

A blurred background image of a business meeting. Several people in professional attire are seated at a table, looking at documents and writing. The focus is on the hands and pens of the people in the foreground, with the rest of the scene softly out of focus.

Benchmark Study for the Thrift Savings Plan

Federal Retirement Thrift Investment Board

November 28, 2017

Aon Hewitt
Retirement & Investment

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Agenda

- Executive Summary
- C and S Funds
- F Fund
- I Fund



Broaden the I
Fund Benchmark
Coverage

Executive Summary

- The Federal Thrift Savings Plan (TSP) requested Aon Hewitt Investment Consulting, Inc. (“AHIC”) 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 Index Investment Fund (F Fund)
 - International Stock Index Investment Fund (I Fund)

- AHIC completed the following tasks:
 - Reviewed multiple indexes/benchmarks for each investment option
 - Construction methodology and opportunity set covered by each
 - Investability and liquidity of the indexes
 - Acceptance of the indexes by the investment community
 - Appropriateness of the indexes for the TSP
 - Estimated costs associated with making a change

- **AHIC recommends that the TSP broaden the I Fund Benchmark from the MSCI EAFE Index to the MSCI ACWI ex U.S. Investable Market Index**

C and S Funds: Overview

- Legislation mandates that the C and S Funds complement one another and do not overlap
- Two viable stock index combinations for the TSP to consider:
 - S&P 500 Index and DJ U.S. Completion Total Stock Market Index (**current structure**)
 - Russell 1000 Index and Russell 2000 Index
- The TSP has two viable stock index combinations for the following reasons:
 - Provide broad coverage of U.S. stock market (over 98% of U.S. market's capitalization is covered)
 - Acceptance by investors; indexes are the most widely followed in terms of assets managed against
 - Availability of products from top passive providers

U.S. Equity Benchmark Implementation Comparison

Market Cap

\$750.9 B	DJ U.S. Total Stock Market Index 3,800 largest U.S. stocks 100% of the U.S. equity market cap LARGEST \$750.9 B	S&P 500 Index 82% of U.S. market cap LARGEST \$750.9 B	Russell 3000 Index 3,000 largest U.S. stocks 98% of the U.S. equity market cap LARGEST \$750.9 B	Russell 1000 Index 92% of the Russell 3000 Index LARGEST \$750.9 B
\$2.8 B		SMALLEST \$2.8 B		
\$1.8B		DJ US. Completion Total Stock Market Index 18% of U.S. market cap		SMALLEST \$1.8 B
\$90.0 M			SMALLEST \$90.0 M	Russell 2000 Index 8% of the Russell 3000 Index SMALLEST \$90.0 M
\$1.7 M	SMALLEST \$1.7 M	SMALLEST \$1.7M		

Source: Russell Investments and Standard & Poor's, as of 6/30/2017

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TSP Benchmark Study Review | November 2017

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C and S Funds – Recommendation

- **We recommend the Thrift Savings Plan continue to use the S&P 500 Index for the C Fund and Dow Jones (DJ) U.S. Completion Total Stock Market Index for the S Fund**
- **Recommendation based on the following:**
 - Entire U.S. stock market is covered versus 98% for Russell 1000/Russell 2000 combination
 - Total passive assets benchmarked to the S&P 500 and DJ U.S. Completion Total Stock Market Index are about nine times of those benchmarked to the combination of Russell 1000 and Russell 2000¹
 - S&P 500 Index has high recognition among non-investment professionals

¹Total passive assets managed by major passive providers across all vehicle types. As of 12/31/2016.

F Fund: Overview

- We reviewed the following broad indexes as alternatives for the F Fund:
 - Citigroup Broad Investment Grade (BIG) Bond Index
 - Citigroup World Government Bond Index
 - Bloomberg Barclays U.S Aggregate Index (Current Benchmark)
 - Bloomberg Barclays Global Aggregate Index
 - Bloomberg Barclays U.S. Universal Index
- We focused on the Citigroup BIG and Bloomberg Barclays U.S Aggregate Index and Universal Indexes as global fixed income benchmarks are exposed to a meaningful amount of volatility associated with foreign currency, which may not be appealing for investors seeking stability in returns and principal
- Bloomberg Barclays U.S Aggregate and Citigroup BIG Bond Indexes provide broad exposure to U.S. dollar denominated investment grade bonds
- Bloomberg Barclays U.S. Universal Index provides exposure to U.S. dollar denominated investment grade bonds as well as high yield, Eurodollars, and dollar-denominated emerging market debt

F Fund – Recommendation

- **We recommend the continued use of the Bloomberg Barclays U.S Aggregate:**
 - Provides broad coverage of investment grade bond market
 - Most widely recognized fixed income benchmark in the U.S.
 - Availability of products benchmarked to Bloomberg Barclays U.S Aggregate
 - While the Bloomberg Barclays U.S. Universal provides broader coverage, it provides exposure to high yield debt which is more correlated with stocks, reducing the diversification relative to the Bloomberg Barclays U.S Aggregate

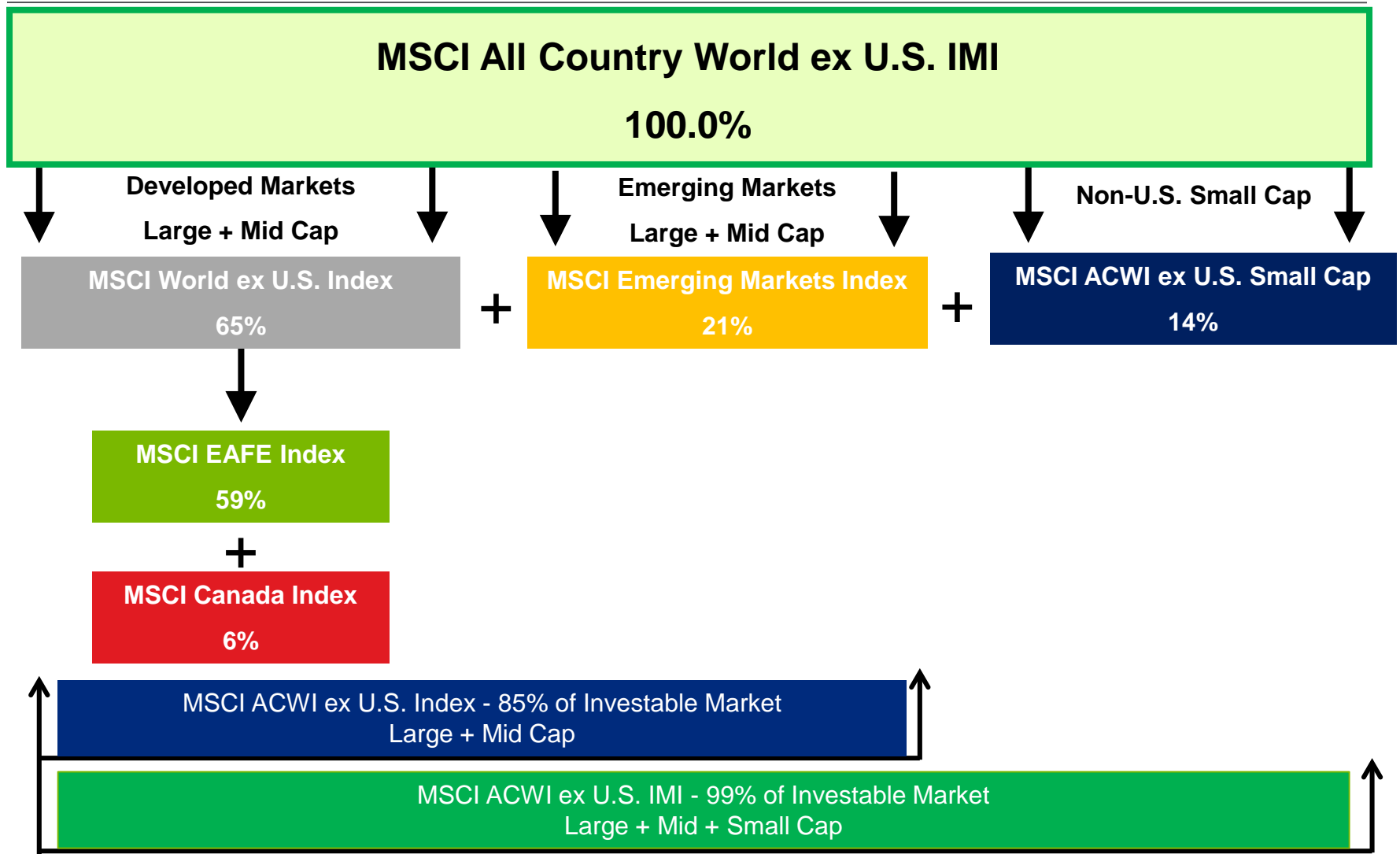
I Fund: Overview

- We reviewed eight non-U.S. stock indexes and identified six as potentially viable alternatives:
 - MSCI Europe, Australasia, Far East (EAFE) Index (**Current Benchmark**)
 - MSCI World ex U.S. Index
 - MSCI All Country World ex U.S. (ACWI ex U.S.) Index
 - MSCI All Country World ex U.S. Investable Market Index (ACWI ex U.S. IMI)
 - FTSE All World Developed ex North America Index
 - FTSE All World ex U.S. Index

- Focused evaluation on Morgan Stanley Capital International (MSCI) family of non-U.S. stock indexes
 - Availability of products by top passive providers; major passive providers with an exception to Vanguard do not offer FTSE indexes for U.S. based investors
 - Acceptance of indexes by U.S. based investors

- Reviewed four MSCI non-U.S. stock indexes:
 - MSCI EAFE Index: non-U.S. developed markets stock index
 - MSCI World ex U.S. Index: non-U.S. developed markets plus Canada stock index
 - MSCI ACWI ex U.S. stock index: non-U.S. developed markets index plus Canada and emerging markets stock index
 - MSCI All Country World ex U.S. IMI: non-U.S. developed markets index plus Canada, emerging markets, and international small cap stock index

MSCI Investable Market Indices



*As of 9/29/2017; Source: MSCI

I Fund – Recommendation

- **We recommend replacing the I Fund’s benchmark, which is currently the MSCI EAFE Index with the MSCI All Country World ex U.S. IMI**
 - The MSCI indices remain the most popular indices for U.S. based institutional investors investing in overseas equity markets.
 - The transition costs associated with the change in the I Fund benchmark are reasonable
 - Market Exposure:
 - Canada is the fourth-largest equity market in the world, representing 6.6% of the developed non-U.S. equity opportunity set.
 - Emerging Markets represents 23.5% of the international non-U.S. equity investable universe
 - International small cap represent 14.3% of the international non-U.S. equity investable universe
 - Liquidity:
 - We believe the inclusion of emerging markets and international small cap equities to the I Fund will not hinder the ability to meet the TSP’s daily liquidity needs
 - Overall, liquidity is managed through the use of the I Fund’s cash buffer and other tools such as optimization and derivatives
 - Additionally, historical daily cash flow assessment scaled to 25% illustrates cash flow activity was at reasonable levels to be traded in emerging markets without adversely impacting the prices of securities
 - Securities Lending:
 - The ACWI ex U.S. IMI generated the highest expected yield and percentage out on loan



Appendix

I Fund – Transition Cost Analysis

Trading Costs for Multi-Tranche Transition

	MSCI ACWI ex U.S. IMI		MSCI ACWI ex U.S.		MSCI World ex U.S.	
	bps	\$	bps	\$	bps	\$
Commissions	2.0	9,086,743	2.0	8,174,568	0.0	1,346,824
Taxes	3.0	12,432,423	2.0	7,195,272	0.0	162,293
Bid/Ask Spread	3.0	13,851,323	2.0	8,535,685	0.0	1,233,350
Market Impact	3.0	12,988,306	2.0	10,127,249	0.0	1,403,012
FX Cost	2.0	9,130,495	2.0	9,052,494	0.0	1,955,712
Mean Expected Cost	13.0	\$57,489,291	10.0	\$43,085,267	1.0	\$6,101,190
Opportunity cost	+/-15.0	+/- \$65,077,507	+/-15.0	+/- \$63,786,286	+/-7.0	+/- \$28,037,955

Source: BlackRock

- The transaction cost associated with transitioning the I Fund's benchmark from the MSCI EAFE Index to the MSCI ACWI ex U.S. IMI is expected to be about 13 basis points or approximately \$57 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 28 bps (\$122.6 million) or a gain of 2 bps (\$7.6 million) about 67% of the time.
- We believe that these transition costs are reasonable given the overall shift from developed markets to emerging markets as well as into international small cap.

I Fund – Securities Lending Yield Estimates

Securities Lending Yield Estimates

	Yield to TSP (bps)		
	EAFE	ACWI ex U.S.	ACWI ex U.S. IMI
2014	7.1	7.3	9.3
2015	8.1	8.8	12.6
2016	8.1	9.6	14.8
2017 (YTD)*	5.7	6.6	10.7
	Yield to TSP (\$ millions)		
	EAFE	ACWI ex U.S.	ACWI ex U.S. IMI
2014	\$24	\$25	\$32
2015	28	31	44
2016	27	32	50
2017 (YTD)*	22	25	41
	On-Loan %		
	EAFE	ACWI ex U.S.	ACWI ex U.S. IMI
2014	3.4%	3.5%	4.4%
2015	3.2%	3.6%	4.9%
2016	3.9%	4.8%	6.2%
2017 (YTD)*	3.2%	4.2%	5.5%

Source: BlackRock

* 2017 YTD is annualized using data through 7/31/2017

- The above table outlines the expected yield and utilization changes as a result of a move from the MSCI EAFE to either ACWI ex U.S. or ACWI ex U.S. IMI. The yields referenced above incorporate both intrinsic and reinvestment yield and only account for the net yield to the TSP.
- The MSCI ACWI ex U.S. IMI generated the highest expected yield and percentage out on loan. Across each of the last three calendar years, the income to the TSP is estimated to have been at least 1.5x more if the I Fund tracked the MSCI ACWI ex U.S. IMI instead of the MSCI EAFE index.
- The market demand for lending emerging markets and international small equity is generally greater than developed large and mid-cap names primarily due to the lack of supply of small capitalization and emerging market securities available for lending.

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