

I Fund Policy Benchmark Review

Federal Retirement Thrift Investment Board

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Aon
Retirement and Investment

Investment advice and consulting services provided by Aon Hewitt Investment Consulting, Inc., an Aon Company.

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Agenda

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**Expand the
I Fund
Benchmark**

Executive Summary

- The Federal Retirement Thrift Investment Board (FRTIB) retained Aon Hewitt Investment Consulting (AHIC) to conduct a review of AHIC's recommendation in November of 2017 to expand the International Stock Index Investment Fund ("I Fund") benchmark from the MSCI EAFE Index to the MSCI ACWI ex USA IMI Index
- Our review included:
 - Review the circumstances of the TSP and compare its circumstances to that of peer plans
 - Evaluate the legislative I Fund benchmark requirements provided by the Federal Employees' Retirement System Act of 1986 (FERSA)
 - Apply the legislative requirements and AHIC capital market assumptions to a broad array of potential alternative benchmarks suitable for further consideration
 - Review the appropriateness of alternative benchmarks to support our recommendation
- After completion of our re-evaluation of the legislative guidance, key criteria, and circumstances, AHIC recommends that the FRTIB maintain its November 2017 approval to move from the MSCI EAFE Index to the MSCI ACWI ex USA IMI Index

I Fund Legislative Requirements

- The 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), as amended, states the following regarding the I Fund, under Title 5 U.S.C. Section 8483 (b)(4):
 - (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.
- The guidance clearly states that the I Fund should be a reasonably complete representation of the international equity markets excluding the United States equity markets
 - The MSCI EAFE Index represents 58% of the non-U.S. equity market capitalization, while
 - The MSCI ACWI ex USA IMI Index represents 99% of the non-U.S. equity market capitalization

Common Practices in Defined Contribution Plans

- When evaluating common practices of the largest defined contribution plans across the United States we found the following:
 - 10 out of 10 of the largest publicly-traded U.S. companies offered DC participants access to emerging market equity, which includes China equities
 - 10 out of 10 of the top awarded Federal contractors offered DC participants access to emerging market equity, which includes China equities

Largest Publicly-Traded U.S. Companies Offering Defined Contribution Plans

1	Microsoft Corp.
2	Apple Inc.
3	Amazon.com Inc.
4	Facebook Inc.
5	Berkshire Hathaway
6	Alphabet Inc.
7	JP Morgan Chase & Co
8	Johnson & Johnson
9	Visa Inc.
10	Exxon Mobil Corp.

Top Awarded Federal Contractors

1	Lockheed Martin
2	The Boeing Company
3	General Dynamics
4	Raytheon
5	Northrop Grumman
6	McKesson
7	United Technologies
8	Leidos Holdings
9	Huntington Ingalls
10	BAE Systems

Common Practices in Defined Benefit Plans

- We evaluated non-U.S. equity exposure within public defined benefit plans. Unlike in private industries that rely on DC, public plans still offer defined benefit plans. We found the following:
 - 20 of the 20 largest public defined benefit plans invest in emerging market equity, which includes China equities

Largest Public Defined Benefit Plans

1	California Public Employees Retirement System
2	California State Teachers' Retirement System
3	New York State Common Retirement Fund
4	New York City Retirement System
5	State Board of Administration of Florida
6	Teacher Retirement System of Texas
7	New York State Teachers' Retirement System
8	State of Wisconsin Investment Board
9	Washington State Investment Board
10	North Carolina Retirement System
11	Ohio Public Employees Retirement System
12	New Jersey Division of Investments
13	Virginia Retirement System
14	State of Michigan Retirement Systems
15	Oregon Public Employees Retirement Fund
16	State Teachers Retirement System of Ohio
17	Minnesota State Board of Investment
18	Teachers Retirement System of Georgia
19	Massachusetts Pension Reserves Investment Management Board
20	Tennessee Consolidated Retirement System

Common Practices in Target Date Funds

- We evaluated non-U.S. equity exposures within target date funds (“TDF”), since TDFs continue to receive a growing share of retirement dollars saved within DC plans by U.S. participants. We found the following:
 - TDFs (as of June 30, 2019) represent more than \$1.9 trillion of assets saved by U.S. participants for retirement¹
 - The top six TDF providers represent more than 86% of that \$1.9 trillion of DC plan assets¹
 - 6 of 6 of the largest TDF asset managers invest participant dollars in the full non-U.S. equity market, which includes exposure to emerging market equity inclusive of China equities

¹Vanguard Target Retirement Funds and Trusts June 30, 2019 Quarterly Report

Investment Merits of Expanding the I Fund Benchmark

- AHIC reviewed the merits of expanding the I Fund benchmark (e.g. Canada, emerging markets (inclusive of China equities), and non-U.S. small cap stocks) to provide more complete coverage of the international equity opportunity set
 - Exposure to a large market with total capitalization of over \$24.2 trillion (approximately 45% of world equity market capitalization)¹
 - TSP participants would gain exposure to Canada, emerging markets, and non-U.S. small cap stocks not previously available to them
- 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)

¹MSCI ACWI ex USA IMI Index market capitalization as of June 30, 2019

AHIC Capital Market Assumption changes from 2017 to 2019

- As the U.S. equity market continued to expand from 2017 through 2019, AHIC's forward looking capital market assumptions continue to signal that the approval by the FRTIB to expand the I Fund's non-U.S. equity benchmark can improve the expected return and expected risk for participants

AHIC Q3 2017	Expected Return	Expected Risk	Sharpe Ratio
Developed Markets	7.3%	20.0%	0.23
Emerging Markets (inclusive of China)	7.7%	30.0%	0.17
Total International Equity Market	7.7%	21.6%	0.24

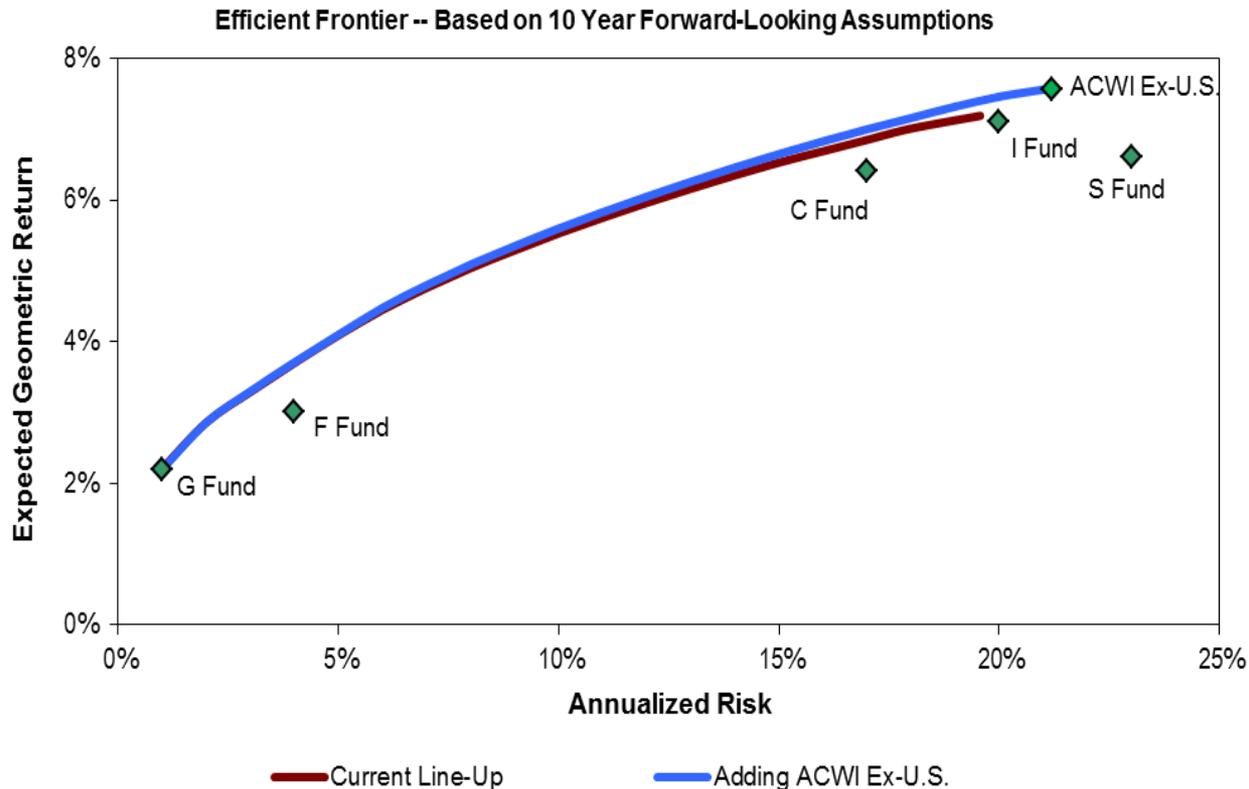
AHIC Q3 2019	Expected Return	Expected Risk	Sharpe Ratio
Developed Markets	7.5%	20.0%	0.26
Emerging Markets (inclusive of China)	8.1%	27.5%	0.21
Total International Equity Market	7.9%	20.6%	0.27

AHIC changes from 2017 to 2019	Expected Return	Expected Risk	Sharpe Ratio
Developed Markets	+0.2%	-	+0.3
Emerging Markets (inclusive of China)	+0.4%	(2.5%)	+0.4
Total International Equity Market	+0.2%	(1.0%)	+0.3

Source: Aon Hewitt Investment Consulting Capital Market Assumptions as of June 30, 2019

I Fund Forward Looking Efficient Frontier and Recommendation

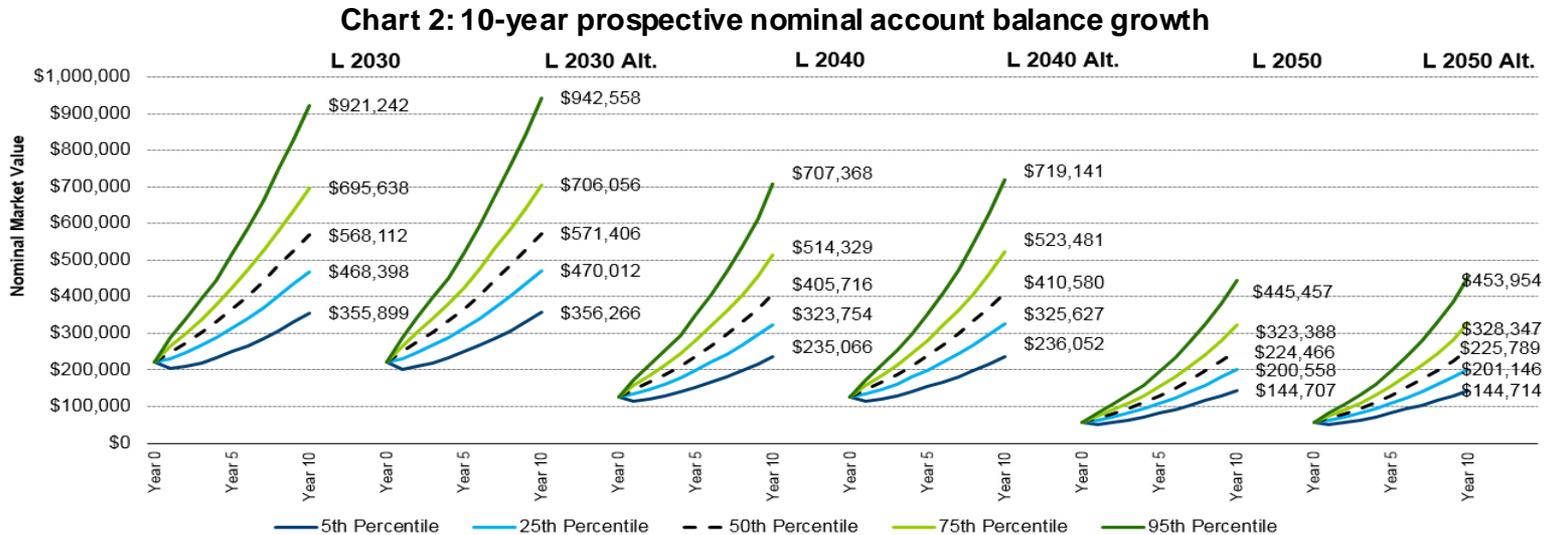
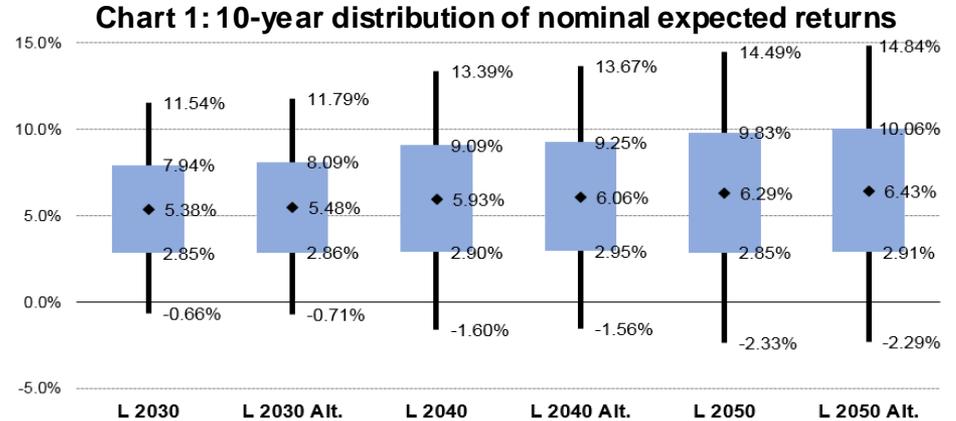
- AHIC recommends the FRTIB maintain its November 2017 approval to expand the I Fund to include broader exposures such as Canada, emerging markets (inclusive of China equities), and non-U.S. small capitalization stocks



Source: Aon Hewitt Investment Consulting Capital Market Assumptions as of June 30, 2019

AHIC's Forward Looking Expectations for the L Funds

- Using AHIC's 10-year forward looking capital market assumptions, we modeled the expanded non-U.S. equity benchmark change impacts on the TSP's L Funds.
- The scenarios that include the MSCI ACWI ex USA IMI Index benchmark to represent the non-U.S. equity exposure can be identified with the "Alt." label
- Our analysis found that the expanded benchmark can improve the expected return and downside risk over a future 10-year period



Source: Aon Hewitt Investment Consulting Capital Market Assumptions as of June 30, 2019

Investment Flows Into China Equities

- Over the past ten years, U.S. retirement funds' capital flows into China equities are estimated to have grown from \$53 billion to \$161 billion¹
- **Overall Investment in China Equities**
 - The increasing weight of overall China within certain MSCI indexes reflects the expanding investable market universe due to increasing issuance across different share classes of China equities, improved market access to its onshore markets, as well as growth in market valuation
 - China's two major stock exchanges, if combined, rank third-largest in the world after the New York Stock Exchange and NASDAQ
 - Over the past 30 years, China's economy has developed significantly
 - China contributed 19% of global GDP as of December 31, 2018
 - Another indicator of China's development is its leadership in the world's top 500 companies where they have surpassed all other international countries
- **China Onshore Equity Markets**
 - Since 2018, MSCI's move to include China onshore equity (A-Shares) in the Emerging Markets Index has provided investors a new channel to gain exposure to China's domestically listed equities
 - MSCI has illustrated the possibility that China (as a country) could comprise more than 40% of the MSCI Emerging Markets Index, rising from the current weight of 32%, when eligible A-Shares are fully included
 - A-Shares alone could jump from the current 2.5% to 17.4% of the MSCI Emerging Markets Index, while other China share classes are displaced by A-Shares²

¹As of 12/31/2018. U.S. retirement funds include total assets of DB, DC Plans and IRAs. Source: Federal Reserve Bank of St. Louis; Allocation to China is estimated based on market survey on DC funds' allocation to Non-U.S. Equity at 6%-8% and DB funds allocation to EM at 2.6%, then assumed a passive allocation to China based on the index weight

²Aon research: MSCI's Announcement to Add China A-Shares to Its Emerging Markets Index-Looking Beyond the Tiny Percentage, 2017

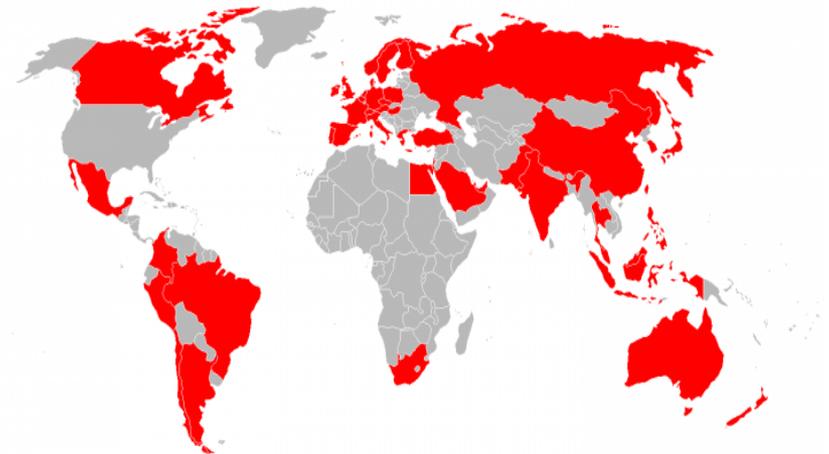
Market Coverage

MSCI EAFE Index



- 21 developed markets
- Large- and mid-cap stocks
- 900+ companies

MSCI ACWI ex USA IMI Index



- 22 developed + 26 emerging markets
- Large-, mid-, and small-cap stocks
- 6,000+ companies

Source: MSCI

Conclusion

▪ I Fund Benchmark Review

- The simplicity and efficiency of the existing line-up makes the TSP a very attractive offering to participants.
 - Based on our analysis, AHIC believes the G, F, C, S, and I Funds currently offered by the TSP remains in the best interest of the Plan’s participants and beneficiaries.
 - AHIC still believes today that broadening the market coverage of the I Fund to Canada, emerging markets (inclusive of China), and non-U.S. small cap stocks would enhance the efficiency of the TSP without compromising its simplicity.
 - In addition, broadening the coverage of the I Fund to encompass the full opportunity set will provide symmetry to TSP’s equity investment lineup as it would give participants access to both U.S. and non-U.S. large and small cap stocks
 - Last, this change would be in line with other large defined contribution plans across the United States
- **In summary, AHIC continues to recommend expanding the I Fund benchmark from the MSCI EAFE Index to the MSCI ACWI ex USA IMI Index as previously approved by the FRTIB.**