

Aggregate Saving Behavior in Africa: A Review of the Theory and the Existing Evidence with a New Empirical Results¹

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Abstract

The objective of this paper is to review the theoretical and empirical literature on aggregate saving behavior and to examine the available evidence in order to draw lessons that are particularly relevant for African economies in general and Ethiopia in particular. It attempts to document the main theoretical linkages of saving to major macro-economic aggregates and the factors that determine saving at the micro-economic or household level, examine the existing empirical evidence, present a new estimated result conducted in the context of this study. The literature as well as the empirical finding in this study shows that saving is positively related to income level or growth, rate of investment, and short-run changes in terms of trade. On the other hand, more it is negatively related to macroeconomic instability, foreign aid, and age-dependency ratio.

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1. Introduction

1.1 An overview

Saving has always figured prominently in both theoretical analysis and policy design in both developed and developing economies. This prominence emanates from its assumed direct theoretical link to future economic growth and current expenditure levels via its link to consumption. Early theories of economic growth emphasized the role of saving as a source of capital accumulation and hence growth. Similarly the aggregate demand based theory of Keynesian economics also focused on aggregate expenditure which has a direct implication to saving. Due to their preoccupation with short-term macroeconomic adjustment and stabilization policies, the emphasis on saving was relatively neglected in the 1980s in many African countries. But the focus on economic growth and hence on saving seems to have resurfaced in the 1990s and after. This interest is partly due to the belief that one of the reasons for slow growth in Sub-Saharan Africa is the low rate of saving relative to other developing regions (Schmidt-Hbbel et al, 1996, Aryeetey and Udry, 1999). This is in particular true when one compares the level of domestic saving and investment (See Annex 1).

Saving could be examined in terms of its aggregate behavior or at a personal or household level. In addition to distinguishing the unit of analysis, it is also imperative that a distinction be made between saving behavior in developed and developing economies. As Deaton (1989) noted, there are many good reasons which indicate that factors that determine saving behavior in developing countries are likely to differ from that of developed countries. As will be discussed later, these differences include both macroeconomic aspects of saving (mainly related to institutional and policy issues) and microeconomic factors (such as family structure and type of asset-portfolios available for households in the two group of countries).

The objective of this article is to review the theoretical aspects of saving both at a macro-economic and micro-economic levels and examine the available evidence, including a new estimation made by the authors, in order to draw policy lessons that are particularly relevant for African economies in general Ethiopia in particular. The remainder of the paper is organized as follows: After examining measurement problems and saving trends in Sub-Saharan Africa, relative to other regions, in the remainder of this sub section, section two presents the theoretical determinants of saving. Section three reviews the empirical evidence by focusing mainly on Sub-Saharan Africa. Section four presents a new empirical result that we have estimated. Finally section five presents summary and the policy implications of the theory and the empirical evidence examined in the paper.

1.2 Measurement issues and saving trends in Sub-Saharan Africa (SSA)

It has to be noted from the outset that data problems in examining saving behavior both at the macro-economic and micro-economic levels, particularly in developing countries, are pervasive. For instance, at the macro-economic level, "saving is not measured directly but is the residual between two large magnitudes [GDP and consumption], each itself measured with errors (Deaton, 1989, p. 62)". Similarly, at the micro-economic level, "The standard household survey may well understate saving. The concept of income is itself extraordinarily complex, and most people in developing countries have little reason to distinguish between business and personal cash transactions" (ibid, p. 63). Aryeetey and Udry (1999) also note that in the case of Sub-Saharan Africa, non-financial assets (livestock, stocks of goods for trading, grain and farm inputs) dominate their asset portfolios which in essence are used to smooth out consumption over time. What is more, due to distortions in the trade sector that results in illegal capital outflow (via over-invoicing of imports and under-invoicing of exports, for instance), saving will be underestimated when calculated as the sum of trade and government surpluses and domestic investment (Deaton, 1989). Analysis of saving behavior in the absence of the above considerations therefore will make it inaccurate and in their presence complex.

With the above caveats in mind, using data from World Bank's 'African and World Development Indicators' growth and saving for Africa and other regions are summarized in Figures 1 to 3 and Annex 1. As can be seen in Figures 1, 2, and 3, GDP growth and Gross Domestic Saving as a share of GDP in Sub-Saharan Africa (SSA, henceforth) were very low. And the performance of the two aggregates had deteriorated sharply after the 1980s. The figures also show that the Asian countries' performance is the best both in terms of accelerating growth and capital formation.

The figures also indicate that within Africa, North African countries had a relatively higher saving rate through out the two decades although their saving rate has also declined after 1980, and recovered after the end of the 1990s.

Figure 1: GDP growth across the World (including Africa)

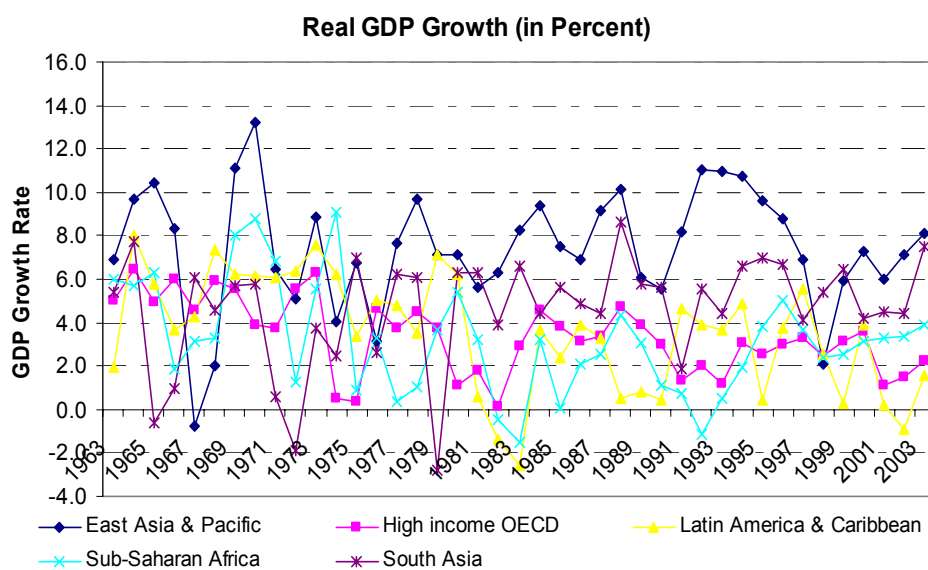


Figure 2: Growth domestic saving across the World (including Africa)

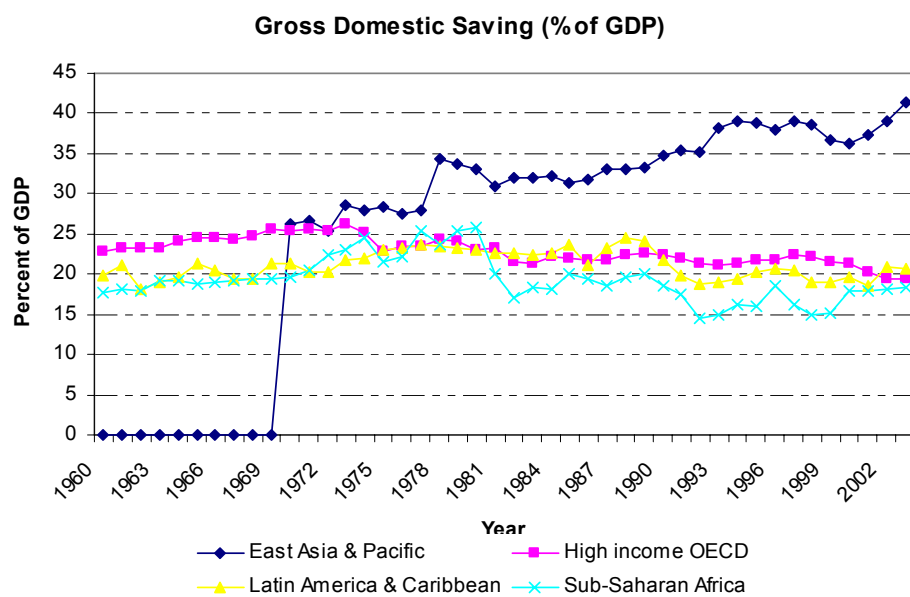
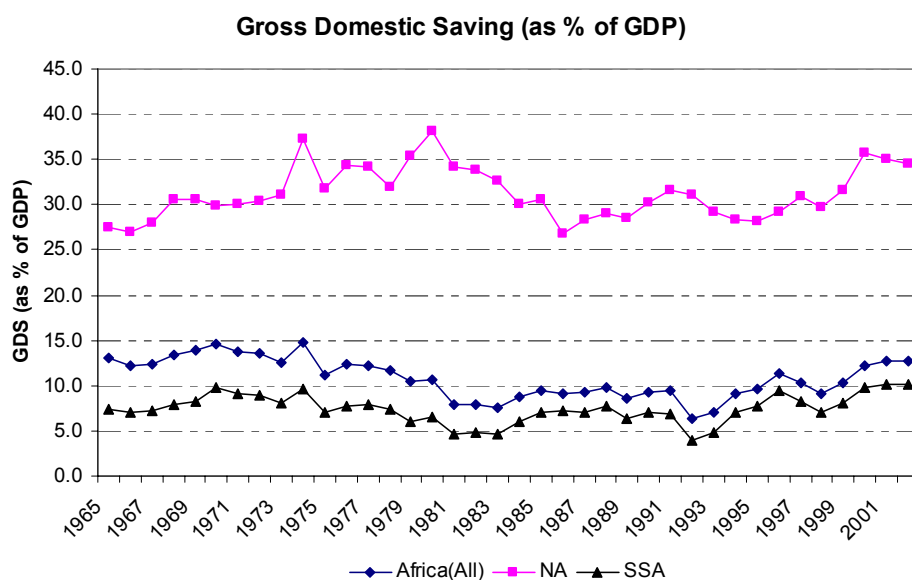


Figure 3: Growth domestic saving in Africa



2. Theoretical aspects of saving behavior

2.1 Saving and growth

Economic theory has maintained for long that saving or capital accumulation is the main determinant of economic growth, which can be understood as sustained long-term rise in income of a country. Lewis (1954, p. 155), among others noted, "central problem in the theory of economic development is to understand the process by which a community which was previously saving 4 or 5 per cent of its national income or less, converts itself into an economy where voluntary saving is running at about 12 to 15 per cent of national income or more". This belief implied that, first, saving is directly translated to investment and, second, saving is a prerequisite for economic growth.

Similarly, all the Neo-classical growth theories developed in the 1950s and 1960s also emphasized the importance of saving in the economic growth process. These emphases could be summarized in the following stylized facts: higher saving leads to higher investment, and higher investment leads to economic growth. The presumption of this reasoning is that, at least in a closed economy, *ex-post* domestic saving must equal *ex-post* domestic investment. And according to the above theories,

investment is directly related to output growth via the incremental capital output ratio (ICOR), at least during the transition to its steady state level or in the short-run. And the more recent endogenous growth theories go further by asserting that saving and investment (combined with technological progress and human capital) induce both short-term and long-term economic growth (Roemer, 1986, Lucas 1988). The implication of the above theories is that, as Schmidt-Hbbel et al, (1996, p. 91) noted, "saving is automatically translated into capital accumulation and thereby growth, and that this translation is simply the mechanism underlying the positive correlation between saving and growth that is observed in practice".

However, as will be discussed in the section on empirical evidence later, the consensus seems to be that only a small portion of cross-country growth differences could be explained by differences in investment ratios. And what is more, the direction of causality between investment and output growth and saving and output growth is far from clear (Schmidt Hebel et al, 1996, Elbadawi and Mwega, 1998). That is, while the correlation between the above variables is positive and mostly significant, the causation seems to run in both directions. For instance, Caroll and Weil (1994), argue that the positive correlation observed between saving and growth is partly due to the fact that growth precedes saving even under the assumption that saving is automatically translated into investment. Not incorporating this two-way causality between saving and growth would therefore overestimate the contributions of saving to growth. Such a finding makes the policy implication complex in that whether saving should be targeted to enhance growth or growth is the cause of saving.

In the case of SSA Elbadawi and Mwega (1998) argue that regardless of the direction of causation (i.e. even if saving follows economic growth), focusing on policies that enhance private saving is important for at least two reasons. First, even if saving is the result and not the cause of economic growth, empirical evidence suggests that sustaining a high rate of growth requires a high level of accumulation of capital which requires high level of saving. Second, due to SSA countries' limited external resources (limited ability to borrow from international capital markets and the conditionality imposed when borrowing from multilateral financial institutions), mobilizing national saving to maintain a high rate of investment and hence growth is essential.

The theoretical linkages of saving, investment and economic growth outlined above suggest that, first as noted earlier, the theories provide less clear direction for policy makers in that they do not provide a clear direction as to which should be targeted first (saving or growth). It is true that this does not diminish the importance of saving

for African countries for reasons appropriately stated by Elbadawi and Mwega (1998), above. But for designing an appropriate policy, it is likely to be useful to clearly identify the exact causative linkage in order to distinguish between what is an instrument and what is a target both in the short run and the long run. Second, at a theoretical level the determinants of saving and investment differ. Therefore, at a policy level the presumption that saving is directly translated to investment may not hold. Arguably, this is more likely to be the case in more recent years than before for at least two reasons: (i) due to the increase in availability of financial instruments not all saving is used for productive investment (but instead at least some of it may be diverted to what is called portfolio investment or speculative capital) purposes; and second, due to liberalization, the relationship between domestic saving and domestic investment incorporate an international dimension. That is, the net change in capital flow is what determines investment and not necessarily the level or rate of domestic saving. The average investment to GDP ratio of 17% vis-à-vis the average domestic saving to GDP ratio of about 6% for the period 1970-2003 in Ethiopia, which is largely true in most SSA countries, is a case in point.

2.2 Saving and consumption smoothing

Given that saving is a postponed consumption, saving has always been examined in relation to consumption smoothing behavior. This is because a decision by households or individuals to consume or save is a joint decision. This decision is the main determinant of national saving. The relationship between saving and consumption could be summed up in the predictions of the two popular models of consumption behavior - namely, the permanent income hypothesis and life cycle models of consumption. These two models are based on the premise that the motive for saving is to average out consumption over an infinite time horizon (the case of the permanent income hypothesis) or a finite time horizon with overlapping generations (in the case of life-cycle model). In general both theories predict that consumption is determined by life time resources rather than each period's income. This suggests that, in the absence of borrowing constraint, saving and dissaving is used as a mechanism to adjust the optimal consumption over the life time horizon.

In particular, the life cycle hypothesis postulates that saving (both to repay previous obligations and to finance expenditures during retirement) is made during productive years. This implies that the age structure of the population has a direct influence on aggregate saving such that a high dependency ratio will have a negative impact on saving (Elbadawi and Mwega, 1998, Masson et al, 1995, Birdsall et al, 1999). This is because, a decrease in the relative size of the working population decreases the

number of savers relative to dissavers (the young and the old). An increase in per capita income has the opposite effect. As Deaton (1989, p. 76) noted, "Per capita income growth has a similar effect (as a decrease in dependency ratio) because workers are saving on a larger scale than the retirees are dissaving". It is to be noted that this is the basis for the earlier discussed positive correlation usually observed between growth and saving.

The view that demographic factors affect saving is not however shared by all researchers. For instance, Koskela and Viren (1989), Kennickell (1990), and Carroll and Summers (1991) question the significance of age structure in determining saving behavior. Kennickell, and Carroll and Summers in particular argue that differences in age-consumption profiles are too small for demographic factors to significantly affect saving rates.

Regardless of the merits of the above theories in explaining the saving behavior in developed countries, the determinants of saving in developing countries are likely to differ in many significant ways. Deaton (1989) documents some of the features that may influence household saving behavior in developing countries. These features include: households in poor countries tend to be large and poor; the economy is dominated by agriculture; households face an uncertain income flow and have different demographic structure; and liquidity constraints are binding. Given these features, therefore, how households smooth consumption over time and decide on how much to save is likely to differ from the basic predictions of the above discussed inter-temporal models of consumption and saving behavior. In explaining the motives for saving in developing countries which exhibit the above features, Birdsall et al. (1999) argue that since households operate in a multi-generational context the need to save for retirement is not important since adults expect that their children will support them during old age. Further, due to the uncertainty of income (say, owing to the volatility of agricultural output) such households may not be able to predict future income and hence plan consumption and saving over a long time horizon. Life cycle models which are based on an inter-temporal decision scheme are therefore likely to have little explanatory power in predicting the saving behavior in poor countries.

As more recent theories emphasize, the main motives for saving in poor income countries are likely to be for precautionary (against random decreases in income as short-run buffering) or to finance private investment since availability of credit for such purposes tend to be scarce. At a policy level, this implies that high rates of return on investment will encourage saving (Birdsall et al., 1999). This of course is only true if the rate of return on investment is higher than the rate of time preference. But as Birdsall et al. (1999) noted, given the subsistence nature of such economies, the rate

of time preference is relatively high since there are not many goods (luxuries, for instance) that could be removed from the consumption bundle. The above arguments suggest that, in addition to a concerted effort to provide access for credit facilities to increase investment, designing tax and other policies to ensure profitability of investment will therefore be required to encourage saving.

Further, a common consideration in the context of consumption smoothing and saving is the impact of interest rates on saving. Theoretically, the impact of the real interest rate on saving is ambiguous. This is because a change in interest rate implies both substitution and income effects. For instance, an increase in income implies that tomorrow's consumption becomes relatively cheaper (or the opportunity cost of current consumption increases) which in turn implies a positive impact on saving. On the other hand, given an increase in expected income (resulting from high interest rate income), it will lead to an increase in current consumption and therefore decrease current saving. The usual assumption is that the substitution effect dominates and therefore an increase in real interest rate (above the rate of time preference) will have a negative impact on consumption and a positive impact on saving. Even though as will be discussed in the empirical evidence section, its impact in the case of developing countries is very little if at all, many theories pay a significant attention to it as a determinant of saving.

In the context of developing countries, the most widely cited theory in this regard is the McKinnon (1973) and Shaw (1973) "financial repression" hypothesis. The main arguments of this hypothesis could simply put as follows: economic growth in developing countries is low because saving rates are low, and saving rates are low because official real interest rates are low. Implicit in this argument is that, saving is automatically translated to investment and economic growth is mainly determined by the rate of investment. It further assumes that private saving responds positively to real interest rate. The repression of the financial sector as reflected in low or negative real interest rates, therefore, hinders saving mobilization. Aryeetey and Udry (1999, p. 24) observed that, "Real interest rates are often generally low in most of SSA for a number reasons, including relatively high inflation and other indicators of macroeconomic instability, as well as institutional factors that have often repressed interest rates".

If indeed the main obstacle to private saving mobilization is financial repression, the policy implication is clear. As has been incorporated in any typical structural reform package (usually sponsored by the Brettonwoods institutions), it takes the form of liberalization of the financial sector in order to offer positive deposit rate such that it encourages private saving. As Masson et al. (1995, p. 7) noted, "the effect of

liberalization on saving behavior can operate through at least two channels. First, financial development may provide outlets for financial saving, thereby raising saving rates..., a channel that has been emphasized in the development literature. The second aspect involves liberalization of consumer access to bank credit, as occurred in a number of industrial countries in the 1980s.” As is well known, many financial reforms have been undertaken in many SSA countries in the 1980s and early 1990s. Despite such reforms however, real deposit rates have not significantly increased in many African countries as Aryeetey and Udry (1999) noted. According to the above authors (P. 24), “the real deposit rates have risen far slower than lending rates in many countries, including Ghana, Malawi, Tanzania, Uganda and Kenya. There are indications, however, that when there is some stability in macro-economic conditions and deposit rates rise, depositors react positively to such rises as happened in Ghana at the end of the 1980s and in Nigeria earlier.” It has to be noted however, the evidence regarding the effect of real interest rate on saving is mixed at best. For instance, Giovannini (1985), Schmidt-Hebbel, Webb and Corsetti (1992) found no significant impact of real interest rate on saving, while Ogaki, Ostry, and Reinhart (1995) found positive effects that are small and very sensitive to income levels.

2.3 Saving and external sector

In the case of open economies, the determinants of saving are more complex. For instance, even *ex-post* saving may not equal investment as long as there is no constraint to capital flow across national boundaries. For instance, capital inflows in the form of concessional loans and foreign aid have an impact on national saving. As noted earlier, the usual rationale for granting aid or concessional loans has been to augment domestic saving. But if instead, as many researchers (Elbadawi and Mwega, 1998, Dayal-Gulati and Thimann, 1997, Schmidt-Hebbel et al, 1996, and Masson et al, 1995, for instance noted), foreign aid is used to smooth out consumption instead of investment, it will have a crowding out effect on domestic saving. That is, foreign aid is a substitute and not complementary to national saving. Recent empirical evidence seems to support the crowding out effect of foreign aid on national saving than the complementarity hypothesis (For more details, see Dayal-Gulati and Thimann, 1997, Schmidt-Hebbel et al, 1996, Global Coalition (1993).

A related issue usually considered in the literature as influencing saving behavior is changes in terms of trade, otherwise known as the Harberger-Laursen-Metzler effect. At a theoretical level, this effect is examined in an inter-temporal optimization model. Accordingly, this theory predicts that a temporary improvement in terms of trade would lead to an increase in saving by increasing temporary income or wealth. But

the effect of permanent changes in terms of trade on saving is ambiguous (Dayal-Gulati and Thimann, 1997, Schmidt-Hebbel et al, 1996). Mwega (1997) argues that the effect of terms of trade is important in SSA countries due to their narrow export base and the price volatility of primary exports. He cites some evidence that this indeed was the case in Kenya in which coffee producing rural households were able to save about 60 per cent of their windfall during the 1976-1977 coffee boom.

2.4 Saving and macro-economic policies

In principle government policy could have a potentially significant influence on national saving either by directly increasing public saving or implementing policies that increase private saving. Such policies include, "revenue policy (tax structure, tax incentives), expenditure policy (transfers, income redistribution), and the degree of government saving," (Dayal-Gulati and Thimann, 1997, p. 7). Government policy directed at financial and pension reforms could also potentially affect private saving, in addition to the above routes through which government could influence national saving.

Whether public saving substitutes or complements private saving is not clear from the theoretical literature. As Mwega (1997) pointed out, in the absence of complete crowding out (Keynesian Assumption), public saving complements private saving; in the case of complete crowding out (Classical but particularly Ricardian equivalence) government budget balance (or public saving) has no effect on private saving. That is, according to the latter theories, the offset coefficient approaches unity. Though it is an empirical issue, due to the stringent assumptions of the Ricardian equivalence hypothesis (infinite planning horizon of households, no borrowing constraint etc), its relevance for a typical SSA county is likely to be limited. This implies that at least in the case of poor African countries, the effect of public saving on private saving is likely to be positive or Ricardian equivalence is unlikely to hold. As will be discussed later, the recent empirical literature is consistent with this observation. The main reason for the failure of the Ricardian equivalence to hold in developing countries is the prevalence of liquidity constraints (Masson et al, 1995).

In addition to fiscal deficits, governments could also potentially influence private saving by introducing tax incentives, as noted above. By raising the after-tax rate of return governments could in principle encourage private saving. But the final outcome on national saving is ambiguous because it decreases public saving and if the tax is selective it may lead to portfolio reshuffling to gain from the tax break thereby introducing distortions. The existing available literature seems to shed no light on this issue.

Similarly, whether direct income transfers and income redistribution positively affect total (national) saving or not is ambiguous at a theoretical level. That is unless the marginal propensity to save between low income groups on the one hand and between the government and the private sector on the other varies significantly, they may offset each other and hence have no impact on total saving.

Other government policies that may affect saving include financial reform, pension reform and macro-economic instability. Financial reform that results in an increase in interest rate is likely to encourage saving ala the McKinnon (1973) and Shaw (1973) argument.

Another potentially relevant determinant of saving is macro-economic instability. Since saving is an inter-temporal decision, how economic agents view the future real value of their wealth affects their saving decisions. For instance, inflation (the usual proxy for macro-economic instability) reduces the real value of financial assets. Therefore, inflation expectation could discourage saving and encourage consumption and/or lead to portfolio reshuffling away from financial assets.

3. Saving behavior in Africa: An overview of the empirical literature

There is a growing empirical literature that attempts to empirically examine the determinants of saving in developing countries. The rest of this paper is devoted to the review of such studies with an emphasis on SSA. To allow smooth flow of the review a thematic classification of the available evidence is made. Each of these themes is discussed below.

3.1 Macroeconomic based explanations

a) Economic growth

According to Elbadawi and Mwega (1998), there is a growing gap, compared to other regions, between saving and investment in SSA for the last three decades (Elbadawi and Mwega, 1998, p. 4; See also Annex 1). It is noted in many studies (See for instance Levine and Renelt (1992), De Long and Summer (1993) and King and Levine (1994) all cited in Elbadawi and Mwega (1998)) that investment is the most important determinant of growth. A neoclassical production function based estimation by Yonger (1994) has also find investment, not technological progress as such, being an important explanatory variable of growth in Southeast Asia (Elbadawi and Mwega 1998).

Growth is crucial in the determination of saving because investment, which is closely linked both with growth and saving (Mwega, 1997, p. 200) links saving to growth although the causality issue (i.e., whether saving causes growth or the other way round) is not yet settled. Carroll and Weil's (1994) based on their empirical findings noted that it is growth that cause changes in the saving rate. Similar result is also reported in Mason et al (1995). Most cross-country studies that include growth in real income as a determinant of saving, as Schmidt-Hebbel *et al* (1996) noted, report a strong positive effect of income on saving. Using per capita income and its growth, Mwega (1997) also reported a positive effect of growth for a sample of LDCs used in his model. When he estimated the model for a sample of African countries only growth is found to have a significant positive effect (his other income variables, per capita income and its square, seem to show problem of multicollinearity). Our result in section four below also confirms this. Elbadawi and Mwega's (1998) empirical study shows that saving rate significantly Granger-causes the investment rate although the relationship between saving rate and economic growth is non-significant. Other studies (Dooley, Frankel and Mathieson 1987, Summers 1998, cited in Schmidt-Hebble *et al* 1996) find that there is a strong correlation between investment and saving both in developed and developing countries. However, growth is found to Granger-cause both saving and investment (Elbadawi and Mwega, 1998, p. 7). Similar result is also reported in the study by Carroll and Weil (1994).

Elbadawi and Mwega (1998) have also estimated a saving function both for a LDCs group and for SSA using different specifications (a pooled estimation with regional dummies, fixed-effect-based estimation and estimations based on GMM-IV). In the study for all LDCs, income and its growth have positive and significant effects on saving rate when the pooled model is used; with the fixed-effect model, however, they becomes statistically insignificant. When the model is estimated using the SSA data only, the effect of per capita income is found to be important (Elbadawi and Mwega, 1998, p. 19). Cross-country evidence also suggests that per capita income has a positive effect on saving rate. According to Deaton's (1990) survey, the literature on household saving in LDCs has almost uniformly found that saving will increase with 'permanent income' (See Bhall 1979, 1980 for India; Musgrave for Latin America; Muellbauer 1982 for Sri Lanka; Berancours 1971 for Chile' and Paxson 1989 for Thailand, all cited in Deaton 1990). This does not mean, however, that there is a strong link between saving and growth; similarly the evidence for good inter-temporal allocation by households is also weak (Deaton, 1990, pp. 86-87).

b) Macroeconomic instability and uncertainty

Despite the earlier outlined theoretical arguments, the evidence regarding the effect of macro-economic instability on saving is inconclusive at best. Macro-economic instability and uncertainty is found to affect private saving rate in Schmidt-Hebbel's (1994) work on explaining Africa's growth performance (See Elbadawi and Mwega, 1998, p. 12). For a sample of LDCs Masson *et al* (1995) found saving being negatively correlated with macroeconomic instability and uncertainty when inflation rate is used as proxy, although Edwards' (1995) result using Latin American countries is inconclusive (See Elbadawi and Mwega, 1998, p. 12; Mwega, 1997, p. 207). In Elbadawi and Mwega's study for a sample of LDCs, inflation is found to have statically significant negative effect in a pooled model while being insignificant in the fixed-effect model.

The empirical evidence of the effect of macro-economic instability on saving rate is therefore mixed. In SSA there is evidence that macroeconomic stability lead to a rise in deposit rates and depositors react positively to this rise as observed in Ghana and Nigeria (as noted by Nissanke an Aryeetey 1998, cited in Aryeetey and Udry, 1999, p. 24). But Mwega's (1997) result show that inflation has no significant effect. Our result in section four below also confirms this result.

3.2. Open economy aspects: Terms of trade and foreign aid

A widely used open-economy based variable for explaining saving in developing countries is foreign aid. The aid-saving debate is a well-documented issue in the aid literature. It goes back to the classic works of Griffin and his associates. Critics of Chenery and Strout's (1966) two-gap model (Griffin 1970, Griffin and Enos 1970, Weisskopf 1972), argued that foreign capital inflow (aid in particular) can be a substitute for saving and a large fraction of it is used for increasing consumption. Similar negative effect of aid on saving is also reported in the literature (Fry 1978, 1980; Giovannini, 1985; Schmidt-Hebbel, Webb and Corsetti, 1992).

Papanek (1972), on the other hand, argued that these critics took association (of low saving and high foreign capital inflow for common exogenous reasons) for causation. Boweles (1987) attempted to investigate the causality question using the 'Granger Causality' test. His analysis suggests that casual relationships are not universal and even in countries where it holds it is found to depend on the structure of aid (say, whether from bilateral and multilateral sources or not).

Gupta (1975) has used a simultaneous equation model that allows for both the direct and indirect effects of aid and suggested that the negative effect of capital inflow is grossly overestimated and the total (indirect and direct effects) may also be positive. His estimation of the saving function, however, shows a negative coefficient both with aid and foreign capital inflow in general.

Gupta (1987), however, reported the most extreme result of positive effect of foreign inflow on saving (Gupta, 1987). Giovannini (1983) found that coefficients on foreign saving for developing countries have mixed signs and are insignificant in regression equations. In a rather careful study which attempted to clean biases in the data, Boone (1994) found that the marginal propensity to consume out of aid (MPC) for ninety-seven developing countries where aid accounts less than 15% of the GNP is found to be close to one. When 15 small island SSA countries, where aid accounts for more than 15% of GNP, are included in the sample the MPC drops to 0.45 – suggesting lack of fungibility in small economies (Boone, 1994). Levy (1988) and World Bank (1994), also reported that about 40% of foreign aid goes into consumption.

In the context of SSA, Elbadawi and Mwega's (1998) work shows that the foreign aid ratio significantly Granger-causes a reduction in saving rate (the effect from saving to aid being insignificant). For a sample of LDCs and using the pooled model they found negative and significant effect of aid on saving; this significant effect, however, disappeared when a fixed-effect model is fitted to the data. In SSA the Global Coalition for Africa (1993), claims a negative and significant effect of foreign aid on domestic saving. Summarizing such evidence Schmidt-Hebbel *et al* (1994) noted that the empirical results do widely vary depending on difference in sample, model specification, estimation method as well as the extent of fungibility of the foreign resources (Mwega, 1997, p. 208). This 'aid-saving debate' has been carried for nearly three decades and is still an unsettled issue (see White, 1992, for an excellent survey).

Another open-economy based variable widely used in the empirical literature is the terms of trade (ToT). The ToT, through what is called the Harberger (1950) and Lursen-Metzler (1950) effect is expected to have a positive effect on private saving, especially when the improvement in ToT is transitory. Some empirical studies confirmed this hypothesis (See Ostry and Reinhart (1992), Bevan *et al* (1992), and Azam (1995)). The widely cited work of Bevan *et al* (1992) on Kenya noted that 60% of proceeds from the Kenyan coffee boom in the mid-1970s is saved. This is largely related to the fact that such incomes are windfalls which result from fluctuation in commodity prices (Deaton 1990). In Elbadawi and Mwega's (1998) study a growth in

the ToT has a positive and significant effect on saving rate. However, in Masson *et al* (1995) the ToT is found to be statistically insignificant. An extreme result of negative ToT effect is reported in Mwega's (1997) study.

3.3 Macro-economic policy issues

a) Fiscal policy

Corbo and Schmidt-Hebbel (1991 cited in Mwega 1997), Mwega (1997) and Elbadawi and Mwega (1998) have used public saving as explanatory variable in their saving equation. For the sample of LDCs they found negative and statistically significant effect of public saving on private saving. On the other hand, government consumption is found to have a positive and significant effect in Mwega's (1997) and Elbadawi and Mwega's (1998) studies.

One way of augmenting public saving is through taxes. It is argued that this situation brings about what is called the Ricardian Equivalence. Most empirical studies for industrial countries reject the Ricardian equivalence. Studies for developing countries also dismiss it in its pure form and agree that public saving offsets some private saving (Haque and Monties 1989; Corbo and Schmidt-Hebbel *et al* 1991; Easterly Rodrigues and Schmidt-Hebbel *et al* 1994; Edwards 1995, all cited in Schmidt-Hebbel *et al* (1996) and Masson *et al* (1995)). These results show that public saving is an effective tool in raising national saving (Schmidt-Hebbel *et al*, 1996, p. 99).

A related fiscal issue is the impact of public investment on private investment and hence saving, and if saving and investment have positive relationship. Serven and Solimano (1993), have examined the impact of public investment on private investment in developing countries and reported a positive and significant correlation in the panel data of developing countries, as well as in separate studies of Latin America and East Asia. Similar positive effect is reported for Africa in Alemayehu (2002). What the empirical evidence suggests about the impact of public investment is that different types of public investment are likely to have different kinds of effect. Empirically, such examination shows that infrastructural investment generally has a positive impact while investment by public enterprise do compete with private investment (See Easterly and Rebelo (1993) cited in Schmidt-Hebbel *et al* (1996)).

Another fiscal policy noted in the literature is the impact of taxes. As was noted earlier, in Kenya during the coffee boom of the mid 1970s, the government did not tax farmers and hence farmers converted most of the windfall into saving (Bevan *et al*

1987). As noted by Deaton (1990), however, what happened in Cote d'Ivoire is the opposite policy and all the wind-fall gains accrued to the government.

b) Financial and monetary policies

An important macro-policy variable widely cited in the literature (in particular in what is called the financial repression school of Mackinnon (1973) and Shaw (1973)) is the real interest rate. On their empirical study Gelb (1989), Fry (1988) and Mackinnon (1991) cited in Elbadawi and Mwega (1998) found real interest rate being positively and significantly correlated with economic growth. This contrasts with Masson *et al*'s (1995), and Giovannini's (1983, 1985), among others' finding that interest rate does not explain saving. Mwega (1997) has found similar result for SSA. The use of nominal or real interest rate does not change the result either (Deaton, 1990, p. 88).

Ogaki, Ostry and Reinhart (1995) find positive interest rate effects that vary with income but are still small. For a sample of LDCs, Elbadawi and Mwega (1998) found this variable having a positive and significant effect in the pooled model. It turned out to be insignificant in the fixed-effect model, however (while the spread become significant in the fixed effect model). The fixed-effect model using the data of SSA shows that the real interest rate had a positive and statistically significant effect on saving. Similar result of sensitivity of interest rate effect to model specification is reported by Blinder and Deaton (1985), cited in Deaton (1990). Other studies of saving in SSA have come up with inconclusive evidence of how interest rate influences saving (See Mwega et al 1990; Oshikoya 1992 and Azam 1996 all cited in Aryeetey and Udry 1999).

Giovannini (1985) examined the effect of expected real interest rate on consumption growth on eighteen developing countries. He noted some non-zero effect in five (India, Jamaica, Greece, Myanmar, and Turkey) and no effect in the other thirteen (Argentina, Brazil, Colombia, Indonesia, Kenya, Korea, Malaysia, Mexico, Philippines, Portugal, Singapore, Taiwan and Thailand).

Another financial variable widely used in the literature is the degree of financial depth which is usually proxied by M2 to GDP ratio. In Masson *et al* (1995) study which used cross-country regression of 64 developing countries, broad money is found to be statistically insignificant. In Elbadawi and Mwega's (1998) empirical study this variable is found to be non-significant for a sample of LDCs. Mwega (1997) also reported similar result for SSA. However, in Elbadawi and Mwega's (1998) study, it turned out to have significant positive effect when the fixed-effect model is used. Similar result is reported by Edwards (1995), both for developed and developing

countries (See also Schmidt-Hebbel *et al*, 1996, p. 103, and Mwega (1997)). On the other hand, Corbo and Schmidt-Hebbel (1991), Schmidt-Hebbel, Webb and Coosetti (1992), report negative effect of broad money on saving. Domestic credit, used as proxy for financial constraint, on the other hand is found to have significant negative effect (its potency increasing with the fixed-effect model).

The issue of credit is worth examining. It can be argued that if households are able to borrow, they may finance high return investment by borrowing rather than saving (See Birdsall *et al*, 1999). The interesting empirical question then is whether poor households are credit-constrained or not? The evidence in Deaton (1992) shows that 25 to 40% of rural households surveyed in the Cote d'Ivoire and Ghana had outstanding loans. Surveys carried out in Nigeria, Pakistan, Kenya and Tanzania indicate that 65 to 90% of households borrowed at some point during a twelve months period – most loans in these surveys being for one cropping season (Udry 1993, Alderman and Garcia 1993 and Kimuyu 1994, all cited in Birdsall *et al*, 1999). This evidence suggests that borrowing is a constraint and may limit high level of investment although it may encourage own saving. Gavin *et al* (1997), cited in Birdsall *et al*, (1999), actually found that for Latin America financial deregulation has reduced savings by eliminating credit constraint. This result is in sharp contrast with findings that noted borrowing constraints have significant and positive effect on private and national saving (See Jappelli and Pagaon (1994); Easterly, Rodriguez and Schmidt-Hebbel 1994, all cited in Schmidt-Hebbel *et al*, 1996, p. 101). This result, however, depends on the variables used. Jappelli and Pagaon 1994 for instance found significant negative effect when loan-to-asset value ratio is used; Edwards (1995) showed negative, though not significant, effect of consumer credit on private saving (See Schmidt-Hebbel *et al*, 1996, p. 103). Mwega (1997) also reported that domestic credit has no significant coefficient both for his LDC sample and for SSA. Our result in section four confirms this latter finding. Birdsall *et al* (1999) further argued, the rise in saving rate in some Asian countries such as Korea and Taiwan (and in Kenya's Central province before the late 1950s) is largely attributed to an improvement in agricultural investment opportunities to which credit constrained households, according to them, would respond by increasing labor supply, lowering consumption and increasing saving (Birdsall *et al*, 1999, pp. 12-13).

3.4 Demographic factors

Many studies about domestic saving in LDCs emphasize the effect of demographic factors. For a sample of LDCs, Elbadawi and Mwega (1998) used two demographic variables: the young-age dependency ratio and urbanization. In the pooled model

both variables have negative and statistically significant effects. This result becomes insignificant, however, when the fixed effect model is used. Comparing their estimation for LDCs with that of SSA, they noted, for SSA the dependency ratio emerged as the most important and robust contributor to the performance of high performing Asian economies relative to SSA. The dependency ratio has negative contribution especially in middle income SSA (Mwega, 1997, p. 214; Elbadawi and Mwega, 1998, p. 19). Masson et al (1995) find that demographic factors have significant negative effect for all but middle income LDCs. Others (See Harrigan, 1995, cited in Mwega 1997) noted that empirical evidence is conflicting and has not resolved the issue. Mwega (1997) reported that adverse effect of high dependency ratio on private saving appears to have little support for the sample of his LDCs.

Deaton (1989) has shown that for developing countries actual age-composition profiles are not consistent with the predictions of life-cycle theories, thereby undermining the empirical importance of the mechanism. The weakness of the life-cycle model in developing countries is also noted by Collins (1991) based on a sample of ten developing countries (See Aryeetey and Udry, 1999)

3.5 Institutional issues

According to Birdsall *et al* (1999), in some Asian countries (in Korea in particular - as opposed, say, to Brazil), public policy – which contributed to high quality, strong demand for labor and low income inequality – generated powerful incentive for the poor to invest in their children and to work more to finance that investment (Birdsall *et al*, 1999, p. 14-15).

Similarly, institutional measures, such as financial liberalization, by easing credit constraint causes a temporary stimulus to consumption. Empirical evidence in countries that have liberalized, access to consumer credit generally supports this view (See Jappelli and Pagano 1989; Bayoumi 1993; Lehmussaari 1990 and Ostry and Levy 1994 cited in Masson *et al*, 1995).

Ikhide (1996, cited in Aryeetey and Udry 1999) argues that institutional and structural constraints to saving are the major reasons for weak saving mobilization in Africa. This is compounded, he argues, by low presence of formal institutions. Extension of commercial bank branches to rural areas in five African countries covered in his study turned out to have the strongest effect on savings. Nissanke and Aryeetey (1998 cited in Aryeetey and Udry 1999) have also suggested that the fragmented nature of financial

markets in Africa tend to increase the transaction cost of moving from one segment to the other and hence could act as a disincentive for saving mobilization in Africa.

One predominant institutional feature of saving in Africa is the importance of informal saving. Deaton (1989) suggested that saving in such set up is intended to smooth consumption. Aryeetey and Udry (1999) though agree with this notion emphasize that most studies of fund utilization by such association shows that the funds are usually spent on consumer durables and for providing working capital (Miracle *et al*, 1980; Aryeetey and Gckel, 1991; Chpeta and Mkandawire, 1991, all cited in Aryeetey and Udry 1999). This informal financial sector is important because the available evidence indicate that the value of formal sector financial assets is less than half of the financial assets held by households in Africa although financial asset in general is relatively a small component of the portfolio asset held by households (See Aryeetey and Udry, 1999, p. 13).

Another structural/institutional feature noted to be important in the African context is the transport cost. Aryeetey and Gockel (1991), cited in Aryeetey and Udry 1999) have note that an average travel time of over an hour is required to reach a bank in rural Northern Ghana and the cost to such travel is about the equivalent of the prevailing minimum wage. This suggests that the incentive to save could easily be offset by the transport cost as long as the cost exceeds the return on saving. Webster and Fdler (1995 cited in Aryeetey and Udry 1999) attributed the relatively low scale of a number of microfinance arrangements in West Africa in part to the spare population in many of the rural area they serve in the Sahel - indicating that the location where access to credit is provided is important. Having the theoretical and empirical evidence discussed thus far, we have attempted our version of an empirical model in the next section.

4. New empirical results

In this section, we have attempted to offer a new empirical result. We have attempted to fit a number of models to the cross section and time series African data of the 1990-1998. To carry out the cross section analysis the following familiar formulation is followed. We have specified the modes as equation [4.1] and in matrix form as in [4.1a],

$$Y_{it} = \alpha + \beta_2 X_{2it} + \beta_3 X_{3it} + + \beta_k X_{kit} + u_{it} \quad [4.1]$$

$$y = \begin{bmatrix} i & X \end{bmatrix} \begin{bmatrix} \alpha \\ \beta \end{bmatrix} + u \quad [4.1a]$$

Where:

$$y_i = \begin{bmatrix} Y_{i1} \\ \vdots \\ Y_{im} \end{bmatrix} \quad X_i = \begin{bmatrix} X_{2i1} & X_{3i1} & \dots & X_{ki1} \\ \dots & \dots & \dots & \dots \\ X_{2im} & X_{3im} & \dots & X_{kim} \end{bmatrix} \quad u_i = \begin{bmatrix} u_{i1} \\ \vdots \\ u_{im} \end{bmatrix}$$

Y_{it} is the dependent variables, saving, for unit i in period t , $i = 1 \dots p$ and $t = 1 \dots m$

X_{jit} is the j th explanatory variable for country (unit) i $j = 2, \dots, k$

u is $n \times 1$ is the Gaussian error term

We will consider p ($p=39$) units indexed by $i = 1, \dots, p$. and m (3) time periods indexed by $t = 1, \dots, m$ giving as $n=mn$ sample points.

The estimated results of the model above are given in Tables 4.1 and 4.2. Having the basic model specified above a number of its variants are estimated by allowing different assumptions, such as common intercept and slope in Model I, intercept varying over the cross section units while maintaining common slope in Model II (fixed-effect model), and varying intercepts and common slope for all, with differential intercepts merged with the disturbance term, in model III (the random-effect model) (See Johnston 1984, Griffith et al 1993 and Baltagi 1995).

The modes are estimated using average values for 1990-92, 1993-95, 1996-98. Model I is also estimated for the year 1998 only (termed Model Ia). The data are from World Bank, African Development Indicators. Two versions of the estimated models are given in Table 4.1 and Table 4.2. The difference between the two tables being the inclusion (and exclusion) of the income variable in Table 4.1 (and Table 4.2). The income data is excluded in the version reported in Table 4.2 because (i) the estimated results are found to be sensitive when income is included, and second (ii) since the dependent variable, saving, is defined as ratio of income(GDP), the latter's inclusion as regressor gives spurious correlation. We opted for the model results reported in Table 4.2 although we offered Table 4.1 for completeness. We have complemented the cross-section result by estimating saving function for 10 individual African countries for which we have data the result of which is reported in Table 4.3.

Table 4.1: Cross section results of different models for SSA: Dependent variables gross domestic saving as % of GDP (including income as regressor)

Regressors	Model using average for 1990-92, 1993-95, 1996-98			Model I: Common Effect (la)
	Model I Common Effect	Model II Fixed Effect	Model III Random Effect (Error Component)	for 1998 only
Constant	-31.92 (-1.60)		4.2508 (0.21)	2.717 (0.06)
AgeDepP	34.25 (1.98)	11.5855 0.45	10.8969 (0.58)	31.03 (0.75)
CPII	0.0007 (0.36)	-0.0030 (-1.43)	-0.0014 (-0.86)	0.0038 (1.84)
CrPrP	-0.0001 (-1.00)	-6.26E-05 (-0.81)	-7.32E-05 (-0.99)	-0.0004 (-0.04)
CABP	0.6035 (5.18)	0.5612 (3.33)	0.5205 (4.23)	0.5544 (1.21)
DISBP	0.3633 (1.43)	0.0166 (0.08)	0.1171 (0.62)	-0.7211 (-1.53)
CgP	0.1150 (0.64)	0.3898 (1.18)	0.2185 (0.99)	-0.7569 (-1.75)
TOTI	0.0360 (1.00)	-0.0664 (-1.32)	-0.0537 (-1.19)	-0.1249 (-0.92)
M2GDPR	-0.0629 (-0.60)	-0.5715 (-2.22)	-0.2373 (-1.77)	-0.0911 (-0.44)
Percapita income	0.0173 (4.27)	-0.0007 (-0.07)	0.0142 (3.25)	0.0213 (1.56)
Percapita income²	-1.95E-06 (-2.61)	7.56E-08 (0.06)	-1.57E-06 (-2.10)	-2.79E-06 (-1.11)
<i>Observation</i>	96	96	96	25
Adjusted R²	0.61	0.87	0.87	0.72
F-test	15.76	73.34		7.1

t-values in brackets

Countries (39 Sub-Saharan Countries):

Angola Benin Botswana Burkina Faso Burundi Cameroon Cape Verde Central African Republic
Chad Comoros Congo, Rep. Cote d'Ivoire Equatorial Guinea Ethiopia Gabon Gambia,
The Ghana Guinea Guinea-Bissau Kenya Lesotho Madagascar Malawi Mali Mauritania
Mauritius Mozambique Namibia Niger Nigeria Rwanda Senegal Sierra Leone
Swaziland Tanzania Togo Uganda Zambia Zimbabwe

Variables Used:

AgeDep = Age Dependency Ratio

CPII= Consumer Price Index (given as index)

CrPrP = Private Credit as percentage of total credit

CABp= Current Account Balance (deficit), net official capital grants, as percent of GDP

DisbL = Disbursement of loan, long term and short term including IMF in current US \$

DisbP = Disbursement of loan, long term and short term including IMF, as % of GDP.

Cgp= General government consumption as % of GDP

Sp=Gross (total) Domestic Saving as % of GDP

TOTI= Terms of trade (1995=100)

M2GDPR= M2 to GDP Ratio, in percent

Data Source: World Bank, African Database (2000).

The result (see Tables 4.1 to 4.3) shows that the age-dependency ratio is found to be negative and statistically significant in all versions of the model. When income is included in the model (although income has positive coefficient), the age-dependency variable offers counter-intuitive positive sign. This perhaps points to the problem of having the denominator of the dependent variable as regressor in the same model. Another important variable found is the current account balance which is found to have statistically significant positive effect on saving in all version of the model. Similarly the M2/GDP ratio is found to be statistically significant in model I and II through the coefficients are counter-intuitive. The other variables (inflation, terms of trade, credit, government consumption and disbursement of loans) are found to be statistically insignificant.

When the saving equation is estimated for each of the ten African countries, income (and per capita income) have statistically positive coefficient in 6 (and 4) of the ten countries. The terms of trade is found to have a statistically significant value only for Senegal and Algeria. Inflation is statistically significant in 3 of the 10 countries. It has, however, the counter-intuitive positive, statically significant, coefficient for Cameroon and Cote d Ivory (while being negative for Ethiopia). The current account balance is found to have a statistically significant coefficient in 5 of the 10 cases while the M2/GDP ratio is significant only in 2 of the 10 cases (being positive for Ghana and negative for Kenya).

Table 4.2: Cross section results of different models for SSA: Dependent variables gross domestic saving as % of GDP (without the income variable)

Regressors	Model using average for 1990-92, 1993-95, 1996-98			Model I: Common Effect (Ia)
	Model I Common Effect	Model II Fixed Effect	Model III Random Effect (Error Component)	for 1998 only
Constant	43.04226 (2.33)		44.14390 (2.36)	92.9490 (2.47)
AgeDepP	-37.47064 (-2.52)	11.66366 (0.47)	-24.46440 (-1.40)	-51.9893 (-1.49)
CPII	0.000359 (0.16)	-0.003002 (-1.52)	-0.001631 (-0.98)	0.0048 (1.98)
CrPrP	-1.31E-05 (-0.10)	-6.25E-05 (-0.82)	-7.08E-05 (-0.94)	0.0012 (.011)
CABP	0.870314 (6.84)	0.557953 (3.54)	0.656281 (5.25)	1.1715 (2.92)
DISBP	0.201326 (0.67)	0.016168 (0.08)	0.061758 (0.32)	-0.8525 (-1.58)
CgP	0.650234 (3.54)	0.384125 (1.22)	0.538551 (2.39)	-0.1437 (-0.35)
TOTI	0.033795 (0.48)	-0.066716 (-1.36)	-0.070022 (-1.51)	-0.1664 (-1.05)
M2GDPR	-0.205340 (-1.72)	-0.573986 (-2.36)	-0.271377 (-1.80)	-0.2415 (-1.03)
Observation	96	96	96	25
Adjusted R ²	0.61	0.88	0.87	0.73
F-test	15.76	97.84		10.1

t-values in brackets

Table 4.3: Time-series based results for sample of countries: Dependent variables gross domestic saving as % of GDP)

Variables	Cameroon		Cote d'Ivoire		Ethiopia		Ghana		Kenya		Malawi		Nigeria		Senegal	
	Coeffi- cients	t-values	Coeffi- cients	t-values	Coeffi- cients	t-values	Coeffi- cients	t-values	Coeffi- cients	t-value	Coeffi- cients	t-value	Coeffi- cients	t-values	Coeffi- cients	t-values
Constant			29.85	(2.4)*	0.34	(8.0)*			24.1	(5.02)*			13.31	(3.4)*		
GDP	-2.5E-10	(-0.25)	15.54	(2.3)*	3.0E-055	(4.3)*	1.17E-09	(1.08)	-5.8E-10	(-0.77)	1.8E-08	(-4.2)*	1.0E-10	(0.58)	3.8E-09	(2.7)*
GDP/Pc	0.010	(0.78)	-0.012	(-2.72)*	-0.002	(-4.12)	-0.02	(-1.07)	0.03	(1.9)**	0.19	(4.1)*	0.02	(1.4)	-0.03	(-2.9)*
TOT	0.036	(1.06)	2.76	(0.52)			0.04	(1.39)	0.05	(1.11)	0.01	(0.43)	-0.08	-1.72@	0.23	(8.0)*
INF	20.23	(1.9)**	55.05	(3.54)*	-0.21	(-2.4)*							1.88	(0.33)	12.1	(1.9)
CBA	0.09	(0.39)			0.10	(0.31)	0.42	(2.6)*	0.56	(3.1)*	0.29	(2.3)*	0.54	(3.1)*	1.17	(6.6)*
M2GDP	48.01	(1.5)	-14.55	(-0.28)	0.05	(0.38)	35.6	(3.13)*	-38.3	(-1.8)**	20.9	(1.0)	29.6	(0.95)	19.1	(1.1)
n	27 (70-97)		31		33		31 (67-97)		31 (67-97)		31 (67-97)		30 (68-97)		30 (68-97)	
R2	0.38		0.59		0.71		0.39		0.30		0.57		0.47		0.81	
F-value	4.17*		7.1*		10.8*		5.9*		3.6*		8.7		5.4*		26.5*	

Table 4.3 Continued

Variables	North African Sample			
	Algeria		Egypt	
	Coeffi- cients	t-values	Coeffi- cients	t-values
Constant	31.8	(7.0)*		
GDP	13.34	(1.9)**	-9.06E-10	(-2.52)*
GDP/Pc	0.005	(2.6)*	0.06	(2.43)*
TOT	12.16	(3.0)*	0.01	(0.81)
INF	-13.9	(-0.81)		
CBA	-0.35	(-1.32)		
M2GDP	-10.21	(-1.42)	3.24	(0.53)
n	28		32 (1966-97)	
R2	0.50		0.27	
F-value	3.3*		4.8*	

5. Conclusions and policy implications

Having reviewed the determinants of saving and its linkages to various economic aggregates, the purpose of this section is to highlight the main conclusions of the theoretical and empirical evidence, including our estimated results, and to summarize their policy implications. We have also attempted to review what we know and what we do not know about saving behavior in Sub-Saharan Africa. The following points seem to emerge from the analysis.

To begin with the saving data, both at macro-economic and microeconomic levels, suffers from measurement problems. This measurement problem arises because at the macroeconomic level saving is measured as a residual of a residual, and at a micro-economic level the concept of saving, particularly in a rural based economy is complex. Hence the reliability of the data that has been used to date is questionable. This problem suggests that even when the models are correctly specified and estimated the inferences drawn from them may not be that reliable. This may partly explain the inconclusive, mixed and at times contrasting evidence found about the determinants of saving. The policy implication of this is, as is already done in few countries in Africa, encouraging household surveys based on clearly defined concepts of income, consumption and saving. Doing this in the context of a diversified portfolio of assets as observed both at the rural and urban households will help clear some of the confusions.

There is a high correlation between growth and saving. However the causality issue (whether saving causes growth or the other way round) is not yet settled. But, in general most studies seem to suggest that income growth influences saving as indicated by the statistically significant growth coefficient in saving equations. For a sample of African countries, growth is found to be the most important variable that has a significant positive effect on saving.

There is also a strong correlation between investment and saving both in developed and developing countries. Growth is found to Granger-cause both saving and investment. Many studies also noted that investment is the most important determinant of growth. In particular, it was noted that traditional theories emphasize that saving augments growth at least until the economy reaches the steady state or in the short-run; and more recent theories further suggest that saving is required to maintain a certain rate of growth even beyond the steady state. In SSA the existing empirical evidence shows that the saving rate significantly Granger-causes investment.

For developing countries in general saving is negatively correlated with macroeconomic instability and uncertainty. In SSA not many studies have been carried out to examine the issue. And the few studies that have been carried out suggest that the impact of

macroeconomic instability on saving is inconclusive. The Ricardian equivalence is rejected both for developed and developing countries. This suggests that the presumption that households smooth out consumption over a long time horizon, as suggested by the conventional theories of consumption, is unlikely to hold. Although there is conclusive evidence that households in developing countries (particularly those in SSA) are credit constraint, the effect of such borrowing constraint on saving is inconclusive. The real interest is generally found to be insignificant in terms of explaining saving in developing countries. However, the result could depend on model specification and the level of income of countries. The finding in SSA strongly supports the conclusion that real interest rates have little or no impact on saving.

Financial reform may increase the incentives to save, but its overall effect is not clear. In addition to the interest rate aspect of this, the availability of credit argument has yet to get supporting evidence that it augments saving. Financial depth, proxied by M2/GDP ratio, is found to be inconclusive both for developing countries in general as well as for a sample of SSA countries.

In developing countries, including those in SSA countries open-economy related variables in particular, foreign aid is found to have a statistically significant negative effect on domestic saving, with only few contrasting results. For developing countries in general and for SSA countries in particular, Terms of Trade (ToT) is found to have a statistically significant positive effect on saving particularly in the short-run, but its long-term effect is ambiguous.

Demographic and institutional factors are found to be important. The dependency ratio, both in developing countries in general and in SSA countries in particular, is found to have a statistically significant negative effect. This underscores the importance of placing an appropriate population policy to enhance saving rates. Addressing institutional (through sensible policies such as formalization of the informal sector), and structural problems (such as infrastructural provision and efficient and relevant education policy) is also noted in the empirical literature as influencing saving mobilization.

To Sum-up, the following variables are empirically found to be the most important determinants of saving in developing countries including those in SSA. Saving is positively related to income level or growth, rate of investment, and short-run changes in terms of trade. On the other hand, more often than not it is negatively related to macroeconomic instability, foreign aid, and age-dependency ratio. We hope the points raised thus far help to chart an appropriate policy to raise the level of saving.

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Annex 1

Table 1: Gross domestic investment as share of GDP (%)

	1990	1991	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
[East and Southern Africa]	17.0	16.4	15.1	15.8	17.6	18.3	18.9	17.0	18.1	17.3	17.1	17.0
[North Africa]	28.4	26.6	25.6	23.4	22.9	22.8	20.6	22.6	25.9	25.8	24.3	24.4
[West Africa]	15.1	17.7	16.6	18.1	18.7	17.7	16.8	18.8	21.7	20.4	18.4	20.5
[All Africa]	19.7	19.2	17.2	16.6	17.3	17.1	19.3	18.0	16.8	17.9	21.6	21.0
[Sub-Saharan Africa]	16.4	16.8	15.6	16.4	17.9	18.2	18.3	17.5	19.2	18.3	17.5	18.1
[Sub-Saharan Africa excl. South Africa]	15.9	16.9	16.3	17.3	18.9	18.3	18.9	18.2	21.0	19.9	18.8	19.9

Source: World Bank (2004), World Bank African Database CD-ROM.

Table 2: Gross domestic savings as share of GDP (%)

	1990	1991	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
[East and Southern Africa]	18.4	16.5	14.3	15.2	16.6	16.3	17.6	14.7	14.3	15.1	17.3	17.0
[North Africa]	22.3	24.5	23.0	20.0	18.0	17.9	19.1	21.3	19.8	21.8	25.1	24.9
[West Africa]	18.3	18.3	15.1	14.2	18.1	17.6	23.8	20.3	17.1	16.6	24.1	21.6
[All Africa]	19.7	19.2	17.2	16.6	17.3	17.1	19.3	18.0	16.8	17.9	21.6	21.0
[Sub-Saharan Africa]	18.4	17.0	14.6	14.9	17.0	16.7	19.4	16.3	15.1	15.6	19.4	18.4
[Sub-Saharan Africa excl. South Africa]	15.5	13.9	11.4	11.5	14.9	14.7	19.8	15.1	13.2	13.5	20.1	17.9

Source: World Bank (2004), World Bank African Database CD-ROM.