academicJournals

Vol. 6(8), pp. 363-375, August, 2014
DOI: 10.5897/JDAE12.152
Article Number: 3468BE446195
ISSN 2006-9774

http://www.academicjournals.org/JDAE

Journal of Development and Agricultural Economics

Full Length Research Paper

Impact of macroeconomic policies on poverty alleviation in Sub-Saharan African countries

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Received 30 October 2012; Accepted 5 June, 2014

The objective of this paper is to examine the relationship between macroeconomic variables and poverty alleviation in Sub-Saharan Africa, by applying descriptive illustration and weighted least square (WLS) regression econometric analysis using the multidimensional poverty index (MPI) taken from the oxford poverty and human development initiative (OPHI) as dependent variable. Furthermore, principal component analysis (PCA) was performed to avoid multicollinearity problems and to improve the estimation power of the regression. Long-term annual gross domestic product (GDP) growth trends were analysed by dividing countries into four groupings, namely upper income, lower middle income, lower income and conflict countries. The results show that post-conflict nations experience good progress in economic growth. With the exception of the ratio of government expenditure to GDP (GEXPGDP), foreign direct investment, net inflows (% of GDP) (INFGDP), agriculture, value added (% of GDP) (AGR.GDP) and the Gini coefficient (GINICOEF) (not significant and not reported), all other variables were found to be statistically significant at the specified significance level. Furthermore, population growth (annual %) (POPGRWTH) holds greater positive magnitude, and shows that economic growth is moving at a slower pace compared to population growth, which complicates the economic development agenda on this continent. The major factors limiting growth are restrictive fiscal policy, contractionary monetary policy in most countries, and balance of payments constraints. Furthermore, it is important to improve local capabilities and inter-firm linkages, thus achieving well-managed privatisation, while it is equally important to have subsidies reaching the poor.

Key words: Sub-Saharan Africa, multidimensional poverty index (MPI), macroeconomic variables, poverty alleviation.

INTRODUCTION

Since poverty is not an easy concept to define, there is a wide range of definitions influenced by different disciplinary approaches and ideologies. The dominant Western definition since World War II has defined poverty in monetary terms, using levels of income or consumption as measurements (Grusky and Kanbur, 2006) and defining the poor by a headcount of those who fall below a given income/consumption level or 'poverty line'

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(Handley et al., 2009). Subramanian (1997) subsequently devised a multidimensional definition comprising the basic needs approach (Streeton et al., 1981; Handley et al., 2009), the capabilities approach (Sen, 1999; Handley et al., 2009) and the human development approach (UNDP, 2006). The acceptance thereof is reflected in the widespread use of the human development index (HDI) of the United Nations development programme (UNDP), which is a composite measure of three dimensions of human development, namely: (i) life expectancy, (ii) educational attainment and (iii) standard of living, measured by income in terms of its purchasing power parity (UNDP, 2006). The conceptualisation of HDI is used in this paper to define poverty.

Sub-Saharan Africa (SSA) is afflicted by many forms of poverty, with HDI scores in most SSA countries having stagnated or declined since 1990, making this region the poorest in the world. Indeed, 28 of the 31 low human development countries are in SSA (UNDP, 2006). An analysis of income poverty is similarly disappointing in that since 1990, income poverty has fallen in all regions of the world except SSA, where there has been an increase in both the incidence and the absolute number of people living in income poverty. This sees some 300 million people in SSA almost half the region's population living on less than US$1 per day (UNDP, 2006).

While the rest of the world has made significant progress towards poverty alleviation, Africa in particular Sub-Saharan Africa continues to lag behind. This trend is projected to increase unless preventative measures are taken. Many factors have contributed to this trend, including the high prevalence of HIV/AIDS, civil war and the associated strife and poor governance, frequent drought and famine, and agricultural dependency on the climate and environment. Food security on the continent has worsened since 1970, and the proportion of the population this is malnourished in SSA has remained within the 33 to 35% range (Velde et al., 2004). The prevalence of malnutrition within the continent varies by region, being lowest in Northern Africa (4%) and highest in Central Africa (40%) (Mwaniki, 2009). Over 70% of the food insecure population in Africa lives in the rural areas. Ironically, smallholder farmers, the producers of over 90% of the continent's food supply, make up the majority (50%) of the food insecure population, while the remainder consists of the landless poor in rural areas (30%) and the urban poor. Food security has three aspects, namely food availability, food access, and food adequacy (Mwaniki, 2009).

To date, regardless of the intensity of development programmes, very little has changed in SSA economies in the past 10 years Although food aid, technical arrangements, and financial and other humanitarian assistance continue to flow in from the developed countries to SSA, problems of drought, famine, inflation, international debt and unemployment continue to escalate. The existing social and infrastructure facilities such as health, education, transportation and many other institutional structures are relatively weak and inadequate (Velde et al., 2004).

According to the 2010 ranking of the top 47 poorest countries worldwide, 32 of those are in SSA. Although the global headcount is between $1.25 and $2.00/day, the multidimensional poverty index (MPI) is considered below $1.50/day poverty line. Niger, Ethiopia and Mali, at 93, 90 and 88% respectively, are the top three countries on the list (Alkire and Santos, 2010).

Therefore, the objective of this paper is to test the impact of macroeconomic policies on the variables of poverty alleviation in SSA. The paper is divided into two main parts: First, the growth performance of SSA is illustrated and described, while the poverty situation is quantified with reference to the MPI, and some of the main reasons for Africa's stagnation in economic development are pointed out. Thereafter, the relationship between the MPI and different macroeconomic variables was tested.

This paper thus gives insight into the areas where research and attention by policy makers and donors are likely to prove more valuable at this point in time. This result is therefore partial rather than comprehensive; it is an agenda focusing closely on the non-macroeconomic factors constraining Africa's poor.

Problem statement and motivation of the study

Economic growth does not come risk-free. Although material progress can be measured by the growth in national output, income and spending, the rapid economic growth of developed countries is accompanied by several short-term and long-term problems (Riley and Eton, 2006), including inflation risks, inequalities and regional disparities. The idea of economic degrowth amongst rich nations is emerging as a response to the triple crisis (environmental, social and economic); it did not appear out of the blue. Sustainable degrowth may be defined as an equitable downscaling of production and consumption that increases human wellbeing and enhances ecological conditions at the local and global level, over both the short and long term (Rull, 2010).

However, according to Weeks (2009), the major causes of growth instability in SSA are: (1) Fluctuations in the terms of trade, which impact directly on aggregate demand via export and import prices, thus affecting the fiscal balance through trade taxes, and tightening or loosening the balance of payments constraint; (2) variations in weather that largely determine the performance of rain-fed agriculture in a region where irrigation is limited; and (3) Low investment confidence towards SSA (mainly due to perceptions of poor quality of governance, legal protection of private property, and institutional limits on leaders). Therefore, the study is directive from a policy perspective, as macroeconomic

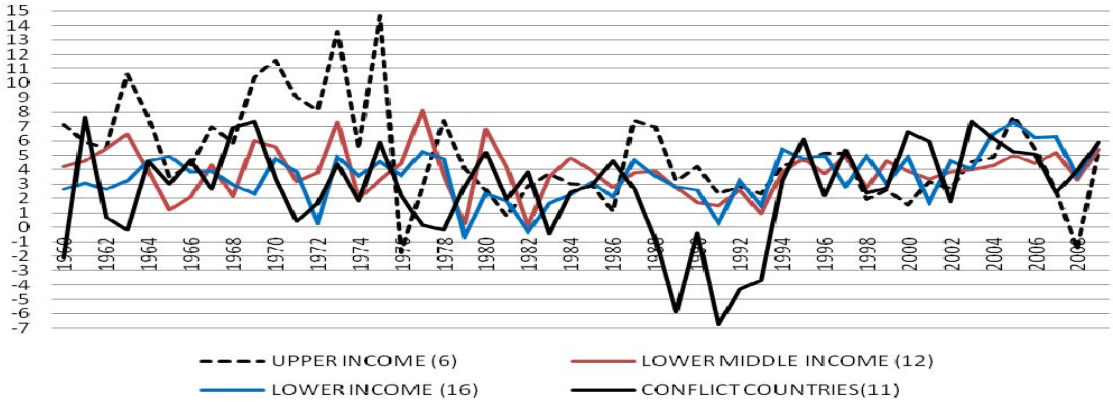

Figure 1. GDP annual percentage growth for SSA, 1960 to 2010. Source: Own representation based on World Bank dataset (2012) dataset.

policy constitutes an important element in the government's efforts to boost the underlying supply capacity of the economy. From a research perspective, the empirical results of this study would be timeous, as SSA affords the opportunity for an in-depth case study on account of significant variations in trade policy orientation and productivity performance across economies. In addition:

1. This is the time when most African nations are showing progress in governance and democracy exercises;
2. This is the time that Africa is encountering a number of challenges, such as climate change, high rates of transmitted diseases (such as HIV/AIDs), and requiring different strategies;
3. This is also the time when there is a need for sustainability to address the triple crisis (economic, social and environmental) using effective and efficient policy instruments; and
4. As mentioned above, if developed nations are willing to downscale their production and consumption to increase human wellbeing and enhance ecological conditions, this will have certain implications for Africa.

METHODOLOGY AND DATA

A descriptive illustration and weighted least square (WLS) regression econometric analysis was applied to build the influence of variables in the modelling. Descriptive statistics were used to assess differences in the basic characteristics of the macroeconomic variables that can influence or affect the MPI. Furthermore, principal component analysis (PCA) was performed to avoid multicollinearity problems and to improve the estimation power of the regression. Out of 21 variables, PCA extracted 12 variables relevant to the analysis. The econometric equation is constructed as follows:

$$MPI = \alpha_1 EXDEBTG + \alpha_2 GEXP.GDP + \alpha_3 INFL.GDP + \alpha_4 GDPGRWTH + \alpha_5 SAVGRWTH + \alpha_6 CREDP.GDP + \alpha_7 MILL.GDP + \alpha_8 TRAD.GDP + \alpha_9 AGR.GDP + \alpha_{10} HELTH.GDP + \alpha_{11} POP.GRWTH + \alpha_{12} GINICOEF + e$$

Where: MPI is as calculated for 104 developing countries by Alkire and Santos (2010) in the oxford poverty and human development initiative (OPHI). This is identified the first multidimensional poverty estimation using micro datasets (household surveys) for such a large number of countries, covering about 78% of the world's population. The MPI has the mathematical structure of one of the Alkire and Santos poverty multidimensional measures and is composed of 10 indicators, corresponding to the same three dimensions as the HDI: Education, Health, and Standard of Living. The MPI captures a set of direct deprivations that afflict a person at the same time. This tool could be used to target the poorest, to track the millennium development goals, and to design policies that directly address the interlocking deprivations experienced by the poor.

The MPI reveals the combination of deprivations that afflict a household at the same time. A household is identified as multi-dimensionally poor if, and only if, it is deprived in some combination of indicators with a weighted sum of 30% or more of the dimensions. The dimensions, indicators and deprivation criteria are contained in the Appendix. The MPI is the product of two numbers: Headcount (H), or percentage of people who are poor, and average intensity of deprivation (A), reflecting the proportion of dimensions in which households are deprived. Alkire and Santos show that this measure is very easy to calculate and interpret, is intuitive yet robust, and satisfies many desirable properties.

The independent variables sourced from the World Bank (2012) database were those relevant variables extracted by PCA, namely: External debt stocks (% of GNI) (EXDEBTG), Government expenditure ratio to GDP (GEXPGDP), Foreign direct investment, net inflows (% of GDP) (INFGDP), GDP growth (annual %) GDPGRWOTH, Gross domestic savings (% of GDP) (SAVGRWTH), Domestic credit to private sector (% of GDP) (CREDP.GDP), Military expenditure (% of GDP) (MILL.GDP), Trade (% of GDP) (TRAD.GDP), Agriculture, value added (% of GDP) (AGR.GDP), Health expenditure, total (% of GDP) (HELTH.GDP), Population growth (annual %) (POPGRWTH), Gini coefficient (GINICOEF), and Error term.

RESULTS AND DISCUSSION

Figure 1 illustrates the 1960 to 2010 growth performance for four groupings of countries in the region: conflict-affected countries (11), non-conflict lower-middle-income countries (12), upper-income countries (6), and non-conflict

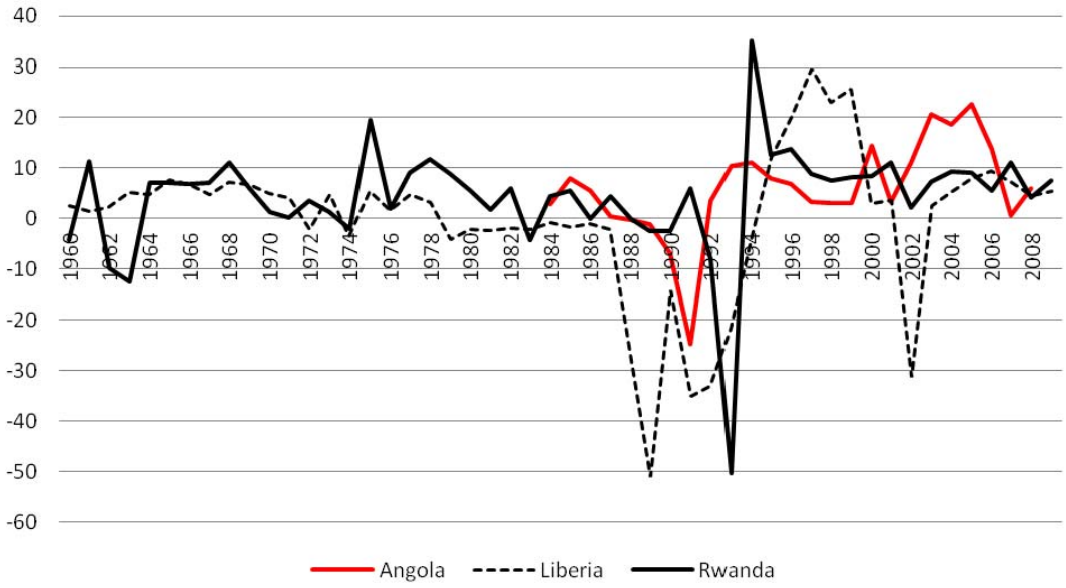

Figure 2. GDP annual percentage growth among conflict-history countries (Angola, Liberia and Rwanda), 1960 to 2010. Source: Own representation based on World Bank (2012) dataset.

low-income countries (16).

In the upper-income categories, Botswana's growth gave a misleading impression of significant improvement; however, Botswana showed exceptional growth performance of 21 to 26 % from 1970 to 1972 and again in 1987. According to a study by Maipose (2008), this was mainly due to the following reasons:

1. From 1975 to 1989, known as the second period in the history of Botswana, and characterised by the end of colonial rule, Botswana experienced the introduction of a multiparty democratic system of government under the inherited market-based economy, as well as the integration of traditional institutional structures into modern institutions, underlined by a policy stance that sought to maximise the flow of foreign capital, aid and private investment, resulting in the moderate growth of the time; and
2. The third period, covering the whole of the 1990 and the new millennium (though overlapping to some degree with the end of the 1980s), saw the start of a new policy environment, signalling the end of the state-led development strategy and a new reorientation towards private-sector-led development with the emphasis on economic diversification, export competitiveness, and privatisation options (Maipose, 2008).

The records for the low-income group of 16 countries fluctuate less than 5%, with the exception of the period 2006 to 2007, with growth of around 6% (Figure 2). This result was not a true reflection of the whole low-income grouping of SSA; rather it was the result of good economic growth in Guinea in 2006 and 2007 (22 and 18% respectively). Growth in per capita income averaged a mere 0.2% during the 1990s, rising to only 1.2% from 2000 to 2005. This lacklustre performance underscores the need for more expansionary and investment-focused macroeconomic policies. The recovery of gross domestic product (GDP) growth in conflict-affected countries, specifically after 1992, shows the annual GDP growth trend in most of those countries catching up with the rest of Africa's groupings, mainly due to certain policy changes. On the other hand, middle-income countries have been showing a drop in performance since 1994, while only modest improvements have been observed in low-income countries.

Figures 3 show the global debt as a percentage of GDP. As indicated in Figure 3, the majority of the countries' debt-to-GDP ratio is very high. The rationale behind acquiring high debt in most SSA countries is that it is believed to: (i) promote private consumption; (ii) promote public investment; (iii) increase total factor productivity (TFP), and (iv) raise sovereign long-term nominal and real interest rates. As a result, the government policy perspective is geared towards financial injections to support longer-term economic growth, but this policy becomes unsustainable and dangerous and may lead to a collapse in the economic prospective of nations and the wellbeing of societies.

The SSA international debt situation is growing ever more serious, while military expenditure is increasing simultaneously. According to WFP (2009) records, SSA remains the top food-aid receiver worldwide. Erratic climatic conditions along with other problems have placed SSA economies in the vicious cycle of economic underdevelopment (Figure 4). Worst of all, existing

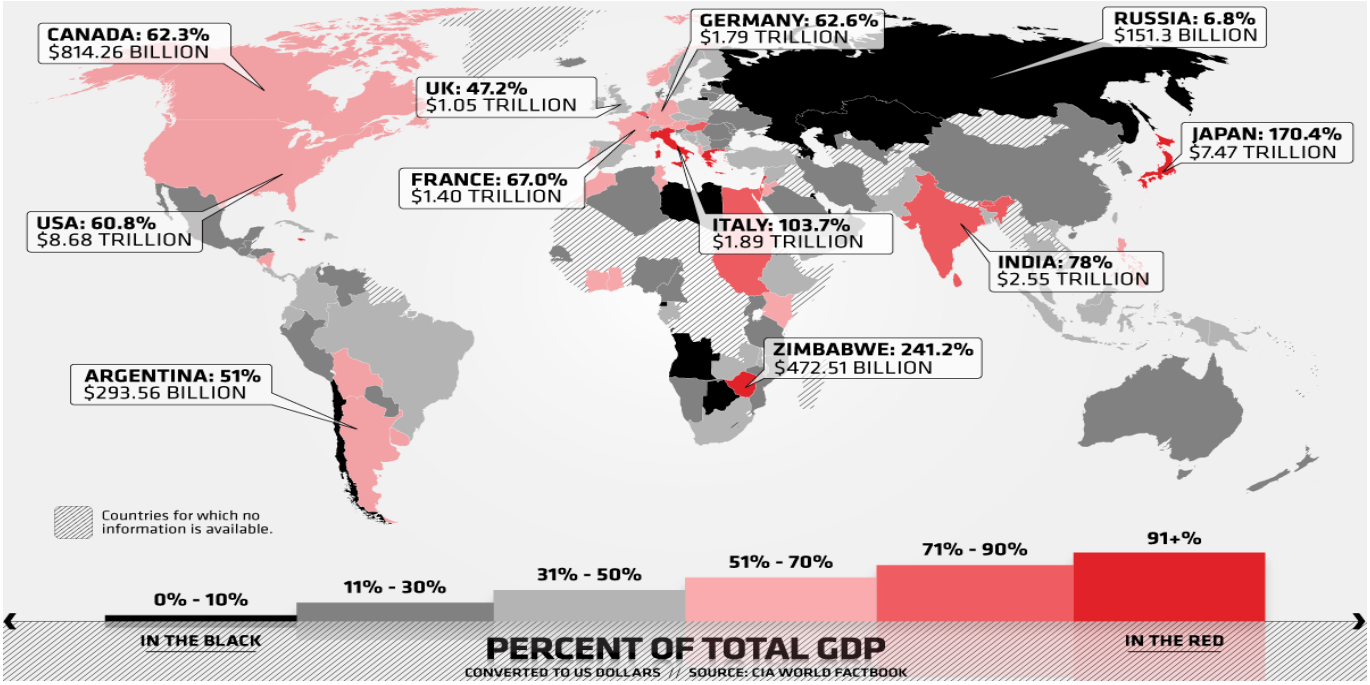

Figure 3. National debt by country, 2009. Source: CIA (2012).

ambitions of war and a lack of effective and efficient policies for development planning make SSA the front runner for a triple crisis (environmental, social and economic). The crucial questions are therefore: Why has economic development policy and cultural change been so difficult to attain in SSA? What might have gone wrong? Have the problems associated with SSA economic theory been diagnosed incorrectly, or have economic theories of development been applied incorrectly? Or are there other factors that have not yet been explored or identified that need to be addressed through other appropriate policies? And where does Africa go from here?

Some of the main reasons for Africa's stagnation in economic development can be summarised as follows:

1. Good leadership, as a prerequisite for economic growth, includes the need to create a secure environment for property, political stability, social harmony, and a respected legal code that protects the rights of owners. Additionally, SSA nations need to offer infrastructure such as roads, ports, airports, railways, electricity, water, telecommunications, and a well-educated and skilled labour force (Friedman, 2006; Sandbrook, 1985). However, the majority of African states have failed to supply the aforementioned basic services, and little has been done thus far in this regard (Mills, 2010);
2. Failure to diversify out of primary product exports led to serious policy failures in poor countries following independence. In 1950, SSA accounted for 3% of world exports, but five decades later that share had dropped to 1.5% (Mills, 2010). For example, although oil revenue in Nigeria increased by 885% over 35 years, the number of people living on less than $1 per day increased by 535%, which means an annual increment of 25% and 15%, respectively. In addition, SSA is a net importer of food, whereas Asia and Latin America have doubled or tripled their agricultural production over 30 years. Another example of policy failure is Zambia, which saw a number of sectors collapse due to poor government policy choices, such as: i) government investing in certain sectors rather than acting as a regulatory body; and ii) government later privatising those sectors while the industries were still in their infancy (Mills, 2010);
3. Notable structural factors include political and ethnic bias, excessive control of political power, economic policies that are discriminatory to the poor (Bates, 2003), and ineffective conflict resolution mechanisms with regard to disputes;
4. According to Ayittey (1998), many indebted African countries have a debt service ratio of about 40%, meaning that for every US dollar earned on exports of domestically produced goods, 40% go towards servicing the debt, while the rest goes towards covering imports, military expenditure, production improvements, education, healthcare and other expenses; and
5. African governments were pushed/forced by international monetary fund (IMF) policies to take certain actions that were not domestically feasible.

To support the above arguments from the empirical evidence, the study applied econometric equations to test

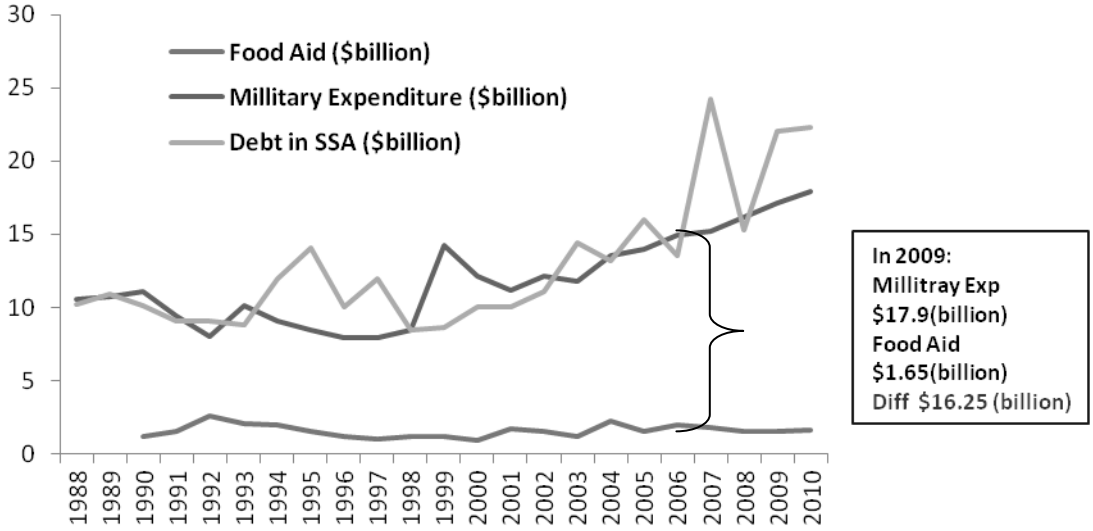

Figure 4. Comparison of debt, food aid and military expenditure in SSA, 1988 to 2010. Source: Own representation based on IMF and UNDP data.

Table 1. Macroeconomic factors influencing levels of poverty in Sub Saharan Africa: Weighted Least Square (2009).

Coefficients	B	Std Error	Beta	t	Sig "t"
EXDEBTG	0.001	0.001	0.096	0.795***	0.095
GEXPGDP	-0.001	0.002	-0.071	-0.478	0.638
INFLGDP	0.001	0.003	0.033	0.240	0.812
GDPGROWTH	0.014	0.007	0.249	1.964***	0.062
SAVGRWTH	-0.003	0.001	-0.634	-2.244**	0.035
CREDP.GDP	-0.004	0.002	-0.262	-2.175**	0.041
MILL.GDP	-0.057	0.020	0.440	2.908*	0.008
TRAD.GDP	-0.003	0.001	-0.727	-0.339*	0.003
AGR.GDP	0.002	0.002	0.211	1.110	0.279
HELTH.GDP	-0.014	0.006	-0.288	-2.250	0.0358
POPGRWTH	0.102	0.025	0.445	4.080	0.001
GINICOEF	0.138	0.169	0.097	0.816	0.423
(Error Term)	0.512	0.174		2.936	0.008
R -Square					0.800
Adjusted R Square					0.692
ANOVA					0.00
F-test					7.36
No. of Observations					34

*, ** and *** significance level at 1, 5 and 10% respectively.

the hypothesis to 34 SSA countries. After conducting the necessary statistical tests, including the relationship among the macroeconomic variables and key determinants/attributes that can contribute to MPI in the SSA region, the ordinary least square (OLS) econometrical model was applied to the cross-sectional 2009 dataset of the World Bank related to MPI. Furthermore, due to the presence of heteroscedasticity and multicollinearity, WLS was the selected estimator.

As shown in Table 1, the overall adjusted explanatory power for export determinants was estimated at 69%. The ANOVA result shows that it is significant at the 1% level, suggesting that there is a linear relationship among the variables (Table 1). With the exception of FEXPGDP, INFLGDP, AGR.GDP and GINICOEF (not significant and not reported in Table 1), all other variables were found to be statistically significant at the specified level of significance. Furthermore, all variables were found to hold the expected sign. However, POPGRWTH was determined to hold a greater positive magnitude of its

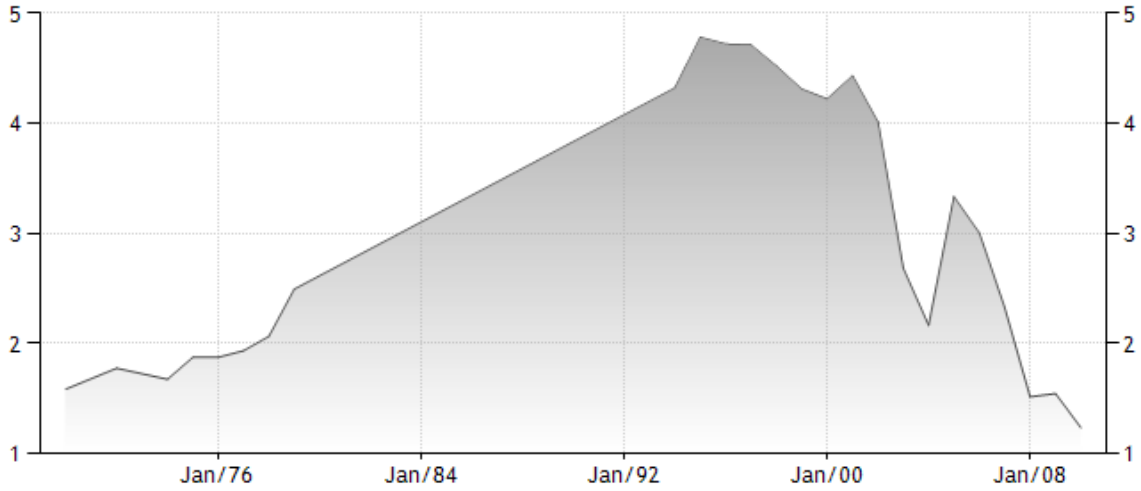

Figure 5. Total debt service (% of GNI) in SSA. Source: World Bank (2012).

estimated coefficient at 0.102, showing that population growth is the greatest challenge to economic growth in SSA.

External debt ratio to GDP (EXDGDP) was found to be significant at 10% and positive, thus implying that external debt contributed significantly to the MPI in SSA (Figure 4). The long-term debt crisis, along with a multitude of other problems, has crippled economic growth in SSA. The World Bank (2012) reported some good news, with debt servicing showing a significant improvement, amounting to 4.6% of GNI in 1996 to 1997. This is due to substantial external debt relief, which has liberated fiscal space in SSA (Figure 5). The IMF (2011) reported that deficits have been increased beyond sustainable medium-term paths; these should be revisited so that policy buffers can be restored. Whereas output remains well below potential, there is a strong case for fiscal policy to help sustain demand in the near term, subject to financing availability.

The four core components of macroeconomic policy that can drive higher GDP growth include government spending, investment spending, savings, and trade balance. This model shows that the first two variables were found not to be significant, meaning that these variables do not play a role in driving higher economic growth, whereas the second two (savings and trade balance) were found to be negatively related and significant at 5 and 1%, respectively. However, the annualised GDP growth is at a very slow pace compared to population growth, implying that SSA economic growth is not growing at the same pace as population growth to support poverty reduction strategies in SSA. According to a recent IMF (2011) report, the limited integration of many countries in the region into the global economy may have helped, but only marginally. Previous (milder) global economic slowdowns had a much more damaging impact. This time, the global downturn was much sharper, but the dislocation was far less. The main factor distinguishing this slowdown from previous cycles has been the stronger macroeconomic position of most countries in the region.

The credit to private sectors ratio to GDP (CREDP.GDP) is negatively related to MPI and is significant at 5%, implying that there is improvement in credit access to private sectors, which can stimulate trade and investment and thereby have a positive impact on good economic growth performance. Military expenditure showed a negative and significant influence at 1% to the MPI, thus implying that if SSA can reduce military expenditure, resources could be redirected to other basic services, such as health, education and R&D, which would best support economic growth. As reported by the World Bank (2012), military expenditure as a percentage of GDP in SSA accounts for 1.57%, whereas there is zero allocated budget for R&D. Additionally, Figure 4 shows a comparison between the military expenditure (estimated at $25 billion) and food aid (estimated at $1.65 billion) in SSA in 2009. Reducing the military budget would have allowed SSA to fill the food deficit from its own resources.

Conclusions

The objective of this paper is to test the relationship between macroeconomic variables and poverty alleviation in SSA. The study applied descriptive analysis and a WLS econometric model to test the relationship between the MPI and basic macroeconomic variables, and further applied PCA to extract the relevant variables that explain the dependent variable (MPI) (Annexure Figure A1 to A5). The paper analysed some of the key trends of macroeconomic variables, and further tested the relationship between macroeconomic indicators and the MPI.

With the exception of GEXPGDP, INFLGDP, AGR.GDP and GINICOEF (not significant and not reported) all other variables was found to be statistically significant at the specified significance level. Furthermore, all variables were found to hold the expected sign. However, POPGRWTH was found to hold greater positive magnitude with an estimated coefficient of 0.102, showing that economic growth is moving at a slower pace than population growth, thus complicating the economic development agenda on the continent.

The major causes of instability in economic growth for SSA can be summarised as: (i) fluctuations in the terms of trade, which impact directly on aggregate demand via export and import prices, affecting the fiscal balance through trade taxes, and tightening or loosening the balance of payments constraint; and (ii) variations in weather, which largely determine the performance of rain-fed agriculture in a region where irrigation is limited. Both these factors are beyond the direct management of SSA governments in the short and medium term, although the effect of the latter could be reduced in the long run by structural changes in the agricultural sector.

The simplest element to specify is how to raise the economic growth rate. Setting aside exogenous factors such as weather effects, the major limitations to more rapid growth are: (1) restrictive fiscal policy; (2) contractionary monetary policy in most countries; and (3) a balance of payments constraint. Furthermore, it is important to improve local capabilities and inter-firm linkages in view of achieving well-managed privatisation, while subsidies to reach the poor are equally important.

It is highly recommended that SSA countries have effective human capital policy, improved infrastructure and good governance, thus:

1. Human capital policy, investing in education and health, focusing on quality and outreach for the poorest, e.g. by providing public goods and institutions;
2. Infrastructure, enabling the poorest to take part in growth opportunities as a result of trade liberalisation, e.g. by providing infrastructure;
3. Addressing asset and income inequality directly through redistribution via transfer and safety nets; and
4. Good governance, focusing on institutions and other factors that drive pro-poor policies and outcomes.

Lastly, it is important for SSA countries to manage debt crises properly, to reduce military expenditure, to improve conflict resolution mechanisms, to invest more in basic services and to emphasise R&D as a means to focus on export orientation capacity.

Conflict of Interests

The author(s) have not declared any conflict of interests.

REFERENCES

Alkire S, Santos ME (2010). Acute multidimensional poverty: A new index for developing countries. OPHI Working p. 38. Oxford: OPHI.

Ayittey G (1998). Africa in chaos. New York, NY: St. Martin's Press.

Bates R (2003). Rental havens and protective shelters. In: T. Young (Ed.). Readings in African Politics. London: International African Institute, pp. 16-23. PMid:14615955

CIA (Central Intelligence Agency) (2012). World Fact Book. Available online at: http://www.creditloan.com/infographics/national-debt-vs-gdp/ (Accessed on 25 April 2012).

Friedman T (2006). The world is flat: A brief history of the twenty-first century. New York, NY: Macmillan.

Grusky D, Kanbur R (2006). Introduction: The conceptual foundations of poverty and inequality measurement. In: D. Grusky & R. Kanbur (Eds.). Poverty and inequality. Stanford: Stanford University Press.

Handley G, Higgins K, Sharma B, Bird K, Cammack D (2009). Poverty and poverty reduction in Sub-Saharan Africa: An overview of the issues. Working London: Overseas Development Institute, P. 299.

International Monetary Fund (IMF) (2011). World Economic Outlook: September 2011. Washington, DC: IMF.

Maipose GS (2008). Policy and institutional dynamics of sustained growth in Botswana. Available online at: www.growthcommission.org/storage/cgdev/.../gcwp035web.pdf (Accessed on 16 May 2012).

Mills G (2010). Why Africa is poor and what Africans can do about it. Johannesburg: Penguin.

Mwaniki A (2009). Achieving food security in Africa: Challenges and issues. Available online at: www.un.org/africa/.../Achieving %20Food %20Security %20in %20Afr (Accessed on 7 May 2012).

Riley G, Eton C (2006). Costs and benefits of economic growth. Available online at: http://tutor2u.net/economics/revision-notes/a2-macro-economic-growth-costs-benefits.html (Accessed in May 2012).

Rull V (2010). The candid approach. EMBO Rep. 11:14-17. http://dx.doi.org/10.1038/embor.2009.261 PMid:20010801 PMCid:PMC2816632.

Sandbrook R (1985). The politics of Africa's economic stagnation. Cambridge: Cambridge University Press. http://dx.doi.org/10.1017/CBO9780511558931

Subramanian S (1997). Measurement of inequality and poverty. Oxford: Oxford University Press. PMCid:PMC158335

United Nations Development Programme (UNDP) (2006). Human Development Report 2006: Beyond scarcity – Power, poverty and the global water crisis. New York, NY: UNDP.

Velde DW, Warner M, Page S (2004). Growth and investment in Sub-Saharan Africa. London: Commission for Africa Overseas Development Institute.

Weeks J (2009). Forty years of ODA and conditionality in Africa. London: School of Oriental and African Studies.

World Food Programme (WFP) (2009). Food and aid flows. Available online at: www.wfp.org/fais/. (Accessed on 30 April 2012).

World Bank (2012). http://www.tradingeconomics.com/sub-saharan-africa/total-debt-service-percent-of-gni-wb-data.html. (Accessed on 16 May 2012.

ANNEXURE

Variables used in calculating MPI

1. Health (each indicator weighted equally at 1/6):

- **Child Mortality:** If any child has died in the family;
- **Nutrition:** If any adult or child in the family is malnourished.

2. Education (each indicator weighted equally at 1/6):

- **Years of Schooling:** If no household member has completed 5 years of schooling;
- **Child School Attendance:** If any school-aged child is out of school in years 1 to 8.

3. Standard of Living: (each of the six indicators weighted equally at 1/18):

- **Electricity:** If household does not have electricity;
- **Drinking Water:** If it does not meet MDG definitions, or is more than 30 min walk;
- **Sanitation:** If it does not meet MDG definitions, or the toilet is shared;
- **Flooring:** If the floor is dirt, sand or dung;
- **Cooking Fuel:** If the household cooks with wood, charcoal or dung;
- **Assets:** If the household does not own more than one radio, television, telephone, bicycle, motorbike or refrigerator, and does not own a car or truck.

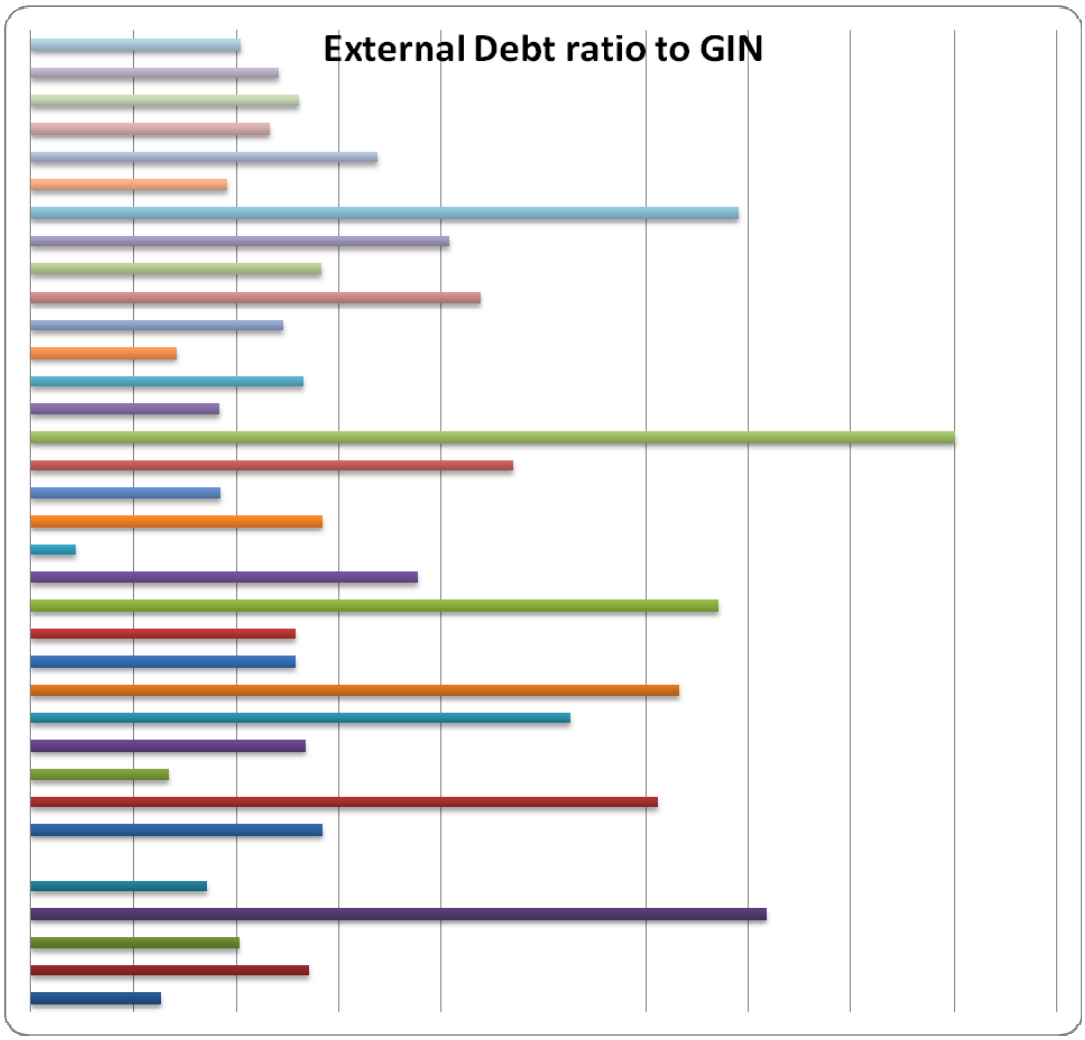

Figure A1. External debt ratio to GNI, 2009.

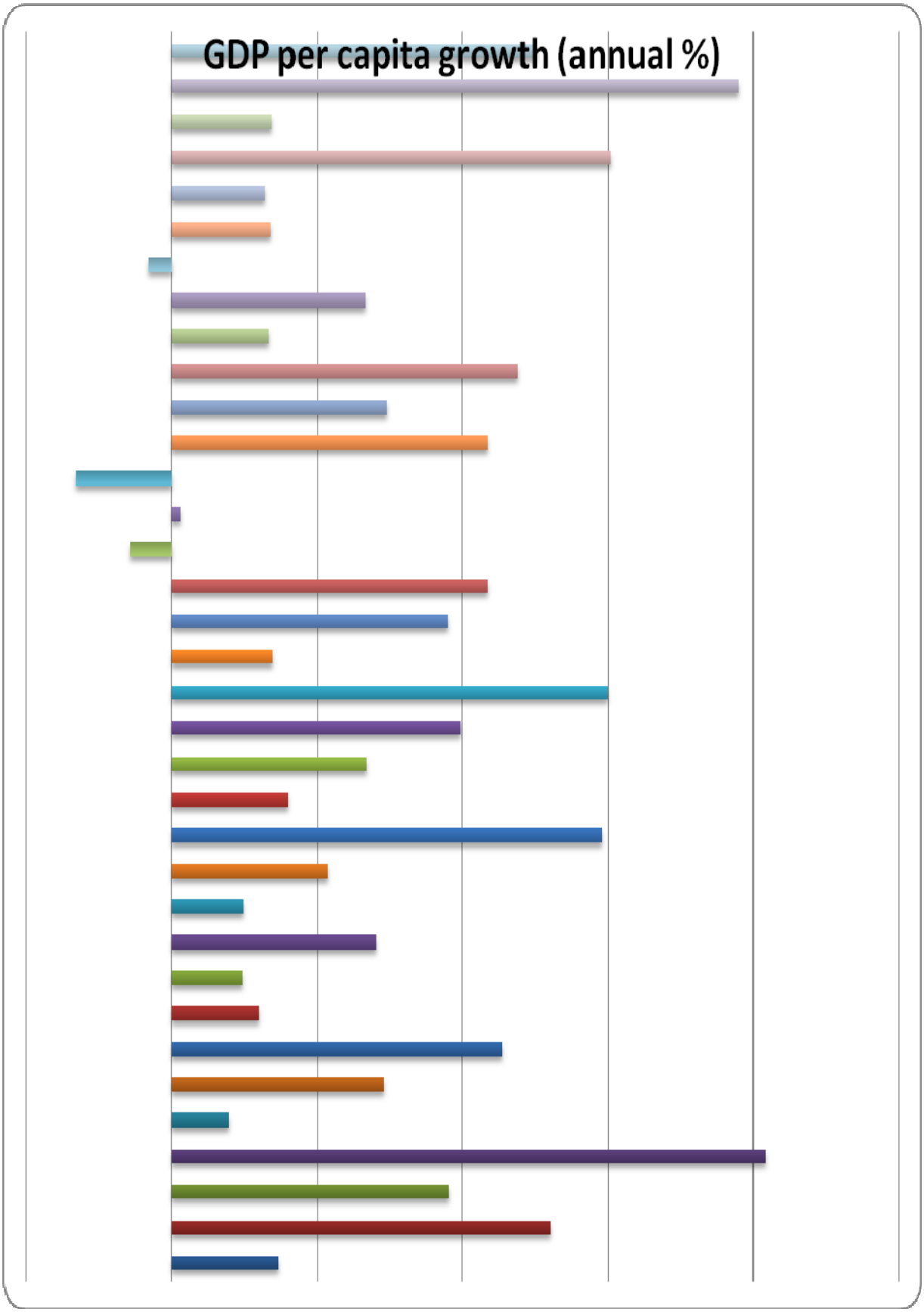

Figure A2. GDP per capita growth (annual %), 2009.

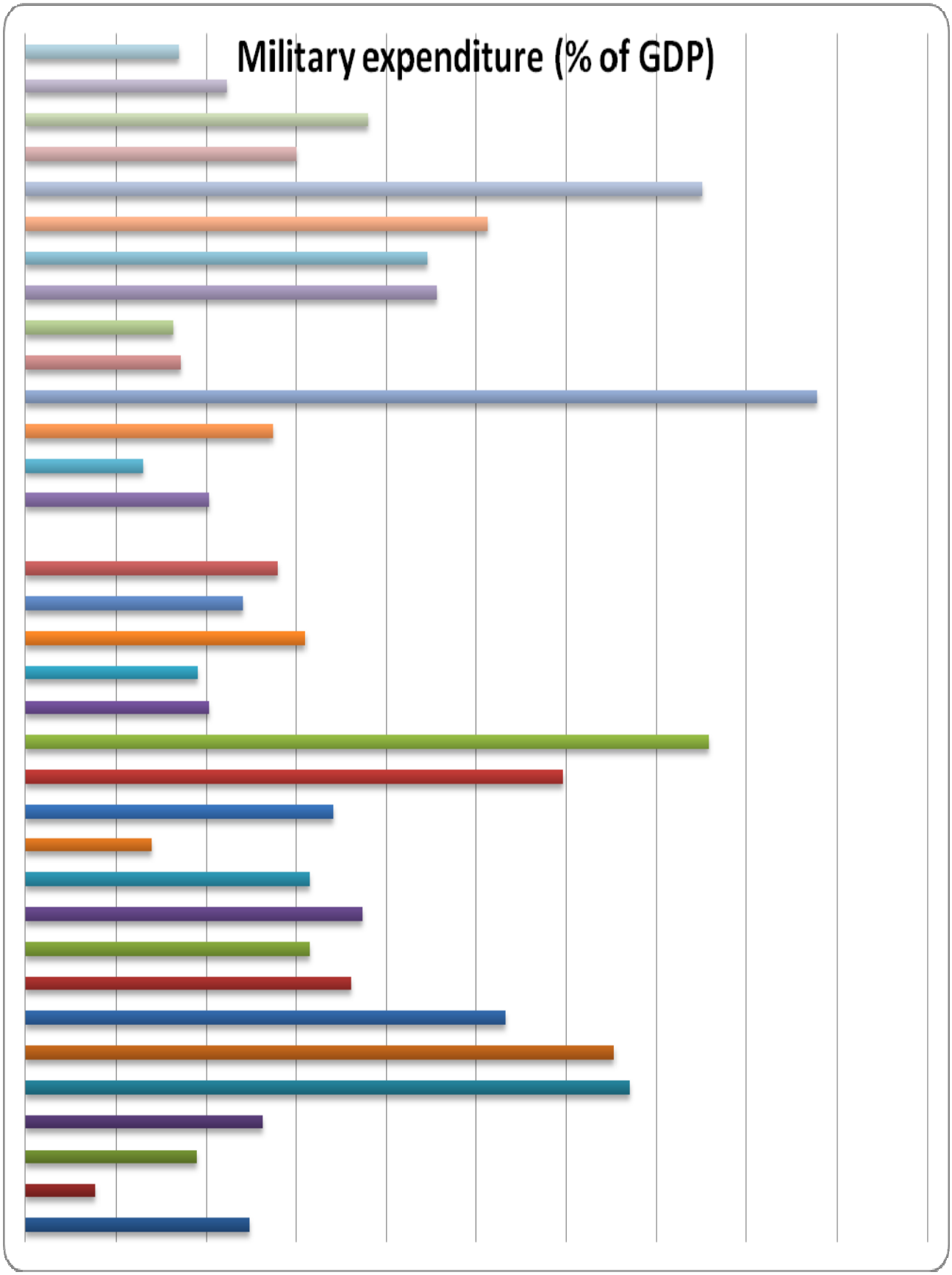

Figure A3. Military expenditure (% of GDP), 2009.

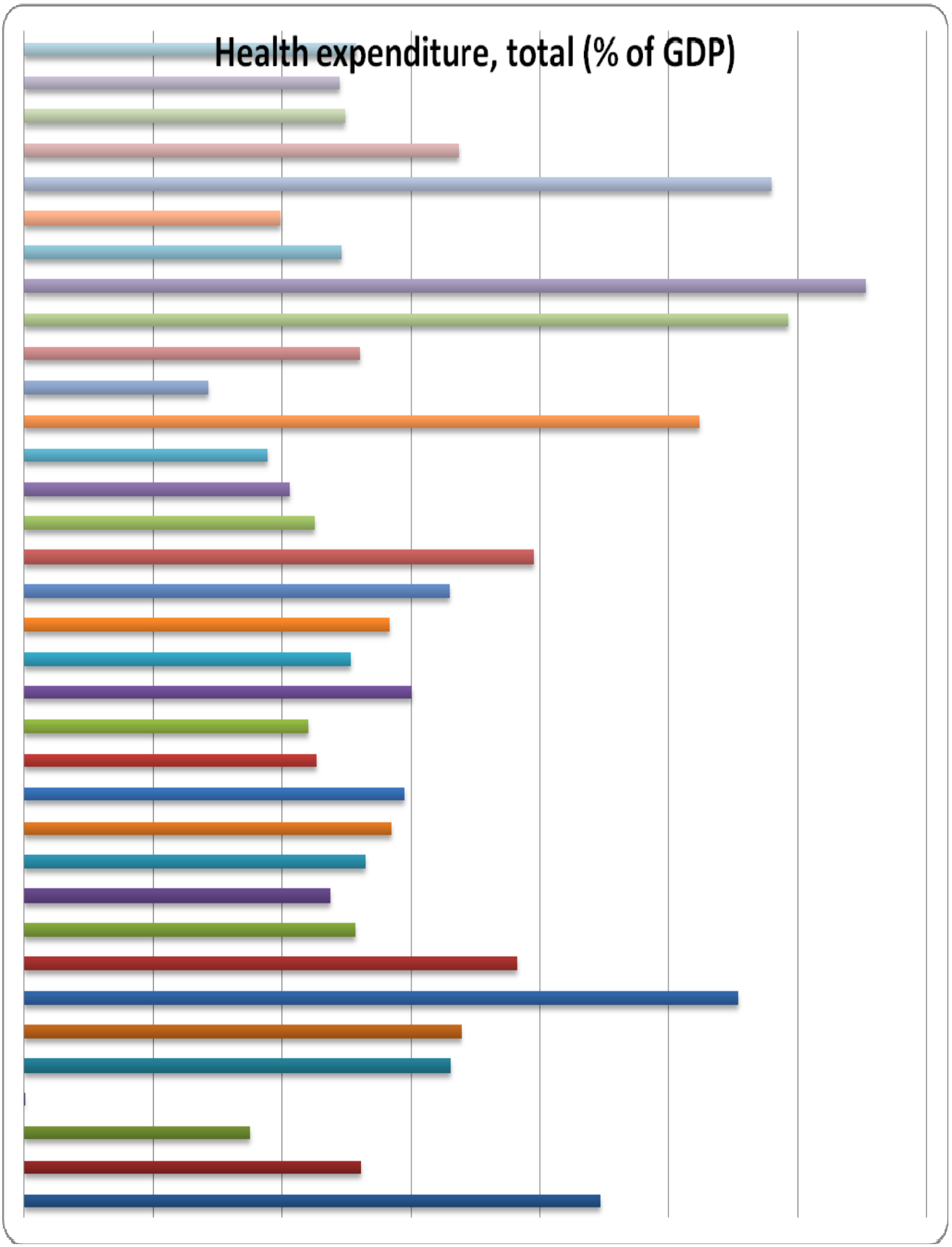

Figure A4. Health expenditure (% of GDP), 2009.

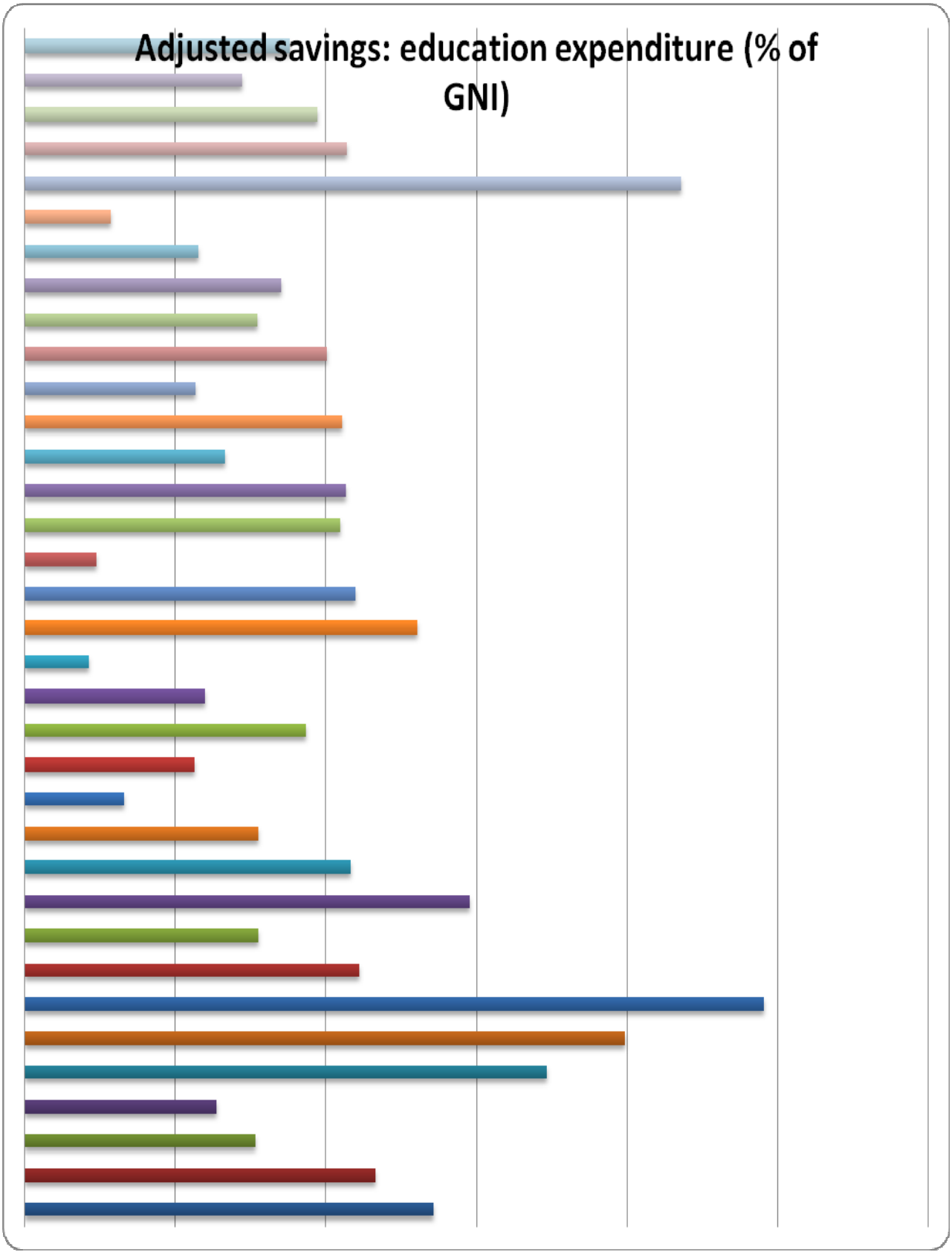

Figure A5. Education expenditure (% of GNI), 2009.