011

Source: Investorforce

Table 28 shows the volatility (cumulative annualized standard deviation) of the indexes over several trailing historical periods. The MSCI ACW ex-U.S. Index and the MSCI ACW ex-U.S. IMI indices have exhibited modestly higher volatility over all time periods as compared to the MSCI EAFE and the MSCI World ex-U.S. indices. The volatility of the MSCI EAFE and the MSCI World ex-U.S. indices are comparable over all time periods.

Table 28
Annualized Standard Deviation

	MSCI EAFE	MSCI World ex-U.S.	MSCI ACW ex-U.S.	MSCI ACW ex-U.S. IMI
5 Years	27.6%	28.5%	32.2%	33.1%
10 Years	24.5	24.8	26.6	27.1
15 Years	22.6	22.8	24.2	25.5
20 Years	20.8	20.9	22.1	--
25 Years	20.3	20.4	--	--
30 Years	23.4	22.7	--	--
35 Years	22.1	21.5	--	--
40 Years	22.4	21.7	--	--

As of 12/31/2011

The realized Sharpe ratios for each of the indexes are shown in Table 29.

Table 29
Sharpe Ratios

	MSCI EAFE	MSCI World ex-U.S.	MSCI ACW ex-U.S.	MSCI ACW ex-U.S. IMI
10 Years	0.02	0.04	0.08	0.11
15 Years	--*	0.00	0.03	0.03
20 Years	0.05	0.06	0.08	--
25 Years	0.09	0.11	--	--
30 Years	0.22	0.23	--	--
35 Years	0.27	0.27	--	--
40 Years	0.23	0.24	--	--

As of 12/31/2011

* Negative Sharpe ratios are excluded

The MSCI ACW ex-U.S. index and the MSCI ACW ex-U.S. IMI indices have registered higher Sharpe ratios than the MSCI EAFE and the MSCI World ex-U.S. indices over all periods for which comparative data is available. This is attributed to the inclusion of emerging markets equities, which have outpaced developed market equities over the last two decades. The MSCI World ex-U.S. index has registered a slightly higher Sharpe ratio than the MSCI EAFE index over all periods.

Investability & Liquidity

All the benchmarks under consideration take into account the liquidity of stocks for inclusion in the index. Although some stocks in certain smaller countries can be difficult to trade, index fund managers still hold most, if not all stocks, though they may have a higher tolerance for mis-weights as the benefit from matching the weights can be more than offset by transaction costs.

Investors have become increasingly interested in the non-U.S. equity markets over the past decade. Institutional investors have embraced non-U.S. equity as an essential asset class in the asset allocation plan. Liquidity in the non-U.S. equity related index products has increased substantially as a result.

More specifically, liquidity in the markets related to the four indexes has reached sizeable level, as shown in Table 30.

Table 30
Average Daily Trading Volume (ADV)
As of 2/14/2012

	MSCI EAFE	MSCI World ex-U.S.	MSCI ACW ex-U.S.	MSCI ACW ex-U.S. IMI
30 Days	5,063,509,000	5,187,200,000	65,391,460,000	75,999,970,000
3 Months	4,614,283,000	4,732,509,000	59,373,180,000	69,371,130,000
6 Months	5,157,466,000	5,283,664,000	61,544,590,000	71,802,030,000

Source: Bloomberg

The five-year tracking errors of institutional index funds managed by five top index fund managers benchmarked to the MSCI family of indexes are shown in Table 31. As shown, most managers have been able to track the indexes quite closely. Vanguard exhibits somewhat higher tracking error due to the use of fair value pricing within the mutual funds. In addition, note that BNY Mellon currently manages funds benchmarked to the MSCI World ex-U.S. and MSCI ACW ex-U.S. Fund, but does not have five years of historical returns as of 12/31/2011.

Table 31
Index Fund 5-Year Tracking Error

	MSCI EAFE	MSCI World ex-U.S.	MSCI ACW ex-U.S.	MSCI ACW ex-U.S. IMI
BlackRock	2.98%	0.14%*	0.16%**	0.23%*
SSgA	1.67	0.25*	0.20***	0.20*
Vanguard	3.23	N/A	N/A	3.13[2]
BNY Mellon	0.25*	N/A	N/A	N/A
Northern Trust	0.14*	0.13*	0.24*	0.39*

As of 12/31/2011

*Represents tracking error of non-daily valued fund

**Represents tracking error of non-daily valued fund. Daily valued MSCI ACW ex-U.S. has a three year history and a realized tracking error of 2.05% over this period

*** Represents tracking error of non-daily valued fund. The daily valued MSCI ACW ex-U.S. has a three year realized tracking error of 1.72%

[2] Vanguard's benchmark for their Total International Stock Index has changed over time: Consists of the Total International Composite Index (composed of MSCI Europe, MSCI Pacific, and MSCI Emerging Markets Index) through August 31, 2006; the MSCI EAFE + Emerging Markets Index through December 15, 2010; and the MSCI ACWI ex USA IMI Index thereafter.

Acceptance

The MSCI indexes are the most widely followed non-U.S. stock indexes for U.S. based institutional investors. Table 32 shows the assets indexed to each of the international MSCI indexes.

Table 32
Assets Indexed to Benchmark

	MSCI EAFE	MSCI World ex-U.S.	MSCI ACW ex-U.S.	MSCI ACW ex-U.S. IMI
Passive Assets	$144 billion	$36 billion	$64 billion*	$76 billion*

*In the chart above, we illustrate the assets that are benchmarked to the underlying index. This information represents assets indexed to each unique benchmark and does not factor any overlap in indexed assets between the different benchmarks.

While the MSCI EAFE Index has the greatest amount of passive assets benchmarked to it as compared to the other indices, the MSCI World ex-U.S. Index, MSCI ACW ex-U.S. IMI Index and the MSCI All Country World ex-U.S. Index all have considerable passive assets managed against them as well. We also note that the index fund providers that offer an MSCI ACW ex-U.S. strategy use a combination of different country and regional funds to create their offering, or may offer standalone emerging markets funds. Hence assets benchmarked to the MSCI ACW ex-U.S. Index are several times greater than the $64 billion would suggest. Further to that point, while the amount of assets managed to the MSCI World ex-U.S. appears lower than the other benchmarks, the assets within this index are a considerable portion (>50%) of the MSCI ACW ex-U.S. and MSCI ACW ex-U.S. IMI.

The MSCI ACW ex-U.S. IMI provides the broadest coverage of the international opportunity set in that it also includes smaller capitalization stocks across the non-U.S. equity markets that are not in the MSCI ACW ex-U.S. Index. The MSCI ACW ex-U.S. IMI Index was launched in 2007 and it is not yet a commonly used benchmark across large institutional investment programs. As such, given that the MSCI ACW ex-U.S. IMI is not as widely used in the institutional space, we prefer MSCI ACW ex-U.S. Index over MSCI ACW ex-U.S. IMI in the analysis for the I Fund.

Analysis of International Equity Benchmarks

Modern portfolio theory suggests that the "market portfolio" is the most efficient portfolio (in terms of risk/return trade-off) that an investor can hold. The "market portfolio" is a market-cap weighted sum of all available asset classes/regions/countries. Excluding segments of the market limits investors' opportunities (return and/or diversification potential).

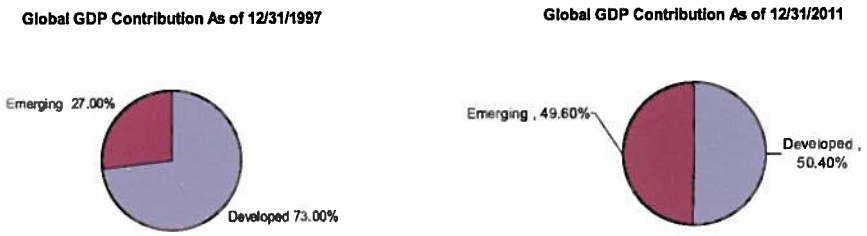
In general, we recommend constructing equity portfolios with the broadest possible market coverage. For instance, we recommend the DJ U.S. Total Stock Market Index, which provides complete coverage of large, mid, and small-cap stocks, as the benchmark for the broad U.S. equity market.

The C and S Fund's recommended benchmarks, the S&P 500 Index and the DJ U.S. Completion Total Stock Market Index, respectively, when combined, provide coverage of the broad U.S. equity opportunity set that is very similar to the coverage provided by the DJ U.S. Total Stock Market Index.

The I Fund's existing benchmark, the MSCI EAFE Index, excludes Canada and the emerging markets. As noted earlier, the Canadian equity market is the third-largest equity market outside of the U.S. Emerging markets represent nearly a fourth of the non-U.S. equity opportunity set. Moreover, emerging markets represent a significant and growing portion of global growth or GDP and an increasingly larger portion of the world equity market capitalization. Over the past two decades, emerging economies, such as Brazil, China, India, Russia and South Africa, have expanded at a much faster pace than developed countries.

Today, emerging markets contribute to half of global GDP as compared to 27% in 1997 (shown in Chart 6).

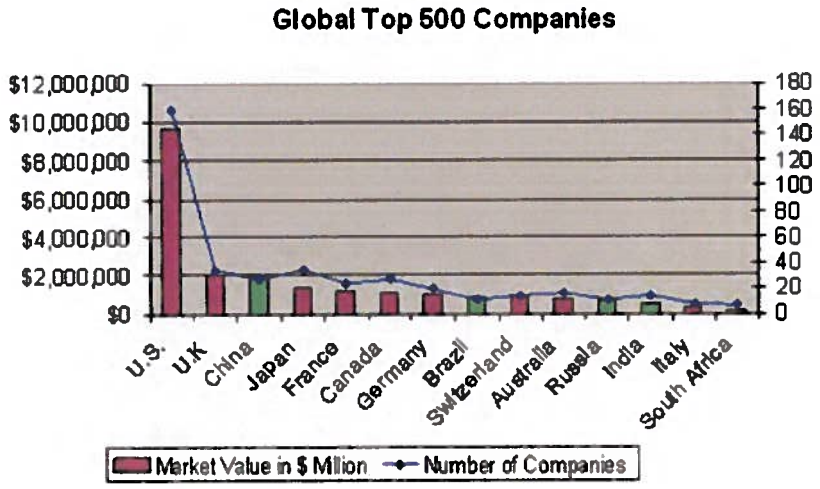
Chart 6: World GDP Breakdown



Source: The Conference Board of Global Economic Outlook

With the growth in emerging economies, several of the world's top-500 companies by market capitalization are based in the emerging markets (See Chart 7).

Chart 7: Emerging markets presence in the global capital markets



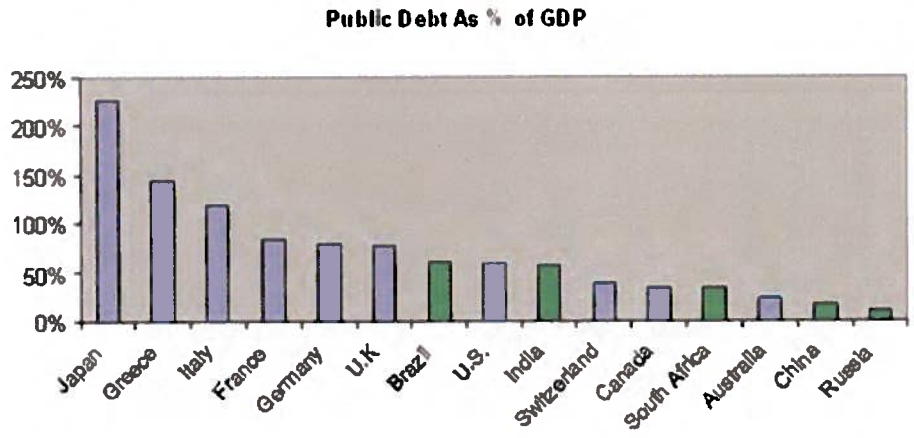
As of 12/31/2011
Source: Financial Times

Market participants broadly expect emerging economies to continue to grow at a faster pace than developed economies. Reasons include:

- Favorable demographics and a growing middle class
- Growth in local consumption demand
- Improving economic, legal and regulatory systems
- Disciplined fiscal and monetary policies

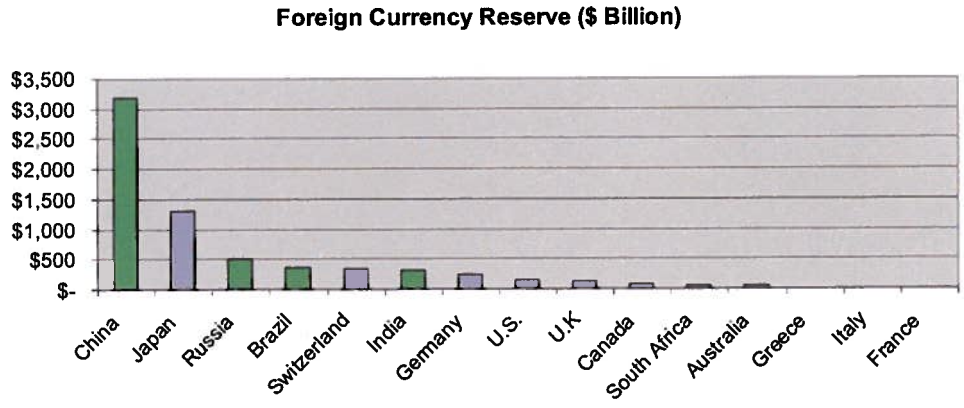
Emerging countries today run surplus budgets and are much less burdened by massive amounts of public debt as compared to their developed counterparts (Chart 8). Several emerging market countries have also accumulated massive amounts of foreign currency reserves (Chart 9), which have proven to provide a cushion against external economic shocks. The growth in foreign currency reserves, combined with a growth in domestic consumption, helped many emerging economies soften the impact of the global economic downturn.

Chart 8



As of 12/31/2011
Source: CIA World Factbook

Chart 9



As of 12/31/2011
Source: IMF

Along with the growing economic power of emerging markets as a whole, the capital markets in several emerging countries have also evolved over the past decade. Data from The World Federation of Exchanges shows that, assessed by total market capitalization and trade value, China's two major stock exchanges, if combined, rank the third-largest in the world after the New York Stock Exchange and NASDAQ. Other emerging countries such as Brazil, India, and Russia also claimed spots within the top-20 stock exchanges at the end of 2011. With the improved liquidity and transparency, lower transaction costs, and improved property rights and legal protections, institutional investors have become more comfortable investing in emerging markets.

While the case for investing in emerging markets has become more compelling, emerging markets have experienced, and, in our opinion, will experience greater volatility than developed markets. Some of the risks in emerging markets include:

- Political risk (rogue regimes, expropriation of assets, etc.)
- Slowing down or a reversal of favorable economic and monetary policies
- A higher willingness based on historical experience to default or devalue their currencies
- Growth that is heavily dependent on or tied to growth in developed markets (exports, commodities, etc.)

While several of these risks are not easily quantified, we do believe investors get compensated for these risks on a risk-adjusted basis. The volatility of emerging markets has been higher than developed markets over the last decade or two, but emerging markets have been able to outperform developed markets on risk-adjusted basis.

Table 33 shows Hewitt EnnisKnupp's expected returns and risk (volatility) for developed and emerging markets over the long-term. These represent 30-year forward looking expectations.

Table 33
Hewitt EnnisKnupp – Capital Market Expectations (Q1 2012)

	Expected Return	Expected Risk
Developed Markets	8.8%	21.0%
Emerging Markets	10.5%	30.0%

As shown, we expect emerging markets to perform favorably as compared to developed markets, but at a materially higher level of risk.

Overall, we favor a benchmark that includes both Canada and the emerging markets as it provides broader coverage of the international equity markets, more fully captures global growth, and provides enhanced diversification of the international equity portfolio. From a theoretical standpoint, we

recommend that clients utilize the MSCI ACW ex-U.S. or MSCI ACW ex-U.S. IMI as these indices provide complete coverage of the global equity opportunity set.

However, as we consider an appropriate benchmark for the I Fund, it is important to take into account the Thrift Savings Plan's unique circumstances. These include:

- Need to provide daily-liquidity
- Funds managed on a post notified basis
- Move to separate account structure that eliminates commingling with other investors' assets
  - Reduced crossing opportunities, which may result in higher transaction costs
  - Administrative complexities: Coordinating custody account openings in emerging markets, which are generally more complex and time consuming.

Considerations in Expanding the I Fund benchmark to Index Emerging Markets

As we review the I Fund's current benchmark, the MSCI EAFE Index, the case to include Canada is very compelling and obvious given that it is the third-largest equity market outside the U.S. and a country that participants should have familiarity with.

The case for the inclusion of emerging markets, while compelling, needs further investigation. The foremost consideration in expanding the I Fund benchmark to include emerging markets is the need to provide daily liquidity. A sufficient level of cash must be maintained in the fund to meet participant withdrawal needs. As an example, BlackRock, the existing manager of the I Fund, holds approximately 3% of the Fund's assets in cash in order to meet routine liquidity needs. The cash is equitized to the markets using futures contracts. While the use of futures contracts minimizes the cash drag on the portfolio, the futures contracts may not always track the benchmark precisely (if multiple country futures contracts are used to track a benchmark) or may not have adequate levels of liquidity. These could be potential sources of tracking error.

We reviewed the TSP I Fund's daily cash flow activity over the three-year period ending December 31, 2011. As of December 31, 2011, the I Fund's assets stood at $21.2 billion, as compared to $12.7 billion in January 2009. This period was characterized by significant volatility in capital markets broadly, but especially in international equity markets.

A general trend that we noticed with respect to participant cash flow activity in the I Fund is that transfers into the I Fund tended to follow periods of favorable international equity market performance, while transfers out of the I Fund tended to increase in periods of poor international equity market performance.

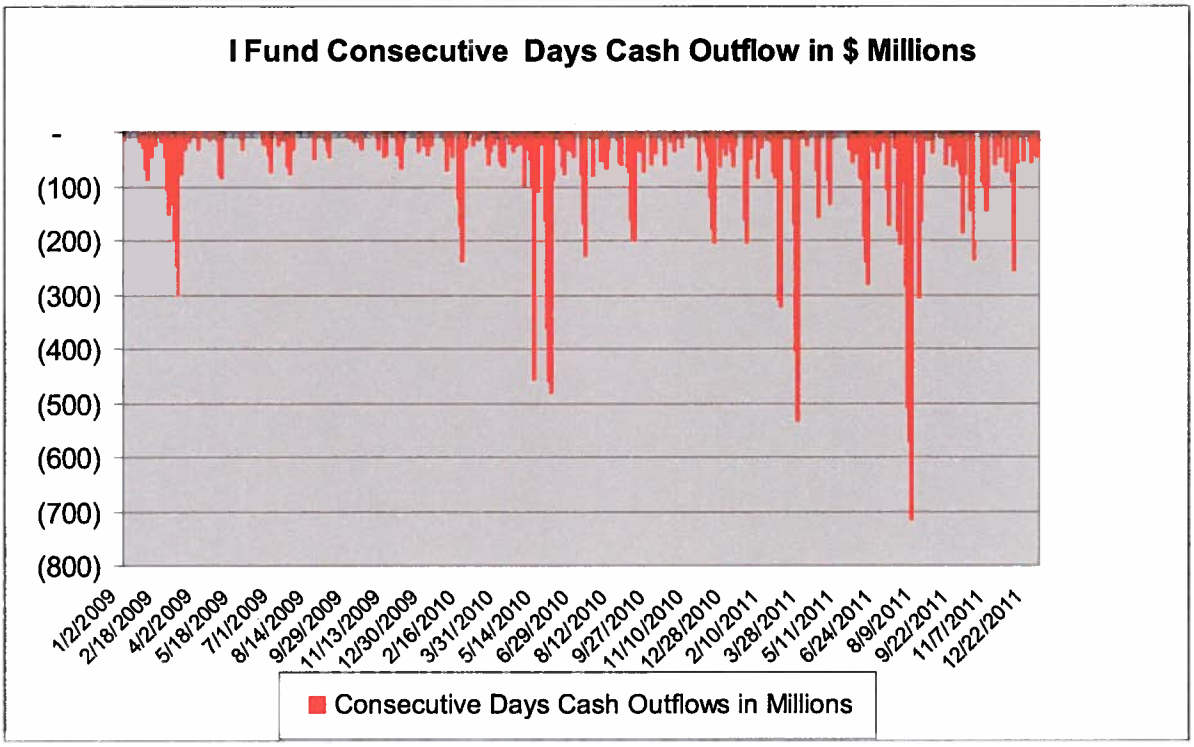
We focused our attention on withdrawals out of the I Fund over the three-year period in order to assess the ability to provide liquidity on a daily basis to meet participant redemption requests. The average daily withdrawal over the period was $35 million, which on an asset base of $21 billion represents about 0.17%

of assets. The largest single cash withdrawal out of the I Fund was $287 million, which occurred on August 8, 2011. This cash flow represented 1.3% of the I Fund's assets as of that day. While the data shown on the following page does not include 2008, we do note that in January 2008 there were four consecutive days where the total net cash flow equaled approximately $1.5 billion, illustrating an extreme outcome that should be noted and considered when evaluating the cash flow needs of the TSP.

While the average daily cash withdrawal and the largest single day withdrawal are well within the cash buffer that it maintained to meet ongoing liquidity, as mentioned earlier, withdrawals tend to spike around periods of poor market performance. We reviewed aggregate cash flows over consecutive days of withdrawals out of the I Fund over a three year period. There were 32 instances when aggregate withdrawals over consecutive days exceeded $200 million over this period and 16 instances when aggregate withdrawals over consecutive days exceeded $300 million. Chart 10 shows the trend in aggregate withdrawals over consecutive days over the three-year period.

There has been one instance where cash flows over multiple days exceeded $700 million (which occurred between July 20 and July 29, 2011).

Chart 10



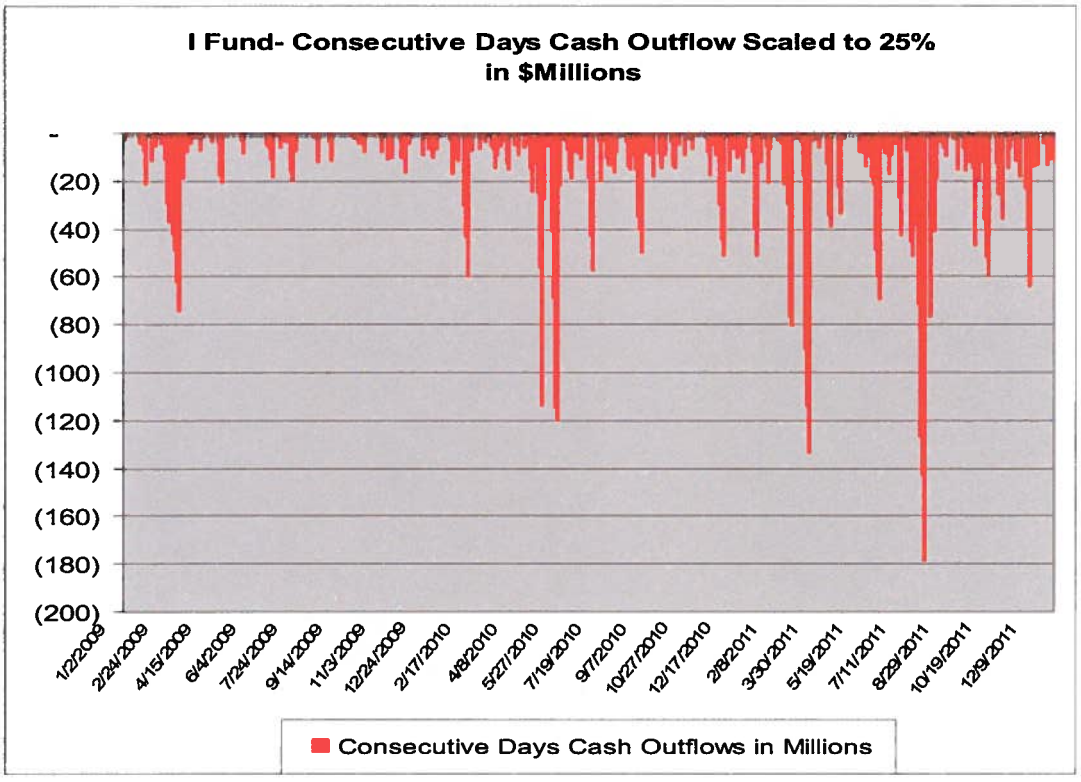
I Fund

As we think about the inclusion of emerging markets into the benchmark for the I Fund, it is critical to take into consideration the liquidity needs of the TSP. While the liquidity in emerging markets has generally improved, we typically see a flight to quality from emerging markets (and other riskier markets) in times of market stress. Liquidity can be adversely impacted in times of market stress.

Based on discussion with index fund managers, they indicate that they are normally able to trade about $200 million to $300 million in emerging market flow on a daily basis, without impacting the prices of securities adversely.

Chart 11 shows the withdrawals over consecutive days for the I Fund at 25% of the actual cash flow. Emerging markets represent 25% of non-U.S. equity markets and hence this analysis gives us a sense for the potential extent of emerging market flows.

Chart 11



While the average cash outflow (from the I Fund scaled to 25%) over this period appears to be well within the $200 - $300 million range that managers indicate that they are able to comfortable trade in emerging markets, there are several instances where the cash flows over consecutive days have exceeded $100 million.

Further, it is important to note that these cash flows represent I Fund (developed market) cash flows scaled to 25%. The inclusion of emerging markets in the I Fund benchmark could result in a higher level of cash withdrawals in times of market stress given the higher volatility of emerging markets.

In addition to liquidity, it is also important to think about the potential increase in tracking error that could result from management of fund liquidity when emerging markets are included. Managers who manage products benchmark to broad-based non-U.S. equity indices that include emerging markets, tend to trade developed markets on more frequent basis than emerging markets in order to meet ongoing fund liquidity needs. Managers typically are willing to trade developed markets every day, or as needed, and emerging markets on a weekly basis. Given the size of their index funds benchmarked to such broad-based products, managers are willing to take on a reasonable level of mismatch between weights of developed and emerging market portions of their funds relative to the index in order to meet liquidity needs. Given the size of their funds, these mismatches tend to be small.

With the move to a separate account, the TSP loses the benefit of commingling of assets with a wider asset base. As a result, when large cash flows occur, as they have over the past three years, and assuming emerging markets are only traded on a weekly basis, there is the potential for the mismatch between the developed and emerging portions to increase relative to the index, which could increase the Fund's tracking error.

In addition, the material mismatch in benchmark weight between developed and emerging markets could cause a potential conflict of the I Fund's mandate relative to the guidelines specified in its statute, which requires that underlying security weights closely replicate weights of securities in the benchmark.

While the case for including emerging markets in the I Fund's benchmark is compelling, the liquidity dynamics of the I Fund gives us pause. Although emerging market liquidity has generally improved, liquidity becomes an issue in times of market stress. Moreover, based on the fact that index fund managers typically trade emerging markets less frequently than developed markets, there is the risk that the mismatch between the weight of emerging and developed markets can become high in times of market stress when there are large withdrawals. This could result in an increase in fund tracking error that will impact all participants – not just participants that initiated withdrawals. In light of these challenges, we do not recommend inclusion of emerging markets within the I Fund benchmark at this time, but recommend the inclusion of Canada.

As such, we recommend replacing the I Fund's current benchmark, the MSCI EAFE Index, with the MSCI World ex-U.S. Index (which is essentially the MSCI EAFE Index + MSCI Canada Index).

Transaction Costs

Table 34 details the estimated costs involved in transitioning the Fund's benchmark from the MSCI EAFE Index to the indexes under review. The estimated cost in dollars is based on expected trading costs and the asset value of the I Fund as of December 31, 2011, which was $21 billion.

Table 34
Trading Costs

	MSCI World ex US		MSCI ACW ex US		MSCI ACW ex-U.S. IMI	
	bps	$	bps	$	bps	$
Commissions	0.9	$1,836,415	4.1	$8,546,884	5.0	$10,516,307
Taxes	0.0	$89,609	1.7	$3,493,839	2.7	$5,607,282
Bid/Ask Spread	0.8	$1,684,867	3.9	$8,202,439	6.1	$12,904,821
Market Impact	2.9	$6,156,430	10.7	$22,463,379	14.7	$30,859,264
Mean Expected Cost	**4.9**	**$10,210,834**	**20.3**	**$42,706,541**	**28.5**	**$59,887,674**
Opportunity cost	+/-13.5	+/-$28,437,564	+/-30.4	+/-$63,782,471	+/-31.4	+/-$65,988,474

Source: BlackRock

The transaction cost associated with transitioning the I Fund's benchmark from the MSCI EAFE Index to the MSCI World ex-U.S. Index is expected to be about 5 basis points or approximately $10 million on average. Depending on market activity at the time of the transition, we would expect the actual cost of transition to range between a cost of 18.5 bps ($38.6 million) or a gain of 8.5 bps ($18.2 million) about 67% of the time. We believe that these transition costs are reasonable given the complete coverage of developed equity markets that will be achieved with the inclusion of Canada.

We recommend that the transition be conducted in a phased, methodical manner over a period of time as liquidity opportunities present themselves, as opposed to a transition in a day or a few days. The actual transition strategy should be worked out with the index fund manager in order to determine timing based on natural liquidity events that may help reduce overall cost.

Benchmark Recommendation for the I Fund

We recommend replacing the I Fund's benchmark, which is currently the MSCI EAFE Index, with the MSCI World ex-U.S. Index, which is the MSCI EAFE + MSCI Canada indices.

- The MSCI indices remain the most popular indices for U.S. based institutional investors investing in overseas equity markets.

I Fund

- Canada is the third-largest equity market in the world, representing 11% of the developed non-U.S. equity opportunity set.
- The transition costs associated with the change in the I Fund benchmark are reasonable.
- While the amount of assets benchmarked to the MSCI World ex-U.S. Index is small in comparison to other indices, such as the MSCI EAFE and the MSCI ACW ex-U.S. Indices, Canada is a component (nearly 10%) of the MSCI ACW ex-U.S. Index and there is well over $100 billion in institutional assets under management managed to this benchmark.
- The tracking error of the MSCI World ex-U.S. Index has been comparable to that of the MSCI EAFE Index and we expect similar levels of tracking error from both indices over time.