

# MONETARY AND FISCAL INFLUENCES ON ECONOMIC ACTIVITY IN AFRICAN COUNTRIES

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## 1. Introduction

Since the sixties, there has been considerable debate with respect to the relative importance of monetary and fiscal influences on economic activity. The monetarists took the position that monetary policy was more important in the United States economy than fiscal policy. In contrast, the Keynesians held that fiscal policy was more efficacious. Substantial empirical focus has been on the United States, utilizing the "St. Louis" single-equation model in which monetary policy has been found to be superior to fiscal policy.<sup>1</sup> The findings for other developed countries have been mixed.<sup>2</sup>

The results of these countries with well-developed financial system, however, cannot be generalized for the developing countries since they have different economic and political structures.<sup>3</sup> For example, the financial sector of many of the developing countries may be described as dualistic, that is, well-organized financial institutions exist side-by-side with an unorganized market for the provision of credit.<sup>4</sup>

In this study, we examine empirically the relative efficacy of fiscal and monetary influences, in the context of five African countries, Ghana, Kenya, Nigeria, Sierra Leone and Tanzania.<sup>5</sup> These countries all have large subsistence non-monetized sectors and their economies may be described as dualistic.<sup>6</sup> In addition, most of these countries have had to cope with

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1. See for instance, T.G. Seaks and S.D. Allen (1980); Leonall C. Andersen and Keith M. Carlson (1970); Leonall C. Andersen and Jerry L. Jordan (1968) and Michael W. Keran, (1969).

2. One good example is Abdur R. Chowdhury (1988).

3. Developing countries differ from the United States economy in two important ways: first they are often far more open, with foreign trade accounting for a large percentage of GDP or GNP and, second, some have large non-monetized sectors. These issues are taken into account in studies by Ali F. Darrat (1984) and Abdur R. Chowdhury (1986).

4. Some implications of money and capital in these types of "fragmented" economies are discussed in Ronal I. McKinnon (1973). Also M.M. Huq (1989), describes the dualistic nature of the Ghanaian financial markets. The organized market consists of the banking institutions and development banks, while the unorganized (non-institutional) market "is made up of money lenders, thrift societies and credit unions. Both licensed and unlicensed lenders operate in the cities, towns and villages. However, their lending activities and the rate of interest they charge are shrouded in secrecy", p 179. As a specific case, "non-institutionalized agricultural credit is normally provided by relatives and friends, private money-lenders, traders, distributors of farm inputs and processors of agricultural products." This type of credit situation could be generalized to the other countries in the study.

5. The countries were selected on the basis of available data on a fairly long basis.

6. In many developing African countries, formal organized banking exists only in the urban areas. Some of the factors that have constrained the development of banks beyond these major areas are discussed in J.K. Onoh (1982).

a number of non-economic factors which present a "development challenge".<sup>7</sup> We will apply the St. Louis equation to these countries, and it is hoped that the results will give some insight into whether the St. Louis equation can be generalized for economies with a dualistic nature. The empirical evidence in our results, though not conclusive, can nevertheless be used to draw inferences about the relationship between economic policies and their implications for economic growth in these countries.

In the second section, we briefly review some studies utilizing the St. Louis equation. In the third section, the empirical framework of the study is outlined. The fourth section discusses the data and the estimates of the model and employs appropriate statistical tests. The fifth section provides the conclusion and some comments.

## 2. Survey of previous studies

Empirical findings employing the reduced-form approach to estimating the relative impact of monetary policy versus fiscal policy on economic activity, tend to suggest that monetary policy has a stronger, more predictable and faster effect on economic activity than fiscal activity in the United State.<sup>8</sup> Despite its drawbacks,<sup>9</sup> the reduced-form model has formed the basis of numerous studies.

When applied to other countries rather than the United States, the results tend to be mixed. For example, Chowdhury<sup>10</sup> tested the St-Louis equation reduced-form model for six small

7. According to Carol Lancaster (1991), the reasons for slow development in African countries differ. However, several broad (non-economic) factors may be categorized: first, economic inheritance - most of the economies gained independence at a very early stage in their development, with limited human and physical infrastructure; second, the accumulated problems of economic mismanagement by African leaders, wherein many of the countries suffered from "bloated and inefficient bureaucracies; controlled prices, wages and interest rates, which have distorted economic signals and depressed productive sectors"... resulting in "thriving black markets and widespread smuggling, (which) have fed the inevitable tendencies on the part of the public officials and the public alike toward rent seeking and corruption". A third factor is the sharp deterioration in the region's terms of trade. These factors are complicated by rapid population growth and internal conflicts, p. 1-8.

8. See, for example, Dallas S. Batten and R.W. Hafer (1983) Leonall C. Andersen and Keith M. Carlson (1970) and Leonall C. Andersen and Jerry L. Jordan (1968).

9. Keran (1969), discusses the theoretical issues and problems regarding the reduced-form single-equation approach.

10. Chowdhury (1988).

open European countries, and found monetary policy to be more potent in three of the countries, Denmark, Norway and Sweden, while fiscal policy was more dominant in two countries, Belgium and the Netherlands. The results were inconclusive in the case of Austria. Batten and Hafer<sup>11</sup> found that changes in money growth had a significant and lasting impact on nominal income growth in all of the six countries studied (Canada, France, Germany, Japan, the United Kingdom and the United States). Fiscal actions, on the other hand, were significant in only two countries, the United Kingdom and France. Keran<sup>12</sup> also found monetary policy to be superior to fiscal policy in eight developed countries.

Studies on less-developed countries have suggested that in countries such as India, and a few Latin-American countries, fiscal policy exerts a stronger influence than monetary policy on economic activity.<sup>13</sup>

### 3. The study model

The model used for this study is the modified St. Louis equation proposed by Batten and Hafer<sup>14</sup>, and subsequently utilized by Darrat<sup>15</sup> and Chowdhury<sup>16</sup>. In the original St. Louis model which employed the first-difference form, distributed lags of a monetary policy variable and a fiscal policy variable explained economic activity. Nominal gross national product was used to measure the dependent variable, economic activity, and different measures of the money stock and government expenditures were used to represent the monetary and fiscal policy variables, respectively.

Our model, has following features: first, it is stated in growth-rate form in order to help resolve the problem of heteroscedasticity. Second, because of the openness of these countries and the heavy dependence on foreign trade, total exports are used to measure the foreign trade effect. The equation to be estimated is the modified St. Louis Equation which can be written as:

$$\dot{Y} = a_0 + m_1 \dot{M}_{t-1} + f_1 \dot{F}_{t-1} + x_1 \dot{X}_{t-1} + u_t \quad [1]$$

11. Dallas S. Batten and R.W. Hafer (1983).

12. Michael W. Keran (1970). (February 1970): 16-28.

13. Ali F. Darrat (1984) and Abdur R. Chowdhury (1986).

14. Batten and Hafer (1983).

15. Darrat (1984).

16. Chowdhury (1986).

where  $\dot{Y}$ ,  $\dot{M}$  and  $\dot{X}$  represent the growth rate of nominal income, narrow money supply, government expenditures and exports, respectively, and  $a$ ,  $m$ ,  $f$ , and  $x$  are the coefficients to be estimated and  $u$  is the error term which is assumed to be serially uncorrelated, with zero mean and constant variance. The signs of all the coefficients are expected to be positive.

#### 4. Data, methodology and estimation

The basic model above is estimated for the five countries, Ghana, Kenya, Nigeria, Sierra Leone and Tanzania, using annual data. The sample periods differ due to differences in data availability. The annual time series were taken from various issues of *International Financial Statistics* and its supplements published by the International Monetary Fund<sup>17</sup>. The variables are annual changes in the following: for economic activity, nominal gross domestic product; the monetary policy variable is currency and demand deposits (the money supply measure referred to as M1); the fiscal variable is total central government total expenditures, net of loans, while the foreign influence variable is measured by total exports. The variables were all measured in million units of local currency.

Table 1 presents summary statistics on the variables used in the regressions. Table 2 contains the simple correlation coefficients.

The model is estimated using the ordinary-least squares regression technique. The Durbin-Watson statistics in all of the countries except for Sierra Leone indicated that the estimates were subject to first-order serial correlation. In those instances, a first-order serial correlation correction technique was necessary. In Table 3 the correction coefficients,  $\rho$ , which remove the problem are shown. Preliminary estimates of lag lengths were made using both a simple lag structure, and the Almon lag technique, with a variety of lags and different degrees of the polynomial. However, the statistical significance and the signs of the estimated coefficients forced us to reject both of these methods.

17. *International Financial Statistics* (various issues). It should be noted that some of the data on these countries are very tentative. Douglas Rimmer (1984) cautions that West African GNP totals and sectoral components, as well as population totals may contain significant margins of error. The author discusses several reasons for this, pp. 9-12. However, he further states that fairly accurate statistics exist in certain enterprises engaged in production and marketing, which need to maintain detailed records for their own purposes. Some examples are large-scale mining, construction and manufacturing and some public services, which for our purposes, includes banking.

Table 1:

## SUMMARY STATISTICS OF REGRESSION VARIABLES

Country	N	Mean	$\sigma$
Ghana			
$\dot{Y}$	20	.40	.29
$\dot{M}$	20	.38	.20
$\dot{F}$	20	.34	.28
$\dot{X}$	20	.49	.76
Kenya			
$\dot{Y}$	23	.15	.04
$\dot{M}$	23	.14	.11
$\dot{F}$	23	.19	.14
$\dot{X}$	23	.13	.17
Nigeria			
$\dot{Y}$	21	.19	.20
$\dot{M}$	21	.22	.25
$\dot{F}$	21	.33	.40
$\dot{X}$	21	.31	.62
Sierra Leone			
$\dot{Y}$	20	.17	.17
$\dot{M}$	20	.22	.22
$\dot{F}$	20	.16	.15
$\dot{X}$	20	.16	.31
Tanzania			
$\dot{Y}$	19	.21	.10
$\dot{M}$	19	.22	.12
$\dot{F}$	19	.24	.20
$\dot{X}$	19	.20	.34

$\dot{Y}$  = growth rate in nominal income

$\dot{M}$  = growth rate in the money supply (narrow money  $M_1$ )

$\dot{F}$  = growth rate in nominal government expenditures

$\dot{X}$  = growth rate in nominal exports

Dots over the variables indicate growth rates.

Sources: see note 17.

Table 2:

CORRELATION COEFFICIENTS OF MODEL VARIABLES

Country	Y	M	F	X
Ghana				
Y	1.00			
M	0.66	1.00		
F	0.29	0.47	1.00	
X	0.62	0.25	0.20	1.00
Kenya				
Y	1.00			
M	0.44	1.00		
F	-0.16	-0.03	1.00	
X	0.72	0.48	-0.50	1.00
Nigeria				
Y	1.00			
M	0.74	1.00		
F	0.43	0.23	1.00	
X	0.75	0.46	0.42	1.00
Sierra Leone				
Y	1.00			
M	0.72	1.00		
F	0.28	0.03	1.00	
X	0.67	0.67	0.22	1.00
Tanzania				
Y	1.00			
M	0.35	1.00		
F	0.36	0.25	1.00	
X	0.50	0.41	-0.08	1.00

For description of variables, see Table 1.

Sources: see note 17.

**Table 3:**  
MONETARY, FISCAL AND FOREIGN INFLUENCES ON GROWTH RATES  
OF ECONOMIC ACTIVITY

Coefficient of	Ghana 1969-88	Kenya 1968-90	Nigeria 1968-87	Sierra Leone 1966-85	Tanzania 1968-87
Constant	0.0369 (0.3851)	0.1245 (6.6115)	0.0622 (1.4378)	0.1855 (0.3832)	0.6377 (0.5565)
$M$	0.7740 (3.7088)	0.0304 (0.5470)	0.2990 (2.6667)	0.4099 (2.4977)	0.0255 (0.2573)
$F$	-0.0884 (-0.6482)	0.0038 (0.0750)	0.0819 (1.4219)	0.2275 (1.2351)	-0.0818 (-0.8569)
$X$	0.2100 (4.3357)	0.1479 (2.9796)	0.1471 (3.5148)	0.1520 (1.2657)	-0.0840 (-0.4829)
$R^2$	0.6484	0.5812	0.7419	0.5426	0.5575
S.E.R.	0.1635	0.0290	0.0958	0.1174	0.0688
D.W.	1.9378	2.0602	1.8319	1.8708	1.9803
$p$ (rho)	(0.4200)	(0.5110)	(0.3171)		(0.9443)
F - stat	9.7610	8.6339	14.6561	8.5126	6.6692

t - statistics are in parentheses

$R^2$  is the adjusted coefficient of determination

S.E.R. is the standard error of the regression

D.W. is the Durbin - Watson statistic

See Table 1 for description of the variables

Sources: various regression estimates.

The results reveal that variable for monetary policy is more significant than the variable for fiscal policy in three countries, Ghana, Nigeria and Sierra Leone, while the fiscal policy variable is statistically significant (at the 10 percent level) in only one of the countries, Nigeria. In two countries, Kenya and Tanzania, neither policy is significant at even the 10 percent level. The variable for the external influence is an important factor in explaining GDP growth in only three countries, Ghana, Kenya and Nigeria. The fiscal variable has an unexpected negative sign in Ghana and Tanzania, while the external impulse variable also has an unexpected negative sign in Tanzania.

The regression exhibit a range of from 54 to 74 percent of explanatory power in describing economic growth in the five countries, with the adjusted  $R^2$ 's varying from a high of .74 in



Nigeria to a low of .54 in Sierra Leone, and the F values indicate that the overall regressions were statistically significant.

Following earlier studies,<sup>18</sup> we tested two common propositions to further evaluate the monetary and fiscal policy influences. These tests examine which of the two, monetary or fiscal policy is more predictable and stronger.

Predictability tests are based on the analysis of the t-statistics of the respective coefficients. Table 3 shows that the t-statistics for the fiscal impacts are relatively larger than those of the monetary impacts in the cases of Ghana, Nigeria and Sierra Leone. In the cases of Kenya and Tanzania, neither variable reflects a significant t-statistic. These tests confirm the evidence described in the regression results.

We further performed tests of the relative strength of the variables by calculating the beta summed coefficients of the policy variables. These coefficients are the product of the estimated sum coefficient and the ratio of the standard deviation of that policy variable and income. The results are shown in Table 4.

**Table 4:**

CALCULATED BETA SUMMED COEFFICIENTS

Country	Monetary Influences	Fiscal Influences
Ghana	0.5655	-0.0884
Kenya	0.0792	0.0347
Nigeria	0.3660	0.1621
Sierra Leone	0.5628	0.1988
Tanzania	0.0319	-0.0151

Source: Tables 1 and 2.

The beta coefficients also confirm that the monetary influence on economic activity is relatively more potent in all of the five countries, including even Kenya and Tanzania, where neither variable was statistically significant.

Additional statistical tests were made on the estimates to assess the stability of the

18. These tests were carried out by Keran (1969), Chowdhury (1986), and Darrat (1984), among others.



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estimates and the statistical exogeneity of the independent variables. These were the Chow test and the Granger test of causality. The Chow test revealed that the estimated equations, except for Nigeria, were not structurally stable at the 5 percent level of significance, while the Granger test suggested that the data suffer from simultaneous-equation bias. Conclusions on these results must, therefore, be qualified, also taking into account the limitations in the measurement of the data, themselves.<sup>19</sup> We now proceed to interpret the results, keeping these limitations in mind.

The results for these countries are not consistent with other studies on developing countries which found fiscal policy, rather than monetary policy to be dominant in all instances.<sup>20</sup> We found monetary policy to be more effective in three countries, and fiscal policy barely significant in only one country. A further test using the beta coefficients, showed monetary policy to be relatively more effective in all of the five African countries. In two countries, neither policy was found to be significant, and export growth was not significant in two countries. The dominance of the monetary influence in these countries may be attributed to the fact that there may be substantial monetization of either foreign exchange reserves and/or government deficits, so that this effect is dominant. Concurrently, government spending has a weak effect and in two cases, an inhibiting effect, on output growth.

## 5. Conclusion

The purpose of this study has been to assess the relative importance of monetary and fiscal policy actions on economic activities in a select group of African countries. We employed a modified St. Louis-type reduced-form equation for the period 1965 to 1990. The regression results suggest that the monetary influence has a greater impact on changes in nominal income than the fiscal influence in Ghana, Kenya and Nigeria. In no country did we find that fiscal influence had a greater impact than the monetary influence. In fact, the fiscal influence was appreciably significant in only one country, Nigeria, and insignificant in all the other four countries. In two countries, Sierra Leone and Tanzania, neither fiscal nor monetary influences was significant in determining nominal income during the period studied. While these results may be considered tentative, rather than conclusive, they do indicate some weakness in the fiscal structure of the countries.

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19. See note 17, above.

20. Chowdhury (1986) and Darrat (1984) found fiscal policy to be more dominant than monetary policy in all of the six developing countries studied.

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**Abstract**

This study examined empirically the relative impact of fiscal and monetary policy influences on economic activity in five African countries employing a modified St. Louis-type reduced-form equation for the period 1965 to 1990. The regression results suggest that the monetary influence is relatively stronger than the fiscal influence in three of the countries, Ghana, Kenya and Nigeria, while the fiscal influence was appreciably significant in only one country, Nigeria. In two countries, Sierra Leone and Tanzania, neither the fiscal nor the monetary influences was significant in determining nominal income. The results, in effect, suggest that monetary policy can be pursued more successfully as a stabilization policy tool in Ghana, Kenya and Nigeria. Additional analysis, however, needs to be done before these results are useful for policy purposes and further conclusions can be reached on the remaining countries, Sierra Leone and Tanzania.

