Bond yields and real estate prices – where next?
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1. Introduction

As at 2020, bond yields and interest rates were at all-time lows in the UK and continental Europe, and real estate prices had increased in line with rising bond prices.

From mid-2015 we experienced something of a stand-off between buyers and sellers, and transaction volumes fell significantly in 2016. The Brexit vote was clearly a factor, both before the shock result and after. But it seems that the stand-off was not all Brexit-related. Buyers had talked themselves into a very risk-averse state of mind. No-one wants to be seen buying at the end of an eight year cycle, at the top of the market, at all time low yields (high prices). And surely interest rates and bond yields are going to bounce back upwards, taking real estate prices back down again?

The bounce back in bond yields had been expected since 2008, when fixed interest government bond yields fell to recent-history lows. But by 2020 they were much lower – and at all-time lows in the UK and US. If the real estate markets expected bond yields to stay lower for the long run, real estate prices would certainly go higher.

Real risk free rates, proxied by the yield on government-issued inflation indexed bonds, are also trading at very low or negative rates. US Treasury Inflation Protected Securities (TIPs) have been issued offering negative yields since 2010 and UK Index-Linked Gilts since 2011. Australian Treasury Indexed Bonds have never offered negative yields, but are now being issued at all-time lows of around 0.5%.

There is much debate over how long such low yields will continue, and the implications for real estate prices. Real estate capitalisation (cap) rates (the inverse of price-earnings ratios) are low in many markets, albeit not – yet – at all-time lows.

How strongly have real estate capitalisation rates been connected or correlated with conventional bond yields, short term interest rates and indexed bond yields? What will happen to real estate prices if bond yields revert back to more 'normal' levels over the next few years? And what will happen to prices if they do not?

2. The relationships

In order to gain an insight into these relationships, we need to go back to re-explore the theory supporting the determination if the yield on bonds. A good starting point is the work of Irving Fisher in the 1920s.

3. The theory

The Fisher equation considers the components of total return delivered by an investment. It states that:

R = l + i + RP (1)

Where:

R is the total required return
l is a reward for liquidity preference (deferred consumption)
i is expected inflation
RP is the risk premium

Index-linked government bonds are widely considered to be risk free and, because the coupon is enhanced by the inflation rate in the previous period, investors do not need to earn an inflation reward in that coupon or running yield. Hence '*l*' is given by the coupon on index-linked government bonds (for the purpose of building an example, let us assume 0.5%). '*l* + *i*' is the required return on conventional government bonds (for simplicity, ignoring an inflation risk premium, let us assume 2.5%). These may be regarded, respectively, as the real and the nominal risk free rates (RF_R and RF_N). If we assume that there is no inflation risk premium in the pricing of the bond $RF_N = RF_R + i$, and $RF_N - RF_R = i$, so *i* appears to be 2.5% - 0.5% = 2%.

However, for an investor interested in real returns (say a defined benefit pension fund) conventional gilts are less attractive than index linked gilts. There is a risk of inflation expectations not being realised, so that higher than expected inflation will lead to lower than expected returns; and second, there is a general discounting of investments where they are risky. In a market dominated by investors with real liabilities, risky (in real terms) conventional gilts would be discounted, meaning the required return would be higher. If required returns equal the available return in an efficient market, then the 2.5% available on the conventional gilt must include a risk premium. Following Fisher again, the full explanation of a required return is

R = l + i + RP (1)

If an inflation risk premium of 0.5% in the pricing of the conventional gilt is assumed, the rate of expected inflation implied by a comparison of index-linked and conventional bond yields is 1.5%.

For assets other than government bonds, further factors contribute to the risk premium. For example, investors in corporate bonds might require a higher premium to reflect the greater risk of default associated with such bonds. Meanwhile, cash flows and prospective sale prices from equity and real estate investments are subject to volatility, which will push the required risk premium even higher.

For illustration, we will assume that an additional risk premium for prime real estate of 3.5% is required. (Note that this includes the inflation risk premium of 0.5% in the pricing of the conventional gilt). The Fisher equation can then be re-written as:

$R = RF_N + RP$ *(2)*

R is 2.5% + 3.5% = 6% in this case.

Investors are prepared to accept a lower initial return from an investment in cases where the cash flow and value of an investment are expected to grow over time.

Expected income growth became embedded in the pricing behaviour of equity and property investors by the late 1950s in the US and UK. It became necessary to extend the simple cash flow model and this was first achieved by introducing a constant rate of growth in nominal income (G_N). Following Gordon's Growth Model:

$K = R - G_N$ *(3)*

where K is the initial rate of return or capitalisation rate (income / price).

G_N can be driven by inflation (i) or real growth (G_R) so that $G_N = I + G_R$.

Finally, this analysis can be extended by introducing a constant rate of depreciation (D) (Baum, 1989; IPF etc). This gives (approximately):

$K = R - G_N + D$ *(4)*

which, by reference to equation 1, can be expanded to:

$K = RFR_N + i + Rp - G_N + D$ *(5)*

If growth of 1.5% was anticipated, in line with expected inflation, and depreciation was 0.5% per annum, this would suggest that an initial yield (K) of 6% - 1.5% + 0.5% = 5% for prime real estate should be observed. The gap between this yield and the return on conventional government bonds would then be 5% - 2.5% = 2.5% with the size of this gap driven by the relative risk premium less growth expectations (3.5% minus 1%).

This is a simple framework which assumes that property behaves as a pure equity investment with annually reviewed rents. The real world is more complicated, not least since rents might be fixed for periods of time, indexed or stepped. Nonetheless, this framework can be used to give insights into how property cap rates should behave through time.

4. The empirical evidence re-examined

Given that property cap rates or yields are determined by a number of factors, it is not clear that any rise in bond yields would translate into a rise in property yields. Whether property yields rise depends on why bond yields are increasing. Conventional government bond yields might rise because of a rise in expected inflation. In this case, index-linked yields would stay unchanged and property yields might not change either depending on how nominal cash flow growth responds to inflation.

There is not a stable relationship and nor is there a clear lead-lag relationship. This may be more meaningful when set in the context of the fundamental relationship:

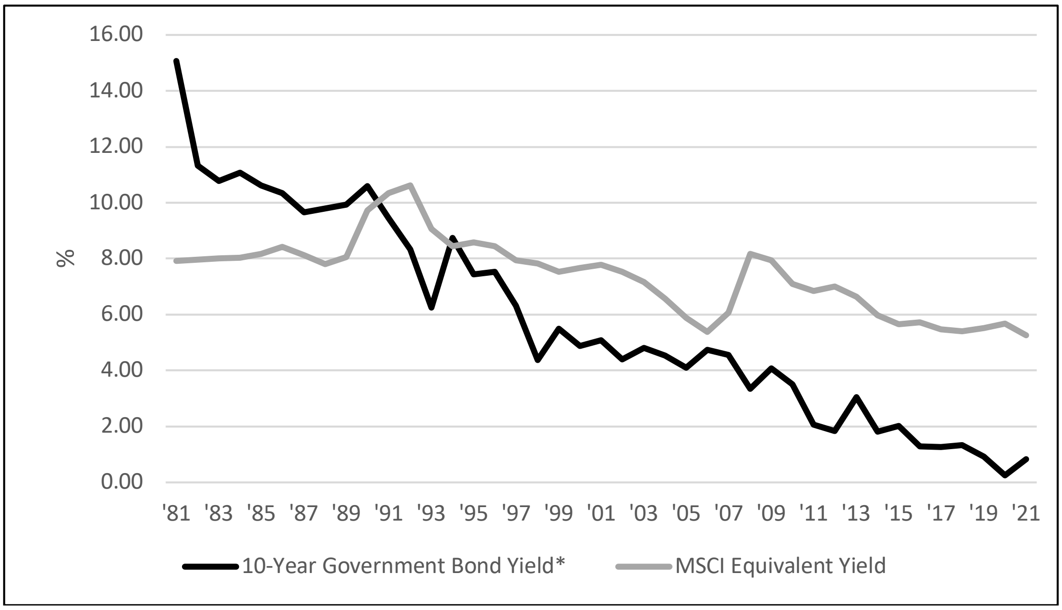
$K = RFR_N + i + Rp - G_N + D$ (5)

This tells us to expect a positive relationship between government bond yields and property yields, but one that is complicated by the risk premium and net growth expectations compared to inflation, in other words net real growth.

The negative yield differential (gilt yields higher than property yields) prior to the early and mid-1990s suggested that, following equation 6, real net property growth expectations exceeded the required risk premium. The switch to a positive yield difference post 1996 requires that the risk premium for property had risen, or anticipated net real growth had fallen or there had been a combination of both. Perhaps markets became sceptical regarding the ability of rents to respond to inflation. Alternatively, property was looking cheap before 1996.

The narrowing yield difference of 2003-5 suggested that the risk premium for property fell, anticipated growth increased, there had been a combination of both – or property had become over-priced. The widening yield difference evident in 2009-11 suggested that the risk premium for property has increased, anticipated growth had decreased, there had been a combination of both – or property had become under-priced.

Figure 1: Conventional gilt yields and property cap rates, 1980-2021



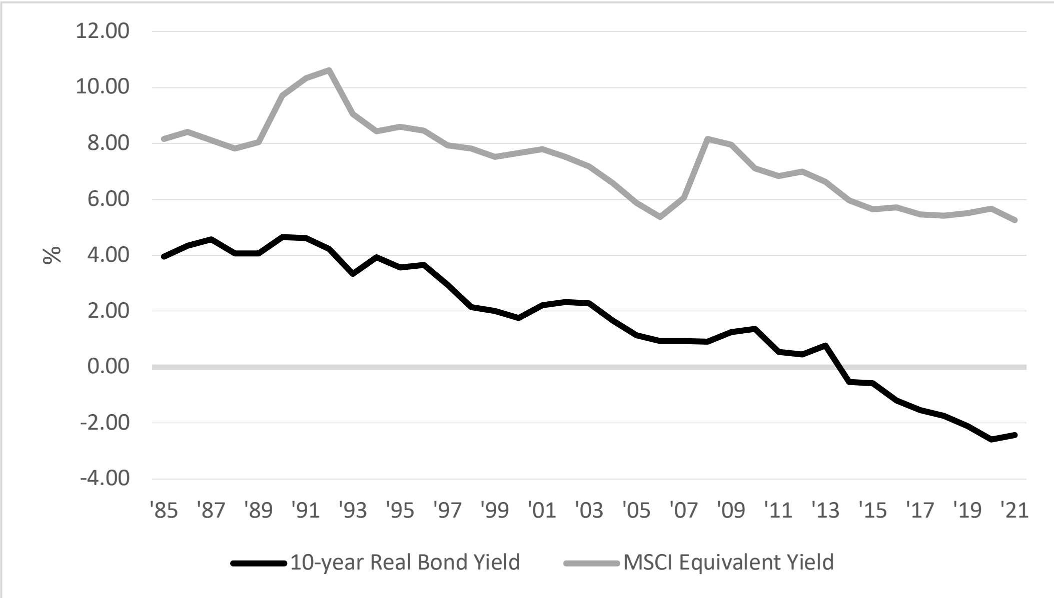
Source: MSCI, RES

The relationship between fixed interest gilt yields and real estate prices is not a simple one. The yield gap between conventional bonds and real estate is affected by a large number of factors, and to some extent we are comparing an apple (a fixed interest or bond-type investment) with a pear (an equity-type investment, or at least a bond-equity hybrid).

For real estate pricing, a correlation between rents and inflation means that there should be a stronger link between real estate yields and index-linked bond yields than between real estate yields and conventional government bond yields.

In these analyses, the gilt data used is the average redemption yield on the FTA over 5-year index-linked gilt series. Figure 2 shows how property yields have moved in relation to index–linked yields since 1995. Over this period the average index-linked yield was 2.48%, compared to a property yield of 7.02%. It can be seen that property yields have tracked index-linked yields down.

Figure 2: UK real estate and index-linked government bond yields, 1985-2021



Source: MSCI, RES

The gap is always positive, because property is riskier, and inflation-related income growth is common to both yield series, as shown by equation 6. We now introduce an inflation risk premium (RPi) referred to in Section 3 above.

$K = (RFR_R + i + Rpi) + Rp – (G_R + i) + D)$ *(6)*

In equation 6, the impact of expected inflation cancels out and we are left with:

$K = RFR_R + Rpi + Rp – G_R + D$ *(7)*

This appears to be a more stable relationship, and might appear to tend towards mean reversion. This makes sense as long as property is regarded as a good inflation hedge. If that is the case, then the yield gap will respond only to fundamentals in the occupier markets ($G_r + D$) and changes in the risk premium for real estate. The yield gap reached a low just before the crash of 2007-9, and reached a peak in 2009, indicating an excellent buying opportunity, as turned out to be the case.

The problem with relying on this relationship, of course, is that real estate can be a bond-equity hybrid, so we may again be comparing an apple (a true inflation hedge) with a pear (an asset which has some similarities to a bond-type investment)!

in the UK from 1980 to 2015, the average 35-year rate of inflation has been 2.6%. The average 35-year rate of rental growth has also been 2.6%. Investors might be forgiven for believing that the two are correlated, and that the index-linked/real estate yield relationship is the key one. However, the correlation is only around 5%, close to zero. A more formal statistical test of this relationship is required.

The difference in CPI and rents was tested for a unit root using augmented Dickey-Fuller and Phillips-Perron tests. Both provided the same answer. The difference between CPI and rents is a stationary process or, phrased differently, CPI and rents are co-integrated. This means that the difference between these two series is a zero drift stochastic process, so even if they drift apart there is some force that brings them back to one another, essentially a mean reversion. So, even though the correlation measure is low, there is a connection between these two series.

Real rental growth was 2.1% in the 1980s, -2% in the 1990s, -1.8% in the 2000s and 0.7% in the current decade so far. In the early to mid 1990s, it would have made sense for investors to underwrite strong real rental growth and accept property yields which were lower than fixed interest gilt yields. Sometime during the following decade this belief should have faded, potentially sending property yields above gilt yields. This is indeed what we can observe, as the yield gap turned positive in 1996 and has remained positive ever since, with only the exuberant 2006-7 period (during which period it appears the risk premium fell to a very low level) threatening the then status quo.

Now, zero real rental growth in the long run seems a reasonable long-term assumption. Given this, the relevant relationship is between index-linked gilt yields and real estate yields. The relevant formula is (6):

$K = (RFR_R + i + Rpi) + Rp – (G_R + i) + D)$ (6)

If real growth is expected to be zero, and depreciation 1%, then the yield gap less one per cent is the risk premium. The current gap is at all time high of 7%. That leaves a 6 per cent risk premium. When so many commentators refer to a risk premium in the order of 2.5%-3.5% and the ex post delivered premium over bonds has been closer to 1%, why is the available risk premium so high? We suggest that the risk of a reversion to more 'normal' bond yields and interest rates is the key reason for this. This possibility clearly worries investors.

But a rise in fixed interest bond yields could result from either or both of two drivers – (i) a rise in real yields evidenced by and indexed bond yields or (ii) a rise in expected inflation coupled with a higher inflation risk premium. Quantitative easing may eventually be successful and reverse the deflationary trend evident in current global markets. If inflation returns, we have another set of issues to confront.

The risk of higher bond yields – for either of these reasons - has been present in the market since 2008, yet interest rates, nominal bond yields and real bond yields are all lower now than they were eight years ago. 'Lower for longer' is the new motif – but how low, for how long? Figure 1 shows that the memory of decision makers forged in their experience of the 1970s and 1980s may distort expectations, as the 1970s and 1980s were the clear anomaly over a 140 year history. It is very possible that we will observe lower rates for much longer. There are various economic explanations: a savings glut among emerging economies with a young populations leading to a fall in the return required for liquidity in Fisher's model; an expectations-driven feedback loop; technology reducing the bargaining power of labour; and others.

So, at 2020, we needed to consider three different scenarios. First, bond yields may stay low for a long time. In this world, the current high available risk premium of say 5.5% will be unjustified and will fall to say 4%, pulling down cap rates and pushing up prices by up to 30% or even more. Bond yields may even go lower – driven by even more negative real yields or by deflation replacing inflation in expectations. More negative real bond yields will drive property prices up.

Second, real yields rise as had long been expected. Given the then current high available risk premium, this possibility was already somewhat discounted into prices. Property yields could flat if real yields rise by up to say 1.5% (back to zero in the UK). Any greater rise in real yields will damage prices.

Third, inflation expectations might surge as a result of further sustained quantitative easing or other shocks. In this scenario, fixed interest bond yields will rise, along with short term interest rates. If rents are, as we suggest, an inflation hedge, property yields will not need to adjust upwards, and there remains room for them to fall. Higher borrowing costs will have some negative impact on some buyers, but pension funds will find real estate attractive. If, on the other hand, we begin to see deflation expectations taking root, then (if property rents are an inflation hedge) both required and exacted returns would fall and there would be no impact on property cap rates – unless, of course, rents cannot fall over the period of a reasonably long lease, in which case cap rates would (again) fall.

On balance, the market in 2020 appeared to be expecting a moderate rise in cap rates driven by a reversion to moderately higher bond yields.

5. The 2022 shock

UK government 10-year gilt yields rose from 1% to 3.5% in one year from December 2021 to Decmber 2022. This was the long-awaited shock, or mean reversion, depending on your point of view. What happens to property prices when conventional bond yields go from 1% to 3.5% in one year?

It depends on why. $RFR^N = RFR^R + I + RPi$ – what has changed?

Initially, there was no sign of real risk free rates rising – index linked yields stayed negative.

There was certainly a shock to inflation expectations, up by say 1.5% in the medium term driven by the Covid crisis and the Ukraine war-driven shock to energy prices.

The resultant uncertainty probably meant that the inflation risk premium in the pricing of fixed interest securities rose too – up by say 1%.

Let's say that prime office cap rates in London stood at 3.5% in 2021. Given index linked gilt yields of negative 2%, an inflation expectation (and government target) of 2%, and an inflation risk premium of 1%, conventional gilt yields of 1% (-2% + 2% + 1%) make sense. Given a property risk premium of 3%, the required return or IRR on super-prime property is (1% + 3%) = 4%.

Assuming negative real rent growth of 0.5% and rents otherwise driven up by inflation, with depreciation taking another 1% rent growth away, we get net rent growth expectations of (-0.5% + 2%) - 1% = 0.5%.

Cap rates have to rise. However, if we believe that property rents are a good inflation hedge, the only driver of change is the higher inflation risk premium - remember, expected inflation cancels out.

$K = (RFR^R + I + RPi) + RP – (G^R + I) + D$
$= (-2\% + 3.5\% + 2\%) + 3\% - (-0.5\% + 3.5\%) + 1\% = 4.5\%$

What if we do not believe that office rents (for example) are a good inflation hedge? Let's say we can expect only 1.5% growth in new building rents when inflation runs at 3.5%. In such a case, cap rates would rise from 3.5% to 6.5%, a 47% collapse in values.

$K = (RFR^R + I + RPi) + RP – (G^R + I) + D$
$= (-2\% + 3.5\% + 2\%) + 3\% - (-0.5\% + 1.5\%) + 1\% = 6.5\%$

By early 2023, there were signs that real risk free rates were on the rise as the demand for money increased. If the real risk free rate goes upto zero, office rents are not seen to be a good inflation hedge and we have higher inflation risk premium, cap rates would go up to 8.5%. If the real risk free rate goes back to its mean rate of around 2%, cap rates would go up to 10.5%, a crash in value of two-thirds.

$K = (RFR^R + I + RPi) + RP – (G^R + I) + D$
$= (0\% + 3.5\% + 2\%) + 3\% - (-0.5\% + 1.5\%) + 1\% = 8.5\%$

or
$= (2\% + 3.5\% + 2\%) + 3\% - (-0.5\% + 1.5\%) + 1\% = 10.5\%$

It is hardly surprising that in early 2023 we can see another stand-off between buyers and sellers. Everyone agrees that values must have fallen, but by how much?