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Models of Economic Growth and Development in the Context of Human Capital Investment: The Way Forward for Africa

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Abstract

The economic literature ever since the dawn of modern economics has been much preoccupied with the issue of economic growth. Economic growth has also been understood to establish the conditions for economic development. The better-known models of economic growth such as the Lewis, Rostow, Harrod-Domar, Solow, and Romer growth models are discussed. The discussions apply contextually to the problematic issue of growth and development in Africa. It is argued that a very necessary condition for growth and transformational development in Africa is heavy investment in human capital. It is pointed out that countries that invest much human capital to produce highly educated populaces usually reap the benefits of such in terms of high per capita GDPs, regardless of the levels of their technological and industrial output. Countries like New Zealand, Iceland, and Denmark offer evidence of this. Models of African development such as the Lagos Plan of Action in terms of the whole continent are discussed within the context of existing impediments to such progress.

Keywords: economic growth, economic development, human capital, growth models

Résumé

Depuis l'avènement de l'économie moderne, la littérature économique s'est beaucoup préoccupée de la question de la croissance économique. La croissance économique est également comprise comme établissant les conditions du développement économique. Les modèles de croissance économique les plus connus, tels que ceux de Lewis Rostow, Harrod-Domar, Solow et Romer, sont abordés. Les discussions s'appliquent contextuellement à la problématique de la croissance et du développement en Afrique. Il a été avancé que de grands investissements dans le capital humain étaient une condition indispensable

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à la croissance et au développement transformationnel de l'Afrique. Il est souligné que les pays qui investissent dans le capital humain produisent des populations hautement éduquées et en tirent généralement des avantages en termes de PIB élevé par habitant, quel que soit le niveau de leur production technologique et industrielle. Des pays comme la Nouvelle-Zélande, l'Islande et le Danemark en apportent la preuve. Les modèles de développement de l'Afrique, tels que le Plan continental d'action dit de Lagos, sont examinés dans le contexte d'actuels obstacles à de tels progrès.

Mots-clés : croissance économique, développement économique, capital humain, modèles de croissance

Introduction

The world as we know it today is economically divided up between the 'industrialised North' and the 'developing South'. The 'industrialised North' consists of North America, Europe, Japan, and parts of Eurasia – comprised principally of Russia. Note though that there are some outposts of the industrialised North in places like Australia and New Zealand. One question though is whether China with the world's largest GDP is part of the industrialised North or not. The question arises because China still considers itself part of the so-called 'developing world'. Previously, the division of the world into developed and 'under-developed' nations was expressed in tripartite terms of First World, Second World, and Third World. It was French economist Alfred Sauvy who coined this tripartite division in 1952 to distinguish between Western nations, Communist nations (Soviet bloc nations, China, etc.), and the so-called non-aligned. These non-aligned nations comprised all those nations that were previously colonised by the powers of Europe–Britain, France, Spain, etc. But with the fall of the Soviet Union, that tripartite division has fallen by the wayside though the idea of 'Third World' still remains. The Third World is seen to comprise all those nations that are seeking one or another to develop along the lines of the industrialised nations in the form of transforming their economies into ones where indigenous and imported primary products are transformed into finished products with the aid of modern and innovative technologies.

The result of this would be increased GDPs, increased average incomes, increased exports of finished products, increased value of currencies, and improved human welfare. Compare, for example, the two countries in Africa with the largest GDPs, Nigeria [population 174 million] and South Africa [population 53 million] the two with some other countries from the North. It will be obvious that an explanation is needed to account for the wide disparities in the metrics that economists care about.

Table 1: Nigeria and South Africa compared with some countries from the North

Country	Population (millions)	GDP ($ billions)	GDP/ per capita($)
Nigeria	174	522	3,000
South Africa	53	351	7,000
Belgium	11	484	43,000
South Korea	50	1,600	26,000
Norway	5	500	103,500
Hong Kong	7	274	38,000
Iceland	0.320 (320,000)	15	44,000
Switzerland	8	650	87,000

Source: Data.worldbank.org/country, 2013

The above metrics are quite interesting given that not all of the countries above are producers of industrial goods. Take, for example, Iceland with a very small population of 320,000 and with an economy dependent mainly on fishing and geothermal energy. The only heavy industry it engages in is aluminum smelting which provides a portion of exports, but the main exports are from fishing. So, the question is why does its per capita GNI amount to $38,000? Africa's largest GNI according to World Bank metrics is from Nigeria with a GNI of $522B while that of South Africa is second with $351B. The per capita GNI for South Africa is $7,000 while that of Nigeria is $3,000. Does this mean that the average South African worker is approximately twice as productive as the average Nigerian worker or is it about the way in which exchange rates are calibrated?

Note also that Switzerland is home to only 8 million people with a GNI of $650B, but that is almost twice that of South Africa's whose GDP is $351B with a population of 53 million. The population of South Korea is approximately the same as that of South Africa but with a GDP four times as large. What is at work here? Is it technology and productivity that are mainly responsible for per capita GDP differentials between nations. Erik Reinert in his *How Rich Nations Got Rich and Why Poor Nations Stay Poor* has this to say on the issue: 'Why is the real wage of a bus driver in Frankfurt [Germany] sixteen times higher than an equally efficient bus driver in Nigeria, as the World Bank recently calculated? I set out to find an answer, and this book is a result' (Reinert 2007: 2). I have an issue with this because Reinert's explanatory thesis is founded on the idea of a 'protective autarky for infant industries and technologies'. But this approach though quite plausible in general does not explain

the economic success of countries like Iceland and Switzerland. Or take other small countries like New Zealand and Norway, whose economic structures are not heavily industrialised. New Zealand's exports are mainly dairy products, wool, and meat. Norway depends mainly on petroleum exports though it does demonstrate some industrial prowess by its ship-building capacities. Yet, the per capita GNIs of both countries are $103, 000 and $36,000 respectively. So this is the issue: how to move countries from low productivity as witnessed by minimal per capita GNI/GDP to larger GNI/GDPs with larger per capita GNI/GDPs? This is the pressing question for African countries. Do the impressive GNIs of both Norway and New Zealand have to do with the implementation of their versions of the welfare state thereby yielding high GNI coefficients? These are the questions that I propose to explore in this article. I will first examine established theories of economic growth on the assumption that economic growth presages development. After discussion of these established theories of economic growth I then examine why most African countries despite showing growth have not shown much evidence of development – in the sense of the 'flying geese' model (Reinert 2006: 141 et seq.) according to which the developmental prowess of a country is determined by its ability to progress from the production of items that require less human capital skill to the production of items that require increased technological knowledge and skill. For example, the knowledge and skills needed to plough a field with a bull is less than doing the same with a tractor. The same holds for a monocultural agricultural society as compared to one which engages in manufacturing and industrial production within the context of a strong services sector.

In the following discussion I argue that the dominant concepts concerning growth and development are mainly those introduced by researchers from the North. This is so mainly because capitalism as an economic system developed first in the North whereby its earliest theoreticians on its progress necessarily hailed from that region. We can easily define Capitalism as the economic system whereby an initial stock of finance capital(K) is invested with the expectation that the value of its final product would be worth more than the intitial capital ($K + \Delta K$) to the extent of a net surplus of value accruing to the original investor. On account of its dynamic nature and the fact that future returns on capital are always fraught with risk, the idea of economic growth has been one of the major preoccupations of theorists of economics.

On Economic Growth

The usual and orthodox question that economists always ask regarding any economy in the short run is: what is the extent of its economic growth? Why is it a necessary and even sufficient condition for the economic health of a nation according to basic neoclassical theory that adequate growth be registered? First, I would rather see balanced growth than just growth. Yet the key question is still why is growth such an important indicator of the health of an economy? The intuitive answer points to the nature of the capitalist market economy. The decision to invest is determined by the expectations of returns on that investment normally called profits. In other words if NX is invested then the investor would expect at some future time NX + ΔNX. Much of investment is done by way of a country's banking operations from the Central Bank down to other banks. Individuals save their assets in banks and the banks in turn loan those assets because there are gains to be made for 'waiting' [rather than immediately consuming] – as Alfred Marshall argued in his *Principles of Economics* (Book vi, Chp.vi).

Thus, it is obvious that when the idea of profits or gains is factored into the question of why growth is of such importance for the health of the economy, it then becomes clear that growth is a necessary component of an economy on account of interest payments as a crucial component. It is because of this that all the major economists in the history of economic theory have argued for the necessity of economic growth.

Adam Smith's celebrated text *An Inquiry into the Nature and Causes of the Wealth of Nations* was essentially a text on 'growth theory' according to which he argued for free markets, unrestricted trade, and a specialised division of labour. As an aside, it is useful to note in the context of the thesis of this paper that Smith himself understood the importance of the investment in human capital to increase productivity and economic growth (Smith [1776] 1991: 228). But Smith's successors in classical economics theory, Ricardo and Malthus, were less optimistic about growth than Smith was. For Ricardo the limitations on the amount of land available in the context of rapid population growth and increases in landlord rent led to less surpluses for capitalist investment. This inevitably led to a stalling of growth and economic stagnation. A similar scenario occurred in the Malthusian model on account of geometric population growth which outstripped food supplies.

Marx, of course, had a different solution for the periodic no-growth occurrences under capitalist market economies. These no-growth periods were due to, 'lack of effective demand' as he put it. Surpluses were accruing mainly to the capital holders and rentiers. To get growth moving again, the surpluses generated from investments must be apportioned back to

those who created wealth by productive labour in the first instance. This was the ideological basis for the argument that it was incumbent on the anti-capitalist vanguard groups in the North to oppose what was called 'capitalist exploitation' on the part of those nations that were colonising the rest of the world. This was the theoretical basis for the Russian and Chinese revolutions, of 1917 and 1948 respectively. In Africa, the socialist type economy was seen as the antidote for colonial exploitation as some theorists saw it. Those politician-theoreticians who supported this approach to growth included Kwame Nkrumah, Ghana's first president, and Amilcar Cabral who fought against the Portuguese colonials in Guinea-Bissau. The argument here was that economic surpluses would be most appropriately employed by the state for growth and development. All this was effected under an economic umbrella that was much opposed by the West.

The problematic nature of the issue of growth was previously underscored by the world economic crisis which struck the United States in 1929. It was here that John Maynard Keynes came to the rescue with novel macroeconomic policies to generate growth and thereby put the unemployed back to work. Such policies were developed and expressed in his *magnum opus* titled *The General Theory of Employment, Interest and Money* (1936). It was in this context that Keynes proposed the idea that in a serious and persistent economic slump it was incumbent on government to deficit-spend in order to employ the long-term unemployed. This was the socio-economic situation in which Keynes developed all those concepts that are now an integral part of modern macroeconomics. Consider the consumption function and the crucial notion that continuous growth requires that Savings = Investment for each economic period. According to Keynesian theory government investment during periods of stagnation is worthwhile because of the so-called multiplier effect (k) which is estimated as the reciprocal of the Marginal Propensity to Save (1/MPS). Some years later the idea of the multiplier was expanded by Samuleson's combining it with the idea of the accelerator (w=Capital/Output) so that investments in the expansion phase of the business cycle be driven not only by multiplier effects but also by the necessity on the part of businesses to invest in new production elements such as new plants and novel technology. My argument here is that the Keynesian multiplier effect on government investment could also lead to enhanced investment by way of the private sector via the acceleration effect. This combination of the multiplier with the accelerator is well-known in macroeconomic theory as the Samuelson multiplier-accelerator effect.

We have established so far that it is the goal of every modern economy to grow continuously but because of an underlying tension between consumption and production on account of the inequality between the

value of consumption and the value of production, the growth path of any economy will not be a straight line linear function as indicated by the Keynesian model. Admittedly that model shows only the expansion path of an economy where government spending boosts the economy from high levels of unemployment to lower levels or full employment. The growth path of any capitalist economy takes on a sinusoidal shape thereby demonstrating the well-known periodic disconnect between demand and supply normally described as the business cycle.

A few years after Keynes's *GTEIM,* growth models became the vogue in macroeconomics. This was so because of an increasingly globalised world and recognition of the important role that capital investment played in the production process. It is in this regard that the Harrod-Domar model became important. This model, developed independently by economists Harrod and Domar, was combined to show in strictly formal terms that net investment in period 1 not only increases the economy's productive capacity in this period but also increases the potential output of the economy in period 2. Thus according to the long-run analysis of this H-D model, a growing economy must show not only increasing demand but also an increasing productive capacity. Thus the H-D equation for balanced or warranted equilibrium growth is one which shows a direct relationship between the economy's growth rate according to investment and the propensity to save, and the *productivity of capital.* We have: dI/I = s(dY/dK)–i.e. the required growth rate equals the propensity to save multiplied by the productivity of capital.

In later times the H-D model was radically modified by Robert Solow (1956, 'A Contribution to the Theory of Economic Growth', *QJE*). This new Solow model has been fine-tuned over time to become known in general as the Neoclassical Growth Theory. What Solow did was to change from the single production process to a multivaried and flexible one in terms of labour inputs and matching capital. Of importance too was the fact that the Solow growth model offered much leeway for growth according to the stochastic vagaries of technological change. So here is the Neoclassical Growth model put more formally: $dI/I = dY/Y = b(dK/K) + (1 – b)dL/L$ where $b = (MPP_k)(K/Y)$ and $1\text{-}b = (MPP_l)(L/Y)$.

To put things in time context we note that Harrod (1939) and Domar (1946) developed their joint model in the period following Keynes's dynamic anti-depression growth model. Solow formulated his model for growth in the mid 1950s just at the time that the decolonisation winds of change began to blow both in Africa and Asia. Historians recall that the British Empire was so vast that it generated the quip that here was an

Empire where the sun never set. In case of Africa the British controlled most of Eastern and Southern Africa while the French were in charge of most of West Africa – except for 15 per cent of the area – and North Africa. After WWII two(2) major spheres of geopolitical interest developed, that of the West and that of the Soviet bloc with China also aligned with the Soviet-Communist bloc. Yet after independence set in during the 1950s and 1960s, most of the newly independent nations regarded themselves as 'non-aligned'. At the same time the West and the communist bloc offered two (2) distinct models of growth and development.

The Russian revolution of 1917 led by Lenin proposed in theory a non-capitalist economic system as the way for progress. The economic system offered by the Soviets and the Chinese, following Mao's revolution in 1948, was one where the state was practically in total control of the economy according to which the supply and demand of commodities were determined by state fiat. This kind of economic system lent itself to the rapid development of state-controlled heavy industry in the Soviet Union and collective agricultural output in the more rural China. The prowess of the Communist system was touted by the fact that both the Soviet Union and China were able to develop nuclear weapons and that the former was able to launch the first space vehicle known as 'sputnik'.

The newly independent nations were offered the dual choices of the Western-type 'mixed-economy' model or the 'statist' type model that was in place in the Soviet Union and China. The expressed goal for these newly independent nations was not only growth but development. 'Development' here meant essentially the eventual transformation of mainly rural and agricultural societies into ones on technological and industrial par with those of the North. As a result an ideological war began to woo Africa's nations to follow one model or another. This was the basis for the Walter Rostow's *The Stages of Economic Growth – A Non-Communist Manifesto* (1960). Rostow's linear growth model was founded on five qualitative stages: 1) the traditional society, 2) the preconditions for take-off, 3) the take-off, 4) the drive to maturity, 5) the age of mass consumption. But this model has not been realised anywhere in Africa. The issue with Rostow's model is that it is too schematic and does not take into the consideration the political and economic issues involved in established a real-world example of economic growth morphing into development. One could think that the best examples of the Rostow model in practice have been the nations of South Korea and Taiwan – both East Asian nations. But the path to development for both nations was not just a straight and unencumbered economic growth path, given that both were pawns in the Soviet Union-United States rivalry during

the Cold War era. What aided greatly was that the United States was very generous in offering to both countries as much low-cost productive capital as possible to make the take-off stage possible.

The only post-colonial case in Africa where there was any serious effort at development was that of Ghana when Nkrumah was President. Nkrumah placed Ghana in the non-aligned socialist camp according to which the state had an important and decisive role to play in the development process. In this regard, Ghana invested heavily in universal education and infrastructure such as roads, electrical power, dams, etc. The rationale here was that the private sector was too weak to make any meaningful developmental impact on the economy. But Nkrumah's approach was much opposed by the West and as a result he was overthrown in a CIA-sponsored coup in 1966, with local collaboration.

Another model of growth and development that was tried in Africa – Ghana specifically – was the Lewis model – after Arthur Lewis (1954, 'Economic Development with Unlimited Supplies of Labour'). This model was founded on the notion that in a society with an excess of rural-based subsistence wage labour, and an urban-based capitalist class, both sectors of the economy could interact in a such a way that the cheap labour migrating from the rural areas could serve as a catalyst for growth and development. Lewis accepted the classical and Keynesian argument that for an economy to grow there must be an adequate amount of savings to invest to make growth possible. But according to Lewis this would not be very feasible for developing nations because savings rates were very low in general and because the wealthy in those societies tend to be landowners who would either consume their rental surpluses or spend on non-productive items and enterprises. The solution is to focus on the capitalist nucleus that existed – either private or state. The goal then would be to extract as much surpluses from cheaper labour to invest in the embryonic capitalist nucleus.

The case of the Lewis model of economic development is interesting because of the fact that its developer was the theorist who worked closely with the government of Ghana to lay the foundations for sustained growth and development. But in this case, the case of Ghana, there were two models in conflict. Ghana was much interested in rapid growth leading to industrial development and the model employed to do so was the statist one then employed by the Soviet Union and China. One goal was to tax the most productive agricultural enterprises then use the proceeds to fund industrial state projects – especially in the areas of education and infrastructure. But the key project in this direction had to do with the Akisombo dam on the Volta river. The dam would provide hydroelectric power to help in the production of aluminium from Ghana's bauxite reserves. The proceeds from

the sale of aluminium would all accrue to the state which would then use such for industrial development. In this regard Ghana was an embryonic state socialist nation. But Lewis was of vintage neoclassical background. His programme for Ghana entailed increasing the productivity of agricultural labour and increasing the efficiency of the public services sector. Another fact of importance is that Lewis approached matters from a strictly economics background while Nkrumah as President approached economic matters from the standpoint of politics and political economy. As stated above, Nkrumah was overthrown in coup and the Ghana experiment in statist economics came to an end. That was what the Cold War between the United States and the Soviet Union was all about. African nations were offered the choice of capitalist free market economics or statist capitalism according to which the state was the main driver of planned economic activity.

In retrospect, the issue was about the role model influence of the developmental models of the Soviet Union and China, or the Keynesian mixed economy model. Of course, both models are to be understood as pure theory. The Soviet Union in its attempt to hold hegemonic sway in terms of their model of Socialism-Communism was not accepting of deviant ideas such as African socialism. One recalls in this regard the unfortunate demise of Tanzania's Ujumaa socialism. On the other hand, the Cold War counter-argument presented by Rostow (1960) was titled as *The Stages of Economomic Growth: A Non-Communist Manifesto.* Rostow's key argument, discussed above was that the five stage developmental path forward for the underdeveloped countries was for them to eschew the statist communist path and adopt the mechanisms of capitalist development. The crucial juncture here for Rostow was that at some point the preconditions for 'take off' would present themselves on account of a set of political and sociological contingencies.

Lenin's New Economic Policy (NEP) of 1921 according to which he sought to introduce market initiatives as a way to handle the destructive Civil War of 1917-1922 was ended by Stalin in 1928. The goal henceforth was to embark on a rapid industrialisation programme to catch up with the West and to resist Hitler's Germany in WW II. Stalin instituted a full statist economy in 1928 with the nationalization of most of the productive enterprises. That was the model that was prescribed for African nations by the Communist world. The same with China where the state owned most of the productive enterprises along with the collectivisation of the agricultural sector.

The West, on the other hand, had adopted multiple variations of Keynes's macroeconomic model. This was about government intervention into the economy to provide the right macroeconomic moves to create jobs and support the unemployed during times of economic depression. The name for such post-Keynesian types of government was 'mixed economy' as distinct

from the statist regimes of the Soviet Union, the East European bloc, China, etc. For the mixed economies, the market and the private corporations still existed but with government exercising its power to tax. These were the models between which African governments had to choose and as a result they were dubbed as 'pro-Western' or 'pro-Soviet'.

But such did not occur. The Kuznet hypothesis was not validated so there were a set of explanations offered. The major explanations were the political economy of neocolonialism within the context of the 'centre-periphery' dependency hypothesis. The names of Paul Baran, Raul Prebisch, Andre Gunder Frank and Samir Amin come to mind. Yet in this context there were no major solutions offered though the analyses were robust and valid. In the meantime, the market economy hypothesis espoused by the United States was seeming to bear fruit with the economic successes of Japan, South Korea, and Taiwan. These were later followed by Hong Kong and Singapore.

In this connection, the neo-classical growth model of Robert Solow (1956) proved itself to match reality. The growth and the technological changes of Japan, South Korea, and Taiwan were deemed to derive from technological changes. It is in this regard that the Solow model is identified with neoclassical growth theory. Thus, despite the plethora of growth theories that followed Keynes's macroeconomic prescriptions as to how to set the conditions for economic growth, the dominant growth theory was that of Solow's (1956) – specifically the Solow-Swan model – fully within the neoclassical paradigm. It is this specific model that has been promoted over the years by institutions such as the IMF and the World Bank. The Harrod-Domar growth model was discussed above and its key point was that an economy's full employment growth rate was directly dependent on net investment which in turn was determined by the economy's marginal propensity to save and the marginal productivity of capital. But given the vagaries of the capitalist market system we are back to the Keynesian problem of regular disjunctions between savings rates and investment rates. It was at this point that Solow's model promised to add some flexibility to the H-D model.

Solow's path-breaking model begins with the rather problematic statement that 'All theory depends on assumptions that are not quite true. That is what makes it theory. The art of successful theorizing is to make the inevitable simplifying assumptions in such a way that the final results are not very sensitive' (Solow 1956: 65). The fact is that successful theories – especially those in the natural and biological sciences – are successful because their assumptions were shown to match empirical reality. This

would make the assumptions of successful theories such as Newtonian theory and DNA theory 'true'. In short, in the sciences there are successful theories and unsuccessful ones. It is the unsuccessful ones that depend on assumptions that are not quite true.

The purpose of Solow's paper was to offer a critique of the H-D model in terms of its conclusion that the neoclassical market economy was intrinsically prone to instability and periodic depressions and recessions on account of an endemic opposition between the 'warranted rate of growth' and the 'natural rate of growth' of the economy. As Solow put it: 'The characteristic and powerful conclusion of the Harrod-Domar line of thought is that even for the long run the economic system is at best balanced on a knife-edge of equilibrium growth' (Solow 1956: 65). According to Solow this opposition between the natural rate of growth and the warranted rate of growth derives from the fact that labour and capital are combined under 'fixed proportions'. Solow writes that under such conditions 'There is no possibility of substituting labor for capital in production. If this assumption is abandoned, the knife-edge notion of unstable balance seems to go with it' (Solow 1956: 65). But here is Solow's ultimate goal: 'The bulk of this paper is devoted to a model of long-run growth which accepts all the Harrod-Domar assumptions except that of fixed proportions' (Solow 1956: 66). The Solow analysis culminates in a single differential equation expressible as follows but which allows for changes in the supply of labour and the introduction of the crucial variable of 'technological change'. Thus we have: $dk/dt = sf(k) - \delta$ according to which dk/dt signifies the growth of capital stock per worker over time, $sf(k)$ which represents the investment rate(i) as a function of the existing capital stock and δ represents the rate of depreciation also a function of the capital stock.

According to Solow, the neoclassical economy would grow smoothly given labour and capital flexibility but would be necessarily affected by the depreciation of the existing capital stock per worker. The so-called 'steady state' according to Solow represents the equilibrium point at which depreciation costs just equal investments. Thus there would be no basis for the economy to progress beyond that point-except under conditions of technological change. This would cause the $sf(k)$ curve to shift upwards thereby intersecting the line $(n + g + \delta)k$ [where n represents population, g represents growth and δ represents depreciation] at a higher point. The following diagramme offers the basic structure of the Solow growth model.

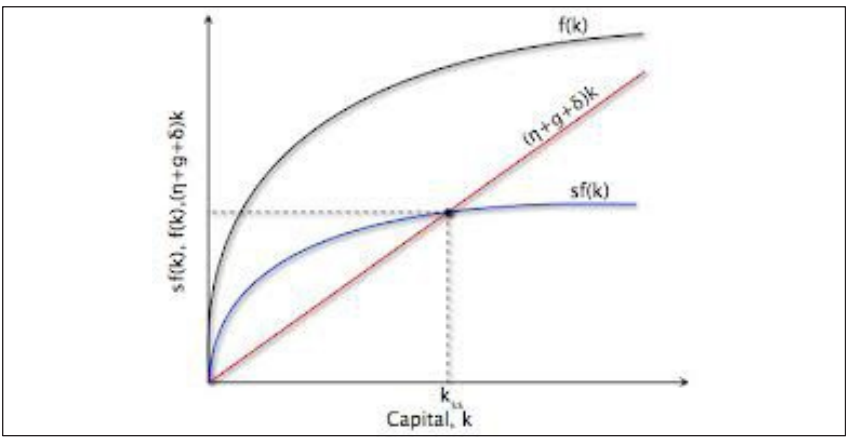

Figure 1: Basic structure of the Solow growth model

At point k the economy would be in a steady state of equilibrium from which there would be little tendency to diverge unless exogenous technology were introduced. It is this model together with slight modifications that forms the bedrock of contemporary neoclassical growth theory. In this connection, it is useful to note the contributions to growth theory by Trevor Swan (1956) whose model has been combined with that of Solow to produce the Solow-Swan growth model. The differences between the two models were of degree and emphasis, not of kind. Solow allowed for labour-capital exchanges, that is Capital /Labour ratios while Swan was more concerned with Output/ Capital ratios.

But the essential point is this: with economic growth and development being strongly connected to technological improvements, the Harrod-Domar model required a radical overhaul if the model were to offer the dynamics of growth over time. This was the purpose of the Solow model when it added time as a variable. The result was that substitutability of labour and capital had to be introduced as a way of adding flexibility to the Harrod-Domar model. That flexibility was necessary to accommodate technological change. But technological change is not some kind of *deus ex machina*. It must have a source.

Over the years there has been a veritable avalanche of articles and books on growth theory following Keynes's *magnum opus* of 1936. Following Harrod and Domar there was the Cambridge-Cambridge theoretical debate on the nature of capital with Joan Robinson and Pierro Sraffa on the European side and Solow and Samuelson on the American side (Sen 1970). And new models were always being generated as in the cases

of Romer (1994), Mankiw (1995) and Barro (1997). But it requires an 'emperor is naked approach' to point out that despite the great number of research papers on growth theory, the economic Third World still exists despite the inputs of battalions of growth theorists offering country-by-country advice at the IMF and World Bank. The world is still saddled with countries afflicted by huge income disparities all demonstrating unbalanced growth, high levels of unemployment and minimal per capita incomes. Yet the theoretical debate is still preoccupied with theorists debating text book concepts such as 'golden ages', 'vintage and non-vintage capital', 'turnpike theorems', and so on.

Solow informs us that 'my purpose was to examine what might be called the tightrope view of economic growth and to see where more flexible assumptions about production would lead a simple model. Underemployment and excess capacity or their opposites can still be attributed to any of the old causes of deficient or excess aggregate demand, but less readily to any deviation from a "narrow balance"' (Solow 1956: 91). Reference here, of course, is to the Harrod-Domar model. To determine the validity of both models the empirical question must be asked. The consensus among economists is that there was a period of growth among Western economies lasting from 1951 to 1973 that witnessed substantial growth to the extent that such period was dubbed as 'the Golden Age of Capitalism'. Economics historian Robert Fogel writes: 'By the late 1950s the United States and other Organization for Economic Cooperation and Development countries were well into the post-World War II expansion now called the Golden Age with growth rates twice the long-term average of the other world leaders. Measured by per capita income, the long-term average growth rate was about 1.9 per cent per annum, and the growth rate during the Golden Age was, for Western Europe, about 3.8 per cent (Kuznets, 1971; Maddison, 1995; and Crafts and Toniolo, 1966). Over the period 1950-1999, expansion multiples for GDP averaged about fivefold in Western Europe and the United States' (Fogel 2005: 8).

There were a number of explanations for this long expansion including replenishment of destroyed capital stock, technological change, etc. (Fogel 2005: 9) but the point remains that the Solow model is more in keeping with the actual empirical data than what was portended by the Harrod-Domar model.

The Developmental Role of Technology and Human Capital

The non-predictable element in the Solow model is the variable that represents technological change. Given the fact that developments in technology have always been a given within human sociology it should be easy to

incorporate such into any growth model by way of inputs in human capital. Paul Romer's theory on endogenous growth approaches matters from this direction. In 'Endogenous Technological Change' (1990) Romer argues that the Solow model can overcome its agnosticism about technological change by incorporating separate variables for human capital and technology. As Romer puts it: 'The four basic inputs in this model are capital, labor, human capital, and an index of the level of technology. Capital is measured in units of consumption goods. Labor services L are skills such as eye hand coordination that are available from a healthy physical body. They are measured by counts of people. As used here, human capital H is a distinct measure of the cumulative effect of activities such as formal education and on-the-job-training' (Romer 1990: 79). Romer also writes that 'technological change–improvement in the instructions for mixing together raw materials – lies at the heart of economic growth. As a result, the model presented here resembles the Solow (1956) model with technological change' (Romer 1990: 72). This is the basis for capital accumulation according to Romer. But what is more important here is that the 'second premise is that technological change arises in large part because of intentional actions taken by people who respond to market incentives. Thus the model is one of endogenous rather than exogenous technological change' (Romer 1990: 72).

Romer's key variables are H_{y}, L, and x which respectively represent human capital, labour, and units of technological inputs. Romer's point is that the combination of these three variables is what eventually produces output (Y_{p}). Thus technological change is endogenous to the model and guaranteed over time except for the following situation. As Romer puts it: '… if the total level of human capital is too small, a stagnation may arise. If H is too low, the nonnegativity constraint on H_{A} is binding and growth does not take place…. This result offers one possible way to explain the wide variation in growth rates observed among countries and the fact that in some countries growth in income per capita has been close to zero. This explanation is reminiscent of the explanation for the absence of growth in prehistoric time that is offered by some historians and anthropologists: civilization, and hence growth could not begin until human capital could be spared from the production of goods for immediate consumption' (Romer 1990: 96). This latter comment could be further amplified with the observation that populations were relatively small in prehistoric times and the structure of economic life was quite different. That structure was essentially one of 'reciprocity and redistribution' (Karl Polyani, 1944). Incentives to improve on modes of production were provided by population growth whereby demand for necessities increased.

The implications of the above discussion are that the Romer model could be more economically expressed by just three (3) variables Capital (K), Labour (L), and A (level of technology). This produces the usual formulation of the orthodox Cobb-Douglas production function as $Y = A(K)^{\alpha}L^{\beta}$. We unpack this formulation as follows: K in this instance represents physical capital and L represents labour with varying degrees of embodied human capital. A represents the level of technology already embodied in capital, K. But there is a feedback loop here: it is active labour (L) as human capital (H) that produces technology which in turn requires increased and novel amounts of human capital over time. This hypothesis is supported by Romer's observation that 'what is important for growth is integration not into an economy with a large number of people but rather into one with a large amount of human capital (Romer 1990: 98).

The reformulation above of the orthodox Cobb-Douglas production function guarantees that Solow's growth impasse is easily avoidable. The point is that existing cultures necessarily impart human capital skills from the earliest human growth years onwards. The street sweeper is subjected to human capital inputs in the same way as the engineer, albeit to a much lesser degree. *The moral here is that a necessary condition for economic growth and development for the countries of Africa are large investments in human capital at all levels.*

The problem with the Solow and Romer models is that they fail to recognise that labour is the driving force in economic growth and development, and that labour is necessarily embodied with human capital in all its activities. Furthermore, it is labour as embodied human capital that produces technology. In fact human capital is knowledge imparted by learning and operant conditioning into the thinking powers of humans. Human capital in turn is the source of technology which represents what is essential about humans. It is for this reason that human capital standing alone is enough to explain the fact that countries that are not mass producers of technological goods but are home to populations which benefit from substantial investments in human capital are economically successful. Cases in point are countries such as New Zealand, Denmark, Finland, Holland, and Norway whose investments in human capital guarantee that their citizens experience approximately twelve years of secular modern education. The investment in human capital for such nations is geared not only towards inculcating technical skills but also imbueing their citizens with the dispositions and skills necessary for critical thinking in all intellectual areas. The same applies to larger population nations such as Australia and Canada, which though not noted for their technological prowess, are home to populations that are guaranteed substantial investments in human capital.

Investment in human capital would seem to be the necessary requirement for economic growth and development. It is not only the basis for autonomous development in terms of new technological adaptations but also the basis for developing societies whose citizens are compatible with social requirements of modern technological society. By contrast, countries that have not invested adequately in human capital remain mired for the most part in technologies and thinking modes of the pre-modern era.

The UNDP's Human Development Index document provides a fairly comprehensive picture of the correlations causes between investments in human capital and the existing agreed-on metrics of human economic development and welfare. Evident proof of this is to compare the first ten countries on the UNDP's Human Development Index list and the last ten. But the same correlations that point to causal connections could be obtained by simply using four countries that are in the 'very highly developed' sector and the last four of the 'low human development' sector. The central point here is that development does not necessarily entail autonomous industrial and technological development but necessarily means having a populace whose behaviours demonstrate maximal investments in human capital not only in terms of both modern, technical and secular knowledge, but also in terms of social dispositions. For example, the very small country, Iceland is not noted for its industrial prowess yet with 10.4 years of investment in human capital its per capita GDP is $35, 116 and its average life-expectancy is 82.1 years. Iceland is 13th on the UNDP's HDI table and is among the 'very highly developed' countries. But consider the following table including eight nations out of one-hundred-and-eighty-seven. The causal links between investment in human capital and development in terms of its most important metrics are obvious.

Table 2: For the years 2012-2013 according to the UNDP's Human Development metrics

Countr(Very High Human Development)	Mean Years of Schooling	Per Capita GDP (2011 PPP $)	H.D.I. Rank
Norway	12.6	63.909	1
Australia	12.8	41, 524	2
New Zealand	12.5	32, 569	7
Denmark	12.1	42,880	10

Table 3: For the years 2012-2013 according to the UNDP's Human Development metrics

Country (Low Human Development)	Mean Years of Schooling	Per Capita GDP (2011 PPP $)	H.D.I. Rank
Chad	1.5	1,622	184
Central African Republic	3.5	588	185
Congo(DRC)	3.1	444	186
Niger	1.4	873	187

Source for tables 2 and 3: http://hdr.undp.org/en/content/table-1-human-development-index-and-its-components

To reinforce the consider the fact that even two years of schooling makes a very noticeable difference. Greece–now undergoing serious economic problems–ranks 29th on the HDI table with 10.2 years of schooling and a per capita GDP of $24, 658. It would seem that at least 12 years of schooling is the minimum to break into the upper ranks of development.

Alternative Development Models

In the modern era, there have been sets of strongly contested models that have sought to establish the optimal models for human economic transactions within and between communities. It is on this basis that real world economics becomes intermingled with politics thereby explaining the operative nomenclature of 'political economy'. In fact, economics in practice is political economy. But the objectivisation of any form of political economy required that the corresponding background theories be reified as being representative of human nature and behaviour. Thus, we have the ongoing ideological conflict between 'free market economics' on the one hand and 'more controlled forms of economic activity' on the other.

In this regard, three names stand out in the modern era: Smith, Marx, and Keynes. These names are important because their holders developed important models as to how the social economies of the modern world should be structured. Smith is seen by his followers to have developed the optimal social economic model according to which individuals within an economic space produce and exchange goods and services mainly on the basis of self interest under conditions of minimal government interference. The economic model developed by Smith has been reduced to phrases such 'free market economics' and 'free market economics produce optimal results', and so on. The Marxian model argued that left to its own devices the free market segmented into capital owners and workers would tend to be periodically disruptive of the economy, principally on account of the differentials between

the returns on capital and income. The solution, according to Marx, would be for the workers to expropriate the capital owners so as to correct the dividends imbalance. The capitalist market system did not collapse on account of its 'internal contradictions' as Marx presaged for a number of reasons, one of which was the expansion of capitalism into areas newly colonised by the economically dominant countries of Europe, whereby the gains made by workers extracted from the capital gains of overseas-invested capital, allowed for the reduction of costs (Lenin 1917) on account of cheaply produced raw materials in the colonial territories.

But that did not solve the issue concerning structural capitalism given the 'Great Crash' of 1929. The solution to that issue was provided by Keynes in his *magnum opus*. 'The General Theory of Employment, Interest and Money' (1936). Keynes's solution, in contradistinction to Say's Law of Markets, was to create a crucial role for a nation's government in managing the endemic issues of periodic overproduction and underconsumption that plague the generic capitalist economy. The key element in Keynes's thesis seems to have been adopted by the majority of industrialised countries in that by intervening permanently in the market economy according to worker demands by way of trade unions and the like. Marx's predictions seem to have been forestalled. In fact, the important ex-state communist nations such as The Soviet Union and China, erstwhile practitioners of a totalitarian capitalism by the state, have now adopted versions of Keynes's 'mixed-economy' model. By way of political party representation, the various countries have been able through taxation, extract from capital and their populations enough surpluses to ensure adequate production of public goods and compensation during times of economic downturns.

But such theorising in terms of how the modern market economy should be run is rarely countenanced in African university or governmental circles. Academic discussions just assume that economics should be pursued according to the standard neoclassical model now current in Western universities. In terms of practice, the standard approach is to follow the ministrations of the IMF, World Bank and the lending agencies of the Euro-American world. The names of Kwame Nkrumah, Julius Nyrere, Claude Ake, etc. rarely ever come up in discussions about the optimal models for African economic development. This can happen only when academic economics in Africa views economics not as some species of accounting or engineering but as an evolutionary social science strongly embedded in politics and sociology.

What is to be Done?

With the dissolution of the Soviet Union in 1991, the West was left triumphal on the economic scene. The path to economic growth and development was strictly determined thenceforth by Western institutions such as the IMF and the World Bank. Neoliberalism with its mantra of privatisation and minimal government intervention in the economy was the only model that the nations of Africa and the South were recommended to follow. The NEPAD [New Economic Policy for African Development] was the new programme that African nations were being encouraged to embrace. Before that, of course, one recalls the ECA (Economic Commission for Africa) and its blueprint for African economic growth and development. This was the Lagos Plan of Action (draft 1980) that urged models of balanced growth in the context of mixed economies along the lines as practiced by the nations of the European Union. The LPA also stressed self-sufficiency and intra-continental trade and cooperation. It should be noted that the LPA was developed as a Pan African initiative drawn up to map out a path for African economic growth and development. A vigorously critical response from the World Bank followed– prepared by Elliot Berg, an economist at the Bank. The Berg Report stressed that private markets rather than the state should be the prime mover toward economic growth and development, and that regional integration was not recommended and that – in so many words – Africa's path to growth and development should be by way of the Bretton Woods institutions and what are now called 'neoliberal' economic policies. The Berg report also argued that the developmental role of the state as the main agent of development should be reduced on account of the neoclassical economic principle that free markets tend to be better at promoting growth and development. It also pointed out that LPA neglected to point to the issue of governmental corruption as a major impediment and to suggest ways to curb such. In retrospect, the LPA was a much better theoretical starting point to tackle Africa's economic problems than the neoliberal and dependency ministrations offered by the IMF and World Bank.

So what is to be done? The answer I propose should include efficient and people-oriented government policies as a necessary step for development. That can be achieved only when the various populaces are boldly involved through direct action. With efficient and development-oriented governance the following measures should be implemented: 1) regional integration in terms of currencies and movement of goods, services, and labour. The EU model is worthy of emulation on this basis. Regional groupings such as ECOWAS, SADEC, etc. should be made to work more efficiently. 2) Pan African institutions such as trans-continental cooperative banks, research

institutes and well-funded universities should be encouraged and promoted. 3) There should be concerted and combined efforts of the populaces of West Africa to confront France's neocolonial policies regarding the CFA currency. Currently, the French Central Bank requires that member CFA countries deposit 65 per cent of their reserves into the French Treasury. 4) There should be more efforts to found a convertible African currency managed by a strongly capitalised African Central Bank in coordination with African governments in terms of their individual fiscal policies. Should such a currency be used for the capitalisation of indigenous projects in the form of regional and trans-continental railways, highways and roads, manufacturing, heavy industry production, solar energy enterprises, it would necessarily increase in unit value over time.

Heterdox economist Ha-Joon Chang (2008: 12) argues that the path to development is not the one recommended by neoliberal economics which includes free market transactions, minimal government, private enterprise, and invitation to foreign investors. Ha-Joon Chang has this to say about Korea's economic advancement. 'Whatever its recent problems have been, Korea's economic growth and the resulting social transformation over the last four and a half decades have been truly spectacular' (Chang 2008: 12). This rapid economic development and technological transformation are often described as a 'miracle', and this is Chang's explanation: 'The Korean economic miracle was the result of a clever and pragmatic mixture market incentives and state direction. The Korean government did not vanquish the market as the communist states did. However, it did not have blind faith in the free market either. While it took markets seriously, the Korean strategy recognized that they often need to be corrected through policy intervention' (Chang 2008: 15). More specifically: 'The government owned all the banks, so it could direct the life blood of business–credit. Some big projects were undertaken directly by state-owned enterprises the steel maker POSCO, being the best example–although the country had a pragmatic, rather than ideological, attitude to the issue of state ownership' (Chang 2008: 14). To ensure the growth of infant industries targeted industries were protected by tariffs (Chang 2008: 14). But above all, according to Chang, economic development for developing nations would depend heavily on manufacturing. He makes this point emphatically when he writes: 'Contrary to the advice of the Bad Samaritans, poor countries should *deliberately* promote manufacturing industries' (Chang 2008: 214).

But behind all this is South Korea's continuing investment in human capital. Despite rough beginnings, South Korea ranks 15th on the UNDP's Human Development Index and shows and average of 11.8 years of

schooling (cf Sweden 11.7 years of schooling). This is what explains its noted prowess in high technology and industrial production. The following OECD economics observation supports this thesis:

> 'Education played a key role in Korea's transformation from one of the poorest countries in the world to a leading industrial nation by promoting the development of human resources and technological change… The exceptionally rapid development of education in Korea is illustrated by differences in the levels of educational attainment for different age cohorts. The share of the population with at least a secondary education ranges from 98 per cent, the highest in the OECD area, for young adults (25-34) to only 43 per cent for older adults (55-64) (Figure 1). Similarly, 65 per cent of young adults have completed tertiary education, the highest share in the OECD, compared to only 13 per cent of older adults (Panel B). In addition to these quantitative measures, Korea has consistently ranked near the top in the OECD in the Programme for International Student Assessment (PISA). As Korea has few natural resources, it must rely on the development of its human resources' (Jones 2013: 5).

In sum, 'universal access to primary and secondary schools promoted social mobility and income equality…. [thereby] laying the foundations for Korea's success in IT and the growth of a knowledge-based economy' (Jones 2013: 5).

Chang's analysis above could serve as a possible path for African development. On account of the abundant labour power that Africa possesses, there are areas in manufacturing such as sports equipment manufacturing that could be exploited. As an example, football as a sport is very popular in a continent of one(1) billion persons, yet the manufacture of footballs, which is highly labour intensive, is dominated by Pakistan and China. Africa could easily enter that market and those of other sports too. One major incentive here would be the fact that the cost of labour in this instance would be approximately on par with Pakistan and China, or even less. Similarly, other manufacturing areas that require labour inputs mainly could be exploited.

But perhaps the most important pay-off for African countries in terms of optimal investments in human capital would be in its capacity to encourage cultural changes within societies whose existing cultures developed within sociological structures and knowledge bases are just not appropriate for modern post-industrial and modern-technology reliant societies. Investments in education and human capital geared towards the knowledge banks of the modern world would do much to improve the political structures and atmospheres of the nations of the South including those of Africa. The nation state and the large economic communities are the socio-

economic structures on which the modern world operates, not the smaller communities of ethnic groups and their local particularities and premodern modes of thinking. Modern education and investment in human capital would recognise the logical content of this argument.

Impediments to Real Growth and Development

On account of the capital-providing hegemony of Western institutions such as the IMF and the World Bank, high-production and influential nations such as China, Russia, India, Brazil, and South Africa have set up an alternative economic bloc known as the BRICS nations. South Africa is the lone African representative but its capital base is quite insignificant compared to those of the other BRICS members. It is on this basis that larger African continental groupings are necessary to compete effectively with Euro-American economic groupings such as the EU, North America, and other continental-size economic areas such as China (1.4 billion population), India (1.3 billion population), and Brazil(a veritable continent in land area with a population of 200 million).

But there are real impediments to the implementation of the programme formulated above. Neocolonial class structures in a heavily truncated Africa promote the economic interests of its national comprador classes under an umbrella of petty and narrow nationalisms as presciently described by Frantz Fanon (1963) in the chapter, 'The Pitfalls of National Consciousness' of his *Wretched of the Earth.* In contemporary Africa nations such as South Africa and Namibia carry the highest Gini coefficients in Africa and the world. But on account of negligent data-gathering both nations could indeed be surpassed by countries such as Equatorial Guinea, Congo, Guinea, Nigeria, Egypt, Algeria, and others. The real economic impact is that the development welfare of the masses in terms of education, health services, basic infrastructure such as housing, etc. are woefully neglected in favour of massive and parasitical comprador class interests. This class broadcasts its class status by making ostentatious shows of its ill-gotten gains by garish display of the imported trinkets and baubles of Western and Asian capitalist production. Much of these kinds of behaviour are forms of 'rent seeking' that sap the productive energies of most developing nations. Such behaviours are normally called 'corruption'. Modern education in both its technical and humanistic forms could help militate against the pervasive and baneful practices of corruption. In this regard, students of economics in African universities should be acquainted with alternative forms of economic analysis which emphasise economics as an evolutionary social science grounded in political economy, sociology, political science, and history. As a result of

this neglect, very few students of economics in the African university are seriously familiar with theories such as 'dependency theory' and 'Marxian economic analysis', 'Austrian theory', and 'Neo-Keynesian theory'.

As a result, most African nations are buffeted by the ills of intolerable unemployment leading to population escapes to Europe under the most perilous conditions. Add to this the ills of very underdeveloped health services and education. The UNDP's annual Human Development Index amply formulates such economic problematics in stark quantitative terms. The issue of the modalities of African development is not just economic but also political, sociological, and ideological.

Conclusion

The issue concerning the economic growth and development of Africa seems to be an unending work in progress. The economic ingredients are all there for development but political and human elements must be tamed before serious progress can be made. In the above I have laid out the economic side of the issue, but such is necessarily intertwined with the political, sociological, and ideological considerations that must be seriously considered. In a presently globalised world, progress can be made only from the blue-prints formulated by theorists such Nkrumah and others many years ago, and now being ably adapted by the European Union, presently with the world's largest collective GDP. But in this, one key element stands out as an absolutely necessary prerequisite for economic development on the African continent. That is much increased investment in human capital. There are existing models to be emulated and modified to fit local conditions when necessary. The educational systems of countries like Finland, South Korea, New Zealand, and similar others are ready examples. That would entail more universities and research centres, and even the building of science cities. With increased investments in human capital the urgent implementation of the ideas of regional integration, single currencies, continental markets could then follow *pari passu.*

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