

by
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 Central Bank of Barbados
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Barbados is a small, middle-income developing country (with per capita income of about US\$3,500 in 1984) where commercial banking services are widely used. There are eight banks with over 40 branches to serve a population of just over one quarter million. Banks lend mainly at short-term, for working capital for business firms, for the purchase of consumer durables and for short-term government financing. They depend for the most part on local deposits for their resources; in exceptional cases banks have borrowed abroad, invariably to meet specific needs of large customers (including the government). With two exceptions banks form part of major multinational chains with headquarters in major financial centres. However, the local branches are evidently regarded as local profit centres, perhaps because they are subject to local central bank regulation. Interest on loans and securities is the banks' main source of revenue, but earnings on foreign exchange transactions are also very significant. Additional revenue comes from commissions and service charges on transactions which the bank executes (for example, issuing and clearing cheques, drafts and other payment instructions).

The five largest banks dominate the sector; four are branches of multinationals, and the fifth is state owned. The remaining three banks, one of which is locally incorporated, are tiny by comparison, each operating only one office. The banks operate an informal cartel, with regular meetings under the

leadership of the larger institutions. Their principal concern has been to order the pattern of interest rates although other matters such as opening hours and services charges are apparently discussed from time to time. The bankers' meeting attempts to secure an agreed reaction to changes in the banks' circumstances, including changes in central bank policy; in general, they appear to succeed. Only once, in 1973 has an interest rate war broken out. As interest rates rose on international markets the smaller banks in operation at that time - some of whom have since closed their Barbados branches - attempted to secure gains at the expense of the larger institutions by competing deposit rates upward. In no more than two weeks in October 1973 deposit rates rose by margins which were, for the local financial system at the time, quite startling. The central bank immediately moved to set a ceiling on the deposit rates.

The Central Bank of Barbados stipulates selected rates, but banks have always had leeway for adjusting other rates within these limits. Initially, the Bank fixed the maximum rate allowed on deposits, between 1973 and 1977. As deposit rates fell away from these ceilings the regulation became inoperative and it was later relaxed. It was replaced with a stipulated average lending rate for selected loans, matched with a minimum rate to be offered on savings deposits. The lending rate was fixed for the majority of loans in the banks' portfolio; only lending to households and to government was excluded. The minimum deposit rate has been much lower than the average lending rate (50% of the lending rate or less), allowing banks considerable room for

independent interest rate decisions within these two outer limits.

The central bank sets other constraints on commercial bank behaviour. Since 1977 there have been varying quantitative limits on bank credit to households, but they affect only about 10% of the banks' lending and some categories of household credit (for housing especially) are not subject to the ceiling. Banks are required to hold a proportion of their deposit liabilities in non-interest bearing deposits with the central bank, a usual practice of central banks originally designed to ensure the liquidity of the banking system but often used to restrict credit availability. In Barbados the ratio crept up in steps from 2% in 1973 to 4% in 1974, 6% in 1975 and 8% in 1977, where it has since remained. The central bank also regulates commercial banks' foreign borrowing and lending; banks are required to maintain their foreign positions within guidelines based on the volume of their foreign transactions, except for specific foreign deposit or loan arrangements which have central bank approval. Finally, the central bank alters its rates on discounts to commercial banks in line with its overall interest rate policy and the need to relax or tighten monetary policy. However, special discounting windows have been set up to effectively exempt discounts for producers, who are offered attractive rates, below those available on loans in general, on funds obtained from the special discount window.

The present paper will discuss how banks make decisions to enhance their profitability within the limits which the central

bank imposes and in view of the behaviour of money and credit markets. The ground to be covered includes: a survey of commercial bank earnings since the Central Bank of Barbados became operational in 1973; evaluation of the markets for deposits and credit by estimating the demand functions for them both; discussion of the trends and relative movements in loan and deposit interest rates; and a simulation of commercial bank interest rate policy based on the position at December 1983.

Trends in Bank Profits

We may identify four episodes in the evolution of bank profits during the 1974-84 period. From 1975 to 1977 net earnings grew slowly; they accelerated from 1978 to 1980; in 1981 there was a slowdown; and from 1982 to 1984 net earnings were on the decline.

In the first phase (1975-77) the gap between earnings on loans and securities and payments on deposits widened a little each year. In 1975 and 1976 earnings were up somewhat while payments fell; in 1977 earnings rose substantially, while payments remained unchanged. In 1977 extra receipts from service charges boosted earnings. Some portion of these earnings was absorbed by increased wage payments and larger provisions for depreciation and for bad debts.

In the second phase (1978-80) rapid increases in earnings on loans and securities exceeded rising payments on deposits by comfortable margins. Noticeable increases in earnings on foreign

exchange transactions swelled the banks' revenues. Receipts from service charges, though much smaller, were also on the increase. Wage payments rose once more and so did bad debt and depreciation provisions.

In 1981, the rise in net income was much lower than in the previous three years because of an extraordinary rise in local banks' contribution to head office expenses, an acceleration in wage payments and increased costs of local interbank borrowing. There was also a significant rise in actual loan losses.

In the fourth phase (1982-84) interest earnings were on the increase in 1982 but a very large jump in bad debt and depreciation provisions absorbed almost one-quarter of total earnings and a further large increase in wages eroded the remaining income gains. Both earnings and expenditure fell in 1983, but earnings fell faster because of declining receipts on interbank lending. In 1984 earnings began to recover, but the increase was insufficient to cover additional wages and bad debt provisions.

The commercial banks were able to manage loan and deposit rates so as to secure increases in the income on credit items, net of payments on deposits, in every year. In years when net earnings grew most rapidly receipts from foreign exchange business augmented bank income. The additional income was eroded by provisions for bad debt and depreciation, by significant wage increases in the 1980s, by severe loan losses on one occasion and by one instance of substantial increases in the local share of banks' overseas head office expenses.

The Interest Elasticity of Deposits and Credit

The way in which banks manipulate interest rates will be informed by the reaction they expect from the public which supplies their funding and utilises their credit. Banks will need to determine whether increasing loan interest rates will depress the demand for credit sufficiently to reduce income; and whether the differential between loan and deposit rates may be widened without depressing deposit rates to such an extent that the public begins to withhold deposits. In this section we investigate the interest sensitivity of bank credit and deposits over the period 1961 and 1983. We do not know whether banks perceived the situation more or less as the statistics reveal it; however, we may comment on the implications of our results for bank behaviour, and compare with what actually took place.

The public holds bank deposits to meet the ins and outs of day-to-day transactions, to maintain a reserve of liquid funds in case of unforeseen contingencies, to accumulate funds to finance large scale transactions, and in anticipation of known commitments. Deposit provisions for all these circumstances may be expected to increase with increases in national income. Lacking specific measures of transactions, liquidity preference and expected spending, we assume their relationship to income is direct and linear, so that we may employ income as the argument to represent them all in the function that explains the demand for bank deposits.

Very few deposits are held as a store of wealth, and we

should expect to find little substitution between deposits and the tangible assets - mainly real estate - which are the society's principal store of value. However, there are opportunities for substituting foreign financial assets for local deposits. For example, trading firms may draw down local deposits to accelerate foreign payments if they find local deposits unattractive; on the other hand, if they wished to deploy the maximum of available funds with the local banking system they might take advantage of suppliers' credits to delay settlement. Companies with foreign ownership may accelerate profit repatriation or vary interest charges. Individuals are forbidden to hold foreign currency accounts without central bank approval but the temptation to flout the law rises with large discrepancies between domestic interest rates and those available in easily accessible financial markets in New York, London and Miami. We therefore expect some substitution between local and foreign financial assets, but only if the differential in returns is sufficiently large to compensate for the transactions costs of switching deposits and the risks of undertaking illegitimate transactions.

The equation we estimate for deposits is therefore of the form:

$$D = D[Y, DM(r_d/r_f)],$$

where D: bank deposits
Y: national income
DM: dummy variable with value of 1 only when $r_d - r_f$ 2 percentage points, zero otherwise

r_d : local time deposit rate

r_f : rate on a London eurodollar
CD of same maturity

The equation is estimated in log form in the hope that we will detect regularities of behaviour more readily by using relationships between proportionate changes. Even though responses to interest rate changes may be smaller in dollar terms in earlier years when the economy was smaller, they may be just as large proportionately as much bigger dollar amounts in later years. Deposits are not deflated by any price index because we find the concept of a real value of deposits elusive; the real value of any deposit will vary depending on which of the several possible reasons the depositor has for maintaining it. If the deposits are purely transactions balances the current rate of inflation may suffice, but if they are part of a contingency reserve an expected inflation rate is required. In any case, the common practice of using the same deflator for deposits and income adds no information to the results, compared with the use of nominal variables.

Bank credit is used mainly for working capital and for the purchase of consumer durables. It can be expected to increase with national income and potential borrowers may be deterred by suitably severe increases in lending rates:

$$C_r = C_r(Y, r)$$

There is not much opportunity to borrow abroad instead of making use of local banks. Lending institutions must know potential

borrowers well enough to assess their credit-worthiness, a consideration that does not arise with respect to depositors. Because of the credit criterion very few local firms or households have direct access to foreign finance. Trading firms with generous facilities for suppliers' credits are an exception, and their activities make our results only approximate.

The main values of the estimated income elasticities for credit and deposits are both about equal to one, but the interest elasticities are not significantly different from zero. However, we cannot be entirely confident of these initial results because the estimating equations are not entirely satisfactory. The levels of overall significance are high, but serial correlation seems to be present in both equations, and the readily available techniques for exploring the nature of the serial link (for example, the Cochrane-Orcutt technique) proved unenlightening.

If bankers believe that credit and deposits are insensitive to interest rate movements they will try to widen the gap between deposit rates and loan rates, since higher loan rates will not reduce loan volume, nor will lower deposit rates slow the inflow of deposits. However, this policy cannot be pursued without limit. It may be that rather small interest rate changes provoke no reaction; this might explain the lack of response to interest rates in the estimates. Very seldom has the increase in rates from one year to the next exceeded two percentage points. Dramatic changes in rates would probably produce results quite unlike those observed over the period of

investigation. The problem for bankers is that the threshold beyond which reaction sets in cannot be inferred from the historical record. With only a small number of banking firms and largely unknown reaction to very large interest rate movements, one might expect banks to move rates gradually, moving together when agreement can be secured and staying close to the market leader if it proves impossible to find common ground. The system may appear quite stable in relatively tranquil times, but it loses this fragile balance if there is a sudden displacement.

Commercial Banks' Interest Rate Structure

Commercial bank lending and deposit rates in Barbados followed the same cycle as international rates. Rates were high in 1973 and 1974, falling in 1975 and 1976. They held steady at the lower levels from 1977 to 1979; in 1980 a period of rapid rate increases began, lasting into 1981. Nineteen eighty-two saw a slight fall, followed by a larger decline in 1983.

The changes since 1977 were stimulated by central bank action. The banks were directed to raise average loan rates and minimum savings deposit rates in 1980 and 1981, and the whole range of bank rates rose in sympathy. The central bank was motivated by concern over the growing gap between domestic and foreign interest rates, and the possibility that deposits might be switched abroad at the expense of a deteriorating foreign exchange reserve position. When foreign interest rates began to ease in 1983 the central bank began to bring local rates down as well.

The period 1980-82 was one of great increase in international financial markets; interest rates rose to extraordinary levels as major industrial countries employed monetary policy to combat inflation. The success of these policies was then in doubt and bankers were unsure what the future held for interest rates. The term structure of interest rates became inverted under these circumstances, a phenomenon which may be observed in Barbados in 1980 and 1981; the minimum interest offered on savings deposits approached the weighted average rate for all deposits, and rates on three and six-month time deposits were higher than for one year. The rates also seem to have narrowed on loans, with the prime and average lending rates virtually equal for a short while.

The spread between the average rate banks paid on deposits and the average receipt on loans widened a little in 1981 and 1982. Except for 1977 (when the differential was 5.8 percentage points) the spread ranged from 4.9 to 5.4 percentage points, but in 1981 and 1982 it was 5.8 and 6.1, respectively.

This slight increase probably results from lags in the adjustment of payments and receipts to changes in interest rates. Existing deposit agreements must run their course when rates change, so lags on payments are to be expected. However, loan interest rates are usually all adjusted in line with any change in the rate, so there should be no significant lag. In fact, receipts on loans reacted just as sluggishly to changes in average loan rates in 1981 and 1982 as did deposits, suggesting

the possibility that the volume of loans may have contracted somewhat on this occasion.

Simulation of Bank Profits

We used the interest elasticities calculated earlier (even though they were statistically insignificant) to simulate the effect on bank profits of increases in the lending rate and increases in the spread between loan and deposit interest rates. We allowed for discounts from the central bank if the net demand for bank funds exceeded the available excess reserves. The increment to bank profits is given by:

$$= r[cr/r] - (r - z)[D/(r - z)] - r_b(Cr - D),$$

where r: loan rate

: difference between loan and deposit rates

r_b : central bank discount rate

: 0, if excess reserves (Cr - D)

1, if excess reserves (Cr - D)

The first term on the right hand side measures the response of credit to loan rates, the second measures the response of deposits to deposit interest rates and the third records the cost of central bank discounts. Bank profits were simulated, for different values of r and z, on the basis of the banks' position at December 1983, when the average loan rate was 11.5%, the differential 6.5%, the discount rate 16% and there were excess reserves of \$6 million.

The simulations indicate that banks would have wished to increase loan rates by 1.5 percentage points and to widen the differential between deposit and loan rates by one point. This combination would have been expected to add \$0.7 million (or about 5%) to bank profits. If either the loan rate or the interest differential had been pushed beyond this point excess reserves might have been expected to become negative. Banks would have been forced to borrow from the central bank at the penal discount rate then in force, immediately reducing profits by \$0.9 million (for a further half point increase in the differential) and by \$1.0 million (for a half point increase in the loan rate), compared to the actual December 1983 level.

The optimum point is not sensitive to the discount rate. If nothing else changes a lower discount rate reduces the contrast between the best profit position and the reduction that borrowing from the central bank would entail, but it leaves unchanged the point where the stock of excess reserves runs out.

The results do depend on the confidence with which banks hold their views on the interest elasticity of credit and deposits. If, as we suggested earlier, they expect little reaction in the neighbourhood of existing rates, they might be prepared to push for wider margins. However, as this differential widens banks would grow increasingly apprehensive of a slowdown in loan demand or a diversion of deposits from local banks. These probable discontinuities in the behaviour of the

credit and deposit functions make it difficult to anticipate the banks' profit seeking decisions. Nevertheless, simulations of bank behaviour provide useful benchmarks for evaluating banks' behaviour.

Deposit and Credit Equations

Deposits

$$\text{Ln } D = -0.80* + 1.02*\text{Ln}Y + 0.01\text{Ln}r_d/r_f$$

(-2.26) (16.22) (0.05)

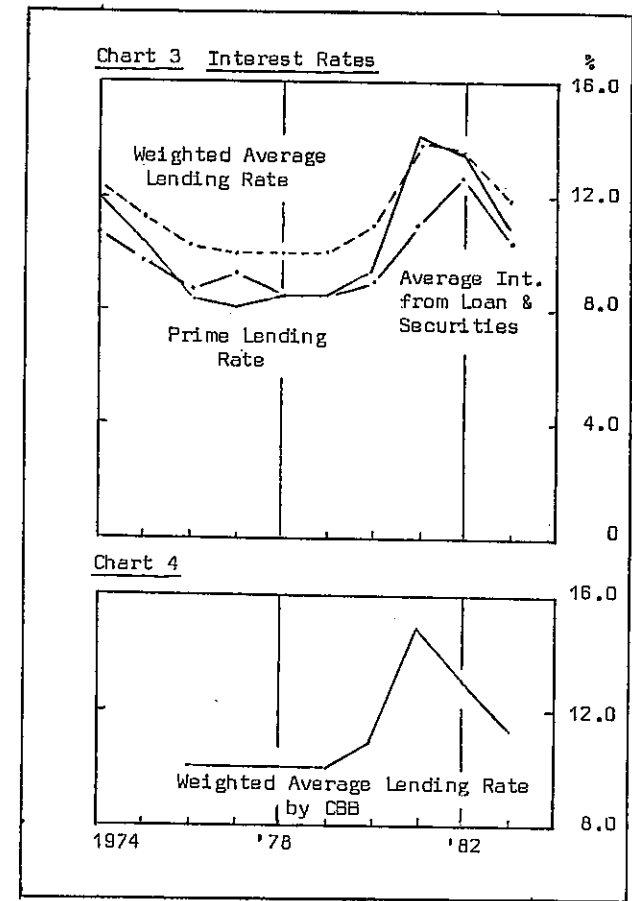
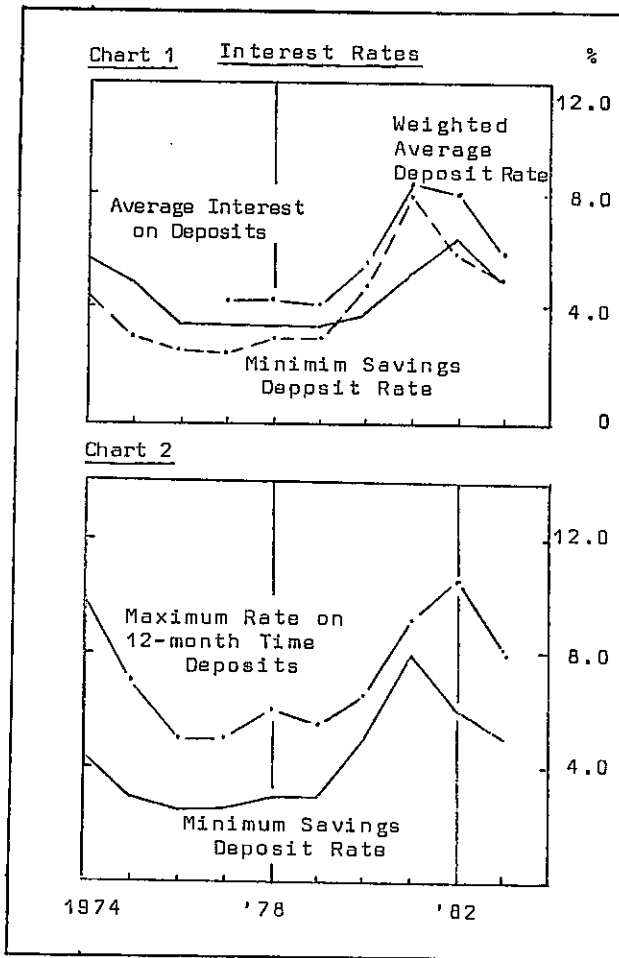
$$R^2 = 0.9417 \quad \text{SER} = 0.2399 \quad \text{DW} = 0.48 \quad F = 178.66 \quad n = 23 \quad (1961-83)$$

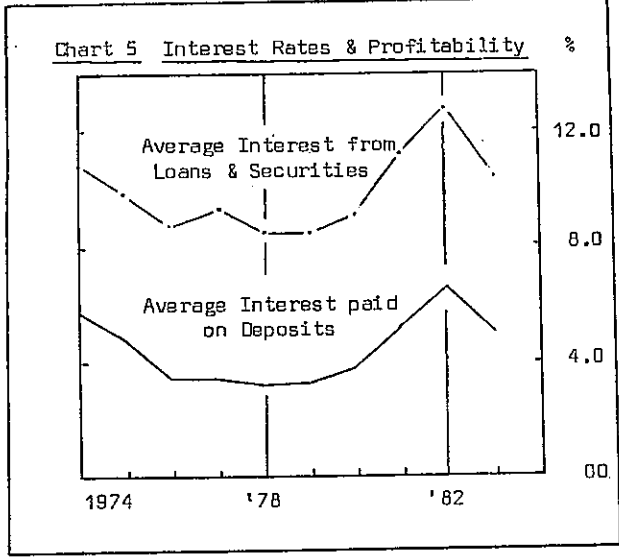
Credit

$$\text{Ln } Cr = -1.90* + 1.04*\text{Ln}Y + 0.42\text{Ln}r$$

(-2.88) (11.40) (0.94)

$$R^2 = 0.9425 \quad \text{SER} = 0.2573 \quad \text{DW} = 0.57 \quad F = 181.36 \quad n = 23 \quad (1961-83)$$





Income and Expenses
(Dollars in thousands)

Item	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
OPERATING INCOME										
Interest from:										
Loans and overdrafts	30,553	30,442	30,448	35,361	36,301	41,560	53,020	76,051	89,239	83,860
Securities	1,866	2,936	3,856	4,115	7,081	8,799	9,386	13,237	20,766	15,728
Local Banks and Financial Institutions	886	1,436	897	1,020	1,225	1,591	1,843	3,237	6,883	3,467
Foreign Banks or Branches	1,174	444	473	515	689	981	1,895	2,683	2,361	1,120
Foreign Exchange	6,426	5,662	5,414	7,226	9,841	12,000	14,556	14,587	15,546	16,261
Other Service Charges	2,821	3,278	3,524	4,344	4,757	5,666	6,838	7,623	8,244	9,819
Commission	48,726	44,218	44,612	52,581	59,894	70,597	87,538	117,418	149,039	130,255
Total	16,305	16,582	13,566	14,469	16,348	19,355	26,639	42,413	56,673	46,043
OPERATING EXPENSES										
Interest paid on Deposits										
Interest on borrowings from:										
Local Banks and Financial Institutions	905	1,705	868	944	846	927	1,335	2,966	6,790	5,283
Head Office, Foreign Branches and Financial Institutions	5,470	3,195	2,956	4,416	4,586	3,384	2,979	2,946	2,822	3,168
Share in Head Office Administration Expenses	1,496	1,816	1,925	2,194	2,187	2,876	3,096	6,386	7,181	7,132
Remuneration of Employees	6,945	8,081	9,236	9,983	11,759	14,318	17,057	20,707	23,805	25,894
Depreciation and Bad Debts	436	613	1,962	2,743	1,590	1,505	2,808	1,377	7,102	5,539
Other Expenses	6,628	6,758	7,597	8,514	9,399	10,403	11,653	14,390	15,809	19,915
Total	38,185	38,750	38,130	43,263	46,715	52,768	65,567	91,185	20,182	112,974
Net Operating Earnings	5,541	5,468	6,479	9,318	13,179	17,829	21,971	26,233	22,857	17,281
Net Loan Losses	-1,450	-984	-1,024	-1,873	-251	-145	876	-884	560	113
Net Income (Before Tax)	4,091	4,484	5,455	7,455	12,928	17,684	22,847	25,349	23,417	17,394