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A Review of Interest Rate Hedging in Real Estate

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A Review of Interest Rate Hedging in Real Estate

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A Review of Interest Rate Hedging in Real Estate

1. INTRODUCTION

Interest rate hedging, in particular interest rate swaps, has become a very topical issue in recent times. The FCA's Interest Rate Hedging Products review has highlighted to many people how unaligned the banks and their borrowers can be with regard to executing suitable interest rate hedging. In addition, there have been several articles and comments in the press with regard to how the mark-to-market overhang from legacy interest rate derivatives has prevented the flow of transactions in the property market, with many participants instead having to extend their funding rather than sell their property assets in order to allow the mark-to-market of their interest rate hedging to 'burn-off'. This short paper looks at how interest rate hedging products have been used historically in the real estate market, how this behaviour has changed over time and concludes with a framework that borrowers and banks should consider when entering into interest rate hedging to protect real estate debt liabilities.

One of the outcomes of the financial crisis that started in 2007 is that derivatives have been much maligned, being described as 'weapons of mass destruction', despite being highly beneficial financial tools that, if used correctly, can be extremely useful to borrowers to manage their financial risk. This paper examines the use of interest rate derivatives in the real estate market in the UK. It considers those issues that have characterised the interest rate hedging strategies adopted and aims to provide a better understanding of the relative advantages and disadvantages of differing strategies. Whilst the focus is on real estate, many of the themes arising out of this paper are easily transferrable to other sectors.

Before entering into a hedging arrangement, the borrower should always understand the purpose of the hedging. In very broad terms, there are two types of hedge: a fair value hedge and a cash flow hedge. A fair value hedge is one that seeks to protect against changes in the value of an asset or liability that are due to changes in a particular variable, for example using a property derivative to hedge the capital value of a well-diversified portfolio of property assets. A cash flow hedge is a hedge that protects the variability in the cash flows of a specific asset or liability due to changes in a particular variable, for example the cash flow liability from the interest payable on floating rate debt.

Interest rate hedging, as predominantly used in real estate transactions, is designed to be a cash flow hedge of the interest payable on floating rate debt. If used appropriately, there is a range of interest rate hedging instruments that allows users to effectively manage their interest rate risk.

The legacy resulting from borrowers entering into long-term interest rate swaps is one of the consequences of the credit bubble of 2006/2007. These swap liabilities were, and in some cases are still, very material, representing in several cases up to 30% of asset value. These large swap liabilities are hampering the ability to effectively manage, restructure and refinance assets and debt. Many long-term interest rate hedging strategies were implemented under the guise of protecting refinancing risk but, in reality, were often an attempt, by borrowers and lenders, to engineer a benefit from the inverted yield curve[1] through a lower fixed rate. As a result, current practice for interest rate hedging is invariably for it to be co-terminus with the maturity of the associated debt.

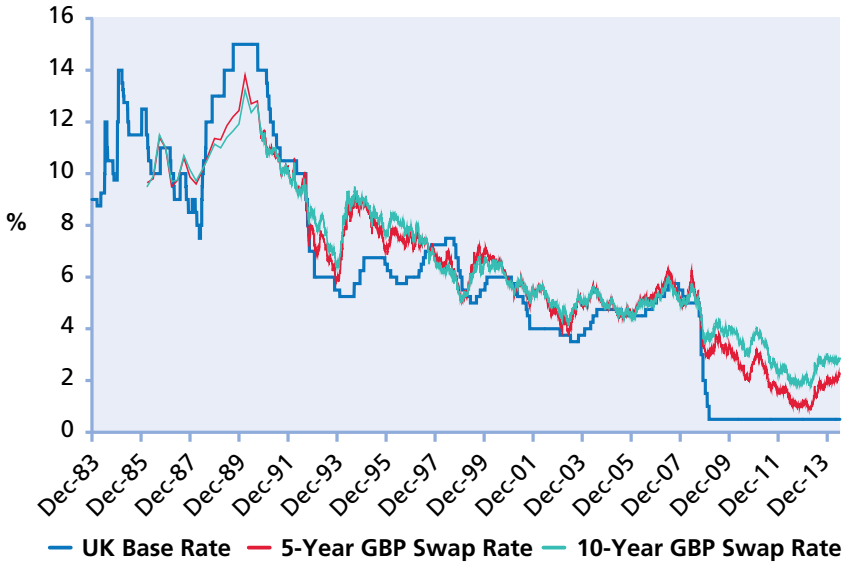
Some real estate market participants, due to their experience of breakage costs, have ceased to use interest rate swaps and, instead, adopt an interest rate cap or, where the lender allows, retain their debt on a floating rate basis. While the emotional (and even market) reasons for this switch in strategy are understandable, the reality is that interest rate hedging decisions are often made in isolation, or as an after-thought to the property transaction, whereas they should be considered in the context of the underlying risk profile of the asset finance and transaction structure to produce an optimal and effective hedge.

[1] An inverted yield curve is a downward sloping yield curve where long-term interest rates are lower than short-term rates.

2. THE USE OF DERIVATIVES IN HEDGING UK COMMERCIAL REAL ESTATE DEBT

During the 1980s, property companies were reliant on institutional debt and the issuance of long-dated fixed rate debentures to finance their activities. The role of banks was relatively limited[2],focusing mostly on development projects. While the terms of any bank loan focused on loan to value (LTV), no conditions were applied using such measures as Interest Cover Ratios (ICR). The risks attached to this, largely floating rate, development debt became evident following the rapid increase in both the UK base rate and swap rates in 1988/1989 (see Figure 2.1). The recession and property crash of the early 1990s resulted in the collapse of many property developers, partly due to their failure to effectively manage their interest rate exposure[3].

Figure 2.1: UK Base Rates and Swap Rates, 1983-2013



Source: Bloomberg and JC Rathbone Associates.

The use of interest rate derivative instruments, especially swaps, therefore became increasingly common practice. Swaps were the primary derivative utilised, in part due to the immediate interest rate savings that could be gained from the steeply inverted yield curve that prevailed throughout the 1988 to late 1990s period. In addition to swaps, shorter term instruments, such as Forward Rate Agreements, were also utilised to take advantage of the market's expectation that high rates would prevail for only a short period of time.

The lower and more stable interest rate environment that characterised the UK post 1992 helped to foster both the economic recovery and the commercial property sector[4]. During the 1990s, bank lending became increasingly significant, in large part replacing the traditional institutional funding sources. One consequence arising from the increasing role of the banking sector in real estate investment was the heightened use of floating rate debt. A key advantage in the greater use of this floating rate debt is that it allows separation of the funding and hedging decisions. This shift towards floating rate debt contributed significantly to the

[2] See Barter (1989), Brett (1998) and McWilliams (1992), amongst others, for an overview of the financing conventions in the UK commercial market at this time.

[3] See commentaries such as Ross Goobey (1993) for detailed examinations of not only the events of the early 1990s but also those factors that contributed to it. Studies such as Scott & Judge (2000) and Davis & Zhu (2004) provide a broader perspective of the impact and inter-relationship between bank lending and commercial property cycles whilst Stevenson (2000) specifically considers the bankruptcy of Olympia & York.

[4] See studies such as Lizieri & Satchell (1997) and Stevenson et al. (2007) for an examination of the interest rate sensitivity of the UK listed property company sector during this period.

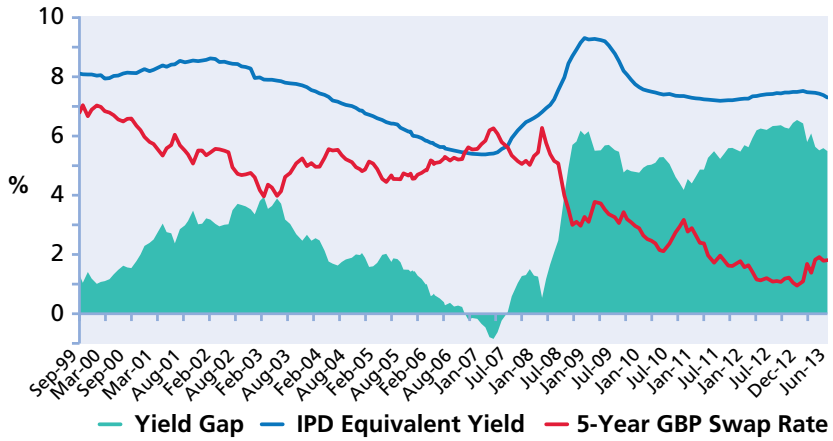
2. THE USE OF DERIVATIVES IN HEDGING UK COMMERCIAL REAL ESTATE DEBT

increase in hedging activity and, thus, the relevance and importance of the hedging strategies adopted. The provision of hedging products has been, and remains, a key profit centre for banks providing commercial property loans. As will be discussed later in the report, there are a number of potential conflicts of interest and agency issues when the provision of hedging products is separated from the lending decision.

Much of this floating rate bank debt was borrowed via Special Purpose Vehicles (SPVs), which allowed the banks to ring-fence loans against specific properties and, in turn, to prescribe hedging conditions to meet ICRs. Again, the main instruments used during the 1990s were interest rate swaps and, to a lesser degree, zero cost collars[5].

By the end of the 1990s, yields had fallen to such an extent that the IPD All Property Equivalent Yield was only slightly above the five-year swap rate (see Figure 2.2), whilst yields in some prime markets were below that. In order to meet lending targets, banks reduced loan margins and ICRs to minimal levels. Furthermore, they started to offer borrowers increasingly more 'exotic' hedging instruments that would engineer a lower funding cost and so allow a higher leverage to be achieved.

Figure 2.2: Equivalent Property Yields and Five-Year Swap Rates



Source: Bloomberg and IPD.

The inverted yield curve led borrowers towards long-dated swaps to achieve a lower rate. Moreover, banks offered hedging instruments that involved the borrower selling options to further lower the rate. The most common of these were bank cancellable swaps. These allowed a below-market swap rate to be achieved in return for providing the bank with the right to terminate after a pre-determined period and, in some cases, at regular intervals thereafter. It is questionable whether banks' credit functions understood such structures , whereby their Treasury function could terminate the swap if interest rates reverted to higher levels. Such an action would leave the borrower in an unhedged position at exactly the point in time when a hedge would have been of most use, inevitably leading to increased credit risk.

[5] Appendix C specifically addresses alternative vehicle structures, including SPVs.

2. THE USE OF DERIVATIVES IN HEDGING UK COMMERCIAL REAL ESTATE DEBT

From 2002 to 2007, UK real estate experienced sustained growth and yields fell significantly (see Figure 2.2). Two significant consequences of this yield compression were that, by 2007, the IPD equivalent yield had fallen below the five-year swap rate and the impact of capital value growth on the value of collateral underlying LTV calculations, both of which aided the growth of debt financing in the investment market. Whilst linked to broader credit conditions, the commercial property sector was also specifically affected by the growth in the CMBS (Commercial Mortgage Backed Security) market during this period. Although the increased ability to securitise commercial property debt partially explains the growth in real estate debt, it also had other consequences. In a majority of cases, borrowers were required to hedge 100% of their floating rate debt as a pre-condition for achieving the desired AAA credit rating on the senior tranche of the CMBS. As a result of the reduction in yields, and the subsequent rise in capital values, borrowers found it increasingly difficult to meet ICR covenants, often leading bank treasury departments to propose structured hedging solutions so that ICR requirements could be met through a lower cost of funds. In many instances, such structures also contained embedded options, giving banks the right to cancel, elongate or increase the notional value of the hedging structure. Some structures also contained a sold interest rate floor, which, if triggered, would increase the hedged rate[6].

As the real estate market progressed through the 'economic and interest rate cycle'[7], many participants were left with interest rate hedging contracted at high interest rates and large negative mark-to-market (MtM) exposures. Following the dramatic reduction in rates in early 2009, borrowers have instigated consensual 'blend and extend' restructurings in an attempt to reduce their cash costs, involving the extension of the term of the existing swap and thereby reducing the contracted fixed rate. This is paid for by increasing the tenor (duration) of the interest rate hedge, thereby deferring the negative MtM over a longer period. As interest rates have remained lower for longer than the market projected, this type of restructuring has proved a relatively expensive but often necessary mechanism to achieve an immediate reduction in borrowers' funding costs.

During the credit crisis, the dislocation in the UK bank funding market led to margins on senior real estate loans (commonly accepted to be those with LTV ratios no greater than 65%) rising to particularly high levels, frequently in the 3.50% to 4.50% range[8]. This created an opportunity for the non-banking sector to provide whole loans with a view to syndicating a senior tranche and engineering a mezzanine tranche and led to a number of real estate debt funds being launched. With syndication, there is a preference for the debt to remain on a floating rate to protect the lender against interest rate movement between origination and syndication. This floating rate debt still needs to be hedged, however, to ensure the borrower can service the loan in the event of a rise in interest rates. Debt funds are not regulated to be hedge counterparties so the hedge must be obtained via a third party. However, debt funds, typically, have only allowed the third party to take a junior security position, resulting in the hedging instrument being an interest rate cap. This differs from the CMBS market, where the hedge counterparty typically ranks in priority (or super-senior) to the CMBS debt holders, hence giving borrowers greater flexibility to hedge through an interest rate swap.

Following the credit crisis, the current practice for bank lending is to provide debt facilities of shorter maturities than before, typically five years or less, with the associated hedging being co-terminus with the debt. Many borrowers are also considering alternatives to interest rate swaps, such as caps, or retaining the debt on a floating rate basis, while other borrowers are sourcing fixed rate debt from institutions.

[6] Appendix A provides extensive details of some of the technical issues surrounding the alternative hedging structures.

[7] It is rather understated to refer to the recent past as an interest rate cycle; in reality, rates were cut and have remained at 0.50% since March 2009.

[8] To put these figures into perspective, immediately prior to the 2007 crisis, margins were generally in a range of 0.25% to 1.25%. Currently, margins lie largely in a band between 1.50% and 2.50%.

3. THE ROLE OF THE BANKING SECTOR IN HEDGING PRODUCTS

In the years following the financial crisis, interest rate hedging has been in the regulatory spotlight. The Financial Conduct Authority (FCA) intervened and, in May 2013, the UK banks committed to a voluntary past business review of hedging instruments sold to 'unsophisticated' borrowers from December 2001 onwards. What has become clear, as this review has progressed, is the lack of understanding by borrowers that the sale of derivatives to them generated a profit to banks, and that often the derivatives side of the bank (the treasury team) was a different legal entity to the lending side of the bank (the loan underwriters). A number of agency conflicts can arise out of this situation, some in part relating to how banks account for profits on derivative instruments.

This may be illustrated in the context of an interest rate swap: when implemented, a spread is applied to the rate offered by the trader and, in the past, the present value of this spread was generally taken as profit by the treasury team. For example, for a £100 million swap, the present value of five basis points (0.05%) over a five-year period would be £219,991 (based on a flat discount rate of 5%). In contrast, the value for a 10-year period would be £391,587. This illustrates the extra profit realised through a bank selling a 10-year rather than five-year swap. Conflicts of interest can also arise when a decision is made on the quantum of hedging: the value of a five basis points spread on a £200 million swap is double that of a £100 million swap. The FCA review has documented a number of examples of borrowers entering into interest rate derivatives that exceeded the quantum of their debt or with tenors vastly in excess of the debt maturity, or both.

With more complex, less transparent products, such as geared interest rate collars and bank cancellable swaps[9], the borrower is at a further information disadvantage. These instruments can achieve a lower initial protected rate but the borrower takes on additional risk later in the life of the product. Interest rate hedging structures that contained inappropriate interest rate risk for the borrower were not understood by loan underwriters.

For example, consider a 10-year £100 million swap in May 2007. At that time, the market rate of a vanilla interest rate swap[10] was 5.50%. The bank could provide the borrower with a bank cancellable swap with an interest rate of 5.40%, i.e. below the market rate, with the proviso that the bank had an option to cancel the swap once, at year five. It is not immediately apparent to the borrower that this product would be out-of-the-money (i.e. have a negative MtM value) in the region of £656,000. Should the bank have had the option to cancel the swap at year five and annually thereafter, the instrument would be out-of-the-money to the tune of £742,000. If this was not transparently and explicitly laid out, the borrower may have primarily concentrated on the perceived upfront saving of 10 basis points versus the vanilla swap rate.

In the case of geared collars, some of the potential issues can be illustrated using the example of a seven-year £100 million hedge from May 2007 to May 2014. In May 2007, the seven-year swap rate was 5.65%. If the preferred maximum rate payable was 6.50% but the borrower wished to avoid having to pay for an interest rate cap, a zero cost vanilla collar could be provided as a cap at 6.50% with a floor of 5.20%. However, if the borrower felt that this did not provide them with sufficient participation in lower London Interbank Offered Rate (Libor) rates, a geared collar could be structured with a cap at 6.50% and a floor at 4.85%, which, when breached, would allow the effective rate to rise again until it returned to 6.50%. Whilst the borrower may have believed they were benefiting through the potential to participate in an additional 0.35% downward movement in Libor, it was not immediately apparent that the value of the geared collar product was £400,000 more negative than the vanilla collar.

[9] More detailed explanations of such products, together with the full array of hedging strategies, are discussed in Technical Appendix A. The examples provided are best read in conjunction with the explanation provided in this Appendix.

[10] A 'vanilla' interest rate swap is a common term, describing an interest rate swap with no embedded features.

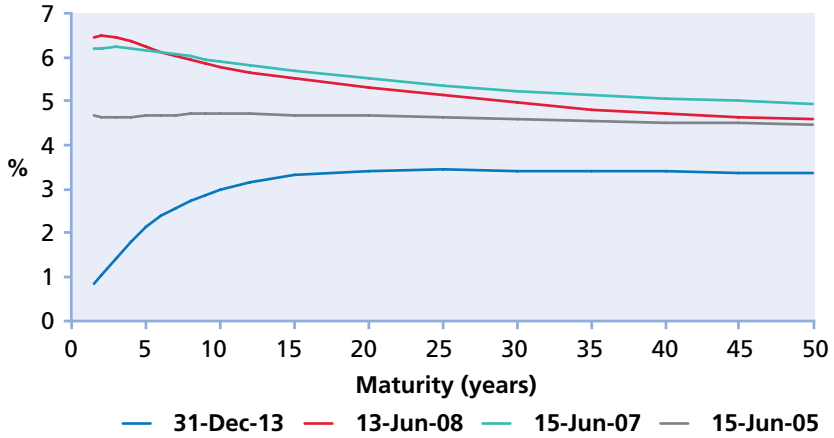
4. THE INTEREST RATE ENVIRONMENT

A wide variety of factors influence the interest rate hedging decision. A key element is the interest rate environment, which can be categorised in a number of different respects: general level of interest rates, the shape of the yield curve and implied market volatility. Whilst interest rates obviously have a direct impact on financing, there are additional channels through which they are of relevance in a property context. As a real asset, property is affected by the performance of the underlying economy. Given the macroeconomic role interest rates have (Bernanke & Blinder, 1992), changes in rates may, if of sufficient magnitude, impact on the operating performance and cash flows of investors in the property market. This may arise via occupational demand, rental growth and vacancy rates. Conceptual and theoretical work, such as that of DiPasquale and Wheaton (1992) and Fisher (1992), illustrates the inter-linkages between economic activity and the direct real estate market, whilst papers such as Ling & Naranjo (1997), and numerous papers subsequently, have empirically demonstrated that interest rates represent a systematic risk factor for real estate. Interest rate risk can also be transmitted via the yields used to capitalise the income flows from the properties held (Lizieri and Satchell, 1997).

The importance of the shape of the yield curve is under-appreciated outside the fixed-income market. There remains ongoing discussion in both academia and the financial sector concerning those factors that influence the yield curve. Only a limited number of papers have explicitly considered the importance of the yield curve in a real estate context. Plazzi et al. (2008) measure the return dispersion in the commercial real estate sector, finding that risk changes can be explained by short-term interest rates and a variable measuring the term spread. A recent paper by Akimov et al. (2014) illustrates the importance of considering the entire shape of the term structure when assessing the interest rate sensitivity of publicly listed real estate vehicles such as Real Estate Investment Trusts (REITs) and property companies.

The yield curve has changed shape quite dramatically over the course of the last decade. Figure 4.1 illustrates this with representative examples between 2005 and 2013. At present, the UK yield curve continues to adopt an upward sloping shape, in marked contrast to its structure in the years prior to the 2007 crisis. In 2005, the curve was flat, whilst in the period leading up to the financial crisis it was inverted with medium- and long-term swap rates persistently lower than short- to medium-term interest rates. For example, in May 2007, the swap curve was such that the five-year swap rate was 25 basis points (0.25%) higher than the 10-year rate, and 71 basis points (0.71%) higher than the 20-year rate. As shown earlier, the inverted yield curve was a motivation to enter into longer-term interest rate derivatives thereby achieving a lower contracted swap rate.

Figure 4.1: UK Yield Curves



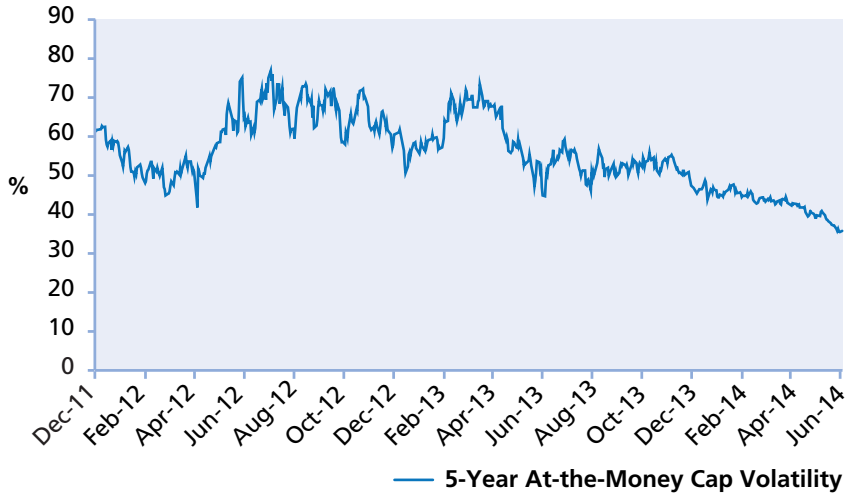
Source: Bloomberg.

4. THE INTEREST RATE ENVIRONMENT

It is worth noting that the forward curve affects the cost of every hedging instrument available to the borrower. However, the forward curve has often been a poor predictor of interest rate movements and, over the last 15 years, for the most part, the forward rate over-estimated the realised Libor rate.

In addition to the yield curve, a further important factor is the implied market volatility of interest rates. As a function of how market participants perceive uncertainty, the implied volatility of interest rates affects the relative attractiveness of option-based hedging relative to contracts for difference, such as interest rate swaps. Figure 4.2 illustrates how the implied volatility can change over time by showing the implied volatility of an at-the-money cap over the period between December 2011 and June 2014, where a higher implied volatility translates into a higher cap premium. Many real estate borrowers focus on achieving high cash-on-cash returns and are unwilling to pay the premium associated with an option-based hedging strategy, deeming it to be too expensive. In some cases, the most suitable hedging strategy will include an element of flexibility through an option-based product. Whilst it may, at first look, appear as though the costs incurred in an option-based strategy are higher, this is not necessarily the case. The primary cost of option strategies comes in the form of an upfront premium. However, other strategies, whilst possibility appearing cheaper, can result in being both more expensive and less appropriate, due to borrowers implicitly (and unknowingly) taking a view of interest rate volatility.

Figure 4.2: Implied Volatility of an At-the-Money Interest Rate Cap



Source: Bloomberg.

5. INSTRUMENT COMPARISON

To compare how different interest rate hedging instruments perform in different interest rate environments, five alternative products are compared under a variety of yield curve scenarios and assuming a debt amount of £100 million for five years and a lending margin of 1.00%.

Analysis is of:

- a five-year vanilla swap
- a 20-year vanilla swap
- an out-of-the-money (OtM) cap
- a borrower cancellable swap
- a bank cancellable swap
- a fixed rate debt

These instruments have been selected as they are among those most commonly used in the real estate market. In the example below, it is assumed that the fixed rate debt is subject to a Spens (or Make Whole) calculation[11] if the borrower seeks to repay the debt early. All the alternatives are priced as of 15 January 2007, ignoring credit and capital costs. Each of the instruments has zero value at inception; hence the premium of the cap, called pay-as-you-go (PAYG), is deferred over its five-year life. The options to terminate embedded into the cancellable swaps are both set for 15 July 2009, halfway through the five-year life. Details of the instruments are set out in Table 5.1. Note that the contract rate of the borrower/bank cancellable swap is above/below the vanilla swap because of the inclusion of the bought/sold option to cancel that is embedded in the swap.

Table 5.1: Details of Hedging Instruments

Instrument	Contract Rate
5-Year Vanilla Swap	5.53%
20-Year Vanilla Swap	4.89%
5-Year OtM Cap	6.00%
5-Year Borrower Cancellable Swap	5.93%
5-Year Bank Cancellable Swap	5.33%

Source: JC Rathbone Associates.

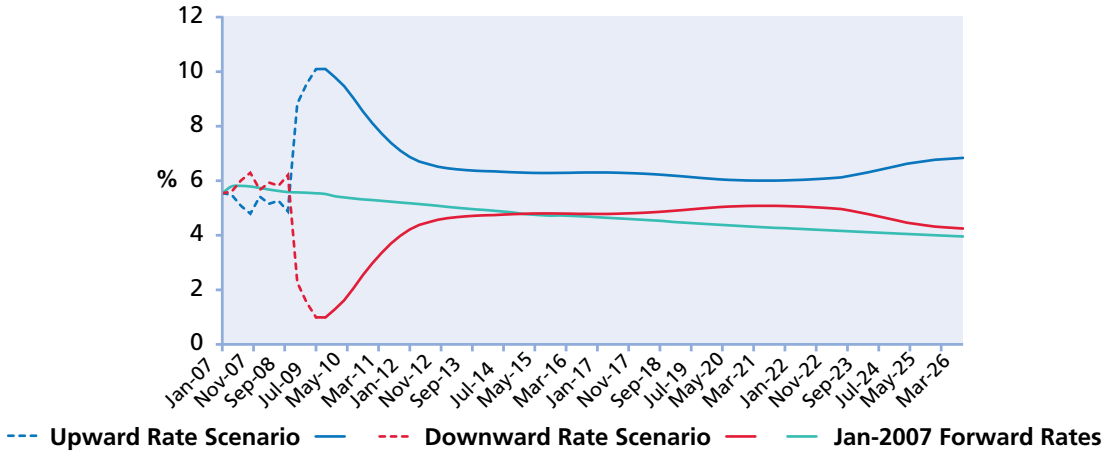
The five- and 20-year swap rates reflect the shape of the forward Libor curve with the contracted fixed interest rates at 5.53% and 4.89% respectively. The rate on the fixed rate debt is not included in this table; for the purpose of this analysis, it has been set at 6.53%, being 1.00% above the vanilla swap rate to reflect the loan margin of 1.00%. For illustrative purposes, a cap strike rate of 6.00% (i.e. out-of-the-money by 0.47%) has been set, which would have an upfront premium of around £1 million. In order to make the cap more comparable with the zero premium swaps products, the premium has been deferred over its life. The deferred premium of the OtM cap equates to a per annum running cost of 0.27% on the £100 million notional amount.

[11] See Technical Appendix A for more information on fixed rate agreements.

5. INSTRUMENT COMPARISON

Figure 5.1 shows the forward Libor rates on the inception date of the instruments. In January 2007, the three-month Libor rate was c. 5.55%, with the expectation that it would rise to circa 5.80% before continuing to fall below 4.00% over the long-term (as defined by the green line).

Figure 5.1: Libor Forward Rates as of January 15th 2007



Source: JC Rathbone Associates

A comparison of how the different products may behave in three different yield curve environments is based on the following assumptions:

A) Forward rates as projected by the market in 2007;
B) Upward yield curve scenario; and
C) Downward yield curve scenario.

In Figure 5.1, the red lines show the real-life downward rate scenario that actually occurred during the period between 15 January 2007 and 15 July 2009; where the dotted red line shows the actual Libor fixings over this period and the solid red line shows the projected forward rates as at 15 July 2009.

The mirror image of this actual downward rate scenario is then constructed to give an illustration of how the instruments would perform in a rising yield curve environment – shown by the blue lines in Figure 5.1.

The valuations of the various instruments, as at 15 July 2009 (two and a half years into the five year life) in the three different scenarios, are considered and the results of the corresponding MtM are presented in Table 5.2.

5. INSTRUMENT COMPARISON

Table 5.2: Details of Hedging Instruments

Instrument	Scenario A As predicted	Scenario B Upward rate	Scenario C Downward rate
5-Year Vanilla Swap	(262,062)	5,574,654	(5,900,899)
20-Year Vanilla Swap	(9,270,892)	12,401,833	(14,035,478)
OtM Cap	(472,360)	5,666,011	(370,978)
Borrower Cancellable Swap	-	4,918,617	-
Bank Cancellable Swap	-	-	(5,566,103)
5-Year Fixed Rate Debt	(1,934,967)	-	(7,635,799)

Note: Figures in brackets denote negative values and are a cost to the borrower.
Source: JC Rathbone Associates.

Scenario A – Forward Rates as Projected by Market

As Table 5.2 illustrates, if interest rates followed the prediction of the curve, both the bank and borrower cancellable swaps would have been terminated, hence they have zero value in the table. The five-year plain vanilla swap is out-of-the-money, due to the fact that the borrower has a fixed rate above the projected forward rates for the remainder of the swap life, although it is worth noting that the borrower has received the benefit of a fixed rate that was lower than the Libor rate early in the life of the swap. Similarly, the 20-year vanilla swap is out-of-the-money as the projected forward rates are below the contracted fixed rate. The cap has a negative value due to the remaining outstanding premium payments. As the cap is valuable as an option product, it is not surprising that, should rates be completely unchanged over the two and half year period, a significant portion of the value is lost.

Scenario B – Upward Rate/Yield Curve Scenario

In the upward rate scenario, all the hedging products have a positive MtM, with the exception of the bank cancellable swap and the fixed rate debt that both have zero value. In this scenario, the bank cancellable swap would be cancelled by the bank, leaving the borrower unhedged and exposed to the higher interest rate environment with rates close to 10%. This illustrates the disadvantages of bank cancellable swaps and how they prove to be very ineffective hedges, leaving the borrower with no control over their hedging. The fixed rate debt has zero value, due to the asymmetric treatment of value of the fixed rate within a Spens calculation[12].

The OtM Cap has a positive value as the cap strike is well below the market interest rates in this scenario. The borrower cancellable swap underperforms the vanilla swap contract as the option to cancel is only valuable when interest rates fall. The long-dated vanilla swap has a large positive value representing c. 12% of the notional amount hedged, a result of the long remaining life of the instrument and the significant rise in rates.

Scenario C – Downward Rate/Yield Curve Scenario

In the downward rate scenario, the interest rate products all have a negative MtM with the exception of the borrower cancellable swap. The borrower cancellable swap in this scenario would be cancelled by the borrower, leaving the borrower open to benefit from the lower interest rate environment with rates close to 1.50%.

[12] Fixed rate debt is not always subject to Spens and will depend on the institution providing the fixed rate. Where a Spens or Modified Spens calculation is not applied, then the value of the fixed rate, typically, reflects the equivalent interest rate swap.

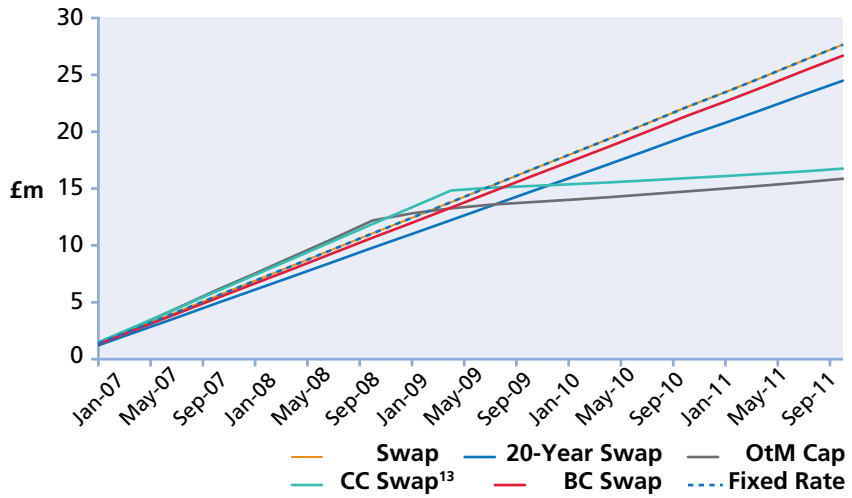
5. INSTRUMENT COMPARISON

The OtM cap outperforms the other swap instruments, as it allows greater participation in falling rates, and the MtM value converges to the present value of the premium outstanding. Finally, the vanilla swap underperforms the bank cancellable contract: the option sold to the bank now has zero value; however, the vanilla swap has a higher contract rate than the bank cancellable swap – to the tune of 0.20%. The long-dated vanilla swap has a large negative value, representing c. 14% of the notional amount hedged, as a result of the long remaining life of the instrument and the significant fall in rates.

The MtM is one measure of the performance of these instruments. Another is the actual net interest payable on the debt when the interest rate hedging product is taken into account. Figures 5.2 and 5.3 show the cumulative interest paid, ignoring the lending margin, on £100 million of debt based on the upward and downward interest rate environments previously considered.

In the downward scenario, it is clear that an interest rate cap product outperforms any swap contract because the cap is purely an insurance product against rising rates. In low or declining rate environments, caps allow the borrower to fully participate and benefit from falls in interest rates, as can be seen in Figure 5.2. The next most effective product is the borrower cancellable swap. Once the user has exercised the right to cancel the product, they can start to fully benefit from the lower rates available in the market place.

Figure 5.2: Cumulative Pre-Margin Interest Paid in a Downward Interest Rate Environment



Source: JC Rathbone Associates.

It is also noticeable from Figure 5.2 that the bank cancellable swap outperforms the vanilla swap, as the bank cancellable swap has a lower contract rate than the vanilla swap. However, the bank would not cancel a swap in such a low interest rate environment. This is an issue that many users faced during and immediately after the financial crisis. Long-dated bank cancellable swaps remain extant as there is no incentive for the bank to cancel.

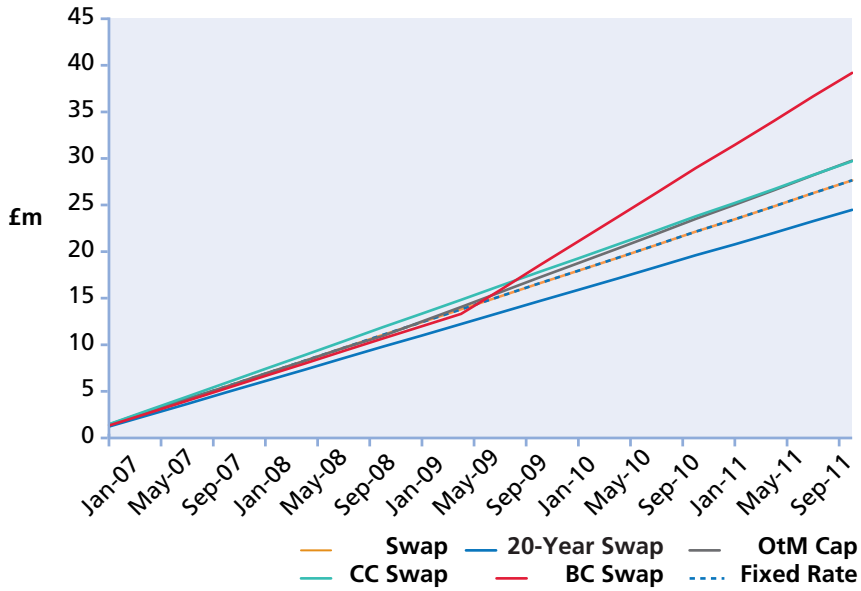
[13] CC Swap: Client cancellable, or borrower cancellable, swap.

5. INSTRUMENT COMPARISON

In the upward interest rate scenario (B), it may be seen that, due to the lower contract rate, the long-dated swap outperforms the other instruments, as displayed in Figure 5.3. Similarly, the bank cancellable swap initially outperforms the other swaps due to its lower contract rate. However, from the point at which the bank can cancel the instrument, the borrower will be exposed to the higher interest rates prevailing in the market. It may be seen that the interest payable under the loan starts to increase dramatically, more than offsetting the initial benefits that were accrued.

The vanilla swap and the fixed rate perform identically as all of the details are the same. In addition, they outperform the borrower cancellable swap and the OtM cap as both of these instruments have higher contract rates than the vanilla swap. This is related to the greater flexibility they afford the borrower, which can prove valuable, as described in the downward scenario.

Figure 5.3: Cumulative Pre-Margin Interest Paid in an Upward Interest Rate Environment



Source: JC Rathbone Associates.

6. SWAP CASE STUDIES

To illustrate the effects of inappropriate swap features on derivative valuations since the financial crisis, three case studies are presented. The details of the case studies have been streamlined in order to allow for cross-comparison and to keep the original trades confidential. The trade date for the three cases is assumed to be 16th January 2007, for ease of comparison between the three cases. The MtM for each is then prepared six months after the trade date and annually thereafter. A notional amount of £100 million is assumed, unless stated otherwise, and quarterly interest payments referencing three-month Libor. The following products are chosen as examples entered into by property companies to hedge five-year floating rate debt.

Case Study I

This case study analyses a vanilla five-year interest rate swap. The purpose of including this instrument is to capture the effect that the significant decrease in interest rates had on the value of interest rate derivatives. While unsuitable hedging products with non-vanilla features led to unpalatable valuations for their owners, derivatives users who owned suitable vanilla products were also exposed to large, negative valuations. It is important to differentiate between the contribution of inappropriate features in hedging products to the negative valuations and the contribution of movement in the underlying interest rates.

The fixed rate, based on the prevailing mid rates on the trade date of 16 January 2007, is 5.53%.

Case Study II

This case analyses a 20-year vanilla swap with a fixed rate that steps up every five years from a very attractive low rate to a high rate in the last five years of the swap. As the yield curve was inverted at the date of trading, the rate on a 20-year vanilla swap would already have been lower than that achievable on the five-year vanilla swap in Case Study I. Combining this with the step-up nature of the fixed rate leads to a very low rate being achievable at the front end. The purpose of this structure would be to back-end the cost of having relatively low rates in the shorter term.

For a 20-year vanilla swap with a constant rate on the fixed leg, the rate, based on the prevailing mid-rates on the trade date, would be 4.89%, which is already significantly lower than the rate on a five-year swap, 5.53% The fixed rate for the first five years is set on the step-up swap at 4.00%; at year five the rate increases to 4.75%; at year 10 it increases to 5.50% and, finally, at year 15 it increases to 6.166%. The rate in the final five years was solved so that the weighted average rate for the step-up swap was equal to the rate on a 20-year vanilla swap, i.e. 4.89%.

Case Study III

The final case study analyses a five-year vanilla swap, extendable, at the bank's option, for a further five years with the notional amount on the extendable portion of the swap being doubled from £100 million to £200 million. The attractiveness of increasing the notional amount on the last five years is that it would double the value of the extendable portion to the bank, thus allowing the rate across the whole swap to be bought down and back-ending the cost of achieving a lower rate. Note that the fixed rate would be solved to be the same on the first five years as on the second five years.

As stated earlier, the fixed rate for a five-year vanilla swap on 16 January 2007 was 5.53%. Selling the bank the option to extend the swap, on the same notional of £100 million, for a further five years in year five reduces the rate on the extendable swap to 5.00%. Doubling the notional amount for the second five years, to £200 million, enables the fixed rate to be reduced further to 4.735%.

6. SWAP CASE STUDIES

Comparison of Mark-to-Markets

Table 6.1 presents the MtMs for each of the case studies on annual dates, starting six months after the trade date and ending six months before the maturity date of the five-year vanilla swap. The extendable swap can be priced as two products: a five-year vanilla swap and a five-year swaption, starting in five years time.

Table 6.1: Annual Valuations of the Case Studies

Instrument	16 Jul 2007	15 Jul 2008	15 July 2009	15 July 2010	15 July 2011
5-Year Vanilla Swap	2,582,508	627,139	(7,684,445)	(6,762,142)	(2,348,751)
25-Year Step-Up Swap	6,713,448	892,748	(9,761,200)	(20,589,540)	(21,761,209)
5-Year Swap Extendable for 5yrs	4,364,433	707,978	(10,776,430)	(21,577,663)	(25,883,641)

Note: Figures in brackets are negative in value.
Source: JC Rathbone Associates.

As Table 6.1 illustrates, even the most straightforward hedging product, a five-year vanilla swap, had a negative MtM of almost 8% of the notional after rates fell in early 2009. However, over the next couple of years, as the swap approached maturity, the negative value of the remaining life of the product decreased to zero. Since actual three-month Libor fixings were lower than implied by the forward curve in July 2009, the net present value of the realised cashflows to the maturity of the five-year swap would have been £11.6 million. However, as the swap was a perfect hedge, these payments were offset by the benefit of lower interest payments on the floating rate debt.

The detrimental impact of the second and third cases, where structures were used to achieve a lower rate in the near term at the risk of higher costs later, is clearly seen in the last two valuations from July 2010 and 2011. The MtM on the step-up swap reaches circa 22% of the notional of the debt and is increasing through to the maturity of the five-year vanilla swap and underlying floating rate debt.

Due to the notional on the second half of the extendable swap being double that of the notional during the initial five years, the valuation of the swaption starts to dominate the MtM from July 2010. In fact, by July 2011, the MtM has reached close to 26% of the original notional amount. Since rates did not increase enough before the expiry of the swaption, the bank would have exercised its right to extend the swap at 4.735% on a notional of £200 million while the market rate for a five-year vanilla interest rate swap on 16 January 2012 (the expiry date) was 1.23%. The result being that the property company would have found itself entering a five-year vanilla interest rate swap that had a negative value of £34.5 million on the day of trading.

7. POST FINANCIAL CRISIS

As a result of the financial crisis and subsequent regulatory focus on derivatives, the way banks sell derivatives has changed. Banks have adopted a full 'belt and braces' approach involving greater disclosure and stringent sales processes, particularly when providing instruments to unsophisticated or retail borrowers.

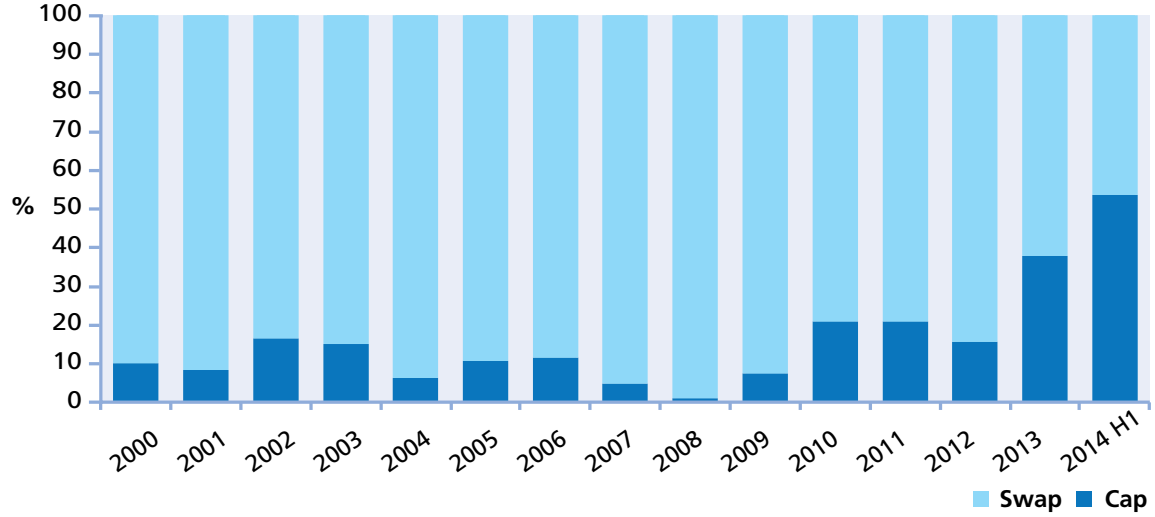
This has led to some banks to withdraw their offer of providing derivatives to retail borrowers. However, this approach can give rise to an otherwise sophisticated borrower being classified as retail and, thus, precluding them from managing their interest rate risk in the manner best suited to their investment. Furthermore, in the current, very low interest rate environment, it might be argued this is precisely the time at which such retail borrowers need to be controlling interest rate risk but are now constrained in how they can achieve this.

Banks have also started to monitor and account for the various value adjustments in the pricing of instruments. Thus, the true cost of providing particular derivatives is priced more effectively into the instrument and reduces the incentive to provide longer-dated or more complex instruments. While banks have borne the costs of the change in pricing methodology on existing derivative positions, they have passed on these costs to borrowers on any new hedging implemented resulting in higher derivative costs for end users. See Technical Appendix B for more information.

More broadly, it has become apparent that borrowers are showing a growing preference for interest rate caps to interest rate swaps, mainly due to a desire to retain some flexibility in their hedging strategy and to mitigate the risks of break costs. Figure 7.1 illustrates this trend, showing the relative percentages of caps versus swaps executed in each period.

In addition, the growth of non-bank floating rate debt and the high credit spreads banks seek to charge have both played a role in this behavioural shift. This movement towards caps comes at a time when the majority of economic commentators anticipate UK Base Rate rising within six months. An increasing rate environment would generally result in swaps performing better. However, if borrowers can meet their ICR covenant, they can purchase cheap out-of-the-money caps as a form of disaster protection only. This would indicate that real estate borrowers either do not agree with market expectations of interest rates or that other concerns, such as an aversion to swap break costs, influence their thinking.

Figure 7.1: Breakdown of Hedging Usage, 2000-2014



Source: JC Rathbone Associates.

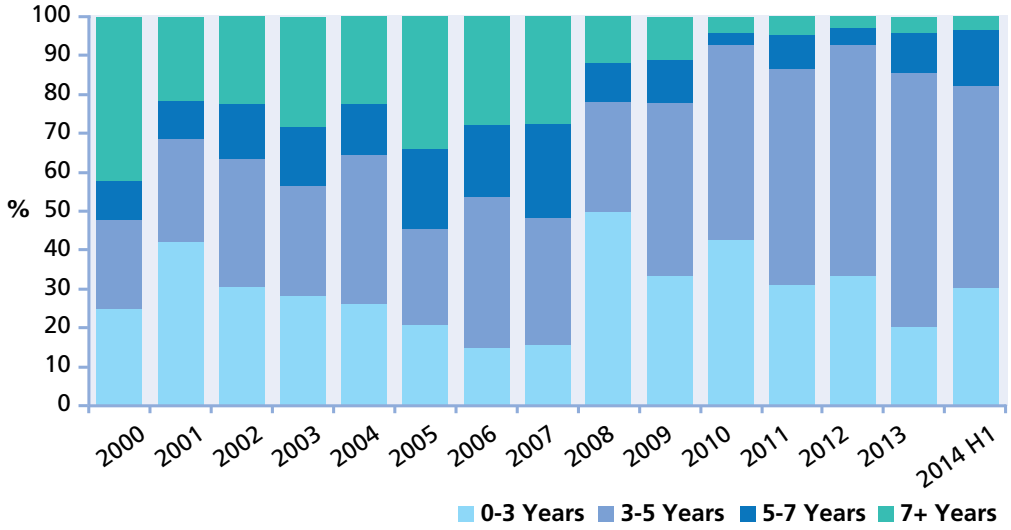
7. POST FINANCIAL CRISIS

Following the financial crisis, from 2009, many borrowers were left with large negative swap liabilities and high contract rates compared to floating Libor, resulting in them being unable to sell the underlying properties without crystallising these large swap liabilities. Many borrowers instead sought to extend their financing arrangements in order to wait for the MtM of their swaps to 'burn-off' as the remaining life shortened.

In other cases, borrowers took advantage of low interest rates to extend their existing interest rate swaps and reduce their contract rates – an interest rate swap restructuring, known commonly as a 'blend and extend'.

A further change is the shortening of hedge tenors since 2007. Figure 7.2 shows the relative percentage of different tenors of interest rate hedging executed in each period. A contributory factor has been the withdrawal of long-term funding by banks, due to the high capital costs of providing such facilities. Debt funds have, in part, become an alternative source of funding from bank debt and generally offer shorter term debt. Whilst institutional debt providers are still providing longer term debt, this is generally of a fixed rate nature. As a consequence, there is no need for a separate hedging product unless the borrower wishes to establish a floating rate liability (i.e. converts fixed into floating).

Figure 7.2: Duration of Interest Rate Hedging, 2000-2014



Source: JC Rathbone Associates.

The appetite of both borrowers and their hedging counterparties to enter into long-dated hedges has reduced over the course of the last seven years. Many borrowers were badly affected in 2007/2008, when interest rates fell to unanticipated and unprecedented low levels. This left many borrowers with large negative liabilities in relation to swap positions. The appetite of the banks to extend credit lines to borrowers for long-dated swaps has reduced as the capital implications under Basel III of doing so are now punitive, whilst, at the same time, banks are also more accurately pricing the credit and funding costs of long-dated hedges, making these products less attractive from a cost perspective.

A third factor is the current interest rate environment. The UK has observed an upward sloping yield curve since late 2008, when the Bank of England started to cut Base Rate significantly, eventually bringing it down to 0.50% in March 2009. As a consequence, hedging longer tenors is less attractive to end users.

8. LESSONS LEARNT FOR GOOD PRACTICE

The final section of this paper considers a good practice framework for interest rate hedging. In recent years, due to the way in which the interest rate cycle has performed, many real estate borrowers and lenders are cognisant of the potential MtM liabilities that may arise through the use of interest rate hedging products. Often, these liabilities have been a function of inappropriate instruments, but the basic products themselves, if used appropriately, are extremely important risk management tools (but may still give rise to large liabilities).

8.1 The Market Perspective

The biggest changes in the market have occurred for the unsophisticated borrower base (classified as Retail under MiFID[15]), although there have been wider changes in the market such as the introduction of Basel III and improvement in how the industry approaches the pricing of latent risk factors in derivative instruments.

Partly as a result of the FCA's Interest Rate Hedging Products review[16], which identified poor internal processes at the banks and a lack of sufficient disclosure of the risk associated with derivative instruments, the market has increased the level of disclosure given to borrowers. Disclosure is important but needs to be combined with borrowers taking a more considered approach to their interest rate hedging decisions.

Market practice is improving with increased education. It is commonplace now for a retail user of an interest rate hedging product to be tested on their understanding of the future interest rate scenarios and what this will mean for the value of their hedge instrument.

In some cases, particular banks have withdrawn entirely from providing floating rate loans to unsophisticated borrowers and will only provide fixed rate loans, while other banks will only allow borrowers to trade vanilla interest rate swaps. Whilst restricting the sale of structured, and at times toxic, interest rate derivatives to retail borrowers is a positive move, it is not an improvement in the market to completely restrict the ability of borrowers to sensibly manage their interest rate risk. There is a need to move forward to an environment where a range of suitable hedging instruments are available to retail borrowers, especially when many sophisticated borrowers end up being classified as retail due to the fact that an asset may be purchased through an SPV, thereby triggering the retail classification.

Another, post financial crisis, change is the greater emphasis on the various pricing components for financial institutions providing derivatives to borrowers. These include Credit Value Adjustment ("CVA") and Funding Value Adjustment (FVA)[17]. With banks starting to make more appropriate reserves and charges on interest rate swaps, this may also start to make inappropriate structures less attractive as the risks involved in providing these structures are priced appropriately, rather than taken as a profit at inception.

[15] Markets in Financial Instruments Directive. MiFID is an EU law that regulate investment services in the EEA.

[16] http://www.fca.org.uk/consumers/financial-services-products/banking/interest-rate-hedging-products.

[17] See Technical Appendix B for an explanation of these terms and other changes in how the pricing of interest rate derivatives has changed.

8. LESSONS LEARNT FOR GOOD PRACTICE

One area that remains unchanged is the separation of bank lending and treasury teams. It would be good progress if their approach to borrower risk management was more coordinated as it may mean less inappropriate hedge instruments are executed between borrowers and their banks. While the credit crisis precipitated a dramatic fall in three-month Libor, the real disaster for those borrowers who took out bank cancellable swaps would have been if interest rates had rocketed to over 10%, leaving them completely unhedged at extremely high interest rates. While treasury teams may have viewed a long-dated bank cancellable swap as a clever mechanism to save a few basis points of interest for a few years, any sensible lender should have looked at the product and realised that it merely exacerbated the bank's refinance risk on the loan. However, banks are not straying into the 'advisory' role and rightly point out in their disclaimers that their role is not to provide advice but to sell a product. The compliance functions within banks are emphasising this more than ever.

8.2 The Borrower Perspective

Type of hedge?

The first concept to consider is why is the borrower seeking to hedge its position? The majority of real estate interest rate hedging is undertaken as a cash flow hedge, where the purpose of the interest rate hedge is to ensure no adverse impact to cash flow from variations in interest rates. Lenders to real estate are similarly conscious of this and, hence, often include minimum hedge requirements as a condition of their loan offer.

A fair value interest rate hedge in real estate is less common. It may arise where the value of the property is closely related to interest rates (which could be the case for a long-dated lease to a highly rated tenant). Here, the value of the asset will be linked to the discounted value of the lease payments (i.e. a function of interest rates). It may be prudent, therefore, to hedge the refinance risk associated with such an investment.

What is being hedged?

The starting point is to look at the term of the debt facility and any amortisation over its life. Variations to this contracted debt profile may then be considered. This will include any influence from the investment strategy such as a disposal, or partial disposal, prior to maturity, rental uplifts, lease breaks, or a desire to hedge a portion of the interest rate element of the refinance risk for an asset that is a long-term hold.

The borrower should then evaluate its sensitivity to interest rates by modelling the projected income, the correlation between income and interest rates, and the required interest or debt service cover ratio. This will give a sense of the ability of the company to take on interest rate risk.

Less objective, but important, is the borrower's appetite for risk. A high net worth individual or property developer may be targeting very high returns and have a very large risk appetite. On the other hand, a publically quoted REIT may have a very low interest rate risk appetite and may be more concerned with maintaining a consistent dividend and dividend cover ratio.

Facility agreements may contain specific covenants that can dictate the parameters of any hedging: minimum quantum, maximum hedge rate, minimum ICR or minimum floating Libor rate. This either needs to be factored into the structuring of the hedge to ensure compliance, or renegotiated with the lender to be more appropriate to the hedge requirements of the borrower.

8. LESSONS LEARNT FOR GOOD PRACTICE

The choice of hedge instrument?

By modelling to analyse the optimal mix between fixed and floating rate debt, the degree of uncertainty about the exact debt profile should be identified, allowing the borrower to incorporate some flexibility into their hedging strategy or to reduce the quantum hedged. For example, if a borrower is seeking to protect against potential, but uncertain, future borrowings, an interest rate swap on 100% of potential borrowings will not be appropriate, whereas a hedge with more flexibility, like an interest rate swaption, may be more suitable.

The fixed-to-floating ratio of debt can also be driven by the degree to which property income is correlated to interest rates. For example, for Hotel companies RevPar (the main metric of income) is thought to be correlated to Libor (the floating interest rate). There is an argument, therefore, that it is more appropriate for hotels to incorporate an element of floating rate or capped rate debt in their funding (Corgel and Gibson, 2005).

The interest rate mix also needs to be considered in terms of the wider portfolio and its evolution. For example, if a borrower has a large amount of fixed rate debt, because they naturally source fixed rate debt from the private placement or institutional market, then an additional tranche of floating rate debt from the banking market may be more appropriately left as, floating or capped rate debt to give a more balanced portfolio level hedging.

Security position of hedge provider?

Interest rate hedging products, such as swaps, have credit risk while other interest rate hedging products, such as caps, have no credit risk (once the premium of the option is paid). The borrower needs to understand the credit requirement of the hedge instrument. A cap, for instance, can be purchased from any market counterparty that has completed the requisite money laundering checks on the borrower (often referred to as 'know your customer' or KYC), whereas an interest rate swap will be limited to those counterparties that already have security over the assets of the borrower.

For any interest rate hedging product that has an element of credit risk, the hedge counterparty typically requires security from the underlying assets of the borrower. The credit quality of the borrower, therefore, can be an important factor in the choice of interest rate hedging instrument. A borrower with a low credit quality may not be able to cost-effectively access hedge products that involve credit risk and may be better placed to purchase an option-based hedging instrument. Similarly, the security position of the hedge provider (i.e. super-senior to senior debt, pari passu to senior debt or junior to the senior debt) can have cost implications for the implementation of interest rate hedge instruments with credit risk.

There is also a distinction between a secured and unsecured position for the hedge provider. In a secured position, the hedging is closely linked to the financing decision, often explicitly through the ISDA agreement governing the hedging. So, while it is possible to novate or transfer interest rate hedging from one hedge counterparty to another, there are typically significant costs involved. There is also the risk that any outstanding MtM liability may need to be settled in order to do so. As such, the financing decisions need to be made in consultation with the hedge provider. In the case of an unsecured hedge provider, the financing decision may be taken without consultation with the hedge provider, as long as covenants continue to be met. Accordingly, the distinction between secured and unsecured hedge providers can have important ramifications for the hedge strategy and the hedge instruments used.

9. CONCLUSIONS

The use of interest rate derivatives in the UK market has changed over time. This paper reviewed how the early users of interest rate swaps started hedging due to the very high interest rates experienced in the late 1980s and early 1990s. Use of derivatives to hedge interest rate risk grew as the banking sector began to dominate lending to real estate companies through the 1990s and into the 2000. The establishment of the UK CMBS market gave further impetus to taking out interest rate hedging in order to meet AAA. As property yields compressed, to the extent in 2007 that the IPD All Property Equivalent yield was below the five-year swap rate, and leverage increased, banks and borrowers explored mechanisms to reduce the hedge rate. This led to hedging longer term, taking advantage of the inverted yield curve, and to more exotic hedge structures – both of which resulted in unsuitable hedging being implemented for short-term gain. The study concludes with some observations about the market post financial crisis and sets out a suggested good practice framework that borrowers should be encouraged to consider when contemplating entering into interest rate hedging.

Many borrowers do not give the choice of interest rate hedging sufficient consideration in the investment and financing process. Borrowers entering into interest rate derivative contracts should approach the interest rate hedging decision in a more proactive manner and give consideration to the following:

- What is being hedged? The objective of protecting cash flows is very important but it is not the only consideration.
- What is the hedge profile? A bank-imposed minimum hedging requirement is a starting point but may not be the final answer.
- What hedging instruments to use? There is usually a tradeoff between flexibility and cost (where cost can be in the form of upfront costs and future potential termination costs). Borrowers need to acknowledge and understand the repercussions of different choices of interest rate hedge instruments.
- Borrowers should consider whether interest rates have influence elsewhere. Is there any correlation with rental income or asset values? Such wider influences should be recognised in the evaluation and decision-making process.
- Derivative product providers are not hedging advisors; borrowers should seek independent advice if they are not comfortable with determining an appropriate hedge for their business.
- The interest rate market is constantly changing. The optimal solution today may not be the optimal one next time; borrowers need to keep themselves informed of what the market is offering.
- Only market testing of derivative pricing will provide a fair and transparent result; borrowers may use one of the many third party consultants able to provide this service to benchmark and, if required, negotiate pricing on their behalf.

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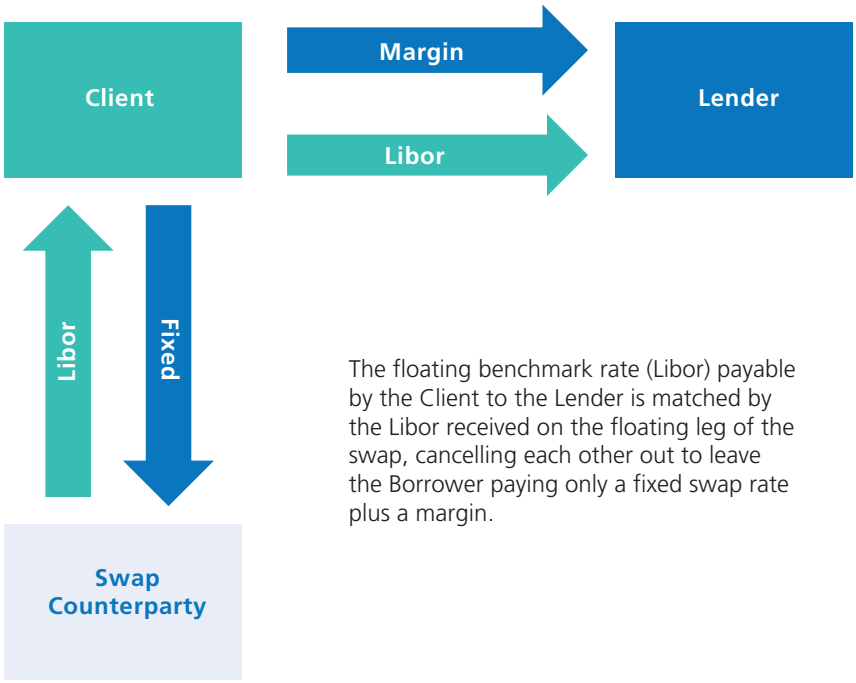
TECHNICAL APPENDIX A: HEDGING PRODUCTS

I: Interest Rate Swap

An interest rate swap is a contractual agreement between two counterparties. In the real estate context, this is normally a borrower and a bank. The two counterparties agree to exchange interest payments on a pre-agreed profile. It is one of the most common products used by real estate market participants to hedge the interest rate risk of floating rate debt. The borrower agrees to pay a pre-agreed fixed rate of interest in return for a floating rate (usually three-month Libor) from the bank. In most cases, the bank counterparty will also be the lender and the floating rate received through the swap is the same as the rate (pre-margin) payable under the loan. The purpose of the swap is to fix the cost of finance for the borrower, thus protecting it from increases in short-term interest rates.

If the floating rate is set above the fixed rate at the beginning of a three-month period, the bank will make a net payment to the borrower and if below, the borrower will make a net payment to the bank, so that the effective cost of funds will remain at the contracted fixed rate level no matter what level the floating rate may be. Figure A1 shows the typical flow of payments of a floating rate loan that has been hedged with an interest rate swap.

Figure A1: Interest Rate Swap Structure



The obvious advantage of an interest rate swap is that it provides the borrower with a pre-agreed fixed rate of interest and, therefore, certainty of cash flow. One of the other primary advantages of an interest rate swap is that there is no upfront premium payable by the borrower; this is a large part of the reason for this product being popular with real estate market participants. The main disadvantage is that the effective cost of finance is fixed and, as a result, the borrower cannot benefit if the floating rate is lower than the fixed rate at any time during the term of the contract. Since the credit crisis, when the market experienced an unprecedented fall in short-term interest rates, users have become increasingly cognisant of the potential early termination costs, which are rate sensitive and may be unpalatable if interest rates are low at the time of termination.

TECHNICAL APPENDIX A: HEDGING PRODUCTS

II: Interest Rate Cap

An interest rate cap is a product that acts like an insurance product against increases in floating rates. It is similar to an interest rate swap except that no payments are made unless the floating rate exceeds a pre-agreed interest rate level (the cap Strike Rate). To enter into the cap, the borrower is required to pay a cash premium to the bank, usually upfront. The purpose of the cap is to establish a maximum cost of finance for the borrower that has floating rate borrowings. This will enable the borrower to enjoy the benefit of low short-term interest rates until such time as they rise above the pre-agreed cap strike rate.

On each three-monthly reset date, the cap strike rate will be compared with the contracted floating rate. If the relevant floating rate is equal to or below the cap strike rate, no payment will be made. If the relevant floating rate is above the cap strike, the bank will pay the borrower the difference for the three-month period. Figure A2 and Table A1 summarise the three scenarios that can occur during the life of an interest rate cap.

Figure A2: Interest Rate Cap Profile

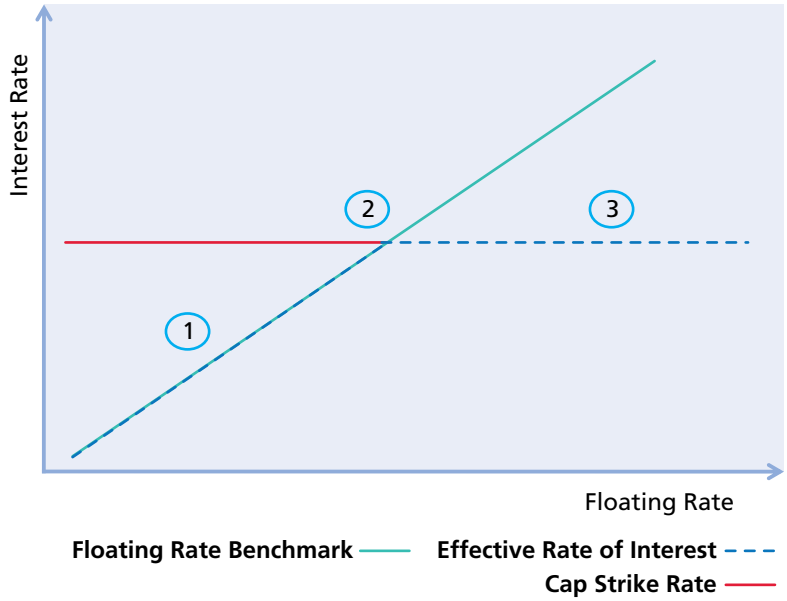


Table A1: Interest Rate Cap Scenarios

Scenario	Conditions	Result
1	Floating rate is below cap strike rate.	Borrower pays floating rate on debt.
2	Floating rate is equal to cap strike rate.	Borrower pays floating rate on debt, which is equal to the strike rate.
3	Floating rate is above cap strike rate.	Borrower pays floating rate on debt, and receives the difference between the floating rate and strike rate from the cap, which nets to an effective cost equal to the strike rate.

TECHNICAL APPENDIX A: HEDGING PRODUCTS

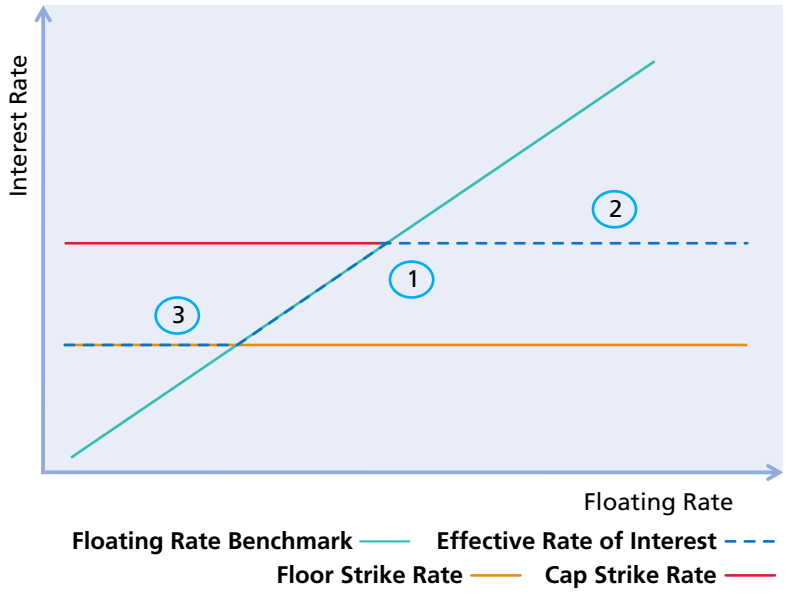
There are clear advantages and disadvantages to an interest rate cap. The agreement is effectively a derivative akin to an insurance product protecting against an increase in interest rates. It has the advantage that it protects the borrower through the provision of a known maximum rate of interest. This is achieved while at the same time providing the borrower with the flexibility to benefit from reduced floating rates should interest rates be lower than the cap strike. One reason why caps have been popular with borrowers and lenders is that there are no additional costs arising on early termination. Whilst the borrower will still be entitled to receive any residual value attributable to the cap, they cannot have a liability. The obvious disadvantage to a cap from the borrower's perspective is that there is a premium incurred (usually paid upfront), which has the effect of increasing the all-in cost of borrowing. Therefore, if the floating rate fails to rise above the cap strike rate during the maturity of the contract, the borrower will have paid a greater amount than if they had remained unhedged and may feel that they received no benefit or value from the product.

III: Interest Rate Collar

As noted above, one of the perceived drawbacks of an interest rate cap is the necessary payment of the premium upfront. One simple mechanism through which market participants may be able to offset some of the cost of the premium is to sell an interest rate floor back to the bank. This has the effect of setting a maximum rate payable through the bought cap and a minimum rate payable through the sold interest rate floor. Whilst this is not always the case, it is usual that the cap and floor are structured in such a way as to perfectly offset each, thus producing a zero cost collar[18].

Between the cap and the floor levels, the cost of finance will remain on a floating rate basis over the agreed period of time. On each interest reset date, the cap and floor strike rates will be compared with the contracted floating rate. If the relevant floating rate is equal to or below the cap strike rate, while simultaneously being equal to or above the floor strike rate, no payment will be made on the collar. If the relevant floating rate is above the cap strike, the bank will pay the borrower the difference for the interest period. If the relevant floating rate is below the floor strike, the borrower will pay the bank the difference for the interest period.

Figure A3: Interest Rate Collar Profile



[18] The instrument is often mistakenly referred to as a cap and collar, whereas it is a cap and floor, which combine to make a collar.

TECHNICAL APPENDIX A: HEDGING PRODUCTS

Table A2: Interest Rate Collar Scenarios

Scenario	Conditions	Result
1	Floating rate is below cap strike rate and above floor strike rate.	Borrower pays floating rate on debt.
2	Floating rate is above cap strike rate.	Borrower pays cap strike rate on debt. The bank will compensate the borrower for the difference between floating rate and strike rate.
3	Floating rate is below floor strike rate.	Borrower pays floor strike rate on debt. The borrower will compensate the bank for the difference between strike rate and floating rate.

The interest rate collar, like an interest rate cap, provides the borrower with a pre-agreed maximum rate of interest. The instrument also provides the borrower with the flexibility to benefit from low floating rates down to the minimum floor level. The other advantage is that, unlike a cap, a collar can be structured such that there is no upfront premium cost. However, the insertion of the floor, which facilitates the no cost benefits, is an obvious potential disadvantage. There may be additional costs arising on early termination due to the borrower having to buy back the floor. These costs may be significant in a low rate environment. However, the borrower will be entitled to receive any residual value attributable to the cap.

IV: Fixed Rate Agreement

An alternative to a standalone derivative instrument alongside floating rate debt is to directly enter into a loan that embeds the derivative. The most common form is fixed rate debt. Under a fixed rate loan the borrower pays a fixed rate of interest, in addition to a fixed borrowing margin, to its lender.

The fixed rate payable is agreed at inception with the lender, who is usually a bank or institution. The purpose of a fixed rate agreement from the borrower's perspective is to fix their cost of funds for the duration of their loan, thus protecting them from variations in interest rates over this period of time. The fixed rate will be set differently depending on the lender. Generally speaking, banks will normally reference to an equivalent interest rate swap. In contrast, institutions commonly use an equivalent government bond yield to set the fixed rate.

Whilst the rate of interest payable is fixed, borrowers do remain exposed to a termination cost should they wish to pre-pay the loan. Bank counterparties will normally price this cost using the same methodology used in a corresponding interest rate swap. However, dependent upon the documentation, borrowers may not be able to receive any potential termination profit.

Institutions, on the other hand, normally price this using a Spens (Make Whole) or Modified Spens (Modified Make Whole) provision. The Spens calculation, unlike the MtM of an interest rate swap, does not allow for any economic benefit if interest rates have increased since inception. The Spens amount payable is the value of the sum of the scheduled future payments (interest, including the margin, and principle), discounted at a re-investment yield, subject to a minimum amount payable equal to the principal of the loan. The yield adopted is normally the equivalent government bond yield. A Modified Spens framework differs in that the re-investment yield is the government bond yield plus a spread.

TECHNICAL APPENDIX A: HEDGING PRODUCTS

The benefits of engaging in a fixed rate loan are obvious. There is certainty regarding cash flows with no immediately evident interest rate exposure. In addition, unlike, say, an interest rate cap, there is no upfront premium. However, this is not to say that there are not costs involved.

The most evident is that due to the fixed nature of the loan agreement the borrower cannot benefit if the market rate is lower than the fixed rate at any time during the term of the contract. Furthermore, the early termination costs of a fixed rate agreement are rate sensitive and may be unpalatable if interest rates are low at the time of termination. In addition, the language included in the loan agreement may include a Spens or Modified Spens provision, which may prevent the borrower from benefiting in a high interest rate environment due to the asymmetry in the termination costs.

All of these elements mean that the ability of the borrower to refinance and thus take advantage and benefit from lower rates is constrained and limited. This is in contrast, for example, to the residential mortgage market in the US where low refinancing costs facilitate the extensive use of fixed rate debt.

V: Interest Rate Swaption

An interest rate swaption is an option contract that provides the borrower with the right to enter into an interest rate swap on an agreed date in the future at an agreed rate, called the strike rate, for a predetermined period. If, on the exercise date, the market swap rate for the hedged period is higher than the specified strike rate, it would be optimal to exercise the option. In contrast, should the market rate be lower than the strike, the borrower would allow the swaption to lapse.

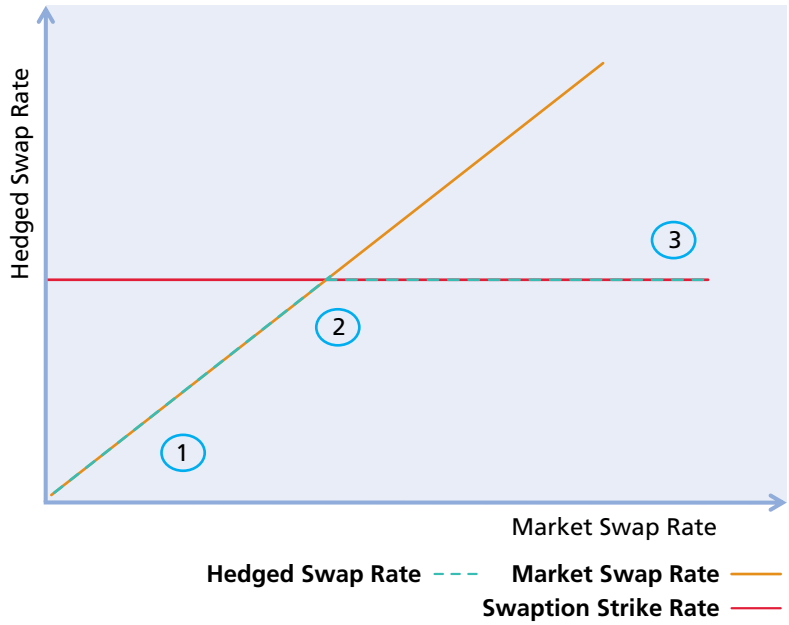
The advantage of using a swaption from the perspective of the borrower is that it provides the comfort of a pre-agreed maximum rate of interest from a future date for a known period. During the period of the option, the borrower can take advantage of the flexibility to benefit from potentially lower floating rates prior to the exercise date of the swaption. There is also a parallel in that swaptions can be conceptually viewed within the context of real options, where the contract is akin to a time option. The swaption allows the contract holder to defer any decision on if and how to hedge that interest rate exposure until more information is apparent about their future borrowing requirements. This allows the borrower to effectively trade with what is hopefully reduced uncertainty. The swaption enables a borrower to protect against adverse movements in the costs of future borrowing in a manner that does not commit the borrower. If the hedge is no longer required on the future date, the borrower will not be exposed to hedge termination costs. As with a cap, there are no additional costs arising on early termination. In addition, the borrower will still be entitled to receive any residual value attributable to the swaption. This is because the borrower is not obliged to enter into the swap if interest rates should fall instead of rise.

Table A3: Interest Rate Swaption Scenarios

Scenario	Conditions	Result
I	Market swap rate is below the strike rate.	Do not exercise swaption as a lower rate is available in the market.
II	Market swap rate is equal to the strike rate.	The borrower would be indifferent about exercising the swaption.
III	Market swap rate is above the strike rate.	Exercise the swaption and enter into a swap at the strike rate.

TECHNICAL APPENDIX A: HEDGING PRODUCTS

Figure A4: Interest Rate Swaption Profile



VI: Cancellable Interest Rate Swap

Deals can be structured in such a manner as to facilitate the cancellation of the swap at an agreed date in the future at no cost. The result is a cancellable interest rate swap. Such contracts are constructed through the combination of a swap embedded with a receiver's swaption where the embedded swap rate is solved to (1) be the same rate as the swaption strike rate, and (2) cover the cost of purchasing the swaption. This enables the borrower to protect their borrowing costs for a defined period of time whilst retaining the opportunity to cancel it on an agreed date or dates in the future without the potential burden of penalty costs.

Cancellable swaps are also provided where the bank has the right to cancel the swap at no cost. In this case, the borrower will have sold a payer's swaption in exchange for a lower embedded borrowing cost. In effect, the borrower will have surrendered control over the hedge to the bank. It is inevitable that the swap will be cancelled just when rates are rising. While popular during the years leading up to the credit crisis, this instrument is not an effective interest rate hedge as discussed in the main text of the paper.

A borrower cancellable swap, like an interest rate swap, provides the borrower with a known fixed rate of interest. Also like an interest rate swap, this instrument is typically entered into with no upfront cash premium required by the borrower. The borrower cancellable swap provides more flexibility than an interest rate swap because it provides the borrower with the opportunity to cancel the contract on a future date(s) at no cost. The obvious downside to an a borrower cancellable swap is that the contract rate will be higher than a vanilla interest rate swap would have been at inception. Therefore, if the market rate increases during the life of the instrument there is an implied opportunity cost through the higher contracted rate.

TECHNICAL APPENDIX A: HEDGING PRODUCTS

Table A4: Cancellable Interest Rate Swaps Scenarios

Scenario	Conditions	Result
1	Swap fixed rate is above the market rate.	Exercise swaption thereby cancelling Swap.
2	Swap fixed rate is equal to market rate.	The borrower would be indifferent about cancelling swap.
3	Swap fixed rate is below the market rate.	Do not exercise swaption as swap holds intrinsic value.

VII: Geared Interest Rate Collars

There are a range of variations on geared interest rate collars. One of the variations most frequently seen in the market by real estate participants is described and considered below. Based upon this version, a geared interest rate collar operates in a similar fashion to a standard vanilla collar where a maximum rate is set. However, with the geared variation, built into these structures there is often a proviso, that should Libor fall below the floor strike, the effective rate payable would start to increase again, typically until it reaches the cap strike rate.

A geared interest rate collar is effectively a combination structure that involves the simultaneous purchase of an interest rate cap at a high strike rate, the sale of two interest rate floors at an intermediate strike rate and the purchase of one Interest Rate Floor at a low strike rate. Typically, the strike rates of the floors are chosen so that the effective rate for the borrower is the same as the high strike rate if rates are lower than the low strike rate. For a borrower who enters into a geared collar, they receive the benefit of a known maximum rate; however, they retain the possibility of paying a lower amount should interest rates remain within a given range. The lowest interest rate payable under this product will be realised if the interest rate is equal to the intermediate strike. By comparison to a vanilla zero cost interest rate collar, the zero cost geared collar can provide the borrower with a lower maximum rate payable as the cap is often subsidised by the geared floors.

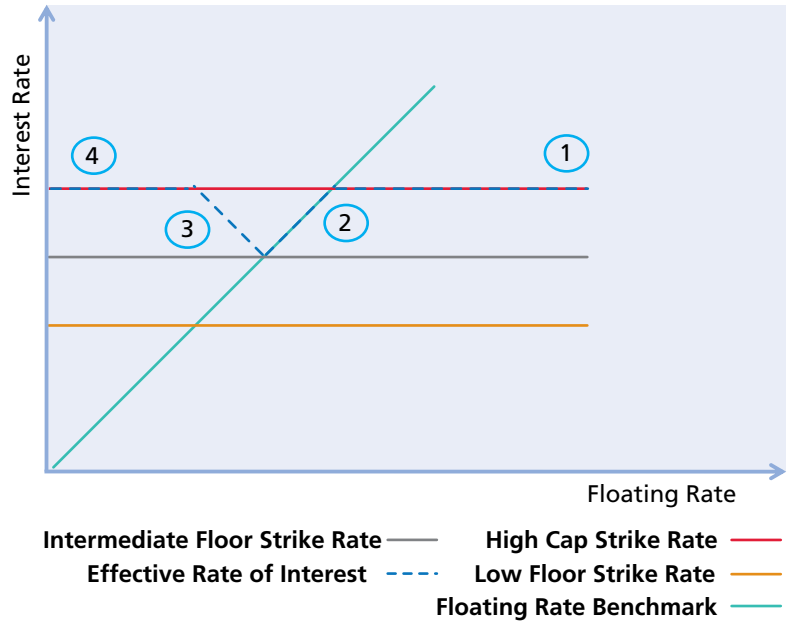
On each reset date, the cap and floor strike rates will be compared with the contracted floating rate.

1. If the relevant floating rate is above the cap strike, the bank will pay the borrower the difference between the cap strike and the floating rate for the period. The effective rate of interest for the borrower is the cap strike rate.
2. If the relevant floating rate is below the cap's high strike rate while simultaneously above the intermediate floor strike rate, no payment will be made by either party. The effective rate of interest for the borrower is the floating rate.
3. If the relevant floating rate is below the intermediate floor strike but above the low floor strike, the borrower will pay the bank twice the difference between the intermediate strike and the floating rate for the three-month period. The effective rate of interest for the borrower is above the floating rate, and is between the intermediate floor strike and cap strike depending on the exact level of the floating rate.
4. If the relevant floating rate is below the low floor strike rate, the borrower will pay the bank twice the difference between the low strike rate and the intermediate strike, plus the difference between the low strike rate and the floating rate. The effective rate of interest for the borrower is the cap strike rate.

TECHNICAL APPENDIX A: HEDGING PRODUCTS

A geared collar provides the borrower with a pre-agreed maximum rate of interest. It also provides the borrower with the flexibility to benefit from a lower payable rate should rates remain range-bound. Unlike a cap, a geared collar can be structured such that there is no upfront premium cost, and with a lower cap rate at zero cost than a vanilla collar. However, despite these advantages there are a number of disadvantages present. There may be additional costs arising on early termination due to the borrower having to buy back the intermediate strike floors. The borrower will, however, be entitled to receive any residual value attributable to the cap and the low strike floor. As such, the break costs under this instrument can be substantially higher than an equivalent vanilla interest rate collar in a low interest rate environment. While the geared collar initially provides participation to lower rates, the borrower becomes negatively exposed to significant falls in interest rates.

Figure A5: Geared Interest Rate Collar Profile



TECHNICAL APPENDIX B: CHANGING NATURE OF DERIVATIVE PRICING

There has been a marked change in how derivatives, and specifically interest rate derivatives, have been priced since the turn of the millennium. For example, the pricing of an interest rate swap was historically relatively straightforward; however, in recent years, the complexity has increased enormously as the market has started to appreciate additional risk factors associated with the pricing of derivatives.

I: Single Currency Basis

Traditionally an interest rate swap, regardless of what tenor Libor it referenced, was priced from the same GBP swap curve. This meant that the forward Libor rates and discount rates were common across a range of different swaps. The instruments quoted on market screens technically referenced the six-month Libor rate, but the distinction between different Libor tenors was considered relatively academic.

Figure B1: UK Base Rates and Libor Rates, 2005-2010

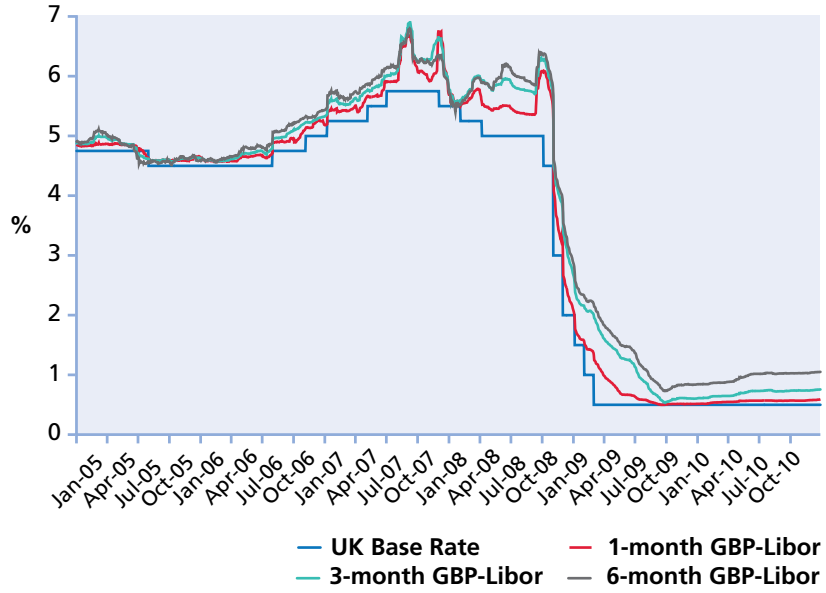
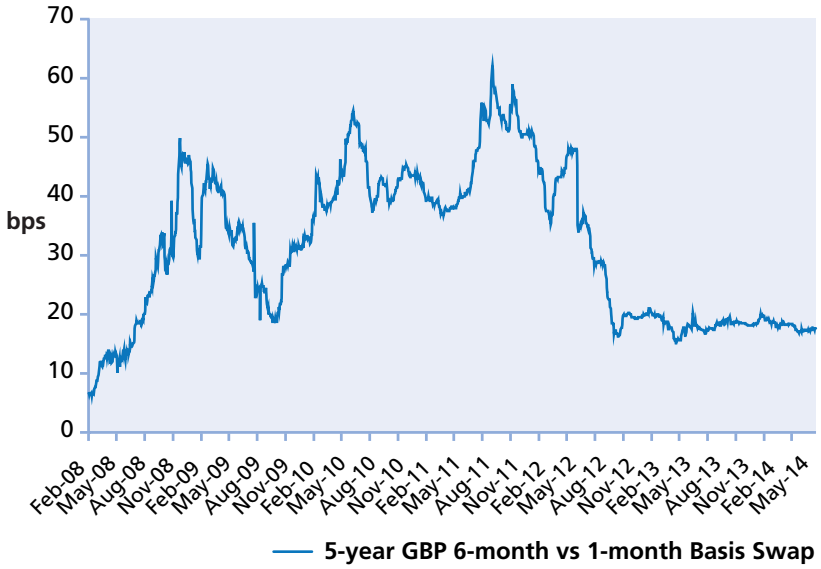


Figure B2: Five-year GBP 6-month versus 1-month Libor Basis Swap Spread



TECHNICAL APPENDIX B: CHANGING NATURE OF DERIVATIVE PRICING

The advent of the financial crisis led market participants to increasingly price the credit risk of unsecured lending to financial institutions very differently. The required return for lending over a period of one month versus three months or six months became substantially different. This led to large differences between Libors of different tenors. Figure B1 shows the historic Libor rates over one-, three- and six-month maturities and, for reference purposes, the Bank of England Base Rate. The dislocation of the different rates during 2007/2008 is evident. The large difference in Libor rates across tenors meant that market participants now considered the distinction in the price of a swap referencing different Libor tenors as a material element of the price of the instrument. This led to the creation of a Libor basis swap market within each currency, i.e. a swap that allows counterparties to exchange one Libor tenor for another Libor tenor. The market convention is to quote a spread over the shorter Libor tenor, which is then exchanged for the longer Libor tenor. Figure B2 displays the five-year swap between one-month and six-month Libor. The spread represents market expectations concerning the average difference between one- and -six month Libor rates over the coming five years.

II: Overnight Index Swap (OIS) Curve Discounting

The determination of the overnight index swap (OIS) curve became an important rate in the pricing of collateralised derivatives during the credit crisis. The OIS curve is now utilised for discounting the value of expected cash flows of collateralised derivatives, for example London Clearing House (LCH) SwapClear product. The OIS curve is based on swaps rates that reference the respective overnight deposit market in different countries[19]. The rationale for using OIS as the discount rate of derivative instruments stems from the collateral or credit support agreement (CSA) that market participants enter into as part of their derivative trading activity. Under a CSA, the counterparty who owes money through the MtM of the derivative will provide their counterparty cash (or acceptable marketable securities) equal to the value of the MtM. These collateral positions are recalculated on a daily basis and the return on the cash deposited is the overnight rate of the currency deposited.

Goldman Sachs is credited as one of the banks that first identified and pushed for this change in the pricing methodology of collateralised derivatives in the market. They identified the benefits of using OIS in the early 2000s (see Cameron, 2013). From 2008 onwards, many of the top tier US and European investment banks followed suit.

III: Credit Value Adjustment (CVA)

Appreciation of the importance of counterparty credit risk was clearly brought into focus with events such as the collapse of Long Term Capital Management in 1998. Since 2005, many accounting standard setters have argued that market participants should include a measure of counterparty credit risk in the valuation of their derivative positions. In addition, there has been a greater focus on mechanisms to reduce counterparty credit risk, including a greater propensity to require collateral agreements. Despite this long standing awareness, it was not until the advent of the financial crisis and the issues surrounding Bear Stearns, various monoline insurers, the nationalisation of banks such as Northern Rock and finally the default of Lehman Brothers that counterparty credit risk became a fundamental element of derivative pricing.

[19] In each of the major currencies there is an overnight deposit market. In the UK the overnight rate is referred to as Sonia (Sterling OverNight Index Average), while, in Europe, it is referred to as Eonia (Euro OverNight Index Average).

TECHNICAL APPENDIX B: CHANGING NATURE OF DERIVATIVE PRICING

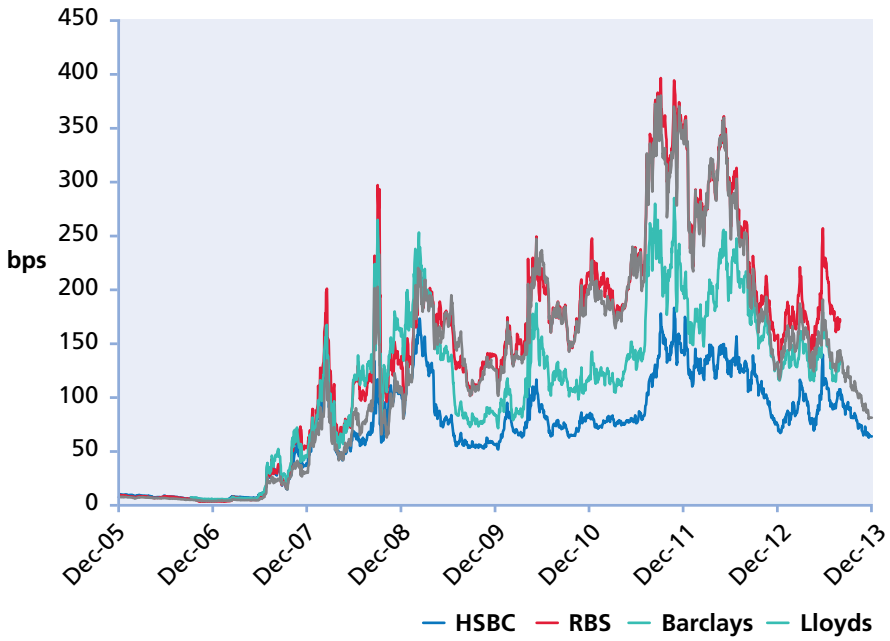
IV: Funding Value Adjustment (FVA)

One of the consequences resulting from the financial crisis was the increased cost of funding that the banking sector observed. Figure B3 displays the funding cost, represented by their five-year credit default swaps (CDS) spreads, for four of the large UK banks between 2005 and 2013. This increased cost of funding focused the attention of bank treasury departments on the sources and uses of liquidity in their institutions. The derivative books of banks create significant, and sometimes long-term, implied funding positions. The majority of the derivatives traded on the market are traded between financial counterparties and, as such, are collateralised. In contrast, end users of derivative instruments, such as real estate investors, do not typically enter into collateral agreements with their bank counterparties. This can create positions whereby the bank has a funding position through its derivatives book.

Consider a derivative transaction where a real estate investor owes money to the bank on its position. The investor does not provide any cash or marketable securities to the bank as it has not entered into a CSA (Credit Support Agreement). The bank, however, hedges the derivative position in the market with another financial counterparty. This offsetting position will be governed by a CSA, which will require the bank to post cash to its counterparty. As discussed in the section on OIS discounting, the return on this cash is the overnight index. The bank, however, will need to fund this cash collateral from its own balance sheet as it will not receive an offsetting cash position from its real estate borrower. This is referred to as a funding cost and the present value of this expected funding cost is called funding cost adjustment (FCA).

The reverse of this position can arise also, where the bank owes the real estate borrower through the derivative contract. In this case, the bank does not post cash to the real estate company but receives cash from the market through its offsetting derivative position. The bank is only required to pay an overnight return to its market counterparty and thereby creates a relatively cheap source of funding. This is referred to as a funding benefit and the present value of this expected funding benefit is called funding benefit adjustment (FBA). The FVA of a derivative position is, therefore, the sum of the FCA and FBA.

Figure B3: Five-year Senior CDS



TECHNICAL APPENDIX B: CHANGING NATURE OF DERIVATIVE PRICING

V: Regulatory Capital Value Adjustment (KVA) or Risk-Weighted Assets (RWA)

The Basel Committee on Banking Supervision introduced the concept of risk-weighted assets (RWA) as a part of a calculation aimed at determining the capital adequacy ratio of a financial institution. The simplest way to express capital adequacy is to use the ratio of Equity to RWA. The reason for calculating assets using a risk weighting is that banks investing in more risky assets should be required to reserve a greater amount of equity to ensure they are adequately capitalised. The Basel Committee have constantly reviewed the calculation of RWA and the minimum required capital adequacy of financial institutions. The most recent iteration, Basel III, is still being implemented in a staggered fashion. However, there has already been some relaxation in the required regulatory capital in certain jurisdictions with, for example, CRD IV and CRR containing certain exemptions for European banks.

When a bank provides a derivative instrument to a borrower, this immediately increases its RWA. As a result, the bank needs to reserve an amount of regulatory capital against the derivative position. Just like any company, banks need to provide a return to their shareholders and therefore they make a charge on the derivative instruments to reflect the RWA associated with the derivative. This is also referred to as the regulatory capital value adjustment (KVA)[20].

VI: Replacement Value Adjustment

As a mechanism to reduce the potential counterparty credit risk in uncollateralised derivative contracts, many people attempt to contract that one or either counterparty of a transaction must be replaced in the event of a particular rating trigger being met. This scenario typically arises in a real estate context when the lender and the hedge counterparty can be dislocated, for example when the loan is expected to be part of a CMBS issue or where there is a non-bank lender such as a debt fund providing floating rate debt. In CMBS transaction, the rating agencies have provided guidance on the required rating of the counterparty and what credit enhancements may be required. This usually involves the bank counterparty posting collateral plus a volatility buffer and, in extreme cases, requiring a complete replacement. The relevant triggers are set in relation to the rating that the agency would look to provide to the highest rated tranche of the CMBS. On the other hand, the shadow lending sector typically relies on absolute thresholds. These may range from investment grade (BBB- or better) to a higher rating requirement (e.g. A- or better). In addition, this sector typically requires complete replacement of the hedge-providing bank rather than being satisfied with an interim collateralisation of the derivative instrument. This gives rise to replacement risk on the hedge-providing bank.

Whilst replacement risk may not appear that problematic on first sight, that belies the fact that the rating of other potential bank counterparties, to whom the incumbent bank can transfer the derivative, are likely to be highly correlated to its own rating. For example, in the current market, it may be possible to find 10 banks with the requisite rating to provide a derivative with a downgrade trigger of say A. If a derivative is taken out with Bank X, which later gets downgraded below the ratings trigger, then it is very likely that several of the other 10 banks may also have been downgraded below the trigger. Bank X could then find itself in a situation where there are only one or two available counterparties who may now be charging hefty premiums in order to accept replacement trades from lower rated banks.

[20] The calculation of RWA depends on whether the bank uses an internal-ratings based approach or whether it uses a standardised approach. The interested reader is directed to the source papers from the Basel Committee on Banking Supervision and Gregory (2012).

TECHNICAL APPENDIX C: REAL ESTATE FUNDING STRUCTURES

I: Special Purpose Vehicle

The most common structure used to purchase real estate is through a non-recourse vehicle, or a special purpose vehicle (SPV). An SPV is a form of legal structure that is designed to isolate or ring-fence the asset and liabilities from the wider group and, as such, is often referred to as a bankruptcy remote entity. In the real estate context, an SPV may be used to purchase particular assets, which then have their own standalone debt-funding structure. In the case of an SPV, the funding is typically secured debt in nature. The standard covenants of the debt relate to the value of the property, a Loan-to-Value covenant (LTV), and to the income coverage relative to debt service obligation, an Interest Coverage Ratio (ICR) or Debt Service Coverage Ratio (DSCR). The use of such structures with appropriate hedging often allows higher levels of gearing to be achieved.

The ring-fenced nature of this structure means that the debt is provided on a secured basis through a bilateral or syndicated debt facility. Similarly, interest rate hedging is typically offered on a secured basis and is usually on pari passu basis to the senior debt tranche. As a result of the limited recourse of the SPV entity and the fact that debt is provided almost exclusively through secured lending, the borrower is typically restricted to hedging with the banks that are lenders on the property. In addition, it is common for banks to include a provision within the heads of terms of their debt offering that any hedge has to be provided by them. This obviously means increased fee revenue for the lender from the transaction.

One obvious implication of having the hedge secured on the property assets is the consequences this can have on the trading decisions of investors. Strategic decisions concerning the refinancing or even sale of assets may be affected by concerns over how, for example, the current level of interest rates may impact the MtM of the associated derivative or hedge. While many market participants may consider their interest rate hedging to be a separate portable instrument and dislocated from their debt, the secured nature of the hedge is explicitly (often through the ISDA document) linked back to the asset and funding decision. This is, in part, why the overhang in interest rate swap liabilities during the financial crisis was linked with the inability to unclog legacy problems within the loan book of banks.

A particular variant on SPVs is that of an OpCo/PropCo structure. Many operating business have historically been particularly intensive users of real estate, for example healthcare and leisure. A particular form of funding structure often seen in the market was to split the business into two components: an operating company (OpCo) and a property company (PropCo). The real estate assets would be placed into the PropCo with the benefit of a long lease to the OpCo. The long lease effectively left the OpCo operationally leveraged. The PropCo was then financed on a secured basis while the OpCo also sourced debt to fund the operating business.

The typical financing structure that became troubled during the financial crisis involved relatively high leverage secured debt in the PropCo structure. Due to the high degree of leverage in the structure, it was important to ensure that the interest rate risk was adequately hedged so that the debt could continue to be serviced despite fluctuations in interest rates. There was also typically a long-dated inflation-linked lease put in place between the OpCo and PropCo. As the interest rate risk was to be hedged through an interest rate swap, it was required to ensure security of income from the lease and therefore an inflation swap was executed to convert the inflation-linked uplifts in the rent into fixed uplifts.

TECHNICAL APPENDIX C: REAL ESTATE FUNDING STRUCTURES

While not unique to the OpCo/PropCo structure, the shape of the interest and inflation curves meant that it was often more attractive to hedge to the maturity of the lease. The rationale provided for hedging longer term was that it provided certainty over the level of income from the lease. In addition, as the level of rates was fixed beyond the life of the debt facility, by hedging longer, it further protected the refinancing risk relating to the PropCo debt. Banks often based their strategy on the premise that the MtM of the long-dated interest rate swap and inflation swap instruments would generally offset each other (high inflation being associated with high interest rates and vice versa). This would therefore net off their risk against the borrower. In reality, the credit crisis provided the perfect storm in that inflation remained persistently high while interest rates hit an unexpected all-time low. This resulted in both inflation and interest rate swaps having large unrealised MtM liabilities.

II: Corporate Balance Sheet

Although the use of SPVs for financing purposes is extremely common, there are a number of market participants who purchase real estate directly on their balance sheet rather than through subsidiary ring-fenced SPVs. The funding associated with such investors is more varied and, whilst not always the case, the degree of leverage is typically lower. In addition, there is a greater propensity to have unsecured debt. The standard covenants of unsecured debt are less restrictive but typically include a negative pledge relating to increasing gearing above a particular threshold level.

The unsecured nature of the debt has consequences for the interest rate hedging decisions. Firstly, the debt may be fixed rate in nature. This means that the borrower will not typically need to engage in interest rate hedging unless they need to synthetically create a greater degree of floating rate debt to have a more balanced fixed/floating interest rate mix.

Secondly, any hedging may be provided on an unsecured basis. This means that the borrower generally has the ability to split their funding decision from their hedging decision. Therefore, while, SPV-funded property transactions were hampered by legacy swap liabilities this issue was less acute in the case of borrowers with unsecured interest rate swaps. However, it should be noted that the introduction of credit break clauses in hedge agreements can reduce this flexibility.

NOTES

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