



# How do UK financial institutions really price their banking products?

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## Abstract

This paper has several objectives. The first is to explore the type (or types) of imperfect competition that prevailed in the retail banking sector in the 1990s. A general linearised pricing model is employed to test for the degree to which competition in certain markets deviated from the competitive ideal. The key finding, is that, with the exception of mortgage products, deposit and loan rate setting by UK financial institutions is best described by the Salop–Stiglitz model of monopolistic competition, with bargain and rip-offs. Cournot type behaviour is evident in some cases. Indirectly, the presence of perfect contestability is largely ruled out. Another objective is to compare these findings with the results of a similar study conducted nearly a decade ago, when financial reforms introduced to encourage greater competition were relatively recent. Based on the results of this study, the policy *lesson* is that financial firms exhibit different types of price setting behaviour depending on the banking product. The policy *implication* is to require firms to produce comparable information for consumers, thereby helping to contain the loss of consumer surplus in imperfectly competitive markets.

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## 1. Introduction

This study analyses the pricing behaviour of UK financial firms offering five generic products, savings accounts, higher interest cheque accounts, mortgages, credit cards, and personal loans. Rates for deposit products are quoted for low and high deposit amounts. All rates are monthly, covering the period 1993–1999. Unlike the US but similar to Canada, UK retail banking is a national market, where deposit and loan rates quoted to customers by a given bank or building society apply across the country.

This paper has several objectives. One is to provide *direct* evidence (for or against) of the extent to which the pricing behaviour of five well-known retail banking products is competitive. The presence of information asymmetries and consumer inertia in this market generates the potential for market imperfections, even if there are many firms offering a product. A second objective is to explore which model (or models) of imperfect competition best describe the retail banking market in the 1990s. Using a generalised pricing model, it is possible to test for the degree to which the different product markets deviate from the perfectly competitive ideal, Cournot oligopoly, the Salop and Stiglitz model of monopolistic competition with bargains and rip-offs, and, indirectly, contestability.

Third, where possible, the results of this study are compared to the findings in Heffernan (1993), which looked at competition in this sector between 1985 and 1989, when reforms implemented to encourage greater competition in the retail financial markets were relatively new. Was there any empirical evidence to support a *law of one price* in the British retail banking? The answer then was an unequivocal *no*. Has it changed as Britain enters the 21st century, and if so, why?

The main difference between the two studies is the dramatic increase in the number of firms offering key retail banking products, and the availability of data on the deposit and loan rates quoted by these firms. For example in the earlier study, a total of 17 firms made up the sample, whereas in this work, there are six different classes of financial institution.

The paper is divided into several sections. Section 2 describes how the data were collected and sorted. Section 3 describes, tests, and analyses the results from the econometric model. Section 4 discusses the findings from the econometric tests. Section 5 concludes, makes some policy recommendations, and compares these with the conclusions of the recent Cruickshank Banking Review.<sup>1</sup>

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<sup>1</sup> The Chancellor of the Exchequer, in his 1998 pre-budget report, announced an independent review of banking services. Mr. Don Cruickshank, a former regulator in the telecommunications industry, was appointed Head of the Review. The Cruickshank Review examined competition in the banking sector for retail consumers and small to medium sized firms.

## 2. Data collection and methodology

The financial institutions examined in the study included 36 banks, 46 mutual building societies, 7 building societies which converted to banks,<sup>2</sup> 15 “community” building societies and 16 “other financial institutions”. The complete list of firms is found in Appendix 1 (on the website for this paper<sup>3</sup>), though not all of them offer the five generic products to be examined in this paper. Community building societies limit their customer base by geographical residency requirements, with a narrow product range; mortgages and savings accounts. “Other financial institutions” are firms which fall outside the other four categories and offer a limited range of financial products, such as the specialist mortgage corporations. In the earlier study, data were available for only 10 banks and 7 building societies. It continues to be the case that only banks and some building societies offer a core intermediation product, that is, chequing accounts and personal loans, in addition to savings products, and credit cards.

The deposit and loan rate data are from Moneyfacts, a private company collecting a large amount of financial information on deposit, loan, investment (e.g., unit trusts) and business finance. However, some data are not available for all the firms offering a given product. The firm may not have reported its rates to Moneyfacts in the early years, or may have ceased to offer the product during the period being studied. These firms were dropped from the sample. Also, given space limitations, the regression results for community building societies are not reported in the article, though they can be found in the working paper – see Heffernan (2000).

The five products subjected to testing were:

*High savings.* To obtain a representative amount for savings accounts<sup>4</sup>, the formula used is

$$\frac{\text{Total } \pounds \text{ deposits} - \text{deposits by financial institutions}}{\# \text{ of other interest bearing accounts}}$$

This resulted in annual amounts for high savings, ranging from £15,981 in 1993 to £23,053 in 1999. As with the other four products, the details of the computation appear in Appendix 2 of Heffernan (2002).

<sup>2</sup> Part of the 1986 Building Societies Act allowed building societies with mutual status to become banks. The funds of a mutual building society are kept in the form of “share” accounts, which allocates one vote to each investor, independent of the size of the investment. Likewise, there was one vote per mortgagee. Dividends are not be paid out. Key operational changes in the society, such as changing to public limited bank status, require a two-thirds majority vote. Some building societies, such as Abbey National, converted soon after the legislation was passed. The converted banks listed in Appendix 1 are the ones that converted during the period of study. The Bank of England (and latterly, the Financial Services Association) supervise these converted banks. Building Societies are regulated by the Building Societies Commission during the period studied.

<sup>3</sup> A web site accompanying this paper provides four appendices for readers who wish to see more detailed results, which due to space constraints, were excluded from the article (see Heffernan, 2002).

<sup>4</sup> Data for representative savings, chequing, and personal loan amounts are from the BBA (1998, 1999), Abstract of Banking Statistics.

*Low savings.* To obtain a figure for a low amount savings deposit, 10% of the high savings figure was used, resulting in amounts ranging from £1598 in 1993 to £2305 in 1999.

High and low savings deposit rates are from institutions quoting 90 day savings accounts, meaning a depositor is required to give 3 months notice of withdrawal to avoid incurring an interest penalty. Financial institutions offer a large range of deposit products. The 90 day account was chosen as the representative deposit product because in early tests done for Heffernan (1993), firms demonstrated similar pricing behaviour across deposit products that required notice of withdrawal (to avoid interest penalties) and do not come with current account facilities such as a cheque/debit card and a chequebook. Not all firms in the sample offer this product. For example, some may offer a 60 day savings product; others may have offered a 60 day product in the early years of the study, then switched to 90 day, or vice versa, in later years.

*High chequing and low chequing.* A similar exercise was conducted to obtain representative figures for the interest earning chequing account, which offers interest on outstanding balances, overdraft facilities, and a debit/cash dispenser/cheque guarantee card. In the 1990s, though it is rare for a current account not to pay interest, a minimum balance is often required and the *real* rate of interest has periods when it is negative. The formula used is

$$\frac{[(\text{Sight deposits}) - (\text{deposits by financial institutions}) - (\text{non-interest bearing deposits})]}{\# \text{ of interest bearing sight accounts}}.$$

For the high chequing, the figures range from £3038 in 1993 to £3058 in 1999. The above equation was multiplied by 10% to obtain low chequing amounts, ranging from £304 to £306 for the low amount.

The choice of 10% of the high amount to obtain the representative low amount for the saving and chequing accounts is arbitrary. In the absence of information on the average small amount held in these accounts, this method seems the best option. It is well known that banks quote step jump rates by tiers of savings. It is very important to avoid rates taken from tiers, which could bias the results considerably. The method used here avoids that problem.

*Unsecured personal loans.* To obtain a representative amount for personal loans, the formula used is

$$(\text{Other lending to individuals})/(\text{total individual accounts} \times 10\%).$$

Again, the choice of 10% is arbitrary, designed to show a loan of appreciable size. The average estimated size of personal loan ranged from £5632 in 1993 to £5608 in 1998, with a (1993–1999) average of £5600, peaking at £6769 in 1997.

*Mortgages.* The rates used here are the “raw” (annual percentage) rates for new and existing borrowers, before the decision as to type, such as repayment or endowment, or fixed or variable rate mortgage is made.

*Credit cards.* The study included all institutions offering Visa, Mastercard or both to their clients. The “price” used is the rate charged on outstanding payments at the end of each month, and quoted as an annual percentage rate. Some card issuers charge annual fees, which are included in the credit card estimating equation (3).

In Heffernan (1993), the products singled out for a test of pricing behaviour were higher interest deposit accounts, higher interest chequing accounts at high and low amounts, repayment mortgages, and personal loans. The absence of rates for credit cards meant they were not part of the earlier study. The raw mortgage rate used here differs from the earlier paper, when a variable rate was quoted for two types of mortgage, repayment and endowment.<sup>5</sup> By the early 1990s, the picture changed completely. Endowment mortgages are unpopular,<sup>6</sup> and the householder has a wide range of mortgage products from which to choose, including repayment, mortgages with options for a payment holiday and/or early redemption with no penalty, and fixed/variable interest rate mortgages.

Non-price characteristics are excluded from this study. There is a relatively straightforward method for computing interest equivalences and adjusting the rate accordingly. However, it was reported, in the earlier paper (1993), that if deposit or loan rates are adjusted for the interest equivalences of non-price features, the regressions do poorly compared to their unadjusted counter-parts, with virtually no significant coefficients and low explanatory power. The probable explanation is that non-price features tend to be constant over long periods of time. For this reason, no attempt is made to estimate equations using an interest equivalence adjusted rate.

To test for the degree of competition in the banking market, a bench mark for a perfectly competitive rate is required, against which deposit and loan rates can be compared. The London Interbank Offered Rate (Libor) is the rate banks quote each other for overnight deposits and loans. Libor represents the opportunity cost of all of a bank's assets; for a bank that aims to maximise expected profit, it is the basis for determining the marginal revenue for all assets, and the marginal cost of all liabilities. It is an international rate, to which all banks have access, and therefore, is representative of a perfectly competitive rate. For these reasons, Libor is treated as a proxy for the perfectly competitive deposit/loan/mortgage/credit card rates. This study employed a monthly average of the daily 3 month Libor rate available from *Datastream* and other sources. Since retail rates are unlikely to respond to changes in current Libor immediately, the rate was lagged by 1, 2 and 3 months.<sup>7</sup>

In Heffernan (1993) the qualitative results of a detailed spread analysis were discussed. The spread is the difference between Libor and the deposit rate; on loans, it is the gap between the mortgage/loan/credit card rates and Libor. A comprehensive analysis for the five products is found in the *Working Paper*,<sup>8</sup> though certain key findings are worth a brief comment.

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<sup>5</sup> Variable rate mortgages were the norm in the UK until the late 1980s, when fixed rate mortgages were introduced.

<sup>6</sup> It has recently come to light that many endowment mortgages will have failed to accumulate enough capital to pay off the mortgage, let alone a lump sum to the mortgagee.

<sup>7</sup> In Heffernan (1997), an error correction model was used to capture the dynamics of retail deposit and loan rates to changes in a base rate. The results (see in particular, Heffernan, 1997, Table 6, p. 223) provide econometric justification for choosing current Libor and Libor lagged by 1, 2, and 3 months, respectively.

<sup>8</sup> See Heffernan (2000).

First and foremost, average annual spreads fell during the period 1993–1999, in contrast to 1985–1989, when they were rising, for all the products tested. However, if broken down by firm classifications, the results pointed to differences in pricing behaviour by type of firm, which is suggestive of imperfect competition in these markets.

Second, spreads were examined over periods of sustained rising and falling Libor rates, to look for asymmetries in the way institutions behave in these periods. For the two savings accounts, during the rising Libor period, all the financial institutions show rising spreads, meaning deposit rates are *falling* relative to Libor. This pattern of behaviour was also found for the building societies, and converted societies. Similarly this pattern was observed for interest chequing, though spreads rose less.

During the period of falling Libor, the banks' spreads are largely unchanged in the first three months, then drop, reaching a low in July 1996, and rise again, substantially. The other institutions display the same pattern of behaviour. It suggests that financial firms begin by passing on the effects of the falling Libor, start to absorb them, then more than compensate for it in the later months. Overall, spreads are higher during a period of falling than rising Libor, implying that institutions pass on the effects of a falling rate faster than they do a rising rate.

For mortgages offered to existing and new borrowers during the period of rising Libor, monthly spreads fall for both categories of borrowers, and for all types of financial institution. Spreads rose for the period of falling Libor. Thus, firms are choosing to absorb the effects of a falling or rising Libor for this asset with a long maturity.

In the credit card market, rising Libor is associated with a falling spread for banks and the converted building societies, though they pass on the effects of rising Libor more than banks. The pattern for the period of falling Libor is somewhat different. To obtain higher spreads, the converted firms were not passing on the benefit of a falling Libor to customers, but the banks were doing the opposite. In a highly competitive market, one would expect firms to behave in a similar fashion.

Some of the spread behaviour can be explained by differences in the features of the products being considered. However, differences in the size and movements of spreads among the financial firms is indicative of some degree of imperfect competition in the market. An econometric analysis of the data gives a more precise idea of the amount and type of imperfect competition that prevails.

### 3. The econometric model and results

The procedure used here follows Heffernan (1993), which employed cross-section, time-series data on UK banks and building societies for the period 1985–1989. Using a generalised linear pricing model, it is possible to test for the degree of competition for a given product, for differences in behaviour among individual firms, and for different types of imperfect competition, such as the Cournot model of oligopoly and the Salop–Stiglitz model of monopolistic competition with bargains and rip-offs. Indirectly, it is also possible to assess whether any of these markets is perfectly contestable.

The generalised pricing model is shown in Eqs. (1)–(3). On the left-hand side, the dependent variable is the “price” of the product, in this case the deposit or loan rate. On the right-hand side is a number of explanatory variables.

The estimating equation for the savings and interest chequing accounts is

$$Rd_{it} = \alpha_0 + \sum_j \beta_j \text{Libor}_{t-j} + \gamma t + \delta_i D_i + \zeta n_t + \varepsilon_{it}, \quad (1)$$

where  $Rd_{it}$  is the gross deposit rate paid by firm  $i$  at time  $t$ ,  $j = 0, 1, 2, 3$  the monthly lags used on Libor,  $n$  the number of firms offering the product,  $\gamma t$  the time trend and  $D_i$  the dummy variable for each financial firm  $i$ ; unity for firm  $i$ ; 0 otherwise.

For mortgages and personal loans,

$$Rl_{it} = \alpha_0 + \sum_j \beta_j \text{Libor}_{t-j} + \gamma t + \delta_i D_i + \zeta n_t + \varepsilon_{it}, \quad (2)$$

where  $Rl_{it}$  is the loan or mortgage annual percentage rate charged by firm  $i$  at time  $t$  and, for credit cards,

$$Rl_{it} = \alpha_0 + \sum_j \beta_j \text{Libor}_{t-j} + \gamma t + \delta_i D_i + \zeta n_t + \eta_i f_{it} + \varepsilon_{it}, \quad (3)$$

where  $f_{it}$  is the FEE for credit cards charged by firm  $i$  at time  $t$ .

Eqs. (1)–(3) were estimated by ordinary least squares, using monthly rates for high and low savings, high and low interest chequing, mortgage, loan, and credit card rates. To estimate the mortgage equation the sample was reduced to 22 of the top banks, converted societies, and building societies (1998 assets).<sup>9</sup>

The variable  $n$  allows a test for Cournot behaviour, which is present if the coefficient on firms is significantly positive (negative) in the deposit (loan) equations.

The dummy variable for each firm permits a direct test of the theoretical model of monopolistic competition with bargains and rip-offs developed by Salop and Stiglitz (1977). In the model, consumer inertia, incomplete information, or a fall in fixed costs will attract more firms and, one would expect, generate greater competition. However, the large number of players in the market means firms are able to offer relatively good or bad buys to the consumer.

In the Salop–Stiglitz model, consumers face unseen information costs. Some know the distribution of prices and others do not. The former only buy bargains; the latter buy randomly. A firm can survive either by charging a low price (bargain) or a high one (rip-off). Rip-off firms stay in business as long as there are enough purchases by the ill-informed (or inert) consumers. Firms offering bargain products profit from a higher volume of sales, because well-informed customers buy their relatively cheaper product. Thus, the relative bargains and bad buys co-exist, and there is a twin-peak price distribution.

In retail banking, some consumers are well informed; others are not, enabling the Salop–Stiglitz theory to be put to the test. The dummy variable captures the

<sup>9</sup> The high number of firms offering mortgages generated a matrix too large for the software programme being used.

competitive behaviour of each individual firm, relative to a default bank. The Royal Bank of Scotland was chosen as the default, thereby acting as a benchmark against which the behaviour of all the other institutions can be studied. The bank was selected because it satisfied a number of criteria: it was important to include the “big four” (Barclays, Lloyds, Midland and National Westminster<sup>10</sup>) and new players in the rankings, and the default firm had to have a complete set of data for all the products over the period of testing, 1993–1999. In fact, the choice of default bank (with which interest rates other banks’ rates are compared) has *no* significance for the ranking of financial institutions, nor for (apart from a common constant), the interest rate deviations. Had another comparator bank been chosen, all the deviations from it change by the value of the coefficient on the default bank. However, the *range* of deviations do not change, nor do the *relative rankings*.

A negative coefficient on a bank offering one of the deposit products means this bank is offering a bad bargain or rip-off relative to the default bank; a positive coefficient indicates a relative bargain. For loan products, the opposite is true; a negative (positive) coefficient confirming the presence of a relative bargain or good buy (rip-off or bad buy).

In the Salop–Stiglitz model, the coefficient on the number of firms offering the product may also be negative for deposit products and positive for loans, the opposite sign expected for the Cournot model. For example, a fall in fixed costs could be one of several reasons why new firms enter the market. Hence, firm entry could rise, and with it, the number of relative rip-offs. On the other hand, a Salop–Stiglitz framework is compatible with the Cournot prediction that as firm entry increases, deposit rates will rise and loan rates will fall. The sign of the coefficient will be determined by the relative influence of the rip-off and bargain firms.

An indirect test of perfect contestability is also possible. A contestable market is one in which incumbent firms are vulnerable to “hit and run” entry and exit, and given this threat, behave as though they are price takers, pricing products at average cost (equal to marginal cost with a horizontal cost curve), thereby maximising consumer surplus. This type of entry is possible if the market is one where customers can switch suppliers faster than the suppliers can reprice, if incumbents and new comers have access to similar technology and factor prices and there are no *sunk* or irrecoverable costs. Under these assumptions, then if existing banks have deposit or loan rates that are lower (higher) than perfectly competitive rates, new entrants will capture market share by offering lower “prices”. They will stay in the market until profit margins begin to fall as existing firms lower their prices. Having made a quick profit, these firms, with virtually no sunk costs, exit the market. This type of market is known as *contestable*; the mere threat of entry keeps existing banks pricing their products at marginal cost. The policy implication is important: if a market can be shown to be contestable, governments need not monitor the pricing behaviour of firms.

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<sup>10</sup> Lloyds Bank took over the Trustees Savings Bank in December, 1995, began calling itself Lloyds TSB in 1999. The Hong Kong and Shanghai Bank Corporation took over the Midland Bank in 1992; in late 1999 the Midland branch network was renamed HSBC.

Some authors have argued that banking markets are contestable, and cite the empirical evidence to prove their point. However, the methodology used to test for contestability is open to criticism, which in turn raises doubts about their empirical results.<sup>11</sup> Furthermore, given the banks' ever increasing dependence on information technology, which dates within a year if not months, it is hard to argue the case for a contestable banking market. For example, secondary markets are likely to be imperfect for used furniture but it might be difficult, if not impossible, to sell ATMs, and, more generally, computer hardware, because of dating or compatibility problems. In this study if the coefficient on firms in Eqs. (1)–(3) significant, then contestability is rejected because the number of incumbent firms should not influence deposit or loan rate setting.

#### 4. Discussion

The findings from the econometric tests are discussed in two sub-sections, below. In Section 4.1, the explanatory power of the estimated Eqs. (1)–(3) and the significance of all the variables are reviewed except for the firm and dummy variable coefficients. Scrutiny of the latter two (Section 4.2) throws light on which model of imperfect competition best describes the data.

##### 4.1. Analysis of the econometric tests

Due to space constraints, the complete set of regression results for the five products, estimated using Eqs. (1)–(3), are reported in Appendix 3 of the website<sup>12</sup> that accompanies this paper. The adjusted  $R^2$ 's range from 0.41 to 0.83, which, given the data are cross-section time series, indicate the overall model is a good fit, though the explanatory power does vary considerably. The differences in the adjusted  $R^2$ 's do not follow a clear pattern. Low savings has an  $R^2 > 0.8$ , but the low chequing and the high savings accounts have the lowest  $R^2$ 's, 0.41 and 0.53, respectively. The adjusted  $R^2$ 's for the "loan" products vary from 0.636 for new borrower mortgages to 0.831 for credit cards. There is no significant heteroscedasticity for the savings products, meaning the null hypothesis of a constant variance among the error terms cannot be rejected. Significant heteroscedasticity is present for the high and low chequing accounts and loan products but the programme used "White corrects"<sup>13</sup> for heteroscedasticity, meaning the  $t$ -ratio test for significance is valid.

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<sup>11</sup> See Heffernan (1996) for a summary of the contributions to the topic of contestability in banking by a number of authors. Readers will note an absence of a literature review in this paper. To do so would be to repeat the exercise undertaken in the (1993) paper, and since then, there have not been many major contributions, with the exception of the book by Atunbas et al. (1996), and De Bandt and Davis (2000).

<sup>12</sup> See Appendix 3 – Tables A3-1(a) and (b) (high and low savings), A3-2 (a) and (b) (high and low chequing), Tables A3-3 (a) and (b) (mortgages for existing and new borrowers), Tables A3-4 (credit cards) and A3-5 (personal loans) in Heffernan (2002).

<sup>13</sup> See White (1982) or Pesaran and Pesaran (1997).

Table 1  
Coefficients (*t*-ratios) for trend and constant coefficients<sup>a</sup>

Product	Trend	Constant
High savings	−0.017 (−26.06)	3.2 <b>(10.28)</b>
Low savings	−0.024 (−41.56)	3.53 <b>(19.71)</b>
High chequing	−0.013 <b>(17.02)</b>	0.733 <b>(2.16)</b>
Low chequing	−0.003 <b>(−5.22)</b>	−0.185 (−1.02)
Mortgages (existing borrowers)	−0.013 <b>(−30.42)</b>	3.8 <b>(7.52)</b>
Mortgages (new borrowers)	−0.014 <b>(6.05)</b>	1.95 <b>(6.05)</b>
Credit cards	−0.011 (−2.15*)	−19.56 <b>(43.9)</b>
Unsecured personal loans	−0.094 <b>(−17.31)</b>	18.76 <b>(48.97)</b>

<sup>a</sup> Bolds (\*): *t*-ratio significant at 99% (95%) level of confidence.

Table 1 summarises the results from the estimation of each product deposit/mortgage/loan rate for two of the explanatory variables, the trend and constant terms. The savings and chequing accounts have a trend coefficient which is very significantly negative, meaning saving and chequing rates are falling through the estimating period, 1993–1999, a point which is consistent with the findings from the spread analysis.

All the high savings and low savings accounts have a significant, and large constant term, which, together with low coefficients on Libor (see Table 2), provides evidence of “smoothing”, with discrete mark-ups by the firms. Smoothing means there is a failure to respond one for one, and a delay in response to changes in Libor, even lagged Libor. The response is partly explained by the presence of “menu costs”, that is, administrative and other costs involved in changing the rates. Indeed, some building societies announce they will not change rates when market rates are falling to “protect our savers”, or to shield mortgagees when rates are rising. At the same time,

Table 2  
Sum of significant coefficients for Libor

	Significant Libors	Sum of significant coefficients
<i>90 Day savings, and interest chequing, 1993–1999</i>		
Low saving	Lagged by 1, 2 months	0.626
High saving	Current, lagged by 1 month	0.702
Low chequing	Lagged by 3 months	0.184
High chequing	Lagged by 3 months	0.381
<i>Mortgage products, 1993–1999</i>		
Existing borrowers	Current, lagged by 2 months	0.848
New borrowers	Lagged by 1, 2 months	0.714

to the extent that consumers are reluctant to change accounts, for whatever reason, it means firms need not immediately respond to changing market rates. By contrast, while the high chequing account has a positive and significant (at the 95% level of confidence) constant term, the sign is negative and insignificant for low chequing. The link to Libor is well attested but shows a much slower (a lag of 3 months) response rate.

The coefficient on Libor would be unity in a perfectly competitive market. The summary in Table 2 shows the deposit rates on savings accounts range from 63% to 71% of a perfectly competitive rate. The comparable rates in Heffernan (1993) were 44% for high savings; and 57% for low savings. Therefore, on the basis of the Libor coefficients alone, it appears that, on average, the term deposit market has become somewhat more competitive. For low chequing, the 3 month lagged Libor coefficient shows the rate paid is just 18% of the competitive rate; 38% for high chequing. In the period 1985–1989, when a chequing account paying interest had just been introduced, the comparable Libor coefficients were, respectively, 56% and 61%. The findings are suggestive of banks introducing new products with highly competitive rates to “capture” the consumer and then reducing the rates over time.

Turning to the mortgage regression results, all the trend coefficients are significantly negative, suggesting falling rates over the period. The constant terms’ coefficients are positive and significant, but the one for existing borrowers is about twice that for new borrowers.

This finding is suggestive of discrimination against existing borrowers and is consistent with the fact that they are locked into the mortgage and most face appreciable costs of switching to a new lender. However, menu costs for financial institutions are higher because, for example, each mortgagee has to be informed of any rate change. Costs of this sort are not relevant to new borrowers. Hence, the changes in the mortgage rate are less likely to be one for one, and, as can be seen from Table 2, respond more slowly to Libor than changes for existing borrowers.

Current Libor is significant in only one case, existing borrowers using the top financial institutions, indicating there is a partial, immediate rate response to changes in the interbank rate. All the regressions have at least one lagged Libor which is significant. As Table 2 shows, the Libor coefficients on mortgages are slightly below unity, suggesting the rates come close to the competitive ideal, and more so than for deposit products. However, the presence of the large constant terms is indicative of smoothing, which slows the rise to the competitive rate, and takes place in discrete jumps. Compared with the period 1985–1989, when variable rates on repayment mortgages were tested, the coefficient on the competitive rate was slightly lower, at 0.748.

For credit cards and personal loans, the constant term is significant and the coefficient large and positive, indicating a substantial smoothing with discrete price mark-ups. The trend coefficient is significantly negative with a large coefficient, suggesting falling loan and credit card rates over the period.

Neither credit card nor personal loan rates respond to changes in Libor until up to 3 months later, and it is 72% of the competitive rate for credit cards, but only 27% for personal loans. Together with the very large mark-up as shown by the constant

term, one may conclude these products have large spreads and respond to changes in the competitive market rate of interest relatively slowly. The credit card market was not included in the earlier study, so no comparisons can be made. The personal loan market is far less responsive to Libor compared to 1985–1989, where the coefficients on current Libor and Libor lagged by 2 months were significant and greater than unity, indicating far less in the way of mark-ups. This is especially true for personal loans, where the lack of a strong link to Libor corroborates the Stiglitz and Weiss (1981) notion of default rates being insensitive to the loan rate set. That is, firms are reluctant to raise loan rates with Libor, in case it provokes an unacceptable increase in default rates.

In the credit card rate regression (Eq. (3)), the coefficient on FEE was strongly significant and positive.<sup>14</sup> As the annual fee rises, so does the credit card rate charged. Financial firms charging annual fees are unquestionably engaging in price discrimination because other credit cards are available with similar non-price features but no annual fee. This finding testifies to the lack of unfettered competition in this market. Thus, even though Cournot type rate behaviour is present (as seen by the significantly negative coefficient on the firms coefficient – see Table 3), any gain is offset by the opportunity to take advantage of ill-informed or inert customers. Either fees and/or the APR charged can be the source of a rip-off.

#### 4.2. *Relative bargains, rip-offs, and best fitting models*

This section looks at the behaviour of the firms and bank dummy variables in the estimation of Eqs. (1)–(3). The signs on the coefficients of these variables taken together, shows the type of market structure prevailing for each of the five generic products.

To further investigate the relative bargain/rip-off model, financial institutions are ranked according to their relatively good and bad bargains.<sup>15</sup> Recall the dummy bank variables are inserted to measure the extent of rate setting dissimilarities across the financial institutions. For deposit products, a negative coefficient indicates a rip-off relative to the default bank (the Royal Bank of Scotland); a positive coefficient is a bargain. If the *t*-ratio is significant, it means the firm's average interest rate difference against the default has been large and/or relatively steady over the period. Had the position varied greatly over time, or the interest rates set by the two institutions been close on average, the standard errors would be high, making the *t*-ratio low.

Tables 3 and 4 summarise the main findings from the ranking of firms which appear in Appendix 4. The first or “product” column in Table 3 ranks the mortgage, deposit, savings, unsecured personal loans, and credit card offerings according to the size of the margin between the relative best bargain and worst rip-off. Mortgages have the smallest margins, not only because of the number of players, but because

<sup>14</sup> The coefficient on FEE was 0.166 with a *t*-ratio of **10.1**.

<sup>15</sup> See Tables A4-1–A4-5, which are derived from the econometric results reported in Tables A3-1–A3-5 in Heffernan (2002).

Table 3

Products ranked by size of margin between relative best &amp; worst buys &amp; key financial institutions offering bargain/rip-off products

Product	Size of margin (%)	Best buy	Worst buy	Relative bargains	Relative rip-offs
Mortgages – existing borrowers	0.38 (–0.32 to –0.06)	First Direct (–0.32%)	Northern Rock (0.06%)	First Direct, Nationwide, Yorkshire BS	Lloyds, Halifax, Midland, Barclays, All & Leic, Abbey National, Nat. West, Woolwich, N. Rock
Mortgages – new borrowers	0.45 (–0.4 to 0.05)	First Direct (–0.4%)	Lloyds (0.05%)	First Direct, Nationwide, Yorkshire BS, TSB, Bk. of Scotland, Halifax, Midland	Lloyds, N. Rock, Woolwich, Abbey National, Nat. West, All & Leis, Barclays
Low chequing	0.92 (–0.36 to 0.56)	Northern Rock (0.56%)	Leeds & Holbeck (–0.03)	N. Rock, Halifax, Woolwich, Bk. of Ireland, Clydesdale, Nationwide, All & Leis	Leeds & Holbeck, A & L Giro, Barclays, First Direct, Midland, Nat. West, TSB, Abbey N., Citibank, Lloyds, Bk. of Scotland
High savings	2.14 (–0.67 to 1.47)	National Counties BS (1.47%)	Coutts <sup>a</sup> (–0.67)	Nat. Counties, TSB, All & Leis, Yorkshire BS, N. Rock, Woolwich, Abbey N.	Coutts, Barclays, Lloyds, Midland, Nat. West, Nationwide
Low savings	4.8 (–2.1 to 2.7)	Kent Reliance BS (2.7%)	Granville Bank (–2.1%)	K. Reliance, Nat. Counties, Chelt & Glos., Britannia, Nationwide, Bk. of Scotland, Manchester, Barclays, All & Leis, Nat. West, Abbey N.	Granville, Yorkshire Bk., Halifax, Bristol & West, Brad & Bingley, Chelsea, Derbyshire
High chequing	5.08 (–2.7 to 2.38)	United Dom Trust (2.38%)	Coop Bank (–2.7%)	UDT, Schroder, Western Trust, Brown & Shipley, Charterhouse Bk., Citibank, Amex, Bk. of Ireland	Coop, First Direct, A & L Giro, Halifax, TSB, Lloyds, Nat. West, All & Leic. Midland, Abbey N., Nationwide, Barclays, N. Rock, Bk. of Scotland, Woolwich

Table 3 (continued)

Product	Size of margin (%)	Best buy	Worst buy	Relative bargains	Relative rip-offs
Personal loans (unsecured)	8.7 (–3.8 to 4.9)	Northern Rock (–3.8%)	Secure Trust (4.9%)	N. Rock, Direct Line, Nat. & Prov, Bk. of Scot Direct, All & Leic, Yorkshire Bk., Citibank, Bk. of Scot Direct, Sainsburys, Nat. Counties, Midland, First Direct, M & S, Lloyds, Nat. West, Coop S & P, Coutts, Nationwide, All & Leic, Woolwich, Abbey N., Midland, F. Direct, Halifax, Sainsburys, Bk. of Scotland, Barclays, Nat. West	TSB, Barclays, Nationwide, Coutts, Bk. of Scot, Newcastle, Leeds & Holbeck, Secure Trust, W Bromwich
Credit cards	16.5 (–7.4 to 9.1)	Save & Prosper <sup>b</sup> (–7.4%)	Standard Chartered (9.1%)		Standard Chartered, Allied Irish, Yorkshire Bk., Beneficial BS, TSB

<sup>a</sup>Subsidiary of National Westminster Bank.

<sup>b</sup>Subsidiary of Robert Fleming Bank.

Table 4  
Best fitting models of imperfect competition by product

Product	Size of margin (%)	Sign on firm's coefficient	Applicable model
Mortgages – existing borrowers	0.37 (–0.32 to –0.06)	(+) Insignificant 0.001 [0.17]	Competitive but with some price discrimination
Mortgages – new borrowers	0.45 (–0.04 to 0.05)	(+) Significant 0.030 [6.60]	Competitive but not contestable
Low chequing	0.92 (–0.36 to 0.56)	(–) Insignificant –0.010 [1.23]	Unclear
High savings	2.14 (–0.67 to 1.47)	(–) Significant –0.047 [–6.10]	Salop–Stiglitz bargain/rip-off
Low savings	2.8 (–2.1 to 2.7)	(–) Significant –0.062 [–23.5]	Salop–Stiglitz bargain/rip-off
High chequing	5.08 (–2.7 to 2.38)	(+) Insignificant 0.007 [0.92]	Salop–Stiglitz bargain/rip-off
Personal loans (unsecured)	8.17 (–3.8 to 4.9)	(+) Insignificant 0.007 [0.47]	Salop–Stiglitz bargain/rip-off
Credit cards	16.5 (–7.4 to 9.1)	(–) Significant –0.143 [–5.40]	Salop–Stiglitz bargain/rip-off

The actual coefficients and [*t*-ratios] appear on the second line of second column; [*italics*] significant at 99% level of confidence.

the size of a mortgage (the largest investment the majority of individuals make in a lifetime) and its duration mean most potential customers will shop around for the best deal. Furthermore, these mortgages are considered “safe as houses” because of the tradition for real property market values to rise.<sup>16</sup> Once, locked in however, there appears to be opportunities for firms to practice price discrimination on existing borrowers.

From Table 3, there appears to be persistent (but not large) relative bargains for existing and new borrowers being offered by Bradford and Bingley, Derbyshire, First Direct, Nationwide, and the Yorkshire Building Society.

The margin of less than 1% between the best and worst low chequing accounts is explained by the fact that through the period, market interest rates were very low. Since the rate of interest is bounded by zero, banks encounter a floor, with very little room to offer relatively bad buys, or relatively low deposit rates. In the 1985–1989 study, nominal interest rates were comparatively high, with a range between the best bargain and worst rip-off higher, at 2.86–0.92 in the period 1993–1999.

One possible interpretation of Table 3 is the use of loss leaders by financial firms. One product might be priced below cost to attract new accounts, with losses defrayed by higher prices on other products.<sup>17</sup> Although this could have happened, briefly, from time to time, Table 3 reports results based on estimating equations over a

<sup>16</sup> The exception to the historical rule was the negative equity crisis from 1990 to 1993, and a high repossession rate from 1991 to 1995 that led managers to raise risk premiums. However, the action was temporary, and the episode increasingly forgotten or treated as a non-recurrent risk by 1997.

<sup>17</sup> I am grateful to the anonymous referee who raised this question.

relatively long period, 1993–1999. The findings here suggest a sustained persistence of relative bargain and rip-offs.

Firms may also price products below cost or cross-subsidise to attract customers into a form of relationship banking, expecting to obtain services at reasonable (if not the most competitive) prices.<sup>18</sup> This might help to explain Table 3's results. The key here is switching costs, which make for consumer inertia that can be profitably exploited later. Relationship banking may convey a mutual benefit if it enhances information flows between customer and bank, but there are drawbacks. Opportunistic behaviour by a customer can catch a bank off guard.<sup>19</sup>

Turning to Table 4, insignificant but opposite signs on the firm coefficients are found for existing mortgages and the low chequing product. For the new borrower mortgage, the sign is positive and significant. The overall conclusion for mortgages and low chequing is that they are not well described by either the Salop–Stiglitz or the Cournot models of imperfect competition. All these markets appear to be competitive, except for the evidence of price discrimination practised on existing borrowers. Also, any conclusion with respect to low chequing is subject to the caveat made on the previous page.

The positive and significant firm coefficient in the estimating equation for the new borrower mortgage rules out contestability. The sign is insignificant for existing borrowers, but recall (from Table 1) the evidence of price discrimination in the mortgage market, a practice which is incompatible with a contestable market. Contestability cannot be ruled out for low chequing, though a reliable direct test would need to be applied to confirm or reject this hypothesis of firm behaviour.

The two 90 day savings accounts have comparably high margins between the relative bargains and rip-offs, especially in the case of low savings. At the same time, deposit rates fall as the number of entrants increases. Given these observations, the Salop–Stiglitz model of monopolistic competition with bargains and rip-offs best describes these deposit accounts. The same conclusion can be drawn for higher chequing; although the sign on the firm's coefficient is positive, suggesting Cournot type behaviour, it is insignificant. Given a 5% margin between the relatively best and worst buys, Salop–Stiglitz appears the best description of this market.

For both credit cards and unsecured personal loans, Table 3 shows a large dispersion of bargains and rip-offs relative to the default bank, the Royal Bank of Scotland. The significance of the *t*-ratios testifies to the persistence of financial firms' positions over time. For credit cards, the range is remarkable, from (9.1%) for the relative worst buy, Standard Chartered, to the best buy, Save and Prosper (Robert Fleming), (-7.4%), a difference of over 16%. Consumers holding the relative rip-off credit cards are paying dearly.

Customers taking out unsecured personal loans also face a large range of relative good and bad buys around the default bank. The rip-offs are offered by small players in the market. The coefficients on the major players, with the exception of Barclays

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<sup>18</sup> Thanks to both anonymous referees for raising at least one of these two issues.

<sup>19</sup> As Deutsche Bank found to its cost in the Jürgen Schneider case, 1994.

(0) are significantly different from the default, and rise to  $-1.1\%$  for Lloyds. So while they are relatively good buys, they are a long way from the best bargain, Northern Rock at  $-3.8\%$ , and the worst buy, Secure Trust, at 4.9, a difference of 8.7%.

The large margins between relatively good and bad buys for credit cards and personal loans may be partly explained by the fact that financial firms charge different risk premia, depending on the type of customer. If this was the main explanation, the newer entrants would be expected to charge the higher rates, because of the tendency for them to attract riskier borrowers refused by long established banks. However, referring to the last two columns of Table 3, there is no evidence that the newer entrants are offering relatively bad deals. All of the firms in the relative rip-off column are well established (with the possible exception of Secure Trust), and include Barclays, Nationwide, Coutts, Bank of Scotland, and Yorkshire Bank. Some of the newer players, such as Marks and Spencer, Direct Line, First Direct, and Sainsburys offer relative bargains.<sup>20</sup>

The Salop–Stiglitz model best describes the unsecured personal loan and credit card markets. Consistent with the 1985–1989 study, the coefficient on firm entry is positively signed but unlike the earlier work, not significant. The credit card market, however, appears to display Cournot like behaviour: as the number of entrants rise, the rate falls. This finding is compatible with the Salop–Stiglitz model because the presence of bargains and rip-offs makes it possible to have a direct or inverse relationship between firm entry and price. Furthermore, the positive coefficient on FEE is evidence of price discrimination and serves to underline the ability for rip-offs to prevail in the market. The pricing behaviour of both products rules out a contestable market.

Looking at Table 3, there is no observable pattern in the position of financial institutions indicating systematic differences in the financial firms' pricing behaviour. For example, Northern Rock, which converted to a bank, offers the best buy for unsecured personal loans and low chequing, but is the worst deal for mortgages. Tiny players appear in both the relative bargain and rip-off columns. Smaller players offer relatively good deals for the low chequing account. In most cases, the extreme positions are occupied by the medium to small banks and building societies.

There are even cases where subsidiaries appear in one column but the parent is in the other. Consider unsecured personal loans. The Bank of Scotland Direct and Sainsburys offer bargains but the parent, the Bank of Scotland, does not. The opposite observation applies to Lloyds (a relative bargain) and TSB, respectively. This may be a simple attempt to give the "new" players a competitive edge, except for the long established TSB.<sup>21</sup>

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<sup>20</sup> Using the term "new" for some of the financial firms is qualified by the fact that many have links with established firms. First Direct and Direct Line Banking are subsidiaries of, respectively, Midland (now HSBC) and Direct Line, the insurance firm. Sainsburys is linked with the Bank of Scotland. Most of these newer entrants do not offer core banking services, that is deposit and loan facilities with a payments service.

<sup>21</sup> TSB was formed by the merger of regional TSBs in 1986, and purchased by Lloyds Bank in the early 1990s. In 1999, it began to advertise itself as a single bank, "Lloyds TSB".

A final observation is the position of the “big 6” British banks – Barclays, Nat West, Abbey National, Lloyds, Halifax, and Midland (all with assets > £ 100 billion in 1998) in the bargain and rip-off columns of Table 3. The majority of the big 6 appear in the relative rip-off column for all the savings and chequing accounts, with the exception of low savings. For personal loans, three appear as relative bargains; two as rip-offs. In the credit card column, five are relative bargains, but TSB is a bad buy.<sup>22</sup>

## 5. Policy implications and conclusions

This paper analysed the retail product pricing behaviour of British financial institutions in the 1990s, with a view to addressing some critical questions in relation to the competitive structure of this sector. Where possible, the findings were compared to earlier results.

While no single model of imperfect competition explained pricing behaviour in this sector, the Salop–Stiglitz bargain/rip-off model of monopolistic competition best describes the market framework for the majority of products studied. The Cournot prediction that increased firm entry into a market lowers “price” is compatible with Salop and Stiglitz, but so too is the possibility that firm entry will actually lower deposit rates and raise loan rates. Either sign on the firms’ coefficient is possible and will depend on the distribution of good and bad buys which prevail in a particular market.

In his recent report, Cruickshank (2000) opposed additional regulations to curb uncompetitive behaviour in retail banking, arguing that increased entry will enforce a greater degree of competition.<sup>23</sup> This conclusion is correct, but *only* in the absence of consumer inertia and in an environment of full or more complete information about the products on offer. The findings here demonstrate his recommendation is unwarranted in several UK banking markets.

Compared to the period 1985–1989, annual average spreads have declined, though if broken down into the six categories of institutions, it is evident that some bucked the trend, and enjoyed rising spreads. A monthly analysis of spreads during periods of sustained rising and falling Libor suggest firms respond by passing on the change in Libor for some products but not others. Their behaviour also differed depending on whether Libor was rising or falling.

The econometric results confirm increased competition in some markets in the 1990s, compared to the later half of the 1980s, but any *law of one price* continues to be absent. Even in the largely competitive mortgage market there were signs of price discrimination. The low chequing product appears to be competitive, though the findings may be partly explained by historically low interest rates in the period, which limited the range of rates firms could offer. The results point to substantially

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<sup>22</sup> Abbey National and the Halifax were excluded from the personal loans dataset; likewise Lloyds in the credit card dataset because of incomplete data for the period 1993–1999.

<sup>23</sup> Cruickshank (2000) made numerous policy recommendations but only those directly relevant to this paper are discussed.

less competition for high and low savings, high chequing, credit cards, and personal loans.

As this study has shown, information asymmetries means firms' pricing behaviour differs depending on the product, ranging from competitive pricing in the new borrower mortgage market, to the existence of substantial pricing differences between relative bargain and rip-off products, especially in the personal loan and credit card markets. The policy implication is to require firms to produce comparable information for consumers, so it is more difficult for the relative rip-off products to survive.

Legislative changes over the past three decades, reinforced by technological innovations, have reduced the fixed costs of producing banking products, and encouraged firm entry into retail banking markets. However, this investigation has shown that more firms need *not* imply keener pricing, in the absence of comparable information sets on core banking products.

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