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FUNGIBILITY AND EFFECTIVENESS OF SELECTIVE CREDIT POLICIES: EVIDENCE FROM NIGERIAN DATA

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I. INTRODUCTION

SELECTIVE credit policies are those adopted by authorities to effect the flow of a given amount of credit in certain desired direction. Two proximate objectives of such policies could be: in the financial sector to correct for credit market imperfections by altering the direction of credit flow and in the real sector to correct for commodity market imperfection by altering the direction of expenditure flow as considered necessary. The ultimate objectives vary, however. They usually include, as in the Nigerian context, increase in output of certain commodities, sectoral balanced growth, and equitable distribution of economic opportunities.

Thus, while selective credit policy may be necessary the world over, it is of much greater importance in developing countries because of their characteristically greater degree of credit and commodity market imperfections. But ironically, while there have been several studies on the effectiveness of such policies for developed countries, similar studies for the developing countries have either not been undertaken, have not been publicized or even published.[1] One aim of this study, therefore, is to contribute to filling this vacuum. In addition, we will attempt to go a step further by correcting for some of the deficiencies alleged against previous studies on the subject.

In the next section, we discuss the applications and objectives of the selective credit policies in Nigeria. Section III discusses our model while Section IV presents the empirical results. The last section summarizes and concludes.

II. APPLICATIONS AND OBJECTIVES OF SELECTIVE CREDIT POLICIES IN NIGERIA

A. *Applications*

Selective credit policies in Nigeria are applied by the government indirectly through the Central Bank of Nigeria and directly by the government itself.

The central bank applies selective credit controls on:

[1] Except those like Bitros [1] for Greece. Others like Patel [9] and Khatkhate and Villanueva [5] are not empirical.

(i) lenders through portfolio restrictions. In this regard, the central bank prescribes sectoral guidelines to the commercial and merchant banks whereby the banks are required to give a certain minimum proportion of their total loans, advances, and discounts to certain preferred sectors (usually referred to as "productive" sectors) while credit to each of the other non-preferred or "unproductive" sectors must not exceed certain limits. Preferred sectors include agriculture, manufacturing, mining and quarrying, real estate and construction, and services. Later, the export sector and the development-finance sub-sector are included. The central bank also stipulates that a certain proportion of a bank's loans, advances, and discounts go to indigenous borrowers.

(ii) credits, by pegging the rate of interest on credit to preferred sectors below the rate on other credit. This is ostensibly done to encourage borrowers to use credit in preferred sectors.

The federal government, on its part, applies selective credit policies directly by setting up specialized financial institutions to mobilize and channel credit to preferred sectors. Such institutions include the Federal Mortgage Bank of Nigeria, Nigerian Agricultural and Co-operative Bank, and Nigerian Industrial Development Bank which channel credits respectively to mortgage, agricultural, and industrial sectors.

B. *Objectives*

The objectives of the authorities include the financial sector proximate objectives of directing credit to preferred borrowers such as indigenous persons (as an integral part of indigenization policy objectives) and to the earlier mentioned preferred sectors of agriculture and manufacturing. The real sector proximate objective is to increase expenditures in preferred sectors and decrease those in non-preferred activities such as imports. All these are not necessarily ultimate objectives in themselves. Ultimate objectives seek to increase the relative output of preferred sectors; to promote balanced sectoral growth, to conserve foreign exchange by discouraging imports and economic opportunities in favor of indigenous borrowers, and so on.

A necessary condition for the effectiveness of selective credit controls is that the objectives for the financial sector be achieved. The effectiveness of policies in this regard can be evaluated by determining the degree of substitution in borrowers' and lenders' portfolios. That would require a study of the behavior of relevant financial institutions, a prototype attempt along this line being that of Silber [10], which would, however, be outside the scope of our study.

But if the objective is to redirect real expenditure flow, i.e., real sector objectives, the borrowers or final spenders must, in addition, view the different finance source and use categories as poor substitutes. Most studies evaluating the effectiveness of selective credit controls confine their scope to this proximate objective by testing for substitutions in borrowers' portfolios between various sources and uses of finance. We have followed this approach, too, among others.

But credit flow may be effectively channelled in a desired direction and credit may be used on the intended capital/durable expenditure in ways which do not

achieve the ultimate purpose. In other words, achievement of proximate financial and real sector objectives do not necessarily imply the accomplishment of ultimate goals. For instance, bank credit to the manufacturing sector may be used in financing, say, inventories or manufacturing equipment, without causing a corresponding increase in manufacturing sector output. This is because there may be no one-to-one relationship between certain categories of manufacturing sector capital and durable expenditures and the final outputs that emerge. Unfortunately, however, previous studies do not evaluate the extent to which such ultimate objectives have been served. This is something the present study attempts to look into.

III. MODELS OF EVALUATING THE EFFECTIVENESS OF SELECTIVE CREDIT POLICIES

This section discusses models used to evaluate the effectiveness of the selective credit policies on real expenditures, i.e., on real sector proximate objective. It then extends the model to evaluate the effectiveness on real sectoral output, i.e., on ultimate objectives.

A. *Proximate and Ultimate Objectives*

The following are expenditures or outputs and their associated credit-types that selective credit policies have been designed for and which are, therefore, tested for.

	Expenditure/Output	Associated Credit-type
1.	Estate and construction investment	Estate and construction (mortgage) bank credit, D_G
2.	Transport investment	Transport bank credit, D_T
3.	Machinery and equipment investment	Manufacturing bank credit, D_F
4.	Stock or inventory investment	Manufacturing bank credit, D_F
5.	Total gross capital formation=(1)+(2)+(3)+(4)	Total bank credit (loans and advances), D
6.	Index of mining production or activities	Mining sectoral bank credit, D_N
7.	Index of estate and construction activities	Estate and construction (mortgage) bank credit, D_G
8.	Index of manufacturing production or activities	Manufacturing bank credit, D_F

Notes: 1. Expenditure items (1) to (5) are normally proximate real objectives, while outputs in (6) to (8) are normally ultimate objectives.
2. It is our guess that expenditure items (3) and (4), machinery and inventory investments for the whole economy, should be associated with manufacturing credit. This, however, needs not be so because these investment expenditures are not incurred on manufacturing activities alone. Our empirical results will throw more light on this.

B. *Expenditure Model of Testing for Selective Credit Policy Effectiveness*

The effectiveness of selective credit policies in directing real expenditure to desired sectors and activities has been examined by econometric techniques to explain categories such as durable consumer expenditures, construction expenditures, and business investment expenditures in terms of explanatory variables that include relevant financial variables. A variant of the approach is to specify a linear expenditure equation of the Mishkin [7] type whereby a particular sectoral expenditure denoted by E_i is expressed as a function of variables that include the sectoral debt which is supposed to finance the variable (denoted by D_i) and other debt, $D-D_i$, which is the total debt, D, minus D_i. Thus, we have

$$E_i=a_0+a_1D_i+a_2(D-D_i) \tag{1}$$

If a_1 is significantly greater than a_2, there is a lack of substitution or fungibility between D_i and $(D-D_i)$ in financing E_i, otherwise, there is adequate fungibility. The greater the fungibility, the less effective policies are in influencing expenditure flow.

This approach was used by Hamburger and Zwick [4] and Bitros [1] for the United States and Greece respectively. But the signs of the coefficients obtained and their interpretations are apparently contradictory. In [4], the expected and actual signs of a_1 and a_2 are negative with a_1 expected to be greater absolutely than a_2 if selective credit policies are to be effective, while the reverse is true with Bitros [1]. In [1], the expected and actual signs of a_1 and a_2 are positive with a_1 expected to be greater than a_2 if policies are to be effective.[2] We are of the opinion that the logic in [1] is correct when viewed from a flow-of-funds perspective in which source of funds (i.e., debt flow) should positively relate to use of funds (or expenditure flow). Interpretation of our model is based on this logic.

In the present study, the equation type (1) specified and estimated is of the form:

$$E_i=a_{0i}+a_{1i}D_i+a_{2i}(D-D_i)+a_{3i}S+a_{4i}P+a_{5i}WD, \tag{2}$$

where E_i stands for each expenditure/output identified in subsection III-A, D_i is the associated credit flow, and D is total bank credit or external finance. Other explanatory variables are included to obtain superior estimates of a_{1i} and a_{2i}. These explanatory variables are total savings S, which is a measure of internal finance, and P, which is the rate of inflation in equations for the first five investment expenditure items identified in subsection III-A. P is expected to enter these equations positively as it is supposed to increase the rate of physical asset accumulation. Finally, WD is a dummy variable for war that is included

[2] The apparent contradiction can be reconciled in that Hamburger and Zwick [4] explain expenditure FLOW in terms of the STOCK of debts whereas Bitros [1] explains the FLOW of expenditures (i.e., physical assets) in terms of the FLOW of debt.

to capture effects of civil war on expenditure/output. $WD=1$ for each war year and $WD=0$ otherwise.

Empirical results of this exercise are in Section IV, Table I for the first four (investment) expenditure categories and Table II for the next three (output) categories.

C. *Pure Substitution Model of Testing for Selective Credit Policy Effectiveness*

Another approach to testing the effectiveness of selective credit policies in influencing expenditure flow is the one championed by Cohen [2] [3]. He identified two types of substitution. First, like the studies mentioned in subsection III-B, Cohen identifies substitution among the alternative financial sources or markets in financing a given expenditure category or commodity market. This is termed financial substitution. It will exist if, for example, mortgage credit is just as indifferently or equally preferred as other bank credit to finance estate and construction expenditures. Secondly, unlike other studies, he identifies real expenditure substitution whereby a given source of funds or financial market may be used in the financing of several expenditure categories or commodity markets. This will happen if, for example, housing expenditures and other expenditures are equally or indiscriminately financed by mortgage credit. We have extended this to output substitution in which a given source of funds contributes to production in several output categories.

To test for the first type of substitution, i.e., financial, the model estimated is in the form of equations (3) and (4) that are designed to test for substitution between different forms or external finance when a real expenditure is being financed:

$$E_i=c_0+c_1Y+c_2D_i \tag{3}$$

$$E_i=d_0+d_1Y+d_2D \tag{4}$$

with c_1, c_2, d_1, $d_2\geq 0$, a priori, where Y is income or a measure of internal finance.

By widening sectoral financial liability D_i in equation (3), we get the total sectoral liability D of equation (4). If the t-value of c_2 exceeds the t-value of d_2, the relationship between D_i and E_i is greater than the relationship between D and E_i therefore implying little substitution between D_i and $(D-D_i)$ in financing E_i. In other words, to finance E_i (or produce E_i output, as appropriate), spenders (or producers, as appropriate) will not normally go to credit marets for $(D-D_i)$ but confine themselves to the D_i financial market. This strengthens the effectiveness of selective credit controls.

In the present study, the particular types of equations (3) and (4) specified and estimated are, respectively, of the form:

$$E_i=c_{0i}+c_{1i}S+c_{2i}D_i+c_{3i}P+c_{4i}WD \tag{5a}$$

$$E_i=d_{0i}+d_{1i}S+d_{2i}D+d_{3i}P+d_{4i}WD \tag{5b}$$

with the same variable definitions and discussions as for equation (2) in subsection III-B.

The empirical results are presented in Section IV, Table III for the investment expenditure equations and in Table IV for the index of output equations.

All along, we have been concerned with the first type of substitution, i.e., financial substitution. To test for the second type, which is the real expenditure (or output, if appropriate) substitution, the model estimated is in the form of equations (6) and (7) below which are designed to test for substitution between different forms of expenditure (or output) in utilizing a particular type of credit:

$$E_i = c_0 + c_1 Y + c_2 D_i, \tag{6}$$

$$E = g_0 + g_1 Y + g_2 D_i, \tag{7}$$

where equation (6) is the same as the earlier equation (3).

By widening the sectoral expenditure (or output) E_i in equation (6), we get the total expenditure (or output) E in equation (7). If the t-value of c_2 exceeds the t-value of g_2, this means that the relationship between D_i and E_i is greater than the relationship between D_i and E, therefore implying little substitution between E_i and $(E-E_i)$ in utilizing financial source D_i. In other words, to utilize D_i, the borrowers do not normally spend in (or produce for, as appropriate) commodity markets for $(E-E_i)$ but confine themselves to the commodity market for E_i. This situation is very conducive to the effectiveness of selective credit policies.

In the present study, the particular types of equations (6) and (7) estimated are respectively of the form:

$$E_i = c_{0i} + c_{1i} S + c_{2i} D_i + c_{3i} P + c_{4i} WD \tag{8a}$$

$$E = g_{0i} + g_{1i} S + g_{2i} D_i + g_{3i} P + g_{4i} WD \tag{8b}$$

with the same variable definitions and discussions as before.

The empirical results for investment expenditures are presented in Section IV, Table V and in Table VI for index of output equations.

Finally, real expenditure (or output) substitution in using external finance can be evaluated by substituting total external finance D for D_i in equations (8a) and (8b) above. If the resulting t-value for c_{2i} exceeds the t-value for g_{2i}, there is little expenditure (or output) substitution between E_i and $(E-E_i)$ in the use of total bank credit or external finance. Borrowers are then said to be using external sources to finance E_i in preference to $(E-E_i)$. This means that aggregate credit policies which affect the flow of total bank credit will affect expenditure (or output), E_i, more than others, $(E-E_i)$, so that such aggregate credit policies have incidental selective policy effects.

The empirical estimates of this equation form are presented in Section IV, Table VII for investment expenditures and in Table VIII for index of output equations.

D. *Other Models of Evaluating Selective Credit Policy Effectiveness*

The approaches in the previous subsections B and C have been criticized (e.g., by Maris [6]) for a possible two-way causation between expenditure flow and

credit flow. To correct for this, rather than the simultaneous equation approach as in the present study and in [1], Maris [6] proposes and uses Sims's causality test [11] for evaluating the existence of two-way causation between specific expenditures and related debt. Various criticisms notwithstanding (e.g., Molho's [8]), the approach requires a large number of sample observations, a luxury the present study could not afford.

IV. EMPIRICAL RESULTS

A. *Time Domain, Data Sources, Estimation Method, and the Estimated Equations*

Annual data for the period 1968 to 1982 are used to give fifteen observations.

We have used two-stage least squares to compensate for possible two-way causation between each finance and associated expenditure category. This is accomplished by substituting predicted credit variable values for actual values. The predicted values are obtained from regression analysis in which each credit type is regressed on the system's total bank deposits and other exogenous variables.

It needs to be pointed out that selection of variables in the model is dictated by data scarcity, a characteristic of many developing economies. That constrains the scope of empirical testing.

All data are obtained from relevant issues of *Economic and Financial Review* published by the Central Bank of Nigeria except for that on savings and the indices of mining, real estate and construction, manufacturing, and industrial production; as well as components of investment expenditures which are obtained from the *Nigerian GDP and Allied Macro-Aggregates* that are published by the Nigerian Federal Office of Statistics.

Finally, variables have been computed as follows:

(a) All financial variables are in nominal values approximated to the nearest million Naira.

(b) All investment expenditures are gross and the base period for the various indices of output is 1975.

(c) The debt variables in level (or stock) form are obtained by taking the monthly average for each year. If the debt variable for the *ith* month of any year is x_i, the average used is $\bar{x}=(x_1+x_2+\cdots+x_{12})/12$. The debt variables used are in flow form, i.e., they are obtained by taking the first-difference of the stock variables.

(d) The price inflation, P, is the annual growth rate of the consumer price index.

Following this procedure, the effectiveness of the selective credit policies is described using the empirical results in Tables I to VIII. Tables I and II serve to define the notations used throughout.

B. *A Discussion of the Results*

Results in Tables I to VIII are now taken with each expenditure/output in the order presented in subsection III-A.

TABLE I

EQUATIONS FOR CAPITAL FORMATION EXPENDITURE THAT ARE IN THE FORM SPECIFIED IN EQUATION (2)

Investment Expenditures on:	K	D_G	$D-D_G$	D_T	$D-D_T$	D_F	$D-D_F$	S	P	WD	$\bar{R}^2$	$D.W.$	
Estate and construction	181	9.07 (3.9)	1.62 (2.3)	—	—	—	—	0.35 (6.6)	245 (0.2)	43 (0.2)	0.98	2.4	(9)
Transport	−71	—	—	−9.38 (0.5)	1.11 (0.8)	—	—	0.09 (2.5)	859 (0.5)	13 (0.1)	0.84	1.4	(10)
Machinery and equipment	5	—	—	—	—	−3.65 (2.0)	3.24 (3.8)	0.10 (3.6)	227 (0.3)	157 (0.9)	0.95	2.1	(11)
Stock or inventory	−32	—	—	—	—	−1.25 (2.2)	0.60 (2.3)	0.05 (5.9)	298 (2.5)	27 (0.5)	0.94	2.5	(12)

Note: K=constant, D_G=mortgage debt, D=total debt, D_T=transport debt, D_F=manufacturing debt, S=savings, P=inflation rate, WD=war dummy. Figures in parentheses are t-values and $D.W.$ is the Durbin-Watson statistic.

TABLE II

INDEX OF OUTPUT EQUATIONS THAT ARE IN THE FORM SPECIFIED EQUATION (2)

Index of:	K	D_N	$D-D_N$	D_G	$D-D_G$	D_F	$D-D_F$	S	WD	$\bar{R}^2$	$D.W.$	
Mining	−77	−0.46 (0.5)	−0.01 (0.8)	—	—	—	—	0.01 (3.5)	−61 (5.7)	0.87	1.8	(13)
Estate and construction	63	—	—	0.16 (2.4)	0.02 (1.9)	—	—	0.005 (3.1)	−35 (3.8)	0.95	1.8	(14)
Manufacturing	61	—	—	—	—	0.10 (1.0)	0.04 (0.7)	0.01 (4.7)	−11 (0.8)	0.94	2.1	(15)

Note: K=constant, D_N=mining debt, D=total debt, D_G=mortgage debt, D_F=manufacturing debt, S=savings, WD=war dummy. Figures in parentheses are t-values and $D.W.$ is the Durbin-Watson statistic.

TABLE III

EQUATIONS FOR CAPITAL FORMATION EXPENDITURES THAT ARE IN THE FORM SPECIFIED IN EQUATIONS (5a) AND (5b)

Expenditure on:	K	S	D_G	D_T	D_F	D	P	WD	$\bar{R}^2$	$D.W.$	
Estate and construction	147	0.39 (6.9)	11.37 (4.6)	—	—	—	3,123 (4.6)	98 (0.3)	0.98	1.8	(16a)
	409	0.39 (6.1)	—	—	—	2.88 (4.1)	−1,788 (1.2)	−24 (0.1)	0.97	1.8	(16b)
Transport	91	0.09 (2.5)	—	5.73 (1.0)	—	—	−169 (0.2)	−36 (0.2)	0.84	1.2	(17a)
	42	0.08 (2.6)	—	—	—	0.44 (1.2)	107 (0.1)	−20 (0.1)	0.85	1.2	(17b)
Machinery and equipment	159	0.10 (2.3)	—	—	2.44 (1.8)	—	−215 (0.2)	−74 (0.3)	0.88	1.3	(18a)
	176	0.08 (2.3)	—	—	—	1.12 (3.1)	−738 (0.9)	−20 (0.1)	0.91	1.5	(18b)
Stock or inventory	−4	0.05 (4.9)	—	—	−0.12 (0.4)	—	501 (2.1)	−16 (0.3)	0.92	1.8	(19a)
	14	0.04 (4.6)	—	—	—	0.03 (0.3)	362 (1.6)	−21 (0.4)	0.91	1.4	(19b)

Note: See Table I for notations.

TABLE IV

INDEX OF OUTPUT EQUATIONS THAT ARE IN THE FORM SPECIFIED IN EQUATIONS (5a) AND (5b)

Index of:	K	S	D_N	D_G	D_F	D	WD	$\bar{R}^2$	$D.W.$	
Mining	78	0.004 (4.0)	−1.03 (1.8)	—	—	—	−61 (5.8)	0.87	1.9	(20a)
	77	0.005 (4.0)	—	—	—	−0.02 (1.9)	−61 (5.9)	0.88	1.8	(20b)
Estate and construction	64	0.005 (3.1)	—	0.20 (2.9)	—	—	−36 (3.5)	0.93	1.8	(21a)
	66	0.007 (4.9)	—	—	—	0.03 (2.9)	−35 (3.4)	0.93	1.4	(22b)
Manufacturing	63	0.01 (4.8)	—	—	0.18 (5.7)	—	−14 (1.2)	0.94	2.2	(22a)
	60	0.007 (4.9)	—	—	—	0.06 (5.8)	−9 (0.8)	0.95	1.9	(22b)

Note: See Table II for notations.

TABLE V

EQUATIONS FOR CAPITAL FORMATION EXPENDITURE THAT ARE IN THE FORM SPECIFIED IN EQUATIONS (8a) AND (8b)

Expenditure on:	K	S	D_G	D_T	D_F	P	WD	$\bar{R}^2$	$D.W.$	
Estate and construction	147	0.39 (6.9)	11.37 (4.6)	—	—	3,123 (4.6)	98 (0.3)	0.98	1.8	(23a)
Total investment	−206	0.55 (5.9)	20.62 (5.2)	—	—	5,436 (5.0)	122 (0.2)	0.98	1.9	(23b)
Transport	91	0.09 (2.5)	—	5.73 (1.0)	—	−169 (0.2)	−36 (0.2)	0.84	1.2	(24a)
Total investment	1,327	0.58 (4.1)	—	66.24 (2.9)	—	6,337 (1.4)	−282 (0.4)	0.95	1.2	(24b)
Machinery and equipment	159	0.10 (2.3)	—	—	2.44 (1.8)	−215 (0.2)	−74 (0.3)	0.88	1.3	(25a)
Total investment	574	0.68 (4.1)	—	—	9.70 (1.8)	42 (0.0)	−300 (0.3)	0.93	1.3	(25b)
Stock or inventory	−4	0.05 (4.9)	—	—	−0.12 (0.4)	501 (2.1)	−16 (0.3)	0.92	1.8	(26a)
Total investment	574	0.68 (4.1)	—	—	9.70 (1.8)	42 (0.0)	−300 (0.3)	0.93	1.3	(26b)

Note: See Table I for notations.

TABLE VI

INDEX OF OUTPUT EQUATIONS THAT ARE IN THE FORM SPECIFIED IN EQUATIONS (8a) AND (8b)

Index of:	K	S	D_N	D_G	D_F	WD	$\bar{R}^2$	$D.W.$	
Mining	78	0.004 (4.0)	−1.03 (1.8)	—	—	−61 (5.8)	0.87	1.9	(27a)
Industrial production	70	0.006 (6.9)	0.20 (0.4)	—	—	−46 (5.3)	0.93	1.9	(27b)
Estate and construction	64	0.005 (3.1)	—	0.20 (2.9)	—	−36 (3.5)	0.93	1.8	(28a)
Industrial production	71	0.005 (3.8)	—	0.09 (1.7)	—	−46 (5.8)	0.94	2.0	(28b)
Manufacturing	63	0.01 (4.8)	—	—	0.18 (5.7)	−14 (1.2)	0.94	2.2	(29a)
Industrial production	71	0.006 (5.5)	—	—	0.01 (0.6)	−47 (5.4)	0.93	1.8	(29b)

Note: See Table II for notations.

TABLE VII

EQUATIONS FOR CAPITAL FORMATION EXPENDITURE THAT ARE IN THE FORM ADAPTED FROM EQUATIONS (8a) AND (8b)

Expenditure on:	K	S	D	P	WD	$\bar{R}^2$	$D.W.$	
Estate and construction	409	0.39 (6.1)	2.88 (4.1)	−1,788 (1.2)	−24 (0.1)	0.97	1.8	(30a)
Total investment	641	0.60 (4.6)	4.48 (3.1)	−2,058 (0.7)	−83 (0.1)	0.96	1.4	(30b)
Transport	42	0.08 (2.6)	0.44 (1.2)	107 (0.1)	−20 (0.1)	0.85	1.2	(31a)
Total investment	As in equation (30b)							(31b)
Machinery and equipment	176	0.08 (2.3)	1.12 (3.1)	−738 (0.9)	−20 (0.1)	0.92	1.5	(32a)
Total investment	As in equation (30b)							(32b)
Stock or inventory	14	0.04 (4.6)	0.03 (0.3)	362 (1.6)	−20 (0.4)	0.91	1.6	(33a)
Total investment	As in equation (30b)							(33b)

Note: See Table I for notations.

TABLE VIII

INDEX OF OUTPUT EQUATIONS THAT ARE IN THE FORM ADAPTED FROM EQUATIONS (8a) AND (8b)

Index of:	K	S	D	WD	$\bar{R}^2$	$D.W.$	
Mining	77	0.005 (4.0)	−0.05 (1.9)	−61 (5.9)	0.88	1.8	(34a)
Industrial production	70	0.006 (5.4)	0.007 (0.9)	−46 (5.4)	0.93	1.7	(34b)
Estate and construction	63	0.007 (4.9)	0.03 (2.9)	−35 (3.4)	0.93	1.4	(35a)
Industrial production	As in equation (34b) above							(35b)
Manufacturing	60	0.007 (4.9)	0.06 (5.8)	−9 (0.8)	0.95	1.9	(36a)
Industrial production	As in equation (34b) above							(36b)

Note: See Table II for notations.

(a) *Estate and construction investment equations.* In both equations (9) and (16), the same conclusion is reached through the two model types that there is little financial substitution between the flow of mortgage debt and other debt in financing real estate-construction expenditure. This is because the coefficient of D_g (mortgage debt) is greater, and has a greater t-value, than the coefficient of $(D-D_g)$ in equation (9). Also, the coefficient of D_g in equation (16a) has a greater t-value than the coefficient of D in equation (16b). This strengthens the

effectiveness of selective policies. However, a look at equations (23a) and (23b) suggests the presence of real investment expenditure substitution so that spenders do not discriminate between real estate-construction investment expenditure and other investment expenditure in the use of mortgage debt flow. This is because the coefficient of D_G in equation (23a) has a t-value which is not greater than that of the coefficient of D_G in equation (23b). This weakens the effectiveness of selective policies.

Thus, on the whole, selective policies on mortgage debt can be only partially successful on real estate and construction expenditures.

A comparison of the t-value of D's coefficients in equations (30a) and (30b) suggests little expenditure substitution in using external finance. That is, spenders now discriminate between real estate-construction and other investment expenditures in using bank credit—spenders prefer bank credit on real estate expenditure to bank credit on other investment. Thus as discussed in subsection III-A, aggregate credit policy will have an incidental selective effect because it affects real estate more than other investments.

(b) *Transport investment equation.* All equations (10), (17a), and (17b), none of the coefficients of D_t (transport credit), $(D-D_T)$, and D is significant. But if we do not reckon with insignificance, the results suggest that there is substitution between the flow of transport debt and other debt in financing transport investment. Similarly, comparisons of equations (24a) and (24b) suggest real expenditure substitution in the way that the transport debt flow is used. Spenders prefer to use transport bank loans to finance all sorts of investment expenditure. When results in equations (31a) and (31b) are compared, the comparison suggests that spenders do not discriminate in favor of transport investment expenditure when using bank credit because no absence of real expenditure substitution is found.

(c) *Machinery and equipment investment equations.* In equation (11) and (18), coefficients of manufacturing debt D_F either have a wrong (minus) sign or insignificant values whereas coefficients of $(D-D_F)$ and D have the expected (positive) sign and significant values. This suggests that some other debt flow is preferred to manufacturing debt flow in financing expenditures on machinery and equipment. Equations (25a) and (25b) suggest that spenders equally prefer machinery and equipment expenditure and other investment expenditure categories in using manufacturing debt flow, i.e., it indicates real expenditure substitution. A likely reason for this was adduced in the last paragraph of subsection III-A, i.e., machinery and equipment expenditure in the aggregate economy may be an inadequate measure of capital expenditure in manufacturing. This contention is supported by the absence of output substitution in (g) below, i.e., because manufacturing output captures manufacturing activities as opposed to economy-wide machinery and equipment expenditure. Equations (32a) and (32b), when compared, indicate an equal preference or indifference on the part of spenders between machinery-equipment and other investment expenditures when using bank loans, i.e., there is real expenditure substitution in usnig external finance. Again, the reason adduced in subsection III-A may possibly account for this.

(d) *Stock or inventory investment equations.* Concerning the two alternate

models represented by equation (12) and equations (19a) and (19b), what has been said about equations (11) and (18) in regard to machinery-equipment expenditures in (c) above holds. In other words, we have spotted the financial preference of nonmanufacturing debt over manufacturing debt (not just financial substitution) in financing inventory investment. A comparison between equations (26a) and (26b) shows that in using manufacturing debt flow, spenders prefer financing other investments rather than financing inventory investment.

Considering equations (33a) and (33b) jointly, it can be seen that spenders prefer to use bank credit in financing other investment expenditures as opposed to inventory holding. All these findings are attributable to the reason adduced in the last paragraph of subsection III-A.

(e) *Index of mining production equations.* In the two alternate models represented by equation (13) and equations (20a) and (20b), the coefficients of all debt flow variants are implausible (i.e., they have negative signs) indicating that bank credits do not appear to have enhanced mining production. The same conclusion emerges when equations (27a) and (27b) are considered jointly. The twin-equations (34a) and (34b) show that when industrialists use external finance they discriminate against mining production and in favor of other industrial activities. These findings are in line with the a priori expectation because the foreign concerns that dominate mining activities often secure most of the finance they need from their head offices abroad.

(f) *Index of estate-construction activity equations.* Equation (14) suggests an absence of financial substitution between mortgage debt and other debts in financing estate and construction activity, and this implies an effectiveness of selective credit policies on estate and construction. However, alternate equations (21a) and (21b) suggest that both mortage and other debt enhance estate and construction activity equally. In real output substitution, equation (28a) and (28b) suggest that during the use of mortgage debt flow, financing estate and construction activity is preferred to financing other industrial production. This serves to strengthen the effectiveness of selective policies on mortgage debt. Equations (35a) and (35b) show that industrialists generally prefer to use bank loans to finance estate and construction activity rather than to finance other industrial production. Thus, aggregate credit policies would have incidental selective policy effects on estate and construction activity.

(g) *Index of manufacturing production equations.* On the whole, when equation (15) is considered in conjunction with alternative equations (22a) and (22b), the conclusion emerges that manufacturers do not discriminate between manufacturing and other debt flow in their production process, i.e., there is financial substitution. This serves to weaken the potency of selective credit policies to increase manufacturing production. However, an assessment of twin equations (29a) and (29b) shows that industrialists prefer to use manufacturing credit for manufactures rather than other industrial outputs. This means there is little output substitution in using manufacturing debt flow, which serves to enhance the potency of the selective policies. Thus, on the whole, about half the selective credit policies are successful in enhancing manufacturing. Equations (36a) and (36b)

indicate that industrialists generally prefer to use external finance for manufacturing rather than other forms of industrial production. Thus, as in the case of estate and construction, aggregate credit policies will have a selective spin-off policy effect on manufacturing.

V. SUMMARY AND CONCLUSION

This article has evaluated the effectiveness of selective credit policies on both proximate and ultimate policy goals in a developing economy. Initially, we reviewed applications and objectives of the policies in the country (Nigeria) being studied. Later, we surveyed the existing framework or models on the subject while discussing our own model which is built upon and thus an extension of existing models.

Having fitted data for Nigeria into the model, we presented the empirical results. In the results, we found that selective credit policies appear to be effective on both the proximate objective of influencing sectoral expenditure on real estate and construction and the ultimate objective of influencing sectoral output. Also, the policy is likely to be effective in achieving the final objective of influencing industrial production. In all other cases, the evidence suggests that the policies may not be effective in accomplishing their objectives (i.e., of influencing transport, machinery and equipment, and inventory expenditures as well as influencing mining sector output). In addition, because spenders are found to prefer using bank loans to finance real estate and construction (as against other investment expenditures) just as producers or industrialists prefer using bank loans to finance manufacturing and real estate and construction activity (as opposed to other industrial production), aggregate credit policy would have an incidental selective effect. A sequence on aggregate credit would selectively discourage real estate and construction expenditure and output as well as manufacturing output.

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