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AN EMPIRICAL ANALYSIS OF THE EFFECTIVENESS OF SELECTIVE CREDIT CONTROLS ON SMALL SCALE MANUFACTURING INDUSTRIES IN ENUGU STATE OF NIGERIA(1980-1994)

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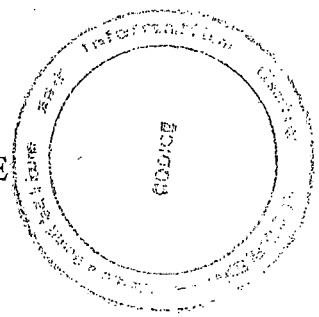

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DEDICATION

This thesis is dedicated to my parents, Mr. Reuben Duhu Isiwu and Mrs. Veronica Ogbu Isiwu (Nee Ngwu), for their love, inspiration and patience that sustained me up to this stage of my academic career.

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ABSTRACT

This study is motivated by the recent emphasis by the Federal Government of Nigeria on the promotion of small-scale Industries as a strategy for self-reliant industrialisation. The Central Bank of Nigeria (CBN) issues guidelines to banks to ensure that at least 20 per cent of their total loans and advances are allocated to these enterprises in the country. Yet, Small-scale manufacturing industries in Enugu State of Nigeria still face a high rate of business failures. Hence, the need for this study.

This study is limited to six small-scale manufacturing industries in Enugu State that are registered with Enugu State Ministry of Commerce and Industry (Funds for small-scale industries Unit) and the National Association of Small-Scale Industrialists, (NASSI) Enugu. Their choice for this study is guided by the data availability during the period covered.

To analyse the data,linear reggression applying Ordinary least squares (OLS)technique was adopted to test the parameter estimates. The empirical results show that there is credit rationing to these enterprises sampled and the impact of rationing on their total gross investment is significant. It is also found that selective credit controls, through which credit rationing comes into effect, is ineffective in influencing their investment activity.

Based on these findings, we recommend that the CBN should regulate the interest rate policy to encourage financial savings without discouraging investment; encourage banks to comply with the sectoral allocation of credit to small-scale manufacturing enterprises; and that the Development Banks in the country should be encouraged to grant long-term loans to these enterprises in order to encourage investment in long-term manufacturing.

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Small-scale manufacturing enterprises have continued to gain increasing recognition in Nigeria in recent times. Thus a lot of work for their development and public policy on them have been done by eminent scholars. These include Okorafor and Iwuji (1975;1976), Ikpeze (1986), Obi (1987) and Osoba (1987). These enterprises create more jobs per unit of investment than large-scale ones (Anderson, 1982: 913; Landi and Diallo, 1987: 5; Little et al, 1987: 203; Osoba, 1987: 10). Sule (1986: 25) notes that after a decade and a half of adopting industrialisation strategy based on large-scale industries, Nigeria has achieved only a fragile industrial development. The triple objective of setting up the plant -achievement of high-level value-added, foreign exchange saving and acquisition of transferred technology - have not been realised. In response to these weaknesses of large-scale manufacturing enterprises, the Federal Government has sought to promote small-scale industries as a strategy for self-reliant industrialisation.

However, inadequate credit facility has always been a constraint on the development of small-scale industries in Nigeria in general and Enugu state in particular. Majority of these enterprises cannot draw

money from the capital market. Consequently, they are either starved of funds or turn to sources other than institutional ones to borrow on extremely unfavourable terms. This hinders their profitability in a competitive market. To overcome this problem, both the Federal and State Governments set up the small-scale industries credit schemes and also gave guidelines to commercial banks to increase their lendings to small-scale enterprises in the country.

The basic assumption underlying selective credit controls is that it is possible to redirect real resources to a particular sector through a reallocation of financial resources. However, the effectiveness of selective credit control depends on the efficiency with which banks mobilise and allocate savings to the favoured sector such as manufacturing (Johnson, 1974: 86). Therefore, this study aims at investigating the effectiveness of selective credit controls with reference to small-scale manufacturing industries in Enugu state of Nigeria. This will help to ascertain whether the credits to this manufacturing sub-sector have helped in achieving governments objectives concerning their development and in alleviating their financial problems.

1.2 Statement of the problem

Over the years, both the Federal and State Governments of Nigeria have stepped up efforts to promote the development of small-scale enterprises in the country through increased incentive schemes and enhanced budgetary allocation for technical assistance programmes. New lending schemes and credit institutions, at both the national and

Local levels, have been established to boost the flow of development finance to these enterprises in the country. These include: World Bank - assisted small-scale Enterprises loan scheme (SMEX), the National Economic Reconstruction Fund (NERFUND) and the Community banks. The central Bank of Nigeria (CBN) equally plays a leading role by issuing guidelines to banks on the minimum credit to be granted to small-scale enterprises. For instance, the CBN expanded its credit guidelines to incorporate the small-scale enterprises through the directive effective January, 1971 to banks to ensure that at least 10 per cent of their total loans and advances are allocated to small-scale enterprises in the country. This percentage was increased to 16 per cent in April, 1980 and to 20 per cent since January, 1990. Non-compliance attracts stiff penalties including forfeiture of the shortfalls of such loans by individual banks under this directive, for on lending to the target group through the Nigerian Bank for Commerce and Industry (NBCI).

However, in spite of all these measures, recent studies show that small-scale industries in all parts of the country still face high rate of business failures (Inang and Ukpong, 1992: 255). Then the question that arises is:

Is the selective credit controls, through which credit rationing to small-scale manufacturing industries in Enugu state comes into effect, effective in influencing their investment activity? It is the answer to this question that is the focus of this research.

1.3 Definition of small-scale industry

There is no universally accepted definition of small-scale industry. This is because an enterprise which is small in the context of one

economy may be relatively large in the context of another. However, there are some common indicators in most of the definitions, namely, the size of capital investment (fixed assets), value of annual turnover (gross output) and the number of paid employees (Inang and Ukpong, 1992; 252).

The Small-scale Industries Division of the Federal Ministry of Industries defined it as an enterprise having investment capital (investment in land, building, machinery and equipment and working capital) of up to N60,000.00 and employing no more than fifty persons. This was later revised to embrace any manufacturing, processing or service industry with a capital investment not exceeding N150,000.00 in machinery and equipment. The Nigerian Bank for Commerce and Industry (NBCI) defines it as a firm whose capital investment does not exceed N750,000.00 (including working capital but excluding land).

The new national definition as contained in the Central Bank of Nigeria (CBN) monetary and credit Policy Guidelines (1993: 9) defines small-scale enterprise as an enterprise whose total cost, excluding cost of land but including working capital, is N1.0 million but not exceeding N10.0 million.

For the purpose of this study, the new national definition will be adopted. In case of employment, the focus will be on those enterprises that employ not more than fifty full-time staff.

1.4 Objectives of the study

The specific objectives of this study are:

(i) To find out the impact of credit rationing on the investment activity of small-scale manufacturing industries in Enugu state; and

(ii) To find out whether the selective credit controls, through which rationing comes into effect, is effective in influencing the investment activity of these enterprises in the state.

1.5 Hypotheses of the study

The following hypotheses will guide the study:

1. $H_0 : b_i = 0$

Credit rationing to small-scale manufacturing industries in Enugu state has no impact on their total gross investment.

2. $H_0 : b_i = 0$

Selective credit controls, through which rationing comes into effect, are ineffective in influencing the investment activity of small-scale manufacturing industries in the state.

1.6 Significance of the study

Small-scale manufacturing enterprises constitute an important block in the nation's industrial structure. Hence, the Federal Government, in recent times, has continued to lay emphasis on promoting economic recovery through encouraging small-scale enterprises in the country.

However, within the Nigerian environment, not much work has been done on the impact of selective credit policy on the investment activity of these enterprises. Hence, the need to carry out an empirical test to find out whether selective credit controls, through which credit rationing to small-scale manufacturing industries in Enugu state comes into effect, is effective in influencing their investment activity.

The outcome from this study will guide the government, policy makers and industrialists in formulating appropriate policies that will help in the expansion of the contribution of this sub-sector to the economy.

1.7 Scope and Limitations of the study

This study covers only the small-scale industries in Enugu state that are engaged in manufacturing and that are registered with the state Ministry of Commerce and Industry (Funds for Small-scale Industries unit) and the National Association of Small-scale Industrialists, Enugu.

The three operators under the small-scale industries sub-sector are:

a. One-man entrepreneur;
b. Co-operative/partnership; and
c. Private limited liability companies.

This study covers only the private limited liability companies. Their choice for this study is guided by their wide capital base over other forms of business organisation and data availability during the period covered.

Due to resource constraint, the study is limited to six small-scale manufacturing industries out of ten of them that are registered with the state Ministry of Commerce and Industry (Funds for Small-scale Industries unit) and the National Association of Small-scale Industrialists, Enugu state. Their choice is guided by the data availability during the period covered. The list of the enterprises sampled is shown in Table 1.1 below.

Table 1.1: List of small-scale manufacturing industries selected for the study.

Serial Number	Industry	Business Interest
1.	St Anthony's Company (Nig.) Ltd.	Food and Beverages
2.	Frastel (Nig.) Ltd.	Soap and cosmetics
3.	Hamson (Nig.) Ltd.	Food and Beverages
4.	Raduche and Company (Nig.) Ltd.	Agro-Allied and soap manufacturing.
5.	Spute Fashion Industry Ltd.	Soap manufacturing
6.	GoeFredrick (Nig.) Ltd.	Furniture.

Source: National Association of Small-scale Industrialists, Enugu office and State Ministry of Commerce and Industry (Funds for Small-scale Industries unit), Enugu.

1.8 Organisation of the study

This project report is divided into six chapters. Chapter one is the introductory chapter. It begins with the discussion of the background of the study and proceeds with the problem statement, operational

definition of small-scale industry, objectives and hypotheses of the study and concludes with the scope and limitation of the study. Chapter two discusses the literature related to the work, which comprises the theoretical and the empirical literature. Chapter three discusses the theoretical framework which provides a theoretical base for the study. Chapter four treats the methodology of the study. It presents the basic model and its specification, estimation procedure, the techniques of evaluation, data requirement and sources. The regression results are presented in chapter five, with the various statistical tests of significance and the second order tests for the possible violation of the stochastic assumptions of linear regression model. The working hypotheses are equally evaluated and the implications of the results highlighted. Chapter six presents the summary and conclusions drawn based on the findings. Policy recommendations and indication for further research are also made in this chapter.

CHAPTER TWO

LITERATURE REVIEW

2.1 Theoretical Literature

While analysing the effectiveness of selective credit controls, Khatkhate and Villanueva (1978: 985) point out that it is crucial to identify where the controls are applied - lenders, borrowers or credit instruments - as the conditions governing effectiveness vary according to where the controls are imposed. In his classifications, Silber (1973: 328) notes that portfolio restrictions, differential reserve requirements and subsidies to lenders are the instruments to influence lenders; interest rate subsidies and capital issuing controls are the instruments for changing the behaviour of borrowers and interest rate ceilings, control over other terms of credit instruments are examples of the third.

However, Khatkhate and Villanueva (1980: 77) and Bitros (1981: 464) note that for a strict test of the effectiveness of selective credit controls, the necessary condition is the observance of fungibility, that is, the ability to use funds borrowed for one purpose for another. In other words, the degree of fungibility would have to be zero. This would obtain if short-term and long-term credits from the banking system are exclusively utilised by business firms to finance fixed and working capital, respectively. However, this would be possible if the demand for

bank funds can be identified (Bitros, 1981: 56). Although, identification may be possible in a country with competitive money and capital market, it may not when the monetary authorities set maximum limits to the interest rates that banks can charge their customers.

However, capital markets are commonly segmented in Less Developed Countries (LDCs) both in terms of access to credit and its costs (Abdi, 1978: 135; Page, 1979: 198). They point out that credit from modern financial institutions is generally available to large investors with established credit experience. Therefore, the small investors must only rely on traditional sources especially personal and family savings, and to a lesser extent co-operative/saving scheme and money lender. The limited credits, they note, force them to economise on capital. Others who are unable to generate personal savings and who are not known to money lenders have no source of capital than credit from suppliers of goods.

Anderson (1982: 916) stresses on the efficient channels of supply as opposed to continuous emphasis on the demand side of credit only. He notes that since both fixed and working capital are indispensable elements in any business activity, the issue is not whether the demand for finance exists, but what are the most efficient channels of supply. He points out that while informal sources may be ideal for small borrowings of short maturity, they cannot be expected to serve because in cloth and garments, the demands are greater for working than for fixed capital, and, given the nature of the products, are most frequently met through trade credits. In other industries, small firms may have to

offer than receive trade credits. In addition, their demands for fixed capital are greater, and for both reasons may seek supporting finance from the commercial and development banks. However, Okigbo (1987: 115) explains that the inadequacies of the nation's development banks have placed commercial banks in a commanding role. He notes that if the government owns controlling interest in the major commercial banks, then, it can influence the channelling of the funds and substantial profits recorded every year by these banks into the priority sectors.

Therefore, for a strict test of the effectiveness of selective credit controls, Silber (1973: 30-45) notes that the analytical framework employed has to satisfy two properties. First, it should integrate the patterns of resources utilisation with the various financial flows, and second, it should encompass the full extent of investment decisions and their dynamic interactions. In their own view, Khatkhate and Villanueva (1980: 77-78) note that:

Selective credit policies will not always have the anticipated effect on interest rates and real investment in a sector that is favoured by such policies; a sufficient, though not necessary, condition for selective credit policies to achieve the desired impact on interest rates and investments in favoured sectors is the insensitivity of the financial sectors lending to the favoured sectors to any changes in the interest rates on loans to other sectors; and in a more likely case where some degree of substitutability of different types of bank assets is prevalent, the success or failure of selective credit policies becomes a more complicated

empirical issue, involving an estimation of allocation functions of the financial and production sectors.

In general, Bitros (1981: 465) concludes that an alternative strategy for testing the effectiveness of selective credit controls at firm level is to design a test based on the interaction between financial flow and resource utilisation. That is, to estimate investment in fixed and working capital and then look at the coefficients of the various categories of funds utilised by the firm to see whether there exists significant differential effects.

2.2 Empirical Literature

Within the Nigerian environment, not much work has been done on this. Therefore, the empirical literature reviewed for this study is based on the related works carried out in the country and other countries. These include Egwuatu (1988), Bitros (1981) Vaez-Zadeh and Leite (1983; 1986).

Egwuatu (1988) analysed the effectiveness of institutional credits to small-scale industries in Nigeria during the period 1970-1986. He came to the conclusion that the structure of institutional credits has been biased against industries that use indigenous technology. He also found out that the working capital that is provided is insufficient in view of the high inflationary rate in the country. However, he has not carried out any statistical tests of significance to establish whether the institutional credits to small-scale industries in the country were effective or not.

Bitros (1981), in his study, analysed the effectiveness of those credit controls only which aim at accelerating investment in fixed capital. The study derives from a record of 153 manufacturing enterprises in Greece over the period 1967-76. However, unlike Meyer and Glauber (1964), Dhrymes and Kurz (1967), who were unable to establish a positive relationship between gross investment and external finance, Bitros (1981) finds out that such relationship does exist. The overall conclusion drawn is that the selective credit controls were ineffective during the period covered. However, the problem with the study is the emphasis on fixed capital only, neglecting the impact of working capital which equally affects the expenditure decisions of manufacturing enterprises.

Vaez-Zadeh and Leite (1983) in their study, carried out an empirical test of the effectiveness of selective credit controls with reference to Indian sugar Industry during the period 1960/61 - 1978/79. They analysed substitutability between bank and non-bank credits which has been ignored in the previous studies. The methodology employed was based on the interaction of credit and real expenditure variable and three tests were carried out. The first test examined whether or not overall external credits affect investment. The second examined the substitutability between various sources of external finance. The third test was based on the total gross investment. In this test, the relationship between total gross investment and the credit variables is estimated to assess the impact on overall investment in the sugar industry of selective credit policy.

The overall conclusion drawn is that the selective credit controls as applied to the Indian sugar industry are not effective because of the possibility of substitution between different sources of external finance. The limitation of this study is the omission of working capital from the total gross investment.

Consequently, Vaez-Zadeh and Leite (1986) analysed the effectiveness of selective credit controls with reference to small-scale, medium-scale and large-scale manufacturing enterprises in Korea over the period 1970-1981. They introduced a new variable, the working capital, in the investment equations. The methodology was designed to permit the possible substitutability between different sources of credits - bank and non-bank credits - in influencing investment, inventories and working capital of those enterprises.

The overall conclusion drawn is that selective credit controls adopted in Korea to expand investment activities of those manufacturing enterprises helped to expand their investment activities. The problem with the study is the omission of credit rationing proxy to test for the impact of credit rationing on the investment activity of those manufacturing enterprises.

2.3 Limitations of the previous studies

The studies reviewed have in one way or the other made useful contributions to the understanding of selective credit controls with reference to the manufacturing sector. However, the study by Egwuatu (1988) is not based on a rigorous test. With the exception of Vaez-

Zadeh and Leite (1983), other studies omitted rationing proxy from the model. Furthermore, with the exception of Vaez-Zadeh and Leite (1986), other studies omitted working capital from the total gross investment. Working capital is a measure of liquidity position and solvency of a firm. Therefore, its omission from the total gross investment makes the investment equation incomplete.

Finally, with the exception of Vaez-Zadeh and Leite (1983; 1986), other studies do not incorporate substitutability test to show the impact of various sources of external finance on the total gross investment. This study takes account of these limitations.

CHAPTER THREE

THEORETICAL FRAMEWORK

3.0 Theoretical framework

The theoretical framework adopted for this study is the theory of Credit Rationing. This theory is chosen because of the introduction of credit rationing proxy (H) in the model.

Credit rationing was first discussed in the context of usury ceiling by Adam Smith (1776). Later in his "Treatise On Money", Keynes (1930: 212-3) stresses on the "frinze of unsatisfied borrowers" as a factor influencing the volume of investment. However, credit rationing and credit availability theories of bank behaviour came into prominence in the early 1950s as part of availability doctrine first developed by Roosa (1951) and later formalised by Scott (1957) and Modigliani (1963). The focus of availability doctrine is that credit rationing influences investment independently of variations in interest rates or in other factors that shift the demand schedules of borrowers. In the early 1950s, however, credit rationing was primarily institutional and descriptive (Soludo, 1987: 29). It centred on the imperfections in the loan market.

Since 1960s, more works on credit rationing have been carried out. These include Hodgman (1960), Freimer and Gordon (1965), Jaffee and Modigliani (1969; 1976), Jaffee and Russel (1976), Azzi and Cox (1976).

3.1. The Postulate of the Theory of Credit Rationing

Hodgman (1960) focused on the risk of default as a source of credit rationing. He defines the risk of a loan as the ratio of the expected value of the payment to the banker to the expected value of the possible payments below the contract (including interest) payment. He assumed that bankers' policy is to require a loan risk ratio above a predetermined figure by increasing the interest rate. However, beyond some loan size, raising interest rate will not prevent a fall in the risk ratio. Therefore, given a risk ratio requirement, a banker will refuse to extend credit beyond some level regardless of the interest rate. However, Hodgman failed to demonstrate that a risk ratio requirement is optimal policy. His analysis was again skewed towards 'weak credit rationing'. A banker who practises weak credit rationing will vary the amount he is willing to lend a borrower with the interest rate up to a limit. Only beyond this limit will he refuse to extend credit regardless of the interest rate.

Freimer and Gordon (1965) developed a credit rationing model with rational lenders in the special case where the loan repayment is set equal to the best possible outcome of the investment project. They considered a bank presented with loan requests by firms desiring finance for investment project. The proceeds from the i^{th} borrower's project equal to the end-of-period value of the firm, is a continuous random variable X with density function $f_i(x)$. The firm has alternative, though more costly sources of finance with which it can complement bank credit.

The borrower contracts to pay the bank an amount

$R_i L_i$ 3.1

where L_i is the size of the loan and

$R_i = 1 + ri$ where ri is the interest on loan. The actual payment to the bank, which is limited to the proceeds from the investment is

$Z = \text{minimum } [X, R_i L_i]$ 3.2

with density function $f_i(x)$. In this case, sure minimum outcomes k_i, and maximum possible outcomes, K_i, for projects are assumed so that $f_i(x) = 0$ for $x < k_i$ and $X > K_i$.

The above analysis, however, assumes that the bank sets an interest rate and extends whatever credit a borrower wants at this rate up to a limit determined by the borrower's financial circumstances. Depending upon the cost of the project, the probability distribution of outcomes from the project and the rate of return on alternative bank investments, it is quite possible that the customer will be unable to borrow the full cost of his project regardless of the interest rate he is willing to pay.

Jaffee and Modigliani (1969) note that Freimer and Gordon (1965) based their arguments on backward supply curve alone, but the definition of credit rationing necessitates taking into account the demand for loans by the bank customers. Therefore, Jaffee and Modigliani (1969: 851) define credit rationing as a situation in which the demand for commercial loans exceeds the supply of these loans at the commercial loan rate quoted by the banks.

To measure the volume of credit rationing, Jaffee and Modigliani (1969: 864) adopt an operational proxy, H, which is simply the

percentage of the total loans which are granted to risk-free customers. Thus, H is expressed as:

$$H = \frac{L_1}{L_1 + L_2} \quad \text{..... 3.3}$$

where L_1= loans granted to risk-free customers and L_2 = loans granted to rationed customers.

In the absence of the information about which loans are risk-free and which are risky, Jaffee and Modigliani (1969: 865) approximate 'H' by the percentage of loans granted at the prime rate or which were large in size. That is the measure of large loans as the proportion of the total loans. They conclude that credit rationing will not occur when the bank is a discriminating monopolist but under equilibrium or disequilibrium conditions when the bank is constrained to charge different classes of borrowers the same rate of interest.

However, if we accept Jaffee and Modigliani's explicit and implicit assumptions underlying a positive relationship between 'H' and the incidence of credit rationing and further assume that variations in investment and loan demands dominate the effects of changes in risk on the equilibrium loan rate, r*, then 'H' (rationing) will be positively related to the spread between r* and sticky rate actually prevailing, r:

$$H = a_0 + a_i (r^* - r) + \varepsilon \quad \text{..... 3.4}$$

where ε is the error term.

On the choice between equations 3.3 and 3.4, Wood (1975: 84) notes that given that sizes of loans, borrowers and banks are positively related, it depends upon:

(i) the nature of the loan demands of large and small borrowers;

(ii) the spread of response of loan rates to changes in market conditions and the variability of those rates among different kinds of customers; and

(iii) the size and cyclical variability of default risk on small loans.

Jaffee and Russel (1976: 651-66) developed a model of credit rationing based on moral hazard in the context of consumer loan model with competitive lender. The key feature of the model is that the propensity for default by certain borrowers rises as they are offered large loans. The zero-profit, loan-contract, locus is therefore rising, with high rates necessary to compensate lenders for the high default experience on contracts with large loans.

3.2 Limitations of the earlier works

Criticising the earlier works, Azzi and Cox (1976: 911-17) point out that credit rationing is not useful because it is based on the inappropriate implicit assumption "that an offer to pay the market rate of interest on a loan constitutes and effective demand for credit". They further note that the distinction between a borrower's wants and demands for credit depends not only on the rate of interest for credit but also on the borrower's equity. Therefore, if one is to have a concept of credit rationing that refers to non-supplied effective demand for loans, rather than unsatisfied wants, it must involve an analysis of lender response to offers of interest rate-collateral-equity combinations rather than only interest rate offers. They therefore define credit rationing as the difference between effective borrower demand and lender supply.

Effective demand is in turn defined as loan demand that is satisfied by lender supply. Thus, credit rationing behaviour is ruled out by definition.

However, Azzi and Cox only considered how borrower-provided collateral affects the incentive of lenders to ration credit through non-price means. Hence, Jaffee and Modigliani (1976: 919) note that their conclusion of no credit rationing is tautological and follows from their definition between effective and desired loan demand.

In view of the above shortcomings, Vaez-Zadeh and Leite (1983: 565) calculate 'H' as:

$$H = \frac{L - L_r}{L} \quad \text{..... 3.5}$$

where L = credit supplied to all firms by the banks and

L_T = credit supplied to the industries being studied by the banks. They use equation (3.5) in their study on the "Effectiveness of selective credit controls: An empirical test applied to Indian sugar Industry" to test for the impact of credit rationing on the investment activity of Indian sugar industry. In this study, equation (3.5) is used to measure H.

CHAPTER FOUR

METHODOLOGY

4.0 Methodology

The methodology adopted for this study is econometrics. Linear regression applying ordinary least squares (OLS) techniques is used to test the parameter estimates. Many empirical works on the effectiveness of selective credit controls with reference to manufacturing industries have applied linear regression and it has been found to be useful. These include Bitros (1981), Vaez-Zadeh and Leite (1983; 1986). Our choice of OLS is further guided by the simplicity of its computational procedure and the optimal properties of the estimates obtained from this procedure - linearity, unbiasedness and minimum variance (Koutsoyiannis, 1977:101).

The basic model for this study is the multi-period model which incorporates interest rate and credit variable. The simultaneous inclusion of interest rate and credit variable arises because interest rate influences the desired level of investment while the availability of credit affects the speed of adjustment to the desired level (Vaez-Zadeh and Leite, 1986:125). This model was used by Vaez-Zadeh and Leite (1983; 1986) to study the effectiveness of selective credit controls with reference to Indian sugar industry and manufacturing sector in Korea, respectively. However, whereas in the model total gross investment

comprises investment in fixed capital and inventories, this study will include working capital as part of total gross investment.

4.1 Model specification

To test for the impact of credit rationing on the investment activity of small-scale manufacturing industries, total gross investment is explained by credit rationing proxy, H. In implicit form,

TGI = f (H)

where TGI = total gross investment, comprising investment in fixed capital, inventories and working capital, and

H = credit rationing proxy, estimated as

$$H = \frac{L - L_r}{L}$$

where L = credit supplied to all firms by the commercial banks in Enugu state, and

Lr = credit supplied to small-scale manufacturing industries being studied by the same banks.

In explicit form,

$$TGI = b_0 + b_1 H + \mu_t \quad \text{.....} \quad 4.1$$

To test for the effectiveness of selective credit controls, through which rationing comes into effect, total gross investment is explained by average interest rate and a credit variable.

In implicit form,

TGI = f (R,C)

where TGI = total gross investment as defined above

R = average interest rate, estimated as the ratio of total interest payments over total debts.

C = Credit variable which represents one of the followings:

LBR = total liabilities to banks (bank credit) by the industries being studied.

COI = Credit from other financial institutions apart from banks (non-bank credit)

BFR = a broad credit variable comprising the sum of LBR and COI.

In explicit form, the basic estimating equations are:

$$TGI = b_0 + b_1 R + b_2 LBR + \mu_t \quad \text{..... 4.2}$$

$$TGI = b_0 + b_1 R + b_2 COI + \mu_t \quad \text{..... 4.3}$$

$$TGI = b_0 + b_1 R + b_2 BFR + \mu_t \quad \text{..... 4.4}$$

$$b_1 < 0 < b_0, b_2$$

μ_t = Error term; $\mu \in N(0, \delta_\mu)$

t = time period.

Since we do not know the exact relationship between the dependent and independent variables, different functional forms (linear and log-linear functions) are tried and we then chose from among the various results the one that is judged as the most satisfactory on the basis of economic, statistical and econometric criteria (Koutsoyiannis, 1977:15).

4.2 Method of Evaluation

4.2.1 Hypothesis 1

To test this hypothesis, simple linear regression is used to estimate equation (4.1). To test for the significance of coefficient of the rationing

proxy (H), 't-statistic' is used and a two-tailed test is conducted at 5 per cent level of significance. The computed t-ratio, t*, is compared with the theoretical t-ratio, $t_{0.0.25}$, with n-k degrees of freedom,

where n = sample size and

k = total number of estimated parameters.

The null hypothesis

H_0: $b_i = 0$ is tested against the alternative

H_1 : $b_i \neq 0$

If $t^* > t_{0.0.25}$, reject H_0, otherwise accept H_0.

R^2, the coefficient of determination, is used to test for the explanatory power of the variable. The closer it is to 1, the better the goodness of fit.

The F-ratio is used to test for the overall significance of the regression equation. The computed F-ratio, F*, is compared with the theoretical $F_{0.05}$ with $v_1 = k-1$ and $v_2 = N-K$ degrees of freedom.

where v_1 = degrees of Freedom for numerator,

v_2 = degrees of freedom for denominator,

k = number of b's (including b_0), and

N = sample size.

The null hypothesis

H_0: $b_i = 0$ is tested against the alternative

H_1 : $b_i \neq 0$

If $F^* > F_{0.05}$, reject H_0, otherwise accept H_0.

4.2.2 Hypothesis 2

To test this hypothesis, multiple linear regression is used to estimate equations (4.2), (4.3) and (4.4). The coefficient of multiple determination, R^2, is used to test for the explanatory power of the variables while the 'F-ratio' is used to test for the overall significance of the regression equations at 5 per cent level of significance.

To test for the substitutability between various sources of external finance, 't-statistic' is used to test for the significance of the beta coefficients of credit variables in the estimating equations. A high 't-statistic' means a closer relationship between the credit variable and the dependent variable. An improvement in 't-statistic' and R^2 of the broader credit variable, BFR, will show that there is some degree of substitutability and hence, selective credit controls is ineffective.

The second-order tests of the stochastic assumptions of linear regression model are equally carried out to avoid biased estimates. They are tests for homoscedasticity, multicollinearity and autocorrelation.

Spearman`s Rank correlation coefficient r^1, is used to test for the presence of heteroscedastic disturbance in our model. If r^1 is high, then heteroscedasticity is a serious problem, otherwise, it is not a serious problem.

To test for the seriousness of multicollinearity the computed overall multiple correlation coefficient R, and the simple correlation coefficients, r between the explanatory variables are compared. According to Klein (1962:64), in a model with two explanatory variables, if $R_y.x_i,x_j \geq r_{x_i x_j}$,

multicollinearity is not a serious problem; otherwise, it is a serious problem,

where

$R_y.x_i,x_j$ is the overall multiple correlation of the relationship and $r_{x_ix_j}$ is the simple correlation between any two explanatory variables.

To test for the presence of autocorrelation in the model, Durbin-Watson's statistic is used. In this test, the Durbin-Watson limits are based on a 5 per cent level of significance and k degrees of freedom, where k is the number of regressors in the equation being estimated. The computed Durbin-Watson statistic, d*, is compared with the theoretical Durbin- Watson limits. If $d_u < d^* < (4-d_u)$, we accept the null hypothesis of no autocorrelation, otherwise, we reject the null hypothesis and accept the alternative that there is autocorrelation (Koutsoyiannis, 1977:215), where d_u is the upper Durbin-Watson limit.

4.3 Data required and sources

Data collected for this study include investment in fixed assets, inventories and working capital by the small-scale manufacturing enterprises sampled; total liabilities to banks and non-bank financial institutions and total interest payments for all debts by these enterprises (collected from the sampled enterprises and commercial bank headquarters, Enugu).

Other data include implicit investment deflator (inflation rate) used to deflate investment in fixed capital and inventories, collected from the CBN Statistical Bulletin (1990-1994). Data were equally collected from

Enugu State Ministry of Commerce and Industry (Funds for Small-scale Industries unit), Enugu and the National Association of Small-scale Industrialists, Enugu office.

CHAPTER FIVE

PRESENTATION AND ANALYSIS OF RESULTS

5.1 The Empirical Results

Using time series data for the period 1980-1994, three functional forms were tried - linear, semi-logarithmic and double-logarithmic functions. To select the appropriate functional form, the following criteria were employed - economic 'a priori' statistical and econometric criteria. With respect to economic criteria, all the regression coefficients have the expected signs. For statistical criteria, we compared the coefficients of multiple determination, R^2, and the statistical significance of the beta coefficients among the three functional forms. With respect to econometric criteria, the pattern of residual errors for the possible violation of the basic assumptions concerning these errors was examined.

On the basis of the above criteria, semi-logarithmic function is finally selected for analysis. The ordinary least squares (OLS) regression technique yields the following results:

5.1

$$LogTGI = 7.805 - 9.204H$$
$$(-6.529)$$
$$R = 0.875$$
$$R^2 = 0.776$$
$$t_{0.025} = 2.16$$
$$F^* = 42.63; F_{0.05} = 4.67$$
$$D.W. = 1.319$$

5.2

$$LogTGI = 2.308 - 13.124R + 1.262LBR$$
$$(-2.345) \quad (2.246)$$
$$R = 0.920$$
$$R^2 = 0.847$$
$$\overline{R}^2 = 0.822$$
$$t_{0.025} = 2.18$$
$$F^* = 33.28; F_{0.05} = 3.89$$
$$D.W. = 1.768$$

5.3

$$LogTGI = 2.189 - 12.504R + 1.009COI$$
$$(-2.141) \quad (2.241)$$
$$R = 0.920$$
$$R^2 = 0.847$$
$$\overline{R}^2 = 0.822$$
$$t_{0.025} = 2.18$$
$$F^* = 33.24; F_{0.05} = 3.89$$
$$D.W. = 1.634$$

5.4

$$LogTGI = 1.909 - 11.595R + 0.622BFR$$
$$(-1.994) \quad (2.417)$$
$$R = 0.924$$
$$R^2 = 0.854$$
$$\overline{R}^2 = 0.830$$
$$t_{0.025} = 2.18$$
$$F^* = 35.13; F_{0.05} = 3.89$$
$$D.W. = 1.599$$

The figures in parentheses represent the t-ratios of the corresponding coefficients. R is the coefficient of multiple correlation which measures the degree of association of the regressors taken jointly and the regressand. R^2 is the coefficient of multiple determination which is the proportion of the total variation in the total dependent variable jointly explained by variations in the explanatory variables. $\overline{R}^2$ is the adjusted coefficient of determination for degrees of freedom. F* is the variant ratio used to test whether the joint influence of the regressors on the regressand is statistically significant. D-W is the Durbin-Watson statistic for testing autocorrelation.

5.2 Examination of the Algebraic signs of parameter estimates

Wrong signed coefficients in an empirical result are usually warnings of incorrect definition, specifications or interpretations (Rao and Miller, 1971: 46).

From the regression results, all the beta coefficients have the expected signs. Given that the lowest R^2 is 76.6 per cent, the explanatory power of the variables are satisfactory.

5.3 Tests of the validity of the assumptions of ordinary least squares (Second-Order Tests).

It is only when the assumptions of ordinary least squares (OLS) are fulfilled that our parameter estimates can be used for evaluation and policy formulation. These tests include homoscedasticity, multicollinearity and autocorrelation.

Table 5.1: Heteroscedasticity Test

Equation No.	Estimated r'	Test Result
2	$r'^{e.R} = 0.253$	HNS
	$r'^{e.LBR} = 0.253$	HNS
3	$r'^{e.R} = 0.279$	HNS
	$r'^{e.COI} = 0.225$	HNS
4	$r'^{e.R} = 0.093$	HNS
	$r'^{e.BFR} = 0.068$	HNS

HNS = Heteroscedasticity Not serious.

From the above table, the values of Spearman`s rank correlation coefficients, r^1, of the error terms and the explanatory variables are very low. This implies that the error terms are fairly homoscedastic.

Table 5.2: Multicollinearity Test

Equation No	Multiple R	Simple r	Test Result
2	0.920	0.842	MNS
3	0.920	0.856	MNS
4	0.924	0.861	MNS

MNS = Multicollinearity Not serious.

In our model, the matrix of zero-order correlation coefficients show that $R_y.x_i,x_j > r_{x_i x_j}$ in all the equations. In other words, the multiple R is greater than the simple r, showing that multicollinearity is not a serious problem.

Table 5.3: Autocorrelation Test

Equation No.	Observed D-W statistic d*	Theoretical D-W Limits		Test Result
		d_u	$(4-d_u)$	
2	1.768	1.54	2.46	FA
3	1.634	1.54	2.46	FA
4	1.599	1.54	2.46	FA

FA = Free Autocorrelation.

Since our observed Durbin-Wastson's fall within the region of zero-autocorrelation ($d_u < d^* < (4-d_u)$), our equations are free of serious autocorrelation. This implies that the variances of the parameter estimates calculated on the assumption of zero autocorrelation are valid.

Hence, the statistical tests of significance of the parameter estimates are valid.

5.4 Statistical Tests of Significance

1. F-statistic is used to measure the joint influence of the explanatory variables on the dependent variable at 5 per cent level of significance. If $F^* > F_{0.05}$, reject H_0, otherwise, accept H_0.

2. The 't-statistic' is used to test for the significance of the beta coefficients. If $t^* > t_{0.025}$, reject H_0, otherwise, accept H_0.

Table 5.4: Results of statistical tests of significance

Equation No.	F*	$F_{0.05}$ DF	Test Result	t*	$t_{0.025}$	Test Result
1	42.63	4.67 1(13)	S	-6.53	2.16	S
2	33.28	3.89 2(12)	S	2.25	2.18	S
3	33.24	3.89 2(12)	S	2.24	2.18	S
4	35.13	3.89 2(12)	S	2.42	2.18	S

S = significance (Reject H_0, accept H_1).

Our results show that both the regression equations and beta coefficients of credit variables are significant at 5 per cent level.

5.5 Evaluation of the Working Hypotheses

5.5.1 Hypothesis 1

This hypothesis states that credit rationing to small-scale manufacturing industries in Enugu has no impact on their total gross investment.

From the regression results, the R^2 is 76.6 per cent, showing that the explanatory power of the variable is satisfactory. The F-ratio shows that the regression equation is significant while the t-value underneath the beta coefficient of the credit rationing proxy, H, is significant at 5 per cent level. We therefore reject the null hypothesis and accept the alternative that credit rationing to small-scale manufacturing industries in Enugu state of Nigeria is significant in influencing their total gross investment.

5.5.2 Hypothesis 2

This hypothesis states that selective credit controls through which rationing comes into effect, is ineffective in influencing the investment activity of small-scale manufacturing industries in Enugu state of Nigeria.

A test of this hypothesis involves an examination of R^2, the coefficient of multiple determination, the `F-ratio` and the 't-ratios' of credit variables in the estimating equations. First, the effect of liability to banks (LBR) on the total gross investment of the enterprises is examined. Given that the R^2 is 84.7 per cent, the explanatory power of the variable is satisfactory, since $F^* > F_{0.05}$, the joint influence of the explanatory variables on the dependent variable is significant. The t-ratio of this credit variable at 5 per cent level of significance is

satisfactory. We therefore reject the null hypothesis and accept the alternative that the liability to banks (bank credit) has a significant influence on total gross investment of small-scale manufacturing enterprises in the state.

Then, bank credit (LBR) is replaced with credit from other financial institutions (COI) other than banks to see if this source of external finance will be more closely related to total gross investment of these enterprises. Given that the R^2 still remains at 84.7 per cent and that the `t-ratio` only declined from 2.46 to 2.41, non-bank credit (COI) is as significant as the bank credit. This implies that there are short-falls in bank credit and hence, non-bank credit is used to substitute for these shortfalls.

To further strengthen the substitutability between bank credit (LBR) and credit from non-bank financial institutions (COI), another regression is performed in which the financing variable represents the sum of LBR and COI. This is to see whether a broader definition of credit variable will be more closely related to total gross investment of these enterprises. From the regression result, there is an improvement in both the R^2 and the `t-ratio`. The R^2, with the broad credit variable (BFR) increased from 84.7 per cent to 85.4 per cent while the `t-ratio` increased from 2.241 to 2.417. This implies that there is high degree of substitutability between bank credit (LBR) and credits from non-bank financial institutions (COI).

The overall conclusion that is drawn is that selective credit controls as applied to small-scale manufacturing industries in Enugu state is

ineffective because in the investment decision of these enterprises, bank credit and credits from non-bank financial institutions are substitutes.

5.6. Implications of the results

Our empirical results show that credit rationing to small-scale manufacturing industries in Enugu state of Nigeria is significant in influencing their total gross investment. However, it is also found that the selective credit controls, through which rationing comes into effect, is ineffective in influencing the investment activity of small-scale manufacturing industries in the state. The existence of credit rationing is shown by the insignificance of the average interest rate in almost all of the equations. This is because investment demand depends on credit availability, and not on its cost, when credit rationing is in effect. The implication of this is that interest rate movement is not the main transmission mechanism through which credit availability influences economic decisions in Nigeria. Interest rates in Nigeria have been artificially kept very low. Artificially low interest rates generates excess demand for credit, and hence, the financial authorities often resort to selective credit allocation and other form of rationing (Soludo, 1987:167).

Government policy, up to the third quarter of 1986, was to maintain low interest rates in accordance with the Keynesian investment theory (Okorie, 1983:45). The Keynesian theory implies that low interest rate, as a component of cost of fund, encourages borrowing for investment. On the other hand Mackinnon and Shaw (1973) view administered low

interest rate as detrimental to increased savings and hence investment demand. Invariably, low interest rates tend to discourage financial savings and therefore reduce the funds available for lending, so that desired investment is higher than the realised investment.

Furthermore, imperfections in the credit market, favour the consumer as against investment borrowing. Therefore, before devising a programme of selective credit controls, the financial authorities should be clear about the decision-making process of the industries to which credit is to be regulated so that such controls can be successfully implemented.

CHAPTER SIX

SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1 Summary and conclusion

The purpose of this study is to find out whether the selective credit controls adopted in the country to boost the flow of development finance to small-scale manufacturing industries in Enugu state in effective in influencing their investment activity. Due to resource constraint and data availability during the period covered, this study is limited to six small-scale manufacturing industries in Enugu state. Data for this research were collected from Enugu state Ministry of Commerce and Industry (Funds for Small-scale Industries unit), Enugu, National Association of Small scale Industrialists (NASSI), Enugu office Headquarters of various commercial banks in Enugu, small-enterprises sampled and CBN publications on small-scale enterprises in the country.

To analyse the data, we specified and estimated a single equation model, employing data over the fifteen year period (1980-1994). Linear regression, applying ordinary least squares (OLS) regression techniques was used to test the parameter estimates. To avoid biased estimates, the second-order tests of the stochastic assumptions of linear regression model were conducted.

The empirical results show that there is credit rationing to small-scale manufacturing industries in Enugu state and the impact of rationing on their total gross investment is significant. However, we found that selective credit controls, through which credit rationing to these

enterprises comes into effect, is ineffective in influencing their investment activity because of high degree of substitutability between various sources of external finance - bank credit and credit from non-bank financial institutions. The overall conclusion drawn is that selective credit controls is ineffective in influencing the investment activity of small-scale manufacturing industries in Enugu state during the period covered.

6.2 Policy Recommendations

Based on the findings, the following recommendations are made:

1. The central Bank of Nigeria (CBN) should regulate the interest rate policy to encourage financial savings without discouraging investment. One of the ultimate objectives of interest rate policy is to channel bank financial savings into direct investment (McKnnon - self finance) or indirectly as loans to borrowers (Shaw - external finance) "to finance the current production, transportation or storage of physical goods, either manufactured or agriculture" (Meyer, 1986:87). While interest rate policy could be effective in mobilising financial savings, (Okorie (1993:49) notes that:

> the economic environment, namely, poor infrastructure economic instability, inadequate information on investments, availability of investment opportunities and public safety could also affect the channelling of the financial savings into productive investment.

2. The CBN should encourage banks to comply with the sectoral allocation of credit to small-scale enterprises and equally ensure that stricter penalties are meted to erring banks.

3. Development Banks such as the Nigerian Industrial Development Bank (NIDB) and the Nigerian Bank for Commerce and Industry (NBCI) should be encouraged to grant long-term loans to small-scale industries. They should be encouraged to give tax holidays to newly established small-scale manufacturing enterprises. This will go a long way in encouraging investment in long-term manufacturing.

4. Since credits from non-bank financial institutions are used to substitute for shortfalls in bank credit, by the small-manufacturing enterprises, a policy that encourages credit from non-bank financial institutions is equally likely to raise the total gross investment of small-scale manufacturing enterprises.

In general, before devising a policy of selective credit controls, the financial authorities should be clear about the decision-making process of the industries to which credit is to be regulated so that such controls can be successfully implemented. This stems from the fact that selective credit control brings the economy closer to an optimum combination of consumption and investment than would be achieved by market allocation of credit (Chima, 1991:69).

6.3 Indication for Further Research

This study does not in any way exhaust every aspect of selective credit controls with reference to manufacturing industries. Therefore, the following are recommended for further studies:

1. An empirical analysis of the effectiveness of selective credit controls on the manufacturing sector in Nigeria.
2. An empirical analysis of the determinants of investment behaviour of small-scale industries in Nigeria.

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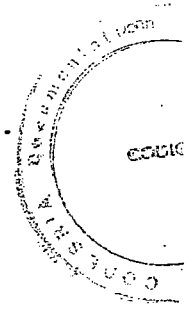

APPENDIX: Table

1	2	3	4	5	6	7	8	9
	TOTAL Gross Investment 1984 =100 TGI	TOTAL Liabilities to Bank LBR	Non-Bank credit COI	Broad Credit Variable (LBR+COIBFR	Total interest payments for all debts	Average Interest Rate $\left(\frac{6}{5}\right)$ R	Total credit to all firm by commercial Banks in the state	Credit Rationing proxy $\frac{(8-3)}{8}$
YEAR	(N Million)	(N million)	(N Million)	(N million)	(N million)	6/5	(N million)	H
1980	0.188	0.065	0.038	0.103	0.028119	0.275	1.998	0.967
1981	0.260	0.081	0.048	0.129	0.03882	0.305	2.294	0.965
1982	0.731	0.095	0.064	0.159	0.04253	0.267	2.655	0.964
1983	0.415	0.105	0.082	0.187	0.048059	0.257	2.782	0.962
1984	0.633	0 089	0.132	0.230	0.05842	0.254	2.458	0.960
1985	0.451	0.198	0.152	0.350	0.0875	0.250	3.013	0.934
1986	0.384	0.208	0.192	0.400	0.0996	0.249	3.103	0.933
1987	0.498	0.258	0.230	0.488	0.11956	0.245	3.149	0.918
1988	0.714	0.247	0.460	0.707	0.168266	0.238	3.213	0.923
1989	0.688	0.430	0.524	0.954	0.225144	0.236	3.470	0.876
1990	0.746	0.520	0.536	1.056	0.244992	0.232	3.442	0.849
1991	0.909	0.425	0 636	1.061	0.24403	0.230	3.472	0.878
1992	1.275	0.597	0.528	1.125	0.25725	0.229	3.579	0.833
1993	1.235	0 616	0.735	1.345	0.3033	0.225	3.609	0.829
1994	1.213	0.866	0.866	1.504	0.332384	0.221	3.655	0.825

Sources: Column 2 and 6 are collected from the small-scale Manufacturing enterprises sampled. Columns 3 and 4 are collected from small-scale Manufacturing enterprises sampled and commercial banks in the state. Column 8 is collected from the commercial banks in the state. Data on implicit investment deflator used to deflate investment in fixed capital and inventories are collected from the CBN statistical Bulletin (various issues).