



Financial Planning Assumptions

(Market Capitalization
Weighted Portfolio)

Data Update
Year End 2022

Benjamin Felix MBA, CFA, CFP, CIM®
Portfolio Manager, Head,
Research & Client Education

Raymond Kerzérho MBA, CFA
Senior Researcher, Head,
Shared Services Research

Published: Winter 2023

This report was written by the Research team at PWL Capital Inc. The ideas, opinions, and recommendations contained in this document are those of the authors and do not necessarily represent the views of PWL Capital Inc.

© PWL Capital Inc.

All rights reserved. No part of this publication may be reproduced without prior written approval of the author and/or PWL Capital. PWL Capital would appreciate receiving a copy of any publication or material that uses this document as a source. Please cite this document as:

PWL Capital Inc., “Financial Planning Assumptions - (Market Capitalization Weighted Portfolio)”

For more information about this or other publications from PWL Capital, contact:

PWL Capital – Montreal, 3400 de Maisonneuve Ouest, Suite 1501, Montreal, Quebec H3Z 3B8

Tel 514-875-7566 • 1-800-875-7566

info@pwlcapital.com

This document is published by PWL Capital Inc. for your information only. Information on which this document is based is available on request. Particular investments or trading strategies should be evaluated relative to each individual's objectives, in consultation with the Investment Advisor. Opinions of PWL Capital constitute its judgment as of the date of this publication, are subject to change without notice and are provided in good faith but without responsibility for any errors or omissions contained herein. This document is supplied on the basis and understanding that neither PWL Capital Inc. nor its employees, agents or information suppliers is to be under any responsibility of liability whatsoever in respect thereof.

Table of Contents

1. Introduction	4
2. Q1 2023 Improvements to Methodology	4
3. Expected Inflation	4
4. Primary Residence	5
5. Asset Class Expected Returns	6
6. Expected Standard Deviations	6
7. Expected Correlations	7
8. Composition of Asset Class Returns	8
9. Portfolio Expected Returns	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 uniquely in the context of an investor who purposely avoids concentration in one or a few securities or sectors. Our investment horizon is 30 years. Key inputs are highlighted in green for users of the Naviplan financial planning software. We also have added an appendix to provide users of Naviplan with data presented in a more compatible format.

2 Q1 2023 Improvements to Methodology

We have made two major improvements to our methodology.

First, we now calculate expected returns net of product fees. The MERs of low-cost total market ETFs were subtracted from asset class expected returns.

Second, we estimate the total volatility of personal residences, accounting for idiosyncratic risk. In the past, we have used the Teranet-National Bank House Price Index, which underestimates the actual volatility of individual homes because it accounts only for the market risk of Canadian homes. We found some research that helps correct this flaw.

3. Expected Inflation

Our estimate for long-run Canadian inflation is the average of 30-year Government of Canada bond breakeven inflation, Canadian historical inflation from 1900 to 2022, and the Bank of Canada's inflation target. These figures are 2.1%, 3.0%, and 2.0%, respectively, for an inflation expectation of 2.4%.

In November 2022, Canada's Ministry of Finance announced it would stop issuing real-return bonds. Thus, we will review our methodology for estimating expected inflation to account for this new development in a future edition of the Financial Planning Assumptions.

Table 1 - Expected inflation composition

1/3 x (Breakeven Inflation) Plus	1/3 x (Historical Inflation) Plus	1/3 x (Bank of Canada Target Inflation)	Equals Expected Inflation
2.1%	3.0%	2.0%	2.4%

Source: PWL Capital; Data Sources: Elroy Dimson, Paul Marsh and Mike Staunton, *Triumph of Optimists: 101 Years of Global Investment Returns*, Princeton University Press, 2002; Elroy Dimson, Paul Marsh and Mike Staunton, *Credit Suisse Global Returns Yearbook and Sourcebook*, 2018, Zurich: Credit Suisse Research Institute, 2021, Bank of Canada University Press, 2002; Elroy Dimson, Paul Marsh and Mike Staunton, *Credit Suisse Global Returns Yearbook and*

4. Primary Residence

We estimate the expected real capital return for personal residences at 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.

For example, a 1% 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.

To estimate the volatility of returns on residences, we found two studies documenting the total volatility of individual homes in the US. Thus, our first step was determining whether US data could provide sound evidence in a Canadian context. We looked at the S&P Case/Shiller and the Teranet/National Bank indices for insight. Although these two indices are only moderately correlated (0.55 from March 1999 to November 2022), their volatilities are similar: 3.5% per annum for the Canadian Index compared to 3.0% for the US. Based on this evidence, we assume the idiosyncratic volatility of Canadian and US homes will be similar.

Haurin & Zhou (2010) document the volatility of individual homes 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 14.1% for the total volatility of Canadian homes, as documented in table 2 below.

Table 2 - Canadian Individual Home Volatility Estimate

Title	Title	Title
Canadian Market Volatility Estimate (3/1999-12/2022)		3.5%
Plus: Idiosyncratic Volatility:		
Haurin & Zhou (1985-2003) ¹	13.1%	
Peng & Thibodeau (1996-2000)	9.4%	
Peng & Thibodeau (2001-2007)	7.9%	
Peng & Thibodeau (2007-2012)	11.5%	
Average	10.6%	10.6%
Total Volatility		14.1%

Source: PWL Capital; Data Sources: Haurin and Zhou, Peng and Thibodeau, Federal Reserve Bank of Saint-Louis, Teranet/National Bank

¹Haurin & Zhou provide an estimate for the total volatility of US homes (15%) from which we subtract the volatility of the S&P Case/Shiller Index for 1987-2003 (1.9%).

5. Asset Class Expected Returns

We estimate asset class expected returns with a weighted average of the Market-Based Expected Return (MBER) and the Equilibrium Cost of Capital (ECOC). The MBER is an estimate of expected returns based on current market conditions. The ECOC estimates expected returns based on more than 120 years of global asset class return historical 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 explanatory power for equity.

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

Table 3 - 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	75%	4.26%	25%	3.07%	3.96%	0.00%	3.96%
Short Term Fixed Income	75%	4.40%	25%	3.61%	4.20%	0.11%	4.09%
Fixed Income	75%	4.28%	25%	4.15%	4.25%	0.09%	4.15%
Canadian Equity	25%	6.77%	75%	7.08%	7.00%	0.05%	6.95%
US Equity	25%	5.64%	75%	7.08%	6.72%	0.15%	6.56%
International Equity (DV+EM)	25%	9.42%	75%	7.08%	7.66%	0.23%	7.41%
Global Equity ²				-	7.05%	0.14%	6.91%

Source: PWL Capital; Data Sources: Bloomberg, Morningstar, Robert Shiller, Elroy Dimson, Paul Marsh and Mike Staunton, *Triumph of the Optimists: 101 Years of Global Investment Returns*, Princeton University Press, 2002; Elroy Dimson, Paul Marsh and Mike Staunton, *Credit Suisse Global Returns Yearbook and Sourcebook*, 2018, Zurich: Credit Suisse Research Institute, 2021

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 4 - Estimated Volatility of Major Asset Classes

Asset Class	Five-year Standard Deviation	20-year Standard Deviation	Estimated Standard Deviation
Fixed Income	5.58%	4.34%	4.96%
Canadian Equity	16.72%	14.29%	15.50%
US Equity	16.51%	13.46%	14.99%
International Equity	12.70%	13.53%	13.12%

Source: PWL Capital; Data Source: Morningstar

² Global Equity² is made of 1/3 Canadian equity, with the balance being allocated on a market cap weighted basis to US and international equity. The weightings of the DFA Global Equity Fund are used as a guide.

7. Expected Correlations

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

Table 5 - Correlation Estimates

	Fixed Income	Canadian Equity	US Equity	International Equity
Fixed Income	1.00	0.27	0.35	0.34
Canadian Equity	0.27	1.00	0.73	0.73
US Equity	0.35	0.73	1.00	0.77
International Equity	0.34	0.73	0.77	1.00

Source: PWL Capital; Data Source: Morningstar

8. Composition of Asset Class Returns

The composition of returns, primarily consisting of the mix between 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 that represent the passive benchmark for each asset class.
- For fixed income, distributions are assumed to be the lowest of the underlying fund's yield and the asset class expected return. Distributions are also assumed to be 100% interest income.
- For Canadian equity, distributions are assumed to be 100% Canadian dividends.
- For US and International equity, 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 50%/50% split between realized and unrealized 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% iShares S&P/TSX Composite ETF (XIC)

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 6. This data is reproduced in a Naviplan-compatible format in the Appendix.

Table 6 - 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	4.15%	2.87%	2.87%	0.00%	0.64%	0.64%
Canadian Equity	6.95%	3.10%	0.00%	3.10%	1.92%	1.92%
US Equity	6.56%	1.21%	1.21%	0.00%	2.67%	2.67%
International equity DV + EM	7.41%	2.94%	2.94%	0.00%	2.24%	2.24%

Source: PWL Capital; Data Sources: Bloomberg, Morningstar, Robert Shiller, Elroy Dimson, Paul Marsh and Mike Staunton, *Triumph of the Optimists: 101 Years of Global Investment Returns*, Princeton University Press, 2002; Elroy Dimson, Paul Marsh and Mike Staunton, *Credit Suisse Global Returns Yearbook and Sourcebook*, 2018, Zurich: Credit Suisse Research Institute, 2021

9. Portfolio Expected Returns

To simplify the practical application of the information presented in this paper, table 7 shows portfolios consisting of various mixes between stocks and bonds.

Table 7 - Composition of Expected Asset Class 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	4.15%	4.96%	2.87%	0.00%	0.64%	0.64%
5/95	4.26%	5.00%	2.79%	0.05%	0.71%	0.71%
10/90	4.41%	5.08%	2.71%	0.10%	0.80%	0.80%
15/85	4.58%	5.30%	2.63%	0.15%	0.90%	0.90%
20/80	4.72%	5.56%	2.55%	0.21%	0.99%	0.99%
25/75	4.84%	5.82%	2.46%	0.26%	1.06%	1.06%
30/70	4.97%	6.16%	2.38%	0.31%	1.14%	1.14%
35/65	5.12%	6.59%	2.30%	0.36%	1.23%	1.23%
40/60	5.26%	7.01%	2.22%	0.41%	1.31%	1.31%
45/55	5.39%	7.44%	2.14%	0.46%	1.39%	1.39%
50/50	5.54%	7.96%	2.06%	0.52%	1.48%	1.48%
55/45	5.68%	8.47%	1.98%	0.57%	1.57%	1.57%
60/40	5.81%	8.99%	1.90%	0.62%	1.65%	1.65%
65/35	5.95%	9.50%	1.82%	0.67%	1.73%	1.73%
70/30	6.08%	10.01%	1.73%	0.72%	1.81%	1.81%
75/25	6.23%	10.61%	1.65%	0.77%	1.90%	1.90%
80/20	6.36%	11.13%	1.57%	0.83%	1.98%	1.98%
85/15	6.50%	11.73%	1.49%	0.88%	2.07%	2.07%
90/10	6.62%	12.24%	1.41%	0.93%	2.14%	2.14%
95/5	6.77%	12.84%	1.33%	0.98%	2.23%	2.23%
100/0	6.91%	13.44%	1.25%	1.03%	2.31%	2.31%

Source: PWL Capital; Data Sources: Bloomberg, Morningstar, Robert Shiller, Elroy Dimson, Paul Marsh and Mike Staunton, *Triumph of the Optimists: 101 Years of Global Investment Returns*, Princeton University Press, 2002; Elroy Dimson, Paul Marsh and Mike Staunton, *Credit Suisse Global Returns Yearbook and Sourcebook*, 2018, Zurich: Credit Suisse Research Institute, 2021

Appendix: Financial Planning Assumptions – Naviplan Input Format

Table 8 - Composition of Asset Class Returns

Asset Class	Interest	Dividends	Capital Gains	Deferred Growth	Total	Standard Deviation
Fixed Income	2.87%	-	0.64%	0.64%	4.15%	4.96%
Canadian Equity	-	3.10%	1.92%	1.92%	6.95%	15.50%
US Equity	1.21%		2.67%	2.67%	6.56%	14.99%
International Equity	2.94%		2.24%	2.24%	7.41%	13.12%

Source: PWL Capital; Data Sources: Bloomberg, Morningstar, Robert Shiller, Elroy Dimson, Paul Marsh and Mike Staunton, Triumph of the Optimists: 101 Years of Global Investment Returns, Princeton University Press, 2002; Elroy Dimson, Paul Marsh and Mike Staunton, Credit Suisse Global Returns Yearbook and Sourcebook, 2018, Zurich: Credit Suisse Research Institute, 2021

Table 9 - 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%	1.67%	2.05%	1.28%
10/90	90.00%	3.33%	4.11%	2.56%
15/85	85.00%	5.00%	6.16%	3.84%
20/80	80.00%	6.67%	8.21%	5.12%
25/75	75.00%	8.33%	10.27%	6.40%
30/70	70.00%	10.00%	12.32%	7.68%
35/65	65.00%	11.67%	14.37%	8.96%
40/60	60.00%	13.33%	16.43%	10.24%
45/55	55.00%	15.00%	18.48%	11.52%
50/50	50.00%	16.67%	20.53%	12.80%
55/45	45.00%	18.33%	22.59%	14.08%
60/40	40.00%	20.00%	24.64%	15.36%
65/35	35.00%	21.66%	26.69%	16.64%
70/30	30.00%	23.33%	28.75%	17.92%
75/25	25.00%	25.00%	30.80%	19.20%
80/20	20.00%	26.66%	32.85%	20.48%
85/15	15.00%	28.33%	34.91%	21.76%
90/10	10.00%	30.00%	36.96%	23.04%
95/5	5.00%	31.66%	39.01%	24.32%
100/0	0.00%	33.33%	41.07%	25.60%

Source: PWL Capital; Data Sources: Bloomberg, Morningstar, Robert Shiller, Elroy Dimson, Paul Marsh and Mike Staunton, Triumph of the Optimists: 101 Years of Global Investment Returns, Princeton University Press, 2002; Elroy Dimson, Paul Marsh and Mike Staunton, Credit Suisse Global Returns Yearbook and Sourcebook, 2018, Zurich: Credit Suisse Research Institute, 2021



www.pwlcapital.com

Ottawa

265 Carling Avenue, 8th Floor, Ottawa, Ontario K1S 2E1
T 613.237.5544 | 1-800.230.5544 | F 613.237.5949
ottawa@pwlcapital.com | www.pwlcapital.com/ottawa

Montreal

3400 de Maisonneuve O. Suite 1501, Montreal, Quebec H3Z 3B8
T 514.875.7566 | 1-800.875.7566 | F 514.875.9611
montreal@pwlcapital.com | www.pwlcapital.com/montreal

Portfolio management and brokerage services are offered by **PWL Capital Inc.**, regulated by Investment Industry Regulatory Organization of Canada (IIROC) and is a member of the Canadian Investor Protection Fund (CIPF).

Financial planning and insurance products are offered by **PWL Advisors Inc.**, regulated in Ontario by Financial Services Commission of Ontario (FSCO) and in Quebec by the *Autorité des marchés financiers* (AMF). **PWL Advisors Inc.** is not a member of CIPF.



Regulated by
Investment Industry Regulatory
Organization of Canada



GLOBAL ASSOCIATION of
INDEPENDENT ADVISORS™