MEASURING THE OUTPUT OF THE BANKS

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Introduction

Banking is significant in many respects in the economy. It is important in terms of its intermediation function - channelling savings from net savers to net borrowers. It is important in terms of the finance flow accounts, its share of total production in the economy and trade.

The banks' importance in terms of moving funds from lenders to borrowers and their importance in creation of money makes them important instruments of monetary policy. Much of the emphasis of analysis and development of data for the banks has dealt with this aspect of the banks.

However, it is also important to measure real output accurately not only because of the banking sector's size, growth and increasing importance in international trade, but also because it is increasingly a consumer of advanced technology. This suggests that productivity should be increasing for banks.

The current measures of banking in terms of its contribution to real GDP, the value of trade in banking services and the allocation of banking services to domestic sectors and industries are all important issues.

Scope of the Study

This paper concentrates on how to measure nominal and real gross output for the banks within the traditional GDP by industry part of the System of National Accounts. Within this framework, the most difficult conceptual and measurement problem is the measurement of gross output of the banks. Estimates of nominal and real value-added were also prepared and those results are also presented in this paper. However, little emphasis is placed on the measurement of intermediate inputs, primary inputs and productivity measures.

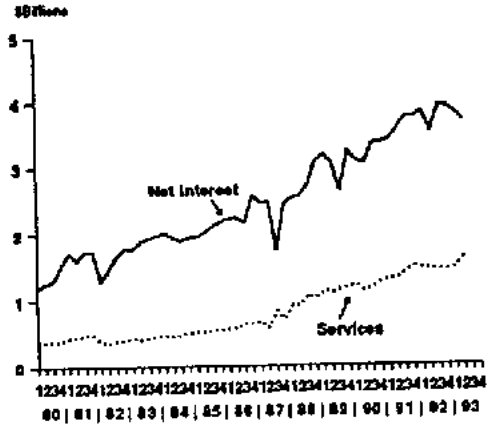
The paper presents a conceptual model which will be used to measure real gross output and the sectoral and industrial allocation of services. For gross output by industry it describes how it was actually applied - the methodology - and finally describes some of the results and conclusions. The results provide the final test of three quite different things - the robustness of the conceptual model, the correctness of the estimation methodology and the accuracy of the data. The paper is organized into three sections - the conceptual model, the methodology used to apply the model and a section which reviews the results of applying the methodology and concepts and draws some conclusions.

How the Industry Functions

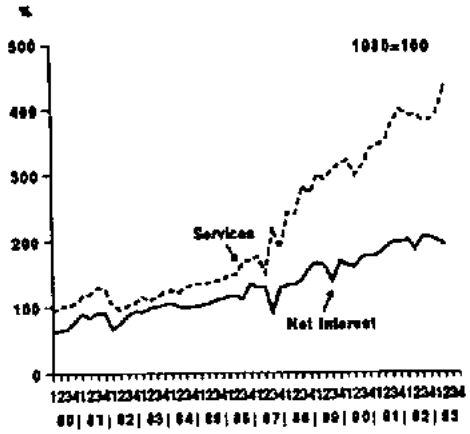
The industry in Canada is dominated by multi-branch banks operating in many geographical locations. The industry has diversified into a number of different activities. In addition to the traditional banking activities, it is also involved in retailing of retirement savings plans, retailing of life insurance (associated with loans), retailing of mutual funds, brokerage and underwriting of share issues.

The major traditional source of revenue of banks has always been the interest margin (the difference between interest received on loans and interest paid on deposits). The importance of service fees is growing but net interest is still the largest source of revenue. Service fees have been growing both because of the diversification into non-traditional services and also because banks are now charging explicit service charges for traditional banking activities.

Components of Revenue



Growth in Net Interest and Service Revenue



Conceptual Framework

The appropriate method of measuring output for banks is controversial. Much of the controversy arises from the fact that the unit of measurement is money, that the industry traditionally measures market share in terms of values of funds subject to intermediation activities (levels of assets and liabilities) and, most importantly, that a large part of the payment for services is indirect. By this is meant that much of the income generated by the banks comes from the interest margin.

In the System of National Accounts (SNA) payments (interest) associated with the rent of financial capital are considered as transfers between the transactors. However, the SNA also recognizes that banks provide real services and the net interest received by the banks represents the value of services performed by the banks which are charged for implicitly. This is usually referred to as "imputed bank service charges".

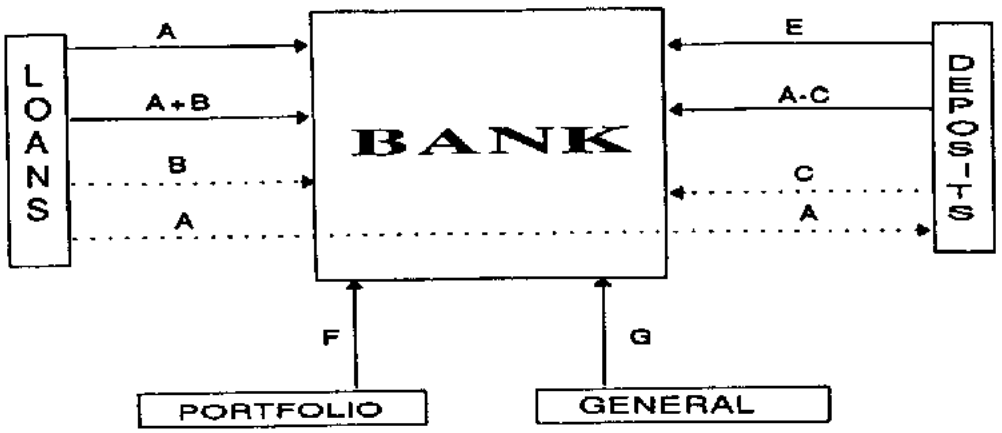
The overall value of the intermediation service provided by the banks is equal to the net interest revenue of the banks plus the explicit service charges of the banks for these services. This concept is included in the U. N. Statistical Manuals and is accepted by most Statistical Agencies although with a number of variants. The object is to develop a conceptual framework and estimation methodology which fits the banking industry within the general output framework of the SNA and the normal practices for measuring real output by industry.

Basic model

Gross Output by Industry

The concept used in this study to measure aggregate output of the industry is consistent with the SNA concept. The value of output for the industry is defined as interest received less interest paid + explicit service charges. The overall flows of income associated with banking are depicted in Diagram 1.

DIAGRAM 1



A: pure interest (transfer)
B: implicit loan charges
C: implicit deposit charges
D: explicit loan charges
E: explicit deposit charges
A+B: interest received
A-C: interest paid
F: charges for portfolio services
G: changes for general services

TRANSACTIONS OUTPUT

$Q^t = (A+B) + (A-C) + D + E =$

$= B + C + D + E$

TOTAL OUTPUT

$Q = Q^t + Q^n + Q^s$

$= B + C + D + E + F + G$

Disaggregation of Gross Output by Commodity

To measure real gross output in the normal way requires nominal gross output by commodity. Even though the definition of gross output for the industry is generally accepted, this definition does not suggest an obvious basis for its disaggregation into commodities in two senses. It is not helpful in defining the service commodities produced by the bank nor does it provide an obvious method for measuring the value of those services. As Diagram 1 indicates, the proposal is to view the banks as producing three broad categories of services - loan services, deposit services and other services. It is really only the deposit and loan services which will be elaborated upon in this paper. Other services of the banks present no more unusual measurement problems than the services produced by other industries.

In the basic concept, depositors barter their right to receive interest to the bank in order to obtain other services e.g. security, portfolio management, money transfer, record-keeping. The interest rate paid to depositors is assumed to be lower than otherwise by the amount of these "free" services.

An essential element of the model is that there is an intermediate "interest" rate between deposit interest rates and loan interest rates which represents the "pure" interest rate. This rate is pure in the sense that it is the price to rent funds without any of the loan or deposit intermediation charges. In theory there could be more than one such intermediate rate based, for example, on different terms or conditions of repayment.

Following the basic assumption of the model, the interest rate paid to depositors is the "pure" interest rate less the value of services provided by the bank to depositors. Depositors are foregoing or bartering some interest revenue for deposit services. The value of interest payments on deposits is the value of the "pure interest rate" reduced by the implicit service charges. For loans, the "interest" payments are assumed to include the "pure" interest charges plus explicit service charges related to loans.

In this approach, the value of deposit services consists of the interest payable at the "pure interest rate" plus explicit service charges less "interest" paid on that type of service. The rate of loan services is the nominal interest received on loans plus explicit loan service charges less the interest payable at the "pure interest rate". The nominal values of services consist of these rates multiplied by the stock values (loans or deposits outstanding).

In summary, banks produce loan services, deposit services and other services. Interest consists of two parts - a transfer part and a service part. In this model the value of interest transferred is the same for both deposits and loans, although the interest rate may differ.

Deflation and Prices

There are two basic methods of estimating constant price output - price deflation and quantity valuation. Price deflation means the division of the current price values by a price index; quantity valuation means multiplying current period quantities by base period prices.

Regardless of which method is used, there are two sources of price change. Prices may rise because prices in general rise and increase the value of the loans or deposits. They can also change because the bank changes the "rate" that it applies to the loan or deposit (the combined net interest spread and direct service charges for a specific loan or deposit product).

Sectoral and Industrial Allocation

The implication is that the value of services should be allocated to sectors - personal business, governement and external - and, within the business sector, to industries. The ideal basis of the allocation should be the deposit, loan and other services consumed by the sectors or industries.

There are some implications to this for flows to and from the external sector. In the case of loans, the interest flows should be considered to consist of two parts - a service flow and an interest flow (pure interest). This of course applies to loans from the external sector and loans to the external sector.

In the case of deposits, it is necessary to impute a flow of services which will be in the opposite direction to the current observed "interest" flow. The value of the interest flow should be increased to the pure rate of interest. In other words the current observed interest flow increases by the value of services. Again this implies flows from and to the external sector.

Estimation Methodology

This section deals mainly with some of the practical problems of measurement. There are a number of such issues to consider, such as measurement of the value of services in nominal prices and estimation of constant price values. The section documents some of the choices and explains the rationale for them. The four problems are the following:

- Calculate interest rates on both loans and deposits. Using published interest rates would not be appropriate because they would not reflect the actual levels of interest that would result from the various vintages of loans and deposits with different terms.

- The conceptual framework suggests there is a pure interest rate but there is no such interest rate available in the data.

- Estimating values in constant prices is also a problem. There are no quantity measures available and as mentioned earlier both the price of money and the rate that the bank charges for its services could change.

- Another problem is the appropriate commodity detail. The estimates of gross output are affected by the level of commodity detail.

Estimating the Loan and Deposit Interest Rates

Rather than use published interest rates, they were calculated using values of interest paid or received divided by the corresponding average loan or deposit balances during the period. Average period balances - rather than end of period balances - were used because they more accurately reflect the deposit or loan values to which the interest applies.

Estimating the "Pure Interest Rate"

There are potentially several different ways to estimate the "pure interest rate" and consequently the potential for controversy. Among the possibilities would be the highest rate on loans or the lowest rate on deposits, an average of these two rates or an average of all interest rates on loans or deposits.

Both of the first possibilities resulted in a larger number of negative service rates than the average rate. The negative service rates could be explained by a number of reasons including the difficulty of controlling net interest revenue for each type of product, by intentional cross-subsidization or by data problems. Nevertheless, the smaller number of negative service rates was the reason for using a weighted average rate of interest on loans and deposits for the "pure interest rate"[1]. This method of estimating the "pure interest rate" satisfies the conditions (constraints) that both the deposit and loan service rates are positive - in the average sense and not for all commodities.

The Effect of Commodity Detail

At the present time, Statistical Agencies are developing commodity classifications for the service industries. This classification of services must facilitate the measurement of real output. One of the questions to decide is the level of detail that should be included in the classification. The significance of choosing any particular level of commodity detail can be tested by calculating real output under different assumptions.

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1 With an adjustment for the excess of deposits over loans.

It is, of course, difficult to know what level of commodity detail is appropriate for measuring output. In practical terms, if the underlying quantities show the same movement or if the relative base year prices of the commodities are similar then the commodity detail is not important. However, if either of these conditions does not hold then the level of commodity detail used will have a significant effect on gross output.

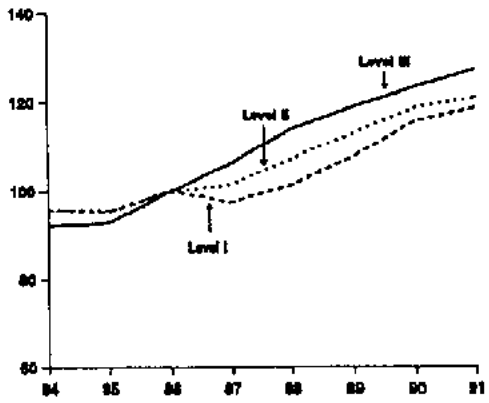
For the "A" Banks[2] three levels of commodity detail were tested. The table below contains the three levels.

LEVEL I	*LEVEL II*	*LEVEL III*
LOANS	*mortgages*	*NHA-insured residential* *other residential* *non-residential*
	individuals	*personal* *credit cards* *other*
	business	*business*
	other	*day, call, short* *banks* *provinces* *lease receivables*
DEPOSITS	*demand*	*individual pcas* *banks* *governments* *other*
	personal	*chequable daily* *chequable other* *non-chequable daily* *non-chequable other* *fixed*
	non-personal	*chequable (banks)* *non-chequable (banks)* *fixed (banks)* *chequable (government)* *non-chequable (government)* *fixed (government)* *chequable (other)* *non-chequable (other)* *fixed (other)*

2 In Canada the Banks are classified as either "A" or "B" banks depending of the ownership of their share capital. The largest banks are the "A" Banks.

The table and graph below indicate the results of using the different level of commodity detail. As commodity detail increased the output levels also increased significantly. Additional commodity detail always resulted in changes in one direction and these changes were significant. This suggests that commodity detail cannot be less that the maximum. As a rough rule of thumb, the test of the adequacy of commodity detail for real output measurement should be that detail is sufficient when additional detail does not significantly alter the estimates of real output.

Real Output Index at Different Commodity Levels



	Level I	Level II	Level III
1984	95.7	95.6	92.1
1985	95.3	95.6	92.8
1986	100.0	100.0	100.0
1987	97.4	101.5	106.3
1988	101.4	107.2	113.9
1989	107.7	113.0	118.9
1990	115.8	118.8	123.5
1991	118.7	121.0	127.4

The remaining calculations are based on the maximum commodity detail for the Banks.

The Steps in Calculating Gross Output

The general approach to computing gross output was as follows:

1. Calculate current price values by product
   - (a) derive effective interest rates for the products.
   - (b) derive "pure interest rate".
   - (c) derive net interest for deposits and loans.
   - (d) derive explicit service charges by product.
   - (e) derive the aggregate revenue by product.

2. Calculate constant price values of gross output.
   - (a) derive constant price values of assets corresponding to each product.
   - (b) derive constant price loan and deposit services.
   - (c) derive constant price non-loan non-deposit services.
   - (d) derive constant price gross output.

Estimating Constant Price Output

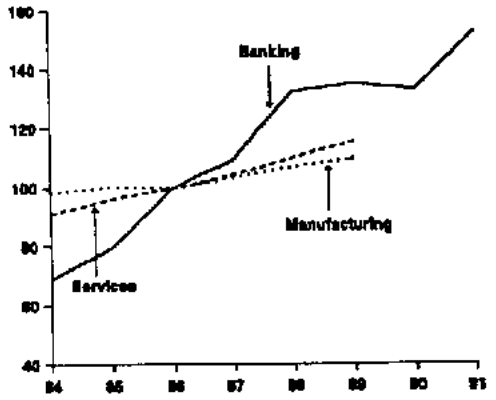
There were no price indexes that could be applied directly to nominal values to measure real output - either at the aggregate level or at the commodity level. Equally there are no quantity projectors in the administrative data that could be applied to project base year values.

For loan and deposit services, the approach taken was a blend of the two approaches. Base year service rates were applied to deflated values of the assets or liabilities with which the service was associated.

To deflate the money values of assets or liabilities requires a price index that reflects the general rate of price change in the economy. Some reasonable proxies for such a measure are the consumer price index or the implicit price of GDP. The prices used in this study were the CPI and the IPPI.

In this study the base year rate is applied to all years. Consequently it is assumed that there is no quality change.

The implicit deflator of gross output is calculated using the total nominal gross output divided by the constant price gross output. The following chart and table contain the implicit deflators for banks and three other groups of industries. The deflator increases at rates higher than the overall rates for Manufacturing and Services industries. An implicit price index is currently weighted so that shifts in the relative weights of commodities could account for some of the difference between banks and the other industries. Nevertheless, taken at face value, this suggests that output measures may be too low. Also fixed-weighted implicit prices were calculated.



	Banking Simple	Banking Fixed-weighted	Manufac-	Services
1984	66.9	67.2	98.2	91.0
1985	77.8	78.0	100.4	96.0
1986	100.0	100.0	100.0	100.0
1987	109.4	109.1	103.2	104.1
1988	133.0	141.2	107.0	109.9
1989	136.0	151.6	109.6	115.4
1990	135.4	154.0		
1991	153.3	164.4		

The results show increasing labour productivity. Furthermore, labour productivity for the Banks is increasing faster that for Manufacturing or Service-producing industries. This suggests that output measures might be too low in contrast to the comparison of implicit deflators.

Results and Conclusions

Regardless of how appealing a particular approach to measurement may be, official statisticians are never satisfied with a concept until they have seen the results of applying it using actual data. However, when actual data are applied they rarely provide unequivocal answers. It is necessary to examine the results to find as many apparent anomalies as possible and then to resolve those anomalies. There are two types of anomalies that can be searched for - those that appear at an industry level and those that appear in the detailed calculations. What follows is some commentary on problems and overall conclusions.

As has already been mentioned there are three different questions which it is desirable that this study provide answers to. They are the robustness of the concept, the correctness of the methodology and the accuracy of the data. Unfortunately there is only one quantitative tool to decide all three - the credibility of the resulting data. Of course, the results cannot determine if the concept if correct, only that it is one conceptual framework that produces credible results.

The results appear credible enough to support this approach of measuring gross output for the banks. The labour productivity measures are positive and in a similar range to the measures for other industries. The implicit price indexes of gross output are higher than a number of industries but their level is at least within a credible range. The results certainly indicate that labour input is not an acceptable measure of output for the banks.

There remain a number of problems. Although it is not included in the paper, gross output/total input productivity was also calculated. It shows very little growth over the period. However, there may be problems with the deflation of informatics capital and intermediate inputs which will have to be studied. However, these problems do not affect the estimates of gross output. They would affect the estimates of real output and productivity calculations other than labour productivity.

In addition to what is shown in the industry aggregates, there are some results in the detailed calculations that appear questionable. For example, some of the effective interest rates are very different from one time period to the next. In addition, some of the net interest components of the service are negative.

These problems could arise for three broad reasons. First, the estimation methodology may not have exploited all of the available data as well as possible. Secondly, adequate data may not be currently available to make estimates for some items. Thirdly some of the data may be incorrect.

Among the estimates that could probably be improved is the estimation of constant price output for some revenue items. The non-loan non-deposit services were generally deflated by the CPI. In addition, the method of estimating constant price output for loan and deposit commodities assumes that the commodities have constant characteristics over the whole period.

The second category of problems appears to be fairly common, that is, where the data aren't available to support the kind of estimates required by the concept and methodology. Among the problems in this category are the estimates of effective interest rates which are based on interest flows divided by the average balances that correspond to those flows (they are averages of balances on one weekday). For some commodities, like deposits, it is possible that this does not provide a good measure of balances and hence of interest rate. A deposit account combined with a line of credit could have negative or positive balances that are combined in the aggregates that are used to estimate effective interest rates.

The CPI on the implicit deflator of GDP may not be the appropriate deflator for the loan and deposit balances. Using another price could result in a different value for output.

Table 1

Year	Loans					
	A-banks					B-banks
	Mortg.	Individ.	Bus.	Other	Tot.	Total
	Average balances					
1984	35367.1	27666.1	103254.3	6869.5	173157	21520
1985	38784.7	30778	102468.4	7108.1	179139.2	24269
1986	45732.0	34551.6	108020.9	6645.6	194910.1	29200
1987	55090.7	43598.1	90584.9	6471.3	195745	37419
1988	69346.2	50117.2	91778.2	6255.4	217497	40463
1989	82493.0	56106.3	101091.1	7566.3	247256.7	46068
1990	97949.8	60197.7	108208.6	7075.6	273431.7	50399
1991	110148.0	61968	111696.6	7057.2	290869.8	50883
	Interest flows					
1984	4234.0	3741.6	12156.4	844.5	20976.5	605
1985	4732.8	4108.5	11234.5	779.3	20855.1	604
1986	5212.5	4516.7	11259.6	666.1	21654.9	598
1987	5937.1	5313.5	8508.6	538.5	20297.7	740
1988	7341.2	6129.7	10083.6	626.6	24181.1	851
1989	9103.4	7692.3	13024.4	824.8	30644.9	1137
1990	11266.3	8885	14440.9	768.8	35361	1395
1991	12672.3	8229.1	12398.5	714.8	34014.7	1121
	Fees					
1984	28.0	277.8	552.4	25.0	883.2	66
1985	31.8	314.7	585.9	26.9	959.2	97
1986	29.1	358.6	658.3	27.1	1073.1	133
1987	33.3	468.4	716.8	34.2	1252.6	173
1988	45.8	570.0	820.8	37.7	1474.2	200
1989	40.9	592.5	812.8	37.1	1483.3	223
1990	45.7	632.7	855.3	32.8	1566.5	288
1991	60.3	679.1	916.0	33.6	1689.0	494

Table 2

Year	Loan Rates					
	A-banks					B-banks
	Mortg.	Individ.	Bus.	Other	Tot.	Total
	Interest rates					
1984	0.1197	0.1352	0.1177	0.1229	0.1211	0.1657
1985	0.1220	0.1335	0.1096	0.1096	0.1164	0.1470
1986	0.1140	0.1309	0.1042	0.1002	0.1111	0.1220
1987	0.1078	0.1219	0.0939	0.0832	0.1037	0.1180
1988	0.1058	0.1223	0.1099	0.1002	0.1112	0.1360
1989	0.1104	0.1371	0.1288	0.1090	0.1239	0.1500
1990	0.1150	0.1476	0.1335	0.1087	0.1293	0.1410
1991	0.1150	0.1328	0.1110	0.1013	0.1169	0.1260
	Fee rates					
1984	0.00079	0.0100	0.0053	0.0036	0.0051	0.0045
1985	0.00082	0.0102	0.0057	0.0038	0.0054	0.0040
1986	0.00064	0.0104	0.0061	0.0041	0.0055	0.0046
1987	0.00060	0.0107	0.0079	0.0053	0.0064	0.0047
1988	0.00066	0.0114	0.0089	0.0060	0.0068	0.0054
1989	0.00050	0.0106	0.0080	0.0049	0.0060	0.0050
1990	0.00047	0.0105	0.0079	0.0046	0.0057	0.0060
1991	0.00055	0.0110	0.0082	0.0048	0.0058	0.0094
	Service rates					
1984	0.0089	0.0337	0.0115	0.0150	0.0145	0.0215
1985	0.0175	0.0383	0.0100	0.0080	0.0164	0.0214
1986	0.0180	0.0447	0.0138	0.0077	0.0200	0.0214
1987	0.0206	0.0448	0.0140	0.0007	0.0223	0.0222
1988	0.0137	0.0408	0.0260	0.0133	0.0251	0.0264
1989	0.0039	0.0407	0.0300	0.0070	0.0230	0.0246
1990	0.0022	0.0448	0.0281	0.0000	0.0217	0.0215
1991	0.0165	0.0447	0.0202	0.0061	0.0237	0.0270

Table 3

Year	A-banks					B-banks
	Mortg.	Individ.	Bus.	Other	Tot.	Total
	Nominal Output: Loans					
1984	314.3	931.3	1183.6	102.7	2531.9	314
1985	677.2	1179.3	1021.5	57.1	2935.2	352
1986	824.9	1542.3	1485.6	51.4	3904.2	420
1987	1132.9	1953.5	1271.1	4.5	4361.8	556
1988	949.2	2047.0	2384.1	83.6	5463.7	660
1989	321.1	2283.8	3024.9	52.6	5682.4	748
1990	213.8	2697.0	3035.6	-0.1	5946.2	729
1991	1822.3	2770.2	2250.9	43.0	6886.4	953
	Real Output: Loans					
1984	665.6	1338.1	1471.5	55.4	3530.6	341
1985	708.7	1426.8	1420.6	55.7	3611.7	356
1986	824.9	1542.3	1485.6	51.4	3904.2	420
1987	963.4	1866.2	1211.8	48.5	4089.9	520
1988	1163.4	2062.3	1177.4	45.0	4448.1	498
1989	1347.3	2199.4	1270.8	53.0	4870.5	589
1990	1579.6	2251.2	1356.6	48.9	5236.2	649
1991	1767.7	2194.3	1414.4	48.5	5424.9	673

Table 4

Year	A-banks: Deposits				B-banks
	Demand	Personal	Non-pers	Total	Total
			Average Balances		
1984	22210.3	111718.7	80427.6	214356.6	21,520
1985	22185.2	120015.9	78013.0	220214.1	24,270
1986	22743.4	129644.7	81113.0	233501.1	29,184
1987	23028.3	137241.4	77486.5	237756.2	37,356
1988	24348.8	147427.9	78265.7	250042.4	40,426
1989	24884.0	164536.1	74564.1	263984.2	46,159
1990	25122.7	190895.6	75256.6	291274.9	50,665
1991	25138.5	208135.4	80012.6	313286.5	50,857
			Interest flows		
1984	667.9	9356.5	8107.3	18131.7	2003
1985	533.6	9648.8	7249.9	17432.3	1985
1986	486.6	9684.1	6493.9	16664.6	1932
1987	324.2	8931.3	5626.2	14881.7	2330
1988	437.1	10469.3	6026.5	16932.9	2681
1989	628.7	15079.5	7118.5	22826.7	3709
1990	730.7	18933.3	7571.0	27235.0	4030
1991	618.1	17169.9	6697.9	24485.9	3664
			Fees		
1984	257.1	229.7	362.4	849.2	45
1985	277.5	267.4	396.0	940.9	97
1986	321.7	329.5	448.5	1099.7	133
1987	370.6	416.2	497.5	1284.3	172
1988	439.0	481.7	573.1	1493.8	200
1989	491.2	529.7	682.3	1703.2	223
1990	497.3	594.1	744.3	1835.7	288
1991	640.4	651.5	782.0	2073.9	494

Table 5

Year	A-banks: Deposits				B-banks
	Demand	Personal	Non-pers	Total	Total
			Interest Rates		
1984	0.030	0.084	0.101	0.085	0.093
1985	0.024	0.080	0.094	0.079	0.082
1986	0.021	0.075	0.080	0.071	0.066
1987	0.014	0.065	0.073	0.063	0.062
1988	0.018	0.071	0.077	0.068	0.066
1989	0.025	0.092	0.095	0.086	0.080
1990	0.029	0.099	0.100	0.094	0.080
1991	0.025	0.082	0.084	0.078	0.072
			Fee rates		
1984	0.012	0.002	0.005	0.004	0.002
1985	0.013	0.002	0.005	0.004	0.004
1986	0.014	0.003	0.006	0.005	0.005
1987	0.016	0.003	0.006	0.005	0.005
1988	0.018	0.003	0.007	0.006	0.005
1989	0.020	0.003	0.009	0.006	0.005
1990	0.020	0.003	0.010	0.006	0.060
1991	0.025	0.003	0.010	0.007	0.010
			Service Rates		
1984	0.072	0.008	-0.006	0.095	0.010
1985	0.074	0.008	-0.002	0.011	0.010
1986	0.073	0.008	0.006	0.014	0.009
1987	0.074	0.010	0.006	0.015	0.010
1988	0.080	0.013	0.011	0.019	0.010
1989	0.095	0.012	0.014	0.020	0.011
1990	0.097	0.010	0.015	0.019	0.010
1991	0.093	0.013	0.018	0.020	0.013

Table 6

Year	A-banks: Deposits				B-banks
	Demand	Personal	Non-pers	Total	Total
			Nominal Output		
1984	1591.8	946.5	-493.0	2045.3	215
1985	1645.9	907.6	-165.8	2387.7	235
1986	1668.6	1096.8	493.6	3258.9	274
1987	1711.2	1406.7	473.2	3591.1	374
1988	1968.1	1917.6	866.8	4752.5	408
1989	2355.4	1933.4	1033.6	5322.3	494
1990	2438.8	1965.3	1177.9	5582.0	491
1991	2334.4	2622.5	1442.3	6398.9	661
			Real Output		
1984	1764.0	1022.9	529.7	3316.0	220
1985	1688.4	1053.2	492.4	3234.1	231
1986	1668.6	1096.8	493.6	3258.9	274
1987	1618.3	1112.1	451.6	3182.0	340
1988	1644.9	1148.5	438.5	3231.9	353
1989	1601.4	1221.0	398.0	3220.4	393
1990	1542.4	1351.4	383.2	3277.0	426
1991	1461.4	1395.1	385.7	3242.2	425

Table 7

Year	Nominal Output	Index of Nominal Output	Real Output	Index of Real Output	Implicit Deflator	implicit deflator GDP services
1984	5106.2	65.0	7407.6	94.3	68.9	91.8
1985	5909.9	75.0	7432.8	94.6	79.3	95.7
1986	7857.1	100.0	7857.1	100.0	100.0	100.0
1987	8882.9	113.1	8131.9	103.5	109.3	103.9
1988	11284.2	143.6	8531.0	108.6	132.2	108.0
1989	12246.7	155.9	9072.9	115.5	135.0	113.3
1990	12748.2	162.3	9588.2	122.0	133.0	118.6
1991	14899.3	189.6	9765.1	124.3	152.5	124.1

Productivity Measurement

Year	Index of Number of Pers.	Index of Labour Product	dq/dt/q %	Sk* dk/dt/k %	sl* dl/dt/l %	Sm* dm/dt/m %
1984	92.7	101.7	-	-	-	-
1985	97.0	97.5	3.2	2.1	2.6	0.8
1986	100.0	100.0	5.4	2.2	1.5	4.2
1987	103.9	99.6	3.5	1.1	1.8	7.6
1988	109.5	99.2	5.1	1.2	2.3	1.5
1989	111.7	103.4	6.9	1.3	0.8	1.0
1990	113.0	108.0	6.5			
1991	112.9	110.1	2.3			

	TFP %
1984	-
1985	-2.3
1986	-2.5
1987	-7.0
1988	0.1
1989	3.8