



# Financial Planning Assumptions

(Market Capitalization Weighted Portfolio)

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Data Update  
Year-end 2025  
Published: Winter 2026

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PWL Capital Inc., A OneDigital Company, "Financial Planning Assumptions for Market Capitalization Weighted Portfolio"

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# Table of Content

1. Introduction	4
2. Expected Inflation	4
3. Primary Residence	4
4. Expected Cost of Borrowing	5
5. Asset Class Expected Returns	6
6. Expected Standard Deviations	7
7. Expected Correlations	7
8. Composition of Asset Class Returns	8
9. Portfolio Expected Returns, Standard Deviations, and Return Composition	9
Appendix: Financial Planning Assumptions – Naviplan Input Format	10

# 1. Introduction

This guide is intended to provide Canadian financial planners with our best estimates of future asset class returns and volatilities to produce financial projections for their clients. This document assumes that investors hold a broadly diversified portfolio of publicly traded Canadian fixed-income and global equity, including developed and emerging markets. These estimates are valid only for an investor who intentionally avoids concentration in one or a few securities or sectors. Our investment horizon is 30 years. Key inputs are highlighted in green for the Naviplan financial planning software users. We have also added an appendix to provide Naviplan users with data presented in a more user-friendly format.

## 2. Expected Inflation

Our estimate for long-run Canadian inflation is the average of Canadian historical inflation from 1900 to 2025 and the Bank of Canada's inflation target. These figures are 3.0% and 2.0%, respectively, for an inflation expectation of 2.5%.

**Table 1 - Expected Inflation Composition**

0.50 x (Historical Inflation) Plus	0.50 x (Bank of Canada Target Inflation)	Equals Expected Inflation
3.0%	2.0%	2.5%

Source: PWL Capital; Data Sources: Elroy Dimson, Paul Marsh and Mike Staunton; Bank of Canada.

## 3. Primary Residence

We estimate the expected real capital return for personal residences to be 1% annually. The carrying costs of real estate, including maintenance, insurance, and property taxes, must also be captured. We estimate a 1% annual cost for maintenance and insurance. As property taxes vary greatly, we do not attempt to prescribe a figure here, but users should be sure to include them based on their circumstances. A 1% expected real return, less maintenance and property taxes (not to mention the opportunity cost of home equity) may make housing look like a poor investment. However, it is essential to remember that the owner receives imputed rent as a benefit.

Haurin & Zhou (2010) document the volatility of individual homes in the US from 1985 to 2003, and Peng & Thibodeau (2016) cover the periods from 1996 to 2000, 2001 to 2007, and 2007 to 2012. We calculate the average idiosyncratic volatility from these studies and add it to the general Canadian market volatility to obtain an estimate of 15% for the total volatility of Canadian homes, as documented in Table 2 below.

## Table 2 - Canadian Individual Home Volatility Estimate

Canadian Market Volatility Estimate		4.5%
Plus: Idiosyncratic Volatility:		
Haurin & Zhou (1985-2003)	13.1%	
Peng & Thibodeau (1996-2000)	9.4%	
Peng & Thibodeau (2001-2007)	7.9%	
Peng & Thibodeau (2007-2012)	11.5%	
Average	10.5%	10.5%
<b>Total Volatility</b>		<b>15.0%</b>

Source: PWL Capital; Data Sources: Haurin and Zhou, Peng and Thibodeau, Teranet/National Bank.

## 4. Expected Cost of Borrowing

Like our methodology for estimating the expected return of fixed-income assets, we estimate the expected cost of borrowing from a combination of Market-Based Expected Return (MBER) and Equilibrium Cost of Capital (ECOC) for five-year fixed-rate mortgages and secured and unsecured personal lines of credit. Our results are summarized in Table 3.

**Table 3 - Expected Cost of Borrowing**

	W1	Nominal MBER	W2	Nominal ECOC	Expected Cost of Borrowing
Five-Year Mortgage - Fixed rate	75%	4.19%	25%	4.73%	4.33%
Personal Line of Credit - Secured	15%	3.82%	85%	5.25%	5.04%
Personal Line of Credit - Unsecured	15%	7.69%	85%	8.49%	8.37%

Source: PWL Capital; Data Sources: Statistics Canada, Bank of Canada, Bloomberg, BMO Global Asset Management.

## 5. Asset Class Expected Returns

For each asset class, we estimate expected returns with a weighted average of the Market-Based Expected Return (MBER) and the Equilibrium Cost of Capital (ECOC). The MBER estimates expected returns based on current market condition metrics. The ECOC estimates expected returns based on more than 120 years of global asset class return data. The weighting of each component is derived from the statistical explanatory power of the MBER. Empirical evidence suggests that the MBER has a high explanatory power for fixed income and a relatively low (but significant) explanatory power for equity and cash instruments.

For each asset class, we attribute a weight “W1” to the MBER and the balance of the attribution “W2” to the ECOC to obtain gross nominal asset class returns. We then subtract product MERs to get the net nominal expected returns. We use total market ETF MERs as our product fee assumption for market-cap-weighted portfolios. The ETFs corresponding to each asset class are outlined in the “Composition of Asset Class Returns” section.

**Table 4 - Asset Class Expected Returns**

Asset Class	W1	Nominal MBER	W2	Nominal ECOC	Nominal Expected Return - Gross of fees	MER	Nominal Expected Return - Net of fees
Cash	15%	2.20%	85%	2.99%	2.87%	0.00%	2.87%
Short Term Fixed Income - MCW	75%	2.97%	25%	3.47%	3.10%	0.12%	2.97%
Fixed Income - MCW	75%	3.54%	25%	3.96%	3.64%	0.09%	3.55%
Canadian Equity - MCW	25%	6.31%	75%	7.09%	6.90%	0.06%	6.83%
US Equity - MCW	25%	5.01%	75%	7.09%	6.57%	0.17%	6.39%
International Equity DV & EM - MCW	25%	8.16%	75%	7.09%	7.36%	0.24%	7.10%

Source: PWL Capital; Data Sources: Bloomberg, DFA Web, Robert Shiller, Elroy Dimson, Paul Marsh and Mike Staunton.

## 6. Expected Standard Deviations

Asset class standard deviations are estimated using a simple average of the 5-year and 20-year historical standard deviations.

**Table 5 - Estimated Volatility of Major Asset Classes**

Asset Class	Five-year Standard Deviation	20-year Standard Deviation	Estimated Standard Deviation
Fixed Income - MCW	6.14%	4.62%	5.38%
Canadian Equity - MCW	13.92%	14.47%	14.19%
US Equity - MCW	15.14%	13.90%	14.52%
International Equity DV & EM - MCW	11.45%	13.23%	12.34%

Source: PWL Capital; Data Source: DFA Web.

## 7. Expected Correlations

Asset class correlations are estimated using a simple 5-year- and 20-year historical data average.

**Table 6 - Correlation Estimates**

	Fixed Income - MCW	Canadian Equity - MCW	US Equity - MCW	International Equity DV & EM - MCW
Fixed Income - MCW	1.00	0.39	0.45	0.48
Canadian Equity - MCW	0.39	1.00	0.71	0.71
US Equity - MCW	0.45	0.71	1.00	0.71
International Equity - MCW	0.48	0.71	0.71	1.00

Source: PWL Capital; Data Source: DFA Web.

## 8. Composition of Asset Class Returns

The composition of asset class returns, primarily consisting of capital appreciation, interest income and dividends, is essential for financial planning. The tax liability in taxable and non-taxable accounts (due to foreign withholding tax) will hinge on the portion of returns assumed to be coming from interest, Canadian and foreign dividends, and realized and unrealized capital gains.

To determine the composition of asset class returns, we proceed as follows:

- Establish one or more mutual funds or ETFs representing the passive benchmark for each asset class.
- For fixed income, the average distribution yield is assumed to be the lowest of the underlying fund's current yield and the asset class expected return. Distributions are assumed to be 100% interest income.
- For Canadian equity, ETF distributions are assumed to be 100% Canadian dividends.
- For US and international equity, ETF distributions are assumed to be 100% foreign dividends.
- The balance of expected returns (net of distribution yields) is treated as capital gains.
- We assume a 90%/10% split between unrealized and realized capital gains.

We use the following funds to estimate the composition of asset class returns:

Fixed income: 100% Vanguard Aggregate Bond ETF (VAB)

Canadian equity: 100% BMO S&P/TSX Capped Composite ETF (ZCN)

US Equity: 100% Vanguard US Total Market ETF (VUN)

International Equity: 70% Vanguard FTSE Developed All Cap Ex North America (VIU), 30% Vanguard FTSE Emerging Markets All Cap Index (VEE)

Our estimates for the composition of expected returns are illustrated in Table 7. This data is reproduced in a Naviplan-compatible format in the Appendix.

**Table 7 - Composition of Expected Asset Class Returns**

Asset Class	Expected Return	Current Yield	Interest & Foreign Dividends	Canadian Dividends	Realized Capital Gains	Unrealized Capital Gains
Fixed Income	3.55%	3.33%	3.33%	0.00%	0.02%	0.20%
Canadian Equity	6.83%	2.22%	0.00%	2.22%	0.46%	4.15%
US Equity	6.39%	0.84%	0.84%	0.00%	0.56%	5.00%
International Equity DV & EM	7.10%	2.40%	2.40%	0.00%	0.47%	4.23%

Source: PWL Capital; Data Sources: Bloomberg, Morningstar, Robert Shiller, Elroy Dimson, Paul Marsh and Mike Staunton.

## 9. Portfolio Expected Returns, Standard Deviations, and Return Composition

To simplify the practical application of the information presented in this paper, Table 8 shows expected returns, standard deviations, and return composition for portfolios consisting of various mixes between stocks and bonds.

**Table 8 - Portfolio Expected Returns**

Asset Mix (Equity/Bond)	Expected Return	Expected Standard Deviation	ESTIMATED RETURN COMPOSITION			
			Interest & Foreign Dividends	Canadian Dividends	Realized Capital Gains	Unrealized Capital Gains
0/100	3.55%	5.38%	3.33%	0.00%	0.02%	0.20%
5/95	3.74%	5.44%	3.22%	0.04%	0.05%	0.44%
10/90	3.93%	5.56%	3.10%	0.08%	0.07%	0.68%
15/85	4.12%	5.73%	2.98%	0.12%	0.10%	0.92%
20/80	4.30%	5.94%	2.86%	0.16%	0.13%	1.16%
25/75	4.48%	6.20%	2.74%	0.20%	0.15%	1.39%
30/70	4.66%	6.49%	2.62%	0.24%	0.18%	1.63%
35/65	4.84%	6.82%	2.50%	0.27%	0.21%	1.86%
40/60	5.01%	7.17%	2.38%	0.31%	0.23%	2.09%
45/55	5.18%	7.55%	2.25%	0.35%	0.26%	2.32%
50/50	5.35%	7.94%	2.13%	0.39%	0.28%	2.55%
55/45	5.51%	8.36%	2.01%	0.42%	0.31%	2.77%
60/40	5.67%	8.79%	1.89%	0.46%	0.33%	2.99%
65/35	5.83%	9.23%	1.76%	0.50%	0.36%	3.21%
70/30	5.99%	9.68%	1.64%	0.53%	0.38%	3.43%
75/25	6.14%	10.15%	1.52%	0.57%	0.41%	3.64%
80/20	6.29%	10.62%	1.40%	0.60%	0.43%	3.85%
85/15	6.44%	11.10%	1.29%	0.64%	0.45%	4.06%
90/10	6.59%	11.59%	1.17%	0.67%	0.48%	4.27%
95/5	6.73%	12.08%	1.05%	0.71%	0.50%	4.47%
100/0	6.87%	12.57%	0.94%	0.74%	0.52%	4.67%

Source: PWL Capital; Data Sources: Bloomberg, Morningstar, Robert Shiller, Elroy Dimson, Paul Marsh and Mike Staunton.

# Appendix: Financial Planning Assumptions – Naviplan Input Format

## Table 9 - Composition of Asset Class Returns

	Interest	Dividends	Capital Gains	Deferred Growth	Total	Standard Deviation
Fixed Income - MCW	3.33%		0.02%	0.20%	3.55%	5.38%
Canadian Equity - MCW		2.22%	0.46%	4.15%	6.83%	14.19%
US Equity - MCW	0.84%		0.56%	5.00%	6.39%	14.52%
International Equity - MCW	2.40%		0.47%	4.23%	7.10%	12.34%

Source: PWL Capital; Data Sources: Bloomberg, Morningstar, Robert Shiller, Elroy Dimson, Paul Marsh and Mike Staunton.

## Table 10 - Portfolio Asset Mixes

Asset Mix (Equity/Bond)	Fixed Income	Canadian Equity	US Equity	International Equity
0/100	100.00%	0.00%	0.00%	0.00%
5/95	95.00%	1.62%	2.23%	1.15%
10/90	90.00%	3.24%	4.46%	2.29%
15/85	85.00%	4.87%	6.69%	3.44%
20/80	80.00%	6.49%	8.93%	4.59%
25/75	75.00%	8.11%	11.16%	5.73%
30/70	70.00%	9.73%	13.39%	6.88%
35/65	65.00%	11.35%	15.62%	8.03%
40/60	60.00%	12.98%	17.85%	9.17%
45/55	55.00%	14.60%	20.08%	10.32%
50/50	50.00%	16.22%	22.32%	11.47%
55/45	45.00%	17.84%	24.55%	12.61%
60/40	40.00%	19.46%	26.78%	13.76%
65/35	35.00%	21.09%	29.01%	14.90%
70/30	30.00%	22.71%	31.24%	16.05%
75/25	25.00%	24.33%	33.47%	17.20%
80/20	20.00%	25.95%	35.70%	18.34%
85/15	15.00%	27.57%	37.94%	19.49%
90/10	10.00%	29.20%	40.17%	20.64%
95/5	5.00%	30.82%	42.40%	21.78%
100/0	0.00%	32.44%	44.63%	22.93%

Data Source: DFA



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