

An Alternative View to the “Africa Dummy”

*Paulos Gutema**

For the last four decades the pace of economic growth in African countries remained too slow or stagnant. This problem is analyzed by first developing a framework that focus on growth process of indigent economy, where deferring current consumption is hardly possible, and by relaxing the usual assumption of unfailing market condition. The analytic result suggests that the degree and direction of effects of factors of market failure make a difference in nations' level of income per capita as well as its rate of growth. On this ground, the poor economic performance observed in the region can be well attributed to poor capacity to manage and exploit factors of market failure. The empirical evidence obtained from analysis of panel data supports strongly this argument.

Introduction

After independence, according to World Bank (1989), Africans had high hopes of rapid development. The leaders, being motivated by the end of colonialism, were determined that their countries should catch-up with the developed countries. There was a widely prevailing saying like "we must run while they walk" to express their determinations and motivations. Despite these intentions the growth experience in the continent, especially, in SSA has been disappointing. After more than three decades of endeavor the income gap between the developed and SSA economies remained as wide as ever. For example, OECD report indicates, as noted by Madison (1996), that the income of the average African in 1995 was roughly equal to the average income of some one living in Western Europe in 1820. This information sounds like the region has lost 175 years in economic history.

In terms of its dynamics, the story is equally alarming. According to World Development Indicator data set¹, GDP per capita average annual growth rate was only 0.45% in the last four decades, which is far below that of the world's average, which is 1.93%. Moreover, from the data set it is possible to observe that the average annual rate of growth in real GDP per capita for the region declined from 2.64% per cent in the 1960s to about 0.83%% in 1970s and further declined to -1.12% and -0.68% in 1980s and 1990s respectively.

* P. O. Box 33229, Institute of Development Research, Addis Ababa University, Ethiopia, Tel. (251-1) 55 68 22, Fax 251-1-55 13 33, e-mail: Pgutema@hotmail.com

This poor performance is also in sharp contrast to the record of World's average performances, where average annual rate of growth 3.34%, 1.91%, 1.43% and 0.96% were achieved for each decade of the above periods, respectively. In short, the above record confirms that economic growth in the region has been very slow or stagnant. This exceptional oddity will be the subject of this paper.

In deed, this paper is neither the first nor will be the last to deal with the indicated problem. Rather the issue has been point of much concern for African specialists, development economists and other scholars. However, there is controversy and uncertainty as to the causes behind the problem. The debate relates to the degree of influence of adverse initial conditions² and domestic policy mistakes. Certainly, absence of objective explanation of the problem has contributed to pending the solution to some extent. To worsen the matter, some researchers have observed the presence of some growth mystery that seems to be particularly associated to the region, after controlling for a number of characteristics falling in the two sets of causes.

In his empirical study of economic growth, Barro (1991), for example, observes that “there appear to be adverse effects on growth from being in Sub Sahara Africa”, which was labeled as “Africa dummy” there after. In the study he indicated that, after controlling for the level of investment, school enrolment, government corruption and political instability, the dummy was associated with an annual decline in GDP per capita of as much as 1.14% during 1960-85. Mauro (1995) estimate this decline to be between 1.75% and 2.1%, after including bureaucratic efficiency index in his growth estimating equation. Similarly, Easterly and Levine (1997), after controlling for ethno-linguistic heterogeneity, estimate the effect of the dummy to range from 1.2% to 1.4% decline in annual GDP per capita, during 1960-1989.

In searching the factor behind this dummy, which is actually inimical to growth, Sachs and Warner (1997) attributed it to a mix of structural and policy variables particularly lack of openness to the world market. Barro (1997), on the other hand, attributed it to ratio of government consumption to GDP. That is, both studies attribute the dummy to policy distortions. Englebert (2000) goes further steps and asks ‘But what is it about Africa which is conducive to “bad” policy choices?’ and attributed it to state structure, particularly, to state legitimacy. Easterly and Levine (1997), on the other hand, stressing poor public choice to be the factor behind the dummy, describe how initial growth conditions themselves contribute to poor public policy choices. In solving the growth problem, in general, the implication of these findings will be correcting the policy mistakes. But, when comes to stating what the right policy is there is still some difficulties that deserves special consideration.

In most of the indicated studies, the approach followed was trying to explain intercountry growth differences by looking for country characteristics that can explain the gaps. As Alesina (1998) notes, readers of the results of the approach often wonder which results are robust and which are not, since changes in specification lead to different results. As a result, what is meant by right policy will vary with the studies. This critical point requires us to look for an alternative approach with an objective way of specification and grounded on firm economic theory.

On the other hand, exposing this growth problem to conventional growth models may give us an information that sounds like the region was not doing well in investing in accumulation of physical capital, human capital or research and development. But the basic question in this implication will be, whether the region remain poor perpetually if it fails to reverse the trend of the investments for some reasons, say due to poverty. The information from the models may indicate that the region remains poor or remain performing poor, which gives no way out of the problem.

Before accepting this prediction for grant, it seems worth questioning whether this prediction is consistent with actual growth process that had taken place in the past in the today's developed nations. That is, whether growth was induced by more investment in the indicated areas, when they were at the level where most African economies exist today. On the one hand, we observe that they have developed i.e. they did not remain at indigent level. On the other hand, we observe that the 'more saving' argument to contradict the general human behaviour³. The inconsistency between the prediction and growth history came to appear from the assumption made about the market structure with in which the poor agents act.

II. Can an Indigent Agent Save?

A close look at the process of wealth accumulation reveals that the process depends on the degree to which competitive equilibrium is ensured at any instant of time and the degree to which the equilibrium established at one moment will influence the rate at which assets are accumulated for the next moment. The former deals with the nature of goods and factor prices, while the later deals with the style of decision made on deferring consumption by saving more. In growth studies, however, we observe, most often, the first condition to be less emphasized as a result of the frequently imposed assumption of competitive equilibrium and the second being well stressed. Romer (1986) and Lucas (1988)⁴ that start from the conjecture of competitive equilibrium and assume away imperfect competition are good examples of this point. As Romer (1994) argues both models fail to be grounded on imperfect competition though they manage to include the endogenously provided technology⁵. However, as Solow (1997) argued the suitability of models constructed this way in solving growth problems facing the poor economies of the world can be questioned as these economies are characterized by severe market failures.

On the other side, the growth models rely heavily on the outcome of the decision made by the agents in choosing appropriate consumption time path. Romer [1986] model, for example, starts by considering that agents divide their current income between current consumption and investment in research technology that produces knowledge from forgone current consumption. Slight differently, Lucas [1988] human capital model starts by considering that agents allocate their non-leisure time between current production and human capital accumulation. In short, both pioneering endogenous growth models are based on attitude of agents' that involves sacrifice of current utility for the sake of improved future welfare. In this approach, we understand that should the agents fail to save and to invest in physical capital accumulation or in human capital accumulation or in discovering new knowledges for some reasons, the consequence will be facing freezing growth. Thus, in the models, we observe that the agents' forward-looking behavior, manifested through their decision on deferring current consumption, plays central role in triggering and sustaining growth. However, the central question here is whether deferring current consumption is actually possible for agents in indigent economy. Can a rational agent work towards forming a rich corpse? Doubtlessly, so far this agent is rational, S/he looks for means of today's survival, rather than getting rich after death. If this behavioral assumption does not work, we have to set another assumption that says indigent agents are irrational in making their decision, which is quite implausible. So under this circumstances, from where the savings come? On the other hand, if such actions (saving) failed to be taken by the agents, the models predict that the agents remain poor perpetually, which is not compatible with growth history of many today's advanced economies. In general, from the point of deferring current consumption perspective, again, we observe that the suitability of the model in explaining the growth problem falls under question.

III. Where else to Look for Source of Growth: The Framework

This section attempts to propose a tool that serves in describing growth process in indigent economies, where deferring current consumption is hardly possible, by invoking factors of market failure. Explaining the process of economic growth in indigent economy requires well-specified production function of the economy. To develop a production function for our idealized poor, first consider a given implicit production function as $Y(t) = f(L(t), X(t))$. Where $Y(t)$, $L(t)$ and $X(t)$ are net out put, labor size and a row vector of factors of production that accumulates as a result of deferred current consumption, at point of time t . By taking the total derivative, we get $dY(t) = f_L dL(t) + f_K dX(t)$. By assumption of no saving, which characterizes the idealized economy, we get $dX(t) = 0$ and, hence

$$dY(t) = f_L dL(t) \quad [1].$$

As indicated in the preceding section, at least growth history of today's developed countries can be a good reason to decline the prediction that nations remain poor if they fail to save. The inconsistency between the prediction and the reality arose from over simplifying assumption of competitive market structure, which hides some of the economic realities. Hence, lets try to relax this assumption and try to see what happens to per capita income growth of the indigent economy. Reconsider equation [1] and introduce factors of market failure.

By factors of market failure it is meant here market incompleteness and competition imperfection. Incontrovertibly, markets between nature and human beings, between generations, between nations, between firms or social groups, between individuals are incomplete. That is exchange of factors of production and products are not carried out solely through market mechanism. Whenever and wherever they exist, they are not perfectly competitive. That is factors are not paid with the marginal value of their products.

Under the presence of these factors of market failure, we understand that marginal product of labor is equal to the sum of its level under unfailing market plus effects of the factors, as

$$dY(t) = (f_L + \varepsilon + \lambda)dL(t) \quad [2]$$

where ε, λ are marginal effects of market incompleteness and imperfection in market competition, respectively. After making some manipulations⁶ growth rate of the aggregate output will be

$$\frac{dY(t)}{Y(t)} = (1 + \theta) \frac{dL(t)}{L(t)} \quad [3]$$

where $\theta \equiv \frac{(\varepsilon + \lambda)}{Y(t)/L(t)}$, the quantity that measures the degree and direction of relative effects of factors of market failure.

[3] informs how growth of net national output takes place depending on exogenously determined labor growth and degree and direction of relative effects of factors of market failure in indigent economy. Taking the indefinite integral of both sides of [3], we get an explicit production function of the economy under consideration as

$$Y(t) = AL(t)^{(1+\theta)} \quad [4]$$

Solving for per capita income growth,

$$\frac{dy(t)}{y(t)} = \theta \frac{dL(t)}{L(t)} \quad [5]$$

[5] suggests that per capita income growth to be determined by effects of factors of market failure and labor growth. Taking the indefinite integral of [5], we find an explicit function associating effects of factors of market failure and labor to per capita income level as

$$y(t) = AL(t)^\theta \quad [6]$$

Where A stands for real wage rate per year under unfailing market condition, or the initial natural endowment to the first person of the economy.

⁶ Interested readers can get the detailed derivation from the author by writing at the given e-mail

In general, from [5] and [6] we observe that the major endogenous source of growth and determinant of level of per capita income for indigent economy to be factors of market failure as labor is treated to be exogenous. For this economy, if growth-favoring factors of market failure outweigh the adverse ones we expect to have some positive values for θ . The larger the θ for a given labor growth, the faster will be the growth and the larger will be the level of per capita income, and the smaller the value of θ , the slower the growth will be. Similarly, if adverse factors of market failure outweigh the favorable ones, we expect some negative values of θ that entails deterioration of per capita. On the other hand, if the two contrary factors are at balance, we face stagnating economic growth.

Returning to the subject of this paper, the “Africa Dummy”, the framework suggests in retrospect, that Africans have not done well in managing and exploiting factors of market failure. That is, the region has had relatively smaller size of θ , which may be either the effects of factors of market failure are generally low, or the adverse factors have counteracted the favorable ones, so that the net effect becomes smaller. In section four of this paper attempt will be made to see if this argument can be supported by empirical evidence.

The framework also has some information on how growth process has taken place in advanced economies, when they were at indigent level. It suggests that the currently developed nations has managed to cross the point of indigent level, not by deferring the then current consumption and investing in physical capital, schooling and research and development, but through properly managing and exploiting possible factors of market failure. Once they passed that level, the arguments of deferred consumption for accumulation of physical capital, human capital can explain their growth process pretty well.

IV. Empirical Evidence:

In this section, we need to see if an effect of factors of market failure in Sub Sahara Africa economies is uniquely different (smaller) from other part of the world. To this effect, first poor countries of the world, countries earning an average GNP per capita less than 370⁷, in 1960s (1960-1969) were taken. Second, from this set of countries SSA countries were sorted out and grouped under African subgroup, while the remaining poor countries were grouped under Non-African subgroup. After forming such groupings, the proposed growth estimating equation was estimated for both subgroups, separately, and estimates of parameter θ in both subgroups were compared for their size, sign and significance. The difference in magnitude of the estimates was used in deciding whether the argument has got some empirical grounds or not.

The statistical data used for this purpose was taken from World Bank [2001]. The data set contains total labor force and gross domestic product per capita for 40 years (1960 – 1999) for a number of countries. From this data set, a total of 21 countries, earning an annual average GNP per capita below 370 in 1960s (1960-1969) were selected on the ground of data completeness, thirteen⁸ of them from SSA - while eight⁹ of them are non-Africans. A brief description of the performances of the two subgroups is given in table-1.

Table-1 Income Status of the Sample Countries

Indicator	Subgroup	Average 1960 - 1969	Average 1970 - 1999	Average 1960 - 1999
GDP per Capita Average	African	239.48	278.14	268.84
	Non-African	206.44	368.76	328.18
GDP per Capita Growth Average	African	1.57	0.20	0.49
	Non-African	1.61	3.12	2.77
Labor Growth Average	African	1.98	2.52	2.40
	Non-African	1.90	2.40	2.28

Table–1 reports the average GDP per capita and its growth in both subgroups for the base period 1960s as well as for the remaining decades up to 1999. In 1960s both Africans and Non-Africans were earning on the average below one dollar a day, and were having very close GDP per capita growth.

But they exhibited different level and rates of GDP per capita there after. The African subgroup was earning an average GDP per capita of \$239.48 and altered this level to only \$278.14 in the following three decades. On the other hand, the Non-African subgroup, earning an average GDP per capita of \$206, again below a dollar a day in 1960s, managed to come to a level \$368.76 in the following three decades. Here, it is possible to restate the problem at hand as whether such a gap is attributable to effect of factors of market failure. Similarly, the table reports that the GDP per capita growth of both subgroups were at a similar rate in 1960s, (1.57% for African and 1.61% for Non-African) but followed dissimilar path there after (0.2% and 3.12%, respectively). In this dimension, too, the exercise is to see if such a gap is attributable to effects of market failure.

Using the data set used for this description, the parameter θ in [6] is estimated for both subgroups using panel data analytic approach. In forming the panel, the time series data of each country was averaged over five years and a total of eight periods were formed for each country in both subgroups. In the analysis, after taking natural logarithm of [6], it was specified as One-Way error component regression model. Under this specification, estimates from the restricted or OLS (RM), the Fixed effect (FE), and Random Effect or GLS (RE) estimators were obtained. Here the superior estimator was chosen based on appropriate statistical tests. The results were given in table 2 and 3.

Table –2: Parameter ' θ ' Estimation for African Subgroup
One-Way Error Component Regression Model

Estimators	Parameters	Estimate of the parameter	St. error of the parameter	T-ratio	p-value
Restricted Model OLS	$\ln A$	6.5123	0.4056	16.0552	0.0000
	θ	-0.0648	0.0272	-2.3876	0.0188
Fixed Effect Model	$\ln A$	0.145806	0.069525	2.09717	0.038427
	θ	4.8222	0.6862	7.0271	0.0000
Random Effect Model	$\ln A$	0.0487	0.0458	1.0633	0.2876
	θ				
Lagrange Multiplier test of RM vs. FE/RE $\chi^2_{(2)} = 139.85, p = 0.0000$					
Hausman test of FE vs. RE; $\chi^2_{(1)} = 0.00, p = 0.9946$					

For the African subgroup, to select appropriate estimator from the three given estimators first we test the pullability hypothesis, i.e. the appropriateness of constrained model or OLS estimator. In other words, the hypothesis of absence of country specific effects has to be examined. With $N=13$ $T= 8$ and $k = 2$, a Lagrange-multiplier test for significance of country specific effects yields a χ^2 -value of 139.85, $p=0.0000$. This is distributed as $\chi^2_{(2)}$ under the null hypothesis of zero country specific effects. The null is soundly rejected, and the within or the random effect model is preferred to OLS estimator. That is, the test does not support the pullability of the data set, as there is strong country specific effects.

Next, for a choice between random effects (GLS estimator) and within effect estimator a Hausman-test is performed. The basic assumption associated with random effect is that there is no correlation between the regressor and country specific effects. If such assumption is violated, then the GLS estimator will be biased and inconsistent. The test gave a χ^2 value equal to 0.00, ($p=0.9946$). This is distributed as $\chi^2_{(1)}$ under the null hypothesis of absence of the indicated correlation. The test accepted strongly the null hypothesis of no correlation between the country specific effect and the regressor, which in turn imply that the GLS estimator in this case is unbiased and consistent. As a result, the preferable estimate of the parameter θ for the African subgroup becomes $\hat{\theta}=0.0487$. This estimate was found to be insignificant at standard levels of significance, $p=0.2876$, implying for the subgroup the effects of factors of market failure is not significantly different from zero during the covered period of study. By the same hand, lets try to estimate the parameter, θ , for Non-African subgroup. Applying the same procedure followed for African subgroup to the data set of Non-African subgroup, the results obtained are given in table 3.

**Table –3: Parameter ' θ ' Estimation for Non-African Poor Group
One-Way Error Component Regression Model**

Estimators	Parameters	Estimate of the parameter	St. error of the parameter	T-ratio	p-value
Restricted Model OLS	$\ln A$	5.51222	0.571133	9.65139	0.0000
	θ	0.006858	0.032934	0.208234	0.835729
Fixed Effect Model	$\ln A$				
	θ	1.02488	0.113938	8.99512	0.0000
Random Effect Model	$\ln A$	0.353686	1.06183	0.333091	0.739066
	θ	0.306171	0.061074	5.0131	0.0000
Lagrange Multiplier test of RM vs. FE/RE $\chi^2_{(2)} = 36.48, p = 0.0000$					
Hausman test of FE vs. RE; $\chi^2_{(1)} = 0.01, p = 0.9347$					

In the Non-African subgroup, like the African subgroup, the model was specified an One-Way error component regression model. Next following the same procedure given above, Random Effect model was found to give preferable estimate of the parameter θ , which estimates the parameter to $\hat{\theta} = 0.3062$. Unlike that of the former subgroup this estimate is significant at standard levels, ($p = 0.0000$).

Next, lets try to see what is implied by the two sets of estimation. As indicated above, both subgroup were poor and were having similar rate of growth in 1960s. However, they followed different path of growth in subsequent decades. From the econometric analysis, we understand that effect of factors of market failure were not similar in two subgroups. In former subgroup it was found to be small and not significantly different from zero, while it was relatively larger and statistically different from zero for the later subgroup. Moreover, the magnitude of the parameter estimate in the later subgroup is about six fold of that of the former subgroup, confirming the hypothesis that effects of factors of market failure was smaller in the African subgroup. The Non-African subgroup, be it intentionally or not, has benefited significant gain from factors of market failure that has brought them to a level above poverty line in the latter periods.

V. Concluding Remarks

One of the growth puzzles, the ‘Africa Dummy’ was examined by using somewhat different spectacle. The framework used to analyze the growth problem was designed by taking in to consideration the problem faced by poor agents in saving part of their income, rather than assuming it away. Moreover, the framework has tried to relax the common assumption of competitive equilibrium and focused on factors of market failure. The framework suggests that poor economies can exhibit per capita growth, by managing and exploiting factors of market failure. They remain poor only if they fail to do so.

On this ground, the poor performance seen in SSA for the last four decades can be well attributed to poor capacity in managing and exploiting the indicated factors. In prospect, the analytic framework suggests the possibility of changing this trend of poor performance, so far as the implied necessary conditions are met. Managing and exploiting factors of market failure may require differentiating activities in the economy according to effects of factors of market failure associated with them, and developing mechanism of encouraging or promoting those activities with growth favoring effects and discouraging those with adverse effects.

Furthermore, the framework has special message for poor African economies. It informs that they have to aim at managing and exploiting possible factors of market failures rather than undermining them or considering them as given. Relatively lesser attention has to be given to the recommendations that are actually beyond their capacities. Finally, supporting Elbadawi (1996) argument, the paper tells us that there is no as such an adverse effect that arises from just being in Africa, or to be labeled as “Africa Dummy” in the process of economic growth.

Notes:

¹ The data set is published in World Bank (2001) by the World Bank.

² The initial conditions include characteristics like, but not limited to, colonial history, ethnic diversity and tribal divisions, tropical climate, geographical factors e.g. access to sea etc.

³ The argument requires agents' attitude that involves sacrifice of current utility for the sake improved future welfare. However, for agents in subsistence life, such decision actually entails risk of passing away before attaining the foreseen greater earnings. As a result the rational decision makers may not be expected to sacrifice their life for the sake of improved future life. They may think like 'what is the point of being rich corpse'.

⁴ Most often the two papers are considered to press growth study forward after neoclassical growth approach.

⁵ In deed, Romer (1990) managed to bring into play both monopoly power (one form of market imperfection) and spillovers (one form of market incompleteness) in his model. But the problem is not as such confined to imperfection due to monopoly.

⁷ for this demarcation, see World Bank [1990]

⁸ African Subgroup includes Malawi, Burundi, Burkina Faso, Lesotho, Kenya, Nigeria, Rwanda, Mali, Chad, Gambia-The, Togo, Congo-Dem.Rep. and Benin

⁹ Non-African Subgroup includes China, Nepal, India, Pakistan, Bangladesh, Sierra Leone, Indonesia and Sri Lanka

References

- Alesina, A. (1998) The Political Economy of High and Low Growth in B. Pleskovic and J.E. Stiglitz (eds) Annual World Bank Conference on Development Economics, The World Bank, Washington, D.C.
- Barro, R. J. (1991), Economic Growth in Cross-Section of Countries, *Quarterly Journal of Economics*, Vol. 106, No. 2, pp. 407-444.
- Barro, R. J. (1997), Determinants of Economic Growth: A Cross Country Empirical Study. Cambridge, MA: MIT
- Easterly, W. and Levein, R. (1997) African Growth Tragedy: Policies and Ethnic Divisions, *Quarterly Journal of Economics*, Vol. 112, No. 4, pp. 1203-50.
- Elbadawi, I.A and B.J. Ndulu (1996), Long-term Development and Sustainable Growth in Sub Saharan Africa, in Lundahl, M. and B.J.Ndulu (eds) New Directions in Development Economics, Growth, Environmental Concerns and Government in the 1990s, Routledge, SAREC
- Englebert, P. (2000), Solving the Mystery of the Africa Dummy, *World Development*, Vol.28, No.10, pp. 1821–1835.
- Lucas, R.E. Jr. (1988), On the Mechanics of Economic Development, *Journal of Monetary Economics*, Vol.22, No.1, pp.3-42.
- Madison, A. (1996) Monitoring the World Economy: 1820-1992” OECD, pp.22
- Mauro, P. (1995), Corruption and Growth, *Quarterly Journal of Economics*, Vol. 110, No. 3, pp. 681-712.
- Romer, P. M, (1990), ‘Endogenous Technological Change’, *Journal Of Political Economy*, Vol. 98, pp. S71-S102.
- Romer, P. M., (1994) ‘The Origins of Endogenous Growth’, *Journal of Economic perspectives*, Vol.8, No.1, pp.3-22.
- Romer, P.M. (1986), Increasing Returns and Long run Growth, *Journal of Political Economy*, Vol. 94, pp.1002-37.
- Sachs, J. D. and Warner A.M. (1997), Sources of Slow Growth in African Economies, *Journal of African Economies*, Vol. 6, No. 3, pp. 335-76.
- Solow, R. M. (1997) Learning from “Learning by Doing”: Lessons from Economic Growth, Stanford, CA: Stanford University Press.
- World Bank (1989), Sub-Saharan Africa, From Crises to Sustainable Growth, a Long Term Perspective Study Washington D.C., World Bank.
- World Bank (1990), *World Development Report 1990: Poverty*. Oxford University Press, New York.
- World Bank (2001), *World Development Indicator -2001*, (CD-version)