TD Greystone Asset Management

Long-Term Asset Class Assumptions

At TD Greystone Asset Management (“TD Greystone”), our breadth of in-house expertise in fixed income, public equities and alternatives allows us to create unique solutions as we seek to provide long-term value for our clients. In the following pages, we outline TD Greystone’s long-term return forecasts for stocks, bonds and alternative investments in order to inform strategic asset mix decisions and to improve total portfolio outcomes.

Setting Return Expectations

Asset class assumptions fall under three categories:

- **Returns:** long-term expected return for each asset class
- **Risk:** standard deviation of asset class returns
- **Correlation:** covariance of asset class returns

Expected Returns

We incorporated the following expected annual returns into the mean-variance optimization model:

Figure 1

	Annual Average Expected Return[1]
Cash	2.0
Canadian Short Bonds	2.4
Canadian Universe Bonds	2.7
Canadian Long Bonds	3.2
Canadian Real Return Bonds	2.9
High Yield	5.5
Private Real Estate Debt	4.4
Canadian Equity	6.9
Canadian Equity Small Cap	7.9
U.S. Equity	6.3
International Equity	6.6
Global Equity	6.4
Chinese Equity	10.2
Commercial Real Estate (Direct)	5.7
Global Commercial Real Estate (Direct)	5.5
Infrastructure (Direct)	8.0

[1] Annual average expected return over the next 7 – 10 years. No assurance that expected returns will be achieved.

TD Greystone utilizes a forward looking building-block approach to set an objective base for disciplined asset class return assumptions. This model builds off of the Grinold and Kroner forecasting methodology. The return assumptions encapsulate three financial and economic parameters: expected real GDP, expected inflation and yield. The formula used for average annual return assumptions is listed directly below:

Average Annual Expected Return =
Forecast Real GDP + Forecast Inflation + Yield

Different asset classes incorporate different financial and economic parameters into their return expectations. For instance, equities include all three, while bonds only incorporate yield.

Below is a breakdown of the separate blocks used to forecast each asset class return:

Real GDP	+	Inflation	+	Yield
Exposed Asset Classes:		**Exposed Asset Classes:**		**Exposed Asset Classes:**
Equities		Real Return Bonds		Bonds[1]
		Real Estate		Private Real Estate Debt[1]
		Equities		Real Estate
				Equities

Fixed Income: Yield is the only factor contributing to returns in TD Greystone's model, as nominal bonds do not reward investors for increases in real economic growth or inflation expectations. While curve movements affect the mark-to-market return, passively held fixed income securities will theoretically return the yield as the investment horizon approaches maturity.

Private Real Estate Debt: Due to the limited availability of information on private debt (private commercial mortgages), we rely on information from TD Greystone's internal strategies. Reflecting our methodology for fixed income expected returns, the assumed return for private debt (private commercial mortgages) reflects the yield of the Greystone Mortgage Fund.

Public Equities: All three building blocks are applied to forecasting equity returns as we believe earnings growth broadly reflects real growth in the economy. Stocks also compensate for inflation through pricing power and provide a dividend yield.

Real Estate: Real Estate provides inflation protection and income. Rising inflation is compensated through CPI[2] linked rental escalation agreements, while higher building costs (e.g. labor, materials, etc.) demands increased real estate pricing. The expected cash yield for investors is the market capitalization rate[3] less 1%[4] for capital expenditures. Capital expenditures include replacement components of a building (e.g. roofing, asphalt, elevators, etc.), repairs or expenditures that improve the functionality and/or marketability of the building.

Infrastructure: It is difficult to estimate future return expectations for global infrastructure based on financial and economic parameters due to the asset-specific nature of infrastructure investments and the lack of publicly available data. We instead use an absolute annual return expectation of 8% over a four-year rolling period, which assumes inflation is 2.0%. This is in congruence with the lower band of our target return on equity for global infrastructure investments.

Incorporating Greystone's Outlook

The asset class return model requires an overlay of professional judgement to create rational assumptions. Asset strategy can help in this regard by adjusting the forecasted returns based on the firm's outlook. Below are some considerations that will affect each factor (GDP, CPI & Yield).

Real GDP	+	Inflation	+	Yield
Exposed Asset Classes:		**Exposed Asset Classes:**		**Exposed Asset Classes:**
Different firm view from consensus		Different firm view from consensus		Default risk in fixed income
Adjust for forecast error		Adjust for forecast error		Expected increase/decrease in dividend payout ratios
Extreme P/E multiples				Curve Steepness

[1] The yield for fixed income assets illustrates geometric expected returns. Geometric returns will be lower than arithmetic returns for any asset that has volatility, or the risk of negative returns. We have converted the fixed income geometric expected returns into arithmetic using the following formula: Arithmetic Average = Geometric Average + $(\sigma/2)^2$

[2] Consumer Price Index – weighted average of prices for goods and services.

[3] The Net Operating Income (NOI) of the properties over previous year divided by the total market value of the properties.

[4] The 1% capital expenditure was deduced from a sample properties managed by TD Greystone where the difference in NOI and Cash Flow from Operations was approximately 1%.

Volatility

Figure 2

Asset Class	Benchmark to Calculate Volatility	Volatility[1]
Cash	FTSE TMX Canada 91-day T-bill	0.8
Canadian Short Bonds	FTSE TMX Canada Short Term	2.3
Canada Universe Bonds	FTSE TMX Canada Universe Bond	3.8
Canadian Long Bonds	FTSE TMX Canada Long Term	6.8
Canadian Real Return Bonds	FTSE TMX Canada Real Return Bond Index	6.6
High Yield	50% ML US HY Master II Trust Hedge to CAD + 50% ML CAD and USD HY Canadian Issuers	10.9
Private Real Estate Debt	40% DEX Mid-term Index , 60% Dex Short term Index + 0.5% p.a.	2.9
Canadian Equity	S&P/TSX Composite	15.5
Canadian Equity Small Cap	S&P/TSX SmallCap Index	19.2
U.S. Equity	S&P 500	13.2
International Equity	MSCI EAFE	14.7
Global Equity	MSCI World	13.3
Chinese Equity	CSI 300	32
Commercial Real Estate (Direct)[2]	IPD Canada All Property Index	8.2
Global Commercial Real Estate (Direct)[2]	MSCI IPD Global Property Fund Index	7.3
Infrastructure (Direct)[2]	Mercer MPA Median Australian Manager AUD	7.6

[1] Volatility is measured by the standard deviation of return of each asset class from December 31, 1998 to September 30, 2018, calculated from quarterly data.

[2] Please note that the experienced volatility was 3.4%, 4.4% and 4.9% for Commercial Real Estate, Global Commercial Real Estate, and Infrastructure, respectively. Infrequently measured assets like Real Estate and Infrastructure exhibit significant serial correlation and failure to correct can grossly understate actual volatility for their asset classes. For this reason we have de-smoothed the return stream of Real Estate and Infrastructure and the results of our analysis reflect this de-smoothing approach.

Correlation

Upon request we would be pleased to provide full information regarding cross asset correlations. Our correlation methodology follows the same approach as our volatility assumptions.

Conclusion

Strategic asset mix decisions require an objective approach to long-term asset class return expectations, and defining forward-looking return expectations can help to shine a light on investor challenges and ultimately how to address them. For more information, please contact your TD Greystone representative or email us at inquiries@greystone.ca.

Disclosures

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Figures shown in this report are in Canadian dollars except as noted, and may be subject to rounding error. Returns are gross of investment management fees.

Indices & Benchmarks

Index returns include reinvestment of dividends, if applicable, but not the deduction of any fees or expenses, which would reduce returns.

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For clients with benchmarks that blend two or more indexes (e.g. FTSE TMX Canada 91 Day T-Bill 3%, FTSE TMX Canada Universe Bond 37%, S&P/TSX Composite 35%, S&P 500 Composite 12.5%, MSCI EAFE (Net) 12.5%): Our reporting system rebalances your benchmark to its stated asset mix on a daily basis. Consequently, there may be discrepancies between benchmark returns presented in this report and those calculated with a monthly or quarterly rebalancing.

For clients who hold fixed income: FTSE TMX Global Debt Capital Markets Inc. is the source for credit ratings. If a particular security is not identified by FTSE TMX Global Markets Inc., an equivalent, recognized, independent rating agency is used. TD Greystone does not rate securities.

Information presented herein may contain backtested performance data. Backtested performance is hypothetical (it does not reflect trading in actual accounts) and is provided for informational purposes to indicate historical performance had the portfolio(s) been available over the relevant period.

For clients who hold real estate: IPD returns are not immediately available at quarter-end; therefore, the prior quarter's index return is used in this report for benchmark calculation purposes. When the actual index is available, the benchmark return is then re-calculated.

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