An End to the Age of Innocence: Rate Setting by UK Banks After the Crisis

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Disclaimer

The views expressed in this paper are those of the authors and not necessarily those of the Bank of England or its committees.
Mervyn King, 2008

‘the age of innocence – when banks lent to each other unsecured for three months or longer at only a small premium to expected policy rates – will not quickly, if ever, return’ (King, 2008).
What happened to retail rates?

• Bank Rate was cut to 0.5% by March 2009 in the aftermath of the Lehman collapse in September 2008.

• LIBOR and swap rates fell with policy rates; funding spreads widened.

• How did the end of the ‘age of innocence’ impact the pricing of UK bank mortgage and deposit rates?
Reference rates have fallen
Funding spreads became wider and more heterogeneous across banks.

Note: Spreads are calculated as yields on five-year euro senior unsecured bonds relative to mid-swaps. Where a five-year bond is not available, a proxy has been constructed based on the nearest maturity of bond available for a given institution. Spreads data are spliced to five-year senior CDS premia for the same lenders prior to 2009.
Mortgage rates for big six UK banks

Source: Moneyfacts, Bank of England
Similar patterns are evident in European Data

• Data from 11 European Countries implies
  – lending rates did not fall that much.
  – On average across the EU margins over policy rates have widened as policy rates have fallen (business lending by 19.5%, mortgage lending by 41.8% (ST) and 37.5% (LT)).
  – This has become a political issue in some countries.
  – Deposit rates got stuck at an effective lower bound just above zero (until recently).
Traditional models

• Traditional models of rate setting focus on pricing over Bank Rate, LIBOR or swap rates and assume 100% pass through.
• We argue that this is not sufficient.
• We refer to official evidence on
  – banks’ internal pricing mechanisms; and
  – market competition.
Evidence from official sources

• Bank of England, PRA (2013), BEQB (2015): shows major banks use internal mechanisms such as transfer pricing curves to set rates.

• Competition and Markets Authority, Report on Retail Banking: retail pricing is related to other products, deals and account conditions on offer.
What is transfer pricing?
How are transfer prices determined?

PRA (2013), BEBQ (2015) Transfer Pricing Definition:

Transfer price = reference rate (LIBOR or swap)  
+ term cost of funding (spread)  
+ cost of liquidity buffer  
+ other costs (fees, cash backs, unhedged risks & management overlays)
Hypothetical example
Mortgage 2 year fixed rate 75% LTV

-150
-100
-50
0
50
100
150
200
250
300
350

Bank 1
Bank 2

-150
-100
-50
0
50
100
150

securitisation credit
fees/cash back
unhedged risks
management overlay
cost of liquidity buffer
spread
reference rate
Hypothetical example
Mortgage 2 year fixed rate 75% LTV

Different transfer prices (190bp and 220bp)

- securitisation credit
- fees/cash back
- unhedged risks
- management overlay
- cost of liquidity buffer
- spread
- reference rate
Hypothetical example
Mortgage 2 year fixed rate 75% LTV

Different retail rates (30bp apart) transfer pricing dominates

- securitisation credit
- fees/cash back
- unhedged risks
- management overlay
- cost of liquidity buffer
- spread
- reference rate
Hypothetical example
Mortgage 2 year fixed rate 75% LTV

Same retail rates (0bp apart) competition dominates

- securitisation credit
- fees/cash back
- unhedged risks
- management overlay
- cost of liquidity buffer
- spread
- reference rate
Application of management overlays
Application of transfer pricing
Proxying transfer prices using market data

Transfer prices are unobservable.

We know from bank responses to surveys that transfer prices are related to market data.

For a typical 1 year fixed rate deposit or 2-year fixed rate mortgage product funding is based on

- 1 and 2 year swap rates (common)
- Senior unsecured bond yields (to mid swap rates) or CDS spreads provide a measure of the spread.
Evidence on transfer prices

Source: Bank Liabilities Survey

Note: Chart shows net percentage balances of lenders in response to question ‘How has the marginal absolute cost of providing funds to business units changed (sometimes referred to as the ‘transfer price’)?’ and of lenders reporting that transfer price was affected by long-term unsecured wholesale funding spreads relative to appropriate reference rates. Net percentage balances are calculated by weighting together the responses. A positive balance indicates an increase in transfer prices.
Competition

How did the tactical decisions of banks in relation to their competitors impact on the pricing of bank mortgage and deposit rates?

• Difficult to measure – switching (GfK annual survey, all banks, 2008 -), engagement, entry.
• GfK survey shows ‘other interest rates’; and ‘better products, deals and conditions elsewhere’ are important.
• Market concentration among the big six relevant but not a measure of competition.
Increase in gross mortgage market concentration

Lloyds-TSB absorbed HBOS 19 January 2009

Northern Rock taken into govt. ownership 22 February 2008

Source: CML Regulated Mortgage Survey (April 2005 onwards)
Competition

How did the tactical decisions of banks in relation to their competitors impact on the pricing of bank mortgage and deposit rates?

• Need to know the products on which they compete (benchmark v. niche products).
• Need to know whether they focus on the ‘mid-values’ or the ‘best buy’ rates.
We focus on products with the most competition

Banks have at least three benchmark products that all banks quote for:

1 year fixed rate retail deposit
2-year fixed rate 75% LTV mortgage
Instant access cash ISA rate

Six major UK banks: HSBC, Nationwide, Barclays, Santander, Lloyds, RBS
Mid value or best buy rates?

Mid values = middle points on the swathe at each date (median value)

Best buy = the lower edge of the swath
Mid value or best buy rates?

Mid values = middle points on the swatch at each date (median value)

Best buy = the upper edge of the swath

Could be a succession of banks offering the median or best buy rates through time.
## Summary Statistics


<table>
<thead>
<tr>
<th>Banking Group:</th>
<th>Mortgage market share (%)</th>
<th>Funding spreads</th>
<th>Mortgage rates</th>
<th>Deposit rates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Average</td>
<td>$sd$</td>
<td>$sd^m$</td>
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<tr>
<td>Average</td>
<td></td>
<td>0.91</td>
<td>0.80</td>
<td>0.37</td>
</tr>
</tbody>
</table>

Modelling framework

A long run relationship based on determinants of TP and competitive (market) forces:

\[ R_{it} = a_{i0} + b_i \left( R_t^S + \psi_i P_{it} \right) + c_i R_{mt} \]

where \( R_{it} \) = retail rate of bank \( i \) at date \( t \), \( R_t^S \) = maturity-matched swap rate, \( P_{it} \) = bank \( i \)'s additional funding premium (spread) and \( R_{mt} \) = summary measure of competitors’ rates.

We estimate the model using FIML in an ARDL format.
Overview of results

Estimates of the model indicate:

• **Median of competitors’ rates**
  – matter for all banks
  – impact banks differently

• **Own funding costs (swaps and spreads) matter for a few banks (not all)**
  – Significant spreads imply market leading behaviour

• **FLS**
  – no direct effect on retail rates but evidence for indirect effect (on all spreads)
Mortgage rate results

Estimates of the model indicate:

• **Pass through is complete (100% from median rates to retail rates for mortgage and deposit rates)**

• **Mortgage rates**
  – Pass through speed differs: one bank makes 100% change in median rates in 2 months, while another passes through 70% change in median rates in 2 months
  – Two banks act as market leaders by responding to their own funding costs in the mortgage market
  – One bank sets the level above market median rates, while two others set them below.

*Results are very specific to products: the CMA found the same bank offered some of the cheapest *and* most expensive products.*
Deposit rate results

Estimates of the model indicate:

• **Pass through is complete (100% from median rates to retail rates for mortgage and deposit rates)**

• **Deposit rates**
  – Two banks price to the median, while three others pass on their own funding costs to customers.
  – There was only one bank that rejected 100% pass through – this is a troubled bank rescued by govt.
  – One bank set deposit rates above median (as part of its marketing strategy), another set them below the median.
Support for the model

The estimates indicate that you would strongly reject the hypothesis [p-values = 0.000] that

– Only median rates matter
– Only funding costs (swaps and spreads) matter

Caution: if you had mistakenly estimated these models your coefficients would be strongly significant, and appear to explain rate setting very well!

Our conclusions on pass through:

– Only common changes in TPs matter for retail rates (from effects of monetary policy on swap rates or common movements in spreads).
– Idiosyncratic changes are rarely passed through.
– Median rates are important, aggregating the effects of other banks’ rates.
Explaining median rates

Median rates are explained well by
- Swap rates (common rate)
- Median spreads

Adjustment to swap rates is swift with 33% adjustment instantaneously, 66% adjustment within 2 months.

Adjustment to median funding spreads is 25% after six months, and 70% after 12 months.
- FLS has no direct effect but did have indirect effects
- 100% pass through for mortgage and deposit rates
Robustness

Replacing median rates with best buy rates – similar findings but slightly poorer fit to the data. Conclusions unchanged.

Replacing median rates with weighted average of other banks’ rates (GVAR model). Similar findings but slightly poorer fit to the data. Conclusions unchanged.
Dynamic adjustment

RESPONSE OF MORTGAGE RATES TO ONE PERCENTAGE POINT INCREASE IN TWO-YEAR SWAP RATE

Difference from baseline (percentage points)

50% adjustment within 4 months, 80% adjustment within 9 months
Dynamic adjustment

RESPONSE OF MORTGAGE RATES TO ONE PERCENTAGE POINT INCREASE IN ALL FUNDING SPREADS

Difference from baseline (percentage points)

Much more variation in adjustment, slower response to spreads
Errors from a misspecified model

RESPONSE OF MORTGAGE RATE OF TYPICAL BANK TO ONE PERCENTAGE POINT INCREASE IN TWO-YEAR SWAP RATE

Difference from baseline (percentage points)

Understates the pass through
Errors from a misspecified model

RESPONSE OF MORTGAGE RATE OF TYPICAL BANK TO ONE PERCENTAGE POINT INCREASE IN OWN FUNDING SPREADS
Difference from baseline (percentage points)

Understates the pass through
Conclusions

• Changes in transfer prices are matched by quantitative evidence on market prices.
• Transfer prices are important for retail rates on mortgages and deposits.
• Response to competitors also crucial to the pass through of monetary policy.
• There is fast and complete pass-through of monetary impulses.
• If we omit internal pricing or competitors’ rates we will understate pass through.
• Monetary policy remains effective after the ‘end of the age of innocence’.
Additional Slides
What is transfer pricing?
SWATHE OF 2-YEAR FIXED MORTGAGE RATES (75% LTV)
Determinacy and Restrictions

Restricting $b_i = 0$ implies retail rate depend only on competitors’ rates (median rates)

Restricting $c_i = 0$ implies retail rate depend only on individual funding costs

So long as $b_i \neq 0$ for all banks, the system of equations is determinate and market-wide retail rates are determined alongside the individual retail rates.
Identification

The median $R_{mt}$ is made up of a sequence of bank rates, and provided the same bank does not always equal the median the long run equation is identified.

For a base buy rate the same applies.
Some Properties

If $b_i + c_i = 1$, we have 100% pass through of funding costs to retail rates.

If $b_i + c_i = 1$, and banks set their rates with reference to the median rate, the median rate itself would be determined in the long run as:

$$R_{mt} = \frac{a_m}{b_m} + R_s^t + \psi_m P_{mt}.$$