CREDIT RATIONING IN THE NIGERIA'S COMMERCIAL LOAN MARKET

Adeyemi A. Fajingbesi
B.Sc. (Econs.), M.Sc. (UNILAG)

A THESIS IN THE DEPARTMENT OF ECONOMICS

SUBMITTED TO THE FACULTY OF SOCIAL SCIENCES
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF DOCTOR OF PHILOSOPHY OF
THE UNIVERSITY OF LAGOS

OCTOBER, 1998

DEDICATION

Dedicated to God Almighty for his mercies upon me never ceasest and to my late father Mr. M. A. Fajingbesi and my mother Mrs. A. Fajingbesi for their love and care for me.

ABSTRACT

In this thesis, the concern has been to examine the structure, function and effects of Nigeria's commercial loan market. The main focus has been to empirically test for the incidence of credit rationing in the loan market, explain the rationale, identify the form and magnitude of rationing and examine the effects in the Nigerian economy. With respect to the structure and functions of the loan market, concentration ratio and market share indices were defined and derived as key measures of structure while loan maturity pattern and credit policy compliance are used to measure performance. Examining the reasons for high concentration in the market, the study finds that the two most significant factors with positive impact are capital intensity of banking operation and the rate of growth of the four dominant banks. The most significant factor which explains rivalry (absence of stability in market shares) among the dominant banks is growth in the demand for the services of the banking industry. Market share, the study finds, tends to stabilize as banks grow bigger. These measures present a clearer picture of the structure and the conduct of the market. Thus, by examining the conduct of the loan market, the study incorporates elements of structure-conduct-performance analysis.

This study attempts to develop, based on the assumptions of equilibrium and disequilibrium, a "dynamic credit rationing model" following the logic of the market clearing and minimization conditions, and provides a framework for directly establishing the existence of credit rationing and determine the mode and magnitude. Two novel concepts are introduced, defined and tested empirically for their significance in explaining behaviours of the supply of commercial loans in Nigeria. These concepts are bank-cutomer relationship and loanable fund flow.

The maximization of the likelihood functions of the disequilibrium market model are tested and verified by using two types of unconstrained nonlinear maximization algorithms; namely, the quadratic hill-climbing developed by Goldfeld and Quandt (1974) and the pattern-search method of Hooke and Jeeves (1961). This thesis reports the results obtained using the quadratic hill-climbing method since the method provides in addition, estimates of the asymptotic standard errors. The results obtained from the maximization and regression exercise are very impressive and consistent with what we captured using historical and discriptive analysis. For the period 1970-96, the results show that the Nigeria's commercial loan market wittnessed more periods of excess demand for loans than it had excess supply, indicating, a propenderance of credit rationing. It is also evident by the relatively high significance of the non-market variables that rationing in the Nigeria's loan market is essentially non-price type.

In addition, the results of this study indicate that during periods of tight money, credit rationing tends to speed the effect of monetary policy thus providing quatitative support to the qualitative conclusions of Tucker (1968). The empirical evidence here shows that the effect of dynamic rationing could be asymmetric with respect to tight versus easy money periods.

Also, as part of the empirical work carried out in this thesis, the results suggest that models of commercial loan market which do not explicitly include the effects of disequilibrium are likely to yield inconsistent parameter estimate.

Finally, the models in this thesis show that the specification and estimation of disequilibrium models is pratical and should provide a powerful tool in analysing the behaviour of certain financial markets since such markets are particularly prone to non-price adjustments.

On the basis of these findings, this study recommends, among other things, that it is important first that the loan market should be recognised as having important role to play in assisting the growth of the economy. It is vital to the whole economy that the banks in the market have a satisfactory earning capacity in order that they may take greater risks needed in a changing economy. The performance of these banks can be improved by insisting on sound banking principles in their lending policy. Attempt should therefore be geared towards improving the quality of their staff through training. A greater reliance should be placed on assessing the potential productiveness of loans rather than being content with the offer of colleteral securities and sound past trading records, although, the latter are also important. Greater efforts should also be devoted to making loans more productive to the recipients - loans granted in time, of adequate amounts and on suitable terms together with the offer of necessary financial guidance and advice. To ensure efficient utilization of credits granted and reduce the risks of defaults often associated with borrowers financial distress, loan officers from banks should visit their customers on a very regular basis while the bank customers on the other hands should keep banks informed about their investment plans. One of the reasons for loan market failure is the presence of serious imperfect information resulting from moral hazard and adverse selection which tend to undermine the operation of the loan market. Moral hazard and adverse selection cause investors to raise the price of borrowing which worsen the quality of the pool of borrowers thereby discouraging the provision of funds.

ACKNOWLEDGEMENTS

This thesis is the result of an inspiration. It is the outcome of an urge to provide some useful insight into the structure, functions and effect of commercial loan market with the aim of guiding policy formulation in the financial sector of the Nigerian economy.

The translation of the inspiration and desire for self-fulfillment into this thesis has not been an easy task and was not accomplished single-handedly. Some principal individuals and institutions made very significant contributions that must be acknowledged.

Most deserving of my gratitude is my thesis major supervisor, Professor Siyanbola Tomori. His tremendous interest in the issues addressed in this study led to the correction of some of my mistaken conceptions and, most importantly, provided me with the impetus that saw this thesis through to a happy conclusion. I wish to express my thanks to him for his concern and encouragement. Also most deserving of my gratitude is Dr. Tayo Fakiyesi, my thesis second supervisor, who contributed immensely to the success of this work. Dr. Fakiyesi's generous and special interest and concern provided the catalyst that eventually led to the completion of the thesis.

Besides members of my thesis committee, there are others who left lasting impression on this work. Notable among these are Professor F. A. Olaloku, Dean of Social Sciences; Professor F. O. Fajana; Professor M. O. Adejugbe, Head, Department of Economics, University of Lagos; Dr. O. Odufalu; Dr. K. A. Familoni; Dr. M. A. Fashola, Dr. P. O. Elegalam and Dr. S.O. Akano, whose constructive comments at the early stages of this work raised its value and final quality. I also wish to thank Mr. A.

Toluwase and Dr. B.O. Bolodeoku for their constructive comments and suggestions.

I acknowledge with thanks, the generous interest and concern shown in this work, especially by Professor M. I. Obadan, Director General, National Centre for Economic Management and Administration (NCEMA), Ibadan and Professor Olu Ajakaiye, Director of Research and Economic Development, Nigerian Institute of Social and Economic Research (NISER), Ibadan; Dr. S.I. Ikhide, Dr. S.I. Oladeji, Dr. Tony Akinlo and Mr.Femi Olomola, all of the Department of Economics, Obafemi Awolowo University (OAU) Ile Ife; Dr. Ademola Ariyo of the Department of Economics, University of Ibadan, Dr. Lai Olurode of the Department of Sociology, University of Lagos, Dr Segun Matanmi of LASU, Prof. E. Oladipo of the UNDP, Dr M. O. Odedokun of the University of Swaziland, Prof. S. A. Olanrewaju of African Development Bank, Cote'de Voire, and my very close and good friends Seun Salako, Yemi Makinde and barrister Tunde Adeoye. I also wish to register the assistance I received from Prof. R. E. Quandit of Princeton University, USA and Dr.C. Martin of Department of Economics, Birbeck College, London. My thanks also go to Prof. Paul Collier of the African Economies Study Unit of the Institute of economice and statistics, Oxford University, Oxford; Dr. Chris Adam and Dr.Machicho Nissanke both of the University of Oxford.

I wish to express appreciation to my wife, Mrs Oluyemisi Fajingbesi, my Uncles, Otunba Egr. Kola Fajingbesi, Otunba Bola Onabadejo and Mr. F. A. Fajingbesi and my very dear Mum, Mrs. A. Fajingbesi, my sister and her husband, Alhaji and Mrs. F. A. Tijani and my pastors at Vine Branch Charismatic Church, Rev. Dr. Sola Kolade, Pastors Dotun Ajayi, Muyiwa Bamgbose and Tolu Okusanya for the inspiration, encouragement and support for my academic advancement. They contributed to what I am today.

I also appreciate the support and encouragement from all my professional colleagues, particularly Dr. G. O. Ogiogio, Dr. A. A. Adubi, Dr. (Mrs.) O. S. Komolafe, Dr. E. C. Obioma, Ayo Odusola, Julius Bogunjoko, Lekan Magbagbeola, Toba Bamidele, Patrick Edebor, Mike Okeniyi, Edu Uga, Chris Ehinomen, Sade Ayanrinde (Mrs), and other staff of the NCEMA. The assistance of Segun Okunlola my very deligent secretary for typing the thesis is particularly acknowledged.

Finally, and very importantly, I wish to express my gratitude to the African Economic Research Consultium (AERC) and the Council for the Development of Social Science Research in Africa (CODESRIA) for their generous funding assistance which made it possible to conduct some surveys and carry out data gathering exercise on a much wider scale and the National Centre for Economic Management and Administration (NCEMA) for providing most of the facilities used in the conduct of this study.

Needless to say, none of these people and institutions is responsible for the opinion expressed in this thesis, let alone the errors and omissions it may contain.

I am extremely greatful to the Almighty God for making it possible for me to eventually complete this programme.

October, 1998 **A. A. Fajingbesi**

SCHOOL OF POSTGRADUATE STUDIES
UNIVERSITY OF LAGOS

CERTIFICATION

This is to certify that the thesis:

Submitted to the
School of Postgraduate Studies
University of Lagos

For the award of the degree of

DOCTOR OF PHILOSOPHY (Ph.D)

is a record of original research carried out

By

Adeyemi A. Fajingbesi
in the Department of
Economics

FAJINGBESI ADEYEMI A.		APRIL 12th 1999
AUTHOR'S NAME	**SIGNATURE**	**DATE**
S. TOMORI		12/4/99
1st SUPERVISOR'S NAME	**SIGNATURE**	**DATE**
O. O. FAKIYESI		12-04-99
2ND SUPERVISOR'S NAME	**SIGNATURE**	**DATE**
Prof.		12/4/99
1ST INTERNAL EXAMINER	**SIGNATURE**	**DATE**
2ND INTERNAL EXAMINER	**SIGNATURE**	**DATE**
PROF. ADEDOYIN SOYIBO		12/4/99
EXTERNAL EXAMINER'S NAME	**SIGNATURE**	**DATE**
Dr V. O. Awonusi		12/4/99
P.G. SCHOOL REPRESENTATIVE	**SIGNATURE**	**DATE**

TABLE OF CONTENT

List of Tables

List of Figure

CHAPTER ONE

INTRODUCTION

1.1 The Problem

In recent times, there has been a renewed interest in the operation of commercial loan market as a result of its significant role in the transmission process of government economic policies. It is now generally accepted that the quantity of commercial loan or their changes exert a major influence on the holding of free reserves by banks and thus on the supply of money. Variations in the size and composition of loans by the market also play a special role in transmitting the influence of monetary policy to the economy. For example, the market for bank loans to commercial and industrial customers has long been deemed a key element in the process of income determination through its impact on aggregate economic activity (Mordi, 1986). The commercial loan market is, therefore, one major linkage between the monetary and real sectors of the economy.

Of equal importance also, is the increasing attention that is being paid to the incidence of credit rationing in the market. That is, a condition that arises because of excess demand for loan above its supply. Many factors are responsible for the increasing interest in credit rationing some of which are the followings;

(a) Economists find it paradoxical that sellers would fail to raise prices when the demand for a commodity exceeds the amount supplied. Thus, the primary motivation for most theoretical studies on credit rationing has been the desire to resolve this paradox i.e. to demonstrate that there are plausible circumstances in which it would be rational for lenders to behave in such a seemingly pervading manner.

(b) Since the price system is known to allocate resources efficiently under certain ideal conditions, the question naturally arises whether the non-price allocation of credit has any adverse implications for economic-efficiency either by introducing some new distortions or by increasing the welfare loss from an already existing market imperfections.

(c) The interest in credit rationing originated in the US in the early 1950s with the debate over the "availability doctrine". The central idea underlying this doctrine was that monetary policy could be used to restrain aggregate demand without causing significant increases in interest rates, even if firms demand for investment were highly insensitive to the cost of borrowing as was widely believed to be the case. In particular, it was argued that a restrictive monetary policy would cause banks to reduce the availability of credit and to ration funds among borrowers rather than raise interest rates on loans.

However, the consensus is that commercial loan market is generally competitive but at times, the commercial loan rate does not clear the market. When this occurs, the quantity of loans transacted is constrained by the supply functions and banks therefore engage in non-price rationing of customers.

Nonetheless, issues relating to the existence and rationality of credit rationing, its timing and its differential effects still remain unresolved. Quite frankly, theoretical models have done little to settle these issues. Jaffee (1971) discusses extensively on the causes and mode of credit rationing in the US. Studies on credit rationing in the developed economies abound and some of the issues have been addressed. However, empirical studies on the existence, incidence and mode of credit rationing in developing economies remain inconclusive. If credit rationing exists in the commercial loan market in developing economies, what is the situation in Nigeria?.

As a matter of fact, not until early 1970s was the Nigeria's commercial loan market started to experience dramatic surge in the demand for loans. In most periods in the 1960s, the market was able to satisfy all demands for loans since total demand fell within the range the market desired to accommodate. During this period, all that was needed was to finance commerce (mainly exports) which were then booming. The revenue generated by the country's exports were on few occasions a little short of the finance need of the economy to the extent that demands for loan were most of the period less desirable for efficient loan market operation. However, by the beginning of the 1970s, there was a dramatic change in the market to the extent that for the first time, borrowing became a serious and contentious problem in Nigeria. A number of events were responsible for this change. In the first place, this period corresponds with the end of a three year bloody and destructive civil war 1967-1970. The infrastructural destructions and economic damage caused by the war necessitated the need to borrow on the part of both the government and non-banking public for reconstruction. The effect of the deficit financing especially by the government were two folds. First, deficit financing have the tendency to increase money supply in the economy with no corresponding increase in output especially when what was being financed could not be immediately transformed into increased output (e.g. construction sector). The effect of this was excess money in the economy and consequently inflation. The effect of inflation further engendered increased demand for loans to finance, not only investment but also, consumption. In addition, it also had the effect of reducing savings because accelerated inflation reduces the real returns on savings especially when nominal interest rate is not allowed to move. Second, increased demand for loan by the government prevented a sufficient loan supply to the private sector. The consequence of this was for the banks to ration credit among private borrowers. This became the case since banks cannot deny government and more importantly, the government was disposed to various means with which it coerced banks to satisfy its financial needs. Therefore, the government deliberate action in fixing interest rates can be seen in this light. A plausible argument which comes to mind here is that rather than the social objective of making credit available to investors at a lower cost, government, has deliberately kept lending rate low in order to provide it with cheap money. Infact this action had the tendency to hinder private sector from competing for available funds because the banks were not enthusiastic to give out loans at the fixed interest rates which were lower than competitive market equilibrium rates.

Apart from the after war demand effect on loan, this period also witnessed dramatic changes in government economic policy objectives. In 1972, the government decided to indigenize the economy by an attempt to transfer the control of major economic activities in the economy to indigenes. This action presupposed that major economic activities previously in the hands of foreigners will have to be taken over by indigenes (Nigerians). Expectedly, the prospective investors were not financially well-off to buy over the indigenised activities nor were they credit worthy to qualify for loans.

Nevertheless, the immediate effect of this action was a dramatic increase in application for loans. As would be expected, this action had more than salutory effect on bank loans to the extent that demand for loans was more than double the preceding years. This can be supported at least by the increase in the actual loan disbursed which rose from ₦351.35 million in 1970 to ₦619.51 million in 1972 (CBN. 1972).

In 1973/74 fiscal year, the Nigerian economy was blessed by the windfall of the world oil market boom. This unprecedented income was translated into a rapidly expanded public sector. Consequently, government social responsibility increased ten fold and inflationary pressure was further fuelled by the government unproductive expenditures. These include increase in wages, and imports with the consequent of reducing output and widening the balance of payments deficit. By the end of 1975, the oil boom was disappearing while the traces of it was becoming very unpleasant. The effect of the advent of oil boom in Nigeria was rather too dramatic. First, it changed the consumption pattern from domestic goods to imported goods. Second, the position of agricultural exports as the major source of foreign exchange as well as major source of government revenue changed and taken over by the crude oil. The development pattern became urban biased. As a result of the rapid infrastructural development taking place in the urban areas and the change in the agricultural terms of trade in favour of the modern sector products, there was a massive rural-urban drift. Agricultural activities became neglected, agricultural productivity fell, domestic food supply became insufficient and problematic. To salvage the economy, the government resorted to importing food stuffs to such a ridiculous extent that Nigeria became a net importer of agricultural products for which it was known to be the world leading producer. To the extent that the country's foreign exchange earning fell below its requirement, and the real domestic income level could not guarantee survival, the demand for loans increased while government freezed wage increase. By 1977, the government again entered into a massive expenditure programme by hosting the FESTAC. The immediate effect of this was as expected to exert pressure on the inflation rate. The creation of additional seven states to the existing twelve states and the preparation for transition into the second republic also had their own impact on the demand for loan.

With the advent of civilian administration in 1979, total commercial loan disbursed jumped from ₦3,705.1 million in December 1979 to ₦9,469.7 million by December 1983, an annual average increase of 31 percent (CBN. 1983). During this period, the country witnessed economic recession and as a result of an exacerbating strain in cash flow there was persistent low capacity utilization of its industries.

Official records since the inception of the economic reform programme in 1986 however,show increase in credit to the economy. While this record may be revealing information on total credit to the economy, of significance is the alarming increases in credits to the government sector under the diguise of stabilization policy. For the past fifteen years for instance, in particular since 1983, both commercial and merchant banks have acquired federal government securities at a fast pace. At the same time commercial loan lending has slowed down. The ratio of commercial loan in these banks total asset portfolio has continued to fall. Likewise, the ratio of commercial loan to the treasury bills holding (its substitute) within the banks' assets portfolio has equally fallen (see table

1.1). This development raises concern that banks are substituting securities investments for commercial loan which might worsen the already discouraging situation of banks' refusal to meet the credit requirement of the private investment programme.

Proponents of financial liberalisation have argued that under financial repression, the limited supply of credit is likely to be rationed across projects according to criteria that do not correlate closely with social returns. But when interest rates are decontrolled, two types of improvement may be induced. First a larger volume of investment can be financed because savings have increased. Second, projects with expected returns below the new market clearing rate drop out, while previously rationed high return projects are afforded the chance to compete for funds [Mckinon (1973), Shaw (1973), Fry (1980)].

Table 1.1: **Short Term Asset Holdings of Banks in the Loan Market 1980-1995**

Years/ Total	Commercial Loans of Merchant and Commercial Banks	Treasury Bills Holdings of Commercial and Merchant Banks	Total Assets of Merchant and Commercial Banks
1980	5103.3	1641.1	17349.1
1981	6846.7	968.6	21376.2
1982	8429.0	2361.5	25964.7
1983	9469.7	4736.2	31006.4
1984	9599.3	8173.1	34562.5
1985	10497.4	9018.0	36999.0
1986	14275.4	3160.0	48124.1
1987	15757.7	5511.1	62109.7
1988	18852.2	5433.0	75230.8
1989	19816.0	2602.6	86660.9
1990	24777.5	802.5	110378.0
1991	31419.5	6927.2	155457.7
1992	39446.9	6185.8	272278.5
1993	64389.7	38245.5	320577.4
1994	90926.5	36924.2	407342.7
1995	132616.2	19817.4	555472.6

Source: CBN, Statistical Bulletin, 1995

With the deregulation of the financial sector in 1987, the loan market was given a greater role in providing and allocating credits. Thus it was expected that abrupt distortions of credit flows to the productive and real sectors which characterised the pre 1986 era would diminish. However, while some studies conducted so far to buttress this position have confirmed that there is some relationship between savings mobilization and financial liberalization in Nigeria e.g.[Ndekwu (1989), Soyibo and Adekanye (1991), Asogwa (1993)] other studies have also shown that the savings are, however, not transmitted to investment especially in small business (Soyibo, 1991). This means that banks are not investing in loans especially the commercial loan.

Surprisingly, while we have been inuandiated with reported cases of banks overshooting the government prescribed credit targets since the financial sector was deregulated in 1987, investors from the private sector have at the same time been complaining of being starved of funds by the banks' refusal to grant their loans requests. We might therefore want to ask, where are the credits, when low capacity utilization persisted while unintended inventory build up accumulated because of scarcity of working capital?. What is responsible for the reduced lending by banks, and the inability of apparently credit worthy borrowers to obtain loans?. Apparently, the banks must have been engaging in some kinds of rationing of credits in the loan market.

In a weak economy, the demand for loans may fall or the credit worthiness of prospective borrowers may deteriorate. More still, lenders may become reluctant to lend either because they have funding problems stemming from disintermediation or because their regulators had urged credit restraint, (Cantor and Wenninger, 1993). In the

Nigeria's commercial loan market, none of the above conditions could have been affirmatively offered, at least,not in the last ten years as reason for the continued slow down in lending and the move towards securitization by the banks.

In other economies, several writers have attributed a similar situation observed in the loan market to either demand or supply factors [Kliesen and Taton (1992), Cantor and Wenninger (1993)]. It is argued that while the reduced willingness by banks to lend measures the supply side, the reduced loan demand by worthy businesses measures the demand side. Despite this line of argument it is difficult to disentangle the supply from the demand factors. However, one way by which the supply versus demand question may be resolved is to examine the existence and implications of credit rationing in the loan market.

Mainwhile, in Nigeria,the issue of credit rationing has never been subjected to any empirical discussion as far as we aware. At best, if any mention has been made at all, it is the work of Ikhide (1997). Other existing work particularly on the commercial banks loan market have only concentrated attention in identifying factors of the demand for and supply of loans (see Ojo 1978), Ajayi and Ojo (1986), Lambo (1986), Adewunmi (1984), Mordi (1986), Asogwa (1993). In other words, as far as we know, no attempt has been made either to analyse the structure of commercial loan market or empirically investigate the incidence of credit rationing in the Nigeria's commercial loan market. To the extent that all previous studies have only concentrated on the entire commercial banks loan market rather than that segment of the commercial loan market makes the present study a pioneering effort.

Given the above, an analysis of the structure, functions and effects of the commercial loan market in the Nigerian economy will be helpful in understanding the rationale for the continued shortage of commercial loan. It will further provide illumination on such paradoxical questions as: What are the means and mode by which credits are rationed?. What are the effects of credit rationing on the economy? Obviously, the issue of credit rationing in the Nigeria's commercial loan market transcends the concern for credit rationing within the business sector due to government policy on sectoral allocation of credit. The issue is rather that of empirically establishing the existence of credit rationing in the Nigeria's commercial loan market as well as its likely effects on monetary policy effectiveness.

As earlier noted, research in this area in the developing countries in general, and in Nigeria in particular, has been neglected to such an extent that policy makers have failed to see the need for a comprehensive investigation into the functioning, and hence the credit rationing in the commercial loan market.

Thus, this study is a deliberate attempt to carry out a rigorous exploration of this neglected area of monetary economics in Nigeria with a view to providing a better understanding of the issues involved in order to help initiate and formulate public policy in the area of monetary policies. This effort will help provide information on the why banks resort to credit rationing; the existence of the credit rationing, the degree and nature of credit rationing as well as the economic impact of credit rationing on the transmission mechanism of monetary policy action. This will afford us a better position to predict with precision, the effect of any monetary impulse on the economy.

This study is, therefore, motivated by the prime need to empirically establish the existence of credit rationing and thereby provide the missing explanations to the incidence and effects of credit rationing in the loan market in order to enhance our understanding and fully appreciate the monetary and financial structure of the Nigerian economy. It is equally as a result of the increasing shift in attention to this rather long neglected but increasingly important area of commercial loan market.

1.2 The Importance of Commercial Loan Market in the Nigerian Monetary System

Commercial loan market has been, and remains one of the most important segements of the Nigerian financial market. In terms of magnitude, the total assets of the two major actively participating institutions i.e. commercial and merchant banks stood at ₦555,472.6 million as at the end of 1995 exceed the sum of the total assets of the next three largest intermediaries; life insurance companies, the development banks, and the people and community banks (CBN, 1995). In terms of diversity, the assets of commercial banks for instance include, with the exception of direct corporate securities, the range of assets held by all of the other more specialised intermediaries. Similarly, the liabilities of the market correspond to the range of liabilities of all other intermediaries with the exception of the life insurance reserves of the life insurance companies.

The importance of the commercial loan market in the Nigerian monetary system depends, however, not only on the magnitude and diversity of the its assets and liabilities, but also on the essential role of the market (particularly the aspect played by commercial banks) in the transmission of the Central Bank monetary policy. Although it has been debated whether commercial banks should be the only financial intermediary directly affected by the CBN policy, there can be little doubt that this attitude changed only recently. The direct effects of the CBN policy operate on the commercial banks through the well known instruments of monetary policy such as, open market operations, the discount rate and the setting of reserve requirements. The objectives of monetary policy, as implemented through these instruments are then achieved by attempting to control the magnitude and composition of the assets portfolio of the banks.

It is in this setting that the importance of commercial loans and the commercial loan market arises. The term commercial loans generally refers to credit of short term maturity extended by commercial banks to business firms. The collateral for this credit is typically a short term asset such as inventory stock or accounts receivable. Producers' durable, equipment and structures may also serve as collateral for commercial loans, although more typically they are used to back 'term loans' which are commercial loans with a maturity exceeding one year.

It should be stressed that the distinction between commercial loans and term loans on the basis of maturity is less clear both conceptually and practically, than the definition might indicate. The conceptual difficulty arises from the reluctance of bankers to deny a request from a customer for an extension of a commercial loan beyond the original maturity. To deny such a request from a financially sound firm would jeopardize the bank's "customer relationship" which may have been built only over a long period of time. In the case of potential bankruptcy, the large costs of collection also make it expeditious for the bank to extend the loan in hope of obtaining full payment in the future. The consequence of this tendency for "automatic" loan i.e. roll-over, that both the bank and the borrowing firm view the stated maturity of commercial loans as less than binding. On the practical side, data on the volume of outstanding term loans have been sketchy or non existence at all in some cases, and there are indications that the available measures of commercial loans include at least some term loans or commercial loans with guaranteed renewal features. The result is that although the discussion here is concerned primarily with short term commercial loans, the close substitution between commercial loans and the longer maturity term loans must be kept in view.

One measure of the importance of commercial loan for the banking system can be seen in the distribution of commercial bank assets, shown in Table 1.2 for the year ended 1995. Among the major categories of assets, loans account for as much as 24.48% of the total. Within the loan category, commercial loan represent the largest single class of loan accounting for over 52 percent of total bank loans. Furthermore these figures actually understate the true importance of commercial loan in the banks portfolio. First, the major part of the liquid asset category reflects cash items in the process of collection and required reserves not available for investment. For the category of only earning assets, - securities, loans and other assets - loans constitute about two-thirds of the total. Second, a significant portion of the residential building loans represent mortgages on commercial property that substitute for term loans made to the same class of bank customers. Finally, and perhaps most importantly, these figures donot reflect the large magnitude of potential claims on bank funds in the form of outstanding commercial loan lines of credit.

Table 1.2: Commercial Bank Assets (December 1995)

	(₦m)	Sub-total	% of Total Assets		% of Sub-total
Cash Assets	14,914.3		5.95		32.92
Balance held within and outside Nigeria	30,389.3		12.13		67.08
Total liquid assets		45,303.6		18.09	
Treasury Bills	28,851.1		11.15		77.28
Treasury Certificate	673.7		0.27		1.81
Others	7,808.9		3.12		20.91
Total Securities		37,334.2		14.90	
Commercial Loans	32,757.1		13.07		52.72
Agricultural Loans	10,753.0		4.29		17.31
Real Estate	5,405.2		2.16		8.70
Loans to Financial Institutions	1,801.4		0.72		2.90
Service Loans	2,617.9		1.05		4.21
Loans to Personnel Government and Professional	1,740.2		0.69		2.80
Other Loans	7,059.1		2.82		11.36
Total Loans		62,133.9		24.48	
Other Assets		105,828.8	42.53	42.53	
Total Assets		250,600.5	100.00	100.00	

Source: Computed from the Financial and Economic Review. Published by Central Bank of Nigeria (1995).

The distinction of commercial loans as the primary asset held by commercial banks and the critical role of commercial loan markets in the transmission of monetary policy have been long recognised (Jaffee 1975). The 'real bills' doctrine or commercial loan theory of banking which first gained prominence in the English and American banking controversies of the early 19th century, was to supply loans to business firms in order to meet the needs of trade and that it was the responsibility of the monetary authorities to help the banks serve this function. The same doctrine also later proved an important basis for the institutional change from the National banking system to the Federal Reserve system in the United States. In terms of the modern theory of central bank policy, the "needs of trade" doctrine has been replaced by more flexible techniques for controlling the cyclical fluctuations in the economy. But in terms of the mechanism and the paths of transmission of monetary policy, the commercial loan market still remains crucial.

1.2.1 The Channels of Monetary Policy

The mechanism by which monetary policy is transmitted through the commercial loan market to the real sectors of the economy can be briefly surveyed by distinguishing two channels of influence; interest rates and credit availability. The interest rate channel is the most orthodox and is in keeping with the neoclassical tradition of perfect markets with well defined demand and supply curves. The operation of the interest rate channel can be illustrated by following through the effects of an open market sale of government securities by the Central Bank. The impact effects of the open market sale are an increase in the interest rate on government securities and a decrease in the reserves of the banking system. The increase in the interest rate on government securities is the direct result of the increased supply to this market by the Central Bank.

A decrease in bank reserves can be avoided only if the Central Bank's security sales are paid for solely by the nonbank sector drawing down its cash balances, an unlikely event. Both the increase in the interest rate on government securities and the decrease in bank reserves have the effect of raising the opportunity cost of loanable funds for banks. The increase in the interest rate on government securities operates through the substitution in the banks' portfolio between government securities and commercial loans, while the decrease in bank reserves has an effect because it decreases the total amount of funds available for investment. The net effect is then a downward shift in the commercial bank's supply curve in the loan market, and thus an increase in the commercial loan rate. The final effect of the increased commercial loan rate on investment expenditures then follows from the standard neoclassical premise of an interest elastic investment schedule. Since the demand for loans is directly derived from business firms' demand for investment goods, the quantity of loans outstanding will also be lower in the final equilibrium.

Credit availability, the second channel for the effect of monetary policy through the commercial loans market, is more Keynesian in concept and is based on imperfections in the capital markets, particularly in the commercial loan market itself. More specifically, most arguments for a credit availability channel are based on the existence of special institutional and competitive situations on the supply side of the market. The main tenet of the availability view is that the quantity of loans actually supplied by banks to the business sector is at least as important as the interest cost of the funds as a determinant of the effectiveness of monetary policy. The use of non-price means for credit rationing by banks is thus critical to the availability channel. The analyses and arguments that have been used to explain the use of non-price rationing by banks have been quite varied and these are discussed more fully under literature review in chapter 3.

Two points, however, should be stressed in the present context. First, the principal advantage of the existence of availability effects for the efficacy of monetary policy is that, even in the absence of significant interest elasticity in investment demand, control of the quantity of loans supplied by the banks may be sufficient for an effective monetary policy. Secondly, and an obviously related point, the methods of implementing monetary policy may be quite different depending on whether the main structural link to the real sectors operates through interest rates or the quantity of loans.; this is also an issue that has not yet been resolved in Nigeria. Resolution of the issue will, therefore, go a long way in assisting monetary authorities to determine its area of focus when it comes to monetary policy target decision.

1.3 Purpose and Objective of the Study

1.3.1 Purpose of the Study

Our study on credit rationing in the commercial loan market, presents and analyse the structure, functions and the effects of the commercial loan market in Nigerian economy.

In particular, research into the structure, functions and effects of the commercial loan market in Nigeria has become necessary because of:-

(a) observed paucity of studies on the commercial loan market in the developing countries, especially, in Nigeria where such study has not been undertaken. This study would, apart from providing a pioneering insight into the structure of the commercial loan market in Nigeria, also enrich existing knowledge on the monetary mechanism;

(b) empirical evidence notably by scholars like Ajayi (1974), Tomori (1974), (1976), Fakiyesi (1989), Ojo (1985), Ikhide (1987, 1991, 1993), Ogiogio (1991), Ajakaiye (1995), Martin (1990), Wood (1975), Meltzer (1974), Soyibo (1991, 1993), Melitz and Pardue (1973) suggests that asset composition and loan behaviour, for instance, of commercial banks have important implications for economic growth and development;

(c) until quite recently, most econometric studies of the monetary mechanism did not give any important place to the commercial loan market. The only principal assigned role of banks in aggregate economic models was to function as the gearing ratio by transforming an increase in free reserves into an increase in the money supply. Consequently, the role of the banking system was entirely mechanical. However, recent works have indicated that the determinants of the money supply are in fact more complex. Thus the supply of money theory has been incorporated into the more general theory of bank portfolio choice rather than only free reserves. In this way, the connection between the commercial loan market and the money supply is made explicit since commercial loans are among the most important assets held by banks;

(d) the commercial loan market is one major linkage between the monetary and real sectors of the economy. This stems from the fact that variations in the size and composition of banks loan, generally play a significant role in transmitting the influence of monetary policy to the economy. For example, the market for bank loans to commercial and industrial customers has long been deemed a key element in the process of income determination through its impact on aggregate economic activity.

(e) given the importance of credit rationing to the speed and effectiveness of monetary policy, an understanding of the existence and mode of credit rationing is essential if we are to understand the mechanism by which monetary policy actions are transmitted into the real sector. Thus, this study seeks to establish the existence of credit rationing in the Nigeria's commercial loan market and attempts to measure the magnitude of credit rationing, thereby allowing for an analysis of the effects of credit rationing on the effectiveness of monetary policy.

1.3.2 Objective of the Study

In view of the above purpose, this study will be guided by the following objectives:-

(i) to present an analysis of the structure, functions and effects of the commercial loan market in the Nigerian economy;

(ii) to investigate the existence or otherwise of credit rationing in the Nigerian commercial loans market as well as ascertaining the rationality for non-price rationing by the banks;

(iii) to find the possibility or otherwise of measuring credit rationing in Nigeria, and if it can be measured, to find out if there are significant variations in rationing overtime and if the variations can be explained; and

(iv) to examine the effects of credit rationing on the speed and effectiveness of monetary policy in Nigeria.

1.4 Outline of the Research Methodology

(a) The issues raised in this thesis are both theoretical and empirical. On the theoretical plane, a comprehensive discussion of the theory is examined to enrich our empirical findings. On the empirical aspect, analysis of data by statistical and econometric techniques are applied.

(b) **Data Sources**

Our study is based on aggregated secondary data for all the commercial and merchant banks in the country except for our measure of concentration and mobility of the dominant banks.

The data requirement for this study were collected from the Central Bank of Nigeria publications and the annual reports of very few selected banks. The IMF International Financial Statistics also provided a valuable source of data. Other information that could not be got from the above mentioned sources were obtained from the publications of the Federal Office of Statistics.

(c) **Data Analysis**

The time series data collected were summarised and analysed using various statistical and econometric techniques. 2SLS, 3SLS, LIVE, FIVE and FIML as well as instability indices and variances were used to determine variability in credits supplied by commercial and merchant banks. Indices were also used to determine stability of oligopoly (market shares).

The Herfindahl-Hirchman (HH) index and a four-firm concentration ratio are used to measure the level of concentration. Minimum efficient bank size is computed on the basis of a measure that synthesizes the Weiss (1983) and Comanor-Wilson (1967) proxies. Various financial ratios were also computed to give an indication of the loan performance of the market. Econometric models of supply and demand of loan were developed and estimated, to capture the behaviour of commercial loan market.

Nominal and real variables were used where appropriate while elaborate diagnostic checks were carried out on the estimated models so as to confirm the validity and reliability of our results. In order to avoid spurious results, stationarity tests were carried out on the time series data first before they were fitted into equations for estimation. Two microcomputer software packages were used to carry out all the required estimations and tests. They are; Econometric View and PC-GIVE. They are all interactive econometric packages, specifically designed for modelling and analysis of time series data.

1.5 Scope of the Study

The commercial loan market will be referred to as a credit market of short term maturity extended to individuals and business firms by financial institutions which comprise of commercial banks, merchant banks, finance houses, trust funds, etc. - in the formal sector and those in the non-formal sector - esusu, thrift and credit society etc. However, since our study seeks to empirically analyse the structure and functions of commercial loan market and as well provide empirical evidence of the incidence and effects of credit rationing in the Nigerian commercial loan market, it was tempting to consider all the institutions. But because of data constraints and in view of the importance of both the commercial and merchant banks in the Nigeria's financial system as well as their dominance of the loan market in the Nigerian economy, we shall refer to commercial loan market as market of short term loans extended only by commercial and merchant banks to both persons and business firms engaged in production and commercial activities. These loans are usually used for financing production expenditures and other current operations. Consequently, only data for the period 1970-1996 were used.

According to the strict traditional definition, commercial loans are granted for commercial purposes as distinguished from loans for investment, speculative or consumption purposes. A prime illustration of the traditional commercial loan would be one having a maturity of one year or less, the proceeds of which are designed to enable the borrower to buy merchandise and make sufficient sales to provide him with funds for repayment of the debt. The collateral for this credit is also typically a short term asset such as inventory, stock or accounts receivable.

1.6 Organisation of the Study

This study is divided into seven chapters. The first chapter introduces the study. Chapter two is devoted to briefly trace the evolution and development of commercial loan market in Nigeria. It reviews the institutional structure and instruments of the commercial loan market in Nigeria.While examining the environment within which the market operates, the chapter identifies three main factors as influencing commercial loan market lending and credit administration in Nigeria, namely; government/statutory controls, institutional/corporate constraints, and macroeconomic or non-statutory constraints. Chapter three surveys the various studies that have been carried out on loan market. This survey of studies ranges from both the theoretical and empirical work on credit rationing to the specification and estimation of commercial loan market models. The chapter identifies three possible ways by which credit could be rationed and provides the rationale for non-interest term rationing. Implications of credit rationing on the effectiveness of monetary policy was also examined.

The fourth chapter presents the theoretical framework and model used for the study. A generalised model of market in disequilibrium was specified. However the assumption of equilibrium was still imposed on the dynamic disequilibrium model at the estimation stage to permit a dynamic analysis of the model and also to compare estimate. A discussion of the econometric techniques used to estimate the model is also provided. Chapter five undertakes the analysis of the structure, conduct and performance of the loan market. Examining the structure of the market, the chapter examines the level of concentration of the market activities by considering the share of the four dominant banks in the loan pool of the market. With the aid of Herfindahl Hirdhman index, the study notes that inspite of the growth experienced in the market over the years, the market is still an oligopolistic type. In assessing the performance level of the market, the chapter examines the growth rate of loans vis-a-vis that of total deposits and assets as well as the market compliance with credit guidelines.

Chapter six contains the discussions of the results of our empirical investigation. It provides an evaluation of the estimated model as well as a full discussion of their implications. The discussion on the effects of credit rationing undertaken here are derivatives of the empirical analysis as implied from the model and the stated objectives of the study.

The summary, conclusions and recommendations which are drawn on the basis of the empirical results of our study are contained in chapter seven.

CHAPTER TWO

NIGERIA'S COMMERCIAL LOAN MARKET: EVOLUTION, MARKET INSTRUMENTS LENDING ENVIRONMENT AND INSTITUTIONAL STRUCTURE

2.1 Introduction

The Nigeria's commercial loan market has come of age. It is defined as credit market for short term maturity extended to individuals, and business firms by financial institutions mostly commercial and merchant banks. Other financial (non-bank) institutions also provide commercial loan, they however, constitute an insignificant proportion of the market. Also data on their activities in the market are not readily available. Although, the emphasis on the operations of the market is in short term credit which is generally defined as having maturity of three months (90 days) or under, in practice, instruments of longer duration do exists. The existence of these longer term instruments and the possibility of extension of short-term credit instrument to a longer term one has beclouded the earlier water tight compartmentalisation between for instance, the commercial loan market and the industrial loan market. However, in order to distinguish commercial loan market from other loans market, the maturity time for its instrument should not exceed one year at most.

This chapter examines the evolution of the Nigeria's commercial loan market, the market instruments, the lending environment in which it operates and the institutions operating in the market. The main aim is to prepare the platform on which analysis to be carried out in subsequent chapters will be placed. An understanding of the environment within which the market operates for instance is imperative for a clear explication of the market. Although, the market instruments examined are commonly referred to as money market instruments, they nevertheless constitute the most viable competing articles of trade in the commercial loan market.

2.2 Evolution and Development of Nigeria's Commercial Loan Market

The evolution of the Nigeria's commercial loan market, the commercial banks and perhaps, that of the Nigerian money market have often appeared inseparable even though, the latter was formally 'born' through the first issue of treasury bills in April 1960. Prior to this date, the commercial loan market in Nigeria was (and is still) dominated by the commercial banks' involvements in short term/export loans. As at today, the major operators in the market are the Central bank, commercial banks, merchant banks, finance and acceptance houses, insurance companies and the federal and state governments as well as individuals and corporate bodies.

To participate in the market means to buy and sell any of the accepted market instruments some of which are creations of the law, while others are evolvements from commercial practice. They include loan (short term or commercial loan which constitute about 52.7% of the credit transactions in the loan market), treasury bills, call money, treasury certificates, commercial papers, Bankers' Unit Fund and Certificate of Deposit.

However, since the market is still as indicated above dominated and dictated by the commercial banks operations, it is tempting therefore, to equate the evolution of the market to that of commercial banks. Thus, the evolution of the present day commercial loan market in Nigeria can be traced back to the advent of and the opening of the

Nigerian branch of the African Banking Corporation in Lagos in the second quarter of the 19th century. Because of their early start, commercial banks have not only continued to play a predominant role in the development of the Nigeria's commercial loan market, they have also become all-purpose lenders. They were the first to meet the needs of households and enterprises for general-purpose financing and liquidity requirements. Thus, the early start of commercial banking practice and long absence of alternatives have enabled the banks to dominate the market. So firmly entrenched are they in the entire economy's financial structure in general and the loan market in particular that other alternative financial institutions and instruments seem to be less significant.

Since the late 1980s, however, the impact of the operations of merchant banks in the market has become equally noticeable. To this extent, no complete and meaningful description of the evolution and development of the market can be done without recognition given to merchant banks. This latest development distinguishes the commercial loan market as it is understood in the United States of America (US) from the way it is known in Nigeria, though conceptually, the tenor of the instruments in the market still remain the same i.e. short term credit.

Other institutions whose operations cannot be easily ignored in the evolution and development of the market include among others, Finance Houses which came into prominence during the early years of the financial sector deregulation in 1986, People's Banks, Community Banks, Insurance Companies etc. It has not been possible however, to include these other institutions in the analysis in this study as a result of lack of adequate data on them.

Suffice to say, however, that both the commercial and merchant banks now dominate operations in the market with a combined market share of about 95 percent.

In line with the development in the loan market, the volume of loans and number of borrowers as well as the categories of the market instruments have also expanded considerably overtime. Thus the development in the market is synonymous with the overall development in the entire financial system. This, as noted above, is due to the fact that the two dominating operators in the market are also the dominant institutions in the entire financial system.

Hence the phenomenal growth that attended the commercial and merchant banks in Nigeria in the last two and half decades has a lot to explain in the recent development of the commercial loan market. It has now become clear that the development of commercial loan market as well as of commercial and merchant banking sub-sector is a sine-qua-non to the economic development of the nation. The reasons being the important role played by the banking industry and hence commercial loan market in the provision of capital (a critical factor required in the process of development), the influence commercial and merchant banks exert on the volume of purchasing power available for investment and consumption expenditures through the commercial loan market by their power to expand or contract credit, and their role in credit creation and extinction with its effect on money supply.

2.3 The Commercial Loan Market Instruments

In Nigeria, the commercial loan market deals specifically on short term credit. There are however, a large array of instruments known as debt instruments existing in the market whose maturities range from twenty four hours to one year. These instruments, some of which serve as alternative to short term loans are undisputably imperative for the existence of the market itself. The instruments can broadly be grouped into three categories, namely;

(a) Treasury papers. These are direct Federal Government created instruments issued on its behalf by the central bank of Nigeria. They comprise treasury bills (TBs) treasury certificates (TCs) etc.

(b) Commercial papers. These are instruments such as bills of exchange and promissory notes that originate from non-government institutions and individuals.

(c) Inter-bank papers. These comprise instruments issued by banks or by the central bank in furtherance of diversifying the market. They include call money, money at call outside Central Bank, certificate of deposits, Bankers' unit fund and Bankers' acceptances.

Treasury Bills (TBs) are short term debt instruments (ninety one day maturity) issued by the Central Bank of Nigeria (CBN). Specifically to raise short term finance for the federal government. They were first issued in April 1960 on a monthly basis and over the years. Weekly issues have evolved after a brief experimentation with fortnightly issues. Though the first issue was limited to 10 per cent of estimated federal government revenue, it has subsequently increased to 150 per cent of the estimated revenue. The overriding interest of the federal government to encourage the growth of commercial loan market and hence the money market led to the issue of TBs, in excess of financing requirements in the early years. Also, the yield on the instrument has been varied over the years ranging between 4⅛ and $5^1/_{16}$ per cent per annum at the beginning to 13 per cent per annum as at December 1996.

Bankers Unit Fund (BUF). The BUF was introduced in 1975 to mop up the excess liquidity in the economy following the monetization of reserves accumulated from the oil boom in the early 1970s. The need for additional instruments arose out of the reluctance of the government to increase its borrowing through the issue of Treasury bills and Treasury certificates. Thus, these instruments aimed at enabling the commercial and merchant banks as well as other financial institutions operating in the loan market to invest part of their liquid funds in a money market asset linked to federal government stocks. Participants invest in multiples of ₦10,000 in the BUF which in turn is invested in government stocks of various maturities. The BUF is rated as part of specified liquid assets of banks.

Bankers Acceptances (BAs). These are credit instruments issued by companies and individuals and guaranteed by banks. They are normally drawn by an individual or business concern on a bank and accepted by the drawee bank. It is an order for the bank to pay a designated person, or to a bearer, a certain sum of money at a stipulated time. When the bank accepts, the draft becomes literally a cashier's cheque or a promissory note of the bank.

By accepting the draft, the drawee bank becomes the principal debtor and the drawer becomes secondarily liable. The Payee or any holder in due course may sell the acceptance at a discount in the open market since the instrument is now a bank instrument for which a ready market exists. Since BAs can be rediscounted at the CBN, they are an ideal type of secondary reserve for banks. BAs became popular in the Nigerian commercial loan market in 1987 with the abolition of the marketing boards and the adoption of the Structural Adjustment Programme. At present, it is not easy to quantify the volume of issues traded due to paucity of data. The BAs have, however, been playing an important role in the financing of international transactions.

Certificate of Deposits (CDs). They were first introduced in 1975 by the CBN. They are interbank debt instruments designed initially mainly to channel surplus funds from commercial banks into merchant banks for the purpose of promoting investment projects on a relatively larger range than the short term projects which are handled by commercial banks. The instrument was introduced due to the backwash of funds in the commercial banking system and lack of investment opportunities for these funds. Banks readily adopted this scheme as it offered new opportunities for the diversification of both assets and liabilities. Two classes of CDs were introduced, namely the negotiable and non-negotiable CDs.

Commercial Papers (CPs). The CPs are another instrument traded at the loan market. These are short term debt instruments of the private sector. They were predated by the Bill Finance Scheme which was first introduced in 1962. The scheme stemmed from the need for the CBN to be prepared to provide the seasonal expansion of credit required to fill the gap between the credit which the banks could provide and the larger amount usually required to finance the major export crops. The volume of CPs issued sharply decreased in 1968 when the CBN was in charge of direct financing of the marketing boards. In 1974, the total CPs outstanding was ₦16.9 million and by 1989 it stood at ₦737.2 million representing an annual growth rate of over 5 per cent. With the abolition of the Marketing Boards in 1986. As part of the structural reforms in the economy, the CPs have become very prominent in the commercial loan market.

Call Money Scheme (CMS). To promote the development of the young money market in its formative years, the CBN also introduced the CMS in July 1962. Initially limited to the commercial banks, this is an arrangement whereby participating institutions invest surplus funds on an overnight basis with interest that can be withdrawn on demand. The requirement for this scheme was underlined by the fact that the existing loan market instruments (TBs) provided opportunities for investment of short-term funds for a period of three months whereas it was necessary to be able to transact business on a shorter basis, preferably twenty four hours. Under the scheme, a call money fund was created at the CBN and the participating banks had to agree to maintain a minimum balance at the bank. Any surplus above the minimum was lent to the fund and any deficits compensated the borrowing from the fund. The CBN administered the fund on behalf of the banks and paid interest at a fixed rate somewhere below the TB rate. The scheme was however abolished in 1974 due to the buoyancy of the federal government as a result of its revenue from the oil boom, a situation that led to the shortage of short-term debt instruments, a veritable avenue for the investment of fund from the CMS. At present, the bank still operate a private CMS. Since 1980, money on call constitutes as much as 50 per cent of total commercial banks loans and advances or 80 per cent of commercial loan transacted.

2.4 Commercial Loan Market Lending Environment

Commercial loan lending and loan administration in Nigeria is influenced by three main factors, namely statutory regulatory controls, institutional constraints and macroeconomic constraints.

2.4.1 Statutory Regulatory Controls

It is now in doubt that the loan market is one of the most closely regulated and price controlled market in Nigeria and the world at large. Even in the United States where emphasis is placed on the operation of the market, the loans market is not free of controls. For instance, regulation Q which prescribes among others, interest rate ceilings on deposits of Federal Reserve member banks was operated for fifty years between 1933 and 1983.

In a bid to ensure a reasonable spread in the loan portfolio of banks and thus prevent making banks' exposure vulnerable through the concentration of credit in a few hands in Nigeria, the banking ordinance of 1958 stipulated a legal limit that no more than 2 percent of the paid up capital and statutory reserves of a bank can be lent to any one borrower or a group of connected accounts, although, this has been raised to 33 1/3 percent through the Banking Amendment Act of 1979. The Central Bank of Nigeria (CBN) and the Nigeria Deposit Insurance Corporation (NDIC) are the principal agencies of government for the control, monitoring and supervision of the banking industry. They both jointly and severally maintain surveillance on bank's capital adequacy and portfolio management in order to ensure that banks are sufficiently liquid to meet the demand deposit requirements of their customers. Thus, in addition to setting the necessary liquid asset ratio, banks are given qualitative guidelines about the types of loans they should encourage or discourage. The Banking Acts of 1969 as amended up to 1979, to the prudential guidelines of November 1990 and the Banking and Other Financial Institutions Decrees (BOFID) 24 and 25 of 1991 stipulate the minimum capital which a bank must maintain. Besides, banks are required to maintain a reserve fund into which they must transfer part of their annual profit, as a regulatory way of enhancing their capital base. The prudential guidelines of 1990 specially spelt out a uniform format for financial statement reporting. The guidelines contain criteria and modalities for banks' recognition of income and losses from credit facilities as well as various provisions for the perceived losses therefrom so as to have a fairly true picture of the financial conditions of licensed banks. In effect, credit facilities are to be classified either as "performing" or "non-performing" in line with a number of objective and subjective criteria listed for identifying them. Thus, if the reserve is less than the adjusted capital fund of a given bank, it must transfer a sum equal to 25 percent of its net profit to the reserve fund. In the situation where the reserve is equal to or in excess of the paid up capital, 12½ per cent of the net profit of the bank must be transferred to the reserve fund. A ratio of 1:2 between a bank's adjusted capital funds and its total loans and advances is also stipulated to be maintained by the 1969 Act. In the period 1976 - 1981, overall maximum net dividends was limited to 16% - 20%. This had the overall effect of putting the banks in a position to encourage profit retention in the industry and keep shareholders' funds in line with rising liabilities.

2.4.2 Institutional/Corporate Constraints

Every bank operating within the economy has limitations imposed upon it by its own institutional constraints which may hinder the effectiveness of its portfolio management. Such constraints include the bank's deposit base, its shareholders' corporate policy and the availability of financial instruments. The size and structure of the deposit base of a bank constitute the barometers of its lending and investment policy. If its deposits are mainly short-term, it will be imprudent to invest a substantial part of such funds in long-term investments, notwithstanding the income-earning attractions. In Nigeria, the greater proportion of banks' deposit is demand deposit. For example, between 1970 and 1975, 43.5 percent of total commercial bank deposit is made up of demand deposit while time and savings deposits averaged 37.2 percent and 19.3 percent respectively. Between 1976 and 1978, the proportion of demand deposit rose to 51.6 percent and later fell to 41.9 percent on the average between 1979 and 1995.

A bank's shareholders' fund is made up of capital including reserves. The smaller the shareholders' funds, the greater the constraints to lending since there is a specified limit of a bank's exposure in relation to the shareholders' fund. In recent times, however, banks in Nigeria have closely managed the growth in shareholders' fund through profit - plough back and capitalisation.

The corporate policy of a bank provides a focus for operational direction at any point in time. This is often a statement of strategy and tactics which can be consolidated into corporate/portfolio planning. In recent times, most Nigerian banks have had to restructure their portfolio owing to the constraints in credit creation and the attraction offered by treasury income. The result is that rather than provide more loans and advances, banks which are risk averse, tend to place more funds in investments and earn a more predictable income. One other element in the portfolio management equation is the availability of loans and investment avenues. Apart from the inadequacies in the number of financial institutions in Nigeria, there is also the paucity of financial instruments which can be issued and traded in. That the existing financial instruments are dominated by those issued by government is a pointer to a serious gap in Nigeria's loan market and the financial system in general. Worse still, all the government securities carry interest rates significantly lower than the market rate and thus are restricted to those markets compelled by law to invest in them. This tends to encourage investing in short-term instrument. Consequently, such securities generate very little secondary market activities and constitute illiquid elements in portfolio asset holding of the bank which reduces their ability to grant loans and advances. Besides, they create very high liquidity preference among investors resulting in a disincentive to long term savings. This trend has to change if the economy is to realise its long-term goal of industrial transformation.

2.4.3 Macroeconomic Policy Constraints

In its annual budget, the Federal Government of Nigeria announces its fiscal and monetary policies which dictate the general direction in which the economy is to move. On its own part, the central bank issues its annual monetary policy circulars specifying the monetary direction and guidelines to be followed by banks and more recently, the other financial institutions in line with the overall objectives of government policy. While it is generally agreed that monetary policy may be designed to deal with four main objects viz. maintenance of price stability, reduction in unemployment, achieving a satisfactory level of economic growth, and maintenance of balance of payments equilibrium, in practice, these objectives sometimes conflict resulting necessarily in the investigation of trade offs. Standard tools have been devised to facilitate monetary policy accomplishment but the tools are not universally applicable. There is a strong need for selectivity, depending on the country's stage of Development. Such tools are variable discount rate, open market operations, variable liquid assets and liquid ratio, moral suasion, selective credit control, cash reserve requirement, special credits and stabilization securities. The impact of any of these tools on commercial bank portfolio composition could be tremendous. For marginal banks, application could stifle portfolio growth and have devastating effects on their operations.

In Nigeria, the most frequently used instrument is the credit control and until recently, interest rate mechanism. The credit control mechanism has two forms: (i) imposition of quantitative ceiling on the overall banking system credit; and (ii) sectoral allocation or distribution of banking system credit.

Prior to the interest rate deregulation in 1987, the Central Bank also fixes the interest rates chargeable in particular sectors of the economy. In particular, loans to certain sectors like agriculture, housing etc. termed preferred sectors attracted lower rate of interest. Besides, the Central Bank's guidelines also stipulate that a given percentage of total loans and advances on each bank's loan portfolio must be reserved for indigenous borrowers. In an attempt to encourage the cultivation of the banking habit among Nigerian rural dwellers (who form about 70 percent of the population), the directed credit practice of the Central Bank also stipulate that 40 percent of total deposit mobilized in the rural areas must be extended to rural dwellers in form of credit.

2.5 Institutional Structure of Nigeria's Commercial Loan Market

The Nigeria's commercial loan market is made up of a wide array of institutions and individuals on both sides of the market. It comprises as earlier noted, the Central Bank of Nigeria, commercial and merchant banks, finance houses and thrift associations on the supply side, while the demand end of the market is made up of individuals and corporate bodies.

The number of commercial and merchant banks operating in the market has been on the increase from 12 in 1960 to about 115 at the end of 1996. The total branch network of the two banks in 1996 was 2554 out of which commercial banks account for 2402 (with 675 in the rural areas). At the end of 1985 (prior to the commencement of the structural adjustment programme), the ownership structure of the share capital in commercial banks indicated dominant ownership by the government (federal and state) amounting to 58.6 percent followed by private share holders (22.5 percent) and foreign interests (18.9 percent). Today with government divestiture of its ownership in major enterprises, the ownership structure has tilted infavour of private individuals with foreign interests playing only a supporting role. As at December end 1996, the ownership structure of insured banks in Nigeria stands as; commercial banks 9.33% for federal government, 8.43% for state government, 73.35% for Private Nigerians and 8.89% for foreigners. For merchant banks, it is 7.17% federal government, 5.22% state government, 80.08 Private Nigerians and 7.52% foreigner (NDIC 1996).

There are other institutions apart from merchant banks who seem to be complimenting the leading role of commercial banks in the market. Their impact in the market however, remain negligible. They are the new institutions just established with the structural adjustment programme to meet up with the ever increasing credit needs of segments of the society that are not adequately catered for by the existing institutions. These are the community banks whose capital requirements are provided by the Communities in which they are located and the people's banks which are supposed to provide for the needs of small and medium scale entrepreneurs in the society. Thrift institutions are also expected to have some prominence in the commercial loan market. These comprise mainly of insurance companies, pension funds and savings banks. In 1987, 87 insurance companies operated in the economy out of which 68 were wholly indigenous and 19 were jointly owned by Nigerian and foreign interests.

The commercial loan market is also inundated by a collection of young and small institutions which are in their very little way providing alternative sources of credits in the market. These include finance companies, leasing companies and loan associations. Most of these have come into prominence in the wake of the financial innovation that pervaded the Nigerian financial system with the onset of the financial sector reform in 1987. Although, their activities have mainly been restricted to the urban areas, their characteristic single unit offices and share aggressiveness and the creation of investment outlets mark them out as viable potentials for the fostering of enhanced loan market given a conducive legal and social environment.

On the demand side of the market are the borrowers. The borrowers are the individuals and corporate bodies either private or public whose credit needs are to satisfied/met by the market. These two sides of the market must exist for the market to operate. The participation of the two sides is important as the market cannot exist if any of the two sides is missing. Thus,the Nigeria's commercial loan market can be viewed as comprising of demand for short term loans of one or less than one year duration and where these loans are met.

Informal financial arrangements are very pervasive in the rural areas where formal rural credit still accounts for a very low proportion of the credit needs of the dwellers. The situation can be better appreciated when it is realised that well over 65 percent of the population of Nigeria dwell in the rural areas. As of 1977, prior to the commencement of the rural banking programme, most of these people did not have access to formal banking system. Inspite of several attempts to extend credit to the rural areas through the establishment of such rural financial institutions like community banks and the People's Bank, these institutions still thrive vigorously in the rural areas and enjoy more patronage than the formal financial institutions. Most prominent among them are Rotating Credit and Savings Associations (ROSCAS). Others go by different names such as Esusu, money lenders and money collectors and Pawnbrokers. Their characteristic low information and transaction costs coupled with the easy access that they provide to low income groups who may not have access to formal finance are some of the factors that have continued to ensure their survival even in a very competitive environment. Their tenacity is a testimony to the often canvassed fact that for the rural dweller, the availability of financial services is of prime importance and that availability of credit is more important than its price (Popiel, 1994).

CHAPTER THREE

LITERATURE REVIEW

3.1 Introduction

This chapter presents a survey of literature on the subject matter - credit rationing. These include a large variety of studies ranging from theoretical questions of the existence and rationale of credit rationing to the empirical attempts to measure the magnitude of rationing and its effects on the economy as well as policy related studies of the implication of the availability doctrine. To start with, it is necessary to distinguish between credit rationing per se and the availability doctrine which is more generally regarded as a theory of commercial loan supply. In order to do this, the next section briefly surveys the literature on the availability doctrine before turning to a more detailed review of the literature on credit rationing. Thus section 3.2 presents a brief survey of literature on availability doctrine. Section 3.3 reviews the various theoretical issues and questions as they relate to credit rationing. The review of empirical works on the various theoretical issues raised in section 3.3 forms the discussion of section 3.4. In section 3.5, we present a review of the various model specifications and applications to the study of credit rationing while section 3.6 concludes the chapter by providing the inferences made from the review of the literature.

3.2 Availability Doctrine

The availability doctrine, the formulation of which was largely the work of Robert Roosa (1951) emerged in the later years of the bond-support programme which forms the legacy left behind by World War II. This came as a solution to the conflict between the belief that a large widely held public debt obliged the Central Bank to confine interest rate movements to narrow limits and the belief that large interest changes were necessary to obtain significant effect on spending.

In fact, the doctrine came into prominence at the end of World War II as an alternative to the then accepted theoretical and empirical views on the monetary mechanism and the efficacy of monetary policy. The received theory indicated that for monetary policy to be effective, real expenditure decisions should be interest elastic and the monetary authorities should have the ability to force the necessary fluctuations in the relevant interest rates[1]. The conditions at the end of World War II led to a rather pessimistic evaluation of monetary policy, if one accepted this theory.

Empirical studies available at the time indicated very little interest elasticity in any important expenditure functions[2]. The first complete statement of the doctrine, for example, was given by Robert Roosa (1951) at the time he was a vice president of the Federal Reserve Bank of New York. On the other hand as Tussing (1966) has stressed, a rigorous statement and critique of the theory of the availability doctrine was developed only later in the professional economic journals[3]. The principal proposition of the availability doctrine was that small variations in the rate of interest on government securities, achieved through open market operations would be effective in influencing real expenditures even in the face of relatively interest inelastic expenditure schedules. The mechanism for this effect of monetary policy operated by reducing the availability of funds from the financial intermediaries rather than through the cost of the funds as in the orthodox theory. It was assumed, at least implicitly, that this reduction in the availability of credit would reduce real expenditure[4].

Several lines of argument have been used to establish the basic link between variations in government interest rates and the availability of credit to the private sector. The main argument according to Jaffee (1971) concerned the effect of uncertainty and changing expectations on the supply of commercial loan. Imperfections in the capital markets and the institutional changes brought about by the large amounts of newly created federal debt, however, were also frequently mentioned.

In the work of Ira Scott (1957), he summarised the elements of the argument leading to the development of the doctrine as follows:-

(i) "The availability doctrine implies the existence of holdings of the same kind of assets by the Central Bank and by financial intermediaries who lend to private borrowers. And the ability and willingness of the central bank to buy and sell these assets must be sufficient to enable it to have a marked influence on the market conditions".

(ii) "It is both a necessary and sufficient condition that yields on the kinds of assets held by both the central bank and financial institutions be permitted to vary".

(iii) "It is not a necessary condition that yields of assets bought only by the institutional lender vary in the same manner, nor is it a necessary condition that the central bank actively engage in the open market purchases or sales. There need not be actual change in the lender's cash reserves. The availability doctrine places emphasis upon the willingness rather than the ability of the lender to lend".

(iv) "The reformation of expectation with respect to the market value of assets, and the accompany effects on liquidity and prices result in a change in the availability of credit to private borrowers".

On the basis of the above, there is one way in which all these elements can be interpreted in terms of the availability of credit. That is, the availability of credit can be taken simply as referring to the willingness of lenders to supply funds in the commercial loan market at the expense of holding cash or government securities.

However, Kareken (1957) has argued that "although the term availability loses much of its novelty if interpreted in this way, a less general translation fails to distinguish the separate influences which affect the willingness of lenders to make private credit available.

Although, it is difficult to formalize all the considerations that have been made about the availability doctrine, we shall, however, use a relatively simple analytic model developed by Ira Scott (1957) as a framework to discuss the major issues.

Scott analyses how the portfolio composition changes when there is a ceteris paribus increase in either the risk or the expected return on government bonds. The same conclusions are obtained for both the utility functions although somewhat restrictive assumptions on the shape of the indifference mapping must be introduced for the more general case[5]. For an increase in the expected return, the standard result is derived; a ceteris paribus increase in the yield on government bonds e.g. leads to an unambiguous increase in the percentage of government bonds held in the portfolio. For an increase in risk, a more surprising result is derived; it is shown that an increase in the risk on government bonds will unambiguously increase the percentage of government bonds in the portfolio. This is easily seen in the case of the maximum variable utility function. For the initial portfolio composition, the increased risk associated with the government bonds portion will increase the risk of the entire portfolio above the acceptable degree. But since the risk on government bonds is assumed, always to be less than the risk on the private loans, the aggregate risk of the portfolio can be decreased only by transferring funds from the loans to the banks.

This would appear to confirm the principal proposition of the availability doctrine. Both the increase in yield on government bonds and the resulting increase in uncertainty about their future yield would lead to a decrease in the amount of the portfolio allocated to private loans. But there is a difficulty. The assumption of ceteris paribus implies that the commercial loan rate, the rate of private loans, remain fixed when the rate on government bonds change. Scott recognizing this point assumes in a footnote that there is "Stickiness in customer loan rates"[6]. The implication of this assumption can be easily seen in figure 3.1 below.

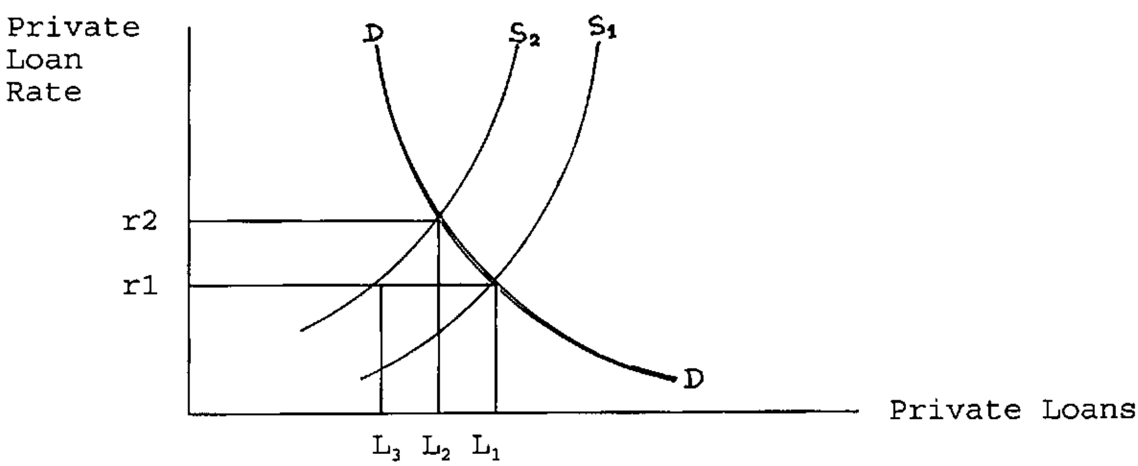

Figure 3.1 shows the demand and supply schedules for private loan as a function of the private loan rate. The demand curve is drawn under the assumption that there is some elasticity in the demand for private credit, although we shall also consider the case of zero elasticity. The positive slope of the supply curve (S_1) can be derived easily from Scott's results; a ceteris paribus increase in the private loan rate causes a redistribution of the bank's portfolio toward private loans. First, consider an initial position in which the loan rate (r_1) and loan quality (L_1) are determined by the intersection of the demand curve and the initial supply curve. Now suppose the Central Bank undertakes an open market sale which increases the yield and the risk on government bonds. Both of these changes have the effect of shifting the supply curve leftward; say to S_2. There are then two cases to consider. In the first case, we assume that the loan rate is flexible and adjusts toward the new equilibrium value given by r_2. Under these conditions, the availability doctrine differs very little from the earlier theory of the monetary mechanism. An increase in the government bond rate does decrease the amount of credit extended to the private sector, but the amount of reduction depends on the elasticity of the demand curve. In the polar case of a completely inelastic demand for private credit even after the shift in the supply curve, L_1 credit would still be extended[7].

Now consider the second case in which the loan rate remains at its initial level of r_1 even after the shift in the supply curve. Under this circumstances, the bank would extend loans in the amount of L_3 and there would be an excess demand or credit rationing given by (L_1 - L_3). If this did occur, the availability doctrine would have made a significant contribution, for the amount of credit extended, L_3 would be independent of the shape or slope of the demand curve. But why would the banks leave the rate at r_1? Scott's reliance on "Stickiness" in this rate is more a statement of a necessary condition for his conclusion than an explanation[8]. It is precisely this explanation as well as conclusion that a theory of credit rationing should attempt to clarify[9].

In addition to the risk-uncertainty line of argument, Robert Roosa and other early proponents of the availability doctrine stressed portfolio valuation effects on financial intermediary behaviour. This aspect of the theory is frequently summarized under the heading of "locked-in or pinned-in effects". The situation arises when the Central Bank undertakes an open market sale that causes long term bond rates to rise, with the result that capital losses accrue to banks holding these securities. The argument then takes two forms. One variant stresses the reduced liquidity which follows from the capital losses. In analogy with the Scott model, but with liquidity replacing risk, the effect of the reduced liquidity is to cause substitution in the banks portfolio away from the private securities and to the more liquid government securities. The second variant assumes that banks have regressive expectations with respect to the government bond rate. In this case, the banks expect to recoup the capital loss if they continue to hold or even purchase more government bonds. However, another variant of this argument was based on the premise that the banks had a phobia against taking capital losses, perhaps to preserve the appearance of their balance sheets, even though the implied portfolio switch was portable.

It is thus apparent that with either of these portfolio valuation arguments, there is tendency for the banks to become locked to their government bond portfolio. On the other hand, the argument must assume that there is relatively little change in the yield on private loans; if the yield on private loans rises sufficiently in response to the open market purchase, then of course, private securities may remain attractive even in view of the locked in effects. Thus, there remains an essentially empirical question whether private yields will rise enough to induce banks to extend additional credit to the private sector. Robert Roosa felt they did not; Warren Smith and others felt they frequently would rise sufficiently[10]. If private yields rise, then the availability doctrine is shorn of much of its impact. If private yields do not rise, we are left with the need to explain why rational profit maximizing banks do not adjust the rates, but instead allow excess demand to develop in the loan market.

Finally, at times the proponents of the availability doctrine appeared to argue that shifts in the demand for credit influenced by the same uncertainty that affected the banks, could be relied on to improve the effectiveness of monetary policy. In terms of our earlier analysis of the paper by Scott and figure 3.1, this would mean that the demand for credit would shift leftward at the same time that the supply curve was shifting. Clearly, the earlier criticism still holds. If the commercial loan rate does adjust, then the availability doctrine differs little from the orthodox theory; and the availability doctrine itself provide little rationale for the loan rate not to adjust.

From the above survey, two major conclusions can be drawn:-

(a) The availability doctrine has only limited significance independent of a theory of credit rationing. For in arguing that the banks restrict the availability of credit, the proponents of this doctrine must face the issue of why the banks do not simply raise the interest rate they are charging their customers. That is, why not ration by price? This of course, is precisely the question that a theory of credit rationing must answer.

(b) Even those studies with the explicit goal of providing a theoretical justification for credit rationing fail to meet the basic issue, since they consider only the supply side of the market and neglect other very relevant questions. Only when the demand for loans and hence the determinants of the commercial loan rate are integrated with the supply can a complete theory be developed.

3.3 Credit Rationing: Survey of Theoretical Issues

The question of credit rationing has been the subject of a number of theoretical discussions as far back as the beginning of the 19th century in England where it was first discussed as a policy issue. Although, the discussion then centered on the various bullion and currency controversies, a much more theoretical discussion came into focus some thirty five years ago, occupying an important place in the so-called cost and availability doctrine. The doctrine was more concerned with explaining how monetary policy could affect spending and the real sector of the economy. The boost came from Roosa (1959) who reemphasized that reductions in the money supply could have significant restrictive effects on spending, even if they result in a small interest rate increase or if spending is not, or only insufficiently, curtailed by such an increase. This would be so because banks would be forced to reduce the amount of credit they could extend to their customers, even if customers did not lower their demand. This is consequent to the fact that spending was largely viewed as being constrained by the availability of credit which was allocated by banks to their customers to some extent through non-price means i.e. through some kind of rationing scheme. Thus, the doctrine, as put then suggests an alternative transmission channel of monetary policy, particularly that to an important extent was based on the existence of a credit rationing argument.

Although, the discussion of credit rationing in the early 1950's was primarily centered on the imperfections in the commercial loan market, recent studies have attempted to determine empirically the rationality for non-price rationing (see Stigtitz and Weiss 1981 and 1983). However, the rationality for credit rationing as the action of profit maximizing lenders has been as is still being challenged. For example, Paul Samuelson, in his testimony before the Patman Committee in 1952 argued that it was entirely inconsistent with profit maximizing bank behaviour to engage in non-price credit rationing. He argued that since commercial loan rate is sticky in the short-run only and hence the resort to non-price rationing, the phenomenon is primarily a short run one.

He also emphasized, however, the importance of the imperfections in the commercial loan market for the existence of rationing. This led to the development of a literature attempting to show that, contrary to this view, credit rationing can be quite consistent with rational profit-maximizing behaviour by lender starting with Hodgman (1963) and culminating in Jaffee and Modigliani (1969) and Jaffee (1971). Koskela (1976) made one of the most complete and interesting inquiries into the subject by building on the earlier literature especially Jaffee's (1971), solidifying this literature and extending it in a number of ways.

Theoretically, the survey of literature on credit rationing can be done under the following questions and issues:- meaning of credit rationing; nature and sources of constraints on loan rate differentiation; price stability versus continuous market clearing; Bank - customer relationship; and market failure and efficient market organization.

3.3.1 The Meaning of Credit Rationing

The occurrence of credit rationing has been variously defined, but in broad term, it refers to any method of allocating credit other than posting an interest rate for each identifiable class of borrowers and allowing each borrower to determine the size of his loan. Credit rationing may thus include non-linear pricing of loans, the imposition of credit ceilings, as it is in Nigeria, and in extreme cases the complete cut off of credit to some borrowers in some circumstances.

Credit rationing derives, ultimately, from the inability of lenders to exercise direct control over the fulfillment by borrowers of loan-contract obligation. In short, credit rationing occurs if the demand for loans exceeds the supply at the ruling price. However, two kinds of rationing which are the outcome of different market conditions can be distinguished in the literature. They are equilibrium or permanent and disequilibrium or temporary rationing conditions.

Past credit rationing literature theoretically at least, were mainly concerned with equilibrium rationing, i.e. with demonstrating that situations where price persistently stays at a level implying an excess of demand over supply can be consistent with rational lender behaviour.

In a condition of equilibrium rationing, a semantic question could be raised about the role of market clearing via adjustments in non-interest aspects of the loan contract, such as requirement concerning collateral, borrowers equity, compensating balances, maintenance of a stable customer relationship, or the length of the loan period. There is a fairly extensive branch in the credit rationing literature that defines credit rationing as a situation where would-be borrowers are crowded out (rationed out) of the market via increases in the "non-interest price" of loans i.e. elements of the price vector other than the stated interest rate, such as mentioned above. It is interesting and worthwhile to ask whether banks respond to excess demand for credit by adjusting the interest rate charged or by adjusting non-interest terms of the loan contract; and what relative roles these two types of responses play, for the lender as well as the borrower. However, the latter type of response clearly does not constitute "non-price rationing". Clearing the market both through interest rates and through non-interest price elements can usefully be regarded as rationing through price. The important point is that in both of these cases, it is the potential borrower who decides that the price is too high after all, and if he feels "rationed out" of the market, it is only because he has held erroneous expectations about the conditions at which he would be able to borrow. In the following, the term "credit rationing" will be used in the narrower and more traditional sense of non-price rationing only, thus reserving it to situations where a borrower's demand is unfulfilled, although he is willing to pay the ruling market price (in the broad sense including all aspects of the loan-term vector). Though, some of the other credit market literature is somewhat ambiguous and vague about what precisely is meant by credit rationing, and some writers, as mentioned, used the broader definition summarized above, this is clearly the kind of credit rationing that much of the past literature represented and summarized by Jaffee and Modigliani (1969), Jaffee (1971) and which Koskela (1976) tries to explain.

There is an alternative, but equivalent way of viewing a loan contract. Instead of talking about a "price-vector" including interest as well as other terms, one can consider the loan as a service that cannot be fully characterised by one dimension - quantity - alone but has several other dimensions or characteristics.

Changes in such non-interest terms as collateral and borrower's equity imply that a loan is of a different type or quality, which of course, should be reflected in its "nominal" interest rate. This suggests treating the loan market as a market with non-homogeneous goods and product differentiation.

The dependence of default risk, and thus loan quality, on loan size, collateral, and borrower's equity raises another question of how to specify competitive price-taking behaviour in such a market. A change in any of these factors, given the nominal loan rate, changes the quality of the loan, in the sense of changing the "effective" interest return implied in the loan contract. Credit rationing models typically assume that the lender has some degree of monopoly power and thus behaves as a price setter, whereas the borrower is assumed to behave as a price taker. The question, then is what price the borrower considers as a market determined parameter in his decision process, and thus, how his demand function should be parametrized?

The usual procedure (see Jaffee (1971) and Modigliani (1969), Smith Venon (1972) and Koskela (1970) is to assume that the borrower views the nominal interest rate as a market-determined parameter in his decision, independent of loan size, collateral and so forth. But this assumption is questionable, since it implies that he assumes that the interest rate he pays is independent of the quality of the loan. An alternative is to treat as parametric the "effective" interest rate which takes into account the influence of loan size, collateral and borrower's equity on the actual expected interest cost that the customer pays.

More generally, this line of argument suggests an applicability of the models of product differentiation and hedonic prices, as discussed, e.g. by Rosen (1974) where the total payment is related not only to the quantity purchased but also to all the relevant quality characteristics, via a "price function" that is a market determined parameter to the competitive buyer.

As Jaffee and Modigliani (1969) have emphasized, the credit rationing issue requires an analysis of not only supply, but also of demand and the interaction of the two in determining price. It is not useful to refer to the fact that a borrower with a given investment project cannot obtain more than a certain amount of credit at the "market rate of interest" without increasing the collateral and/or equity, as credit rationing means that we are facing a market with heterogenous goods.

3.3.2 The Nature and Sources of Constraints on Loan Rate Differentiation

However, the major justification for "equilibrium" credit rationing, in the sense discussed above and found in the literature is in terms of constraints on price setting.

Jaffee and Modigliani emphasise in particular constraints on the difference between the interest rates that a bank can charge to different customers. They discussed the problem of loan rate determination under a number of alternative assumptions. In all of them, the bank is basically treated as a price setting monopolist, with the borrower acting as a price taker. Thus, the lender basically optimizes along the borrower's demand function, which is derived on the basis of price taking behaviour on the borrower's part. However, their primary concern is with equilibrium credit rationing. They assume that a lender can act as a discriminating monopolist and conclude that he will ration some borrowers if he is subject to an institutional constraint which requires him to charge the same interest rate to borrowers with different demand curve for credit. According to them, different borrowers may differ with respect to both their risk characteristics and demand functions. In the case of a "perfectly discriminating monopolist" i.e. in the case where the lender is allowed to set a different rate for each customer[11], the lender will never set the price at a level where the customer's demand exceeds the lender's optimal supply, so that clearly, no customers will be rationed. However, if the bank, for some reasons, engages in limited loan rate differentiation among customers - generally will be such that some customer's demands at that rate exceed the lender's optimal supply to them, so that they will be rationed[12].

The fact that such constraints on price setting if existing and binding, as in Nigeria, prior to the deregulation of the financial system in 1987, can result in rationing should not be surprising and requires only simple objective assumptions about both the lender and borrower. The loan market is no different from any other market. Much more interesting is the question of their origin and importance. This question was not given much attention by Jaffee and Modigliani. The fact that perfect price differentiation is impossible is introduced as an entirely exogenous element into their theory. They mention interest rate ceilings, (e.g., imposed by usury laws) and appeal to a vague concept of "moral costs" and considerations of "goodwill" which makes it inadvisable to charge widely different rates to different customers[13].

In a way, the discussion with this essentially returns to the point where Hodgman started out in 1960, in that the proof of consistency of credit rationing with rational behaviour relies on precisely those legal "moral" or "psychological" constraints and rigidities that Hodgman tried to avoid as a necessary element of a theory of credit rationing.

The discussion of credit rationing based on limited loan rate differentiation would appear to be much more satisfactory if the latter were explained in terms of some factors indigenous to the model rather than simply asserted as an institutional fact. This is not impossible. For instance, it can be explained in terms of the costs (especially information costs) of distinguishing between different customers and their risk characteristics ("screening costs") and/or the direct costs of a more complicated and detailed rate system. This is the line of argument that we follow in this study. The bank's imperfect ability to screen customers is discussed by Koskela (1976) and Jaffee and Russell and Russell as a reason for limited rate differentiation. In these discussions, it is asserted that it is impossible, or prohibitively costly, to distinguish sufficiently between the risk characteristics of customers, at least in the case of "new" customers (a term that seems to identify the class of customers to whom this argument applies).

Jaffee and Russell (1976) demonstrate the rationality of credit rationing in competitive credit markets lending to personal borrowers. This does not in any way negate the fact that the same rationality can be proved for rationing credit to commercial and industrial borrowers even in the face of oligopolistic market conditions as is the case with the Nigeria's commercial loan market.

One important implication of the inability to screen customers in Jafee-Russell model is that the bank's cost function of granting loans is non-separable in that the (perceived) marginal cost of granting credit does not vary from customer to customer. In the case of "old" customers, on the other hand, screening is said to be possible, with the result that the bank's cost function of granting credit becomes separable with respect to different customers[14].

However, the problem with this endogenous justification of limited price differentiation, as far as the credit rationing issue is concerned is that limited interest rate differentiation implies the possibility of credit rationing in the case of separable cost functions for granting loans only but not in the case of a non-separation cost function (Koskela 1976). If the cost function is separable i.e. if the bank can distinguish the riskiness of it's customers, then credit rationing is possible, given limited ability for interest rate differentiation[15]. However, in the case where such endogenous constraints make sense is the case of imperfect screening i.e. the case where the cost function is not separable and in this case no rationing occurs.

The legal "social" and "moral" constraints on differentiation with respect to interest rates, to the extent that they exist, probably are considerably less binding than they appear at first view, because they can be circumvented to a large extent via adjustments in other loan terms, such as collateral arrangements, borrower's equity (down payment ratios) guarantees by third parties, and tied-in sale. This point which was largely ignored by Jaffee and Modigliani, was emphasized by Azzi and Cox (1976) and is discussed in detail by Koskela (1983). The use of non-interest loan terms eliminates credit rationing caused by constraints on loan rate differentiation, unless similar constraints apply to these other aspects of the loan contract too. As far as imperfect differentiation due to screening costs is concerned, this should apply, as Koskela (1983) points out, to non-interest loan terms as well as interest rates. But with respect to these endogenous constraints, the qualification mentioned above again applies. The importance of legal or "moral" constraints on the other hand, can hardly be very great in the case of these non-interest terms.

Koskela's conclusion from his discussion of non-interest loan terms seems to be that nothing is charged concerning the possibility and likelihood of credit rationing by allowing them to play a role in the loan agreement, since fundamentally, (qualitatively) the same results apply as in the case of interest rates: rationing is possible and consistent with rational lender behaviour if constraints concerning loan term setting and differentiation exist. This is also the view taken by Bester (1985) in their response to Arnott and Stiglitz (1983). However, in quantitative terms, i.e. in terms of the likelihood of rationing results and thus, of the importance of this kind of argument, it is quite clear that the ability to use non-interest loans terms in addition to interest rates gives the lender much more flexibility and ability to differentiate as compared to the interest-rate only case, and thus, reduces the importance of the legal and "moral" constraints emphasized by Arnott and Stiglitz (1983).

3.3.3 Price Stability Versus Continuous Clearing

The approach to the credit rationing issue looked into above is based on imperfect price differentiation among customers. The question of price rigidity or sluggish price adjustment, can also be raised in an intertemporal sense with respect to individual customers, in connection with intertemporal cost or demand shifts (which in principle, may be of a stochastic or deterministic nature). Of course, if price does not continuously and instantaneously adjust to (random or deterministic) shifts in cost and/or demand conditions, the possibility of temporary excess demands or supplies and thus of rationing occurs.

This kind of rationing which we earlier referred to as "disequilibrium rationing", is obviously not unique to the loan market, but may and will occur, to some extent, in any market. Rationing due to non-instantaneous adjustment of market to disequilibrium, i.e. due to "sluggish" price adjustments, in a much more general context, forms the very foundation of all the past disequilibrium theories pioneered by Clower (1965) and further developed by Borro and Grossman (1976), Laffont and Garcia (1977), Sealey (1979) and others. This kind of rationing has turned out to be much more important than the "equilibrium rationing" that dominated in past credit rationing discussions[16].

The basic question raised in this context is why do banks not continuously and instantaneously adjust price and resort instead, at least temporarily to quantify adjustment? One possible answer to this question found in the literature is in terms of the costs of price adjustments. Koskela (1983) discusses such an approach, based on Barro's (1972) model. If the bank experiences some cost every time it changes price, it will not adjust price continuously to its desired value in the presence of stochastically changing market (cost and/or demand) conditions, but will do so only if the resulting gain covers the cost of the adjustment itself. The result is an SS-type policy for optimal price adjustments, where within certain boundaries (which depend on the size and nature of the adjustment costs) no adjustments are made.

The next question naturally is what is the nature and the source of these costs of price adjustments? One answer that is often provided is first point to direct administrative cost, such as the cost of informing employees and branches, and of changing advertisements. Probably more important though, are the costs of a variable price policy to the customer. The cost savings for the customer due to a stable price policy (which can be transmitted to the lender via the demand function), bought at the expense of queues and inventories, has been emphasized by Stiglitz and Weiss (1981). Koskela attempts to implement this idea by interpreting "rigid" loan contracts as risk-sharing devices between risk averse borrowers and risk neutral lenders in the sense of the labour market models by Azariadis (1975) Bailey (1974) and Gordion (1974). That is, the bank is viewed as offering a loan contract at fixed or "predictable" terms and the (risk averse) borrower is assumed to be willing to pay for this characteristic of the loan contract in terms of a higher expected price, with customers or information concerning customers, being at least partly considered as "specific" by a particular bank.

3.3.4 The Justification and Consequences of Bank - Customer Relationship

The concept of "Bank - customer relationship" has for a long time played an important role in the credit rationing literature. Hodgman (1961), Kane and Malkiel (1965) both stress the importance of the "customer relationship" in determining the characteristics of credit rationing. Hodgman's argument is based on the value of the customer's deposits to the bank. With an institutional structure which prohibits interest payment for deposits and which places a floor under the commercial loan rate in the form of the prime rate convention, the bank, Hodgman argues, will compete for the deposits of large corporations by providing other banking services. One of the most important of these services is the provision of bank credit in periods of tight money. Blackwell and Santomero (1982) take a slightly different view. They argue that there is a class of customers for which the denial of a loan request increase the bank's aggregate risk. The fear of the bank is that it will loose these customers and most importantly their deposits in the long run. Thus both theories indicate that in periods of tight money, banks will redistribute their loans toward a class of large, stable customers. However, the issue of "customer relationship" can be given to two related but somewhat separable, interpretations. The traditional one (see Hodgman (1961) Hodgman (1963) Kane and Malkiel (1965) and Koskela (1976)) is in terms of jointness of demand for loans and other bank services, such as demand deposits. That is, it is hypothesized that an increase in the amount of credit granted by the bank to a given customer will increase that customer's demand for other bank services at the bank in question and thus generate "non-loan rate income" and vice versa. Thus the existence of such a relationship is assumed to raise the effective rate of return the bank obtains when it grants loans. It follows in this study. Directly, of course that, given interest rates and other loan terms, the bank will favour customers for which such a relationship exists over other customers. However this does not imply anything about rationing per se, although it may superficially look like it, unless price rigidity in some form is assumed first. This leads to a crucial problem of why a non-prime customer cannot compete for loans by simply offering a high enough interest rate. Hodgman's argument is that the rate which the non-depositor would have to pay is so high that the firms demand for loans at this rate is essentially zero. Rather than embarrass the firm with this very high rate, however, the bank goes through the fiction of telling the firm that there is simply no rate high enough to warrant a loan. It should be obvious that this is a classic case of price rationing. The fact that the customer's demand is zero at the equilibrium rate should not cloud the issue, and the fact that bank saves the customer's face by telling him that he is rationing is clearly irrelevant.

The Blackwell and Santomen (1982) argument is somewhat different. A good depositor, they argue, is more valuable to his current bank than is his would-be value to some competing banks, since the value of a customer is only developed over time as a result of a growing confidence in the stability of his deposits. They also note that a bank may be indifferent between a poor depositor of their own bank and a prime customer at some other bank. But the long run profit potential of prime customers in no way implies that a non-prime customer (regardless of whether he is considered prime at some other bank) may not still bid loanable funds away from a bank's prime customer. Indeed what Blackwell and Santomoro study suggests is that the total quantity of loans of both prime and non-prime customers may rise in periods of tight money.

The existence of such relationship is sometimes asserted as in Koskela (1981) and its nature and origins are somewhat vague. However, it can be seen as the result of some sort of regulatory or oligopolistic constraints e.g. deposit rate limitations, which induce banks to compensate their deposit customers through reduced charges and requirements for other services especially loans. Alternatively, it could be explained in terms of transaction costs i.e. the ease and convenience of doing all banking business at the same place. Or, finally, it can be justified in terms of asymmetric information about customers across banks (e.g. Stiglitz and Weiss (1981, 1983, 1987). The recent theoretical discussion of Stightz and Weiss (1987) show that in the presence of asymmetric information, it is quite possible for credit rationing to occur even with unregulated, competitive banking. More precisely, they show that circumstances can arise in which not all those in a pool of observationally equivalent loan applicants will be offered loans. The Stigltitz and Weiss model considers the potential for credit rationing in a single pool of loan applicant each of whom have projects with the same expected return. Here the focus is shifted to the banking sector's total demand for loanable funds - a demand derived by examining the effects of interest rate changes across different risk pools. It is shown that even if adverse selection occurs in each risk pools, only in a single marginal pool could rationing ever be observed. However, a major problem envisaged in this model is that the extent of rationing generated here is not likely to be empirically important.

3.3.5 Market Failure and Efficient Market Organization

The question of efficiency or otherwise of the loan market in connection with credit rationing discussions constitute a major area of controversy in the study of credit rationing. Is there something "special" to the loan market, which leads to non-price rationing and thus causes distortions and inefficiencies in the allocation of credit? Do loan markets "fail" i.e. not work in the way they are supposed to, the way "normal" markets do? If so why? Or alternatively, do the phenomena that we have discussed as credit rationing rather represent an efficient response of the loan market to the presence of certain cost elements and frictions?

Answers to these questions require us to again look more deeply and distinguish between the different meanings of the term "credit rationing". So far as rationing via non interest aspects of the loan contract is concerned, there is no particular reason to believe that this type of response is inefficient and represents "failing" of the market in any sense. If there exist institutional constraints on loan rates or their differentiation, as discussed by Jaffee and Modigliani (1969) and Koskela (1983), on the contrary, it is quite clear that allocative efficiency will be improved by allowing non interest loan terms to play a role in the adjustment process, since this has the effect of loosening the constraints imposed on effective loan rates.

So far as rationing in the narrower sense emphasized above and employed by Jaffee and Modigiliani is concerned, it is important to differentiate its efficiency implications. In the case of the Jaffee - Modigliani - Koskela type of rationing based on loan-rate and term constraints ("equilibrium rationing"), it becomes vital to distinguish between "exogenous" and "endogenous" constraints. Legal (institutional) constraints on loan term adjustments may lead to rationing and certainly may have undesirable efficiency results[17]. Endogenous constraints based on imperfect information and screening which are emphasized by Koskela (1976), Stiglitz and Weiss (1983) Jaffee and Russell (1976) and Joel and Howitt (1980) on the other hand, should not be seen as a factor causing inefficiencies and distortions. Rather, they represent an efficient response of the market to the existence of certain cost elements present in the loan market but not in the usual "textbook" market, namely information and transaction cost elements found in any market with heterogeneous goods. They can certainly not be the rationale, therefore, for any corrective regulatory measure.

The same is basically true for the case of credit rationing due to "sluggish" adjustment of loan rates or terms. Thus a certain degree of price rigidity or sluggishness clearly should be viewed as an efficient response of the market to elements such as adjustment costs and uncertainty, rather than inefficiency in the market system.

3.4 Model Specification of Markets in Disequilibrium with Rationing

Dissatisfaction with the aggregate minimization-condition model led Muellbauer to suggest the first model that allowed for disequilibrium across a range of submarkets in 1978. The genre has used a variety of different analytical frameworks: some papers assume a continuum of submarkets, others a finite (but "large") number; some analyse supply and demand explicitly while others use a more indirect approach. The literature did not begin with Muellbauer (1978), however his was the first formal model that is useful for our purposes. Much of Muellbauer's paper is taken up with arguments against the use of the aggregate minimization-condition disequilibrium model in market economies. He then develops the submarkets in disequilibrium model. He assumes that there are a continuum of submarkets. In the same manner, it shall be assumed in this study that there are a large, but finite, number of submarkets within the commercial loan market. This approach though may appear unorthodox, the essence is to capture differences in behaviour.

Suppose that demand in a particular submarket is xd(i). To construct an aggregate demand, we must at some stage aggregate demand over the different submarkets. The usual response to such an aggregation problem in economics has been to introduce a fictitious "representative consumer" whose behaviour represents the behaviour of all the separate agents. To get an aggregate expression, we merely multiply the demand of this representative consumer by the number of agents. This is unsatisfactory since it ignores what appear to be very real and pervasive differences in behaviour between individuals and firms. However it is equally clear that without data on individual agents, proper aggregation is not possible. Therefore we should not think that a model that uses aggregate data aggregates the behaviour of different agents. Rather, since we want tractable aggregate expressions, we should be content with allowing for diversity in the behaviour of those agents whose composite behaviour our aggregate expression is trying to mimic.

Following Muellbauer (1978), this will be done by expressing xd(i) as the sum of two unrelated components: a component that is common to all the submarkets and a component specific to each submarket.

So we can write (we do not make time subscripts explicit at this stage),

$$xd(i) = xd + u(i) \tag{3.1}$$

The component that is common to all submarkets, xd, is the demand function that will be used (in aggregated form) by the modeller at the aggregate level. The submarket-specific component is given by u(i). Since this contains the difference between the general demand function, xd, and the true demand function, xd(i), we can effectively treat the submarket-specific elements as error terms. They can represent the bias induced by aggregate modelling.

We can write supply on submarket i in an analogous way as

$$xs(i) = xs + v(i) \tag{3.2}$$

where xs is common to all submarkets and v(i) specific to submarket i.

The model is completed by the use of the min condition at the level of the individual submarket:

$$x(i) = \min\{xd(i), xs(i)\} \tag{3.3}$$

where x(i) is the amount of trade on the submarket. This basic structure must now be integrated into an aggregate model.

Submarket i will be in excess demand if xd(i) > xs(i), i.e. if

$$xd - xs > v(i) - u(i) \tag{3.4}$$

Clearly only the submarket-specific errors vary across submarkets, therefore the probability of being in excess demand will be the same for all submarkets and will depend on the distribution of u(i) - v(i). Let F(.) be the distribution function of the standardised variable $\eta(i) = \{u(i) - v(i)\}/s$, where s is the standard deviation of u(i) - v(i). This will be derived from the joint distributions of u(i) and v(i) in the usual way. The probability that submarket i will be in excess demand, π, is given by

$$\pi \quad = \quad 1 - F((xs - xd)/s) \tag{3.5}$$

It is common to all models in the genre to suppose that there are a large number of equally-sized submarkets. Then the proportion of submarkets that are in a particular regime is equal to the probability of a particular submarket being in that regime.

Aggregate loan transaction will be given by the sum of demand across those submarkets that are in excess supply and of supply across those submarkets that are in excess demand. So, if

$$X = \sum_{i=1}^{m} xd(i)$$

is aggregate loan transacted (suppose that there are m submarkets):

$$X = \sum_{exs} xd(i) + \sum_{exd} xs(i) \tag{3.6}$$

where Σ_{exd} denotes aggregation over those submarkets that are in excess demand and Σ_{exs} denotes aggregation over those submarkets that are in excess supply. This can be rewritten as

$$X = \sum_{exs} xd + \sum_{exs} u(i) + \sum_{exd} xs + \sum_{exd} v(i) \tag{3.7}$$

$$= m(1-\pi)xd + m\pi xs + \sum_{exs} u(i) + \sum_{exd} v(i) \tag{3.8}$$

since, by definition, xd and xs are the same in all submarkets. This leaves the problem of the error terms. Over the whole range of submarkets, we can take their mean to be zero. However their mean over those submarkets that are in excess demand or excess supply cannot be taken to be zero because their value will affect which regime the submarket is in. Therefore we have a sample selection problem.

Different models within the overall framework can more or less be characterised by the distribution that is assumed for the submarket-specific errors and hence by how they solve the sample selection problem.

Assuming that this selection problem can be solved, we will have an equation for aggregate trade. We should consider the criteria that such an equation should fulfill. The first is easy interpretation: ideally the equation should relate trade to aggregate demand or supply with the difference between the two positively related to aggregate excess demand or supply. Secondly, since the aggregate min-condition model is rejected because we suspect that in actual markets behaviour on all submarkets is not alike, the difference between the submarkets model and the aggregate min-condition model should depend on the diversity of behaviour across submarkets. Furthermore, when the diversity of behaviour across submarkets becomes negligible, the expression for aggregate trade should collapse to that of the aggregate min model. Thirdly, the equation should encompass the market-clearing model in both the intuitive sense and the Hendry and Richard (1983) sense. The difference between a disequilibrium model and a market-clearing model is that the former contains non-zero excess demand terms. As these excess demand terms become small, actual trade will approach market-clearing and we should expect our expression for trade to do the same.

All of these points are contained in Muellbauer's original paper which essentially contains the general framework outlined above. He also provided expressions for excess demand and excess supply on the assumption that u(i) - v(i) is uniformly distributed on [-a, a].

A somewhat different approach is found in Batchelor (1977). The paper examines the behaviour of firms who turn to the export market when facing excess supply, or more precisely, excess capacity on the domestic market. The supply to the export market depends on the level of domestic demand and the relative profit from exporting. The firm may be willing to accept a lower price, perhaps only to cover short run operating costs, when exporting. Therefore the firm's behaviour is governed by two separate behavioural functions, with a switch operating when the firm turns from supply to the domestic market to exporting. The link between this and the submarkets in disequilibrium approach is that the switch point will differ across firms. This means that some firms will be happy to export even when domestic demand is strong.

Assuming that supply and demand submarket-specific errors are independently and uniformly distributed, that the variable which determines the switch between the two regimes, capacity in Batchelor's model, is also uniformally distributed, and further assuming that some firms will always be arbitrarily close to full capacity utilisation, an equation for aggregate exports can be derived. Although linear, it is somewhat cumbersome and precise interpretation of the results seems hazardous.

The model is an interesting and imaginative one. However, as with Muellbauer's original model, the assumption of uniform distributions gives implausible results. This distribution also leads to equations for aggregate trade that are difficult to interpret. So our criteria are not fulfilled.

A different approach was initiated by Malinvaud (1981). He did not attack the problem using supply and demand functions. Therefore the Malinvaud model cannot be slotted into our framework without some interpretation. Instead he starts from the fact that supply will be the lesser of demand, full capacity output and full-employment output. These are somewhat uncertain concepts at the level of the individual submarket. Malinvaud seems to be assuming that the firm will supply at the "full-employment" level until it hits the limit of capacity. This seems unrealistic, the profit-maximising output seems better than the full employment level.

Stochastic variation is introduced into the model by assuming that the difference between full-employment output and capacity-constrained output contains an economy wide element and a stochastic submarket-specific element. The same applies to output.

In general the model can be written as

$$y \quad = \quad y^f + H(e, ee, s, ss) \tag{3.9}$$

where y is aggregate output, y^f is full employment output at the aggregate level. e and ee are the economy wide components of the two differences between full-employment output for the firm and capacity and demand constrained output, s and ss are the respective stochastic components.

Malinvaud assumes that e and ee are uniform on [-1, 1] and solves the equation for y. Once again it is cumbersome. This approach confuses the basic issue; disequilibrium is best approached in terms of differences between supply and demand. Before interpreting Malinvaud's model properly, it has to be transposed into supply and demand terms.

Kooiman and Kloek (1979) start from a supply and demand model along the lines of Muellbauer. They define h(xs(i), xd(i)) which gives the number of submarkets upon which supply is xs(i) and demand xd(i). They then put this into a continuous submarkets framework. They define h_n (xs(i), xd(i)) and approximate this by a continuous function. Then g(S, D) is h_n (.,.) scaled to the aggregate level where

$$S = \sum_{i=1}^{m} xs(i) = \sum_{i=1}^{m} xs, \text{ and } D = \sum_{i=1}^{m} xd(i) = \sum_{i=1}^{m} xd,$$

where m is the number of submarkets. Therefore aggregate trade is given by

$$X = \int_{-\infty}^{x} \int_{-\infty}^{\infty} D\, g(S,D)\, dSdD + \int_{-\infty}^{x} \int_{-\infty}^{\infty} S\, g(S,D)\, dDdS \qquad (3.9)$$

which is essentially the problem as stated by Muellbauer (in fact this expression shows that the actual level of trade in the submarkets model is equal to the expected amount of trade in the aggregate min-condition model). The problem is then one of choosing an appropriate distribution for g(.,.). They choose the means of this distribution to be XD and XS, so that error can only come from misspecifying the form of the distribution.

Notice that this makes sense within the framework outlined at the beginning of the section. This implies that the distribution g(.,.) is derived from the distribution of u(i) and v(i), which can be taken to have zero mean. Kooiman and Kolek then add stochastic errors to XD and XS. This will be necessary for econometric purposes, but the errors play no immediate role and so only serve to confuse the issue.

They then consider the implications of g(.,.) being either normal or lognormal. The normal seems to be a much more useful distribution than the uniform. However the lognormal does not seem to be very useful since it restricts the submarket errors to be positive, and therefore it is not possible to interpret the errors as aggregation bias.

Their proof in the case of the normal is difficult. However, they derive an expression (equation 21 of their paper) which can be rewritten as:

$$X = XD - ED\Phi(ED/s_a) - s_a\alpha(ED/s_a) \qquad (3.10)$$

where $\Phi(.)$ is the standard normal distribution function and $\alpha(.)$ the corresponding density. s_a is a parameter that reflects the diversity of behaviour across submarkets. If s_d and s_s are the standard deviations of u(i) and v(i) respectively, and r is their correlation, then

$$s_a^2 = m(s_d^2 + s_s^d - 2rs_ds_s) \qquad (3.11)$$

ED is aggregate excess demand:

$$ED = XD - XS \qquad (3.12)$$

This equation was also derived independently by Nickell (1984).

The major difference between the analysis of Kooiman and Kloek and that of Nickell (1984) lies in the estimation procedure used to estimate (3.10). Kooiman and Kloek attempt to integrate out the error terms from (3.10). This is a difficult undertaking and can only be done under certain assumptions. The result is a complicated expression that does not easily lend itself to estimation. This is reflected in some rather disappointing empirical results when the model was applied to data from Dutch manufacturing.

The algebra is yet more complicated if u(i) and v(i) are assumed to be lognormal. In fact we must assume that s_a is small (in which case the aggregate min model will be increasingly appropriate). If so:

$$X = XD - ED'\Phi(ED'/s_a) - (1/2)(XD+XS)s_a\alpha(ED'/s_a) \qquad (3.13)$$

where ED' = logXD - logXS.

The equation relies on an approximation that is only valid for small s_a. Therefore the equation does not seem very robust and does not fulfill our criteria. Since a normal distribution for u(i) and v(i) seems more natural than the lognormal and produces an equation that is both more general and easier to analyse.

Nickell (1984) uses essentially the same model as that outlined at the beginning of the section. This seems more convenient since there is no need to consider a continuum of submarkets, rather all we need is a continuous distribution for u(i) and v(i). Furthermore, while an approximation is necessary, it is likely to be a close one since it is based on the law of large numbers. Nickell expresses equation (3.4) as

$$X = XS + ED(1-\pi) + \sum_{exs} u(i) + \sum_{exd} v(i) \qquad (3.14)$$

But $\pi = \Phi(ED/s_a)$, therefore

$$X = XD - ED\,\Phi(ED/s_a) + \sum_{exs} u(i) + \sum_{exd} v(i) \qquad (3.15)$$

Nickell then proves that the last two terms of this expression can be written as

$$-s_a\alpha(ED/s_a) \qquad (3.16)$$

and so aggregate trade can be written as

$$X = XD - ED\Phi(ED/s_a) - s_a\alpha(ED/s_a) \qquad (3.17)$$

which is the same equation as that derived by Kooiman and Kloek.

Gourieroux and Laroque's (1985) approach is slightly different from those we have just considered, since they set out a simple artificial economy with quantity rationing. They prove the existence and uniqueness of equilibrium in such an economy before considering estimation. The idea is that the artificial features of the model do not hamper empirical application. In fact, it is possible to remove the artificial features of the Gourieroux-Laroque model and get a much more plausible structure.

Once again there is assumed to be a continuum of submarkets. On each submarket there are two types of agent. One type operates only on the specific submarket while the other type operates on all submarkets and so generates the spillover effects. They seem to do this to avoid the unappealing extremes of assuming either that agents are restricted to one submarket or that they operate on all submarkets. It is impossible to allow agents in particular submarkets to operate on other specific submarkets since this would require more adding up than is possible in the aggregate model.

Since Gourieroux and Laroque allow for spillovers between submarkets, we need to consider the form that effective demands take. These differ from conventional, notional, demand functions in that they allow responses on the current market to rationing encountered on other submarkets. Gourieroux and Laroque assume that agents respond in a linear fashion to the difference between the amount traded on other markets and the amount that would have been traded on the market in equilibrium. It may be more plausible to allow agents to respond to the difference between effective demands and the amount traded, i.e. effective supply. The introduction of the two different categories of agent does affect the equation for aggregate trade.

An equilibrium with quantity rationing is then defined in the usual way, although they must provide a rationing scheme that explains how the sum of rationing is divided up between the two types of agent. They then prove the existence and uniqueness of equilibrium, this uniqueness property being largely guaranteed by the linear spillover effects.

They then consider the amount that is traded in such an equilibrium. Their method has two major virtues. The first is that they can model one side of the market in isolation from the other. The second is that they manage to express effective demands in terms of the proportion of submarkets that are in excess demand. Recalling the definition of π, above,

$$\pi = 1 - F((xs-xd)/s) = 1 - F(-ED/s_a) \qquad (3.18)$$

then

$$ED = -s_a F^{-1}(1-\pi) \qquad (3.19)$$

If this equation can be solved, then the problem of allowing for the role of excess demand will have been greatly simplified. In fact their equation for aggregate trade can be written as

$$X = XD - (1-\mu\alpha)s_a[g(\pi) - \pi F^{-1}(1-\pi)] \qquad (3.20)$$

where α is a parameter of the effective demands and μ is a parameter of the rationing scheme that allocates excess demand between the two types of agent. $g(\pi)$ is the expected value of the difference between notional demand and the amount actually traded, on a submarket that is in excess demand. They suggest the use of the logistic distribution for F(.), and this does simplify the model greatly.

They then consider problems of estimation. If stochastic additive errors are introduced to XD and XS, the model seems ready for estimation. However, they point out that π is endogenous. Their solution is to estimate jointly the equation above together with the corresponding equation for the supply side. The amount traded and π are the endogenous variables. This implies a complicated Jacobian term and complicated nonlinear estimation. While π is undoubtedly endogenous, we can use properly chosen instrumental variables.

The paper by Kooiman (1984) attempts to construct a submarkets in disequilibrium model based around the use of survey data. For each firm, assuming that goods cannot be stored, output is given by

$$y = \min[y^s, y^d, y(l^s)] \tag{3.21}$$

where y^s is effective goods supply, y^d is effective goods demand and $y(l^s)$ the amount that can be produced with the given effective labour supply, l^s. In a similar fashion employment will be given by

$$l = \min[l^d, l^s, l(y^d)] \tag{3.22}$$

where l^d is effective labour demand and $l(y^d)$ the amount of labour needed to produce the given goods demand.

There are four possible regimes for the firm, capacity constrained (cc), demand constrained (dc), labour constrained (lc) and demand and labour constrained (dlc). Assuming that there is a continuum of firms, we may define aggregate output, Y, as

$$Y = \int y^s dH + \int y^d dH + \int y(l^s)\, dH \tag{3.23}$$

where H is the distribution of (y^s, l^d, y^d, l^s). Likewise employment, L, is given by

$$L = \int l^d dH + \int l^s dH + \int l(y^d)\, dH \tag{3.24}$$

Compressing Kooiman's argument, aggregate supply can be defined, as;

$$Y^s = \int y^s dH \tag{3.25}$$

capacity utilisation as

$$Q = Y/Y^s \tag{3.26}$$

and the proportion of firms in various regimes as

$$P_i = \int (1/Y^s)\, y^s dH \qquad (3.29)$$

for i = cc, dc, lc or dlc.

The various equations can be schematically written as

$$Y = Y(Y^s,\ L^d,\ Y^d,\ L^s;\ z) \qquad (3.30)$$

$$L = L(Y^s,\ L^d,\ Y^d,\ L^s;\ z) \qquad (3.31)$$

$$Q = Y/Y^s \qquad (3.32)$$

$$\begin{gathered} P_i = P_i(Y^s,\ L^d,\ Y^d,\ L^s;\ z) \\ i = cc,\ dc,\ lc \text{ or } dlc \end{gathered} \qquad (3.33)$$

where z is a vector containing the parameters of H. Since the means have been defined to be equal to Y^s, L^d, Y^d, L^s, z will contain the parameters of the second and higher moments of H.

The analysis must be complicated somewhat at this point to allow for the fact that the data that Kooiman uses, a time-series on Dutch manufacturing, has a category in which firms report themselves as unconstrained. Since this has no place in the theoretical model, Kooiman hypothesises that firms report themselves as unconstrained so long as their capacity utilisation does not fall below a threshold level. This complicates the model but does not alter anything fundamental.

Thus far we have nothing but an exercise in aggregation. Kooiman then shows that if we make the rather restrictive assumptions that H is lognormal and that the $y(l^s)$

and $l(y^d)$ functions are linear and pass through the origin, then

$$P_{cc} = \int_0^{\infty}\int_0^{\infty} n(A,B)\,dAdB \tag{3.34}$$

$$P_{dc} = \int_0^{logr}\int_0^{\infty} n(A,B)\,dBdA \tag{3.35}$$

$$P_{lc} = \int_{-\infty}^{-\infty}\int_B^{\infty} n(A,B)\,dAdB \tag{3.36}$$

$$P_{uc} = \int_{logr}^{\infty}\int_A^{B} n(A,B)\,dAdB \tag{3.37}$$

where P_{uc} the proportion of firms that report themselves as unconstrained, r is a "measure of normal capacity utilisation", essentially a measure of the threshold beyond which firms report themselves as constrained. $A = \log(Y^d/Y^s)$ and $B = \log(L^s/\mu L^d)$, where μ is a measure of "normal labour availability", the threshold for the reporting of labour constraints. The covariances are s_a^2, s_b^2 and rs_{ab}. The mean of n(A,B) is

$$\begin{aligned}[m_a : m_b] = [&\log(Y^d/Y^s) - 0.5s_a^2 : \log(L^s/L^d) \\ &- 0.5s_b^2 + const]\end{aligned} \tag{3.38}$$

The equation for aggregate capacity utilisation is

$$\begin{aligned}Q = &\int_0^{\infty}\int_0^{\infty} n(A,B)\,dAdB + \int_{-\infty}^{\infty}\int_A^{\infty} e^{A} n(A,B)\,dBdA \\ &+ \int_{-\infty}^{\infty}\int_B^{\infty} e^{B} n(A,B)\,dAdB\end{aligned} \tag{3.39}$$

Aggregate output is then given by QY^s. An equation for employment can also be derived but is not reported. It turns out that the equations for Q and the P_i are homogenous of degree zero in (Y^s, Y^d). This means that the survey data gives information about excess demands but not about the levels of aggregate demand and aggregate supply. This is not surprising as an equation for aggregate demand or aggregate supply can be specified using survey data to correct for the excess demands. Kooiman does not do this and, relying solely on survey data, he does not estimate equations for aggregate output and employment. Rather he treats $\log(Y^d/Y^s)$ and $\log(L^s/L^d)$ as "free parameters". This leaves Kooiman with the problem of estimating equations for the various P_j and for Q. Allowing m_a and m_b to vary over time, and adding a stochastic error to each equation, Kooiman is faced by a nonlinear optimisation problem.

It is probably fair to say that the results are disappointing. Satisfactory estimates for the variance terms were difficult to obtain. This affected the results, although the fitted value of $\log(L^d/L^s)$ does track recorded unemployment quite well.

In summary, Kooiman presents an imaginative attempt to produce a model that treats aggregation properly and uses only survey data. In this he is successful. However, the nature of the data means that he only has information on excess demand. This means that output and employment equations cannot be estimated using his method.

A paper by Bouisson, Laffont and Vuong (1986) presents an attempt to model the survey data themselves, rather than to use the survey data in an aggregate model. Using data collected for French industry for 1975 to 1982, they cattegorise firms into one of the familiar four regimes (Classical Unemployment, Keynesian Unemployment, Repressed Inflation and Underconsumption). This reveals a predominance of Keynesian Unemployment, although the other regimes are also in evidence.

They then set out to explain the probabilities of a firm being in one of these regimes, using conditional logit models. Although the results are somewhat difficult to interpret, they find that the best predictor of the current regime is the previous regime. Also generally significant are an indicator of whether demand was greater than expected, indicators of sectoral real wages and lagged values of an indicator of sectoral public expenditure.

Lambert (1986) develops submarket disequilibrium modelling in a significant way. He starts from the following model

$$\log x^d(i) = \lambda^d + \epsilon^d(i) \tag{3.40}$$

$$\log x^s(i) = \lambda^s + \epsilon^s(i) \tag{3.41}$$

$$\log x(i) = \min[\log x^d(i), \log x^s(i)] \tag{3.42}$$

where $[\epsilon^d(i), \epsilon^s(i)]$ are assumed to be jointly normally distributed. The model therefore assumes a lognormal distribution for the submarket-specific errors in terms of the levels of x^d and x^s. Therefore the errors are assumed to have a multiplicative effect.

If one defines

$$\overline{X}^d = \exp[\lambda^d + \sigma_d^2/2], \ \overline{X}^s = \exp[\lambda^s + \sigma_s^2/s],$$

where $\sigma_d{}^2$ is the variance of $\epsilon^s(i)$, as the "average" demand in each submarket, then Lambert derives an equation for aggregate trade corresponding to the following CES form:

$$X = [(X^d)^{-\rho} + (X^s)^{-\rho}]^{-1/\rho} \tag{3.43}$$

where $X^d = \Sigma\bar{x}^d$, $X^s = \Sigma\bar{x}^s$ and $\rho = -1 + [(2/\sigma)\alpha(-\sigma/2)/\Phi(-\sigma/2)]$, where $\sigma = [\mathrm{var}(\epsilon^d(i)-\epsilon^s(i))]^{1/2}$. $\Phi(.)$ is the standard normal distribution function and $\alpha(.)$ its associated density function. This equation is somewhat difficult to interpret in terms of the underlying submarket level variables, but at the aggregate level it does produce a relatively simple equation that is straightforward to estimate and interpret. The aggregated "normal" demands and supplies, X^d and X^s are modelled directly. Equation 3.43 is not an exact result however: the proportion of submarkets that are in excess demand is given by a rather complicated equation involving the density and distribution functions of the standard normal. Since this proportion must vary between 0 and 1, Lambert approximates the complicated equation by a simple logistic function. This is not apparent from the main text but see Appendix A, p 138, of Lambert (1986). Therefore the equation for aggregate trade either is exact,if one relies on a mixture of lognormal and logistic distributions, or else must be seen as an approximation. There is no intrinsic fault in approximations of this form, particularly when they produce simple and convenient results, but the approximation must be kept in mind when one seeks to interpret the results.

The proportion of the market that is in excess demand is given by

$$\pi = 1/(1+(X^d/X^s))^{-\rho} \qquad (3.44)$$

The equation for aggregate trade, (3.43) can be written as

$$X = X^s[1 + (X^d/X^s)^{-\rho}]^{-1/\rho} \qquad (3.45)$$

or as

$$X = X^s \pi^{1/\rho} \tag{3.46}$$

Hence

$$X^s = X\pi^{-1/\rho} \tag{3.47}$$

Similarly,

$$X^d = X(1-\pi)^{-1/\rho} \tag{3.48}$$

Taking logs, we find

$$\log X = \log X^s + 1/\rho \log \pi \tag{3.49}$$

$$\log X = \log X^d + 1/\rho \log(1-\pi) \tag{3.50}$$

Equations (3.49) and (3.50) are similar (in terms of identifiable parameters), except that they are in logs. This probably reflects the fact that Lambert has assumed a logistic distribution function in order to simplify his model.

Sneesens and Dreze (1986) use the framework developed by Lambert, although they do not develop it in any fundamental way. They use the CES equation for aggregate trade developed by Lambert in their investigation of unemployment in Belgium. They show how the model implicitly contains a Philips Curve and develop the macroeconomics of the model further. This is interesting but somewhat beyond the scope of this thesis. The estimation procedure used by Sneesens and Dreze makes several simplifying assumptions. Since they attempt to estimate seven equations in all, including export and consumption functions and a production function, this is probably necessary. Rather than estimate the model as a whole, exploiting the complicated cross-equation restrictions, they choose to estimate the system recursively.

A similar approach to Lambert is taken by Stalder (1986) in his model of the Swiss Labour market. Assuming a structure similar to (3.40) - (3.43) and assuming lognormally distributed submarket - specific errors he derives an equation for aggregate trade of the form

$$\begin{aligned} X &= X^d\Phi(\log((X^s/X^d)/\sigma) - \sigma/2) \\ &+ X^s\Phi(\log((X^d/X^s)/\sigma) - \sigma/2) \end{aligned} \tag{3.51}$$

Unlike Lambert, he does not use any approximations in the derivation. The proportion of submarkets that are in excess demand is then given by

$$\pi = \frac{1/[1+X^d\Phi(\log((X^s/X^d)/\sigma) - \sigma/2)]}{X^s\Phi(\log((X^d/X^s)/\sigma) - \sigma/2} \tag{3.52}$$

This is clearly a complicated expression and is similar to that which led Lambert to derive an approximation. Stalder recognises the necessity of simplifying the equations, particularly if X^d and X^s are allowed to be stochastic. Therefore he approximates (the precise details of the justification for this are left rather obscure) the equation for aggregate trade as

$$X = X^d(1-\pi)^\alpha \tag{3.53}$$

$$X = X^s\pi^\alpha \tag{3.54}$$

where α is a parameter. This produces equations similar to (3.46) and (3.47) of the Lambert model. Therefore it appears that using lognormal errors leads to prohibitively complicated equations and that resort to approximations based around the logistic seems to be necessary.

3.5 Survey of Empirical Studies

(i) Techniques of Measurement

Just as with the theoretical discussions on the issues of credit rationing, empirical analysis of this phenomenon has equally advanced very significantly in recent years. Despite the expansive coverage of the theoretical discussion on credit rationing, the coverage on the empirical front so far has not been as equally wide. In fact the scope of empirical studies has been limited to three albeit, that of establishing its existence, measurement of credit rationing and of course the nature and type of rationing.

Essentially, four indirect techniques have been used for the measurement of credit rationing. They are: (i) Cross Sectional Analysis where bank loan supply functions are analysed with cross sectional data over periods of differing monetary tightness for evidence of differential bank behaviour in the light money periods; (ii) Time Series Analysis where demand and supply functions for loans are estimated over time with explicit allowance for the existence of credit rationing. The significance of rationing variables is then used as the test for the existence of rationing; (iii) Survey Techniques, where commercial banks or business firms are questioned by survey concerning the existence and amount of credit rationing; (iv) Proxy Measures; where variables expected to be highly correlated with credit rationing are used as proxy measures of the actual phenomenon.

However, prior to Sealey (1979), the most successful of the approaches are those which employ survey techniques or proxy measures. Of the writers employing survey techniques, the work of Harris (1970, 1974a, 1974b) is perhaps the most comprehensive. Harris employs the Federal Reserve's "Quarterly survey of changes in Bank lending practices" to establish the existence of credit rationing. Although Harris' work supports the existence of credit rationing, his analysis provides no direct measure of the magnitude of credit rationing. In addition, it is of no assistance in incorporating credit rationing into a model of the commercial loan market. More importantly, however, Harris' results may be less than totally convincing since as Jaffee (1971) points out, there are inconsistencies and biases in the survey data used.

Jaffee (1971) provides what is perhaps the most comprehensive study of credit rationing by employing the proxy measure approach. In his study, Jaffee attempts to measure the existence and magnitude of credit rationing within a fully specified model of the commercial loan market thus providing, in addition, structural estimates of this market. However, since Jaffee employs the proxy measure approach, his results are dependent on the degree to which the proxy actually reflects the degree of credit rationing. This, proposition can be tested only indirectly by determining the degree of association between the proxy measure and those variables thought to be related to rationing. Although, Jaffee's results are in most cases good, he finds that the credit rationing proxy is not significantly related to loan demand. He discounts this result by hypothesizing that firms may adjust their net assets in the face of credit rationing so as not to require significant adjustments in loan demand. It is possible, however, that this lack of significance may reflect some inadequacies on the part of the proxy itself. An additional problem with Jaffee's results is that they are based on a recursive model where the demand for and supply of loans do not interact to simultaneously determine the loan rate and the quantity of loans exchanged in the market. As Melitz and Pardue (1973) and Kraimer (1969) have shown, a fully simultaneous model of the commercial bank loan market is consistent with observed data. Hence Jaffee's model may also suffer from specification error.

The use of the two other methods are more recent. Their use and application to the study of credit rationing involve the developments in the techniques of modelling and estimation of markets in disequilibrium. Unlike the survey and the proxy methods, the cross sectional and time series analysis methods are not limiting their focus on establishing the existence and measuring credit rationing. They are more focused on identifying the structural character of the loan market. In this way, they would be able to account for the disequilibrium nature of the loan market, specify and estimate the demand and supply functions, ascertain the nature of rationing i.e. whether it is a price or non-price rationing and whether it is equilibrium or dynamic rationing and more importantly, the degree of rationing can be measured and its effects evaluated.

Tybout (1984) took an exploratory study of the effects of credit rationing on investment behaviour in a developing country taking Colombia as a case study. He upholds the Mcknon's position that poor financial intermediation drastically reduces the quality of capital formation and this can be almost as damaging to a country development prospect as no capital formation at all. Working on this premise, he established two potential links between rationing and investment, namely; cost effects and liquidity effects. Applying the credit rationing and investment model he constructed for the Colombian economy, he separated the investors into two groups namely small firms and large firms. Like Sealey (1979) he used the Full information maximum likelihood (Fiml) estimates and concludes that internal funds generation is an important source of financing among the small firms suggesting a high preponderance incidence of credit rationing among this group of investors. This therefore, prevents the firms from realising their notional investment level, encourage inefficiency as firms devote resources to gaining access to finance instead of productive activities, reduce the market value of affected firms and thus expose them to takeover attempts by their more favoured competitors.

Mayada et al (1994) looks at the incidence of credit rationing in small scale enterprises, with focus on the special microenterprises programme in Ecuador. Building on the work of Aguilara and Graham (1990) and Maddala and Trost (1982), they specified a two equation model i.e. demand for and supply of loans model. They noted that the framework needed for analysing credit rationing requires consideration of the demand for and supply of loans. A simultaneous equations system should therefore be estimated utilising information about all applicants, both borrowers and non-borrowers, in order to avoid biased results. The results show that a single equation model could mislead interpretation that lenders discriminate against a particular type of borrower.

Mocan et al (1997) examines discrimination in mortgage lending in the United States over three decades 1960 to 1990. The focus was on whether deregulation, increased Federal oversight and enhanced competition reduce discrimination as Becker's theory suggests (Becker, 1971). The study found that rationing is evident over the three decades. Taken together credit rationing is prevalent from 1960 to 1980, but is absent in the data from 1980 to 1990. This finding strongly supports Becker's hypothesis. Preferences for discrimination appear to be offset by the higher costs of engaging in them after 1980.

Prior to the works of Martin (1987, 1989, 1990), Sealey (1978), Laffont and Garcia (1979), Mayada, Richard and Nelson (1994) and Mocan et al (1997), previous empirical studies, Brady (1967) de-Leeuw-Gramlich (1964) Huang (1966) Silber (1970), Sparks (1967) and Smith (1969) have introduced non-interest credit terms as a means of accounting for non-interest credit rationing effects[18]. However, the variables were simply treated as predetermined explanatory variables and, therefore, subject to simultaneous equation bias[19]. Moreover, since the estimates of their supply and demand functions are based on the assumption of market equilibrium with respect to the interest rate, previous estimated models are logically inconsistent when they use non-interest credit terms as measures of disequilibrium rationing[20].

Hueng (1969) was the first to analyse explicitly the disequilibrium character of the commercial loan market. He assumed that changes in the loan rate are proportional to excess loan supply and was able to examine the disequilibrium growth path of the loan rate. However, in estimating his adjustment equation, he assumed that observed quantities fall on the loan demand curve and not on the supply curve. Thus, his estimates are inconsistent with that of loan supply where he assumed the observed quantities fall on the supply curve.

One primary problem peculiar to previous studies is the inability to identify supply and demand and at the same time account for disequilibrium rationing. Jaffee (1972) was the first to adequately address himself to the problems in doing both[21]. He assumed that the observed quantities lie on the loan supply curve, and estimated the loan demand curve indirectly from the estimation of a loan rate adjustment equation where the loan rate is a function of the observed quantity of bank credit, the loan rate lagged one quarter and the variables in the demand equation other than the loan rate itself[22]. But if the sluggish loan rate happens to be above the equilibrium rate one would expect that the observations would fall on the demand curve rather than the supply curve. Jaffee dismisses this possibility with the argument that throughout most of his sample period the change in interest rate was non-negative. Thus, the actual loan rate was either below the equilibrium rate or at the equilibrium rate. Jaffee's study is consistent in that once he posits disequilibrium, he does not attempt to estimate demand and supply from the same set of quantity observations.

In general, Jaffee's assumption will be most useful. However, his model requires an objective means of analyzing the market to determine whether one is actually in a supply 'regime' (as Jaffee assumed to be true for his period of study) or a demand regime[23].

Fair and Jaffee (1972) suggested procedures for determining whether the market is in a 'demand regime' or 'supply regime'. These procedures utilize the direction of interest rate change to determine the condition of the market. If observed changes in the interest rate are negative, the market is in a demand regime' and excess supply exists.

If observed changes in the interest rate are positive, the market is in a 'supply regime' and excess demand exists in the market. Once the observations have all been classified with respect to being demand or supply determined, ordinary least squares are used to estimate the demand and supply schedules. Only demand based interest rates and quantities are used to estimate the demand schedule.

Fair and Jaffee also attempt to estimate disequilibrium markets by utilizing the quantitative assumption that positive (negative) interest rate changes are proportional to unobserved excess demand (supply). Consequently, they estimate the unobserved portion of the demand schedule by regressing observed quantities on the determinants of demand and on current interest rate changes. Such changes act as proxies for unobserved excess demand.

There are problems with the Fair-Jaffee approach, first, their directional approach to estimating disequilibrium results in inconsistent coefficient estimates[24], and in their (Fair-Jaffee) quantitative approach, (the imposition of coefficient constraints on the interest rate change variable (equality) across demand and supply equation) preclude their use of conventional simultaneous equation estimation. Second in terms of efficiency, structural specification of disequilibrium processes are preferable to general techniques. The Fair - Jaffee technique ignores the specific means by which lenders ration credit when markets are in disequilibrium with respect to the loan rate. By the omission of non-interest credit variables they overlook the incidence of rationing as well as the potential effect of non-interest rationing variables on the supply and demand for commercial loan. Also interest rate changes may not measure the extent of disequilibrium but simply the impact such changes have on borrowers expectations. Structural measures of market disequilibrium may serve a good proxy for excess demand and yet incorporate expectational influences. The problems with the above cited study leave us with the choice of appropriate techniques.

The first major application of proper disequilibrium techniques is in Laffont and Garcia (L-G) (1977). This piece exemplifies the work in this area rather well.

L-G apply the simple switching model:

$$Q = \min(D,S)$$

where Q is the volume of loans actually transacted, D is the effective demand for these loans and S is the effective supply. L-G apply this model to the market for bank loans to firms in Canada. L-G are aware of the necessity of distinguishing desired from realised values of variables and, therefore, of not using as an explanatory variable anything that will pick up the effects of rationing. According to them, "Disequilibrium analysis must explain rationing through the model rather than through the explanatory variables".

The supply function is assumed to be a lag polynomial in the following variables: PR the prime rate, (GBR-LTR), the differential between the government bond rate and the long-term bond rate, (TDR-PR) the differential between the rate paid on time deposits and the prime rate, TD, the amount of time deposits, DD, the amount of sight deposits, K, the reserve ratio, IP, an index of industrial production, and certain dummies to pick up peculiarities of the market.

The demand equation is a lag polynomial in the following: (PR-FCR), the differential between the prime rate and the rate on short term commercial paper, (LTR-IBR), the differential between the long term rate and the industrial bond rate, IP, FINT, a measure of undistributed profits and certain dummies.

They experiment with a range of different estimators for the disequilibrium model. The first is the directional method of Fair and Jaffee (1972) (F-J). The sample is divided into excess supply and excess demand regimes on the basis of a price adjustment equation. The excess supply points are used to estimate the demand curve and vice versa. The separation is done on the basis of two different adjustment equations. In the original F-J model, prices were assumed to react to current excess demand. L-G argue that this is unrealistic and that it is more sensible to assume that prices react to lagged excess demand since the value of excess demand is not observed until the end of the period. In the F-J formulation the price will be correlated with the supply and demand errors and so ordinary least squares estimate (OLS) will be inconsistent. In the L-G formulation, this problem will not arise.

They also estimate the model using the standard Maddela-Nelson (M-N) maximum likelihood estimator. They construct a 2SLS method which can allow for varying speeds of adjustment of prices to excess demand and to excess supply. Unfortunately, this assumes a non-stochastic price adjustment process as does the directional method. Essentially, the method estimates the supply and demand equations together after substituting in for the price adjustment equation. The great advantage of the non-stochastic price equation comes out here since price will tell us not only which regime is in operation but also the values of both demand and supply. If there is excess supply then we observe demand. Since the increase in price between periods is proportional only to the extent of excess supply we can easily deduce what supply is. Therefore the joint estimation of supply and demand schedules is possible. Finally they combine the nonstochastic price equation with the behavioural functions and the min condition to derive the likelihood function.

The estimates for the different disequilibrium estimators make very interesting reading. The directional method produced estimates that were reasonably close to those of the equilibrium model, although the price elasticities were somewhat higher. The (M-N) estimator seemed to allocate only one period to the supply regime and no sensible estimates of the supply function were possible. The estimates of the demand regime, however, were again similar to those of the equilibrium model. The lack of data points for the supply regime shows up in the results of the simultaneous estimation of both functions using the sample separation information contained in the price equation. The introduction of excess supply into the supply equation improves the estimates as we would expect if supply is rarely observed. It has little effect on the demand function. Again the estimates are quite comparable with the previous results. Much the same can be said for the likelihood estimates which incorporate the price equation.

The conclusions seem to be that the demand for loans from banks on the part of companies responds positively to the level of output and to the level of retained profit. These results suggest that loans may not be desired to carry the firm over bad times since if this were so we would expect both coefficients to be negative (however this is a very simplistic argument). The demand also appears to be quite price responsive. L-G attempt to model both the short-term and the long-term interest rate effects on the demand for bank finance. The former is modelled by the differential between the prime rate and the rate on commercial paper; this has a substantial coefficient. L-G do not present the estimated elasticities and so it is difficult to be sure how strong this effect is. The long-term effect is measured by the differential between the rate on commercial bonds and the inter-bank rate. This seems an odd choice of variable, but it does produce a sizeable and correctly signed estimate. The supply of funds to firms by banks also seems to respond to goods market variables in as much as supply increases with industrial output. Supply also increases as the stocks of time and demand deposits rise. Price elasticities again seem to be high and correctly signed.

The disequilibrium models appear to fit slightly better on the standard errors. No likelihood values are provided, so the performance of the M-N estimator, which is the one method which does not rely on simplifying assumptions, cannot be judged. The results suggest that the market is demand-determined

The paper of Sealey (1979) is much less challenging and interesting. He applies the standard Maddala-Nelson model with endogenous price adjustment. Like L-G he assumes that prices only change in the face of excess demand. To his credit he is aware of the danger of using rationed variables as explanatory variables, and he rejects the use of inventories on these grounds.

The demand function is a linear function of the following variables: (rl-ra), the differential between the observed loan rate and the corporate bond rate, the first lag of

IP, index of industrial production, the first lag of UP, undistributed profits, and a dummy for 1973:2 to 1975:1. The lag of output is supposed to proxy for expectations. However, there is a problem in the use of retained profits. Essentially lagged retained profits have two distinct roles in corporate firm behaviour models. First, they measure the amount of funds available to the firm if it does not approach the banks, and second they provide an indicator of the general economic outlook. These two roles should really be distinguished, as they are bound to have conflicting (income and substitution) effects on firm behaviours. While from the firm's viewpoint a large amount of retained profit tends to reduce the firm's need for borrowing, the general economic outlook of it should have been that more borrowing will be made as retained profits increased.

The supply function is a linear function of the following: (rl-rt), the differential between the lending rate and the treasury bill rate, TD, total bank deposits, CD, a measure of the cost to the bank of these funds and the first lag of IP, industrial production.

The result obtained by the use of Full information maximum likelihood (Fiml) is more elegant and consistent with the theory of credit rationing. The assumption of disequilibrium imposed on the market and the method of estimation provide a direct measure of the degree of credit rationing. Even when the assumption of equilibrium was still imposed, the parameter estimates were better than the earlier studies. Therefore, its obvious elegance and the asymptotic nature of its estimates coupled with its easy application to available data will make its use in the Nigerian setting more appealing.

Ito and Udea (I-U) (1981) use the disequilibrium methodology to compare the effects of credit rationing in the US and in Japan. Examination of the financial structure leads them to expect that credit rationing is more likely in Japan.

They make great use of a non-stochastic price adjustment function of the form: $P_t = dP_{t-1} + (1-d)P_t^*$ where a superscript * denotes the equilibrium price. This form has been encountered above. In fact, I-U allow d to take on different values depending on whether price adjustment is upwards or downwards.

They supplement this equation with structural supply and demand equations and by the standard min condition. It is possible to solve out for P_t^* in terms of the structural form equations. The fact that the price adjustment process is assumed to be nonstochastic and also to depend only on excess demand means that I-U can deduce what demand and supply were in each period. In fact they use exactly the same procedure as did L-G although this is disguised by the fact that a different price adjustment process is used. However the two processes are merely reparameterisations of each other. This information is added to the structural form of demand and supply relationships and estimation is then easy since the equations are fully identified. There are cross-equation restrictions, so ML 3SLS was used. I-U instrument for prices which is something that L-G did not do. They also estimate the reduced form of price adjustment equation, that is with the equilibrium price expressed in terms of the demand and supply functions.

The estimators clearly rely very strongly on the properties of the price adjustment process. The consequences of using such a price process have been discussed above. The conclusion there was that the real misspecification probably came not from assuming that the process was nonstochastic but rather from assuming that prices adjusted to excess demand only. The probable effects of this misspecification are hard to quantify, but certain simple cases can be investigated. For example if demand and supply depend on both current and lagged values of price, it is perfectly possible for the estimate of d to be negative. The sign of the estimate for d under this form of misspecification depends on the relative elasticities of demand and supply with both current and lagged price. If the demand elasticity exceeds the demand elasticity with lagged price, the estimate of d is more likely to be positive. Another form of misspecification that should be considered concerns the presence of longer lags of prices in the price adjustment process. This could arise easily; for example if there is partial adjustment in the rates of change of prices or if an error correction mechanism is in operation that adjusts to disequilibrium with lags of greater than one. It turns out, after some fairly simple algebra, that if the price adjustment process is highly autoregressive, the bias created by the misspecification will be rather small. The converse is that if the process is not highly autoregressive, the biases may be substantial. If equilibrium exists then the adjustment process will not be autoregressive (although prices themselves may be). This suggests that a test of equilibrium against disequilibrium will be least reliable when equilibrium is in effect, when this form of misspecification is present. The implications of this are that if the test indicates that disequilibrium is present (d is small), the test may be reliable. If the test indicates that equilibrium is in effect, the results should be treated with caution.

The specifications adopted by I-U are as follows: demand is a linear function of (pr-pcr) the differential between the prime rate and the rate on commercial paper, ip_{t-1}, lagged industrial production, cur, capacity utilisation, and bl_{t-1}, lagged lending. Supply depends linearly on: (pr-dir), the differential between the prime rate and the discount rate, dp, total deposits with the banking sector, bl_{t-1} and tb_{t-1}, the lagged value of the rate of government stock.

The estimates of the reduced form price equation for the US yield sensible coefficients. d is estimated to be 0.126 so that the prime rate adjusts to cover 87% of the gap. Serial correlation is, however, present. They acknowledge that this may well indicate misspecification but do not investigate further since "it could be very difficult to obtain precise estimates of the coefficients due to an increase in the number of the RHS variables", by which they presumably mean that the structural form coefficients will be harder to identify. This excuse cannot be used in the estimation of the structural forms proper by ML3SLS. Again a "correction" for AR(l) errors is used but the serial correlation still seems to be strong. The estimate of d is .02 which is tantamount to equilibrium. It also seems that the prime rate has different speeds of adjustment depending on the sign of excess demand.

They then perform the same estimates for the Japanese loan market. In this case the reduced form price equation produces an estimate of d of .767 which indicates substantial delay in adjustment. Again serial correlation is present despite use of the Fair adjustment. The structural form estimates also indicate a slow adjustment speed. They cannot reject the hypothesis that the prime rate reacts with the same speed to excess demand whatever its sign.

In summary, the I-U paper can be taken to be tentative rather than conclusive. The estimates seem to be sensible and to indicate that the Japanese credit market is substantially slower in adjustment than its American counterpart. The problems lie with the specification of the price adjustment process. The assumptions are far too restrictive and the consequences are hard to quantify. For one plausible form of misspecification it does seem that their approach yields a poor test of whether or not a market is in equilibrium.

The issue of testing the performance of alternative estimators is taken up by Stenius (1982) in a model of the Finnish bond market. She compares the performance of the Maddala-Nelson estimator, with sample separation information, and the "stochastic min-condition model" of Ginsburg, Tischler and Zang (GTZ) (1980). This merely augments M-N by adding an error term to the min condition. However, the behavioural equations are assumed to be nonstochastic. The likelihood function is then relatively simple. She also uses a 3SLS form of the GTZ estimator. The problems of using nonstochastic equations when the data model would seem to require stochastic equations has already been discussed. The tentative conclusions that could be made out of this are that nonstochastic equations could be regarded as first order Taylor Series approximations to stochastic formulations and that potentially more damaging assumptions were common. If this is so, we should expect that the two models would produce fairly similar estimates. This does not mean that the use of nonstochastic equations is justified by itself, the case must be made in terms of approximating a proper stochastic formulation.

Stenius (1982) does not seem to address any interesting economic questions, apart from the obvious one of whether the Finnish bond market is in equilibrium. The demand function depends linearly on the following: rpp, a weighted average of yields on bonds, yd, real income, arp, the sum of interest and redemption payments linearly upon rpp, arp, dpp, real government borrowing, and frp, average yield on dollar bonds on the international bond market.

The estimates of the model when equilibrium is assumed are fairly plausible, price variables are significant. Clear substitution effects between bonds and bank deposits are indicated by the negative sign on rdp in the demand equation.

Both the ML disequilibrium models give a higher price elasticity in the demand equation, which is what would be expected from a properly specified model. The 3SLS estimates fail in this respect. The price variable fails to be significant in all three estimates of the supply equation. This is probably because the supply regime is badly identified. Only 25% of the sample is allocated to excess demand. No estimates of the magnitude of excess demand are given, so it is hard to quantify the effects of rationing.

The main issues in the paper are econometric. There, the conclusions are pleasing since the M-N and the TGZ estimates are more or less identical. This would seem to back up the general methodological conclusion. The 3SLS method does not seem to have this desirable property and produces the least plausible estimate.

3.6 Model Specification for the Loan Market in Nigeria

In Nigeria, no study has yet been undertaken to analyse the disequilibrium nature of the loan market nor has any been specifically devoted to analyse the incidence of credit rationing in the commercial loan market or any other market. What exist has been studies on the specification and estimation of demand for and supply of banks loans without any allowance made for credit rationing. These studies include Ojo (1978), Ajayi and Ojo (1986), Mordi (1986).

Following the pioneering work of Meltiz and Pardue (1973), Ojo (1978) specified and estimated a two equation model of the demand and supply of commercial banks loan in Nigeria 1962 - 1972. Though, the variables were chosen to reflect the underdeveloped nature of the Nigerian financial market, the Fisher's capital-theoretical approach however formed the basis of his analysis. For instance, his measure of productivity of the system is the GDP and its components, in particular exports and what he termed internal demand defined to include consumption, investment and government expenditure. To complete the Fisherne model, he measured time preference by the rate of interest on commercial bank loans. In addition, two sets of dummy variables were introduced into the demand equation, to take account of the seasonality factor in the Nigerian economy and the political crises during the period 1966 - 1970. Finally aggregate demand for bank loans was estimated in nominal terms thus imputing money illusion to individuals in the economy.

For the supply equation, Ojo recognized that in a country like Nigeria where the central bank is constrained in the use of open market operations to control bank credit due to under-developed money and capital markets, non-market devices are often employed to achieve the same objectives. Such non-market mechanism according to him is the liquidity ratio which strikes directly at the liquidity of the banking system and as such determines the capacity of the banking system to extend credit. This variable was then admitted as a candidate and is expected to have an inverse relationship with the supply of loans. Another variable considered relevant is the assets of commercial banks which measure the turnover or bank activity and hence bear a direct relationship with the supply of loans. Following Meltiz and Pardue's tradition, a variable which measures the cost per unit naira of deposit was defined.

The results of regression analysis reported by Ojo however appeared to lend more support to the income and seasonal dummies as the most relevant variables in the demand for loan equation and interest rate in the supply equation. Ajayi and Ojo (1986) recognising the shortcoming in the study of Ojo (1978), noted that; supply and demand relationships are best dealt with within a system of simultaneous equations as ordinary least squares estimates may not be the best in view of the simultaneity between supply and demand; and that the assumption of period by period equilibrium between supply and demand is a heroic assumption since the series on demand are not directly observable.

Following the proposed methods of estimating models in disequilibrium as provided by Fair and Jaffee (1972) and Fair and Kalejian (1974), Ajayi and Ojo respecified the Ojo (1978) model utilizing the directional method to estimate the model. This method provided an improved result over what was obtained in the earlier work of Ojo. Despite the improvement however, certain variables which theoretically are considered important are either not significant or carried wrong signs. This type of situation is not unexpected considering the economic setting of the Nigerian economy.

It is interesting to note that while Fair and Jaffee suggested the use of an equilibrium interest rate to partition observed data into periods of excess demand and supply. Ojo and Ajayi, used the discount rate on the excuse that equilibrium rate of interest does not exist in Nigeria. While one may not quarrel with this approach, (that is the use of discount rate) one would have expected to see the same variable appearing as explanatory factor in both the demand and supply equations instead of the interest rate on lending.

(Mordi 1986),based on Ojo (1978) study and still following the Melitz and Pardue tradition, attempted to specify and estimate the demand for and supply of commercial banks loan functions in Nigeria. His specifications were based on certain assumption as enunciated by Goldfield (1966) -that demand for loans increases with aggregate income and that demand for loans are typically satisfied via the sales of short term securities where there is problem of illiquidity. These assumptions underly his choice of stock adjustment model which attempt to differentiate between the desired demand and supply functions and actual demand and supply functions.

He reported however, that most of the conventional theoretical factors considered to influence the demand for and the supply of commercial banks' loans turned out to be empirically unimportant. These factors include the banks' liquid assets, the policy instruments and the rate of interest. He observed that assets variables and costs have not been major determinants of loan supply in Nigeria and that policy instruments do not in any way influenced the supply of loans. He therefore concluded by saying that any policy designed to control supply of loans through these media will not yield the desired results.

One may not quarrel with this because the study was undertaken for the periods when the financial sector was seriously regulated and controlled. This conclusion may not hold any longer with the current reform of the financial sector as well as the whole economy in general. One fundamental shortcoming of the study however is its failure to suggest what variables should explain the dependent variables haven negated all theoretical claims. This is not however, to say that his specification was right. For instance, the inclusion of both the rediscounting rate and rate on competing assets in the supply function is questionable as the two variables are likely to be truly dependent. This has an obvious implication of multicolinearity in econometric work.

Lastly, the assumption and consequent imposition of capital - stock adjustment model is not found to be based on any theoretical consideration. This is an unjustified imposition of econometric method to describe economic behaviour. The appropriateness of a particular model to a situation must be demonstrated vividly on theoretical ground. The same also goes for the relevance of the adaptive expectation hypothesis to loan demand function. Stock adjustment is applicable in a situation where there is a discrepancy between actual physical stock of a durable asset and a desired level of stock. In theory, what are likely to preoccupy banks in deciding the supply of loans is the excess of their liquid assets over the reserve requirement, the cost of savings and time deposits, the liquidity ratio, the rate of interest on loans relative to other interest rates, and their portfolio holdings of assets. The asset variable should even be further adjusted for the amount of loans in order to prevent a regression of a variable on itself. Given the control over bank liquidity and an assumed cost minimizing behaviour, it could be expected that banks do have a desired level of liquidity they want to maintain. Whatever the desired level of loans banks want to extend to customers (if such a level exist in Nigeria) may not be relevant and theory seems to be silent about this.

3.7 Conclusions

The result of our survey indicates that controversy over the issue of measurement as well as the appropriate specification of the commercial loan market still ranges on. However, a stronger argument has been put forward in favour of any study that considers the loan market as a market in disequilibrium. Nonetheless, a major drawback with all the disequilibrium econometric investigations of credit rationing is that they only attempt to demonstrate the applicability of disequilibrium techniques without going on to use those techniques to answer any substantive questions. Generally, they have concentrated on applying the Standard Maddala-Nelson (1974) model and report only estimates, standard errors and the regime classifications.

In view of the shortcomings with the previous studies, this present study adopts the Fisherine theoretic model of credit market behaviour following Meltiz and Pardue (1973) tradition to analyse the Nigeria's commercial loan market. Much as we accept Harris (1975) empirical evidence using the survey method on the existence of credit rationing at commercial banks, one important conclusion that can be drawn from the study suggests the necessity of applying disequilibrium econometric methods or at least the possibility of an interesting domain of application for these methods. The interest of applied econometric work within disequilibrium framework seems particularly important in view of the recent developments in disequilibrium micro-econometrics. It is equally important to note that the task of econometrics will be to define empirically the relevant range of Walrasian and disequilibrium (Keynesian?) economics respectively. Econometricians have often included, without any special care, in their large scale models, equations for the supply of and demand for bank loans. However, these equations are intended generally for prediction purposes and do not carefully analyze the structure of this market.

In view of the above, our approach borrows extensively from the Generalised model of a market in disequilibrium presented by Fair and Kalejian (1974) and further developed by Maddala and Nelson (1974). This approach has been adopted with various modifications by Laffont and Garcia (1976), Sealey (1979), Martins (1989 and 1990) and Mayada et al (1994).

As indicated in the review, adopting a generalised market model by following the combined approach of Sealey (1979), Lanfort and Garcia (1976), Martin (1989, 1990) and Mayada et al (1994), will serve our purpose for better in this study as identification and measurement of credit rationing could be facilitated through a direct estimate of the demand and supply equations. In addition, the adoption of the technique of Full information maximum likelihood estimate as in Sealey (1979), Tybout (1984), Mayada et al (1994) and Mocan et al (1997) will result in asymptotically efficient parameter estimate than with the use of other techniques of ordinary and two stage least squares.

END NOTES

1. The availability doctrine as evaluated here does make one contribution. Given some elasticity in the demand for credit, the reduction in the amount of credit outstanding is achieved with perhaps a small change in the level of the government bond-rate. The private bond rate would still fluctuate significantly as noted earlier by Kareken (1957) pages 300 - 302. This result was no doubt of much greater significance in the milieu of the Pre Accord period in which the availability doctrine was first postulated than it is today. See Modigliani (1963).

2. Hodgman (1960) has also noted Scott's reliance on an unexplained stickiness in the commercial loan rate.

3. For other discussions of the availability doctrine (See Scott Ira O. Jr., Lindbeck Assar, and Kane Edward I and Burton G. Malkiel) The availability doctrine does include a number of other important elements in addition to the mentioned credit rationing argument, in particular, the "locking in" effect.

4. "It is quite possible therefore that, in the period immediately after open market contractionary operations by the Federal Reserve System or after an increase in legal reserve requirements, the individual bank will react to the credit stringency not by raising his posted interest rates but by rationing out the smaller supply of credit more stringently. Why do I say that after a few months time this rationing aspect will become less important? Do I mean that after a few months time the competitive character of the loan market will change and that the banker will cease to be an administrator of interest and a rationer of credit? No, I definitely do not, rationing and discretionary decisions will always characterise the loan market in the short run and the long run.

5. "The imperfect competition aspect of banking is absolutely crucial for the recently fashionable doctrine that the central bank gains its leverage not through its effects upon the cost of credit but by its effects upon the availability of credit. I would gladly trade 100 pages of the written and oral testimony before this committee for even a few paragraphs of careful analysis on this point".

6. In his study, Sealey (1976) considers the existence of credit rationing under two different market conditions (equilibrium and disequilibrium conditions). He then concludes that rather than equilibrium, dynamic rationing provides a better analysis and would seem to be a more reasonable vehicle through which loans are rationed in the presence of excess demand and supply. The present study therefore follows Sealey analysis of permanent and dynamic rationing.

7. See Guttentang Jack M (1960) Hester, Donald D (1967) Luckett Dudley G. (1970) Harris (1973) Harris (1974) Ostas J. R. and F. Zahn (1975).

8. Hester's (1967) term of a "credit offer function" could also be employed in this context.

9. Further discussion of credit market problems along these lines are given in Baltensperger (1967), Balternsperger (1973) Barro Robert (1976).

10. See, Jaffee and Modigliani, (1969) Jaffee (1971) and Koskela (1976).

11. It should be noted, though, that this implies not necessarily price discrimination in the usual sense of this term - i.e. the setting of different prices for different customers, depending on their demand elasticities, regardless of identical costs. The price differentiation involved here may just as well be accountable to different risk characteristics of the different customers. In other words, it may result from the fact that loans to different customers are different "goods" in the sense of implying different costs.

12. The analysis of credit rationing is usually discussed in terms of a lender with full monopoly power facing borrowers with no alternatives (see for example Jaffee (1971) and Koskela (1976) It is not clear that this is really fully representative of the typical lender-borrower relationship, although assertions to this effect are frequently made. If the borrower is allowed to have some alternatives, and thus some market power too, the analysis of loan rate setting and quantity determination becomes much more complex, of course see Hodgman (1962) for some related discussion. The lender then will have to take into account the possibility that the borrower will reject an offer made by the lender, an event which in the usual credit rationing models is assigned a probability of zero. Along with this, the question of "customer flow dynamic" as discussed for example by Phelps and Winter (1970) would have to be considered.

13. However, it should be kept in mind again that we are not talking about price differences because of differences in demand elasticities, but in price differences because of cost differences.

14. This allows one possible interpretation of Hodgman's "customer relationship" concept.

15. This assertion is adequately demonstrated in the next chapter.

16. See Sealey C. W. (1979).

17. The legal constraints on loan term adjustments as well as allocation of credit in Nigeria has been equated to credit rationing - see Ajayi and Ojo (1981) and Mordi (1986).

18. In one of the first econometric studies, Sparks (1967) avoided the fundamental credit rationing issue by assuming that both interest and non-interest credit terms move together. This assumption allowed him to conceptualize a composite credit term variable. But Sparks did not obtain structural estimates of loan demand.

19. Smith (1969) used the yield differential on mortgages and bonds to represent non-interest credit rationing effects. Silber (1970) used the length of amortization in his residential construction demand equation and loan to-property ratio in his mortgage supply equation to measure the non-interest credit rationing effects. Silber found that the length of amortization variable was significant in his housing demand equation but surprisingly not significant in his mortgage demand equation. This unexpected result may be attributable to the endogenous character of credit rationing, thus biasing his estimates. We would expect that the non-interest measures of credit availability used by Smith and Silber would be endogenously determined by contemporaneous mortgage demand and simply influences. These non-interest measures would, inturn be correlated with the error terms present in the demand and supply equations resulting in asymptotically biased coefficient estimates.

20. Smith (1969) assumes mortgage demand equals mortgage supply when estimating his mortgage rate equation. Silber (1970) makes a similar assumption in the estimation of his multiequation model. These assumptions are inconsistent with Smith's use of non-interest credit rationing variables in his housing starts equation and Silber's use of such terms in his residential construction equation.

21. Jaffee's study was reviewed by Fair (1971).

22. Jaffee estimates Rt = F(Qt, XDt, Rt-1), where Qt is observed quantity of mortgage credit, Rt is the mortgage rate and XDt is a vector of predetermined demand variables. In equilibrium Rt-1 = Rt and Qt = LDt. Thus, Jaffee's estimated equation can be solved for LDt interms of XDt and Rt; LDt = F(XDt, Rt), the mortgage demand curve.

23. A demand regime would be time periods when interest rates were above the market clearing level and, thus, where observations fall on the demand curve rather than the supply curve.

24. As Fair and Jaffe explain, if demand is estimated only in a 'demand regime' (i.e., when excess supply exists and demand is relatively small), then we might expect large values of exogenous demand determinants to be associated with small values of the demand relationships error term.

CHAPTER FOUR

THEORETICAL FRAMEWORK, MODEL SPECIFICATION AND METHODOLOGY

4.1 Introduction

This chapter is essentially an attempt to develop a model of commercial loan market under a fairly generalised assumption that allows the market to be in excess demand at a particular time while at another time there is excess supply. Our aim here is to borrow from the existing theory of credit market behaviour in specifying the model.

The model is therefore built with the hindsight of establishing the existence of credit rationing right from the beginning. The importance of an adequate model to explain the Nigeria's commercial loan market behaviour cannot be overemphasised since borrowing from the market is a major source of financing productive activities in Nigeria. Also lending activities of the market is an important constituent of the domestic money supply. As such rationing of credit in the market will not only have serious implications for corporate and individual solvency, output and employment but more also will affect the process of monetary transmission and any attempt to control it. It is for this reason that the theoretical basis for credit rationing was extensively explored in chapter three.

Therefore, the model developed below allows us to address a range of questions that could not previously be considered. The most important of these concerns the effect of credit rationing on the demand for credit and its effect on the sectors of the economy other than the commercial loan market. Since commercial loan market provides one of the most significant links between the real and financial sectors of the economy, we might suspect that rationing will have important effects.

The model is structural since it will estimate the effective demand and supply of credit functions. Thus, not only will the volume of loan traded be determined, but also the extent of excess demand.

The aim here is to estimate as general as possible a model of the whole market. In this way we will be able to see how credit rationing manifests itself in the amount that is lent and examine the interaction between the two. The model is however much more in the spirit of Meltiz and Pardue (1973).

Since the commercial loan market is viewed in general terms as the interaction of demand and supply of commercial loans, the chapter begins by providing a framework for the demand and supply of loan relationship before a formal model of the market is specified.

In section 4.3 we present a formal commercial loan market model adopting the specification of generalised model of market in disequilibrium. The data, econometric problems and methods of estimation adopted for the study is explained in section 4.4.

In the study, loans to firms and individual are aggregated. The aggregation is done for convenience. This may seem unfortunate since one can expect at least from monetary theory quite different behaviour for these agents. However, we expect that this will not have any adverse effect on our result.

4.2 A Framework for Demand for and Supply of Loan

The size of any loan taken by an individual is usually regarded as the result of the interaction of the forces related to the demand and supply of loans. When the rate of interest is flexible, the demand for loan and its supply are functions of the rate of interest and characteristics of borrowers. The demand and supply therefore simultaneously determine the amount borrowed and the equilibrium rate of interest. The above is a useful framework for a perfectly competitive loan market. To this extent, the demand and supply of loans will determine the amount borrowed by an individual. Therefore the structural equation of a borrowing function may be used for empirical estimation where the amount of a loan obtained is a function of the factors which influence demand and/or supply of loans.

In almost all economies of the World, the monetary authority has a general rule that limits loans to a given yearly percentage increase. Thus borrowed loans can not just rise or fall without any ties to this limit. If, however, most loans were at this ceiling, it would imply that demand and supply forces are not operating. But since all loans received were in most cases less than the total prescribed, (in the case of Nigeria), we can then examine the role of demand and supply forces in determining the size of the loans. More importantly, there is uncertainty and risk in borrowing funds. Repayment according to the rules can also be difficult. Therefore the demand for loans may not necessarily extend up to the bank's ceiling. The amount of the loan requested will depend on the characteristics of the borrower which affect first, the profitability of the investment and second, the willingness and ability of the borrower to take the risk of borrowing large amount.

The factors which positively influence the profitability of investment for a particular borrower will also increase his or her credit-worthiness and thus work on the supply side to increase the amount of the loan. Similarly, the borrower's ability to accept the responsibility of a larger loan will not only generate a larger demand but will also influence the supply side so that he or she will be trusted with a larger funds.

The profitability of loan use by a borrower will be affected by his or her access to supplementary resources, which will exert influence on the borrower's ability to use a loan productively and make regular repayments. This will influence the amount of loan obtained. Banks take into account expected repayment performance. Repayment depends on the productive use of the loan and on the willingness of the borrower to continue his or her customer-relationship with the bank.

One way of assessing repayment success is export judgement. Thus those who successfully make repayments may not only obtain another loan but may obtain a larger loan on account of having earned the confidence of the bank. In the case of an individual, the number of years of customership may be expected to have a positive impact on the size of a loan obtained. At the macro level however, the size of loans obtained/extended is expected to be influenced by loan-customer relationship.

Much as the above framework provides a useful guideline for demand for, and supply of commercial loans specification, it must be borne in mind that there are certain variables that cannot be quantified. It is however expected that these will be captured by the error term of our equations.

4.3 Commercial Loan Market Model

Starting from the micro level, the commercial loan market is made up of a large number of borrowers (firms and individuals) and lenders (banks) assumed for convenience to be a continuous of equally sized constituent submarkets. These submarkets constitute the aggregate market. Demand for credit on each submarket is assumed to take the form,

$$L^d = X_i^d + U_i \tag{4.1}$$

The component X_i^d is common to all submarkets while to allow for differences in behaviour between borrowers, there is an error term that is specific to the submarket. For example, the average price that prevails over the market might be a component of X_i^d. The error U_i will then contain the difference between this average price and the actual price that prevails in the submarket. The precise level of disaggregation that a submarket represents is irrelevant to the aggregate model. Therefore, a submarket could represent behaviour at the level of the individuals or firms (as in Kooiman (1984)) or could represent behaviour further up the ladder of aggregation. We did not assume that U_t is serially uncorrelated and therefore allow for systematic differences between the demand and supply of credit to firms and individuals.

The specification of supply follows similar principles;

$$L^s = X_i^s + V_i \tag{4.2}$$

where X_t^s is common to all submarkets and V_i is specific to submarket *i*.

The model is augmented by a minimization condition operating in each submarket separately;

$$L_i \;=\; \min\,(L_i^d,\ L_i^s) \qquad (4.3)$$

where L_i is the volume of loan that is actually exchanged on submarket i. Since there are many equally sized submarkets, we can take the probability of a particular submarket being in a particular regime as being equal to the proportion of submarkets that are in fact in that regime. We complete the model by assuming that U_i and V_i are jointly normally distributed with zero mean and variance σ_v^2.

We can express aggregate loan $\bar{L}$ as;

$$\bar{L} \;=\; \int_d L_i^d d_i \;+\; \int_s L_i^s\, d_i \qquad (4.4)$$

where d denotes the set of submarkets that are in excess supply and on which we observe demand while s denotes the set of those submarket that are in excess demand. The values of the submarket specific errors will enter the expression for aggregate loan since they influence which regime the submarket is in.

The expression for aggregate loan in terms of aggregate demand and aggregate supply in this model has been given by Kooiman and Kloek (1979) and by Nickell (1984), as;

$$\bar{L} \;=\; \bar{L}^d - \bar{e}^d\, \Phi(\bar{e}^d/\bar{\sigma}) - \bar{\sigma}\phi(\bar{e}^d/\bar{\sigma}) \qquad (4.5)$$

where $\sigma^2 = \mathrm{var}(V_i - U_i)^2$. i.e. $(E(V(i)_t - U(i)_t)^2)$

Here $\bar{L}^d = \int L^d d_i$ is aggregate demand while $\bar{e}^d$ is aggregate excess demand defined as $\bar{L}^d - \bar{L}^s$, where $\bar{L}^s = \int L^s\, d_i$ is aggregate supply. $\Phi(.)$ is the distribution function of the standard normal distribution and $\phi(.)$ is the associated density function. $\bar{\sigma}$ measures the diversity of behaviour across the commercial loan market defined as $\bar{\sigma} = \int \sigma d_i$.

A higher value for $\bar{\sigma}$ implies greater differences in demand and supply across the market.

To show more clearly that the level of borrowing differs from the level of aggregate demand, equation (4.5) can be written as;

$$\bar{L} = (1-\pi_t)\bar{L}^d + \pi_t\bar{L}^s - \bar{\sigma}\phi(\bar{e}^d/\bar{\sigma}) \tag{4.6}$$

where π_t is the probability that a submarket is in excess demand i.e. $\pi = P_r\{L_i^d > L_i^s\} = \Phi(\bar{e}^d/\bar{\sigma})$. This shows that aggregate borrowing is a weighted average of aggregate demand and aggregate supply, less the effect of the last term (which encapsulates the submarket specific errors). The level of transaction usually is lower than in the aggregate minimization-condition model and yet further lower than under market-clearing condition (Quandt (1988). As $\bar{\sigma} \rightarrow 0$, we have the aggregate minimization-condition model i.e. as $\bar{\sigma} \rightarrow 0$, the differences in behaviour across submarket become insignificant and so all submarkets are expected to be in the same regime; while as $\bar{\sigma} \rightarrow 0$ and $\bar{e}^d = 0$, the market clearing model is obtained. These conditions are sufficient to ensure that $L_i^d = L_i^s$ in all submarkets.

As indicated above, the parameter σ measures the diversity of behaviour across submarkets and provides an indication of the aggregation error implied by aggregate modelling.

As a step towards empirical implementation, however, it is usual to model aggregate demand and supply as linear equations with catch-all error terms.

Following the generalised model of a market in disequilibrium developed by Fair and Jaffee (1972) and subsequently extended by Fair and Kalejian (1974) and Maddala and Nelson (1974), Aguilera and Graham (1990) and Maddala and Trost (1982), among others, argue that it is necessary to utilise a model including both demand and supply equations to determine conclusively whether credit allocation patterns represent supply side external rationing or internal self selection by types of borrowers.

It therefore follows that the framework needed for analysing credit rationing, requires consideration of the demand for, and supply of loans. Adopting the generalised model of a market in disequilibrium, equations (4.1) and (4.2) can be re-expressed in aggregate form as follows:

$$\bar{L}^d = x\alpha + u = x_1\alpha_1 + \alpha_2 r + u \tag{4.7}$$

$$\bar{L}^s = z\beta + v = z_1\beta_1 + \beta_2 r + v \tag{4.8}$$

where r is the rate of interest, x_1 and z_1 are vectors of explanatory variables while α and β are parameter vectors. u and v are normally distributed error terms which we shall use to derive the likelihood function. Substituting these equations into (4.5) leads to an equation of the form;

$$L_t = L^d - \bar{e}^d\Phi(\bar{e}^d/\sigma) - \bar{\sigma}\phi(\bar{e}^d/\bar{\sigma}) \tag{4.9}$$

where now $\bar{e}^d = x\alpha + \bar{\Theta}_1 L_1 + \ldots.. + \bar{\Theta}_m h_m - z\beta + u - v$. The arguments of the $\Phi(.)$ and $\phi(.)$ functions are thus stochastic and so we cannot derive a closed form likelihood function. However, if we note that

$$\Phi(\bar{e}^d/\bar{\sigma}) = \pi \textit{ and that } \bar{e}^d = \bar{\sigma}^d = \bar{\sigma}\Phi^{-1}(\pi),$$

we then have

$$L_t = L^d + \bar{\theta}_1 L_1 + \ldots.. + \bar{\theta}_m h_m - \bar{e}^d\bar{u} - \bar{\sigma}\phi(\Phi^{-1}(\pi)) \tag{4.10}$$

This render the equation linear in parameters, although the error term will be given by $w = (1-\pi)\pi + \pi v$ and hence will be generated by a mixture of distributions.

Although we have in (4.10) a complete model of commercial loan demand, it does not capture all possible information about credit rationing. This is because the interest rate can be expected to reflect the presence of rationing. Therefore any comprehensive model of the market that allows for credit rationing should make this variable endogenous. If there is credit rationing, this will be reflected in an interest rate that fails to equate demand with supply. We should also expect the interest rate to reflect any changes in the intensity of rationing. We could allow for sluggish adjustment using an equation of the form

$$r = \lambda r^* + (1-\lambda) r_{t-1} \tag{4.11}$$

where r^* is the interest rate that equates supply and demand and r_{t-1} is the previous interest rate (see Quandt (1988)). While this does allow for sluggish adjustment, we feel it may not be adequate always in explaining the conditions when applied to the commercial loan market. Other factors for example the spread of other interest rates and institutional constraints may also help push the interest rate away from market clearing level. On a theoretical level, we should allow for the possibility of equilibrium credit rationing as argued in Stiglitz and Weiss (1981). Therefore we use a more general

$$r = \lambda r^* + \lambda_1 \rho \tag{4.12}$$

equation where ρ incorporates those variables that also affect the interest rate. r_{t-1} will be subsumed into ρ.

This interest rate equation can provide us with a measure of excess demand since, on substituting the relationship

$$
\begin{aligned}
r^* &= \frac{x_1\alpha_1 + \overline{\theta}_1 h_1 + \ldots\ldots + \overline{\theta}_m h_m + u - Z_1\beta_1 - v}{\beta_2 - \alpha\ 2} \\
&= \frac{x\alpha + \overline{\theta}_1 h_1 + \ldots\ldots + \overline{\theta}_m h_m + u - z\beta - v}{\beta_2 - \alpha_2} + r \qquad (4.13) \\
&= \frac{\overline{e}^d}{\beta_2 - \alpha_2} - r
\end{aligned}
$$

into (4.12), we find that

$$
\overline{e}^d = \frac{\beta_2 - \alpha_2}{\lambda_1}[(1-\lambda)r - \lambda_1\rho] \qquad (4.14)
$$

which is a nonstocahstic measure of effective excess demand. We can therefore estimate the system

$$
\overline{L} = x\alpha + \overline{\theta}_1 L_1 + \ldots . + \overline{\theta}_m h_m - \frac{\beta_2 - \alpha_2}{\lambda_1}\ x\ [(1-\lambda)r - \lambda_1\rho]\pi - \pi\phi(\Phi^{-1}(\pi)) \qquad (4.15)
$$

$$
r = \frac{\lambda}{\beta_2 - \alpha_2}[x_1\alpha_1 + \overline{\theta}_1 h_1 + \ldots + \overline{\theta}_m h_m - z_1\beta_1] + \lambda_1\rho + V \qquad (4.16)
$$

where

$$
V = \lambda/(\beta_2 - \alpha_2)(u - v)
$$

This system comprises a complete model of the commercial loan market that reflects credit rationing in both aggregate borrowing and interest rate equations. Notice, however our reliance on a nonstochastic interest rate equation. This will enable us to generate a nonstochastic measure of the excess demand for borrowing in terms of the parameters of the interest rate equation. We should note that Andrews and Nickell (1986) use a nonstochastic wage equation for precisely this reason. Allowing for a stochastic interest rate equation in country like Nigeria where for most of the period, the interest rate was pegged will imply a composite error term that will depend on π. Experiments in Martin (1987) however, suggest that although it is possible to allow for a nonstochastic interest rate equation, it leads to a likelihood function that is difficult to maximize and appears to be poorly identified. Again using a nonstochastic interest rate equation, we could write the aggregate borrowing equation as

$$\overline{L} = x\alpha + \overline{\theta}_1 h_1 + \ldots + \overline{\theta}_m h_m - \overline{e}^d \Phi(\overline{e}^d/\overline{\sigma}) - \overline{\sigma}\phi(\overline{e}^d/\overline{\phi}) + u \quad (4.17)$$

where

$$\overline{e}^d = ((\beta_2 - \alpha_2)/\lambda_1))\left[(1-\lambda)r - \lambda_1\rho\right]$$

is derived from the interest rate equation. This is the equation estimated by Andrews and Nickell (1986) for the U K labour market. They note that this equation appears to be poorly identified. However, since for most of the period we are studying, interest rate was administratively fixed, the interest rate equation will not be necessary to make our model completed.

In order that the likelihood function is maximized and ensure that it is not poorly identified, equations (4.7) and (4.8) are re-expressed as

$$L_t^d = rc_t\beta_1 + X_t^d\beta_2 + \mu_1 \tag{4.18}$$

$$L_t^s = rc_t\beta_3 + X_t^s\beta_4 + \mu_2 \tag{4.19}$$

where at time t, L^d and L^s_t are the quantities of loan demanded and supplied, respectively. β_1 and β_3 are parameter values, X^d_t and X^s_t are factors of exogenous variables assumed to influence demand and supply respectively. β_2 and β_4 are factors of unknown parameters while μ_1 and μ_2 are the disturbance terms and they are serially and contemporaneously independent with the distribution $N(0, \sigma^2\mu_{1t})$ and $N(0, \sigma^2\mu_{2t})$, respectively, and rc is the observed loan rate.

If the model presented in equations (4.18) and (4.19) were specified as an equilibrium model, then market clearing condition must follow that $L^d_t = L^s_t = Q_t$ and they can then be estimated as a simultaneous model using an appropriate technique. However, if we recognise the presence of credit rationing, it becomes clear then that price changes could not be relied upon to equate demand and supply and thus the market clearing condition cannot be employed. The main problem is that L^d_t and L^s_t are not observable variables since the observed quantity traded in the market may not satisfy the demand and supply schedules. Thus

$$Q_t = \text{Min}\,(L^d_t, L^s_t) \tag{4.20}$$

and

$$\Delta rc_t = \lambda(L^d_t - L^s_t) + \mu_3; \quad 0 \leq \lambda \leq \infty \tag{4.21}$$

Equations (4.20) and (4.21) represent the basic assumptions used by Fair and Jaffee (1974) and subsequently employed by Fair and Kalejian (1974), Amemiya (1974) and

Maddala and Nelson (1974) concerning the relationships between Q_t, L^d_t and L^s_t and the price adjustment process where Q_t is the actual quantity of loans extended in the market. However, the assumption given by equation (4.20) is that the quantity exchanged in the market will be either on the demand or supply equation, whichever is less. The rationale for that assumption is that in markets with voluntary exchange, the short side of the market must prevail. Equation (4.21) indicates that the direction of change in price in the market is an indicator of the excess demand status of the market. The assumption providing the basis for (4.21) is that the change in price is directly related to the amount of excess demand in the market.

It should be noted from the above that Δrc_t is stochastic so that all changes in Δrc_t are not attributable to excess demand. However, prior to August 1987, rc_t were administratively determined[1]. Thus, the Δrc_t are essentially non-stochastic. Despite this framework, one can still not totally ignore the influence of the market even when the rates had to be determined administratively.

In a model of continuous time, the coefficient λ is equal to zero in the extreme case where no adjustment occurs and approaches infinity in the case of instantaneous adjustment. In models of discrete time however, the actual value of λ depends on the length of the time unit and measures the average adjustment to excess demand during the period between observations[2]. In the dynamic version of this model therefore, the quantity demanded, quantity supplied and price are endogenous variables. Any disequilibrium which occurs, i.e., any divergence between quantity demanded and supplied, results from lack of complete price adjustment. The fact that loan rates are sticky and change only slowly has long been recognized in the literature and suggests that a disequilibrium model such as (4.18) through (4.19), accurately reflects conditions in the loan market. This lack of complete interest rate adjustment is the basis, e.g. for theoretical models of dynamic rationing developed by Tucker (1968) and Jaffee and Modigliani (1969). The model also assumes that non-price terms of credit change in the same direction as the loan rate[3]. This assumption is supported by the empirical works of Harris (1970 and 1974) which find that the price and non-price terms of credit move closely together. Thus as loan rates are rising, non-price credit requirements become tighter and excess demand is likely to occur at prevailing rates. The opposite circumstance are likely to occur during periods of declining rates.

To estimate the parameters of a model such as (4.20) through (4.21), Maddala and Nelson (1974) suggest that an appropriately formulated full information maximum likelihood technique be employed. First, note that equations (4.18), (4.19) and (4.21) form a three equation model in three endogenous variables. Now, let the joint density of the endogenous variables L^d_t, L^s_t and rc_t be denoted by Ψ_t (L^d_t, L^s_t rc_t/X_t) where X_t is a vector of the exogenous variables in the model. The joint density function Ψ_t can be derived from the joint density of the structural disturbances μ_{it}, μ_{2t} and μ_{3t}. Assuming that the distribution of the disturbance terms is joint normal, the density Ψ_t becomes:

$$\Psi_t = \frac{|J|}{2\pi |\Omega|^{½}} \cdot \exp\left[-½ \left(\mu_t \rightarrow \Omega^{-1}\mu_t\right)\right] \qquad (4.22)$$

where $|J|$ is the Jacobian determinant of the transformation from the disturbances to (L_t^d, L^s_t rc_t); Ω is the covariance matrix of the structural disturbances, and μ_t is the vector (μ_{1t},

μ_{2t}, μ_{3t}). To complete the joint density Ψ_t, equations (4.18), (4.19) and (4.20) are solved for μ_{1t}, μ_{2t}, μ_{3t} and substituted into (4.22).

As a result of the disequilibrium character of the market, L^d_t and L^s_t are not simultaneously observable. Thus the model must be stated in terms of observable endogenous variables. Let $\Phi(q_t\ rc_t/X_t)$ denote the joint density of the observable endogenous variables. Maddala and Nelson (1974) show that Φ_t can be expressed in terms of Ψ_t as follows.

$$\begin{aligned}\Phi_t(q_t, rc_t\backslash X_t) &= \int_{qt}^{\infty}\Psi_t(q_t, L_t^s rc_t\backslash X_t)\,\delta L_t^S \\ &+ \int_{qt}^{\infty}\Psi_1(L_t^d, q_t, rc_t\backslash X_t)\,\delta L_t^d\end{aligned} \tag{4.23}$$

where for the first-term on the right hand side it is assumed that $L^d_t = q_t$ and for the second term on the RHS, $L^s_t = q_t$ is assumed. Given (4.23), the log likelihood function can be stated as follows;

$$L = \sum_{t=1}^{n} \log \Phi_t\ (Q_t,\ rc_t\backslash X_t) \tag{4.24}$$

Maximizing 4.24, yields maximum likelihood estimates for the parameters of the model.

<u>The Statistical Model</u>

However, in order to complete the model of the commercial loan market, explicit demand and supply equations for commercial loan must be specified. The general form of the demand and supply equations though have already been presented in equations (4.18) and (4.19), they are however, can be specified as a function of the own rate of interest and a set of exogenous variables.

(i) Demand Equation

The theory explaining the demand for loan is well presented in Melitz and Pardue (1973). It is clearly recognised in the literature, that the demand for commercial loan is a demand for credit. In the Nigerian context, since the clampdown on credit for consumption purposes, demand for commercial loan is largely to finance production and to meet other immediate financial needs. In this regard, it could then be safely assumed that credit will be demanded by an individual investor in the event of a shortage of investible/production funds available to the investor. Thus loans are needed to bridge the gap existing between an investors own resources and the desired level of investment. However, the amount demanded will depend on the borrowing-lending opportunities available to the individual investor, productive investment opportunities and his time preference. Because of the dependence of almost every activity on the foreign sector in Nigeria however, the macro-economic variable that will reflect the productive investment opportunities open to an investor depend on such variables like the level of available external reserves, total foreign exchange available to the country, and aggregate value of trade (imports plus exports). Also, the dominance of government activities in the domestic level of activities requires that the productive investment opportunities can be measured by total government expenditure.

However, while this variable may well pass for a suitable measure of the level of economic activities, the high proportion of deficits in the total government expenditure (which at times amount to more than 40 percent) are mostly financed through bank credits. To the extent that banks credits to the government are specified, the size of these deficits or more precisely actual amount of the deficits financed through banks' credits becomes an identity of the total credits of the banks. If however, the task is to specify banks' loan supply function to the private sector, then the ratio of the banks' credits to the government out of the total banks' credits to the economy becomes an important argument in the behavioural equation of loan supply.

The appropriateness of the above variables in the demand for commercial loan, especially those which relate to the foreign sector, is reinforced by the process whereby the savings-investment gap is bridged in our economy. The fact that an investor has investible resources in local currency does not automatically mean that the resources can be invested. This is because foreign exchange must be available to finance the off-shore cost of investment. Even if access to the domestic capital market is open, that is borrowing-lending opportunities exist, without the foreign capital to supplement local resources, investment efforts will be frustrated and thus the demand for commercial loan will fall.

Other factors that are likely to play important role in the specification of demand for commercial loan in Nigeria are the real rate of interest to reflect time preference. The rate of interest enters as the rate of discount employed for investment decisions while its nominal value represents the cost of credit. This variable (real rate of interest) becomes necessary when for instances calculating the net present value of a particular investment project. The decision to reject or accept an investment project is usually based on this discounted stream of net benefit which is largely influenced by the rate of interest. Where the real rate of returns on investment is lower than the real rate of interest on loans, it becomes unnecessary and unprofitable for the investor to embark on such project and thus his demand for loans falls.

An alternative means of investment financing is the non distributed profits of the firms. It is expected in theory that there should be an inverse relationship between the amount of loan demand and undistributed profits. That is, the larger the amount of profits firms/investors withhold to reinvest, the lesser will his loan requirements be and as such, the lower will be the demand for loans. However, in view of the institutional constraints often imposed by banks that part of investment should be financed by recapitalised profits and part by loans it may be more plausible, contrary to theory, to expect positive relationship between undistributed profits and loans demand.

Another important variable is the rate of interest on loans charged in other loan market other than commercial loan market from where loans could also be obtained. There are however, two problems associated with the use of such a variable. First, interest rates in Nigeria and particularly within the formal financial sector are serially and highly correlated, thus the use of two rates of interest on loan in the same equation will necessarily generate the problem of serial autocorrelation. Second, the alternative rates which could have been more relevant are the rates charged in the informal sector but on which data are unavailable or unobservable. Lastly, aggregate capital stock or its breakdown into fixed capital stock, current investment and inventory will be a relevant determinants of the demand for commercial loan in Nigeria. The logical and theoretical reason for the inclusion of this last variable in the demand specification has been well explained in Melitz and pardue (1973) and Ojo (1976).

On the basis of the above, equation (4.18) above can be explicitly written as:

$$L^d = \alpha_0 + \Sigma\alpha_1 (rc - rcp)_{t-i} + \Sigma\alpha_2 UP_{t-i} + \Sigma\alpha_3 CP_{t-i} + \Sigma\alpha_4 IP_{t-i}$$

$$+ \alpha_5 D_t + \alpha_6 TIME + \sum_{j=2}^{4} \alpha_7 Sj + \mu_t \qquad (4.25)$$

where

Σ	=	distributed lag
μ_t	=	stochastic error term
Sj	=	seasonal variation
rc	=	commercial loan rate
rcp	=	commercial paper rate or any of its substitute
UP	=	undistributed profit proxied by capital consumption in the National account
CP	=	values of commercial papers outstanding
IP	=	index of industrial production
D_t	=	dummy reflecting changes in both economic and political situations
TIME	=	Time.

(ii) Supply Equation

The predominant theoretical approach to the supply of commercial loan uses portfolio management theory. The supply of commercial loan by banks is therefore hypothesized to be determined by loan own rate, the rate on alternative assets (treasury bill rate in the case of Nigeria), the available resources represented by time and demand deposits, expectations about the state of the economy, institutional constraint and the cost of deposit.

In Nigeria, policy guidelines on loans, credit, interest rates etc. are important determinants in the specification of supply equation. Mordi (1986) notes that commercial banks in Nigeria work rigorously to adhere to these guidelines to avoid penalties normally imposed by the monetary authority in case of default; rather than considerations of profitability and/or returns to assets. In as much as one may not totally dispute this assertion, it is however erroneous to believe that there is no profit consideration in the supply of loan function by the banks. At least, the banks will be guided by the need to cover cost and pay dividends to its shareholders so as to be able to keep afloat.

Thus we posit that banks have a desired level of loan supply which depends on the available resources at the disposal of the bank which here is represented by the total bank deposits defined above as the scale variable and their liquid assets. We contend that at high level of total bank deposits and liquid assets, banks will seek to increase their loan supply because of the relatively higher attractiveness of loans in terms of its yield. However, a high cash reserve ratio will exert a downward pressure on the ability of banks to increase their supply of loans. Thus, even if total deposits increase, there might not be any appreciable change in the bank loans if the increase in deposits is accompanied by a corresponding increase in the total reserve requirement (primary and secondary reserves). Instead of looking at the total deposits, what is important is the bank deposits net of total reserve requirement simply defined as the loanable funds (Lf).

However, the loanable funds is by itself determined by the bank credits/loans extended in the previous period Ls_{t-1}, thus the loanable funds enter the loan supply equation as an endogenous variable.

Expectations about the state of the economy i.e. about the global evaluation of risks are expected to have a significant positive effect. These expectations can be formalized with a distributed lag on the index of industrial production.

An alternative surrogate for the scale variable is to take the total banks' assets in excess of legally required reserve. de Leeuw (1965). However, we still believe that this measure will not adequately represent the strength of the bank with regard to loan supply. This is because, in most cases, the assets variable is not categorised. While buildings and equipments as well as office space are lumped into the asset of the bank, the inclusion of these category of assets will over estimate the ability of banks to supply loans. For this reason, we will subscribe to the use of loanable funds as a better measure of scale variable.

The rates of interest on commercial loan which theoretically is the price of loan are expected to constitute a significant factor in the determination of commercial loan. In the absence of interest rate control, the rates on loans are determined by the forces of demand and supply of loans. Thus, one expects the supply of loans to be high the higher the loans own rate.

The profit consideration of the banks also make it mandatory or desirable for banks not only to consider the loans' own rate but also the rate of returns on alternative earning assets into which banks can invest. The higher the rate of returns on alternative assets relative to the loans' own rate the lower the urge by banks to supply loan and the lower the amount of loans banks will be willing to grant. As noted earlier, since the objective function of banks is to maximize profit, it then follows that more funds will be diverted into those alternative earning assets until the marginal yield on these assets equal to the marginal yield on loans. For this to hold, more funds would have to be invested on these assets and less on loans.

Other variable which also impinge on the supply function of commercial loan is institutional constraints. This include, the credit ceiling imposed by the monetary authority to control credit expansion of the banks and liquidity ratio which is imposed to serve as a measure of control of excess liquidity of the banks and in the economy in general.

The degree of moniness of an economy is also a major determinant in the supply of loans, that is, the degree to which cash is required or used. Nigerian economy for instance is highly monetized, i.e. a cash economy, demand to hold cash is very high. This attitude which in part tells much about the banking habit of the economy reduces the ability of the bank to give loans. The penchant for liquidity among Nigerian is a reflection of our propensity for liquidity. This is demonstrated by the prefrence for demand deposit as against any other forms of deposit as reflected by the high proportion of demand deposit to total commercial banks' deposit liability, This is also reflected in the ratio of M_1 to M_2 or even the ratio of total currency outside the banking system to money supply. The implication of of the above is that banks will have to keep excess reserves at all time in anticipation of eventual cash withdrawal, thus competing with their ability to give loans.

Recently, the foreign exchange market in Nigeria was liberalized. Since then, all the banks have been fully engaged in the market transactions. The rate of Naira exchange rate depreciation has been very tremendous. And since it now takes more naira to obtain a unit of dollar for instance, it follows that out of the 'fixed amount of resources available in the market, more of the resources will be required in the foreign exchange market with a little left for the loan market transactions. This implies that as naira depreciates, more and more naira will be needed to carry out the same volume of transactions in the foreign exchange market and thus leave the loan market with less than enough.

Ogiogio (1992) investigate the effect of the foreign exchange market liberalization on the loan market in Nigeria. He found out that banks, since the reform programme have diverted quite a lot of funds to the market for foreign exchange. This finding is supported by the government action when in 1989 it directed that all government departments and establishments (agents) withdraw their deposits from the commercial and merchant banks and transfer same to the central bank. Opinions as to the rationale for this action differ. While a group was of the view that the move was to forestall the ridiculous rate at which naira depreciates as a result of the way banks bid in the foreign exchange market, the other view reports that the move became necessary to stop banks from overlending and thus stem the rate of inflation. Whatever the view, the fact cannot be denied that banks have been gaining a lot from their transactions in the market. This gain which has been at the expense of the loan market, increases with Naira exchange rate depreciation. It is therefore logical for banks to invest more in foreign exchange as naira depreciates thus reducing the amount of loan that banks could supply. On the banks' side, this is sensible. However, it is worthy to note that depreciated naira reduces the future value of naira to the extent that expected inflation rate becomes much higher than the nominal rate of interest on loan. Besides, the rate of turn over in the foreign exchange market is high, thus the desire to supply loan reduces the higher the rate of turn over in the foreign exchange market. In addition to the high rate of turn over is the absolute differentials between the buying rate and selling rate of foreign exchange in relation to the interest rate differentials between savings/deposits and loans. The wider the differential between the buying and selling rates of foreign exchange to the differential between savings and loans rates, the more profitable the transactions in the foreign exchange market becomes and the lower the amount of funds that would be allocated to loans as banks divert resources to the foreign exchange market to maximize profits.

Of equal importance also, is the differentials between the official rate of exchange and the parallel market rate of exchange. The wider the differential, the more, profitable will it be for banks to commit resources into the foreign exchange market and as such the lower will be the supply of loans by the banks.

Based on the above framework the model of supply of commercial loan can formally be expressed as

$$L^s_t = f(L_r, L_f, X_s) \qquad (4.26)$$

where L^s_t = the gross flow of commercial loan supply

L_r = commercial loan rate

Lf_t = the volume of loanable funds at the disposal of all the banks in the market

Xs_t = a vector of predetermined supply variables.

Even though, commercial loans are normally short term in nature, the need to maintain bank-customer relation has made it necessary to extend these loans beyond the initial maturities whenever requests for renewal are made. The above, therefore, implies that the best alternative earning assets of the banks should be government securities of between one and two years maturity. However, where majority of the bank's loans are short term, the rate of return on treasury bills will serve a better alternative earning asset of the bank. Since we have been able to identify some variables which are exogenously determined, equation (4.26) can be explicitly written as

$$
\begin{aligned}
Ls = \; & \beta_0 + \Sigma\beta_1\, rc_{t-i} + \Sigma\beta_2\, (rc - tbr)_{t-i} + \Sigma\beta_3\, (tdr - tc)_{t-i} \\
& + \Sigma\beta_4\, TD_{t-i} + \Sigma\beta_5\, DD_{t-i} + \beta_6 K + \Sigma\beta_7 IP_{t-i} \\
& + \beta_8\, D + \mu_{it} \qquad (4.27)
\end{aligned}
$$

where;

Σ	=	distributed lags of yet unspecified lengths
rc	=	commercial loan rate
tbr	=	treasury bill rate
tdr	=	time deposit rate
TD	=	time deposit
DD	=	Demand deposit
K	=	reserve ratios (secondary and excess)

IP = index of industrial production as sorrogate for level of economic activity

D = Dummy variable of government policy changes.

4.4 Data, Econometric Problems and Methods of Estimation

(i) Data Sources

The main source of the data for the study are the various years publications of the Central Bank of Nigeria namely

- Annual Reports and Statement of Accounts
- Economic and Financial Review
- Statistical Bulletin.

Other sources include the Annual Reports and Accounts of the various banks obtained from their headquarters, and the Nigerian Banking Finance and Commerce published by Redasel.

Certain information are considered classified and as such were not supplied, they include; figures of aggregate commercial loan requests, banks' advertisement outlay etc. The inability to get hold of this vital information denied this study the inclusion of the advertisement outlay for instance in the analysis of the market conduct. More importantly, the unavailability of data on desired commercial loan supply and demand led us to the formulation of the Minimum condition assumption and other assumptions in the estimation process.

(ii) **Estimation Methods and Econometrics Problems**

Apart from the data problem which is an obvious one, the other major problem encountered during the course of the estimation of our model arose from the assumption of disequilibrium imposed on the commercial loan market. The main problem is that in the absence of an equilibrium condition (as imposed on the model) the observed quantity transacted in the market could not be taken as satisfying both the demand and supply schedules. Since what we are interested in is the desired supply and demand rather than the actuals, the problem therefore centres on the approach to adopt in separating the sample into demand and supply regimes such that each schedule may be appropriately fitted against the observed quantity for the sample points falling within its regime. To overcome this problem we followed the approach of Laffont and Garcia (1976) and Sealey (1979) who provided modifications to Jaffee and Fair (1972) suggestion[6].

(a) **Equilibrium Hypothesis**

Following traditional Walrasian econometrics, we first assume that the interest rate on commercial loan is flexible enough to equate supply and demand each period i.e. the exchanged quantity q_t is such that

$$q_t = L^s_t = L^d_t \qquad (4.28)$$

Though this is erroneous. It is never so in Nigeria.

In the two equations (i.e. Demand and Supply Equations), the loan rate is a common explanatory variable. With this assumption, we had no problem in estimating our equations since it is the observed quantity that appears in both equations as the dependent variables. However the result obtained run contrary to our intention of determining the existence of credit rationing. Because, once the assumption of equilibrium is imposed, it them follows that demand and supply will always be equal and that the observed quantity exchanged is the desired as well as the actual demand and supply. Since we are looking at a system, and following the suggestion of a simultaneous estimation of both the demand and supply equations, we estimated equation (4.18) and (4.19) by Ordinary Least Squares (OLS).

(b) Disequilibrium Hypothesis

We now assume that the loan rate of interest is not perfectly flexible and that rationing occurs, this assumption implies the formulation of the hypothesis expressed in equation (4.20)

$$i.e. \quad Q_t = Min\ (L_t^d,\ L_t^s)$$

meaning that if the observed quantity is equal to either the quantity demanded or the quantity supplied, it will be equal to the minimum of these two quantities. In other words, it seems reasonable that if the quantity demanded exceeds the quantity supplied, borrowers will go unsatisfied and if the quantity supplied exceeds the quantity demanded, suppliers will go unsatisfied. The rationale for the above assumption is that in markets with voluntary exchange the short side of the market must prevail.

To fulfil our desire of using disequilibrium techniques, we followed the same approach adopted by Ajayi and Ojo (1985) i.e. the directional method as initiated by Fair and Jaffee's (1972) in which the sample is first separated into periods of excess demand and excess supply on the basis of the observed price change. The supply function is then estimated over periods of excess demand and demand function estimated over periods of excess supply. To classify an observed quantity as belonging to the supply or demand equation, two alternative assumptions on price setting behaviour are made.

$$rc_t - rc_{t-1} = f(L_t^d - L_t^s) = \Delta rc_t = f(L_t^d - L_t^s),\ f'(L_t^d - L_t^s) > 0 \quad (4.29)$$

$$\Delta rc_t \gtrless 0 \quad as \quad L_t^d - L_t^s \gtrless 0 \quad (4.30)$$

In equations (4.29) and (4.30) it is assumed that the price setting mechanism operates within the period, but does not succeed generally in clearing the market. and,

$$rc_t - rc_{t-1} = f(L_t^d - L_t^s) = \Delta rc_t = f(L_t^d - L_t^s),\ f'(L_t^d - L_t^s) > 0 \quad (4.31)$$

$$\Delta rc_t \gtrless 0 \quad as \quad L_t^d - L_t^s \gtrless 0 \quad (4.32)$$

In equations (4.31) and (4.32) however, it is assumed that supply and demand of the period are based on the price quoted at the beginning of the period. Then on the basis of excess demand, the price is revised for the next period. This second assumption appears more applicable to the situation in the Nigerian commercial loan market prior to the deregulation of the market in August 1987.

We also adopt an approach that utilised the observed quantities. However, to reflect the disequilibrium, imposed at the onset, we endogenise the loan rate and sum the equations simultaneous by estimating equations (4.18) and (4.19) by two stage least squares (2SLS). To combine Almon distributed lags and 2SLS, we use two different methods. We suppose that there is a distributed lag on the interest variable, namely rc_t,

rc_{t-1}, ... rc_t-h). TSLS, we specify the interest rate equation as

$$rc = \delta_1 r^* + \delta_h r_{t-1} + \delta_3 r_{tb} + \delta_4 (P-P_{t-1}) + \mu_3 \qquad (4.33)$$

where r^* is as defined in equation (4.11) r_{tb} is treasury bill rate and $(P-P_{t-1})$ is the change in inflation rate. This we found sufficient to ensure unbiasedness in view of our stochastic assumption.

With the above assumptions, various systems estimation methods were used namely; Two Stage Least Squares (TSLS), Three Stage Least Squares (3SLS), Limited Instrumental Variable Estimate (LIVE), Full Instrumental Variable Estimate (FIVE), and Full Information Maximum Likelihood (FIML) as suggested in the literature so as to eliminate the correlation between rc_t and μ_t.

As Maddala and Nelson (1974) and Sealey (1978) have rightly pointed out, in the absence of any information concerning the price adjustment process, the model as specified above itself allows us to determine the probabilities with which each observation belongs to the demand or the supply equation when the error μ_1 and μ_2 are normally distributed random variables. Thus

$$P_r(L_t^d > L_t^s) = P_r(\mu_1 - \mu_2 < X_t^d \beta_2 - X_t^s \beta_4 + (\beta_1 + \beta_3) rc_t) \qquad (4.34)$$

where rc_t is considered as exogenous, the expression in 4.34 above is well defined for given X_t^d, X_t^s and rc_t.

In addition, Amemiya has suggested an iterative scheme to compute the maximum likelihood estimators. However, the maximization of likelihood function requires the use of an unconstrained, non-linear maximization algorithm. Goldfield and Quandt (1974) suggested that several maximization techniques be used with a number of initial starting values for the parameters to ensure that a maximum has been reached. The techniques used are (1) quadratic hill-climbing developed by Goldfield and Quandt (1974) and (2) pattern search method of Hooke and Jeeves (1961). Both algorithms converged to the same solution from a number of different starting points. The results presented as final were obtained with quadratic hill-climbing since the method also provides estimates of the asymptotic standard errors. Both the assumptions of equilibrium and disequilibrium were made. The statistical significance of the estimates were tested with the use of the asymptotic standard errors of the coefficients. The standard errors were obtained from a numerical approximation of the variance-covariance matrix of the coefficient.

4.5 Definition and Derivation of Variables

In defining and deriving the key variables used in this study, care was taken to ensure that the variables and the methods adopted in deriving them follow the underlying theory.

(i) Loanable Funds

Taking a cue from Hewson and Sakakibara (1975) and Corsepius (1990), the appropriate measure of the flow of loanable funds of the commercial banking firm was defined as:

$$LF_t = TD + DD - (TR) \tag{4.35}$$

where TD = The sum of time and saving deposits of commercial banks

DD = Demand deposits

TR = Total Reserve Requirement = K(D)

In Nigeria however, the reserve requirements are placed on the demand deposits of the bank but also vary with the volume of the total deposits. What we have used here is the average of the reserve requirements which is calculated as the sum of all the reserve ratios of all classes of deposit volume divided by the number of classes of deposit volume.

$$i.e. \quad \sum_{i=1}^{4} K_i/4 \qquad (4.36)$$

where K_i is the respective reserve ratio attached to each of the 4 classes of deposit volume.

These classes are:

	Total deposit liabilities	Ratio of reserve to Demand deposit
A	₦1 billion or more	a%
B	₦500 million or more but less than N1 billion	b%
C	₦100 million or more but less than ₦500 million	c%
D	Less than ₦100 million	d%

$$\therefore \quad \sum_{i=1}^{4} K_t/4 = (a + b + c + d)\%/4 \qquad (4.37)$$

But, given the fact the commercial banks are sometimes required to keep more than the stipulated reserve requirements of their total deposit liabilities, the reserve ratio is made as a subject of the total deposit liabilities to arrive at the volume defined as loanable funds of the commercial bank i.e.

$$LF_t = TD_t + DD_t - K(TD+DD)_t \tag{4.38}$$

Where K = reserve ratio and others are as defined above

Decomposition of GDP into Quarterly Series

The GDP quarterly for Nigeria was derived following suggestion from literature[7] and modification suggested by Collier (1991). The derived quarterly real GDP is obtained by using the interpolated quarterly GDP deflated by the consumer price index as a proxy for quarterly real income. The quarterly GDP figures are derived by decomposing the annual GDP figures using the technique adopted by Ajakaiye and Odusola (1995). This technique involves the use of exports, whose figures are available on both annual and quarterly bases, in decomposing the annual GDP figures into quarterly series. The formula is expressed as:

$$Y_{it} = Y_t \cdot \frac{X_{it}}{X_t} \tag{4.39}$$

where,

Y_t = Annual GDP at current period which is known.

Y_{it} = Unknown GDP for quarter i at current period, for i = 1, 2, 3, 4.

X_t = Annual export at current period which is known.

X_{it} = Exports for quarter i at current period which is also known, for i = 1, 2, 3, 4.

The use of exports to decompose annual GDP figures into quarterly series is based on a number of factors such as the high correlation coefficient (0.98) estimated between GDP and exports, and the fact that exports accounted for about 95.0 per cent of total changes in GDP during the period, as can be seen from the following regression results (based on annual data between 1970 and 1996):

$$Y_t = \underset{(1.21)}{35136.06} + \underset{(11.43)^*}{2.68X_t} \qquad (4.40)$$

$R^2 = 0.96$, $\bar{R}^2 = 0.95$, SE = 49865.67, DW = 1.65, F = 130.66.

where figures under the parameter estimates are t-ratios and * indicates significant at 5 per cent level or less. The results are similar to those obtained by Ajakaiye and Odusola (1995) who adopted the same technique in decomposing the annual GDP figures into quarterly series.

(iv) **Naira Cost of Deposit**

Two measures of this variable are applied in this study. First, following Laffont and Garcia (1977) the cost of funds for the bank is represented by the time deposit rate (TDR) and this is expected to have a significant role with a negative sign. The high collinearity with the lending rate however, suggests the introduction of the rate differential which apart from measuring the net cost of funds to the bank also express the profitability of the lending activity. The second measure takes cue from Melitz and Pardue (1973)[8] Ojo (1976) and Mordi (1986) where three measures were suggested. However, since it has been asserted by Melitz and Pardue that the one involving the multiplication of the rate of interest on saving deposits by the ratio of savings deposits to total deposits performs better, we therefore define our cost of deposit as

$$CD = r.(\text{Savings Deposits/Total deposits}) \qquad (4.41)$$

where r = rate of interest on savings Deposits. Apart from the assertion by Melitz and Pardue, the use of the other measures suggested was hampered by data and statistical constraint. For instance the one involving the use of the actual interest rate paid on savings deposits times the ratio of savings to total deposits could not be used due to data constraint on actual interest paid by banks on savings deposits.

The other measure involves a calculated rate of interest and is defined as:

$$r_t^c = r_t^m \cdot \tfrac{1}{8} \sum_{t=1}^{8} \left(\frac{r^a_{t-1}}{r^m_{t-1}} \right) \tag{4.42}$$

where r^c_t = calculated rate of interest or cost per naira deposit

r^m_t = legal maximum rate of interest on deposit

r^a_t = actual rate paid, and;

the subscripts refer to time.

END NOTES

1. Prior to 1987, the changes observed in the commercial loan rates in Nigeria had been a result of institutional manipulation rather than as a result of changes in either the demand or supply of loans.

2. It should however, be stressed that the extreme case of perfect adjustment corresponds to the market always being in equilibrium. The assumption that the market is always in equilibrium can be tested in the estimation below by testing whether the estimates of λ are significantly different from zero. If the estimates are not different from zero, then the null hypothesis of perfect market adjustment cannot be rejected.

3. As noted previously, the little variations in the loan rates before the deregulation of the commercial loan market in August 1987 were due mainly to administrative fiat by the monetary authority. However, the assumption of loan rate changes or adjustment is made to take cognisance of the post interest rate deregulation situation in Nigeria.

4. Nerlove and Wallis (1966 235-8) found that the classical Durbin-Watson D W - Statistic is biased towards 2 (its asymptotic value in the absence of autocorrelation) if Yt-1 appears as an explanatory variable in the right-hand side of the equation.

5. In practice, of course, it may be the case that the observed quantity satisfies neither the demand schedule nor the supply schedule. In this case, some assumptions would have to be made about how the observed quantity is determined before the supply and demand schedules could be estimated. However, in this study it is assumed that the observed quantity satisfies either the demand schedule or the supply schedule, which ever is less.

6. See Literature on market in disequilibrium.

7. Ajani H.A. (1978) "Quarterly Interpolation of Constant Price Gross Domestic Product of Nigeria 1963/64-1972/73" Economic and Financial Review CBN, Vol.16, No.2 and Awoseyita A. P. and Okonta (1991) "Methodological Notes on the Computation of Consumer price index, inflation rate and GDP Deflator in Nigeria, CBN Economic and Financial Review No. 1 Vol. 29.

8. Melitz and Pardue (1973) introduce C as a measure of the per unit cost of deposits. As several writers (e.g. Pesels (1970) and Toway 1974) argue, increase in bank costs should lead to a reduction of the scale of bank activities thus implying a negative relationship between C and the supply of loans. However, as Melitz and Pardue point out, increase in the cost of deposits generally indicate greater reliance on more stable time deposit funds as opposed to demand deposits. Thus as C increases, the banks liquidity needs decrease leading to increases in the more illiquid assets categories i.e. loans. As a result, the prior sign of C is indeterminate.

CHAPTER FIVE

NIGERIA'S COMMERCIAL LOANS MARKET: ANALYSIS OF STRUCTURE, CONDUCT AND PERFORMANCE

5.1 Introduction

This chapter presents an analysis of the structure, conduct and performance of Nigeria's commercial loans market. The analysis looks at some major features and characteristics of the market. For instance, the discussion on the growth of the number and volumes of instruments as well as the dominance of the market by a very few institutions lead to the assertion that Nigeria's commercial loan market is still charactically an oligopolistic type. Also the efforts of the very few dominant institutions to introduce new products and innovation encouraged by their conduct were found to have broaden the scope of the market thereby making their operation more complex. However, because of the various statutory constraints which limit the freedom of operators coupled with the rather hostile business environment which tend to raise the degree of and complexity of risk associated with lending, the market is characterised by credit rationing.

The rest of this chapter is divided into four sections, Section 5.2 attempts to analyse the structure of the market. In section 5.3, the various efforts being put up by the operation of the market, particularly the two dominants institutions; the commercial and merchant banks are examined. The performance of the market in respect of its compliance, especially, to the yearly credit guidelines issued by the Central Bank of Nigeria is examined in Section 5.4. Observations and implications of the analysis in the three preceding sections are summarised in Section 5.5.

5.2 Structure of Nigeria's Commercial Loan Market

The Nigeria's commercial loan market has experienced a tremendous growth over the years in terms of the number and variety of institutions operating in the market as well as the volume of instruments, especially loans transacted. Even in the face of crises, the market has been able to maintain a steady growth, appear to be more dynamic and above all enjoy increasing patronage.

The market which started with the commercial banks as the sole institution providing the entire loan offered by the market now has among others, the merchant banks, acceptance and finance houses, insurance companies and even mortgage and development banks as well as a host of other formal and informal financial institutions providing short term credits to business firms, individuals and governments. Also the variety of instruments traded in the market has equally grown over the years with new products being introduced almost on daily basis.

In spite of the increasing presence of merchant banks operation which however became noticeable starting from late 1980s, Nigeria's commercial loan market is still characterised by a very high concentration (Table 5.1). A situation where only four banks accounts for about 50 percent of market share as measured by the volume of loans. The banks are the First Bank of Nigeria (FBN), Union Bank of Nigeria (UBN), United Bank of Africa (UBA), and Afribank Nig. Plc. The four banks earn over 50 percent of total gross earnings in the market. This is equally true of their combined holdings of shareholders funds, capital, deposit liabilities as well as total assets.

Table 5.1

NIGERIA'S COMMERCIAL LOAN MARKET: CONCENTRATION AND STABILITY IN MARKET SHARE 1974-1996

Years	H.H Conc. Index (1)	4-Firm Conc. Ratio (2)	Mobility (3 MSH) (3)	Growth in Market Share of 4-Firm (4)	Average Market Share (5)	MEMSH ** (6)	TMSH / MEMSH* (7)	N (8)
1974	16.22	79.40	0	-	5.00	17.07	5.86	20
1975	16.00	79.01	2	-0.49	4.54	16.46	6.07	22
1976	16.64	81.20	0	2.77	4.35	17.14	5.83	23
1977	16.04	78.56	4	-3.25	4.17	17.00	5.88	24
1978	15.85	77.72	2	-1.07	4.17	15.82	6.32	24
1979	16.40	74.25	4	4.46	3.85	15.39	6.50	26
1980	15.66	74.11	2	-0.19	3.85	14.85	6.73	26
1981	14.17	70.25	3	-5.21	3.85	13.26	7.54	26
1982	14.41	70.36	2	0.16	3.33	12.99	7.70	30
1983	15.71	74.55	0	5.96	2.86	14.12	7.08	35
1984	15.66	73.96	4	-0.79	2.63	13.99	7.15	38
1985	16.97	75.51	4	2.09	2.50	14.89	6.72	40
1986	15.91	74.81	2	-1.76	2.44	13.95	7.17	41
1987	14.36	63.99	0	-14.46	2.00	10.90	9.17	50
1988	10.18	59.84	2	-6.49	1.52	7.45	13.42	66
1989	18.28	64.49	0	7.64	1.23	12.80	7.81	81
1990	13.11	60.25	0	-6.57	0.93	8.71	11.48	107
1991	10.43	54.67	0	-9.26	0.84	6.45	15.50	119
1992	10.18	51.47	2	-5.85	0.84	5.99	16.69	119
1993	10.07	51.02	2	-0.87	0.84	5.89	16.98	119
1994	10.58	52.00	2	1.92	0.86	6.27	15.95	116
1995	11.01	52.20	2	0.38	0.87	6.52	15.34	115
1996	12.80	53.25	2	2.01	0.87	7.57	13.21	115

Notes

1. Herfindahl-Hirschman Concentration Index i.e.

$$\sum_{i=1}^{4}\left[\frac{CL_{it}}{(CL_t)^2}\right]$$

   where CL_{it} is bank (i)'s commercial loan CL_t is total commercial and merchant banks' commercial loan in the market. For more discussion see Adelman (1969).
2. The ratio is based on the market share of the four dominant banks namely FBN, UBN, UBA and IBWA. The market share is calculated as the ratio of the four banks' total commercial loan to total banks commercial loans in the market.
3. This is obtained by summing up the total change in rank based on the loan by the four dominant banks among themselves from one year to another.
4. This is obtained by calculating the rate of change in the market share of the four dominant banks.
5. This is calculated as the total market share divided by the number of banks on the market.
6. MEMSH* = Minimum Efficient Market Share = (CR*DFAMS) + OFAMS where CR = 4 - firm concentration ratio; DFAMS = Average market share of the 4 dominant banks and OFAMS = Average market share of the other banks.
7. $\frac{\text{TMSH}}{\text{MEMSH*}} = \frac{\text{Total Market Share}}{\text{Minimum Efficient Market Share}} =$ Number of technological efficient banks
8. N = Total number of banks in operation.

Source: Computed from individual banks Annual Reports and CBN Publications.

Although, the concentration ratio has remained high, one thing is however, obvious, the share of the four dominant banks has been declining over the years. Based on the 4 firm contraction ratio, the market share of the dominant banks was highest in 1976, during which they accounted for over 80 percent of total commercial loans in the market. Since then, there has been a noticeable tendency for the ratio to decline. By 1989, the ratio picked up again after fallen to 59.84 percent in 1988 ostensibly as a result of the transfer of all government deposits from commercial and merchant banks to the Central Bank thereby reducing these banks ability to grant loans. Mostly affected by the move are the state government banks whose survival depended on government's patronage.

In the following year however, the share fell drastically and this trend continued till it reached its lowest level of 51.02% in 1993 before picking up again and rose only marginally to 53.25 percent in 1996.

The same trend is virtually captured by the Herfindahl Hirchman concentration index (HH). The declining concentration in the market may be explained by the falling growth in the combined market share of the dominant banks. The tendency for growth to decline may be the result of declining marginal benefit of diversification to these banks or growth in the number of banks above average size entering the market. Both cases are reasonable notwithstanding the growing returns to the dominant banks' asset portfolios.

The entry of more banks into the market is not only indicated by the absolute number of banking firms and other non-banking financial institutions which increased by over 500 per cent between 1974 and 1996, this is implicit in the declining growth in the combined market share of the four main banks as well as the average market share. The impact of increasing entry and declining marginal benefit of diversification to the dominant banks are also reflected in the decline in minimum efficient market share and the rising number of technological efficient banking firms in the market (Table 5.1).

Conversely, there is little evidence of tacit collusion by the dominant banks. In fact, there appears to be keen competition amongst these banks over the period under consideration. Mobility, measured by total change in ranks, was highest in 1977, 1979, 1984 and 1985 and of course, for these periods, the combined market share of the banks remain well above 60 percent and thus, concentration. (Table 5.1). Since 1987, however, there appears to have been more instability in the relative positions of the dominant banks as they gradually lose market shares to new entrants.

Apart from the concentration and market share of operators, especially the operating banks in the market, the market is also characterised by array of instruments some of which compete with commercial loans for recognition (Table 5.2).

Over the year, the relative proportion of these various instruments to the entire commercial loan market size (CLM size) has been changing. The changes observed here is a reflection of changes and development in the market in particular and the entire financial system in general. For instance, while the proportion of the market taken up by Treasury Bills (TBs) increased from 12 percent level in 1977 to as much as 57.65 percent in 1992, that of Bankers Unit Funds (BUFs) has experienced a rapid decline from 6 percent in 1977 to 0.009 percent in 1988. By 1990, the instrument ceased from being

Table 5.2

VALUE AND STRUCTURE OF COMMERCIAL LOAN MARKET INSTRUMENTS
(Millions of Naira)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
YEAR	CPS	TBS	TCS	CDS	BUF	LOANS	Clm Size
1976	27.011	616	652	40.225	130	1654.3	3119.536
1977	26.331	691	900	23.85	368.669	3563.7	5573.55
1978	45.6	2118	1800	106.8	114.2	3100.5	7285.1
1979	24.2	2119	2310	89.2	125.4	3406.4	8074.2
1980	48.1	2119	3027.6	120.9	28.3	5103.3	10447.2
1981	73	5782	2057.6	168.5	19.4	6846.4	14946.9
1982	110.4	9782	1668.6	346.5	21.1	8428.8	20357.4
1983	153.3	13476	4894.4	419.1	18.5	9469.3	28430.6
1984	156.7	15476	6413	260.7	18.5	9599.6	31924.5
1985	139.3	16976	6654.1	211.7	18.5	10498.5	34498.1
1986	432.3	16976	6654.7	261.9	17.5	14275.4	38617.8
1987	496.4	25226	6664.1	1349.4	8.6	15757.7	49502.2
1988	668.9	35476	6794.6	1861.3	5.9	18852.2	63658.9
1989	737.2	24126	6944.6	1309.8	5.9	19816	52939.5
1990	953.4	25476	34214.6	1743	0	24777.5	87164.5
1991	1031.6	56728.3	34214.6	1107.4	0	31419.5	124501.4
1992	1701.9	103317.5	34214.6	536.5	0	39446.9	179217.4
1993	3371.5	103326.5	36584.3	90.8	0	64389.7	207762.8
1994	5252.5	103326.5	37342.7	15.2	0	90926.5	236863.4
1995	10034.9	103326.5	23596.3	48	0	132616.2	269621.9
1996	8023.7	103326.5	0	104.9	0	147843.8	259298.9

Source: Central Bank of Nigeria, Reports and Statement of Accounts, Various Years.

part of the market instrument due largely to bank's preference for relatively short-dated and more remunerative instruments in the face of continuing reserve pressure mounted on the banks by the monetary authorities. On the other hand, there appeared to be a relatively consistency in the proportion of the market taken up by Treasury Certificate (TCs) whose share of the market has remained between 20 percent in 1976 and 15 percent in 1994 although with some sharp fluctuations in between. It's share of the market was however, as low as 8.75 percent in 1995. The share of commercial loan in the entire loan market was for most of the period below 50 percent except for 1976, 1977 when it recorded 53 percent and 63.9 percent respectively and in 1996 when it recorded 57.01 percent. The commercial papers (CPs) issued by private sector incidentally as alternative or supplementing source of financing production and other commercial activities enjoyed a relatively impressive growth over the years. Its share, however, has remained relatively low lying between 0.02 and .7 percent through the entire period. However, it must be mentioned that the relative growth of CPs observed started in 1986 with the reform programme when the marketing boards were abolished.

The picture presented in tables 5.2 and 5.3 is a clear demonstration of the intense rivalry between commercial loan and other instruments which tend to compete for the limited available resources in the market. This situation is heightened by the relative advantage these other instruments have over commercial loans (i.e. they are relatively more secured, carrying lower risk and higher liquidity), which make them more attractive than commercial loans. The above therefore underscore the obvious rationing of credits that pervades the market.

Table 5.3

RELATIVE SIZE OF COMMERCIAL LOAN MARKET INSTRUMENTS
(in Percentage)

YEAR	CPS	TBS	TCS	CDS	BUF	LOANS
	(1)	(2)	(3)	(4)	(5)	(6)
	(2)%(8)	(3)%(8)	(4)%(8)	(5)%(8)	(6)%(8)	(7)%(8)
1976	0.865866	19.74653	20.90054	1.289455	4.167286	53.03032
1977	0.472428	12.39784	16.1477	0.427914	6.614617	63.9395
1978	0.625935	29.07304	24.70797	1.466006	1.567583	42.55947
1979	0.29972	26.24409	28.60965	1.104753	1.553095	42.1887
1980	0.46041	20.28295	28.98001	1.157248	0.270886	48.8485
1981	0.488396	38.68361	13.76607	1.127324	0.129793	45.80482
1982	0.542309	48.05132	8.196528	1.702084	0.103648	41.40411
1983	0.539208	47.39963	17.21525	1.474116	0.065071	33.30672
1984	0.490846	48.47688	20.08802	0.816614	0.057949	30.0697
1985	0.40379	49.20851	19.28831	0.613657	0.053626	30.43211
1986	1.119432	43.959	17.23221	0.678185	0.045316	36.96586
1987	1.002784	50.95935	13.46223	2.725939	0.017373	31.83232
1988	1.050756	55.72826	10.67345	2.923865	0.009268	29.6144
1989	1.392533	45.57278	13.11799	2.474145	0.011145	37.43141
1990	1.093794	29.2275	39.25291	1.999667	0	28.42614
1991	0.828585	45.56439	27.4813	0.889468	0	25.23626
1992	0.949629	57.64926	19.09112	0.299357	0	22.01064
1993	1.622764	49.73292	17.60869	0.043704	0	30.99193
1994	2.217523	43.62282	15.7655	0.006417	0	38.38774
1995	3.721842	38.32274	8.751626	0.017803	0	49.18599
1996	3.094383	39.84841	0	0.040455	0	57.01675

Source: Computed from Table 5.2

The structure of yields of commercial loan market instruments (Table 5.4) also indicate relative stagnant in the movement of the yields overtime of all the yields, particularly in the period before the deregulation of the financial system in 1987. All the rates appear more dynamic and assume higher rate just at the onset of the reform in 1986. From whichever point it is viewed, the fact that the yields on all of the instruments have persistently been fixed and fallen below the inflation rates has made it necessary for the operating banks to device various methods of circumventing the credit policies of government which by themselves amount to credit rationing by allocation.

Even between the two major operating banking institutions, the percentage share holding of the market instruments supplied by each of them has a lot to do with the performance of the entire market.

Table 5.5 shows the value of each of these instruments outstanding within each of the two institutions. Table 5.6 presents the share holding of commercial loans by commercial banks and merchant banks. A look at the two tables confirm the statement earlier made that the market is still being dominated by commercial banks. Although, their combined holdings of the market has been increasing, the rate of growth of the market share being held by merchant banks has been very impressive especially in respect of the volume of loans granted and the value of commercial papers taken up. Of course, the most impressive growth was recorded in the share of commercial papers taken up rising from 6.6 percent in 1979 to 66.04 percent in 1986 onward. The share fall to 41.5 percent in 1988 only to pick up sharply again to 67.8 percent in 1990. The share, however, assume a downward trend starting from 57.6 percent in 1991 and

Table 5.4

STRUCTURE OF YIELDS OF COMMERCIAL LOAN MARKET INSTRUMENTS (Percentages)

Years	tbr	tcr	lr
1970	4	4.5	7.42
1971	4	4.5	8.67
1972	4	4.5	9
1973	4	4.5	9
1974	4	4.5	9
1975	3.5	4.5	8
1976	2.5	3	8
1977	3	3.5	6
1978	4	4.5	9.3
1979	4	4.5	9.17
1980	5	5.5	8.5
1981	5	5.5	9.17
1982	7	7.5	9.92
1983	7	7.5	10.42
1984	8.5	9	10.83
1985	8.5	9	9.83
1986	8.5	9	11
1987	11.75	12.25	18.57
1988	11.75	12.25	17.13
1989	17.5	16.38	25.77
1990	17.5	18.2	26.4
1991	15	15	20.44
1992	21	22	30.6
1993	26.9	27.4	31.16
1994	12.5	13	21
1995	12.5	13	20.49
1996	12.5	13	21

Note: tbr = treasury bill rate
tcr = treasury certificate rate
lr = loan rate (average)

Source: CBN Statistical Bulletin (1996).

Table 5.5

HOLDING OF COMMERCIAL LOAN MARKET INSTRUMENTS OUTSTANDING

YEAR		Commercial papers			Treasury bills		Bankers Fund		Total (₦ Million)
	Mcht banks (₦ Million)	Com banks (₦ Million)	Total	Mcht banks (₦ Million)	Com banks (₦ Million)	Total	Mcht banks (₦ Million)	Com banks (₦ Million)	
1976	3.3	26.6	29.9	7.4	466.9	474.3	12.1	112	124.1
1977	2.6	23.8	26.4	26.7	296	322.7	10.3	337.1	347.4
1978	0	0	0	7.8	512.4	520.2	0	0	0
1979	1.6	22.6	24.2	46.9	1307	1353.9	0.2	125.2	125.4
1980	5.5	42.6	48.1	40.6	1600.5	1641.1	9	19.3	28.3
1981	13.7	59.3	73	51.1	917.5	968.6	0	19.4	19.4
1982	36.9	73.5	110.4	171.7	2189.8	2361.5	0	21.1	21.1
1983	34.8	118.5	153.3	374.5	4361.7	4736.2	0	18.5	18.5
1984	103.1	53.6	156.7	876.5	7296.5	8173	0	18.5	18.5
1985	91.8	47.2	139	1027.1	7990.9	9018	0	18.5	18.5
1986	142.9	116.1	259	98	3062	3160	0	18.4	18.4
1987	200.9	231.4	432.3	260.6	5250.5	5511.1	0	8.6	8.6
1988	277.8	391.1	668.9	159.1	5273.9	5433	0	5.9	5.9
1989	368.2	369	737.2	84.6	2535.2	2619.8	0	5.9	5.9
1990	619.5	294	913.5	340.3	7665.8	8006.1	0	0	0
1991	594.4	437.7	1032.1	673	6254.2	6927.2	0	0	0
1992	535.8	1166.1	1701.9	1004.8	5181	6185.8	0	0	0
1993	751.7	2619.8	3371.5	9393.8	28851.7	38245.5	0	0	0
1994	2041	3211.5	5252.5	8637.4	38286.8	46924.2	0	0	0
1995	1544.9	8490	10034.9	4441.1	28151.1	32592.2	0	0	0
1996	1480.1	6543.6	8023.7	8947.7	46770.8	55718.5	0	0	0

Source: CBN Statistical Bulletin.

attained its lowest share of 15.4 percent in 1995 only to rise marginally to 18.5 percent in 1996. Generally, commercial banks outweighed merchants banks in importance until 1984 when merchant banks dominated the market with a market share of 65.7 percent. This dominance continued until 1989 except for 1987, 1988 and 1989 marginally conceded to commercial banks reflecting the continued reliance on merchant banks for the provision of credits for financing external trade. A similar trend is also displayed in the share of merchant bank in the total commercial loans supplied to the market. From a share of 2.2 percent in 1980, the bank's entrance into the market did not only improve the aggregate loan available in the market, its share also rose steadily and reached its highest level of 26.19 percent in 1993. In 1994, the share fell to about 18 percent and fell further to 12.1 percent in 1995 and 12.42 percent in 1996. See Table 5.5.

Tables 5.6 and 5.7 both present the maturity structure of commercial loans held by the commercial and merchant banks. The tables also show the share of commercial loan in the loan portfolios of the banks. The merchant banks for instance have been having an increasingly greater percentage of their total loans going to commercial loan market. The proportion has been lying between 25.16 percent and 58.9 percent between 1980 and 1996. With commercial banks, the story is different with a share total of between 77.9 percent and 85.4 percent of its loan portfolio going to the market within the period 1980 to 1996. This is not surprising as commercial banks are traditionally expected to provide commercial loans.

Table 5.6

PERCENTAGE SHARE HOLDING OF COMMERCIAL LOAN MARKET INSTRUMENTS BY COMMERCIAL AND MERCHANT BANKS

Year	Commercial Papers		Treasury Certificates		Bankers Unit Fund	
	Com. Bk	Mer. Bk	Com. Bk	Mer. Bk	Com. Bk	Mer. Bk
1976	88.96321	11.03679	98.43981	1.560194	90.2498	9.750201
1977	90.15152	9.848485	91.72606	8.273939	97.03512	2.964882
1978			98.50058	1.499423		
1979	93.38843	6.61157	96.53593	3.464067	99.84051	0.15949
1980	88.56549	11.43451	97.52605	2.47395	68.19788	31.80212
1981	81.23288	18.76712	94.72434	5.275656	100	0
1982	66.57609	33.42391	92.7292	7.270802	100	0
1983	77.29941	22.70059	92.09282	7.907183	100	0
1984	34.20549	65.79451	89.27566	10.72434	100	0
1985	33.95683	66.04317	88.61056	11.38944	100	0
1986	44.82625	55.17375	96.89873	3.101266	100	0
1987	53.52764	46.47236	95.27136	4.728639	100	0
1988	58.46913	41.53087	97.0716	2.928401	100	0
1989	50.05426	49.94574	96.77075	3.229254	100	0
1990	32.18391	67.81609	95.74949	4.250509		
1991	42.40868	57.59132	90.28467	9.715325		
1992	68.51754	31.48246	83.75635	16.24365		
1993	77.70429	22.29571	75.43816	24.56184		
1994	61.14231	38.85769	81.59287	18.40713		
1995	84.60473	15.39527	86.37373	13.62627		
1996	81.5534	18.4466	83.94124	16.05876		

Source: Computed from Table 5.5.

Note: Com. Bk = Commercial Banks
Mer. Bk = Merchant Banks

Table 5.7

RELATIVE SHARE HOLDINGS OF COMMERCIAL LOANS BETWEEN MERCHANT AND COMMERCIAL BANKS

(1)	(2)	(3)	(4)	(5)	(6)
YEAR	Merchant banks (₦ Million)	Commercial banks (₦ Million)	Total (₦ Million)	(2) as % of (4)	(3) as % of (4)
1980	109.9	4993.4	5103.3	0.021535	0.978465
1981	145.9	6700.5	6846.4	0.02131	0.97869
1982	343.9	8084.9	8428.8	0.040801	0.959199
1983	437.1	9032.2	9469.3	0.04616	0.95384
1984	496.2	9103.4	9599.6	0.05169	0.94831
1985	525.1	9973.4	10498.5	0.050017	0.949983
1986	964.9	13310.5	14275.4	0.067592	0.932408
1987	1575	14182.7	15757.7	0.099951	0.900049
1988	1971	16881.2	18852.2	0.10455	0.89545
1989	3020.4	16795.6	19816	0.152422	0.847578
1990	4314.9	20462.6	24777.5	0.174146	0.825854
1991	5254.8	26164.7	31419.5	0.167246	0.832754
1992	4724.8	34722.1	39446.9	0.119776	0.880224
1993	16861.5	47528.2	64389.7	0.261866	0.738134
1994	16339.3	74587.2	90926.5	0.179698	0.820302
1995	16088.8	116527.4	132616.2	0.121319	0.878681
1996	18369.7	129474.1	147843.8	0.124251	0.875749

Source: CBN Statistical Bulletin (1996).

Table 5.8

MATURITY STUCTURE OF COMMERCIAL LOANS OF THE MERCHANT BANKS

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
YEAR	On Call (₦ Million)	0 - 6 Mts. (₦ Million)	6 - 12 Mts. (₦ Million)	1 Yr. (₦ Million)	Total CL. (₦ Million)	Total Loans (₦ Million)	(6) as % of (7)
1960							
1970							
1980	28	28.7	53.2	0	109.9	354.5	0.310014
1981	36.5	43.3	66.1	0	145.9	570.2	0.255875
1982	105.3	58.6	180	0	343.9	840.7	0.409064
1983	179.7	72.5	184.9	0	437.1	1021.3	0.427984
1984	255.2	57.9	183.1	0	496.2	1181.4	0.42001
1985	265.2	69	190.9	0	525.1	1326.1	0.395973
1986	337.8	114.8	371	141.3	964.9	2208.1	0.436982
1987	517.4	268.5	474.8	314.3	1575	3274.4	0.481004
1988	640.8	296.1	627.5	406.6	1971	4419.2	0.446008
1989	977.3	671.3	918.5	453.3	3020.4	5887.6	0.51301
1990	1074.7	1155.5	1317.1	767.6	4314.9	8080.1	0.534016
1991	2365.1	1029.2	1266.7	593.8	5254.8	9896	0.531002
1992	1630.2	1209.9	1346.9	537.8	4724.8	11303.9	0.41798
1993	9952.6	3922.8	1547.3	1438.8	16861.5	28618.9	0.589174
1994	8493.6	5023.2	1340.9	1481.6	16339.3	28000.3	0.58354
1995	8948.3	3705.7	1516.4	1918.4	16088.8	30730.8	0.52354
1996							

Source: CBN Statistical Bulletin.

Note: Total CL. = Total Commercial Loan.

Inspite of the above development, it is noteworthy to briefly touch on the adverse implications of preponderance of very short term lending in the entire loan market portfolio. While it is important for the very short end of the market to coexist, the observed predominance of it is bound to impede capital formation in the country. Productive investment is therefore likely to be hampered as market agents provide funds for only very short periods.

Up to this moment, we have focused on the variety and volume of instruments traded in the market. At this point it is necessary to have a discussion of the growth of the different instruments. Table 5.10 presents the growth rate of these instruments. Over the period 1976 and 1996 the CPs registered four negative growth. These were in 1977, 1979, 1985 and 1996. The most remarkable growths were recorded in 1980, with 98.76 percentage, 1986 with 210.3 percentage, 1993 with 98.1 percent and 1995 with 91.05 percent. This performance especially those recorded since the initiation of SAP in 1986 could be traced to the abolition of marketing boards, as banks now assumed a more prominent role in the financing of commodity trade through the use of CPs.

Treasury bills holding rose dramatically from 12 percent in 1977 to 206.5 percent in 1978. In 1981, a dramatic rise of 172.96 was also recorded. However, between 1982 and 1988, the growth rate range between 0 and 69 percent. A decline of 31.99 percent was, however, recorded in 1989. The positive growth recorded in 1990 assumed a sharp jump in 1991 and 1992. By 1993, the rate of growth had nose dived reaching zero where it stayed from 1994 to 1996. Suffice to say that with deregulation, treasury bills yields were increased from 10 to 14 percent. This development made it more attractive

Table 5.9

MATURITY STRUTURE OF COMMERCIAL LOANS OF COMMERCIAL BANKS

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
YEAR	On Call (₦ Million)	0 - 6 Mts. (₦ Million)	6 - 12 Mts. (₦ Million)	1 Yr. (₦ Million)	Total CL. (₦ Million)	Total Loans (₦ Million)	(6) as % of (7)
1980	3246	822.7	727	197.7	4993.4	6377.3	0.782996
1981	4369.5	911.7	1066.6	352.7	6700.5	8601.4	0.779001
1982	5157.1	1540.9	996.5	390.4	8084.9	10273.1	0.786997
1983	5126.4	2052.8	1020.8	832.2	9032.2	11096.1	0.813998
1984	5448.3	1885	1091.9	678.2	9103.4	11494.2	0.791999
1985	6142.1	2189.3	1204.1	437.9	9973.4	12162.5	0.820012
1986	8026.9	2976.9	1574.2	732.5	13310.5	15586.2	0.853993
1987	8677.9	2506.9	2068.7	929.2	14182.7	17531.3	0.808993
1988	10421.3	3229.9	2376.8	853.2	16881.2	20314.4	0.830997
1989	10710.8	2979.9	2354.7	750.2	16795.6	20838.2	0.806001
1990	12370.9	4772	3060.3	259.4	20462.6	25935	0.788996
1991	15989.5	6130.4	3634	410.8	26164.7	31599.9	0.827999
1992	22739	7670.9	3975.6	336.6	34722.1	42008.2	0.826555
1993	28799	11817.8	5635.1	1276.3	47528.2	57193.9	0.831001
1994	45147.3	18579.5	8885.8	1974.6	74587.2	89756	0.831
1995	70533.4	29026.7	13882.3	3085	116527.4	140225.4	0.831001
1996	78325.8	32233.5	15416	3498.8	129474.1	155717.3	0.831469

Source: CBN Statistical Bulletin.

Note: Total CL. = Total Commercial Loan.

relative to loans. Although, the TB issue rate was not allowed to be determined by the forces of demand and supply, the fixing of the minimum rediscount rate at 15 percent in 1987 increased the bill issue rate of about 14 percent.

From 1970 to 1983, the bill rate ranged between 4 and 7 percent (Table 5.4) rising marginally to 8.5 percent in 1985. Against this background, one can appreciate the impact of the deregulation of interest rate and the near 30 percent increase in the volume outstanding in December 1988. But as the rates in other instruments exceeded the treasury bills rates, coupled with the government withdrawal of its deposits from both commercial and merchant banks, a drop of 31.99 percent was observed in 1989, reflecting the preference of these banks for higher-yielding investments such as investing in foreign exchange. The drop is also a reflection of the degree of dependence of these banks and probably the entire commercial loan market on government deposits. This is demonstrated by the negative growth also recorded by the entire commercial loan market in 1989.

Commercial loan also as instrument of the commercial loan market had untruncated growth except in 1977, when it recorded a decline of 12.99 percent. Between 1978 and 1996, the growth rate ranged between 1.37 percent and 63.23 percent, although, the trend was not a straight one. This is not surprising in view of the government guidelines of encouraging the banks to invest more on loans especially to the private sector.

Table 5.10

GROWTH OF THE COMMERCIAL LOAN MARKET AND INSTRUMENTS
(Percentage Change)

YEAR	CPS	TBS	TCS	CDS	BUF	LOANS	Clm Size
1976	0	0	0	0	0	0	0
1977	-2.51749	12.17532	38.03681	-40.7085	183.5915	115.4204	78.66599
1978	73.1799	206.5123	100	347.7987	-69.0237	-12.9977	30.70844
1979	-46.9298	0.047214	28.33333	-16.4794	9.807356	9.866151	10.8317
1980	98.76033	0	31.06494	35.53812	-77.4322	49.81505	29.38991
1981	51.76715	172.8646	-32.0386	39.37138	-31.4488	34.15633	43.07087
1982	51.23288	69.18021	-18.9055	105.638	8.762887	23.11288	36.19814
1983	38.8587	37.76324	193.3237	20.95238	-12.3223	12.34458	39.65732
1984	2.217873	14.8412	31.0273	-37.7953	0	1.376026	12.28922
1985	-11.104	9.692427	3.759551	-18.7956	0	9.363932	8.06152
1986	210.3374	0	0.009017	23.7128	-5.40541	35.97562	11.94182
1987	14.82767	48.59802	0.141254	415.2348	-50.8571	10.3836	28.18493
1988	34.7502	40.63268	1.958254	37.93538	-31.3953	19.63802	28.59812
1989	10.21079	-31.9935	2.207635	-29.6298	0	5.112401	-16.8388
1990	29.32718	5.595623	392.6792	33.07375	-100	25.03785	64.64927
1991	8.202224	122.6735	0	-36.4659	0	26.80658	42.83498
1992	64.97674	82.12691	0	-51.5532	0	25.5491	43.9481
1993	98.10212	0.008711	6.925991	-83.0755	0	63.23133	15.92781
1994	55.79119	0	2.07302	-83.2599	0	41.2128	14.00665
1995	91.04998	0	-36.8115	215.7895	0	45.84989	13.83012
1996	-20.0421	0	-100	118.5417	0	11.48246	-3.82869

Source: Computed from Table 5.2.

Note: CPS = Commercial Papers; TBS = Treasury Bills; TCS = Treasury Certificates; BUF = Bankers Unit Funds; Clm Size = Commercial Loan Market Size; CDS = Certificate of Deposits.

Generally, we can attribute the structure of the market outlined above to a number of factors especially the observed growth pattern of the market instruments. The 1989 monetary policy guidelines just like the guidelines before it placed a limit of 10 percent on the expansion of credit by each commercial bank, down from 12.5 percent in 1988.

Since banks cannot expand their loans and advances which is a major pivot of profitability, and funds cannot be left idle, the banks have resorted to holding short term loan market instruments.

The above underscore the prevalent of shortage of loanable funds and the resultant rationing of credit in the market throughout most of the period under consideration.

It has also been argued that the deregulation of interest rates under SAP resulted in making all the instruments except loan attractive. For instance in January 1987, the CBN partially deregulated interest rates and increased the minimum rates payable on savings and time deposits from 9.5 to 11 and 12 percent respectively. Not satisfied with partial deregulation, it opted for full deregulation in August 1987 by abolishing all direct controls on interest rates. The high interest rates were further pushed up by foreign exchange market auctions which absorbed large quantities of the domestic currency. FEM as a major element in the SAP appeared to have moderately revised commercial activities in the economy. In addition to the pressure exerted on liquidity by aggregated demand for commercial loans, most banks usually called back their funds to finance foreign exchange requirements in FEM. Due to the tight liquidity situations, banks therefore felt reluctant to invest in loans and other loan market instruments and as a result such as CPs, bankers acceptance etc. private sector issuing these instruments were forced to increase the prevailing rates so as to make them more attractive for banks. Since there is no ceiling on the interest rates on such instruments, a further increase can be obtained.

5.3 Conduct of the Nigeria's Commercial Loan Market

The Nigeria's commercial loan market is one of the most vibrant and dynamic sector market in the Nigerian economy. We have noted earlier the tremendous growth recorded by the market within the last two decades. However, one thing that has gone far beyond the imagination of the market watcher is the erudity and the doggedness with which operations of the market are being conducted.

At the helms of affairs are the two dominant operating institutions - commercial and merchant banks - dictating the pace and path to follow. Even among these institutions, there exist variations in approach to address the market situations.

Basically, the ability of the market to satisfy the loan demand of its customers depend to a very large extent on the available resources (deposits) at its disposal. The conduct analysis required here, therefore is that which focuses on how the resources (deposits) are mobilized transformed and channeled into loans as required by the borrowers.

In recent years, the banks' have continued to respond more aggressively to the competitive pressures recipitated by the deregulation of the entire financial system. One way by which the banks are responding to the competitive challenges in the market has been the expansion of banking activities, especially through the rapid development of new bank products. By exploiting new technologically-based techniques for providing banking services and through other innovative approaches including an innovative interpretation of existing laws and regulations, the banks are expanding into new geographical markets and widening their product offerings.

There is no doubt that the interest in the development of additional bank products stemmed from the problems which arose from the withdrawal of government accounts from the banks in 1989. The programme depleted loanable deposits of the banks and consequently they had to embark on the development of new bank products not just to promote competitive efficiency but majorly to enhance resource (deposit) base.

Moreover, in order to meet the increasing demand of their customers and the sophistication as well as complexity of services demanded, most of the banks have set up specialised departments like Business Advisory Services, Economic Research, Corporate Finance Services etc. In addition to adopting the modern hi-tech information system, several of the banks have in recent years embarked on computerisation of their data processing having regard to the growing volume of book-keeping and the need for improved service delivery.

As a means of 'catching up' with the dynamics of the system and outplay their competitors, the banks among themselves have also embarked on various sales promotion strategies designed to create unique images of their services in the minds of their customers and public at large through advertisement and provision of extra conveniences for the customers. Sales promotion strategies being adopted by the banks in their non-price competition therefore, include, advertisements, attractive premises, night safe deposits and weekend services, drive in parks, insurance on saving deposit, saving target, attractive cashiers and prompt attention and others.

However, advertisement constitutes the most singular significant form of sales promotion strategy. All of the banks now utilise available communication media like newspapers, radio, television and cinema screens and bill boards to advertise their services. While some of them stress their wealth of experience and connections with international financial markets, others and more particularly the wholly privately owned indigenous banks, lay emphasis on their knowledge of local conditions and appeal for national sentiments. They all however do stress their efficient, friendly and courteous services.

The effect of this development is the increased cost of operations by the banks which are now being passed on to their customers and the consequent decline in the growth of the loan being supplied to the market. The decline is due to the inability of the banks to raise the prevailing lending rate above the permissible maximum set by the monetary authority.

The product improvement strategies are over market strategies, and they are reflected in such things like accuracy of bank statements, principal/prompt attention given to customers, reduction in the length of time spent in cashing a cheque and the easiness of transacting business domestically or internationally through the banks. Apart from increasing cost of operations as noted earlier, these recent developments have also had to do with introducing of an element of differentiation into the loan market by reference to the characteristics of the clients or customers by the traditions to which the banks are accustomed.

It is important, however, to emphasise here that current account balances form a sizable part and the hard core of the banks' resources because these resources are payable on demand, they have been especially cautious in the use of the deposits. Thus, overdrafts are made payable on demand and bank lending is confirmed for the most part for highly liquid purposes. In general, the banks adopt the attitude of reluctance to get drawn into medium-term lending, but show strong preference for the so-called self-liquidating transactions and lending on overdraft as can be seen in tables 5.8 and 5.9. This indeed has been one major area of reform by the monetary authorities in the last decade or so. Secondly, short-term lending is more easily managed and more remunerative. Some borrowers especially companies, find it more convenient to borrow in this way, rather than to submit to the scrutiny involved in seeking public subscription or medium term finance from the banks. The banks on their part are able, under this system, to turn their assets quickly into cash to meet demand or adverse clearing balance. But more significantly, this form of lending imposes a minimum burden and risk on the lending banker in terms of financial and investment analysis.

5.4 Performance of the Nigerias' Commercial Loans Market

Given the emerging relative sophistication of the Nigerian economy, there has been an increase in the scale of operations, of the commercial loan market. The surge in the demand for commercial loans for instance and the market response to this demand can be appreciated by undertaking an analysis of the growth of such major indices as total assets, total deposits liabilities, total credit, total loans and advances in addition to institutional savings held by the commercial and merchant banks hereinafter referred to as 'the banks'.

In absolute terms, the banks have had a good showing in the growth of their assets. Assets increased from ₦1,152.034 million to ₦548,758.3 million between 1970 and 1996 representing an annual average growth rate of 23.87 percent. Viewed in relation to the total assets of the financial system, the two institutions hold at least 93.4 percent of the total assets of the system.

Corresponding to the rapid growth in assets is also an expansion of the banks' deposit liabilities. From ₦657.1 million in 1970, deposits in the banks jumped to ₦11,127.3 million in 1981. Thereafter, it rose steadily at an annual average rate of 25 percent to ₦25,428.3 million in 1986 and subsequently to ₦249,712.0 million in 1996 (Table 5.11). These deposits held by the banks constitute over 90 percent of the system's total liabilities. This rapid increase could be attributed to the growth of the economy, the increased monetization of the economy, as well as the improvement of banking habits arising from the increased number of bank offices from 274 in 1970 to 2549 by the end of 1996. It will be recalled that until the Central Bank decided to mop up the excess liquidity in the system, some of the banks discriminated on the opening of accounts and were stipulating minimum amounts of deposits over and above the statutory requirements. The growing demand for the banks' services and the extent of their performance reflected by the growth of their activities is best demonstrated by this rapid expansion of their assets and liabilities.

Table 5.11

DEPOSIT LIABILITY, ASSETS AND LOANS OF NIGERIAS' COMMERCIAL AND MERCHANT BANKS (1970 - 1996) (N. MILLIONS)

YEAR	DEPOSITS			ASSETS			LOANS		
	Comm.	Merchant	Total	Comm.	Merchant	Total	Comm.	Merchant	Total
1970	624.8	4.3	629.1	1151.8	0	1151.8	351.5	0	351.5
1971	657.1	7.1	664.2	1276.2	16.2	1292.4	502	7.6	509.6
1972	793.7	10.7	804.4	1438.4	29	1467.4	619.5	13.9	633.4
1973	1013	14.4	1027.4	1769.7	31.2	1800.9	753.5	14	767.5
1974	1693.9	21.9	1715.8	2811.1	62.1	2873.2	938.1	23.5	961.6
1975	2938.2	63.4	3001.6	4308	188.6	4496.6	1437.5	80.7	1518.2
1976	4164.4	61.8	4226.2	6371.1	168.3	6539.4	2123	78.1	2201.1
1977	5235.2	85.9	5321.1	8531	319.6	8850.6	4313.5	109.6	4423.1
1978	5302.6	123	5425.6	9105.8	424.1	9529.9	4114.9	194.2	4309.1
1979	6967.8	171	7138.8	11238.6	614.4	11853	4630.4	226.2	4856.6
1980	10009.1	286.1	10295.2	16340.4	1008.2	17348.6	6349.1	400.2	6749.3
1981	10676.9	450.4	11127.3	19477.5	1898.7	21376.2	8582.9	711.9	9294.8
1982	12018.9	963.6	12982.5	22661.8	3302.9	25964.7	10275.3	1189.8	11465.1
1983	13251.9	1278.4	14530.3	26701.5	4304.9	31006.4	11093.9	1465.4	12559.3
1984	14908.4	1481.6	16390	30066.7	4495.9	34562.6	11503.6	1671.8	13175.4
1985	16776.1	1848.7	18624.8	31997.9	5001.1	36999	12170.2	1802.9	13973.1
1986	17771	2341.6	20112.6	39678.8	8445.3	48124.1	15701.6	2771.5	18473.1
1987	20422.3	3383	23805.3	49828.4	12280.9	62109.3	17531.9	4101.3	21633.2
1988	29065.1	4817.6	33882.7	58027.2	17203.6	75230.8	19561.2	4419.1	23980.3
1989	27164.9	3799.6	30964.5	64874	21786.9	86660.9	22008	5887.5	27895.5
1990	38777.3	6309.9	45087.2	82957.8	27420.2	110378	26000.1	7588.1	33588.2
1991	52408.7	7029.2	59437.9	11751.9	37945.8	49697.7	31306.2	13787.7	45093.9
1992	76073.5	11645.4	87718.9	181731.1	50542.4	232273.5	42008.2	13000.5	55008.7
1993	119595.1	19216.6	138811.7	226163	53759	279922	62133.9	16917.1	79051
1994	147006.6	20638.3	167644.9	295035	62447	357482	94183.9	17319.8	111503.7
1995	174993.3	17501	192494.3	385143	79913	465056	144569.6	27945.5	172515.1
1996	214360	24413.3	238773.3	458779	899979.3	1358758	157568.8	33516.6	191085.4

Despite economic recession, savings with financial institutions experienced an upsurge in the 1980s. Between 1980 and 1986, total savings in the economy grew at an annual average of ₦1.3 billion. As at the end of 1987, institutional savings outstanding stood at ₦18,655.8 million, this increased to ₦159,846.9 million by the end of 1996. During the period under review both the commercial and merchant banks held the bulk of this total, with ₦155,729.8 or 97.4 percent in the vaults of the banks at the end of 1996. Nevertheless, there has been a decline in the proportion of system's total savings held by the banks, dropping from 93.3 percent in 1980 to 91.5 percent in 1989 only to rise again to 97.4 percent in 1996 (see Table 5.12).

At ₦413,778.3 million at the end of 1996, aggregate banking systems credit outstanding to the domestic economy increased by ₦19,581.5 million over the level at the end of 1995. Taken further back, aggregate banking systems credit stood at a mere ₦5,608.8 million in 1977. In all these years, the banks were responsible for a bulk of the system's total credit. Further examination shows that of the total credit by the banks, a greater proportion went to the private sector. However, in 1987, the banks' credit to the government rose sharply by 56.6 as against a decline of 54.9 percent in 1986. Although, there has been an overall decline of the banks' share of aggregate system's credit, (from 73.1 percent in 1977 to 64.4 in 1996) the dominance of the banks in this sphere is another pointer to their level of performance and the continued rise in the demand for their services.

Loans and advances made by the banks of which commercial loan constitute the largest proportion continue to arouse the interest and curiosity of both the banking public

Table 5.12

SAVINGS STATISTICS (CUMULATIVE) (₦ Million)

Year/ Quarter	Savings and time Deposits with Commercial Banks	National Provident Fund	Federal Savings Bank	Federal Mortgage Bank	Time Deposits with Merchant Banks	Premium Bonds, Savings Certificates, Savings Stamps	Life Insurance Funds	Other Deposit Institutions[1/]	Total
1970	336.7	-	4.9	-	-	-	-	-	341.6
1971	371.8	-	4.5	-	-	-	-	-	376.3
1972	456.9	-	4.3	-	-	-	-	-	461.2
1973	582.3	-	4.5	-	-	-	-	-	586.8
1974	973.2	129.8	4.7	7.3	22.0	0.1	-	-	1,137.1
1975	1,572.4	159.9	8.1	11.3	63.4	0.1	-	-	1,815.2
1976	1,979.2	193.9	6.9	16.3	58.9	0.1	-	-	2,255.3
1977	2,255.1	230.4	8.0	16.8	82.4	0.1	-	-	2,592.8
1978	2,601.7	269.9	8.1	19.2	110.7	0.1	-	-	3,009.7
1979	3,702.1	306.7	7.7	27.9	117.3	0.1	-	-	4,161.8
1980	5,163.2	338.9	7.3	40.7	219.7	0.1	-	-	5,769.9
1981	5,796.1	375.3	7.1	56.0	328.0	0.1	-	-	6,562.6
1982	6,338.2	411.5	4.0	69.3	691.3	0.1	-	-	7,514.4
1983	8,082.9	472.3	5.0	89.9	793.7	0.1	-	-	9,443.9
1984	9,391.3	504.1	8.0	114.0	970.6	0.1	-	-	10,988.1
1985	10,550.9	540.5	8.1	104.0	1,318.2	0.1	-	-	12,521.8
1986	11,487.7	577.4	8.1	121.1	1,739.7	0.1	-	-	13,934.1
1987	15,088.7	614.0	16.9	133.7	2,822.8	0.2	-	-	18,676.3
1988	18,397.2	651.0	22.4	195.5	3,982.8	0.1	-	-	23,249.0
1989	17,813.3	699.1	37.5	213.2	3,970.7	0.1	1,067.4	-	23,801.3
1990	23.137.1	723.5	-	304.6	4,349.4	-	1,136.6	-	29,651.2
1991	30,359.7	650.0	-	433.7	5,007.0	-	1,242.2	45.6	37,692.6
1992	43,438.8	719.8	-	729.4	8,342.5	-	1,411.3	475.0	54,116.8
1993	60,895.9	766.8	-	819.5	19,296.8	-	1,569.9	1,679.0	85,027.9
1994	76,127.8	757.9	-	816.7	11,315.8	-	19,442.3	2,506.3	93,466.8
1995	96,535.4	731.4	-	894.9	11,101.1	-	1,928.5	1,666.9	124,133.9
1996	125,997.9	n.a	-	472.4	29,731.9	-	1,945.2	1,699.5	159,846.9

[1/] People's Bank and Community Banks.

Source: CBN Statistical Bulletin and Annual Reports and Statement of Account, 1995 and 1996 respectively.

and the government. Despite the inability of the banks to meet the statutory rate of expansion, the rapid rise in nominal (absolute) terms of their loans and advances is a definitive pointer to the growing demand for the banks loans. From ₦6,314 million in 1970, the banks aggregate credit to the private sector rose to ₦23,558.8 million in 1987. The increase in the later years was 11.6 percent above the statutory ceiling of 8.0 percent average. This contrasted with the situation in 1983 and 1985 when the rates of expansion which were 5.83 percent and 8.0 percent respectively fell below permissible ceilings of 12.5 percent and 25 percent for the two years correspondingly (see Table 5.13).

However, given the enviable position and the assumed critical role to be played in the development process of the modern day economy, the performance evaluation of a commercial loan market will be more appropriately done by examining the extent to which the market has faired interms of its contribution in meeting the finance need of the economy. In order words, we shall be looking at the extent to which the major participating operators (commercial and merchant banks) comply with government prescribed credit allocation by activities/sectors. This is a reflection of the desired development activities into which the financial resources should be directed. The degree of compliance with these directives or prescriptions is seen as a useful guide in assessing the level of and or effectiveness of performance of the market in directing financial resources appropriately.

First, table 5.15 presents the extent to which these banks have effectively and efficiently utilized the resources at their disposals for the benefit of the economy as a whole. On the other hand, Table 5.16 shows the prescribed credit guidelines for the

Table 5.13

BANKING SYSTEMS CREDIT TO THE ECONOMY (₦ Million)

Year/ Quarter	Aggregate Credit Net	PRIVATE SECTOR CREDIT				CREDIT TO GOVERNMENT SECTOR			
		Commercial	Merchant	CBN	Total	Commercial	Merchant	CBN	Total
1980	10,787.5	6,434.5	-	756.4	7,190.9	2,639.8	-	956.8	3,596.6
1981	16,268.5	3,743.8	-	910.4	4,654.2	2,033.4	-	4,580.0	6,613.4
1982	21,906.8	10,453.5	-	918.0	11,371.5	2,978.3	-	7,557.0	10,535.3
1983	28,182.1	11.291.1	-	1,062.8	12,353.9	5,300.0	-	10,528.2	15,828.2
1984	31,141.6	11,639.8	-	1,302.2	12,942.0	8,790.3	-	9,409.3	18,199.6
1985	32,680.3	12,276.6	-	1,423.6	13,700.2	10,138.4	-	8,841.7	18,980.1
1986	36,820.3	15,738.6	-	1,626.4	17,365.0	4,570.9	-	14,884.4	19,455.3
1987	46,926.5	17,899.7	5,659.1	1,917.3	25,476.1	6,866.3	290.3	14,293.5	21,450.1
1988	57,326.3	20,828.9	6,526.2	2,418.5	29,773.6	21,767.2	56.6	21,767.2	43,591.0
1989	49,259.1	22,325.8	7,114.8	1,502.2	30,942.8	3,035.8	90.7	15,189.8	18,316.3
1990	57,674.9	26,364.5	8,866.4	1,400.1	36,631.0	7,036.6	315.5	22,993.4	30,345.5
1991	83,823.7	31,763.2	11,270.7	2,291.3	45,325.2	5,883.7	492.1	32,122.7	38,498.5
1992	141,735.7	43,436.9	13,657.2	3,926.2	61,020.3	1,470.0	689.3	78,556.1	80,715.4
1993	274,134.3	67,959.2	22,666.1	4,659.7	95,285.0	28,457.4	9,452.2	146,939.1	184,848.7
1994	350,622.7	94,761.5	21,914.1	5,597.7	122,273.3	37,885.7	8,271.0	182,192.7	228,349.4
1995	396,891.5	124,475.1	27,255.7	10,598.1	162,328.9	20,296.4	3,710.4	206,655.7	230,662.5
1996	413,778.3	175,218.4	40,933.0	10,039.2	226,190.6	41,548.8	8,822.0	137,216.9	187,587.7

Source: CBN Statistical Bulletin and Annual Reports and Statements of Accounts, 1995 and 1996 respectively.

allocation of loans and advances by the banks between 1970 and 1996. Against these expected allocations, we have in Table 5.14, the actual percentage allocations of loans and advances by the banks. The emerging deviations between Tables 5.14 and 5.16 is presented in Table 5.17. These deviations in Table 5.17 can however, be best appreciated against the background of the aims of the various credit guidelines of government. Broadly put, the principal purpose has been to encourage the banks to inject financial resources into the most productive (i.e. job-creating and local value-adding) sectors, see Falegan (1978) thus minimum allocations have always been specified for the 'preferred sectors' - 'general commerce' and 'others'. The philosophy behind all these, it may be useful to note, derives from the recognition of the allocational efficiency of the market mechanism in an economic environment like Nigeria in which conditions for the ideal theoretical perfect competition are non-existent. These guidelines to the banks are thus given to ensure that credit resources are allocated to support planned productive activities in various sectors of the economy. It, therefore, appears rational that the loan performance of these banks with which we are mainly concerned should not be only assessed by looking at the volume of loans or by considering the loans to deposits ratio and loans to assets ratio but should also be evaluated in terms of their compliance with these directives. Non-compliance by the banks is sure not only to frustrate the overall plan for the economy but the effects that credit rationing which may result from the policy itself will be disruptive.

The evidence that emerges from Table 5.15 indicates that the banks did not perform creditably with respect to the use of resources available to them as represented

Table 5.14

SECTORAL COMPOSITION OF COMMERCIAL AND MERCHANT BANKS LOANS PORTFOLIO 1970 - 1996

Year	Agriculture Forestry and Fishing		Manufacturing		Mining and Quarrying		Real Estate and Construction		Public Utilities		General Commerce		Transport & Communication		Others		Total (₦m)
	(₦m)	%	(₦m)	%	(₦m)	%	(₦m)	%	(₦m)	%	(₦m)	%	(₦m)	%	(₦m)	%	
1970	6.99	2.0	76.39	21.7	6.58	1.9	25.96	7.4	0.68	0.2	167.54	47.7	18.97	5.4	48.24	13.7	351.55
1972	19.25	3.1	46.78	7.5	10.16	1.6	143.58	23.2	5.16	0.8	222.19	35.9	44.38	7.2	125.22	20.2	619.51
1975	37.50	2.4	410.70	26.7	16.30	1.1	212.80	13.8	17.10	1.1	403.70	26.3	82.00	5.3	257.40	16.7	1537.30
1978	224.00	5.5	1138.00	27.7	39.40	1.0	882.80	21.5	62.30	1.5	868.60	21.1	284.50	6.9	610.10	14.9	4109.70
1980	462.20	7.3	1956.80	30.8	50.90	0.8	1325.40	20.9	88.00	1.4	1209.30	19.1	485.40	7.7	771.10	12.1	6349.10
1982	826.70	7.3	3460.20	30.6	107.10	0.95	2281.00	20.2	104.80	1.8	1979.50	17.5	725.90	6.4	1712.40	15.2	11302.10
1984	1131.4	8.6	3613.10	27.4	192.50	1.5	2686.50	20.4	215.70	1.6	2050.60	15.5	775.40	5.9	2523.00	19.1	13189.50
1986	2042.1	11.1	5485.00	29.7	266.10	1.4	3176.10	17.2	278.30	1.5	3142.20	17.0	794.1	4.3	3288.90	17.8	18473.00
1988	3643.2	15.3	7986.70	33.6	285.00	1.2	3343.5	14.1	290.00	1.2	4655.30	19.6	992.10	4.2	2655.20	11.2	23751.0
1990	5275.0	16.0	10975.20	33.2	414.1	1.3	3738.0	11.3	242.20	0.7	6269.90	19.0	1036.70	3.1	5108.0	15.5	33039.40
1992	8574.5	16.1	21181.3	39.8	871.1	1.6	4802.2	9.0	325.5	0.6	9309.5	17.5	1525.10	2.9	7336.4	13.8	53197.0
1994	29347.7	16.8	71744.3	41.0	13410.4	7.7	-		-		2280.8	13.0	-		37849.6	21.6	175181.8

Note: In 1994, the Federal government of Nigeria broke the whole sectors into two - 'High priority' and 'others' - the high priority sector consist of Agriculture, manufacturing, solid mineral, and Exports while 'others' takes care of other sectors activities.

Source: Economic and Financial Review of the CBN for Various Years (1970 - 1993).

by the ratios of loans and advances to deposits in a greater part of the period under study. After the encouraging ratios of 76.4, 78.0 and 74.4 in 1971, 1972 and 1973 respectively, the ratio fell progressively beginning in 1974 with 55.4% to 51.0% in 1976. There was a mild increase in 1978 to 77.5 percent. However, by 1981 the ratio picked up at 80.6 percent to reach its peak level of 86.6 percent in 1986. There was, however, a decline between 1983 and 1985. The steady decline that set in 1987 reached its lowest level of 52.0 percent in 1993 only to rise again in 1995 to 79.7 percent. The mean annual loans and advances to deposits ratio between 1970 and 1996 is 68.8 percent.

This phenomenon is clearly of particular importance, since the transformation of deposits into loans is the essence of bank intermediation. The ratios of loans and advances to the banks total assets in Table 5.15 show a more disappointing performance of the banks, and this calls for some explanation.

The low level of loans and advances to deposits ratio in 1970 was due to many factors. This was a period during which on the one hand, loans and advances were kept in check especially by the risk and the uncertainty of the economic and political situation arising from the 1967 - 1970 war, and on the other hand, securities were made especially attractive by the stabilization of their prices by the CBN. At the same period, there was a restrictive monetary policy put in place to minimise the incidence of inflation and deficit financing. In this respect, the government embarked on the use of selective credit control method. This to a large extent encouraged credit rationing. However, by the end of 1971, the restraint was relaxed to accommodate the government policy targets of output expansion, and a slow down of the rate of price increase.

Table 5.15

AVERAGE RATIOS OF COMMERCIAL AND MERCHANT BANKS LOANS TO DEPOSITS AND ASSETS 1970 - 1996

Years	Loans & Advances/ Deposits Ratio	Loan & Advances/ Assets Ratio
1970	0.561	0.305
1971	0.764	0.393
1972	0.780	0.431
1973	0.744	0.425
1974	0.554	0.334
1975	0.541	0.260
1976	0.510	0.333
1977	0.587	0.360
1978	0.775	0.451
1979	0.664	0.411
1980	0.696	0.552
1981	0.806	0.442
1982	0.855	0.453
1983	0.796	0.416
1984	0.731	0.383
1985	0.692	0.381
1986	0.866	0.397
1987	0.759	0.352
1988	0.683	0.335
1989	0.818	0.343
1990	0.665	0.311
1991	0.597	0.266
1992	0.552	0.231
1993	0.520	0.248
1994	0.598	0.278
1995	0.797	0.301
1996	0.800	0.348

Sources:

1. CBN, Economic and Financial Review of Various Years (1970 - 1989).
2. CBN Statistical Bulletin 1991-1995.
3. CBN, Annual Report and Statement of Accounts, 1996.

The next set of circumstances occurred in the period between 1974 and 1977, a period when a different form of portfolio constraints were introduced. The CBN circular placed a limit on the margin by which the loans and advances to deposit ratio of one year might exceed the credit of the previous year. In addition, there was the slow down in the loans and advances given by banks to the public in 1976 for the implementation of the indigenisation programme because of their experiences in financing the first phase of the programme in 1972. Thus, despite the payment of Udoji salary increases and the rise in petroleum receipts, which led to an inordinate swelling of demand and other deposits on the one hand, and equally increased demand for credits on the other, the banks were reluctant to finance new purchases of newly issued shares in 1976 as they had done in 1972. Instead, they resorted to credit rationing through 'adverse selection'. This was because of the delays experienced in sending returned funds (since most of the issues were oversubscribed), in sending certificates of shares issued and sometimes misdirection of shares.

It is equally important to emphasise that a greater proportion of the decline in loans and advances to deposits ratio between 1970 and 1980 was accounted for by the fact that the banks were not aggressive in seeking out loan opportunities; they generally waited for the investors to come to them with investment proposals which mostly had to go through careful examination and selection.

From 1981, the ratios of loans to deposits, however, improved inspite of the world wide economic recession and the subsequent decline in the level of economic activities. However, the drop in the ratio from 85.5% in 1982 to 69.2% in 1985 was

Table 5.16

PRESCRIBED SECTORAL ALLOCATION OF COMMERCIAL AND MERCHANT BANKS LOANS 1970 - 1996 (PERCENTAGE)

Sector/Sub-sector	1970/ 71	1971/ 72	1972/73 1974/75	1975/ 76	1976/77 1977/78	1978/ 80	1979/ 80	1980/ 81	1981/ 82	1982/ 83
Production	45.0	30.0	45.0	48.0	48.0	50.0	53.0	56.0	56.0	59.0
- Agriculture	100.0	151.0	4.0	6.0	6.0	6.0	6.0	8.0	8.0	8.0
- Mining and Quarrying	32.0	30.0	4.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
- Manufacturing	48.0	25.0	30.0	30.0	30.0	36.0	36.0	36.0(3)	36.0	36.0
- Real Estate and Construction	27.0	11.0	7.0	10.0	10.0	10.0(1)	10.0(1)	10.0(1)	10.0	13.0
Services	50	11.2	11.0	10.0	10.0	10.0	11.0	12.0	12.0	12.0
- Public Utilities	120.2	100.0	3.0	2.0	2.0	2.0	2.0	3.0	3.0	3.0
- Transport and Communications	38.0	7.3	8.0	8.0	8.0	8.0	9.0	9.0	9.0	9.0
General Commerce	10.0	5.1	32.0	32.0	30.0	28.0	18.0	17.0	17.0	17.0
- Bills discounted	14.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	0.0
- Domestic Trade	9.0	0.0	10.0	10.0	12.0	12.0	11.0	11.0	11.0	11.0
- Exports	11.0	12.3	10.0	10.0	6.0	6.0	6.0	5.0	5.0	3.0
- Imports	7.0	0.0	10.0	10.0	10.0	8.0	5.0	6.0	6.0	6.0
Others (4)	0.0	-33.6	12.0	10.0	12.0	12.0	12.0	8.0	8.0	8.0
- Credit & Financial Institutions	0.0	0.0	1.0	3.0	3.0	3.0	3.0	1.0	1.0	3.0
- Governments Institutions	0.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0
- Professionals and Personnel	0.0	-50	4.0	4.0	4.0	4.0	4.0	3.0	3.0	0.0
- Miscellaneous	0.0	-22.0	3.0	1.0	3.0	3.0	3.0	2.0	2.0	4.0
Total	1000.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

TABLE 5.16 (Contd.)

Sector/Sub-sector	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	1992/93	1994/95	1995/96
Production	61.0	61.0	62.0	65.0	50.0	50.0	50.0	50.0	50.0	65	65
- Agriculture	10.0	10.0	12.0	15	15.0	15.0	15.0	15.0	15.0	18	18
- Mining and Quarrying	9.0	9.0	9.0	-	-	-	-	-	-	5	5
- Manufacturing	36.0	36.0	35	44.0	35	35.0	35.0	35.0	35.0	42	42
- Real Estate and Construction	6.0	6.0	6.0	6.0	0.0	-	-	-	-	-	-
Services	12.0	12.0	11.0	13	0.0	0.0	0.0	0.0	0.0	-	-
- Public Utilities	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-
- Transport and Communications	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-
General Commerce	19	18.0	18.0	22.0	50.0	5.0	50.0	50.0	50	-	-
- Bills discounted	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-
- Domestic Trade	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-
- Exports	3.0	2.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	10	10
- Imports	5.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-
Others (4)	5.0	6.0	9.0	0.0	0.0	0.0	0.0	0.0	0.0	25	25
- Credit & Financial Institutions	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-
- Governments Institutions	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-
- Professionals and Personnel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-
- Miscellaneous	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Notes:
(1) Subdivided into (i) residential (5%), others (5%) in 1978/79 (ii) residential (5%), others (4%) in 1979/80 (iii) residential (6%), others (4%) in 1980/81
(2) Desired percentage changes were specific for these years
(3) Agro-allied industries (3%), other manufacturing (33%)
(4) The whole economy was compressed into two in 1986; the high priority sectors which consists only of the agricultural production and manufacturing enterprises. The rest of the economy are categorised as other sector i.e. less priority sector
(5) From 1994/95, the emphasis in mining and quarrying sector shifted to solid minerals as one of the priority sectors others are agriculture, manufacturing and export).

Sources: CBN Annual Report and Statement of Accounts of Various Years (1970 - 1996).

Table 5.17

DEVIATIONS FROM PRESCRIBED TARGETS OF SECTORAL ALLOCATIONS OF COMMERCIAL AND MERCHANT BANKS' LOANS AND ADVANCES 1970-1996

Sector/Sub-sector	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Production (1)	+15	+51.1	-7.6	-6.4	-1.7	-0.9	+4.6	+6.4	+5.6	+6.3	+4.0	+3.8
- Agriculture	-41.0	-85.1	-1.5	-0.9	-1.0	-3.4	-2.2	-1.5	-0.4	+0.5	-1.2	-0.8
- Mining and Quarrying	+50.0	+113.9	-2.2	-2.5	-2.7	-0.9	-1.3	-0.8	-1.0	-1.0	-1.1	-1.1
- Manufacturing	+13.0	+29.4	+1.2	+2.7	+4.0	+4.8	+9.4	+11.5	+11.4	+13.8	+12.8	-15.1
- Real Estate and Construction	+19	+70.6	-5.1	-5.7	-2.0	-1.4	-1.3	-2.8	-4.4	-7.0	-5.2	-2.8
Services (2)	+14.0	+62.8	-3.1	-3.1	-3.2	-3.1	-0.5	-0.9	-1.5	-3.2	-3.5	-2.8
- Public Utilities	+34.0	+125.8	-2.3	-2.6	-2.1	-0.8	-1.0	-0.5	-0.4	-0.9	-1.4	-1.4
- Transport and Communications	+40.0	72.1	-0.8	-0.5	-1.1	-2.3	+0.5	-0.4	-1.1	-1.9	-2.0	-1.4
General Commerce (3)	+3.0	+34.5	+3.7	+2.3	-2.3	-4.0	-5.0	-6.8	-6.9	-0.5	+0.3	+0.1
- Bills discounted	+23.0	+66.2	-0.8	-0.4	-0.1	0.0	-0.9	-1.2	-1.0	-0.7	-0.7	-
- Domestic Trade	+31.0	+89.5	+2.6	+3.2	+1.1	0.0	-2.1	-2.3	-2.0	-1.4	-1.5	-0.8
- Exports	-37.0	+12.0	+1.0	-0.1	-1.8	-3.0	-1.5	-2.7	-4.1	-4.3	-3.5	-3.6
- Imports										+1.6	+0.4	+0.7
Others (4)	+31.0	+81.1	+7.0	+7.2	+7.2	+8.0	+0.9	+1.3	+2.8	+1.3	+3.9	+5.1
- Credit & Financial Institutions	-7.0	+66.7	+1.4	+0.7	+1.0	+0.6	-0.6	+0.1	+0.6	+0.4	+1.5	+2.3
- Governments Institutions	-36.0	+70.4	-0.6	+0.1	+0.8	+0.6	+0.6	+0.8	+1.2	+1.5	+0.2	-0.7
- Professionals and Personnel	+98.0	-121.8	+2.9	+1.3	+0.5	+2.0	+0.6	+0.6	+1.0	+0.2	+1.0	+0.5
- Miscellaneous	+25.0	-51.8	+3.3	+5.1	+4.9	+4.8	+0.3	-0.2	0.0	0.0	+1.1	+1.1

TABLE 5.17 (Contd.)

Sector/Sub-sector	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
Production (1)	-0.2	-2.9	-2.0	-12.0	-5.6	-8.0	-4.6	-4.0	-3.8	-2.6	+3.2	-6.7	-2.9	+4.3
- Agriculture	-0.8	-1.8	-1.2	-0.3	-3.2	-2.1	+0.3	+0.3	-0.9	-0.1	+1.4	-1.1	-0.1	-0.3
- Mining and Quarrying	-1.1	-8.0	+6.8	-2.3	-	-	-	-	-	-	-	-	-0.7	+1.9
- Manufacturing	+7.6	+14.5	+0.9	-	-	-	-	-	-	-2.5	+1.8	-4.2	-1.8	-1.5
- Real Estate and Construction	-5.5	-7.6	-8.5	-9.4	-2.4	-5.9	-4.9	-4.3	-4.7	N.A	N.A	N.A	N.A	N.A
Services (2)	-3.1	-3.3	-3.9	+2.6							N.A			
- Public Utilities	-0.9	-1.2	-2.0		N.A	N.A	N.A	N.A	N.A	N.A	N.A		N.A	
- Transport and Communications	-1.8	-2.1	-1.9											
General Commerce (3)	-0.9	+0.3	-2.5	-3.8										
- Bills discounted	-	-	-	-	N.A	N.A	N.A	N.A	N.A	N.A	N.A		N.A	
- Domestic Trade	-0.6	-1.0	-0.6											
- Exports	-	+1.9	-0.9	-2.9	N.A	N.A	N.A	N.A	N.A	N.A	N.A	-1.4	-1.7	+4.2
- Imports	-0.3	-0.6	-1.0	-										
Others (4)	+6.6	+9.7	+8.4	+18.4	+5.6	+8.0	+4.6	+4.0	+3.8	+2.6	-3.2	+6.7	+2.9	-4.3
- Credit & Financial Institutions	-0.7	+1.6	+1.9								N.A		N.A	
- Governments Institutions	+1.6	+1.9	-1.3	+1.9										
- Professionals and Personnel	+5.2			-1.3										
- Miscellaneous	+0.8													

Notes:
(1) Deviations of monthly average up to March 1991 from target.
(2) Deviation of monthly average up to March 1972 from target.
(3) Production and Services sectors are the preferred sectors.
(4) Categorisation of the economy was limited to two general sectors in 1986 high priority sectors and others. The high priority sectors consists of the Agricultural production and Manufacturing enterprises. Others sectors are contained in the category of less priority sectors.

Sources: CBN Annual Report and Statement of Accounts of Various Years 1970 - 1996.

occasioned by the prescribed aggregate credit ceilings which was reduced from 12.5% level in 1984 to 7.0% in 1985. In addition, uncertain political and economic environment in the country at that time left banks jilted. In 1986 there were major economic reforms though they were not directed at the banks until 1987 when the financial sector was full deregulated. However, the immediate effect of SAP on the loan performance of the banks could not be immediately ascertained as they could not easily adjust to the opportunities for more profitable ventures offered by their participation and transaction on the foreign exchange market. A detailed effect of the foreign exchange transaction on the bank profit performance has been discussed elsewhere. [see Ogiogio (1995)]. Meanwhile, it is important to note that the profit opportunities which the banks later discovered to exist in the forex market seriously affected their lending performance as can be seen in the declining ratio of loans to assets from 39.7 percent in 1986 to 24.8 percent in 1993. A little improvement was however recorded in 1994 and 1995 when the ratio increased to 27.8 and 30.1 percent respectively. It must be mentioned also that this seemingly high level performance was achieved through the concerted efforts of the government which made it mandatory that a given proportion of the banks' total assets must be in loans and advances. The recent improvement is also due to the declining profitable opportunities that existed in the forex market at the onset of the deregulation of the forex market.

Then the question that emerges from this analysis is to what extent did banks actually comply with these directives? As a matter of fact, the high ratio of loan to deposits as shown in Table 5.12 especially from 1986 to the end of 1993 is misleading.

One is mislead to believe that this reflects their performance. However, unpublished information have it that the amount reported as loans and advances were not allocated as stipulated. The practice was for these banks to set up financial houses where resources that were meant to be given out as credits are directed and reported as loans. These finance houses whose method of operation in the foreign exchange market are as bureau de change then directed the resources to the forex market for maximum profits for the banks thereby creating scarcity of loanable funds. This factor, coupled with the revision on banks' equity participation in non-bank enterprises, in 1988, the banks could not find lending activities as lucrative as before. The drastic decline that was observed from 1991 to 1993 in attributable to the incidence of distress that set into the financial sector around 1989 but only became manifest at the beginning of 1991. In this connection, an examination of the banks compliance with the government credit guidelines will as noted earlier throw more lights on their performance assessment.

The banks' allocation of credits to the production sector deviated from target throughout the 1971 - 1996 period, ten times positively and sixteen times negatively (Table 5.15). Since minimum credit allocation is set for the sector, one is tempted to consider the positive deviations as desirable. The desirability, however, very much depends on the source of the deviations. Real estate and construction has been a major contributor to these deviations. More of the advances to this sector have in fact been in respect of government construction contracts for roads, bridges etc., rather than for residential accommodation. The result of this has been limited resources available for private sector lending and consequently rationing of credit. That this is so is partially supported by the action of the Central Bank of Nigeria in its 1978/79 monetary circular. In it and in subsequent ones, the CBN has specified that advances for residential buildings (of course which is a private sector lending) should constitute, at least, half of the 10 percent for the subsector.

While the banks have rigidly adhered to the 'real bill doctrine' by their eager to finance short-term advances to construction firms with guaranteed payments by governments, they were transparently reluctant to support the agricultural sector. The banks failed to meet all prescribed targets of credit allocations to this sector except in 1980, 1989, 1990 and 1993 when positive deviations were recorded. Negative deviations were, however, as high as 41.0% and 85.1% respectively in 1970 and 1971. The seemingly small deviations throughout the remaining years can only be appreciated when related to the percentage allocations prescribed for the sectors. Monetary circulars 4-6 for 1972 - 1975 directed that a minimum of 4 percent of all the banks' loans and advances were to be allocated to agriculture. Subsequent circulars since then have asked for a higher minimum percentage ranging from 6 in 1976 to 18.0 percent in 1996. It seems an evidence of malfunction of these banks that these rather low targets were not met at least for a duration of fourteen years at a stretch. Not only that, margins of deviations were equally as wide as -3.4, -2.2, -3.2 and -2.1 in 1976, 1977, 1987 and 1988 respectively.

The performance of the banks in other subsectors of great importance to the development process of the economy has been equally uninspiring. In 1971 and 1972 for instance, the market allocated more to the manufacturing subsector by 19.0 and 70.0

percent respectively. In all other years however, the deviations have been negative with the least being 1.4 percent and highest, 9.4 in 1976 and 1986 respectively.

It is important to mention also that the failure of the banks in the preferred sectors was of course, made up in the less preferred sectors. For instance, 'other sectors' within which the government sector is a part consistently had more than its prescribed minimum credit allocation. There was however, a desirable trend of increasing under allocation of credit to the general commerce sector. From -2.3 percent in 1975, the decline gradually proceeded to reach -6.9 percent in 1980 and started the trend again in 1985 after a brief improvement in the allocation between 1981 and 1984. It has to be stressed however, that this trend was likely, at least partly, due to the continued strict control of imports and other stringent trade policies of the government rather than a deliberate action of the banks. The economically desirable activity of exporting did not, for instance enjoy the much expected financial support from the banks as the data in table 5.17 will indicate. A significant proportion of the negative deviations in credit allocations to the 'general commerce' sector has indeed, been associated to the shortfalls in credits to the 'exports' subsector. It was against the background of this trend and to underline the importance of the 'exports' subsector that the government included it in the preferred sector of the economy from the beginning of 1979 (see Credit Guideline for 1979/80 and the subsequent years).

5.5 Conclusions

It can be averred from our discussion so far especially with respect to the structural analysis of the loan market that the level of concentration in the market is high in Nigeria. Until 1982/83, market shares amongst the dominant banks were not very stable presupposing the existence of intense competition as opposed to tacit collusion. With the growing stability in market shares among the dominant banks in the 1980s, the level of concentration declined with the growing entry of new banks. A policy of deregulating the banking subsector, particularly reduction of administrative controls on entry and level of interest rates, as was made a component of the 1986 economic reform programme was therefore timely and well-reasoned. It is the only means by which level of competition can be raised and innovation brought to play in the provision of services in the market as was discussed in section 5.3 of this chapter.

However, much as the removal of controls on entry is considered desirable for rapid growth of financial intermediation at reduced costs, some fundamental issues with respect to loan performance in the Nigerian commercial loan market are apparently at variance with normal expectations.

The analysis in Table 5.17 for instance, shows that the banks have deviated undesirably from credit targets set by the country's monetary authorities in conformity with the development priorities of the government. This, it should be mentioned, is inspite of the growth in their resources and facilities. Undoubtedly, this makes the growth in aggregate and sectoral loans and advances noted in section 5.3 of this chapter much less impressive as an indication of efficient performance. To the extent that these deviations hamper rather than help planned economic activities, it will not be out of context to say that the market has been "inefficient" in its loan performance for most of the period under study.

In defence of this kind of view, it is common for banks to claim that they have been responding to the particular demand function facing them. This can be easily countered by reference to the fruitful business development activities of banks in such developed countries as Japan, Germany, America and to some extent, Britain. The examples of these countries demonstrate beyond doubt that the performance of these banks can be improved given the conducive environment and the enabling framework. The banks, by themselves, can stimulate the 'right' kind of demand for their resources and thus satisfactorily alter the 'undesirable' demand function they are faced with. Indeed as observed since the introduction of the prudential guidelines of 1990 and the promulgation of the Bank and other Financial Institutions Decree (BOFID) No. 25, the Central Bank of Nigeria (CBN) Decree No. 24 both of 1991, and the Nigeria Deposit Insurance Corporation (NDIC) Decree of 1988, there is growing evidence that progressive bank practices, as currently being pursued in the country, are antecedent to a vigorous demand for credit. The problem that, however, remains is in respect of the ability of the banks to meet the increasing demand for banks' credit.

Perhaps, it may be unfair to apportion all blames arising from credit shortfall in the commercial loan market to the banks alone. The policy environment and institutional framework within which they operate should equally bear part of the blame.

END NOTES

1. O. Teriba (1968) "Competition for Bank Deposits in Nigeria" The Banker's, May, p. 23.

2. See Bates and Bradford (1980) "An analysis of the Portfolio Behaviour of Black owned commercial Banks" Journal of Finance Vol. XXXV, No. 3, pp. 753 - 768.

3. See Ajayi S. I. (1981) "Growth in the banking industry in Nigeria" Domestic and International Banking Services, Nigerian Institute of Bankers Annual Seminar, 1980, Macmillan Nigeria. Publishers Ltd. 1981 pp. 170 - 188.

4. See Bates and bradford (1980) o.p. cit. for instance the ratio of capital to loans and advances for the commercial banks stood at 16.4 percent in 1970. By 1980, it had declined steeply to 6.1 percent a ratio that remain fairly constant through the years up to 1990. Thus, in the area of doubtful loans. Nigerian Commercial Banks are collectively undercapitalized to the level of about 44 percent.

5. Ibid.

CHAPTER SIX

EMPIRICAL ANALYSIS AND PRESENTATION OF RESULTS

6.1 Introduction

This chapter presents the results and the empirical analysis of the regression estimates carried out on the model specified in chapter four. Various estimation techniques were tried viz Two stage least squares (2SLS), Three stage least squares (3SLS), Limited instrumental variable estimates (LIVE), Full instrumental variable estimates (FIVE) and Full information maximum likelihood estimates (FIML). The analysis undertaken below are the results of the estimates obtained using the full information maximum likelihood estimate techniques (FIML). While the choice of FIML on our estimation technique was informed by its all encompassing property estimates (possess more qualitative properties of unbiasedness, consistency, efficiency and asymptotic normality), the selected estimates certainly represent a local maximum of the likelihood function. The results reported below have therefore been chosen on the basis of their minimum estimated error of the equations about the regression line. The estimates of the preferred specification of the model are contained in tables 6.1, 6.2, 6.3 and 6.4. However, the estimates obtained using other techniques and assumptions are put in annexes I and II.

In the process of estimating the model, two assumptions are imposed on the equations; these are the assumptions of equilibrium and disequilibrium credit rationing. These assumptions are necessary in view of the fact that over the period of our estimation, two separate regimes of interest rate determination can be identified. The separate regimes are regime of control and regime of deregulation. With the results obtained using these two assumptions, it has been demonstrated that, it is possible to experience both an equilibrium and disequilibrium rationing in the same market though, at different time.

Section 6.2 presents the results obtained on the assumption of equilibrium credit rationing while section 6.3 is devoted to analysing the disequilibrium ration regression estimate. Both the short-run and long-run impact multiplier of the equation using the two assumptions are also calculated and reported. A comparative analysis of equilibrium and disequilibrium parameter estimates is done in section 6.4 with a view to seeing if there is any significant differences between the estimates. Section 6.5 examines the implications of the results of the loan market disequilibrium for the speed and effectiveness of monetary policy while section 6.6 undertakes an analysis of the effect of credit rationing on investment expenditures and other financial markets.

6.2 Empirical Analysis of the Estimated Equilibrium Credit Rationing Model of Commercial Loan Market

Table 6.1 below shows the parameter estimates result of our model under the assumption of equilibrium credit rationing. The estimates are pleasing, have the expected signs and are generally significant. The t-ratios are based on the estimated Hessian of the model rather than on the moment matrix of the data and therefore vary slightly between different runs of the model. Nonetheless, they are well determined. The stability of the estimates can be tested using a likelihood ratio test as discussed in Anderson and Mizon (1984). The value of the criterion is 54.6 which is asymptotically distributed as a chi-square with 178 degrees of freedom. The degrees of freedom are n(n

+ 1)/2 where n are the numbers of parameters. We can extract two sets of residuals from the estimates; those from the supply and those from the demand equations. Since there is a mixture of regimes in effect at all times however, it is also possible to construct generalised residuals for either the supply or demand equation. There are some slight evidence of autocorrelation in the supply equation but non in the demand equation.

Turning first to the supply equation, the result is quite plausible. All the coefficients are significant at 0.01 level with the expected signs. The loan rate (rc) was initially used in absolute term but generated poor result. Differential of the loan rate and the rate on alternative assets (tbr) was then used and this appears very impressive. The implication of this is that a higher rate of return on alternative interest yielding assets depresses supply of credit to the market. The explanation for this could be that since these assets are less risky or in some cases riskless particularly when compared with commercial loans, with high default rate, the tendency is for banks to prefer them to loans. Recent events have revealed that the ratio of bad debt in Nigeria is very high, banks have therefore found it more convenient to invest in the bills and securities than to lend. Moreover, these other assets are more liquid than commercial loans to the extent that, any rise in the rate of interest attracts away more funds from the market to the bills even when the rates on loans are higher than the rate of return on these assets.

Table 6.1

PARAMETER ESTIMATES OF THE EQUILIBRIUM CREDIT RATIONING MODEL SAMPLE: 1970.2 TO 1996.2

$$\underset{}{L_t^s} = \underset{(3.715)}{3.3283\,(rc\text{-}tbr)_{t\text{-}i}} - \underset{(2.011)}{2.6493(tdr\text{-}rc)_{t\text{-}i}} + \underset{(8.921)}{0.1710TD_{t\text{-}i}}$$

$$+ \underset{(5.115)}{0.7145\,DD_{t\text{-}i}} + \underset{(1.053)}{0.5017\,IP_{t\text{-}i}} - \underset{(8.212)}{37.0299K_{t\text{-}i}}$$

$$L_t^d = \underset{(9.345)}{-30.1523(rc\text{-}rcP)_{t\text{-}i}} + \underset{(6.016)}{4.2100UP_{t\text{-}i}} - \underset{(2.048)}{24.3914CP_{t\text{-}i}}$$

$$+ \underset{(7.143)}{0.9981IP_{t\text{-}i}} + \underset{(5.532)}{77.1165D_{t\text{-}i}}$$

$$\text{Log Det } \Omega = -9.1712, \text{ Likelihood } \alpha = 164.352$$

Supply equation; $R^2 = 0.91$, Skew $= 0.4$, ek $= -0.2$, SCF $(5, 97) = 4.725$, $\sigma = 0.0697$

Demand equation; $R^2 = 0.93$, Skew $= 0.1$, ek $= 0.2$, SCF $(4, 98) = 5.625$, $\sigma = 0.0892$

Notes: Estimation by Full information maximum likelihood; t-statistics are in parentheses. Skew and ek are the coefficients of skewness and excess Kurtosis of the residuals, SCF tests for the exclusion of all variables in a regression of the residuals on their first four lagged values, σ are the equations standard errors of regression. Little change occurred in function values over the last 3 iterations, however, strong convergence was achieved in BFGS after 21 iterations and 118 functions calls.

In other words, the justification for the obvious negative influence of the rate of returns on treasury bills for instance on supply of loans relates to the preference of Nigerian banks for liquid assets portfolio instead of the less liquid but more risky and profitable loans. Thus in the circumstances, the desire to supply commercial loans in Nigeria tend to get depressed as the rate of default which rises with increases in interest rates rises.

However, the most significant price effect comes from changes in the rate differential between the cost of funds (tdr) and the loan rate (rc) i.e. changes in the profitability of commercial loans. From a change of 1 percent in this differential, one may expect a change of about 6 percent in the loans supply. The significance of this variable support the hypothesis that banks are profit maximizers and that the interest rate differentials are more meaningful to banks than the absolute rate on loans. However, it may be necessary to bear it in mind that this variable might pick up part of a substitution effect due to short run alternatives in so far as the cost of funds and the rate on short run alternatives are correlated. It is also important to be cautions in the interpretation of this result as it was not possible to introduce in a significant way a complete price structure due to the prevailing direct control of interest rate by the government over most of our estimation.

Looking at the result also provide an interesting picture particularly because a point which is often overlooked (especially by previous studies) is statistically supported by the estimate of the supply equation. That is, non-interest credit terms influence loan supply. For example, the coefficient of secondary reserve ratio (K_t) has the right negative sign and very significant confirming that this is an effective instrument in controlling supply of loans and hence a veritable tool for rationing credits. The negative sign is to show that a rise in K_t is a constraint and thus reduces the ability and desire of banks to grant loans requests. This variable is usually a policy variable of the monetary authority which requires that banks keep a given proportion of their eligible assets as reserves. As this ratio (proportion) rises, the ability of the banks to grant more loan requests is reduced.

Our result also shows that, as expected, the scale variable for economic activities (IP_{t-i}) appears rightly signed except that it was not as significant as it should have been expected.

The positive but non-encouraging performance of the index for economic activities in the supply of loans equations is not in doubt. As noted in chapter two, banks are the most controlled of all businesses the world over. Nigeria is no exception in this case. Over the years, the usual practice has been for the monetary authority to specify at the beginning of each fiscal year, the credit ceiling. The banks are, of course, bound to comply, however, the issue of non-compliance has been addressed in chapter 5. In this circumstance, the volume of loans supplied to the market is dictated by the government directives rather than the economic exigencies or what the banks perceived to be the level of economic activities. One may not, however, be able to rule out the influence of economic exigencies on the government directives. This possibility, probably, may have been accounted for the positive but not too good impact of (IP_{t-i}) as reported above. In whichever way one may view it, this result tend to confirm the fact, that after all, the possibility of economic exigencies cannot be ruled out of government direct monetary controls. That is, the hypothesis that the monetary authority's credit ceilings are made without reference to the current as well as the expected state of the economic activities can not be total rejected. The inclusion of two other scale variables, TD_{t-i} and DD_{t-i} which together constituted the level of available loanable fund have great impact on the supply of loans. The plausibility of this is straight forward. First, the more of loanable funds available or the banks are able to mobilise, the more the banks will be disposed to grant loan requests. Infact, the relationship between loans granted and ability to mobilise loanable funds has earlier been established. There is a feed back between the volume of loans granted and ability of banks to mobilise loanable funds. The more loans granted, the more loanable funds banks are able to mobilise and the more loanable funds banks are able to mobilise, the more loans requests banks will be able to grant. This relationship is termed "loan-customer relationship.

Interestingly, number of bank offices as alternative surrogate for the market size (supply side), when also included in the equation appear significantly positive. This means that more loans requests can be granted if more bank offices are opened. The justification given for increased flow of loanable funds on the basis of increased bank offices is equally useful here. As banking facilities are brought to underbank and unbanked areas, the tendency is for the demand for the services of the banks to increase and for these banks to justify their extence, the demand for their services will have to be matched at least partially by their supply of loan.

The lagged dependent variable (LS_{t-i}) when included in the supply of commercial loans equation appeared significantly positive too. This is an indication of the extent to which banks try to keep their customers. That is, the larger the volume of loan requests granted, the greater the tendency for borrowers to ask for more. And where this happens, the more of the request the bank will grant so as to keep their prime customers. This same variable (LS^{t-i}) also measures the loan market trend over time. The positive and significant impact of this variable is an indication of the fact that the market has been growing. This provide enough justification for the rejection of the hypothesis of no differences in the supply of loans overtime.

Finally, a variant of the cost per deposit included as an alternative cost of funds in the regression equation generate similar results in terms of sign. First, following Melitz and Pardue (1973) the cost per naira deposit (CD) was negative and significant. This confirms the fact that banks in Nigeria are risk shy. The higher this cost, the lower the return to total banks' activity. This is contrary to Melitz and Pardue (1973) views that "but as this cost rises if only the structure of bank deposits is unaltered, the same is the risk implicit in the total balance sheet position of the banks. As a result, based on the usual postulate of preference for variety, banks will be willing to bear more risk for extra expected returns. Since expected returns and risks on assets will still be the same, this means that the banks will wish to substitute high-yielding, high risk assets for others or to switch out of securities and excess legal reserves and into loans". For instance, looking at the component and asset structure of Nigeria's commercial banks over the year shows no perceptible changes in the structure nor was there any significant change in the composition of the asset portfolio. The fact that there have always been excess liquid asset over the legal requirement is a testimony to the fact that commercial banks in Nigeria are risk shy. The same is true of the merchant banks. Thus the hypothesis of risk shy as implied in chapter five is here again confirmed.

Based on the foregoing, it can be inferred that;

> high rates of interest on lending do not necessarily lead to correspondingly high supply of loans. Rather, the safety of the funds kept with the banks appears more paramount in this case. It has been found earlier that rate of default increases with interest rate. Thus, a rise in the loan rate of interest may not necessarily attract more supply, the reverse may,possibly hold where banks are very conscious of this. This evidently leads to credit rationing. For banks to respond to high interest yield on loans, the differential between lending rate and deposit rate becomes more meaningful. This is justified by the fact that the service charge always imposed on demand deposit is not large enough to compensate for the cost of administering the deposit. Banks therefore look for higher profit margin as measured by the difference between the prime rate and the rate paid on time deposits. Thus, any interest rate policy which specifies the spread between the lending and deposit rates will not appear to be helpful as this will still imply an element of financial repression which for long has retarded financial intermediation.

Given the negative influence of the cost per deposit on the Supply of commercial loans and the fact that deposits form the basis for the creation of loans portfolio, it then implies that banks in Nigeria prefer riskless assets to more risky assets such as loans. That is, banks are risk shy where this holds, rationing of credits becomes the order of the day.

Also, the positive and significant influence demonstrated by the coefficient of TD_{t-i}, DD_{t-i} as well as SL_{t-i} is an indication that bank-customer relationship is strong in the Nigeria's commercial loan market. This probably is an indication to the possibility of preferential treatment in the loan market. The existence of preferential treatment is a signal for rationing of credit as may be confirmed in the demand for loan analysis. For a long time in the country, there have been ceilings on both the loan and deposits rates. There have also been no competitive banking system in the real sense. Although, one can not rule out the possibility of the banks evading the loan rate ceiling through imposition of compensating balances, they seem to be generally observed particularly for all public sector borrowing. To the extent that banks do observe the loan rate ceiling, non-price credit rationing must occur. Credit is allocated not according to expected productivity of the investment projects, but according to transaction costs and perceived risks of default. Quality of collateral, political pressures, "name", loan size and covert benefits to loan officers have been the major factors that influence allocation of loans in Nigeria's commercial loan market. Loan rate ceilings discourage risk taking on the part of the banks, since premium can not be charged when ceilings are binding and effective. This itself ration out a large proportion of potentially high yielding investments.There is therefore the tendencies for the investments that are financed to yield returns barely above the ceiling interest rates.

Monetary authority policy variable proxied by secondary reserves or the ratio of liquid asset in the total asset portfolio (K_{t-i}) generates the desired negative impact on the supply of commercial loans. The impressive regularity of the significance of this variable in all the equations estimated tends to suggest that monetary policy or rather that tools of monetary policy in Nigeria if well applied could generate the desired results.

Finally, the commercial loan market is not particularly disposed towards lending activities. Although this is supposed to be their main preoccupation, their dare desperation for liquidity and or profit maximization has almost made them forget this role. The negative and very significant impact of the treasury bill and foreign exchange rates is a test acid to this fact. The rates differential between foreign exchange and loans has for instance caused more than proportional funds to be diverted to the foreign exchange market at the expense of loans. This has been very pronounced since the deregulation of the foreign exchange market in July 1986.

Turning to the demand equation, the result also appear very impressive with all the coefficients rightly signed. The numerical results show the inelasticity of the demand for loans to interest rates. This insignificance of the interest rate variable though runs contrary to theory, it is nevertheless anticipated in view of the peculiar nature of the Nigeria's commercial loan market environment. This is justified on two grounds. First, over a long period, interest rates in Nigeria remained relatively fixed in nominal term while the rate of inflation accelerated. In view of the static nature of the nominal rate of interest and the declining trend in the real term, the response of demand for commercial loans to the cost of credit could not but be expected to be less significant. Second, it has been noted in certain quarters that rates of returns on investment in Nigeria are high and cannot be compared with the static interest rates. To this end, even when the rate of interest rises, as long as it lags behind the rate of returns on investment, the increase in the rate of interest will not matter much.

Of course, equally worthy of mention is the fact that it was a deliberate government policy to encourage demand for loan by fixing and keeping interest rate below the market equilibrium level. This has generated excess demand for loans in most cases to the extent that even when the rates are raised it is hardly noticed and could only have little effect on the demand for loans.

However, there is a high elasticity with respect to interest rate differentials expressing alternatives, i.e. the elasticity of financing with respect to variations in the price structure. An increase of one percent in the relative price of commercial loans therefore leads to an average of 7 percent in the demand. Expectations of lenders and borrowers in this sense seem to be very close with some slightly slower and stronger revision process for borrower. The close similarly of the expectations of these agents demonstrated is expected since they have very close contacts and roughly the same general information.

The result reported in table 6.1 also shows as expected a positively signed scale variable proxied by the index of industrial production IP_{t-i}. This is consistent with expectations in that an increase in IP_{t-i} all things being equal, should be accompanied by an increase in the demand for loans. The justification for this reasoning is the fact that the IP_{t-i} which replaces the gross domestic product (GDP) because of its poor performance is viewed as index of the general level of the national production possibility curve and not of any particular points on the curve. If the index is viewed as defined, above, it should be expected therefore, that there, will be need for more funds in order to attain a higher level of production possibility curve, such that as the curve is pushed outward i.e. as a higher level of production is attained, the demand for commercial loans should also increase. Since this variable did not only come out positively signed but also very significant, it therefore must have testified to the fact that more commercial loans will be required as the production possibility frontier is pushed outward in order to attain a desired higher level.

Two significant other factors which also come out with the right signs and significant in the demand equation are the variable proxing the undistributed profit of borrowers which of course is positively signed. The second variable is negatively signed and it enters the equation as an alternative source of fund to commercial loans.

During the period under review, the ratio of loan demand to undistributed profit moved from 4 to 3 and this is perfectly reflected in the coefficients of UP_{t-i} and Time. The importance of the criterion of profitability and its stability in the granting of loans by banks and probably also, the importance of profits to encourage firms to invest thereby raising the desire for more loans is clearly shown by the positively signed and high significance of UP_{t-i}.

During the long period (January 1970 to July 1987), the loan rate stayed relatively stable at its lowest level. The dummy variable introduced for this period in the demand equation is not significant. This might not be unconnected to the short period of interest rate deregulation (August 1987 to June 1996) suggesting that the other dimensions of credit did not remain stable.

At this juncture, it is proper to briefly discuss the relative elasticities of the endogenous variables to changes in the exogenous variables. All the coefficients are elasticities since the variables are in logarithm. However, the elasticities measure only direct effects of changes in exogenous variables. Indirect effects are therefore ignored. To find the total effect (i.e. direct and indirect) of a change in an exogenous variable on an endogenous variable we consider both the short run and the long run impact multipliers. Table 6.2A shows the absolute short run multiplier coefficient, while table 6.2B presents the long run multiplier estimates.

An examination of the estimates shows that the long run elasticity-multiplier of both the demand and supply functions are larger than the short run co-efficients reported in table 6.2A. Thus there is greater responsiveness of endogenous variables to changes in the exogenous variables in the long run. However, both periods show the relative dominance of the impact of (rc-tbr). In other words, the rate differential between commercial loan and an alternative short-term investment have the highest total impact on the endogenous variables.

One interesting feature of the multiplier is the seemingly equal coefficient of the impact of the individual exogenous variables on both the demand and supply variables. In other words, each of the explanatory variable exert the same impact on the endogenous variables. That is, there is hardly any difference in the impact of individual exogenous variables on either of the endogenous variables. It should, however, be noted that since the rate differential between the loan and an alternative short term investment exert the greatest total influence on the endogenous variables, measures aimed at strengthening the control of the differential by the government should be pursued. This is necessary for effective monetary policy.

The inflation variable though positively signed, was not significant. The importance of this may be well noted when the demand equation is specified with all the variables strictly stated in nominal term. However, it will be expected that it will be cheaper to borrow in an economy with rising inflation rate and fixed interest rate.

The seasonal variable is positively signed. The variable is however, not significant. The non significance of the variable may be due to the fact that borrowers found no differences among seasons. In addition, since what is being considered here is commercial loans rather than loans meant for some specific sectors like agriculture the issue of season becomes less relevant. The trend variable however, was both significant and positively signed. This is very much expected as it implies an increase in the demand for commercial loan overtime and an affirmation of the analysis in chapter five.

TABLE 6.2A

SHORT-RUN IMPACT MULTIPLIER OF THE EQUILIBRIUM MODEL PARAMETER ESTIMATES

	(rc-rcP$_{t-i}$)	(rc-tbr$_{t-i}$)	(tdr-rc$_{t-i}$)	TD_{t-i}	DD_{t-i}	IP_{t-i}	K_{t-i}	UP_{t-i}	CP_{t-i}	D_{t-i}
L^s_{t-i}	0.209	0.496	0.434	0.0015	0.059	0.018	0.028	0.0059	0.073	0.073
L^d_t	0.207	0.493	0.431	0.0015	0.059	0.018	0.028	0.0059	0.073	0.073

TABLE 6.2B

LONG-RUN IMPACT MULTIPLIER OF THE EQUILIBRIUM MODEL PARAMETER ESTIMATES

	(rc-rcP)$_t$	(rc-tbr)$_t$	(tdr-rc)$_t$	TD_t	DD_t	IP_t	K_t	UP_t	CP_t	D_t
L^s_{t-i}	0.961	1.231	0.243	0.025	0.075	0.062	0.013	0.035	0.020	0.096
L^d_t	0.956	1.224	0.241	0.025	0.074	0.062	0.013	0.034	0.020	0.095

6.3 Empirical Analysis of the Estimated Disequilibrium Credit Rationing Model of Commercial Loan Market

Table 6.3 presents the estimates obtained from the assumption of disequilibrium rationing imposed on our model. The table contains the preferred estimates for the desired supply of and demand for commercial loan function.

Over all, the coefficients have the expected signs and are statistically significant. The estimates proved to be reasonably robust even to the inclusion of additional explanatory variables.

In view of the innovations in the market in recent years, the apparent stability of the estimates is interesting. The relatively static nature of the specification is not rejected by the battery of mis-specification tests. The specification may not contain many dynamics in the form of lags on included variables, it does reflect dynamic behaviour through the role of the interest rate adjustment specification included in the model. It is perhaps worth stressing the simplicity of the specification. An extensive specification search over lag structure was not necessary. This may be because the model allows for rationing.

A whole range of other variables were included in the specification but found to be insignificant. These include many of the variables that were found to be significant in the equilibrium model. Variables such as bank offices, and inflation were not found to be useful. However, the inclusion of IP_{t-i} which does not appear to be very significant in the equilibrium model seems to be statistically significant in the disequilibrium model. This sort of variables that are significant suggest why this might be so; while some of the above variables clearly do have an effect on desired lending and borrowing, the influence seems to be indirect operating through their effect.

Table 6.3

PARAMETER ESTIMATES OF THE DISEQUILIBRIUM CREDIT RATIONING MODEL SAMPLE: 1970.2 TO 1996.2

L_t^s	=		4.3046 $(rc\text{-}tbr)_{t\text{-}i}$	-	1.9744$(tdr\text{-}rc)_{t\text{-}i}$	+	0.1967$TD_{t\text{-}i}$	
			(5.8119)		(1.276)		(8.212)	
		+	0.8134 $DD_{t\text{-}i}$	+	0.4419 $IP_{t\text{-}i}$	-	37.7098$K_{t\text{-}i}$	
			(4.533)		(8.527)		(11.8244)	
L_t^d	=		-22.8061$(rc\text{-}rcP)_{t\text{-}i}$	+	3.9146$UP_{t\text{-}i}$	-	32.4027$CP_{t\text{-}i}$	
			(10.6938)		(4.582)		(4.3306)	
		+	1.1705$IP_{t\text{-}i}$	+	73.3237$D_{t\text{-}i}$	+	0.00640λ	
			(13.0983)		(7.3014)		(3.0210)	

Log Det Ω = -11.1011, Likelihood α = 187.383

Supply equation; $R^2 = 0.97$, Skew = 0.4, ek = -0.2, SCF (5, 97) = 6.823, $\sigma = 0.0072$

Demand equation; $R^2 = 0.96$, Skew = 0.1, ek = 0.2, SCF (5, 97) = 6.220, $\sigma = 0.0065$

Notes: Estimation by Full information maximum likelihood; t-statistics are in parentheses. Skew and ek are the coefficients of skewness and excess Kurtosis of the residuals, SCF tests for the exclusion of all variables in a regression of the residuals on their first four lagged values, σ are the equations standard errors of regression. Little change occurred in function values over the last 7 iterations, however, strong convergence was achieved in BFGS after 42 iterations and 220 functions calls.

The parameter of most interest in this technique is the market adjustment parameter λ. As noted in chapter four, in the case of continuous time, the limiting values of λ are zero and infinity; zero indicates no price adjustment in response to excess demand and infinity indicates instantaneous adjustment. As shown in Table 6.3, the parameter λ has an estimated value of 0.0064. The estimated standard error for the adjustment parameter implies a confidence interval which reflects much of the extreme value of zero. Thus the results indicate some but little less than complete price rigidity during each quarter especially since the beginning of the deregulation of the financial sector in August 1987.

Since the loan market experiences only partial price adjustment, dynamic rationing as discussed by Jaffee (1974) and Tucker (1970) would seem to be a reasonable vehicle through which loans are rationed in the presence of excess demand and supply. Therefore, the disequilibrium estimates strongly suggest the existence of dynamic rationing in the loan market in Nigeria.

Unlike previous studies, the techniques of disequilibrium model used here allow determination of the degree to which the loan rate responds to excess demand in the loan market. (Though the results obtained in this case may not be whole heatedly relied upon as we are aware that interest rates were administratively determined and remained relatively stable for the major part of the period covered in this study). The magnitude of the market adjustment parameter indicates that an excess demand of approximately ₦3,906 million is required to cause a change in the loan rate of 25 percents. Thus the loan rate responds only slowly to excess demand particularly since the deregulation of the financial sector in 1987.

Therefore, during certain periods, dynamic rationing could have been responsible for a large part of the adjustment in the loan market. It is also interesting to note that the degree of disequilibrium in the Nigeria's commercial loan market found here is considerably greater than that found by Laffont and Garcia (1977) for the business loan market in Canada and the one found by Sealy (1979) for the US loan market.

The estimates of excess demand in the commercial loan market are shown in Table 6.5. Following the suggestion by Maddala and Nelson (1974) an estimate of the probability that loan demand is greater than loan supply or vice versa during each time period was obtained. The estimates of these probabilities are shown in Table 6.4. These estimates indicate the probability that the quantity observed in the market belongs to the supply equation. Of the 104 quarters in the sample, 64 quarters are associated with excess demand while only 40 indicate excess supply. Again, this result is quite different from that found by Laffont and Garcia who conclude that business loans in Canada are essentially demand determined. In contrast, the result presented here shows that, in Nigeria, commercial loans are essentially supply determined with intermittent periods of demand determination.

The pattern of excess demand indicated by the disequilibrium estimates seem reasonable when compared to financial developments over the sample period. For example, consider the three expansionary periods of 1970-1971, 1973-1975 and 1977. During these periods, the estimates indicate that excess demand existed in the loan market. In addition, for the contractionary periods of 1978-1979 and mid 1980-1981, excess supply existed. In more recent years, during the expansionary periods of 1989-1990 and 1991-1995, the probabilities indicate excess demand and thus credit rationing. Moreover, during the recessions of 1984-1985, 1987-1988, the model suggests that the loan market was characterised by excess supply.

A comparison of the credit rationing estimates presented here with studies conducted elsewhere, particularly, the proxy and survey measures of Jaffee (1971) and Harris (1974) shows great similarities. For example, the earlier studies found a close association between excess demand and tight money periods.

Table 6.4: **Estimates of the Probability that (Dt > St) (1970-1996)[1]**

Quarters	(Dt > St)	Quarters	(Dt > St)	Quarters	(Dt > St)
1970		1980 I	0.51	1989 I	0.35
		II	0.51	II	0.51
III	0.56	III	0.48	III	0.78
IV	0.66	IV	0.43	IV	0.65
1971 I	0.77	1981 I	0.43	1990 I	0.98
II	0.66	II	0.49	II	0.98
III	0.52	III	0.32	III	0.98
IV	0.32	IV	0.35	IV	0.98
1972 I	0.30	1982 I	0.41	1991 I	0.37
II	0.37	II	0.61	II	0.25
III	0.41	III	0.64	III	0.48
IV	0.49	IV	0.42	IV	0.53
1973 I	0.63	1983 I	0.73	1992 I	0.57
II	0.70	II	0.75	II	0.55
III	0.66	III	0.80	III	0.79
IV	0.61	IV	0.81	IV	0.85
1974 I	0.67	1984 I	0.79	1993 I	0.81
II	0.64	II	0.83	II	0.68
III	0.63	III	0.49	III	0.66
IV	0.67	IV	0.31	IV	0.32
1975 I	0.69	1985 I	0.49	1994 I	0.51
II	0.77	II	0.36	II	0.63
III	0.54	III	0.47	III	0.63
IV	0.21	IV	0.92	IV	0.55
1976 I	0.19	1986 I	0.84	1995 I	0.52
II	0.46	II	0.57	II	0.54
III	0.68	III	0.59	III	0.57
IV	0.66	IV	0.88	IV	0.54
1977 I	0.79	1987 I	0.72	1996 I	0.32
II	0.77	II	0.61	II	0.28
III	0.61	III	0.32		
IV	0.52	IV	0.41		
1978 I	0.51	1988 I	0.34		
II	0.32	II	0.43		
III	0.45	III	0.20		
IV	0.37	IV	0.16		
1979 I	0.34				
II	0.45				
III	0.48				
IV	0.56				

Source: Estimates of the full information maximum likelihood (FIML) of the model.

Table 6.5: Estimates of Excess Demand in the Loan Market (₦ million) (1970-1996)[2]

Quarters	(D t-St)	Quarters	(D t-St)	Quarters	(D t-St)
1970		1980 I	0.445	1989 I	-7.523
		II	0.298	II	9.284
III	1.501	III	-0.628	III	17.005
IV	4.128	IV	-1.245	IV	18.454
1971 I	3.452	1981 I	-1.842	1990 I	16.325
II	4.182	II	-0.523	II	14.288
III	0.543	III	-0.441	III	11.340
IV	-2.751	IV	-1.240	IV	11.000
1972 I	-3.297	1982 I	-2.882	1991 I	-3.445
II	-3.469	II	2.846	II	-5.546
III	-2.251	III	3.731	III	-3.115
IV	-0.117	IV	-3.139	IV	6.233
1973 I	3.367	1983 I	4.148	1992 I	13.456
II	5.270	II	4.891	II	10.798
III	4.061	III	4.455	III	17.776
IV	2.887	IV	4.906	IV	22.846
1974 I	4.437	1984 I	2.092	1993 I	21.231
II	3.526	II	4.603	II	16.386
III	3.436	III	-2.173	III	8.354
IV	4.340	IV	-0.229	IV	-9.455
1975 I	5.110	1985 I	-0.623	1994 I	11.453
II	2.510	II	-2.396	II	16.881
III	1.991	III	-5.489	III	17.045
IV	-2.311	IV	5.267	IV	14.115
1976 I	-2.799	1986 I	4.164	1995 I	18.521
II	-1.921	II	1.785	II	20.225
III	2.831	III	2.270	III	21.081
IV	2.111	IV	6.849	IV	19.132
1977 I	2.008	1987 I	5.998	1996 I	-4.485
II	3.624	II	2.854	II	-9.844
III	2.750	III	-4.748		
IV	0.545	IV	-2.226		
1978 I	0.146	1988 I	-4.181		
II	-2.210	II	-1.760		
III	-1.259	III	-8.502		
IV	-3.237	IV	-6.299		
1979 I	-4.042				
II	-1.345				
III	-0.540				
IV	4.387				

Source: Author's calculations from the estimations of the model using full information maximum likelihood (FIML) technique, negative figure indicate the amount of supply in excess of demand while positive figures are the amount of demand in excess of supply.

6.4 A Comparison of the Equilibrium and Disequilibrium Parameter Estimates

As the estimates in Tables 6.1 and 6.3 show, the parameters for both model assumptions have the expected signs and in addition, the magnitude of their coefficients are reasonable in each case. A comparison of the estimates, however, indicates important differences between the two assumptions. First, contrary to what was obtained using other techniques of estimation, there are substantial differences in the interest rate parameters. The estimated interest rate parameters for the supply equation in the disequilibrium model is approximately 29% greater than the same parameter for the equilibrium model. In addition, the interest rate coefficient for the demand equation is approximately 24% smaller for the disequilibrium model. Thus, the disequilibrium model indicates greater responsiveness to interest rate differentials on the supply side and less responsiveness on the demand side than does the equilibrium model.

The fact that the estimates of the interest rate coefficients differ considerably between the two models is understandable. If prices are assumed to adjust sufficiently to equilibrate the market and in fact do not, as the estimate of the market adjustment parameter indicates, then serious biases in the interest rate coefficient could easily result. This apparently is the case with the model of the commercial loan market (in Nigeria). Second, there are also considerable differences among many of the remaining parameter estimates. Again, these differences can easily be accounted for by the strong disequilibrium character of the loan market.

In addition, Tables 6.6A and 6.6B present the short run and long run impact multipliers of the exogenous variables on the endogenous variables. As in the equilibrium case, the impacts in the long run are far greater than in the short run. However, a distinguishing feature of the estimates is the fact that the exogenous variables each have different impact on the endogenous variable while the dominance of the policy dummy variable is exceptionally higher. Although, the impact of (rc-tbr) is still higher than any other variables except D_t, the impact is far less than usual on the demand variable in the long run. This may perhaps be the result of the market adjustment parameter imposed on the model. The need for this adjustment as reasoned earlier is to capture the response of agent to excess demand on the assumption of market disequilibrium.

It is noteworthy that, generally, the impacts of the disequilibrium model are in all cases far greater than the equilibrium model both in the short and long run.

TABLE 6.6A

SHORT-RUN IMPACT MULTIPLIER OF THE DISEQUILIBRIUM MODEL PARAMETER ESTIMATES

	$(rc\text{-}rcP_{t-i})$	$(rc\text{-}tbr_{t-i})$	$(tdr\text{-}rc_{t-i})$	TD_{t-i}	DD_{t-i}	IP_{t-i}	K_{t-i}	UP_{t-i}	CP_{t-i}	D_{t-i}	λ
L^s_{t-i}	1.138	2.703	2.366	0.0083	0.323	0.101	0.155	0.032	0.99	19.318	0.096
L^d_t	0.237	2.209	2.663	0.262	0.142	0.041	0.678	0.191	0.297	8.589	0.095

TABLE 6.6B

LONG-RUN IMPACT MULTIPLIER OF THE DISEQUILIBRIUM MODEL PARAMETER ESTIMATES

	$(rc\text{-}rcP)_t$	$(rc\text{-}tbr)_t$	$(tdr\text{-}rc)_t$	TD_t	DD_t	IP_t	K_t	UP_t	CP_t	D_t	λ
L^s_{t-i}	5.241	6.711	1.323	0.136	0.407	0.339	0.072	0.189	0.110	13.413	0.522
L^d_t	1.749	0.374	0.954	0.050	0.079	0.064	0.511	0.298	0.131	9.597	0.730

6.5 Implications of the results of the Loan Market Disequilibrium for the Speed and Effectiveness of Monetary Policy

The most comprehensive discussions of the influence of credit rationing on the effectiveness of monetary policy was provided by tucker (1968). He concludes, ...interest rate adjustment lag may speed up the response of an economic system to monetary contraction providing (a) rationing of credit accompanies the lag in interest rate adjustment, and (b) this rationing of credit has a sufficiently strong effect on investment demand. Tucker bases his discussion on the disequilibrium effects of dynamic rationing.

However, given the results presented above, dynamic rationing has important implications for the speed and effectiveness of monetary policy. First, the disequilibrium estimates indicate that interest rate adjustments do indeed lag behind the magnitude which is required to achieve full price adjustment in the loan market. The studies by Harris (1968) indicate that changes in the nonprice terms of credit accompany price adjustments in the loan market and thus dynamic rationing should accompany the disequilibrium in the commercial loan market. Second, disequilibrium in the loan market appears to have a rather strong effect on business investment since excess demand for business loans is present and quite large during certain time periods. The estimates, therefore, indicate that credit rationing should substantially increase the speed and effectiveness of monetary policy during contractionary periods.

The estimates from the model also provide evidence of the effects of loan market disequilibrium during periods of monetary expansion. The estimates show that the effects of dynamic rationing on the effectiveness and speed of monetary policy are not symmetric with respect to monetary expansion and contraction. As discussed above, credit shortages resulting from incomplete interest rate adjustments should reduce business expenditures. However, during periods of monetary expansion, credit surpluses are not directly and immediately translated into a stimulating effect on demand. This can easily be seen by the fact that there are periods where considerable surpluses of credit exists in the commercial loan market. The implication is that the economy, when faced with loan market disequilibrium, responds more rapidly to monetary contraction than to monetary expansion.

Finally, our estimates support the conclusion of Tucker (1968) that writers, e.g., Kareken and Solow (1963), dealing with the lags in monetary policy, who have not included the effects of dynamic rationing may have seriously misspecified their models. This conclusion is equally applicable to Harris (1970) who concludes that "...credit rationing probably will not shorten the lag between changes in monetary policy and changes in economic activity. It would shorten the lag if nonprice terms were altered more quickly than interest rates in response to monetary policy". Harris goes on to argue, based on his survey work, that all terms of credit, price and nonprice, change together. Even though Harris provides convincing evidence that all terms of credit move synchronously, he bases the above conclusion solely on this fact. He provides no quantitative evidence at all of the effects of price versus nonprice adjustment on the loan market itself. The quantitative estimates presented here suggest, contrary to Harris' conclusion, that even though all terms of credit move synchronously, the nonprice effects can be of an important magnitude and should speed the effects of contractionary monetary policy.

6.6 Effect of Credit Rationing on Investment Expenditures and other Financial Markets

The implicit assumption in almost all earlier discussions of the availability doctrine and credit rationing was that a limited availability or rationing of loan funds would be directly transmitted to the real sectors of the economy in the form of reduced expenditures by business firms. The most complete and consistent model of such a transmission process is provided by Tucker (1968). Credit rationing develops in the loan market of Tucker's model as the result of lags in the adjustment of the commercial loan rate to the desired level. The transmission process is then viewed as very direct. A firm desiring to increase its fixed or working capital stock approaches a bank for a loan. Finding the loan is not available, the firm has no choice but to reduce its expenditures to a level that is consistent with the funds that it does have on hand.

Tucker also introduces further assumptions which allow for what he terms a credit contraction multiplier. The principal assumption is that the response of investment to credit rationing is faster and greater than the response of investment to the corresponding interest rate change that would occur in the long run. Alternatively, it can be assumed that the response of investment to credit rationing occurs at the same speed as the response to the interest rate change, but then a lag in production decisions must also be introduced. The central notion of Tucker's argument for a credit multiplier is that credit rationing will immediately reduce the sales of investment goods, but that production may be reduced with only a lag. This will create an increase in the inventory stock of investment goods. If firms producing investment goods must then use their available funds to finance this unexpected inventory accumulation, the result may be additional cancellations of investment expenditures. The impact of the multiple contraction of expenditures occurs primarily, however, in the short run. Over a longer period the unintended inventory could be sold, thus creating a cash flow to finance the desired fixed capital investment. Even so, the credit contraction multiplier does offer a plausible explanation for the destabilizing credit squeezes that have been observed.

The critical premise underlying Tucker's mechanism for a direct effect of rationing on investment expenditures is the assumed absence of alternative means for the rationed firm to finance its desired investment. Otherwise, if rationed firms were allowed access to funds in other financial markets, then it would appear that the impact of commercial loan market rationing would be reduced, if not completely avoided. Tucker recognizes, of course, that alternative means of finance may exist, but he leaves the empirical verification of this offset to credit rationing as an open question.

For the present purposes, however, it is important to try to draw more definitive conclusions concerning the likely degree of the offset to credit rationing that is due to the availability of funds in other markets. Two principal modes of such financing can be distinguished: funds available in the capital markets and trade credit. The capital markets are defined here to include the markets for short term debt (other than commercial loans), long term debt, and equity issues. Trade credit is the direct financing of sales by business firms. Trade credit, unlike capital market financing, is offered only in conjunction with a purchase from the lending firm, and can thus be viewed as essentially a redistribution of funds within the business sector. In the discussions below, the degree of the offset to credit rationing that might be attributed to the availability of funds from these two sources is considered.

The first issue that must be considered is the availability of capital market funds for the firms rationed in the commercial loan market. It is certainly going to occur that firms rationed by commercial banks will also be rationed in their attempts to obtain capital market financing. The inability of a firm to obtain bank credit, for example, might itself strongly prejudice the chances of the firm obtaining capital market funds. Furthermore, even when funds from the capital markets are available, the terms may not be acceptable to the borrowing firm. A particularly clear case occurs when the only available funds are in the form of an equity interest, and the borrowing firm views the dilution of ownership as too high a cost. Regardless of the form of the capital market rationing, however, it is clear that when it does occur, commercial loan credit rationing will continue to have an important and direct effect on business investment.

It is not difficult, on the other hand, to develop cases in which capital market funds will be available although the firm has been rationed by commercial banks. First, firms that cannot obtain funds on a loan basis may still attract and accept funds on an equity basis. It is clear, in fact, that in many cases, an "adequate" equity base may be a necessary condition for obtaining a bank loan. The equity markets thus serve the function of providing the risk capital, in return for which the lender receives a higher expected return. Second, the rationing of firms by commercial banks will generally take the form of a limit on the size of the loan made available, rather than a complete rejection of the loan request. The firm would thus enter the capital markets in need of only supplemental financing, with the remainder of the financing already provided or guaranteed by the bank. In this case, the likelihood of rationing in the capital markets is less certain.

Even when funds are available in the capital markets, however, there remains the question of whether the entry of the rationed customers into these markets might not still have an effect on aggregate investment expenditures. One possible channel for such an effect would occur if the level of interest rates in the capital markets increases because of the entry of the bank rationed firms. It is clear, for example, that firms rationed at commercial banks are likely to be required to pay higher than average interest rates for capital market funds. Any reduction in investment that is due to the higher interest rates paid by these firms should not, however be attributed to credit rationing. To the extent that such firms are not willing to pay the higher rates, it is the cost rather than the availability of the funds that is at issue.

A more significant effect occurs when the entire level of interest rates is higher because of the entry into the capital markets of the additional demand of the firms rationed by the banks. In this case, even firms not rationed by banks will find their interest costs higher. This suggests that credit rationing, even if it does not affect firms directly, could still have an indirect influence through higher interest rates in the capital markets.

It is to be stressed, however, that this interest rate effect is likely to be damped, if not eliminated, by substitution on both the demand and supply sides of the capital markets. On the demand side, nonrationed firms may react to the higher interest costs by transferring more of their financing to the commercial loan market. The empirical results reported above on loan demand, for example, indicated significant substitution between commercial loans and commercial paper. Furthermore, it can be noted that the additional loan demand of these firms may be accepted by commercial banks, even though the banks are rationing smaller and riskier customers. The net effect of the higher interest rates in the capital markets can thus be simply a redistribution of funds in which small and risky firms use the open capital markets while larger firm substitute commercial loans for the more costly capital market funds.

The interest rate effect will also be damped by an increase in the supply of funds by the commercial banks to the capital markets. That is, the banks may invest the funds, made available by commercial loan rationing, in open market securities such as government development stocks and treasury certificates. Although these funds would not be directly available to corporate borrowers, the current trend in the Nigeria's capital market seems to indicate that an increase in the flow of funds to one sector of the market is likely, via substitution, to increase the supply in other sectors.

In summary, it is apparent that if firms rationed in the commercial loan market are also rationed in the capital markets, then commercial loan credit rationing should have a direct and important effect on the investment expenditures of the rationed firms. If capital market rationing does not occur, on the other hand, then even if the bank rationed firms must pay higher interest rates for the capital funds, these funds will still be available for investment expenditures. Furthermore, the effects of higher capital market interest rates on nonrationed firms are likely to be small because these firms will substitute commercial loans for the capital market funds and because the commercial banks will also increase their supply of funds to the capital markets. The question of whether commercial loan market credit rationing can be offset by the availability of funds in the open capital markets reduces then, perhaps obviously, to the question of whether the firms rationed by banks will also be rationed in the capital markets. Unfortunately, no direct empirical evidence is available yet on the extent to which capital market credit rationing occurs.

Trade credit obtained from other business firms provides a second alternative source of funds for firms rationed by commercial banks though, the extent to which it is in use in Nigeria has been limited. The analysis of trade credit as a substitute for loans follows the same basic lines used for capital market funds. The major issue again concerns the availability of trade credit to the rationed firms.

Several factors suggest that trade credit may be more readily available than capital market credit for firms that are rationed by commercial banks. First, trade credit is an expensive source of funds for a firm that has alternatives in the form of either commercial loans or capital market borrowing. Trade credit is usually granted in the form of a discount from the quoted price if the firm pays within a stated period (typically 10 days); otherwise the firm is expected to pay the full price within some net period (typically 30 days). If the discount period is 10 days, the net period is 30 days, and the discount rate is 2 percent, then the implicit cost of foregoing the discount to obtain credit for 20 days is an annual interest rate of 36 percent ([(360 days) (2 percent)]/[20 days]). It would thus appear that only rationed firms would wish to make use of this form of credit. Furthermore, assuming competition between business firms in the granting of trade credit, the high cost must be interpreted as an indication that the borrower has a high default risk.

Finally, experience has shown that trade credit could be an important determinant of loan demand for small firms. This implies that, in periods of credit rationing, small firms can decrease their need for commercial loans by increasing the amount of trade credit obtained from large firms. The large firms will, in turn, finance the trade credit through either bank loans or the capital markets. The net effect is thus a redistribution of funds from the large firms to the small firms, with the large firms bearing the burden of obtaining the funds from banks or the capital markets.

This redistribution of trade credit may substantially dampen the effect of credit rationing on real expenditures. The small firms will change their expenditure decisions only to the extent that the cost of trade credit is substantially higher than the cost of the rationed commercial loans, assuming ample trade credit is provided. Even then, if the interest elasticity of investment decisions by small firms is low, and there is certainly evidence in this direction, small firms may be relatively unaffected by rationing. Similarly; large firms will change their behaviour only if the cost of the bank loans, or long term liabilities, used to finance the additional trade credit exceeds the return on the trade credit. Although the implicit interest rate on trade credit will be very high, the risk will also be great, and thus it may be difficult to determine a reasonable rate of return.

END NOTES

1. Ogiogio G. O. (1990) "Portfolio Performance of Nigeria's financial Institutions" Unpublished Ph.D Thesis.

2. See the review of literature on this matter. Mordi (1986) finds that the interest rate variable carry the wrong sign.

3. See Hodgman (1969) for a full discussion.

4. See Jaffe (1969)

5. See Ojo O. (1976), Ajayi and Ojo (1986) and Mordi (1986).

6. The previous studies covered the period when interest rates in Nigeria were administratively determined. However, the inclusion of the deregulated period in the present study and the encouraging results obtained thereof is a pointer to the fact that interest rate as a policy variable (tool) in Nigeria may after all be important.

CHAPTER SEVEN

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

7.1 Summary

This study is an attempt to understand, analyse, and evaluate the effect of commercial loan market in the Nigerian economy. It aims at assessing the implications of the observed results obtained from the empirical evidence of the existence of credit rationing and the influence of the loan market disequilibrium on the speed and effectiveness of monetary policy. The study provides an understanding of the phenomenon, incidence, magnitude and effect of credit rationing in the Nigeria's commercial Loan market.

As a way of achieving the set objectives of the study, both the theoretical and empirical issues concerning the behaviour of commercial loan market and the phenomenon of credit rationing are examined. The theoretical issues bother on the incidence, rationale and the mode of rationing of credit in the loan market. The need to situate what factors inhibit or determine the quantity of loans extended in the commercial loan market led to the formulation of equilibrium models for the demand for and supply of commercial bank loans. These models which make use of the derived volume of the loanable fund available in the banking system to determine the system's capacity to lend, is a novelty in the formulation and estimation of the supply of commercial loans. Prior to this study, previous studies have employed either the total asset variable or the deposits variable decomposed into time and demand deposits as a measure of strength (available resources) for the banks to grant loans. For instance, Melitz and Pardue

(1973), Mordi (1986) used the adjusted asset to explain the ability (interms of available resources) to grant loan requests. Laffont and Garcia (1978) used the time and demand deposits as the measure of strength. Much as the use of either the adjusted asset or demand and time deposits are supported by theory, their use in the Nigeria's loan market might not appropriately reflect the true strength. This is as a result of the fact that banks are often compelled to keep reserves which are usually expressed interms of the deposit liabilities of the banks. In this circumstance, the total asset (adjusted for the volume of loan) which includes reserves that banks must keep and can not be lent out plus all other items on the asset side of the bank balance sheet will not provide the true position of the strength of banks to grant loans. So also will the case where total deposit liabilities of the banks are used. The consistency of the empirical evidence reported by the equations using the fitted value of the loanable funds variable shows the extent to which this variable is important in the supply of loan equation and also the extent to which previous studies on the supply of loans in Nigeria's banks have been mis-specified. That may account for why these previous studies did not yield satisfactory results.

On the empirical front, this thesis examined the impact of those factors which are expected to influence the demand for as well as supply of commercial banks' loan. It also examined the incidence of credit rationing in the commercial loan market and its effect on the economy. The findings are quite impressive and in most cases consistent with theory.

With particular reference to the supply of commercial loans, the study indicates that interest rates on loans *per se* were less important than many other variables in the loan portfolio behaviour of the banks. As argues in Fakiyesi (1988), this may be an indication of the predominance of risk averse behaviour over speculative behaviours by the banks. Furthermore, the relative insignificance of the rates of interest may be a reflection of possible divergence of regulated rates and the actual cost of funds to the banks especially between 1970 and 1986. This may arise when there is a profitable opportunity for under the counter trading in funds - a consequence of financial repression which the study has been able to establish to be prevalent in the country during the 1970 and 1986 periods. However, in spite of the low significance of the rate of interest, the overall indications from the study seems to suggest that the influence of rates and hence yields on the bank loan portfolio no matter how negligible cannot be ignored. This is so despite the fact that the policies (pre-structural adjustment policy) in the country with respect to interest rates seek to control both the structure and movement of the rates. This conclusion follows from the joint influence of the rates in the model employed. This seems to be the justification for the current government policy of guided deregulation of interest rate. Individually, the results did not give much to rely upon with regard to the interest rate implication for policy. For instance, while the results show the deposit rate to be significant in some cases, the less impressive significance of the other rates of interest particularly in the supply of loans by the banks left much to be desired and cast appertion on the effectiveness of interest rate policy. We must, however, be cautious in generalising these results as the question can be asked whether in a normal situations, holdings of loan portfolio would increase in these circumstances. In the Nigerian situation, however, the perverse nature of the results is not totally surprising since the rates sometimes hardly vary over a substantial length of time and spread between rates, i.e. deposits and lending rates hardly reflect the opportunity cost of transforming deposit funds into income earning assets of the banks particularly bank loans.

The results also demonstrate that apart from the conventional variables often come across in the study of the supply and demand of bank loans, a point often overlooked is statistically supported by the estimates of the supply of loan equations. That is, the influence of bank-customer relationship as measured by lagged value of bank credits. Given the more efficient and consistent parameter estimates obtained from our disequilibrium model, the study confirm that, though, the supply of loan and the demand for loan can be identified by conventional means,the parameters of the estimate become suspect when it is obvious that the bank loan market is characterised by disequilibrium.

Also, as part of the empirical work carried out in this study, determinants of concentration and stability in market shares were examined as a basis for the study of the market structure, conduct and performance. It was however, found that the hitherto high level of concentration and market share previously enjoyed by the four largest banks have since the deregulation programme began in 1987 been disappearing as a result of many more new entrants into the market as well as the increase in the number of more efficient banks in the market. The mobility observed among the four largest bank is also an indication of a new development in the industry - that is, competition. Where this is engendered as consequence to policy, efficiency in the operation and performance of the industry can then be assured.

Finally, the study is able to empirically confirm the existence of credit rationing, identify the prevalence of non-price rationing as outcome of government policies and adverse risk selection as well as moral hazard by the banks. Effects of credit rationing in the loan market and in the economy in general are analysed with focus on monetary policy as well as firms investment behaviour and capital market. For a long time in the country, there have been ceilings on both the loan and deposits rates. There have also been no competitive banking system in the real sense. Although, one can not rule out the possibility of banks evading the loan rate ceiling through imposition of compensating balances, they seem to be generally observed particularly for all public sector borrowing. To the extent that banks do observe the loan rate ceiling, non-price credit rationing must occur. Credit allocation is done not according to expected productivity of the investment projects, but according to transaction costs and perceived risks of default. Quality of collateral, political pressures, "name", loan size and covert benefits to loan officers have been the major factors that influence allocation of loans in Nigeria's banks. Loan rate ceilings discourage risk taking on the part of the banks, since premium can not be charged when ceilings are binding and effective. This itself ration out a large proportion of potentially high yielding investments.There is therefore the tendencies for the investments that are financed to yield returns barely above the ceiling interest rates.

7.2 Conclusions

From an economic point of view, one of our conclusions is that for the most of the period we studied, the main feature was an upward sluggishness of prices leading to an essentially supply-determined market for commercial loans. Disequilibrium was very important and the very few periods of excess supply have been exceptional. This conclusion which derived from the disequilibrium methods employed in the study, happens to disagree with the initiative opinion of the bank of Canada's model builders, Clinton and Masson (1975) that affirmed that 'Loans are essentially demand determined'.

The more interesting aspect of this study is the implied satisfactory estimate of the commercial loan demand and supply relationships in spite of the disequilibrium character of the commercial loan rate and the attendant non-interest credit rationing influences. Accordingly, this study has suggested a theory of interaction in the loan market which explains both equilibrium and non-interest credit rationing and disequilibrium loan rate movements. The theory is supported by appropriate statistical tests. The results of this study imply that structural estimates of commercial loan demand and supply which fail to include non-interest credit terms may be subject to serious specification error. In other words, any models of the commercial loan market which do not explicitly include the effects of market disequilibrium are likely to yield inconsistent parameter estimate. The results also imply that the orthodox Keynesian transmission channels by which monetary policy affects the economy through the interest rates impact on investment and consumption decisions must be supplemented by consideration on the transmission effects working through non-interest i.e. availability influence. Studies which indicate interest inelastic investment behaviour now provide less compelling arguments for monetary policy's weakness, particularly in the commercial loan market.

Paradoxically, this study implies that the more flexible the commercial loan rate, the less it is necessary for non-interest stringency to clear the loan market. Consequently, as observed by the recent (1988 - 1995) experience of high interest rates and 'easy' non-interest credit terms, the costs and availability of credit may move in the same direction.

Further, this study lends support to those who argue that stringent monetary policy is discriminatory in its impact. In particular, the evidence cited implies that a restrictive monetary policy which diminishes the credit supply of intermediaries tends to affect those borrowers having little or no retained earning, i.e. smaller borrowers. And since theoretical analysis and empirical evidence suggest that borrowers with little or no retained earnings are borrowers with relatively low asset position (Muth (1962)), it can be concluded that a 'tight' monetary policy will have a differential impact within the commercial loan market. The incident of such impact will fall most frequently on borrowers with low non-human wealth positions.

Finally, the fact of non-interest rationing implied by this study indicates that monetary policy may be a useful policy tool without necessitating the disruptive effects of large interest rate movements. Duesenberry (1969) speculated that "the greater the amount of non-interest rationing taking place in the nation's financial market, the greater the 'elbow room' there is for monetary policy to operate without requiring large distabilizing interest rate movements". If monetary policy were to operate solely through the interest rate transmission channel, the necessary range in the variation of interest rates needed to effect a given investment spending target might be so great that such policy could be precluded from the policy marker's itinerary of feasible economic tools. It is in this line that the recent Federal Government policy on guided deregulation of interest rates should be considered.

7.3 Recommendations

Based on the foregoing, it is important first, that the commercial loan market should be recognised as having important task to play in assisting the growth of the economy. To this end, it is vital that banks (the major actor) have satisfactory earning capacity in order that they may take greater risks needed in a changing economy. The performance of these banks have been discovered to have fallen below expectation. Therefore, the performance can be improved by insisting on sound banking principles in their lending policy. A greater reliance should be placed on assessing the potential productiveness of loans rather than being content with the offer of collateral securities and sound past trading records, although, the latter are also important. Greater efforts should also be devoted to making loans more productive to the recipients - loans granted in time, of adequate amounts and on suitable terms together with the offer of necessary financial guidance and advice.

To ensure efficient utilization of credits granted and reduce the risks of defaults often associated with borrowers financial distress, loan officers from banks should visit their customers on a very regular basis while the bank customers on the other hand should keep banks informed about their investment plans. One of the reasons for loan market failure is the presence of serious imperfect information resulting from moral hazard and adverse selection which tend to undermine the operation of the loan market. Moral hazard and adverse selection cause investors to raise the price of borrowing which worsen the quality of the pool of borrowers thereby discouraging the provision of funds.

A primary function of the commercial loan market is to transform its liabilities (deposits) into assets (loans). To allow this to be adequtely done, large scale net withdrawals of deposits have to be avoided. Lender of last resort facilities of deposits insurance do this in developed banking systems. A similar facility is expected of the Nigerian Deposit Insurance Corporation (NDIC). However, where there are few number of competiting banks, pricing by one bank can have significant effect on the financial flows to another. In response, banks will retain assets in liquid form and maturity transformation be discouraged. This is still precisely the case with banks in Nigeria where the stability of the system is fragile and most of the costs of competition are borne by the public and public institutions. The government should therefore enforce increase in the supply of commercial loan and still reduce the risks to lender for instance, by requiring fuller disclosure of financial information and defining and enforcing the lenders' rights.

As a measure to ensuring the stability of the market and discourage lenders from fraud, it is important that the machinery for the supervision of financial markets and institutions be improved. In the past, supervisors have spent too much time checking banks' compliance with directives on credit allocation and too little time inspecting the quality of their loans and the adequacy of their capital.

Borrowers in the commercial loan markets are constrained by the influence of credit rationing in the loan market because the influence of their income on their demand for credit remain positive which is an indication of their preparedness to increase their indebtedness. In this circumstance, their investment decisions can highly be affected as this will often result in the choice of low yielding investments. The effect of low yielding investment will be more appreciated by the relationship between the banks' credit and the rate of economic growth. The adverse effect of credit rationing in the economy can be greatly reduced if policies are put in place to mitigate the incidence credit rationing while banks take care to ration out only borrowers whose intentions are questionable. This can be done through the assessment of their request forms for loan. As noted above, a purposeful criterion is the productivity of investment for which the loan is required.

With regard to the cost and availability of credit, banks should embark on efforts that will ensure a larger volume of loanable fund. A wider spread of bank offices to underbank and rural area will go a long way to improve the banking habit of the people and through the increase in the demand for bank services mobilized more savings/deposits which can be transformed into loans.

Introduction of modren payment mechanism in addition to increased use 6 credit cards and cheques will help to reduce the massive cash withdrawal from banks deposit liabilities. The instability of deposits occasioned by highly volatile cash drain from the banking system seriously account for shortage of funds in the bank. Even when these funds are available, bank feel reluctant to lend them out because of the fear of eventual withdrawal. The financial sector should be encouraged to develop modern payment mechanisms which make less use of cash. An emphasis on credit availability is preferable to interest rate subsidies which undermine the financial process.

7.4 Limitation of the Study and Areas for Further Research

7.4.1 Limitations

The major limitation to this study has been the difficulty in covering the broad spectrum of the entire commercial loan market in Nigeria. Theoretically, commercial loan market was conceived to be the concern mainly of commercial banks. The practice in Nigeria, however, allows other numerous financial institutions (both formal and informal) to participate in the loan market. This study could not accomodate these numerous institutions because of data constraint. As such, caution needs to be taken in generalising the results emerging from the study as these other instutions also have their peculiar characteristics and problems which individually dictate their operations. Instead the results should be seen as indicatives.

Also, a study of this nature should have employed in a greater scale disaggregated cross sectional data so as to be able to be more precise in respect of the apparent effects of credit rationing particulaly the effect of credit rationing on investment decisions across the various sectors of the economy. But the methodology and the techniques of analysis adopted can only be applied to aggregated time series data. This prevented our being able to categorically identify and measure the effect of credit rationing on investment decisions of investors except to rely on theory and observation of the prevailing situation generally.

Furthermore, the 'commercialisation' of all loans in Nigerian banks blurred the obvious distinction between commercial loan and other types of loan. Thus, there was a temptation to treat every loan in Nigeria as commercial loan.

Finally, the overwhelming regime of control as against regime of deregulation prevented the introduction of a complete price structure into our model,thus limiting the extent to which the result obtained from equations containing price adjustment process can be relied upon for policy prescription in a fully deregulated economy.

7.4.2 Areas for Further Research

One significant improvement that can be made on this work through subsequent research efforts is to determine the efficiency of banks credit. This will involve calculating the growth loss as a result of the inefficient utilization of credits obtained. Once calculated, this will permit an optimal solution to the problem of loan diliquency and pave way for eliciting the weak link between the real and financial sectors of the economy.

Subsequent research efforts should also be directed toward the quantitative measurement of the effects of credit rationing on the other financial markets and macroeconomic variables such as investment, consumption etc.

Lastly from the rather impressive inference made from our model, it will be desirable for future research efforts to be directed at determining the actual amount attracted away from the loan market by the attractiveness of the foreign exchange market. If this can be done, it may be possible to have a clearer understanding of the foreign exchange market forecast with accuracy and predict the future rates of exchange and the issue of misalignment between exchange rate policy and credit or interest rate policy be taken care of.

BIBLIOGRAPHY

Abe S., Fry M. J., Min B. K., Vongviparond P., and Teh-Pei Yu (1975) "The Demand for money in Pakistan. Some Alternative Estimates", Pakistan Development Review (Summer 1975).

Adekunle J. O. (1968) "The Demand for Money: Evidence from Developed and Less Developed Countries. IMF Staff Papers Vol. 15 No. 2.

Adelman, M. A. (1969) "Comment on the "H" Concentration Measure as a Number-Equivalent". Review of Economics and Statistics. Vol. 51(1).

Adewunmi W. (1984) "Loan Management in the Nigerian Banks: A Study of Efficiency of the Commercial Banks Lending Function in a Developing Economy". BAMGOR OCCASIONAL PAPERS IN ECONOMICS No. 21.

Agu, C. C. (1984) "The Role of Commercial Banks in Mobilization and Allocation of Resources on Development in Nigeria". Savings and Development No.2 Vol. viii.

Agu, C. C. (1988) Nigeria Banking Structure and Performance: The Banking Systems Contribution to Economic Development. African Hypothesis Limited, Enugu.

Agu, C. C. (1992) "Analysis of the Determinants of the Nigerian Banking System's Profits and Profitability Performance". Economic and Business Review, Vol. 1, No. 1.

Ajakaiye, D. O. (1992) "Challenges of the Nigerian Banking Sector: A Macro-economic Overview" New Nigeria Bank Plc Economic and Business Review, Vol. 1, No. 1.

Ajakaiye, O. and A. F. Odusola (1995) "Real Deposit Rates and Financial Savings Mobilization in Nigeria: An Empirical Test" Journal of Economic Management. Vol. 2, No. 2, NCEMA, Ibadan.

Ajani H. A. (1978) "Quarterly Interpolation of Constant Price Gross Domestic Product of Nigeria 1963/64-1972/73". Economic and Financial Review, CBN Vol. 16, No. 2.

Ajayi S. I. (1972) "A Critique of the Money Multiplier Approach to Money Supply Determination". Nigeria Journal of Economics and Social Studies Vol. 16.

Ajayi S. I. (1972a) "The Monetary Basic in Nigeria". Journal of Modern African Studies Vol.1.

Ajayi S. I. (1974) "Critique of Money Multiplier Approach to Money Supply Determination: A Rely". Nigerian Journal of Economics and Social Studies Vol. 16.

Ajayi, S. I. and O. Ojo (1986) "Nigeria's Commercial Bank Loan Market". In Oyejide, A. and A. Soyode, eds., Commercial Banking in Nigeria. Ibadan University Press.

Ajayi S. I. (1978) Money in a Developing Economy: A Portfolio Approach to Money Supply Determination in Nigeria. Ibadan: University Press.

Ajayi, S. I. (1981) "Growth in the Banking Industry in Nigeria". In Domestic and International Banking Services. Nigerian Institute of Bankers Annual Seminar. Macmillan Nigeria Publishers Ltd.

Ajayi S. I. (1978b) "The Money Multiplier and Monetary Control" In Teriba O. and V. P. Diejomaoh (eds), Money, Finance and Nigerian Economic Development in Honour of Obasami Olakanpo. Ibadan: University Press.

Ajayi S. I. and Ojo O. (1981) Money and Banking: Analysis and Policy in the Nigerian Context. (London: George Allen and Unwin, Limited).

Ajayi S. I. (1977) "Some Empirical Evidence on the Demand for Money in Nigeria. American Economist (Spring).

Akhtar M. A. (1974) "The Demand for Money in Pakistan". Development Review (Spring 1974).

Akinyemi O. (1981) "The Role of Financial Institutions in the Development of LDCS, Capital Market". Unpublished B.Sc. Dissertation. University of Lagos.

Almon, S. (1965) "The Distributed Lag between Capital Appropriations and Expenditures," Econometrica, Vol. 33.

Amemiya, T. (1974) "A Note on Fair and Jaffee Model" Econometrica VIIIL.

Anderson, J. and Ostas, J. R. (1978) "Interest and Non-interest Credit Rationing in the Mortgage Market". Journal of Monetary Economics and Statistics Bulletin XXXI.

Andrews, M. and S. Nickel (1986) "A Disaggregated Disequilibrium Model of the Labour Market" Oxford Economic Papers, No. 38.

Andrews P. W. S. (1940) "A Further Inquiry into the Effects of Rates of Interest" Oxford Economic Paper March 1940.

Arnold Zeller (1987) Basic Issues in Econometrics: (The University of Chicago Press Chicago and London).

Artus P. A. Laroque, G. and Michel, G. (1984) "Estimation of a Quarterly Macroeconomic Model with Quantity Rationing". Econometrica, Vol. 52.

Asabia, S. O. (1992) Essay in Money and Banking; Fountain Publications, Ibadan.

Asogwa, R. C. (1993) "Financial Liberalization and Macroeconomic Stabilization in Nigeria" Phd Dissertation, University of Nigeria, Nsukka.

Awoseyila A. P. and Okonta (1991) "Methodological Notes on The Computation of Consumer Price Index Rate and GDP Deflator in Nigeria CBN, Economic and Financial Review No.1, Vol.29.

Azariadis C. C. (1975) "Implicit Contracts and Underemployment Equilibria" Journal of Political Economy 83 (Dec.).

Azzi and Cox (1976) "Theory and Test of Credit Rationing; Comment" American Economic Review, Vol. 66 (Dec.).

Bach G. L. and C. J. Huizenga (1961) "The Differential Effects of Tight Money" American Economic Review, Vol. 51, (March).

Bailey Martin N. (1974) "Wages and Employment Under Uncertain Demand" Review of Economic Studies 41 (Jan.).

Balasa Bela (1989) "The Effect of Interest Rates on Savings in Developing Countries" World Bank Development Report.

Baltensperger (1978) "Issues in Credit Rationing", Journal of Monetary Economics Vol. 3, No. 36.

Baltensperger (1976) "The Borrower-Lender Relationship, Competitive Equilibrium and the Theory of Hedonic Prices". American Economic Review 66 (June).

Baltensperger E. (1978) "Credit Rationing: Issues and Questions" Journal of Money, Credit and Banking. Vol.10.

Barro R. J. and Grossman H. I. (1976) Money, Employment and Inflation. New York Cambridge University Press.

Barro Robot J. (1977) "The Loan Market, Collateral and Rates of Interest" Journal of Money Credit and Banking (8 Nov.).

Bates T. and Bradford W. (1980) "An Analysis of the Portfolio Behaviour of Black-owned Commercial Banks". Journal of Finance, Vol. XXXV, No. 3.

Bates T. (1976) "Lending Activities of Black-owned Commercial Banks". Review of Black Political Economy. (Winter).

Batchelor, R. (1977) "A Variable Parameter Model of Export Behaviour" Review of Economic Studies, No. 44.

Benassy J. P. (1982) The Economics of Market Disequilibrium: Academic Press, New York.

Bhatia R. J. and D. R. Khatkchate (1975) "Financial Intermediation, Savings Mobilization and Enterpreneural Development;The African Experience". IMF Staff Paper. Vol. 22, No. 1.

Blinder A. and Stiglitz J. (1983) "Money, Credit Constraints and Economic Activities" American Economic Review. Vol. 73.

Blinder Alan S. (1987) "Credit Rating and Effective Supply Failures". Economic Journal, No. 97, Vol. 386.

Bowden R. J. (1978) The Econometrics of Disequilibrium. North Holland Armsterdam.

Boenda, S. (1997) "Financial Instability Reconsidered; Orthodox Theories versus Historical Facts". Journal of Economic Issues, Vol. XXXI, No. 1.

Brown C. V. (1966) The Nigerian Banking System. (London: Allen E. Unwin).

Bruce R. B. (1991) "Weak Links in the Monetary Transmission Mechanism: The Case of Malawi" Paper Presented at the ODI/HIID Conference on Improving Monetary Policy in Africa and Asia; London.

Burgess W. R. (1927) The Reserve Banks and the Money Markets, New York Harper and Bros.

Cantor, R. and J. Wenninger (1993) "Perspective on Credit Showdown" Federal Reserve Bank (FRB) of New York, Quarterly Review, Vol. 18, No. 1.

Carson D. and Scott I. O. Jr (1963) "Commercial Bank Attributes and Aversion to Risk". In Dean Carsons (ed) Banking and Monetary Studies. Hunewood/illinois: Richard D. Irwin Inc.

Caves R. E. Yamey B. S. (1971) "Risk and Corporate Rates of Return Comment" Quarterly Journal of Economics Vol.ixxv (August).

Central Bank of Nigeria (1986) "The Growth of Commercial Bank Activities". In Oyejide A. and A. Soyode eds. Commercial Banking in Nigeria. Ibadan University Press.

Chandavarkar Anandi (1990) "Macroeconomic Aspects, Foreign Flows and Domestic Saving Performance in Developing Countries: A State of the Art Report" Technical Paper Development Centre in the Organization of Economic Cooperation and Development. No. 11, Paris, February.

Charemza, W. W. and Deadman, D. F. (1992) New Directions in Econometrics Practice; General to Specific Modelling, Cointegration and Vector Autoregression. Edward Elgar Publishing Limited.

Chase Samuel B. Jr. (1965) "Credit Risk and Credit Rationing Comment" Quarterly Journal of Economics 79 (August).

Cho Y. J. (1988) "The Effect of Financial Liberalization the Efficiency of Credit - Some Evidence from Korea" Journal of Development Economics 29.

Cho, Y. J. and J. K. Kim (1995) "Credit Policies and the Industrialization of Korea". World Bank Discussion Paper 286 Washington D.C.

Collier P. and Mayer Colin, (1989) "The Assessment; Financial Liberalisation, Financial Savings and Economic Growth".Oxford Review of Economic Policy. No. 4, Vol. 5.

Clementz, G. (1984) "Credit Rationing in the Absence of Direct Observability of Efforts and Abilities of Borrowers," Working Paper no.8405, Intitut fur Wirtshaft-wissenchaften, Universitat Wien.

Clinton, K., and P. Masson (1975) "A Monthly Model of the Canadian Financial System", T. R. No. 4, Bank of Canada.

Clower, R. W. (1965) "The Keynesian Counter Revolution: A Theoretical Appraisal" In The Theory of Interest Rates edited by F. H. Hahn and F. P. R. Brechling, London Macmillan.

Comanor, W. S. Willson, T. A. (1967) "Advertising Market Structure and Performance" Review of Economics and Statistics, Vol. 49.

Corsepius Uwe (1990) "The Structure of financial Savings and Loanable Funds; Evidence from Peru". Savings and Development No. 1, Vol. xiv.

Crockett Friend and Shavell (1967) "The Impact of Monetary Stringency on Business Investment" Survey of Current Business, September.

Cuddington J. T. (1986) "Capital Flight; Issues, Estimates and Explanations" Priceton Studies, International Finance; Vol. 58.

Dean Carson (1961) "The Differential Effects of Tight Money, Comment" American Economic Review 51, Dec.

Deleeuw (1965) "A Model of Financial Behaviour". In Brooking Quarterly Econometrics Models of the USA. Edited by J S Duesenberry et al Chicago: Rand Mc Nally.

Dimitri Vittas and Yoon je Cho (1996) "Credit Policies; Lessons from Japan and Korea" The World Bank Research Observer, Vol. 11, No. 2.

Donaldson L and Jenrette Inc. (1967) "Timely Review of 1966 Credit Shortage Effects on Business Financing and Spending Decisions" July 1967.

Dooley M. P.(1986) "Country-Specific Risk Premiums, Capital Flight and Net Investment Income Payments in Selected Developing Countries". (Washington D.C. IMF OM/86/17 March).

Dornbusch R and Reynoso (1989)" Financial Factors in Economic Development". American Economic Review Papers and Proceedings. Vol. 79.

Drake, Peter J. (1969) "Securities' Markets in Less Developed Countries" Journal of Development Studies, No. 2, Vol. 13.

Duesemberry, J. S. (1969) "Policy Effects on Thrift Institutions, in Savings and Residential Financing" Conference Proceedings (United States Savings and Loan League, Chicago).

Edwards, S.(1986)"The pricing of Bonds and Bank Loans in International Markets; An Empirical Analysis of Developing Countries' Foreign Borrowing". European Economic Review. No. 3, Vol. 13.

Fair, R. C. and Kalejian (1974) "Methods of Estimation for Markets in Disequilibrium" Econometrica 42.

Fair, R. C. and Jaffee D. M. (1972) "Methods of Estimation for Markets in Disequilibrium" Econometrica 40. Vol. XL.

Fakiyesi, T. (1988) "Asset and Liability Management of Commercial Banking Firms in the Process of Monetary and Financial Making in Nigeria" African Review of Money Finance and Banking, Vol. 1.

Fakiyesi, T. (1986) "A Dynamic Analysis of Commercial Banks Portfolio Behaviour and Selection in Nigeria" West African Economic Journal, Vol. 6.

Falegan, S. B. (1987) Redesigning Nigeria's Financial System: A Study of Nigeria at the Financial Cross Road in Applied Financial Intermediation. University Press Limited, Ibadan.

Fama, Eugene (1986)"What is different About Banks?". Journal of Monetary Economics. No. 1, Vol. 15.

Fischer B.(1981) "Interest Rate Ceiling and Economic Growth in Developing Countries". Quarterly Journal of Economics. Vol. 23.

Freimer, M. and Gordon, M. J. (1965) "Why Bankers Ration Credit" Quarterly Journal of Economics.

Fritz R.G. (1984) "Time Series Evidence of the Causal Relationship Between Financial Deepening and Economic Development". Journal of Economic Development, July.

Fry M.J. (1979b) "The cost of Financial Repression in Turkey". Savings and Development. Vol. 3.

Fry M.J. (1979a) "Money and Financial Deepening in Economic Development". Journal of Money, Credit and Banking. Vol. 10, No. 3.

Fry M.J. (1980) "Savings,Investment, Growth and the cost of Financial Repression" World Development. No. 4, Vol. 8, April 1980.

Fry M.J. (1989) Money, Interest and Banking in Economic Development: John Hopkins University Press, London.

Fry M. J. (1982) "The Variable rate of Growth effects in the life Saving Model; Children, Capital Inflows,Interest and Growth in a New Specification of the life-cycle model applied to Seven Asian Developing countries" Economic Inquiry. Vol. 20, No. 3.

Ghatak S. (1977) "Rural Credit and the cost of Borrowing: Inter-State variations in Indian". Journal of Development Studies. No. 1, Vol. 13.

Ghatak S. (1995) Monetary Economics in Developing Countries. (London, Macmillian 1981).

Gian Franco Caliguri, Antonio Fazio and Tommaso Padoa-Schioppa (1974) "Demand and Supply of Bank Credit in Italy". Journal of money, credit and Banking. Vol. 6, No. 4, November.

Giovannim A. (1985) "Saving and the Real Interest Rates in LDCS" Journal of Development Economics. Nos. 2-3, Vol. 18.

Goldfeld, S. M. (1966) Commercial Bank Behaviour and Economic Activity Amsterdam North Holland Publishing Co.

Goldfeld, S. M. and Quandt, R. E. (1974) "Estimation in a Disequilibrium Model and the Value of Information" (Research Memorandum No. 169, Econometric Research Programme, Princeton University).

Goldfeld S. M. and R. E. Quandt (1981) "Some Properties of the Simple Disequilibrium Model with Covariance" Economic Letters 1.

Goldfeld S. M. and R. E. Quandt, (1975) "Estimation in a Disequilibrium Model and the Value of Information". Journal of Econometrics, 3.

Goldfeld S. M. (1966) Commercial Bank Behaviour and Economic Activity; Amsterdam. North Holland Publishing Co.

Goldsmith R. W. (1969) Financial Structure and Development. New Haven Yale University Press 1969.

Goldsmith R. W. (1969a) "Determinant of Financial Structure". Parish OECD.

Goodhart C., (1975) Money, Information and Uncertainty, Macmillan.

Goodhart C. (1984) "Disequilibrium Money - a Note," In Monetary Theory and Practise, The UK Experience. Macmillian.

Gordon D. F. (1975) "A Neoclassical Theory of Keynesian Unemployment" Economic Inquiry 12, Guisburg.

Gourieroux, C. and G. Laroque (1985) "The Aggregation of Commodities in Quantity Rationing Models". International Economic Review, No. 26.

Greenwald, B., Stiglitz, J. and A. Weiss (1984), "Informational Imperfections in the Capital Market and Macroeconomic Fluctuations," American Economic Review. 74.

Grossman, S. J., O. D. Hart E. Maski, (1983) "Unemployment with Observable aggregate Shocks," Journal of Political Economy, 91.

Gupta K. L. (1987) "Aggregate Savings, Financial Intermediation and Interest Rate" Review of Economics and Statistics. Vol. 62, No. 2.

Gupta K. L. (1984a). Finance and Economic Growth in Developing Countries. (London; Groom Helm, 1984).

Gupta K. L. (1970) "Personal Saving in Developing Nations; Further Evidence" Economic Record.

Gupta K. L. (1984b) "Financial Liberalization and Economic Growth; Some Simulation Results". Journal of Economic Development. Vol. 9, No. 2.

Gurley J. G. and Shaw E. S. (1960) Money in a Theory of Finance. (Washington D. C. Brookings Institutions.

Guttentag J. M. (1985) "Commercial Bank Lending to Developing Countries; from overlending to underlending to Structural Reform", In International Debt and the Developing Countries edited by Gordon W. Smith and John T. Cuddington (Washington D. C. World Bank.

Guttentang Jack M (1960) "Credit Availability, Interest Rates and Monetary Policy" Southern Economic Journal 26 (January).

Hand, John (1968) "The Availability of Credit and Corporate Investment" American Economic Review 58 (March).

Harris, D. G. (1970) "Rationing Credit to Business; More Than Interest Rates" Business Review, Federal Reserve Bank of Philadelphia (August).

Harris, D. G. (1973) "A Model of Bank Loan Term Adjustment" Western Economic Journal XI.

Harris, D. G. (1974) "Credit Monitoring at Commercial Bank" Journal of Money, Credit and Banking, VI.

Harris Duane G. (1974) "Credit Rationing at Commercial Banks: Some Empirical Evidence" Journal of Money, Credit and Banking 6 (May).

Harris J. W. (1979) "An Empirical Note on the Investment Content of Real output and the Demand for Money in the developing Economy". Malayan Economic Review. Vol. 24 (April).

Hartley, J. J. and P. Mallela (1977) "The Asymptotic Properties of a Maximum Likelihood Estimation for a Model of Markets in Disequilibrium" Econometrica, Vol. 45, No. 5.

Hartley M. J. and Madlelg P. (1974) "The Asymptotic Properties of a Model of Markets in Disequilibrium" Discussion paper No. 329, State University of New York at Buffalo.

Hendershortt P. (1968) "Recent Development of the Financial Sector of Economic Models". Journal of Finance, 23.

Hester Donald D. (1967) "An Empirical Examination of a Commercial Bank Loan Offer Function" in Studies of Portfolio Behaviour; edited by Donald D, Hester and James Tobins, New York, Wiley.

Hewson John and Sakakibara Eisuke (1975). "The effect of US Controls on U.S. commercial bank borrowing in the Eurodollar Market". The journal of Finance No. 4 Vol. xxx.

Hodgman, D. R. (1960) "Credit Risk and Credit Rationing" Quarterly Journal of Economics, LXXIV.

Hodgman, D. R. (1962) "Credit Risk and Credit Rationing Reply" Quarterly Journal of Economics (August).

Hodgman Donald R. (1959) "In Defence of the Availability Doctrine: A Comment" Review of Economics and Statistics, (February).

Hodgman, D. R. (1961a) "The Deposit Relationship and Commercial Bank Investment Behaviour" Review of Economics and Statistics (August).

Hodgman, D. R. (1961b) "Credit Risk and Credit Rationing Reply" Quarterly Journal of Economics.

Hodgman D. R. (1963) Commercial Bank Behaviour Loan and Investment Policy. (Champaign, ill University of illnois Press).

Hooke, R. and T. A. Jeeves (1961) "Direct Search Solution of Numerical and Statistical Problems". Journal of the Association of Computing Machinery, Vol. VIII.

Ikhide S. I. (1988) "Simulating An Econometric model of Nigeria's Financial Sector". Nigeria Journal of Economics and Social Studies. No. 1, Vol. V.

Ikhide S. I. (1987) "Financial Growth and Economic Development in Nigeria". Journal of Economics and Social Studies. No. 2, Vol. 29.

Ikhide S. I. (1997) "Financial Sector Reform and Growth of Capital Market in Nigeria". Visiting Research Fellow Monograph Series, No. 291.

Ito, T. and K. Udea (1981), "Tests of the Equilibrium Hypothesis in Disequilibrium Econometrics: An International Comparison of Credit Rationing", International Economic Review, 22.

Ituwe, C. E. (1983) Elements of Practical Banking University Press Limited, Ibadan.

Jaffee, D. M. (1971) Credit Rationing in the Commercial Loan Market (New York: John Wiler and Sons Inc.).

Jaffee, D. M. and Modigliani, F. (1969) "A Theory and Test of Credit Rationing" American Economic Review, Vol. 59.

Jaffee and Modigliani (1976) "A Theory and Test of Credit Rationing: Further Notes" American Economic Review 66 (Dec.).

Jaffee and Russell (1976) "Imperfect Information, Uncertainty and Credit Rationing" Quarterly Journal of Economics 90.

Jao Y. C. (1976) "Financial Deepening and Economic Growth; A Cross Section Analysis" Malayan Economic Review Vol. 21 (April).

James, P. D. Jr. (1995) "The Demand and Liquidity Effects of Monetary Shocks" Journal of Monetary Economics, Vol. 36.

Joel F. and P. Howitt (1980) "Credit Rationing and Implicit Contract Theory" Journal of Money, Credit and Banking No. 3 Vol XII, (August).

John, B. (1997) "Explaining Stationary Variables with Non-stationary Regressors" Applied Economics Letter, Vol. 4.

Jung W. S. (1986) "Financial Development and Economic Growth; International Evidence" Economic Development and Cultural Change Vol. 334-346.

Kane Edward J and B. G. Malkiel (1965) "Bank Portfolio Allocation, Deposit Variability and the Availability Doctrine" Quarterly Journal of Economics (February).

Kareken, John H, (1957) "Lenders' Preferences, Credit Rationing and the Effectiveness of Monetary Policy" Review of Economics and Statistics (August).

Kareken, J. H. (1959) "In Defence of Availability Doctrine: Reply" Review of Economics and Statistics IXL.

Keller P. M. (1977) "Controlling fluctuations in Credit" IMF Staff Papers Vol. 24, No. 1 (March).

Khatkhate D. R. (1988) "Assessing the Impact of Interest Rates in Less Developed countries" World Development (May).

Kiefer, N. M., (1980) "A Note on Regime Classifications in Disequilibrium Models". Review of Economic Studies, 47.

Kliesen, K. I. and J. A. Taton (1992) "The Recent Cash Crunch, The Neglected Dimensions" FRB of St. Louis Review Vol. 74, No. 5, Sept/Oct.

Kooiman, P. and T. Kloek, (1985) "An Empirical Two-Market Disequilibrium Model for Dutch Manufacturing," European Economic Review, 29.

Kooiman, P. (1984) "Smoothing the Aggregate Fix-Price Model and the Use of Business Survey Data", Economic Journal, 94.

Kooiman, P. and Kloek, T. (1979) "Aggregation of Micro Markets in Disequilibrium, "Working Paper, Erasmus University, Rotterdam.

Koskela Erkki (1976) "A Study of Bank Behaviour and Credit Rationing" Helsinki Academia Scientiarum Fennica.

Kraimer, R. E. (1959) "Structural Estimates of Supply and Demand in the USA, Short-term Bank Loan Market" Oxford University Institute of Economics and Statistics Bulletin, XXXI.

Krugman, P. (1978) Interest Rate Ceilings, Efficiency and Growth; A Theoretical Approach. (New Haven Yale University, Department of Economics).

Laffont, J. J. and Garcia Rene (1977) "Disequilibrium Econometrics for Business Loans" Econometrica, Vol. 45, No. 5.

Laffont, J. J. (1985) "Fix-Price Models: A Survey of Recent Empirical Work", In Arrow, K. and Honkapohja, S., ed, Frontiers of Economics, Basil Blackwell, Oxford.

Lambert, J. P., (1986) Disequilibrium Macroeconomic Models: Theory and Estimation of Rationing Models Using Business Survey Data. Cambridge University Press.

Lambo (1986a) "Commercial Bank Portfolio Management" In A. Oyejide and A. Soyode (Eds), Commercial Banking in Nigeria (University of Ibadan: Department of Economics).

Lambo (1986b) "A Structural analysis of commercial banks Loans and Advances" In A. Oyejide and A. Soyode (Eds) Commercial Banking in Nigeria (University of Ibadan: Department of Economics).

Lanyi A. and Saracoghi R. (1963) "Interest Rate Policies in Developing Countries" Occasional paper 22 Washington D. C. International Monetary Fund (October).

Leeuw F. De (1965) "A Model of Financial Behaviour" In The Brookings Quarterly Economic Model of the U.S. ed. by James Duescenberry et al Chicago, R and Mc Nally and Co.

Lindbeck, Assar, (1959) "The New Theory of Credit Control in the United States", Stockholm Economic Studies", Stockholm Economic Studies Pamphlet Series 1 Stockholm Aomquist and Wiksell.

Luckett Dudley G. (1970) "Credit Standards and Tight Money", Journal of Money, Credit and Banking Vol. 2.

Lutz Friedrich A. (1945) "The Interest Rate of Investment in a Dynamic Economy" American Economic Review, Dec.

Maddala, G. S. and R. P. Trost, (1982) "On Measuring Discrimination in Loan Markets", Housing Finance Review, Oct.

Maddala, G. S. and F. D. Nelson, (1974) "Maximum Likelihood Methods for Models of Markets in Disequilibrium", Econometrica, 42.

Maisel Sherman J (1965) "Non Business Construction" In J. S. Duesenbeny et al editors. The Brookings Quarterly Econometric Model of the United States. R and Mc Nally and Coy., Chicago.

Malinvaud, E. (1981) "Econometric implications of Macro- Disequilibrium Theory", INSEE Working paper No. 8114.

Martin, C. (1987) "Disequilibrium Models with Dispersed Trading". Unpublished Ph.D Thesis, Birkbeck College, London.

Martin, C. (1990) "Corporate Borrowing and Credit Constraints: Structural Disequilibrium Estimates for the UK" The Review of Economics and Statistics.

Matheism, D. J. (1979) "Financial Reform and Capital Flows in a Developing Economy" IMF staff Paper No. 3, Vol. 26.

Mayada, M. B.; Richard, L. M. and A. A. Nelson (1994) "Credit Rationing in Small-Scale Enterprises; Special Microenterprise Programmes in Ecuador" The Journal of Development Studies, Vol. 31, No. 2.

Mbat O. David (1982) "Commercial Banking and Rural Banking Policy in a Developing Economy: Policy Implications". Savings and Development, Vol. 6, No. 4.

Mc Lagan D. L. (1973) "A Non-econometrician's Guide to Econometrics" Business Economics, Vol. 8, No. 3.

Mckinnon, R. I. (1973) Money and Capital in Economic Development, Washington D.C. The Brookings Institution.

Mc Kinoon R (1989) "Financial Liberalization and Economic Development; A Reassessment of Interest Rate Policies" Vol. 5 (Winter).

Melitz and Pardue (1973). "The Demand and Supply of Commercial Bank loans". Journal of Money, Credit and Banking. No. 2, Vol. 5.

Meltzer A. H. (1974) "Credit Availability and Economic Decisions; Some Evidence from the Mortgage and Housing Markets". Journal of Finance, Vol. 29, No. 3.

Miller Merton H. (1962) "Credit Risk and Credit Rationing Further Comment" Quarterly Journal of Economics 76 (August).

Modigliani F. (1963), "The Monetary Mechanism and its Interaction with Real Phenomena: A Review of Recent Developments". Review of Economics and Statistics (Feb.).

Mordi C. N. (1986) "Specification and Estimation of the Demand and Supply Functions of Commercial Bank Loans and Advances in Nigeria 1961 - 1983" Economic and Financial Review of the Central Bank of Nigeria (March) Vol. 16, No. 1.

Muellbauer, J. and Portes, R. D. (1978) "Macroeconomic Models with Quantity Rationing", Economic Journal 88.

Muellbauer, K., (1978a) "Macrotheory vs Macroeconometrics: The Treatment of Disequilibrium in Macro models". Discussion Paper No. 59, Birbeck College, London.

Musgrave Richard A. (1948). "Credit Controls Interest Rates and Management of Public Debt", In Income Employment and Public Policy; Essays in Honour of Alvin H. Hansen, New York WW Norton and Coy.

Ndekwu, E. C. (1989) "Interest Rates, Bank Deposits and Growth of the Nigerian Economy", NISER Monograph Series.

Nickell, S. (1984) "The Modelling of Wages and Employment" In David Hendry and Ken Wallis (eds.) Econometrics and Applied Economics. (Oxford; Basil Blackwell 1984).

Nishat M. (1989) "Determinant of Growth of Bank Deposits in Parkistan" Savings and Development No. 4 Vol. xviii.

Nwankwo G. N. (1980) The Nigerian Financial System, London/Lagos The Macmillian Press.

Odama, J. S. (1974) "The Demand for Money in the Nigerian Economy: A comment" Nigerian journal of Economics and Social Studies Vol. 16 (March).

Ogiogio, G. O. (1992) "Measuring Commercial Bank Performance in Nigeria: A Framework, some Evidence and Lessons" Economic and Business Review, Vol. 1, No. 1.

Ogiogio, G. O. (1994): "Misalignment between Reforms in Exchange Rate and Credit Management Strategies in Nigeria's Structural Adjustment Programme", In Economic Policy Experience in Africa: What Have We Learned?, (eds.) A. Atsain, S. Wangwe and A. G. Drabek African Economic Research Consortium (AERC), Nairobi.

Ogiogio, G. O. (1989) "Ownership Structure and Firm performance in Nigeria's commercial Banking Industry". Saving and Development. Quarterly Review.

Ogiogio, G. O. (1989a) "Response of Financial Intermediaries to Interest Rate Differentials and implication for Monetary Policy Administration in Nigeria" African Review of money Finance and Banking No. 1 vol. 89.

Ogiogio, G. O. (1990) "Portfolio Performance of Nigeria's Financial Institutions" Unpublished PhD. Thesis of the University of Ibadan.

Ojo, J. A. T. and Adewunmi, O. (1984) Banking and Finance in Nigeria (Graham Burn).

Ojo, O. (1974) "The Demand for money in the Nigerian Economy. Some comments". Nigerian journal of Economics and Social Studies. Vol. 16, No. 1.

Ojo, O. (1976) "The Demand and Supply of Commercial Banks Loans in Nigeria, 1962-1972" In O. Teriba and V.P. Diejomaoh (ed.), Essay in Monetary Economics in Memory of Professor Olakanpo, Ibadan University Press.

Ojo, M. O. (1992) "The Evolution and Performance of Monetary Policy in Nigeria in the 1980s". Research Department occasional paper No. 2, Central Bank of Nigeria.

Ojo O. (1984) "Financial Intermediation and Growth". University of Ibadan Press (Inaugural lecture).

Okigbo, P. N. C. (1981) Nigeria Financial System: Structure and Growth (Essex; Longman).

Okorie Aja (1986) "The Extent of Risk in Commercial Banks Lending to Agriculture in Nigeria; Some Evidence". Savings and Development No. 4, Vol. 10.

Okorie Aja (1988) "The Role of Commercial Banks in Funding Agriculture in Nigeria (1960-1984)" African Review of Money Finance and Banking No. 1.

Olashore, O. (1988) Perspectives on Finance, Banking and Economic Policy in Nigeria. Heinemann Educational Books, Nigeria Limited, Ibadan.

Ostas Jr. and Zahn F. (1975). "Interest and Non-interest Credit Rationing in the Mortgage Market". Journal of Monetary Economics 1 (April).

Oyejide, A. and A. Soyode (1986a) "Commercial Banking and Economic Development" in A. Oyejide and A. Soyode (eds.) Commercial Banking in Nigeria. Unibadan Publishing Consultants.

Oyejide, A. and A. Soyode (1986b) "Market Share and Profitability in Commercial Banking" in Oyejide and Soyode (eds.) Commercial Banking in Nigeria. Unibadan Publishing Consultants.

Oyejide, A. and A. Soyode (1986c) "Deposit Relationships and Commercial Bank Earnings" in A. Oyejide and A. Soyode (eds) Commercial Banking in Nigeria. Unibadan Publishing Consultants.

Oyejide T. A. and A. Soyode (1986d) "Determinants of Structural Systems in Commercial Bank Deposits" In Oyejide and Soyode (eds) Commercial Banking in Nigeria. Unibadan Publishing Consultants.

Oyejide, A. and A. Soyode (1986e) "Commercial Banks in Nigeria; Resources, Uses and Effectiveness" in A. Oyejide and A. Soyode (eds) Commercial Banking in Nigeria. Unibadan Publishing Consultants.

Ozoaga W. O. (1981) Money and Banking in Nigeria (Enugu Forth Dimension Press).

Phelps E. S. and Sidney G. Winter (1970) "Optimal Price Policy under Automatic Competition" In Microeconomic Foundations of Employment and Inflation Theory, edited by Edmnd S. Phelps, New York Norton.

Philips A. (1970) "Structure, Conduct and Performance Conduct Structure" in J. Markham and G. Papanek. Industrial Organization and Economic Development in Honour of S. Mason (Boston. Houghton in Mifflin).

Popiel, P. (1994) "Financial System in Sub-Saharan Africa: A Comparative Study". World Bank Discussion Papers 260 Africa Technical Development Series.

Pringle J. J. (1974a) " A Theology of the Banking Firm: Comment" Journal of Money, Credit and Banking Vol. 5 (November).

Pringle J. J. (1974b) "The Capital Decision in Commercial Banks" Journal of Finance. Vol. 29, No. 3.

Pyndic R. S. and Rubinfeld D. L. (1991) Econometric Models and Economic Forecasts, (New York; Mc Graw-Hill).

Quandit, R. E. (1978) "Test of the Equilibrium Versus Disequilibrium Hypothesis", International Economic Review 19.

Quandit, R. E. (1982) "Econometrics of Disequilibrium Models", Econometric Reviews 1, 1-63.

Quandit, R. E. (1988) Econometrics of Disequilibrium (Oxford ;Basil Blackwell, 1988).

Ratti, R. A. (1980) "Bank Attitude Towards Risk; Implicit Rates of Interest and the Behaviour of an index of Risk Aversion for Commercial Banks". Quarterly Journal of Economics Vol. xcv.

Riefler, W. W. (1930) Money Rates and Money Markets, New York Harper and Bros 1930.

Roosa Robert V. (1951) "Interest Rates and the Central Bank" in Money, Trade and Economic Growth in Honour of John Henry Williams, New York, The Macmillan Coy.

Rosen Sherwin (1974) "Hedonic Prices and Implicit Markets: Product Differentiation in Pure Competition" Journal of Political Economy, 82(Jan./Feb.).

Rossi, N. (1986). "Government Spending, the Real Interest Rate, and the Behaviour of Liquidity Constrained Consumers in Developing Countries" IMF Staff Papers Vol. 34.

Rostow, W. W. (1960). The Stages of Economic Growth. Harper, New York.

Samuelson Paul, (1952). "Hearings before the Sub-Committee on General Credit Control and Debt Management of the Joint Committee on the Economic Report" 82nd Congress 2nd Session Washington D. C. Government Printing Office 1952.

Sayers, R. S. (1940) "Business men and the Terms of Borrowing" Oxford Economic Papers (March).

Schatz S. P. (1964) The Capital Shortage illusion In Development Bank Lending in Nigeria; NISER. Oxford University Press Ibadan Pp 89-106.

Scott Ira O. Jr. (1957a) "The Availability Doctrine; Theoretical Underpinnings", Review of Economic Studies (Oct.).

Scott Ira O. Jr. (1957b). "The Availability Doctrine: Development and Implications". Quarterly Journal of Economics (Nov.).

Sealey, C. W. (1979) "Credit Rationing in the Commercial Loan Market; Estimates of a Structural Model Under Conditions of Disequilibrium". Journal of Finance, Vol. 34, No. 2.

Shapiro, M. A. (1964) "Taking another look at long term bank financing" The Commercial and Financial Chronicles. Vol. 199, No. 6372 (28, May 1964).

Shaw, E. S. (1973) Financial Deepening in Economic Development (New York Oxford University press).

Shumpeter, J. A. (1934) The Theory of Economic Development (Cambridge mass: Harvard University Press).

Silber W. L. and Dolakoff M. E. (1970). "The Differential Effects of Tight Money; An Econometric Study". Journal of Finance (March).

Smith Warren L. (1956). "On the Effectiveness of Monetary Policy". American Economic Review (September).

Smith Vernon L. (1970) "The Theory of Credit Rationing - Some Generalizations" American Economic Review.

Smith Lawrence B. (1969). "A Model of the Canadian Housing and Mortgage Markets", Journal of Political Economy (Sept/Oct.).

Sneesens, H. R. (1983) "A Macroeconomic Rationing Model of the Belgian Economy, "European Economic Review 20.

Soyibo, A.; Sobodu, O. and R. Osayameh (1991) "A Multi Objective Lending and Credit Administration Model for Commercial Banks in a Developing Country" Saving and Development, No. 2, Vol. XV.

Soyibo, A. (1991) "The Saving-Investment Process in Nigeria: An Empirical Investigation of the Characteristics of the Supply Side" AERC Sponsored Research.

Soyibo, A. and F. Adekanye (1991) "The Nigerian Banking System in the Context of Policies of Financial Regulation and Deregulation" AERC Research Paper.

Sparks, Gordon R. (1968) "An Econometric Analysis of the Role of Financial Intermediaries in Post War Residential Building Cycles" In Robert Ferber eds. Determinants of Investment Behaviour. New York Columbia University Press.

Spencer P. D. (1975) "A Disequilibrium Model of Personal Sector Bank Advances 1964 - 1974: Some Preliminary Results" Working Paper; H. M. Treasury 1975.

Staley Fisher (1989) "Economic of Government Budget Constraint" A paper presented at the Zalid Hussain Memorial lecture at the state Bank of Parkistan Karachi.

Sterius, M. (1982). "Testing the Efficiency of the Finnish Bond Market" The Finish Journal of Business Economics.

Stightz and Weiss (1987). "A Credit Rationing Reply" American Economic Review; March.

Stiglitz, J. E. and A. Weiss (1981) "Credit Rationing in Markets with Imperfect Information". American Economic Review, Vol. 71, No. 3.

Teigen, R. (1969). "An Aggregated Quarterly Model of the United State Monetary Sector 1953 - 1964" In Targets and Indicators of Monetary Policy, ed, by K. Brunner, San Framsisco Chandler Publishing Co.

Teriba, O. (1968) "Competition for Bank Deposits in Nigeria" The Bankers.

Teriba, O. (1986) "The Development of the Banking Habit in Nigeria" In A Oyejide and A. Soyode op. cit.

The World Bank (1989) Financial Systems and Development. Policy and Research Series 15.

Thornton John (1989) "The Demand for money in India: A Test of Mckinnon Hypothesis". Savings and Development. Vol. 4.

Thorton John (1990) "Money and Capital in Economic Development; A Test of the Mckinnon Hypothesis for Nepal" Journal of Money, Credit and Banking.

Tobin James. (1953). "Monetary Policy and the Management of the Public Debt; The Patman Inquiry". Review of Economics and Statistics (May).

Tomori S. (1984) Indigenous Non-Bank Financial Institutions; Unpublished working paper, University of Lagos (April).

Tomori S. (1972) "Demand for money in the Nigerian Economy" Journal of Economic and Social Studies.

Tomori S. (1978) "Credit Management of Nigerian Commercial Banks". In Money Finance and Nigerian Economic Development. Edited by O. Teriba and V. P. Diejomaoh.

Tucker, D. P. (1968) "Credit Rationing, Interest Rate Lags and Monetary Policy Speed". Quarterly Journal of Economics, Vol. 84, Pp. 54 - 83.

Tun Wai U. (1972). Financial Intermediaries and National Savings. (New York; Preager).

Tussing A. Dale (1966). "Can Monetary Policy Influence the Availability of Credit" Journal of Finance (March).

Tybout J. R. (1983). "Credit Rationing and Investment Behaviour in a Developing Country". Review of Economics and Statistics. No. 4, Vol. 65.

Tybout J. R. (1984) "Interest Controls and Credit Allocation in Developing countries" Journal of Money, Credit and Banking. No. 4, Vol. 16.

Umo J. U. (1987) "Econometric Estimates of Some Styled Savings Functions for Members of the Economic Community of West African States. (ECOWAS). West African Economic Journal. Vol. 2, No. 2.

Wai Tun. U. (1956) "Interest rates in the organised money markets of underdeveloped countries" IMF Staff Papers. No. 2, Vol. 5.

Weiss L. W. (1963) "Factors in Changing Concentration" Review of Economics and Statistics, Vol. 45.

Williams John N. (1942) "The Implications of Fiscal Policy for Monetary Policy and the Banking System" American Economic Review, March 1942 Supplement.

Wong C. (1977) "Demand for money in developing countries; some theoretical and empirical results". Journal of Monetary Economics, Vol. 2 (January).

Wood J. H. (1975) A Model of Commercial Banks Loans and Investment Behaviour. John Willey & Sons.

ANNEX I

Output for a:ade.LST
Begun at
19:10:50 on 2nd October 1998

Data came from the Input Files: phd98.INF and phd98.BIN

Present Sample Dates are: 1970(2) to 1996(2) less 6 forecasts

PRIOR SEASONAL COEFFICIENTS

		CONSTANT	Q1	Q 2	Q 3
Lls		8.4501	.0901	-.007756	-.0426
Lld		8.2216	.0273	-.0575	-.0940
Lip		5.0483	.002333	-.0384	-.0465
Lip	1	5.0018	.0465	.0173	-.0184
Ldd		7.7631	.0768	-.0536	-.0955
Lcp		8.3896	.0475	-.0554	-.0980
Lbo		6.5275	.0256	-.005964	-.0306
Lup		7.4867	.0327	.000415	-.0437
Lup	1	7.4430	.0437	-.0187	-.0334
Ltd		7.5478	.0373	-.0533	-.0801
Lsd		7.0219	.0527	.001150	-.1609
kt		.4405	.002632	.0135	-.006316
Dt		.1053	.000000	-.005263	0.
Time		40.0000	1.	.000000	-1.
cdt		.0132	.000111	.001485	.000553
rccpr		.0129	-.003395	-.002972	-.001763
tdrrc		-.0209	.001132	.003522	.000763
rctbr		.0312	-.003947	-.003784	-.001895
Lls	1	8.4076	.0426	.0111	-.0567

RECURSIVE UNRESTRICTED SYSTEM ESTIMATES

	Lip	Lip1	Ldd	Lcp	Lbo	Lup	Lup1
Lls	-.3664	.0144	.2496	.3214	.2872	-.0153	.0605
Lld	-.0507	.1464	.0103	.4253	1.1877	-.1174	.2311

	Ltd	Lsd	kt	Dt	Time	cdt	rccpr
Lls	.1100	-.0362	-.1363	.1434	.0128	-10.9215	3.5699
Lld	.2145	.0165	-.5870	-.2629	-.0122	11.2815	1.6599

	tdrrc	rctbr	Lls1
Lls	1.5928	-3.3249	.1176
Lld	-1.6861	-2.3074	.0116

RECURSIVE UNRESTRICTED SYSTEM STANDARD ERRORS

	Lip	Lip1	Ldd	Lcp	Lbo	Lup	Lup1
Lls	.0797	.0797	.0936	.0933	.1897	.0636	.0588
Lld	.0846	.0846	.0994	.0990	.2014	.0675	.0624
	Ltd	Lsd	kt	Dt	Time	cdt	rccpr
Lls	.0550	.0273	.1028	.0584	.0065	3.5158	1.1342
Lld	.0583	.0290	.1091	.0621	.0070	3.7327	1.2042
	tdrrc	rctbr	Lls1				
Lls	1.0588	1.5135	.0962				
Lld	1.1241	1.6068	.1021				

COVARIANCE MATRIX of UNRESTRICTED SYSTEM RESIDUALS

	Lls	Lld
Lls	.0027	
Lld	.0003	.0030

STANDARD DEVIATIONS of EQUATION RESIDUALS

Lls	.05173
Lld	.05492

LOG DET Ω = -11.742327

LIKELIHOOD α 354.661305

LOG DET YY/T = -3.60531833

VECTOR ALIENATION COEFFICIENT = .00029

TRACE CORRELATION = .92014

F-tests on Retained Regressors:

F(2, 56)

	Lip	Lip1	Ldd	Lcp	Lbo	Lup
F =	7.68	1.09	2.60	9.85	12.87	1.10
Pr=	.0011	.3432	.0829	.0002	.0000	.3402
	Lup1	Ltd	Lsd	kt	Dt	Time
F =	5.11	5.80	.84	10.68	9.79	2.85
Pr=	.0092	.0051	.4378	.0001	.0002	.0665
	cdt	rccpr	tdrrc	rctbr	Lls1	
F =	7.79	3.97	1.87	2.26	.54	
Pr=	.0010	.0245	.1634	.1141	.5833	

CORRELATION MATRIX of SYSTEM RESIDUALS

	Lls	Lld
Lls	1.0000	
Lld	.1230	1.0000

SYSTEM SEASONALS

	CONSTANT	Q1	Q 2	Q 3
Lls	1.5855	.0251	.0278	.0326
Lld	-5.6892	-.0355	-.0232	-.0139

STANDARD ERRORS OF SYSTEM SEASONALS

	CONSTANT	Q1	Q 2	Q 3
Lls	1.1545	.0177	.0190	.0177
Lld	1.2257	.0188	.0202	.0188

URF SIMULATION

LAG-1 MULTIPLIERS

	Lip	Lip1	Ldd	Lcp	Lbo	Lup	Lup1
Lls	-.043	.0017	.029	.038	.034	-.0018	.007110
Lld	-.004	.0002	.0029	.0037	.003	-.00018	.000703

	Ltd	Lsd	kt	Dt	Time	cdt	rccpr
Lls	.013	-.0043	-.016	.017	.0015	-1.284	.420
Lld	.0013	-.0004	-.0016	.0017	.00015	-.127	.042

	tdrrc	rctbr
Lls	.187	-.391
Lld	.019	-.039

LONG-RUN [I-π(1)] MATRIX

	Lls	Lld
Lls	-.882	0.
Lld	.012	-1.

LONG-RUN MULTIPLIERS

	Lip	Lip1	Ldd	Lcp	Lbo	Lup	Lup1
Lls	-.415	.016	.283	.364	.325	-.017	.069
Lld	-.056	.147	.014	.430	1.191	-.118	.232

	Ltd	Lsd	kt	Dt	Time	cdt	rccpr
Lls	.125	-.041	-.154	.162	.015	-12.377	4.046
Lld	.216	.016	-.589	-.261	-.012	11.137	1.707

	tdrrc	rctbr
Lls	1.805	-3.768
Lld	-1.665	-2.351

CORRELATION of ACTUAL and PREDICTED

SAMPLE period is 1970 2 - 1996 2

Lls	Lld
.9992	.9991

CORRELATION of ACTUAL and SIMULATED

SIMULATION period is 1970 2 - 1996 2

Lls	Lld
.9992	.9991

Tests of parameter CONSTANCY over: 1995 1 - 1996 2

ERROR VARIANCE FORECAST TEST [no parameter variance]

SINGLE CHI²(2)/ 2

HORIZON	1	2	3	4	5	6
	11.113	7.612	34.448	43.721	25.271	65.285

CUMULATIVE TEST: CHI²(12)/ 12 = 31.242

MATRIX OF FORECAST STANDARD ERRORS

HORIZON	1	2	3	4	5	6
Lls	.0783	.0762	.1138	.1174	.1290	.1200
Lld	.0832	.0809	.1208	.1246	.1370	.1274

FORECAST CONFIDENCE INTERVAL

SINGLE CHI²(2)/ 2

HORIZON	1	2	3	4	5	6
	4.846	3.510	7.116	8.491	4.064	12.132

CUMULATIVE TEST: CHI²(12)/ 12 = 6.693

Forecast Test F-FORM: F(12, 56) = 4.868 [.0000] **

MEAN FORECAST ERRORS

Lls	Lld
.13193	-.34448

FORECAST STANDARD ERRORS

Lls	Lld
.14634	.12319

FORECAST-ERROR CORRELATION MATRIX

	Lls	Lld
Lls	1.0000	
Lld	-.6903	1.0000

Present Sample Dates are: 1970(2) to 1996(2) less 6 forecasts

PRIOR SEASONAL COEFFICIENTS

		CONSTANT	Q 1	Q 2	Q 3
Lls		8.4501	.0901	-.007756	-.0426
Lld		8.2216	.0273	-.0575	-.0940
Lip		5.0483	.002333	-.0384	-.0465
Lip	1	5.0018	.0465	.0173	-.0184
Ldd		7.7631	.0768	-.0536	-.0955
Lcp		8.3896	.0475	-.0554	-.0980
Lbo		6.5275	.0256	-.005964	-.0306
Lup		7.4867	.0327	.000415	-.0437
Lup	1	7.4430	.0437	-.0187	-.0334
Ltd		7.5478	.0373	-.0533	-.0801
Lsd		7.0219	.0527	.001150	-.1609
kt		.4405	.002632	.0135	-.006316
Dt		.1053	.000000	-.005263	0.
Time		40.0000	1.	.000000	-1.
cdt		.0132	.000111	.001485	.000553
rccpr		.0129	-.003395	-.002972	-.001763
tdrrc		-.0209	.001132	.003522	.000763
rctbr		.0312	-.003947	-.003784	-.001895
Lls	1	8.4076	.0426	.0111	-.0567

2SLS ESTIMATION

LOG DET Ω = -10.334525
LIKELIHOOD α 175.433899

L.R. TEST of OVER-IDENTIFYING RESTRICTIONS
$CHI^2(15)$ = 108.401

RESIDUAL COVARIANCE MATRIX

	Lls	Lld
Lls	.0046	
Lld	-.0009	.0072

EQUATION STANDARD ERRORS

Lls	.068049
Lld	.084870

SEASONALS COEFFICIENTS

	CONSTANT	Q 1	Q 2	Q 3
Lls	-1.9818	.0147	.0314	.0313
Lld	1.4539	-.0285	-.0433	-.0214

2SLS SIMULATION

LAG-1 MULTIPLIERS

	Lip	Lip1	Ldd	Lcp	Lbo	Lup	Lup1
Lls	0.	0.	0.	0.	0.	0.	0.
Lld	-.049	.034	.193	0.	.265	0.	0.
	Ltd	Lsd	kt	Dt	Time	cdt	rccpr
Lls	0.	0.	0.	0.	0.	0.	0.
Lld	.048	-.026	-.110	0.	0.	.782	0.
	tdrrc	rctbr					
Lls	0.	0.					
Lld	-.186	-.177					

LONG-RUN $[I-\pi(1)]$ MATRIX

	Lls	Lld
Lls	-1.	0.
Lld	.316	-1.

LONG-RUN MULTIPLIERS

	Lip	Lip1	Ldd	Lcp	Lbo	Lup	Lup1
Lls	-.155	.106	.612	0.	.840	0.	0.
Lld	-.244	.235	.193	.244	.265	-.193	.322
	Ltd	Lsd	kt	Dt	Time	cdt	rccpr
Lls	.152	-.081	-.348	0.	0.	2.473	0.
Lld	.048	-.026	-.110	-.427	.027	.782	3.819
	tdrrc	rctbr					
Lls	-.590	-.559					
Lld	-.186	-.177					

CORRELATION of ACTUAL and PREDICTED

SAMPLE period is 1970 2 - 1996 2

Lls	Lld
.9986	.9980

CORRELATION of ACTUAL and SIMULATED

SIMULATION period is 1970 2 - 1996 2

Lls	Lld
.9986	.9980

Tests of parameter CONSTANCY over: 1995 1 - 1996 2

ERROR VARIANCE FORECAST TEST [no parameter variance]

SINGLE $CHI^2(2)/2$

HORIZON	1	2	3	4	5	6
	11.799	7.575	4.742	8.271	1.505	13.375

CUMULATIVE TEST: $CHI^2(12)/12$ = 7.878

MEAN FORECAST ERRORS

Lls	Lld
-.06301	-.29223

FORECAST STANDARD ERRORS

Lls	Lld
.02601	.11560

FORECAST-ERROR CORRELATION MATRIX

	Lls	Lld
Lls	1.0000	
Lld	-.4212	1.0000

RESTRICTED REDUCED FORM COEFFICIENTS

	Lip	Lip1	Ldd	Lcp	Lbo	Lup	Lup1
Lls	-.155	.106	.612	0.	.840	0.	0.
Lld	-.195	.202	0.	.244	0.	-.193	.322

	Ltd	Lsd	kt	Dt	Time	cdt	rccpr
Lls	.152	-.081	-.348	0.	0.	2.473	0.
Lld	0.	0.	0.	-.427	.027	0.	3.819

	tdrrc	rctbr	Lls1
Lls	-.590	-.559	0.
Lld	0.	0.	.316

RESTRICTED REDUCED FORM STANDARD ERRORS

	Lip	Lip1	Ldd	Lcp	Lbo	Lup	Lup1
Lls	.092	.091	.046	0.	.111	0.	0.
Lld	.114	.118	0.	.096	0.	.086	.093

	Ltd	Lsd	kt	Dt	Time	cdt	rccpr
Lls	.061	.033	.087	0.	0.	3.024	0.
Lld	0.	0.	0.	.066	.0041	0.	1.099

	tdrrc	rctbr	Lls1
Lls	1.213	1.291	0.
Lld	0.	0.	.127

COVARIANCE Matrix of REDUCED FORM RESIDUALS

	Lls	Lld
Lls	.0046	
Lld	-.0009	.0072

REDUCED FORM EQUATION STANDARD ERRORS

Lls	.068049
Lld	.084870

CORRELATION MATRIX of REDUCED FORM RESIDUALS

	Lls	Lld
Lls	1.0000	
Lld	-.1608	1.0000

REDUCED FORM SEASONALS

	CONSTANT	Q 1	Q 2	Q 3
Lls	-1.9818	.0147	.0314	.0313
Lld	1.4539	-.0285	-.0433	-.0214

STANDARD ERRORS of STRUCTURAL SEASONALS

	CONSTANT	Q 1	Q 2	Q 3
Lls	.4981	.0229	.0230	.0227
Lld	.5157	.0282	.0292	.0282

EQUATION 1 for Lls

VAR	COEFF	STANDARD ERROR	t-RATIO	PROBABILITY
Lip	-.15504	.09202	-1.685	.0967
Lip1	.10625	.09155	1.161	.2500
Ldd	.61175	.04601	13.296	.0000
Lbo	.83977	.11175	7.515	.0000
Ltd	.15196	.06189	2.455	.0167
Lsd	-.08095	.03304	-2.450	.0169
kt	-.34845	.08756	-3.979	.0002
cdt	2.47325	3.05281	.810	.4207
tdrrc	-.58970	1.22716	-.481	.6324
rctbr	-.55906	1.30362	-.429	.6694

EQUATION 2 for Lld

VAR	COEFF	STANDARD ERROR	t-RATIO	PROBABILITY
Lip	-.19521	.11387	-1.714	.0910
Lip	.20180	.11863	1.701	.0935
Lcp	.24420	.09668	2.526	.0139
Lup	-.19324	.08695	-2.222	.0296
Lup1	.32213	.09452	3.408	.0011
Dt	-.42739	.06604	-6.471	.0000
Time	.02707	.00415	6.518	.0000
rccpr	3.81888	1.10770	3.448	.0010
Lls1	.31603	.12850	2.459	.0165

Tests of Parameter CONSTANCY over: 1995 1 - 1996 2

MATRIX of FORECAST STANDARD ERRORS

HORIZON	1	2	3	4	5	6
Lls	.0919	.0879	.1142	.1138	.1238	.1186
Lld	.1120	.1104	.1059	.1137	.1200	.1166

SINGLE CHI^2(2)/ 2

HORIZON	1	2	3	4	5	6
	6.633	4.414	2.647	4.106	.576	6.847

CUMULATIVE TEST: CHI²(12)/ 12 = 4.204

Forecast Test F-FORM: F(12, 64) = 3.494 [.0005] **

[2SLS ESTIMATION]

```
[ 1]  Lls =   -.155 Lip + .106 Lip1 + .612 Ldd
SE           (.09202)     (.09155)     (.04601)
   +.840 Lbo + .152 Ltd  -.081 Lsd   -.348 kt
   (.11175)    (.06189)    (.03304)    (.08756)
   + 2.473 cdt  -.590 tdrrc   -.559 rctbr
   (3.05281)    (1.22716)    (1.30362)
           Eq σ =         .068049
[ 2]  Lld  =  -.195 Lip + .202 Lip1 +  .244 Lcp
SE           (.11387)     (.11863)     (.09668)
    -.193 Lup + .322 Lup1   -.427 Dt + .027 Time
   (.08695)    (.09452)    (.06604)    (.00415)
   + 3.819 rccpr + .316 Lls1
   (1.10770)      (.12850)
           Eq σ =  .084870
```

3SLS ESTIMATION

LOG DET Ω = -10.343815

LIKELIHOOD α 176.250733

L.R. TEST of OVER-IDENTIFYING RESTRICTIONS

CHI²(15) = 107.685

RESIDUAL COVARIANCE MATRIX

	Lls	Lld
Lls	.0047	
Lld	-.0012	.0072

EQUATION STANDARD ERRORS

Lls	.068240
Lld	.084934

SEASONALS COEFFICIENTS

	CONSTANT	Q 1	Q 2	Q 3
Lls	-2.0004	.0144	.0311	.0313
Lld	1.4650	-.0275	-.0426	-.0213

3SLS SIMULATION

LAG-1 MULTIPLIERS

	Lip	Lip1	Ldd	Lcp	Lbo	Lup	Lup1
Lls	0.	0.	0.	0.	0.	0.	0.
Lld	-.049	.036	.194	0.	.272	0.	0.

	Ltd	Lsd	kt	Dt	Time	cdt	rccpr
Lls	0.	0.	0.	0.	0.	0.	0.
Lld	.050	-.024	-.127	0.	0.	.855	0.

	tdrrc	rctbr
Lls	0.	0.
Lld	-.227	-.231

LONG-RUN [I-π(1)] MATRIX

	Lls	Lld
Lls	-1.	0.
Lld	.323	-1.

LONG-RUN MULTIPLIERS

	Lip	Lip1	Ldd	Lcp	Lbo	Lup	Lup1
Lls	-.152	.112	.599	0.	.842	0.	0.
Lld	-.255	.230	.194	.253	.272	-.200	.325

	Ltd	Lsd	kt	Dt	Time	cdt	rccpr
Lls	.156	-.074	-.394	0.	0.	2.643	0.
Lld	.050	-.024	-.127	-.420	.026	.855	4.005

	tdrrc	rctbr
Lls	-.701	-.715
Lld	-.227	-.231

y - y* from Equation [1] for Lls

ANALYSIS OF SCALED RESIDUALS

Sample Size 77

Mean	-.000006
Std.Devn.	1.006558
Skewness	-.514774
Excess Kurtosis	2.277332
Minimum	-3.767105
Maximum	3.127620

CHI-SQUARED Test For NORMALITY on Lls : CHI²(2) = 17.437

RESIDUAL CORRELOGRAM

77*(Sum Of 16 Squared Residual Autocorrelations) = 26.138

.2349	-.0917	.2618	.1075	-.0688	.0913	.0331	-.2126
-.0434	.0475	-.0549	-.1153	-.0449	-.1730	-.1727	-.2328

CORRELATION of ACTUAL and PREDICTED

SAMPLE period is 1970 2 - 1996 2

Lls	Lld
.9986	.9980

CORRELATION of ACTUAL and SIMULATED

SIMULATION period is 1970 2 - 1996 2

Lls	Lld
.9986	.9980

Tests of parameter CONSTANCY over: 1995 1 - 1996 2

ERROR VARIANCE FORECAST TEST [no parameter variance]

SINGLE CHI²(2)/ 2

HORIZON	1	2	3	4	5	6
	12.828	8.070	5.142	9.032	1.853	14.077

CUMULATIVE TEST: CHI²(12)/ 12 = 8.500

MEAN FORECAST ERRORS

Lls	Lld
-.06568	-.29881

FORECAST STANDARD ERRORS

Lls	Lld
.02774	.11597

FORECAST-ERROR CORRELATION MATRIX

	Lls	Lld
Lls	1.0000	
Lld	-.4607	1.0000

RESTRICTED REDUCED FORM COEFFICIENTS

	Lip	Lip1	Ldd	Lcp	Lbo	Lup	Lup1
Lls	-.152	.112	.599	0.	.842	0.	0.
Lld	-.206	.194	0.	.253	0.	-.200	.325

	Ltd	Lsd	kt	Dt	Time	cdt	rccpr
Lls	.156	-.074	-.394	0.	0.	2.643	0.
Lld	0.	0.	0.	-.420	.026	0.	4.005

	tdrrc	rctbr	Lls1
Lls	-.701	-.715	0.
Lld	0.	0.	.323

RESTRICTED REDUCED FORM STANDARD ERRORS

	Lip	Lip1	Ldd	Lcp	Lbo	Lup	Lup1
Lls	.092	.092	.045	0.	.110	0.	0.
Lld	.114	.118	0.	.095	0.	.085	.093
	Ltd	Lsd	kt	Dt	Time	cdt	rccpr
Lls	.061	.032	.087	0.	0.	3.014	0.
Lld	0.	0.	0.	.065	.0041	0.	1.095
	tdrrc	rctbr	Lls1				
Lls	1.208	1.287	0.				
Lld	0.	0.	.126				

COVARIANCE Matrix of REDUCED FORM RESIDUALS

	Lls	Lld
Lls	.0047	
Lld	-.0012	.0072

REDUCED FORM EQUATION STANDARD ERRORS

Lls	.068240
Lld	.084934

CORRELATION MATRIX of REDUCED FORM RESIDUALS

	Lls	Lld
Lls	1.0000	
Lld	-.2042	1.0000

REDUCED FORM SEASONALS

	CONSTANT	Q 1	Q 2	Q 3
Lls	-2.0004	.0144	.0311	.0313
Lld	1.4650	-.0275	-.0426	-.0213

STANDARD ERRORS of STRUCTURAL SEASONALS

	CONSTANT	Q 1	Q 2	Q 3
Lls	.4966	.0230	.0230	.0228
Lld	.5138	.0282	.0292	.0282

EQUATION 1 for Lls

VAR	COEFF	STANDARD ERROR	t-RATIO	PROBABILITY
Lip	-.15152	.09185	-1.650	.1037
Lip1	.11156	.09140	1.221	.2265
Ldd	.59875	.04559	13.134	.0000
Lbo	.84236	.11056	7.619	.0000
Ltd	.15568	.06113	2.547	.0132
Lsd	-.07376	.03263	-2.260	.0271
kt	-.39411	.08684	-4.538	.0000
cdt	2.64348	3.02384	.874	.3851
tdrrc	-.70087	1.21348	-.578	.5655
rctbr	-.71458	1.29101	-.554	.5817

EQUATION 2 for Lld

VAR	COEFF	STANDARD ERROR	t-RATIO	PROBABILITY
Lip	-.20650	.11380	-1.815	.0740
Lip1	.19425	.11838	1.641	.1054
Lcp	.25275	.09581	2.638	.0103
Lup	-.20022	.08589	-2.331	.0227
Lup1	.32512	.09331	3.484	.0009
Dt	-.42013	.06552	-6.412	.0000
Time	.02649	.00411	6.443	.0000
rccpr	4.00498	1.09915	3.644	.0005
Lls1	.32340	.12709	2.545	.0132

Tests of Parameter CONSTANCY over: 1995 1 - 1996 2

MATRIX of FORECAST STANDARD ERRORS

HORIZON	1	2	3	4	5	6
Lls	.0921	.0880	.1142	.1138	.1238	.1186
Lld	.1119	.1103	.1059	.1136	.1199	.1165

SINGLE CHI^2(2)/ 2

HORIZON	1	2	3	4	5	6
	7.180	4.688	2.812	4.383	.691	7.127

CUMULATIVE TEST: CHI^2(12)/ 12 = 4.480

Forecast Test F-FORM: F(12, 64) = 3.724 [.0003] **

[3SLS ESTIMATION]

[1] Lls = -.152 Lip + .112 Lip1 + .599 Ldd
SE (.09185) (.09140) (.04559)
+.842 Lbo +.156 Ltd -.074 Lsd -.394 kt
(.11056) (.06113) (.03263) (.08684)
+ 2.643 cdt -.701 tdrrc -.715 rctbr
(3.02384) (1.21348) (1.29101)
Eq σ = .068240

[2] Lld = -.206 Lip + .194 Lip1 + .253 Lcp
SE (.11380) (.11838) (.09581)
-.200 Lup + .325 Lup1 -.420 Dt + .026 Time
(.08589) (.09331) (.06552) (.00411)
+ 4.005 rccpr + .323 Lls1
(1.09915) (.12709)
Eq σ = .084934

FIML ESTIMATION

LITTLE CHANGE IN FUNCTION VALUES OVER THE LAST 1 ITERATIONS.

STRONG CONVERGENCE in BFGS after 68 Iterations and 280 Function Calls

P A R A M E T E R S

-.1498	.1138	.5934	.8432	.1573	-.0709	-.4116
2.6955	-.7352	-.7792	-.2099	.1907	.2583	-.2031
.3259	-.4162	.0263	4.0610	.3245		

G R A D I E N T S

-.00000009	.00000005	.00000050	-.00000004	.00000013	.00000088	-.00000002
-.00000000	-.00000002	-.00000000	.00000014	.00000002	.00000007	-.00000064
-.00000061	-.00000003	.00000862	-.00000000	.00000030		

F U N C T I O N = -5.172297154427

LOG DET Ω = -10.344594

LIKELIHOOD α 176.319406

L.R. TEST of OVER-IDENTIFYING RESTRICTIONS

CHI^2(15) = 107.625

RESIDUAL COVARIANCE MATRIX

	Lls	Lld
Lls	.0047	
Lld	-.0013	.0072

EQUATION STANDARD ERRORS

Lls	.068417
Lld	.084994

SEASONALS COEFFICIENTS

	CONSTANT	Q 1	Q 2	Q 3
Lls	-2.0080	.0143	.0310	.0313
Lld	1.4691	-.0272	-.0421	-.0211

FIML SIMULATION

LAG-1 MULTIPLIERS

	Lip	Lip1	Ldd	Lcp	Lbo	Lup	Lup1
Lls	0.	0.	0.	0.	0.	0.	0.
Lld	-.049	.037	.193	0.	.274	0.	0.

	Ltd	Lsd	kt	Dt	Time	cdt	rccpr
Lls	0.	0.	0.	0.	0.	0.	0.
Lld	.051	-.023	-.134	0.	0.	.875	0.

	tdrrc	rctbr
Lls	0.	0.
Lld	-.239	-.253

LONG-RUN [I-π(1)] MATRIX

	Lls	Lld
Lls	-1.	0.
Lld	.324	-1.

LONG-RUN MULTIPLIERS

	Lip	Lip1	Ldd	Lcp	Lbo	Lup	Lup1
Lls	-.150	.114	.593	0.	.843	0.	0.
Lld	-.259	.228	.193	.258	.274	-.203	.326

	Ltd	Lsd	kt	Dt	Time	cdt	rccpr
Lls	.157	-.071	-.412	0.	0.	2.695	0.
Lld	.051	-.023	-.134	-.416	.026	.875	4.061

	tdrrc	rctbr
Lls	-.735	-.779
Lld	-.239	-.253

CORRELATION of ACTUAL and PREDICTED

SAMPLE period is 1970 2 - 1996 2

Lls	Lld
.9985	.9979

CORRELATION of ACTUAL and SIMULATED

SIMULATION period is 1970 2 - 1996 2

Lls	Lld
.9985	.9980

Tests of parameter CONSTANCY over: 1995 1 - 1996 2

ERROR VARIANCE FORECAST TEST [no parameter variance]

SINGLE CHI^2(2)/ 2

HORIZON	1	2	3	4	5	6
	13.183	8.248	5.275	9.283	1.970	14.341

CUMULATIVE TEST: CHI^2(12)/ 12 = 8.717

MEAN FORECAST ERRORS

Lls	Lld
-.06580	-.30114

FORECAST STANDARD ERRORS

Lls	Lld
.02840	.11615

FORECAST-ERROR CORRELATION MATRIX

	Lls	Lld
Lls	1.0000	
Lld	-.4742	1.0000

RESTRICTED REDUCED FORM COEFFICIENTS

	Lip	Lip1	Ldd	Lcp	Lbo	Lup	Lup1
Lls	-.150	.114	.593	0.	.843	0.	0.
Lld	-.210	.191	0.	.258	0.	-.203	.326
	Ltd	Lsd	kt	Dt	Time	cdt	rccpr
Lls	.157	-.071	-.412	0.	0.	2.695	0.
Lld	0.	0.	0.	-.416	.026	0.	4.061
	tdrrc	rctbr	Lls1				
Lls	-.735	-.779	0.				
Lld	0.	0.	.324				

RESTRICTED REDUCED FORM STANDARD ERRORS

	Lip	Lip1	Ldd	Lcp	Lbo	Lup	Lup1
Lls	.092	.092	.045	0.	.110	0.	0.
Lld	.114	.118	0.	.095	0.	.085	.092
	Ltd	Lsd	kt	Dt	Time	cdt	rccpr
Lls	.061	.032	.087	0.	0.	3.014	0.
Lld	0.	0.	0.	.065	.004	0.	1.093
	tdrrc	rctbr	Lls1				
Lls	1.208	1.287	0.				
Lld	0.	0.	.126				

COVARIANCE Matrix of REDUCED FORM RESIDUALS

	Lls	Lld
Lls	.0047	
Lld	-.0013	.0072

REDUCED FORM EQUATION STANDARD ERRORS

Lls	.068417
Lld	.084994

CORRELATION MATRIX of REDUCED FORM RESIDUALS

	Lls	Lld
Lls	1.0000	
Lld	-.2208	1.0000

REDUCED FORM SEASONALS

	CONSTANT	Q 1	Q 2	Q 3
Lls	-2.0080	.0143	.0310	.0313
Lld	1.4691	-.0272	-.0421	-.0211

STANDARD ERRORS of STRUCTURAL SEASONALS

	CONSTANT	Q 1	Q 2	Q 3
Lls	.4965	.0230	.0231	.0229
Lld	.5132	.0282	.0292	.0282

EQUATION 1 for Lls

VAR	COEFF	STANDARD ERROR	t-RATIO	PROBABILITY
Lip	-.14981	.09220	-1.625	.1089
Lip1	.11380	.09176	1.240	.2192
Ldd	.59336	.04546	13.054	.0000
Lbo	.84317	.11009	7.659	.0000
Ltd	.15732	.06078	2.588	.0118
Lsd	-.07087	.03244	-2.185	.0324
kt	-.41157	.08664	-4.750	.0000
cdt	2.69549	3.01391	.894	.3743
tdrrc	-.73521	1.20767	-.609	.5447
rctbr	-.77915	1.28658	-.606	.5468

EQUATION 2 for Lld

VAR	COEFF	STANDARD ERROR	t-RATIO	PROBABILITY
Lip	-.20993	.11390	-1.843	.0697
Lip1	.19068	.11834	1.611	.1117
Lcp	.25829	.09516	2.714	.0084
Lup	-.20314	.08506	-2.388	.0197
Lup1	.32586	.09237	3.528	.0008
Dt	-.41624	.06514	-6.390	.0000
Time	.02625	.00408	6.436	.0000
rccp	4.06096	1.09302	3.715	.0004
Lls1	.32449	.12601	2.575	.0122

Tests of Parameter CONSTANCY over: 1995 1 - 1996 2

MATRIX of FORECAST STANDARD ERRORS

HORIZON	1	2	3	4	5	6
Lls	.0922	.0882	.1143	.1140	.1239	.1188
Lld	.1119	.1103	.1059	.1136	.1198	.1164

SINGLE CHI²(2)/ 2

HORIZON	1	2	3	4	5	6
	7.368	4.787	2.867	4.471	.729	7.232

CUMULATIVE TEST: CHI²(12)/ 12 = 4.576

Forecast Test F-FORM: F(12, 64) = 3.803 [.0002] **

```
   [FIML   ESTIMATION ]
[ 1]  Lls  = -.150 Lip +  .114 Lip1 + .593 Ldd
SE            (.09220)     (.09176)   (.04546)
+ .843 Lbo + .157 Ltd  -.071 Lsd  -.412 kt
  (.11009)   (.06078)   (.03244)  (.08664)
   + 2.695 cdt  -.735 tdrrc  -.779 rctbr
   (3.01391)    (1.20767)    (1.28658)
          Eq σ =   .068417

[ 2]  Lld  = -.210 Lip + .191 Lip1 +  .258 Lcp
SE           (.11390)     (.11834)     (.09516)
   -.203 Lup +.326 Lup1  -.416 Dt + .026 Time
   (.08506)   (.09237)   (.06514)   (.00408)
   + 4.061 rccpr + .324 Lls1
   (1.09302)      (.12601)
          Eq σ =  .084994

System Modelling Session Finished at
19:59:49 on  2nd October   1998
```

Output for ph1.LST
Begun at
8:25:18 on 14th May 1998

Data came from the Input Files: phd98.INF and phd98.BIN

Present Sample Dates are: 1970(2) to 1996(2) less 8 forecasts

PRIOR SEASONAL COEFFICIENTS

		CONSTANT	Q1	Q2	Q3
Lls		8.4501	-.008086	-.0993	-.0426
Lld		8.2216	-.0661	-.1516	-.0940
Lip		5.0483	-.0212	-.0649	-.0465
Ldd		7.7631	-.0109	-.1369	-.0955
Lcp		8.3896	-.0409	-.1475	-.0980
Lbo		6.5275	-.0235	-.0552	-.0306
Lup		7.4867	-.0448	-.0770	-.0437
Ltd		7.5478	-.0604	-.1354	-.0801
kt		.4405	-.009415	.003158	-.006316
rccpr		.0129	-.005253	-.004711	-.001763
tdrrc		-.0209	.001975	.004184	.000763
rctbr		.0312	-.005629	-.005368	-.001895
cdt		.0132	-.000816	.000363	.000553
Lls	1	8.4076	-.0561	-.0882	-.0567

RECURSIVE UNRESTRICTED SYSTEM ESTIMATES

	Lip	Ldd	Lcp	Lbo	Lup	Ltd	kt
Lls	-.2999	.2074	.2647	.4951	.1116	.1405	.0839
Lld	.0284	.0202	.6068	1.0078	.0099	.1480	-.8083

	rccpr	tdrrc	rctbr	cdt	Lls1
Lls	4.5005	-.2186	-4.4901	-2.7138	.2044
Lld	1.1132	-.5655	-2.5299	-1.0343	-.0992

RECURSIVE UNRESTRICTED SYSTEM STANDARD ERRORS

	Lip	Ldd	Lcp	Lbo	Lup	Ltd	kt
Lls	.0756	.1038	.0971	.1267	.0411	.0584	.1119
Lld	.0913	.1254	.1174	.1532	.0497	.0706	.1353

	rccpr	tdrrc	rctbr	cdt	Lls1
Lls	1.2129	1.1083	1.6084	2.7581	.0954
Lld	1.4663	1.3398	1.9444	3.3343	.1154

COVARIANCE MATRIX of UNRESTRICTED SYSTEM RESIDUALS

	Lls	Lld
Lls	.0034	
Lld	-.0005	.0050

STANDARD DEVIATIONS of EQUATION RESIDUALS

Lls	.05833
Lld	.07052

LOG DET Ω = -11.002245
LIKELIHOOD α 244.966792
LOG DET YY/T = -3.62821196
VECTOR ALIENATION COEFFICIENT = .00063
TRACE CORRELATION = .84496

F-tests on Retained Regressors:
F(2, 59)

	Lip	Ldd	Lcp	Lbo	Lup	Ltd
F =	6.21	1.64	15.04	25.92	3.01	4.56
Pr=	.0036	.203	.0000	.0000	.0568	.0143

	kt	rccpr	tdrrc	rctbr	cdt	Lls1
F =	14.04	6.01	.09	4.15	.46	1.95
Pr=	.0000	.0042	.9096	.0206	.6365	.1519

CORRELATION MATRIX of SYSTEM RESIDUALS

	Lls	Lld
Lls	1.0000	
Lld	-.1235	1.0000

SYSTEM SEASONALS

	CONSTANT	Q1	Q 2	Q 3
Lls	-.6372	.0326	.0204	.0338
Lld	-3.6837	-.0287	.007084	-.000694

STANDARD ERRORS OF SYSTEM SEASONALS

	CONSTANT	Q1	Q 2	Q 3
Lls	.5451	.0199	.0202	.0194
Lld	.6590	.0241	.0244	.0234

URF SIMULATION

LAG-1 MULTIPLIERS

	Lip	Ldd	Lcp	Lbo	Lup	Ltd	kt
Lls	-.061	.042	.054	.101	.023	.029	.017
Lld	.030	-.021	-.026	-.049	-.011	-.014	-.008320

	rccpr	tdrrc	rctbr	cdt
Lls	.920	-.045	-.918	-.555
Lld	-.446	.022	.445	.269

LONG-RUN [I-π(1)] MATRIX

	Lls	Lld
Lls	-.796	0.
Lld	-.099	-1.

LONG-RUN MULTIPLIERS

	Lip	Ldd	Lcp	Lbo	Lup	Ltd	kt
Lls	-.377	.261	.333	.622	.140	.177	.105
Lld	.066	-.0057	.574	.946	-.004	.131	-.819

	rccpr	tdrrc	rctbr	cdt
Lls	5.657	-.275	-5.644	-3.411
Lld	0.552	-.538	-1.970	-.696

CORRELATION of ACTUAL and PREDICTED

SAMPLE period is 1970 2 - 1996 2

Lls	Lld
.9989	.9986

CORRELATION of ACTUAL and SIMULATED

SIMULATION period is 1970 2 - 1996 2

Lls	Lld
.9989	.9985

Tests of parameter CONSTANCY over: 1994 3 - 1996 2

ERROR VARIANCE FORECAST TEST [no parameter variance]

SINGLE CHI²(2)/ 2

HORIZON	1	2	3	4	5	6	7	8
	1.568	3.647	7.673	5.392	1.434	1.184	1.114	6.494

CUMULATIVE TEST: CHI²(16)/ 16 = 3.563

MATRIX OF FORECAST STANDARD ERRORS

HORIZON	1	2	3	4	5	6	7	8
Lls	.0714	.0787	.0873	.0866	.1118	.1116	.1204	.1168
Lld	.0863	.0952	.1056	.1047	.1351	.1349	.1455	.1412

FORECAST CONFIDENCE INTERVAL

SINGLE CHI²(2)/ 2

HORIZON	1	2	3	4	5	6	7	8
	1.046	2.001	3.423	2.447	.390	.323	.262	1.620

CUMULATIVE TEST: CHI²(16)/ 16 = 1.439

Forecast Test F-FORM: F(16, 81) = 1.132 [.3486]

MEAN FORECAST ERRORS

Lls	Lld
-.06259	-.11892

FORECAST STANDARD ERRORS

Lls	Lld
.04474	.10712

FORECAST-ERROR CORRELATION MATRIX

	Lls	Lld
Lls	1.0000	
Lld	.1663	1.0000

Present Sample Dates are: 1970(2) to 1996(2) less 8 forecasts

PRIOR SEASONAL COEFFICIENTS

		CONSTANT	Q 1	Q 2	Q 3
Lls		8.4501	-.008086	-.0993	-.0426
Lld		8.2216	-.0661	-.1516	-.0940
Lip		5.0483	-.0212	-.0649	-.0465
Ldd		7.7631	-.0109	-.1369	-.0955
Lcp		8.3896	-.0409	-.1475	-.0980
Lbo		6.5275	-.0235	-.0552	-.0306
Lup		7.4867	-.0448	-.0770	-.0437
Ltd		7.5478	-.0604	-.1354	-.0801
kt		.4405	-.009415	.003158	-.006316
rccpr		.0129	-.005253	-.004711	-.001763
tdrrc		-.0209	.001975	.004184	.000763
rctbr		.0312	-.005629	-.005368	-.001895
cdt		.0132	-.000816	.000363	.000553
Lls	1	8.4076	-.0561	-.0882	-.0567

2SLS ESTIMATION

LOG DET Ω = -9.662485
LIKELIHOOD α 125.366654

L.R. TEST of OVER-IDENTIFYING RESTRICTIONS
CHI^2(11) = 100.482

RESIDUAL COVARIANCE MATRIX

	Lls	Lld
Lls	.0052	
Lld	-.0018	.0130

EQUATION STANDARD ERRORS

Lls	.071818
Lld	.113972

SEASONALS COEFFICIENTS

	CONSTANT	Q 1	Q 2	Q 3
Lls	-1.7894	.0199	.0383	.0422
Lld	-.6698	-.003002	-.0385	-.0219

2SLS SIMULATION

LAG-1 MULTIPLIERS

	Lip	Ldd	Lcp	Lbo	Lup	Ltd	kt
Lls	0.	0.	0.	0.	0.	0.	0.
Lld	-.027	.473	0.	.655	0.	.135	-.244

	rccpr	tdrrc	rctbr	cdt
Lls	0.	0.	0.	0.
Lld	0.	-.706	-.687	.598

LONG-RUN $[I-\pi(1)]$ MATRIX

	Lls	Lld
Lls	-1.	0.
Lld	.853	-1.

LONG-RUN MULTIPLIERS

	Lip	Ldd	Lcp	Lbo	Lup	Ltd	kt
Lls	-.032	.555	0.	.769	0.	.158	-.287
Lld	.0026	.473	.220	.655	-.039	.135	-.244

	rccpr	tdrrc	rctbr	cdt
Lls	0.	-.828	-.806	.701
Lld	1.396	-.706	-.687	.598

CORRELATION of ACTUAL and PREDICTED

SAMPLE period is 1970 2 - 1996 2

Lls	Lld
.9984	.9962

CORRELATION of ACTUAL and SIMULATED

SIMULATION period is 1970 2 - 1996 2

Lls	Lld
.9984	.9971

Tests of parameter CONSTANCY over: 1989 1 - 1996 2

ERROR VARIANCE FORECAST TEST [no parameter variance]

SINGLE $CHI^2(2)/ 2$

HORIZON	1	2	3	4	5	6	7	8
	1.562	2.351	2.143	.584	.391	.351	1.268	1.722

CUMULATIVE TEST: $CHI^2(16)/ 16 = 1.296$

MEAN FORECAST ERRORS

Lls	Lld
-.02639	-.10516

FORECAST STANDARD ERRORS

Lls	Lld
.02671	.13530

FORECAST-ERROR CORRELATION MATRIX

	Lls	Lld
Lls	1.0000	
Lld	-.1758	1.0000

RESTRICTED REDUCED FORM COEFFICIENTS

	Lip	Ldd	Lcp	Lbo	Lup	Ltd	kt
Lls	-.032	.555	0.	.769	0.	.158	-.287
Lld	.030	0.	.220	0.	-.039	0.	0.

	rccpr	tdrrc	rctbr	cdt	Lls1
Lls	0.	-.828	-.806	.701	0.
Lld	1.396	0.	0.	0.	.853

RESTRICTED REDUCED FORM STANDARD ERRORS

	Lip	Ldd	Lcp	Lbo	Lup	Ltd	kt
Lls	.073	.043	0.	.113	0.	.068	.090
Lld	.122	0.	.105	0.	.041	0.	0.

	rccpr	tdrrc	rctbr	cdt	Lls1
Lls	0.	1.289	1.342	3.113	0.
Lld	1.160	0.	0.	0.	.084

COVARIANCE Matrix of REDUCED FORM RESIDUALS

	Lls	Lld
Lls	.0052	
Lld	-.0018	.0130

REDUCED FORM EQUATION STANDARD ERRORS

Lls	.071818
Lld	.113972

CORRELATION MATRIX of REDUCED FORM RESIDUALS

	Lls	Lld
Lls	1.0000	
Lld	-.2244	1.0000

REDUCED FORM SEASONALS

	CONSTANT	Q 1	Q 2	Q 3
Lls	-1.7894	.0199	.0383	.0422
Lld	-.6698	-.003002	-.0385	-.0219

STANDARD ERRORS of STRUCTURAL SEASONALS

	CONSTANT	Q 1	Q 2	Q 3
Lls	.5321	.0241	.0240	.0236
Lld	.3983	.0379	.0380	.0374

EQUATION 1 for Lls

VAR	COEFF	S.E	t-RATIO	PROBABILITY
Lip	-.03166	.07347	-.431	.6679
Ldd	.55520	.04387	12.655	.0000
Lbo	.76874	.11572	6.643	.0000
Ltd	.15849	.06976	2.272	.0263
kt	-.28670	.09130	-3.140	.0025
tdrrc	-.82793	1.32221	-.626	.5333
rctbr	-.80603	1.37025	-.588	.5584
cdt	.70096	3.19062	.220	.8267

EQUATION 2 for Lld

VAR	COEFF	S.E	t-RATIO	PROBABILITY
Lip	.02959	.12202	.242	.8091
Lcp	.21989	.10695	2.056	.0435
Lup	-.03856	.04142	-.931	.3551
rccpr	1.39633	1.17038	1.193	.2369
Lls1	.85253	.08549	9.973	.0000

Tests of Parameter CONSTANCY over: 1994 3 - 1996 2

MATRIX of FORECAST STANDARD ERRORS

HORIZON	1	2	3	4	5	6	7	8
Lls	.0841	.0916	.1045	.1011	.1286	.1309	.1385	.1346
Lld	.1261	.1257	.1454	.1372	.1349	.1400	.1458	.1409

SINGLE CHI²(2)/ 2

HORIZON	1	2	3	4	5	6	7	8
	1.270	1.828	1.186	.366	.204	.117	.775	1.115

CUMULATIVE TEST: CHI²(16)/ 16 = .858

Forecast Test F-FORM: F(16, 87) = .743 [.7402]

[2SLS ESTIMATION]

[1] Lls = -.032 Lip + .555 Ldd + .769 Lbo
SE (.07347) (.04387) (.11572)
+ .158 Ltd -.287 kt -.828 tdrrc -.806 rctbr
(.06976) (.09130) (1.32221) (1.37025)
+ .701 cdt
(3.19062)
Eq σ = .071818

[2] Lld = .030 Lip + .220 Lcp -.039 Lup
SE (.12202) (.10695) (.04142)
+ 1.396 rccpr + .853 Lls1
(1.17038) (.08549)
Eq σ = .113972

3SLS ESTIMATION

LOG DET Ω = -9.683015
LIKELIHOOD α 126.660172

L.R. TEST of OVER-IDENTIFYING RESTRICTIONS
$CHI^2(11)$ = 98.942

RESIDUAL COVARIANCE MATRIX

	Lls	Lld
Lls	.0052	
Lld	-.0024	.0130

EQUATION STANDARD ERRORS

Lls	.072247
Lld	.114157

SEASONALS COEFFICIENTS

	CONSTANT	Q 1	Q 2	Q 3
Lls	-1.8705	.0197	.0383	.0418
Lld	-.5744	-.000754	-.0356	-.0208

3SLS SIMULATION

LAG-1 MULTIPLIERS

	Lip	Ldd	Lcp	Lbo	Lup	Ltd	kt
Lls	0.	0.	0.	0.	0.	0.	0.
Lld	-.031	.446	0.	.673	0.	.139	-.290

	rccpr	tdrrc	rctbr	cdt
Lls	0.	0.	0.	0.
Lld	0.	-.488	-.594	-.097

LONG-RUN [I-π(1)] MATRIX

	Lls	Lld
Lls	-1.	0.
Lld	.835	-1.

LONG-RUN MULTIPLIERS

	Lip	Ldd	Lcp	Lbo	Lup	Ltd	kt
Lls	-.037	.534	0.	.807	0.	.167	-.347
Lld	-.037	.446	.249	.673	-.041	.139	-.290

	rccpr	tdrrc	rctbr	cdt
Lls	0.	-.585	-.712	-.116
Lld	1.951	-.488	-.594	-.097

CORRELATION of ACTUAL and PREDICTED

SAMPLE period is 1970 2 - 1996 2

Lls	Lld
.9983	.9962

CORRELATION of ACTUAL and SIMULATED

SIMULATION period is 1970 2 - 1996 2

Lls	Lld
.9983	.9972

Tests of parameter CONSTANCY over: 1994 3 - 1996 2

ERROR VARIANCE FORECAST TEST [no parameter variance]

SINGLE CHI^2(2)/ 2

HORIZON	1	2	3	4	5	6	7	8
	1.793	2.546	2.896	.873	.437	.251	.913	2.303

CUMULATIVE TEST: CHI^2(16)/ 16 = 1.502

MEAN FORECAST ERRORS

Lls	Lld
-.00271	-.13479

FORECAST STANDARD ERRORS

Lls	Lld
.03287	.13050

FORECAST-ERROR CORRELATION MATRIX

	Lls	Lld
Lls	1.0000	
Lld	.0241	1.0000

RESTRICTED REDUCED FORM COEFFICIENTS

	Lip	Ldd	Lcp	Lbo	Lup	Ltd	kt
Lls	-.037	.534	0.	.807	0.	.167	-.347
Lld	-.006	0.	.249	0.	-.041	0.	0.

	rccpr	tdrrc	rctbr	cdt	Lls1
Lls	0.	-.585	-.712	-.116	0.
Lld	1.951	0.	0.	0.	.835

RESTRICTED REDUCED FORM STANDARD ERRORS

	Lip	Ldd	Lcp	Lbo	Lup	Ltd	kt
Lls	.073	.043	0.	.112	0.	.067	.089
Lld	.122	0.	.104	0.	.041	0.	0.

	rccpr	tdrrc	rctbr	cdt	Llsl
Lls	0.	1.274	1.331	3.079	0.
Lld	1.154	0.	0.	0.	.084

COVARIANCE Matrix of REDUCED FORM RESIDUALS

	Lls	Lld
Lls	.0052	
Lld	-.0024	.0130

REDUCED FORM EQUATION STANDARD ERRORS

Lls	.072247
Lld	.114157

CORRELATION MATRIX of REDUCED FORM RESIDUALS

	Lls	Lld
Lls	1.0000	
Lld	-.2892	1.0000

REDUCED FORM SEASONALS

	CONSTANT	Q 1	Q 2	Q 3
Lls	-1.8705	.0197	.0383	.0418
Lld	-.5744	-.000754	-.0356	-.0208

STANDARD ERRORS of STRUCTURAL SEASONALS

	CONSTANT	Q 1	Q 2	Q 3
Lls	.5282	.0243	.0242	.0237
Lld	.3984	.0380	.0381	.0374

EQUATION 1 for Lls

VARIABLE	COEFFICIENT	STANDARD ERROR	t-RATIO	PROBABILITY
Lip	-.03720	.07306	-.509	.6122
Ldd	.53430	.04303	12.416	.0000
Lbo	.80658	.11310	7.132	.0000
Ltd	.16695	.06805	2.453	.0168
kt	-.34695	.08961	-3.872	.0002
tdrrc	-.58483	1.28906	-.454	.6515
rctbr	-.71161	1.34240	-.530	.5978
cdt	-.11640	3.11346	-.037	.9703

EQUATION 2 for Lld

VARIABLE	COEFFICIENT	STANDARD ERROR	t-RATIO	PROBABILITY
Lip	-.00602	.12174	-.049	.9607
Lcp	.24931	.10526	2.368	.0206
Lup	-.04131	.04088	-1.010	.3158
rccpr	1.95145	1.15991	1.682	.0969
Lls 1	.83482	.08439	9.892	.0000

Tests of Parameter CONSTANCY over: 1994 3 - 1996 2

MATRIX of FORECAST STANDARD ERRORS

HORIZON	1	2	3	4	5	6	7
Lls	.0844	.0918	.1046	.1012	.1281	.1304	.1380
Lld	.1263	.1259	.1453	.1372	.1350	.1401	.1457

HORIZON	8
Lls	.1340
Lld	.1410

SINGLE CHI²(2)/ 2

HORIZON	1	2	3	4	5	6	7
	1.461	2.002	1.625	.566	.295	.133	.506

HORIZON	8
	1.510

CUMULATIVE TEST: CHI²(16)/ 16 = 1.012

Forecast Test F-FORM: F(16, 87) = .877 [.5965]

[3SLS ESTIMATION]

[1] Lls = -.037 Lip + .534 Ldd + .807 Lbo
SE (.07306) (.04303) (.11310)
+ .167 Ltd -.347 kt -.585 tdrrc -.712 rctbr
(.06805) (.08961) (1.28906) (1.34240)
-.116 cdt
(3.11346)
Eq σ = .072247

[2] Lld = -.006 Lip + .249 Lcp -.041

Lup
SE (.12174) (.10526) (
.04088)
\+ 1.951 rccpr + .835 Lls 1
(1.15991) (.08439)
Eq σ = .114157

LIVE ESTIMATION

LOG DET Ω = -9.662485
LIKELIHOOD α 125.366654

L.R. TEST of OVER-IDENTIFYING RESTRICTIONS
CHI^2(11) = 100.482

RESIDUAL COVARIANCE MATRIX

	Lls	Lld
Lls	.0052	
Lld	-.0018	.0130

EQUATION STANDARD ERRORS

Lls	.071818
Lld	.113972

SEASONALS COEFFICIENTS

	CONSTANT	Q 1	Q 2	Q 3
Lls	-1.7894	.0199	.0383	.0422
Lld	-.6698	-.003002	-.0385	-.0219

LIVE SIMULATION

LAG-1 MULTIPLIERS

	Lip	Ldd	Lcp	Lbo	Lup	Ltd	kt
Lls	0.	0.	0.	0.	0.	0.	0.
Lld	-.027	.473	0.	.655	0.	.135	-.244

	rccpr	tdrrc	rctbr	cdt
Lls	0.	0.	0.	0.
Lld	0.	-.706	-.687	.598

LONG-RUN $[I-\pi(1)]$ MATRIX

	Lls	Lld
Lls	-1.	0.
Lld	.853	-1.

LONG-RUN MULTIPLIERS

	Lip	Ldd	Lcp	Lbo	Lup	Ltd	kt
Lls	-.032	.555	0.	.769	0.	.158	-.287
Lld	.002598	.473	.220	.655	-.039	.135	-.244

	rccpr	tdrrc	rctbr	cdt
Lls	0.	-.828	-.806	.701
Lld	1.396	-.706	-.687	.598

CORRELATION of ACTUAL and PREDICTED

SAMPLE period is 1970 2 - 1996 2

Lls	Lld
.9984	.9962

CORRELATION of ACTUAL and SIMULATED

SIMULATION period is 1970 2 - 1996 2

Lls	Lld
.9984	.9971

Tests of parameter CONSTANCY over: 1994 3 - 1996 2

ERROR VARIANCE FORECAST TEST [no parameter variance]

SINGLE CHI^2(2)/ 2

HORIZON	1	2	3	4	5	6	7
	1.562	2.351	2.143	.584	.391	.351	1.268

HORIZON	8
	1.722

CUMULATIVE TEST: CHI^2(16)/ 16 = 1.296

MEAN FORECAST ERRORS

Lls	Lld
-.02639	-.10516

FORECAST STANDARD ERRORS

Lls	Lld
.02671	.13530

FORECAST-ERROR CORRELATION MATRIX

	Lls	Lld
Lls	1.0000	
Lld	-.1758	1.0000

RESTRICTED REDUCED FORM COEFFICIENTS

	Lip	Ldd	Lcp	Lbo	Lup	Ltd	kt
Lls	-.032	.555	0.	.769	0.	.158	-.287
Lld	.030	0.	.220	0.	-.039	0.	0.

	rccpr	tdrrc	rctbr	cdt	Lls 1
Lls	0.	-.828	-.806	.701	0.
Lld	1.396	0.	0.	0.	.853

RESTRICTED REDUCED FORM STANDARD ERRORS

	Lip	Ldd	Lcp	Lbo	Lup	Ltd	kt
Lls	.073	.043	0.	.113	0.	.068	.090
Lld	.122	0.	.105	0.	.041	0.	0.

	rccpr	tdrrc	rctbr	cdt	Lls 1
Lls	0.	1.289	1.342	3.113	0.
Lld	1.160	0.	0.	0.	.084

COVARIANCE Matrix of REDUCED FORM RESIDUALS

	Lls	Lld
Lls	.0052	
Lld	-.0018	.0130

REDUCED FORM EQUATION STANDARD ERRORS

Lls	.071818
Lld	.113972

CORRELATION MATRIX of REDUCED FORM RESIDUALS

	Lls	Lld
Lls	1.0000	
Lld	-.2244	1.0000

REDUCED FORM SEASONALS

	CONSTANT	Q 1	Q 2	Q 3
Lls	-1.7894	.0199	.0383	.0422
Lld	-.6698	-.003002	-.0385	-.0219

STANDARD ERRORS of STRUCTURAL SEASONALS

	CONSTANT	Q 1	Q 2	Q 3
Lls	.5321	.0241	.0240	.0236
Lld	.3983	.0379	.0380	.0374

EQUATION 1 for Lls

VARIABLE	COEFFICIENT	STANDARD ERROR	t-RATIO	PROBABILITY
Lip	-.03166	.07347	-.431	.6679
Ldd	.55520	.04387	12.655	.0000
Lbo	.76874	.11572	6.643	.0000
Ltd	.15849	.06976	2.272	.0263
kt	-.28670	.09130	-3.140	.0025
tdrrc	-.82793	1.32221	-.626	.5333
rctbr	-.80603	1.37025	-.588	.5584
cdt	.70096	3.19062	.220	.8267

EQUATION 2 for Lld

VARIABLE	COEFFICIENT	STANDARD ERROR	t-RATIO	PROBABILITY
Lip	.02959	.12202	.242	.8091
Lcp	.21989	.10695	2.056	.0435
Lup	-.03856	.04142	-.931	.3551
rccpr	1.39633	1.17038	1.193	.2369
Lls 1	.85253	.08549	9.973	.0000

Tests of Parameter CONSTANCY over: 1994 3 - 1996 2

MATRIX of FORECAST STANDARD ERRORS

HORIZON	1	2	3	4	5	6	7
Lls	.0841	.0916	.1045	.1011	.1286	.1309	.1385
Lld	.1261	.1257	.1454	.1372	.1349	.1400	.1458

HORIZON	8
Lls	.1346
Lld	.1409

SINGLE CHI^2(2)/ 2

HORIZON	1	2	3	4	5	6	7
	1.270	1.828	1.186	.366	.204	.117	.775

HORIZON	8
	1.115

CUMULATIVE TEST: CHI²(16)/ 16 = .858

Forecast Test F-FORM: F(16, 65) = .743 [.7402]

[LIVE ESTIMATION]

[1] Lls = -.032 Lip + .555 Ldd + .769 Lbo
SE (.07347) (.04387) (.11572)
\+ .158 Ltd -.287 kt -.828 tdrrc -.806 rctbr
(.06976) (.09130) (1.32221) (1.37025)
\+ .701 cdt
(3.19062)
Eq σ = .071818

[2] Lld = .030 Lip + .220 Lcp -.039 Lup
SE (.12202) (.10695) (.04142)
\+ 1.396 rccpr + .853 Lls 1
(1.17038) (.08549)
Eq σ = .113972

FIVE ESTIMATION

LOG DET Ω = -9.662485
LIKELIHOOD α 125.366654

L.R. TEST of OVER-IDENTIFYING RESTRICTIONS
CHI²(11) = 100.482

RESIDUAL COVARIANCE MATRIX

	Lls	Lld
Lls	.0052	
Lld	-.0018	.0130

EQUATION STANDARD ERRORS

Lls	.071818
Lld	.113972

SEASONALS COEFFICIENTS

	CONSTANT	Q 1	Q 2	Q 3
Lls	-1.7894	.0199	.0383	.0422
Lld	-.6698	-.003002	-.0385	-.0219

FIVE SIMULATION

LAG-1 MULTIPLIERS

	Lip	Ldd	Lcp	Lbo	Lup	Ltd	kt
Lls	0.	0.	0.	0.	0.	0.	0.
Lld	-.027	.473	0.	.655	0.	.135	-.244

	rccpr	tdrrc	rctbr	cdt
Lls	0.	0.	0.	0.
Lld	0.	-.706	-.687	.598

LONG-RUN [I-π(1)] MATRIX

	Lls	Lld
Lls	-1.	0.
Lld	.853	-1.

LONG-RUN MULTIPLIERS

	Lip	Ldd	Lcp	Lbo	Lup	Ltd	kt
Lls	-.032	.555	0.	.769	0.	.158	-.287
Lld	.002598	.473	.220	.655	-.039	.135	-.244

	rccpr	tdrrc	rctbr	cdt
Lls	0.	-.828	-.806	.701
Lld	1.396	-.706	-.687	.598

CORRELATION of ACTUAL and PREDICTED

SAMPLE period is 1970 2 - 1996 2

Lls	Lld
.9984	.9962

CORRELATION of ACTUAL and SIMULATED

SIMULATION period is 1970 2 - 1996 2

Lls	Lld
.9984	.9971

Tests of parameter CONSTANCY over: 1994 3 - 1996 2

ERROR VARIANCE FORECAST TEST [no parameter variance]

SINGLE CHI²(2)/ 2

HORIZON	1	2	3	4	5	6	7
	1.562	2.351	2.143	.584	.391	.351	1.268

HORIZON	8
	1.722

CUMULATIVE TEST: $CHI^2(16)/16$ = 1.296

MEAN FORECAST ERRORS

Lls	Lld
-.02639	-.10516

FORECAST STANDARD ERRORS

Lls	Lld
.02671	.13530

FORECAST-ERROR CORRELATION MATRIX

	Lls	Lld
Lls	1.0000	
Lld	-.1758	1.0000

RESTRICTED REDUCED FORM COEFFICIENTS

	Lip	Ldd	Lcp	Lbo	Lup	Ltd	kt
Lls	-.032	.555	0.	.769	0.	.158	-.287
Lld	.030	0.	.220	0.	-.039	0.	0.

	rccpr	tdrrc	rctbr	cdt	Lls 1
Lls	0.	-.828	-.806	.701	0.
Lld	1.396	0.	0.	0.	.853

RESTRICTED REDUCED FORM STANDARD ERRORS

	Lip	Ldd	Lcp	Lbo	Lup	Ltd	kt
Lls	.073	.043	0.	.113	0.	.068	.090
Lld	.122	0.	.105	0.	.041	0.	0.

	rccpr	tdrrc	rctbr	cdt	Lls 1
Lls	0.	1.289	1.342	3.113	0.
Lld	1.160	0.	0.	0.	.084

COVARIANCE Matrix of REDUCED FORM RESIDUALS

	Lls	Lld
Lls	.0052	
Lld	-.0018	.0130

REDUCED FORM EQUATION STANDARD ERRORS

Lls	.071818
Lld	.113972

CORRELATION MATRIX of REDUCED FORM RESIDUALS

	Lls	Lld
Lls	1.0000	
Lld	-.2244	1.0000

REDUCED FORM SEASONALS

	CONSTANT	Q 1	Q 2	Q 3
Lls	-1.7894	.0199	.0383	.0422
Lld	-.6698	-.003002	-.0385	-.0219

STANDARD ERRORS of STRUCTURAL SEASONALS

	CONSTANT	Q 1	Q 2	Q 3
Lls	.5321	.0241	.0240	.0236
Lld	.3983	.0379	.0380	.0374

EQUATION 1 for Lls

VARIABLE	COEFFICIENT	STANDARD ERROR	t-RATIO	PROBABILITY
Lip	-.03166	.07306	-.433	.6661
Ldd	.55520	.04303	12.901	.0000
Lbo	.76874	.11310	6.797	.0000
Ltd	.15849	.06805	2.329	.0229
kt	-.28670	.08961	-3.200	.0021
tdrrc	-.82793	1.28906	-.642	.5229
rctbr	-.80603	1.34240	-.600	.5502
cdt	.70096	3.11346	.225	.8225

EQUATION 2 for Lld

VARIABLE	COEFFICIENT	STANDARD ERROR	t-RATIO	PROBABILITY
Lip	.02959	.12174	.243	.8087
Lcp	.21989	.10526	2.089	.0403
Lup	-.03856	.04088	-.943	.3489
rccpr	1.39633	1.15991	1.204	.2327
Lls 1	.85253	.08439	10.102	.0000

Tests of Parameter CONSTANCY over: 1994 3 - 1996 2
MATRIX of FORECAST STANDARD ERRORS

```
 HORIZON       1          2          3          4          5          6
      7
 Lls            .0841      .0916      .1045      .1011      .1286
.1309     .1385
 Lld            .1261      .1257      .1454      .1372      .1349
.1400     .1458
 HORIZON       8
 Lls           .1346
 Lld           .1409
                SINGLE CHI²(  2)/  2
 HORIZON       1          2          3          4          5          6
      7
               1.270      1.828      1.186       .366       .204
.117      .775
 HORIZON       8
               1.115
      CUMULATIVE TEST:  CHI²( 16)/ 16  =            .858
      Forecast Test F-FORM: F( 16, 87) =          .743  [ .7402]
    [FIVE   ESTIMATION ]
 [ 1]  Lls      =     -.032 Lip     +     .555 Ldd     +     .769
Lbo
 SE            (        .07306)     (        .04303)      (
.11310)
    +     .158 Ltd          -.287 kt           -.828 tdrrc
-.806 rctbr
    (      .06805)    (       .08961)    (      1.28906)    (
 1.34240)
    +     .701 cdt
    (      3.11346)
           Eq σ =         .071818
 [ 2]  Lld      =      .030 Lip     +     .220 Lcp          -.039
Lup
 SE            (        .12174)     (        .10526)      (
.04088)
    +    1.396 rccpr   +     .853 Lls    1
    (      1.15991)    (       .08439)
           Eq σ =         .113972
```

```
                         FIML ESTIMATION

 LITTLE CHANGE IN FUNCTION VALUES OVER THE LAST      1 ITERATIONS.

 STRONG CONVERGENCE in BFGS after   34 Iterations and  164 Function
Calls
    P A R A M E T E R S

     -.0381      .5244      .8224      .1712     -.3734     -.4778
  -.7122
     -.4550     -.0226      .2687     -.0423     2.1910      .8210
    G R A D I E N T S

  .00001023  .00002031  .00000978  .00002666 -.00000077 -.00000081
.00000113
  .00000015 -.00000055 -.00001443 -.00000566  .00000058 -.00001422
        F U N C T I O N  =          -4.842598490572
            LOG DET Ω     =        -9.685197
            LIKELIHOOD  α        126.798408

                    L.R. TEST of OVER-IDENTIFYING RESTRICTIONS
                   CHI²( 11) =      98.779

               RESIDUAL COVARIANCE MATRIX
         Lls      Lld
 Lls          .0053
 Lld         -.0026    .0131

         EQUATION  STANDARD  ERRORS
 Lls                .072721
 Lld                .114373

          SEASONALS COEFFICIENTS
           CONSTANT       Q  1       Q  2       Q  3
 Lls        -1.9061      .0195      .0381      .0416
 Lld         -.5332    .000129     -.0340     -.0201

                         FIML SIMULATION
                    LAG-1  MULTIPLIERS
           Lip        Ldd        Lcp        Lbo        Lup        Ltd
   kt
 Lls              0.         0.         0.         0.         0.
0.        0.
 Lld           -.031       .431         0.       .675         0.
.141      -.307
           rccpr      tdrrc      rctbr      cdt
 Lls              0.         0.         0.         0.
 Lld              0.      -.392      -.585      -.374

                    LONG-RUN  [I-π(1)]  MATRIX
           Lls        Lld
 Lls            -1.         0.
 Lld            .821        -1.
```

LONG-RUN MULTIPLIERS

	Lip	Ldd	Lcp	Lbo	Lup	Ltd	kt
Lls	-.038	.524	0.	.822	0.	.171	-.373
Lld	-.054	.431	.269	.675	-.042	.141	-.307

	rccpr	tdrrc	rctbr	cdt
Lls	0.	-.478	-.712	-.455
Lld	2.191	-.392	-.585	-.374

CORRELATION of ACTUAL and PREDICTED
SAMPLE period is 1970 2 - 1996 2

Lls	Lld
.9983	.9962

CORRELATION of ACTUAL and SIMULATED
SIMULATION period is 1970 2 - 1996 2

Lls	Lld
.9983	.9973

Tests of parameter CONSTANCY over: 1994 3 - 1996 2

ERROR VARIANCE FORECAST TEST [no parameter variance]

SINGLE CHI²(2)/ 2

HORIZON	1	2	3	4	5	6	7
	1.884	2.616	3.233	1.022	.511	.275	.868

HORIZON	8
	2.655

CUMULATIVE TEST: CHI²(16)/ 16 = 1.633

MEAN FORECAST ERRORS

Lls	Lld
.00945	-.14839

FORECAST STANDARD ERRORS

Lls	Lld
.03616	.12825

FORECAST-ERROR CORRELATION MATRIX

	Lls	Lld
Lls	1.0000	
Lld	.0861	1.0000

RESTRICTED REDUCED FORM COEFFICIENTS

	Lip	Ldd	Lcp	Lbo	Lup	Ltd	kt
Lls	-.038	.524	0.	.822	0.	.171	-.373
Lld	-.023	0.	.269	0.	-.042	0.	0.

	rccpr	tdrrc	rctbr	cdt	Lls 1
Lls	0.	-.478	-.712	-.455	0.
Lld	2.191	0.	0.	0.	.821

RESTRICTED REDUCED FORM STANDARD ERRORS

	Lip	Ldd	Lcp	Lbo	Lup	Ltd	kt
Lls	.074	.043	0.	.112	0.	.067	.089
Lld	.122	0.	.104	0.	.040	0.	0.

	rccpr	tdrrc	rctbr	cdt	Lls 1
Lls	0.	1.271	1.330	3.072	0.
Lld	1.153	0.	0.	0.	.084

COVARIANCE Matrix of REDUCED FORM RESIDUALS

	Lls	Lld
Lls	.0053	
Lld	-.0026	.0131

REDUCED FORM EQUATION STANDARD ERRORS

Lls	.072721
Lld	.114373

CORRELATION MATRIX of REDUCED FORM RESIDUALS

	Lls	Lld
Lls	1.0000	
Lld	-.3177	1.0000

REDUCED FORM SEASONALS

	CONSTANT	Q 1	Q 2	Q 3
Lls	-1.9061	.0195	.0381	.0416
Lld	-.5332	.000129	-.0340	-.0201

STANDARD ERRORS of STRUCTURAL SEASONALS

	CONSTANT	Q 1	Q 2	Q 3
Lls	.5279	.0244	.0243	.0239
Lld	.3988	.0380	.0381	.0375

EQUATION 1 for Lls

VARIABLE	COEFFICIENT	STANDARD ERROR	t-RATIO	PROBABILITY
Lip	-.03809	.07354	-.518	.6062
Ldd	.52440	.04270	12.282	.0000
Lbo	.82239	.11176	7.358	.0000
Ltd	.17120	.06711	2.551	.0130
kt	-.37343	.08894	-4.199	.0001
tdrrc	-.47781	1.27063	-.376	.7081
rctbr	-.71223	1.33015	-.535	.5941
cdt	-.45496	3.07183	-.148	.8827

EQUATION 2 for Lld

VARIABLE	COEFFICIENT	STANDARD ERROR	t-RATIO	PROBABILITY
Lip	-.02256	.12187	-.185	.8536
Lcp	.26867	.10385	2.587	.0118
Lup	-.04230	.04046	-1.046	.2993
rccpr	2.19098	1.15274	1.901	.0615
Lls 1	.82105	.08353	9.829	.0000

Tests of Parameter CONSTANCY over: 1994 3 - 1996 2

MATRIX of FORECAST STANDARD ERRORS

HORIZON	1	2	3	4	5	6	7
Lls	.0848	.0922	.1050	.1016	.1283	.1306	.1381
Lld	.1265	.1261	.1455	.1374	.1351	.1402	.1459

HORIZON	8
Lls	.1341
Lld	.1411

SINGLE CHI²(2)/ 2

HORIZON	1	2	3	4	5	6	7
	1.537	2.068	1.828	.672	.362	.171	.426

HORIZON	8
	1.733

CUMULATIVE TEST: $CHI^2(16)/16$ = 1.100

Forecast Test F-FORM: F(16, 87) = .953 [.5161]

```
   [FIML   ESTIMATION ]
 [ 1]  Lls      =     -.038 Lip     +     .524 Ldd     +     .822
Lbo
 SE            (        .07354)      (        .04270)      (
.11176)
    +     .171 Ltd          -.373 kt          -.478 tdrrc
-.712 rctbr
    (        .06711)    (        .08894)    (       1.27063)    (
 1.33015)
          -.455 cdt
    (       3.07183)
           Eq σ =        .072721
 [ 2]  Lld      =     -.023 Lip     +     .269 Lcp          -.042
Lup
 SE            (        .12187)      (        .10385)      (
.04046)
    +     2.191 rccpr    +     .821 Lls    1
    (       1.15274)    (        .08353)
           Eq σ =        .114373
```

ANNEX II

Linear Regression Results of the Supply of Commercial Loans (1970-1996)

Equations	1	2	3	4	5	6	7	8	9	10	11
Constant	-3660.69 (3.861)*	-3608.98 (3.229)*	-3505.5 (4.178)*	-3535.86 (4.502)*	-2682.95 (2.465)*	-3359.18 (3.633)*	3435 (4.818)*	-3939.23 (5.704)*	-535.83 (0.657)	-213.98 (0.364)	-4614.7 (9.664)*
LR	25711.9 (2.659)*	19548.15 (1.931)**	3504.8 (0.358)	5933.86 (0.644)	45385.5 (3.671)*			38286.2 (4.430)*	52058.03 (4.389)*	14245.18 (2.30)**	44842.6 (10.72)*
(LR-TDR)						7.071 (0.597)	111.576 (1.091)				
BAO	7.804 (4.796)*	8.472 (5.155)*	7.335 (5.085)*	7.475 (5.338)*	5.121 (2.631)*	7.354 (4.800)*	8.251 (4.863)*	5.796 (3.850)*			
LF	0.411 (3.489)*		0.431 (4.134)*	0.535 (4.772)*	0.597 (4.756)*	0.439 (4.034)*	0.623 (6.088)*	0.495 (5.286)*		0.373 (4.083)*	0.1313 (2.365)**
LQR	-7.933 (0.606)	-7.204 (0.537)	-5.743 (0.481)			-13.448 (0.111)		-10.502 (0.908)	-11.048 (1.279)	-12.411 (0.976)	-15.791 (2.291)**
TGSCB	-0.263 (1.851)**	-0.052 (0.281)	-0.393 (3.048)*	-0.125 (0.802)	-0.177 (0.998)	-0.414 (3.157)*		-0.209 (2.050)**			
IP_{t-1}	0.727 (0.121)	1.415 (0.237)	2.413 (0.451)	2.79 (0.543)	446.97 (2.413)*	2.534 (0.475)					
A'A							0.457 (9.376)*		0.457 (9.346)*		
ER	-339.96 (1.487)	5.843 (0.025)	-523.89 (2.543)*	-328.12 (1.545)***	-269.59 (0.999)	-493.08 (2.507)*					
LS-1	0.386 (3.538)*									0.476 (4.043)*	8.785 (10.077)*
BLA		-0.052 (0.302)		-0.348 (2.201)*	-0.301 (1.698)***		-0.469 (4.464)*				
(TDR-LR)					-0.227 (0.039)				-572.38 (3.632)*		

CD			1287.39 (4.677)*	1233.86 (4.761)*		1332.59 (5.505)*					
D1								3654.54 (4.529)*	-4578.35 (4.412)*		
R2	97.72	97.68	98.22	98.32	97.97	98.21	97.75	98.16	97.09	97.33	99
DW/h	1.663	2.199	1.914	1.983	1.794	1.912	1.742	2.058	1.735	2.162	0.437
SER	1159.2	1167	1025	994	1094	1026	1149	1041	1308	1253	680
F	502.7	433.5	564.9	600.7	439	564	894	730	549	748	2541
RMSE	-	-	-	939.4	-	-		996	-	-	-
MDV	8183	8183	8183	8183	8183	8183	8183	8183	8183	8183	8183

t, Statistics are in parenthesis *significant at 10%,
**significant at 5% and ***significant at 10%
+ h statistics for equations 1, 10 and 11 because of the lagged dependent variable.

ANNEX IIA

Linear Regression Results of the Equilibrium Model of the Supply of Commercial Loans (1970-1996)

Equations	1	2	3	4	5	6	7	8
Constant	-3.348 (5.159)*	-3.893 (6.335)*	-5.579 (8.361)*	-8.205 (5.317)*	-14.439 (6.102)*	-5.411 (3.686)*	-11.187 (5.064)*	-3.579 (6.535)*
LLR	-0.205 (2.445)*	-0.32 (3.862)*	-0.626 (6.843)*	-0.164 (1.746)*	0.438 (4.515)*	0.158 (1.569)***	-0.016 (0.127)	-0.163 (2.310)**
LLF	0.757 (11.767)*	0.788 (13.167)*		0.929 (12.603)*		0.909 (14.059)*		0.717 (12.530)*
LBAO	0.607 (4.051)*	0.879 (5.699)*	1.355 (7.497)*	1.486 (6.046)*	2.558 (7.267)*	0.906 (3.682)*	1.859 (5.371)*	
L1P-1	0.324 (2.907)*	0.279 (2.700)*	0.408 (3.858)*	0.255 (2.588)*	0.442 (3.954)*	0.255 (3.096)*	0.429 (4.328)*	0.289 (3.052
LBLA	-0.002 (0.299)	-0.005 (0.606)		-0.00006 (0.008)				
LTCSCB		-0.149 (3.834)*	-0.133 (2.426)**	-0.146 (3.948)*	-0.145 (2.887)*	-0.159 (4.945)*	-0.157 (3.520)	
LLQR			-0.055 (2.426)**		-0.068 (2.070)**		-0.078 (2.664)*	-0.0049 (4.541)*
LAA			0.588 (8.453)*		0.922 (8.589)*		0.919 (9.662)*	
TREND				-0.025 (3.019)*	-0.05 (3.876)*	-0.009 (1.269)	-0.034 (2.789)*	
D1						0.341 (4.794)*	0.416 (4.649)*	
R2	99.23	99.35	98.92	99.41	99.59	99.55	99.29	99
DW	0.75	0.839	0.652	0.999	0.88	1.27	1.02	0.807
SER	0.121	0.111	0.143	0.106	0.731	0.093	0.116	0.107
F	2111	2074	1254	1969	1275	2576	1425	2678
RMSE	-	-	-	-	-	0.088	-	-
MDV	8.329	8.329	8.329	8.329	8.329	8.329	8.329	8.329

t Statistics are in parenthesis

ANNEX IIB

Linear Regression Results of the Equilibrium Model of the Demand for Commercial Loan (1970-1996)

Equations	1	2	3	4	5	6	7	8	9
Constant	0.767 (1.129)	0.215 (0.219)	5.117 (1.652)***	0.556 (0.585)	0.273 (0.264)	-0.034 (0.017)	0.428 (0.198)	0.03 (0.159)	0.369 (0.467)
LRt	-0.055 (1.399)	-0.006 (0.265)	-1.244 (8.537)*	-0.009 0.366)	-0.00003 (0.041)	63.318 (2.274)**	-45.016 (2.248)**	-0.002 (4.877)*	-0.062 (1.244)
LS-1	0.971 (42.817)*	0.969 (40.856)*		0.972 (41.094)*	0.968 (40.160)*				0.974 (42.066)
GDINVt						0.0003 (0.686)			
FXINVt	0.032 (0.644)	0.03 (0.718)	0.4 (2.478)*	0.02 (0.394)	0.028 (0.544)		0.0016 (5.995)*	0.00054 (1.016)	0.0148 (0.396)
INVTt	-0.199 (1.471)***	-0.138 (1.007)	-0.596 (1.253)	-0.123 (0.892)	-0.122 (0.882)		-0.0033 (2.380)*		-0.192 (1.436)
YT	0.00005 (2.683)*		0.041 (2.292)**	0.005 (1.220)	-0.0058 (0.256)	-0.00018 (0.653)			
YP	0.024 (0.981)	0.022 (0.689)	0.197 (2.519)*	0.042 (1.017)	0.04 (0.965)	0.0008 (4.537)*		62.616 (2.289)**	0.00004 (2.099)**
IP-1							0.078 (4.045)*		
FOFEX	0.0002 (2.334)**	0.0002 (2.359)**		0.0002 (2.249)**	0.00018 (0.965)	0.0022 (7.786)*	0.002 (6.386)*	0.00214 (7.285)*	0.00016 (2.257)**
EXTR	0.00005 (2.243)**		0.001 (4.324)*	0.000002 (0.030)					
INFL		0.033 (0.780)	1.437 (8.085)*		0.03 (0.716)				0.0027 (0.064)

S1		0.194 (1.547)***		0.152 (1.191)	0.165 (1.277)	-0.0149 (0.047)	0.0136 (0.0428)	-0.039 (0.127)	0.197 (1.619)***
TREND			0.478 (14.212)*			0.421 (13.271)*	0.2713 (8.377)*	0.425 (13.633)*	
R2	98.27	98.19	78.21	98.18	98.16	87.38	86.88	87.57	98.29
DW	2.018	2.19	0.71	2.189	2.186	1.563	1.6199	1.55	1.93
SER	1.159	1.183	4.11	1.188	1.191	3.128	3.189	3.105	1.15
F	582	558	37.79	492	440	82.12	78.57	97.29	591
RMSE	1.094	-	-	-	-	-	-	-	1.086
MDV	20.669	20.669	20.669	20.669	20.669	20.669	20.669	20.669	20.669

t Statistics are in parenthesis * significant at 1%,
** significant at 5% and *** significant at 10%

ANNEX IIC

Linear Regression Results of the Equilibrium Model of the Demand for Commercial Loans (1970-1996)

Equations	1	2	3	4	5
Constant	9.482 (4.452)*	14.044 (8.214)*	7.975 (15.527)*	0.256 (0.316)	12.737 (6.958)
LRt	0.199 (0.649)	-0.773 (2.909)*	-0.425 (7.462)*	-0.071 (1.390)	-62.532 (2.125)**
GDINV		-0.0015 (3.519)*			
LS-1	0.0013 (9.234)*	0.0014 (9.335)*	0.00029 (9.861)*	0.978 (41.442)*	0.0019 (12.430)*
FOFEX	0.0029 (9.2516)	0.0033 (10.801)*		0.0002 (2.042)**	0.0025 (8.387)*
EXTR	0.0014 (3.278)*			0.022 (0.887)	
IP-1			0.0082 (2.694)*		
FXINV			0.00033 (3.694)*	0.0337 (0.679)	0.00029 (1.546)***
INVT			-0.00076 (2.770)*	-0.176 (1.299)	-0.0029 (1.779)***
YPt				0.000005 (2.234)*	0.0007 (4.430)*
YTt				0.00005 (0.668)	0.00023 (0.790)
S1				0.187 (1.528)***	
INFL				0.0027 (0.063)	
R2	82.1	79.9	81.2	98.29	86.43
DW	1.42	1.44	1.62	1.94	1.5
SER	3.72	3.95	1.59	1.155	3.24
F	76.4	82.51	71.85	468	75.6
RMSE	-	-	-	1.076	-
MDV	20.669	20.669	20.669	20.669	20.669

t Statistics are in parenthesis * significant at 1%,
** significant at 5% and *** significant at 10%

ANNEX IID

Log Linear Regression Result of the Equilibrium Model of the Demand for Commercial Loans (1970-1996)

Equations	1	2	3
Constant	5.737 (72.594)*	5.694 (83.223)*	5.741 (74.680)*
LR	-4.001 (5.569)*	-1.432 (1.468)***	-4.271 (6.025)*
FXINV	0.000016 (1.108)	0.00008 (4.382)*	0.000021 (1.4678)***
INVT		-0.00006 (1.2889)	-0.00018 (2.318)*
YP		0.00002 (3.796)*	
YT		0.00001 (1.273)	
FOFEX	0.00012 (10.804)*	0.0001 (10.225)*	0.00011 (9.671)*
EXTR			
LS-1			
TREND	0.056 (48.359)*	0.059 (54.629)*	0.0561 (48.886)*
S1	0.006 (0.538)	0.0047 (0.436)	0.0061 (0.559)
IP-1	0.0014 (2.025)**		0.0016 (2.413)*
R2	99.29	99.39	99.33
DW	1.08	2.11	1.18
SER	0.116	0.107	0.113
F	1908	1915	1731
RMSE	-	0.102	-
MDV	8.329	8.329	8.329

t Statistics are in parenthesis * significant at 1%
** significant at 5% and *** significant at 10%

ANNEX IIE

Log Linear Regression Results of the Equilibrium Model of the Demand for Commercial Loans (1970-1996)

Equations	1	2	3
Constant	475.99 (0.684)	-1827.89 (2.024)**	-1709.31 (1.788)***
LR	-3263.2 (0.302)	18845.2 (1.682)***	18188.6 (1.557)***
FXINV	-0.012 (0.111)	0.038 (0.373)	0.042 (0.399)
INVT	-2.409 (4.017)*	-1.726 (2.994)*	-1.649 (2.858)*
YP	0.199 (3.099)*	0.117 (1.921)***	0.144 (2.302)**
YT	-0.042 (0.175)	-0.238 (1.239)	-0.292 (1.477)***
FOFEX	0.032 (0.269)	0.12 (1.071)	
EXTR	-0.139 (2.518)*		-0.027 (0.455)
LS-1	0.782 (14.176)*	0.478 (5.047)*	0.571 (5.212)*
TREND			78.084 (3.198)*
S1		-59.519 (0.495)	-65.532 (0.542)
INFL	-24.39 (0.771)	-31.535 (1.016)	-29.291 (0.939)
R2	97.55	97.85	97.83
DW	2.279	2.143	2.149
SER	1201	1124	1131
F	363	374	370

t Statistics are in parenthesis * significant at 1%
** significant at 5% and *** significant at 10%

ANNEX IIF

Regression Results of the Disequlibrium Model of Commercial Loan Market (1970-1996); The Supply Equations: $Ls = \beta_0 + \Sigma\beta_1\, rc_{t-i} + \Sigma\beta_2\, (rc - tbr)_{t-i} + \Sigma\beta_3\, (tdr - tc)_{t-i} + \Sigma\beta_4\, TD_{t-i} + \Sigma\beta_5\, DD_{t-i} + \beta_6 K + \Sigma\beta_7 IP_{t-i} + \beta_8\, D + \mu_{it}$

Estimation Methods	rc_{t-i}	$(rc-tbr)_{t-i}$	$(tdr-rc)_{t-i}$	TD_{t-i}	DD_{t-i}	IP_{t-i}	K_{t-l}	$1/\gamma_2$	λ	$\bar{R}^2$	DW
OLSQ		1.6944 (2.234)	-6.2160 (2.454)	0.462 16.668	0.793 14.186	1.2173 (2.994)	-7.609 (4.784)			0.997	1.92
TSLS1		1.7587 (4.344)	-4.8640 (2.604)	0.350 (18.842)	1.231 (15.222)	1.4701 (3.060)	-9.793 (5.152)			0.997	1.93
TSLS2		1.8373 (5.027)	-3.323 (3.426)	0.352 (18.850)	1.2541 (15.545)	5.329 (6.950)	-9.824 (6.201)			0.997	1.80
MD1		1.7175 (6.804)	-5.2151 (3.205)	0.351 (18.844)	1.2370 (15.002)	5.077 (7.13)	-9.245 (5.622)			0.997	2.04
MD2		1.92214 (8.112)	-7.3515 (3.332)	0.351 (18.843)	1.2804 (17.012)	4.969 (7.380)	-9.445 (8.012)			0.997	1.98
MQ1		1.8367 (4.845)	-4.5817 (3.007)	0.344 (18.849)	12.800 (16.921)	5.212 (6.791)	-9.434 (7.970)	6.5783 (0.019)		0.997	1.998
MQ2		1.7235 (4.705)	-7.5497 (3.185)	0.350 (18.850)	1.2402 (16.966)	4.846 (4.820)	-9.345 (7.999)	4.3530 (0.016)		0.997	2.004
FIML Equilibrium		3.3283 (3.715)	-2.6493 (2.011)	0.1710 (8.921)	0.7145 (5.115)	0.5017 (6.053)	-37.0299 (8.212)				
FIML Disequilibrium		4.3046 (5.8119)	-1.9744 (1.276)	0.1967 (8.212)	0.8134 (4.533)	0.4419 (8.527)	-37.7098 (11.8244)				

Note: t = Statistics are in parentheses and are significant at 1% level.

ANNEX IIG

Regression Results of the Disequilibrium Model of Commercial Loan Market (1990-1996);
The Demand Equations: $L^d = \alpha_0 + \Sigma\alpha_1 (rc - rcp)_{t-i} + \Sigma\alpha_2 UP_{t-i} + \Sigma\alpha_3 CP_{t-i} + \Sigma\alpha_4 IP_{t-i}$

$$+ \alpha_5 D + \alpha_6 TIME + \sum_{j=2}^{4} \alpha_7 Sj + U_t$$

Dependent Variable	rc_{t-i}	$(rc-rcp)_{t-i}$	UP_{t-i}	CP_{t-i}	IP_{t-i}	D	Time	Sj	$1/\gamma_1$	λ	$\bar{R}^2$	Dw
OLSQ		-25.439 (4.220)	4.19 (2.20)	4.613 (3.909)	0.6218 (9.56)	1.613 (0.201)	-45.85 (6.03)				0.999	2.210
TSLS1		-25.953 (4.408)	4.13 (2.02)	4.6809 (4.059)	0.6409 (9.74)	1.970 (0.201)	45.82 (6.20)				0.999	2.161
TSLS2		-22.939 (5.779)	4.58 (2.26)	5.6019 (6.967)	0.6539 (9.745)	1.446 (0.261)	-61.69 (7.17)				0.998	1.743
MD1		-27.594 (4.874)	4.24 (2.26)	5.0612 (5.155)	0.6500 (9.74)	1.118 (0.263)	-49.27 (6.35)				0.998	2.182
MD2		-27.193 (4.211)	4.331 (2.22)	5.0504 (4.246)	0.5682 (7.120)	1.945 (0.222)	-46.89 (6.43)				0.999	2.540
MQ1		-25.573 (4.229)	4.1910 (2.20)	4.7054 (4.139)	0.6605 (10.57)	1.431 (0.200)	-48.64 (6.59)		3.0437 (3.1737)		0.999	2.223
MQ2		-25.597 (4.229)	4.2100 (2.20)	4.6437 (4.032)	58.01 (8.5710)	1.151 (0.202)	-43.21 (6.59)		2.8631 (3.846)		0.999	2.245
FIML Equilibrium		-30.1523 (9.345)	4.8366 (6.016)	-24.3914 (2.048)	0.9981 (7.143)	77.1165 (5.532)						
FIML Disequilibrium		-22.8061 (10.6938)	3.9146 (4.582)	-32.4027 (4.3306)	1.1705 (13.0983)	73.3237 (7.3014)				0.00640 (3.0210)		

Note: t = Statistics are in parentheses and are significant at 1% level.

ANNEX III

Derivation Procedure of Tables 6.5 and 6.6

The probability that demand is greater than supply i.e. $Pr(D > S)$ is measured by the difference in the ratio of the fitted demand from our regression to its actual values and the ratio of the fitted supply from the regression to its actual value.

The estimate of excess demand is obtained by subtracting fitted values of supply from the fitted values of the demand.