MARCH 1996

RESEARCH PAPER FORTY-EIGHT

THE TRANSMISSION OF SAVINGS TO INVESTMENT IN NIGERIA

ADEDOYIN SOYIBO

AFRICAN ECONOMIC RESEARCH CONSORTIUM

CONSORTIUM POUR LA RECHERCHE ECONOMIQUE EN AFRIQUE

The transmission of savings to investment in Nigeria

Other publications in the AERC Research Papers Series:

Structural Adjustment Programmes and the Coffee Sector in Uganda by Germina Ssemogerere, Research Paper 1.

Real Interest Rates and the Mobilization of Private Savings in Africa by F.M. Mwega, S.M. Ngola and N. Mwangi, Research Paper 2

Mobilizing Domestic Resources for Capital Formation in Ghana: the Role of Informal Financial Markets by Ernest Aryeetey and Fritz Gockel, Research Paper 3.

The Informal Financial Sector and Macroeconomic Adjustment in Malawi by C. Chipeta and M.L.C. Mkandawire, Research Paper 4.

The Effects of Non-Bank Financial Intermediaries on Demand for Money in Kenya by S.M. Ndele, Research Paper 5.

Exchange Rate Policy and Macroeconomic Performance in Ghana by C.D. Jebuni, N.K. Sowa and K.S. Tutu, Research Paper 6.

A Macroeconomic-Demographic Model for Ethiopia by Asmerom Kidane, Research Paper 7.

Macroeconomic Approach to External Debt: the Case of Nigeria by S. Ibi Ajayi, Research Paper 8.

The Real Exchange Rate and Ghana's Agricultural Exports by K. Yerfi Fosu, Research Paper 9.

The Relationship Between the Formal and Informal Sectors of the Financial Market in Ghana by E. Aryeetey, Research Paper 10.

Financial System Regulation, Deregulation and Savings Mobilization in Nigeria by A. Soyibo and F. Adekanye, Research Paper 11.

The Savings-Investment Process in Nigeria: an Empirical Study of the Supply Side by A. Soyibo, Research Paper 12.

Growth and Foreign Debt: the Ethiopian Experience, 1964-86 by B. Degefe, Research Paper 13.

Links Between the informal and Formal/Semi-Formal Financial Sectors in Malawi by C. Chipeta and M.L.C. Mkandawire, Research Paper 14.

The Determinants of Fiscal Deficit and Fiscal Adjustment in Cote d'Ivoire by O. Kouassy and B. Bohoun, Research Paper 15.

Small and Medium-Scale Enterprise Development in Nigeria by D.E. Ekpenyong and M.O. Nyong, Research Paper 16.

The Nigerian Banking System in the Context of Policies of Financial Regulation and Deregulation by A. Soyibo and F. Adekanye, Research Paper 17.

Scope, Structure and Policy Implications of Informal Financial Markets in Tanzania by M. Hyuha, O. Ndanshau and J.P. Kipokola, Research Paper 18.

European Economic Integration and the Franc Zone: the future of the CFA Franc after 1996. Part I: Historical Background and a New Evaluation of Monetary Co-operation in the CFA Countries by Allechi M'bet and Madeleine Niankey, Research Paper 19.

Revenue Productivity Implications of Tax Reform in Tanzania by Nehemiah E. Osoro, Research Paper 20.

The Informal and Semi-formal Sectors in Ethiopia: a Study of the Iqqub, Iddir and Savings and Credit Co-operatives by Dejene Aredo, Research Paper 21.

Inflationary Trends and Control in Ghana by Nii K. Sowa and John K. Kwakye, Research Paper 22.

Macroeconomic Constraints and Medium-Term Growth in Kenya: A Three-Gap Analysis by F.M. Mwega, N. Nguguna and K. Olewe-Ochilo, Research Paper 23.

The Foreign Exchange Market and the Dutch Auction System in Ghana by Cletus K. Dordunoo, Research Paper 24.

Exchange Rate Depreciation and the Structure of Sectoral Prices in Nigeria Under an Alternative Pricing Regime, 1986-89 by Olu Ajakaiye and Ode Ojowu, Research Paper 25.

Exchange Rate Depreciation, Budget Deficit and Inflation - The Nigerian Experience by F. Egwaikhide, L. Chete and G. Falokun, Research Paper 26.

Trade, Payments Liberalization and Economic Performance in Ghana by C.D. Jebuni, A.D. Oduro and K.A. Tutu, Research Paper 27.

Constraints to the Development and Diversification of Non-Traditional Exports in Uganda, 1981-90 by G. Ssemogerere and L.A. Kasekende, Research Paper 28.

Indices of Effective Exchange Rates: A Comparative Study of Ethiopia, Kenya and the Sudan by Asmerom Kidane, Research Paper 29.

Monetary Harmonization in Southern Africa by C. Chipeta and M.L. C. Mkandawire, Research Paper 30.

Tanzania's Trade with PTA Countries: A Special Emphasis on Non-Traditional Products by Flora Mndeme Musonda, Research Paper 31.

Macroeconomic Adjustment, Trade and Growth: Policy analysis using a Macroeconomic model of Nigeria by C. Soludo, Research Paper 32.

Ghana: The Burden of Debt Service Payment Under Structural Adjustment by Barfour Osei, Research Paper 33.

Short-Run Macroeconomic Effects of Bank Lending Rates in Nigeria, 1987-91: A Computable General Equilibrium Analysis by D. Olu Ajakaiye, Research Paper 34.

Capital Flight and External Debt in Nigeria by S. Ibi Ajayi, Research Paper 35.

Institutional Reforms and the Management of Exchange Rate Policy in Nigeria by Kassey Odubogun, Research Paper 36.

The Role of Exchange Rate and Monetary Policy in the Monetary Approach to the Balance of Payments: Evidence from Malawi by Exley B.D. Silumbu, Research Paper 37.

Tax Reforms in Tanzania: Motivations, Directions and Implications by Nehemiah E. Osoro, Research Paper 38.

Money Supply Mechanisms in Nigeria, 1970-88 by Oluremi Ogun and Adeola Adenikinju, Research Paper 39.

Profiles and Determinants of Nigeria's Balance of Payments: The Current Account Component, 1950-88, by Joe U. Umo and Tayo Fakiyesi, Research Paper 40.

Empirical Studies of Nigeria's Foreign Exchange Parallel Market 1: Price Behaviour

C

and Rate Determination by Melvin D. Ayogu, Research Paper 41.

The Effects of Exchange Rate Policy on Cameroon's Agricultural Competitiveness by Aloysius Ajab Amin , Research Paper 42

Policy Consistency and Inflation in Ghana by Nii Kwaku Sowa, Research Paper 43

Fiscal Operations in a Depressed Economy: Nigeria, 1960-90 by Akpan H. Ekpo and John E. U. Ndebbio, Research Paper 44

Foreign Exchange Bureaus in the Economy of Ghana by Kofi A. Osei, Research Paper 45

The Balance of Payments as a Monetary Phenomenon: An Econometric Study of Zimbabwe's Experience by Rogers Dhliwayo, Research Paper 46

Taxation of Financial Assets and Capital Market Development in Nigeria by Eno L. Inanga and Chidozie Emenuga, Research Paper 47

The transmission of savings to investment in Nigeria

Adedoyin Soyibo
University of Ibadan
Ibadan, Nigeria

AERC Research Paper 48
African Economic Research Consortium, Nairobi
March, 1996

©African Economic Research Consortium, 1996

Published by The African Economic Research Consortium
P.O. Box 62882
Nairobi, Kenya

Printed by Majestic Printing Works Ltd.
P.O. Box 42466
Nairobi, Kenya

ISBN 9966-900-73-X

F

Contents

I.	Introduction	1
II.	Methodology and analytical framework	4
III.	Descriptive analysis of the characteristics of the demand side of the savings-investment process in Nigeria	10
IV.	Empirical modelling of choice of investment finance alternatives by some Nigerian Firms	27
V.	Summary, Recommendations and Conclusion	39

Notes: 43
Appendix A: An empirical investigation of transmission of savings to investment in Nigeria 44
Appendix B:The transmission of savings to investment in Nigeria: a follow up study 46
Appendix C: The transmission of savings to investment in Nigeria: a follow up study 49
References 50

List of tables

1	Characteristics of the respondent organizations	11
2	Relationship of respondent organizations with banks	12
3	Relative volume of the different sources of financing productive investment by year	14
4	Use of funds obtained from bank credit by type of investment	16
5	Use of funds obtained from retained profit by type of investment	17
6	Use of funds obtained from share capital increase by type of investment	18
7	Use of funds obtained from drawdown on savings by type of investment	19
8	Use of funds obtained from debentures and other capital market debt instruments by type of investment	20
9	Perceived importance of different finance sources before and after deregulation	21
10	Factors that influence the choice of the different financing alternatives used	21
11	Constraints to the use of sources of financing productive investment	22
12	The relationship between sector of operation, type of ownership, number, as well as types of banks used	23
13	Relationship between types of credit facilities used and type of ownership/sector of operation	25
14	Relationship between sources of finance and sector of operation/ownership type	26
15	Some descriptive statistics of the pooled time series financial measured used in the analysis	28
16	Distribution of means of financial measures used by selected organization characteristics	30
17	Correlation matrix of the variables of interest	31
18	Determinants of financing alternatives choice and estimated discriminant functions -The general models	32
19	Determinants of financing alternatives choice and estimated discriminant functions - The specific models	35
20	Determinants of financing alternatives choice using logistic regression analysis	37

1 Introduction

The Problem

In two earlier studies, we established that, to some extent, liberalization of the financial system does matter in Nigeria and that operators of the banking system, as suppliers of credit, believe in the efficacy of the liberalization effort in stimulating deposit and promoting competition between banks, thus paving the way for better utilization of resources and encouragement of productive investment.

There is, therefore, a need to study the mechanisms by which the investing public, the beneficiaries of this policy about which a lot of optimism has been expressed, actually transmit the credit received into productive investment. Accordingly in this study, we analyzed the structure of the different sources of finance used by beneficiaries of bank credit, the relative share of bank credit in their investment portfolios, the type of investment engaged in, among others, with a view to establishing a possible trend in the way finance obtained from several sources, is translated into actual investment. Productive investment is defined as investment that produces goods and services or investment in tangible reproducible assets.

The core argument regarding the relationship between financial conditions, savings and economic growth is hinged on the McKinnon-Shaw financial intermediation hypothesis. However, the transmission mechanism for effecting the relationship differs according to the view points of these two authors. McKinnon posits that potential investors must accumulate money balances prior to investment. Consequently, the more attractive the process of accumulating money, the greater the incentive to invest. Thus, the relative lumpiness of investment expenditures implies that aggregate demand for money will be greater, the larger the proportion of investment in total expenditures (McKinnon, 1973; Fry, 1978, 1982; Molho, 1986; and Arrieta, 1988). This indirect relationship between money and physical capital, often called the McKinnon's *complementarity hypothesis,* is incorporated in a money demand equation.

On the other hand, Shaw's hypothesis emphasizes the role of external, rather than internal, finance as an effective constraint on capital formation. Accordingly, it places a premium on the role of deposits as a source of funds for financial intermediaries. Thus, expanded financial intermediation between savers and investors, resulting from higher real rates of interest, increases incentives to save by means of deposits, stimulates investment due to an increased supply of credit, and raises the average efficiency of investment because financial intermediaries can use their expertise to allocate efficiently

the larger the volume of investible funds (Shaw, 1973; Fry, 1978, 1982; Molho, 1986; Arrieta, 1988). This is the Shaw's *debt intermediation* hypothesis, also incorporated into a demand for money model.

Thus, the link between savings and growth as postulated by the McKinnon-Shaw hypothesis is investment. However, behaviourally savings and investment differ (Bhatia and Khatkhate, 1975; Fry, 1978); since transfer of savings to investment depends on a host of other factors other than the real interest rate. Such factors include availability of investment opportunities at rates exceeding cost of funds, institutional constraints and cost of administering funds. Consequently, a study of the link between savings and investment can hardly be done solely by showing the applicability or otherwise of the McKinnon-Shaw hypothesis.

Unfortunately, it seems that the relationship between savings and investment, is at best, theoretically assumed as given via the savings-investment Keynesian equilibrium (e.g. Ndulu, 1990) or when *a priori* specification is assumed difficult, it is assigned to casual empiricism without detailed analysis of its possible determinants (e.g. Mwega *et al*, 1990). What is often done in the literature is to study the determinants of private investment *per se,* with little or no regard for the source of finance. For example, the neoclassical flexible accelerator model has been the most widely accepted general theory of investment behaviour (Greene and Villanueva, 1990). However, the applicability of the theory to developing countries is very much in doubt because either the key assumptions like perfect capital markets and little or no government investment are absent, or data for certain variables like capital stock, real wages, and real financing rates for debt and equity, is unavailable or inadequate.

Hence, there is a need to study formally the mechanism by which investors transmit savings via bank credit to investment by investigating the relative share of bank credit in the productive investment portfolios of firms in developing countries. This is particularly relevant in the case of Nigeria, where it has been established that, to some extent, the liberalization of financial markets does matter (Soyibo and Adekanye, 1991; 1992) and that operators of the Nigerian banking system who are suppliers of credit believe in the efficacy of the liberalization effort in stimulating deposit and promoting competition between banks, thus paving the way for better utilization of resources and encouragement of productive investment.

Accordingly, in this study, we proceed to analyze the structure of different sources of finance used by beneficiaries of bank credit, the relative share of bank credit taken in their investment portfolios, the type of investments engaged in, among others, with a view to establishing a possible trend in the way finance obtained from several sources is translated into actual investment. In this connection, we can establish in some relative way, how the savings mobilized by the banking system are transmitted to investment, in comparison to other sources of investment finance.

Objectives of Study

This study will analyze the characteristics of the demand side of the savings-investment process in Nigeria. Specifically, the objectives of the study are to:

- Characterize the different sources and relative volume of investment finance taken by beneficiaries of bank credit in Nigeria with a view to establishing the relative position of bank credit in their investment portfolios;

- Determine the structure of investments undertaken over different financial regulation regimes with a view to finding out whether financial regulation does matter or not in this regard;

- Characterize the behavioural reactions of Nigerian investors to different financial regulatory policies;

- Characterize some descriptive determinants of transmission of savings to investment as well as estimate determinants of investment finance choice by firms; and

- Offer policy recommendations that can make for effective use of the intended benefits of financial system liberalization by Nigerian investors.

II. Methodology and analytical framework

Methodology

The study was conducted in two complementary parts. The first part adopted a micro approach and involves a descriptive analysis of the characteristics of the demand side of the savings-investment process in Nigeria. For this data was generated using a survey of a stratified random sample of the organized private sector in Nigeria.

The second part, which adopted a macro approach, involved pooling enterprise-based data to estimate models of choice of financing options used by Nigerian firms to finance productive investment. For the purpose of the study, productive investment is defined as investment that produces goods and services or investment in tangible reproducible assets.

The study identified two groups of financing alternatives: financing options from internal sources and financing options from external sources. The financial options categorized as coming from external sources are:

- Bank credit;
- Increase in share capital (particularly if done through the capital market);
- Debentures and other capital market debt instruments.

The internal financing options defined by the study are:

- Ploughing back retained profit (often in demand deposit accounts with banks);
- Drawing down on time and savings deposit of firms in banks.

It is debatable that these two classes of internal financing options specified above can be viewed as retained profit. In this study, an attempt has been made to distinguish them explicitly because they have different opportunity cost implications. First, until recently, demand deposit accounts in Nigeria were non-interest-bearing and there was no restriction on withdrawals. On the other hand, time and savings deposit accounts are revenue-yielding and tend to be used for medium to longer term projects.

Data used for the two parts was collected during two different periods. While data for the micro approach was collected during the first half of 1992, data for the macro approach was collected during the second half of the same year. In fact, the sample of firms used

for the second approach was a subsample of those used for the first approach. The details of the selection procedure are elaborated later.

Two questionnaires were used for the study. The first used for the descriptive aspect of the study, was based on the following research questions and is attached in the Appendix.

The Research Questions

1. What are the different sources by which beneficiaries of bank credit finance productive investment?
2. What are the volumes of these sources in monetary terms?
3. What factors influence the choice of the different sources in the Nigerian environment?
4. What are the constraints to the use of bank credit in Nigeria - institutional, legal, policy, etc?
5. What is the impact of the different regulatory regimes in the choice of the sources mentioned in Question 1?
6. What are the different uses into which the Investment finance obtained from the different sources is put, i.e., what is the structure of the investment portfolios?
7. What factors influence the investment choices?
8. What are the constraints inhibiting the choice of investment alternatives - legal, institutional, policy, etc.?
9. What is the impact of the different regulatory regimes on these investment choices?
10. Are there shifts in investment choices attributable to the regulatory regimes?

Analytical framework

This section discusses the techniques used in estimating the models of choice of financing alternatives used by firms in financing productive investment.

A general model of choice of investment financing alternative by firms

For any firm, the choice of an investment financing option is discrete: it's either chosen or not. This choice will depend on a number of factors. We posit that the choice of alternative financing options by a firm will depend at least on four groups of characteristics:

- Industry characteristics;
- Ownership characteristics;
- Performance characteristics of firm; and
- Cost characteristics of investment type.

Symbolically, we write

$$W_{ij} = f(S_j, O_j, P_j, C_i) \quad (1)$$

where

W_{ij} = whether financing alternative i is chosen by firm j;
S_j = industry characteristics of firm j, proxied by its sector of operation;
O_j = ownership characteristics of firm j;
P_j = performance characteristics of firm j; and
C_i = cost characteristics of investment financing option i.

Discriminant and logistic regression analyses are two of the popular methods for analyzing the type of general model specified in Equation (1). These two techniques were used in this study.

Many variables can be used for proxy *Pj*, performance characteristics of firm *j*. For this study we propose eight such financial measures, viz:

- Profit after tax;
- Retained profit;
- Total dividend;
- Current asset;
- Current liability;
- Total asset;
- Total liability; and
- Shareholders fund.

Since this study is concerned with the transmission of savings to investment, and to reduce the confounding effects which different firm sizes can introduce into the analysis, the above variables were deflated using fixed asset as a scaling factor. The resulting ratios, which can be interpreted variously as returns on fixed assets, were then used in the analysis. However, because of measurement difficulties, cost characteristics of investment *i, Ci*, will not be investigated further in this study.

Discriminant analysis

Discriminant analysis is a multivariate regression analysis approach that is used to classify an observation into several *a priori* groupings dependent upon the observations of individual characteristics. It is used to classify, explain classifications and/or make predictions when the dependent variable is dichotomous e.g., yes/no, success/failure, bankrupt/non-bankrupt etc. The first step is to establish group classifications.

In discriminant analysis, a linear combination of the independent variables is formed and serves as a basis for assigning observations to groups. Thus, information contained

in the multiple independent variable is summarized in a single index (Norusis, 1990). The linear discriminant equation is given by:

$$D = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \ldots + \beta_n x_n \tag{2}$$

where the *x*s are independent variables and *b*s are estimated from the data .

As a rule, the *b*s are computed in such a way that the values of the discriminant function differ as much as possible between the groups. This is accomplished by ensuring that the ratio:

$$\frac{\text{between-group sum of squares}}{\text{within-group sum of squares}} \tag{3}$$

is maximum.

Discriminant analysis has been used extensively in studying finance and financial economics particularly in studying bank failures, for example, Adekanye (1992). It has also been used in medicine (van Viet and Gupta, 1973) and in predicting administrative performance in industries as well as in studying the relationship between values and career choices (Hemphill *et al*, 1962; Cooley and Lohnes, 1962).

Logistic Regression Analysis

In logistic regression analysis, the probability that an event will or will not occur is directly estimated and at the same time the variables that are important in predicting the probability are identified. The logistic regression model is given by:

$$\text{Prob (event)} = \frac{e^z}{1+e^z} \tag{4}$$

or equivalently as:

$$\text{Prob (event)} = \frac{1}{1+e^{-z}} \tag{5}$$

where Z is the linear combination,

$$Z = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \ldots + \beta_p x_p \tag{6}$$

where the *X*s are independent variables and the *B*s are estimated from the data.

In logistic regression, the parameters of the model are estimated using maximum-likehood method, i.e., the coefficients that make our observed result most 'likely' are selected. Since logistic regression is non-linear, an iterative algorithm is used for its estimation (Norusis, 1990) . Logistic regression analysis has had a wide application in situations involving discrete choices particularly in healthcare demand studies involving provider choice (e.g., Akin *et al,* 1983; Bitran 1989 and Mbanefoh and Soyibo, 1991). The formulation used in this paper is motivated by healthcare provider choice modelling.

Sample Design and Data Collection

Two approaches were adopted to generate the frame for the first part of this study. The first approach involves approaching the banks used in generating data used by Soyibo (1991). Different lists of the corporate customers of these banks classified by size, sector of operation and geographical location, were obtained. These lists were cleaned up for duplication. It must be noted that the oath of confidentiality between banks and customers made obtaining a comprehensive list difficult.

Because of the limitation of obtaining a comprehensive list from the bank, a second approach, using the organized private sector was adopted. Four major organized private sector groups were approached. These were Manufacturers Association of Nigeria (MAN), the Lagos Chamber of Commerce and Industry, the Association of Food, Beverages and Tobacco Employers (ASFBTE), and the Nigerian Association of Small-Scale Industrialists (NASSI). A sampling frame was generated from their directories, after cleaning for duplications.

To obtain the maximum co-operation of members, application letters were written to their governing councils informing members of the objectives of the research and attaching the questionnaires.

A stratified random sampling procedure was adopted to select a sample of 200 organizations reflecting sector of operation, scale of operation and location. The survey was carried out in the Lagos-Ogun-Oyo industrial axis. A total of 73 completed questionnaires were retrieved for analysis, out of which 56 were found usable representing a response rate of 28%. For an industrial survey a benchmark of 25% response rate is often adjudged satisfactory.

Data for the second part of the study was collected from a subsample of firms whose questionnaires were found usable for the first part. This subsample consists of incorporated companies operating under the Companies and Allied Matters Decree of 1990. Such companies are required by law to provide certain financial data to the Director-General of the Corporate Affairs Commission. Information relating to sector of operation, type of ownership, choice of investment finance alternatives and some critical financial information like profit after tax, retained profit, total dividend, current asset, fixed asset etc., were collected for each member of the subsample over a period of ten years. The

questionnaire used for data collection in this part of the study is attached as Appendix B.

III Descriptive analysis of the characteristics of the demand side of the savings-investment process in Nigeria

Background information and characteristics of the respondent organizations

Table 1 shows the characteristics of the respondent organizations. They operate mostly in non-oil business and in the non-agricultural sectors. Over 46% operate in the manufacturing and crafts sector while about the same percentage operate in the 'others' (services, banking and finance, construction etc.) sector. The respondent businesses are essentially wholly Nigerian-owned while about one in four operates under joint-venture agreements. The respondent organizations are also mostly unquoted on the Nigerian Stock Exchange.

Using paid-up capital as an index of scale of operations, the majority of the responding organizations will be seen to be small-scale. However, using turnover as a proxy for scale of operations, while the proportion of organizations in the small-scale industrial category appears static, there appears to be an improvement in the proportion of organizations in the medium/large scale-turnover classification.

Table 2 shows the dealings of respondent organizations with banks as financial intermediaries in Nigeria. In general the respondent organizations have business accounts in more than one bank. As much as 59% operate business accounts with between two to five banks. Commercial banks are generally more popular than merchant banks, those dealing with merchant banks only declined by more than 50% after deregulation. In terms of the type of credit facilities obtained from banks, overdrafts seem to be the most popular and are not affected by the change in regulatory regimes. Short-term loans are next in order of importance. Long-term loans are generally unpopular. This has implications for the type of investment that Nigerian organizations can finance using bank credit. This suggests that in financing capital projects that have long economic lives, banks may not be popular sources for Nigerian organizations. This behaviour of banks may not be unconnected with the fact that, in spite of financial liberalization, the maturity structure of their deposits have not altered significantly. Thus deposits still predominate and time and savings deposits form a negligible percentage of their depsoits (Soyibo, 1995).

Table 1: Characteristics of the Respondent Organization

1. Type of business	
Oil	4(7.1)
Non-oil	51 (91.1)
Missing data	1 (1.8)
2. Sector of operation	
Agriculture and livestock	2 (3.6)
Manufacturing and crafts	26 (46.4)
Conglomerate	1 (1.8)
Others	27 (48.2)
3. Ownership structure	
Wholly Nigerian	36 (64.3)
Joint venture	15 (26.8)
Government parastatal	5 (8.9)
4. Whether quoted on the stock exchange	
Yes	8 (14.3)
No	47 (83.9)
5. Share capital	
(a) Approved	
Small scale (up to 2 million naira)	26 (46.4)
Medium scale (above 2 - 5 million naira)	5 (8.9)
Large scale (above 5 million naira)	12 (21.4)
Missing data	13 (23.2)
(b) Paid up	
Small scale (up to 2 million naira)	17 (30.4)
Medium scale (Above 2 - 5 million naira)	5 (8.9)
Large scale (Above 5 million naira)	12 (21.4)
Missing data	22 (39.3)

6.Turnover	1986	1987	1988	1989	1990
Small scale (up to 15 million naira)	22 (39.3)	22 (39.3)	22 (39.3)	22 (39.2)	20 (35.7)
Medium and large scale (Above 15 million naira)	17 (30.4)	21 (37.5)	23 (41.1)	24 (42.9)	25 (44.6)
Missing data	17 (30.4)	13 (23.2)	11 (19.6)	10 (17.9)	11 (19.6)

Note: In all tables, numbers in parentheses are percentages.

Table 2: Relationship of respondent organizations with banks

1.	Number of banks organizations operate account with		
	1 bank		7 (12.5)
	2 – 5 banks		33 (59.0)
	6 – 10 banks		5 (9.0)
	Above 10 banks		4 (7.0)
	Missing data		7 (12.5)
2.	Types of banks dealt with	Before 1987	After 1987
	Commercial banks only	28 (50.0)	29 (51.8)
	Merchant banks only	12 (21.4)	6 (10.7)
	Both commercial and merchant banks	16 (28.6)	21 (37.5)
3.	Types of credit facilities from banks	Before 1987	After 1987
	Overdraft	30 (53.6)	30 (53.6)
	Advances	4 (7.1)	5 (8.9)
	Short-term loans	14 (25.0)	15 (26.8)
	Long-term loans up to to 5 years	3(5.4)	9 (16.1)
	Long-term loans above 5 years	5 (8.9)	6 (10.7)
4.	Sources of productive investment financing by responding organizations		
	Bank credit		32 (57.1)
	Retained profit[1]		44 (78.6)
	Increase in share capital		15 (26.8)
	Savings[2]		19 (33.9)
	Debentures etc.		3 (5.4)

Notes: 1 Drawing down on demand deposits.
2 Drawing down on time and savings deposit.

Financing productive investments by the respondent organizations

Table 2 also shows the sources of productive investment financing by the respondent organizations. From the table (section 4), it will be seen that retained profit is the most popular source of financing productive investment, in terms of the proportion of organizations using it, being used by over 78% of the respondents. Next in order of importance of use is bank credit, reportedly used by 57.1% of respondents. Drawing down corporate time and savings in the banking system is third in order of importance

and is used by nearly 34% of respondents. When the proportion of those who draw down savings from banks is taken along with that of those using bank credit as well as those using retained profit, it can be seen that use of the savings mobilized by the banking system by Nigerian organizations is quite high (barring double-counting). However, use of direct credit is reported only by about half of the respondent organizations. The use of debentures and other capital market debt instruments for financing productive investment is the least popular of the financing options.

Table 3 shows the average relative volume of the different sources of finance used per reporting organization. The table also indicates the number of organizations reporting the indicated average value. Taken with Table 2, the willingness of Nigerian organizations in providing financial information can be seen to be much less than in providing non-financial information.

In terms of monetary value, increase in share capital appears to be more popular than other sources of finance, accounting for between 25% and nearly 60% during the years under study. However, when it comes to the number of organizations using it, it trails behind other sources of finance like retained profit, bank credit and drawing down on corporate time and savings deposits, in that order.

The table also shows that, by and large, retained profit is an important source of financing productive investment when one considers monetary value or the number of organizations using the source. Given that more organizations use it, at the macro level, the totality of its monetary value will be much higher than any other source.

Next in importance is bank credit. Its relative monetary share declined sharply between 1981 and 1982 and between 1985 and 1987. After 1987, its relative share in the average organization's investment portfolio picked up from 6.25% to as high as 19.49% in 1989 before declining to 15.80% in 1990. In general, bank credit accounts for less than 20% of the total volume of the investment portfolio of the average respondent organization. However, retained profits appeared to have been preferred to bank credits especially after deregulation, perhaps because of the higher cost of funds .

In addition, Table 3 also indicates that there is at least a marginal increase in the use of bank credit for financing productive investment after deregulation. Also, the number of organizations using bank credit shows a marginal increase after deregulation. When the position of drawing down of corporate savings in banks is taken along with bank credit, it will also be seen that the contribution of longer-term mobilized savings of the banking system accounts for nearly 40% of the productive investment portfolio of the average respondent organization. The much higher proportion of drawing down on corporate savings after deregulation, particularly in 1987 and 1988 and 1990, suggests that high costs of fund might have promoted the use of this approach more than the use of bank credit. This conclusion is easily seen to hold if one examines the relative proportions of bank credit and drawing down on corporate savings between 1982 and 1984, where differences between them do not appear significant.

Table 3 also shows that the use of debentures and other capital market debt instrument is the least popular in terms of monetary volume and the number of organizations reporting its use. In summary, Table 3 suggests that while deregulation seems to have promoted a marginal increase in the use of bank credit to finance productive investment, however,

Table 3: Relative volume of the different sources of financing productive investment by year (average per reporting organization, (₦ million)

Finance sources	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
1. Bank credit	51.76	6.52	12.29	15.18	13.37	4.42	6.25	7.47	19.49	15.80
	(40.04).	(7.79)	(7.35)	(16.72)	(12.83)	(4.98)	(6.21)	(7.98)	(14.5)	(14.5)
Reporting organizations	11	10	9	11	13	14	12	17	16	18
2.Retained profit (demand	18.15	16.79	21.06	18.89	16.01	12.88	15.11	13.56	18.64	26.15
deposit drawdown)	(14.04)	20.06)	(12.60)	(20.82)	(15.36)	(14.52)	(15.00)	(14.48)	(13.9)	(24.0)
Reporting organizations	12	13	13	13	15	20	21	25	26	27
3. Share capital increase	33.35	37.50	100.00	22.41	33.42	31.63	39.13	30.23	66.84	25.34
	(25.80)	(44.80)	(59.91)	(24.69)	(32.06)	(35.65)	(38.85)	(32.28)	(49.9)	23.25)
Reporting organizations	3	3	2	8	3	4	4	6	4	7
4. Time and savings	10.01	6.90	17.84	18.27	25.44	24.99	26.62	29.98	23.24	31.67
deposit drawdown	(7.74)	(8.24)	(10.67)	(20.13)	(24.41)	(28.17)	(26.43)	(32.02)	(17.4)	29.07)
Reporting organizations	3	3	5	5	7	9	10	10	11	12
5. Debentures and other	16.00	16.00	16.00	16.00	16.00	14.80	13.60	12.40	5.75	10.00
capital market debt instrument	(12.38)	(19.11)	(9.57)	(17.63)	(15.35)	(16.68)	(13.50)	(13.24)	(4.3)	(9.18)
Reporting organizations	1	1	1	1	1	1	1	1	2	1
Total	129.27	83.71	167.19	90.75	104.24	88.72	100.71	93.64	133.96	108.96
	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	100.0)

higher cost of gunds might have encouraged more use of drawing down on corporate savings during the same period. Thus the analysis suggests that the transmission of savings in the bank system to productive investment in Nigeria is done by two major approaches, a direct approach using bank credit and an indirect approach which involves drawing down on longer-term corporate savings in the banks and deregulation appears to have promoted the latter approach more. The results of this section appear to be the investment counterpart of the finding, in Soyibo and Adekanye (1991, 1992) on the marginal impact of liberalization on savings. Also, it corroborates the finding of Soyibo (1991) on the high cost of funds after liberalization.

Specific use of different investment finance sources

Tables 4-8 show specific uses into which the different investment finance alternatives have been put. Four different classes of investment options were identified. These are:

- Raw materials/operating cost/working capital/ inventory expansion;
- Expansion of monetary base e.g., company stock and debt instrument;
- Repairs and maintenance of existing assets;
- Machinery and equipment/new projects.

However, the problem of fungibility of funds is worth mentioning. While an orgnization may say that it borrows funds to finance a particular investment, it is ususally difficutl to verify that the borrowed funds are used for the purpose intended. Secondly, the issue of what the organization would have done in the absence of funds, is also important. Would it have carried out this particular investment, or would it have reduced expenditure on something else?

Ideally, by summing entries in Tables 4-8, the result obtained should be consistent with that of Table 3. Empirically, exact consistency will be difficult for at least three reasons. First, it might be difficult to know exactly what proportion of funds a given source is allocated to particular investment options. Second, in a Third World setting, with a poor culture of record keeping, knowing what goes exactly into a particular investment becomes rather difficult. Finally, fewer number of organizations answered questions on this aspect of the questionnaire, consequently the means obtained cannot be the same.

Table 4 shows that in general, the reporting organizations tended to use bank credit more often than not for raw material acquisition/operating cost/work capital, although the average declines, particularly since the era of deregulation. Also, there is a decline in the number of organizations using bank credits for raw materials/operating cost/working capital since the introduction of deregulation. An interesting finding relates to the use of bank credit for expanding the corporate financial base. As much as three to five of the respondent organizations reported using bank credit this way since deregulation, in spite of the supposed high cost of funds!

Retained profit was used more for raw material/working capital as well as financial

Table 4: Use of funds obtained from bank credit by type of investment (average per reporting organization. Million naira)

Investment type	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Raw materials /operating cost/ working capital	18.54	5.43	0.79	4.50	8.01	3.03	7.77	1.10	5.00	7.50
Reporting organizations	6	5	4	1	6	5	5	1	1	1
Expansion of financial base	3.00	–	50.00	1.44	–	–	–	29.66	17.56	48.52
Reporting organizations	1	–	1	5	–	–	–	5	6	3
Repairs, maintenance, etc.	–	–	–	–	–	–	–	–	–	–
Reporting organizations	–	–	–	–	–	–	–	–	–	–
Machinery and equipment/ new projects	–	–	0.97	–	–	–	–	–	–	–
Reporting organizations	–	–	1	–	–	–	–	–	–	–

base expansion during the pre-deregulation era. Since deregulation, while it is still used for these two classes of investment alternatives by a number of companies, a greater proportion of this financing option seems to be devoted to repairs/maintenance of existing assets by some companies, and in 1990, four companies reported expending an average of ₦96.55 million of their retained earnings on machinery and equipment/new projects.

Tables 6-8 also show that raw materials acquisition etc. and expansion of capital base are important uses of other sources of financing, in particular drawing down on savings. The analysis in Tables 4-8 confirms an earlier finding; that Nigerian organizations tend to invest more on the short-term end of the investment spectrum. As can be observed, only in very few cases do we have any use of fund sources in investing in machinery, equipment and new projects.

Table 5: Use of funds obtained from retained profit by type of investment (Average per reporting organization, Million naira)

Investment type	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Raw materials/ operating cost/ working capital	0.82	0.50	0.81	1.90	2.29	0.46	1.39	1.23	8.89	4.94
Reporting organizations	3	3	3	2	3	1	2	1	2	5
Expansion of financial base	7.20	15.00	0.07	0.11	0.11	1.58	4.78	2.63	3.80	25.09
Reporting organizations	3	2	2	1	1	5	3	4	5	2
Repairs, maintenance, etc.	–	–	–	–	–	15.06	0.18	50.09	50.09	0.02
Reporting organizations	–	–	–	–	–	2	1	2	2	1
Machinery and equipment/ new projects	–	–	–	–	–	–	–	–	–	96.55
Reporting organizations	–	–	–	–	–	–	–	–	–	4

Table 6: Use of funds obtained from share capital increase by type of investment (Average per reporting organization, Million naira)

Investment type	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Raw materials/ operating cost/ working capital	–	–	–	–	–	–	–	25.00	0.35	–
Reporting organizations	–	–	–	–	–	–	–	1	1	–
Expansion of financial base	10.00	–	–	150.00	–	–	600.00	15.39	–	2.20
Reporting organizations	1	–	–	1	–	–	1	1	–	1
Repairs, maintenance, etc.	–	–	–	–	–	–	–	–	–	–
Reporting organizations	–	–	–	–	–	–	–	–	–	–
Machinery and equipment/ new projects	–	–	–	–	–	–	–	–	–	8.43
Reporting organizations	–	–	–	–	–	–	–	–	–	3

Table 7: Use of funds obtained from drawdown on savings by type of investment (Average per reporting organization, Million naira)

Investment type	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Raw materials/ operating cost/ working capital	0.01	0.01	–	–	–	0.25	0.00	33.48	143.34	50.00
Reporting organizations	1	1	–	–	–	2	1	3	3	2
Expansion of financial base	–	–	–	–	2.20	–	0.00	–	–	–
Reporting organizations	–	–	–	–	1	–	1	–	–	–
Repairs, maintenance, etc.	–	–	–	–	–	–	–	–	–	–
Reporting organizations	–	–	–	–	–	–	–	–	–	–
Machinery and equipment/ new projects	–	–	–	–	–	–	–	–	–	–
Reporting organizations	–	–	–	–	–	–	–	–	–	–

Table 8: Use of funds obtained from debentures and other capital market debt instruments, by type of investment (Average per reporting organization, Million naira)

Investment type	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Raw materials/ operating cost/ working capital	–	–	–	–	–	–	–	–	0.50	–
Reporting organizations	–	–	–	–	–	–	–	–	1	–
Expansion of financial base	5.00	–	–	–	–	–	–	–	–	–
Reporting organizations	1	–	–	–	–	–	–	–	–	–
Repairs, maintenance, etc.	–	–	–	–	–	–	–	–	–	–
Reporting organizations	–	–	–	–	–	–	–	–	–	–
Machinery and equipment/ new projects	0.03	–	–	–	–	–	–	–	1.00	–
Reporting organizations	1	–	–	–	–	–	–	–	1	–

Some descriptive determinants of choice of finance sources and investment alternatives

Perceived determinants

Table 9 shows the perceived importance of the different investment finance sources before and after deregulation. It indicates that from the point of view of users of bank credit, retained profit stands out clearly as the most important source of investment finance by the respondent organizations, both before and after deregulation. Next in order of importance is bank credit, while savings is third. Again, when savings and bank credit are taken together, the importance of savings mobilized by the banking system in financing production can be seen.

Table 10 shows the factors identified by the respondents as influencing the choice of the investment finance sources. Among the three most important factors identified for

Table 9: Perceived importance of different finance sources before and after deregulation

	Before deregulation		After deregulation	
	Rank	Percentage choosing rank	Rank	Percentage choosing rank
Bank credit	2	23.2	2	21.4
Share capital increase	4	8.9	4	14.3
Retained earnings	1	44.6	1	44.6
Time and savings deposit drawdown	3	17.9	3	17.9
Debentures	5	7.1	5	7.1

Table 10: Factors influencing the choice of the different financing alternatives used

Financing alternatives		
1.	Bank credit	
	Normal means of financing	4 (20)
	Management policy with regards to financing particular investment	2 (10)
	Relative cheapness before deregulation	7 (35)
	Duration of payment	4 (20)
	Ease of processing	3 (15)
2.	Profit retained	
	Usual business practice of ploughing back profit	20 (35.1)
	Fiscal authority regulation promotes its use	20 (35.1)
	Absence of other immediate investment options	17 (29.8)
3.	Share capital increase	
	Ideal in a situation of embarking on expansions	1 (11.1)
	Cheapest cost of financing	5 (55.6)
	Has some element of permanency	3 (33.3)
4.	Savings drawdown	
	Better earnings from alternative investment over savings	3 (20)
	Ease of implementation	7 (46.7)
	Desire to reduce indebtedness	5 (33.3)

Table 11: Constraints to use of sources of financing productive investment

Financing alternatives	
1. Banking credit	9 (12.7)
Banking bureaucracy/collateral security	22 (30.9)
Preference for short loans by banks	11 (15.5)
High interest rate	29 (40.9)
2. Retained profit	
Usually requires board approval	4 (8.3)
Amount available usually smaller than level of capital required	16 (33.3)
Decrease in purchasing power of retained funds often lead to unprofitability of investment	17 (35.5)
Deregulation of dividend policy	4 (8.3)
Increasing operating costs lower value of amount retained	7 (14.6)
3. Share capital increase	
Reluctance on the part of equity investment e.g., in joint venture	8 (61.5)
Fluctuating dividend policy of firms	5 (38.5)
4. Savings	
Usually smaller than level of capital required	19 (100)

bank credit are:

- Relative cheapness before deregulation;
- Duration of payment;
- Normal means of financing.

The table also shows that retained profit is perceived as a normal means of expanding business because it is often the practice to plough back profit to the company. It is also felt that fiscal authority regulation promotes the use of returned earnings as a means of financing productive investment .

Table 11 gives the constraints identified by the respondents as hampering the use of different sources of investment finance. Of particular importance is the constraint of credit-ceiling which is perceived as affecting the use of bank credit. Though this constraint featured more during the pre-deregulation era, it had not, as yet, been abrogated totally. The table also shows that, as attractive as retained profit may be as a source of investment finance, it has a host of other constraints, emphasising that the firm needs a variety of sources of investment finance to grow and contribute meaningfully to economic development.

Table 12: The relationship between sector of operation, type of ownership, number as well as types of banks used

	Sector of operation				Type of ownership		
	Agriculture & Livestock	Manu-facturing	Cong-lomerate	Others	Wholly Nigerian	Joint venture	Govern ment
1. Number of banks							
1 Bank only	-	3 (13.6)	–	4(16.7)	5(15.6)	2(15.4)	–
2 to 5 banks	1(50.0)	13(59.2)	1(100.0)	18(75.0)	24(74.9)	5(38.4)	4(100.0)
6 to 10 banks	–	4(18.2)	–	1(4.2)	2(6.4)	3(23.1)	–
Above ten banks	1(50.0)	2(9.0)	–	1(4.2)	1(3.1)	3(23.1)	–
2. Types of banks							
Commercial banks only	1(50.0)	11(42.3)	1(100.0)	15(55.6)	19(52.8)	6(40.0)	3(60.0)
Merchant banks only	–	4(15.4)	–	8(29.6)	9(25.0)	2(13.3)	1(20.0)
Both commercial and merchant banks	1(50.0)	11(42.3)	–	4(14.8)	8(22.2)	7(46.7)	1(20.0)

Relationship between selected economic variables and some measures of transmission of savings to investments

Table 12 shows the relationship between number and types of bank used and some economic variables. In general, the use of multiple number of banks for business accounts by the respondent organizations can be seen to be independent of the sector of operations and type of ownership. However, when it comes to the use of more than six banks for business accounts, it can be seen that the manufacturing sector tends to stand out clearly. In the same way, when relating the number of banks where business accounts are kept to the type of ownership, joint-venture organizations tend to keep business accounts with more than six banks than other ownership types.

The table also shows that the sector of operation and the type of ownership affect the choice of types of banks to keep business accounts with. In this regard, while the 'others' sector of operation and wholly Nigerian-owned firms tend to keep accounts mainly with commercial banks, the manufacturing and joint-venture organizations tend to be indifferent, in that there does not seem to be any significant difference in the proportions of the classes of firms patronising commercial banks only, as well as those patronising both commercial and merchant banks. Government parastatals, it will be observed, tend to use commercial banks more significantly.

From Table 13, it can be inferred that the sector of operation and the type of ownership affects the type of credit facilities used. Thus, overdraft tended to be more popular with manufacturing firms before liberalization than after liberalization, while the 'others' sector was more popular after liberalization. Joint-venture companies tend to use overdraft more than wholly Nigerian-owned companies. However, the policy of financial liberalization does not seem to exert any significant effect.

Of particular importance is the fact that manufacturing companies tend to use short-term and long-term loans more than companies in other sectors. The table also suggests that its use appears to be higher after liberalization.

Also, joint-venture companies reported using long-term loans more after liberalization. Overdrafts appear popular with government parastatals, although loans also seem a little popular.

Table 14 shows that the popularity in the use of retained profit as a source of financing productive investment appears independent of the sector of operations, although there are variations in the proportions of respondents reporting usage. However, private sector companies tend to use it significantly higher than parastatals. This is plausible since most parastatals are not for profit-making. Similarly, the use of bank credit appears more popular with conglomerates and manufacturing companies. Joint-venture organizations report using it significantly more than any other types of ownership.

Table 13: Relationship between types of credit facilities used and type of ownership/ sector of operation

	Sectors								Type of ownership					
	Agriculture and livestock		Manufacturing		Conglomerates		Others		Wholly Nigeria		Joint venture		Government parastatal	
	Before 1987	After 1987	Before 1987	After 1987	Before 1987	After 1987	Before 1987	After 1987	Before 1987	After 9187	Before 1987	After 1987	Before 1987	After 1987
Facilities														
Draft	–	–	17 (65.4)	15 (57.7)	1 (100)	1 (100)	–	14 (51.9)	16 (44.4)	17 (47.2)	11 (73.3)	11 (73.3)	3 (60.0)	2 (40.0)
Sources	–	–	4 (15.4)	4 (15.4)	–	–	–	1 (3.7)	3 (8.3)	2 (5.6)	1 (6.7)	3 (20.0)	–	–
Short-term loans	1 (50.0)	–	9 (34.6)	11 (42.3)	–	–	4 (14.8)	4(14.8)	9 (25.0)	10 (27.8)	5 (33.3)	5(33.3)	–	–
Long-term loans up to 5 years	–	–	2 (7.7)	6 (23.1)	–	–	1 (3.7)	3 (11.1)	1 (2.8)	6(16.7)	1 (6.7)	3 (20.0)	–	1 (20.0)
Long-term loans above 5 years	–	–	3 (11.5)	4 (15.4)	–	–	2 (7.4)	2 (7.4)	1 (2.8)	1 (2.8)	2 (13.3)	3 (20.0)	2 (40.0)	2 (40.0)

Table 14: Relationship between sources of finance and sector of operation/ownership type

Sources of finance	Sector of operations				Type of ownership		
	Agriculture and livestock	Manufacturing	Conglomerates	Others	Wholly Nigerian	Joint venture	Government parastatal
Bank credit	1 (50.0)	18 (69.2)	1 (100.0)	12 (44.4)	18 (50.0)	11 (73.3)	3 (60.0)
Retained profit	2 (100.0)	19 (73.1)	1 (100.0)	22 (81.5)	31 (86.1)	11 (73.3)	2 (40.5)
Increase in share capital	1 (50.0)	8 (30.8)	–	6 (22.2)	9 (25.0)	6 (40.0)	–
Savings drawdown	1 (50.0)	6 (23.1)	1 (100.0)	11 (40.7)	9 (25.0)	6 (40.0)	4 (80.0)
Debentures	–	2 (7.7)	–	1 (3.7)	1 (2.8)	1 (6.7)	1 (20.0)

IV Empirical modelling of choice of investment finance alternatives by some Nigerian firms

Some characteristics of the data set

Data used in this study was collected from a subsample of the 56 organizations whose data set were found usable for the analysis used in Section III of this paper. The sole criterion for the choice of sample was that the organization must be an incorporated company operating under the Companies and Allied Matters Decree of 1990. This criterion was imposed to access the required financial data. This reduced the number of organizations in the subsample to about 25 out of which 15 completed the questionnaires.

Data on the variables of interest was collected in a time series format for the period 1981 to 1990. The type of analysis that will be done in the study requires that there should be minimal missing data. Accordingly, data cleaning resulted in the choice of only 10 of the 15 companies that completed the questionnaires.

Data cleaning was also done to ensure that the years under study resulted in minimal missing data. This led to the restriction of the analysis to data collected between 1985 and 1990. In order to satisfy the requirements of the model for large sample size, the time series data so collected was pooled, resulting in about 60 observations for each variable of interest.

Each financial variable used was corrected for firm size by scaling with the fixed assets of the respective organizations. Table 15 shows some descriptive statistics of the pooled time series data set used in the study. It shows, to a large extent, that some variability exists in the data set, except in the case of shareholder fund expressed as a ratio of fixed assets. This suggests that in spite of the smallness of the sample, there is some degree of differences between the measures used. The sources of the variability observed in Table 15 can be gleaned from Table 16, which shows the distribution of means of the financial measures used, controlled for such organization characteristics like type of ownership, sector of operation and the reported financing options used for productive investment.

In general, firms that were joint ventures tended to perform better, while wholly Nigerian-owned companies performed worst. The performance of the government parastatals in this sample is perhaps affected by the fact that only one such organization is in the sample and it is an insurance company. The performance of the manufacturing sector tends to be better than any other sector except for the case of current and total

Table 15: Some descriptive statistics of the pooled time series financial measures used in the analysis (Expressed as ratios of fixed asset)

	Mean	Standard deviation	Maximum
Profit after tax	0.22	0.23	1.28
Retained profit	0.11	0.19	1.28
Total dividend	0.06	0.09	0.49
Current asset	2.78	3.76	22.94
Current liability	1.65	1.80	9.70
Total asset	2.87	3.59	21.59
Total liability	1.63	1.82	9.70
Shareholders' fund	1.26	0.96	4.33
Number of observations used	53	53	53

asset as well as current and total liability where the finance sector has the highest average. This is understandable given the peculiar characteristics of the portfolio of this sector.

When it comes to considering the effect of the reported financing options used, it is difficult to make a general statement about the differences in the means of the variables of interest. Thus, there does not appear to be any significant difference in the average ratio of profit after tax to fixed assets over the different financing options. The same can be said for the ratio of retained profit to fixed assets, except for the fact that the average ratio of organization using debentures is generally about 50% less than that of other options. Also, the differences in the average ratio of dividend paid to fixed asset do not appear significant over the different financing options used.

However, when it comes to considering the ratio of current asset to fixed asset, the average ratios of users of debentures, time and savings deposit drawdown as well as retained profits (demand deposit drawdown) tend to be bigger than the corresponding ratios for users of bank credit and share capital increase. In the same vein, it can be observed that the ratios of current liabilities to fixed assets for firms using debentures and share capital increase as financing sources for productive investment tend to be higher than those of other sectors. While conclusions similar to these two can be drawn with regards to the ratios of total assets and total liabilities respectively to fixed assets, for the firms under study the same cannot be said of the ratio of shareholders' funds to

fixed assets. There does not appear to be any significant difference between them.

The correlation matrix of the variables used in the study is shown in Table 17. The table shows that the following variables are highly correlated:

- Profit after tax and retained profit;
- Total asset and current liability;
- Total liability and current liability;
- Total liability and total asset

Estimation of the discriminant analysis model

In applying the discriminant analysis approach to identifying the determinants of choice of investment-financing alternatives by Nigerian firms, we adopted the 'general to specifics' approach of modern time series econometrics (Hendry, 1980; Hendry and Ericson, 1991) .Although originally specified for time series econometrics of the ordinary least squares genre, the underlying principle of this approach is sufficiently robust for it to be applicable to other analytical approaches of time series econometrics. This approach starts with the most general model and based on the results of estimation and demonstrated properties of the estimates, the model is reduced to a 'comfortably specific' form.

The results of the discriminant model using the most general form of the model specification are presented in Table 18 for each of the financing alternatives. Based on the results of Table 18, the significant determinants of the choice of bank credit as an investment financing mode are:

- Total dividend;
- Current asset; and
- Type of ownership..

This finding is also corroborated by the values of the Wilks' lamda which are smaller for these variables, showing that only in these cases are there differences in the group means of users and non-users of bank credit as a financing option.

Besides, the result is not different from what is expected by theoretical expectations. To be able to get bank credit, bankers look at the ownership and management characteristics of organizations as well as their performance characteristics. It is not surprising, therefore, that type of ownership is highly statistically significant and the standardized coefficient of the variable is positive. The significance of dividend paid and its sign suggests that the higher its value, the better the performance of the company and the more confident the organizations will be in seeking bank credit and the more willing banks will tend to be in extending investment credit. The significance of current assets is in consonance with the commercial loan theory of bank asset management which stipulates that banks, particularly commercial banks, tend to invest in short-term self-liquidating and 'productive' loans. The significance of current asset, therefore, places premium on

Table 16: Distribution of Means of financial measures used by selected organization characteristics (Expressed as ratios of fixed asset)

	Type of ownership				Reported financing options used					Sector of operation			
	Wholly Nigerian	Joint venture	Govt. parastatal	Bank credit	Retained profit demand deposits draw down	Share capital increase	Time and savings deposit draw down	Debenture and other capital market instruments	Manufac-turing	Serviced repair industry	Finance	Medical and health services	Conglomerate
Profit after tax	0.04	0.29	0.11	0.24	0.22	0.27	0.26	0.27	0.30	0.05	0.11	0.04	0.26
Retained profit	0.01	0.14	0.08	0.12	0.11	0.13	0.12	0.05	0.16	0.01	0.08	0.00	0.06
Total dividend	0.00	0.08	0.05	0.04	0.06	0.07	0.04	0.05	0.08	0.01	0.05	0.00	0.08
Current asset	1.67	2.23	8.03	2.22	2.78	2.43	3.37	2.99	2.21	0.09	8.03	2.71	2.38
Current liability	1.94	1.66	1.08	1.81	1.65	1.93	1.70	2.53	1.71	0.55	1.09	2.86	1.38
Total asset	2.67	3.39	–	1.17	2.87	3.61	3.25	5.55	3.40	1.10	–	3.71	3.38
Total liability	2.11	1.76	–	1.77	1.63	2.05	1.60	2.57	1.77	–	–	3.10	1.71
Shareholders' fund	0.67	1.30	1.99	1.18	1.26	1.30	1.42	1.45	1.27	–	2.8	1.12	1.46
Number of observations used	10	37	6	41	53	40	33	11	31	4	6	6	6

Table 17: Correlation matrix of the variables of interest

	Profit after tax	Retained profit	Total dividend	Current asset	Current liability	Total asset	Total liability	Share holders fund
Profit after tax	1.00	-	-	-	-	-	-	-
Retained profit	0.75	1.00	-	-	-	-	-	-
Total dividend	0.05	-0.02	1.00	-	-	-	-	-
Current asset	0.11	-0.06	1.14	1.00	-	-	-	-
Current liability	0.31	-0.03	-0.12	0.43	1.00	-	-	-
Total assets	0.38	-0.06	-0.12	0.37	0.85	1.00	-	-
Total liability	0.29	-0.09	-0.01	0.31	0.87	0.91	1.00	-
Shareholder fund	0.39	0.08	-0.01	0.35	0.46	0.44	0.31	1.00

the ability of firms to be able to pay back the credit as at when due. This finding is in agreement with an earlier one by Soyibo (1991) which shows that Nigerian bankers rank ability of the borrower to repay as the most important factor underlying their lending decisions. Thus, when firms are conscious of their ability to be able to pay their loans as at when due, they tend to be more disposed to seeking bank credit.

The significance of sector of operation as a highly statistically significant determinant of the use of bank credit in financing productive investment by the firms studied also buttressed the findings of Soyibo (1991) where profitability of sector of operation was judged the second-most important factor underlying the lending decisions of the bankers surveyed. This finding is also in consonance with the anticipated income theory of bank asset management. This approach posits that the security of a loan is ultimately determined by the ability of the borrower to repay, which in turn is a function of the borrower's income over the future period when the repayment is due (Elliot, 1984) .

Because of data difficulties (there was only one non-empty group), it was impossible to use the model to investigate the determinants of the demand for retained earnings for financing productive investment. However, Table 18 shows that the significant determinants of choosing share capital increase as a source of productive investment financing by the firms studied are:

- Profit after tax;
- Total asset;
- Current liability;
- Total liability; and
- Ownership structure.

These findings all conform with theoretical expectations. The source of share capital increase for financing productive investment is mainly external to the organization. The variables identified as determinants of the choice of the financing alternatives are the ones normally used by potential shareholders to assess the desirability or otherwise of owning equity in the organization. In particular, profit after tax and total asset are positive

Table 18: Determinants of Financing Alternatives Choice and Estimated Discriminant Functions - the General Model

A. Determinants				B. Standardized canomical discriminant functions	
Variable	Wilks' Lambda[1]	F	Significance	Variable	
1. Bank credit					
Profit after tax	0.99	.78	.38	Profit after tax	-0.40
Total dividend	0.79	13.67	.00	Total Dividend	0.50
Current asset	0.92	4.42	.04	Current asset	0.32
Total asset	0.93	3.66	.06	Total asset	-1.97
Current liability	0.97	1.51	.23	Current Liability	-0.96
Total liability	0.98	1.29	.26	Retained profit	-0.03
Share of household fund	0.97	1.38	.25	Total liability	2.66
Sector of operation	0.99	.46	.50	Share of Household fund	0.461
Type of ownership	0.58	37.45	.00	Sector of operation	-0.43
				Type of ownership	1.04
				Per cent of correct classification	94.6
2. Retained profit					
Cannot be estimated because it has only one non-empty group.					
3. Share capital increase					
Profit after tax	0.88	7.054	.01	Profit after tax	0.51
Total dividend	0.98	1.19	.28	Total dividend	0.39
Current asset	0.97	1.42	.24	Current asset	-0.29
Total asset	0.87	7.87	.00	Current liability	-0.16
Current liability	0.92	4.36	.04	Retained profit	0.17
Retained profit	0.96	1.98	.16	Total liability	0.31
Total liability	0.83	10.44	.00	Share of household fund	-0.02
Share of household fund	1.0	.25	.61	Sector of operation	0.38
Sector of operation	0.99	.30	.58	Type of ownership	-0.51
Type of ownership	0.83	10.4	.00	Per cent of correct classification	81.1
4. Time and savings deposit drawdown					
Profit after tax	0.95	2.63	.11	Profit after tax	0.87
Total dividend	0.94	3.18	.08	Total dividend	-0.54
Current asset	0.96	2.18	.15	Current asset	-0.27
Total asset	0.98	.96	.33	Total asset	1.31
Current liability	1.0	.08	.78	Current liability	-0.34
Retained profit	0.99	.37	.54	Retained profit	-0.48
Total liability	1.00	.03	.88	Total liability	-0.77
Share of household fund	0.96	2.39	.12	Share of household fund	-0.36
Sector of operation	1.00	.87	.98	Sector of operation	0.34
Type of ownership	0.89	6.18	.02	Type of ownership	0.51
				Per cent of correct classification	75.5
5. Debentures and other capital market debt instrument					
Profit after tax	0.99	.62	.44	Profit after tax	-0.33

Table 18....continued

Total dividend	0.99	.44	.51	Total dividend	0.22
Current asset	1.00	.04	.84	Current asset	0.47
Total asset	0.85	8.90	.00	Total asset	-1.11
Current liability	0.94	3.52	.07	Current liability	-0.06
Retained profit	0.97	1.38	.25	Retained profit	0.75
Total liability	0.93	3.94	.05	Total liability	0.31
Share of household fund	1.00	.53	.47	Share of household fund	0.26
Sector of operation	0.88	7.20	.01	Sector of operation	0.26
Type of ownership	1.00	.03	.86	Type of ownership	-0.44
				Per cent of correct classification	83.0

Note: 1. See footnote 1.

determinants often used by investors in taking up shares in firm's as shown by the results of Table 18.

Similarly, current and total liabilities are also used to assess investing in share capital. The conflicting signs on current and total liabilities may be due to which perspective (either the organization or the potential investor) is being considered. Considering the organization's perspective in choosing share capital increase as a source for financing productive investing, the differences in sign on the coefficient of the two variables will be seen not to conflict. The higher the ratio of current liabilities to fixed asset, the more reluctant an organization will likely be in using share capital increase because prospective investors might adjudge the organization not particularly healthy in meeting its current obligation based on the returns on use of its fixed assets. However, in the case of the ratio of total liabilities to fixed assets a higher ratio might be interpreted as a measure of credit-worthiness of the firm by potential investors and hence its coefficient can be positive. The negative sign on the coefficient of type of ownership may be interpreted as being due to a large proportion of unquoted companies mainly joint ventures and wholly-owned Nigerian firms in the subsample. Because of the 'closed' ownership characteristics of such companies, there is likely to be an inverse relationship between desire to choose the option and the variable.

The choice of time and savings deposit drawdown as a means of financing productive investment is only mainly dependent on the type of ownership, although total dividend is weakly significant at the 8% level. The significant determinants of the use of debentures and other capital market debt instruments as a means of financing productive investment as shown in Table 18 are:

- Current assets;
- Total liabilities; and
- Sector of operation.

These findings, as in the case of the others above, seem to be in conformity with theoretical expectation in that the variables are some of the measures that are used by potential investors in buying the debentures of the organization.

It is debatable that the determinants of the various financing options identified in the foregoing are more associated with supply than demand. In general, users of the different options tend to be aware of the factors that can strengthen their success in getting the required financing option from suppliers. Thus, supply determinants can be anticipated by users, leading to a coincidence of determinants of supply and demand as the results show.

The problem of multicollinearity is recognized in the estimates of Table 18. Following the principles of 'general to specific' methodology, some variables which are highly correlated and those which are not significant were dropped from the model, resulting in the estimates of Table 19. This is because the presence of multocolinearity variables which otherwise would not have been signifcant, tend to behave as if they wee significant. However, Norusis (1990) asserts that the problem of multicollinearity in discriminant analysis affects the interpretation of the coefficient and sign of the estimate. There is hardly any affects on the significance of the variables and their levels of significance as will be shown later. Thus, in investigating the determinants of a dependent variable, multicollinearity may not be too much of a problem if one is not interested in interpreting the coefficients of the variables.

It will be seen that the significant determinants of using bank credit to finance productive investment identified in Table 18 are mostly the same as those of Table 19. In addition, their levels of significance are exactly the same, although there is a slight fall in the percentage of correct classification by the model. In the case of the choice of share capital increase, two models were estimated. It is easily seen that the significance of the chosen variables as well as their levels are exactly as they are in Table 18. However, it can be seen that there is some difference in the magnitudes of the coefficient of these variables. The conclusions drawn above can easily be seen to be true of the other two investment options choices: time and savings deposit drawdown and debentures and other capital market instruments .

To interpret the coefficients of the estimated variables, we shall therefore use the estimates of Table 19. It can be seen that total dividend paid and type of ownership have similar magnitude of impact on the choice of bank credit as a source of financing productive investment. This suggests that highly dividend yielding organizations tend to be owned (and perhaps managed as well) by those that are credit-worthy. A policy implication of this for banks is the need to target high dividend-paying companies for bank credit, perhaps using the principles of management-by-exception which stipulates that management needs to pay more attention to critical activities or highly-paying investment than the others. One implication of this finding for organizations is that to be successful in getting bank credit for productive investment, there is a need to have highly credit-worthy ownership and that firms must work hard to improve not only their market values but also the worth of their owners through payment of dividend.

When it comes to comparisons between variables, both total dividend and type of ownership exert twice the influence on the choice of bank credit as a source of financing productive investment as either current asset or total asset. This has a policy implication for credit-marketing in banks; suggesting that in credit assessment of potential corporate customers, more emphasis may need to be placed on total dividend (or profitability) and

Table 19: Determinants of financing alternatives choice and estimated discriminant functions - the specific models

A. Determinants				B. Standardized canomical dis criminant functions	
Variable	Wilks' Lambda	F	Significance	Variable	
1.Bank Credit					
Total dividend	0.79	13.67	.00	Total dividend	0.74
Current asset	0.79	4.42	.04	Current asset	0.33
Total asset	0.93	3.66	.06	Total asset	-0.33
Type of ownership	0.58	37.45	.00	type of ownership	0.77
				Per cent of correct classification	94.3
2.Share capital increase					
(a)					
Profit after tax	0.88	7.054	.01	Profit after tax	0.64
Type of ownership	0.83	10.40	.00	Total asset	-0.17
Current liability	0.92	4.364	.04	Type of ownership	-0.62
Total liability	0.83	10.44	.00	Current liability	-0.38
				Total liability	0.88
				Per cent of correct classification	83.0
(b)					
Profit after tax	0.88	7.05	.01	Profit after tax	0.64
Total asset	0.87	7.87	.00	Total asset	-0.26
Type of ownership	0.83	10.40	.00	Type of ownership	-0.68
Total liability	0.83	10.44	.00	Total liability	0.63
				Per cent of correct classification	84.9
3.Time and savings deposit drawdown					
Total dividend	0.94	3.18	.08	Total dividend	-.69
Type of ownership	0.89	6.18	.02	Type of ownership	0.87
				Per cent of correct classification	75.0
4.Debenture and other capital market debt instruments					
Total asset	.85	8.89	.00	Total asset	0.35
Current liability	.93	3.51	.06	Current liability	-0.16
Total liability	.92	3.93	.05	Total liability	-0.49
Sector	.87	7.19	.05	Sector	-0.66
				Per cent of correct classification	81.1

type of ownership than the other two variables.

Also, it will be observed that for the choice of bank credit as a means of financing productive investment by the firms studied, current assets and total asset have equal but

opposite effects. This suggests that firms with high current asset tend to take more credit for financing productive investment while those which have high total assets tend to take less credit.

When it comes to drawing down corporate time and savings deposit to finance productive investment, type of ownership exerts a strong influence. Besides, the impact of total dividend is also in the opposite direction. Thus, high dividend-paying firms tend not to draw down on their time and savings deposit for financing productive investment. A policy implication of this for credit marketing planning by banks is to focus on high dividend-paying firms as potential corporate time and savings depositors. Similar interpretations as those above can be given for the choice of the other investment-financing alternatives .

Another policy implication of this study relates to the use of discriminant analysis for predicting potential customers by banks and capital market operators. Banks can use the model to predict whether a firm can be its potential customer in demanding bank credit or drawing down its time and savings deposit to finance productive investment. In the same way, capital market operators can use the model to predict whether a firm will come to the capital market to increase its share or raise debentures for financing productive investments. This can be done simply by substituting the corresponding firm's variable into the relevant discriminant equation.

Government can also target specific significant variables of the different financing options by designing policies to make them move in the directions specified by the study. For example, to promote use of bank credits, policies that can increase dividend may be desirable.

Estimation of the logistic regression analysis model

The estimates of the logistic regression equations of the choice of productive investment-finance options by the Nigerian firms studied are shown in Table 20. The results show that the performance of logistic regression modelling of productive investment-finance choice is not as good as that of the discriminant analysis approach. For example, in estimating the determinants of bank credit as a source for financing productive investment, no variable is significant at the 5% level. Total dividend is weakly significant at the 7% level. This contrasts sharply with the result obtained using discriminant analysis, where dividend as a ratio of fixed asset is highly statistically significant. Besides, three other variables were identified as significant determinants of the choice of bank credit for productive investment.

Table 20: Determinants of financing alternatives choice using logistic regression analysis

Variable	Coefficient	S.E.	Wald2	df	Sig	R3	Exp (Coeff.)		Chi-square	df	Significance
1. Bank Credit											
Type of ownership	41.31	64.58	0.40	1	0.52	.0000	8.74E+17	-2 Log likelihood	12.81	46	1.00
Sector of operation	-1.05	15.85	0.00	1	0.95	.0000	0.35	Model Chi-sqaure	43.89	6	.00
Current asset	-2.69	2.07	1.70	1	0.19	.0000	0.07	Improvement	43.89	6	.00
Share of household fund	2.65	2.22	1.41	1	0.23	.0000	14.08	Goodness of fit	11.99	46	1.00
Total dividend	43.75	24.31	3.24	1	0.07	.1478	1.00E+19				
Total asset	1.13	1.25	0.82	1	0.36	.0000	3.10	Per cent of correct classification			92.5
Constant	-86.88	114.77	0.57	1	0.45						
2. Share Capital Increases											
Type of ownership	-1.92	1.85	1.07	1	.30	.00	.15	-2 Log likelihood	11.52	47	1.00
Profit after tax	-34.88	16.39	4.53	1	.03	-.21	.00	Model Chi-square	47.53	5	.00
Total asset	12.96	6.14	4.45	1	.04	.20	.00	Improvement	47.53	5	.00
Total liability	4.25	2.88	2.18	1	.14	.06	70.38	Goodness to fit	13.13	47	1.00
Constant	18.15	8.68	4.37	1	.04			Percent of correct classification			96.2
3. Time and Savings Deposit Drawdown											
Total dividend	9.95	5.49	3.29	1	.07	.14	20993.28	-2 Log likelihood	57.50	50	.21
Type of ownership	-1.7	.73	5.55	1	.02	-.23	0.18	Model Chi-square	12.75	2	.00
								Improvement	46.56	50	.61
								Goodness of fit			
								Per cent of correct classification			85.3
4. Debentures and Other Capital Market Debt Instruments											
Sector of operation	7.80	36.77	.05	1	.83	.00	2450.77	-2 Log likelihood	34.37	47	.92
Total dividend	3.94	5.50	.51	1	.48	.00	51.17	Model Chi-square	19.76	5	.00
Total asset	-.34	.48	.67	1	.41	.00	.67	Improvement	19.76	5	.00
Current liability	.33	.88	.14	1	.71	.00	1.39	Goodness of fit	29.35	47	.98
Total liability	.05	.82	.00	1	.96	.00	1.05				
Constant	-22.43	110.34	.04	1	.84			Per cent of correct classification			84.6

Note: 2 See footnote 2. See footnote 3.

In terms of the determinants of use of share capital increase in financing productive investment, the logistic regression approach identifies two significant determinants. These are profit after tax and total asset. This is similar to the findings of the approach using discriminant analysis, except that the latter approach identified three additional determinants of this financing alternative.

It is only in respect of the determinants of the choice of drawdown on time and savings deposit as a source of financing productive investment that the results obtained using logistic regression analysis are identical with that obtained using discriminant analysis. They also have a comparable level of significance. In particular, the level of significance of the variables using logistic regression analysis is better. The identified determinants of the choice of drawdown on corporate and savings deposit are total dividend paid and type of ownership .

In the case of the use of debentures and other capital market debt instruments for financing productive investment, the model performed most poorly, identifying not even a significant variable. This contrasts sharply with the estimation using discriminant analysis which identified three significant determinants. In general, the poor performance of logistic regression modelling for estimating determinants of different productive investment-financing choices, deserves further investigation. Issues relating to the cause of such poor performance and more diagnostic studies on the fulfillment of the underlying assumptions of the model are among those that will require further investigation .

Unlike discriminant analysis, the interpretation of the coefficients of the logistic regression equation is not as direct. It is easier to estimate the antilogarithm of the coefficients, that is the exponent of the coefficient Exp (coeff) in Table 20. This is interpreted as the factor by which odds change when a particular independent variable is increased by a unit. If the coefficient is positive, this value is greater than 1 and if it is negative, the value is less than 1. When the factor is zero, it !eaves the odds unchanged.

V Summary, recommendations and conclusions

In this study, we analyzed the characteristics of the demand side of the savings-investment process in Nigeria using two approaches; a descriptive approach and a modelling approach.

Major findings of the descriptive approach

The descriptive approach attempted to characterize the relative importance of the different sources of investment finance to users of bank credit. While most Nigerian organizations studied tended to use the services of multiple banks, the use of retained profit in financing productive investment is judged more important than that of both bank credit and that of drawing down of corporate time and savings deposit in the banking system. In terms of order of importance, the respondent organizations ranked the different sources as follows:

- Retained profit (drawing down on demand deposits);
- Bank credit;
- Drawing down of corporate time and savings deposits;
- Share capital increase; and
- Debentures and other capital market debt instruments.

In terms of relative volume of the different sources, increase in share capital has a dominant position but is used by very few companies. However, in terms of consistency of use, retained profit still has a pre-eminent position.

When bank credit is taken together with drawing down of corporate savings in the banking system, the contribution of longer-term savings mobilized by banks to investment financing is quite enormous. In this regard, the study has shown that the transmission of savings to investment in Nigeria is done using at least two approaches: a direct approach using bank credit and an indirect approach by drawing down corporate savings (demand and time) in the bank. In particular, drawing down corporate time and savings deposit became more popular by volume and number of organizations using it after liberalization, apparently because of the higher cost of funds. This suggests that there is need to mollify the harsh effects of costs of funds, if increased savings mobilized by the banks as a result of liberalization are to be effectively channelled to investments through bank crèdits.

This aspect of the study also identified some perceived factors promoting the use of the different sources of finance in financing productive investment in Nigeria as well as

factors inhibiting their use. From the point of view of users of bank credit, the relative cheapness of bank credit before deregulation and the duration of payment, among others, are some of the major factors promoting its use while the use of credit ceiling is seen as a major constraint to its use.

It has also been shown by this part of the study that certain economic variables affect some measures of transmission of savings to investment. Thus, while the use of retained profit in financing productive investment is independent of the sector of operation, it is affected by type of ownership as private sector companies tend to use it more. Similarly, bank credit tends to be used more by manufacturing organizations and conglomerates.

Major findings of the modelling aspect of the study

This part of the study analyzed the investment-financing choice patterns of some Nigerian firms by estimating a model of the determinants of investment-finance choice using two approaches: discriminant analysis and logistic regression analysis. It identified the determinants of four major productive investment-finance alternatives used:

- Bank credit;
- Share capital increase;
- Drawing down on corporate, time and savings deposit; and
- Debentures and other capital market debt instruments.

We adopted the 'general-to-specific' methodology of modern time-series econometrics in carrying out the analysis.

In general, the discriminant analysis model performed better than the logistic regression model. Accordingly, an area of further research should investigate the factors responsible for the poor performance of the logistic model. In particular, there is a need to conduct more diagnostic tests on the fulfillment of the underlying assumptions of the model and what needs to be done to improve the performance of the logistic regression model. Other major findings can be summarized as follows:

1. The significant determinants of the choice of bank credit in financing productive investment by the firms studied are:
    - Total dividend paid;
    - Current asset;
    - Total asset; and
    - Type of ownership.

2. The significant determinants of the use of share capital increase as a productive investment-financing option are:
    - Profit after tax;

- current liability;
- Total asset;
- Total liability; and
- Type of ownership.

3. In the case of drawdown on corporate time and savings deposit, the study identified its significant determinants as:
   - Total dividend paid; and
   - Type of ownership.

4. The study also established that the choice of debentures as a financing option for productive investment by the firms studied depends on:
   - total asset;
   - total liability; and
   - sector of operation of the firm.

The study recommends that banks should adopt credit marketing planning by targeting the identified significant variables and focusing on them in accordance with the management-by-exception principle.

In addition, the significant variables identified for the choice of drawdown on corporate time and savings deposit as an investment finance option would also need to be manipulated by banks in their favour. In this regard, banks will need to exploit the relative magnitudes and signs of the estimated coefficient of significant variables of the two financing options within their purview to their advantage.

The study also recommends the adoption of modelling demand for investment-financing options by the money and capital market operators. Both operators can use the models to classify potential corporate customers into groups that could then demand financing options which the operators could supply.

Limitation of study and conclusion

The dropping of data on cost characteristics of financing option whose choice determinants are being investigated from the model, tends to make the determinants identified look more like the determinants of the supply side of the various financing options. This is a major limitation of this study. In spite of this, the results of the modelling aspect of the study can still be regarded as identifying the significant determinants of the demand for the various financing alternatives study. This is because firms, from experience, tend to anticipate what providers of finance will require in their demand for finance. Consequently, it is no surprise that the determinants of choice of finance options by users will tend to coincide with the determinants of supply of these alternatives.

In conclusion, the results of this study corroborated some of the views of suppliers of

bank credit on the factors that can inhibit its use. For example, Soyibo (1991) indicated that bankers believed that high cost of funds could inhibit the use of bank credit for productive investment. This study has shown that in the face of high cost of fund, users of bank credit, while not abandoning it, tend to complement it with less costly funds; drawing down on corporate time and savings deposit and making more use of retained earnings. The study has also identified factors that can promote the transmission of savings of the financial system to productive investment and suggested that managements of banks as well as government will need to exploit the characteristics of these determinants to advantage in order to facilitate the transmission mechanism.

Notes

1. Wilks' Lamda, sometimes called the U statistic, is a statistic whose value for each variable is obtained as a ratio of the within-groups sum of squares to total sum of squares. A lamda of 1 occurs when observed group means are equal. Values close to 0 occur when within-groups variability is small compared to total variability, that is when most of the total variability is attributable to differences between means of the groups. Thus large values of lamda indicate that group means do not appear to be different, while small values indicate that group means do appear to be different (Norusis, 1990) . For example, in Table 18 under the bank credit as a financing option, the Wilk's Lamda for type of ownership, total dividends and current asset indicate that group means of users and non-users of this financing option in the sample appear different. Of course, this is also indicated by the level of significance which is higher, the lower the level of the Wilks' Lamda.

2. The Wald Statistic is used in testing hypotheses about the coefficients of the logistic regression being non-zero. The statistic has a chi-square distribution. When a variable has a single degree of freedom, the Wald Statistic is given by the square of the ratio of the coefficient to its standard error. For categorical variables, the statistic has degrees of freedom equal to one less than the number of categories.

3. The R-statistic in logistic regression is a partial correlation statistic. As in the case of multiple regression, the contribution of individual variables is difficult to determine, particularly when independent variables are highly correlated. The values of R range from -1 to +1. A positive value of R indicates that as the variable increases in value, so does the likelihood of the event occurring. When it is negative, the converse is true. Small values of R indicate that the variable has a small contribution to the model. The R statistic is computed using the equation:

$$R = \frac{(Wald\ \ Statistic - 2K)}{-2LL_{(0)}}$$

The denominator is -2 times the log likelihood of a base model that contains only the intercept or a model with no variables if there is no intercept. If the Wald Statistic is less than 2, R is set to zero. K is the number of variables.

Appendix A:

An empirical investigation of the transmission of savings to investment in Nigeria

Questionnaire

Part I:

A Background information

1. Respondent Code No:

2. Type of business:

3. Please indicate the sector(s) of operation of your business:

   1 Agriculture / Livestock
   2. Forestry and Fisheries
   3. Manufacturing and Crafts
   4. Service and Repair Industry
   5. Building Construction
   6. Distributive Trade/General Commerce
   7 Financial Services (Banking, Insurance, Finance, Houses, etc.)
   8. Hotels, Restaurant and Entertainment Services
   9. Transportation and Communication
   10. Public Utilities
   11. Education
   12. Medical and Health Services
   13. Conglomerate
   14. Others (Please specify)

4. Type of ownership:-

   1. Wholly Nigeria
   2. Joint Venture
   3. Wholly Foreign
   4. Government Parastatal

5. Whether quoted on the Stock Exchange:

   1. Yes 2. No

6. (a) Approved share capital N

   (b) Paid-Up share capital N

7. Please complete the following table in the turnover of your organization in the last five years

	1986	1987	1988	1989	1990
Turnover (N)					

8. With how many banks does your organization operate business accounts ? bank (s).

9. Indicate the type(s) of bank your organization deals with in question 9: (Please tick)

	Before 1987	After 1987
1. Commercial banks only		
2. Merchant banks only		
3. Both commercial and merchant banks		

10. Indicate which of the following credit facilities your business has enjoyed from your bank(s).

	Before 1987	After 1987
1. Overdraft		
2. Advances		
3. Short-term loans		
4. Long-term loans of up to 5 years		
5. Long-term loans over 5 years		
6. Others (please specify)		

Appendix B

Financing productive investments

11. What are the different sources of finance used by your organization in financing productive investments?

    1. Bank credit
    2. Retained profit
    3. Increase in share capital
    4. Savings
    5. Debentures and other capital market debt instruments
    6. Others (please specify)

12. Please indicate your perception of the order of importance of the different sources of financing to your organization before and after financial deregulation in the country (rank 1 for the most important; 2 for the next most important, etc. Of course, factors of the same importance are ranked the same.)

	Before Deregulation	After Deregulation
1. Bank credit		
2. Retained profit		
3. Share capital increase		
4. Savings		
5. Debentures and other capital market debt instruments		
6. Others (please specify)		

13. Please indicate the factors influencing the ranking given in Question 12.

Part II

14. Please indicate the amounts of the different sources of finance mentioned in question

12 used by your organization in financing productive investments over the last 10 years.

Source of finance	Amount (Naira)									
	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
1. Bank Credit										
2. Retained Profit										
3. Share Capital Increase										
4. Savings										
5. Debentures and other Capital Market Debt Instruments										
6. Others (please specify)										

15. What factors influence the choice of the different sources?

Sources	Factors influencing choice
1. Bank credit	
2. Retained profit	
3. Share capital increase	
4. Savings	
5. Debentures and other capital market debt instruments	
6 . Others (please specify)	

16. What are the constraints to the use of these different sources in financing productive investment in the Nigerian environment?

Sources	Constraints to use of sources
1. Bank credit	
2. Retained profit	
3. Share capital increase	
4. Savings	
5. Debentures and other capital market debt instruments	
6 . Others (please specify)	

17. Please complete the following tables about the structure of the (investment) alternative uses of the different funds used in financing productive investment.

17 (i) Bank credit

Year	Type(s)	Amount (₦)

17 (ii) Retained profit

Year	Type(s) of investment	Amount (₦)

17 (iii) Share capital increase

Year	Type(s) of investment	Amount (₦)

17 (iv) Savings

Year	Type (s) of investment	Amount (₦)

17 (v) Debentures and other capital market debt instruments

Year	Type (s) of investment	Amount (₦)

17 (vi) Others (please specify)

Year	Type(s) of investment	Amount (₦)

18. Please indicate the factors influencing the investment choices mentioned in Question 18.

19. What are the constraints inhibiting the transmission of the different sources of finance to productive investment in Nigeria?

Sources	Constraints inhibiting transmission to productive Investment
1. Bank credit	
2. Retained Profit	
3. Share Capital Increase	
4. Savings	
5. Debentures and Other Capital Market Debt Instruments	
6. Others (Please specify)	

20. Please assess the impact of different regulatory regimes on the investment choices given in Question 18.

Appendix C:

The transmission of savings to investment in Nigeria: A follow up study.

Respondent's code:

Variables	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
1. Profit after tax (₦ Million)										
2. Retained profit (₦ Million)										
3. Total dividend (₦ Million)										
4. Fixed assets (₦ Million)										
5. Current assets (₦ Million)										
6. Current liabilities (₦ Million)										
7. Total assets (₦ Million)										
8. Total liabilities (₦ Million)										
9. Shareholders fund (₦ Million)										
10. Total investment on capital projects (₦ Million)										
11. Total interest earned on banking savings (₦ Million)										

References

Adekanye, F . A. 1993. *"Commercial bank performance in a developing country: A multivariate regression analysis approach"*, PhD thesis (forthcoming) Department of Banking and Finance, City University. London.

Akin, J.C., C.C. Griffin, D.K. Guilkey and B.M. Popkin. 1983. *"The demand for health services in the third world"*."Rowan and Allanheld, Totousa, N.J.

Arrieta, G.M.G. 1988. "Interest rates, savings and growth in LDCs: An assessment of recent empirical research". *World Development* 16(5). 589–605.

Bhatia, R.J. and D.R. Khatkhate. 1975. "Financial-intermediation, savings mobilization and entrepreneurial development: The african experience", *IMF Staff Papers* 22(1): 132–158.

Bitran, R. 1989. *"Household demand for medical care in Santo Domingo, Dominican Republic"*. Health Care Financing in Latin America and the Caribbean Research Report No. 9. State University of New York. Stony Brook, N . Y.

Cooley, W.W. and P. R. Lohnes. 1962. *"Multivariate procedures for the behavioural sciences."*. John Wiley. New York.

Elliot, J.W. 1984. *"Money, banking and financial markets"*. West Publishing Company. St. Paul, Minnesota.

Fry, M.J. 1978. "Money and capital or financial deepening in economic development". *Journal of Money, Credit and Banking*. 10(4): 464–475 .

Fry, M.J. 1982. "Models of financially repressed economies". *World Development* 10(9): 731–750.

Greene, J. and D. Villaneva. 1990. "Private investment in developing countries: An empirical analysis". *IMF Staff Working Papers* (April).

Hemphill, J.K., D.E. Griffths and N. Federiksen. 1962. *"Administrative performance and personality"*. Teachers College Press, Columbia University. New York.

Hendry, D.F. 1980. "Econometrics-Alchemy or Science". *Econometrica* 47: 387–406.

Hendry, D.F. and N.R. Ericson. 1991. *"An econometric analysis of UK money demand in monetary trends in the United States and the United Kingdom "*. By Milton Friedman and Anna J . Schwartz" . American Economic Review. 81 (1): 8—38 .

Mbanefoh, G.F. and A. Soyibo. 1991. *"A model of healthcare provider choice in Nigeria"*. Paper presented at the Annual Conference of the International Health Policy Program. Nyon, Switzerland. November 18–22.

McKinnon, R. I. 1973. *"Money and capital in economic development "*. Washington DC. The Brookings Institution.

Molho, L.E. 1986. "Interest rates, savings and investment in developing countries: A re-examination of McKinnon-Shaw hypotheses". *IMF Staff Papers* 33(1): 90–116.

Mwega, F.M., S.M. Ngola and N. Mwangi. 1990. *"Real interest rates and the mobilization of private savings in Africa: A case study of Kenya".* AERC Research Paper 2. Initiatives Publishers. Nairobi.

Ndulu, B . J. 1990. *"Growth and adjustment in sub-Saharan Africa"*. Paper presented at the World Bank African Economic Issues Conference, Nairobi, Kenya. June.

Norusis, M. J. 1990. *SPSS/PC+ Advanced Statistics*, SPSS Inc. Chicago.

Shaw, E. 1973. *"Financial Deepening in Economic Development".* Oxford University Press. New York.

Soyibo, A. 1991. "The savings-investment process in Nigeria: An empirical investigation of the characteristics of the supply side". Paper presented at the Workshop of the African Economic Research Consortium. Nairobi. Kenya. May. 24–30.

Soyibo, A. and F. Adekanye. 1991. *"Financial system regulation, deregulation and savings mobilization in Nigeria"*. AERC Research Paper. Final Report.

Soyibo, A. and F. Adekanye. 1992. *"The Nigerian banking system in the context of policies of financial regulation and deregulation"*. AERC Research Paper. Final Report.

van Viet P.K.J. and J.M. Gupta. 1973. "THAM V Sodium Bicarbonate in Idiophthic Respiratory Distress Syndrome". *Archives of Disease in Childhood.* 48: 249-255.

52

RP 48
MARCH 1996

THE TRANSMISSION OF SAVINGS TO INVESTMENT IN NIGERIA

Adedoyin Soyibo

EXECUTIVE SUMMARY

Context

Sources of investment finance are often limited in developing countries, in part because highly controlled financial systems are not conducive to promoting savings. Thus one of the reasons for liberalizing financial systems is to stimulate savings to provide funds for investment. In Nigeria, operators of the banking system, as suppliers of credit, were optimistic that the liberalization would promote competition among banks, thus paving the way for better utilization of resources and encouragement of productive investment.

What is the problem?

It has been established that the more attractive the process of accumulating money is, the greater the incentive to invest becomes. The question arises, *to what extent and in what ways does Nigeria's investing public actually transmit the credit received into productive investment?* This study tries to answer these questions by analysing data on the sources of finance used by beneficiaries of bank credit, types of investments and other factors. The study combines information from a survey of firms with an econometric model of investment data.

The savings-investment process in Nigeria

The survey covered 56 of 200 firms in the Lagos-Ogun-Oyo industrial axis that were chosen to reflect location and sector and scale of operation. Over 46% of the firms are in the manu-

AFRICAN ECONOMIC RESEARCH CONSORTIUM
CONSORTIUM POUR LA RECHERCHE ECONOMIQUE EN AFRIQUE

facturing and crafts sector. Most are essentially wholly Nigerian owned, but about one-quarter operate as joint ventures.

Reponding firms generally have business accounts in more than one bank; 59% operate accounts with two to five banks. Commercial banks are more popular than merchant banks, and the number of firms dealing only with merchant banks declined by more than 50% after deregulation.

In terms of the type of credit facilities obtained from banks, overdrafts are the most popular and were not affected by changes in the regulatory regimes. Short-term loans are next in order of importance, and long-term loans are generally unpopular. This suggests that in financing capital projects that have long economic lives, banks may not be popular sources for Nigerian organizations. This may be because, in spite of deregulation, the maturity structure of banks' deposits has not altered significantly. Demand deposits still predominate, and time and savings deposits form a negligible percentage of their deposits.

In terms of numbers of firms, retained profit is the most popular source of financing for productive investment (78%). Next in order of importance are bank credit (57.1%) and drawing down corporate time and savings in the banking system (34%). When the proportion of those that draw down savings from banks is taken along with those that use bank credit as well as retained profit, it can be seen that use of savings mobilized by the banking system is quite high. Use of direct credit, however, is reported by only about half of responding organizations. Debentures and other capital market debt instruments for financing productive investment are least popular of the financing options.

When considered in terms of monetary value, increase in share capital is more popular than other sources of finance, accounting for 25%-60% during the years under study. In terms of the number of user firms, however, this mechanism trails other sources of finance. Retained profit is also an important source in terms of monetary value, with bank credit next, though bank credit accounts for less than 20% of the total volume of the investment portfolio of the average respondent organization.

Retained profits seem to be preferred to bank credits, especially since deregulation, perhaps because of the higher cost of funds.

The number of organizations using bank credit increased marginally after deregulation. When bank credit is taken together with drawing down of corporate savings, the contribution of longer-term mobilized savings accounts for nearly 40% of the productive investment portfolio.

The analysis suggests that the transmission of savings in the bank system to productive investment is done by two major approaches, directly using bank credit, and indirectly using drawn-downs on longer-term corporate savings in banks. Deregulation seems to have promoted the latter approach.

Four classes of investment options were identified:

- Raw materials/operating cost/working capital/inventory expansion.
- Expansion of monetary base, e.g., company stock and debt instruments.
- Repairs and maintenance of existing assets.
- Machinery and equipment/new projects.

Organizations tend to use bank credit more often than not for raw material acquisition, operating costs and working capital, but the average declined after deregulation. Three to five of the firms reported using bank credit to expand their corporate financial base, despite the supposed high cost of such funds. Before deregulation, retained profit was used more for raw material/working capital and financial base expansion, but since deregulation a greater portion of this source of financing is devoted to repairs/maintenance of existing assets.

Among the three most important reasons firms identified for choosing bank credit are relative cheapness (before deregulation), duration of payment and normal means of financing. Retained profit is also seen as a normal means of expanding business because it is often the mechanism for ploughing profit back into the company.

A number of constraints hamper the use of the different sources of investment finance. Particularly important is the credit ceiling; while this was more important before deregulation, it still remains a concern. Retained profit, though attractive, also has many constraints. The indication is that a firm needs a variety of sources of investment finance in order to grow and contribute meaningfully.

Empirical modelling of investment finance alternatives

In the modelling aspect of the study, the performance of firms seemed to directly affect their choice of financing options. Certain variables in this regard are highly correlated. These are profit after tax and retained profit; total assets and current liability; total liability and current liability; and total liability and total assets. Furthermore, the most significant factors in the choice of bank credit as an investment financing mode are total dividend, current assets and type of ownership.

These results are not surprising. Bankers look at the ownership and management characteristics of potential client firms, as well as their performance. Firm managers assess their own ability to handle loans on the basis of their company's performance and prospects. The variables identified as determinants of the choice of financing option are, moreover, virtually the same as those used by potential shareholders to assess the desirability or otherwise of owning equity in a particular organization.

Policy implications

When bank credit is taken together with drawing down of corporate savings in the banking system, the contribution of longer-term savings mobilized by banks is quite enormous. However, the cost of such funds is high, particularly since deregulation, and firms augment bank credit with cheaper sources of funds. There is need to reduce the costs if deregulation is to achieve its full objective of mobilizing savings for productive investment.

Banks need to actively market their credit facilities by fully understanding the motivations and constraints of their clients. They might, for example, adopt systems of modelling the demand for investment financing options. They could use the models to classify potential

corporate customers into groups and tailor financing options accordingly. Both the managers of the financial institutions and government policy makers need to understand the requirements of corporate customers so as to both provide a conducive environment and take maximum advantage of customer requirements to facilitate the transmission of savings.

Other related AERC publications

"Financial System Regulation, Deregulation and Savings Mobilization in Nigeria" by A. Soyibo and F. Adekanye, AERC RP 11, November 1992.

The Savings-Investment Process in nigeria: An Empirical Study of the Supply" by A. Soyibo,AERC RP 12, March 1994.

"The Nigerian Banking System in the Context of Deregulation" by A. Soyibo and F. Adekanye, AERC RP 17, December 1992.

AFRICAN ECONOMIC RESEARCH CONSORTIUM (AERC)

The principal objective of the African Economic Research Consortium (AERC), established in 1988, is to strengthen local capacity for conducting independent, rigorous inquiry into problems pertinent to the management of economies in sub-Saharan Africa. In response to special needs of the region, AERC has adopted a flexible approach to improve the technical skills of local researchers, allow for regional determination of research priorities, strengthen national institutions concerned with economic policy research, and facilitate closer ties between researchers and policy makers. AERC is supported by private foundations, bilateral aid agencies and international organizations. Further information concerning the AERC and its publications can be obtained by writing to:

Manager, Publication & Dissemination
African Economic Research Consortium
8th Floor, International House
P. O. Box 62882, Nairobi, Kenya
Tel: (254-2) 228057 Fax: (254-2) 219308 Telex: 22480

- 56

AFRICAN ECONOMIC RESEARCH CONSORTIUM

P.O. BOX 62882
NAIROBI, KENYA

TELEPHONE (254-2) 228057
225234 215898 212359
332438 225087

TELEX 22480

FAX (254-2) 219308

E-MAIL aerc@elci.gn.apc.org

The principal objective of the African Economic Research Consortium (AERC), established in August 1988, is to strengthen local capacity for conducting independent, rigorous inquiry into problems pertinent to the management of economies in Sub-Saharan Africa.

In response to special needs of the region, AERC has adopted a flexible approach to improve the technical skills of local researchers, allow for regional determination of research priorities, strengthen national institutions concerned with economic policy research, and facilitate closer ties between researchers and policy makers.

Since its establishment, AERC has been supported by private foundations, bilateral aid agencies and international organizations.

SPECIAL PAPERS contain the findings of commissioned studies in furtherance of AERC's programmes for research, training and capacity building.

RESEARCH PAPERS contain the edited and externally reviewed results of research financed by the AERC.

It is AERC's policy that authors of Special and Research Papers are free to use material contained therein in other publications. Views expressed in the Special and Research Papers are those of the authors alone and should not be attributed to the AERC's sponsoring Members, Advisory Committee, or Secretariat.

Further information concerning the AERC and additional copies of Special and Research Papers can be obtained by writing to: African Economic Research Consortium, P.O. Box 62882, Nairobi, Kenya.

ISBN 9966-900-73-X