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Dependency Ratio and the Economic Growth Puzzle in Sub-Saharan Africa

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Conventional growth theories in the literature explain the poor economic performance of African economies by stressing the inadequacy of savings, human capital, and poor institutional quality. However, the key question is how to enhance savings for the accumulation of both physical and human capital in order to spur growth. A common thread that runs through the existing models is that the dependency ratio, not only remains constant over time, but has no long-run negative impact on economic growth. By relaxing this rigid assumption, this paper constructs a growth estimating equation which accommodates this demographic factor. The analytic results from the modified model suggest that economies with high dependency ratio face their stable equilibrium at lower levels of their income per capita. Moreover, econometric results from analysis of panel data drawn from Sub-Saharan Africa economies suggest that the growth puzzle can be well explained in terms of the demographic factors, especially the level and dynamics of dependency ratio of the region.

JEL Classification: R11, N3, F43

Keywords: Sub-Saharan Africa, growth model, dependency ratio, steady state, panel data, fixed-effects model, random-effects model, and policy

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I. Introduction

Sub-Saharan Africa's poor economic performance seems to be a somewhat enigmatic feature in world economy. According to the World Bank (2002) data set, in the 1960s an average person living in SSA was earning an average annual income of USD 522.94, while an average person living in high income economic groups[1] of the world was earning an annual average income of $12330 which is about 23 times that of the SSA. This ratio reached 34 in the 1990s. Leaving alone the high income group, if one compares SSA with that of Latin American and Caribbean, an average person living in the later region during 1960-2000 was earning an annual average income of $3052 which is about five fold of that of SSA.

The same image can be observed from an income dynamics perspective. The estimate from the data set used suggests that if the conditions of 1960-2000 are to persist into the future, an average SSA person may require 750, 350, and 422.6 years[2], respectively to arrive at the income per capita level of high income groups, Latin America and Caribbean, and World average income, respectively. Similar oddities can also be observed from development perspective. According to the UNDP (1997) human development index (HDI) which is a composite index based on literacy and life expectancy rates and the real GDP per capita growth rate, 32 of the poorest 40 countries of the world are in SSA. Here, the central question is what has gone wrong with the SSA region to have performed so poorly?

In tracing the root cause of this enigmatic economic problem, development specialists have listed a number of factors as sources of the disparity. Some writers attribute it to geography i.e. tropical climate and land-lockedness (See, Braudel, 1995; Landes, 1998; Diamond, 1997; Reader, 1998; Hall and Jones, 1997; and Sowell, 1998). Others attribute

[1] The groupings are according to World Bank (2002) data set.
[2] An implicit objective of the paper is to search for a mechanism that may help to reduce such disturbing long catching-up periods.

it to demography (Bloom and Williamson, 1998), poor institutional quality and/or public policy choice (Mauro, 1995; Sachs and Warner, 1997; Barro, 1997), ethno-linguistic heterogeneity (Easterly and Levine, 1997), and state legitimacy and colonial legacy (Englebert, 2000).

This study develops and analyzes a framework that focuses on the growth process of an economy with high dependency ratio taking its departure the Solow growth model (1956).

Dependency could be related to economic performance through its effect on savings which is the basic component of the neoclassical growth model. Typically, dependents (the elderly and children) will be supported either through government transfers which are financed through taxes and government assets, or they will be supported through in-house family care. In the former case, as the number of dependents increases, the required transfers increase which, in turn, require increasing taxes that suppress savings. Like wise, in the case of family-care, as dependents increase, the consumption rate per household will increase, which suppresses savings rate. Moreover, within a household, as dependency increases the time required to take care for the dependents will increase and the time available for paid labor force will be reduced.

The converse of this argument may not necessarily be true. Basically, as the dependency ratio declines, more resources will be released for investment in physical and human capital accumulation which, in turn, raises the per capita income growth rate. However, this condition demands the existence of a better economic environment to prevail. Particularly, the released volume of resources has to exactly be invested in that particular economy without an outflow or leakage for whatever reason. If the resources are diverted to other economies, be it willingly or unwillingly, the expected growth gain from decline in the dependency ratio may not be achieved. In this connection, some authors have attributed the absence of gains from dependency decline to financial crises, debt services, and unfavorable terms of trade. By considering the relationship between dependency rates and savings in the context of a properly defined theoretical framework applicable household saving behavior under uncertainty, Rossi (1989) reaches the conclusion that even the current anemic growth in Sub-Sahara Africa and elsewhere may have to be downward adjusted in the presence of rising dependency rates. Bloom, Canning, and Sevila (2001), for example, have attributed the absence of growth gains from dependency decline in Latin America to recurrent financial crises and high trade tariffs. In the next sections, we provide both a theoretical and empirical evidence to demonstrate the dependency ratio and economic growth puzzle using Sub-Sahara Africa as a case study.

II. The Framework

From the Solow (1956) growth model), we have

$$\Delta k = sy - (n+\delta)k \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots [1]$$

where Δk, s, y, n, δ, and k are change in capital per worker, savings rate, per capita income, rate of population growth, depreciation rate, and capital per worker, respectively. The above model implicitly assumes the insignificance and constancy of dependency ratio over time. However, due to demographic transition and changes in the status of health, there is a possibility of having a variable dependency ratio (low or high). On this ground, equation [1] could be modified as

$$\begin{aligned}\Delta k &= s\frac{Y}{P^e}\frac{P^e}{P} - (n+\delta)k \\ &= sy\frac{P^e}{P^e+P^d} - (n+\delta)k \\ &= sy\left(\frac{1}{1+\mu}\right) - (n+\delta)k \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots [2]\end{aligned}$$

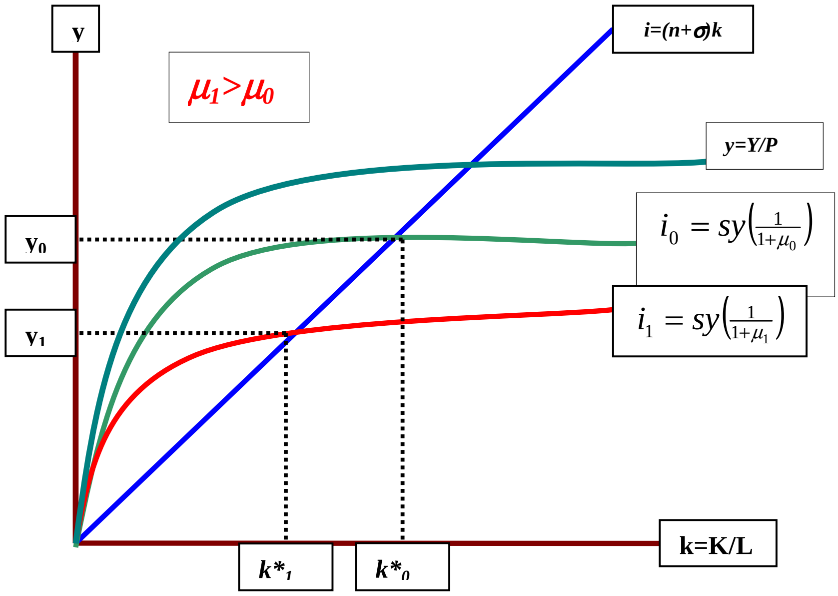
where P is the total population, P^e is the labor force,

P^d is the dependent population, and $\mu = \frac{P^d}{P^e}$

μ is the dependency ratio

Equation [2] suggests that economies with high dependency ratio (μ) reach their steady state equilibrium at a low level of income in relative terms. To highlight this point, the stable equilibrium of two economies with unequal dependency ratio is given in figure [1].

Figure 1: Solow Model with Dependency Ratio



$$k_1^* = sy\left(\tfrac{1}{1+\mu_1}\right) - (n+\delta)k < k_0^* = sy\left(\tfrac{1}{1+\mu_0}\right) - (n+\delta)k$$

where μ is dependency ratio

Figure [1] indicates the steady state of two economies with different dependency ratios, (μ_0 and μ_1, where $\mu_0 < \mu_1$). Economy 1 with (μ_0) dependency ratio reaches its steady state at k_0 and y_0, while economy two with dependency ratio (μ_1) reaches its steady state at k_1 and y_1 which is below the former steady state. In other words, as dependents of an economic agent increase, the portion of income an individual is willing to save will be reduced and hence lower the level of capital per worker. Moreover, Figure [1] suggests that the wider the range between the dependency ratios, the wider the gap between the two economies' steady states. Turning back to the SSA's economic growth puzzle, the result implies that high dependency ratio could be one of the major factors that has trapped economies characterized with a low income per capita level.

The common prescription given for escaping this type of low-level equilibrium trap is applying economy-wide "big-push" investment efforts coming from grants or foreign direct investment. From figure [1], it is possible to infer that the higher the dependency ratio, the greater the big-push necessary in order to lift the economy beyond the unstable equilibrium so that the economy can self-sustain to move towards the second stable equilibrium. However, if the size of the push (the massive infusion of investment) is not proportionally big enough to the dependency ratio, then the economy may not escape the trap. Other things remaining the same, the general implication of this analysis is that economies with large dependency ratio may require a massive infusion of capital should the means of influencing the level of stable equilibrium is only limited to a big-push strategy.

Moreover, it is possible to suggest from the analysis the allocation of such a big push whenever it is available. If investment in physical capital accumulation is made while the dependency ratio is so high, the growth gain achieved from the push will be short lived, and the stable equilibrium will tend to revert back to its original equilibrium point. If the strategic resources used for reducing the dependency ratio are investments in education and improvements of the health status of the people, however, the gain may be sustainable.

From Figure 1, one might also observe that the steady state capital per worker level and income per capita could be influenced by variation of the level of dependency ratio. As has already been indicated, the economic logic behind this argument is that when the dependency ratio declines, some resources will be available to be invested in physical and human capital accumulation. From the above argument, we can infer that $y = f(\mu)$ and Equation [2] can be now be replaced by Equation [3].

$$y = \alpha\mu^{\Phi} \cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots[3]$$

Using calculus, we can obtain α *and* Φ *as parameters*; *and* Φ *is* exp*ected to be negative*

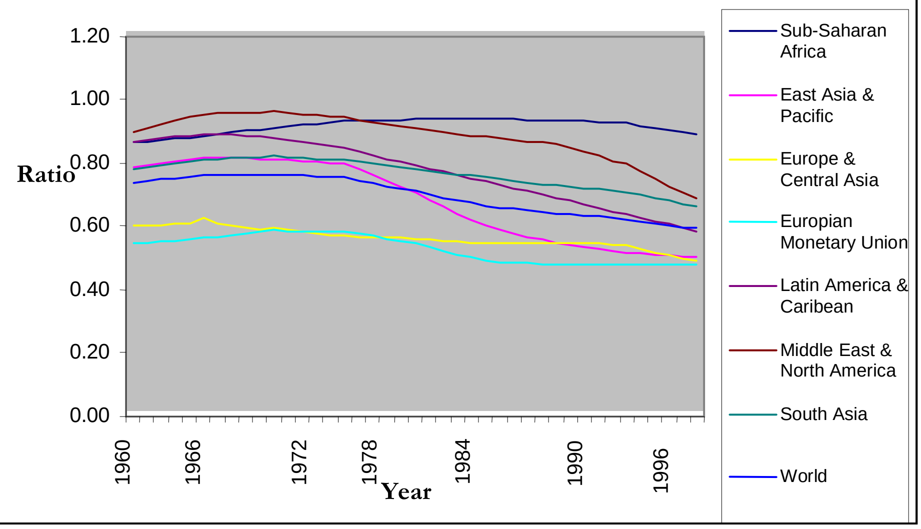
In explicit terms, equation [3] states that if an economy could reduce its dependency ratio from μ_1 to μ_0 as in figure [1], then income per capita will increase from y_1 to y_0 through savings and investment in the suggested factors of production. The next section deals with further examination of this argument with the help of empirical data.

III. The Empirical Evidence

3.1 Descriptive Analysis

World Bank (2002) data set indicates that the dependency ratio of SSA is consistently higher than that of other regions of the world. Time series data on dependency ratio of the region in comparison with other regions is presented on Figure [2]. The graph below shows that only during the 1960s and early 1970s did the region's dependency ratio fall below that of North Africa and Middle East. In fact, the figure indicates that SSA is the only region which failed to experience a decline in the dependency ratio that was observed in most other parts of the world. However, whether the difference between SSA's dependency ratio and other parts of the world could be due to sampling error or not shall be clarified using some statistical tools.

Figure- 2: Dependency Ratio in Some Regions of the World



3.2. Analysis of Variance for Regional dependency Ratio

Figure [2] suggests that there are some variations in the dependency ratio of some regions. The European Monetary Union, for example, has got a dependency ratio that is far below that of other regions throughout the 1960-2000. If such differences are statistically significant, one may expect a different steady state for the different regions based on equation [2]. Such a conclusion, however, has to be statically validated. For this purpose, we employed one-way classification of analysis of variance (ANOVA). This test informs whether expecting a different steady state for different regions is legitimate, or not; i.e. if the variation we observe in the figure [2] is attributable to a simple sampling error or not. Should the F-test accepts the hypothesis that between-groups variation is identical with that of in-groups variation, then expecting a different steady state for the regions is considered to be inappropriate and the observed variation will be considered to be simply due to a sampling error. If on the other hand the test rejects the hypothesis, then expecting a different steady state for different regions will be legitimate. Under this circumstance, we expect SSA to have a different steady state, at least with one of the listed regions. The test results are given in table-1.

Table-1: ANOVA of Regional Dependency Ratio

Source of Variation	SS	Df	MS	F	P-value
Between Groups	11.5184	16.0000	0.7199	153.2955	0.0000
Within Groups	3.1934	680.0000	0.0047		
Total	14.7117	696.0000			

The F-value and its corresponding p-value in table-1 suggests that there is strong mean differences between the indicated regions ***(p=0.0000),*** which in turn implies that expecting a

different steady state level for different regions is legitimate. Moreover, we expect SSA to have a different steady state from at least one region included in the analysis based on this test result. In fact, this test result has to be qualified to present as an evidence for SSA to have low steady state because of its high dependency ratio. We need to get more a statically significant evidence for the argument that SSA's dependency ratio is higher than the other regions by employing a two sample mean difference t-test, assuming unequal variance. The test result is given on table-2

Table-2: Two-Sample Mean Difference t-test, Assuming Unequal Variance

Region	**Mean**	**SE**	**T-value**	**P-value**
Sub-Saharan Africa	0.9182	0.0230		
East Asia & Pacific	0.6804	0.1245	12.0275	0.0000
Europe & Central Asia	0.5646	0.0322	57.2687	0.0000
European Monetary Union	0.5299	0.0437	50.3639	0.0000

Latin America & Caribbean	0.7760	0.1012	8.7742	0.0000
Middle East & North Africa	0.8863	0.0743	2.6224	0.0117
South Asia	0.7665	0.0469	18.5785	0.0000
World	0.7121	0.0885	22.1289	0.0000

The second column of table-2 suggests that the average dependency ratio of SSA (0.9182) is higher than the other regions. The fourth column gives the p-values for the test that compares this mean with the other region's mean, one after the other and all the p-values confirm the argument that SSA's dependency ratio is significantly higher than the other regions of the world ***(p<0.05)***. This test result together with equation [2] will inform that the region has faced its first stable equilibrium at a relatively lower level of capital labor ratio and lower income per capita.

3.3 Econometric Analysis

In this sub-section, we examine to see if the steady state level could be influenced by the changing the dependency ratio based on an empirical evidence. In other words, we try to see whether the dynamics of dependency ratio has got some connection with income per capita dynamics. For this purpose, we estimated the parameters of equation [3] using panel data analysis. Moreover, to see if marginal effect of a change in the dependency ratio is similar with the rest of the world, we first estimate the equation from the full (entire world) panel data that contain 99 countries, and secondly, from SSA's panel data that contain 41 countries of the region over the 40 years from 1960-2000. In forming the panel, the time series data of each country were averaged over five years and a total of eight periods were formed for each country; an econometric model is specified for equation [3] in its general form. In order to provide an empirical exposition of the model, the specification is given as follows:

$$\mathrm{y}(\mathrm{g},\mathrm{t}) = \delta(g) + \Gamma(t) + \Phi\,\mu(\mathrm{g},\mathrm{t}) + \Psi(\mathrm{g},\mathrm{t}) \cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots [4]$$

Where y(g,t) is natural logarithm of GDP per capita of country *g* at period *t*, and μ***(g,t)*** is natural logarithm of the dependency ratio for *g=1,2,…m* (number of countries), *t=1,2,…T* (number of periods), $\boldsymbol{\Phi}$ is a parameter; $\Psi(g,t)$ is a classical stochastic disturbance term with $E[\Psi(g,t)]=0$ and $var[\Psi(g,t)] = \sigma^2_\varepsilon$; $\delta(g)$ *and* $\Gamma(t)$ are country and time specific effects, respectively. Instead of an a priori decision on the behavior of $\delta(g)$ and $\Gamma(t)$, five different types of the most common assumptions are separately imposed on the model and the one that gives a superior estimate is selected based on statistical rules.

The first assumption is that all of the country specific effects are constant and equal across the countries; and the time specific effects are not present, i.e. $\delta(g)=\lambda$ *and* $\Gamma(t) = 0$, for some constant λ. Under this assumption, Equation ***[3]*** is estimated by ordinary least squares (OLS) method and the results are reported as the Restricted OLS Model.

The second and third alternative specifications assume the absence of time specific effects, which is a basic attribute of the One-Way specification. The second estimation technique assumes that country specific effects are constants like the first one, but not necessarily equal, i.e. $\delta(g) = \lambda(g)$ *and* $\Gamma(t) = 0$, for some constants $\lambda(g)$. Under this case, equation ***[3]*** is estimated by a partitioned OLS. The estimates are reported under One-Way Fixed-Effects Model.

The third assumption type tested in the analysis is that country specific effects are not constants, but rather are disturbances; and the time specific effects are not present here again i.e. $\delta(g)=\lambda+w(g)$ *and* $\Gamma(t) = 0$, where $E[(w(g)]=0$, and $var[w(g)] = \sigma^2_w$ and $cov[\Psi(g,t),w(g)] = 0$. Unlike the previous cases, equation ***[3]*** is estimated by a feasible 2-step Generalized Least Squares (GLS). The results of this estimation are given under the One-Way Random-Effects Model.

The fourth and the fifth assumptions differ from the first three in their time specific effects components (a basic feature of Two-Way specification). The fourth assumption requires that both country and time specific effects are constants, but are not necessarily equal; and there is an overall constant, i.e. $\delta(g) + \Gamma(t) = \lambda' + \lambda'(g) + \gamma(t)$, where λ', $\lambda'(g)$

and $\gamma(t)$ are some constants. The results of this estimation are reported under the Two-Way Fixed-Effects Model.

The last assumption is that both the country and time specific effects are disturbances with $\delta(g) + \Gamma(t) = \lambda'' + w'(g) + \tau(t)$, where λ'' *is* some constant, and $w'(g)$, $\tau(t)$ are disturbances. In this case, just as in assumption three above, equation ***(3)*** is estimated by a 2-step GLS model. The results of the estimation are reported under Two-Way Random-Effects Model. After estimating the parameters based on the above five assumptions, the superior specification is selected on the basis of a suitable statistical test.

Accordingly, equation ***(3)*** is estimated using the data and method described above. The empirical results from the World Bank panel data are given in tables 3 and 4. To choose from One-Way and Two-Way specifications, we use the F-statistics. The statistics tests the significance of any time specific effect that is not included in One-Way regression specification. The test result given at the bottom of table [4], suggests that Two-Way error component regression model is superior to the One-Way, ***(p=0.0000)***.

Table [3]: One-Way Error Component Regression

Model Estimates for Equation *(3)*

Estimators	Parameters	Estimate of the parameter	St. error of the parameter	T-ratio	p-value
Restricted Model	Φ	-4.9251	0.1424	-34.5924	0.0000
	α	6.0986	0.0552	110.3930	0.0000
Fixed Effect	Φ	-1.6670	0.0848	-19.6516	0.0000
Random Effect	Φ	-1.8322	0.0797	-22.9886	0.0000
	α	7.0100	0.0924	75.8647	0.0000
Lagrange Multiplier test of RM vs. FE/RE $\chi^2_{(1)} = 1637.27$, $p = 0.0000$					
Hausman test of FE vs. RE; $\chi^2_{(1)} = 0.00$, $p = 0.9888$					

Table [4]: Two-Way Error Component Regression

Model Estimates for Equation *(3)*

Estimators	Parameters	Estimate of the parameter	St. error of the parameter	T-ratio	p-value
Fixed Effect Model	Φ	-1.1752	0.0874	-13.4430	0.0000
	α	7.2035	0.0270	266.4630	0.0000
Random Effect Model	Φ	-1.4111	0.0845	-16.6934	0.0000
	α	7.1340	0.1012	70.4901	0.0000

F-test of One-Way vs Two-Way *F[7.685]=34.504*, *p*=0.0000

Lagrange Multiplier test of RM vs. FE/RE $\chi^2_{(2)} = 1664.31$, $p = 0.0000$

Hausman test of FE vs. RE; $\chi^2_{(1)} = 111.98$, $p = 0.0000$

The next step will be selecting an appropriate estimator from the three given estimators. To start with, the poolability or appropriateness of the constrained model, or OLS estimator is tested. In other words, this test helps us to examine the hypothesis of absence of country specific effects. With N=99 T= 8 and k = 2, a Lagrange-multiplier test for significance of country specific effects yields a χ^2-value of 1637.27, ***p=0.0000***. This is distributed as $\chi^2_{(1)}$ 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 poolability of the data set, suggesting that there are strong country-specific effects.

Next, for the choice between the random-effects (GLS estimator) and the within-effect estimator, a Hausman-test is performed. The basic assumption associated with the random-effect is that there is no correlation between the regressor and country-specific effects. If such an assumption is violated, then the GLS estimator will be biased and inconsistent. The test shows a χ^2 value equal to ***0.00, (p=0.9888)***. This is distributed as $\chi^2_{(1)}$ under the null hypothesis of absence of the indicated correlation. The null hypothesis of no correlation between the country-specific effect and the regressor is strongly accepted. This implies that the GLS estimator in this case is unbiased and consistent. As a result, the preferable estimates of the parameters in equation ***(3)*** can be given by the two-way random-effects models.

Accordingly, the coefficient of the natural logarithm of the dependency ratio is found to be negative and statistically significant, suggesting that growth of the variable adversely affects the pace of GDP per capita growth in the entire world. The results suggest that a one percent increment in dependency rate can suppress GDP per capita growth by about 1.4%.

Following the same method of analysis, next, we estimated equation [3] from SSA's panel data separately, to compare marginal effects of dependency ratio of the region with that of the world. The results are given in table [5] and table [6].

Table [5]: One-Way Error Component Regression

Model Estimates for Equation *(3)*

Estimators	Parameters	Estimate of the parameter	St. error of the parameter	T-ratio	p-value
Restricted Model	Φ	-3.2933	0.3687	-8.9325	0.0000
	α	5.8726	0.0653	89.8706	0.0000
Fixed Effect	Φ	-2.3461	0.3893	-6.0270	0.0000
Random Effect	Φ	-2.4232	0.2562	-9.4592	0.0000
	α	5.9718	0.1245	47.9800	0.0000
Lagrange Multiplier test of RM vs. FE/RE $\chi^2_{(1)} = 439.72$, $p = 0.0000$					
Hausman test of FE vs. RE; $\chi^2_{(1)} = 0.00$, $p = 0.9759$					

Table [6]: Two-Way Error Component Regression

Model Estimates for Equation *(3)*

Estimators	Parameters	Estimate of the parameter	St. error of the parameter	T-ratio	p-value
Fixed Effect Model	Φ	-2.4929	0.2574	-9.6852	0.0000
	α	5.9637	0.0387	154.2110	0.0000
Random Effect Model	Φ	-2.5075	0.2505	-10.0085	0.0000
	α	5.9637	0.1287	46.3376	0.0000
F-test of One-Way vs Two-Way *F[7,209]=3.497, p*=0.0014					
Lagrange Multiplier test of RM vs. FE/RE $\chi^2_{(2)} = 439.78$, $p = 0.0000$					
Hausman test of FE vs. RE; $\chi^2_{(1)} = 0.06$, $p = 0.8044$					

Following the procedure given above, we found out the two-way random effect model to give a superior estimate of the parameter in equation [4] for SSA. The results in table [5] suggest that just like the other parts of the world, a progressive dependency ratio has got an adverse effect on the GDP per capita growth in the region. Conversely, the results suggest that, should the region have control over the gains available from falling dependency ratio and use it effectively for the improvement of its economic growth efforts, a falling dependency ratio has an income per capita growth enhancing effect, serving it as a mechanism for changing the current dismal economic status of SSA. According to the present level of dependency ratio in Europe and Central Asia (0.56), this may generate an income per capita growth equivalent to what was recorded in East Asia & the Pacific during the 1990s in twenty years time (which is actually too restrictive), then the region could reach the current average income per capita level of High Income groups, Latin America & the Caribbean, and World in 61, 28 and 34 years time, respectively. On the other hand, if the region plans to reach the indicated dependency ratio in 50 years time, this may generate an average income per capita growth that was observed in the region during the 1960s, keeping other things unchanged; the region may reach the current income per capita level of High Income groups, Latin America & Caribbean and World in about 150, 70 and 85 years time, respectively, in stead of the catching-up years indicated in the introduction part.

Moreover, the econometric results indicate that the marginal effect of the dependency ratio is more than double that of the world with a parameter estimate of -2.5075 instead of 1.18. This could be due to the structure of the dependency ratio, i.e., an increase in the dependency ratio could be possible either by increasing number of dependents as a result of high the fertility rate, high elderly immigration rate, and an improvement of the health status of elderly people; or by the fall in the size of the labor force due possibly to the emigration of the labor force, high mortality rate of labor force, and high child mortality rate, or both at a time. Some authors (e.g. Bloom and Williamson, 1998) have found out that the youth dependency has more negative effect on economic growth than the elderly dependency rate and its African dependency ratio is dominated by youth dependents. Similarly writers like Chesnais (1992) and Cohen (1993) have documented the fact that the fertility rate in Africa is somewhat different from the other regions of the world, even after controlling for infant mortality difference, income and education, and urbanization the continent shows higher fertility rate. Besides the case of youth dependency, SSA's dependency ratio dynamics is characterized by high labor force emigration and high labor force mortality due to the recurrent civil wars and the HIV/AIDS pandemic. It is expected that This aspect of the dependency ratio dynamics has more adverse effect on the GDP per capita growth than the former one due to its direct negative effect on productivity. In either of the cases, the analytic results suggest that the growth deterring effect of dependency ratio is more serious in SSA than in other parts of the world.

VI. Summary and Conclusion

The study has investigated the role that dependency ratio can play in economic growth in Sub-Sahara Africa based on the Solow theoretical growth model. The main data source for the study is the World Bank (2002) data set, covering the 1960-2000 periods.

The result obtained from statistical analysis of mean difference suggest that the region was forced to face its stable equilibrium at lower level of income than the other regions of the world due to its higher level of dependency ratio. Moreover, the results obtained from Two-way random-effect regression model suggest that an increase in dependency ratio has a strong adverse effect on the GDP per capita growth with a marginal effect that is almost double of the marginal effect seen in the rest of world. This implies that the lower stable equilibrium, as indicated in the above analysis, is reached at a very slow pace due to the rising dependency ratio prevailing in the region.

In general, the results suggest that the economic growth puzzle of SSA (low income per capita level and stagnant economic growth) could well be explained based the demographic factors, particularly dependency ratio. Our analytic result suggests that the region is trapped in low income stable equilibrium due to its significantly high dependency ratio. Moreover, the results suggest that the per capita income growth is adversely affected by the rising dependency ratio of the region. Furthermore, we can conclude that any effort to change the current dismal economic status of SSA that ignores the possible mechanisms for reducing the dependency ratio of the region may serve little for steering the region along its long-run growth path.

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