

2022 L Funds

Asset Allocation Review

Presented By
Mike Jerue, Office of Investments
May 24, 2022



Thrift Savings Plan

FEDERAL RETIREMENT THRIFT INVESTMENT BOARD
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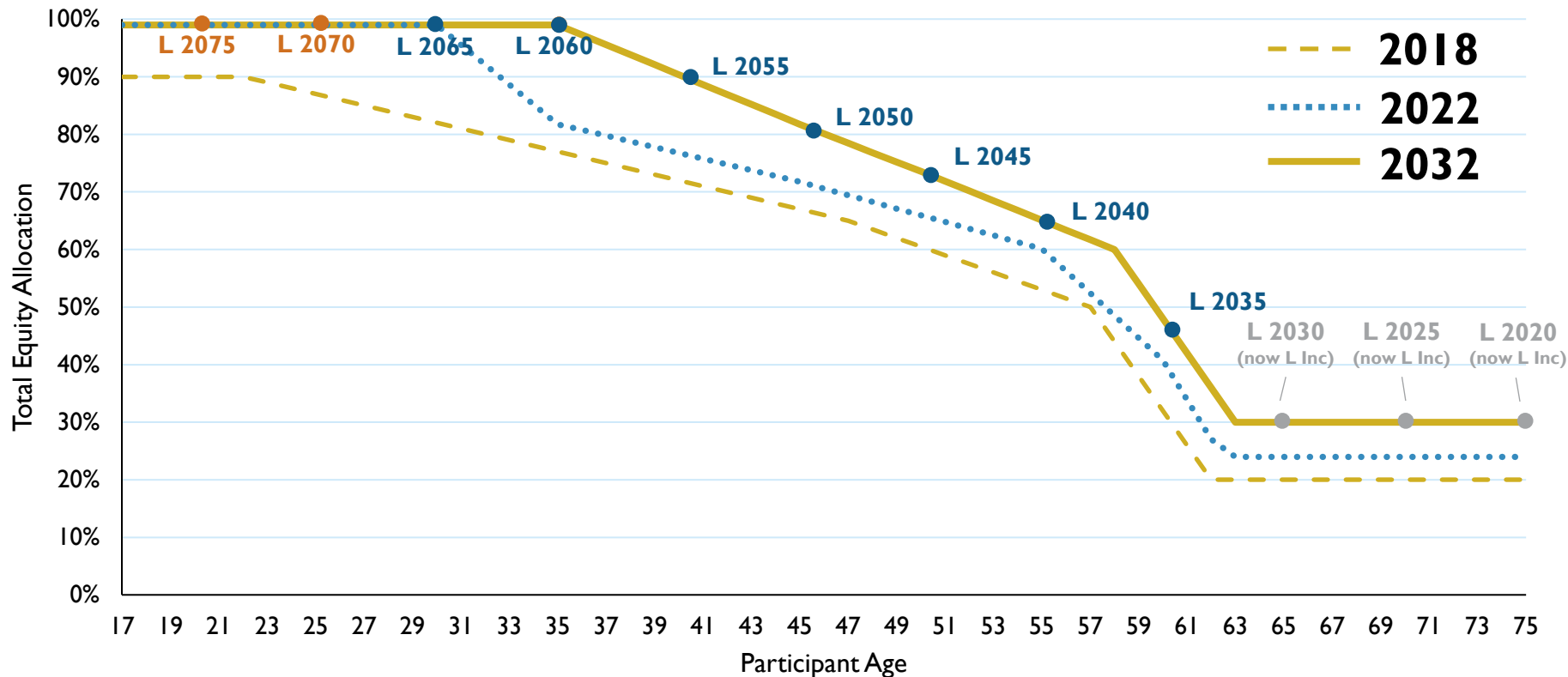
L Funds Asset Allocation Review

- Annual review conducted in collaboration with investment consultant
- Explored ways to improve outcomes without unreasonably increasing risk
- Recommended no changes to the current designs; Executive Director concurred

L Funds Asset Allocation Review

- Participant demographics
- Capital market assumptions
- Potential changes to design

Glide Path Transition (2018-2032)



Presentation by Aon





L Funds Asset Allocation Review

May 2022

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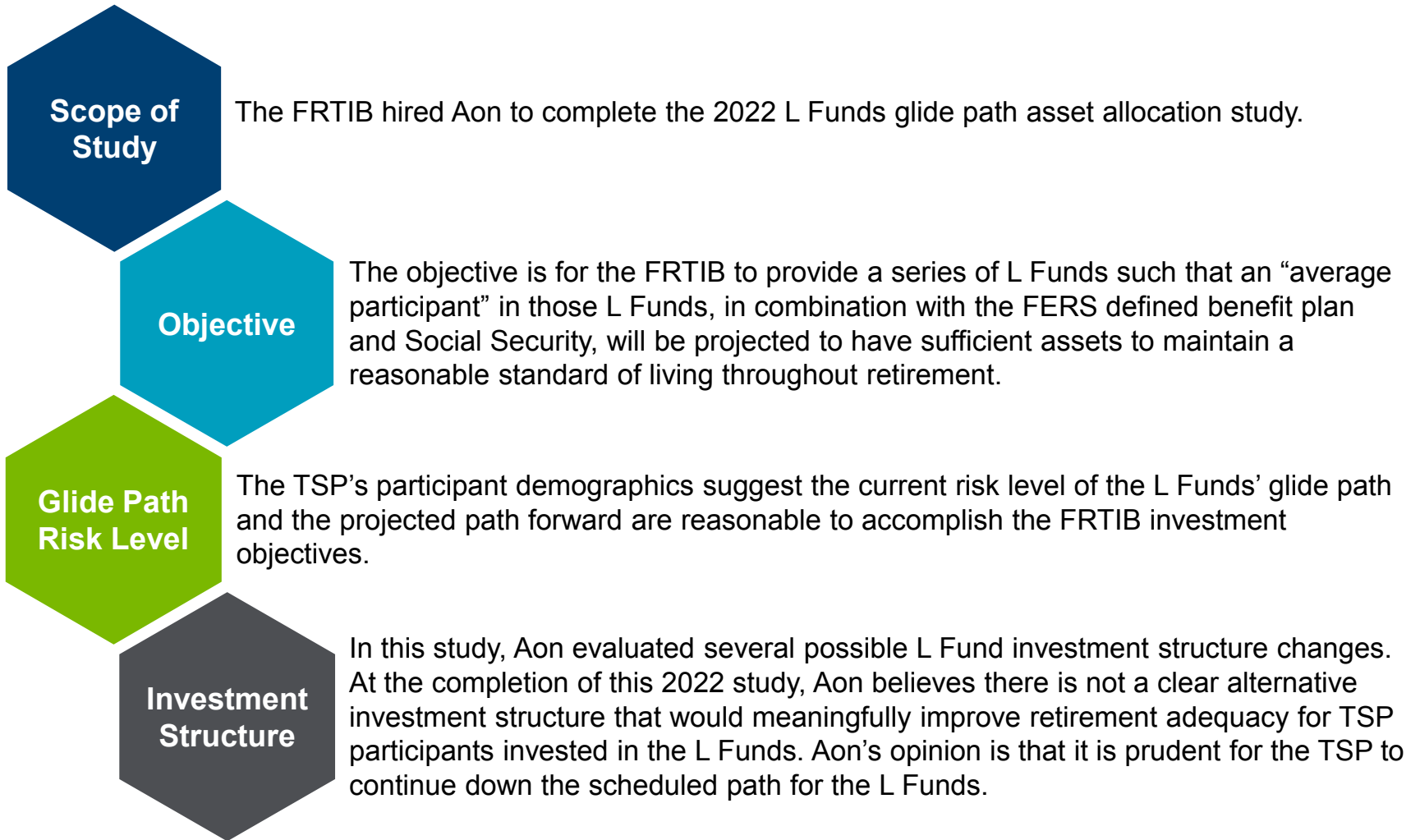
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Executive Summary

Executive Summary





Glide Paths Modeled

Glide Paths Modeled

Current Glide Path Asset Allocations as of July 2022

| Asset Allocation | L 2065 | L 2060 | L 2055 | L 2050 | L 2045 | L 2040 | L 2035 | L 2030 | L 2025 | L Income |
|-----------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|----------|
| C Fund | 50.07% | 50.07% | 50.07% | 41.41% | 39.03% | 36.75% | 33.92% | 31.07% | 21.17% | 12.57% |
| S Fund | 14.28% | 14.28% | 14.28% | 11.73% | 10.86% | 9.89% | 8.94% | 8.01% | 5.33% | 3.03% |
| I Fund | 34.65% | 34.65% | 34.65% | 28.61% | 26.86% | 25.11% | 23.08% | 21.04% | 14.27% | 8.40% |
| F Fund | 0.62% | 0.55% | 0.49% | 7.72% | 7.91% | 7.41% | 7.16% | 6.35% | 6.15% | 5.70% |
| G Fund | 0.38% | 0.45% | 0.51% | 10.53% | 15.34% | 20.84% | 26.90% | 33.53% | 53.08% | 70.30% |
| Total | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% |
| Key Characteristics | L 2065 | L 2060 | L 2055 | L 2050 | L 2045 | L 2040 | L 2035 | L 2030 | L 2025 | L Income |
| Years to Maturity | 43 | 38 | 33 | 28 | 23 | 18 | 13 | 8 | 3 | 0 |
| Equity Percentage | 99.00% | 99.00% | 99.00% | 81.75% | 76.75% | 71.75% | 65.94% | 60.12% | 40.77% | 24.00% |
| Non-U.S. / Total Equity | 35.00% | 35.00% | 35.00% | 35.00% | 35.00% | 35.00% | 35.00% | 35.00% | 35.00% | 35.00% |
| SMID / Total U.S. Equity | 22.19% | 22.19% | 22.19% | 22.07% | 21.77% | 21.20% | 20.86% | 20.50% | 20.11% | 19.42% |
| G Fund / Total Fixed Income | 38.00% | 45.00% | 51.00% | 57.70% | 65.98% | 73.77% | 78.98% | 84.08% | 89.62% | 92.50% |

Glide Paths Modeled

Alternate Glide Path Scenarios

| Scenario | Description | Equity Percentage | G Fund / Total Fixed Income | SMID / Total U.S. Equity | Int'l / Total Equity |
|----------|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|---------------------------|---------------------------|
| 1 | Current Glide Path | Transitional glide path with targets of: <ul style="list-style-type: none"> 99% equity at age 35 60% equity at age 58 30% equity at age 63 | Upward trajectory to 92.5% by target year | Transition to 20% by 2025 | 35% |
| 2 | Move to Ultimate Glide Path | Move immediately to target equity allocation | Upward trajectory to 92.5% by target year | Transition to 20% by 2025 | 35% |
| 3 | Fixed Income 100% G | Same as current | Immediately move all fixed income to G Fund | Transition to 20% by 2025 | 35% |
| 4 | Fixed Income 100% F | Same as current | Immediately move all fixed income to F Fund | Transition to 20% by 2025 | 35% |
| 5 | Transition to 15% SMID/U.S. | Same as current | Upward trajectory to 92.5% by target year | Transition to 15% by 2025 | 35% |
| 6 | Transition to 25% SMID/U.S. | Same as current | Upward trajectory to 92.5% by target year | Transition to 25% by 2025 | 35% |
| 7 | Transition I to 30% of Equity | Same as current | Upward trajectory to 92.5% by target year | Transition to 20% by 2025 | Transition to 30% by 2025 |
| 8 | Transition I to 40% of Equity | Same as current | Upward trajectory to 92.5% by target year | Transition to 20% by 2025 | Transition to 40% by 2025 |
| 9 | De-risk 5 Years Sooner | Transitional glide path with targets of: <ul style="list-style-type: none"> 99% equity at age 30 60% equity at age 58 30% equity at age 63 | Upward trajectory to 92.5% by target year | Transition to 20% by 2025 | 35% |
| 10 | De-risk 5 Years Later | Transitional glide path with targets of: <ul style="list-style-type: none"> 99% equity at age 40 60% equity at age 58 30% equity at age 63 | Upward trajectory to 92.5% by target year | Transition to 20% by 2025 | 35% |
| 11 | 10-year Through Glide Path | Transitional glide path with targets of: <ul style="list-style-type: none"> 99% equity at age 35 60% equity at age 58 50% equity at age 63 30% equity at age 73 | Upward trajectory to 92.5% by target year | Transition to 20% by 2025 | 35% |



Summary Analysis

Expected Return and Risk Assumptions (10-Year)

| Geometric Return | 2022 Study | 2021 Study ¹ | 2020 Study ² |
|--------------------------------------|------------|-------------------------|-------------------------|
| C Fund: Large Cap U.S. Equity | 5.9% | 5.6% | 6.1% |
| S Fund: Small/Mid Cap U.S. Equity | 6.1% | 5.8% | 6.7% |
| I Fund: Non-U.S. Equity ³ | 7.0% | 6.6% | 7.3% |
| F Fund: Core Fixed Income | 2.6% | 1.6% | 2.9% |
| G Fund: Government Yield | 2.3% | 2.0% | 3.1% |
| Inflation | 2.4% | 2.1% | 2.2% |
| Standard Deviation | 2022 Study | 2021 Study | 2020 Study |
| C Fund: Large Cap U.S. Equity | 17.0% | 17.0% | 18.0% |
| S Fund: Small/Mid Cap U.S. Equity | 23.0% | 23.0% | 20.6% |
| I Fund: Non-U.S. Equity | 20.0% | 20.0% | 20.8% |
| F Fund: Core Fixed Income | 4.0% | 4.0% | 5.3% |
| G Fund: Government Yield | 0.8% | 1.0% | 1.2% |
| Inflation | 1.0% | 1.0% | 1.7% |
| Yield History | 2/28/22 | 2/24/21 | 9/30/19 |
| Bloomberg U.S. Aggregate | 2.33% | 1.39% | 2.26% |
| 10-year Treasury | 1.83% | 1.38% | 1.68% |

- Based on Aon 2022 Q1 10-year capital market assumptions (as of December 31, 2021), adjusted for changes in yields through February 28, 2022
- The G Fund is assumed to earn the yield on 9-year duration Treasury bonds
 - Currently, the duration on all outstanding Treasury bonds with 4 or more years to maturity is about 9 years

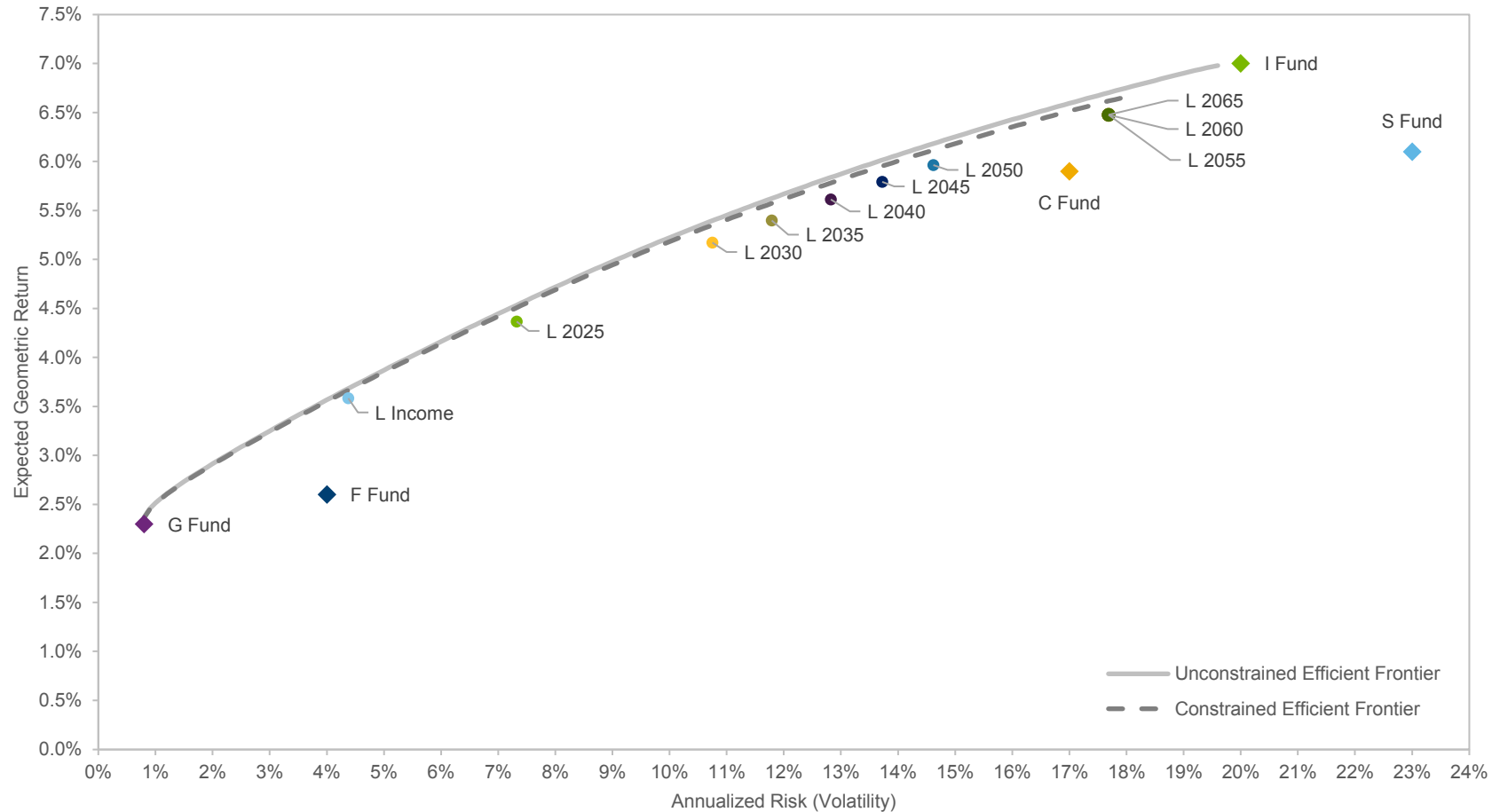
¹ 2021 study assumptions based on the Aon report "Thrift Savings Plan – Full Report, Lifecycle Fund Asset Allocation" dated May 12, 2021. Assumptions are based on a 10-year horizon.

² 2020 study assumptions based on the Mercer report "Thrift Savings Plan: Lifecycle Fund Asset Allocation – Board Summary" dated March 23, 2020. Assumptions are based on a 20-year horizon.

³ In 2020, the I Fund benchmark was assumed to be the MSCI ACWI ex USA IMI index. For the 2021 and 2022 studies, the benchmark is assumed to be the MSCI EAFE index.

Efficient Frontier

Based on 10-Year Forward Looking Assumptions



Demographic Profile for L 2040 Fund

- Demographic profiles were provided by FRTIB officials
- Data is based on actual December 31, 2021 data and rolled forward to July 1, 2022 by FRTIB officials
- Employee deferral rates are extrapolated from the characteristics provided by cohort
- Employer contributions are assumed to be 5% of pay
- All participants are assumed to earn a Social Security benefit based on pay projected to retirement and regressed to date of hire using the salary merit scale assumptions
- All participants are assumed to earn a defined benefit pension equivalent to 30% of final pay
- Salary merit scale assumptions are based on schedules from the Civil Service Retirement and Disability Fund Annual Report for the fiscal year ending September 30, 2020
 - Assumed blend of 80% non-postal, 20% postal workforce
 - Select and ultimate table based on age and service
 - Net of inflation
- Age-based rates are as of the sample ages shown

| Fund | L 2040 | | |
|----------------------------------------------------|-------------------|-------------------|--------------------|
| Assumed Hire Age | 35 | | |
| Age as of 7/1/2022 | 45 | | |
| Retirement Age | 62 | | |
| Age at First Withdrawal | 63 | | |
| Annual Salary as of 7/1/2022 | \$91,723 | | |
| DC Balance as of 7/1/2022 | \$143,621 | | |
| Deferral Rate as of 7/1/2022 | 7.44% | | |
| Contribution and Salary Scale Rates at Sample Ages | Employee Deferral | Employer Contrib. | Salary Merit Scale |
| 25 | - | - | - |
| 30 | - | - | - |
| 35 | - | - | - |
| 40 | - | - | - |
| 45 | 7.44% | 5.00% | 1.99% |
| 50 | 8.07% | 5.00% | 1.65% |
| 55 | 9.29% | 5.00% | 1.04% |
| 60 | 10.20% | 5.00% | 0.88% |
| 62+ | 0.00% | 0.00% | 0.00% |

Summary Results

L 2040 Fund

| Account Balance ¹ & Replacement Ratio ² at First Withdrawal | Current | Move to Ultimate GP | Fixed Income 100% G | Fixed Income 100% F | Transition to 15% SMID/US | Transition to 25% SMID/US | Decrease I to 30% of Equity | Increase I to 40% of Equity | De-risk 5 Years Sooner | De-risk 5 Years Later | 10-year Through GP |
|-----------------------------------------------------------------------------------|---------|---------------------|---------------------|---------------------|---------------------------|---------------------------|-----------------------------|-----------------------------|------------------------|-----------------------|--------------------|
| Account Balance - Median (50th Percentile) | \$566.0 | \$570.0 | \$562.3 | \$585.0 | \$564.7 | \$567.5 | \$564.6 | \$566.2 | \$564.8 | \$566.8 | \$576.6 |
| Account Balance - Downside (5th Percentile) | \$322.4 | \$323.1 | \$318.9 | \$335.5 | \$322.4 | \$322.3 | \$321.9 | \$322.5 | \$322.8 | \$321.2 | \$320.2 |
| Replacement Ratio - DB+DC+SS - Median (50th Percentile) | 72.7% | 72.8% | 72.6% | 73.3% | 72.7% | 72.7% | 72.6% | 72.7% | 72.7% | 72.7% | 73.0% |
| Replacement Ratio - DB+DC+SS - Downside (5th Percentile) | 65.6% | 65.5% | 65.5% | 65.9% | 65.6% | 65.5% | 65.5% | 65.6% | 65.6% | 65.5% | 65.5% |
| Replacement Ratio - TSP Only - Median (50th Percentile) | 16.6% | 16.7% | 16.5% | 17.1% | 16.5% | 16.6% | 16.5% | 16.6% | 16.5% | 16.6% | 16.8% |
| Replacement Ratio - TSP Only - Downside (5th Percentile) | 9.4% | 9.4% | 9.4% | 9.8% | 9.5% | 9.4% | 9.4% | 9.5% | 9.4% | 9.4% | 9.4% |
| Likelihood of Negative Real Return ³ | Current | Move to Ultimate GP | Fixed Income 100% G | Fixed Income 100% F | Transition to 15% SMID/US | Transition to 25% SMID/US | Decrease I to 30% of Equity | Increase I to 40% of Equity | De-risk 5 Years Sooner | De-risk 5 Years Later | 10-year Through GP |
| Likelihood of < 0% Real Return During 2 Years Before Withdrawal | 32.7% | 32.7% | 32.9% | 30.1% | 32.6% | 32.6% | 32.9% | 32.7% | 32.7% | 32.7% | 32.5% |
| Likelihood of < -5% Real Return During 2 Years Before Withdrawal | 17.7% | 17.7% | 17.9% | 15.9% | 17.6% | 17.9% | 17.7% | 17.6% | 17.7% | 17.7% | 20.5% |
| Post-Retirement Account Exhaustion ⁴ | Current | Move to Ultimate GP | Fixed Income 100% G | Fixed Income 100% F | Transition to 15% SMID/US | Transition to 25% SMID/US | Decrease I to 30% of Equity | Increase I to 40% of Equity | De-risk 5 Years Sooner | De-risk 5 Years Later | 10-year Through GP |
| Likelihood of Account Exhaustion by Age 80 | 17.6% | 17.5% | 18.3% | 11.8% | 17.8% | 17.5% | 18.0% | 17.3% | 17.6% | 17.6% | 14.8% |
| Likelihood of Account Exhaustion by Age 90 | 50.4% | 49.7% | 51.4% | 40.1% | 50.6% | 50.1% | 50.8% | 49.8% | 50.5% | 50.3% | 44.7% |
| Likelihood of Account Exhaustion by Median Life Expectancy Age | 47.4% | 46.9% | 48.5% | 37.4% | 47.7% | 46.9% | 47.7% | 46.7% | 47.5% | 47.0% | 41.5% |
| Exhaustion Age - Median (50th Percentile) | 89.8 | 90.1 | 89.5 | 94.4 | 89.8 | 90.0 | 89.7 | 90.1 | 89.8 | 89.9 | 92.2 |
| Exhaustion Age - Downside (5th Percentile) | 75.8 | 75.8 | 75.7 | 77.0 | 75.8 | 75.8 | 75.7 | 75.8 | 75.9 | 75.8 | 76.2 |

¹ Account balance represents the projected account balance at first withdrawal age, discounted back to 2022 with projected inflation. Account balances shown are in thousands.

² Replacement ratio is the ratio of income in the first year of withdrawal to final earnings prior to withdrawal under a conservative hypothetical spending policy. Spending policy is based on converting the DC account balance into an inflation-indexed period-certain annuity based on an interest rate of 3.00%, an inflation rate of 2.30%, and a horizon of 80th percentile life expectancy according to the Pri-2012 mortality and MP-2021 improvement, rounded to the nearest year.

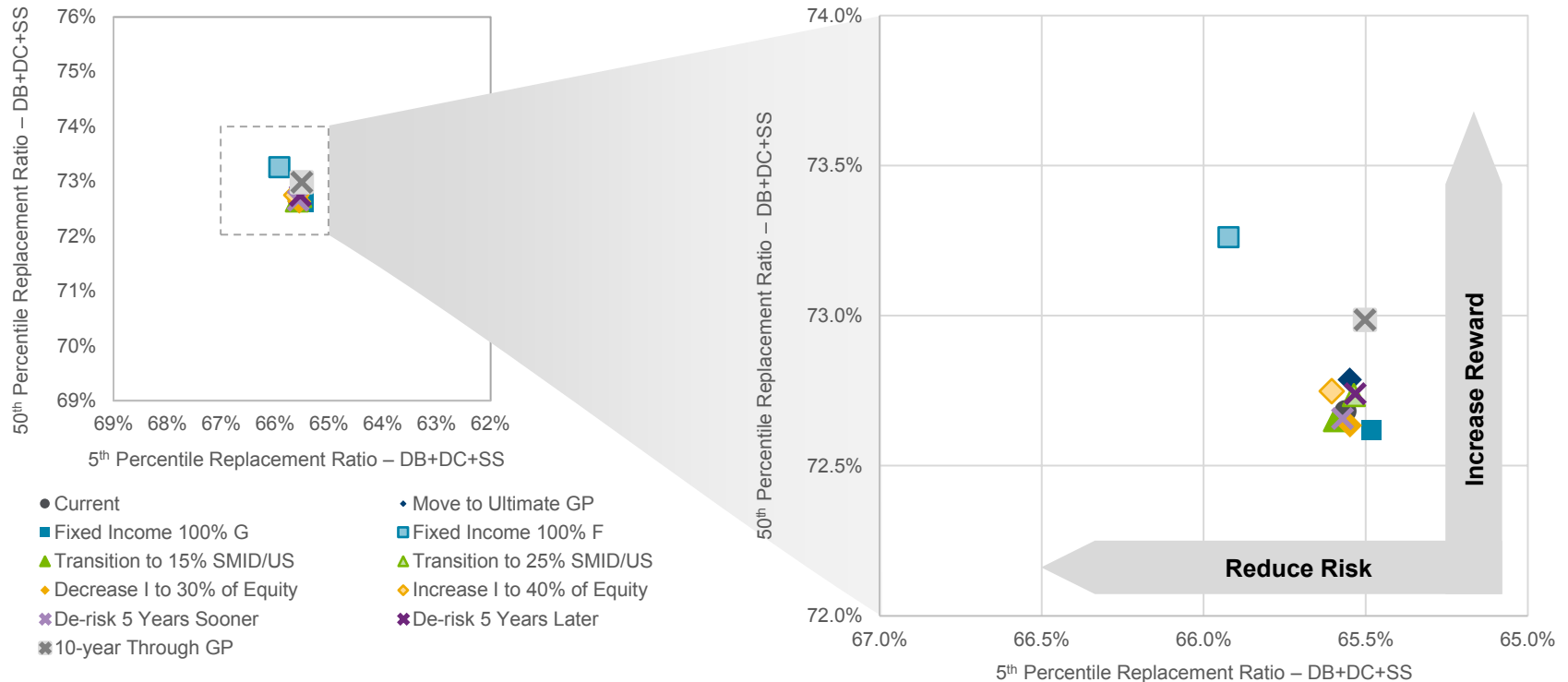
DB+DC+SS replacement ratio measures pay replacement from TSP, Social Security, and defined benefit sources combined. See appendix for more detail.

³ Measures the likelihood of < 0% (or < -5%) compounded real return over the 2-year period prior to withdrawal (between ages 61 and 63).

⁴ Account exhaustion is based on a target retirement spending policy of 80% of final earnings, indexed for projected inflation, minus annual income from guaranteed sources (DB and Social Security), not less than \$0 in any given year.

Summary Results

L 2040 Fund – Expected vs. Downside Replacement Ratio¹



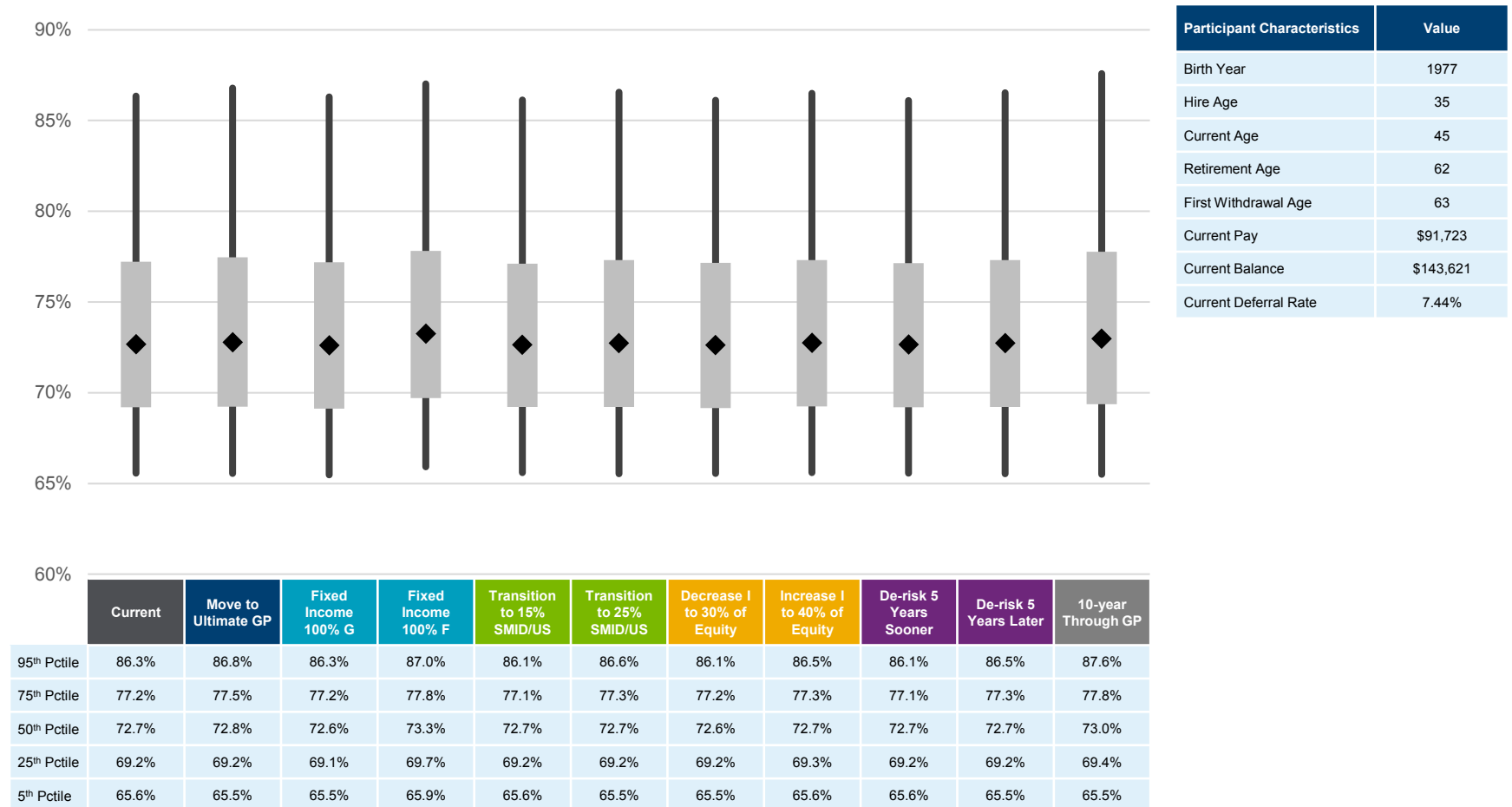
- Results for the various scenarios lead to relatively similar outcomes in absolute terms
- Over long horizons, policies with higher equity allocations have higher expected outcomes, but lower downside outcomes (i.e. higher risk)

¹ Replacement ratio is the ratio of income in the first year of withdrawal to final earnings prior to withdrawal under a conservative hypothetical spending policy. Spending policy is based on converting the DC account balance into an inflation-indexed period-certain annuity based on an interest rate of 3.00%, an inflation rate of 2.30%, and a horizon of 80th percentile life expectancy according to the Pri-2012 mortality and MP-2021 improvement, rounded to the nearest year.

DB+DC+SS replacement ratio measures pay replacement from TSP, Social Security, and defined benefit sources combined. See appendix for more detail.

Summary Results

L 2040 Fund – Distribution of Replacement Ratio¹



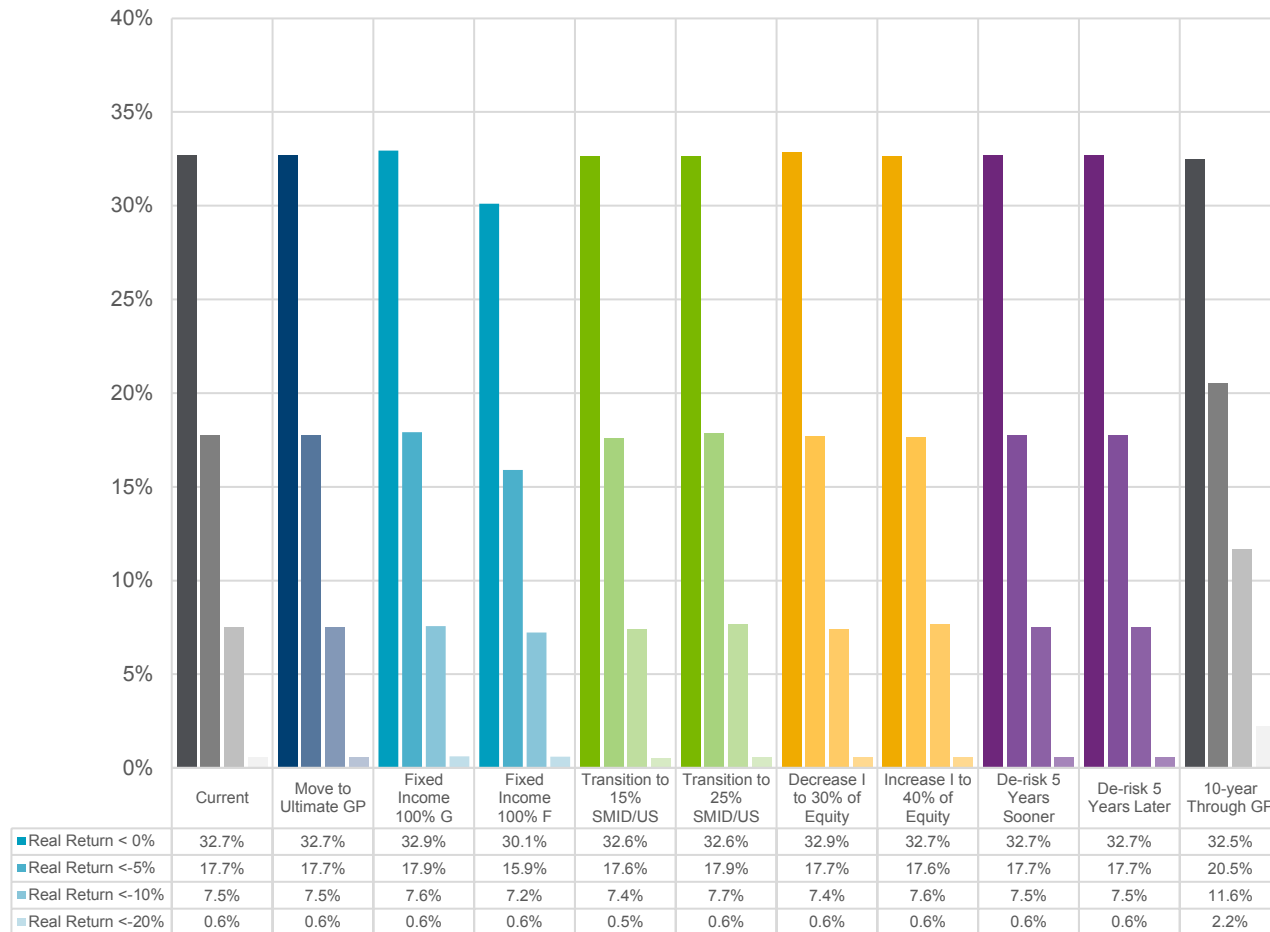
| Participant Characteristics | Value |
|-----------------------------|-----------|
| Birth Year | 1977 |
| Hire Age | 35 |
| Current Age | 45 |
| Retirement Age | 62 |
| First Withdrawal Age | 63 |
| Current Pay | \$91,723 |
| Current Balance | \$143,621 |
| Current Deferral Rate | 7.44% |

¹ Replacement ratio is the ratio of income in the first year of withdrawal to final earnings prior to withdrawal under a conservative hypothetical spending policy. Spending policy is based on converting the DC account balance into an inflation-indexed period-certain annuity based on an interest rate of 3.00%, an inflation rate of 2.30%, and a horizon of 80th percentile life expectancy according to the Pri-2012 mortality and MP-2021 improvement, rounded to the nearest year.

DB+DC+SS replacement ratio measures pay replacement from TSP, Social Security, and defined benefit sources combined. See appendix for more detail.

Summary Results

L 2040 Fund – Likelihood of Negative Real Return¹



| Participant Characteristics | Value |
|-----------------------------|-----------|
| Birth Year | 1977 |
| Hire Age | 35 |
| Current Age | 45 |
| Retirement Age | 62 |
| First Withdrawal Age | 63 |
| Current Pay | \$91,723 |
| Current Balance | \$143,621 |
| Current Deferral Rate | 7.44% |

¹ Measures the likelihood of < 0, < -5%, < -10%, or < -20% compounded real return over the 2-year period prior to withdrawal (between ages 61 and 63).



Conclusions and Next Steps

Commentary on Analysis

- **“To” versus “through:”** The current glide path, as well as the transitional glide path, for the L Funds provides participants a reasonable and age-appropriate risk level. Aon believes risk level is a more important evaluation factor for each participant’s long-term outcomes than the tactical decision of “to” vs. “through.” In other words, the absolute risk level is a more important driver of results than the specific shape of the glide path.
- **Equity level:** The glide paths Aon tested with higher equity allocations have better expected outcomes for participants, which supports the FRTIB’s long-term transitional glide path implementation strategy.
- **Equity structure:** The allocations with a higher proportion of equity coming from non-U.S. equities perform better over a full career for all percentiles shown. However, this is not a guarantee of uniformly better performance, as there are economic scenarios and horizons during which non-U.S. equity is expected to underperform U.S. equity.
- **Fixed income structure:** Shifting some of the G Fund allocation to the F Fund has incremental impacts in most of the quantitative results, but Aon has less conviction in this change because the results are highly sensitive to capital market assumptions.
- **Timing of changes:** Any meaningful glide path changes are subject to a risk of poor timing, which is why Aon continues to support the FRTIB’s long-term transitional glide path approach. This strategy provides incremental changes that allow the TSP to try to mitigate any point-in-time risks in market timing.

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Conclusion

- Recommended no changes to the current designs; Executive Director concurred



Questions?

