Manitoba Public Insurance
2017/18 GRA

MPI's Investment Portfolio
Risk, Return and Good Practice

Prepared for Consumers' Association of Canada, (Manitoba) Inc.
Submitted by the Public Interest Law Centre

Valter Viola

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CONTENTS

INTRODUCTION

Terms of Reference

I was retained by the Consumers' Association of Canada Manitoba ("CAC") to advise and assist on issues related to the MPI investment portfolio (the "Portfolio"), including a good practice consideration of issues related to risk versus return and prudent, reasonable and appropriate management of the portfolio.

As stated in my terms of retainer, it is my duty to provide evidence that:

- is fair, objective and non-partisan;
- is related only to matters that are within my area of expertise; and
- provides such additional assistance as the Public Utilities Board ("PUB") may reasonably require to determine an issue.

I understand that my duty in providing assistance and giving evidence is to help the PUB. This duty overrides any obligation to CAC.

Rate Application Materials Reviewed

My review of the Rate Application focused on information related to the portfolio, including:

- Asset-Liability Studies;
- MPI's Investment Policies; and
- MPI's Financial Statements and Accounting Principles.

Other Considerations

I also reviewed and considered the following other information:

- MPI's most recent annual report;
- Information responses prepared by MPI and/or Aon to CAC questions relating to its investment portfolio;
- annual reports/websites of selected other funds;
- selected information from Rate Applications related to prior years;
- Report on Canadian Economic Statistics to 2013[1]; and
- Asset Mix Survey of Canadian defined benefit ("DB") pension plans prepared by Pension Association of Canada ("PIAC").

To a lesser extent, I reviewed information about MPI's capital adequacy (reserves). I also read the IRFRF Technical Conference Materials and participated in the session by phone.

[1] The latest report was not used. Instead, data from 2013 was used since this data would have been the data available when the 2014 asset-liability study was completed by Aon.

Organization of this Document

This document consists of these three sections:

I. OVERVIEW AND OVERSIGHT/GOVERNANCE;
II. MEASUREMENT; and
III. MANAGEMENT.

This document takes into account three (3) inconvenient truths, and their consequences, which are illustrated below.

TRUTH	**We don't know very much**	**Beneficiaries/ owners ≠ managers**	**Correlations are not perfect**
	Low signal/noise (return/risk) ratio	*Institutions manage $ for clients/beneficiaries*	*Risks don't add (1 + 1 ≠ 2)*
Truth and Consequence	We need to make investment decisions but **we don't know very much**	The interests of stakeholders[1] may not be aligned because **beneficiaries/owners are not the same as managers**	The effect of an investment on total portfolio risk depends on the characteristics of other assets in the portfolio because **correlations are not perfect**
HELPFUL TOOLS	**BELIEFS[2]**	**CAPITAL/REGULATORY FRAMEWORK[3]**	**RISK FRAMEWORK[3]**

1. Stakeholders include MPI, rate-payers and Manitoba Finance.
2. Beliefs support long-term portfolio design (e.g., asset mix).
3. Capital/Risk/Regulatory Frameworks provide a focus (clarity in mission) and process to overcome common barriers to excellence.

BELIEFS: In Section I (OVERVIEW AND OVERSIGHT/GOVERNANCE) my beliefs related to risk management are summarized, along with a list of common challenges ("barriers to excellence") among organizations generally, and asset management firms in particular. I believe that two of the top three challenges facing asset management firms relate to their **focus and process**, and the beliefs help to address these challenges.

The third challenge relates to resources, which in MPI's case, includes a portfolio that is closer to $2 billion than $200 billion. Simply put, practices that are appropriate and prudent for a $200 billion fund may not be available to a $2 billion fund, though the beliefs and principles that are deemed to be appropriate and prudent for both funds may be the same.

FRAMEWORKS FOR RISK/CAPITAL MANAGEMENT: The second and third truths (including their consequences), inform **Measurement** (Section II) and **Management** (Section III) – i.e., long-term asset mix decision-making.

Terminology

Appendices include a glossary of terms to facilitate discussions, including the terms listed below. Not all of these terms may appear in this document, but all terms were defined in either CAC (MPI) 1-67 or CAC (MPI) 2-34.

• Accounting reports • Actuarial reports • Asset risk • Assumptions • Available for sale (AFS) • Duration • Financial assets and liabilities at Fair value through profit or loss (FVTPL) • Held to maturity (HTM)	• Inherent risk • Investment risk • Liability from Basic Claims • Liability from pension plan • Liquidity risk • Market interest rate • Market reports • Market risk • Other comprehensive income (OCI)	• Reinvestment rate risk • Risk • Risk (as defined in Asset-Liability Study) • Risk-free rate • Risk profile • Surplus risk • Unrealized gains and losses • Valuation methodology • Value

Appendices include other information that is referenced in one or more sections.

AUTHOR BACKGROUND

Relevant Experience

With over 20 years of experience in the institutional fund management sector, I have 12 years of combined executive, senior management and other experience at two of Canada's largest institutional investors:

- ~ $290 billion CPP Investment Board (2000 to 2005); and
- ~ $170 billion Ontario Teachers' Pension Plan (1993 to 2000).

I have a decade of consulting experience (Holland Park Risk Management, since 2005) advising some of North America's largest institutional investors (boards, investment committees, executives and other staff) on various aspects of investment risk management, measurement and governance. Clients have also included Canadian pension funds with assets under management that are about the same as those managed by MPI.

My specific expertise includes:

- investment research, economics and risk management;
- portfolio management; and
- quantitative asset-liability modelling.

My curriculum vitae is in Appendix A.

CPP Investment Board

I was the first executive officer responsible for research and risk management of CPP Investment Board ("CPPIB"), the largest single purpose pool of capital in Canada with assets under management of ~ $290 billion today. As VP, Research and Risk Management I reported to the CEO/Chief Investment Officer over a five year period and was the chief risk officer responsible for all aspects of investment risk management. Research responsibilities covered a broad range of investment issues, including long-term asset allocation, currency hedging and investment policies. As one of four investment executive officers, I was involved in investment strategy specifically and the management of the organization generally.

Ontario Teachers' Pension Plan

I held a variety of roles over a seven year career at Ontario Teachers' Pension Plan ("Teachers'"), the largest single-profession pension plan in Canada with ~ $170 billion of assets under management today. Teachers' is considered a global leader in pension/risk management.

As the first analyst in the Research and Economics Department, I developed Teachers' first Asset-Liability Model to support long-term asset allocation strategies (e.g., allocation between equities, bonds and other asset classes). As a Director of Research, my responsibilities included conducting research to support the introduction of new asset classes, currency hedging policies, as well as broad asset allocation decisions on both a strategic (policy/long-term) and tactical (active/short-term) basis.

As a member of Teachers' Investment Planning Committee, I participated in shorter-horizon (tactical/active) decisions regarding asset allocation and currency hedging. As the first Portfolio Manager of Teachers' Tactical Asset Allocation ("TAA") portfolio, I was responsible for managing one of the most "active" programs at Teachers'[2]. I was also the Portfolio Manager of the real return bond ("RRB") portfolio[3].

Pension Investment Association of Canada (PIAC)

I was also a member of the Investment Practices Committee of the Pension Investment Association of Canada ("PIAC").

No P&C Experience

I have not worked with property and casualty ("P&C") insurers, but I have been an advisor to workers' compensation funds in Canada and asset managers who manage assets for workers' compensation funds in both Canada and the United States.

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[2] Performance of the TAA portfolio exceeded value added targets and resulted in the maximum bonus multiplier allowed under Teachers' performance incentive system.

[3] As RRB portfolio manager, I was part of a team that greatly increased the size of Teachers' RRB portfolio. In the year that I left Teachers' to join CPPIB (2000), Teachers' increased its exposure from $8.6 billion to $20.6 billion.

Teaching, Applied Research and Education

I received the Chartered Accountant (CA) designation and taught accounting as well as finance/investments at Wilfrid Laurier University and York University respectively before starting my career in applied research and portfolio/risk management in the Research and Economics Department at Teachers', where I qualified as a Chartered Financial Analyst ("CFA").

I am an MBA graduate from the Richard Ivey School of Business (Western University) and graduated from the University of Toronto with distinction (BComm).

EXECUTIVE SUMMARY

This paper has been informed by:

- principles that are generally accepted and relevant in the circumstances;
- investment beliefs that, by definition have varying degrees of empirical support and theoretical justification, but which I hold and consider to be reasonable and relevant in the circumstances; and
- facts from a variety of sources, including:
    - MPI (e.g., the Rate Application, audited financial statements and responses to CAC questions); and
    - Aon (e.g., Asset-Liability Study and responses to CAC questions related to it).

Recommendations

Clarity of Accounting Choices	MPI should clarify what flexibility it has regarding the accounting for assets and liabilities, while remaining GAAP-compliant, and the factors it takes into account in electing to use one method/assumption over others.
Adoption of More Comparable Accounting Principles	In measuring its investment portfolio and liabilities, MPI should consider adopting accounting principles, where GAAP allows MPI to make such elections, that reduce the discrepancy between net income and comprehensive income (as these terms are currently defined by MPI), to improve comparability across all assets as well as liabilities. Comparability would be improved, for example, by accounting for more assets in a way that is consistent with the treatment of financial assets and liabilities at fair value through profit or loss ("FVTPL").
AFS and HTM Accounting	Unrealized gains and losses for AFS assets (~ 20% of assets), for example, are reported as "other comprehensive income (OCI)" and are excluded from net income until realized, making the net income recognition for unrealized gains on equities (~ 18% of assets) inconsistent with FVTPL assets. The treatment of HTM Bonds (25%), recorded at amortized cost, should also be re-considered. Market valuations are generally more comparable, relevant, transparent, understandable and subject to less potential bias than valuations in reports that are based on MPI's current accounting practices.
Pension Liability Accounting	Reconsideration should also include the remeasurement of employee benefits (~ 15% of liabilities and equities) which is considered OCI. The remeasurement of employee benefits is large (given the long duration of pension liabilities), but OCI arising from changing interest rates that impact the value of pension liabilities is not recognized through transfers to net income under current practices.
Return/Risk Definitions for Asset Mix Decision	MPI should re-define return/risk used to inform its long-term asset mix decisions to be based on valuations that reflect market values, rather than accounting ones (which may be materially different). At a minimum, net income should be replaced by comprehensive income in the numerator (return) and retained earnings should be expanded to include accumulated other comprehensive income (AOCI) in the denominator (risk). In the long term, market returns and market risks will determine average long-term premium rates, regardless of how assets and liabilities are accounted for under GAAP.

De-Linking Discount Rates	For purposes of long-term asset allocation decision-making, MPI should consider "breaking the link" (recursive) between liability valuations and the yield on some of its assets. Economic theory suggests this approach is more appropriate.
Min/Max Asset Class Constraints	The minimum/maximum and other constraints imposed on the portfolio (e.g., when asset-liability studies are conducted) should be reviewed and relaxed, to avoid costly constraints (lower risk-adjusted returns). The rationale for imposing any such constraints should be made explicit.
Evolved Risk Framework	An evolved risk framework should be considered to improve portfolio/risk measurement, management and/or governance.

Explicit Risk Management Goals	Among other things, the risk framework could include explicit goals related to market risk management (as well as goals related to other types of risk if those require enhancement). One goal might be to avoid "undue risk", which is risk that is taken:
	• unknowingly, not having been identified (unaware); or
	• knowingly, but which:
	  ○ cannot be managed prudently, given current capacities (ineffective);
	  ○ exceeds risk tolerances (prohibited);
	  ○ is higher than it needs to be (inefficient); or
	  ○ is not understood (uninformed).
	
	Another goal might be to get paid better/well for those risks that are desired, with incentive systems that encourage desired behaviours that achieve desired outcomes and controls that monitor compliance with limits that discourage/prevent undesired behaviours and prevent undesired outcomes.

Minimum Risk Portfolio	A minimum risk portfolio (for market risk) should be clearly defined. It should be aligned with the interests of relevant stakeholders, with clarity regarding the short-term and long-term factors that impact rate sustainability and other important outcomes.
Canadian Equities' 10% Minimum Allocation	The appropriateness and prudence of having a 10% minimum weight to Canadian Equities ("to retain a meaningful exposure to home markets") should be reconsidered, given the different interests of different stakeholders (e.g., employees through the pension plan), the concentrated nature of Canada's equity market, and other such relevant considerations.
No International Equities	The appropriateness and prudence of having no exposure to International Equities should be reconsidered, given the large size of non-US foreign markets, the return opportunities that are potentially available from those missed opportunities and the effects of increased international diversification on long-term market risks.
No Over-Reliance on Quantitative Modeling	MPI should be vigilant about its potential over-reliance on quantitative considerations, given the high sensitivity of optimal asset allocations to seemingly small changes in capital market assumptions (returns, volatilities and correlations) and the large number of inputs.
Exclusion of Real Return Bonds	The role that RRBs can play in effectively managing relevant risks should be discussed, with consensus achieved regarding the effectiveness of RRBs from a risk management perspective (i.e., independent of the cost of any "insurance" as measured by RRB yields and their expected returns).
Effectiveness of Duration Policy	The effectiveness of the duration policy should be reviewed, given the inherent risks of changing real interest rates and unexpected inflation arising from MPI's liabilities, and exposure to changes in nominal interest rates in the MPI portfolio (i.e., nominal bonds

	without inflation protection). More specifically, MPI should re-assess the effectiveness of its duration-matching strategy since inflation (actual and/or expected) may differ from current expectations.
Integration of Real Estate/Infrastructure Liabilities in Duration Management	MPI should consider the liabilities arising from all sources (i.e., including real estate and infrastructure) in its interest rate risk management practices (duration), to be consistent with its management of risks arising from insurance, pension and other liabilities. The financial leverage assumptions used in Asset-Liability Studies that support long-term asset mix decisions should be made consistent with the leverage actually used in the portfolio, removing the ~ 4% difference related to real estate debt.
Removal of 105% Rule in Investment Policies	MPI should remove from its Investment Policies the ability to request external managers to realize gains (losses) ("105% Rule"), which MPI says "is no longer relevant". This would remove an ability by MPI to cause a manager to realize gains (losses) for the sole purpose of having an impact on net income, without yielding any economic value, reducing risk or otherwise conferring another benefit on MPI.
Pension Fund	The interests of all relevant stakeholders should inform decisions regarding both the accounting for and management of the assets and liabilities related to the pension plan and other employee benefits. A desirable outcome is to have greater clarity around the appropriateness and prudence of maintaining different types of assets and liabilities commingled in one fund.

I. OVERVIEW AND OVERSIGHT/GOVERNANCE

Principles that Informed Evidence and Questions

Principle #1: The Valuation Basis Should Reflect the Specific Need

The basis for valuing assets and liabilities, and recognizing revenues, expenses, gains and losses, should reflect the specific need (i.e., decision). Some needs are common to all stakeholders (e.g., assessment of past performance) and can be met by the application of generally accepted accounting principles (GAAP), with perhaps minor adjustments, while other needs are better met using other bases for measurement that require much larger adjustments to GAAP.

I believe that long-term, asset mix decisions in particular requires the use of market valuations in calculations of returns and risks rather than ones that are based on accounting valuations.

Principle #2: Common Barriers to Excellence Should Be Acknowledged and Addressed

Institutional investors face common challenges ("barriers to excellence"). For example, over 20 years ago senior executives responsible for managing defined benefit pension plans cited the following three largest barriers to excellence:

1. Poor **process** (almost 100%):
    a. Structure;
    b. **Communication**;
    c. Inertia;
2. Inadequate resources (~ ½); and
3. Lack of **focus** or clear mission (almost ½).

This evidence and questions I posed were informed by the first and third common challenge noted above. i.e., process (#1), including communication (i.e., accounting) and focus (#3), including how return/risk is defined.

Given the nature and scope of my terms of reference, I include no observations regarding resources (#2 challenge).

The next page shows the source for these common barriers, including the rest of the "Top 10" list of barriers, with "conservatism" being #4.

Table 2.2 Barriers to Excellence in Pension Fund Management: The Views of 50 Senior Pension Executives

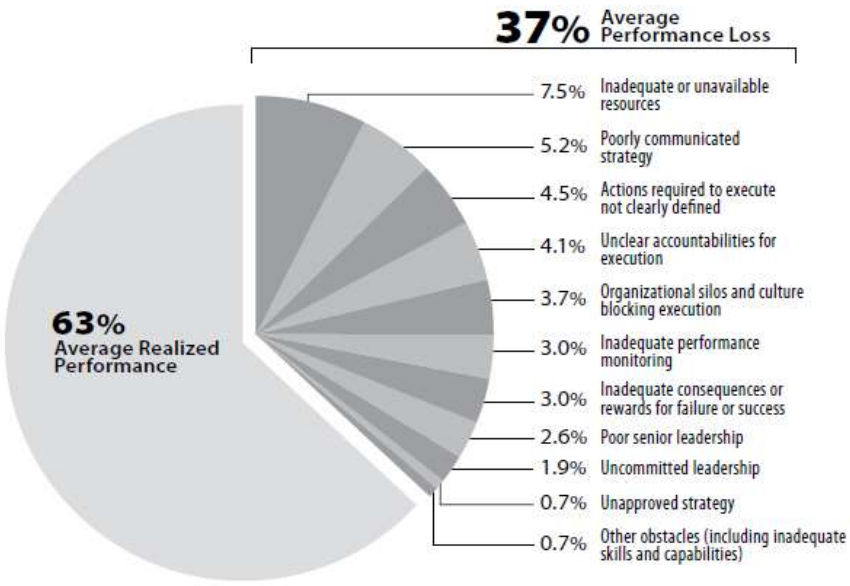
Rank	Barrier	Cited (%)
1	Poor process (including structure, communication, and inertia)	98
2	Inadequate resources	48
3	Lack of focus or of clear mission	43
4	Conservatism	35
4	Insufficient skills	35
6	Inadequate technology	13
7	Conflicting beliefs	8
7	Difficult markets	8
9	Lack of innovation	5
9	Suppliers	5

Source: Excellence Shortfall in Pension Fund Management: Anatomy of a Problem, by K. Ambachtsheer, C. Boice, D. Ezra, and J. McLaughlin, unpublished Research Paper, October 1995.

A Harvard Review article (2005) made similar observations (below) regarding organizational performance generally (i.e., not just pension funds or other types of institutional investors), describing "where the performance goes" and how average realized performance falls short (only 63%, per graph below).

Where the Performance Goes

This chart shows the average performance loss implied by the importance ratings that managers in our survey gave to specific breakdowns in the planning and execution process.



Beliefs that Informed Evidence and Questions

The first "inconvenient truth" is that **we need to make investment decisions but we do not know very much in the field of investments due to the low signal/noise (return/risk) ratio**. As a result, we need to rely on beliefs and I believe that it is important to be transparent about those beliefs. (MPI has included some of its beliefs in its Investment Policies, and I list five of mine below.)

The five beliefs listed below were developed by a former colleague of mine at CPPIB, whom I consider to be a global thought leader in investment management[4].

Belief #1: SUSTAINABILITY: The major stakeholder risk is that the current provisions will not be sustainable in the future (recognizing that investment returns are one of many factors which will contribute, positively or negatively, towards sustainability).

This belief is important because "lack of focus or clear mission" was cited by almost ½ of surveyed pension executives as being a large barrier to excellence (3rd largest challenge).

I believe that investment programs need to focus on the risk of long-term sustainability, and to develop the key metrics (starting with risk) that clearly define the primary risk (i.e., primary risk metric, and time horizon).

Belief #2 (MINIMUM RISK PORTFOLIO): Determining the Minimum Risk Portfolio is the first step towards responsible long-term management of the portfolio.

This belief is important because "poor process" was cited by almost 100% of surveyed pension executives as being the largest (#1) barrier to excellence. I believe that investment programs need to have better processes for communicating the primary risk and the structures to support the management of that primary risk (i.e., metrics that define return/risk tradeoffs, with a long-term perspective).

I believe that MPI's minimum risk portfolio (MRP) should include at least some long-duration real return bonds (RRBs), given the nature of MPI's liabilities (long term, with some inflation exposure). Note, however, that Belief #2 simply supports the definition of the primary risk, but says nothing about whether to buy any assets that make up the MRP (e.g., RRBs). The belief says nothing about how much risk should be taken in relation to it. Appropriate and prudent answers to these follow-on questions requires additional beliefs, starting with the next two beliefs below (taken together).

[4] Donald Raymond led the development of these beliefs as Vice President, Public Markets at CPP Investment Board. These beliefs were approved by the CPPIB Board of Directors, and reviewed by three other external advisors who were considered to be thought leaders as well.

Belief #3 (ADDITIONAL RISK): Taking additional risk beyond the Minimum Risk Portfolio should be done only if the expected additional returns justify doing so.

AND

Belief #4 (TOTAL PORTFOLIO): The additional risk to the Total Portfolio is the relevant risk to consider if risk beyond the Minimum Risk Portfolio is taken.

Together, Beliefs #3 and #4 imply that the attractiveness of any asset class should be assessed, not in isolation, but in the context of the other assets that are in the portfolio or contemplated to be in the portfolio, and the MRP that is defined in Belief #1 and #2.

The rationale for taking a total portfolio approach stems from the "inconvenient truth", mentioned earlier, and re-stated below.

> The effect of an investment on total portfolio risk depends on the characteristics of other assets in the portfolio because correlations are not perfect.

In questions related to RRBs, MPI said:

> *"Real return bonds were excluded … because they were deemed to be expensive. Aon Hewitt's … assumptions showed **real return bonds to have significant volatility and down side risk*** with modest returns relative to nominal bonds …. Also, page 17 of the Phase 1 report Aon concluded that "RRBs are not a good inflation hedge"."* [5]
>
> *** Emphasized by me, not MPI, to highlight a fundamental difference in beliefs.**

When asked if MPI agreed with AON's conclusion that **RRBs are not a good inflation hedge**, MPI said:

> *"The Corporation accepts Aon's belief that there are other inflation hedging asset classes available (i.e.: real estate and infrastructure) with greater expected returns … At the time of the ALM study the real yields on RRBs were below 40 bps for 20 year terms and below 10 bps for 10 years and shorter terms. Real yields for the same terms are currently negative."*

Asked why Aon believes RRBs are not a good inflation hedge for MPI, Aon's response was:

> *"RRBs are not a good inflation hedge for MPI for the following reasons:*
>
> 1. *The underlying inflation according to nominal and real return bonds do not match the inflation used to value liabilities (which is based on a survey of Canadian banks);*
> 2. *RRBs suffer from a limited offering;*
> 3. *Supply and demand for RRBs have a large impact on the market value; and*
> 4. *Therefore, the economics of the inflation protection from **RRBs do not match the financial impact to MPI on a year by year basis**."* [6]
>
> *** Emphasized by me, not Aon, and discussed on the next page.**

[5] Source: CAC (MPI) 1-77

[6] Source: CAC (MPI) 2-39

My observations related to Aon's four points are:

1. this is a problem with the method for valuing the liabilities (survey of Canadian banks), which is not a market-based method, not a problem with the hedging properties of RRBs against a market-valued set of liabilities;
2. while RRBs suffer from a limited offering (liquidity), larger funds have managed to accumulate significant exposures (e.g., the average PIAC fund has 3%);
3. while supply and demand for RRBs may have a large impact on market value, presumably this is a one-time market impact acquisition cost – a small price to pay if RRBs are considered a buy-and-hold asset class, with little turnover; and
4. Aon appears to concede that RRBs do offer inflation protection (despite their earlier comment to the contrary) but that **RRBs do not match the financial impact to MPI on a year by year basis**. This last point represents the symptom of a bigger problem, which relates to the next belief (constraints).

When asked if Aon could list one or two asset classes that offer better inflation hedges than RRBs for MPI, and offer any evidence to support that belief, Aon said it could not, adding:

> *"There is no asset class that we know that can hedge the short term inflation risk … Over the long term, **where RRB's are held to maturity, shorter term price sensitivity is less relevant and inflation experienced over the period would result in higher cash flows and an inflation hedge*.** It is a commonly accepted belief … that higher inflation would gradually be reflected in nominal bond yields, equity returns through higher profits, real estate through increased rents and infrastructure, especially where regulated, through increased tariffs ..."*
>
> *** Emphasized by me, not Aon, to note the tradeoff between shorter term price sensitivity (less relevant according to Aon, with which I agree) and inflation experienced over the period which would result in higher cash flows and an inflation hedge.**

Belief #5 (CONSTRAINTS): Constraints never increase expected risk-adjusted returns.

This belief is important because there appear to be two very binding constraints that may cause MPI to have lower risk-adjusted returns.

These very binding constraints relate to:

1. **HOW RISK IS DEFINED** (i.e., with focus on the short term)
   "The short-term volatility of the premium rate requirement is a primary concern"[7]; and

2. **HOW ASSET CLASSES ARE CONSTRAINED**
   Minimum/maximum asset allocations in optimizations conducted as part of the most recent Asset-Liability Study, for example, are overly restrictive.

   The constrained optimization problem results in a "pre-determined" allocation to ≥ 80% of the portfolio, leaving little room to optimize return/risk tradeoffs (i.e., allocating ≤ 20% of the remaining assets). This is discussed further in another section.

[7] Source: CAC (MPI) 1-73

II. MEASUREMENT

The Measurement Section consists of two parts:

- Background; and
- Q&A with MPI about Accounting and Portfolio/Risk Management Dependencies.

Background

Different Users of Financial Information Have Different Needs

There are a variety of stakeholders who have an interest in MPI, including:

- MPI;
- consumers, who are premium/rate-payers; and
- Manitoba Finance.

Each stakeholder has common information needs regarding MPI's financial affairs, as well as unique ones that reflect their unique interest or relationship with MPI as well as their unique roles/responsibilities.

To meet the information needs of such a varied group of stakeholders, it is not reasonable to expect one set of reports to satisfy all needs of all stakeholders. That is why different kinds of reports are provided by different types of professionals, including:

- accountants;
- actuaries; and
- portfolio/risk managers.

These three information providers, and the bases for their reporting, are summarized below to facilitate discussions and avoid potential confusion. While accountants, actuaries and portfolio/risk managers use similar terms (e.g., "assets" and "liabilities"), the bases for assigning values to assets and/or liabilities often varies and these differences can be material.

This is important because the appropriateness and prudence of relying on a particular set of metrics (e.g., those prepared in accordance with GAAP) depends on the circumstances (i.e., the intended use of the information). In MPI's case, for example, MPI defines return/risk using accounting metrics ("net income/retained earnings"), rather than metrics based on market values. As a portfolio/risk manager on the one hand and former professional accountant on the other hand, I appreciate the usefulness of different measurement bases for different purposes and the potential for confusion among stakeholders that may arise.

Before reviewing the methods/assumptions used by each provider of information, and the circumstances under which one method or source is more appropriate and prudent than others, it is important to understand the characteristics of information that make it more useful in decision-making.

Useful Information Has Key Characteristics

The quality of information varies depending on many factors, and an assessment of information quality starts with clarity and agreement on the specific need (decision support) and the relevance of the information in meeting that need. Some of the characteristics of information that make it more useful are listed below. To inform the development of GAAP, for example, the accounting profession suggests that information is more useful if it is more:

- relevant;
- neutral/unbiased;
- free from error;
- comparable over time and across assets and liabilities;
- verifiable; and
- timely.

Tradeoffs exist, so choices need to be made. For example, information that is most relevant (e.g., about an uncertain future) may be less reliable compared to the past (no uncertainty, since it happened).

Accountants, Actuaries and Portfolio/Risk Managers are Guided by Different Principles

Each type of professional is guided by principles and standards that are considered appropriate and prudent in their profession.

Accountants are guided by **generally accepted accounting principles ("GAAP").**

Actuaries are guided by **actuarial standards of practice ("ASOP")**.

Portfolio/risk managers are guided by **generally accepted risk principles ("GARP")**.

GAAP, ASOP and GARP are All Important, But They Answer Different Questions

GAAP, ASOP and GARP have similarities, but also many differences. As the table below illustrates, reports prepared by accountants, actuaries and portfolio/risk managers differ in at least three respects:

- time period (past, present and future);
- basis for valuation and conservatism (e.g., historic/amortized cost, market value, etc.); and
- single valuation, compared to a range.

Role	Principles/ Standards	Relative[8] Focus (Scale from 1 to 10)			Perspective	Questions ↓ Decisions	Key Outputs (Answers)
		Past	Present	Future			
Accountant	**GAAP**	5 ●●●●●	4 ●●●●	1 ●	Today and Past (last 2 years)	What happened? ↓ Performance Assessment	GAAP-compliant Financial Statements (balance sheet, income statement)
Actuary	**ASOP**	0	3 ●●●	7 ●●●●●●●	Today and Future (decades)	What is expected to happen? ↓ Funding (Premiums/ Rates)	ASOP - compliant Rate-Setting Processes, Analyses and Valuations
Portfolio/ Risk Manager	**GARP**	0	2 ●●	8 ●●●●●●●●	Today and Future (decades)	What could happen (good and bad)? ↓ Return/Risk Profile (Asset Mix)	Efficient Frontiers (Expected Returns/Risks[9])

[8] Numbers are indicative and designed to illustrate different time perspectives.

[9] The author believes strongly that return/risk metrics should be based on the market value (as distinct from accounting value) of assets and liabilities.

The following observations are intended to distinguish between the perspectives of accountants, actuaries and portfolio/risk managers to facilitate discussions. The observations are not meant to be a complete list of how the three professionals satisfy the requirements of their profession.

Accountants

Accountants prepare accounting balance sheets (statements of financial position) at a point in time (the present), and income/cash flow statements about the recent past (prior two years).

While some values related to "present valuations" involve expected future cash flows, most reporting relates to the present financial condition as well as the results of operating, investing and financing activities from the recent past.

The present valuation of future cash flows, for the purpose of assigning a value to assets and/or liabilities, is prescribed under GAAP with GAAP-compliant practices that vary between different types of organizations (public sector vs private sector), different jurisdictions (Canada vs United States) and different sectors (insurance companies, pension plans, etc.).

Actuaries

Actuaries prepare actuarial valuations at a point in time (the present), and project income/cash flows into the future (decades). Their actuarial reports help to inform decisions about the sufficiency of assets in relation to the liabilities at a point in time and possibly the sustainability (i.e., rate adequacy) of an insurance plan or pension plan, as the case may be, over the longer term.

Portfolio/Risk Managers

Portfolio/risk managers prepare valuations at a point in time (the present) and assessments of the market value at risk arising from potential future scenarios that vary in terms of their likelihood/probability as well as severity/attractiveness (adverse vs favourable related to assets, liabilities or both).

Unlike accountants, portfolio/risk managers measure opportunity costs, as well as actual or projected costs. For example, a portfolio manager may consider the return of a benchmark portfolio (e.g., S&P 500) and a risk manager may consider risks in relation to that same benchmark portfolio ("tracking error" or active risk) as well as in relation to a minimum risk portfolio that serves as a proxy for underlying liabilities ("surplus at risk" or funding risk).

Many Discount Rates, Each to Meet a Different Need

For accounting purposes, MPI uses a discount rate for valuing liabilities that depends on yields related to MPI's assets. For actuarial purposes, MPI uses a discount rate that reflects the principles and standard for that profession. For portfolio/risk management purposes, discount rates should reflect market opportunities, and these rates may differ significantly from both accounting and actuarial discount rates.

Terminology Can Be Confusing, Given Different Bases for Measurement

The next page starts with MPI's balance sheet, prepared in accordance with GAAP, to facilitate discussions and to contrast GAAP (accounting perspective) on the one hand with GARP (portfolio/risk management perspective) on the other hand.

A glossary of terms is included in Appendix B.

> For example, "comprehensive income" is the sum of "net income" and "other comprehensive income (OCI)".

These definitions are important because MPI uses accounting definitions for return/risk analyses that support long-term asset mix decisions, and these are not the same as market-based definitions (which the author believes are more relevant to support long-term asset mix decisions).

The next page illustrates the "adjustments" that a portfolio/risk manager might make to MPI's accounting values, to meet his/her asset allocation/risk management needs, using information from MPI's financial statements that MPI confirmed (in a later section) was correctly interpreted by me.

MPI's Balance Sheet (GAAP) Needs "Adjustments" for Portfolio/Risk Management

The table below shows accounting values as a percentage (%) of the total portfolio from MPI's recent financial statements, including three (3) types of assets – each with a different accounting basis.

Three colours highlight the extent to which the bases for accounting differ from market valuations (red = larger potential difference, yellow = more modest differences, green = immaterial differences, if any).
To appreciate differences between accounting and market valuations, the table below groups assets vertically based on MPI's accounting (FVTPL, AFS, HTM) and horizontally based on market volatility[10].
Assets are sorted on an accounting basis, with asset groups characterized as having smaller differences between market values and accounting values (green) at the top and larger differences (red) below. Assets are sorted on a market volatility basis with the least volatile assets on the left. Liabilities are grouped similarly, noting that the duration of employee benefits (including the pension) is higher than for unpaid claims (i.e., greater volatility).

Accounting Asset Group	Difference Between Market and Accounting Value	
FVTPL	Financial assets and liabilities at fair value through profit or loss	**Immaterial, if any**
AFS	Available for sale	**More modest**
HTM	Held to maturity + non-financial	**Largest potentially**

Accounting Asset (Liability)		A GAAP	B Reclassify	A + B Reclassified GAAP	*Lowest* Market Volatilities → *Highest* Cash	Bonds	Real Estate	Infra-structure	Equities
FVTPL	Infrastructure	3[3]	*	3				3	
	Real Estate – Pool	9	4*	13			13		
	Liabilities – Real Estate		(4)*	(4)		(4)			
	FVTPL Bonds[11]	42		42		42			
AFS	Cash[12]	2		2	2				
	Equities	18		18					18
HTM[13]	HTM Bonds	25	0	25		25			
	Real Estate – Property	1		1			1		
	Total Portfolio	100	0	100	2	63	14	3	18
Non-Portfolio Liabilities									
	Unpaid Claims	(70)		(70)		(70)			
	Employee Benefits	(15)		(15)					(15)
	Total Equity	15		15					

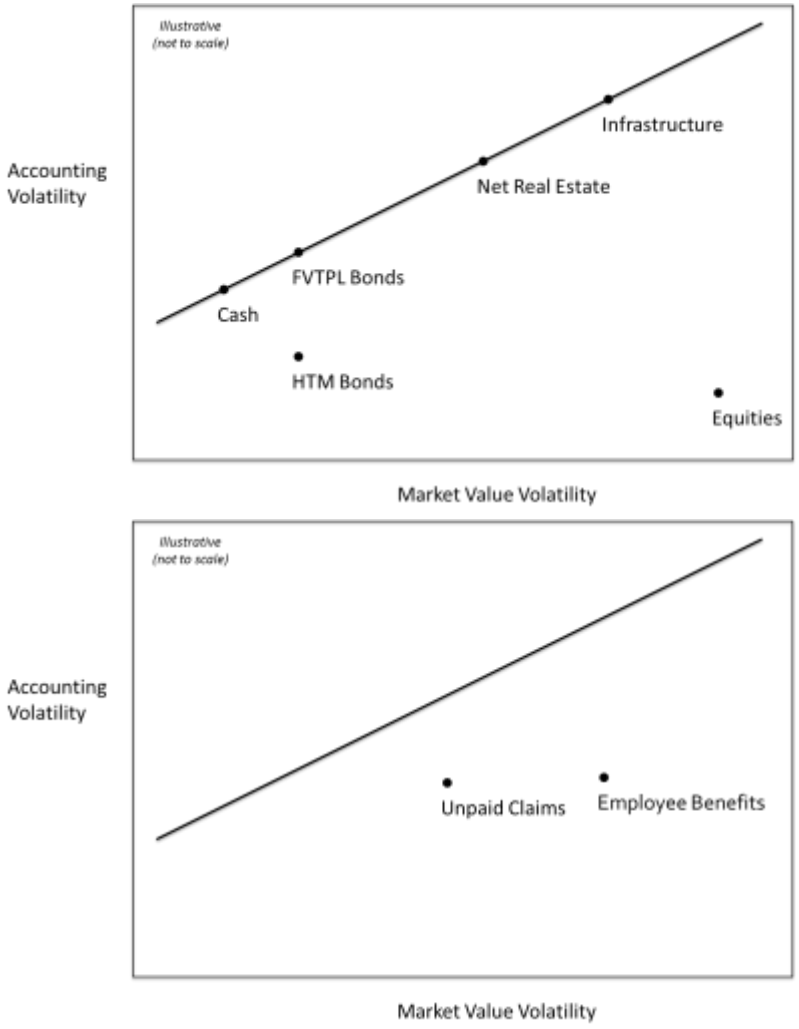
* Liabilities arising from real estate are reclassified for presentation purposes to "bonds" (by 4%) to be more consistent with assumptions used in Asset-Liability Studies. For simplicity, a similar adjustment could be made, but has not been, for liabilities arising from infrastructure given its smaller size and consistent treatment between asset-liability studies and implementation in practice.

[10] The order of market volatilities, from left to right, reflects the assumptions used in Aon's Asset-Liability Study.
[11] Includes Federal, Other Manitoba, Other Provinces and Corporates.
[12] Includes other assets (not material at ~ 0.1%).
[13] Accounting is assumed to be HTM. If this is not correct, the discrepancy is immaterial (only a 1% allocation).

The biggest differences between market values and accounting values are illustrated below, with assets shown in the top panel and liabilities in the bottom.

The X axis shows market volatility while the Y axis shows accounting value volatility.

If there were no differences between the bases for measuring assets/liabilities for accounting purposes on the one hand and portfolio/risk management purposes (market value based) on the other hand, assets and liabilities would plot along a straight 45 degree line (Y = X; i.e., no difference).



Assets/liabilities plotting below the line have market valuations that are more likely to deviate from their accounting valuations, on average. The larger the vertical gap from the line, the larger the difference is likely to be between accounting and market-based metrics. Portfolio/risk managers, including the author, may make adjustments to accounting values in their analyses to reflect these differences.

In MPI's case, notable differences from the above graphs arise for several items.

Equities (18% of Assets) and HTM Bonds (25%) Require the Biggest Adjustments

Equities (18%) are the most volatile assets, but the material component of equity volatility is recognized in net income only when gains/losses are realized through sales (i.e., unrealized gains/losses are included as OCI, not net income). HTM bonds (25%) are recorded at amortized cost for accounting purposes, which differs from market value.

Employee benefits (15%) and Unpaid Claims (70%) Require Adjustments Too

Employee benefits (15%) are the most volatile liabilities, given their long duration, but remeasurement of Employee Future Benefits Gains/Losses do not get recognized in net income (only OCI). Liabilities related to Unpaid Claims are valued for accounting purposes using a discount rate that is based on certain assets in MPI's portfolio, rather than a market rate that would be used by a portfolio/risk manager.

Q&A with MPI about Accounting and Portfolio/Risk Management Dependencies

This section reviews some of the questions that CAC posed and the responses from MPI and/or Aon. The questions were designed to better understand the dependencies, or lack thereof, between portfolio/risk management on the one hand (e.g., asset mix choice) and the basis for measurements (values of assets and liabilities, return/risk) on the other hand.

Reconciling Market Values, Accounting Values and the Nature of their Risks

The table below shows accounting values as a percentage (%) of the total portfolio using accounting values from a recent MPI balance sheet, consistent with those shown earlier.

	Portfolio[1]	FVTPL	AFS	HTM+Non-Financial
18	Equities		18	
10	Real Estate	9		1
3	Infrastructure	3		
42	FVTPL Bonds	42		
25	HTM Bonds			25
2	Cash		2	
100	**Total Portfolio**	**54**	**20**	**26**
		↓	↓	
	Unrealized Gains/Losses to:	Net Income	OCI	n/a
	Liabilities	**"Sticky" Yield[2]**	**"AA" Yield**	
70	Unpaid Claims	→ Net Income		
15	Employee Benefits	→	OCI	
85	**Total Liabilities**			
	Equity			
13	Retained Earnings			
2	Accumulated OCI			
15	**Total Equity**			
100	**Total Liabilities and Equity**			

[1] Other assets, net of other liabilities, are ~ 1% of the Total Portfolio (not shown).
[2] This represents the yield on the bond portfolio.

MPI confirmed that our understanding of the accounting, as depicted above, was correct by saying:

> *"your understanding is correct for the liabilities; however, please note that it is only the remeasurement of the employee future benefits that is put to Other Comprehensive Income (OCI), other items relating to employee future benefits is expensed to net income."*[14]

[14] Source: MPI's response to CAC (MPI) 1-71

I interpret this to mean that the (less uncertain/volatile) accrual related to employee future benefits is reflected in net income (and therefore included in the risk metric, as defined in the Asset-Liability Study), but that the (more uncertain/volatile) component arising from changing interest rates is not reflected in MPI's risk metric. (As noted in the notes to MPI's financial statements, the duration or interest rate sensitivity that results in "remeasurement" is high at 16 years – a topic discussed again in more detail in another section).

MPI did not comment on the "asset" side of the depiction above, so I assume that MPI is in general agreement with both the nature and size of the components of the assets, using the accounting-based valuations from MPI's financial statements.

Accounting as a Potential "Tool"

MPI was asked if one "general" tool that is either being used by MPI now, or could be used by MPI in the future, is the "choice" of metrics ("basis for measurement") for valuing assets, liabilities and income recognition. MPI said:

> "The "choice in metrics" for "valuing assets, liabilities and income recognition" is determined by … IFRS ... These items are not at … MPI … discretion."[15]

MPI Has Some Discretion re: Accounting, But It Is Not Clear What That Is

MPI was asked what flexibility it has in choosing accounting valuation methods for assets and liabilities and what their implications for net income and OCI are. MPI said:

> *"… MPI … is required to adhere to … IFRS ... Where there are choices within an IFRS standard, the Corporation evaluates the options and determines which is most appropriate for the Corporation."*[16]

MPI also said:

> *"certain interest rate movement can be elected to be in either Comprehensive Income or Net Income."*[17]

[15] Source: MPI's response to CAC (MPI) 2-34
[16] Source: MPI's response to CAC (MPI) 1-72
[17] Source: MPI's response to CAC (MPI) 2-34 f)

Asset Accounting is Not Comparable Across the Portfolio

The inconsistent valuation and treatment of unrealized gains and losses across asset classes is an undesirable characteristic of MPI's accounting metrics (lower transparency, less comparability), from the perspective of an external stakeholder (e.g., CAC). Some of this inconsistency may be due to the required application of GAAP in order to be GAAP-compliant while some of it may arise from MPI's election(s) to choose one method where GAAP provides such choice(s).

Asset Accounting: AFS Assets

Net income under GAAP is a metric that is influenced (positively or negatively) by both:

- the underlying transactions ("reality"); and
- how transactions are reported (i.e., accounting policies, which change over time, vary by industry/sector and region, and may provide some discretion or election to choose between two or more practices that are generally accepted and GAAP-compliant).

The adoption by MPI of AFS accounting for equities (~ 18% of assets), for example, implies that only realized gains will impact net income while unrealized gains will impact OCI. This means that net income depends on equity "turnover", which is controllable directly by the manager and indirectly by MPI. (Comprehensive income would not change as a result of turnover alone, except for the related transaction costs.) The potential for MPI to impact net income in this way, without adding real value as a result of the transaction, is a governance feature that can be improved upon.

The Investment Policy Statement says:

> *"The Corporation may … request external equity investment counsels to realize capital gains that have accumulated …. The ability to realize gains is subject to the ratio of the market value to book value of the total of both the Canadian and U.S. equity portfolios (in their native currencies) exceeding 105%. The market value to book value ratio must not fall below 105% as a result of the gains taking process."*[18]

When asked what circumstances would cause MPI to request managers to realize gains that had accrued and about the significance of the "105% rule", MPI replied:

> *"The Corporation has not requested equity managers to realize capital gains for several years and does not foresee any reasons to request the managers to realize capital gains in the future. The 105% rule was added to the Investment Policy Statement (IPS) during the 2005 IPS Review. The rule was established to provide a buffer from equity market volatility. This rule is no longer relevant to the management of the investment portfolio."*

[18] Source: CAC (MPI) 1-89

Asset Accounting: HTM Assets

Because HTM assets are carried at amortized cost in MPI's financial statements[19], some of the market risks for a significant portion of the portfolio (~ ¼ of MPI's assets) are not captured in the risk definition used by MPI in long-term asset-liability studies (i.e., the risk definition is an accounting one, which "under-reports" the true market volatility for HTM assets, among other assets and liabilities, as noted elsewhere in this document).

Liability Accounting: "Remeasurement" of Employee Benefits (Excluded from Risk Metric)

MPI said:

> "it is only the remeasurement of the employee future benefits that is put to … OCI … other items relating to employee future benefits is expensed to net income"[20].

When asked if remeasurement of the employee future benefits that is put to OCI is more volatile than the "other items relating to employee future benefits", MPI said:

> *"The response to this question requires a definition of 'volatility'. The split between remeasurement of employee future benefits and other items relating to employee future benefits is based on accounting standards. Both are actuarially determined and fluctuate year over year."*

MPI was asked if it agreed that "remeasurement of employee future benefits (as defined in Note 21 of MPI's financial statements") will never impact "net income" nor "retained earnings" as those terms are used in the definition of "return" and "risk" in the Asset-Liability Study. MPI's response is below.

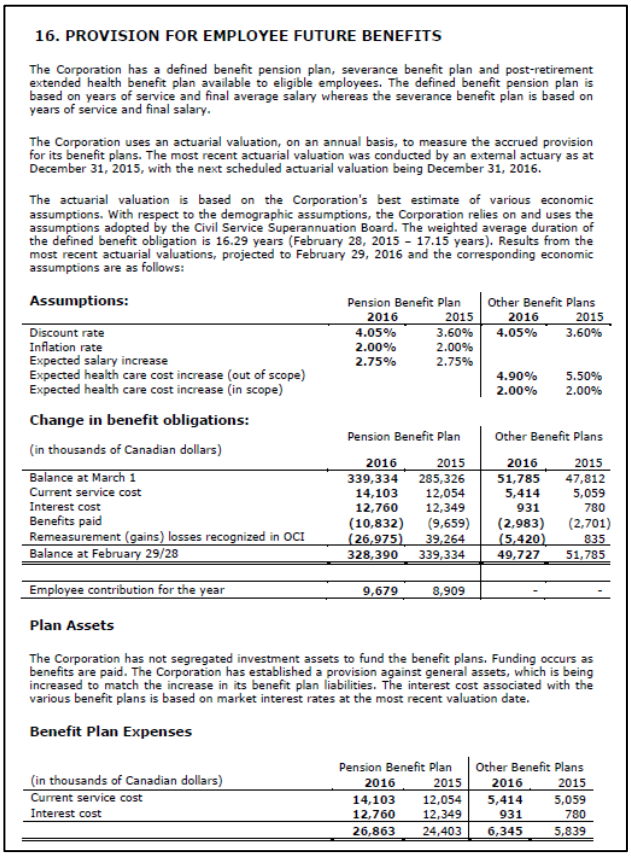
> *"The Corporation does not strictly agree …, as accounting standards related to the remeasurement of employee future benefits could change in the future. The Corporation … follows all relevant accounting guidelines (IAS 19) …, but has no control over prospective changes in those guidelines. Accordingly the Corporation cannot agree … that remeasurement of employee future benefits will never impact net income."*
>
> *In response to i) AON offers the following:*
>
> *We agree that the inherent economic or market risk arising from employee future benefits (reflected in the re-measurement of employee future benefits) is not reflected in the return/risk metrics in the Asset-Liability Study.*
>
> *There is a tenuous link between retained earnings and re-measurement of employee future benefits. Re-measurement … impacts … AOCI … AOCI is considered in the calculation of surplus distributions/special contributions. Surplus distributions/special contributions impact retained earnings. However, the impact is likely very small."*
>
> *Re-measurement of employee future benefits does not impact net income.*
>
> *The impact of changes in the present value of pension liabilities is modeled and flows into the AOCI."*

---

[19] Source: MPI's audited financial statements (Feb 2015)
[20] Source: MPI's response to CAC (MPI) 1-71

Based on these responses, I conclude that the inherent economic or market risk arising from employee future benefits (reflected in the re-measurement of employee future benefits), which I believe to be material, is not reflected in the return/risk metrics in the Asset-Liability Study and therefore not appropriately considered in asset mix decisions. As noted in MPI's financial statements "the weighted average duration of the defined benefit obligation is 16.29 years"[21]. This means that a 1% change in the discount rate used to value the liabilities would cause the value of the liability to change by approximately 16% in the opposite direction.

From MPI's financial statements (below, enlarged on the next two pages), the 0.45% increase in discount rate (to 4.05%) resulted in a remeasurement gain of ~ $27 million last year, consistent with MPI's sensitivity analysis (next page) which shows an expected $51 million gain[22] for a 1% increase (~ double the 0.45% actually reflected).



16. PROVISION FOR EMPLOYEE FUTURE BENEFITS

The Corporation has a defined benefit pension plan, severance benefit plan and post-retirement extended health benefit plan available to eligible employees. The defined benefit pension plan is based on years of service and final average salary whereas the severance benefit plan is based on years of service and final salary.

The Corporation uses an actuarial valuation, on an annual basis, to measure the accrued provision for its benefit plans. The most recent actuarial valuation was conducted by an external actuary as at December 31, 2015, with the next scheduled actuarial valuation being December 31, 2016.

The actuarial valuation is based on the Corporation's best estimate of various economic assumptions. With respect to the demographic assumptions, the Corporation relies on and uses the assumptions adopted by the Civil Service Superannuation Board. The weighted average duration of the defined benefit obligation is 16.29 years (February 28, 2015 – 17.15 years). Results from the most recent actuarial valuations, projected to February 29, 2016 and the corresponding economic assumptions are as follows:

Assumptions:

	Pension Benefit Plan		Other Benefit Plans	
	2016	2015	**2016**	2015
Discount rate	**4.05%**	3.60%	**4.05%**	3.60%
Inflation rate	**2.00%**	2.00%		
Expected salary increase	**2.75%**	2.75%		
Expected health care cost increase (out of scope)			**4.90%**	5.50%
Expected health care cost increase (in scope)			**2.00%**	2.00%

Change in benefit obligations:

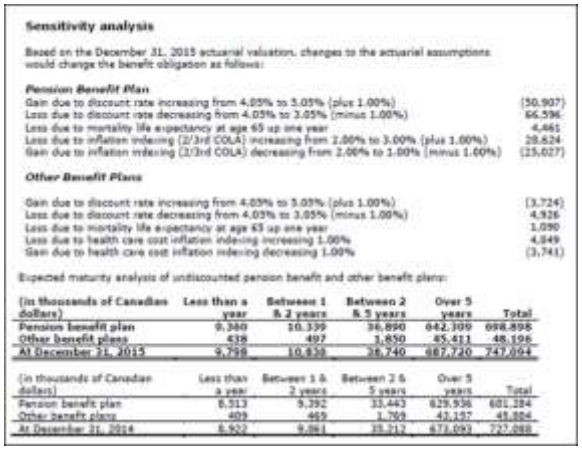
(in thousands of Canadian dollars)	Pension Benefit Plan		Other Benefit Plans	
	2016	2015	**2016**	2015
Balance at March 1	**339,334**	285,326	**51,785**	47,812
Current service cost	**14,103**	12,054	**5,414**	5,059
Interest cost	**12,760**	12,349	**931**	780
Benefits paid	**(10,832)**	(9,659)	**(2,983)**	(2,701)
Remeasurement (gains) losses recognized in OCI	**(26,975)**	39,264	**(5,420)**	835
Balance at February 29/28	**328,390**	339,334	**49,727**	51,785
Employee contribution for the year	**9,679**	8,909	-	-

Plan Assets

The Corporation has not segregated investment assets to fund the benefit plans. Funding occurs as benefits are paid. The Corporation has established a provision against general assets, which is being increased to match the increase in its benefit plan liabilities. The interest cost associated with the various benefit plans is based on market interest rates at the most recent valuation date.

Benefit Plan Expenses

(in thousands of Canadian dollars)	Pension Benefit Plan		Other Benefit Plans	
	2016	2015	**2016**	2015
Current service cost	**14,103**	12,054	**5,414**	5,059
Interest cost	**12,760**	12,349	**931**	780
	26,863	24,403	**6,345**	5,839



Sensitivity analysis

Based on the December 31, 2015 actuarial valuation, changes to the actuarial assumptions would change the benefit obligation as follows:

Pension Benefit Plan

Gain due to discount rate increasing from 4.05% to 5.05% (plus 1.00%)	(50,907)
Loss due to discount rate decreasing from 4.05% to 3.05% (minus 1.00%)	66,596
Loss due to mortality life expectancy at age 65 up one year	4,461
Loss due to inflation indexing (2/3rd COLA) increasing from 2.00% to 3.00% (plus 1.00%)	28,624
Gain due to inflation indexing (2/3rd COLA) decreasing from 2.00% to 1.00% (minus 1.00%)	(25,027)

Other Benefit Plans

Gain due to discount rate increasing from 4.05% to 5.05% (plus 1.00%)	(3,724)
Loss due to discount rate decreasing from 4.05% to 3.05% (minus 1.00%)	4,926
Loss due to mortality life expectancy at age 65 up one year	1,090
Loss due to health care cost inflation indexing increasing 1.00%	4,849
Gain due to health care cost inflation indexing decreasing 1.00%	(3,741)

Expected maturity analysis of undiscounted pension benefit and other benefit plans:

(in thousands of Canadian dollars)	Less than a year	Between 1 & 2 years	Between 2 & 5 years	Over 5 years	Total
Pension benefit plan	9,380	10,339	36,890	642,309	698,898
Other benefit plans	418	497	1,850	45,411	48,196
At December 31, 2015	9,798	10,836	38,740	687,720	747,094

(in thousands of Canadian dollars)	Less than a year	Between 1 & 2 years	Between 2 & 5 years	Over 5 years	Total
Pension benefit plan	8,513	9,392	33,443	629,936	681,284
Other benefit plans	409	469	1,769	43,157	45,804
At December 31, 2014	8,922	9,861	35,212	673,093	727,088

[21] Source: MPI's audited financial statements

[22] $51 million gain ~ 16 year duration x 1% change x $312 million average value of pension benefits in the year).

16. PROVISION FOR EMPLOYEE FUTURE BENEFITS

The Corporation has a defined benefit pension plan, severance benefit plan and post-retirement extended health benefit plan available to eligible employees. The defined benefit pension plan is based on years of service and final average salary whereas the severance benefit plan is based on years of service and final salary.

The Corporation uses an actuarial valuation, on an annual basis, to measure the accrued provision for its benefit plans. The most recent actuarial valuation was conducted by an external actuary as at December 31, 2015, with the next scheduled actuarial valuation being December 31, 2016.

The actuarial valuation is based on the Corporation's best estimate of various economic assumptions. With respect to the demographic assumptions, the Corporation relies on and uses the assumptions adopted by the Civil Service Superannuation Board. The weighted average duration of the defined benefit obligation is 16.29 years (February 28, 2015 – 17.15 years). Results from the most recent actuarial valuations, projected to February 29, 2016 and the corresponding economic assumptions are as follows:

Assumptions:	Pension Benefit Plan		Other Benefit Plans	
	2016	2015	**2016**	2015
Discount rate	**4.05%**	3.60%	**4.05%**	3.60%
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Balance at February 29/28	**328,390**	339,334	**49,727**	51,785
Employee contribution for the year	**9,679**	8,909	-	-

Plan Assets

The Corporation has not segregated investment assets to fund the benefit plans. Funding occurs as benefits are paid. The Corporation has established a provision against general assets, which is being increased to match the increase in its benefit plan liabilities. The interest cost associated with the various benefit plans is based on market interest rates at the most recent valuation date.

Benefit Plan Expenses

(in thousands of Canadian dollars)	Pension Benefit Plan		Other Benefit Plans	
	2016	2015	**2016**	2015
Current service cost	**14,103**	12,054	**5,414**	5,059
Interest cost	**12,760**	12,349	**931**	780
	26,863	24,403	**6,345**	5,839

Note 16 is continued below.

Sensitivity analysis

Based on the December 31, 2015 actuarial valuation, changes to the actuarial assumptions would change the benefit obligation as follows:

Pension Benefit Plan

Gain due to discount rate increasing from 4.05% to 5.05% (plus 1.00%)	(50,907)
Loss due to discount rate decreasing from 4.05% to 3.05% (minus 1.00%)	66,596
Loss due to mortality life expectancy at age 65 up one year	4,461
Loss due to inflation indexing (2/3rd COLA) increasing from 2.00% to 3.00% (plus 1.00%)	28,624
Gain due to inflation indexing (2/3rd COLA) decreasing from 2.00% to 1.00% (minus 1.00%)	(25,027)

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Gain due to discount rate increasing from 4.05% to 5.05% (plus 1.00%)	(3,724)
Loss due to discount rate decreasing from 4.05% to 3.05% (minus 1.00%)	4,926
Loss due to mortality life expectancy at age 65 up one year	1,090
Loss due to health care cost inflation indexing increasing 1.00%	4,849
Gain due to health care cost inflation indexing decreasing 1.00%	(3,741)

Expected maturity analysis of undiscounted pension benefit and other benefit plans:

(in thousands of Canadian dollars)	**Less than a year**	**Between 1 & 2 years**	**Between 2 & 5 years**	**Over 5 years**	**Total**
Pension benefit plan	**9,360**	**10,339**	**36,890**	**642,309**	**698,898**
Other benefit plans	**438**	**497**	**1,850**	**45,411**	**48,196**
At December 31, 2015	**9,798**	**10,836**	**38,740**	**687,720**	**747,094**

(in thousands of Canadian dollars)	Less than a year	Between 1 & 2 years	Between 2 & 5 years	Over 5 years	Total
Pension benefit plan	8,513	9,392	33,443	629,936	681,284
Other benefit plans	409	469	1,769	43,157	45,804
At December 31, 2014	8,922	9,861	35,212	673,093	727,088

Greater Volatility in Comprehensive Income than Net Income

MPI was asked if "comprehensive income" (i.e., including OCI) is more volatile than "net income" (i.e., excluding OCI). MPI said:

> "the answer depends on the definition of volatility and nature of volatility being assumed. If there is more potential for fluctuation due to valuation changes in equities and employee future benefits, then agreed."

A portfolio/risk manager's definition of volatility would be based on the market valuations of assets and liabilities (as distinct from accounting valuations), implying that comprehensive income is more volatile than net income as a result of investments in equities and employee benefits (mainly the pension plan's liabilities).

This greater volatility in comprehensive income, compared to net income, arises because comprehensive income includes OCI, but net income does not, for:

- unrealized gains and losses from changes in the market value of equities (AFS assets, which includes equities), noting that equities have higher market volatility compared to other assets; and
- unrealized gains and losses from changing interest rates that impact the value of pension liabilities, noting that the long duration (16 years, per MPI's financial statements) of pension liabilities makes these liabilities very sensitive to changes in interest rates.

MPI was asked if "comprehensive income" is closer to a market-based definition of "income" than is "net income", as these terms are currently defined. MPI's response is below.

> *"This question is theoretical in nature and the response requires a definition of 'market based'. Comprehensive Income and Net Income are determined based on adherence to Accounting Standards and available elections under the accounting standards. Certain interest rate movement can be elected to be in either Comprehensive Income or Net Income. Other actuarial valuations based on interest rates are required to be in comprehensive income based on accounting standards."*

I do not agree with MPI regarding the theoretical nature of the question. I believe that comprehensive income, as currently defined, is more volatile than net income, as illustrated in MPI's most recent audited financial statements below[23].

[23] Source: MPI's audited financial statements (Feb 2016)

Statement of Comprehensive Income (Loss)

For the years ended February 29/28 (in thousands of Canadian dollars)	Notes	2016	2015
Net income (loss) from operations	*24*	**(31,314)**	57,578
Other Comprehensive Income (Loss)	*16&21*		
Items that will not be reclassified to income			
Remeasurement of Employee Future Benefits		**32,395**	(40,099)
Items that will be reclassified to income			
Unrealized gains (losses) on Available for Sale assets		**(66,316)**	34,689
Reclassification of net realized (gains) losses related to Available for Sale assets		**33,771**	(28,064)
Net unrealized gains (losses) on Available for Sale assets		**(32,545)**	6,625
Other Comprehensive Loss for the year		**(150)**	(33,474)
Total Comprehensive Income (Loss)		**(31,464)**	24,104

OCI is the difference between Net Income and Comprehensive Income, which consists of:

- "items that **will not be** reclassified to income"
  – i.e., Remeasurement of Employee Future Benefits Gain (Loss); and
- "items that **will be** reclassified to income"
  – i.e., Unrealized gains (losses) on Available for Sale assets (inclusion + reversal or reclassification to AFS when realized as a result of a sale/turnover).

When asked if MPI agreed that "total equity" (i.e., including AOCI) has more volatility than "retained earnings" (i.e., excluding AOCI), MPI said "the answer depends on the definition of volatility and nature of volatility being assumed. If there is more potential for fluctuation due to valuation changes in equities and employee future benefits, then agreed."[24]

MPI's Return/Risk Metric is a Less "Comprehensive" Accounting Metric

"Return" and "risk" are measured in Aon's Asset-Liability Study on an "accounting" basis:

- "net income", on the return (Y) axis; and
- "average annual volatility of retained earnings", on the risk (X) axis.

MPI confirmed that:

> *"'return' and 'risk' metrics in the Asset-Liability Study reflect the accounting definitions for 'net income' and 'retained earnings' (i.e., they exclude … OCI … and … AOCI) in 'return' and 'risk' respectively)".*[25]

[24] Source: MPI's response to CAC (MPI) 2-34
[25] Source: CAC (MPI) 1-73

MPI Elects to Use Net Income/Retained Earnings in Return/Risk Definition

MPI said that it is not required, but elects to use "net income" and/or "retained earnings" (excluding AOCI), rather than "comprehensive income" (including OCI) or "total equity" (including AOCI), respectively, in "how return and/or risk are defined in Asset-Liability Studies".[26]

The decision to use net income/retained earnings in Asset-Liability Studies has the effect of under-reporting the volatility in Asset-Liability Studies compared to the underlying volatility that is actually inherent in those assets and liabilities on a market value basis.

Short-Term vs Long-Term Tradeoffs

MPI was asked if there is a trade-off between short-term rate stability on the one hand and long-term accuracy of market risk assessments that arises from using the same basis for measurement for both of these two purposes. MPI responded:

> "As stated on the PUB (MPI) 1-20 (a) Attachment B Phase II - Part A ALM Study page 5, MPI's Basic compulsory program is required to break even rather than to target profits. The objective of the ALM study was that "the short-term volatility of the premium rate requirement is a primary concern". Therefore, the benefits of long-term accuracy of market return and risk through comprehensive net income are not as important compared to reducing the short-term volatility of the premium rate requirement."[27]

MPI said that "short term volatility of the premium rate" is a primary concern, which was echoed by Aon in the Asset-Liability Study, by saying Aon perceived that "MPI has a low risk tolerance resulting from the mandate to break even instead of targeting profit, the extensive process to change targeted levels of reserve and the lack of control of MPI over premium rates."

MPI said that "for these organizations in year performance is less critical as they do not set annual rates as does MPI. As a result, these organizations are able to take more investment risk and have a much higher allocation to equities than MPI (an average of 50.8% vs. 18.5% in 2015). The average allocation to fixed income by these organizations is 31.7%, while MPI had 66.4% in fixed income."[28]

Comprehensive Income is Better than Net Income (for Risk Management), But Not Best

When asked if MPI believes that comprehensive income is a better or worse metric than net income, as these terms are currently defined, MPI said:

> "MPI would not define one measure as better than another. The two measures show different views of the corporation's activities which does not necessitate superiority of one over the other. One may be more suited to an analysis than the other, depending on what is being analyzed." [29]

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[26] Source: MPI's response to CAC (MPI) 2-34(c)(ii)
[27] Source: MPI's response to CAC (MPI) 2-36(b)(ii)
[28] Source: Volume II – Investment Income, page 25
[29] Source: MPI's response to CAC (MPI) 2-34(n)

I believe that the better metric depends on the principles/beliefs used to inform decision-making and the purpose for which the metrics are used. For the following reasons, I believe comprehensive income is better than net income, but still not the best, for the purpose of long-term asset allocation decision-making.

- **Comprehensive income is more relevant** than net income, reflecting OCI components that bring it closer to a market value basis;
- **Comprehensive income is more "comprehensive"** or complete than net income, because it includes unrealized gains and losses on AFS assets (20% of assets, including equities which are more volatile than other assets) and employee future benefits gains/losses (which have a high sensitivity to interest rates), while net income does not;
- **Comprehensive income is more neutral** because it is not impacted (as net income is) by portfolio turnover; and
- **Comprehensive income is more consistent/comparable and understandable**, by including more (but not all) assets and liabilities on the same valuation basis – market value, as distinct from an accounting basis that currently includes some but not all of unrealized gains/losses in income.

Any increased reliance on comprehensive income would likely involve higher costs (e.g., market valuations), but these costs are likely to be small compared to the benefits which would flow from its use (risk management generally, but long-term asset allocation specifically).

Market Values are More Relevant than Accounting Values for Portfolio Decision-Making

GAAP is designed to meet the common information needs of a variety of users who have different needs. GAAP measures of assets and liabilities may be appropriate for some purposes but are less relevant for others despite being "generally accepted" for accounting purposes.

Also, accounting (and actuarial) principles may differ from one jurisdiction to another, and they may change over time. These differences and changes, however, are unrelated to the underlying factors that create the inherent market risks related to the assets and liabilities. Simply put, measuring something differently does not change its characteristics.

Portfolio/risk managers generally agree that market values (rather than accounting values) are more relevant for informing investment/risk management decisions. This explains why portfolio/risk managers make various "adjustments" to net income or asset/liability valuations in making decisions about long-term portfolio designs (e.g., asset mix).

Market Risks Do Not Depend on How Assets and Liabilities are Measured by Accountants

MPI was asked if the market risk (e.g., volatility or other appropriate market risk metric) of MPI's liabilities depends on the principles, valuation methodologies, assumptions and/or values developed by actuaries.

MPI responded by referring to its earlier response (CAC (MPI) 1-72 (f)), where MPI was asked if the inherent market risks arising from the liabilities (viewed in isolation, not in relation to assets) can only be changed by changing the nature of the cash flows that underlie the liabilities (e.g., by changing their degree of indexation to inflation or other such basis), and not through the adoption of different "valuation" methodologies (including "smoothing").

In 1-72 f), MPI said:

> "*The Corporation agrees that inherent market risks arising from liabilities can be changed by changing the nature of cash flows underlying the liabilities. However, such change can also occur by the adoption of a different 'valuation' methodology. E.g. If the 'valuation' methodology required the use of a risk-free interest rate to discount the liabilities, then the inherent market risk would be reduced. However, the tradeoff is that MPI would have to hold a higher amount of liabilities. As stated in the responses above, the Corporation's current 'valuation' methodology is in adherence to IFRS and is in accordance with current accepted actuarial practice*".

MPI's responses to CAC (MPI) 1-72 e) appears to contradict its response to 1-72 f) regarding the dependency of market risks and their basis for measurement. In 1-72 e), MPI agreed that the "*'actual' market risks arising from MPI's liabilities do not depend on how those liabilities are valued (by either accountants or actuaries)"*.

The underlying or inherent risks related to assets and liabilities do not depend on how they are accounted for, in the same way that using a Celsius thermometer (rather than Fahrenheit) leaves the temperature unchanged despite having different readings on the two scales.

MPI's long-term portfolio decisions (e.g., asset mix) are influenced by return/risk accounting-based metrics, and these accounting metrics may differ materially from those that are "market-based".

Three "Theoretical" Questions About the Interdependence of Accounting and Portfolio Design

MPI was asked if it agreed with the following three statements, the first two relating to potential changes in accounting for asset and liabilities, and the third to the impact such accounting changes might have (e.g., lead to more, less or about the same allocation to equities, as compared to bonds).

1st Question: Changes in Asset Accounting

- Assuming that GAAP were to change and require MPI to use market interest rates/prices for valuing assets (i.e., 100% of unrealized gains and losses would impact net income):
  - net income for accounting purposes would become more volatile;
  - rates (i.e., premiums) would become more volatile (explain why; e.g., through the effects on both net income and the fact that the rate-setting formula is based on net income); and
  - the inherent (market) risk, as defined above, of the assets that would be subject to the revised accounting treatment would remain unchanged. If not, why not?

2nd Question: Changes in Liability Accounting

MPI was asked if it agreed with the following statements, assuming that GAAP were to change and require MPI to use market interest rates/prices for valuing liabilities:

- net income for accounting purposes would become more volatile;
- rates (i.e., premiums) would become more volatile. If so, please explain why;
- the inherent (market) risk, as defined above, of the liabilities that would be subject to the revised accounting treatment would remain unchanged; and
- if not, please explain why not?

3rd Question: Changes in Asset Mix

MPI was asked if the changes to GAAP related to either the assets, liabilities or both described above had been in place when the latest Asset-Liability Study was completed, what impact would the change(s) likely have had (e.g., likely lead to more, less or about the same allocation to equities, as compared to bonds)? Please explain briefly.

MPI's Response to Questions 1, 2 and 3

MPI's response to all these questions is below.

> *"This question is theoretical in nature and the request is to comment on potential currently undrafted accounting changes that may or may not occur. However, please note that MPI currently uses market interest rates and prices for valuing assets and liabilities where required under current accounting standards."*

My question may be theoretical, but I believe it is an important one to ask.

Also, MPI does have some discretion regarding its accounting choices (as discussed elsewhere).

An article, funded by the Rotman International Centre for Pension Management (ICPM), that illustrates how and why accounting matters (for better or worse) is included as a reference in the footnote below[30].

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[30] See *Pension Fund Asset Allocation and Liability Discount Rates: Camouflage and Reckless Risk Taking by U.S.*

III. MANAGEMENT

The Cost of Constraints

As noted in the beliefs section, "constraints never increase expected risk-adjusted returns".

Nevertheless, there may be good reasons for imposing constraints, including some of the following perhaps:

- Legislation or regulation (e.g., maximum foreign property);
- Market risk management (e.g., avoid concentration by setting a maximum);
- Liquidity risk management (e.g., set a maximum for illiquid assets as a group and/or at the asset class level for real estate, infrastructure and private equity);
- Return expectations (e.g., maximum for low-yielding assets);
- Insufficient internal/external asset management capabilities; and
- Concerns about the accuracy of modelling methodologies and/or assumptions, and the (widely-known) sensitivity of optimization results to assumptions re: returns, risks, correlations, etc.

Reliance on Quantitative Models

On this last point above, it important to note that:

- optimal solutions from quantitative portfolio optimizations are very sensitive to the capital market assumptions used; and
- there are at least 44 such assumptions in the Asset-Liability Study, involving MPI's 8-asset class portfolio, as calculated below.

44 Important Assumptions (estimates, but "unknowns")

8 average return assumptions (1 for each asset class)
8 volatility assumptions
28 correlations (= 8 x 7 ÷ 2)
44 "unknowns"

It goes without saying, perhaps, that an over-reliance on the quantitative results of optimizations is inappropriate and imprudent, given the large number of "unknowns" and other considerations.

Public Plans? at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2070054.

Minimum/Maximum Constraints in Optimizations

The min/max constraints for asset classes in the Asset-Liability Study, listed below, are very binding. By establishing them, the constrained optimization problem results in a "pre-determined" allocation to ≥ 80% of the portfolio, leaving little room to optimize return/risk tradeoffs (i.e., allocating ≤ 20% of the remaining assets).

80% of the portfolio is constrained[31] as follows.

≥ 10% Canadian Equities
≥ 10% Real Estate
≥ 5% Infrastructure
≥ 55% Liability Matching
≥ 80% of the portfolio is "pre-determined" by minimum constraints

10% Minimum Weight to Canadian Equities to Retain a Meaningful Exposure to Home Markets

MPI said that the minimum weight of 10% for Canadian equities was set "to retain a meaningful exposure to our home equity markets".[32]

It is not clear why it is important for MPI to maintain a "meaningful" exposure to Canadian equities unless it relates to a regulatory requirement or return/risk consideration.

Pension plans and other institutional investors have generally acknowledged a "home bias" when it comes to investing (i.e., overweighting domestic equity markets relative to the domestic market's global capitalization %), and they have been diversifying their portfolios internationally to remove the bias and improve risk-adjusted returns.

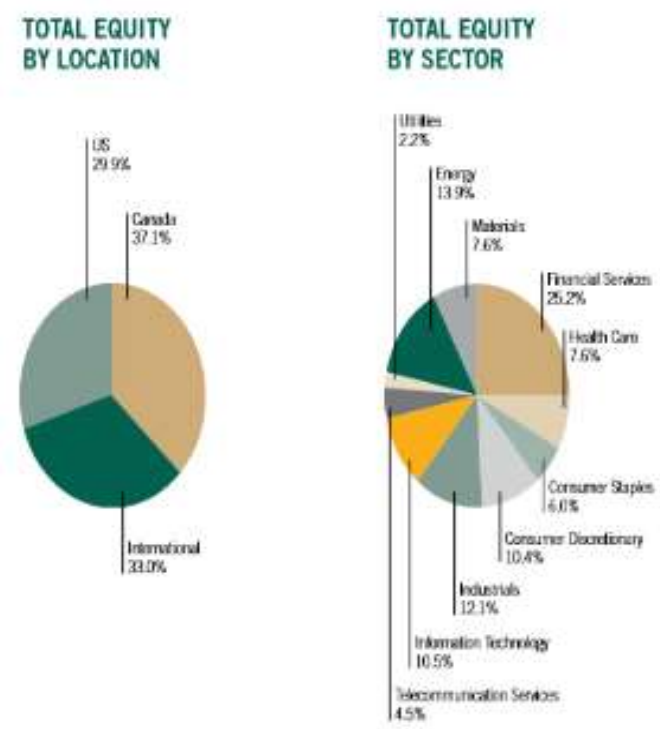
This international diversification has been more important for Canadian investors, given the concentrated nature of our market. Three (of 10) sectors in Canada, for example, typically represent a very large proportion of the TSX market cap:

- Financials > ⅓;
- Energy ~ 20%; and
- Materials ~10%.

Canadian equities are underrepresented in health care and information technology (< 3%), and Canada represents a very small (~ 3%) portion of the world's market capitalization of publicly-traded stocks.

[31] Source: MPI's response to CAC (MPI) 1-77

[32] Source: MPI's response to CAC (MPI) 2-39



Manitoba's TRAF (Teachers' Retirement Allowances Fund), for example, has a higher allocation of equities in International Equities (33%) than US Equities (30%) and a combined foreign exposure (63%) that is two times higher than in Canada (37%) (far left).[33]

TRAF's allocation by sector (near left) shows a more diversified portfolio on a sector basis as a result of having more foreign exposure.

When asked if MPI was comfortable with its concentration in Canadian Equities (⅔ of total equities), given Canada's small size (~ 3% of the world's market cap) and concentrated exposure to three (of 10 GICS) sectors (Financials, Energy and Materials), MPI said it was "comfortable with the current exposure to Canadian equities. The current portfolio was selected from the efficient frontier developed during the Asset Liability Management (ALM) study completed in January 2015".[34]

[33] Source: TRAF's annual report

[34] Source: MPI's response to CAC (MPI) 1-83

Equity Risk Concentration[35]

Most institutional investors have a significant allocation to International Equities (i.e., excluding Canada and US), but MPI has 0%.

Saskatchewan Auto Fund, administered by Saskatchewan Government Insurance ("SGI"), for example, has almost ¼ of its public equities in International Equities as illustrated on the right.[36]

Public Equity Mix	MPI	SGI	Diff
Canadian Equity	67	47	20
US Equity	33	31	2
International Equity	-	23	- 23
	100	100	-

The average defined benefit pension plan, as surveyed by the Pension Investment Association of Canada (PIAC[37]), has an even higher allocation to International Equities (> ⅓ of equites), with non-Canadian Equities (US + International) representing almost ¾ of total public equities and Canadian Equities ~ ¼ as illustrated on the right.

Public Equity Mix	MPI	PIAC	Diff
Canadian Equity	67	24	42
US Equity	33	38	- 5
International Equity	-	37	- 37
	100	100	-

PIAC's 2015 asset mix report is on the next page.

[35] Source: CAC (MPI) 1-83

[36] These figures were included in CAC's questions and have not been updated since then.

[37] Source: PIAC website, at http://www.piacweb.org/publications/asset-mix-report.html

Asset Mix Report

Year :

2015

ASSET MIX OF DB PLANS OF SPONSOR ORGANIZATIONS REPRESENTED BY MEMBERS AS AT DEC 31, 2015	MILLIONS $	PERCENT OF TOTAL
CASH AND SHORT TERM	-8,172.19	-0.52%
CANADIAN NOMINAL BONDS	356,548.27	22.68%
REAL RETURN BONDS	49,546.23	3.15%
MORTGAGES	18,595.23	1.18%
FOREIGN FIXED INCOME	54,448.24	3.46%
CANADIAN EQUITIES	136,838.97	8.70%
U.S. EQUITIES	74,399.22	4.73%
EAFE EQUITIES	58,694.80	3.73%
EMERGING MARKETS EQUITIES	64,784.40	4.12%
GLOBAL EQUITIES	262,033.44	16.66%
REAL ESTATE	172,358.72	10.96%
VENTURE CAPITAL/PRIVATE EQUITY	151,721.50	9.65%
INFRASTRUCTURE	88,018.50	5.60%
OTHER ASSETS	58,685.20	3.73%
HEDGE FUNDS - used as part of portable alpha strategy	11,083.52	0.70%
HEDGE FUNDS - not used as part of portable alpha strategy	22,814.17	1.45%
TOTAL ASSETS AT MARKET	$1,572,398.22	100.0%
NOTE: TOTAL ASSETS DO NOT INCLUDE ASSETS OF NON-REPORTING FUNDS		
TOTAL ASSETS OF ALL DB FUNDS $1,572,303.60 MILLION		

Duration

MPI was asked if the duration-matching strategy would be as effective if future inflation (actual and/or expected) turns out to differ from current expectations. MPI replied:

> "MPI … agrees that the duration matching strategy is not as effective if future inflation turns out to differ from current expectations … MPI "has accepted short term inflation risk and has accounted for this risk through margins and reserve. The 'excess portfolio' was also designed to provide some long-term protection against inflation." The excess portfolio includes real estate and infrastructure."[38]

Borrowing (Interest Rate Risk) in Real Estate

The Real Estate Fund has leverage of ~ 30%, while Aon assumed an unlevered real estate investment (i.e., zero debt), which means the gross and net (of debt) metrics differ between what was modeled by Aon on the one hand in supporting the long-term asset mix decision and what was implemented in practice on the other hand – a difference of 4% below.

	Pooled Real Estate Fund		
% EV			% AUM
100%	Gross Enterprise Value (EV)	317,000	13%
30%	Debt	95,000	4%
70%	Net	222,000	9%

MPI agreed that this implies a 4% difference between the actual exposures implemented by MPI and the assumptions for "real estate" and "fixed income" in the Asset-Liability Study (i.e., gross real estate exposure is closer to 13% than 9%, and exposure to fixed income is 4% lower – i.e., by the amount of debt within the real estate portfolio). MPI added that it "reports the holding on a net basis in keeping with the Net Asset Value reported by the fund manager. Therefore, it is not necessary to split out the debt associated with the fund and report it separately".[39]

When asked if the 4% difference (~ $95 million) was material, and whether the difference should be reflected somehow for greater clarity (e.g., investment policy min/max constraints and targets) and reflected in duration and/or other calculations, MPI said:

> "The real estate pooled fund is reported net of debt as this represents the proceeds that would be realized … upon liquidation ... Real estate investments are reported at their estimated fair values as provided by the external manager in the audited financial statements for the fund.
>
> The use of leverage in the real estate pooled fund represents a liability to that fund and is integral to the manager's strategy and cannot be separated. Because of these facts, there is no need to consolidate the debt associated with the investment in GREF with the Corporation's fixed income portfolio and therefore no impact on duration.

[38] Source: MPI's response to CAC (MPI) 76
[39] Source: CAC (MPI) 76

> When the real estate pooled fund is measured on a net basis, the overall exposure to real estate (pooled real estate fund and CityPlace) as of February 2016 was 11.3%, which is within the min/max range defined for that asset class (7% - 13%). The rebalancing policy defines the monitoring of the target allocation on a fiscal quarterly basis, at a minimum, and rebalancing back to target within six months, if the weight of any asset class falls outside the allowable range. Because the real estate pooled fund is reported on a net basis there is no need for additional clarification of the investment policy min/max constraints and targets."

For greater clarification, here are a few observations.

- There is a 4% difference between what was modeled by Aon (and presumably the basis for the policy allocations implemented) and what was actually implemented in practice:
  - Real estate's gross exposure (excluding debt) is 4% higher than Aon's recommendation;
  - Net exposure to interest rates, at the total portfolio level, is 4% lower even though the effect of leverage is accounted for within the real estate asset class;
- MPI did not answer our question regarding the materiality of the 4% difference, where (though not stated) implicitly materiality refers to the effect that the 4% difference might have on portfolio decision-making or design as distinct from how items might be accounted for;
  - Given MPI's duration policy and interest rate risk management practices, which are very detailed, the risk management (as distinct from the accounting) treatment for liabilities arising from real estate activities is inconsistent with those for the liabilities arising from providing auto insurance (and pensions);
- I disagree with MPI's answer that "because the real estate pooled fund is reported on a net basis there is no need for additional clarification of the investment policy min/max constraints and targets". I would note that the policy min/max constraints and targets approved are therefore not consistent with the results and recommendations from the Asset-Liability Study
  - Greater clarity and consistency of treatment between the Asset-Liability Study and the policies would seem both more appropriate and prudent.

Commingling of Employee Benefit Plans

When asked if the creation of a separate trust for the pension plan would "trigger" a realization (recognition in net income) of "remeasurement of employee future benefits", MPI said:

> *"This question is theoretical in nature and therefore not relevant to the rates setting process. Further, without discussion on the nature of the trust and the type of transaction to create and fund the trust, an accurate answer can not be provided."*[40]

I believe strongly that the portfolio design of the whole portfolio (including the pension plan) should not be influenced by how the parts (insurance vs pension liabilities) are accounted for.

[40] Source: CAC (MPI) 2-34

APPENDIX A: VALTER VIOLA'S CURRICULUM VITAE

VALTER VIOLA

50 De Vere Gardens, Toronto, ON M5M 3E7 | vviola@hollandparkrisk.com 416 819 2307

PROFILE

Portfolio, research and risk management professional with over 20 years of experience in institutional investment management (mostly defined benefit pension plans)

- *Executive and senior management roles in investment research, economics and risk management at two of Canada's largest institutional investors*
- *Consultant to large North American institutional investors, advising Boards, Investment Committees and Management Teams on investment strategies and investment risk management*

PROFESSIONAL EXPERIENCE

2014 – 2016 **MaPLE** Toronto, Santiago

Partner

- Participating in private energy and infrastructure opportunities in South America, starting with power generation and related infrastructure in Chile

2005 – 2014 **Holland Park** Toronto

President, Founder

- Advised defined benefit pension plans, workers' compensation funds and other institutional investors on investment risk governance, management and measurement practices, including:
  - Board education;
  - developing investment/risk frameworks;
  - drafting investment/risk management policies and procedures that were prudent and appropriate in the circumstances and took into account relevant principles and leading practices; and
  - developing risk budgets to support the management of surplus (assets and liabilities) and active management programs (performance vs benchmarks)
- Provided investment risk monitoring and reporting services to pension funds, including:
  - managing third party risk analytics, clients' holdings and benchmark data, proxies for liabilities and market data;
  - recommending and implementing generally accepted and appropriate risk measurement methodologies; and
  - preparing and presenting reports to Boards and executive management teams to meet their needs for relevant, reliable and timely information about investment risks

VALTER VIOLA

2000 – 2005 **CPP Investment Board** Toronto

Vice President, Research and Risk Management

- First executive responsible for total portfolio research, design and investment risk management of the largest single purpose pool of capital in Canada
- Led a growing team of professionals, focused on the total portfolio including:
  - investment risk management (relative to liabilities and benchmarks);
  - policy asset mix and currency hedging;
  - active management;
  - other investment policies
- Collaborated with the CEO/CIO, VP Private Markets and VP Public Markets in the development and implementation of investment strategies
- Collaborated with other executives to develop and implement strategies and business plans, policies and procedures, including leading the development of an investment/risk management framework that took into account the unique circumstances of the CPP and CPPIB (e.g., large unfunded liability, non-marketable bonds, large cash inflows)

1993 – 2000 **Ontario Teachers' Pension Plan** Toronto

Director, Portfolio Manager, Analyst (Research and Economics)

- Member of the Investment Planning Committee, with shared responsibilities to advise the CIO on the tactical management of the total portfolio (shorter-term horizon, broad asset class allocations and currency hedging decisions)
- Supported strategic/policy and tactical asset mix/currency hedging and other total fund decisions through independent research, including:
  - developing the fund's first asset/liability model, which supported the fund's asset mix transition shortly after the fund's inception;
  - conducting research to support new asset class introductions; and
  - recommending appropriate benchmarks
- Managed the tactical asset allocation portfolio, a portfolio that had one of the largest value added targets for the fund
- Managed the real return bond portfolio, including closing the largest single investment in the fund's history ($650 million private placement of inflation-linked bonds that financed the 407 Electronic Toll Road)

1992 – 1993 **Wilfrid Laurier University and York University**

Lecturer in Investments, Finance and Accounting

- Conducted lectures in the undergraduate programs at two universities

1990 – 1992 **Corporate Planning Associates**

Financial Advisor

- Advised high net worth individuals (portfolio management, tax planning, etc.)

1986 – 1988 **Price Waterhouse**

Auditor

- Completed audit and related work for corporate clients in various industries, as well as organizations in non-profit and other sectors

VALTER VIOLA

OTHER EXPERIENCES

PENSION ASSOCIATIONS/COMMITTEES

2006 – 2009 **Healthcare of Ontario Pension Plan (HOOPP)**

External Advisor to Investment Committee

- Advised the Investment Committee of a large, Canadian defined benefit plan on matters related to the management of the total portfolio

2003 – 2005 **Pension Investment Association of Canada (PIAC)**

Member of Investment Practices Committee

- Shared non-proprietary investment practices with peers as a member of an industry association
- Led the publication of a paper ("Risk Budgeting") to meet the needs of member organizations

VOLUNTEER

2013 – 2016 **Enbridge Ride to Conquer Cancer**

Fundraiser, Co-Captain

2004 – 2007 **North Toronto Soccer**

Coach

1988 – 1989 **New Visions Toronto**

Board Member

EDUCATION

1995 ***Chartered Financial Analyst***

1990 ***Master of Business Administration***, University of Western Ontario

1989 ***Chartered Accountant***

1986 ***Bachelor of Commerce***, University of Toronto

APPENDIX B: GLOSSARY OF TERMS

The table below includes the definitions of commonly used terms.

Concept	Definition
Accounting reports	Reports prepared by accountants to meet specific needs (which may differ from the needs of users of other types of reports). The basis of measurement in MPI's accounting reports is "historical cost … except for financial instruments and insurance contract liabilities and reinsurers' share of unpaid claims ... Insurance contract liabilities … are measured on a discounted basis in accordance with accepted actuarial practice (which in the absence of an active market provides a reasonable proxy for fair value) ..."
Actuarial reports	Reports prepared by actuaries to meet specific needs (which may differ from the needs of users of other types of reports).
Asset risk	Market risk related to assets measured in an absolute sense (i.e., not relative to a benchmark or liabilities).
Assumptions	The inputs used in a valuation.
Available for sale (AFS)	As defined in MPI's Financial Statements, AFS assets represent ~ 20% and include: • Equity Investments • Cash and Cash Equivalents • Other Investments (not material).
Duration	Market risk metric that measures the price sensitivity of a security or portfolio to changes in interest rates.
Financial assets and liabilities at fair value through profit or loss (FVTPL)	As defined in MPI's Financial Statements, FVTPL assets represent ~ 54% and include: • Other Bonds (Federal, Other Manitoba, Other Provinces, Corporates) • Infrastructure • Pooled Real Estate Fund.
Held to maturity (HTM)	As defined in MPI's Financial Statements, HTM assets represent ~ 25% and include: • Bonds – Manitoba • Municipal • Bonds – Manitoba, Schools.

Concept	Definition
Inherent risk	The “true” market risk of an asset or liability.
Investment risk	Risk of loss associated with investment activities, including: • market risk (including credit risk) • liquidity risk.
Liability from Basic Claims	Liability or provision at a point in time arising from providing basic auto insurance coverage.
Liability from pension plan	Liability or provision at a point in time arising from providing defined benefit pension coverage to employees.
Liquidity risk	Risk of not being able to generate sufficient cash or its equivalent to meet commitments as they come due in a way that is: • timely and • cost effective.
Market interest rate	A rate used to value an asset or liability based on an assessment of the inherent market risk of a security and/or its underlying cash flows
Market reports	Reports prepared to support market risk management, including portfolio design (e.g., asset mix). Reports are prepared using “best estimates” (i.e., no bias towards conservatism).
Market risk	Risk of loss in the market value of assets and/or liabilities due to changes in security prices, interest rates, currencies or other such factors in either absolute (e.g., assets only) or relative terms (e.g., vs benchmarks or liabilities, known as active risk/tracking error and surplus risk respectively).
Other comprehensive income (OCI)	As defined in MPI’s Financial Statements.
Reinvestment rate risk	Risk that reinvested income will be insufficient to meet a goal.
Risk	An outcome which has some (non-zero) probability of having an adverse impact on one or more stakeholders.
Risk (as defined in Asset-Liability Study)	An important consideration in portfolio design (i.e., asset mix).
Risk-free rate	A term used by MPI in response to a Round 1 question; not a term to be used in responses to questions below, unless “risk-free rate” is clearly defined by MPI and distinguished from other “rates”.

Concept	Definition
Risk profile	Risk level and/or risk allocation (composition).
Surplus risk	Market risk related to the difference between assets and liabilities.
Unrealized gains and losses	Gains and losses, representing differences between the cost (accounting or book value) of one or more assets and their fair value for accounting purposes.
Value	The quantitative assessment of an asset or liability based on the application of a valuation methodology and related assumptions (e.g., book value, accounting value, actuarial value, market value).
Valuation methodology	The method, excluding the assumptions used to implement the method, to value assets or liabilities for one or more purposes (e.g., discounted cash flow or present value methodology).