# ALM Study Update

Presented to the PUB & Intervenors

on July 29, 2022

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# ALM Study Phases

1. Phase One: IFRS, new asset classes, risk mgmt. strategy, forecasting of CMAs
2. Phase Two: create efficient frontiers & identify optimal asset mixes
3. Phase Three: develop motorcycle specific asset mix

# Phase One Report Covered:

- IFRS 9 & 17 – Impact on Investment Strategy
- Merits of Adding New Fixed Income Asset Classes
- Merits of Adding Non-Fixed Income Asset Classes for Long Tail Basic Liabilities
- Interest Rate Risk Management Policy – Review
- Capital Markets Assumptions
- Review Current MPI Forecasting Methodology & Recommend Improvements
- Real Liability Benchmark Developed

# Phase Two included these Reports:

- Phase Two Report
- New Asset Classes for Consideration
- Comparison of MPI returns vs. Other Institutional Investors
- Discussion Paper on Levered Bonds, Real Return Bonds & Mortgages
- Asset Mix Optimization: Efficient Frontier Analysis for Basic Insurance Component
- Asset Mix Optimization: Efficient Frontier Analysis for RSR, EXT, SRE and EFB Portfolios

# Phase Two Report Covered:

1. Inflation & Equity Risks
2. Nominal & Real Liability Benchmark & Appropriate Investment Strategy
3. Risk & Return Parameters for Current & Alternative Asset Mixes
4. New Asset Class Evaluation
5. Probability of Meeting Expectations in Various Economic Scenarios
6. Asset Classes Considered & Recommended (normal, min & max weights)
7. Recommended Asset Allocations
8. Recommended Liability Proxies
9. Cost of Constraints
10. Investment Policy Review – Summary
11. Capital Markets Assumptions

# New Asset Classes Being Considered

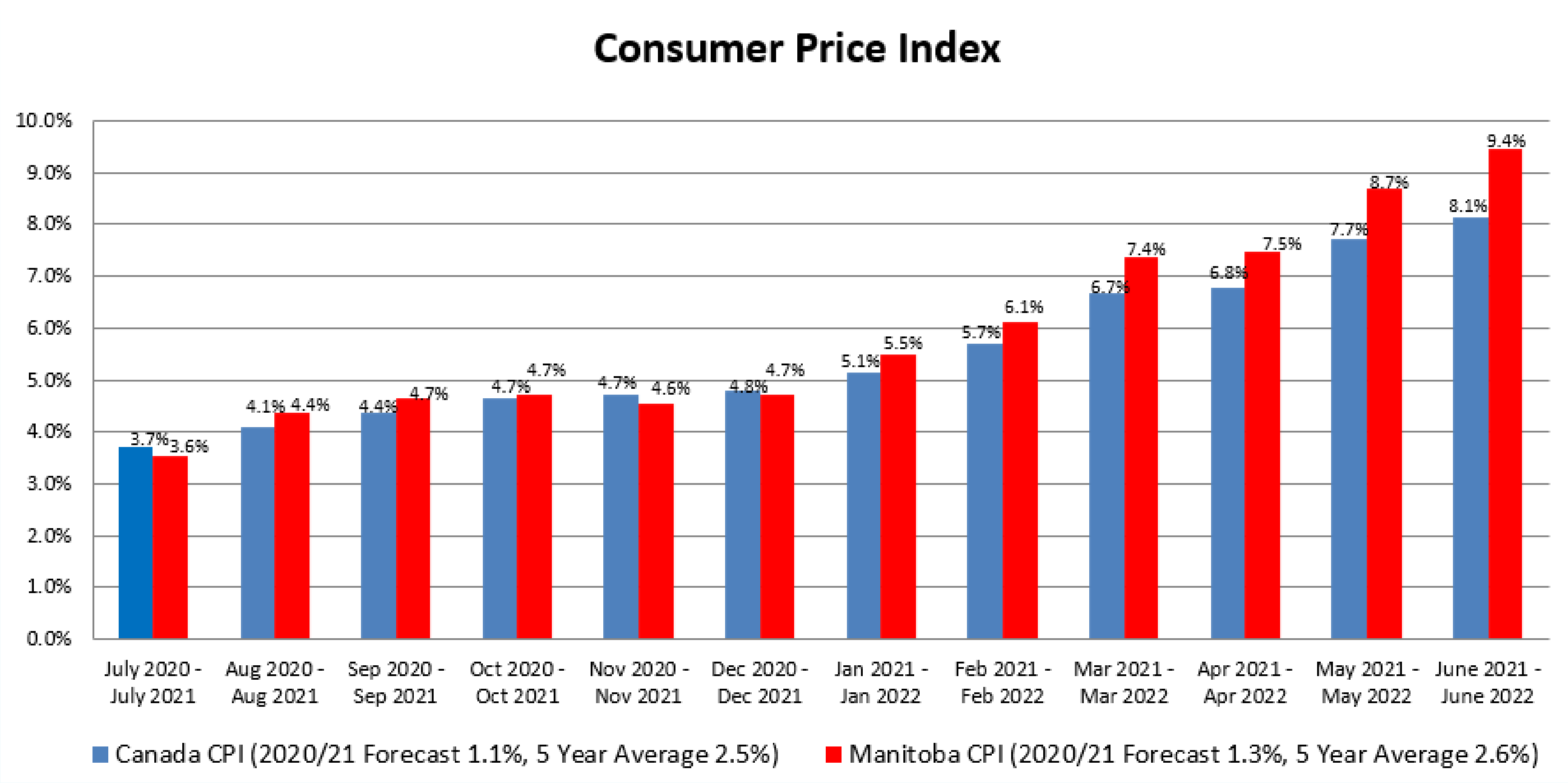
- Real Return Bonds
- Commercial Mortgages
- Real Estate
- 3x Levered Long Provincial Bonds
- 3x Levered Real return Bonds
- Canadian Equities & Global Equities

# Process

1. Investigate levered bond strategies (complete)
2. Investigate RRB implementation issues (complete)
3. Obtain input from the PUB & intervenors: special meeting, IRs & hearing
4. Complete analysis on impact of inflation on claims liabilities (TBD)
5. Present Recommended Asset Mixes to ICWG: October 13
6. Present Recommended Asset Mixes to Investment Committee: November 10

# Primary Issue

- 73% of PIPP benefits indexed to Manitoba CPI & 16% impacted by health care inflation
- Manitoba inflation is at 40-year highs (9.4% in June)
- The Basic Claims investment portfolio currently offers no inflation protection



# Basic Claims Efficient Frontiers

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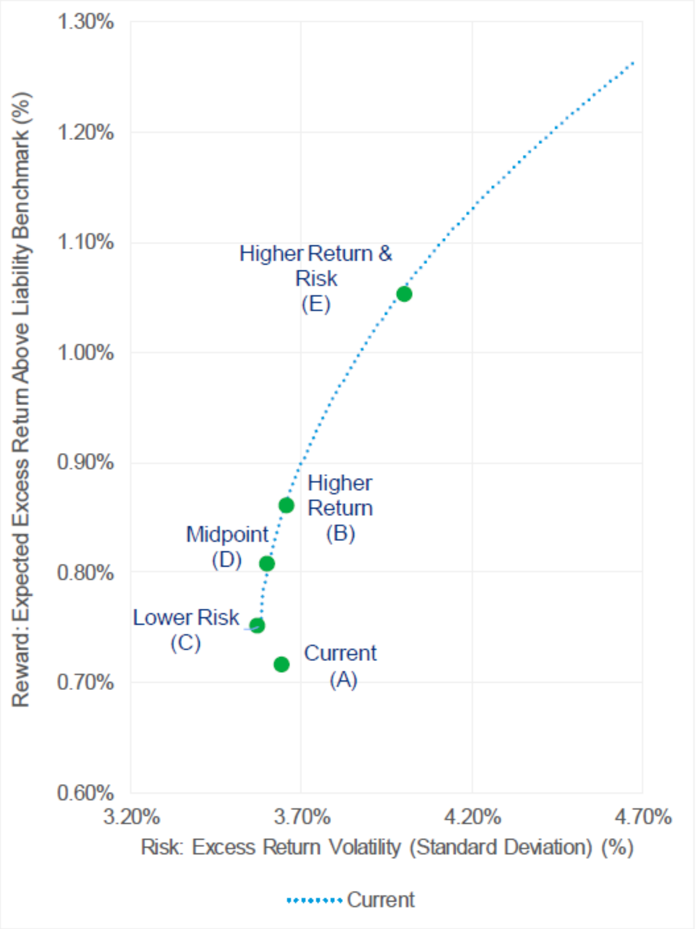
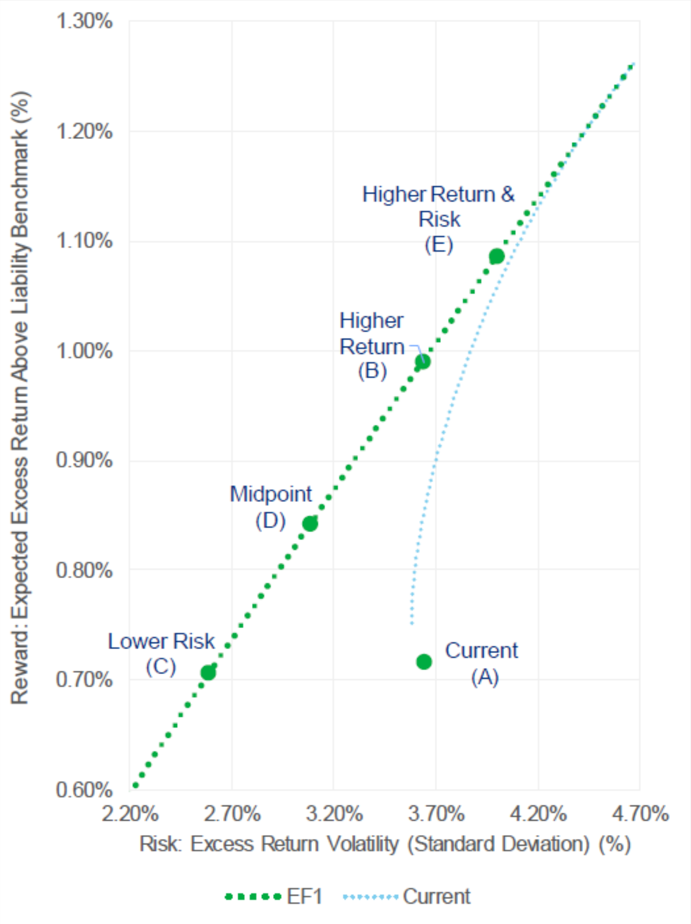
# Efficient Frontier with Current Asset Classes

| | Liability Benchmark | Current (A) | Higher Return (B) | Lower Risk (C) | Midpoint (D) | Higher Return & Risk (E) |
|---|---|---|---|---|---|---|
| **Fixed Income** | 100% | 100% | 100% | 100% | 100% | 100% |
| 3x Real Return Bonds | --- | --- | --- | --- | --- | --- |
| Real return bonds | 62% | --- | --- | --- | --- | --- |
| 3x Long Provincial Bonds | --- | --- | --- | --- | --- | --- |
| Provincial short-term bonds | 36% | --- | --- | --- | --- | --- |
| Provincial mid-term bonds | 2% | 33% | 13% | 18% | 10% | 26% |
| Provincial long-term bonds | --- | 27% | 28% | 34% | 35% | --- |
| Corporate mid-term bonds | --- | 9% | 29% | 28% | 35% | 7% |
| Corporate long-term bonds | --- | 11% | 10% | --- | --- | 47% |
| MUSH Bonds | --- | 20% | 20% | 20% | 20% | 20% |
| **Public Equities** | -- | -- | -- | -- | -- | -- |
| Canadian equity (large cap.) | --- | --- | --- | --- | --- | --- |
| All Country World Equity | --- | --- | --- | --- | --- | --- |
| **Alternatives** | -- | -- | -- | -- | -- | -- |
| Commercial mortgages | --- | --- | --- | --- | --- | --- |
| Core Canadian Real Estate | --- | --- | --- | --- | --- | --- |
| **Return Metrics** | | | | | | |
| Median return - 10 year | 1.85% | 2.48% | 2.63% | 2.52% | 2.58% | 2.82% |
| **Risk Metrics** | | | | | | |
| Expected excess return - 10 year | | 0.72% | 0.86% | 0.75% | 0.81% | 1.05% |
| Surplus volatility | | 3.65% | 3.66% | 3.57% | 3.60% | 4.00% |
| Information Ratio (Excess Return/Risk) | | 0.20 | 0.24 | 0.21 | 0.22 | 0.26 |
| 5% Value at Risk | | 124.0 M | 126.3 M | 123.0 M | 124.3 M | 138.1 M |
| **Other Metrics** | | | | | | |
| Minimum Capital Required | | 15.6 M | 31.0 M | 22.7 M | 28.3 M | 41.2 M |
| **Interest Rate Metrics** | | | | | | |
| Duration | 10.9 | 11.1 | 11.0 | 10.9 | 10.9 | 10.9 |
| Hedge Ratio | 100% | 101% | 100% | 99% | 100% | 100% |



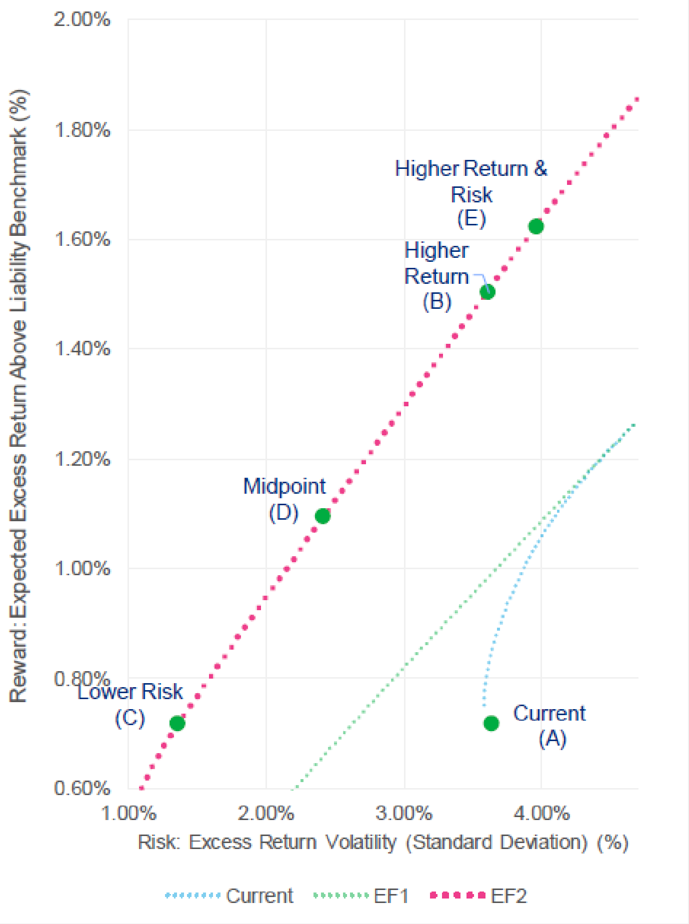
# Efficient Frontier with Real Return Bonds

| | Liability Benchmark | Current (A) | Higher Return (B) | Lower Risk (C) | Midpoint (D) | Higher Return & Risk (E) |
|---|---|---|---|---|---|---|
| Fixed Income | 100% | 100% | 100% | 100% | 100% | 100% |
| 3x Real Return Bonds | --- | --- | --- | --- | --- | --- |
| Real return bonds | 62% | --- | 13% | 30% | 22% | 8% |
| 3x Long Provincial Bonds | --- | --- | --- | --- | --- | --- |
| Provincial short-term bonds | 36% | --- | --- | --- | --- | --- |
| Provincial mid-term bonds | 2% | 33% | 6% | 6% | 6% | 5% |
| Provincial long-term bonds | --- | 27% | --- | --- | --- | --- |
| Corporate mid-term bonds | --- | 9% | 29% | 32% | 30% | 28% |
| Corporate long-term bonds | --- | 11% | 32% | 12% | 22% | 39% |
| MUSH Bonds | --- | 20% | 20% | 20% | 20% | 20% |
| Public Equities | -- | -- | -- | -- | -- | -- |
| Canadian equity (large cap.) | --- | --- | --- | --- | --- | --- |
| All Country World Equity | --- | --- | --- | --- | --- | --- |
| Alternatives | -- | -- | -- | -- | -- | -- |
| Commercial mortgages | --- | --- | --- | --- | --- | --- |
| Core Canadian Real Estate | --- | --- | --- | --- | --- | --- |
| **Return Metrics** | | | | | | |
| Median return - 10 year | 1.85% | 2.48% | 2.77% | 2.50% | 2.63% | 2.85% |
| **Risk Metrics** | | | | | | |
| Expected excess return - 10 year | | 0.72% | 0.99% | 0.71% | 0.84% | 1.08% |
| Surplus volatility | | 3.65% | 3.64% | 2.59% | 3.09% | 4.01% |
| Information Ratio (Excess Return/Risk) | | 0.20 | 0.27 | 0.27 | 0.27 | 0.27 |
| 5% Value at Risk | | 124.0 M | 127.0 M | 91.9 M | 108.6 M | 138.6 M |
| **Other Metrics** | | | | | | |
| Minimum Capital Required | | 15.6 M | 47.7 M | 35.0 M | 40.9 M | 52.1 M |
| **Interest Rate Metrics** | | | | | | |
| Duration | 10.9 | 11.1 | 10.9 | 11.0 | 11.0 | 10.9 |
| Hedge Ratio | 100% | 101% | 100% | 100% | 100% | 100% |



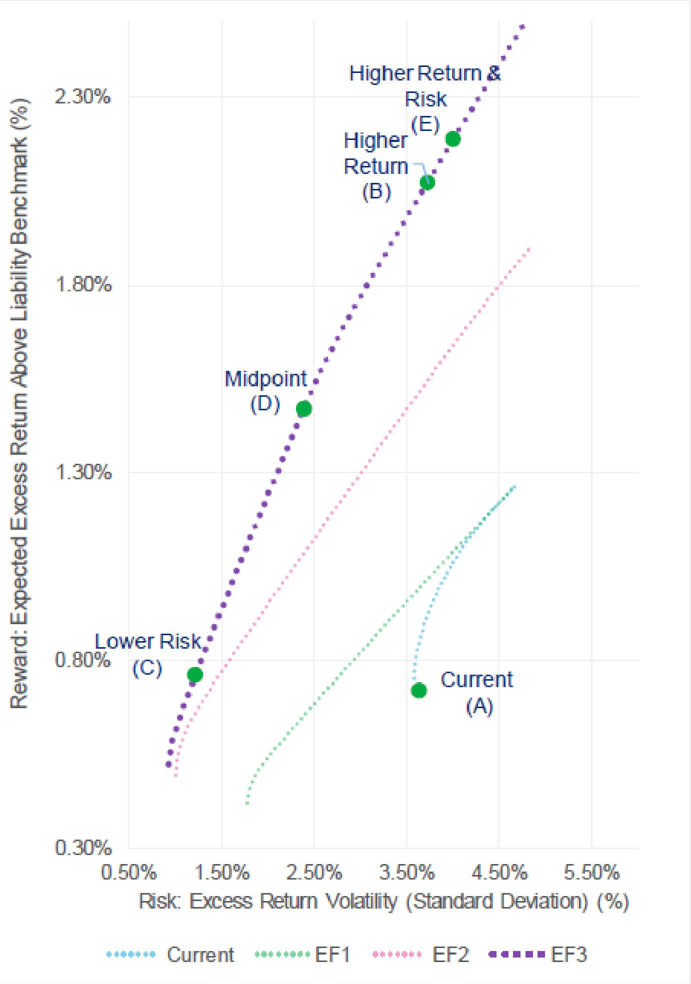
# Efficient Frontier with Mortgages & Real Estate

| | Liability Benchmark | Current (A) | Higher Return (B) | Lower Risk (C) | Midpoint (D) | Higher Return & Risk (E) |
|---|---|---|---|---|---|---|
| Fixed Income | 100% | 100% | 85% | 85% | 85% | 85% |
| 3x Real Return Bonds | --- | --- | --- | --- | --- | --- |
| Real return bonds | 62% | --- | 20% | 46% | 34% | 16% |
| 3x Long Provincial Bonds | --- | --- | --- | --- | --- | --- |
| Provincial short-term bonds | 36% | --- | --- | --- | --- | --- |
| Provincial mid-term bonds | 2% | 33% | 1% | 5% | 3% | --- |
| Provincial long-term bonds | --- | 27% | --- | --- | --- | --- |
| Corporate mid-term bonds | --- | 9% | 8% | 14% | 11% | 7% |
| Corporate long-term bonds | --- | 11% | 36% | --- | 17% | 42% |
| MUSH Bonds | --- | 20% | 20% | 20% | 20% | 20% |
| Public Equities | -- | -- | -- | -- | -- | -- |
| Canadian equity (large cap.) | --- | --- | --- | --- | --- | --- |
| All Country World Equity | --- | --- | --- | --- | --- | --- |
| Alternatives | -- | -- | 15% | 15% | 15% | 15% |
| Commercial mortgages | --- | --- | 1% | 9% | 5% | --- |
| Core Canadian Real Estate | --- | --- | 14% | 6% | 10% | 15% |
| **Return Metrics** | | | | | | |
| Median return - 10 year | 1.85% | 2.48% | 3.31% | 2.55% | 2.92% | 3.42% |
| **Risk Metrics** | | | | | | |
| Expected excess return - 10 year | | 0.72% | 1.50% | 0.72% | 1.09% | 1.62% |
| Surplus volatility | | 3.65% | 3.62% | 1.36% | 2.43% | 3.97% |
| Information Ratio (Excess Return/Risk) | | 0.20 | 0.42 | 0.52 | 0.45 | 0.41 |
| 5% Value at Risk | | 124.0 M | 133.5 M | 62.8 M | 95.8 M | 144.4 M |
| **Other Metrics** | | | | | | |
| Minimum Capital Required | | 15.6 M | 92.5 M | 53.9 M | 72.4 M | 98.2 M |
| **Interest Rate Metrics** | | | | | | |
| Duration | 10.9 | 11.1 | 10.9 | 10.9 | 10.9 | 11.0 |
| Hedge Ratio | 100% | 101% | 100% | 100% | 100% | 100% |



# Efficient Frontier with Leverage & Equities

| | Liability Benchmark | Current (A) | Higher Return (B) | Lower Risk (C) | Midpoint (D) | Higher Return & Risk (E) |
|---|---|---|---|---|---|---|
| Fixed Income | 100% | 100% | 69% | 81% | 75% | 68% |
| 3x Real Return Bonds | --- | --- | 9% | 2% | 12% | 8% |
| Real return bonds | 62% | --- | --- | 38% | --- | --- |
| 3x Long Provincial Bonds | --- | --- | 4% | --- | --- | 5% |
| Provincial short-term bonds | 36% | --- | --- | --- | --- | --- |
| Provincial mid-term bonds | 2% | 33% | 33% | 21% | 43% | 31% |
| Provincial long-term bonds | --- | 27% | --- | --- | --- | --- |
| Corporate mid-term bonds | --- | 9% | 3% | --- | --- | 4% |
| Corporate long-term bonds | --- | 11% | --- | --- | --- | --- |
| MUSH Bonds | --- | 20% | 20% | 20% | 20% | 20% |
| Public Equities | -- | -- | 16% | 4% | 10% | 17% |
| Canadian equity (large cap.) | --- | --- | 12% | 4% | 10% | 13% |
| All Country World Equity | --- | --- | 4% | --- | --- | 4% |
| Alternatives | -- | -- | 15% | 15% | 15% | 15% |
| Commercial mortgages | --- | --- | 4% | 12% | 9% | 3% |
| Core Canadian Real Estate | --- | --- | 11% | 3% | 6% | 12% |
| **Return Metrics** | | | | | | |
| Median return - 10 year | 1.85% | 2.48% | 3.82% | 2.58% | 3.24% | 3.93% |
| Probability of positive real return - 10 year | | 63% | 82% | 72% | 79% | 83% |
| **Risk Metrics** | | | | | | |
| Expected excess return - 10 year | | 0.72% | 2.07% | 0.76% | 1.47% | 2.19% |
| Surplus volatility | | 3.65% | 3.73% | 1.22% | 2.41% | 4.01% |
| Information Ratio (Excess Return/Risk) | | 0.20 | 0.55 | 0.62 | 0.61 | 0.54 |
| 5% Value at Risk | | 124.0 M | 122.4 M | 52.9 M | 74.7 M | 132.1 M |
| Probability of deficit - 10 year | | 26% | 11% | 14% | 11% | 11% |
| **Other Metrics** | | | | | | |
| Minimum Capital Required | | 15.6 M | 160.5 M | 60.8 M | 103.3 M | 169.4 M |
| **Interest Rate Metrics** | | | | | | |
| Duration | 10.9 | 11.1 | 11.0 | 10.9 | 11.1 | 10.9 |
| Hedge Ratio | 100% | 101% | 100% | 100% | 101% | 100% |



# Recommendation on New Asset Classes to Include in the Basic Claims Portfolio

- Real Return Bonds: yes
- Commercial Mortgages: yes
- Real Estate: yes
- Leverage: still evaluating

# Non-Basic Portfolios

1. Rate Stabilization Reserve (RSR):
    - Current portfolio is very close to the efficient frontier
    - Minor changes to current asset mix proposed
    - New asset classes do not significantly improve risk/return profile
2. Employee Future Benefits (EFB):
    - Asset mixes for status quo & pre-funding scenarios were developed
    - Use of leverage still under consideration

# Investigating Real Return Bonds

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# What is a Real Return Bond?

- Issued by Federal government & Provinces
- Pay interest semi-annually & principal at maturity
- Purchasing power is protected as the coupon & principal are indexed to CPI
- Limited availability as there are only 13 issues (8 federal & 5 Provincial)
- Approximately $82B outstanding, vs. $1.9T for the overall fixed income market
- Federal RRBs are auctioned 4x annually, $350M issued at each auction
- Nominal Yield = Real Yield + Inflation Accrual

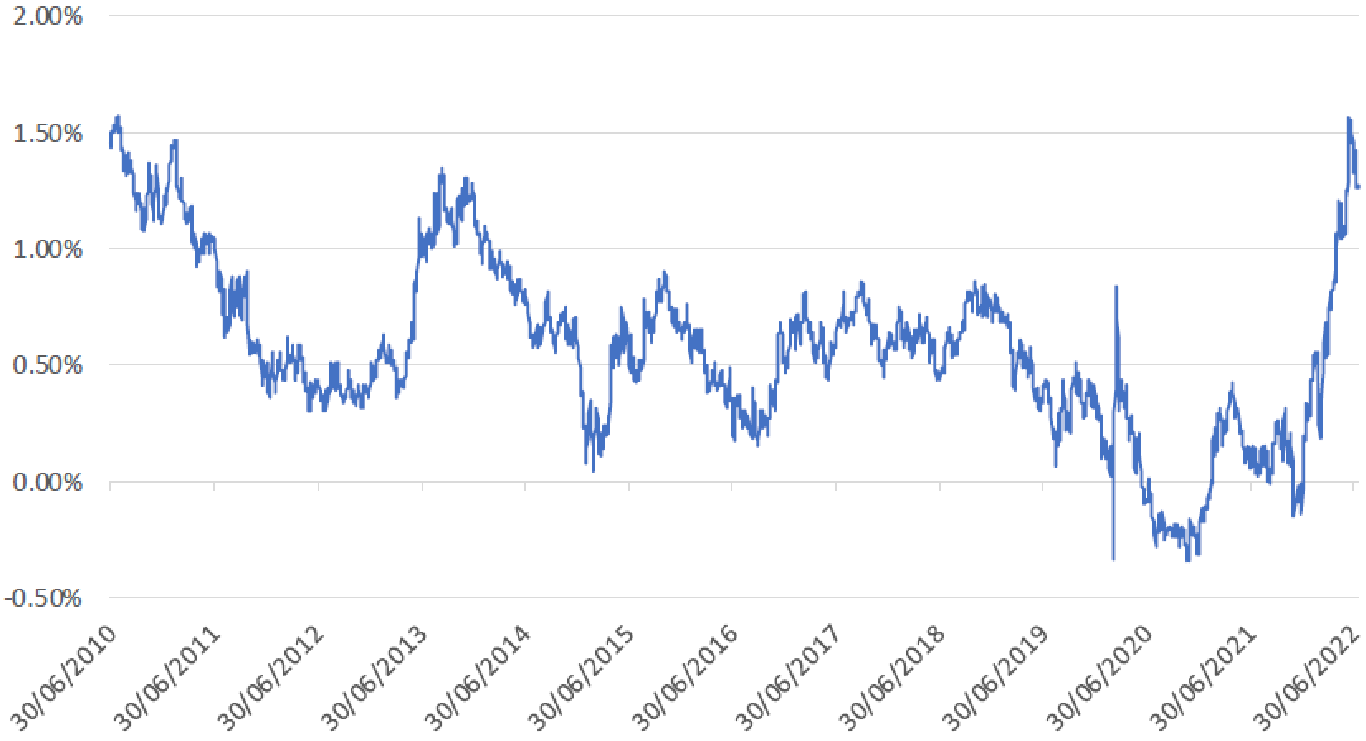
# Performance of RRBs is a Function of:

- Inflation Accrual: currently large & positive
- Coupon: always positive
- Price Change: product of real yield change & duration
- Break-even inflation rates
- Historically, changes in real yields have been the largest driver of RRB performance

# Attractiveness of RRBs is a Function of:

- Changes in real yields:
  - Real yields are currently at 10-year highs
  - When real yields fall RRBs increase in price

Figure 3: Government of Canada Long-Term Real Return Bond Yield




Source: Bank of Canada

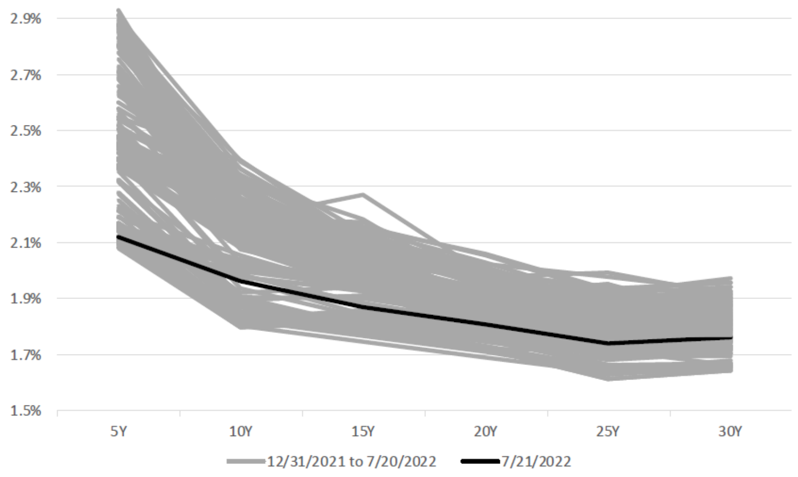
# Break-Even Inflation Rates:

- The break-even inflation rate is the difference between the yield on a nominal Federal bond and the real yield on a Federal RRB with the same term.
- The break-even inflation rate is the market implied inflation rate. It is the rate of inflation which would make the RRB equivalent to the nominal Federal bond.
- If the break-even inflation rate is less than your expectation of future inflation then real return bonds are an attractive purchase.
- Changes in break-even inflation rates reflect both changes in inflation expectations and changes in market liquidity for RRBs.
- Inflation risks remain skewed to the upside – meaning that an upside surprise is more likely than downside surprise.

# Attractiveness of RRBs is also a Function of:

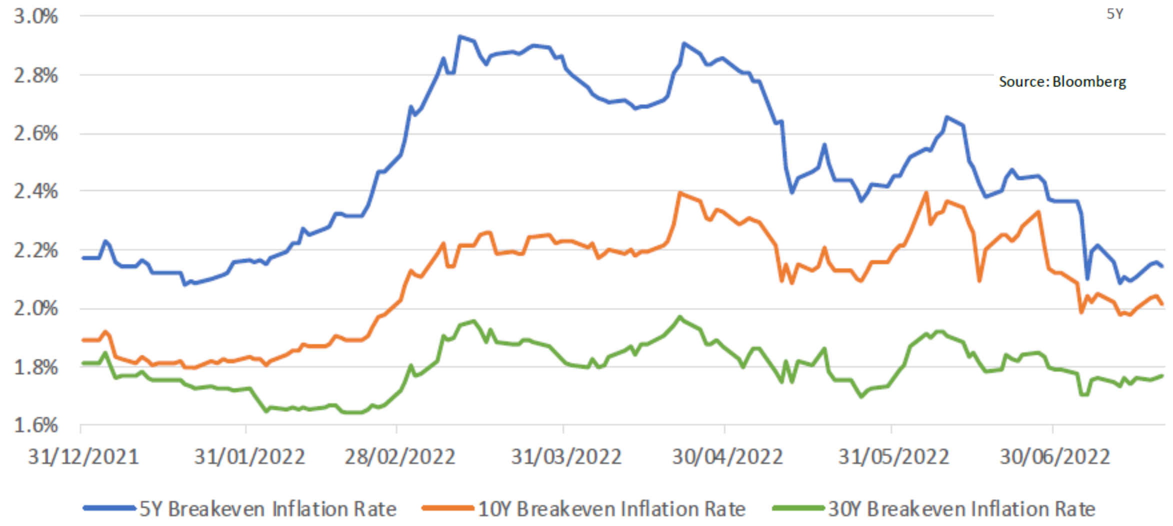
- Level of break-even inflation rates:
  - At or near lowest level since December 2021 for 5, 10 & 30 year terms

Figure 1: Breakeven Inflation Curve




Source: Bloomberg

Figure 2: Breakeven Inflation Rates




Source: Bloomberg

# Implementation Considerations:

- RRBs are illiquid and therefore should be a long-term rather than tactical allocation
- There is an active secondary market, although the bid-ask spread for RRBs is greater than for nominal bonds so RRBs are more expensive to trade
- Increased liquidity around announcement of CPI data and auction dates
- Can also be purchased directly from the Bank of Canada at auction

# Investigating Levered Bond Strategies

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# What is Leverage?

- Leverage involves investing borrowed money
- For a 3x levered bond fund: contribute $1, borrow $2, invest $3
- Derivatives (repurchase agreements, futures, forwards, swaps) are used to obtain leverage
- Provides long duration exposure

# How, why & who?

- Levered bond strategies or bond overlays allow investors to gain long duration exposure and maintain interest rate sensitivity with less capital. They are used by liability focused investors as a risk management tool and they allow investors to build higher yielding and more diversified portfolios
- Typically used by liability driven investors with long duration liabilities (defined benefit pension plans & insurance companies)
- Used to achieve a better match to interest rate / inflation sensitive liabilities or free up capital for redeployment into high-quality income, equity or non-traditional asset classes.
- Allow investors to increase or maintain interest rate exposure with less capital.
- Bond overlay strategies help to obtain portfolio exposures beyond the limitations and constraints present in a physical/cash only investment portfolio.

# Risks

- **Counterparty Risk**: only deal with highly rated Canadian chartered banks with strong balance sheets, diversify exposure across several banks, daily exchange of collateral provides protection
- **Financing cost:** changes in spread between borrowing rate & real yield of RRB
- **Access to derivatives market/repo liquidity/rollover risk**: ladder maturities to limit exposure on any single date, diversify exposure across counterparties; the repo market proved resilient in time of stress (2008 GFC and 2020 pandemic)
- **Changes to leverage ratio:** rebalancing required to maintain target ratio

# Rewards

- **Capital efficient** (do not need to invest 100% in fixed income to hedge interest rate risk)
- **Expanded investment opportunity set**
- **Exposure to growth assets**
- **Improved diversification**: more options to better diversify the corporate credit risk exposure or other return-seeking assets. Longer term bonds have limitations with respect to sector, issuer and quality diversification, constraining alpha opportunities if enhanced returns are desired.
- **Yield enhancement**
- **Liquidity**: more flexible structure to attain overall duration & yield curve allocation
- **Greater flexibility** vs. cash/physical only bond portfolio

# Other Issues

- U.S. TIPs – more liquid than RRBs but introduces basis risk between U.S. CPI and Manitoba CPI

- Impact on required capital (MCT): will increase due to increased exposure to corporate bonds and addition of real estate & mortgages; addition of equities would further increase required capital.

# Input from PUB & Intervenors

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# PUB & Intervenor Input

- Special Meeting: July 29
- Round 1 & 2 Information Requests: August & September
- Intervenor Evidence: September
- Hearing: October 19 – November 9

# Questions?

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