Financial deepening, economic growth and development: Evidence from selected sub-Saharan African countries

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Lack of or stagnant growth of output of any country is often caused by "shallow - finance". A shallow financial depth (FD) means that the range of financial assets for that country is narrow. It is a scenario that goes far in explaining why most SSA countries have low or negative per capita growth rates. This study identifies the range of financial assets that can adequately approximate financial deepening, which simply means an increase in the supply of financial assets in the economy.

FD is represented by two variables, the degree of financial intermediation/development (M2/Y) and the growth rate in per capita real money balances (GPRMB). Because of lack of data on other measures of financial assets in most SSA countries, broad money (M2) was used as numerator for both variables.

Estimations depending on the two measures of FD and other explanatory variables of interest were done with an ordinary least squares (OLS) multiple regression procedure. Three modelled equations, with justifications for each, were estimated and analysed. A cross-country regression was used for 34 SSA countries. To even out year-to-year fluctuations as well as reflect underlying structural changes, the variables were calculated on a decade average basis.

Two policy implications derive from the study: that SSA countries should strive hard to make real money balances grow, and that these countries should also come up with policies to improve financial development/intermediation. Given such factors as price stabilization, elimination of fiscal deficit and removal of various restrictions on financial institutions, real money balances could be made to grow. Financial intermediation/ development could positively affect output growth if, among other suggested ways, the volume of investment is raised.

1. Introduction

By and large, economic growth cannot be possible without the combined role of investment, labour and financial deepening. As Jao (1976) puts it, this role of money and finance in economic development has been examined by economists from different angles and with various degrees of emphasis. In particular, the writings of Gurley and Shaw (1955, 1956, 1967) and Goldsmith (1958, 1969) stress the role of financial intermediation by both banks and non-banks in the saving-investment process, where money, whether defined narrowly or broadly, forms a part of a wide spectrum of financial assets in the portfolio of wealth-holders. Indeed, the economic growth and development of a country depends greatly on this role, the role of financial deepening.

As both Meltzer (1969) and Stein (1970) observe, only countries with high per capita incomes can experience rapid growth in financial assets. Such countries are none other than the developed countries. But what is crucial here is what constitutes the financial assets that wealth-holders must have as a result of high per capita income. Only when we can identify those financial assets will we be able to approximate financial deepening adequately. In short, and for our purpose, financial deepening simply means an increase in the supply of financial assets in the economy. Therefore, the sum of all the measures of financial assets gives us the approximate size of financial deepening. That means that the widest range of such assets as broad money, liabilities of non-bank financial intermediaries, treasury bills, value of shares in the stock market, money market funds, etc., will have to be included in the measure of financial deepening. To simply pick the ratio of broad money (M2) to gross domestic product (Y), as done in this study, is because of lack of data on other measures of financial assets likely to adequately approximate financial deepening in most SSA countries.

It is important to note that if the increase in the supply of financial assets is small, it means that financial deepening in the economy is most likely to be shallow; but if the ratio is big, it means that financial deepening is likely to be high. Developed economies are characterized by high financial deepening, meaning that the financial sector in such countries has had significant growth and improvement, which has, in turn, led to the growth and development of the entire economy.

2. Objectives of the study

This study basically intends to evaluate the impact of financial deepening (here the widest range of financial assets, including money, will be developed to represent financial deepening) and other growth related factors in selected sub-Saharan African (SSA) countries. The study will also attempt to relate these factors to the economic growth of these countries through an unrestricted/augmented neoclassical growth model using cross-country data.

In that context, then, the objectives for this study are:
- To understand generally what financial deepening (FD) is all about.
- To determine the appropriate measures of financial deepening by developing some measures of the widest range of financial assets.
- To evaluate the impact of financial deepening and other growth related factors on growth in selected SSA countries.
- On the basis of this evaluation, to articulate policy direction aimed at promoting financial development and economic growth in SSA.

3. The sub-Saharan African (SSA) economies and their performance

From the slow growth of output (even negative growth in some years) that characterizes the economies of most SSA countries, it is evident that these countries are greatly affected by "shallow finance" or "financial repression". As shown in Appendix A, Table A1, the extent of financial development as portrayed by our measure of financial deepening for most SSA countries is very low. For example, the table shows financial deepening as the ratio of broad money to GDP (i.e., M2/Y; as TDY in the table); by this measure the rates of financial depth in these countries are despairingly low. Using the decade average of 1980–1989 data in computing financial depth for 34 SSA countries, we find that only three countries, South Africa, Lesotho and Mauritius, with 51.4%, 48.97% and 45.5%, respectively, had over 45%. Six others have financial depth above 30%. All the rest (25 countries) made theirs below 30%.

What is observed in the SSA countries from our computation in Table A1 agrees with the views of some top economists that only countries with high per capita incomes can achieve high financial ratios or rapid growth in financial assets (Gurley and Shaw, 1967; Meltzer, 1969; Jao 1976), whereas for poor countries like those in SSA, the financial ratios/growth in financial assets are not likely to be high. Several reasons can be advanced for this. As stated by Jao (1976), the major cause has to do with inappropriate policies that impose ceilings on nominal interest rates, inhibit the expansion of the fiscal base and maintain fixed exchange rates that over-value the domestic currency. Such policies, as we are well aware, penalize savings, suppress market signals about capital scarcity and encourage lop-sided development of capital intensive industries that exacerbate unemployment.

Financial deepening as well as liberalization will, in contrast, enable interest and exchange rates to reflect relative scarcities, stimulate savings, and discriminate more efficiently between alternative investments. In turn, this may induce replacement of capital intensive processes and technology by labour intensive ones. Indeed, if financial deepening is high for any country, that country is likely to have the potential to generate positive employment, improved productivity and growth. Unfortunately, the growth and employment performance in most SSA countries is very poor due to shallow financial depth brought about by inappropriate policies.

4. Review of related literature

There is a general observation by economists that as per capita income of some countries increases, these countries usually experience more rapid growth in financial assets than in national wealth or national product. Developed countries of Europe, the United States, Japan, etc., whose financial assets have grown faster than their gross national products (GNP) have been cited as good examples of this general observation. The works of Gurley and Shaw (1967), Goldsmith (1969), Meltzer (1969), Stein (1970), Meier (1984), and Jao (1976) are very clear on this observation. For example, Meier (1984) observes that in the United States the growth of financial assets relative to GNP has been remarkably fast given that "the ratio increased from about unity at the beginning of the last century to 4.5 in the 1980s". In the case of Japan, Meier further observes that "the ratio of financial assets to GNP rose from 10% in 1885 to over 150% in the 1980s". Meier and other economists share the opinion that as countries rise along the scale of wealth and income, their financial structures usually become increasingly rich in financial assets, institutions and markets. Thus, financial growth in excess of real growth of output has been seen as a common phenomenon in most developed countries.

Theoretical disagreements do exist about the role of financial systems in economic growth. Some economists see the role as minor or negligible while others see it as significant. Robinson (1952), for example, argues that the financial system does not spur economic growth; rather the financial system simply responds to development in the real sector. In contrast, Goldsmith (1969), McKinnon (1973), Levine and Zervos (1996), and others emphasize the positive role of financial systems in economic growth. In particular, King and Levine (1993a) and DeGregorio and Guidotti (1995) show convincingly that measures of banking development are strongly correlated with economic growth. In addition, they share the view that a well functioning financial system is critical to sustained economic growth.

From the literature on financial deepening, including particularly the works of McKinnon (1973) and Shaw (1973) basically for extending formal theoretical analysis of the relationship between growth and financial deepening to developing countries, two major propositions have emerged. One, that growth of real money balances augurs well for economic growth, and two, that the growth of an economy depends, in part, on the degree of financial development or financial intermediation. Empirical studies to justify these propositions have been carried out on an international basis by such economists as Shaw (1973), Jao (1976), Fry (1978) and Ogun (1986).

Financial intermediation

As noted by several economists, financial intermediation is seen as the extent to which financial institutions (banks) bring deficit spending units and surplus spending units together. Such a joining of spending units is likely to result in more deepening of the financial system (Goldsmith, 1969; Ghani, 1992; Greenwood and Jovanovic, 1990). In other words, there will be more investment in the economy through the financial system. In his contribution in particular, Goldsmith (1969) observes that the financial superstructure of an economy "accelerates economic performance to the extent that it facilitates the migration of funds to the best user, i.e., to the place in the economic system where the funds yield the highest social return". The opinion of Greenwood and Jovanovic (1990) is in line with this view; they state that financial intermediation promotes growth because it allows a higher rate of return to be earned on capital, and growth in turn provides a means to implement costly financial structures. In his contribution, Montiel (1995) argues that growth and financial development/intermediation are mutually dependent in that the level of per capita income partially determines the level of financial development, while financial development/intermediation can contribute to economic growth in the long run.

Measures of financial deepening

Since financial deepening (FD) means an increase in the supply of financial assets in the economy, it is important to develop some measures of the widest range of financial assets, including money. This will involve identifying these financial assets, determining their measures and summing them up. The sum total of all the financial assets is one broad measure that represents financial deepening; the other, as indicated earlier, is the growth rate of per capita real money balances. The range of financial assets to be considered in this study includes broad money (M2), liabilities of non-bank financial assets (NB), treasury bills (TB), value of shares (VS) and money market fund (MMF). The sum of these financial assets can thus approximate one of the widest measures of financial deepening.

The summing up of these financial assets to represent a broad measure of financial deepening is not a problem, but the availability of data for some of them is. Because of narrow and undeveloped capital markets in many SSA countries, data on value of shares (VS) and money market funds (MMF) in particular are not available. It is equally difficult to get consistent annual data on all financial assets except broad money (M2). If data had been available on these financial assets, the degree of financial intermediation, which is an important part of financial deepening (FDY), would be the sum of the measures of these financial assets, thus:

$$FDY = (M2 + TB + NB + VS + MMF)/Y$$

The financial deepening based on such an identity is unlikely to capture a good number of SSA countries because these countries have narrow and shallow capital markets. Thus, the market capitalization as a percentage of GDP in these countries has been seen to be quite low compared with much higher percentages in advanced economies (Nyong, 1996). This may be because many companies in SSA are not quoted on the stock exchange. One example is Nigeria, where funds from the capital market in the 1970s formed a negligible 5% of total capital investment (Alili, 1984). In view of the lack of information, our study uses broad money (M2) as a proxy for the measure of financial deepening. Given the empirical/scientific work of Jao (1976), Fry (1978) and Ogun (1986), however, financial deepening is represented by two variables: the degree of financial intermediation measured, in our case M2/Y, and the growth rate of per capita real money balances (GPRMB).

Financial development and long-run endogenous growth variables

There are several ways in which financial development can affect real growth of output. As observed by Goldsmith (1969) and Bencivenga and Smith (1991), the first way is to raise the volume of investment and the second is to improve the volume and structure of savings. Fry (1988) agrees that these are the basic ways financial development can affect real growth of output. Again, from the works of Greenwood and Jovanovic (1990) and King and Levine (1993b), financial development is likely to affect growth by improving the efficiency of investment through project selection, innovation and entrepreneurship growth. This last point is the emphasis laid in the numerous recent endogenous growth models.

Besides financial deepening, there are other variables that may affect long-run endogenous growth. We will examine these variables as much as possible. We know, for example, that there are different ways of looking at fiscal policy impacts. One is to emphasize the role of inflationary tax/finance, while the other is to emphasize the role of fiscal deficit or fiscal balance.

Our study is interested in the issue of inflationary tax. Experts emphasize that with full employment of resources achieved, inflationary tax can be used as an instrument to finance investments, hence growth and development, in developing countries (Bailey, 1956; Tanzi, 1978; Aghevli and Khan, 1977; Asogu 1991). But sad enough, a full employment situation rarely holds in SSA countries. That being the case, inflationary tax through investment may not have the desired effect on growth and development. While fiscal balance has been seen to have a positive effect on long-run growth, fiscal deficit has a negative effect on growth (Easterly and Levine, 1994; Schmidt-Hebbel, 1994). At this point, we should also mention that if fiscal deficit is monetized through government sales of securities to the central bank, the result will be inflationary tax/finance as long as the high powered money has been made to increase. The practice of monetizing debt or deficit by borrowing from the central bank is common in developing countries of Africa and Asia (Klein and Nuemann, 1990).

Another point to note is that high and rising rates of inflation due to devaluation usually lead to a fall in the purchasing value of the domestic currency, so that holders of such currency suffer in terms of forgoing real goods and services. This is the main reason why rational economic agents tend to hold other assets such as gold, physical goods, land and foreign currency in preference to domestic currency. This last option, holding foreign currency, brings to mind the need to look at the cost-benefit analysis of dollarization to see how it affects growth and development. An independent country would prefer to use its national currency to avoid paying seigniorage to the foreign country provided there are no transaction costs (i.e., costs involved in exchanging domestic currency for, say, the US dollar). If there are transaction costs (usually these costs exist in developing countries subjected to devaluation and high rates of inflation), foreign currency would be used and that would involve paying seigniorage. Being a cost that results from high preference for foreign currency, seigniorage is expected to affect growth and development negatively (Medhora, 1991; Klein and Neumann, 1990; Nyong, 1994; Schmidt-Hebbel, 1994). On the other hand, if benefits result from the analysis of dollarization, the effect of seigniorage on growth is expected to be positive.

In the 1990s several studies were conducted to further examine factors influencing long-run growth. Among the studies of great significance were those of Easterly and Levine (1994). They identified for inclusion in the cross-country growth regressions such important explanatory variables as (1) the measure of black market premium; (2) the extent of financial development or financial depth (see King and Levine, 1993a/b; Barro and Lee, 1993, etc.); (3) a measure of the degree of openness, i.e., the ratio of exports plus imports to GDP; (4) measure of inflation; and (5) government fiscal deficit.

Long-run endogenous growth, according to Easterly and Levine is, on the whole, negatively affected by many factors, including low schooling based on primary/secondary school enrolment rate, political instability, an under-developed financial sector or shallow financial depth, and a sizeable black market premium. Other factors with negative impacts are large fiscal deficits, low infrastructure, and ethnic diversity or fractionalism. Spillover from neighbours greatly magnifies all of these factors. Other robust long-run endogenous growth studies have been conducted by such eminent economists as Fisher (1993), Easterly and Rebelo (1993), Elbadawi and Ndulu (1994), Montiel (1995), and McMahon and Schmidt-Hebbel (1995). They have also identified for use some of these long-run variables.

5. Conceptual issues and methodology

This study is derived from the formal neoclassical growth model by incorporating financial deepening into it. The simple neoclassical growth model is restrictive in the sense that capital and labour are the only explanatory variables whose weights or coefficients have to sum up to one. This type of function is described as displaying constant returns to scale (CRTS). But the real-life situation is that today's productive plants tend to display increasing returns to scale. That being the case, it is proper to stick with the unrestricted or augmented neoclassical model, in which most economists involved in related growth studies agree that some variables be treated as factors of production (Sinai and Stokes, 1972; Schmidt-Hebbel, 1994; Easterly and Levine, 1994; Easterly and Rebelo, 1993; Elbadawi and Ndulu, 1994; King and Levine, 1993a/b).

One growth study particularly related to financial depth was that of Wallich (1969), in which the rate of output growth was treated as dependent on certain monetary variables such as the rate of money growth and the degree of intermediation. As indicated earlier, these two explanatory variables are seen to represent financial deepening. As our main objective in this study, real per capita growth of output will be related to variables making up financial deepening and other growth related explanatory variables using an unrestricted neoclassical growth model.

To achieve this objective, we have to calculate the ratio of broad money (M2) to GDP on a decade average of 1980 basis to represent one measure of financial deepening for all the SSA countries captured by this study. This calculation is done for other variables to even out year-to-year fluctuations and to reflect underlying structural changes. Thereafter, it would be possible to introduce this measure of financial deepening and other variables into an unrestricted/augmented neoclassical growth model using a multiple regression technique. For our purpose, the neoclassical growth model is derived from the aggregate production function. Estimation, depending on our measures of financial deepening and other explanatory variables of interest, is done through an ordinary least square (OLS) multiple regression procedure. Results derived are carefully analysed and interpreted. It is important to add that the study is a cross-country study encompassing SSA countries.

6. Model specification

The purpose of our study is to test the hypothesis that economic growth in selected SSA countries is related not only to financial deepening (FD) but also to other long-run explanatory variables like the ratio of foreign trade to GDP, inflationary tax, primary/secondary school enrolment rates, per capita income and its growth, growth of population or labour, growth of per capita real money balances, and several others.

The effect of growth on these variables can be derived from the aggregate production function as follows:

$$Y = AF(K,L) \tag{1}$$

where:

Y = output; A = efficient parameter; and K and L are capital and labour employed, respectively.

In terms of growth rate, we have Equation 1 thus:

$$\frac{dY}{Y} = \frac{dA}{A} + \alpha_k \frac{dK}{K} + \alpha_L \frac{dL}{L} \tag{2}$$

But $dK = 1 =$ investment $\tag{2^1}$

Equation 2 can also be expressed as

$$\frac{dY}{Y} = Y_k dK + Y_L dL + Y_A dA \tag{2^2}$$

Or, equivalently, we have

$$\frac{dY}{Y} = (Y_k).\frac{dK}{Y} + \left(\frac{Y_L L}{Y}\right).\frac{dL}{L}.\left(\frac{Y_A.A}{Y}\right)..\frac{dA}{A} \tag{3}$$

But $A = A(FD, FV)e^{at}$ $\tag{4}$

where:

FD   =   variable representing financial deepening
FV   =   other explanatory variables

If we assume that the level of FD/Y and FV/Y affects the growth rate of efficiency, then Equation 4 can be appropriately written as

$$A = A_o e\left[a + b_1\left(\frac{FD}{Y}\right).b_2\left(\frac{FV}{Y}\right)\right]t \tag{5}$$

Equation 5 can also be expressed in growth terms, thus

$$\frac{dA}{A} = a_o + a_1\left(\frac{FD}{Y}\right) + a_2\left(\frac{FV}{Y}\right) \tag{5^1}$$

But $dA = [A_{FD}dFD + A_{FV}dFV]e^{at} + A(FD, FV)ae^{at}$ \hfill (6)

Equation 6 uses the rule that states:

$d(x.y) = y.dx + x.dy$

Dividing Equation 6 through by A, we can have its equivalent in Equation 7:

$$\frac{dA}{A} = \left(\frac{A_{FD}.FD}{Y}\right).\frac{dFD}{FD} + \left(\frac{A_{FV}FV}{Y}\right).\frac{dFV}{FV} + a \tag{7}$$

Then putting together equations 3 and 7 gives us an equation that is close to the one we intend to estimate, thus:

$$\left(\frac{dY}{Y}\right) = a_0 + a_1\left(\frac{I}{Y}\right) + a_2\left(\frac{dL}{L}\right) + a_3\left(\frac{dFD}{FD}\right) + A_4\left(\frac{dFV}{FV}\right) + U \tag{8}$$

For our purpose, variables representing other explanatory variables besides financial deepening (FD) include the ratio of foreign trade to GDP (FTY), inflationary tax (FLA), rate of primary/secondary school enrolment (SS) and others.
Rewriting Equation 8 and relating FD and FV, as the case may be, we have

$$\left(\frac{dY}{Y}\right) = a_0 + a_I\left(\frac{I}{Y}\right) + a_2\left(\frac{dL}{L}\right) + a_3\left(\frac{FD}{Y}\right) + A_4\left(\frac{FT}{Y}\right) +$$

$$a_5 uFLA + a_6 SS + u \hspace{4cm} (9)$$

We intend to estimate three growth equations. The first one is a long-run endogenous growth equation that is similar in some respects to the works of Easterly and Levine (1994) and others. This growth equation will have such explanatory variables as school enrolment/attainment made up of primary school enrolment, secondary school enrolment and average year of school attainment; population/labour growth rate; measure of financial deepening as represented by the degree of financial intermediation (M2/Y or *FDY*); measure of trade openness (*FTY*); measure of real per capita income (*PCY*) assumed to be a proxy for capital; and measure of inflation tax/finance as a proxy for the existing rate of inflation (refer to Appendix B for its derivation).

The second growth equation is semi long run in nature. It takes after the works of Jao (1976), Fry (1978) and Ogun (1986). What is important here is that financial deepening is represented by two explanatory variables: the degree of financial intermediation measured as M2/Y or *FDY*, and the growth rate of per capita *real* money balances (*GPRMB*). Other explanatory variables like trade openness *(FTY)* and inflationary tax/ finance (*FLA*) are also included in the growth equation.

The third growth equation uses all the explanatory variables as in the second equation except that here growth in per capita money balances is in *nominal* terms. Note that this variable was in real terms in the second growth equation.

In all three growth equations, real per capita GDP growth (*PCYG*) is the dependent variable. Since ordinary real GDP growth (*G*) is not deflected by population, it is not seen in this case to be relevant for use as our dependent variable. As indicated earlier, a decade average basis of calculating the variables was done to even out year-to-year fluctuations and to reflect underlying structural changes (Jao, 1976; Ogun, 1986).

7. Empirical estimation and results

The three modelled equations are stated as follows:

$$\text{PCYG} = a_0 + a_1\text{PCY} + a_2\text{SS} + a_3\text{PG} + a_4\text{FDY} + a_5\text{FTY} + a_6\text{FLA} + u \tag{1.1}$$
$$\text{PCYG} = b_0 + b_1\text{FDY} + b_2\text{GPRMB} + b_3\text{FTY} + b_4\text{FLA} + u \tag{1.2}$$
$$\text{PCYG} = c_0 + c_1\text{GPMB} + c_2\text{FDY} + c_3\text{FTY} + c_4\text{FLA} + u \tag{1.3}$$

All variables are defined below.

List of variables used in the model

FCY	=	real per capita GDP (or log of real per capita GDP measured at the start of the decade of 1980)
SS	=	school enrolment/attainment at the start of the decade, which is subdivided into three variables, PRI, SEC and SCH
PRI	=	primary school enrolment rate at the start of the decade of 1980
SEC	=	secondary school enrolment rate at the start of the decade of 1980
SCH	=	average years of school attainment measured in log form at the start of the 1980 decade
PG	=	population/labour growth rate (average of 10 years, 1980–1989)
FD	=	financial deepening (a decade average, 1980–1989)
FDY	=	Measure of financial intermediation, i.e., M2/Y (a decade average)
FTY	=	foreign trade/trade openness, i.e., sum of exports and imports over GDP (a decade average)
PCYG	=	real per capita GDP growth (a decade average)
FLA	=	inflationary tax or finance (A proxy for this is the existing rate of inflation; see Appendix B)
G	=	real GDP growth rate (a decade average)
GPRMB	=	growth rate of per capita real money balances (a decade average)
GPMB	=	growth rate of per capita (nominal) money balances (a decade average)

FD ...   is here represented by two variables: FDY and GPRMB or GPMB

Coefficients a, b and c are for the equations to be estimated.

Decade average data for 1980–1989 were applied to all the variables except PCY and SS, which used data information at the start of the decade (Easterly and Levine, 1994).

Regression results based on OLS estimation procedure

A s indicated earlier three regression results are presented. The first result has to do with a long-run endogenous growth model similar, in some respects, to the works of Easterly and Levine (1994). Here financial deepening (*FD*) is represented only by the degree of financial intermediation (FDY or M2/2). See Table 1.

The result of the second model has a limited number of explanatory variables and takes after the works of Jao (1976), Fry (1978) and Ogun (1986). What is important in the second growth model is that financial deepening (*FD*) is represented by two variables as these economists emphasize: the degree of financial intermediation (*FDY*) and the growth rate of per capita real money balances (*GPRMB*). The third model result is only slightly different from the second, and that from the standpoint of one variable. That variable is the growth rate of per capita money balances (one of the two variables representing financial deepening), which is in nominal terms in the third model.

Equation 1.2 estimated results:

$$PCYG = -0.0229 + 0.2612\ GPRMB + 0.0144\ FDY$$
$$(-2.0731) \qquad (2.6064) \qquad (0.4475)$$

$$+ \quad 0.0167\ FTY + 0.0179FLA$$
$$(1.4912) \qquad (0.7981)$$

$R^2 = 0.3063$ DW = 1.4911
n = 34 SSA countries
*Growth in per capita money balances (GPRMB) is in real value.

Equation 1.3 estimated results:

$$PCYG = -0.0297 + 0.1741\ GPMB + 0.0352\ FDY$$
$$(-2.4308) \qquad (2.0120) \qquad (1.7177)$$

$$0.0121FTY + -0.0809\ FLA$$
$$(1.7954) \qquad (1.0315)$$

$R^2 = 0.2488$ DW = 1.5995
n = 34 SSA countries
*Growth in per capita money balances (GBMB) is in nominal value.

Table 1: Equation 1.1 Estimated results: Long-run endogenous growth model

Variables	Estimated equation (EQ)							
Dependent PCYG	EQ1	EQ2	EQ3	EQ4	EQ5	EQ6	EQ7	EQ8
Independent PCY"	0.0059 (0.8135)	0.0081 (1.0685)	0.0077 (1.0967)	0.0044 (0.5301)	0.0039 (0.5001)	0.0094 (0.9886)	0.0110 (1.1718)	0.0076 (0.7701)
PRI	-0.0029 (-0.1456)							
SEC		-0.0278 (-0.6658)		-0.0277 (-0.6668)		-0.0331 (-0.6816)		
SCH			-0.0119 (-0.8041)		-0.0103 (-0.6929)		-0.0190 (-0.9530)	-0.0185 (-0.9275)
PG	-0.8018 (-0.8656)	-0.8735 (-1.0576)	-0.6788 (-0.7986)	-0.9012 (-1.0962)	-0.7297 (-0.8555)	-0.8908 (-1.0563)	-0.6115 (-0.7003)	-0.6541 (-0.7511)
FDY	0.0475 (1.4952)	0.0487 (1.8375)	0.0624 (1.8512)	0.0453 (1.7827)	0.0567 (1.8567)	0.0492 (1.8651)	0.0725 (1.8742)	0.0682 (1.8799)
FTY				0.0151 (1.1380)	0.0142 (1.2632)			0.0149 (1.0968)
FLA						0.0063 (0.2241)	0.0177 (0.5402)	0.0205 (0.6253)
INT	-0.0253 (-0.4834)	-0.0035 (-0.7121)	-0.0352 (-0.7309)	-0.0192 (-0.3713)	-0.0181 (-0.3565)	-0.0435 (-0.7014)	-0.0584 (-0.8987)	-0.0442 (-0.6684)
	R^2 = 0.1408 DW=1.4552	R^2 = 0.1532 DW=1.5152	R^2 = 0.1590 DW=1.5023	R^2 = 0.1906 DW=1.4648	R^2 = 0.1916 DW=1.5599	R^2 = 0.1547 DW = 1.4967	R^2 = 0.1676 DW=1.5675	R^2 = 0.2031 DW=1.5299

Brief discussion of the regression results

The results for each equation are described in turn. The variables are as listed above.

Equation 1.1

Having established our dependent variable as real per capita GDP growth (*PCYG*), we had to relate some explanatory long-run endogenous growth variables to it. Some of these explanatory variables are *PCY*, representing real per capita GDP (assumed to be a proxy for capital), population/labour growth rate (*PG*), school enrolment/attainment measured by three variables (*PRI*, *SEC* and *SCH*), measure of financial intermediation (*FDY*), growth rate of per capita money balances (*GPRMB* or *GPMB*), measure of trade openness (*FTY*), and measure of inflationary tax/finance (*FLA*).

Table 1 presents results for eight estimated equations. Except in the case of Equation 1 in which the coefficient of financial intermediation (*FDY*), our explanatory variable of interest representing a portion of financial deepening (*FD*), was insignificant, the other equations 2 to 8 all had their *FDY* coefficients close to being significant at the 5% level. The signs of *FDY* coefficients in all eight equations, even with the non-significant one in Equation 1 were right. Apparently because of the large number of observations (34 countries in all), the coefficients of *FDY* in Equation 2 to 8 were significantly different from zero not at the 5% level, but at about 6.5% level.

Among the three explanatory variables representing school enrolment/attainment, *PRI* (primary school enrolment rate), which had a negative sign due to low enrolment, must have contributed to the *FDY* coefficient in Equation 1 being insignificant. The other related variables, *SEC* (secondary school enrolment rate) and *SCH* (average year of school attainment,) were also used in equations 2 to 8. Even though the signs associated with school enrolment/attainment were negative, implying low enrolment/attainment in all cases in the SSA countries, the *FDY* coefficients of equations 2 to 8 were barely satisfactory in terms of significance. As observed by Easterly and Levine (1994), the structural problems associated with the data on school enrolment/attainment in the 34 SSA countries under study are seen to have contributed to the wrong signs of these coefficients. The parameter estimates of the other variables, like *PCY*, *FTY* and *FLA*, though with the right signs, were not significant.

Mention has to be made of the coefficients of determination (R^2). In all eight equations (Table 1), the coefficients of determination were low, meaning that the power of variables to explain changes in the dependent variable (*PCYG)* is weak. This is not surprising, as other key variables outside those in Table 1 do positively affect per capita growth of output. Even though it is observed by Jao (1976) and others that the coefficients of determination for cross-country studies are not usually high, we expected R^2 of at least 25% to 40%.

The shallow finance or financial depression in most SSA countries as observed by

Easterly and Levine (1994), Elbadawi and Ndulu (1994), and Montiel (1995), is enough to retard growth. To achieve substantial and sustained growth in these countries, a sound financial policy for improving financial depth must be put in place. This is what the last section of this study on policy implications and concluding remarks will examine. Meanwhile, let us discuss other estimated results.

Equation 1.2 estimated results

Two variables here represent financial deepening (FD). They are the degree of financial intermediation (FDY or M2/Y), and the growth rate of per capita *real* money balances (*GPRMB*). As indicated at several points in this study, the empirical/scientific works of Jao (1976), Fry (1978) and Ogun (1986) emphasize and use the two variables to represent financial deepening in their respective studies. This study is, indeed, influenced by their work. For one thing, we know that financial intermediation (M2/Y or *FDY*) uses broad money deflated by GDP; also, growth rate of per capita *real* money balances (*GPRMB*) uses broad money (real), which is deflated by population before growth is calculated. The numerator common to these two variables of financial deepening is broad money (M2), which comprises M1 (currency outside banks + demand deposit) plus quasi money (savings deposit + time deposit). Given the relevance of M2 to the two variables, one cannot doubt that they represent financial deepening. The more the financial assets can be increased beyond M2, the greater will be the financial deepening (FD). In such a situation, FD coefficient will not only be significant, but will also have positive effect on growth. This was the result that Jao (1976) got for a set of 41 countries in the world.

The results of Equation 1.2 are interesting in the sense that they conform to the works of Jao and Ogun in terms of the right signs and significance of variable coefficients. Fair enough, the coefficient of the growth rate of per capita real money balances (*GPRMB*) was significantly different from zero at 0.05 level, but that of financial intermediation (*FDY*) was insignificant. Both variable coefficients, however, had the right signs. This is important for policy. Other variable parameter estimates like trade openness (*FTY*) and inflationary tax/finance (*FLA*) were not significant but had the right signs. The explanatory power of the variables in explaining changes in the dependent variables (*PCYG*) as reflected in the R^2 of 0.3063 is much better here than the R^2s of each of the eight equations on Table 1.

Equation 1.2 basically satisfies our expectation, as one of the variable coefficients representing financial deepening (*GPRMB*) is significant and has a positive sign. The other variable coefficient (*FDY*) of financial deepening, though not significant, has also a right (positive) sign. By and large, our findings for the sub-Saharan African (SSA) countries agree with those of Jao (1976), Fry (1978) and Ogun (1986). It was only when Jao (1976) used M3, broader moneyæwhich in effect means much more increase in financial assetsæthat the *FDY* coefficient was significant for 41 countries, six of which were from sub-Saharan Africa. The parameter estimates of *FDY* were not significant when M1 and M2 were used by Jao for three different sets of countries in the world.

Equation 1.3 estimated results

There is only one difference between the estimated results of Equation 1.2 and Equation 1.3. In Equation 1.3 one of our variables of interest (*GPMB*) representing a part of financial deepening is in nominal value, whereas in Equation 1.2 it is in real value. The parameter estimate of *GPMB* (in nominal value) was significantly different from zero at the 5% level. This result agrees with Equation 1.2 in which the *GPRMB* variable was in real value. Therefore, the significance of this variable coefficient (i.e., growth rate of per capita money balances), whether in real or nominal value, cannot be doubted. The *FDY* coefficient barely improved in Equation 1.3, as it was significant at the 10% level. The signs of the two variables (*GPMB* and *FDY*) representing financial deepening (*FD*) were right (positive) as expected. However, with an R^2 of 0.2488, it is clear that the power of the variables to explain changes in the dependent variable (*PCYG*) is rather weak.

Direction of financial deepening on growth

Given the results of our three equations, we can conclude that financial deepening as represented by the growth rate of per capita (real/nominal) money balances (*GPRMB/ GPMB*) and degree of financial intermediation (*FDY*) does positively affect per capita growth of output. The FDY parameter estimate, with, of course, the right sign, was close to being significant at the 5% level (was actually 6.5%) in Equation 1.1 and at 10% in Equation 1.2.This apparently less than satisfactory performance of the financial intermediation variable is due basically to "shallow" finance and the absence of well functioning capital markets in most SSA countries.

8. Policy implications and concluding remarks

From our study of the relationship between financial deepening and growth of output we can derive the following conclusions:

*   SSA countries should make concerted efforts to improve the growth of real money balances.
*   Efforts should also be made to substantially improve financial development or financial intermediation in SSA countries.

It is important that we concentrate on these two points since financial deepening, as we have pointed out from other studies (Jao, 1976; Fry, 1978; Ogun, 1986) and shown in our study, is represented by the growth rate of per capita real money balances and the degree of financial intermediation.

In expanding on the first point, we can identify factors that stimulate the growth of real money balances. These factors include price stabilization, elimination of fiscal deficits and removal of various restrictions on financial institutions. Such a removal, as Jao (1976) observes, will help to "solicit savings by offering realistic interest rates". Therefore, for growth in real money balances to be substantially improved, SSA countries must develop a policy mix to achieve these factors.

On the second point, there are basic ways financial development or financial intermediation can positively affect growth of output. One way is to raise the volume of investment. This is accepted by most economists as the single most important explanatory variable for significantly improved growth. Elsewhere in this study, we showed that financial intermediation involves, among other things, deficit and surplus spending units coming together. Such togetherness is likely to result in greater deepening of the financial system. That, in other words, means that there will be more investment in the economy through the financial system. Recognizing the important role of investment in growth, SSA countries must put in place policies to attract both domestic and foreign investment.

Another way financial development can affect growth is by improving the volume and structure of savings. Fry (1988) is very emphatic on this point. Savings must be encouraged and any country that does not encourage savings should forget about making any investment, whether private or public. In most SSA countries, private savings are negative due to low salary incomes. Also, interest rates on savings in these countries are usually too low to encourage savings and the banks are not reliable enough as some of them are visibly distressed. Finally, financial development/intermediation can be achieved if SSA countries direct public policies towards maintaining external competitiveness, promoting structural reforms, slowing population growth and encouraging human capital development.

In conclusion, we repeat that the literature on money and finance is quite vocal on the role of the supply of financial asset; if the supply is small, the financial deepening in a country is most likely to be shallow. For third world economies like the SSA countries covered in this study, growth of financial assets is far from the levels obtained in developed countries, for a number of reasons. For one thing, most SSA countries have no capital markets. Of the eight or so that do, in only five do the capital markets work somehow. Indeed, the absence of well-functioning capital markets in SSA countries means that such financial assets as shares and money market funds are not available. Continued decrease in the size of financial assets due to non-existing or poor functioning of the capital markets, as well as the absence of structural reforms relating to financial institutions, contributes in no small way to shallow financial deepening in most SSA countries.

To achieve substantial and sustained growth of output, therefore, SSA countries need to put in place sound financial policy aimed at improving financial depth. This can be done by addressing the shortages identified in this paper.

Appendix A

Table A2:Variables PCY, PRI, SEC, Pg, FDY and FTY Cross country study of sub-Saharan African Countries (Decade average 1980-1989)

S/No	Country	PCY	PRI	SEC	Pg	FDY	FTY
1	Benin	6.97	0.670	0.198	0.0313	0.1111	0.76883
2	Burkina Faso	6.14	0.235	0.035	0.0255	0.1031	0.43454
3	Burundi	6.18	0.400	0.033	0.0281	0.1616	0.35537
4	Botswana	7.53	0.990	0.225	0.0348	0.2907	1.34255
5	Cameroon	7.32	1.046	0.206	0.0327	0.2005	0.36260
6	CAR	6.66	0.753	0.153	0.0253	0.1780	0.786313
7	Chad	6.22	0.190	0.060	0.0236	0.2252	0.62471
8	Congo	7.57	0.659	0.162	0.0328	0.0702	1.0084
9	Cote d'Ivoire	7.49	0.775	0.193	0.0415	0.1311	0.67295
10	Ethiopia	5.83	0.370	0.105	0.0288	0.3698	0.32898
11	Gabon	8.26	1.110	0.261	0.0416	0.1938	0.88471
12	The Gambia	6.53	0.603	0.140	0.0347	0.1130	1.40008
13	Ghana	6.90	0.778	0.395	0.0321	0.1235	0.40478
14	Kenya	6.86	1.085	0.198	0.0411	0.3786	0.67097
15	Lesotho	7.15	1.088	0.200	0.0265	0.4897	1.58467
16	Liberia	7.07	0.335	0.195	0.0334	0.0287	0.97340

Table A2 continued:

S/No	Country	PCY	PRI	SEC	Pg	FDY	FTY
17	Madagascar	6.76	1.310	0.355	0.0301	0.1074	0.45996
18	Malawi	6.41	0.614	0.038	0.0325	0.2242	0.62456
19	Mali	6.24	0.244	0.076	.0231	0.0945	0.45867
20	Mauritania	7.03	0.400	0.128	0.0262	0.1044	1.16243
21	Mauritius	8.15	1.015	0.485	0.0224	0.4553	1.12414
22	Niger	6.68	0.260	0.055	0.0304	0.0681	0.48332
23	Nigeria	7.35	0.920	0.245	0.0321	0.2671	0.82412
24	Rwanda	6.55	0.623	0.035	0.0326	0.1370	0.24095
25	Senegal	7.09	0.513	0.120	0.0285	0.1425	0.56853
26	Sierra Leone	7.06	0.560	0.166	0.0229	0.2103	0.41358
27	South Africa	8.44	1.452	0.412	0.0234	0.5149	0.58474
28	Swaziland	7.83	1.050	0.412	0.0333	0.3234	1.42285
29	Tanzania	6.23	0.883	0.030	0.0341	0.3260	0.38669
30	Togo	6.77	0.804	0.268	0.0319	0.1928	0.80887
31	Zaire	5.85	0.927	0.400	0.0320	0.1684	0.42908
32	Uganda	5.44	0.533	0.060	0.03063	0.0620	0.24837
33	Zambia	6.80	0.930	0.168	0.0341	0.3173	0.76988
34	Zimbabwe	7.25	1.157	0.250	0.0357	0.3943	0.57381

Source: Data sources on SSA countries from Easterly and Levine (1997), Sachs and Warner (1996), and World Bank (1995).

TABLE A2: Variables G, PCYG, SCH, FLA, GPMB, Cross country study of sub-Saharan African Countries (Decade average 1980-1989)

S/No	Country	PCYG	SCH	FLA	GPMB	GPRMB	GPMB
1	Benin	0.03190	0.01869	0.501	0.0807	0.0929	0.009
2	Burkina Faso	0.03836	0.01246	0.425	0.0716	0.1096	0.032
3	Burundi	0.04297	0.01409	0.476	0.0920	0.1203	0.011
4	Botswana	0.11034	0.07278	1.191	0.1082	0.2282	0.094
5	Cameroon	0.04014	0.01534	1.015	0.0746	0.1121	0.034
6	CAR	0.011122	-0.01262	0.593	0.1002	0.0915	-0.094
7	Chad	0.05428	0.0317	0.396	0.0839	0.1076	0.038
8	Congo	0.07040	0.03591	1.187	0.0951	0.1251	0.070
9	Cote d'Ivoire	-0.01070	-0.04764	0.996	0.0345	0.0185	-0.033
10	Ethiopia	0.00833	-0.01882	0.491	0.0302	0.0846	0.061
11	Gabon	0.01378	-0.01117	1.067	0.0425	0.0621	0.006
12	The Gambia	0.03058	-0.00524	0.501	0.1297	0.1606	0.022
13	Ghana	0.02074	0.01158	1.218	0.5051	0.3639	-0.021
14	Kenya	0.04263	0.00529	1.235	0.1076	0.1012	0.004
15	Lesotho	0.03817	0.00869	1.452	0.1221	0.1577	-0.030

TABLE A2 continued:

S/No	Country	PCYG	SCH	FLA	GPMB	GPRMB	
16	Liberia	-0.00772	-0.04751	0.850	0.0174	0.0455	0.005
17	Madagascar	0.01407	-0.02161	1.504	0.1866	0.1587	-0.023
18	Malawi	0.01598	-0.02348	1.185	0.1331	0.1348	0.017
19	Mali	0.01575	-0.00871	0.451	0.0495	0.0994	0.028
20	Mauritania	0.02207	-0.00368	0.492	0.0933	0.1030	0.020
21	Mauritius	0.04448	0.03441	1.669	0.0814	0.1756	0.072
22	Niger	-0.00462	-0.03645	0.405	0.0609	0.0949	0.009
23	Nigeria	0.01108	-0.01754	1.291	0.2086	0.1132	0.023
24	Rwanda	0.03393	0.00269	0.688	0.0402	0.0781	0.037
25	Senegal	0.0286	-0.0018	0.495	0.0859	0.0698	-0.024
26	Sierra Leone	0.01655	0.00789	0.948	0.3013	0.2993	0.072
27	South Africa	0.01732	-0.00093	1.725	0.1349	0.1366	0.121
28	Swaziland	0.04662	0.01133	1.391	0.1071	0.1013	-0.024
29	Tanzania	0.03168	0.00226	1.232	0.2510	0.1860	0.013
30	Togo	0.02679	-0.00319	0.963	0.0693	0.1032	0.014
31	Zaire	0.01741	-0.01494	1.007	0.5534	0.4276	-0.008
32	Uganda	0.00601	-0.00701	0.971	0.9454	0.3766	-0.068
33	Zambia	0.01277	-0.02210	1.495	0.3256	0.1947	-0.023
34	Zimbabwe	0.05221	0.01803	1.221	0.1251	0.1154	0.008

Sources: Data sources on SSA countries from Easterly and Levine (1997), Sachs and Warner (1996), and World Bank World Tables (1995).

Appendix B: Derivation of inflation tax

From high-powered money (H), inflation tax can be calculated thus:

(B) $$\frac{\Delta H}{P} = \frac{H}{P} \cdot \frac{\Delta H}{P}$$

(B) $$\frac{H}{P}$$

(B) $$\therefore \frac{\Delta H}{P} \equiv \frac{\Delta H}{H} \cdot \frac{\Delta P}{P}$$

(B) Thus $$\frac{\Delta H}{H} = h\left(\frac{\wedge h}{h} + \frac{\wedge P}{P}\right)$$

Let $$\frac{\Delta P}{P} = \pi$$

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