CAC Manitoba – Book of Documents
MPI GRA 2019/20

1

PUBLIC
INTEREST
LAW
CENTRE

CENTRE
JURIDIQUE
DE
L'INTÉRÊT
PUBLIC

AN INDEPENDENT
SERVICE OF
LEGAL AID
MANITOBA

L'AIDE JURIDIQUE
DU MANITOBA

SUPPORTED BY
LEGAL AID MANITOBA
THE
MANITOBA LAW
FOUNDATION
AND MEMBERS
OF THE
MANITOBA
BAR
ASSOCIATION

200 – 393 PORTAGE AVE
WINNIPEG, MANITOBA
R3B 3H6

TEL: 204.985.8540
FAX: 204.985.8544

E-MAIL: centre@pilc.mb.ca

Writer's direct line: (204) 985-8533
Email: bwilliams@pilc.mb.ca

8 August 2018

Darren Christle
Board Secretary
400 330 Portage Avenue
Winnipeg, MB R3C 0C4

Dear Mr. Christle:

Re: Manitoba Public Insurance – 2019 General Rate Application (2019 GRA)

Overview

Pursuant to s. 15 and 16 of the PUB *Rules of* Practice, CAC Manitoba is applying for an order compelling Manitoba Public Insurance to undertake the analysis requested in CAC Manitoba IR 84 f) and 85 g) on the grounds that:

- the information sought is relevant to the Public Utilities Board in its assessment of the Asset Liability Management Study as outlined under issue 21 of *Order 82-18* as it goes to overall credibility of the study and whether the analysis was biased by the choices made by MPI;
- MPI has failed to provide any response much less a full and adequate response to a relevant information request within the meaning of s. 15 and 15 of the *Rules of Practice*; and,
- it is more cost effective to have the information prepared by Mercer's for MPI than it is for the expert witness of CAC MB to attempt to replicate the analysis.

CAC Manitoba notes that the PUB has directed that August 10, 2018 be the date for hearing motions. Neither Mr. Williams or Ms Dilay will be in Winnipeg on August 10, 2018 for the hearing of this motion. However, Mr. Williams would be pleased to present his arguments via conference call.

Mr. Williams also observes that MPI has indicated in email correspondence today that while its motion for confidentiality has been made returnable for August 10, 2018 it is unlikely to be in a position to file its supporting affidavit on that date. In the event the PUB chooses to reschedule the oral argument, counsel for CAC MB are available on any other days other than August 13, 2018 or August 14, 2018. Alternatively, the Board may wish to consider the motion based on written submissions.

The Rules of Practice

Section 15 1) a) of *The Rules of* Practice imposes an obligation on MPI to provide full and adequate responses to information requests except in circumstances where it contends the information request is not relevant, the answer is not available or cannot be provided with reasonable effort, the information is confidential or where it relies on other grounds.[1]

1 *Rules of Practice*, s. 16.

The Information Request and the Reasons for Refusal

In information requests 84 f) and 85 g), CAC Manitoba asked Mercers to rerun its efficient frontier model under different assumptions. In refusing the information request, MPI does not appear to argue that the information request is not relevant. Rather MPI appears to rely on the suggestion that it would cost approximately $20,000 to respond to 84 f) and $10,000 to respond to 85 g).

MPI references an email exchange with CAC Manitoba in which it asked that the intervenor provide "evidence that Mercer's inflation forecast used in the ALM study was sufficiently inaccurate, or flawed in some way, so as to call into doubt the results of the ALM study" before it agreed to provide the informatio sought.

MPI does not reference an earlier email from CAC Manitoba in which detailed reasons were presented suggesting the information was relevant and material. MPI also does not reference a subsequent email from CAC Manitoba in which it was indicated that MPI and CAC MB would have to agree to disagree.

The Information Requested is Relevant and Material

The information sought will assist the PUB in its assessment of Issue 21 as set out in PUB Order 82-18:

> Asset Liability Management Study, including **review of all aspects of the Study recommendations** and implementation thereof, the basis for and evaluation of risk and return, **alternative portfolio compositions**, proposed portfolio segregation and **recommended composition of the investment portfolio(s)**, forecast investment performance and changes to the Investment Policy Statement." (emphasis added)

As the PUB will be aware the modelling of efficient frontiers for the purposes of investment decisions can be highly susceptible to key assumptions including assumptions relating to interest rates.

The purpose of the questions posed is to test the decisions made regarding key assumptions on which the ALM study is based. If the qualitative rationale to support a key decision (such as liability characteristics) is flawed, the value of the ALM study may come into question.

In this case, based on our review of the material, the ALM study is potentially vulnerable given the simplifying assumption about the nature of the liabilities (nominal vs real). Given this reality, it is important to understand the implications of that assumption.

The liability modeling "simplification" does not just impact the apparent attractiveness of Real Return Bonds as an asset class. It also impacts the return/risk relationships for all assets, and therefore the relative attractiveness of all asset classes - with particularly notable impacts on other real assets (i.e. real estate and infrastructure). Given the liability assumptions used in the ALM study, it appears that the model will "prefer" nominal bonds, and will tend to not prefer RRBs, real estate and infrastructure. That is a material outcome related to three asset classes.

If different liability assumptions were used, it is possible that alternative portfolio compositions would have been recommended. This is central to Issue 21 being examined by the PUB.

As noted above, IRs CAC 1-85(g) and 1-84(f), along with the other sub-parts to those IRs, are attempting to test whether the assumptions and constraints imposed in the Mercer's ALM study were appropriate. Specifically:

- Were **liabilities** modeled as accurately as possible (by including RRBs in the liability benchmark portfolio)? If not, this can make RRBs (as an asset class) look inferior to nominal bonds, which means the model will not like RRBs as much as nominal bonds. A more subtle but important point is that the liability modeling assumption makes other real asset classes (like real estate and infrastructure) look less attractive too, not just RRBs. The liability benchmark portfolio definition is fundamental to the whole analysis.
- Were **RRBs (as an asset class)** inappropriately excluded from consideration as an asset class to consider (constrained weight = 0%)? If so, this can bring into question the results of the ALM study.

In terms of issues relating to inflation, CAC Manitoba notes that inflation is not completely flat (some volatility) in the MPI projection models, and time horizon may be too short (5 years versus decades). However, this was not modeled, and models are very sensitive to assumptions.

A Response to IR 84 f) and 85 g) by Mercers is the most cost effective way to obtain reliable information

We note that CAC Manitoba and its consultants could do the analysis, using the first method of single period optimization to get efficient frontiers, for less than $10,000 by downloading an Excel optimization model from the web and using Mercer's capital market assumptions as inputs to the model. However, there are two difficulties with this option that would likely make it more efficient for MPI/Mercer's to conduct the analysis:

1. MPI and the PUB would likely want to check our calculations, and it is possible that Mercer's would decide to do the analysis themselves directly and compare the results; and
2. We cannot replicate the second method (multi-period scenarios), at least not without a lot more work/cost, and assumptions could differ from those that were actually used by Mercer under the Nominal approach. Based on our review of the material, the second method was likely the basis for the final decision (the first method being "preliminary" to start eliminating some asset classes and adding others to the study).

Conclusion

Thank you for your consideration of this motion.

Yours truly,

BYRON WILLIAMS
DIRECTOR

BW/vs

2

PUBLIC
INTEREST
LAW
CENTRE

CENTRE
JURIDIQUE
DE
L'INTÉRÊT
PUBLIC

AN INDEPENDENT
SERVICE OF
LEGAL AID
MANITOBA

L'AIDE JURIDIQUE
DU MANITOBA

SUPPORTED BY
LEGAL AID MANITOBA
THE
MANITOBA LAW
FOUNDATION
AND MEMBERS
OF THE
MANITOBA
BAR
ASSOCIATION

200 – 393 PORTAGE AVE
WINNIPEG, MANITOBA
R3B 3H6

TEL: 204.985.8640
FAX: 204.985.8644

E-MAIL: centre@pilc.mb.ca

Writer's direct line: (204) 985-8533
Email: bwilliams@pilc.mb.ca

August 15, 2018

The Public Utilities Board of Manitoba
Attention: Mr. Darren Christle
Executive Director and Board Secretary
400-330 Portage Avenue
Winnipeg, MB R3C 0C4

Dear Mr. Christle:

Re: MPI GRA 2019/20 additional materials relied upon in support of motion to compel responses to information requests 84 f) and 85 g)

Pursuant to Rules 15, 16 and 22 of the PUB *Rules of* Practice, CAC Manitoba is providing notice that in support of its motion to compel responses to information requests 84 f) and 85 g), it intends to rely on the assertions made in its motion as well as the following additional information:

- Excerpts of Pre-filed evidence of Mr. Valter Viola (September 26, 2016) in the 2017-18 General Rate Application - p. 16, 17,18 which highlight his opinion on the importance of establishing a minimum risk portfolio as a proxy for the liabilities of MPI that appropriately models: 1) real interest risk and, ii) inflation risk - p. 41 which identifies the concerns of Mr. Viola about the widely known sensitivy of optimization model results to their base assumptions;
- October 2006 article of Mr. Viola at www.benefitscanada.com which was filed as part of Mr. Viola's qualifications during the 2017/18 GRA and which details the appropriate elements of a risk strategy framework including the potential role of real return bonds in terms of reducing risks;
- October 2016 Power Point filed in support of Mr. Viola's oral evidence - p. 3 which highlights his opinion that the MPI portfolio provides poor liability protection against unexpected inflation and real rate risk - p. 10, 15, 16 and 22 which discuss the role of real return bonds - p. 29 – 35 which highlight the vigourous debate in the 2017-18 GRA proceeding regarding real interest rate risk and inflation risk - p. 46 which focuses on the sensitivity of asset allocation models to assumptions;
- *Order 162/16* - p. 44, 45 and 50 which highlight the qualifications of Mr. Viola as well as the ongoing debate about whether MPI is assuming an undue level of risk for an inadequate return due to its failure to appropriately hedge against real interest rate risk and inflation risk in its portfolio; and
- Response to CAC Manitoba IR I-84 c) which confirms that the basis for making the simplying assumptions uses a five year horizon;

The intent of this material is:

i) to establish that the debate over the appropriate approach to real interest rate risk and inflation risk is a long standing one before the PUB in which the opinion of the independent expert of CAC Manitoba versus the position taken by MPI has differed; and,

ii) given the sensitivity of optimization models to long term assumptions including volatility around the mean inflation rate, to identify the real possibility that the optimized portfolio would have had a materially different look if it was based upon a minimum risk portfolio (liability proxy) that reflected the real interest rate and inflation sensitivity of the underlying liabilities.

Rather than filing these materials in their entirety this evening and to assist the PUB, MPI and Intervenors in reviewing this material, CAC Manitoba will provide a electronic version of the excerpts of these materials tomorrow including an index and page numbers.

Thank you for your consideration of these materials.

Yours truly,

BYRON WILLIAMS
DIRECTOR

BW/ab

cc: Board Counsel
Manitoba Hydro
Approved Interveners

3

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

September 26, 2016

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.

4

PRACTICAL alternative

Plan sponsors need to consider risk-based budgeting as a way to weather economic and stock market turbulence.

By Valter Viola

In 2000, Nortel Networks represented an 'index-distorting' one-third of the TSE 300 Index, creating undue risk for many funds. Some funds managed this risk by underweighting Nortel, which created active risk relative to their policy portfolio. Others chose a policy response, adopting a capped index that limited how much could be invested in a single stock. Both the active management and policy responses were band-aid solutions that treated the symptom of undue risk, but not the problem. The underlying problem was that asset-based processes—those that set target weights and minimum/maximum position limits, although simple, had become less effective in dealing with today's complicated and evolving portfolios.

A more effective and timely way to deal with the Nortel problem would have been to adopt a risk-based approach to portfolio management. Such an approach would have involved measuring risk more frequently, setting limits on risk and rebalancing the portfolio based on risk/return assessments rather than asset mix targets. In its 2001 annual report, the Canada Pension Plan Investment Board described how it avoided more than $500 million in potential losses, on average assets of $5 billion, related to Nortel through a "risk management initiative" that moved the fund from passive to "partially active" investing. It's remarkable how uncommon this approach was at the time, and still is, but that's about to change.

THE PROCESS

Risk budgeting is the process of allocating risk in an explicit way. Like all budgeting processes, it allocates a scarce resource (risk) to meet an objective (maximize returns). It has the same goal as asset-based processes, but that's where the similarities end. In risk budgeting, the focus is on risk and return, and the asset mix is a by-product. For asset-based processes, it's the other way around—the focus is on assets and returns.

Companies that define their processes in terms of "why" (objectives) rather than "how" (means) are more likely to evolve with changing times. That's why XEROX calls itself a document management company—not a company that makes photocopiers. It's also why risk budgeting is better than asset-based processes. Risk budgeting acknowledges that a constant asset mix has a changing risk profile (as the Nortel example illustrates) and that rebalancing should be based on risk and return assessments, rather than asset weights.

Another costly asset-based constraint is the "long-only" constraint, which imposes a minimum (0%) and maximum (100%) allocation to assets. The constraint is designed to mitigate potentially large losses from short selling. The large cost of the constraint, which is widely acknowledged, could be reduced if risks were controlled directly using risk-based limits.

The popular 50% currency hedge ratio represents a further asset-based constraint that may impose a cost. If

hedge ratios are limited to be between 0% and 100%, the selection of 50% is convenient for those who want to maximize the room for active management. Unfortunately, having the same hedge ratio for all currencies may not be optimal in the long term. It may be the case—depending on a fund's liabilities—that certain funds should adopt different hedge ratios for different currencies, just as they have different asset allocations for different asset classes.

PROS AND CONS

Asset-based processes have one redeeming quality. They're simple. A typical process might involve finding the asset mix that meets a return objective, while minimizing surplus at risk (the risk that assets rise less than liabilities). Unfortunately, the process is too simple. The surplus at risk and active risks that flow from this process might be discussed, but these risks are not reviewed and updated regularly to reflect changes in market conditions. As a result, those who manage and oversee the fund are less likely to appreciate the dynamics of the risks that the fund takes through time. The greater focus on returns (rather than risk) provides a false sense of comfort—especially when you consider that returns are less predictable than risks. When bad things happen, as they surely will, a frequent reaction is one of shock—at either the severity or frequency with which certain losses occur.

Risk-based processes are harder to understand, but are more effective and will result in higher risk-adjusted returns (more efficient portfolios) because better (risk) measurement will lead to better (risk) management. Processes that rebalance based on risk assessments relative to return expectations will avoid undue risk more often than processes that rebalance based on fixed asset targets.

To implement risk budgeting in practice, pension funds need to answer at least five questions:

1. What risks should we manage?

2. How much return do we need for risks that we take?

3. How much risk is too much?

4. Where should we take risk?

5. Did we get paid enough for the risks we took?

The answers to these questions could flow from a risk management framework that provides a link between a fund's investment strategy and its mission, values and beliefs. Such a risk framework should include at least five elements:

- A **minimum risk portfolio** (MRP) that becomes the primary benchmark for assessing risk and performance.

- A **cost of risk capital** that acknowledges risk as a scarce resource that has a cost (risk premium), and that a higher return is required for activities that involve incrementally higher risk.
- **Risk limit(s)** that replace, or at least supplement, asset-based limits that are too costly and inconsistent in their treatment of different portfolios over time.
- A **risk budget** that allocates the target level of risk to various assets and managers to produce a required return in the most efficient way possible.
- An **assessment process** that measures economic value added that takes into account returns and risk on a regular basis (i.e. monthly or quarterly).

The MRP is the policy portfolio if risk budgeting is applied to active management. For surplus management ("liability-driven investing"), the MRP is the liabilities, as represented by a portfolio of securities (mostly fixed income).

The cost of risk capital might depend on the equity risk premium, in the case of surplus management. In an active management context, the cost of risk capital at the total portfolio level would depend on the number of active programs and their size.

A starting point for developing risk limits is to calculate what surplus and active risks are implied by the current portfolio. In other words, calculate what the maximum surplus and active risk would be using the asset-based policy targets and minimum/maximum limits as constraints. A typical 60/40 asset mix, for example, might have a surplus at risk of 11%—one year in 10 or 10% of the time, assets might be expected to grow less than liabilities by 11% or more. One year in 100 or 1% of the time, assets might underperform liabilities by 22% or more. The active risk limits implied for the total portfolio would depend on the range of the minimum/maximum bands for asset classes and the extent to which active management is pursued within asset classes and other activities.

Funds that applied risk budgeting processes in the past few years were probably less surprised (or not at all surprised) by the severity and frequency of losses during the recent "perfect (pension) storm", where assets did poorly and liabilities rose with falling real interest rates. Such funds were likely better prepared for the storm and may have decided to react differently once the storm subsided.

The risk budget is the risk-based equivalent of a target allocation, except that the allocation is expressed in terms of risk rather than assets. This can be presented in many ways but the most informative way is to measure and compare the impact of small changes in asset allocations on both risk and return. A risk budget presented on a surplus basis might have shown Nortel contributing a great deal of risk in 2000—more than could be justified by any reasonable

return expectation for the stock. That risk budget might also have shown that real return bonds looked very attractive because they reduced risk much more than they reduced expected returns, given their low allocation in most portfolios.

The assessment process involves measuring risk as frequently as returns. Ideally, someone is held accountable for this performance by linking risk-adjusted performance to compensation. This is easier said than done, and it's easier to do in an active management context, where correlations are low, than surplus management ("liability-driven investing" or LDI), where correlations are higher. Why is it harder for LDI? Because LDI is the ultimate team sport—where individual specialists (fixed income) may be asked to play a total portfolio game.

Canada's two largest DB plans, the Ontario Teachers' Pension Plan and the Canada Pension Plan Investment Board, have applied these frameworks and processes in managing both surplus and active risk. But is it time for smaller plans to implement risk-based processes? Maybe. The benefit of doing so increases over time as portfolios become more complex. In 1990, the average Canadian DB plan had two-thirds of its assets in fixed income. Portfolio management was easier because two asset classes (Canadian stocks and bonds) represented 90% of the portfolio. Today, half of the bonds (about one-third of the total portfolio) is in other, more complex, assets—a fact that makes risk measurement much harder.

Fortunately, the costs of maintaining the risk systems and data needed to implement risk budgeting in practice are falling. They're still big, but much smaller than the cost associated with undue risk—risk that is higher than it has to be or risk that is not well understood and which could lead to poor portfolio choices.

We may have reached the point where smaller funds have the comparative advantage over larger funds when it comes to risk budgeting. When the Canada Pension Plan avoided large losses on Nortel in 2000/01, its investment department consisted of two people—the chief executive officer and its vice-president of research and risk management. Today, this fund—with closer to two hundred people than two—would have more resources at its disposal than in 2000, but it would have other challenges to overcome if it were to implement risk budgeting from scratch. Portfolio management is a team sport and no paradigm shift is ever easy, but having fewer cats to herd makes it easier. **BC**

Valter Viola is president of Holland Park Risk Management Inc. in Toronto. vviola@hollandpark1.com

5

holland park

TESTIMONY

Manitoba Public Insurance
2017/18 GRA

Valter Viola
President, Holland Park
vviola@hollandparkrisk.com
416 819 2307

holland park

SYMPTOMS VS PROBLEMS

SYMPTOMS	SHAKY GOALIE	**No Real Return Bonds** • Poor liability protection against unexpected inflation, real rate risk • Less effective duration management
	PUCK HOG	**Canadian Equities** • Larger-than average home bias • Concentrated sectors/stocks
	SHORT-HANDED	**No International Equities** • Missed opportunities to add value, diversify portfolio
PROBLEMS	FOCUS	**Short-term Rate Stability** • At cost of lower long-term level
	PROCESS	**"Smoothed" Accounting** • Rather than "volatile" market value **Asset-Based Rebalancing** • Rather than risk **A-L Studies Every 4 Years** • Rather than annual/quarterly risk-informed discussions

BARRIERS TO EXCELLENCE

REMEDIES →

FRAMEWORK

RISK BUDGETING

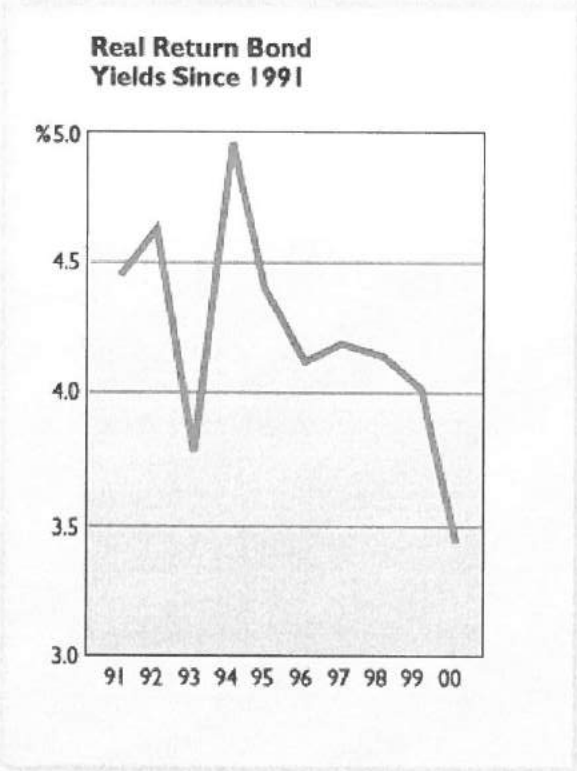
FRAMEWORK

- Provides FOCUS (barrier to excellence)
- Context, cohesion, link between vision, mission, objectives and strategies

Example

- Want to earn actuarial (real) rate, which no asset guarantees
  - Closest: RRBs yielding < actuarial rate
  - Take risk to maximize returns
- Avoid undue risk, be paid for risks taken
- Measure/attribute risks to sources, improve understanding/management

MATCHING ASSETS AND LIABILITIES



Real return yields declined by 59 basis points in 2000, after remaining within a 10 basis point range for the three previous years.

Source: Teachers' 2000 Annual Report, page 19

MATCHING ASSETS AND LIABILITIES

To create a funding surplus we manage the relationship between investment assets and pension liabilities. Our goal is an asset mix that balances risks and rewards, avoids excessive volatility, and maintains stable contribution rates.

Because both assets and liabilities are sensitive to interest rate changes, one of our goals is to reduce the risk that liabilities will increase more than assets in response to lower real interest rates. Unfortunately, that is what happened in 2000. The sharp decline in real rates of return increased the value of total liabilities by $3 billion. During the year, we shifted assets from fixed-income and equity portfolios to real-rate products and real estate. Debt securities, along with inflation-sensitive assets, outperformed total equities to produce the healthy accounting surplus.

MRP AND RRBS

holland park

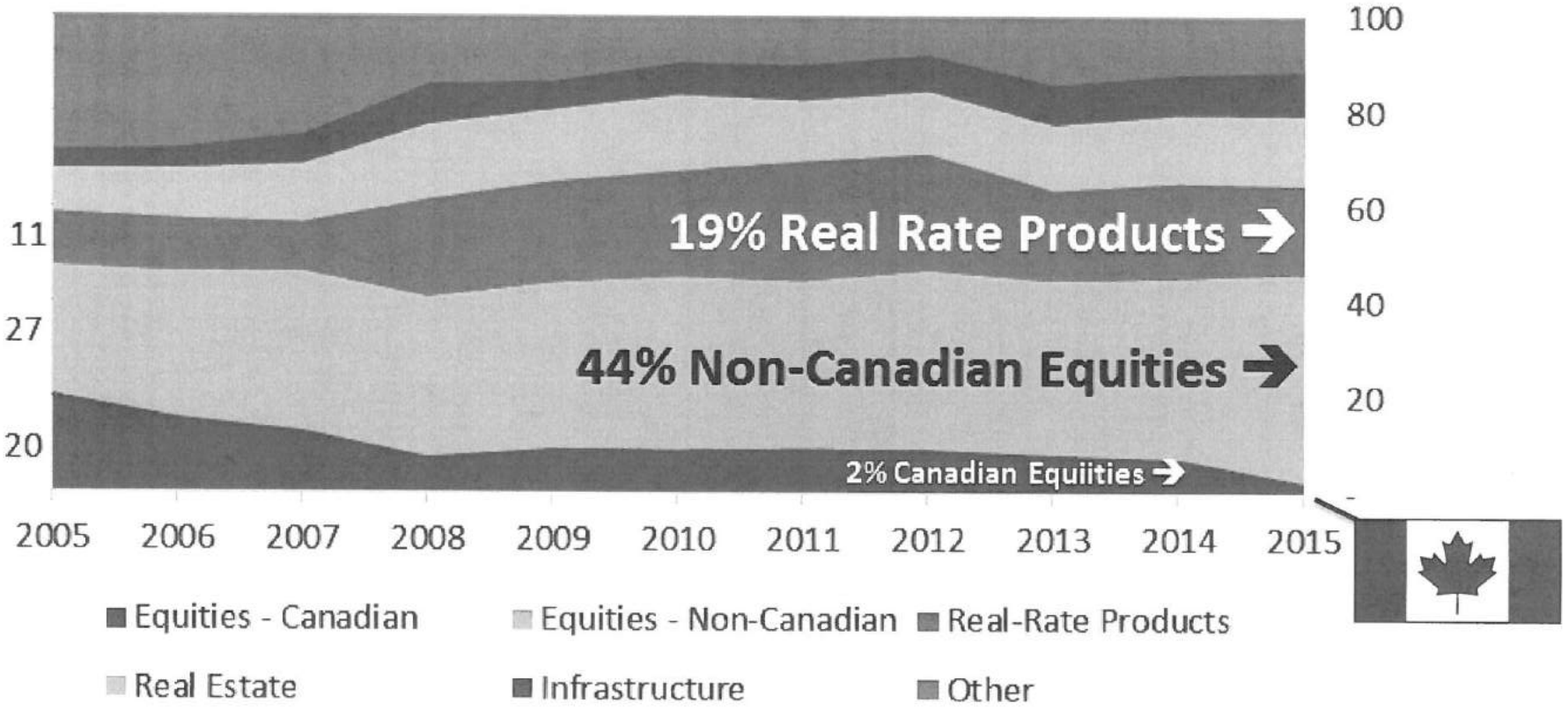
- Some liabilities resemble RRBs (zero-coupon real cash flows)
- RRBs could closely match risks in real liabilities
- "Insurance" cost varies with yield
- Nominal bonds only good fit if inflation stable

Tendency to ignore portfolio risk interdependence

- Assets risky in isolation, safer when combined with other assets/liabilities (long RRB duration risky on its own, not with long liabilities)
- Diversification makes management a team sport: appetite to take risk in one asset depends on risks in other assets and liabilities

TEACHERS' IN 2015

Teachers' RRBs = 19%, Non-Canadian Equities = 44%, Canadian Equities = 2%



Source: Graphed using data from Teachers' 2015 Annual Report, page 71

holland park

10. MINIMUM RISK PORTFOLIO

minimum risk portfolio ... should be ... defined ... aligned with ... stakeholders ...

- MRP should reflect risk in cash flows re: insurance, pension and other liabilities (e.g., real rates, inflation)
- MRP should include some RRBs
- MRP definition ("benchmark" for risk and surplus growth) says nothing about whether to buy RRBs

holland park

14. EXCLUSION OF REAL RETURN BONDS

role that RRBs can play in ... managing ... risks should be discussed, with consensus ... regarding ... effectiveness ... from a risk ... perspective ... independent of ... cost of ... "insurance" ... measured by RRB yields and ... expected returns

- Consensus should be achieved on RRB's effectiveness in hedging liability risks (insurance vs pensions) compared to other assets (e.g., cash, "nominal" bonds, real estate, infrastructure) on a market value basis
- Consensus should be achieved on RRB's efficiency in a total portfolio context, and on a market value basis

MPI'S VIEW

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.**

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

MPI'S VIEW

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."*

AON'S VIEW

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.**

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

MY VIEW

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).

AON AGREES

holland park

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.**

15. EFFECTIVENESS OF DURATION POLICY

duration policy should be reviewed, given ... inherent risks of changing real ... rates and ... inflation ..., and exposure to ... nominal ... rates in ... portfolio (... bonds without inflation protection)

- MPI agrees that duration matching is not as effective if inflation turns out to differ from expectations
- "Accepted short term inflation risk and ... accounted for risk through margins and reserve"
- "Excess portfolio was designed to provide some protection against inflation"

holland park

13. NO OVER-RELIANCE ON QUANTITATIVE MODELING

be vigilant about ... over-reliance on quantitative considerations, given ... high sensitivity of optimal asset allocations to ... assumptions (returns, volatilities and correlations) and ... large number of inputs	
44 Assumptions	• 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" Source: Evidence, page 41
A-L Studies Every 4 Years	• Too infrequent, considering "dynamic risks" in static asset mix

6

Public Utilities Board

Régie des services publics

Order No. 162/16

MANITOBA PUBLIC INSURANCE CORPORATION (MPI OR THE CORPORATION): COMPULSORY 2017/2018 DRIVER AND VEHICLE INSURANCE PREMIUMS AND OTHER MATTERS

December 15, 2016

BEFORE: Robert Gabor, Q.C., Chair
Karen Botting, B.A., B.Ed., M.Ed., Vice Chair
The Hon. Anita Neville, P.C., B.A. (Hons.), Member
Allan Morin, B.A., ICD.D., Member

allocation. Proceeding in this manner would ensure that growth portfolio was not entirely in illiquid assets and that it had some diversification into more liquid asset classes.

As observed by AON, duration matching of investments and claims liabilities would not mean that net income is fully immunized against interest rate changes, as only average durations are being matched, not the cash flows underlying those durations. Also, over 35% of the fixed income portfolio supporting the interest rate sensitive claim liabilities was invested in non-marketable (i.e. MUSH) bonds, which are not interest rate sensitive and do not fluctuate with changes in interest rates. This large investment in non-marketable bonds would make it difficult for MPI to fully protect at the Basic level its net income exposure to changes in interest rates.

MPI implemented the ALM duration matching at the Corporate level, as it provides a better risk versus return profile. The Corporation indicated that undertaking the matching at the Basic level would increase the indicated rate increase in this Application from the initially proposed 2% to 3.7%.

The Corporation stated that fully matching the duration of the fixed income portfolio and claims liabilities does not completely eliminate all interest rate risk to the Corporation, nor would it eliminate what it considered to be the need for an IRFRF. In the Application, the Corporation stated that the net interest rate impact was $16.0 million on average over the rating years, compared to $18.1 million using last year's assumptions, a $2.1 million difference.

Mr. Valter Viola was called as an expert witness in the hearing, on behalf of CAC. Mr. Viola is a Chartered Financial Analyst and holds a Masters in Business Administration and a Bachelor of Commerce degree. He provides consulting services to institutional investors, Boards, Investment Committees and Management Teams on investment strategies and investment risk management. The focus of Mr. Viola's evidence, and his report filed as an exhibit in the GRA, was to discuss investment portfolio management and the risk/reward framework, and to provide several recommendations related to MPI's investment portfolio design. Mr. Viola was qualified to give evidence in the hearing as an expert in (1) investment portfolio management; (2) investment portfolio research, economics and risk management; and (3) quantitative asset liability modelling.

Mr. Viola questioned the reliance on accounting metrics based on net income, which metrics were used by AON for the asset portfolio design for MPI. Those metrics would not capture

changes in the market value of material assets such as equities or MUSH bonds, or changes in the value of pension liabilities. Mr. Viola recommended that MPI make elections that minimize the discrepancy between net income and comprehensive income for asset/liability modelling purposes, even if only on a notional basis.

Mr. Viola also recommended that MPI redefine return risk, to inform its long-term asset mix decisions based on valuations that reflect market values rather than accounting values, which may be materially different. Regardless of the accounting convention, for portfolio management and asset mix decision making, according to Mr. Viola, there needs to be an adjustment to assets and liabilities to the extent that the accounting is not market-value based.

Mr. Viola also questioned the high concentration of Canadian equities in the Corporation's portfolio. Mr. Viola indicated that international diversification was important to Canadian investors given the concentrated nature the Canadian Market with three (of ten) sectors in Canada where Financial Services, Energy and Materials represent a very large portion of the Canadian market. He noted that MPI had no investments in international equities, a large part of the global market. He further stated that there is a potential for missed opportunities to add value, have higher returns, and to diversify the portfolio. Mr. Viola stated his belief that through its focus on short-term rate stability, MPI is losing the opportunity for long-term lower premium rate levels.

4.5. Investment Income Forecasting

At the 2014 GRA, the Corporation proposed a new methodology to forecast its investment income. This methodology measured the impact of interest rate changes on investment income and claims liabilities, whereas the methodology employed by the Corporation previously did not do so. MPI now models changes in the fair market value of its marketable bonds and the changes to bond values flow through Basic's net income because those assets are categorized as Fair Value Through Profit and Loss. Basic's operating results are very sensitive to interest rate changes, including the timing and the amount of the interest rate changes. Because it is difficult to predict the amount and timing of assumed interest rate changes, Basic net income is very difficult to forecast accurately.

4.6. *Interveners' Positions*

CAC

CAC suggested that Mr. Viola's recommendations regarding the Corporation's investment portfolio be given a significant amount of weight. The AON ALM study, according to CAC, has limited utility in allowing the Corporation to make portfolio decisions, given the return/risk metrics and excessive constraints, and remarked that Mr. Viola's evidence was that he viewed the ALM study as understating the risks of the Corporation, being market risks. CAC stated that the weight assigned to Canadian equities in the Corporation's portfolio is not consistent with evidence of the historic advice of experts. CAC asked the Board to find there is reason to be concerned the Corporation's portfolio is not adequately protected against interest rate risk. Furthermore, an emphasis by MPI on short-term rate stability leads to an excessive level of risk for the investment returns gained. CAC followed Mr. Viola's evidence, that one should look to the use of Real Return Bonds as a starting point for a benchmark portfolio with minimum risk. CAC noted that one of the factors of a major loss in the Corporation's investment portfolio was a $28.5 million write-down in Canadian equities. Accordingly, CAC argued that MPI is putting itself at risk by being too heavily weighted in favour of Canadian equities.

With all of that in mind, CAC argued that a new ALM study is required. CAC expressed concern that undue risk is being placed on Manitoba consumers as a result of investment portfolio selections. The ALM study conducted by AON in 2014 was based on accounting metrics which were driven by concern with short-term volatility, and Accumulated Other Comprehensive Income (AOCI) was excluded from the metrics. As a result, as stated by Mr. Viola, MPI's portfolio design is being driven by inappropriate selection of risk and return metrics, understating the risk, and unduly constraining the portfolio outcomes.

On the issue of interest rate forecasting, CAC stated that interest rate forecasting has been challenging since the financial crisis of 2008. CAC argued that the Naïve forecast should not be adopted as a sustainable best estimate, and that it could not find a precedent for the 50-50 forecast proposed by the Corporation. CAC stated that the evidence in the hearing did not favour reliance on the 50-50 forecast, and that the SIRF should be adopted. CAC argued that the Corporation had not met its onus to establish that the 50-50 interest rate forecast is the best estimate.

7

CAC (MPI) 1-84

Part and Chapter:	**PART VI INV**	**Page No.:**	**1459-1462; 1654; 1755; 1749; 1765**
PUB Approved Issue No:	**21. Asset Liability Management Study**		
Topic:	**CAC's 18 Recommendations**		
Sub Topic:	**Recommendation #13. No Over-Reliance on Quantitative Modeling**		

Preamble to IR (If Any):

Recommendation #13

> 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.

Mercer's response:

> Mercer agrees that investors should not rely solely on quantitative modeling. The ALM process began with projections of the risk, return, and correlation of a variety of asset classes. **The ALM process concluded with a thorough discussion of practical considerations and observations regarding the current market environment.**

On page 1,654, Mercer said:

> While quantitative models can be instructive and useful, we very much agree that investors should never rely solely on quantitative modeling ...

Capital Market Assumptions for the Liability Benchmark

Page 1,765 (INV Appendix 17, Attachment A) shows the assumptions related to the components of the liability benchmark, which CAC summarized below (Basic and Pension only).

	Components of Liability Benchmarks	Return	SD
1	Treasury Bills	1.50%	1.50%
2	Short-Term Provincial Bonds	2.40%	3.50%
3	Mid-Term Provincial Bonds	3.00%	6.50%
4	Long-Term Provincial Bonds	3.30%	8.50%
5	Long-Term Corporate Bonds	4.20%	8.50%
6	Real Return Bonds	3.00%	7.50%

	Correlations					
	1	2	3	4	5	6
Treasury Bills	1.00					
Short-Term Provincial Bonds	0.31	1.00				
Mid-Term Provincial Bonds	0.02	0.87	1.00			
Long-Term Provincial Bonds	(0.14)	0.61	0.89	1.00		
Long-Term Corporate Bonds	(0.38)	0.14	0.51	0.69	1.00	
Real Return Bonds	(0.19)	0.39	0.65	0.70	0.62	1.00

The significant difference between the nominal and real bases are shown below for both Basic and Pension liabilities.

	Basic			Pension		
	Nominal	**Real**	Diff	Nominal	**Real**	Diff
Treasury Bills		**26**	26	- 17	**- 11**	6
Short-Term Provincial Bonds	28	**8**	- 20			-
Mid-Term Provincial Bonds	18		- 18			-
Long-Term Provincial Bonds	54		- 54		**30**	30
Long-Term Corporate Bonds			-	117		- 117
Real Return Bonds		**66**	66		**81**	81
	100	**100**	-	100	**100**	-

The GRA included many efficient frontiers using the **Nominal** Liability Benchmark, showing for example, the effects of adding different asset classes one step at a time ("stepped approach") so the effects on return/risk could be seen. (Fewer such analyses were provided using the **Real** Liability Benchmark, and no "steps" were shown in the GRA on this basis.)

The table below shows how material the Liability Benchmark decision is on return/risk and asset allocation. (The supporting tables, A to C, are on the next two pages. They show the different implications reported by Mercer arising from the selection of a different Liability Benchmark – i.e., nominal vs. real).

Table	Content	Materiality of Liability Benchmark Choice
A	**Table A shows return/risk metrics** for a portfolio that has the same expected return as the current portfolio (~ 4.2%), but is more efficient than the current portfolio (i.e. less risk); **The asset allocations** are also shown	The main difference between the optimizations relates to the inclusion of **RRBs in the portfolio under the real optimization**; The total fixed income allocation is the same (~ 75%) under both real and nominal optimizations
B	**Table B shows the current portfolio's return/risk metrics**	n/a
C	**Table C shows the improved efficiency** (less risk, same return) of the optimized portfolio, compared to the current portfolio (i.e. C = A minus B)	**Surplus volatility falls more when the real liability proxy is used (1.1% risk reduction, rather than 0.4%)**

B	**Current Portfolio**	Real	Nominal
	Expected 10-Year Return:		
	Portfolio	4.2	4.2
	Liability Benchmark Portfolio	2.4	2.8
	Excess Return	1.8	1.4
	Anticipated Surplus Volatility	4.9	5.0
	Excess Return/Anticipated Surplus Volatility	0.37	0.28
	Information Ratio (Return/Risk)	0.37	0.27
	Difference	- 0.00	0.01

C	**Improved Efficiency (Same Return)**	Real	Nominal	C = A - B
	Expected 10-Year Return:			
	Portfolio	-	0.1	No change in return (except rounding)
	Liability Benchmark Portfolio	-	-	
	Excess Return	-	0.1	
	Anticipated Surplus Volatility	**- 1.1**	**0.4**	More measured risk reduction with Real Liability
	Excess Return/Anticipated Surplus Volatility	0.11	0.00	
	Information Ratio (Return/Risk)	0.11	0.03	
	Difference	- 0.00	- 0.03	

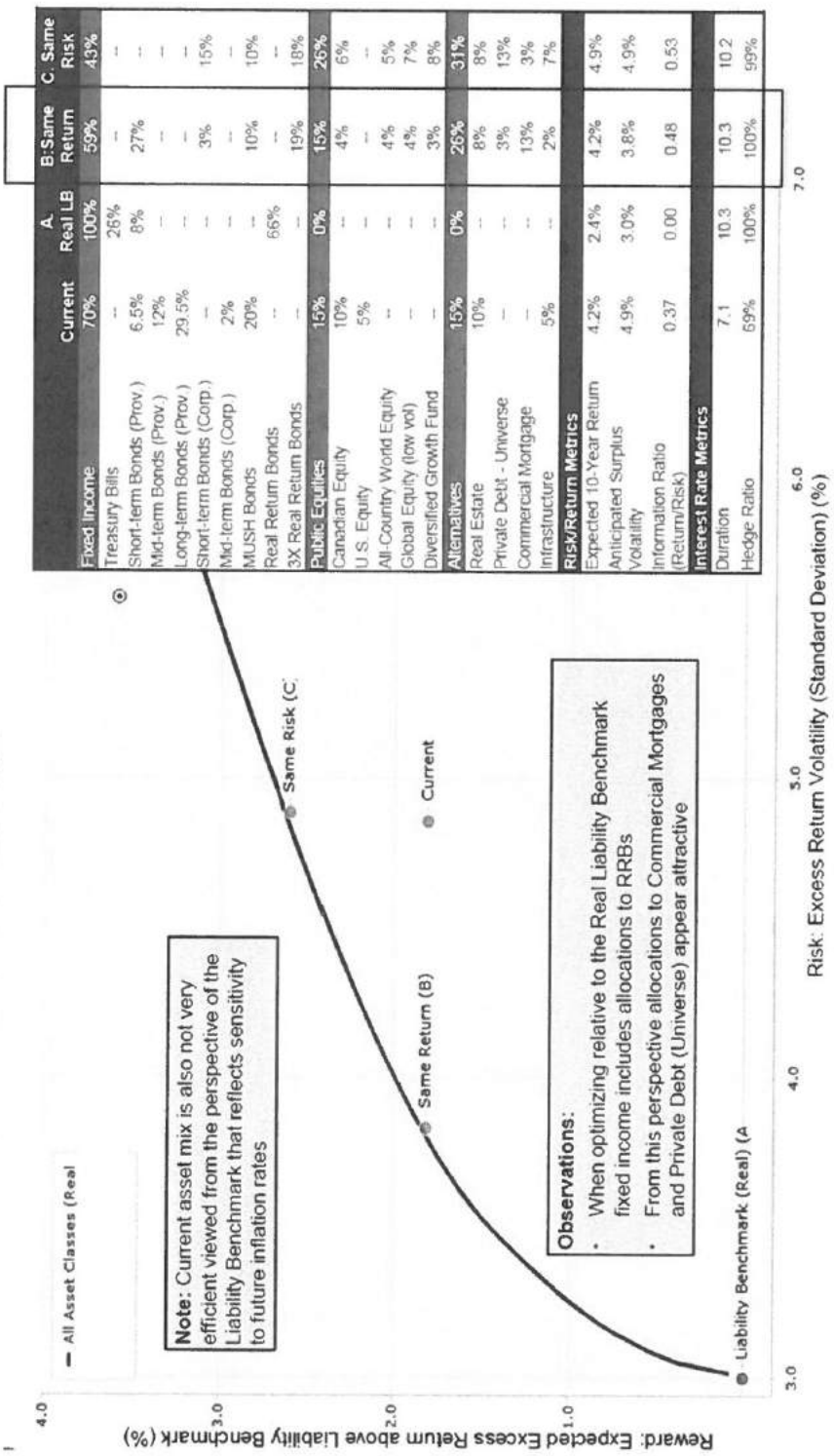
The source for the above data is on the following two pages.

"Real" Liability Benchmark (page 1,755)

2019 GENERAL RATE APPLICATION
INV Appendix 17
Attachment A

June 15, 2018

EFFICIENT FRONTIERS (MINIMALLY CONSTRAINED)
REAL LIABILITY BENCHMARK



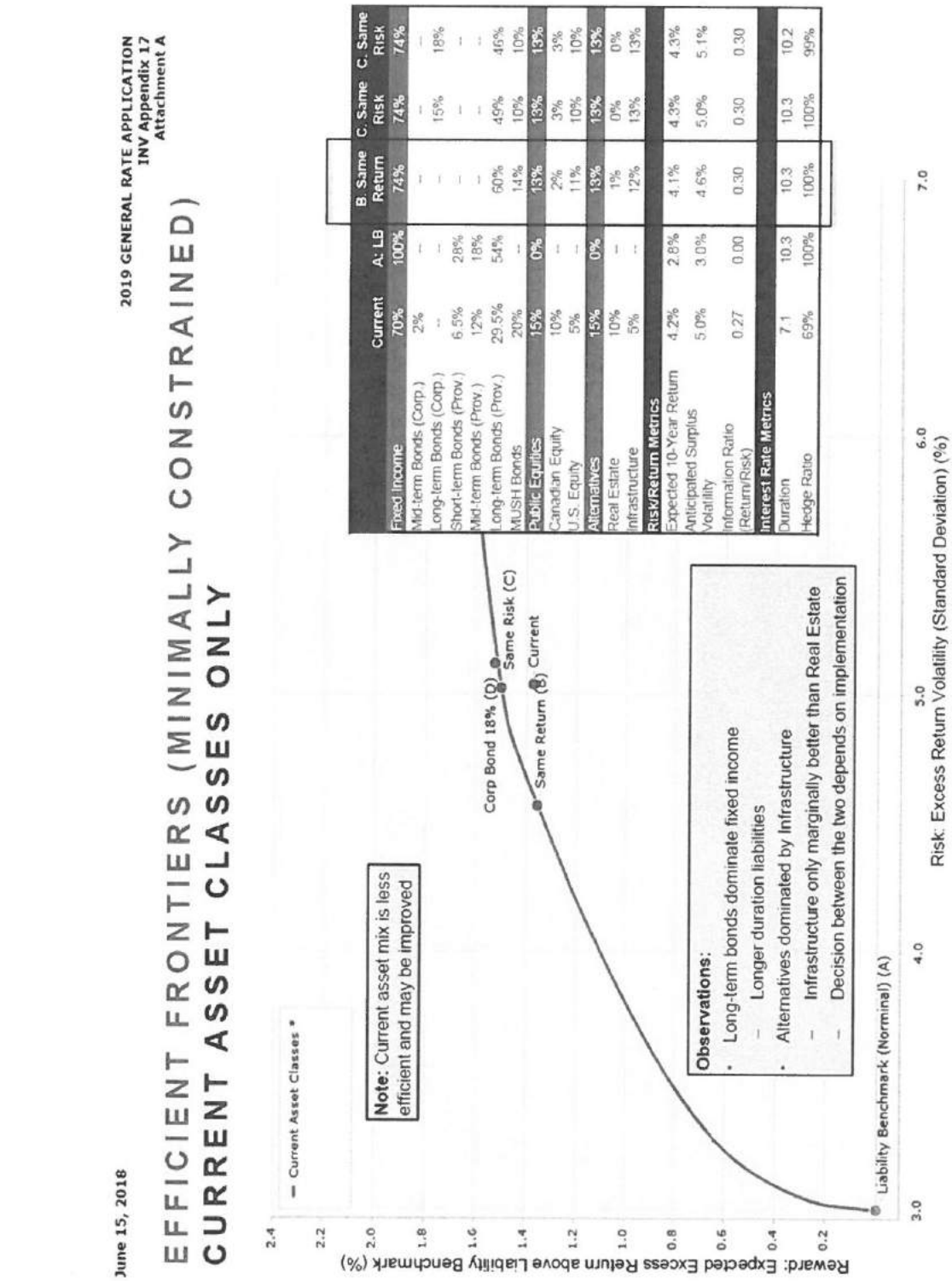
	Current	A. Real LB	B:Same Return	C. Same Risk
Fixed Income	70%	100%	59%	43%
Treasury Bills	--	26%	--	--
Short-term Bonds (Prov.)	6.5%	8%	27%	--
Mid-term Bonds (Prov.)	12%	--	--	--
Long-term Bonds (Prov.)	29.5%	--	--	--
Short-term Bonds (Corp.)	--	--	3%	15%
Mid-term Bonds (Corp.)	2%	--	--	--
MUSH Bonds	20%	--	10%	10%
Real Return Bonds	--	66%	--	--
3X Real Return Bonds	--	--	19%	18%
Public Equities	15%	0%	15%	26%
Canadian Equity	10%	--	4%	6%
U.S. Equity	5%	--	--	--
All-Country World Equity	--	--	4%	5%
Global Equity (low vol)	--	--	4%	7%
Diversified Growth Fund	--	--	3%	8%
Alternatives	15%	0%	26%	31%
Real Estate	10%	--	8%	8%
Private Debt - Universe	--	--	3%	13%
Commercial Mortgage	--	--	13%	3%
Infrastructure	5%	--	2%	7%
Risk/Return Metrics				
Expected 10-Year Return	4.2%	2.4%	4.2%	4.9%
Anticipated Surplus Volatility	4.9%	3.0%	3.8%	4.9%
Information Ratio (Return/Risk)	0.37	0.00	0.48	0.53
Interest Rate Metrics				
Duration	7.1	10.3	10.3	10.2
Hedge Ratio	69%	100%	100%	99%

"Nominal" Liability Benchmark (page 1,749)

2019 GENERAL RATE APPLICATION
INV Appendix 17
Attachment A

June 15, 2018

EFFICIENT FRONTIERS (MINIMALLY CONSTRAINED)
CURRENT ASSET CLASSES ONLY



	Current	A: LB	B. Same Return	C. Same Risk	C. Same Risk
Fixed Income	70%	100%	74%	74%	74%
Mid-term Bonds (Corp.)	2%	--	--	--	--
Long-term Bonds (Corp.)	--	--	--	15%	18%
Short-term Bonds (Prov.)	6.5%	28%	--	--	--
Mid-term Bonds (Prov.)	12%	18%	--	--	--
Long-term Bonds (Prov.)	29.5%	54%	60%	49%	46%
MUSH Bonds	20%	--	14%	10%	10%
Public Equities	15%	0%	13%	13%	13%
Canadian Equity	10%	--	2%	3%	3%
U.S. Equity	5%	--	11%	10%	10%
Alternatives	15%	0%	13%	13%	13%
Real Estate	10%	--	1%	0%	0%
Infrastructure	5%	--	12%	13%	13%
Risk/Return Metrics					
Expected 10-Year Return	4.2%	2.8%	4.1%	4.3%	4.3%
Anticipated Surplus Volatility	5.0%	3.0%	4.6%	5.0%	5.1%
Information Ratio (Return/Risk)	0.27	0.00	0.30	0.30	0.30
Interest Rate Metrics					
Duration	7.1	10.3	10.3	10.3	10.2
Hedge Ratio	69%	100%	100%	100%	99%

Questions:

a. **Quantitative vs. Qualitative:** To what extent were the results of the **quantitative** analyses relied upon to inform asset allocation decisions (as compared to **qualitative** considerations)?

b. **Practical Considerations:** What "practical considerations", if any, were used to justify the use of a Liability Benchmark based on **nominal** rather than real metrics?

c. **Time Horizon:** What time horizon did the "current market environment" refer to in the concluding phase of the ALM process?
   i. Next 5 years, or less?
   ii. Longer?

d. **Correlations:**
   i. Why do Treasury Bills have a negative correlation with both long-term bonds (Provincial and Corporate) and RRBs?
   ii. What is the significance of these negative correlations on optimal asset allocations, particularly as it relates to treasury bills, long-term fixed income (including RRBs), and the attractiveness of "leverage"?

e. **Basis Risk ("Tracking Error"):** Would MPI and Mercer agree that there is material tracking error* or basis risk between the Nominal Liability Benchmark and the Real Liability Benchmark for:
   i. Basic liabilities?
   ii. Pension liabilities?

   * **Tracking error** measures the standard deviation of the return difference between two groups of assets or liabilities (e.g. actual portfolio vs. benchmark). Basis risk refers to the risk that two portfolios (including liability benchmarks) will experience different performance/growth, arising from imperfect correlations (not = 1.0), for example.

f. **More Detailed Analysis for Real Scenarios:** Was the same "stepped" analysis that was performed using the **Nominal** Liability Benchmark (e.g. pages 1,749 to 1,753) also performed using the **Real** Liability Benchmark?
   i. If so, provide the analysis and commentary (at least for Basic and Pensions).

ii. If not, could a similar analysis and commentary be provided, showing the effect of including RRBs ("minimally" constrained)? (at least for Basic and Pensions)

Rationale for Question:

While MPI and/or Mercer have responded to CAC's 18 Recommendations, CAC respectfully disagrees that certain responses have been "completed in full", as suggested by MPI. Accordingly, CAC has clarifying/additional questions.

Model optimizations are very sensitive to the assumptions (established in 2017 GRA), including assumptions related to the Liability Benchmark used to measure a key metric (surplus risk).

RESPONSE:

Mercer provided the following responses:

a) MPI relied on both quantitative analyses and qualitative considerations to inform asset allocation decisions. From Mercer's perspective, MPI's reliance on both quantitative analyses and qualitative considerations was reasonable and prudent given the situation and consistent with other like investors.

b) During the early stages of the project, MPI advised that they were comfortable with a fixed 2% inflation assumption and that they were less concerned with inflation risk (in particular, the risk of long-term inflation materially exceeding 2%) than nominal interest rate risk (in particular, the risk of buying fixed income securities with duration much shorter than liabilities). Accordingly, it was agreed to model liabilities assuming 2% inflation and utilize a nominal liability benchmark.

c) When the "current market environment" was referred to, it was the next 5 years, or less.

d)

i. Our correlation assumptions are based on analyzing quarterly total returns during the last 2 decades for the respective FTSE TMX bond indices. Treasury Bills have exhibited a consistently negative correlation with both long-term bonds (Provincial and Corporate) and RRBs.

ii. The negative correlations of Treasury Bills with long-term bonds and RRBs were of very little significance, if any, to the recommended portfolios. MPI preferred to manage interest rate risk using physical securities (rather than leverage) for a variety of reasons and the early stages of the Asset Liability Study indicated this was possible.

e) There is tracking error or basis risk any time one uses a portfolio of marketable fixed income securities to proxy liabilities. Whether the tracking error/basis risk is 'material' depends on one's interpretation of what is 'material'. Given MPI's overall risk tolerance, return objectives, modelling budget, asset class constraints and the scope of the project, Mercer is supportive with MPI's decision to make its asset allocation decisions based off of the liability benchmarks analysis used.

f) Please see Rationale for Refusal.

RATIONALE FOR REFUSAL TO FULLY ANSWER THE QUESTION:

Mercer estimates that re-running the modelling of efficient frontiers will take approximately a week, and cost in excess of $20,000. The requested analysis is predicated on inflation forecast assumptions that Mercer and the Corporation rejected, in early stages of the ALM study, as not probable.

In an email exchange with counsel for the CAC, the Corporation suggested it would consider having Mercer conduct the requested analysis if the CAC could provide some evidence that Mercer's inflation forecast used in the ALM study was sufficiently inaccurate, or flawed in some way, so as to call into doubt the results of the ALM study.

As that evidence was not forthcoming from the CAC, the Corporation does not expect the requested analysis to add any meaningful evidence to the record, but will instead satisfy academic interest. When weighed against the costs of having Mercer conduct the analysis, the Corporation cannot establish that it is prudent to incur those costs.