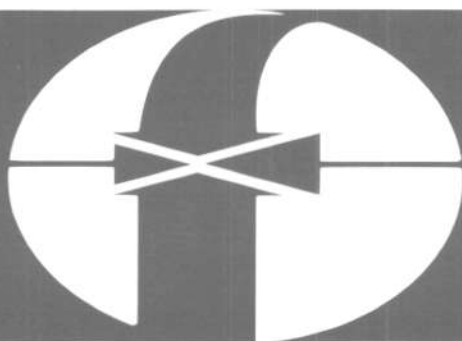


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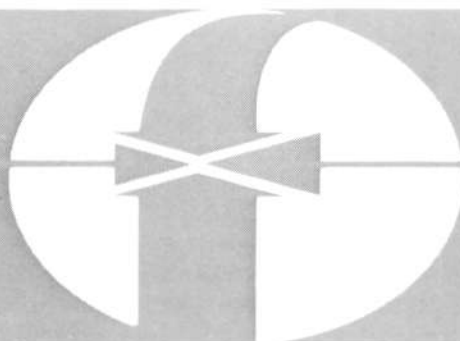
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ON THE PERFORMANCE ANALYSIS: THE DEFINITION AND MEASUREMENT OF BANK OUTPUT IN NIGERIA

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1. Introduction

In recent years attention has become much more focused on the performance of the banking system, and performance in this context is usually taken by the market as being synonymous with profit and output. In our first article¹ we discussed the Nigerian banking system's performance with respect to profit and profitability. The objective of this article is therefore to examine the concept of bank output and to evaluate the output performance of the Nigerian banking system.

2. Problems of Measurement and Concept

A long debated issue in banking is the identification and measurement of bank output. «Despite the strategic role that banks play in monetary theory and in real world, there is little agreement on what it is that banks produce»². Various, sometimes conflicting output measures serve researchers especially in estimating banks' production function³.

Banking in an industry that is characterized by certain features which set it apart from other industries and which have important implications for the measurement of bank output. Banking is a service industry. In microeconomic theory of the firm, for instance, the same output variable performs many diverse roles. Production of output absorbs factor inputs and is functionally related to cost. Output is also that item which is sold by the firm thus making revenue and profits dependent upon output. Furthermore, the volume of output measures the size of the firm⁴.

The theory of the firm cannot be applied without modification to the commercial bank and other financial institutions, because there is no readily quantifiable single physical

1 See C.C. Agu, «Management and measurement of bank profits and profitability», *Nigerian Management Review*, 1, 1 June 1985.

2 J.A. Gorman, «Alternative measures of the real output and productivity of commercial banks», in Victor, R. Fuchs (ed) *Production and Productivity in the Service Industries*, (New York, National Bureau of Economic Research: Columbia University Press) p. 155.

3 See G.J. Benston, «Economies of scale and marginal costs in bank operations», *National Banking Review*, 2, June 1965, pp. 507-49; F. W. Bell and N.B. Murphy, «Economies of scale and division of labour in commercial banking», *Southern Economic Journal*, 35 Oct. 1968, pp. 131-9; S.I. Greenbaum, «A study of bank costs», *National Banking Review*, June 1965.

4 C.L. Fry; C. P. Harper and S. R. Stansell, «An analysis of credit union costs: a new approach to analysing costs of financial institutions», *Journal of Bank Research*, Winter 1982, pp. 239-49.

output as there is in the non-service industry, that can adequately perform these many roles. In a bank, for instance, factor inputs are used in the processing activities inherent in financial intermediation. Following micro-theory, therefore output legitimately can be defined as the volume of processing. Revenue for a (financial institution) bank, however, is not obtained by directly selling this processing output. Revenue is related to volumes and types of loans and investments which are limited by the volume of deposits. Since no particular naira amount of loans and investments need be associated with a particular volume of processing, revenue cannot simply be written as a function of processing output. The implication of these observations is that if one defines output to be processing activities, then the impact of changes in output on revenue, profits and the size of the financial institution will differ from the impact of changes in output on the firm of microtheory. Conversely if one defines output to be the volume of loans and investments one cannot simply assume that output has any direct functional relationship to factor input usage. Clearly either approach can lead to semantic difficulties and misinterpretation.

Banking produces what is technically termed as «multiproduct» output, (although the case for analysing bank as a single product firm is argued by Hodgman)⁵. The output includes, among other things depositing and safe-keeping, making loans of various types, giving advice, performing trust services and transferring and collecting funds. Attempts to measure bank output therefore, should ideally take cognisance of this range of services, their interdependence and complementarity, as well as contribution of each of these to aggregate output, however defined.

Aside from the difficulties of measurement and concept of output peculiar to commercial banks and other services, output measurement in these services shares most of the problems inherent in output measurement generally. For instance, in conventional method of quantity measurement the unit selected is that which is observed: a table, a car, number of cheques handled and so on. Differences in quality are either not taken into account at all or gauged on the basis of difference in the resources required to produce alternative qualities at a given moment in time. This involves the recognition that utility derived from a good is seldom unidirectional; most goods represent a cluster of characteristics that are sought by the customers. As Kravis argued:

The more successful we are in selecting units that represent the characteristics really sought by buyers (and the less enmeshed we become in the intertemporal matching of purely physical

5 See D.R. Hodgman, *Commercial Bank Loan and Investment Policy*, (USA: Bureau of Economic and Business Research: University of Illinois, Champaign), 1963.

specifications), the more successful we will be in catching the quality changes that are increases in output from a welfare standpoint but which elude present measures⁶.

Revell corroborated this view and added another twist when he contended:

It is commonplace that the output of services cannot be satisfactorily measured, and it is therefore impossible to say whether the services for which the payment is being made has changed in quality.

The discussion of this point usually omits an equally important consideration: one of the fundamental services of financial institutions is to remove from the shoulders of their customers a large part of the risk associated with financial transactions. Risk is even less susceptible to objective measurement than quality of service⁷.

In reality banks operate in a world of uncertainty and they produce additional services by pooling risks for their customers and individuals with funds to invest. However, important as such concepts as risk and uncertainty are, they are rather tenuous and what could best be done is to take note of the risk as such especially in the Nigerian experience where the banks do not cooperate enough to supply even the necessary basic data and information.

Another observation is that a bank's output is received far more directly than in most manufacturing industries by its customers or clients so that the direct relationship between employee and customers comes into play far more in the case of banks than in most other industries. All these make it difficult to fix a rigid standards or norms of output for a number of services rendered by banks.

Furthermore, bank output being a service is intangible and is often sold as a package. In estimating provision for certain services and their contribution to final output the jointness of the services should, if possible, be taken into account. Unfortunately it is empirically impossible to isolate the various elements of the package and measure each component directly for the purpose of determining aggregate output. The high degree of jointness in the output profile of commercial banks makes the application of cost accounting technique of limited value, because the cost methods measure output as equivalent units produced from cost introduced in the production process⁸.

6 I.B. Kravis, «What is output? Problems of concept and measurement» in V.R. Fuchs (ed). *Production and Productivity in Service Industries*, (New York: National Bureau of Economic Research. Columbia University Press) 1969 p. 51.

7 J.R.S. Revell, *Costs and Margins in Banking: An International Survey*, (Paris: OECD), 1980 p. 20.

8 C. Horngren, *Cost Accounting: A Managerial Emphasis*, (New Jersey: Englewood Cliffs, Prentice-Hall), 1972.

Complicating the situation further is the existence of an «input-output» dilemma in commercial banking. An example to illustrate this dilemma is money placed in a deposit account. The deposits receive the banking services of protection and book-keeping. These services may be considered as the output of banks. The bank can also use the deposits for supporting loans and investments and, therefore services provided to attract and maintain deposit accounts may also be regarded as bank input to produce income generating output of loans and investments.

The other feature which characterizes commercial banks (and other financial institutions) and which affect, to a large extent, their output performance however measured is that commercial banks are subject to regulations by the monetary authorities. The control takes many forms in Nigeria such as the use of various instruments of monetary policy to influence the cost and volume of credit, prescription of interest rates for deposits and advances.

Finally, commercial banking like most service industries is labour intensive and «not profiting from the same continuous gains in productivity as manufacturing industry»⁹. Output of goods and services grows through one of two ways: the use of more inputs or the way in which inputs are combined is changed, thereby affecting efficiency. The most important input in the production process is labour. Changes in other inputs and changes in the way these inputs are combined influence the volume of output that a unit of labour can produce. This is called labour productivity. Labour productivity can therefore be a measure of output in non-service industry but it cannot be easily measured nor cost be used as an adequate measure of output in service industries such as commercial banks. This is because service industries suffer from «Baumol's cost disease». As observed by Baumol, the productivity of labour in services does not grow as fast as that of labour in goods production¹⁰. This would present less problem as long as labour in each of the lines of production is rewarded in proportion to its productivity. The fact, however, is that wages and salaries increase at much the same rate in all sectors of the economy. Labour in services receive almost equal reward as labour in goods production even though productivity in services has not matched productivity in other sectors.

9 J.R.S. Revell, *op. cit.*

10 See W.J. Baumol and W.E. Oates, «The cost disease of personal services and the quality of life, *Scandinaviska Banken Quarterly Review*, 2, 1972.

3. Output Measures used in Literature

«Attempts to measure and compare bank productivity are bedevilled by the absence of any coherent yardstick of output, changing economic conditions and valuations in bank's mix of business»¹¹. As a consequence, therefore, various approaches have been adopted by various researchers. Two factors have seemed to determine the approaches adopted by various researchers in this field. First, the particular approach depends on the object of the study. For instance, Powers noted that while Benston's measures of bank output namely the number of deposit accounts or loans and the average account of loan balance for various services suited his study of banking operations, such measures were not appropriate for his (Powers) study of branch versus unit bank efficiency. Powers thus defined bank output as level of lending and non-lending services, using loans and investments as the measure of the former and deposits as the measure of the latter¹². The second determinant of the measure of bank output is the availability of data. As Kinsella observed, the availability of data has forced some researchers to use pragmatic definition of output¹³.

Generally, most of the previous studies in this field used balance sheet items as proxies for output. Alhadeff and Horvitz used loans and investments in their study¹⁴. While Gramely used total assets¹⁵. Gramely was interested in the real value of output and was the first to relate bank output to social values of the services provided. Greenbaum also recognized the need for defining bank output into two components: lending and non-lending. Lending output was defined as the gross yield weighted sum of diverse earning assets in the bank's portfolio. He computed yield weight for each of the sixteen classifications of earning assets which he then multiplied by their year end amounts. To this he added the non-lending gross operating income which gave him the «social

11 P. Frazer, «How» not to measure bank productivity», *The Banker*, August 1982 pp. 103-5.

12 See A.J. Powers, «Branch versus unit banking: bank output and cost economies», *Southern Economic Journal*, 35 Oct. 1969, pp. 153-64; G.J. Benston, *op. cit.*

13 R.P. Kinsella, «The Measurement of bank output», *Journal of Institute of Bankers in Ireland*, 82, 3 (July 1980) pp. 173-83.

14 See D.A. Alhadeff, *Monopoly and Competition in Banking* (Ca. Berkeley: University of California Press) 1954; P.M. Horvitz, «Economies of scale in banking», in *Private Financial Institutions*, (New Jersey: Englewood Cliffs, Prentice-Hall), 1963.

15 See L.E. Gramely, *A study of Scale Economies in Banking*, (Kansas City: Federal Reserve Bank of Kansas City), 1962.

value» of bank output for each bank¹⁶.

Gorman in his lucid paper emphasized the need for a definition of bank output consistent to overall approach to national accounts. He developed two approaches to measure bank output: the liquidity and transaction approaches. Comparing the two approaches he found that they yielded different results. The principal argument for the liquidity approach is that it is directly related to the decision to hold deposits; in other words the liquidity approach determines output on the basis of the volume of liquidity desired by the depositors. The transaction approach is based on the volume of transactions handled by the banks. The two approaches differ only as the velocity or turnover differs. When velocity rises, the transaction approach yields more increases in output than does the liquidity approach¹⁷.

Benston attempted alternative measures of bank output. In his approach, bank output is classified into six relatively homogenous services; demand deposits, time deposits, mortgage deposits, instalment loans other loans and investment services. Benston used two types of measures of quantity of output of each service: the number of deposit accounts and the average account of loan balance¹⁸. The procedure enabled Benston to provide estimates of individual bank's services from which estimates of marginal cost and economies of scale from contraction or expansion of specific services can be estimated. The rationale of this approaches is that output is best defined in terms of what it is that banks do which causes them to incur operating costs. Benston's contention is that operating costs are related to the number of documents handled and customers served rather than to the Naira of deposits, loans or assets.

Sealey and Lindley attempted to untangle the confusion about bank output. They regard bank output as comprising a set of financial services accruing to depositors and borrowers. These services are input absorbing and therefore comprise the technical output of financial institutions. They, however assume that since production and cost require measures of these services in physical units, the monetary volume of various types of earning assets is the physical units of output of the banking firm which is analogous

16 See S.I. Greenbaum, «Competition and efficiency for the banking system — empirical research and its policy implications», *Journal of Political Economy*, 75, 4 (Aug. 1967) pp. 461-79.

17 J.A. Gorman, *Op. cit.*

18 See G.J. Benston, «Economies of scale of financial institutions», *Journal of Money, Credit and Banking*, 4, 2 (May 1972), pp. 312-41.

to the physical units of output of a non-financial firm¹⁹.

In a more recent study Goldschmidt used «moneyness» as a measure of bank output. He contends: «An integration of the role of banks in monetary process with their behaviour as profit maximising producers, lead us to suggest «moneyness» as the measure of bank output»²⁰. He defined moneyness as a flow of services derived from bank deposits. The identification of the level of moneyness embodied in bank deposits measures the output of banks and this, he argued, can be done by adopting one of two approaches: first using various financial assets including bank deposits as independent variable in equations that try to explain variation in GNP. The regression coefficients serve as moneyness weights for the corresponding assets. The second approach focuses on consumers' demand for characteristics rather than goods and therefore bank deposits are viewed as goods employed by consumers to produce some common characteristics. Goldschmidt's approach seems a variant of Gorman's liquidity approach to measurement of bank output.

Finally in another very recent study, Fry, Harper and Stansell assume that output consists of processing of financial transactions²¹. According to them, this processing is primarily devoted to maintaining loans and share accounts. They expressed one type of processing, as a function of factor inputs and other «factor absorbing» processing activities and obtained a relationship between loan volume and employment of factor inputs.

4. Measurement of Output of the Nigerian Banks

A survey of the past measures of bank output and a search for measures to reflect the activities of commercial banks statistically have revealed that there exists no single valid measure of bank output. Instead there are a number of possible series each revealing a special facet of bank business. The characteristics of these various measures make their aggregation impossible. In consequence, therefore, the measurement of the Nigerian banking system's output is approached through a series of surrogates showing the different characteristics of the Nigerian banking system's output. The growth

19 See C.W. Sealey Jr and J.T. Lindley, «Input, output and a theory of production and cost at depository financial institutions», *Journal of Finance*, 32, 4 (September 1977) pp. 1251-66.

20 A. Goldschmidt, «On the definition and measurement of bank output», *Journal of Banking and Finance*, 5, 4 (December 1981), pp. 575-85.

21 See C.L. Fry, C.P. Harper and S.R. Stansell, *op.cit.*

pattern in these series during the period 1960-80 is analyzed.

The selection of the surrogates used here is dictated very much by the availability of data and information. There are no data on many balance sheet items including net income, costs (apportioned between wages and salaries and deposit interest), nor is there information on the number of accounts. The bank data problem in Nigeria is inherent in the force of traditional belief in respect of secrecy in bank as well as the issue of «confidence» alleged to be invested in presenting true bank returns especially the various items of bank costs, revenue and profits. Furthermore there is no known study of bank market structure in Nigeria.

It is pertinent to point out right away that the choice of the various surrogates used does not deny the multi-product nature of the Nigerian banks. Services provided by the Nigerian banks include the acceptance of various deposit accounts, transmission of monies, provision of credit, safekeeping facilities, giving advice, transferring and collecting funds and provision of loans of various kinds. Ideally we would like to derive production functions for the main categories of the services and indeed refine such measures by attaching appropriate weights based on their contribution to final output. This is not possible because of lack of adequate data and information.

Since banks provide liquidity, safety and monetary changes, deposits as a measure of output reflect the degree to which these functions are being performed. The level of deposits also determines the intermediation ability of the banking system. The high input utilization resulting from deposit management constitutes yet another justification for using deposits as output measure. Bell and Murphy found that 5.7 percent of employment in a typical bank in the US is absorbed by services associated with deposits²². This is particularly more so in Nigeria because of the labour intensive, low technology nature of banking operations in the country.

To further support the use of deposits as one of the proxies for bank output, Revell has this to say:

Strictly speaking it is best to measure increases in (bank) business by the growth in deposits and other funds available for lending but the incompleteness of some of the balance sheet information makes it more convenient to use volume of business as a proxy. Since the capital ratios are low, the difference is only marginal²³.

22 F.W. Belland, N.B. Murphy, «Economies of scale in banking», (*Federal Reserve Bank of Boston*), 1976 p. 3.

23 J.R.S. Revell, *op.cit.*

As Table 1 indicates the volume of deposits held by the Nigerian banks registered a sixty-four-fold increase during the period 1960-80, increasing from N137 million in 1960 to N 8,842.7 million in 1980. It recorded an average annual growth rate of 20.5 per cent. The growth rate was higher in the period 1970-80 when the average annual growth rate recorded was 32.5 percent than in the period 1960-69 when the average annual increase was only 13.6 percent. The period 1970-80 witnessed a tremendous increase in Government earnings from crude oil exports. The increase in Government wealth and expenditure led to a general rise in income level in the economy, and since there is a positive relationship between the rise in income and the level of saving, the deposits with the commercial banks, the major avenue for institutional saving in the country, had to rise. It is also noted that the growth in deposits both at current and constant prices dropped to a very low rate of 1.2 percent and 18.6 percent respectively in 1978. This was the

Table 1

DEPOSITS OF THE NIGERIAN BANKING SYSTEM AT CURRENT AND CONSTANT PRICES, 1960-80

Year	(N million)	(Percentages)		
	Deposits at Current Prices	Deposits at 1975 Constant prices *	Growth rate of deposits at current prices*	Growth rate of deposits at constant prices
1960	137.0	391.4	—	—
1961	154.0	412.9	12.4	5.5
1962	173.8	443.4	12.9	7.4
1963	191.8	502.1	10.4	13.2
1964	232.0	610.5	21.0	21.6
1965	265.0	660.8	14.2	8.2
1966	297.2	675.5	12.2	2.2
1967	241.6	571.2	- 18.7	- 15.4
1968	330.6	785.3	36.8	37.5
1969	401.0	864.2	21.3	10.0
1970	625.8	1,185.2	56.1	37.1
1971	657.2	1,072.1	5.0	- 9.5
1972	776.2	1,234.0	18.1	15.1
1973	1,013.0	1,523.3	30.5	23.4
1974	1,693.9	2,264.6	48.7	48.7
1975	2,839.1	2,839.1	67.2	25.4
1976	4,164.2	3,358.2	46.7	18.3
1977	5,235.2	3,532.5	25.7	5.2
1978	5,302.6	2,877.2	1.2	- 18.6
1979	6,967.8	3,400.6	31.4	18.2
1980	8,842.7	4,058.1	26.9	19.3
Average Annual Growth			20.5	12.5

Sources: 1. CBN Annual Report and Statement of Accounts - various years

2. Central Bank of Nigeria: Economic and Financial Review - various years.

Note: * Computed with consumer price index (1975 = 100).

impact of the decline in Government expenditure as a result of the fall in revenue from the crude oil exports in 1978 and the consequent fall in general income level in the economy coupled with the general economic recession.

Deposits and growth in deposits are not an unambiguous measure of bank output, because changes in the level of deposits may not always reflect the same directional changes in output. Inflation produces an automatic increase in bank deposits so that bank deposit outstanding may increase because of inflation without any increase in the quantity of services provided by the banks. Left to itself, however, the process would result in a fairly steady increase of deposits in line with inflation, at least in the short-run, but the efforts of the Government to control inflation by operating on the money supply lead to rather more spasmodic growth of bank deposits. It is therefore necessary to distinguish between inflation induced increase of deposits and real growth of deposits. To correct the current deposits series for price effect the index of consumer prices was used as price deflator. This is shown also in Table 1. The price deflated deposits series exhibited a ten-fold increase during the period 1960-80. It rose from N391.4 million in 1960 to N4,058 million in 1980. The average annual growth rate is 12.5 per cent.

The influence of other distorting factors on deposits series was examined to establish the validity of this series as one of the measures of banks' output performance. Deposit mix changes affecting deposit activities influence bank output without changing the level of total deposits outstanding. The time plus savings deposits to total deposits ratio indicates the directional effect of deposit mix changes on output.

Time and savings deposits use fewer bank service because of their lower turnover. Consequently an increase in the proportion of time and savings deposits to total deposits implies a lower level of real output of the banking system.²⁴

Table 2 shows the absolute amount of time and savings deposits as well as their proportion to total deposits. In absolute terms, time plus savings deposits increased steadily during the period 1960-80. The growth rate shows the volatile behaviour of these deposits over the period. However, the average annual increase is 25.6 percent. The ratio of savings plus time deposits to total deposits also showed an increasing trend between 1960 and 1968, but fluctuated in the period 1969-80. The conclusion thus far, is that the output of the Nigerian banks as measured by deposits had been increasing in the period 1960-80.

24 R.C. Bhatia, *Banking Structure and Performance: A case study of the Indian Banking System: 1950-68*; (Ph. D. Thesis: West Virginia University Press), 1978.

An important criticism which may be levied against the use of deposits series is that deposits represent the capacity rather than the output of the banks. The divergence between capacity and output level is not serious for service industries like bank because inventory accumulation is not possible and excess demand exists on such industry as the banking, therefore capacity measure can serve as a proxy for bank output.

An alternative approach to measure bank output is the use of earning assets. This approach rests on the premise that output of financial institutions, particularly commercial banks are viewed as financial services provided to depositors and borrowers and that since output generates revenue, earning assets, by far the most important source of bank revenue may serve as the yardstick of bank output.

The fact that the output of a financial firm is viewed as a service flow and the physical units of this flow are measured by earning assets which are generally thought to be a stock variable may at first seem inconsistent. The view that earning assets and cer-

Table 2

TIME AND SAVINGS DEPOSITS OF THE NIGERIAN BANKING SYSTEM 1960-80

Year	(N million)	(Ratio)	(Percentages)
	Time and Savings Deposits	Time and Savings Deposits/Total Deposits	Growth rate of time and savings deposits
1960	54.8	0.40	—
1961	70.6	0.46	28.8
1962	83.2	0.48	17.8
1963	94.2	0.49	13.2
1964	116.4	0.50	23.6
1965	141.0	0.53	21.1
1966	162.6	0.55	15.3
1967	131.2	0.54	-19.3
1968	183.6	0.56	39.9
1969	215.4	0.54	17.3
1970	336.8	0.54	56.4
1971	371.8	0.57	10.4
1972	461.2	0.59	24.0
1973	582.3	0.57	26.3
1974	973.2	0.57	67.1
1975	1,302.3	0.46	33.8
1976	1,979.1	0.48	52.0
1977	2,255.1	0.43	13.9
1978	2,601.7	0.49	15.4
1979	3,702.1	0.53	42.3
1980	5,111.9	0.58	38.0

Sources CBN (i) *Annual Report and Statement of Accounts* - various years.(ii) *Economic and Financial Review* - various years.

tain other balance sheet entries are a stock is an implication of a portfolio approach to bank behaviour. However as Pesek stated the view that bank balance sheet entries are stock does not accurately reflect economic realities since, «by its very nature bank money is constantly sliding into the abyss of non-existence, either as it is returned to the banks for conversion into currency or as rentals («or loans») of it expires».²⁵ The continuing existence of earning assets and deposit entries on the banks' balance sheet requires continuing activity on the part of the banker to prevent the «ever changing stock or rather, flow» of these entries from being destroyed. To further quote Pesek, if balance sheet entries are to be considered as a stock, they are «not comparable to a stock of Rembrandt paintings but rather to a river, constantly renewed in the mountains and constantly disappearing down the valley, with the banker controlling the sluice»²⁶. Therefore, banks can maintain a stock of earning assets or deposits on their balance sheet only by constantly incurring costs.

In objecting to the use of earning assets as a measure of bank output, Mackara contended that viewing earning assets as bank output is analogous to viewing inventories as output for the manufacturing firm²⁷. He argued that looking at the firm's stock of inventories yields little information about the firm's production activities without information such as net change and turnover of inventories over a specified period of time.

Conceptually, however, there are distinct differences between inventories which are held by the manufacturing firm and earning assets held by the banks. First as noted above, most balance sheet items are «perishables» in the sense that costs must be constantly incurred to maintain a given level of earning assets. Second, and equally important, is the fact that inventories yield no direct revenue to the manufacturing firm while earning assets are the banking firm's primary source of revenue. Therefore the behavioural process involved in making inventory decision on the part of the manufacturing firm is distinctly different from the bank's decision making process concerning the production of services of what the earning assets are the physical measure.

Table 3 shows the earning assets of the Nigerian banking system. The total earning assets shows an increasing trend, rising over 79 times the 1960 level in 1980. The

25 See B.P. Pesek, «Banks supply function and the equilibrium quantity of money», *Canadian Journal of Economics*, 3 (August 1970), pp. 357-85.

26 B.P. Pesek, *Ibid.*

27 W. Mackara, «What do banks produce?», *Monthly Review Federal Reserve Bank of Atlanta*, (May 1975), pp. 71-74.

Table 3

EARNING ASSETS OF THE NIGERIAN BANKING SYSTEM 1960-80 (N million)

Year	Loans and Advances	Bills Discounted	Investment	Total Earning Assets Unweighted	Total Earning Assets Weighted
1960	111.5	2.5	5.7	119.7	10.5
1961	117.7	2.2	8.7	128.6	11.6
1962	147.9	6.2	10.0	164.1	12.7
1963	164.0	14.9	4.7	183.6	14.4
1964	214.7	30.1	14.0	258.8	21.0
1965	228.0	42.1	15.9	268.0	23.0
1966	238.0	60.1	35.4	333.5	26.3
1967	238.6	36.4	35.8	310.8	24.6
1968	220.6	5.1	206.2	431.9	27.3
1969	238.2	4.5	349.0	591.7	33.3
1970	345.5	5.9	534.0	885.4	47.7
1971	492.0	10.0	324.8	826.8	58.0
1972	611.5	8.0	418.6	1,038.1	78.5
1973	742.4	11.1	424.5	1,178.0	92.0
1974	924.1	14.0	778.3	1,716.4	124.5
1975	1,509.1	28.2	832.0	2,369.3	158.3
1976	2,099.1	23.8	1,391.1	3,514.0	204.1
1977	3,050.8	23.8	2,016.5	5,091.1	245.0
1978	4,070.0	39.7	1,573.5	5,683.2	513.4
1979	4,596.1	22.6	2,628.4	7,247.1	546.8
1980	6,356.5	—	3,115.0	9,471.5	727.8

Sources: CBN (1) *Economic And Financial Review* - various years.
 (2) *Annual Report and Statement of Accounts* - various years.

average annual increase is 24.4 per cent as compared with 20.5 per cent average annual increase registered by deposits. The difference in the two series may be attributed to the monetary policy measures of the CBN with regard to liquidity ratio requirements. For example the widening of the choice of instruments between 1970 and 1980 had led to the relative decline of cash and Treasury bills as instruments for satisfying the CBN rules of liquidity.

It is important to note the significant average annual increase of 36 per cent in the period 1972-77. The increase is connected with two parallel movements: the promulgation of Nigerian Enterprises Promotion Decree (NEPD) 1972 and 1976, compelling alien companies to sell part of their equity holdings to Nigerians. Much of the purchases were financed by the banking system thus raising the level of banks' loans and advances. A second movement is seen through the rise in the public issues transactions in the Nigerian Stock Exchange — also connected with the NEPD 1972. Most of the issues were financed by bank loans, the securities issued being used as security by borrowers.

The earning assets series suffer from the same shortcoming as deposits as a measure of bank output, that is changes in the mix of earning assets may affect the physical output without changing the naira volume of assets of the bank. It is necessary to correct this shortcoming. To ignore the distortion would imply that all forms of bank credit are perfect substitutes to the bank and the community.

To correct for this distortion weights were deduced to make our measure of each earning asset of the bank reflect not only the money value of assets outstanding but also the expected yield of the assets. All earning assets have an average expected yield that must be considered in the evaluation of bank output. In this study, an easily measured quantity that can serve as proxy for the average expected yield of each type of earning asset is the rate of interest actually paid for each earning asset.²⁸ The form of measure is the interest rate times the amount of individual earning assets outstanding. The formula is:

$$Q_i = \sum_j r_{ij} x_{ij}$$

where

Q_i is the total output of the i th bank;
 r_{ij} is the interest rate charged by bank i
 for j th type of earning assets;
 x_{ij} is the amount of the j th type of
 earning assets outstanding during a
 given year by the i th bank.

It might have been reasoned that greater disaggregation of earning assets with loans and advances divided into sub categories could have refined the weighting process. For the Nigerian banking system, loans and advances represent a fairly homogenous category of short-term business loans. Consumer finance is virtually non-existent and banks are not active in mortgage lending. For these reasons loans and advances were treated as a single broad category. Investment could have been divided between Government securities and other investments. But because treasury bills and treasury certificates constituted over 80 per cent of all investment instruments, classifying investments into categories was unnecessary. The earning assets were divided into three categories: Loans and advances, Bills discounted, and Investments. (See table 3).

The weighted earning assets exhibited almost equal rate of average annual growth with

28 See J.A. Powers, *Op. cit.*

the unweighted series. The weighted earning assets average annual growth rate was 24.2 per cent compared to 24.4 per cent for unweighted earning assets series.

For a closer comparison of the two output measures so far discussed we refer to fig. 1. The figure clearly indicates that an upward trend existed in the Nigerian banking system's output performance during 1960-80 period. The figure also shows that 1972 was the turning point in the increased output performance of the banks.

The next measure of bank output as an indication of the Nigerian banking system's performance used here is the number of cheques processed by the banks. As a volumetric measure of output, it is fairly insensitive to price level changes and it is superior to the other measures in this respect. On this Hodgman agrees with Gorman's observations that:

The vast bulk of observable activities in commercial banks relate to the processing of cheques and other transactions: banks would need a very small labour force indeed if nobody ever spent their deposits. Therefore, on this view the function of a bank is to help depositors spend their money, and the volume of commercial bank output is proportional to the volume of transactions handled.²⁹

This measure, however, fails to capture all the monetary aspects of banking system's performance and is in large part indicative of only the mechanical workload in the banks.³⁰ The Nigerian banking system is still highly labour intensive, and cheque-related transactions absorb a significant amount of labour and other inputs. The number of cheques can therefore be one of the indicators of the banking system's output performance.

Table 4 shows that the number of cheques processed by the banks recorded an average annual rate of increase of 14.5 per cent. The clearing efficiency was also measured as the ratio of the monthly average number of cheques cleared in a year to the monthly average number of working days in the year. This is also shown in Table 4 and it also recorded an increasing trend. There was a drop in 1967 as a result of the civil war when banking activity was equally disrupted. It should be noted, however, that the large scale transfer of funds within the system, resulting from a significant increase in average size of the cheques processed may create banking services which remain unrecognized in this output measure.

29 See D.R. Hodgman, «Alternative measures of the real output and productivity of commercial banks», Discussion in V.R. Fuchs (ed) *Production and Productivity in Service Industries*, (New York: National Bureau of Economic Research: Columbia University Press), 1969 p. 161; J.A. Gorman, *Op.cit.*.

30 R. Speagle & E. Kohn, «Employment and output in banking, 1919-1955», *Review of Economics and Statistics*, 40 (February 1958), pp. 22-35.

Table 4

NIGERIAN BANKING SYSTEM: NUMBER AND AMOUNT OF CHEQUES PROCESSED 1960-79

Year	(Million) Number of cheques cleared	(N Million) Amount of cheques cleared	Average clearing efficiency
1960	—	—	—
1961	0.5	360.7	2,425
1962	0.8	604.2	2,762
1963	0.9	681.0	3,539
1964	1.2	899.9	4,635
1965	1.5	1,177.5	5,090
1966	1.7	1,318.1	6,444
1967	1.6	1,295.0	6,173
1968	1.6	1,485.3	5,477
1969	1.9	1,944.3	6,660
1970	2.3	2,892.8	7,909
1971	2.9	3,848.3	9,719
1972	3.3	4,580.6	12,228
1973	3.5	5,465.0	14,061
1974	4.1	7,512.3	16,418
1975	4.7	12,381.4	18,582
1976	5.0	18,650.9	19,869
1977	4.9	26,551.8	20,034
1978	5.6	30,312.1	22,235
1979	4.9	18,582.4	19,688

Source: CBN *Economic and Financial Review* - various years.

4. Conclusion

The intangible nature of the products of service industries like banking creates serious output problems and makes it difficult to evaluate the output performance of banks.

The long-run output performance of the Nigerian banks exhibited an upward trend in the period 1960-80. The output measures of deposits series, earning assets (weighted and unweighted) series indicated an average annual increase in output performance of the Nigerian banks in the range of 12.5 per cent to 25.6 percent.

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