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The Case for Bonds

The purpose of this paper is to demonstrate that bonds can act as a preserver of value in portfolios during times of economic or financial stress. We also highlight how current bond market signalling is consistent with historical analogues where it was conducive to holding bonds.

Firstly, we provide historical context of how current bond market signalling is consistent with previous periods, where it was prudent to be underweight growth assets and to incorporate high quality bonds within one's portfolio.

We then showcase bond market returns across these periods to highlight how bonds can outperform on a relative basis and protect capital once these bond market signals are activated. We show the range of returns that are possible and that should be expected from bonds through these periods.

Additionally, we conduct a simple analysis where we speculate on bond index returns based on carry, changes in interest rates, current levels of bond market convexity and yield curve twist.

Background and Historical Context

A yield curve is a line graph that plots the yields or interest rates of bonds with different maturities. The yield curve shows the relationship between the bond yield and the bond's time to maturity.

The last 120 years provides robust data on how the yield curve can forewarn of impending stress in the economy and financial markets. The exact reasons for the robustness of this relationship can differ in every scenario.

Inversion of the yield curve, where longer term bond yields are lower than short term bond yields, may be a product of the intentional intervention by monetary authorities in order to slow the economy, mainly from the perceived threat of inflation.

It may also be a function of market participants' expectations of lower growth and economic activity. In such a scenario these participants may flock to higher quality and 'safe' assets such as bonds, pushing down the longer-term rates and causing the inversion.

Whilst yield curve inversion can be attributed to either of the above two hypotheses, they may not be the only cause.

High Quality Bonds as Collateral

When we consider what a government bond is, it is simply **long duration currency that is collateralised.** That is, for a 30-year US Treasury Bond, you will receive a large payment of US Dollars at maturity, and many small coupon payments of US Dollars every 6 months until maturity. These future receipts of US Dollars are discounted into a present value, being the bond price, that can act as collateral (an asset) in its own right. This gives the holder an ability to pledge this asset as collateral for borrowings if desired, just as you would pledge your own home as collateral to borrow from the bank.

However, unlike your home, the probability of a nominal default on a US Treasury are considered near zero. Given that a US Treasury is merely a stream of future US Dollar cashflows with a near 100% probability of being paid in nominal terms, US Treasuries exhibit 'moneyness' or are themselves a form of money or currency within our financial system. This is the same for many high-quality government bonds across the globe.

The implication is that these high-quality, mainly government bonds and other securitised assets such as Mortgage-Backed Securities (MBS), are often transferred between large financial

institutions as if they were themselves currency. Why not just use cash? Well, as we have recently seen, an uninsured bank deposit with any size has too much counterparty risk. And bank reserves kept by banks at the Fed can only be used in very narrow interbank transactions. So collateralised currency, being high-quality bonds, can act as cash in wholesale markets but with less counterparty risk.

As we have recently found, banks and other financial institutions hold vast amounts of these collateral assets on their balance sheets. They are often traded and swapped between those institutions in order to manage balance sheet liquidity and maturity transformation (funding themselves at lower rates to lend at higher rates). These are often off-balance sheet activities conducted via 'repo', or repurchase, markets. The same collateral asset can often be used and 'rehypothecated' (that is, repledged or reused) multiple times by counterparties who receive it in these wholesale money market transactions.

So, bonds are an asset often used by banks and other institutions to manage their balance sheets and assists them to provide credit and liquidity to the broader economy and financial system. If the value of this collateral declines too much, as we have seen recently when interest rates rise, it impairs bank balance sheets and their ability to extend credit to the financial system. **As a result, such collateral asset values underpin risk asset values more than people typically realise, particularly through the funding and credit channel.**

The last sentence in bold is key. If the value of high-quality bonds or collateral decline, the less balance sheet capacity banks have to create credit. Banks and large financial institutions utilise bonds as collateral to manage asset and liability matching on their balance sheets, manage risk and to make profits.

For financial institutions such as banks and primary dealers, **bonds aren't just investments. They are balance sheet tools.** They use these tools in many complex ways to not only manage their own balance sheet but also help the balance sheet management of other financial market participants. Financial institutions that are users of this collateral look at many aspects relating to these instruments. This includes liquidity, volatility, interest rate sensitivity and the funding terms on offer for these instruments. This analysis then extends to their whole book. Sometimes they will demand particular securities in order to alter the risk of their wider book and has nothing to do with the characteristics of that individual security. However, sometimes the assumptions used in this analysis are wrong. Or there are sometimes shocks that impair the value or use of these instruments. The deterioration in value or quality of the collateral on a financial institution's balance sheet can in turn impair its ability to serve its function to the financial system or real economy.

Given the heavily financialised economic system of today, credit creation for asset purchases and productive investment is often a large driver of asset prices and economic activity respectively. However, this very credit creation is heavily influenced by the balance sheet health of financial institutions, such as banks. This balance sheet strength in turn is impacted by the stability (or volatility) and values of these balance sheet tools or collateral assets that we have spoken of.

Sophisticated participants in the wholesale money markets are usually the first to know of balance sheet constraints and problems in the financial sector. These markets are far greater in size than Central Bank balance sheets and account for more than 90% of money creation in our economic system. As economic or financial fragilities deteriorate, certain forms of lower quality collateral may no longer be accepted by counterparties in these markets. Or the terms may become prohibitive. As a result, the demand for higher quality bonds may rise for reasons that have nothing to do with conventional fundamentals but rather the balance sheet needs of market participants. In such situations, the prices of high-quality bonds can be bid up in excess of the short-term rates on offer. This results in what is known as an inverted yield curve.

Just as an individual would raise cash in a risk-off moment, large institutions accumulate collateral assets as they are a form of money in wholesale funding markets. Institutions that still possess balance sheet capacity have no incentive to conduct longer-term lending as the term structure of interest rates offer no term premia in an inverted condition. So, they instead preference the more attractive yield of short-term securities instead of longer-term lending. This is how the lagged effects of financial fragilities in the financial sector can translate into the real economy.

And so, it can often be a self-fulfilling prophecy, as whatever causes the inversion of the yield curve can influence market participants to change their behaviour and exacerbate the dynamics at play. Very importantly, an inverted yield curve approximates an expansion of bank assets and investment in excess of available savings and balance sheet capacity in the economy – and any slow-down in the growth rate of credit exposes the malinvestment and unsustainable economic structures that have built up. The result is an economic contraction.

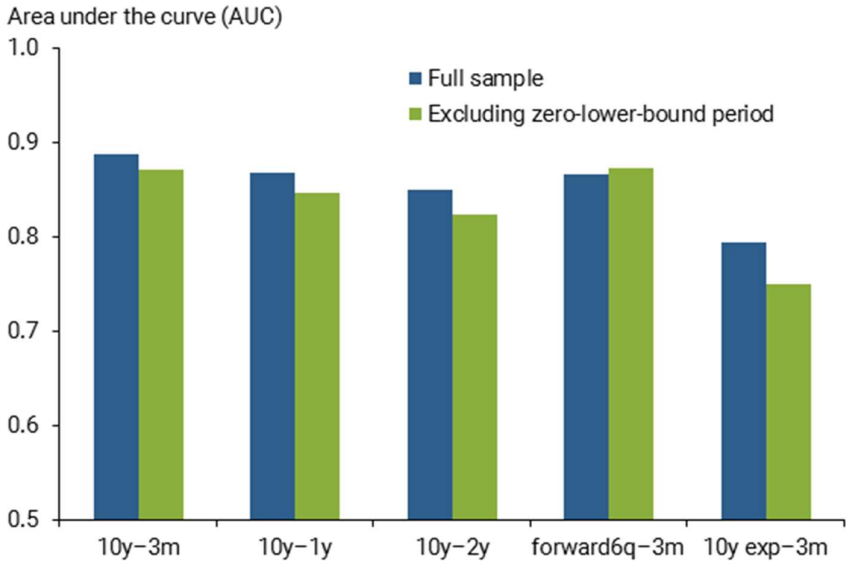
Put simply, the yield curve is a great measure of the appetite for risk assets versus collateral (safe) assets in the financial sector. When the yield curve is at its flattest, confidence is in excess, and it is generally prudent to be accumulating collateral assets (such as bonds). When the yield curve is at its steepest the demand for collateral is in excess and you want to be accumulating risk assets (such as equities).

As George Soros articulated in the Alchemy of Finance, 'Experience has taught me that the best buying opportunities in long-term bonds present themselves when the yield curve is inverted.'

Significance of the Yield Curve

The statistical significance of the yield curve in predicting recession is prescient. In 2018, the San Francisco Federal Reserve conducted a study to assess this significance. Their results are shown by Figure 1 below.

Figure 1: The Predictive Power of Different Term Spreads[1]



[1] Information in the Yield Curve About Future Recessions, Federals Reserve Bank of San Francisco Economic Letter, August 27, 2018

A reading close to 1 on the y-axis infers perfect predictive power. A reading of 0.5 corresponds to the absence of any predictive power. The San Francisco Fed found that the 10yr-3mth yield curve was the most coincident curve in predicting a recession. This is significant as risk asset prices tend to be poor during a recession. Whereas collateral or 'flight to safety' assets tend to do relatively well in these periods.

An inverted yield curve is not a perfect predictor of recessions. There have been recessions where the yield curve has not been inverted. There can also be long lags between inversion and crises. As we will soon see, it is the ***yield curve steepening*** that is more coincident with economic slowdown and crises.

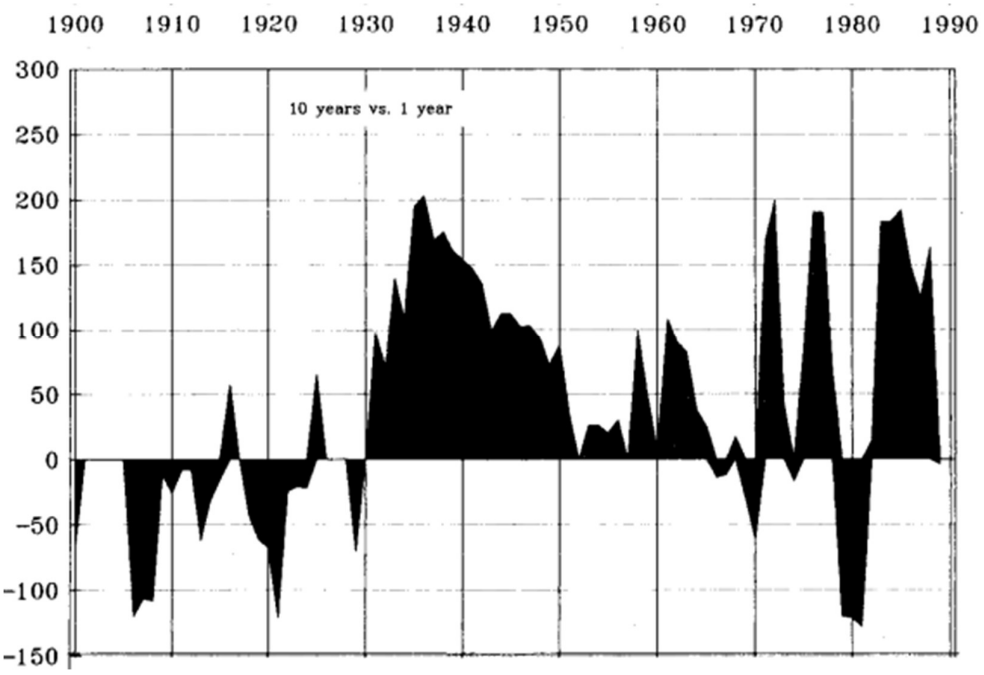
It is important to keep in mind that an inverted yield curve is not just a predictor of recession. As we spoke of earlier, yield curve inversion may simply be an indicator of financial fragility that ultimately leads to a recession.

Nevertheless, from an asset allocation perspective, severe yield curve inversion followed by curve steepening is certainly a signal one should pay attention to when trying to manage risk. It has also tended to be a conducive time to owning bonds as we will demonstrate.

The Historical Experience of the Yield Curve and Bond Returns

Having established why the yield curve inverts before and during crises, we now examine previous periods of inversion and the resultant experience with respect to bond market returns. Figure 2 displays the history of yield spreads for the United States in the 20th Century.

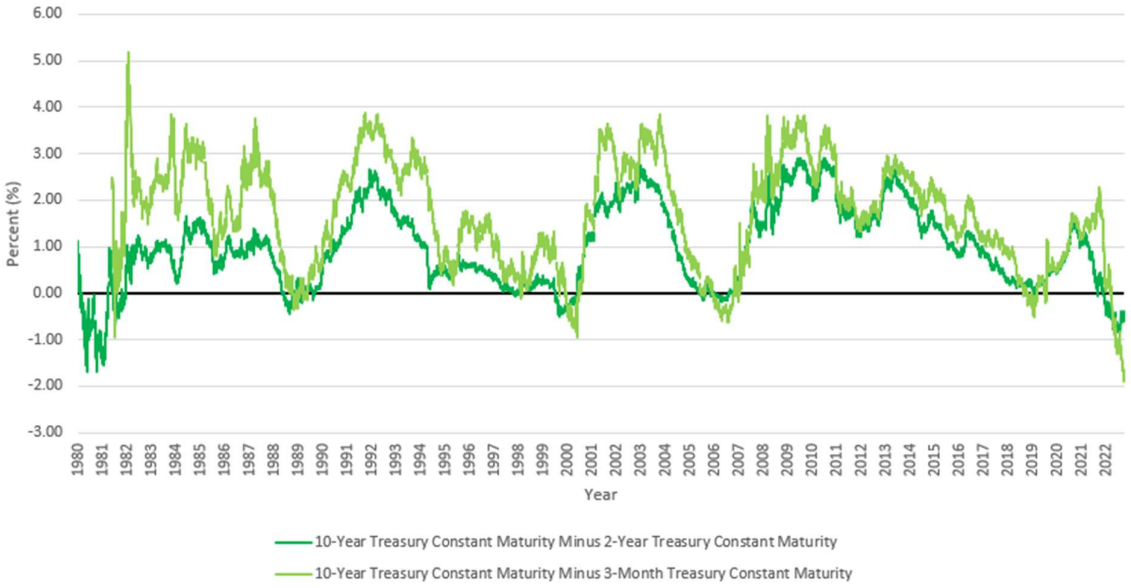
Figure 2: History of Yield Spreads Between Basic Corporate (1900-1955) and US Government (1956-1989) Bond Yields[2]



[2] A History of Interest Rates, Sidney Homer, Wiley Finance 4th Edition, pg. 405

We also display more recent decades of yield spreads data, for which we have clearer data sources for. In Figure 3, we display both the 10yr-2yr and 10yr-3mth yield curves.

Figure 3: Major US Yield Spreads[3]



It can be noted from the charts above that yield spreads was a harbinger of the following crises:

- 1907 Bank Panic
- 1910 recession
- 1913/14 recession
- 1921 depression
- 1929 Great Depression
- 1969/70 recession
- 1973/75 recession
- 1980 recession and 1981/82 Savings and Loans Crisis
- 1990/91 recession
- 2001/03 recession
- 2008 Global Financial Crisis

All the above episodes were precipitated by a steepening yield curve.

We first must note that a steepening of the yield curve is a coincident indicator of crises and a flight to safety. Once a yield curve appears to be steepening from an inverted level, it is time to pay attention and manage risk. We define a steepening as the yield curve going from a severely inverted or flat condition to an extremely positive and steep condition in a relatively short manner.

The period between 1899 to 1920 was a bear market for bonds where, if we use a constant 30-year bond as our proxy for that time, bonds lost 34.5% over that period. However, we see in the below figure that as we went from a severely inverted yield curve to a steepening, the bond market was able to provide attractive relative returns.

[3] FRED Economic Data, St Louis FED, https://fred.stlouisfed.org/series/T10Y2Y#0

Figure 4: The Bond Bear Market 1899-1920[4]

Dates of Price Trends	Duration Yrs.	Duration Mos.	Yield, % (from Table 45)	Yield Change, Basis Points*	Price Change of a Constant 30-Year 3¼s Bond, Points
1. Jan. 1899					
Decline to Nov. 1907	8	10	3.20–4.21	+101	−17½
Advance to Feb. 1909	1	3	−3.77	−44	+7⅜
	10	1		+57	−10⅛
2. Feb. 1909					
Decline to Sept. 1915	6	7	3.77–4.30	+53	−8½
Advance to Jan. 1917	1	4	−3.98	−32	+4½
	7	11		+21	−4
3. Jan. 1917					
Decline to May 1920	3	4	3.98–5.56	+158	−20⅜ (23.6s)
Total change: Jan. 1899–May 1920	21	4	3.20–5.56	+236	−34½ (points and s)

*1 basis point = .01s in yield.

We can see that even in a brutal bond bear market, the curve steepening exhibited in 1907 was the harbinger of the strongest bond market returns for those entire 21 years, with bonds delivering a 7.5% return from 1907 to 1909. This is relative to estimates that put the stock market declines in the 1907 panic at 50%.

Figure 5: The Bond Bull Market 1920-1946[5]

Dates of Price Trends	Duration Yrs.	Duration Mos.	Yield, % (from Table 47)	Yield Change, Basis Points*	Price Change of a Constant 30-Year 5½s Bond, Points
1. May 1920					
Advance to Jan. 1928	7	8	5.56–4.04	−152	+25⅛
Decline to Sept. 1929	1	8	−4.59	+55	−10⅜
	9	4		−97	+14½
2. Sept. 1929					
Advance to May. 1931	1	8	4.50–3.99	−60	+11¾
Decline to June 1932	1	1	−4.83	+84	−15⅞
	2	9		+24	−4½
3. June 1932					
Advance to Apr. 1946	13	10	4.83–2.37	−246	+56⅝
Total change: May 1920–April 1946	25	11	5.56–2.37	−319	+67*

*Points and percent.

[4] A History of Interest Rates, Sidney Homer, Wiley Finance 4th Edition, pg. 339
[5] A History of Interest Rates, Sidney Homer, Wiley Finance 4th Edition, pg. 346

Similarly, if we look at the great bond bull market of 1920-1946, a constant 30-year maturity bond proxy rose 67% over that period. The curve steepening in 1921 anticipated very strong bond market returns, which broke an aggregate 21-year losing streak for bonds at a time when the Dow Jones declined by 46%.

Figure 5 also shows the curve steepening in 1929, the onset of the Great Depression, coincided with very attractive relative returns to bonds, whilst the Dow Jones declined 89%. Bond returns corrected in May 1931 to June 1932, but the very attractive gains to bonds continued as the steepening process resumed after June of 1932. And when bonds did incur losses in this period, the losses were far less than stocks.

The huge inversion and steepening that precipitated the 1981/82 Savings and Loans Crisis, which also crushed inflation and began the current bond bull market, also delivered attractive relative bond market returns. One study[6] found that intermediate-term government bonds, of 5-year maturity, returned 9.45% in 1981 and 29.10% in 1982. They also found Long-Term Government Bonds, of 20-year maturity, returned 1.85% in 1981 and 40.35% in 1982. Other researchers[7] find that a US Treasury Bond Index returned 8.20% in 1981 and 32.81% in 1982, commencing a decades' long bond bull market.

In Figure 6, we summarise total bond market returns in more recent periods for which we have more accessible data. Returns are represented by the Bloomberg Barclays Global Treasury Index, which includes the major sovereign bond markets globally. Returns are expressed in both unhedged AUD terms and currency hedged terms. We display multiple time periods for the total returns from one year after yield curve steepening, to once the recession ended and finally to once the curve steepening ended and the yield curve began to flatten again. It is important to note we never measure to the point of maximum return. We merely measure simple points related to yield curve movement that are easily identifiable. Measuring the maximum point of bond returns would yield higher results.

We present two scenarios utilising the 10yr-3mth yield curve, which is viewed as the most coincident indicator of recession, and the 10yr-2yr yield curve, the most common curve measurement utilised in markets.

Figure 6: Bond Market Returns from the Curve Steepening (10yr-3mth)[8]

Date Steepening Commenced (10yr - 3 month)	Date Recession Ended	Date Steepening Ceased	Total Return 1-year Forward from Steepening (AUD)	Total Return 1-year Forward from Steepening (Hedged)	Total Return Once Recession Ended (AUD)	Total Return Once Recession Ended (Hedged)	Total Return Once Steepening Ceased (AUD)	Total Return Once Steepening Ceased (Hedged)
9/06/1989	4/03/1991	5/05/1992	6.12%	8.88%	20.60%	26.22%	37.14%	38.23%
2/01/2001	2/11/2001	3/09/2003	6.59%	7.30%	12.70%	8.61%	4.12%	21.46%
7/03/2007	2/06/2009	10/06/2009	-2.51%	8.50%	12.33%	18.67%	12.22%	18.25%
28/08/2019	3/04/2020	18/03/2020	-4.46%	1.52%	11.08%	1.31%	11.63%	-1.49%

[6] Stocks, Bonds, Bills, and Inflation: Historical Returns (1926-1987), Robber G Ibbotson & Rex A. Sinquefield, the Research Foundation of The Institute of Chartered Financial Analysts, pg55
[7] Historical Returns on Stocks, Bonds and Bills: 1928-2022, Aswath Damodaran, New York University Stern School of Business
[8] Source: Federal Reserve of St Louis, FE Analytics

Figure 7: Bond Market Returns from the Curve Steepening (10yr-2yr)[9]

Date Steepening Commenced (10yr - 2yr)	Date Recession Ended	Date Steepening Ceased	Total Return 1-year Forward from Steepening (AUD)	Total Return 1-year Forward from Steepening (Hedged)	Total Return Once Recession Ended (AUD)	Total Return Once Recession Ended (Hedged)	Total Return Once Steepening Ceased (AUD)	Total Return Once Steepening Ceased (Hedged)
30/03/1989	4/03/1991	14/07/1992	11.38%	4.87%	27.30%	24.83%	55.37%	45.08%
10/04/2000	2/11/2001	25/07/2003	19.43%	10.17%	24.12%	16.54%	14.97%	32.57%
22/11/2006	2/06/2009	4/06/2009	0.20%	6.85%	13.50%	20.45%	15.53%	20.44%
28/08/2019	3/04/2020	18/03/2020	-4.46%	1.52%	11.08%	1.31%	11.63%	-1.49%

This historical analysis is useful to ascertain the level of total return (including price change AND carry) that bonds can offer in periods of economic hardship and crises. The above tables show that whilst the 10yr-3mth curve is a more coincident indicator of recession, the 10yr-2yr curve is more accurate in anticipating bond market returns.

All these periods of large inversion **followed by rapid steepening** typify periods of weak risk asset returns, higher corporate defaults and credit risks, higher market volatility and in some cases, financial institution failures.

Curve inversion often gets the most press, but it is important to stress that rapid curve steepening from a heavily inverted condition is a more important indicator of crises and relative attractiveness of bonds.

An important consideration for today is that whilst the 10yr-3mth curve has not begun a steepening process, there is a good chance the 10yr-2yr has. So, the most coincident curve for recession has not started flashing red yet, but the most coincident indicator of bond market returns has. However, curve steepenings are often gradual processes that can take a number of months to fully manifest.

The policy response as the Covid-19 pandemic hit led to some of the most disappointing bond market returns during a crisis. Whilst still attractive on a relative basis to risk assets over that multi-month period, it is the only example of yield curve inversion to steepening that was not preceded by exorbitant inflationary pressure, financial crises or asset price mania. Rather, it was an exogenous shock unrelated to deep fissures within the economy or financial system. But the associated policy response was by far the largest in recorded history. So, whilst the relative returns from bonds over that period were still attractive, it is considered an outlier to the downside in terms of nominal absolute returns.

Another point that should be noted is that the current level of bond market inversion has only been seen in 1907, 1921 and 1981. These were obviously very difficult periods for the economy and risk asset returns. The equity market is beginning to price for recession but thus far only a mild one.

[9] Source: Federal Reserve of St Louis, FE Analytics

Forward economic indicators are pointing to a marked slowdown. It will be interesting to see how much of this slowdown the market has priced thus far. It should be noted that the tools available to policy makers today are far more substantial and effective in nature than in previous periods of similar curve inversion.

We should briefly reflect on some periods where the yield curve did not invert but serve as a perfect signal for recession or excess bond returns. These were the:

- 1945 recession
- 1948/49 recession
- 1953/54 recession
- 1957/58 recession
- 1960/61 recession

During and immediately after World War II, the Federal Reserve pegged three-month Treasury bills at 0.40% and longer dated Treasuries at 2.5%. This was to aid the Treasury in war financing and to keep down the costs of servicing the Federal debt. This yield curve control was executed via what would today be called Quantitative Easing, where the Federal Reserve, via its open market operations, would conduct asset purchases to support Treasury prices, or at least assist in financing the government. It was nearly 60 years later in 2009 when Ben Bernanke resurrected similar policies.

It wasn't until 1951 where a Treasury-Federal Reserve accord was struck, which freed the Fed from the obligation to support bond prices. As price controls were gradually removed, the Fed wished to move its mandate from minimising the cost of the Treasury's debt service, to one of price stability. And so short-term rates began to rise secularly from the mid 1950's to the great peak of 1981.

We believe the massive interventions by the Fed in the Treasury market negated much of the proper market signalling of the curves during World War II and the post-war years, particularly in the 1940's. However, as we entered the 1950's, despite a large stock of the outstanding Treasury debt still being held by the Fed, the curves still gave some signalling of impending economic and financial stress.

In the post 1940's episodes mentioned above, the curves did not invert (as shown in Figure 2) but they came close to it. The curves in every scenario flattened noticeably. This was followed by a tremendous steepening. The below figure shows that in what was a horrendous bond bear market from 1946 through to 1981, where a constant maturity 30-year bond proxy lost 83% in price terms, all the major positive bond price reversals were preceded by a large flattening or even inversion of the yield curve followed by a significant steepening.

Figure 8: The Bond Bear Market: 1946-1981[10]

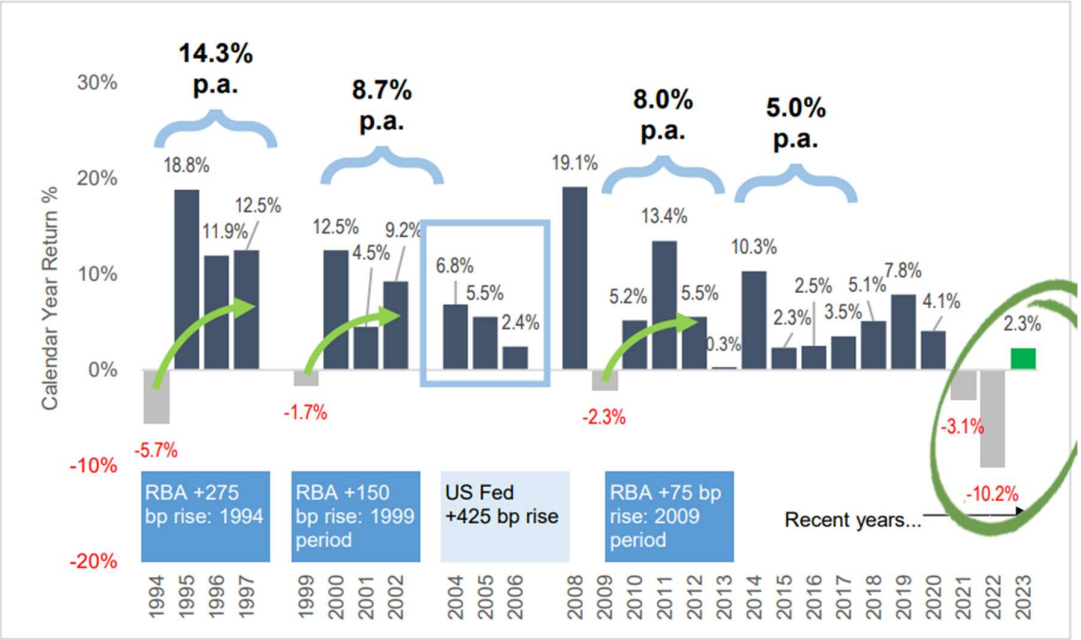
Dates of Price Trends	Duration		Yield, % (from Table 50)	Yield Change, Basis Points	Price Change of a Constant 30-Year 2½% Bond, Points
	Yrs.	Mos.			
Initial date: Apr. 1946					Initial price $100\frac{7}{8}$
1. Decline to Aug. 1948	2	4	2.46–2.84	+38	$-7\frac{3}{4}$
Advance to Jan. 1950	1	5	−2.57	−27	$+5\frac{3}{8}$
	3	9		+11	$-2\frac{3}{8}$
2. Decline to June 1953	3	5	−3.40	+83	$-15\frac{3}{8}$
Advance to Apr. 1954		10	−2.85	−55	$+9\frac{7}{8}$
	4	3		+28	$-5\frac{1}{2}$
3. Decline to Sept. 1957	3	5	−4.12	+127	$-20\frac{3}{4}$
Advance to May 1958	0	8	−3.57	−55	$+8\frac{1}{4}$
	4	1		+72	$-12\frac{1}{2}$
4. Decline to June 1960	1	5	−4.57	+100	−14
Advance to Feb. 1963	3	4	−4.19	−38	$+4\frac{7}{8}$
	4	9		+62	$-9\frac{1}{8}$
5. Decline to Oct. 1970	7	4	−8.48	+429	$-37\frac{1}{8}$
Advance to Jan. 1972	1	7	−7.19	−129	$+9\frac{3}{4}$
	8	11		+300	$-27\frac{3}{8}$
6. Decline to Oct. 1974	2	9	−9.27	+208	$-14\frac{3}{8}$
Advance to Sept. 1977	2	11	−7.92	−135	$+8\frac{5}{8}$
	5	8		+73	$-5\frac{7}{8}$
7. Decline to Sept. 1981	4	0	−15.49	+757	−21
Total change: Apr. 1946–Sept. 1981	35	5		+1303	$-83\frac{3}{4}$ (−83%) Final price: $17\frac{1}{8}$

The implication is that yield curves that move from inverted (or significantly flattened) to steepening conditions can provide us important information regarding economic and financial fragility. Most importantly, it can signal to us pertinent moments where one should own bonds and be concerned about risk asset prices.

The underperformance and mark-to-market losses of bonds in 2022 has been well publicised. It was the worst calendar year for bonds in recorded modern history. This highlights the convexity of bond returns. Bond convexity is higher at lower levels of rates, making them more interest rate sensitive. Given the low starting point for yields in 2021, the arithmetic of duration and convexity for bonds at a time of inflationary concerns from markets and policy makers was unfavourable. The Australian fixed income manager, Jamieson Coote, conducted a study of bond market returns after historically bad selloffs. The below table summarises their findings.

[10] A History of Interest Rates, Sidney Homer, Wiley Finance 4th Edition, pg. 368

Figure 9: Calendar Year Performance of the Bloomberg AusBond Treasury Bond Index[11]



They found that after particularly negative periods of bond returns over the last 3 decades, bond returns were robust and attractive on a relative and risk-adjusted basis. Given the highly collateralised nature of bond markets we spoke of earlier, this makes intuitive sense. We are in a credit-based system, and credit is often provided by financial institutions which utilise bonds as collateral to fund and expand their balance sheets to create and extend credit to the wider financial system. Financial institutions, such as banks, play a pivotal role in our debt-based economy. A decline in the value of these very levered institutions' core assets, bonds, impedes their ability to continue to serve this function, precipitating a slowdown.

Once crises or economic slowdowns begin, policy makers need to support the value of these collateral assets via interest rate cuts or asset purchases or both. Whilst beyond the scope of this paper, these risk-free collateral assets that underpin our financial system need to gain in value during stress to give our financial system any hope of reflating the broader economy and risk assets.

As we are currently learning, if financial institutions are sustaining mark-to-market losses on these collateral assets, their capacity to increase the size of their balance sheet in the future is impaired.

Generally speaking, a bank increasing the size of its balance sheet represents that institution providing credit to the wider financial system. When the financial sector exhausts its balance sheet capacity, it impedes its ability to continue to finance the indebted system. It may need to raise liquidity and even shrink. Malinvestment comes home to roost.

The financial system is now generally a refinancing mechanism rather than a financing mechanism. That is, the main purpose of the financial system is to refinance the existing stock of debt. If the financial sector is unable to fully fulfill its role as a refinancing mechanism, the lowest quality and highest indebted credits tend to fail. The value of more quality risk assets is still impaired. In these scenarios, trust in the economy and financial markets is reduced. Market participants and economic agents try to avoid counterparty risk. This causes the initial flight to quality and 'safe havens'. This

[11] Domestic and Global Defence for Portfolios, Jamieson Coote Bonds, Slide 74, February 2023

is the initial driver of bond returns, particularly in interbank and wholesale funding markets. Financial institutions try to de-lever. Collateral is called back in. Bonds, a central source of collateral, become highly demanded.

Whilst also beyond the scope of this paper, we have seen typical signs of trouble in interbank and wholesale funding markets. The Swiss National Bank was drawing USD20billion from USD swap lines in October 2022 just as Credit Suisse's credit default swaps were spiking above 330bps. Bond market liquidity has been particularly challenged as evidenced by the UK Gilt shock in September 2022 where the Bank of England was required to step in. We have had US regional bank failures, echoing previous experiences in the 1907 bank panic and 1980's US Savings and Loans crises. We are witnessing bank deposit contraction not seen since the savings and loan crisis and before that the Great Depression. Yield curves are at record inverted levels signalling that there is financial fragility. Recent bank failures have coincided with significant steepening in some of the curves. The robust historical pattern seems to be following the script thus far.

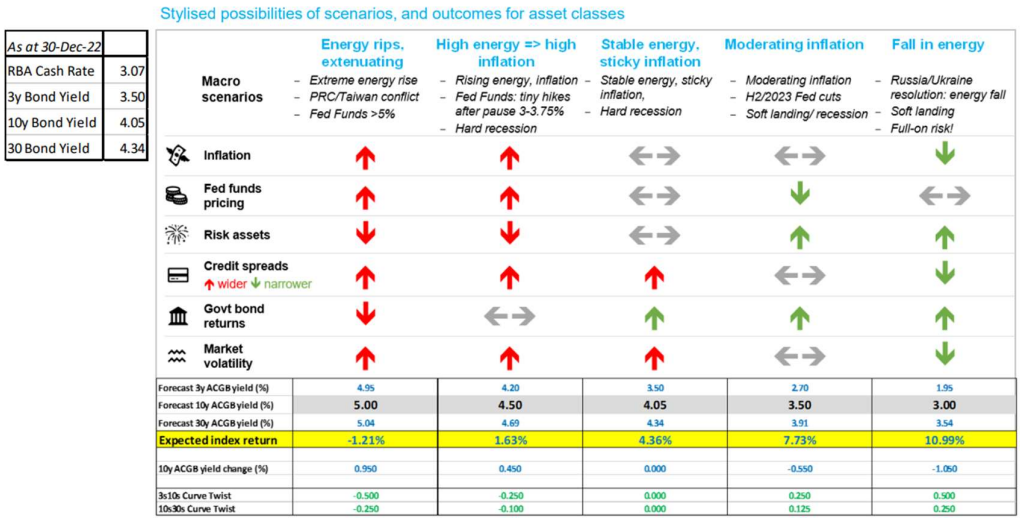
The conclusion is that central banks are starting to become credible on inflation. The financial sector is becoming stressed as they are forced to de-lever and even shrink. This may make safe assets such as bonds highly demanded in the period ahead. At the same time, financial institutions may start to bid collateral assets as they de-lever and other market participants may begin to buy bonds, speculating on lower inflation and slower growth after what has been near record short positioning in bonds over the previous year. As financial institution balance sheets shrink out of necessity, this is not conducive to higher rates of growth and inflation.

We have spoken a lot about historical bond market returns and why there might be some upward pressure on bond prices given the structure of the financial sector. We now briefly speculate on forward looking bond market returns.

Potential Bond Market Returns

In the same study mentioned earlier, some forward-looking scenario analysis was also carried out. This analysis was performed at the end of 2022, before the latest bout of financial stresses occurred. Nevertheless, it is still valuable for this discussion. The findings are presented below.

Figure 10: Scenario Analysis for Australian Government Bond Returns[12]



[12] Domestic and Global Defence for Portfolios, Jamieson Coote Bonds, Slide 44, February 2023

The scenario test found that there was limited downside to bonds. If one could not conceive of 10-year yields exceeding 5%, then the expected loss would only be 1.21%. This highlights our discussion of bond convexity earlier and how it diminishes at higher levels of yields.

On the other hand, it can be seen that with even a limited rally in the level of rates, prospective bond returns are relatively attractive. The Bloomberg Ausbond Treasury Index return is already on track for their most bullish scenario, having appreciated 4.32% YTD[13] off the back of a 55bps rally in the Australian Commonwealth 10yr Government Bond YTD.

Figure 11: Scenario Analysis for G7 Sovereign Bonds[14]

	Returns Hedged to AUD				
Country	Most Bond Bearish	Mild Bond Bearish	Unchanged	Mild Bond Bullish	Most Bond Bullish
United States	0.8%	2.6%	4.5%	8.3%	12.7%
Canada	1.2%	2.8%	4.5%	7.6%	11.2%
Japan	3.8%	4.8%	5.6%	6.5%	7.8%
Britain	-1.2%	1.1%	3.7%	8.6%	14.3%
Germany	-0.2%	1.4%	3.2%	6.2%	9.8%
Italy	1.6%	3.5%	5.4%	9.5%	14.0%
France	0.2%	2.1%	3.9%	7.9%	12.3%
Total	**1.5%**	**3.1%**	**4.7%**	**7.7%**	**11.2%**

The same scenario analysis for G7 global government bonds, shown above, highlights that there was little downside for global government bonds at the beginning of this year, if one believed that the US 10-year yield could not exceed 5%. And indeed, the Bloomberg Barclays Treasury Index has rallied 2.81% YTD[15] in unhedged terms and 2.61% in hedged terms as the US 10-year has rallied 24bps.

In terms of modelling potential future bond returns, we utilise a simple model that incorporates modified duration, bond convexity and curve twist. A deeper explanation of our simple methodology can be found in the Appendix at the end of this paper where we also define these inputs.

It provides us with the following results for bond sensitivity given a stated change in the level of interest rates:

[13] As of 10th May, 2023
[14] Domestic and Global Defence for Portfolios, Jamieson Coote Bonds, Slide 45, February 2023
[15] As of 10th May, 2023

For Australia we utilise the S&P Australia Sovereign Bond Index[16].

Figure 12: S&P Australia Sovereign Bond Index Return Sensitivities

Change in Yield	-2.50%	-2.25%	-2.00%	-1.75%	-1.50%	-1.25%	-1.00%	-0.75%	-0.50%	-0.25%	0.00%	0.25%	0.50%	0.75%	1.00%	1.25%	1.50%	1.75%	2.00%	2.25%	2.50%
Price Change (%)	15.86%	14.27%	12.69%	11.10%	9.51%	7.93%	6.34%	4.76%	3.17%	1.59%	0.00%	-1.59%	-3.17%	-4.76%	-6.34%	-7.93%	-9.51%	-11.10%	-12.69%	-14.27%	-15.86%
Total Return (Assuming 18 month hold)	19.52%	17.93%	16.35%	14.76%	13.17%	11.59%	10.00%	8.42%	6.83%	5.25%	3.66%	2.07%	0.49%	-1.10%	-2.68%	-4.27%	-5.85%	-7.44%	-9.03%	-10.61%	-12.20%
Annualised	12.62%	11.62%	10.62%	9.61%	8.60%	7.58%	6.56%	5.54%	4.50%	3.47%	2.43%	1.38%	0.33%	-0.73%	-1.80%	-2.87%	-3.94%	-5.02%	-6.11%	-7.21%	-8.31%

For Global Bonds we utilise the Bloomberg Barclays Global Treasury Index below.

Figure 13: Bloomberg Barclays Global treasury Index Return Sensitivities

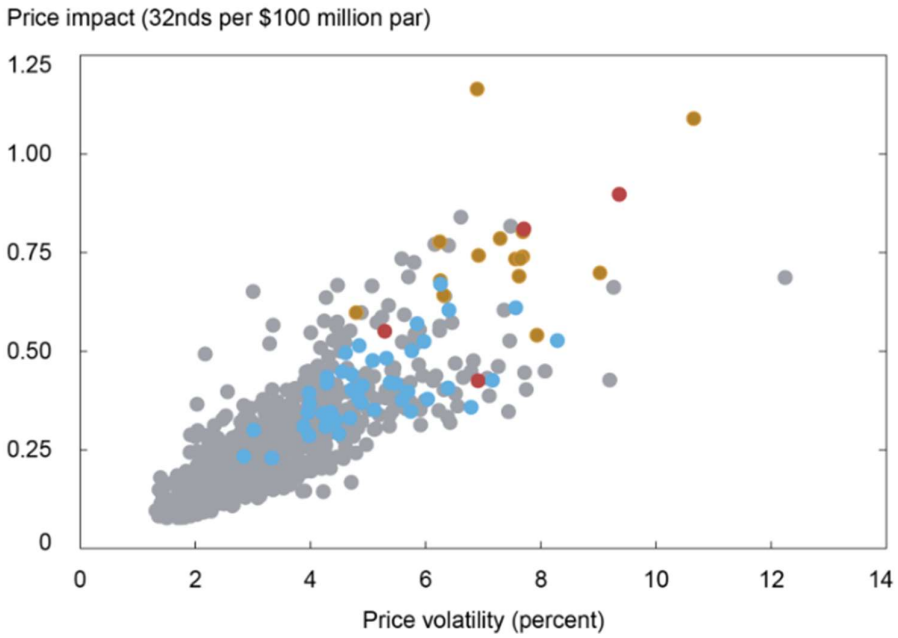
Change in Yield	-2.50%	-2.25%	-2.00%	-1.75%	-1.50%	-1.25%	-1.00%	-0.75%	-0.50%	-0.25%	0.00%	0.25%	0.50%	0.75%	1.00%	1.25%	1.50%	1.75%	2.00%	2.25%	2.50%
Price Change (%)	18.89%	17.00%	15.11%	13.22%	11.33%	9.44%	7.56%	5.67%	3.78%	1.89%	0.00%	-1.89%	-3.78%	-5.67%	-7.56%	-9.44%	-11.33%	-13.22%	-15.11%	-17.00%	-18.89%
Total Return (Assuming 18 month hold)	21.86%	19.97%	18.08%	16.19%	14.30%	12.41%	10.53%	8.64%	6.75%	4.86%	2.97%	1.08%	-0.81%	-2.70%	-4.59%	-6.47%	-8.36%	-10.25%	-12.14%	-14.03%	-15.92%
Annualised	14.09%	12.91%	11.72%	10.52%	9.32%	8.11%	6.90%	5.68%	4.45%	3.21%	1.97%	0.72%	-0.54%	-1.81%	-3.08%	-4.36%	-5.66%	-6.96%	-8.27%	-9.59%	-10.92%

These return sensitivities should be considered as rough estimates. As previously discussed, duration and convexity can change as bond prices and yields change. To take this into account would require more sophisticated modelling. As a result, the downside scenarios shown are overstated as interest rate sensitivity reduces at higher levels of rates. The level of curve twist assumed is modest and is likely conservative and underestimating the level of bond returns should a recession scenario be realised.

There are risks to the upside scenarios. Over the last year, bond market liquidity as measured by bid-ask spreads, order book depth, price impact and bond market volatility has been challenged. We believe the bond market selloff has been exacerbated by poor bond market liquidity. The clearest example of this was the UK Gilt market episode of September 2022. Figure 11 shows that bond market volatility is correlated with illiquidity as measured by price impact. Bond volatility remains high and continues to rival previous recent crises periods. This means there is potential for upward gap risks in yields as we saw with UK Gilts in September of last year.

[16] Ideally, we would use the Bloomberg Ausbond Treasury Index, however some of the required data was unavailable.

Figure 14: Liquidity and Volatility of US Treasuries[17]



These liquidity concerns have moderated somewhat and bond market liquidity indicators we monitor suggest that bond market liquidity has improved, even though bond volatility remains high. But the risk is still there.

Other risk factors include geopolitics and deglobalisation, particularly around global energy supplies with respect to Russia and manufacturing supply chains with respect to China. Further shocks on these fronts could handicap the fight against inflation causing central banks to continue to be hawkish. This could initiate further shifts upward in the yield curve as a result of policy action.

Furthermore, continuing fiscal support and debt issuance can continue to put upward pressure on bond yields. Of particular note is government expenditure to fund the green energy transition. This transition could also serve to push up energy prices, but fiscal spending and deficits also tend to put upward pressure on real yields.

However, a recent IMF paper showed that whilst these global forces do matter with respect to yields, individually their effect is not as great as other factors. Combined, they may exert a more significant influence than otherwise. But the IMF researchers found that by far and away the greatest drivers of yields were total factor productivity growth and demographics. In the IMF's opinion, these factors are set to drive yields back towards pre-pandemic levels in the years ahead. No doubt there can be some short-term shocks to the IMF's secular view as we have seen.

Additionally, the IMF[18] highlighted how international capital flows and the scarcity of safe assets, particularly US Treasuries, can continue to support bonds and drive returns. This is exactly the phenomenon we laboured upon as we explored bonds as collateral assets earlier in this paper. This will be particularly important as various market participants begin to demand or call back high-quality collateral. Term premia in US Treasuries and German Bunds are the most negative they have ever

[17] How Liquid Has the Treasury Market Been in 2022, Liberty Street Economics, Federal Reserve Bank of New York, November 15, 2022
[18] The Natural Rate of Interest: Drivers And Implications for Policy, World Economic Outlook, Chapter 2, pg. 53, The International Monetary Fund

been since modern records began, as typified by deeply negative curves. This indicator of financial fragility insinuates that there is a shortage of perceived risk-free collateral as their prices are held up at levels that economic textbooks tell us should not make sense.

The conclusion of their research is that 'recent increases in real interest rates are likely to be temporary. When inflation is brought back under control, advanced economies' central banks are likely to ease monetary policy and bring real interest rates back towards pre-pandemic levels. How close to those levels will depend on whether alternative scenarios involving persistently higher government debt and deficits, or financial fragmentation materialize.'[19]

There are some lessons of history the IMF paper does not consider. Consider historical periods such as the 1940's and 1970's where after a surge in inflation, central banks seemingly defeated it via the aggressive exertion of policy, only to see it return. This is because tight monetary policy can impede capital expenditure (capex)and the creation of productive capacity. Therefore, when authorities return to stimulatory policy settings, the necessary productive capacity is not available to ensure the rebound is not too inflationary. Stimulus can spill over into the real economy and the consumer price level, as we have seen in recent times. These episodes can inhibit real and sometimes even nominal bond returns over the medium and longer term.

Global fragmentation having an impact in excess of the IMF's assumptions may further add to this effect.

These factors are outside the scope of this paper and are longer-term considerations. But in the immediate circumstance, we can clearly see a slowdown in the economy and conditions present where holding pristine collateral assets within the defensive portion of a portfolio is beneficial.

Given current circumstances in the banking sector and other signals of financial fragility, private sector demand for collateral should support bonds even in the absence of central bank policy action. Commercial bank balance sheets dwarf the current size of central bank balance sheets. Central banks may be forced to follow private sector activity currently driving bond prices, which has caused a divergence from policy rates. This is common at this point in the cycle. However, Central Banks are still publicly focussed on inflation fighting credibility and we suspect it could take some time and more breakages in the system to cause them to outright pivot.

We have already had some large 16 standard deviation moves in daily and weekly bond prices at the outset of the current banking crisis. Record short positioning by CTAs, trend followers and macro funds contributed to these moves. As such, we expect some 'choppy' behaviour and corrective moves in the weeks and months to come. But expect the general trend to now be supportive of bond prices.

Whilst we do believe bond prices will be supported despite measures policy makers may take, we do have to take heed of the Covid experience. During the pandemic, policy makers took unprecedented action that was extremely effective at reflating markets and the economy. It is beyond the scope of this paper to describe the nuances of this policy action and how it was very different from the past. But these measures may now be normalised and employed very easily. Whilst bond returns over the pandemic crisis period were still attractive on a relative basis, the nominal returns were not as attractive as in previous crises. As we mentioned earlier, we believe the pandemic crisis to be very different from those previously and the current circumstance seems more like the historical analogues. Nevertheless, we must be prepared to exit bonds faster than otherwise should these policy measures be employed once again to the same magnitude.

[19] The Natural Rate of Interest: Drivers And Implications for Policy, World Economic Outlook, Chapter 2, pg. 58, The International Monetary Fund

In conclusion, defensive assets such as bonds have been out of favour. Market participants have been under positioned and were record short bonds. Financial system fragilities and economic slowdown should put a private sector bid under perceived safe haven collateral assets. Central bank accommodation via lower policy rates and asset purchases should eventually provide further tailwinds, although this will take some time and may take different forms to what we have been used to. The current historical pattern resembles past periods which exhibited strong relative and absolute bond market returns versus risk assets.

Lessons from history tell us that we should begin to heed the warnings from the early signs of yield curve steepening. We believe the probabilities warrant risk management becoming a priority and defensive assets such as bonds being introduced, or weightings increased, in a portfolio.

Appendix

In this Appendix, we briefly define the terms used in our bond price sensitivity analysis and explain the simple methodology used to make these calculations.

Duration is a measure of a bond's price sensitivity to changes in interest rates. Specifically, it measures the weighted average time to maturity of a bond's cash flows, taking into account both the timing and size of the cash flows. Duration is expressed in years and is an estimate of the percentage change in a bond's price for a given change in interest rates.

Modified duration is a version of duration that takes into account the bond's yield or interest rate. It measures the percentage change in a bond's price for a 1% change in interest rates, and it adjusts the duration calculation by dividing it by (1 + yield).

The reason for this adjustment is that duration assumes that the yield on a bond remains constant, which is not the case. Modified duration is a more accurate measure than duration because it considers the impact of changes in yield on bond prices. In other words, modified duration reflects the fact that a bond's yield changes when interest rates change, and this change in yield affects the bond's price.

Bond convexity is a measure of the sensitivity of a bond's duration to changes in interest rates. It is a second-order effect that considers the fact that the relationship between bond prices and yields is not linear, but rather curved or convex. When interest rates change, bond prices do not move in a straight line, but rather they curve around a central point.

The addition of the convexity term in the formula helps to provide a more accurate estimate of the percentage change in a bond's price for a given change in interest rates, especially for larger changes in yield. The convexity term accounts for the non-linear relationship between bond prices and yields, and it helps to refine the estimate obtained from using modified duration alone.

It's important to note that this method is an approximation, and it assumes that the relationship between bond prices and yields is approximately parabolic. In practice, the relationship may be more or less curved than this, and the use of convexity may not always provide an accurate estimate of a bond's price sensitivity to changes in interest rates.

The last input we use is curve twist. Curve twist refers to a change in the slope or curvature of the yield curve, where the yields on some maturities may rise or fall by a different amount than the yields on other maturities. Without assuming some level of curve twist, we would be assuming a parallel shift in the yield curve when rates change, which is unlikely.

When there is a curve twist, the relationship between changes in interest rates and changes in bond prices may differ from what would be expected based on the bond's duration and convexity alone. For example, if the yield curve becomes steeper, with long-term yields rising more than short-term yields, this can increase the price sensitivity of long-term bonds to changes in interest rates, even if their duration and convexity remain the same. Curve twist further enhances bond returns when we steepen from a heavily inverted level in a ‘bull steepening’ process as we may be now.

Applying these concepts provides us with the following formula to calculate the change in the bond index’s price:

Price Change = ((-1 x Modified Duration x Delta Yield) / (1 + (Current Yield / 2))) + ((Convexity x (Delta Yield)^2) / ((1 + (Current Yield / 2)) x 100)) + ((Curve Twist x (Delta Yield)^2) / ((1 + (Current Yield / 2)) x 100))

Where the Delta Yield is the change in yield.

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