

Misallocations of Human Capital in the Context of New Structural Economics Framework: Evidence from Sudan

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Abstract

Despite the availability of skilled and high professionals' workers, there has been misallocation of human capital and there is a little benefiting from it is contribution to economic transformation. In this paper I attempt to investigate the reasons behind human capital misallocation and how lean productivity shapes today's Sudanese productive sectors. A theoretical analysis is considered to quantify the correlation relationships between human capital and economic transformation. Data from 2008-2014 labor force survey and National Statistics bureau survey are considered. Based on econometric time series data estimations over 2000-2014, we find evidence that human capital in Sudan is associated with lower productivity per worker and thereby lower economic growth. Results further show that labor market is characterized by a majority of workers are involved in unproductive and unpaid activities. In order for economic transformation be achieved, the Sudanese authorities must enhancing the collaboration between productive sectors and educational institutions.

Keywords: New structural economics; Structural change; Neoclassical growth theory

Introduction

Background

Human capital is considered one of the main determinants of economic growth and it continues to play an important role in the technological progress of countries. To some extent, numerous studies have neglected the importance of human capital on growth through interaction with industrial specialization of either developed and developing economies.

Endowments structure is a key to economic development in many countries. Human capital, in particular plays a vital role in sustain the productive sectors by skilled labor forces. Many have discussed this association in terms contribution to education, wages and economic growth in Sudan, no study has done a direct and comprehensive examination of human capital misallocation.

Human capital has been one of the drivers the developed economies specially those in South Asia and some of ASEAN countries. These countries during their developing have focused on investments in high quality technological innovation, which helped these countries to achieve high growth and economic transformation. Migration and brain drain of professionals, global economic recession, and the unstable political situation have become a major concern for Sudan [1].

However, a growing evidence of links human capital, such as high skilled labor in context of conflicts and weak institutions. We study misallocation of human capital in Sudan and skilled labor force has forest to seek a better opportunities in the Gulf Cooperation Council (GCC) countries.

The educational attainment of labor force is widely considered to be one of the factors to accelerate economic growth and increase productivity if a country investing in it's a human capital. The productivity could be raised by adapting new technologies as a result the embodying of knowledge and skills, the economy have ability to develop further [2]. As cited in [2] the new endogenous growth theories often argue the human capital stock through innovation is believed as the engine of economic growth. Furthermore, the level of educational

attainment could directly influence the productivity growth towards the "catching-up process [3,4].

Our central contribution is to the knowledge is to link the current economic outlook in Sudan to misallocation of human capital. It's the first study to raise this issue by showing its close connection to Total Factor Productivity (TFP). This baseline, the study demonstrates how human capital misallocation fosters the misallocation of productivity in productive sectors in Sudan, in both the current context and also looking forward.

The accumulation of physical capital acquires skills and knowledge to increase future's income. Therefore, improving the human capital skills will increase the productivity [5,6]. The neoclassical theory as cited in [7] often argues that human capital contributes to a faster convergence of economies to increase levels of income per capita and helps poor countries catching-up the rich countries.

This paper considers Sudan has attained higher levels of human development Index (HDI); for instance, there is increasing enrolments in secondary and higher education. It can be noticed that over the past ten years, Sudan from sectoral contributions to the GDP is on the road to a pre-industrial service economy.

The paper evaluates of contribution of human capital to Sudan's economic growth over the period 2000-2015. The paper adopts new structural model to explain how human capital may transform the economy, if a particular country pay attention to its resources.

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Hypotheses and questions of the study

Based on the above background, the central issue that although Sudan has invested in its human capital during the last decade, but it's not contributed to economic growth as many studies show. The endogenous theory of human capital argues that high professional skilled labors raise the economic growth and improve the economic welfare. The study aims to provide an empirical investigation the consequences of misallocation of human capital and lower productivity. The study seeks to answer these questions. What are the major causes of lower productivity in Sudan? What are the major factors of declining Sudan's economy? What are the major policies for allocation human capital? I will answer these questions in the context of new structural economic framework.

Our main hypotheses are derived from the above research questions.

- There is a need for Sudan to transform the economy from agrarian base to industry base. This allows the local and foreign investors to join and invest in productive sector, particularly in industrial sector. This will attract the skilled labor and professionals and thereby reduces unemployment rates.
- Sudan needs to benefit from its high skilled labor and professional to raise productivity to achieve its initiative "Made in Sudan" and stabilizes the economy.

Economic structure of human capital and development: some evidence from Sudan

For over six years, the Sudanese economy has been under pressure, with an economic shock, secession of South Sudan and sanctions applied by western economies. As a result of such challenges, the economy was slowed down, the unemployment was increased among skilled labor and professional, which finally were immigrated to the GCC countries for better opportunities. This attitude could conclude to the fact that the government failed to inefficient use of human capital to generate economic growth and use them in a productive sector. Nevertheless, this research intends to show that these concerns are justified as empirical results demonstrate.

Sudan is a lower middle-income economy with a rapidly evolving working population and still struggling in transform it is economic from agriculture base to agro-industry base due largely to human capital constraints in the form of knowledge, skills and technical knowhow to exploit the natural resources to promote growth and economic transformation. About forty two percent of the Sudanese are under 15 years old as in 2012. Moreover, there are large rural-urban migrations. For these reasons, the Sudanese labor market is tight in capital of Sudan, where hiring firms are often concentrated.

Six years after the 2011 secession of South Sudan, which warned Sudan of economic shock, this study concentrates on how well human capital allocated, which brings renewed attention to economic development theory. Sudan has been facing big challenges; one of the most is lack of human capital management issue. Sudan is endowed with different kinds of natural resources which could be exploited to turn the fortunes of Sudan around. The Gross National Income per capita at current Purchasing Power Parity (PPP) is decline multiplier than before five years. The difference between the underdevelopment and developed economies is due to success in acquiring and using knowledge.

As general known, the higher levels of human capital lead to

increased productivity and innovation. Although Sudan has achieved higher human development income (HDI) but it is evidently weak. For instance, adult literacy rates are comparatively low, while inadequate institutions and support mechanisms for education and skill development continue to limit access to institutions of training and learning. It is now recognized that misallocation of Sudan's human capital is a complex phenomenon, which is evident in lack of low levels of productivity, but also linked with many factors such infrastructure, access to labor market conditions. Therefore, it is particularly important to investigate the factors associated with misallocation of human capital in Sudan from a New Structural Economics perspective.

In contrast, the minimum wages in Sudan have attracted increased attention from a policy and practical perspective for several reasons. One of the most obstacles is that the inequality has growing very rapidly and Sudan has expanded into the market economy. As a result to this policy, however, human resources in general, professionals and skilled labors have been facing big challenges such as inappropriate policies and minimum wages, which lead to emigration of most the talent brilliant minds and professionals. During the last two decades over 80,000 doctors and pharmacists immigrated for seeking better opportunities.

In recent years, high level of skilled human capital in Sudan have immigrated to the GCC countries and continued to contribute to economies of these countries. However, Sudan was not benefit from its higher skilled labor, and due to the minimum wages policy, many professionals have immigrated to other countries especially GCC countries. Accordingly, in 2014 there were 50,000 skilled workers immigrated to Saudi Arabia [8]. Throughout literature, we drew some light on socioeconomics situation of professionals, skilled labors and policy makers, but the main focus on misallocation of human capital, which leads to disappointments.

As general known, growth theory has paid attention to the importance of human capital and of education, which later considered as a policy approach of many developing countries in the Millennium Development Goals.

This paper is organized as follows. The section follows this background presents related literature review. Theoretical framework and methodology are presented in section three. Analysis of results is discussed in section four. Concluding remarks are summarized in section five.

Previous Literature

What is the key to the economic transformation of developing countries? For many long years, many scholars have paid a lot of attentions on factors leading to economic growth and it helps to transform a least income economies to grow faster. Some economists believe that technology is the key factor for high productivity and innovations. Solow pointed out that technological development is the main source for growth in the long run. Nelson and Phelps [2] found strong relation between technology and human capital; they also found that human capital has a high influence on the economic growth. However, the new growth theory sees "human capital as an important input in the creation of new ideas, and education as a determinant of growth rates".

Ghirmai Kefela and Ravinder Rena [9] examined the continuing proposition of human Capital Investment in North East African countries, where Sudan among these countries. The authors found

that sustainable development could not occur even with higher skilled human resource in these countries.

Although there have been a numerous studies concentrating on the relationships between human capital and economic growth or human capital and technology [8,10], no previous study has attempted to investigate the misallocation of human capital in Sudan. For instance, Khalafalla Arabi and Suliman Zakaria [8] investigated the impact of human capital on economic growth, they used three-stage least squares technique over the period of 1982-2009, the studies demonstrates the quality of the education has a determinant role in the economic growth; it also found that the health quality factor has a positive impact on economic growth. Nour [10] explored the assessment of Science and Technology Indicator in Sudan by employing both descriptive and comparative approaches, the author found that Sudan struggles in sciences and technology input-output indicators; it also found that there were insufficient human resources and the lack of research and development and most of the technologies were imported through technology transfer.

This study is concentrated on misallocation of human capital from the view of the new structural economics framework. It highlights the endowment structure to understand how Sudan losses its professional and knowledgeable labor forces in order to provide a basis for economic policies that can contribute to progress towards economic transformation.

Conceptual Framework and Methodology

Conceptual framework

The theoretical models of economic growth and human capital are built on the hypothesis that skills and knowledge embodied in humans will raise productivity and increase a particular country to develop and adopt new technologies. The new endogenous growth theories of [3,11], who argue that human capital influences productivity growth and that's may speed the catching-up process.

The research applies neoclassical growth model and our analysis are closely to previous scholars. Solow model of production function in Cobb-Douglas framework is considered to explain the contribution of human capital in productivity [12].

$$Y(t) = K(t)^\alpha (A(t)L(t))^{1-\alpha}$$

Where:

Y: Input; K: Capital; L: Labor; A: Technology; α : share of capital in total output.

We assumed that L and A grows exogenously at n and g rates.

$$L(t) = L(0)e^{nt}$$

$$A(t) = A(0)e^{gt}$$

We also assume that y^* is the steady-state level of income per capita, while we consider y as the actual income per capita at time t , which can expressed in following equation.

$$\frac{dy}{dt} = \lambda[\ln(y^*) - \ln y(t)]$$

λ represents the rate of convergence, where as $\lambda = (n + g + \delta)(1 - \alpha)$. Our districts growth rate is approximated in the neighborhood of the steady and expressed in the following equation.

$$\ln(y_i, t) - \ln(y_i, t - \tau) = (1 - e^{-\lambda\tau}) \ln(y_i, t - e^{-\lambda\tau}) \frac{\alpha}{1 - \alpha} \ln(s) - (1 - e^{-\lambda\tau}) \frac{\alpha}{1 - \alpha} \ln(n + g + \delta)$$

's' represents rate investments, δ represents the physical capital

depreciation rates ($\tau = t_2 - t_1$) in district i . According to the previous empirical studies, we modify the model of dynamic model to quantify the accumulation of human capital and explicit role of human capital in determining productivity and economic growth. Now, we modify our first model of human capital as follows.

$$Y(t) = K(t)^\alpha H(t)^\beta (A(t)L(t))^{(1-\alpha-\beta)}$$

$$\dot{k}(t) = s^k y^k(t) - (n + g + \delta)k(t)$$

$$\dot{h}(t) = s^h y^h(t) - (n + g + \delta)h(t)$$

The quantities of per capita can be expressed as $y^k = Y/AL$, $k^k = k/AL$, $h^k = H/AL$, where the physical and human capital are s^k and s^h .

Estimation Methodology and Data

After modification and arrangements we have.

$$\ln(y_{t_2}) - \ln(y_{t_1}) = (1 - e^{-\lambda\tau}) \frac{\alpha}{1 - \alpha} \ln(s) - (1 - e^{-\lambda\tau}) \frac{\alpha}{1 - \alpha} \ln(n + g + \delta) + (1 - e^{-\lambda\tau}) \frac{\beta}{1 - \alpha} \ln(h) + e^{-\lambda\tau} \ln(y_{t_1}) + (1 - e^{-\lambda\tau}) \ln(A_{t_2})$$

$y = Y/L$, $k = K/L$, $h = H/L$ are quantities of per capita, and $\lambda = (n + g + \delta) + (1 - \alpha - \beta)$

Data of per capita GDP, wage level, demographic structure, labor structure and surplus labor, employment and unemployment, industrial structure (share of large, medium and small firms), the government revenues and spending is collected from various sources for the recent period from 2000 to 2015. The data will be collected from difference resources; this research employs the following empirical models. The wage effect and employment effect.

Analysis Results

What Sudan must do?

In this section, I argue that the best way to achieve economic transformation in Sudan and obviously in developing countries is to manage its human capital, as many of the skilled and professional labors have immigrated to the GCC countries, Sudan still has opportunity to transform its economy if the government committed and initiated real economic policies to attract these professionals to contribute in economic development. This includes increased commitments of Sudanese government to attract local and foreign investments [13-15]. Moreover, Sudanese government must have unwavering political to benefit from human capital efforts.

It better for our knowledge that Sudan government has made its efforts to enhance the private sector to participate in production, but there are still many obstacles such as institutions and low wages to promote economic development. The concern however is that, almost these private sector institutions have been involved in producing same products. In this regard, I suggest for government to create conducive environment to seek private sector participation in economic development to benefit from availability of human resource.

The results opposite the previous evidences that transition and developed economies such as in China and South Korea have gained higher income growth through the contribution of human capital.

Our results indicate that human capital plays a less role in Sudan's economic growth. The results also show that even with educational expansion of college enrollments in Sudan during the years from 1995 to 2015 around 47%, the economic growth and total factor productivity are decreased. This means that there have been decreased in the efficiency of worsened misallocation of human capital. This supports our hypothesis that the how importance of efficient use of human capital and it is creation, in Sudan's growth strategy [16].

Structural Change in Sudan Economy

The population data comes from Sudan's National Statistics Bureau 2012 censuses, which shows Sudan has a population of 34,206,710. However, the structure ages of labor force around 24,853,506, which represent 55.2% of total population. These human capital resources are not employed well for sustaining the economic growth and achieve higher living standards (Table 1).

Sudan has been struggling to stabilize its economic growth and foreign exchanges market. Even though, it carries out austerity masseurs in a way that to reduce expenditures and attempts to generate new sources such as gold mining for revenues, it's still struggling in economic shock, which might not recover unless mobilize its human capital (Table 2).

The unemployment rate in Sudan was estimated to reach 20% in 2012, where the economy was not creating sufficient jobs even with the minimum wages policy. As a result, of economic slowing down, many professional and skilled labor are immigrated to the GCC countries for seeking a better opportunities [17].

The table below shows that over the years from 2005 to 2015 the distribution of labor in agriculture and industry has declined, while the contribution of services sector has increased, for instance, during 2010 and 2014, it increased from 31.55% to contribute to 45.03%, and this can be particularly the investments in education and health care (Table 3).

The irregular activities including contemporary jobs have increased from 1.2% in 2005 to 20.25% in 2014. Due to increasing in unemployment, many graduates and skilled workers involved in these activities.

The table also shows that the industrial as well as agricultural sectors are not well developed. In the one hand, most of the existence industrial institutions are managed by its owned, which were in fact considered as traders. I found that most of revenues they gained are invested in real states, which allows me to conclude that these industrial activities may not be able to hire new workers. On the other hand, the agriculture has been facing big challenges as the government ignores many national projects such Algazira scheme, which is considered as a backbone for textiles and food industries.

	Total percentage	Male	Female
0-14 years	42.1%	9,696,726	9,286,894
15-64 years	55.2%	12,282,082	12,571,424
65 years and over	2.7%	613,817	596,559

Source: CIA World Factbook

Table 1: Age structure (2011 estimates).

Year	Unemployment rate	GDP Growth rate	Structure of Sudan economy		
			Agriculture	Industry	Service
2004	16.3	7.2	40	28	32
2005	16.2	8	39	28	32
2006	17.3	10	36.8	27.5	35
2007	19.4	10.5	35.3	30.6	34.1
2008	20.7	7.8	29.3	29.2	41.5
2009	17.8	6.1	31.1	23.9	45
2010	13.5	8.9	30.5	21.7	47.8
2012	22	5.3	29.6	22.4	48
2013	27.1	-5.3	30.4	21.2	48.4
2014	33.4	-2.4	31.5	21.3	47.2
2015	34.6	2.1	34.1	16.8	49.1

Source: Central Bank of Sudan; central bureau of statistics.

Table 2: Unemployment and Structural Change in Sudan Economy.

Economic Activity	2005	2010	2014
Agriculture	51.08	48.56	35.19
Industry	8.19	7.65	7.32
Manufacturing	5.4	3.52	3.21
Services	23	31.55	45.03
Activities not classified	1.2	12.24	20.25
Total	83.74%	100%	100%

Source: National Statistics Bureau, 2015.

Table 3: Distribution of labor by sector 2010-2015.

Concluding Remarks

We have focused on misallocation of human capital in Sudan and its impact on economic growth. We extracted data from labor force survey and National Statistics bureau survey over the period from 2000-2015. The study finds evidence that human capital in Sudan is associated with lower productivity per worker and thereby lower economic growth. Further analysis shows that labor market is characterized by a majority of workers are involved in unproductive and unpaid activities.

Nevertheless, this study supports our hypothesis that most of high skilled labor and professionals were not contributed well to the economy as the failure and bad policies to transfer them to the productive sectors. Therefore, Sudanese government should commit appreciate the necessity of empowering its skilled and professionals labors through employing them in productive sectors such as industrial and agricultural sectors to put the economy on the path of transformation. It also necessary for government to stepping up the investments in education especially that related to industry, which is considered as a dynamic sector.

With regard to future research, it would seem useful to find further empirical support the regulation of labor market and minimum wages policy in Sudan.

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