



Greystone Target Date Plus Funds Performance Analysis Paper

As at June 30, 2019

The Greystone Target Date Plus Funds (the “Funds”) Performance Analysis Paper provides attribution commentary and analysis on an absolute basis, as well as a relative basis versus each Fund’s respective benchmark and peer group. We also examine attribution of our Annual Glide Path Update process. This paper focuses on year-to-date 2019, calendar year 2018 and since inception performance. All performance is reported in Canadian dollars.

At TD Greystone Asset Management, (“TD Greystone”), our philosophy is to align the investment strategy of the Funds with members’ savings and decumulation needs with the aim to help plan members improve retirement outcomes. The performance of the Greystone Target Date Plus Funds is a result of our philosophy being put into action through our disciplined, repeatable investment process.

We believe that, for target date funds, outperforming over the long run means providing better retirement outcomes for the plan members of capital accumulation plans:

- For members who purchase an annuity at retirement, a better outcome is a higher account balance at retirement to fund that purchase.
- For members who remain invested through their retirement years, a better outcome is that their money lasts longer while still meeting their spending needs.
- For all members, a better outcome is the greater peace of mind engendered when there are smaller and/or fewer investment “bumps” along the way

This paper provides attribution commentary and analysis for year-to-date 2019, calendar year 2018 and since inception¹ performance:

- In the first half of 2019, equity markets rebounded from the sharp fourth quarter decline in 2018. The Funds have achieved strong absolute performance.
- During a volatile 2018, the Funds achieved positive performance across each vintage and led the peer group, in part due to the inclusion of private alternatives, whose diversification characteristics demonstrated their value.
- Since inception, eight out of nine Funds have demonstrated top quartile peer relative performance and peer leading risk-adjusted performance (as measured by Sharpe ratio) showing the longer term value for plan members across both up and down markets.
- Active management of the underlying funds has added between 70 and 140 basis points (“bps”) across vintages of annualized value since inception, primarily driven by equities.
- Our Annual Glide Path Update has added approximately 20-40 bps across vintages², since inception.

Performance Update as at June 30, 2019

Year to Date

As shown in Appendix A (pg 6), in the first half of 2019, the Funds witnessed strong returns as interest rates continued to drop and equities bounced back from a dismal Q4-2018.³ Expectations for central bank rate hikes moved to anticipate easing, pushing interest rates lower and improving investor sentiment within equities and credit.

¹ The inception date of the Greystone Target Date Plus Funds is January 1, 2015.

² Annualized

³ Bloomberg L.P.

Equity markets climbed higher in an effort to recapture lost ground from late last year. Canadian bonds posted mid-single digit returns as interest rates continued to fall. Credit markets responded to the sentiment in a similar fashion to equities, with spreads continuing to retrace the widening that commenced in late 2018.

Real assets and private commercial mortgages demonstrated their diversifying return profile with lower, but more stable returns through the first half of 2019. While lagging the strength found in public markets thus far in 2019, as the cycle continues to mature, the potential diversification benefits of private asset integration will become increasingly important.

Year-to-date outperformance for the Funds has been primarily driven by security selection within global equities.

Since Inception

Since the Funds' inception on January 1, 2015, key performance highlights include:

- Strong returns.** The Funds demonstrated mid to high single-digit annualized returns ranging from 7.1% - 10.1%. In addition, eight out of nine Funds ranked top quartile among peers over this time horizon (Figure 1).
- Low peer relative volatility.** Providing a smoother path to retirement is important for member peace of mind and increases the potential for achieving savings objectives in all return environments. The Funds have provided strong performance with low volatility relative to the peer group (Figure 2).
- High peer relative Sharpe ratio.** Theoretically, the incorporation of private alternatives allows for a decrease in standard deviation without sacrificing expected return. The peer leading Sharpe ratio achieved since inception, shows this theory in action as the Funds achieved higher risk-adjusted returns, consistent across all vintages. (Figure 3).

Figure 1: Since Inception Annualized Peer Relative Return



Figure 2: Since Inception Annualized Peer Relative Standard Deviation



Figure 3: Since Inception Annualized Peer Relative Sharpe Ratio



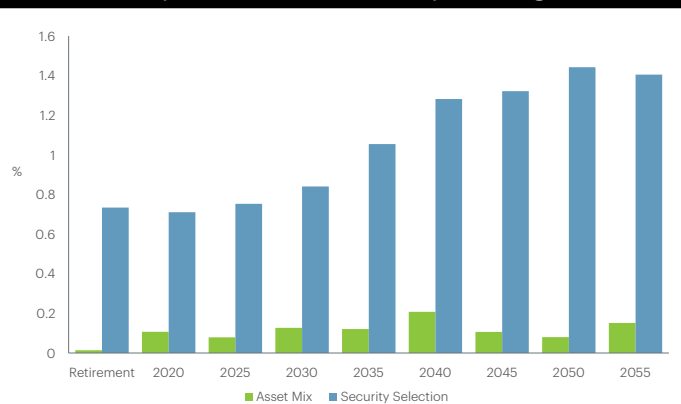
For target date funds, standard attribution analysis primarily highlights the value add from security selection⁴ within the underlying funds. This is because the target date fund benchmark is typically set by the asset manager based on the strategic asset mix for the subsequent quarter. Therefore, for active managers who don't employ a tactical asset allocation overlay, the impact of asset mix effect⁵ is often low or negligible as the manager is trying to match the asset mix weights of the benchmark.

Figure 4 shows the since inception attribution across vintages (Figure 4a) and broken down across asset classes for the Greystone 2040 Target Date Plus Fund (Figure 4b). Since inception, security selection has added between 70 and 140 bps of annualized value across vintages primarily driven by security selection within equities and hence the effects are more pronounced in longer vintage funds.

⁴ Portion of value added or detracted by a single security compared to its weight in the benchmark index. The calculation considers security selection, its portfolio weight, buy/sell timing, interaction and currency.

⁵ Portion of value added or detracted from overweighting (underweighting) the asset class compared to its benchmark.

Figure 4a:
Since Inception Attribution by Vintage



Source: TD Greystone Asset Management. As at Jun 30, 2019. Attribution is transaction based and is calculated on a daily basis. Actual transactions, and their costs, are included in the analysis. Individual day results are linked together to produce longer period reports.

Figure 4b:
Since Inception Attribution Breakdown of Greystone 2040 Target Date Plus Fund

Asset Class	Asset Mix Effect	Security Selection Effect
Cash and Equivalents	0.0	0.0
Equities	0.0	1.4
Fixed Income	0.0	-0.1
Infrastructure	0.1	0.0
Real Estate	0.1	0.0
Total	0.2	1.3

Source: TD Greystone Asset Management. As at Jun 30, 2019. Attribution is transaction based and is calculated on a daily basis. Actual transactions, and their costs, are included in the analysis. Individual day results are linked together to produce longer period reports.

Calendar Year Performance Analysis

2018 Highlights

In 2018, which was a difficult return environment for equities and bonds, all vintages generated positive returns ranging from 1.4% to 2.4% (Figure 5). After a strong first half to 2018, equities sold off sharply in the fourth quarter as concerns grew that the U.S. overnight rates would continue to rise through 2019 and as global economic growth started slowing. In addition, bond yields fell as markets priced in the prospects of lower inflation and lower growth. Risk aversion spilled into the corporate bond market with credit spreads widening significantly.

The incorporation of private alternatives aided the Funds in achieving positive performance⁶ and leading the peer group⁷, particularly as equity markets experienced one of the deepest sell-offs in the fourth quarter of 2018 since the global financial crisis. Over that same quarter, private alternatives demonstrated their low correlation with equities as real estate and infrastructure posted positive returns that were driven by income and capital appreciation, while private commercial mortgage spreads tightened resulting in positive returns as well.

Figure 5: 2018 Peer Relative Performance



Source: TD Greystone Asset Management, eVestment Alliance LLC. 1-Year return as at December 31, 2018.

Attribution Analysis of the Annual Glide Path Update

TD Greystone uses what we call adaptive allocation to set the asset mix for the Funds. Adaptive allocation is a middle ground between tactical asset allocation (where the portfolio is actively tilted to try to take advantage of short term opportunities in the market) and strategic asset allocation (where the portfolio's asset mix is set using long-term asset class assumptions and not adjusted based on market environment). To implement adaptive allocation, we formally examine our glide path through the Annual Glide Path Update process at the end of each calendar year. Through this process, we re-run our proprietary TD Greystone Asset Management Glide Path Model and incorporate any evolutions in available asset classes or funds, long-term asset class assumptions or demographics. This process helps to ensure that the Funds continue to meet plan member objectives in the current market environment.

To help gauge the impact and effectiveness of the Annual Glide Path Update, the team conducts an annual analysis that quantitatively evaluates the impact of strategic glide path changes on the performance outcomes achieved. To exclude the effects of active management, which are captured through standard attribution analysis, underlying asset class benchmarks are used.

⁶ 2018 calendar year performance for private alternatives: 5.4% for the Greystone Real Estate LP Fund, 14.3% for the Greystone Infrastructure Fund (Canada) LP II (in C\$), and 5.0% for the Greystone Mortgage Fund.

⁷ eVestment Alliance, LLC.

Year-to-Date 2019 Adaptive Allocation Attribution

The 2018 Annual Glide Path Update led to a modest rotation from equities to fixed income as yields had risen based on the timing of the inputs. Additionally, higher expected returns across asset classes drove a slightly lower need for risk and an ability to structure portfolios with greater diversification in order to achieve objectives. Within fixed income, there was an adjustment to the sources of duration between short, universe, real return and long bonds. For equities, re-allocation occurred with the addition of Canadian small cap equities and a higher,

long-term expected return for Canadian equities over global equities. Among alternatives, there was a shift from Canadian real estate to private debt, which was driven by lower cap rates (implying a decreased long-term expected return for Canadian real estate) and increasing yields.

Year-to-date, the 2018 Glide Path Update has added 0.0% - 0.4% of value (Figure 6). The fixed income adjustment to sources of duration proved quite positive as long bonds generated double-digit returns⁸.

Figure 6: Year-to-Date Adaptive Allocation Attribution

	Retirement	2020	2025	2030	2035	2040	2045	2050	2055
Value Add YTD 2019	0.0%	0.0%	0.0%	0.3%	0.3%	0.4%	0.2%	0.0%	0.0%

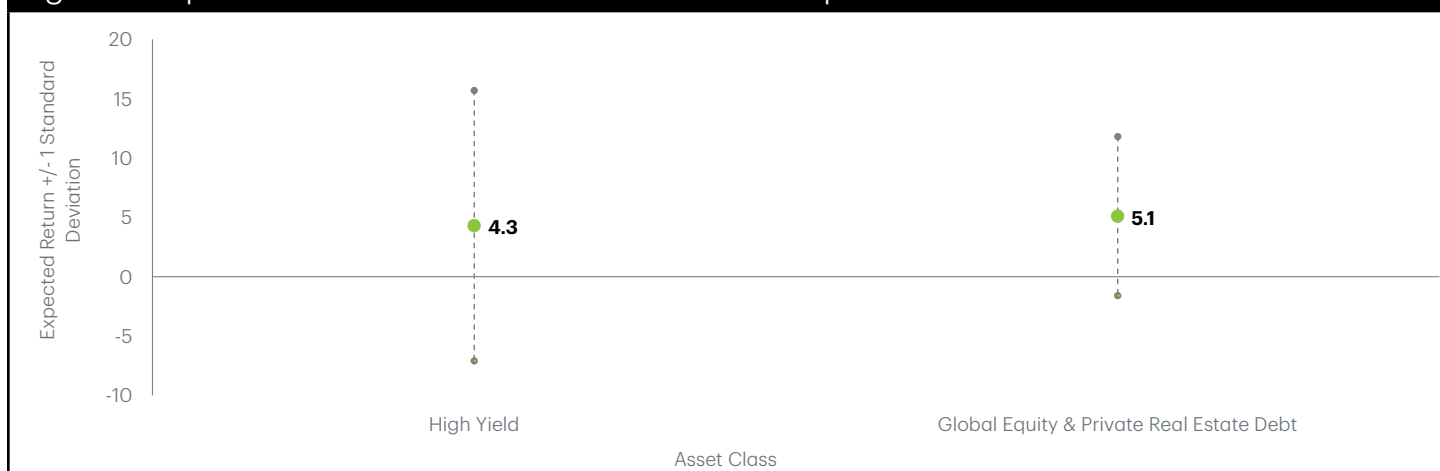
Source: TD Greystone Asset Management. As at Jun 30, 2019.

2018 Adaptive Allocation Attribution

In the 2017 Annual Glide Path Update, we removed our exposure to high yield in favour of global equities and private real estate debt. This was a result of credit spreads collapsing as the cycle continued to mature and based on our belief that in late-cycle

expansions credit tends to underperform equities. In addition, through this adaptive allocation, we were able to improve long-term expected return and decrease expected standard deviation (Figure 7).

Figure 7: Expected Return & Standard Deviation Assumptions



Source: TD Greystone Asset Management. Values shown are TD Greystone Asset Management's long-term return expected returns as of Sep 30, 2017. No assurance that expected returns will be achieved.

The changes implemented through the 2017 Glide Path Update have thus far demonstrated a value add of 0.1%-0.6% across vintages (Figure 8).

Figure 8: Adaptive Allocation Attribution for the 2017 Glide Path Update

	Retirement	2020	2025	2030	2035	2040	2045	2050	2055
Value Add in 2018	0.1%	0.1%	0.1%	0.0%	0.1%	0.1%	0.4%	0.3%	0.3%
Value Add in 2019*	0.0%	0.0%	0.0%	0.3%	0.4%	0.5%	0.0%	-0.2%	-0.1%
Total	0.1%	0.1%	0.1%	0.4%	0.5%	0.6%	0.4%	0.2%	0.2%

* To Jun 30, 2019.
Source: TD Greystone Asset Management

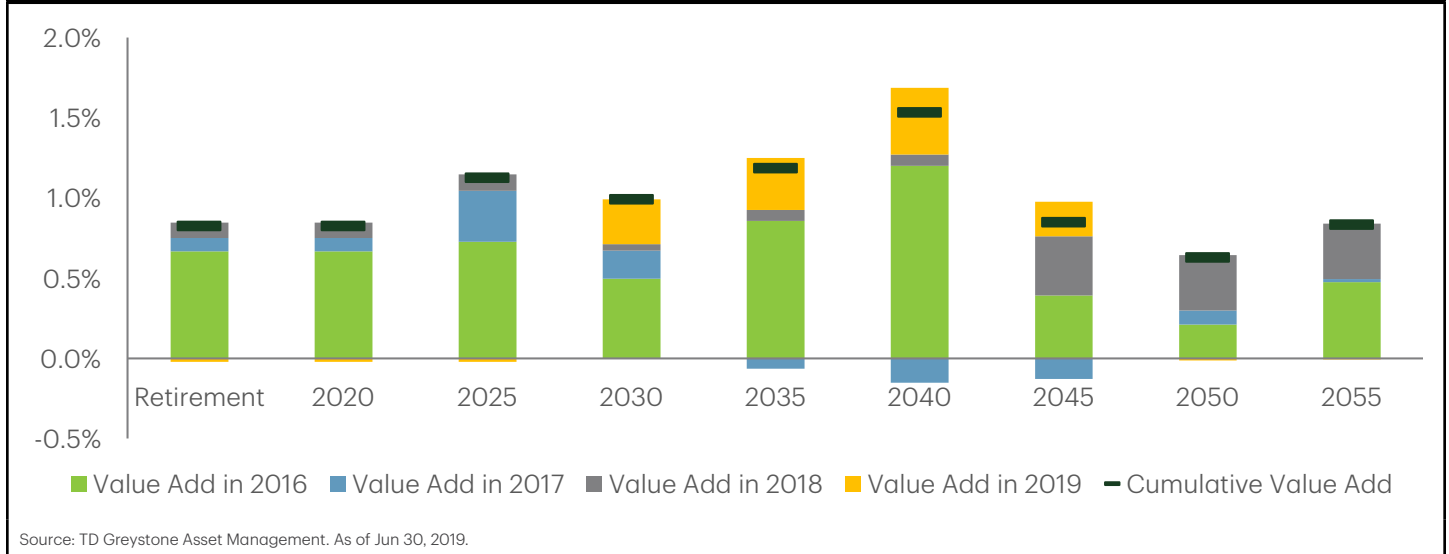
⁸ 12.1% to Jun 30, 2019.

Since Inception Adaptive Allocation Attribution

Since the Funds' inception⁹, we have implemented our Annual Glide Path Update process four times. Adaptive allocation has proven valuable for plan members as the Annual Glide Path

Update has achieved between 0.6% and 1.5% in cumulative value add¹⁰ (Figure 9). On an annualized basis, the Annual Glide Path Update has resulted in approximately 0.2% to 0.4% per year.

Figure 9: Cumulative Value Add of Annual Glide Path Update Process



Conclusions

Since inception, the Greystone Target Date Plus Funds have demonstrated strong absolute and peer relative performance, all while achieving this at a below median peer relative standard deviation overall, resulting in a strong peer relative Sharpe Ratio¹¹. The performance results reflect TD Greystone's overall philosophy seeks to improve retirement outcomes for plan members in the long run.

Within the execution of our process, active management of the underlying funds contributed between 0.7% to 1.4% of annualized value add across vintages and our Annual Glide Path Update process contributed between 0.2% to 0.4% of annualized value add across vintages.

With the diversifying benefits of private alternatives, our robust adaptive allocation Annual Glide Path Update process and active management capabilities, we believe the Greystone Target Date Plus Funds will continue to help position plan members for retirement success.

⁹ The inception date of the Greystone Target Date Plus Funds is January 1, 2015.

¹⁰ For simplicity, we calculate cumulative value add as the sum of 1-year value add for each Annual Glide Path Update. As shown through the section "2018 Adaptive Allocation Attribution" changes made will have impacts beyond the first year that they were implemented.

¹¹ eVestment Alliance LLC

Appendix A – Greystone Target Date Funds' Performance

	Annualized						
Performance as at June 30, 2019							
% Returns	Q2-19	YTD	1 yr	2 yrs	3 yrs	4 yrs	Since Jan-15
Retirement Plus Fund	1.7	7.8	7.0	7.1	7.4	6.2	7.1
Benchmark	1.8	7.5	6.5	6.5	6.9	6.0	6.5
Difference	-0.1	0.3	0.5	0.6	0.5	0.2	0.6
2020 Target Date Plus Fund	1.9	8.1	7.1	7.1	7.5	6.2	7.1
Benchmark	1.8	7.5	6.4	6.4	6.8	5.9	6.5
Difference	0.1	0.6	0.7	0.7	0.7	0.3	0.6
2025 Target Date Plus Fund	1.9	8.1	7.0	7.3	7.7	6.4	7.2
Benchmark	1.8	7.5	6.4	6.6	7.0	6.1	6.6
Difference	0.1	0.6	0.6	0.7	0.7	0.3	0.6
2030 Target Date Plus Fund	2.0	8.8	7.5	7.6	8.0	6.7	7.7
Benchmark	1.9	8.2	6.6	6.8	7.2	6.4	7.0
Difference	0.1	0.6	0.9	0.8	0.8	0.3	0.7
2035 Target Date Plus Fund	2.1	9.5	7.5	8.0	8.8	7.3	8.5
Benchmark	1.9	8.8	6.5	7.1	8.0	6.9	7.7
Difference	0.2	0.7	1.0	0.9	0.8	0.4	0.8
2040 Target Date Plus Fund	2.3	10.6	8.2	9.1	10.2	8.3	9.6
Benchmark	2.0	9.7	6.6	7.9	9.3	7.7	8.5
Difference	0.3	0.9	1.6	1.2	0.9	0.6	1.1
2045 Target Date Plus Fund	2.2	10.8	8.1	9.4	10.6	8.6	9.9
Benchmark	1.9	9.9	6.4	8.2	9.7	8.0	8.9
Difference	0.3	0.9	1.7	1.2	0.9	0.6	1.0
2050 Target Date Plus Fund	2.0	10.7	7.8	9.5	10.9	8.7	10.1
Benchmark	1.8	10.0	6.2	8.3	10.0	8.2	9.1
Difference	0.2	0.7	1.6	1.2	0.9	0.5	1.0
2055 Target Date Plus Fund	1.8	10.2	7.5	9.4	10.9	8.7	10.1
Benchmark	1.8	10.0	6.3	8.4	10.2	8.3	9.2
Difference	0.0	0.2	1.2	1.0	0.7	0.4	0.9

Details regarding benchmarks are available upon request.

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