

Presenting:



Inflation Protection: Do Alternative Assets Work?



Inflation Protection Assets: Efficacy & Performance

Canadian defined benefit pension plans and insurance companies that are exposed to inflation-linked liabilities are natural buyers of Real Return Bonds (RRBs), an important inflation hedging product that has been in persistent short supply since issuance began.

Similarly, RRBs are a viable asset for managing inflation risk for any investor's portfolio.

Index-linked pension plans must earn a real rate of return and find inflation protection to meet future liabilities, and keep contribution rates affordable. Depending on the funding position, real hurdle rates can be as high as 5% before inflation.

Real return bonds provide precise inflation protection, as the Government of Canada adjusts the coupon payment in line with recent inflation¹, and provide a real yield determined at issuance.

Real interest rates have been trending down since 1980, and the real yield on RRBs has fallen below the hurdle rate of many index-linked pension plans, making this source of inflation protection costly². Real return bond yields in Canada were **negative 0.3%** prior to their reversal in 2022, so investors were paying the government directly for their inflation protection.

To solve this problem, other assets have been touted to provide both inflation protection and a higher real yield. However, unlike RRBs alternative assets provide imprecise CPI-linked compensation but may have the advantage of higher returns.

Infrastructure, real estate, and commodities are three popular inflation protection asset substitutes for RRBs. Infrastructure and real estate can pose access and management challenges (liquidity, accessibility and size) for all but the largest and most sophisticated asset managers, who are less liquidity sensitive. Commodities are also a hedge against inflation, yet they lack the real return that accrues to infrastructure and real estate. Commodity exposure through long futures positions can both protect against unanticipated inflation and offer better diversification against equity exposures compared to bonds, as their return volatility better matches equity return volatility in the context of a multi-asset portfolio.

The balance sheets of large index-linked pension plans allocate a significant share of assets to inflation and real interest rate exposure to manage liability risk. OTPP, an early adopter of real return bond substitutes to manage inflation risk, allocates about half its balance sheet to these products, as outlined in Table 4. The lack of RRB availability and their low rate of return means real rate fixed income products make up just 4% of the balance sheet, while infrastructure, real estate, and commodities amount to a much larger 38%.

¹ Canadian inflation is measured monthly by Statistics Canada and is the reference index for inflation payments.

² The hurdle rate is the investment return necessary to meet all future liabilities over a given investment horizon for a given contribution rate and the existing asset value at time of determination.

Where to Source Inflation?

Following Canada's decision to end the issuance of RRBs in late 2022, there has been widespread conversations in the search for inflation protection substitutes. Validus has developed a RRB Replication that can provide both inflation protection and superior risk-return characteristics, compared to existing RRB benchmarks.

Table 1 shows the OTPP liability hedge portfolio devoted to inflation and duration risk management. The portfolio includes nominal and index linked bonds, and three major index-linked bond substitutes – commodities, infrastructure, and real estate.

Table 1 – Ontario Teachers' Pension Plan Liability Hedge Portfolio (2023)

Asset	Asset Mix Weight %
Fixed Income	
Nominal Bonds	35%
Index Linked Bonds	4%
Inflation Sensitive	
Commodities	9%
Natural Resources	5%
Inflation Hedge	5%
Real Assets	
Real Estate	12%
Infrastructure	16%

Source: Ontario Teachers' Pension Plan 2023 Annual Report

Do Index-Linked Bond Substitutes Do What We Expect?

Many liability managers look to RRBs to hedge inflation and minimize the asset-liability risk which dominates the funding position. The long duration of RRBs was a key attraction, and as the existing bonds roll-off with no immediate ILB substitutes, their ability to hedge the funding ratio will decay.

In what follows we will examine whether these three RRB substitutes – infrastructure, real estate, and commodities – deliver the expected inflation protection and if so to what extent they succeed. We will then contrast them with the characteristics of the Validus RRB Replication Strategy concluding that it is superior solution to inflation risk management compared to these alternatives.

To test the inflation hedging properties of the alternatives, we select US\$ benchmarks for each asset (see Table 2). We then regress the performance of these benchmarks – as measured by quarterly returns – versus the change in the year over year (YoY) US CPI for different lag periods.

**Table 2 –
Selected Benchmarks for Inflation Protection Assets**

Asset Benchmark	Description
Infrastructure – INFRA 300	An index containing 300 unlisted infrastructure companies assembled by EDHEC.
Real Estate – NAREIT	An index of REITs provided by NAREIT capturing the performance of global real estate equities.
Commodities – RICIGLTR	The Rogers International Commodities Index Total Return.

The results of this analysis are summarized in Table 3. The coefficient values tell us the relative sensitivity between each asset class and CPI (the bigger the coefficient the higher the sensitivity to inflation). The P statistic tells us whether the information resulting from the coefficient is different from mere chance, with a lower P statistic value indicating greater confidence in the asset's inflation protection properties.

We found that commodities are by far the most closely linked to inflation, followed by infrastructure assets. However, it is important to note that in our study infrastructure assets react with a lag (of two quarters) to changes in CPI. Finally, while REITs do present a sensitivity to inflation, the relationship is weak making them a less than ideal candidate for protection against an inflationary surge.

**Table 3 –
Contribution to Inflation Hedging by Asset Class Relative to Index-Linked Bonds**

Asset Class	Coefficient Value	P Statistic
REITS	1.548	0.248
Commodities	8.561	1.1 e-13
Infrastructure*	1.699	0.022

** Lag of +2 quarters (i.e. changes in infrastructure index prices lag CPI changes by 2 quarters)
Source: Publicly available sources & Validus Calculations. . Jan 2004 – Dec 2022.*

We conclude that all alternative inflation protection assets offer some benefit, however there can be significant performance differentiation among them. This suggests we need to gain a better understanding of the inflation hedging benefits of each of these assets.

Inflation Hedging Benefits & the Efficacy of Alternative Assets

All three selected alternative assets exhibit a positive return relationship with CPI; however, it is their inflation hedging characteristics as measured by the sensitivity to the change in real rates that is of interest to us.

The goal of our research is to examine and compare the relative inflation hedging efficacy to RRBs. To do so, we took a closer look at the relationship between the performance of these alternative assets versus the excess returns of TIPS over the nominal bonds of the same constant 10-year maturity.

Excess Returns Analysis

The relative attractiveness of using the index-linked substitutes to hedge inflation is determined by comparing how well the asset performed against TIPS. We did so by looking at the asset's excess returns relative to the excess returns of TIPS (i.e. a proxy for breakeven rates), the results of which have been outlined in Table 4.

$$\frac{(\text{Asset quarterly return} - 10\text{-year nominal bond quarterly return})}{\text{regressed against}}$$

$$\frac{(\text{10-year TIPS quarterly return} - 10\text{-year nominal bond quarterly return})}{\text{regressed against}}$$

Commodities stand out as a powerful inflation protection asset, which we expect given their direct input into the inflation process. While REITS did not exhibit either a convincing or evident relationship to CPI, they do a better-than-expected job as they have a viable and strong relationship with break-even rates (i.e. the expected inflation rate). In contrast, while infrastructure is correlated to CPI it has no relationship with break-even rates. This might appear counterintuitive at first, but the period of study was dominated by a long period of lower inflation, and infrastructure asset prices grew along with muted inflation. However, when inflation surged infrastructure asset prices reflected the change in nominal yields as a whole, rather than the break-evens. As such infrastructure does not provide any convincing inflation protection benefits.

Table 4 – Performance of Inflation Hedge Assets Excess Return (ER) Relative to TIPS ER

Asset Class	Coefficient Value	R Square	P Statistic
REITS	2.272	0.355	1.71 e-8
Commodities	3.547	0.689	3.4 e-20
Infrastructure*	0.0096	0.0002	0.914

* Lag of +2 quarters (i.e. changes in infrastructure index prices lag CPI changes by 2 quarters)

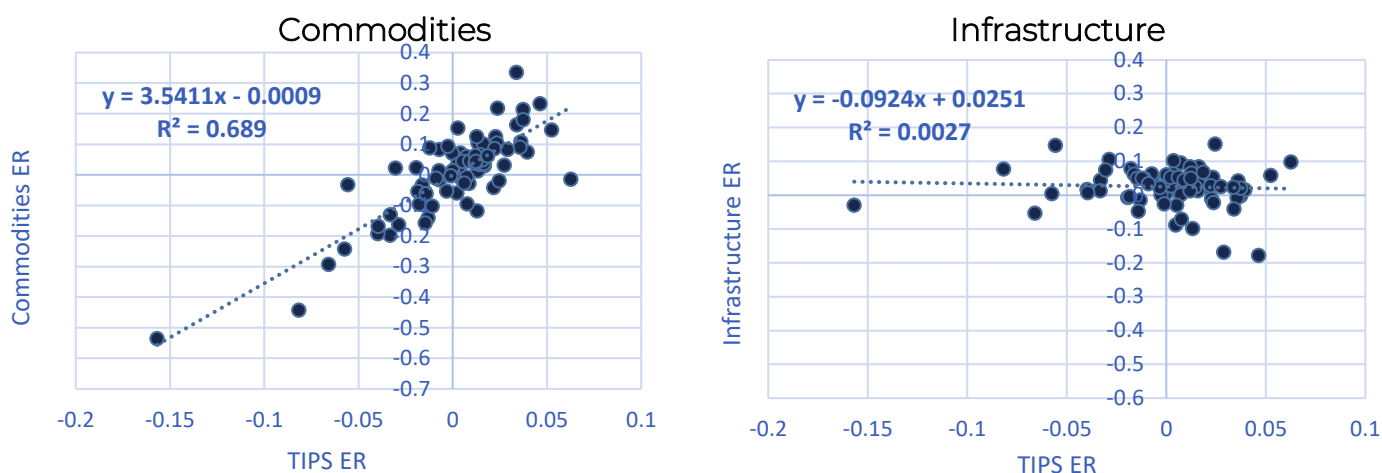
Source: Publicly available sources & Validus Calculations. Jan 2004 – Dec 2022.

Infrastructure is not a cleanly defined asset class. When infrastructure was initially presented as an inflation protection asset it was defined as service infrastructure such as toll roads, toll bridges, or rail providers that had the ability to change tariffs in line with inflation.

Given the infrastructure inflation adjustments are periodic rather than monthly, inflation comes with a lag compared to index-linked bonds or commodities (as shown by our study). The inflation protection was present; however, it was less precise in terms of dollar value and timing.

Infrastructure's inflation protection role has diminished through time. Governments have sought ever more infrastructure financing for projects beyond roads, bridges and rail, and it is likely that the relationship with inflation has become less precise both in value and timing. For example, if a pension plan funds the construction of a hospital, the return characteristics will be more like equity than index linked bonds. Investors are well advised to steer away from infrastructure as an inflation protection asset, in favour of commodities and real estate.

**Figure 1 –
Commodities and Infrastructure Excess Return versus TIPS Excess Return**



* Lag of +2 quarters (i.e. changes in infrastructure index prices lag CPI changes by 2 quarters)

Source: Publicly available sources & Validus Calculations. Jan 2004 – Dec 2022.

Finally, while real estate provides inflation protection to the extent that is driven by real rates, it is important to note that during inflationary periods absolute real estate prices can be uncertain as they are affected by a rise in nominal rates (usually a downward pressure), but also the economic context (recessionary or growth). Thus, on a mark to market basis, part of the inflation protection can be volatile and imprecise.

Among the assets touted as inflation protection, only commodities seem to offer a strong case for inclusion in an inflation hedge basket. But is there a strategy, which is both liquid and more precise to meet the challenges posed by inflation?

Validus RRB Replication

The reliance of many investors on competing inflation protection assets is driven by the lack of availability and returns on RRB's, yet infrastructure and real estate assets are available only to those with balance sheet size and the ability to manage illiquidity. Commodities are more liquid, offer additional diversification benefits, and offer the best and strongest inflation protection among RRB alternatives.

In response to the cancellation of RRB issuance, Validus has developed an RRB Replication Strategy which is liquid, scalable, and a superior solution in the quest for inflation protection.

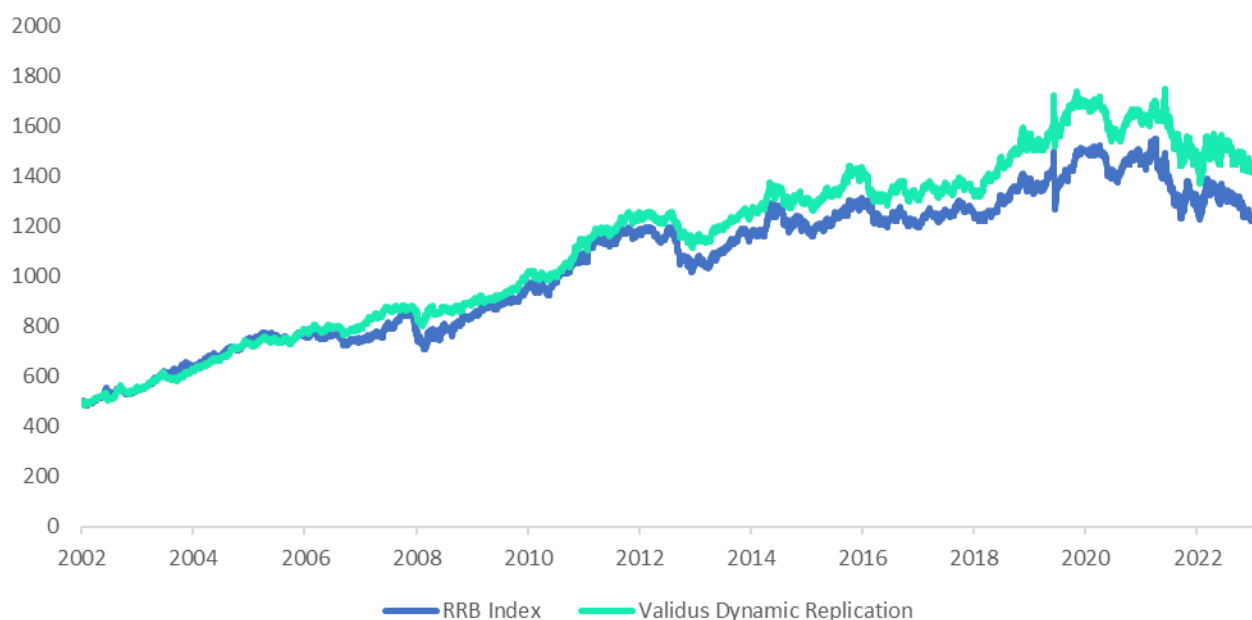
The Validus RRB Strategy was designed to mimic the prevailing RRB benchmark, *the Bloomberg Canada Government Inflation-Linked All Maturities Total Return Benchmark* (“BCICIT index”).

In the search to replace RRB’s, many investors have turned to US TIPS. We believe this is an inferior solution compared to the Validus RRB strategy, as use of TIPS has many drawbacks and weaknesses. First, there are significant differences in the US and Canadian CPI baskets. Second, there is the potential for excess volatility in Canada-US interest rate differentials reflecting independence in monetary policy. Finally, volatility in the C\$/US\$ exchange rate introduces risk unrelated to inflation.

The Validus strategy creates exposure to nominal bonds combined with a custom-made commodity-driven inflation hedge overlay. The inflation hedge is composed of a basket of commodity exposures mapped directly onto the components of Canada’s CPI. The strategy’s construction aims to avoid the large mark-to-market losses and drawdowns suffered by nominal bonds in a rising interest rate regime whilst the custom Canada CPI hedge basket captures rising inflation. The hedge solution applies a proprietary rule-driven selection of commodity weights to maximize the value of inflation protection.

The historical performance profile of the Validus Real Return Bond Dynamic Exposure Strategy versus the selected benchmark is shown in Figure 1 below.

**Figure 1 –
Historical Performance of the Validus Real Return Bond Dynamic Exposure Strategy (\$CAD) – value of \$500 invested**



Source: Bloomberg & Validus Calculations. Oct 2022 – Jun 2023

RRB index: Bloomberg Canada Government Inflation-Linked All Maturities Total Return Benchmark (“BCICIT index”).

Table 5 compares the performance statistics of the Validus Strategy to that of a maturity-matched TIPS. Note the improved performance metrics - most notably the annualized return and annualized volatility. The strategy also has a smaller drawdown compared to fixed-income alternatives, including US TIPS, nominal bonds, and the RRB BCICIT Index benchmark. While the coherence to the RRB inflation cash flows is not precise, the CPI hedge basket is comparable to a call on future and unanticipated inflation, which has significant value to investors.

**Table 5 -
Comparison of Performance Characteristics of Validus RRB Dynamic Strategy**

Strategy	Annualized Return	Annualized Volatility	Information Ratio	Max Drawdown
Validus Dynamic Replication	5.51%	8.35%	0.66	-22.46%
TIPS Proxy	4.52%	11.41%	0.40	-33.45%
Nominal Bond Index	4.54%	9.89%	0.46	-39.95%
BCICIT Index (Benchmark)	4.82%	8.99%	0.54	-23.32%

** Lag of +2 quarters (i.e. changes in infrastructure index prices lag CPI changes by 2 quarters)*

Source: Publicly available sources & Validus Calculations. Jan 2004 – June 2023

Takeaways and Synthesis

- Among the most common assets touted for their embedded inflation protection characteristics, **only commodities, and to a lesser extent Real Estate**, exhibit a **hedging benefit** in inflationary regimes. Infrastructure inflation protection remains far from convincing.
- Additionally, these assets do not provide exact tools for managing inflation risk in a portfolio context. They do provide protection but quantifying it is rather an art than a science. There **could be noticeable “basis” risk** (i.e. difference between what would the perfect hedge and the one provided by these assets).
- The **Validus RRB Dynamic Strategy’s design** on the other hand, is such that **it** aims to mimic an exposure to an inflation-linked bond in a **much more rigorous** manner.
- It is **nearly 90% correlated to an RRB benchmark** with the same weighted time to maturity.
- Even if RRBs had not been discontinued, the Validus Strategy would still provide a **leading investment solution for inflation protection** given its superior performance characteristics, **liquidity, and scalability**, which far exceeds the outstanding balance of RRBs.
- The Validus RRB Replication strategy is designed to **fit into the fixed income category** but also straddles the second category of **inflation sensitive assets**. It performs well against existing fixed income products
- The RRB replication is also a stand-alone asset and replaces the existing RRB benchmark: it is not a value-added proposition that attracts tracking error. Rather, **it becomes its own benchmark**. As RRBs roll out of the stock of government debt, the existing benchmark cannot be sustained.



Box One – Cancellation of Canada's RRB Issuance Program

Canada cancelled its RRB program at the end of 2022 citing insufficient demand and poor market liquidity. This has created a major problem for natural buyers of RRBs; the defined benefit, inflation index-linked, pension plans.

Historically, a lack of liquidity has plagued this market which is a function of insufficient supply rather than insufficient demand. Canada's RRBs are 2% of all bonds on issue compared to the US at 6% and the UK at 22%. Why Canada cited poor demand for RRB's as a reason to cancel issuance is a puzzle.

Canada's RRB program began in 1991 during the Bank of Canada's campaign to lower inflation to a negligible level after two decades of high and disruptive inflation.

The RRB program was a signal that the fiscal authority was supporting the central bank in its objective to get inflation to 2.0%.

Governments should be indifferent about whether they issue index-linked bonds or nominal bonds because their tax revenues move higher with inflation even as the cost of index-linked transfer programs move higher with inflation.

Governments like zero inflation and positive real economic growth the most because indexed programs would remain unchanged in nominal terms, but revenue would continue to rise with real GDP growth.

Canada's fiscal trajectory has deteriorated since 2015 as expenditures have exceeded revenue growth. The debt ratio also had a one-time bump given the large transfers necessary to protect the economy from the effects of the CV-19 lock-down.

Canada does not exploit fiscal drag, where adjustments to nominal incomes to compensate for prior inflation pushes taxpayers into higher tax brackets leaving them worse-off in real terms. The federal government indexes the basic personal amount that is free of tax and adjusts tax thresholds upwards along with inflation. The provinces are an entirely different story, and to varying degrees they have all exploited inflation by not indexing thresholds in their upper tax brackets so capturing more tax from the inflation adjustment received by higher income earners leaving them worse off in real terms.

While the federal government is not seeking to leverage an inflation tax, the cancellation of the program is a subtle yet real signal that the federal government is no longer fully behind maintenance of low inflation. It could easily suspend inflation adjustment to tax thresholds, and as RRB's roll out of the debt stock the need to pay inflation compensation to investors would be reduced to potentially increase inflation-driven tax revenues.

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