



Colchester®
GLOBAL INVESTORS

Global and Emerging Market Inflation-Linked Bonds

June 2025





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I. Why Inflation-Linked Bonds – are they an effective hedge against inflation?

The underlying rationale to hold inflation-linked bonds within a diversified asset portfolio is as a hedge against the erosion of purchasing power and as a protection against unexpected inflation. Experience in high inflation economies, particularly in Latin America, suggests that bonds providing a guaranteed real rate of return over the level of inflation provided better inflation insurance than exposure to a range of nominal financial assets or real assets. Intuitively this makes sense as the source or driver of inflation - cost push, demand pull, institutionalised indexation, unionised wage inflation, etc., - can vary through time. Accordingly, the sensitivity of different asset classes to inflation can also vary.

As inflation-linked bonds provide positive (and potentially negative) real return over inflation they are increasingly being utilised in an array of portfolios with differing investment objectives. Inflation-linked bonds are used by pension funds to hedge their pension liabilities, by endowment funds to preserve their purchasing power, by other entities for asset-liability matching purposes, and by superannuation funds to insure against unexpected inflation and diversify their portfolios. Similarly, defined benefit pension schemes, and others with a need to match future indexed liabilities have an increasing demand for inflation-linked bonds. The asset class provides an effective hedge against future indexed liabilities provided there is no meaningful maturity mismatch.

Given the direct return link with inflation, it is not surprising that there is a high correlation of inflation-linked bond returns with inflation. Indeed, empirical studies of returns in the longer running inflation-linked bond markets like Brazil (and others) point to a strong correlation of returns with inflation. Furthermore, historically this correlation has increased with the investment horizonⁱ. As inflation-linked bonds have been issued for a much shorter period of time in most developed markets (see below), it is more difficult to draw similar conclusions in those markets. Nonetheless, the body of evidence suggests that inflation-linked bonds may be expected to provide a consistent hedge against both 'expected' and 'unexpected' inflation through time.

In contrast, the academic and empirical evidence suggests that many other asset classes believed to be good inflation hedges have failed to provide consistent inflation protection through all different economic cycles. Asset classes proven to be a reasonable hedge against inflation in one cycle have not performed as well in others, as the source or type of inflation has varied; starting valuations have differed, etc. Studies show equities have historically been an ineffective hedge against inflation and even act as a perverse hedgeⁱⁱ. Similarly, the academic evidence suggests that they, along with nominal bonds, have been a poor hedge against unexpected inflationⁱⁱⁱ. Historically, real assets have not fared much better either. While the evidence supporting the inflation hedging characteristics of real estate is mixed, here too research suggests that it has not provided a consistent hedge against unexpected inflation^{iv}. Here starting valuations and the potentially higher beta or exposure of property to the broader economic environment may have a greater influence. For example, inflation was higher than the movement in real estate prices for a sustained period in the aftermath of the Global Financial Crisis (GFC) in the 2000's. Similarly, commercial property prices in the UK, US, and elsewhere notably lagged domestic inflation in the post GFC period. In the post Covid-19 period, real estate returns have, varied notably, with significant divergence in residential, commercial office space, and other sector returns.

Lastly, commodities are often considered a good inflation hedge. This may be the case when commodity prices are a dominant driver of inflation but is less so when other inflation drivers such as domestic wage inflation or persistent wage or price indexation are more important. The high volatility of commodities also limits their potential role within a diversified portfolio as a core inflation hedge asset. With a volatility of almost three times that of inflation-linked bonds, the 'hurdle rate' for commodities to play a significant risk mitigation or hedge role within a diversified portfolio is high^v.



II. Domestic versus Global Inflation-Linked Bonds

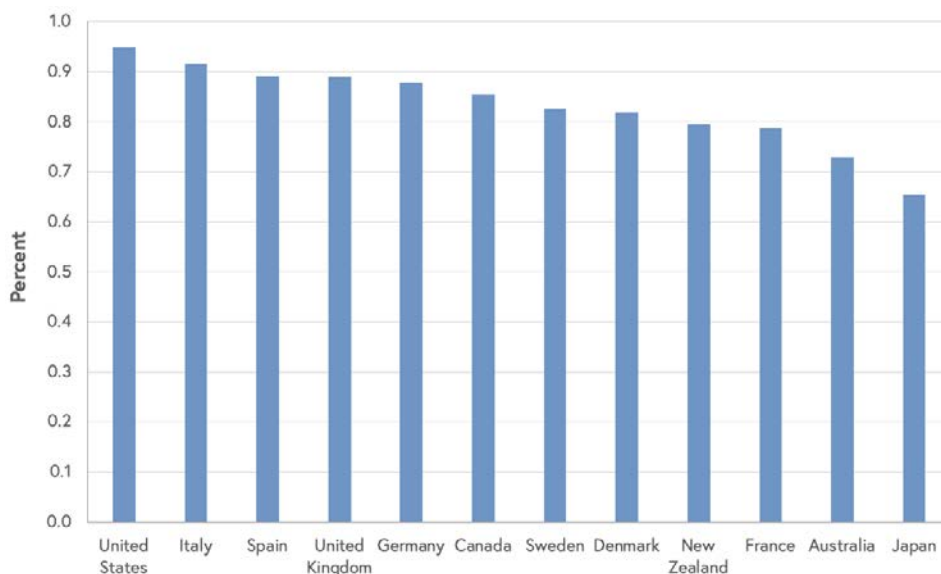
A desire to hedge domestic liabilities often constrains asset allocators to consider their inflation hedge purely in domestic market and domestic currency terms. This may be sub-optimal as, like any other asset class allocation decision, improved risk and return characteristics may be achieved by going global. The rationale to invest in global inflation-linked bonds, as opposed to staying domestic, rests on the enhanced real return potential and improved diversification characteristics (i.e. lower volatility) of the asset class. Importantly, this may be achieved with only a small 'give up' of the domestic inflation hedge.

Inflation rates are highly correlated around the world

Often overlooked in the debate about whether to invest in global, as opposed to domestic inflation-linked bonds, is the global beta of inflation. Namely, the drivers of inflation in one country are often highly correlated with those in another. For example, a rise (or fall) in commodity prices feeds through into all inflation rates, a demand driven global economic slowdown has a similar impact on global inflation, and so on. While the sensitivity of each country to different inflation shocks is in part a function of the composition of the CPI basket (e.g. more food and necessities in lower per-capita income countries' CPIs results in a greater price sensitivity to these components), this 'common' exposure results in a relatively high correlation of inflation rates across the world.

This high correlation of domestic inflation with global inflation has been widely observed in a number of academic studies. By way of example, work by Ciccarelli and Mojon (2010)^{vi} suggests that the global inflation component among OECD countries may be as high as 70%, with a strong tendency for individual country inflation to follow long-term global trends. Similarly, work by Neely and Rapach (2011)^{vii} looking at a much broader group of 64 countries, including developing economies, suggests that on average 35% of an individual country's inflation is explained by global inflation and 16% by regional inflation. Both studies covered a long time period spanning both the acceleration of inflation in the 1960s and 1970s and subsequent decline and fall in volatility in the decades that followed. The high correlation of inflation in the aftermath of the Covid supply and subsequent demand shock is also self-evident.

Chart 1: Correlation of Individual Country with Advanced World Inflation



Source: IMF WEO April 2025, annual data series from 1980 to 2024.

The chart shows the correlation of selected countries with the combined advanced world inflation rate as defined by the IMF.

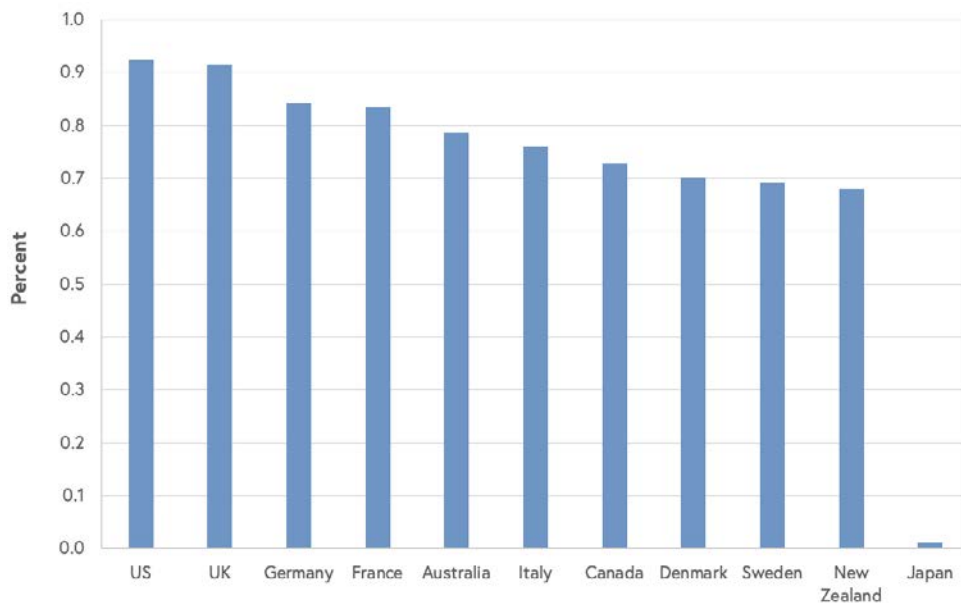


This phenomenon can also be seen in Chart 1. The average correlation of domestic inflation in developed countries (where there is issuance of inflation-linked bonds) with Advanced World^{viii} inflation has been in the order of 0.83 since the late 1980s. This suggests that the 'actual' tracking error of substituting global for domestic inflation-linked bonds is significantly lower than generally assumed.

As a result, global inflation-linked bond market returns are also reasonably correlated

This relatively high correlation of domestic with global inflation has historically resulted in a meaningful correlation of individual inflation-linked bond market returns with the global inflation-linked index returns (see Chart 2). Unsurprisingly given the high weight of both the US (approximately 52%) and the UK (21%) in the Bloomberg World Government Global Inflation-Linked Bond benchmark as at the end of May 2025, their respective return correlations with the global index are relatively high and are in the order of 0.9. However, even the much smaller weighted countries like Australia, Canada, Denmark, France, New Zealand, Sweden and Germany all have return correlations in the order of 0.7 - 0.8^{ix}. This suggests that an investor in global inflation-linked bonds is getting most of the domestic 'inflation insurance' by investing globally, whilst also accessing the potential to benefit from the increased return opportunities afforded by a larger opportunity set. In the case of Australia for example, the historical correlation of returns of Australian inflation-linked bonds with global inflation-linked bonds suggests that the latter may provide a reasonable hedge against Australian inflation while potentially offering higher returns and enhanced diversification.

Chart 2: Correlation of Individual Country Inflation-Linked Bond Returns with Global Inflation-Linked Bond Returns



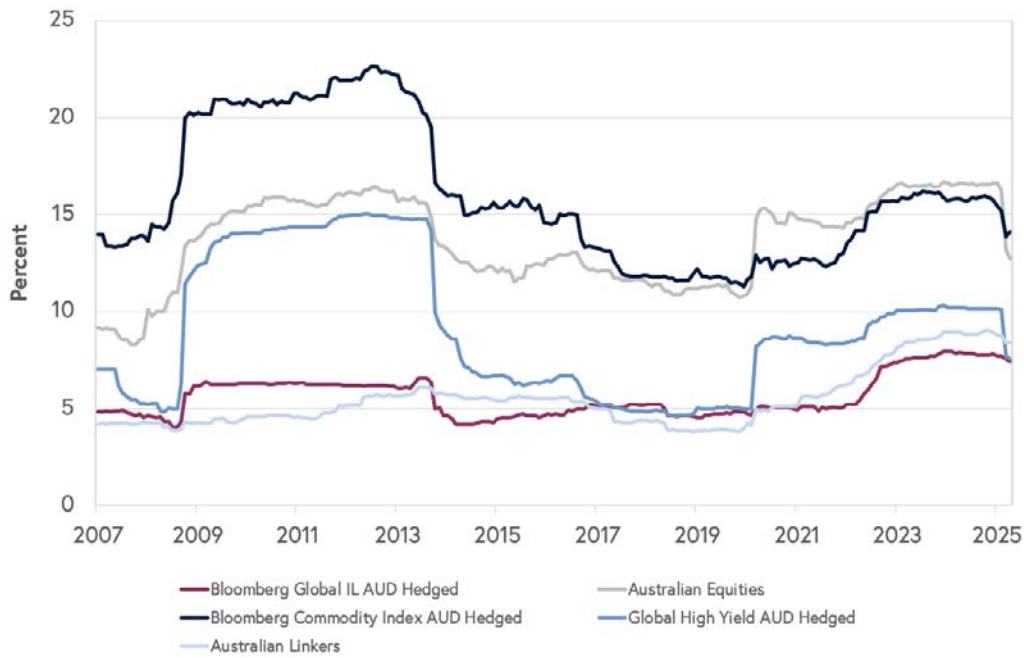
Source: Bloomberg. Monthly Index return data in AUD hedged terms. Correlation estimates use monthly data for the 5 years to end May 2025.

Global diversification produces lower volatility

The volatility of global inflation-linked bonds in hedged Australian dollar terms has been similar to that of Australian inflation-linked bonds since the emergence of this asset class, albeit slightly lower in the post covid period. Both have been notably lower than other alternative asset classes (Chart 3). While the relatively short time period since inception of most of these inflation-linked bond markets suggests some caution in interpreting this data, it should be apparent that the volatility of the global index has (as expected) been low and similar to the domestic alternative over this period. Furthermore, the asset class has lower volatility than a number of other asset classes, including commodities, that are often touted as inflation hedges.



Chart 3: Five Year Rolling Annualised Volatility



Source: Bloomberg. All the return data are in AUD hedged terms, five years rolling to end May 2025.

Notwithstanding the relatively high correlation at the aggregate index level, there is notable diversity across the global opportunity set. Table 1 highlights the low correlation between some of the alternative markets in the opportunity set. While the correlation between the US and UK is in the order of 0.73, that between Germany and Mexico is 0.27, and New Zealand and Colombia 0.2. Similarly, the Australian market has had a negative correlation of -0.05 with the Japanese inflation-linked market. Such low correlations provide excellent diversification potential, improving the overall risk reward characteristics of a global portfolio.

Table 1: Correlation of Inflation-Linked Bond Market 5 Year Monthly Returns AUD Hedged

	Australia	Canada	Denmark	France	Germany	Italy	Japan	New Zealand	Sweden	UK	US	Global	Brazil	Mexico	Colombia	Chile
Australia	1.00															
Canada	0.68	1.00														
Denmark	0.64	0.48	1.00													
France	0.71	0.59	0.84	1.00												
Germany	0.69	0.59	0.85	0.97	1.00											
Italy	0.67	0.55	0.81	0.91	0.87	1.00										
Japan	-0.05	0.11	0.01	0.09	0.09	0.08	1.00									
New Zealand	0.74	0.65	0.50	0.58	0.57	0.50	0.05	1.00								
Spain	0.69	0.57	0.83	0.97	0.94	0.91	0.08	0.57	1.00							
Sweden	0.65	0.53	0.60	0.65	0.69	0.51	-0.09	0.52	0.59	1.00						
UK	0.66	0.60	0.55	0.66	0.68	0.62	-0.01	0.58	0.61	0.55	1.00					
US	0.75	0.74	0.64	0.76	0.77	0.67	0.00	0.66	0.73	0.71	0.72	1.00				
Mexico	0.41	0.53	0.19	0.30	0.27	0.35	0.14	0.47	0.32	0.28	0.45	0.59	1.00			
Colombia	0.27	0.13	0.09	0.04	0.05	0.18	0.25	0.22	-0.02	0.00	0.23	0.16	0.40	1.00		
Chile	0.42	0.45	0.43	0.40	0.36	0.44	0.15	0.51	0.41	0.38	0.36	0.44	0.52	0.24	1.00	

Source: Bloomberg. All the return data in AUD hedged terms.
Correlation estimates use monthly data for the 5 years to end May 2025.



III. The Evolution of Inflation-Linked Bond Markets

An investor looking to invest globally in inflation-linked bonds is confronted by a diverse and growing opportunity set in both developed and developing markets. Their use is more entrenched in a number of developing economies, with most developed economies only beginning issuance from the 1990s onwards. Not surprisingly, the Latin American countries were at the forefront of developing the use of inflation-linked bonds. The persistent and diverse nature of the inflation shocks that frequently rolled across the continent promoted the growth of the asset class. Brazil, for example, issued its first inflation-linked bond in 1964. Even though the threat of hyperinflation has subsequently eased on the continent as many countries have adopted orthodox macro-economies policies, they have remained an asset of choice in many Latin economies. In addition to Brazil, they are now firmly entrenched in Chile, Colombia and Mexico.

In contrast, the asset class is relatively new in the developed world. While the UK established the 'linker' market in 1981 most other developed countries like Australia, Canada, Sweden, France and the US only started issuing inflation-linked bonds in the 1990s. The largest market – the US Treasury Inflation-Protected Securities (TIPS) market – only began in 1997. A second wave saw recently the likes of Germany*, Japan, Denmark, Hong Kong, Spain, to name a few, issue inflation-linked bonds throughout the 2000's. The Germans however ceased further issuance in 2024, the existing four German inflation-linked bonds will however remain tradable but will not be reopened.

While the number and size of issuance varies by market, a number of countries have now developed deep and liquid inflation-linked yield curves extending from 2 through to 30 years. The US and the UK, for example, has some 53 and 33 inflation-linked bonds on issue respectively across the entire maturity spectrum. The UK has even issued a 52-year bond stretching the curve out to 2073. The Australian government restarted its inflation-linked bond program in 2009 and now has a developed inflation-linked curve extending out to 2050. Latin America's historical experience has resulted in many of those countries developing full maturity yield curves, with the likes of Mexico and Brazil having maturities all the way out to 2054 and 2060, respectively. In contrast, South Korea who begun issuance in 2007, have six bonds with the longest maturity limited to 10 years. More recently, New Zealand has re-entered the market and has four bonds with maturities stretching out to 2040. While the length of maturity and market depth varies across countries, there is a clear commitment across many sovereign debt management offices to develop this market and to continue to improve liquidity in this asset class to meet increasing demand.

IV. Colchester's Approach to Investing in Inflation-Linked Bonds

Colchester believes its real yield value based approach to managing bond portfolios is particularly well suited to managing inflation-linked bond portfolios. At the heart of Colchester's philosophy is the belief that investments should be valued in terms of the income they will generate in real terms. The approach was developed using key actuarial principles which have at its core inflation-adjusted income and present valuing techniques. The investment approach is therefore based on the analysis of inflation, real interest rates and real exchange rates, supplemented by our Financial Stability Score (FSS). FSS combines an assessment of a country's overall balance sheet strength (fiscal, external and monetary etc.), governance and other [ESG factors](#)^{xi}. Portfolios are constructed to benefit from those opportunities with the greatest relative risk adjusted real investment potential for a given level of risk.

Underpinning the investment approach is a forecast of inflation. The forecasts are underpinned by standard monetary theory, commodity and nominal currency movements and capacity utilisation considerations. Armed with these forecasts and supplemented with an assessment of the financial strength of a country, Colchester then makes an assessment of the



potential real return on offer in both inflation-linked and nominal bond markets and across various segments of the yield curve. An optimal bond portfolio is then constructed, utilising the highest risk adjusted real yielding global government bonds and segments, subject to a tracking error target, concentration limits and other risk considerations.

Within this framework, Colchester seeks to add value in its inflation-linked bond programs by:

- Investing in the highest real yielding inflation-linked bond markets;
- Investing in the highest value part of a country's inflation-linked yield curve;
- Investing in high real yielding nominal bonds in a limited and constrained fashion when appropriate; and,
- Adding additional alpha through its currency management.

Colchester invests only in sovereign bonds. For the developed global-linked inflation program, the universe includes markets that are investment grade or higher although different minimum credit ratings may be applied at the discretion of separate account clients. Colchester applies a qualitative screen to all countries to decide upon their inclusion, or otherwise, in the opportunity set. Size of market, liquidity, institutional structure, regulatory environment, capital regulations, political environment, stability issues, etc., are all considered by Colchester in its determination of the suitability of a country to be included in the opportunity set. Colchester considers the current global inflation-linked investment universe to be broken down as follows:

Table 2: Colchester Global Inflation-Linked Investment Universe

Developed World Inflation-Linked Bond Universe (investment grade or higher at time of purchase)					
Australia	Canada	Chile	Colombia	Denmark	France
Germany	Israel	Italy	Japan	Mexico	New Zealand
Spain	South Korea	Sweden	United Kingdom	United States	

Developing World (EM) Inflation-Linked Universe					
Brazil	Chile	Colombia	Israel	Mexico	Peru
Poland	South Africa	South Korea	Thailand	Türkiye	Uruguay

Lastly, Colchester's well-established currency valuation framework uses estimates of real exchange rates, short term real interest rate differentials and external balance sheet and ESG factors to determine value. Optimal currency portfolios are built, and as noted above, risk managed within this framework to provide another potential source of lowly correlated alpha. Together, Colchester's independently constructed optimal bond and currency portfolios deliver a well-diversified overall global inflation-linked government bond portfolio.

V. The 2022 Return Paradox

After a decade or more of low and stable inflation in the aftermath of the Global Financial Crisis, inflation returned forcefully in response to the Covid shock to remind everyone of its potential destructive powers. It also brought into focus the use of inflation-linked bonds as an asset diversifier and a potential hedge against inflation.

In the aftermath of the Covid shock inflation rose to multi-decade highs across the globe. Policymakers were slow to respond in many countries, initially viewing the upward pressure on inflation as transitory. Only in 2022 when price pressures had broadened, and inflation was becoming entrenched, did the major central banks embark on an aggressive interest rate hiking cycle.



In the early stages of the inflation shock, inflation-linked bonds outperformed nominal bonds returning +5.47% in 2021 versus nominal bond returns of -2.38%^{xii}. However, inflation-linked bonds are particularly sensitive to movements in real yields. The cashflow structure means that they are typically of a longer interest rate duration and so are more sensitive to changes in interest rates compared to nominal bonds with a similar maturity. This interest rate sensitivity negatively impacted on the total return of inflation-linked bonds in 2022 as interest rates rose sharply, offsetting the inflation indexation component of return. As a result, global inflation-linked bonds suffered double-digit negative returns in 2022 and underperformed nominal bonds by 4.5% as both real and nominal yields rose. This came as a surprise to some.

The longer duration exposure of inflation-linked bonds paradoxically led to a situation where inflation-linked bonds underperformed nominal bonds in a rising interest rate environment triggered by higher inflation. This may suggest to some that inflation-linked bonds may be a poor hedge against unexpected inflation shocks. However, as with all asset prices, the starting point matters, and it is especially important in understanding the performance of inflation-linked bonds in the great interest rate unwind in the aftermath of the abnormal post GFC decade. Real yields were close to historical lows going into 2022, so any adjustment back to historical norms would have an adverse impact on the price of both inflation-linked and nominal bonds as the real yield component in both reset. The longer duration exposure of inflation-linked bond benchmarks relative to nominal bond benchmarks explains this apparent relative return paradox. The outsized impact of the rise in the real yield element can be seen in the magnitude of the increase in the US 10-year inflation-linked bond (TIPS) from a low of around -1.1% at the end of 2021 towards +1.5% to +2% at the end of 2022, and into 2023 (please see Chart 4). While the current outlook is clouded, in our opinion the likelihood of a further 3% increase in real yields is unlikely in the near term. This suggests that it is more likely than not that going forward the potential impact of any further upward adjustment in global real yields will have a more muted impact on price and thus not overwhelm the inflation indexation element of returns.

VI. Current Valuations of Inflation-Linked Bonds

To the extent that asset allocators may be concerned about an increasingly uncertain and potentially diverse inflation outlook in 2025, inflation-linked bonds may have a part to play. Inflation expectations have risen in 2025, particularly in the US, amid concerns that the US Administrations tariff agenda will lead to higher prices. However, uncertainty surrounding the scale, duration, and scope of tariffs complicates their potential impact on a global level. Initially, tariffs may be expected to act like a supply shock – pushing inflation up – especially in the US, where tariffs on imports are likely to be passed onto consumers. Outside the US, direct inflation effects depend on whether retaliatory tariffs or barriers emerge. The second-round effects on inflation are even less clear. As tariffs raise prices, this is expected to reduce consumer income and demand, potentially slowing growth and exerting downward pressure on inflation. Additionally, goods redirected from the US market to other countries could also potentially lower prices there.

Furthermore, while inflation has fallen from its 2022 highs in most countries, the "last mile" of restoring inflation to target levels has proven to be difficult. Core inflation remains elevated across a number of developed countries. Moreover, inflationary pressures coming from increasing protectionism, trade barriers, realignment of supply chains, and tightening immigration are all immediate manifestations of a broader reversal of the drivers of the previous decades' secular disinflation trend. All these factors suggest inflation is likely to be more uncertain and structurally tilted to the upside going forward. Such inflation uncertainty and improved valuation metrics compared with the early 2020's suggests global inflation-linked bonds may now provide a prudent hedge against future unexpected inflation at a relatively low "insurance" cost.

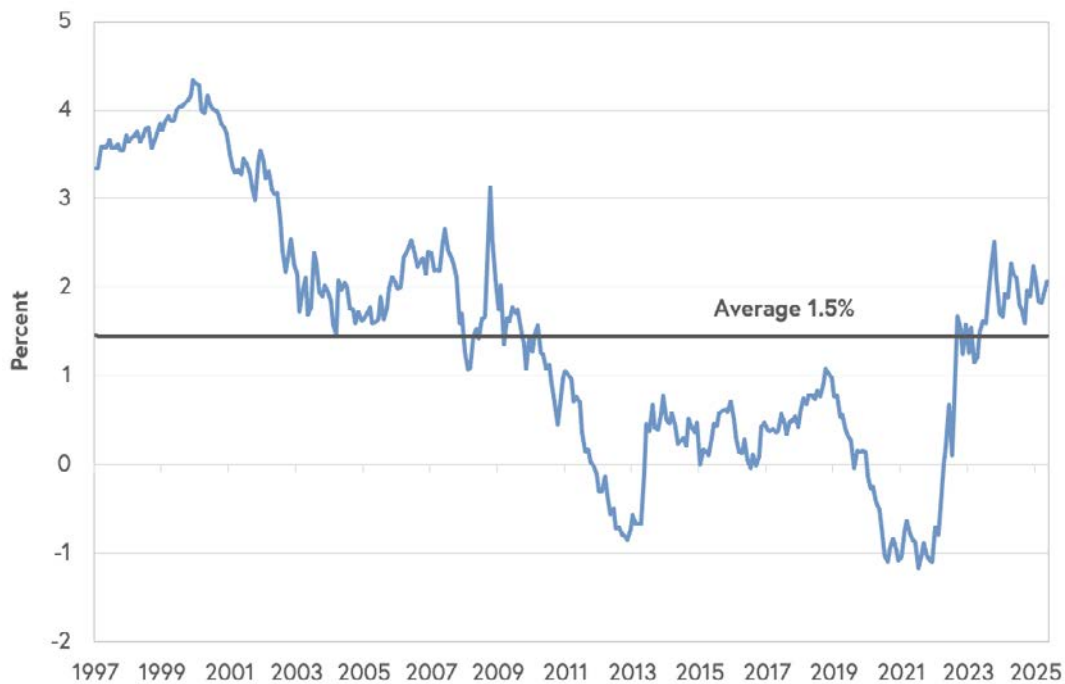


The post 2021 back up in real yields has translated through into attractive value in the global inflation-linked bond space. The rise in real yields seen in the US (Chart 4) has been mirrored in other inflation-linked bond markets around the globe. The UK Linker market, for example, followed a similar path to the US (Chart 5). Historically the UK had been one of the most expensive, if not the most expensive market, in the global inflation-linked opportunity set for a number of years. There was and continues to be strong demand for UK Linkers from Britain's large defined benefit pension schemes who use the bonds to help derisk their portfolios. This demand was key in driving down UK real yields into deeply negative territory. However valuations have improved significantly and as at the end of May 2025, UK 10 year Linkers were offering a real yield of around 1.5%, the highest level it has been since 2009 and meaningfully above its long-term historical average.

In our opinion, the real yield levels currently on offer in global and emerging market bond space suggests that investors are being paid to own bonds today compared to the last decade when real yields were near zero (or even turned negative in some cases) and inflation remain muted.

Furthermore, as illustrated in Chart 6, which shows the real yield valuations as at the end of May 2025, there are a number of markets showing attractive valuations. This suggests that a diverse portfolio of global inflation-linked bonds could be constructed including the likes of New Zealand, the US, Canada, Mexico, and Colombia, along with some Australian inflation-linked bonds, that would offer relatively attractive valuations, as well as providing some diversification benefits relative to a single country portfolio (such as a standalone Australian inflation-linked portfolio). In addition to Mexico and Colombia, Chart 7 shows Brazil and South Africa are offering real yields of 7.3% and 5.2% respectively in the emerging inflation-linked opportunity set.

Chart 4: 10 Year US Treasury Inflation Protection Real Yield



Source: Bloomberg. Data from Jan 1997 to May 2025.

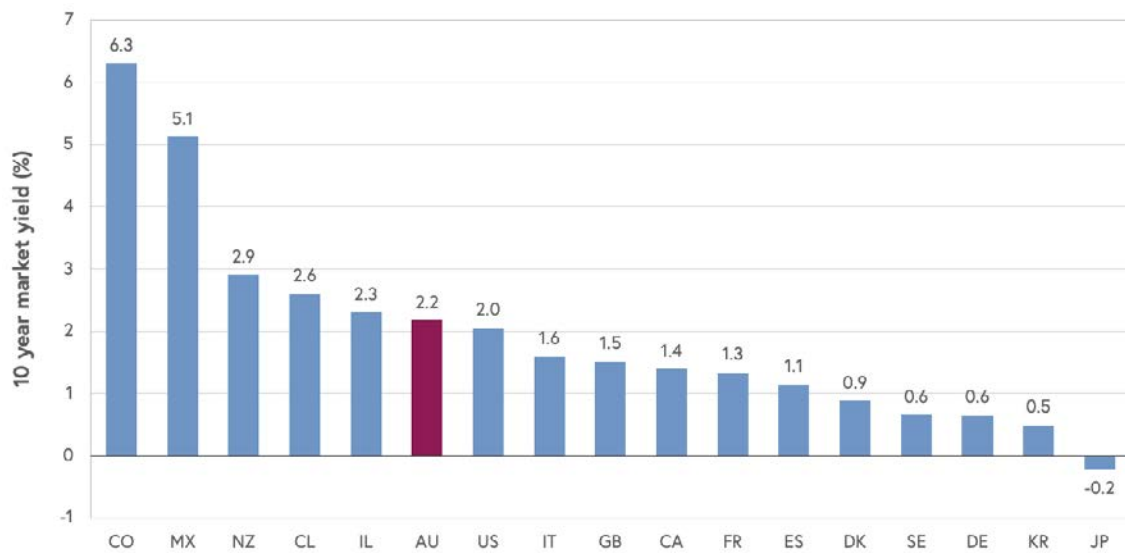


Chart 5: 10 Year UK Linker Real Yield



Source: Bloomberg. Data from Jan 1993 to May 2025.

Chart 6: Market Real Yield on 10 Year Inflation-Linked Bonds as at May 2025

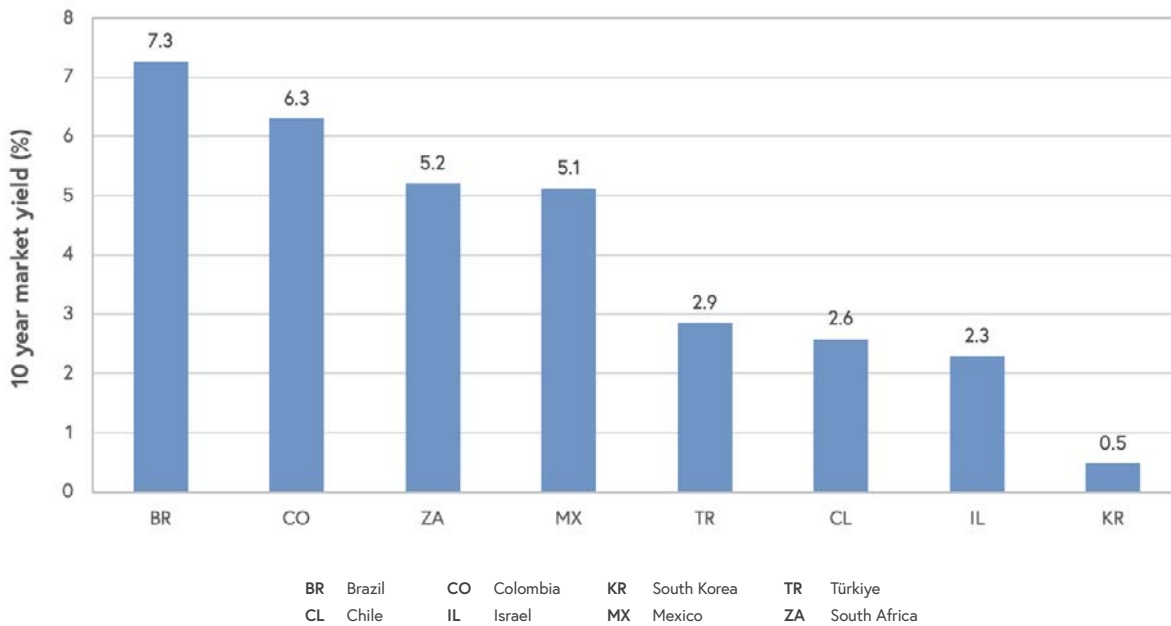


AU Australia	DE Germany	GB United Kingdom	KR South Korea	US United States
CA Canada	DK Denmark	IL Israel	MX Mexico	
CL Chile	ES Spain	IT Italy	NZ New Zealand	
CO Colombia	FR France	JP Japan	SE Sweden	

Source: Colchester Global Investors.



Chart 7: Emerging Market Real Yield on 10 Year Inflation-Linked Bonds as at May 2025



Source: Colchester Global Investors.

VII. Summary – Potential Implications for an Australian Based Investor

History shows that the perceived "inflationary hedge" provided by certain asset classes, such as property, commodities and others, is time dependent and typically a function of the driver or "type" of inflationary shock. Unsurprisingly commodity returns have been high at times of positive commodity price shocks, and so on. The empirical evidence suggests that inflation-linked bonds provide the most consistent hedge against inflation and are therefore the most likely to provide some degree of inflation protection, on average over time. Naturally investors who determine that there is a role for such a hedge within their diversified aggregate portfolio, are drawn to holding their own domestic inflation-linked bonds. In other words, an Australian dollar investor would look to own Australian inflation-linked bonds in the first instance. However, history also suggests that there is a high correlation of inflation around the world. Accordingly, inflation in the likes of Australia moves broadly in a similar way to that observed elsewhere in the world. Not a surprising result if one considers the transmission of higher oil prices, global supply chain disruptions, etc., around the globe and their inflationary consequences. Given this interconnectivity, most developed world inflation-linked bond market returns – including those in Australia – have been highly correlated with "global" returns. Whilst clearly not "hedging" all country specific inflation risks – such as those stemming from a natural disaster, wayward policy, or country specific economic shocks – this high correlation of returns suggests the majority of the inflation risk may be hedged with exposure to a diversified basket of global inflation-linked bonds. Doing so opens up the opportunity to benefit from both potentially higher returns on offer elsewhere, and the diversification afforded by the low correlations between some countries in the broader global opportunity set. This suggests that an Australian investor may improve the overall risk reward characteristics of their portfolio by introducing some exposure to global inflation-linked bonds into their aggregate portfolio, either in place of, or alongside, Australian inflation-linked bonds.



Appendix: Market Overview

Information on each market can be found in the following table. Today's global government inflation-linked bond markets in the developed world originated in their current form in the UK in 1981. Issuance subsequently followed chronologically in Australia, Canada, Sweden, New Zealand, the US, France, Italy, Japan, Germany, Denmark and Spain.

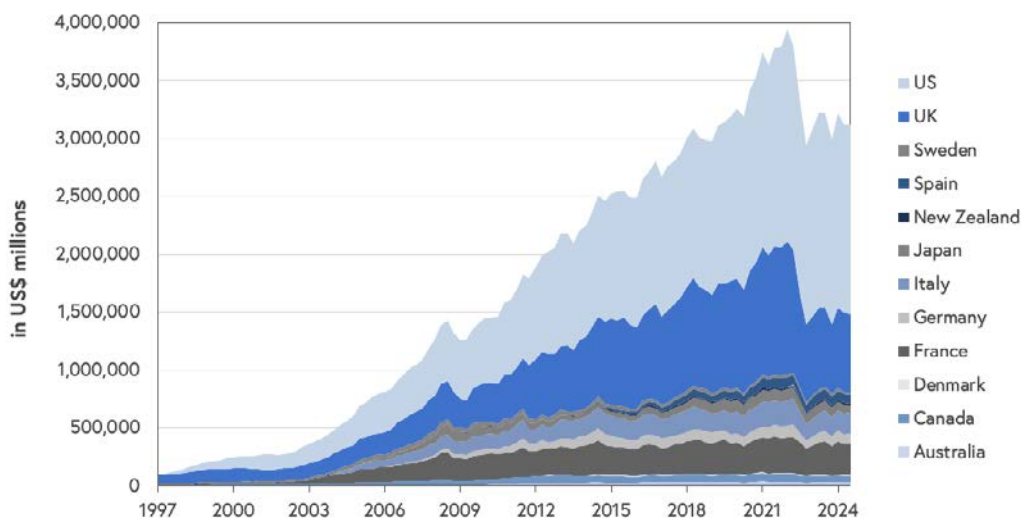
Inflation-linked bonds were first issued in emerging markets well before developed markets, although not in their current form. Israel was the first emerging market country to issue inflation-linked bonds in 1955, followed by Chile in 1956. Both countries struggled at that time with stubborn and high inflation, and inflation-linked bonds were the only means of market funding in local currency at medium-term maturities. Brazil and Colombia launched inflation-linked bonds in the 1960s, the popularity of inflation-linked bonds in these markets and elsewhere in Latin America increased significantly as those countries went through crises during the 1980s and 1990s. Other smaller markets followed suit throughout the 1990s and in the 2000s like South Korea (2007) and Türkiye (2007).

Colchester assesses the depth and limitations of each inflation-linked market rigorously. Each new market Colchester identifies for inclusion within the inflation-linked investment opportunity set is subject to an assessment before investment commences. The review includes:

- Institutional arrangements and market operations, including settlement, restrictions on local currency, registration and certification requirements, etc.
- The range and nature of active market counterparties.
- The key features of acceptable securities within the market.
- Market liquidity.
- Withholding tax framework, including the income and capital gains tax consequences of investment in the market and the potential impact of those costs (broad implications based on jurisdiction and entity type). The understanding of the tax framework is not to provide tax advice to clients, but rather to understand its impact on the potential real yield.

The following charts show the growth of the developed or advanced country and developing government inflation-linked bond markets.

Chart 8: Growth of Inflation-Linked Issuance in Developed Markets

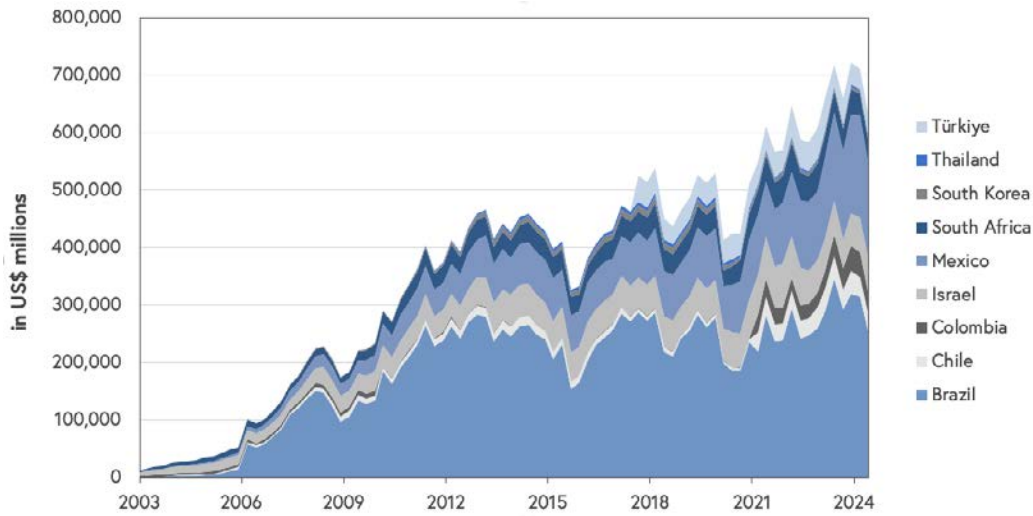


Source: Bloomberg – data from Jan 1997 to May 2025.

Note: The chart includes only those Inflation-linked government bond markets in the Bloomberg World Government Inflation-Linked Bond (WGILB) Index.



Chart 9: Growth of Inflation-Linked Issuance in Developing Markets



Source: Bloomberg Barclays – data from Dec 2002 to May 2025.

Note: The chart includes only those Inflation-linked government bond markets in the Bloomberg Emerging Markets Tradable Inflation-Linked Bond (EMTIL) Index.

Table 3: Inflation-Linked Bond Information by Country of Issuance

	Australia	Brazil	Canada	Chile	Colombia	Denmark	France	Germany	Israel	Italy	Japan
Generic Name	Australian Capital Indexed Bonds	NTN-Bs, NTN-Cs	Canadian Real Return Bonds	BCU	TES	DGBi	OATi, OAT€i, BTAN€i	OBL€i, DBR€i	Galil, ILCPI	BTP€i	JGBi
First Issued	1985	1964	1991	1956	1967	2012	1998	2006	1995	2003	2004
Linking Index	All Groups CPI	IPCA, IGPM	CPI All Items nsa	UF CPI	UVR CPI	Denmark CPI	French CPI ex-tobacco; Euro HICP ex-tobacco	Euro HICP ex-tobacco	Israel CPI	Euro HICP ex-tobacco	Nationwide CPI General ex-Fresh Food
Linking Index Bloomberg Ticker	AUCPI Index	BZPIIPCA Index	CACPI Index	CLUFUF Index	COCPi Index	DNCPINEW Index	FRCPXTOB Index, CPTFEMU Index	CPTFEMU Index	ISCPINM Index	CPTFEMU Index	JCPNGENF Index
Indexation Lag	6 months	Up to 4 weeks, includes forecasts	2-3 months	1 month to 9th of month	1 month to 15th of month	2-3 months	2-3 months	2-3 months	Up to 1.5 months adjusted on inflation release	2-3 months	2-3 months to 10th of month
Par Floor?	Coupon and principal par floor	No floor	No floor	No floor	No floor	Par floor	Par floor	Par floor	Coupon and principal par floor (Galil), No floor (ILCPI)	Par floor	Par floor for new issuances since 2013
Coupon frequency	Quarterly	Semi-annual	Semi-annual	Semi-annual	Monthly	Annual	Annual	Annual	Annual	Semi-annual	Semi-annual
Market value outstanding US\$m*	29,503	287,527	53,389	35,931	40,129	6,654	305,519	63,647	74,149	228,397	63,220



	Mexico	New Zealand	Peru	South Africa	South Korea	Spain	Sweden	Thailand	Türkiye	UK	Uruguay	US
Generic Name	Udibonos	New Zealand Inflation-Indexed Bond (IIB)	VAC	South Africa Index-Linked bond	KTBi	SPGBEi	Swedish Government Index-Linked	THAIGB	TURKGB	United Kingdom Index-Linked Gilts	UI	Treasury Inflation Indexed Securities, TIIS, TIPS
First Issued	1989	1995**	2003	2000	2007	2014	1994	2011	1997	1981	2007	1997
Linking Index	Unidas de Inversion (UDI)	New Zealand All Groups CPI	VAC Index linked to monthly CPI	South Africa CPI NSA	Korean CPI	Euro HICP ex-tobacco	CPI nsa	Thailand CPI	Turkish CPI	RPI	Uruguay Indexed Unit (Unidad Indexada)	CPI All Urban nsa
Linking Index Bloomberg Ticker	MXUDI Index	NZCPCPI Index	PRVAC Index	SACPI Index	KOCPI Index	CPTFEMU Index	SWCPI Index	THCPI Index	TUCPI Index	UKRPI Index	URUIRUI Index	CPURNSA Index
Indexation Lag	up to 2 weeks	6 months	1 month	3-4 months	2-3 months	2-3 months	2-3 months	2-3 months	2-3 months	8 months or 2-3 months	1 month	2-3 months
Floor?	Par floor	Coupon and principal par floor	No floor	Par floor	No floor	Par floor	Par floor for new issuances since 1999	Par floor	Par floor	No floor	No Floor	Par floor
Coupon frequency	Semi-annual	Quarterly	Semi-annual	Semi-annual	Semi-annual	Annual	Annual	Semi-annual	Semi-annual	Semi-annual	Semi-annual	Semi-annual
Market value outstanding US\$m ⁿ	180,727	13,249	930	46,756	5,456	95,337	21,375	3,635	34,358	674,009	8,499	1,687,724

*as of 31st May 2025.

** relaunch of New Zealand's government indexed bond market (two different series of index-linked bonds were issued starting in 1977, but discontinued in 1984).

Source: Bloomberg; Colchester; National Treasury Department; Price, R. (1997) "The Rationale and Design of Inflation-Indexed Bonds", IMF WP 97/12, p.56-65; Deacon M., Derry A., and Mirfendereski D., (2004) "Inflation-indexed Securities: Bonds, Swaps and Other Derivatives", 2nd Edition, p179.

Note: Table 2 includes only those Inflation-linked government bond markets within Colchester's investment universe.

- i See Brière, M. and Signori, O., (2011) "Hedging inflation risk in a Developing Economy" Available at SSRN: <http://ssrn.com/abstract=1805512>.
- ii See for example Fama, E. F. and Schwert, G. W., (1977) "Asset returns and inflation", Journal of Financial Economics, 5(2), p.115-146. And Fama, E.F., (1981). Stock Returns, Real Activity, Inflation, and Money, American Economic Review, 74 (4), p. 545-565.
- iii See Bekaert G. and Wang X., (2010) "Inflation Risk and the Inflation Risk Premium", Economic Policy, 25(64), October, p. 755-806.
- iv See Hoesli M., Lizieri C. and MacGregor B., (2008) The Inflation Hedging Characteristics of US and UK Investments: A Multi-Factor Error Correction Approach, Journal of Real Estate Finance and Economics, 36(2), p.183-206.
- v For example, over the period January 2001 to May 2025, the annualized volatility of monthly returns of Bloomberg World Government Inflation-Linked Bond Index has been 5.9%, compared with 15.6% for the Bloomberg Commodity Index.
- vi Ciccarelli M. and Mojon B., (2010). Global Inflation, The Review of Economics and Statistics, 92(3), p.524-535.
- vii Neely C. and Rapach D., 2011. International co-movements in Inflation rates and Country Characteristics, Journal of International Money and Finance, 30, p.1471-1490.
- viii Advanced World Economies' as defined by the IMF includes the following countries: Andorra, Australia, Austria, Belgium, Canada, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hong Kong SAR, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Luxembourg, Malta, Macao SAR, Netherlands, New Zealand, Norway, Puerto Rico, Portugal, San Marino, Singapore, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Taiwan Province of China, United Kingdom, and United States.
- ix The notable exception is Japan, which shows a very low correlation with the global index – likely due to idiosyncratic factors in the Japanese bond market, such as distorted pricing from Bank of Japan's dominance and the persistence of negative real yields over the past decade.
- x Germany's Finance Agentur announced that it would no longer issue or reopen inflation-linked bonds from 2024 onwards.
- xi <https://colchesterglobal.com/wp-content/uploads/esg-policy-june-2024.pdf>
- xii Return of nominal bonds measured by the FTSE World Government Bond Index (WGBI) and return of inflation-linked bonds measured by the Bloomberg World Government Inflation-Linked Bond (WGILB) Index, both in AUD hedged terms.



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